May 24, 1963

ELECTRONIC DESIGN

ELEVENTH ANNUAL

TRANSISTOR DATA CHART

PLANAR DEVICES FROM FAIRCHILD

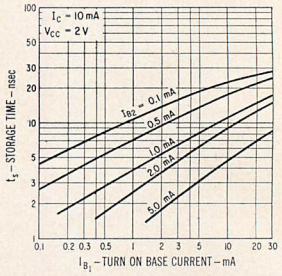
FASTEST TRANSISTORS FOR ALL COMPUTER REQUIREMENTS

FASTEST LOW LEVEL LOGIC

2N709
(NPN)

- SWITCHING TIME — τ_s — 6 nsec max @ 5/5/5mA
- V_{sat} — 0.3V max @ I_C = 3mA I_B=.15mA
- h_{FE} — 20 min @ I_C=10mA V_{CE}=0.5V
- f_T — 600 MC min @ I_C=5mA V_{CE}=4V

Package: TO-18

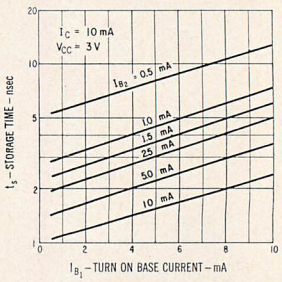


FASTEST LOGIC

2N2369
(NPN)

- SWITCHING TIME — τ_s — 13 nsec max @ 10/10/10mA
- V_{sat} — 0.25V max @ I_C=10mA I_B=1mA
- h_{FE} — 20 min @ I=100mA V_{CE}=2V
- f_T — 500 MC min @ I_C=10mA V_{CE}=10V

Package: TO-18

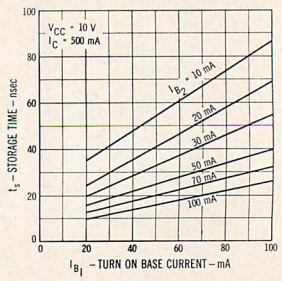


FASTEST CORE DRIVER

2N2845 SERIES
(NPN)

- SWITCHING TIME — τ_s — 20 nsec @ 50/50/50mA
- V_{sat} — 1.0V max @ I_C=500mA I_B=50mA
- h_{FE} — 20 min @ I_C=500mA V_{CE}=10V
- f_T — 250 MC @ I_C=50mA V_{CE}=10V

Package: TO-18, TO-5



FAIRCHILD
SEMICONDUCTOR
A DIVISION OF FAIRCHILD CAMERA AND INSTRUMENT CORPORATION
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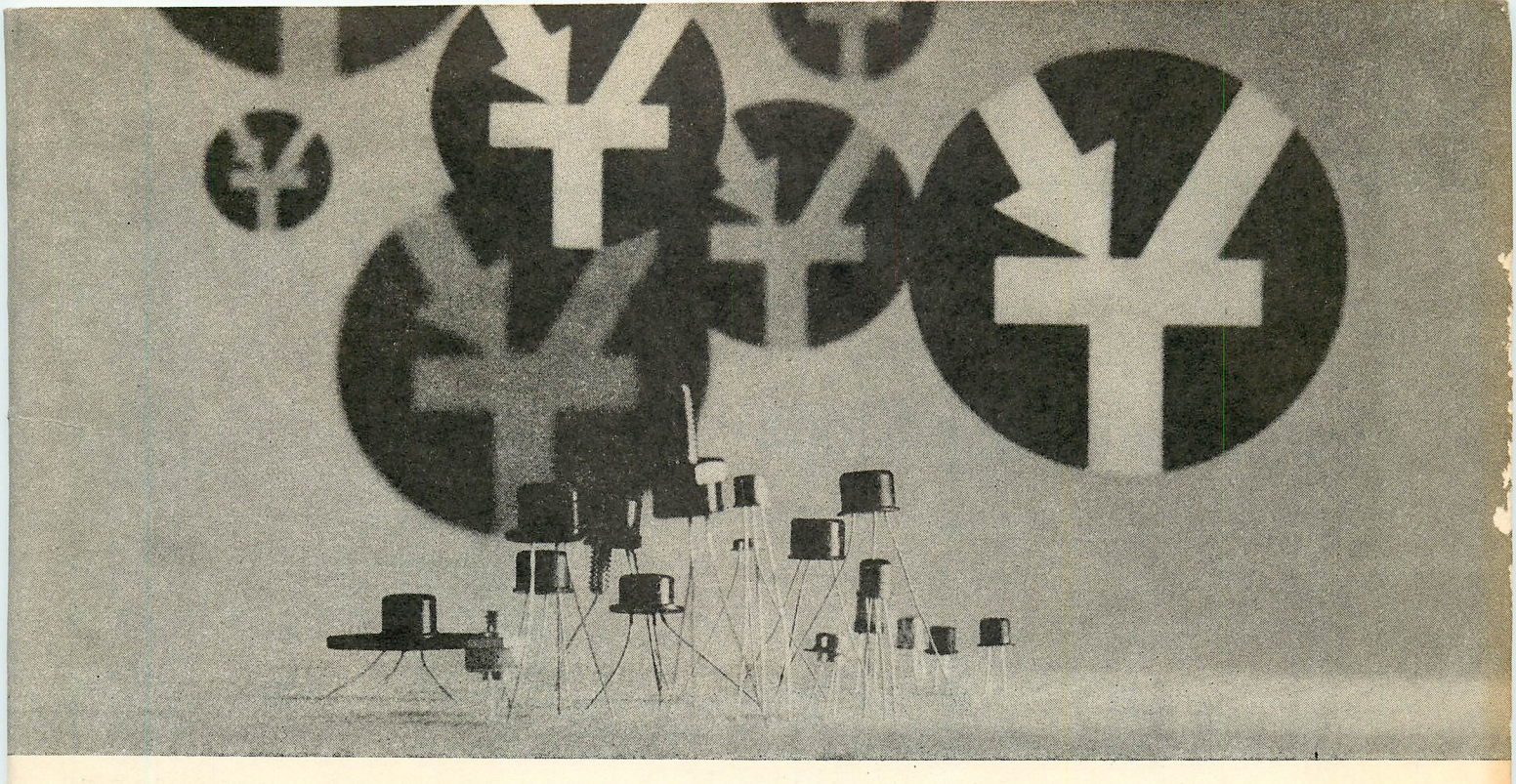
Planar: a patented Fairchild process.

ON READER-SERVICE CARD CIRCLE 440



ELECTRONIC DESIGN'S ELEVENTH ANNUAL

TRANSISTOR DATA CHART

1963

Donald Christiansen
Technical Editor

ELECTRONIC DESIGN's 11th Annual Transistor Data Chart includes more than 3,000 listings, of which about 375 appear for the first time.

Transistors are classified according to seven application categories: Audio and General Purpose (page T4), High-Frequency (page T16), Power (page T40), Low-Level Switching (page T62), High-Level Switching (page T77) and, for the first time, Field-Effect (page T85) and Unijunction (page T86).

Within each category, types are arranged in order of increasing value of a key design parameter. This also permits quick identification of close substitutes.

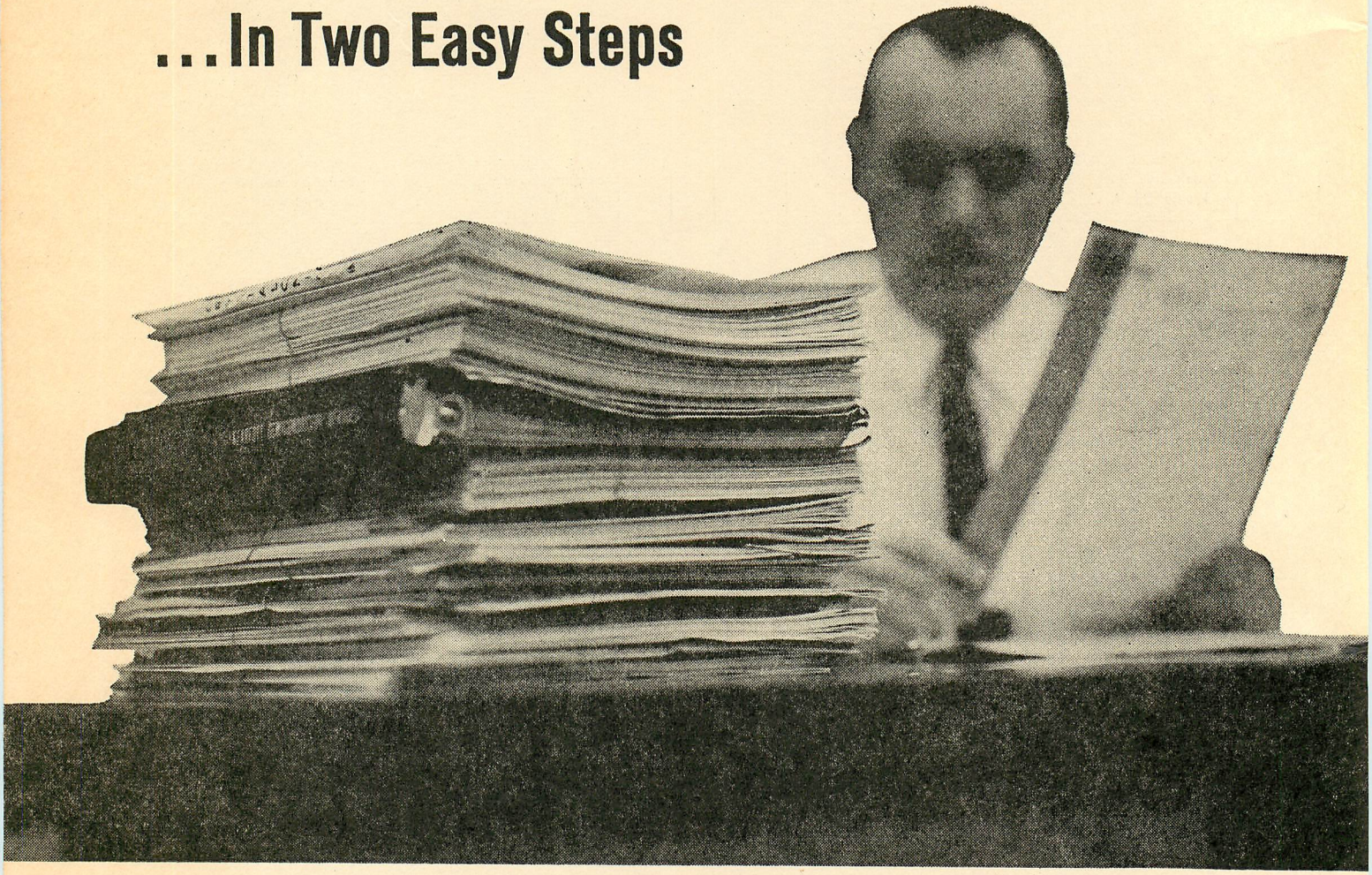
Alternate suppliers are listed in the "Remarks" column. The manufacturer whose data are listed is identified in the "Mfr." column. He is not necessarily the original registrant.

A cross index (page T88) identifies types in numerical sequence. Each type in the cross index carries a code that identifies its application category and specifies the block of 10 types in which it appears. A3, for example, means the type can be found in the third block of the Audio section.

Many manufacturers, upon request, provide detailed application notes and data sheets to the design engineer. Where this is true, it is noted next to the manufacturer's name in the list of manufacturers (page T1).

Update Your Transistor File

...In Two Easy Steps



Step 1. Send for your personal copy of the 1963 Transistor Data Chart, Reader-Service No. 549. It has been tailored to meet your needs as a design engineer—to guide you in the rapid selection of transistors for a particular circuit need.

Step 2. Having narrowed the field to a number of similar types, your next step is to refer to manufacturers' specification sheets for exact test conditions, application details and other pertinent information.

But unless you have invested much time and effort on your transistor file, it is bound to contain obsolete types and overlook new ones.

So, to supplement the Data Chart, ELECTRONIC DESIGN has made special arrangements with semiconductor manufacturers to provide specification sheets and application notes to readers requesting this material. Merely circle the number alongside each manufacturer's name on the special Reader-Service card at the end of this section.

Transistor Manufacturers

Code	Company	Further Information Available	
		Type	Circle Reader-Service No.
AI	Amelco, Inc. 341 Moffett Blvd. Mountain View, Calif.	FET application notes, 20-page data folder, and other brochures	400
AMF	American Machine and Foundry Co. Leland Airborne Products Div. AMF Semiconductor Dept. Vandalia, Ohio	Data sheets on 38 transistor types	401
AMP	Amperex Electronic Corp. 230 Duffy Ave. Hicksville, L.I., N.Y.	Several condensed catalogs and application notes	402
BE	Bendix Semiconductor Div. South St. Holmdel, N.J.	Two guides to silicon and germanium transistors	403
CS	Clark Semiconductor Corp. Div. of National Semiconductor Walnut Ave. Clark, N.J.	Data sheets on transistors	404
CL	Clevite Transistor 200 Smith St. Waltham 54, Mass.	Condensed catalog and application notes	405
CT	Crystalonics, Inc. 249 Fifth St. Cambridge 42, Mass.	3-ring folder of data sheets and application notes	406
DE	Delco Radio Div. GM Corp. Kokomo, Ind.	Condensed catalog, data sheets, application notes and test data	407
FA	Fairchild Semiconductor 545 Whisman Road Mountain View, Calif.	Condensed catalog and data sheets	408
GE	General Electric Co. Semiconductor Products Dept. Electronics Park Syracuse 1, N.Y.	Condensed catalog, data sheets and application notes	409
GI	General Instrument Corp. 18 East 41st Street New York 17, N.Y.	Data sheets, tentative specifications and application notes	410
HW	Honeywell Semiconductor Products 2747 Fourth Ave. South Minneapolis 8, Minn.	Application notes, lab reports and data	411
HU	Hughes Semiconductor Div. 500 Superior Ave. Newport Beach, Calif.	Application selection guide, data sheets and brochures	412
IND	Industro Transistor Corp. 35-10 36th Ave. Long Island City 6, N.Y.	Condensed catalog, data sheets and application notes	413
KF	Kearfott Semiconductor Corp. 437 Cherry St. West Newton 65, Mass.	Loose leaf binder of semiconductor engineering data	414
MO	Motorola Semiconductor Products, Inc. 5005 E. McDowell Road Phoenix 8, Ariz.	Condensed catalog, data sheets and reliability brochure	415
NA	National Semiconductor Corp. 90 Rose Hill Ave. Danbury, Conn.	Condensed catalog, data sheets, engineering memos, application notes	416

Code	Company	Further Information Available	
		Type	Circle Reader-Service No.
PSI	Pacific Semiconductor, Inc. (TRW Electronics) 12955 Chadron Ave. Hawthorne, Calif.	Condensed catalog and data sheets	417
PH	Philco Corp. Lansdale Div. 504 Church Road Lansdale, Pa.	Transistor reference chart and planar reliability report	418
RCA	Radio Corp. of America Semiconductor Div. Somerville, N.J.	Condensed catalog, data sheets and application notes on many devices	419
RRD	Radio Development & Research Corp. 100 Pennsylvania Ave. Paterson 3, N.J.	Will not manufacture after 1963	
RA	Raytheon Co. Semiconductor Div. 350 Ellis St. Mountain View, Calif.	Condensed catalog	421
STC	Silicon Transistor Corp. 150 Glen Cove Road Carle Place, L.I., N.Y.	Condensed catalog	422
SI	Siliconix, Inc. Sunnyvale, Calif.	Application notes, data sheets and articles on FET devices	423
SSE	Solid State Electronics Corp. 15321 Rayen St. Sepulveda, Calif.	Data sheet on SST610 transistor	424
SSP	Solid State Products, Inc. One Pingree St. Salem, Mass.	Folder of data sheets and *comparison chart*	425
SSD	Sperry Semiconductor Div. Norwalk, Conn.	Data sheets and tentative specifications	426
SPR	Sprague Electric Co. 347 Marshall St. North Adams, Mass.	Condensed catalog	427
SY	Sylvania Semiconductor Div. 100 Sylvan Road Woburn, Mass.	Full catalog, data sheets and Circuit Loops brochures	428
TI	Texas Instruments Inc. 13500 North Central Expressway Dallas 22, Texas	Data sheets, application notes and theory of FET devices brochure	429
TR	Transitron Electronic Corp. 168-182 Albion St. Wakefield, Mass.	Data sheets, application notes, condensed catalog and an article reprint	430
TS	Tung-Sol Electric, Inc. One Summer Ave. Newark 4, N.J.	Condensed catalog, FET brochure and silicon double diffused brochure	431
WE	Western Electric Co., Inc. Marion and Vine St. Laureldale, Pa.	Available only to agencies of the U.S. Govt. and their subcontractors	
WH	Westinghouse Electric Corp. 3 Gateway Center Pittsburgh 30, Pa.	Condensed catalog, data sheets, application and design notes	433

How to Use the Charts

A color code pairs the transistor type with *the value of its key parameter.* Types are listed in order of increasing value of key parameter. Note, however, that since various manufacturers may characterize their types differently, some "jumps" may take place in the sequence. Consider, for example, a type in the high-frequency category. Its key characteristic will be $f_{\alpha e}$, f_T, or $f_{\alpha b}$ (values of f_T are preceded by a single asterisk; values of $f_{\alpha b}$, by a double asterisk). But $f_{\alpha e}$ is the frequency at which h_{fe} drops to 0.707 of its low frequency value, and f_T is the gain-bandwidth product, or the product of h_{fe} and frequency at a point where h_{fe} is dropping by 6 db per octave. Thus, f_T is about h_{fe} times greater than $f_{\alpha e}$ for a given transistor.

Under *maximum ratings,* manufacturers were asked to specify collector power dissipation at 25 C case temperature, this generally being the most meaningful single dissipation rating. The derating factor can then be used to estimate P_c for other operating temperatures.

Either V_{CEO} or V_{CBO} is listed as a maximum voltage rating. V_{CEO} is related to collector-emitter diode breakdown and V_{CBO} to collector-base diode breakdown. But bear in mind that many manufacturers' data sheets will list other important voltage ratings, such as V_{CES} or V_{CER}.

Under *characteristics,* ELECTRONIC DESIGN asked manufacturers to supply typical values rather than maxs or mins. Where deviations from this occur they are noted.

Finally, it must be cautioned that the characteristics listed are primarily a guide and generally cannot be used for direct comparison of types. This is because it is impossible to list the wide variety of test conditions under which characteristics have been measured. V_{CEO}, for example, can differ considerably for comparable devices when measured at a collector current of 100 μa in one case and 1 ma in another. The best bet is to consult the manufacturers' data sheets before making the final selection.

Key to Symbols

$f_{\alpha e}$	=	small-signal short-circuit forward current transfer ratio cutoff frequency (common-emitter)
$f_{\alpha b}$	=	small-signal short-circuit forward current transfer ratio cutoff frequency (common-base)
f_T	=	gain-bandwidth product
P_c	=	collector power dissipation (average)
T_j	=	junction temperature deg C
mw/°C	=	derating factor
V_{CEO}	=	max collector voltage, collector to emitter, base open
V_{CBO}	=	max collector voltage, collector to base, emitter open
I_c	=	max collector current
I_p	=	max collector current (peak)
h_{fe}	=	small-signal short-circuit forward current transfer ratio (common-emitter)
h_{FE}	=	dc short-circuit forward current transfer ratio (common-emitter)
I_{CO}	=	collector cutoff current (dc) emitter open
C_{oe}	=	output capacitance (common-emitter)
C_{ob}	=	output capacitance (common-base)
t_r	=	rise time
t_s	=	storage time
$V_{CE(sat)}$	=	collector-to-emitter saturation voltage
g_m	=	transconductance
V_P	=	pinch-off voltage
I_{DSS}	=	zero-bias drain current
BV_{DGO}	=	drain-gate breakdown voltage with gate-source open-circuited
BV_{DGS}	=	breakdown voltage from drain to gate with drain shorted to source
C_{is}	=	common source short-circuit input capacitance
N.F.	=	noise figure
η	=	intrinsic standoff ratio
I_{EO}	=	max emitter reverse current
I_P	=	max peak point emitter current
$V_{E(sat)}$	=	max emitter saturation voltage
V_{EB2}	=	min emitter reverse voltage
V_{OB1}	=	min base one peak pulse voltage

Key to Transistor Types

Construction

AJ	Alloy junction
AD	Alloy diffused
DD	Double diffused
DG	Grown diffused
DJ	Diffused junction
DM	Diffused mesa
DDM	Double-diffused mesa
DP	Diffused planar
DR	Drift
ED	Electro-chemical diffused-collector
EM	Epitaxial mesa
EP	Epitaxial
FA	Fused alloy
FJ	Fused junction
GD	Grown diffused
GJ	Grown junction
GR	Rate grown
MB	Meltback
MD	Micro-alloy diffused base
MS	Mesa
PE	Planar epitaxial
PL	Planar
SBT	Surface barrier
SP	Surface precision alloy
TDP	Triple-diffused planar

Materials

ge	germanium
si	silicon

Manufacturers and their Lines

Manufacturer	Audio (A)	High-Frequency (HF)	Power (P)	Low-Level Switching (LL)	High-Level Switching (HL)	Field-Effect (FE)	Uni-junction (UNJ)
Amelco		●		●		●	
AMF			●				
Amperex	●	●	●	●	●		
Bendix	●		●	●	●		
Clark			●				
Clevite		●	●	●	●		
Crystalonics				●		●	
Delco			●		●		
Fairchild		●	●	●	●		
General Electric	●	●	●	●	●	●	●
General Instrument	●	●	●	●	●		
Honeywell		●	●				
Hughes	●	●		●	●		
Industro	●	●	●	●	●		
Kearfott	●	●	●	●	●		
Motorola	●	●	●	●	●	●	
National Semiconductor	●	●	●	●			
Philco	●	●		●	●		
PSI		●	●		●		
Radio Development	●						
Raytheon	●	●	●	●	●		
RCA	●	●	●	●	●	●	
Silicon Transistor			●		●		
Siliconix						●	
Solid State Electronics	●			●			
Solid State Products					●		
Sperry	●	●		●			
Sprague	●	●		●			
Sylvania	●	●	●	●			
Texas Instruments	●	●	●	●	●		●
Transitron	●	●	●	●	●		
Tung-Sol	●	●	●	●	●	●	
Western Electric	●	●	●	●	●		
Westinghouse			●		●		

AUDIO AND GENERAL PURPOSE

Mostly audio and general-purpose types below one watt. In order of increasing forward-current transfer ratio.

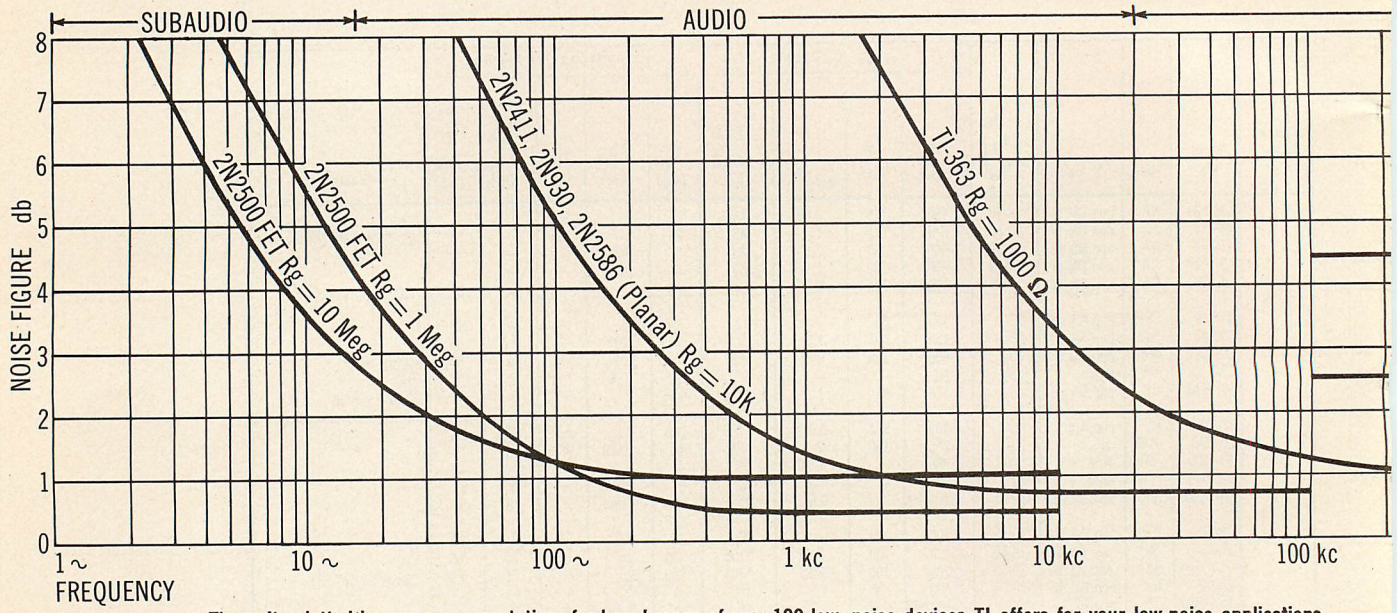
Cross Index Key	Type No.	Mfr.	Type	h_{fe} *h_{FE} **G_m	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	Remarks
A 1	2N160	RRD	npn,GJ,si	0.93	150	175	–	*40	25	0.2	25	7	4	
	2N160A	RRD	npn,GJ,si	0.93	150	175	–	*40	25	0.2	25	7	4	
	2N349	RRD	npn,GJ,si	0.95	750	175	–	*125	40	10	–	–	3	
	2N161	RRD	npn,GJ,si	0.96	150	175	–	*40	25	0.2	25	7	5	
	2N161A	RRD	npn,GJ,si	0.96	150	175	–	*40	25	0.2	25	7	5	
A 2	2N348	RRD	npn,GJ,si	0.96	750	175	–	*90	50	10	–	–	3	
	2N1096	RRD	npn,GJ,si	0.96	500	175	–	*90	30	6	–	–	3	
	2N347	RRD	npn,GJ,si	0.98	750	175	–	*60	60	10	18	7	3	
	2N1095	RRD	npn,GJ,si	0.98	500	175	–	*60	40	5	–	–	3	
	2N163	RRD	npn,GJ,si	0.99	150	175	–	*40	25	0.2	25	7	6	
	2N163A	RRD	npn,GJ,si	0.99	150	175	–	*40	25	0.2	25	7	6	
	2N1566	TI	npn,MS,si	1.2	–	175	80	60	100	1	50	–	–	TR, NA
	2N2673	GE	npn,GD,si	*8-22	250	185	1.66	*60	25	0.004	11	4	10	
	2N1154	NA	npn,DM,si	9	750	150	5	50	60	5	–	–	–	TI
	2N1155	NA	npn,DM,si	9	750	150	5	80	50	6	–	–	–	TI
A 3	2N1156	NA	npn,DM,si	9	750	150	5	120	40	8	–	–	–	TI
	2N117	TI	npn,GR,si	9-20	150	175	1	*30	25	2	20	–	4	TR,USN
	2N332	TI	npn,GR,si	9-20	150	175	1	45	25	2	20	–	6	GE,TR,RRD,NA,RA,AMP
	2N332A	NA	npn,MS,si	9-20	150	175	0.86	45	–	2	–	30	–	GE, TI
	2N333A	NA	npn,MS,si	9-20	500	175	2.8	45	–	0.5	–	15	–	GE, TI
	2N1149	TR	npn,DJ,si	9-20	150	150	–	*45	25	0.1	25	7	7	NA, TI
	2N243	TI	npn,GJ,si	9-32	750	150	6	60	60	1	–	–	7	NA, SO
	2N470	TR	npn,GJ,si	10-25	200	200	–	15	25	0.02	22	7	8	NA, TI, AMP
	2N471	TR	npn,GJ,si	10-25	200	200	–	30	25	0.02	22	7	8	NA, TI, AMP
	2N472	TR	npn,GJ,si	10-25	200	200	–	45	25	0.02	22	7	8	NA, TI, AMP
A 4	2N472A	TR	npn,DG,si	10-25	.200	200	–	45	25	0.02	22	7	8	NA, TI
	2N102/13	SY	npn,AJ,ge	10.5	1w	75	20	*30	1.5a	5ma	–	–	–	
	2N144/13	SY	npn,AJ,ge	10.5	1w	75	20	*60	0.8a	5ma	–	–	–	
	2N1439	NA	pnp,AJ,si	12	400	200	2.28	50	100	0.01	12	25	1	audio/med. power
	2N756	NA	npn,DM,si	12-20	500	200	2.5	45	–	9.2	–	–	–	
	2N756A	NA	npn,DM,si	12-20	500	200	2.5	60	–	0.1	–	–	–	
	2N2674	GE	npn,GD,si	*12-40	250	185	1.66	*60	25	0.004	11	4	11	
	CK64B	RA	pnp,AJ,ge	13.5	75	85	1.25	45	100	10	–	–	–	Sub min
	CK64C	RA	pnp,AJ,ge	13.5	75	85	1.25	45	100	10	–	–	–	Sub min
	2N935	SSD	pnp,AJ,si	14	385	160	2.85	40	50	0.005	18	70	2	NA
A 5	2N284	AMP	pnp,AJ,ge	15	125	75	2.5	*32	125	4.5	–	–	–	
	2N284A	AMP	pnp,AJ,ge	15	125	75	2.5	*60	125	4.5	–	–	–	
	2N339A	TR	npn,DJ,si	15	1000	200	8	55	1	–	–	–	–	
	2N340A	TR	npn,DJ,si	15	1000	200	8	85	0.1	1	–	–	–	
	2N341A	TR	npn,DJ,si	15	1000	200	8	*125	0.1	1	–	–	–	
	2N927	NA	pnp,AJ,si	15	150	200	2.5	70	–	.005	–	12	.8	
	2N938	SSD	pnp,AJ,si	15	250	175	1.7	35	100	.001	–	7	1	NA
	2N1247	NA	npn,DM,si	15	30	150	0.2	6	5	1.5	–	12	–	TR
	2N1249	TR	N-GJ	15	30	–	–	6	5	0.002	–	8	5	
	2N1440	NA	pnp,AJ,si	15	400	200	2.28	50	100	0.01	12	25	1	audio/med. power
A 6	2N1623	RA	pnp,AJ,si	15	250	160	0.54	20	50	.005	18	70	.1	
	2N1655	RA	pnp,AJ,si	15	250	160	0.54	*125	50	.005	18	70	.2	AMP
	BCZ12	AMP	si	15	250	150	2	*60	50	0.01	8	50	1	
	TR34	IND	pnp,AJ,ge	15	120	85	3	40	150	10	15	15	1.6	
	2N2391	TI	P,si	*15-*45	1000	–	–	20	30	–	–	–	–	
	TS601	TS	pnp,AJ,ge	*15-*60	200	100	–	*12	400	20	–	–	–	
	TS603	TS	pnp,AJ,ge	*15-*60	200	100	–	*20	400	20	–	–	–	
	2N925	NA	pnp,AJ,si	16	150	200	2.5	50	–	.005	–	12	.8	
	2N529	GI	*	17	100	85	2	*15	–	3	14	14	–	matched pnp,npn
	2N756A	TR	N-M	17	500	–	0.30	60	100	0.1	–	5	100	
A 7	2N1277	TR	N-GJ	*18	150	–	1.00	*40	25	–	–	5	15	
	2N1584	TR	N-GJ	18	150	–	1.00	60	25	–	–	5	5	
	2N1586	TR	npn,GJ,si	*18	150	150	1.33	15	50	0.5	20	*2	15	
	2N1587	TR	N-GJ	18	150	–	1.00	30	25	–	–	5	5	
	2N1588	TR	npn,GJ,si	*18	150	150	1.33	60	50	0.5	20	*2	15	
	2N334A	NA	npn,MS,si	18-36	500	175	2.8	45	–	0.5	15	–	–	TI
	2N757	NA	npn,MS,si	18-36	500	200	2.5	45	–	0.2	–	–	–	
	2N757A	NA	npn,MS,si	18-36	500	200	2.5	60	–	0.1	–	–	–	
	2N118	TI	npn,GR,si	18-40	150	175	1	*30	25	2	20	–	5	TR
	2N333	TI	npn,GR,si	18-40	150	175	1	45	25	2	20	–	8	GE,TR,NA,RA,AMP

A *continued*

Cross Index Key	Type No.	Mfr.	Type	h_{fe} *h_{FE} **G_m	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/^oC	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	Remarks
A 8	2N1150	NA	npn,DM,si	18-40	150	175	0.86	45	25	2	–	7	1	TI
	2N334	TI	npn,GR,si	18-90	150	175	1	45	25	2	20	–	10	GE,TR,NA,RA,AMP
	2N758	NA	npn,MS,si	18-90	500	200	2.5	45	–	0.2	–	–	–	
	2N758A	NA	npn,DM,si	18-90	500	200	2.5	60	–	0.1	–	–	–	
	2N1151	NA	npn,DM,si	18-90	150	175	0.86	*45	25	2	–	7	8	TR,TI
	2N129	SPR	pnp,AJ,ge	20	30	85	–	*3	5	–	–	–	30	
	2N923	NA	pnp,AJ,si	20	150	200	2.5	40	–	.005	–	12	.8	
	2N1051	WE	npn,DD,si	20	600	150	0.25	60	–	0.1	–	8	70	US,MIL only
	2N1248	TR	N-GJ	20	30	–	–	6	5	0.002	–	8	5	NA
	2N1670	GI	pnp,DR,ge	20	120	85	2	*100	–	3	–	3	–	Hi-volt switch
A 9	2N2551	HU	pnp,A,si	*20	400	160	3.0	.150	200	0.1	6	90	1.0	
	BCZ10	AMP	si	20	250	150	2	*25	50	0.001	8	50	1	
	ST1506	TR	N-M	*20	300	–	0.50	30	–	–	–	–	–	
	ST1543	TR	N-M	20	30	–	–	6	5	0.002	–	8	5	
	TNT839	TR	npn,MESA,si	20-45	100amb	175	0.66	45	50	0.1μa	–	*8	50	
	2N475A	TR	npn,DG,si	20-50	200	200	–	45	25	0.02	20	7	10	TI
	2N2042	MO	pnp,AJ,ge	20-50	200	100	2.67	*105	200	25	–	25	0.5	TI
	2N2042A	MO	pnp,AJ,ge	20-50	200	100	2.67	*105	200	25	–	25	0.5	"Meg-A-Life", TI
	2N761	NA	npn,DM,si	20-55	500	200	2.5	45	–	.2	–	–	–	
	TMT2427	TR	npn,PL,si	*20-60	150amb	175	1.0	40	50	0.010μa	4	*6	50	
A 10	2N406	SY	pnp,AJ,ge	20-80	150	75	3	*20	35	14	–	–	250	
	2N530	GI	*	22	100	85	2	*15	–	3	14	3	–	*matched pnp,npn
	TR722	IND	pnp,AJ,ge	22	150	2.5	3	45	200	10	15	20	2.5	
	CK22A	RA	pnp,AJ,ge	22.5	80	85	–	20	100	2	6-5	–	1.2	micromin
	CK64A	RA	pnp,AJ,ge	22.5	80	85	–	.29	100	2	22	–	0.8	micromin
	2N2675	GE	npn,GD,si	*22-76	250	185	1.66	*60	25	0.004	11	*4	13	
	2N186A	GE	pnp,AJ,ge	24	200	85	4	25	200	16	–	40	0.8	
	2N189	GE	pnp,AJ,ge	24	75	85	2	25	50	16	15	40	0.8	
	2N1150	TR	npn,GJ,si	*24	150	150	1.33	45	50	0.5	20	*2	15	
	2N1476	SSD	pnp,AJ,si	24	250	175	1.7	100	100	.05	–	7	1	
A 11	2N381	SY	pnp,AJ,ge	24-45	200	85	3.3	*25	200	20	–	–	10	TI
	2N44	GE	pnp,AJ,ge	25	240	100	4	45	300	16	6	40	1	MIL, GI
	2N229	SY	npn,AJ,ge	25	180	85	3	10	–	100	–	–	600	
	2N330A	SSD	pnp,AJ,si	25	385	2.85		30	50	.005	8	–	0.5	NA
	2N460	TS	pnp,AJ,ge	25	200	100	0.3	*45	400	15	–	–	–	TI
	2N564	IND	pnp,AJ,ge	25	150	85	2.5	30	300	3	12	20	0.8	US,GI
	2N592	GI	pnp,AJ,ge	25	150	100	0.2	*20	–	5	116	35	0.4	Bilateral, TI
	2N726	TI	pnp,DM,si	25	1w	175	–	25	50	.007	–	–	–	
	2N1265	SY	pnp,AJ,ge	25	50	85	0.9	*10	100	100	–	–	600	
	2N1441	NA	pnp,AJ,si	25	400	200	2.28	50	100	0.01	12	25	1	audio/med. power
A 12	2N524A	MO	pnp,AJ,ge	25-42	225	100	3	*45	500	10	15	40	5	"Meg-A-Life"
	2N1101	SY	npn,AJ,ge	25-50	180	75	3.6	*20	100	50	–	–	0.01	RCA
	2N1102	SY	npn,AJ,ge	25-50	180	75	3.6	*40	100	50	–	–	0.01	
	2N34	SY	pnp,AJ,ge	25-125	150	75	3	*40	100	50	–	–	0.01	Driver, TI
	2N35	SY	npn,AJ,ge	25-125	180	85	3	*40	100	50	–	–	0.01	Driver, TI
	2N306	SY	npn,AJ,ge	25-125	180	85	3	*20	100	100	–	–	0.6	
	2N464	MO	pnp,AJ,ge	26	200	100	2.5	*45	100	6	–	–	0.7	IND, RA, US, GI, TI
	2N1474	SSD	pnp,AJ,si	26	250	175	1.7	60	100	.005	–	7	1	NA
	2N531	GI	*	27	100	85	2	*15	–	3	14	14	–	*matched pnp, npn
	CK65B	RA	pnp,AJ,ge	27	75	85	1.25	45	100	10	–	–	–	Sub min
A 13	CK65C	RA	pnp,AJ,ge	27	75	85	1.25	45	100	10	–	–	–	Sub min
	2N936	SSD	pnp,AJ,si	28	385	160	2.85	35	50	.005	18	70	.3	NA
	2N244	TI	npn,GJ,si	28-90	750	160	6	60	60	1	–	–	8	NA
	2N757A	TR	N-M	29	500	–	0.30	60	100	0.1	–	5	100	
	2N279	AMP	pnp,AJ,ge	30	125	75	2.5	*30	10	110	10	–	0.15	
	2N524	SY	pnp,AJ,ge	30	225	100	3	*45	500	10	–	–	2	GE, MO, TI
	2N594	GI	npn,AJ,ge	30	150	85	1.67	*20	–	2	16	15	2	Bilateral, TI
	2N939	SSD	pnp,AJ,si	30	250	175	1.7	35	100	.001	–	7	2	
	2N1446	IND	pnp,AJ,ge	30	200	85	3.33	45	400	5	6	20	2	
	2N1474A	SSD	pnp,AJ,si	30	250	175	1.7	60	100	.005	–	7	2	
A 14	2N1654	RA	pnp,AJ,si	30	250	160	0.54	*80	50	.005	18	70	.2	
	2N1656	RA	pnp,AJ,si	30	250	160	0.54	*125	50	5	18	70	.2	
	2N2428	AMP	pnp,ge	30	165	75	0.3	*32	100	–	4	–	1.7	
	2N331	MO	pnp,AJ,ge	30-70	75	85	1.2	*30	–	1	20	50	.4	
	2N727	TI	pnp,PE,si	*30-*90	1000	–	–	20	50	–	–	–	–	
	2N1372	SY	pnp,AJ,ge	30-90	150	100	2	*25	200	100	–	–	–	KF, TI
	2N1373	SY	pnp,AJ,ge	30-90	150	100	2	*45	200	100	–	–	–	KF, TI
	2N2392	TI	P,si	*30-*90	1000	–	–	20	30	–	–	–	–	
	2N2711	GE	npn,P,si	*30-*90	200	100	2.67	*18	100	0.05μa	2.8	*9	–	
	ST1242	TR	N-GJ	30	200	–	0.80	*40	50	75	–	4	10	

Now 1~ to 14gc low-noise

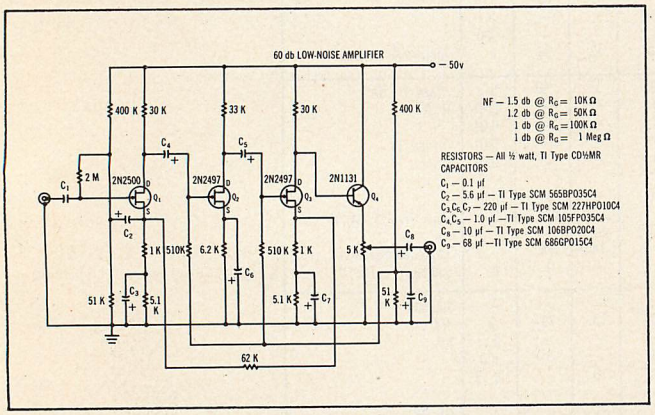
10 DECADES OF LOW-NOISE DEVICES



The units plotted here are representative of a broad range of over 100 low- noise devices TI offers for your low-noise applications.

Low-noise devices for your
SUBAUDIO CIRCUITS

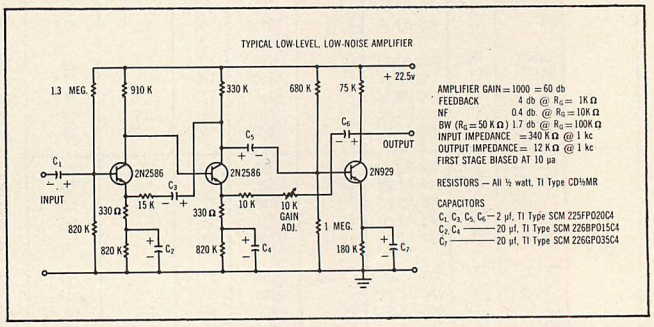
Texas Instruments 2N2497-2500 series field-effect transistors give the design engineer extremely low-noise characteristics — as low as 5 db at 10 cycles. They are ideal for such low-frequency equipment as null-detection apparatus, medical research equipment, oscillographic and magnetic tape recorders, oscilloscopes and all types of low-level transducers. ■ The circuit below illustrates how Texas Instruments 2N2500 silicon field-effect transistors are used to achieve low-noise, low-frequency operation.



This circuit gives you a *maximum* voltage gain of 60 db ±0.5 db from —55°C to 125°C with built-in gain adjustment. You also get good low-frequency response and stable circuit operation. ■ Write for your technical information file on low-noise TI devices for your subaudio applications.

Low-noise devices for your
AUDIO CIRCUITS

Now you can design the low-level, high-gain amplifier shown below with typical noise figure as low as 1 db. Advanced low-level planar technology of Texas Instruments 2N929 and 2N2586 transistors makes possible high gain at low current levels, plus the extremely low leakage currents necessary for true low-noise performance.



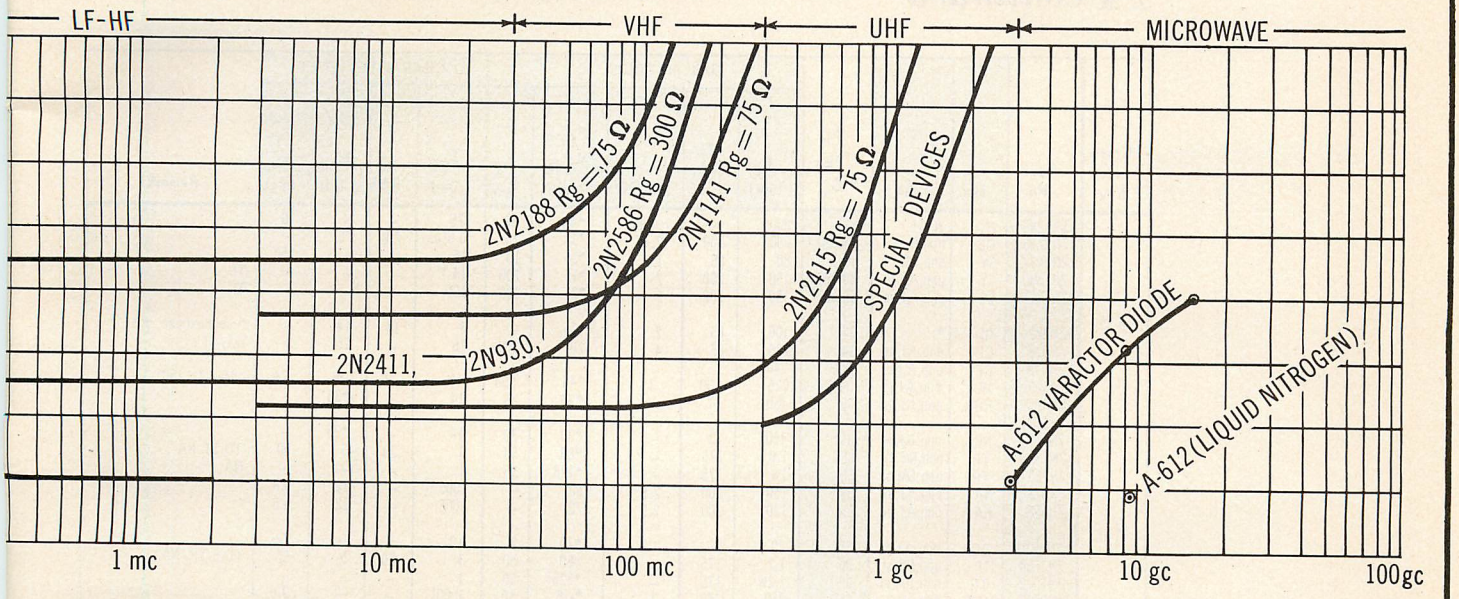
For high-impedance transducer applications, TI 2N930 and 2N2586 devices permit typical 1 db noise figure at emitter currents below 1 microampere, and generator resistances over 1 megohm. These special characteristics allow direct coupling of low-level, high-impedance sources . . . advantages previously available only with vacuum tubes and field-effect transistors. High gain at low levels plus very thin regions in these units combine to offer low power consumption and high radiation resistance to make the 2N930 and 2N2586 ideal for space applications. ■ A technical information file on almost 50 TI low-noise devices for audio circuits is yours upon request..

TI cannot assume any responsibility for any circuits shown or represent that they are free from patent infringement.

SEMICONDUCTOR-COMPONENTS DIVISION

solid-state amplification

FROM TEXAS INSTRUMENTS

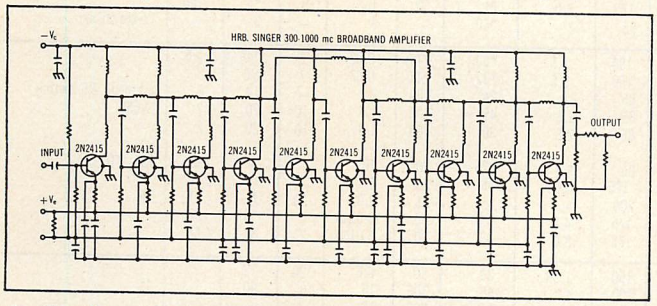


Figures shown are not theoretical; all are achieved measurements from actual circuit operation.

Low-noise devices for your

LF-UHF CIRCUITS

For your low-noise, high-frequency receiver and preamplifier applications, TI 2N2415 germanium mesa transistors give you a typical noise figure of 2.4 db at 200 mc, maximum available gain of 15.5 db at 500 mc with a f_{MAX} of 3 gc. ■ In the following circuit, HRB-Singer, Inc. utilizes 2N2415 transistors and "multiple feedback" techniques to achieve a uniform low noise figure, nominally 6 db, over the entire frequency range of 300 to 1000 mc with an average gain of 35 db. Unique design provides stable operation over a temperature range of —30° to +70°C and eliminates the need for RF tuning capacitors.



Another line of TI low-noise communications devices is the Dalmesa 2N2188 and TI363 series of germanium alloy diffused mesa transistors. These advanced units offer you ultra-high performance from dc to 100 mc, typical mid-frequency noise figures of less than 2 db, and increased high-frequency stability through guaranteed maximum output capacitance of 2.8 pf at 9 volts. ■ Investigate TI's wide selection of low-noise transistors for LF-UHF circuits by writing for a free fact file on these devices.

Low-noise devices for your

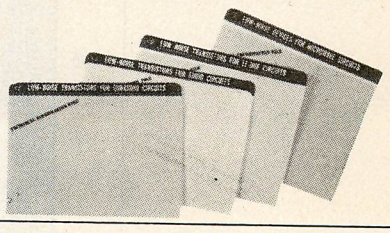
MICROWAVE CIRCUITS

Now you can design microwave circuits for highest frequencies at lowest noise with the new GaAs Pill Varactor Diode from Texas Instruments. These new subminiature devices offer you minimum cutoff frequency of 90 gc to 150 gc at −2 volts with low junction capacitance $-C_J$ @ 0 bias from 0.15 to 0.75 pf. Your production-line requirements for identical plug-in units are met through tight control of junction and package characteristics. ■ These features offer you the lowest package capacitance and inductance in industry today—backed up with TI varactor manufacturing capacity to meet your tightest production schedules. ■ TI GaAs Pill Varactor Diodes are particularly applicable to low-noise parametric amplifiers, harmonic generators, microwave switches, sub-harmonic oscillators, phase shifters and parametric limiters.

FOR FULL INFORMATION . . .

. . . write for a fact-filled file of technical data on low-noise TI devices designed for application in your frequency range. Please address your card or letter to Department 605 and specify which of these four information files you desire.

1. SUBAUDIO
2. AUDIO
3. LF-UHF
4. MICROWAVE



Ask your authorized TI distributor about "Transistor Circuit Design," an informative new hardbound book for circuit designers authored by 32 TI engineers and published by McGraw-Hill.

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A *continued*

Cross Index Key	Type No.	Mfr.	Type	h_{fe} *h_{FE} **G_m	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	*V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	Remarks
A 15	ST1243	TR	N-GJ	*30	200	–	0.80	*40	50	75	–	4	10	
	2N2715	GE	npn,P,si	*30-90	200	100	2.67	*18	25	0.05μa	2.8	*5	–	
	2N1432	SY	pnp,DD,ge	30-120	80	85	1.3	*35	10	15	–	–	250	
	2N1380	SY	pnp,AJ,ge	30-300	150	100	2	*15	200	14	–	–	–	TI
	2N1381	SY	pnp,AJ,ge	30-300	150	100	2	*25	200	100	–	–	–	TI
	2N532	GI	*	32	100	85	2	*15	–	3	14	14	–	* matched pnp, npn
	/N319	GE	pnp,AJ,ge	34	225	85	4	20	200	16	–	25	2	MO, TI
	2N44A	GE	pnp,A,ge	34-65	240									
	2N525A	MO	pnp,AJ,ge	34-65	225	100	3	*45	500	10	15	40	5.5	"Meg-A-Life"
	2N405	RCA	pnp,AJ,ge	35	150	71	–	*20	35	14	–	*35	–	
A 16	2N406	RCA	pnp,AJ,ge	35	150	71	–	*20	35	14	–	*35	–	
	2N734	TR	npn,MS,si	35	1.0	175	–	*80	50	1	20	5	50	TO-18, NA
	2N738	TR	npn,DM,si	35	1w	175	–	*125	35	1	–	–	–	NA
	2N926	NA	pnp,AJ,si	35	150	200	2.5	50	–	.005	–	12	0.8	
	2N928	NA	pnp,AJ,si	35	150	200	2.5	70	–	.005	–	12	0.8	
	2N1010	RCA	npn,AJ,ge	35	20	–	–	*10	2	10	5	–	*2	
	2N1564	TI	npn,MS,si	35	1.2	175	–	*80	50	1	20	5	50	TO-5 TR, NA
	2N1572	TR	npn,DM,si	35	1.2w	175	–	*125	50	1	–	–	–	
	2N2617	AMP	pnp,si	35	250	150	2	*-25	50	0.001	–	–	3.0	
	BCZ11	AMP	si	35	250	150	2	*25	50	0.001	6	50	3	
A 17	OC57	AMP	pnp,PADT,ge	35	10	55	–	*7	10	1.5	–	–	1.4	
	2N383	SY	pnp,AJ,ge	35-110	200	85	3.3	*30	200	20	–	–	10	TS,KF, TI
	2N190	GE	pnp,AJ,ge	36	75	85	2	25	50	16	15	40	1	
	2N187A	GE	pnp,AJ,ge	36	200	85	4	25	200	16	–	40	1	
	2N119	TI	npn,GR,si	36-90	150	175	1	*30	25	2	20	–	6	TR, USN
	2N335	TI	npn,GR,si	36-90	150	175	1	45	25	2	20	–	11	TR, GE, NA, RA, AMP
	2N335A	NA	npn,MS,si	36-90	500	175	2.8	45	–	0.5	–	–	–	GE, TI
	2N759	NA	npn,DM,si	36-90	500	200	2.5	45	–	0.2	–	–	–	
	2N759A	NA	npn,DM,si	36-90	500	200	2.5	60	–	0.1	–	–	–	
	2N1152	NA	npn,DM,si	36-90	150	175	0.86	45	25	2	–	7	1	TR, TI
A 18	2N533	GI	*	37	100	85	2	*15	–	3	14	14	–	* matched pnp, npn, TI
	2N1278	TR	N-GJ	*37	150	–	1.00	*40	25	–	–	5	15	
	2N742	NA	npn,MS,si	40	–	200	1.71	60	100	0.1	–	5	200	Switch
	2N1009	SY	pnp,AJ,ge	40	150	85	2.5	*25	20	1	–	–	–	
	2N1176	BE	pnp,AJ,ge	40	300	85	6.6	15	300	10	–	–	–	
	2N1176A	BE	pnp,AJ,ge	40	300	85	6.6	40	300	10	–	–	–	
	2N1176B	BE	pnp,AJ,ge	40	300	85	6.6	60	300	15	–	–	–	
	2N1191	MO	pnp,AJ,ge	40	200	100	2.7	*40	200	2	10	–	1.5	TI
	2N1566	TI	npn,DM,si	40	1200	175	8.0	60	50	1μa	5	*5	150	
	2N1678	GI	pnp,DR,ge	40	120	85	2	*60	–	3	–	3	–	Trixie Driver
A 19	BCY11	AMP	si	40	312	150	2.5	*60	500	0.02	7	90	1.5	
	BCY12	AMP	si	40	312	150	2.5	*32	500	0.02	7	90	2	
	CK4A	RA	pnp,AJ,ge	40	80	85	–	24	100	2	–	14	6	micromin RF switch
	TR-650	IND	pnp,AJ,ge	40	150	85	2.5	45	400	1.0	10	20	2	2N650
	TR-653	IND	pnp,AJ,ge	40	150	85	2.5	30	400	1.0	10	20	2	
	2N382	SY	pnp,AJ,ge	40-76	200	85	3.3	*25	200	20	–	–	10	KF, TI
	TNT840	TR	npn,MESA,si	40-90	100amb	175	0.66	45	50	0.1μa	–	*8	50	
	2N480A	TR	npn,DG,si	40-100	200	200	–	45	25	0.02	20	7	11	TI
	2N929	TI	npn,PL,si	*40-120	600	175	4.0	45	30	0.01μa	2	*6	60	
	2N2387	TI	npn,PL,si	*40-120	1200	175	8.0	45	30	0.01μa	2	6	60	
A 20	ST1244	TR	npn,GJ,si	*40-125	200	150	1.33	20	50	0.8	20	*2	20	
	2N43	GE	pnp,AJ,ge	42	240	100	4	45	300	16	6	40	1.3	TI
	OC79	AMP	pnp,PADT,ge	42	550	75	–	*26	300	10	–	–	1.2	
	2N104	RCA	pnp,AJ,ge	44	150	–	–	30	*10	–	12	*.7	50	
	2N215	RCA	pnp,AJ,ge	44	150	–	–	30	*10	10	–	12	*.7	
	2N525	GE	pnp,AJ,ge	44	225	100	4	*45	500	10	6	25	2.5	MO, SY, TI
	2N1924	GE	pnp,AJ,ge	44	225	85	–	40	500	4	–	–	–	MO, TI
	2N322	GE	pnp,AJ,ge	45	140	85	4	18	100	16	–	25	2.0	Driver, MO, TI
	2N465	IND	pnp,AJ,ge	45	150	85	2.5	*45	200	6	15	20	0.8	MO, RA, US, GI, SY, TI
	2N595	GI	npn,AJ,ge	45	150	85	1.67	*20	–	2	16	15	4	Bilateral , TI
A 21	2N924	NA	pnp,AJ,si	45	150	200	2.5	40	–	.005	–	12	0.8	
	2N1098	GE	pnp,AJ,ge	45	140	85	4	16	100	16	–	25	–	Driver, TI
	2N1145	GE	pnp,AJ,ge	45	140	85	4	16	100	16	–	40	–	Driver
	2N1372	TI	pnp,AJ,ge	45	250	100	3.3	25	200	3	7	–	1.5	KF
	2N1373	TI	pnp,AJ,ge	45	250	100	3.3	45	200	3	7	–	1.5	KF
	2N1442	NA	pnp,AJ,si	45	400	200	2.28	50	100	0.01	12	25	1	audio/med. power
	2N1447	IND	pnp,AJ,ge	45	200	85	3.3	45	400	5	6	20	3	
	2N1451	IND	pnp,AJ,ge	45	200	85	3.3	45	400	7.5	9	20	1.5	
	2N1477	SSD	pnp,AJ,si	45	250	175	1.7	100	100	2	–	7	1	
	CK65A	RA	pnp,AJ,ge	45	80	85	–	24	100	2	22	–	1.0	micromin

A *continued*

Cross Index Key	Type No.	Mfr.	Type	h_{fe} *h_{FE} **G_m	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/^oC	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	Remarks
A 22	TR721	IND	pnp,AJ,ge	45	150	2.5	3	30	200	10	15	20	3	
	2N762	NA	npn,DM,si	45-150	500	200	2.5	45	–	0.2	–	–	–	
	2N2676	GE	npn,GD,si	*45-290	250	185	1.66	*60	25	0.004	11	*4	15	
	2N280	AMP	pnp,AJ,ge	47	125	75	2.5	*20	10	150	10	–	0.1	
	OC71N	AMP	pnp,ge	47	110	75	0.45	*-30	10	–	10	–	–	
	TR320	IND	pnp,AJ,ge	48	150	85	3	25	100	10	–	25	2.5	2N320
	2N650	MO	pnp,AJ,ge	49	200	100	2.7	*45	500	3	5	–	1.5	US, TI
	2N650A	MO	pnp,AJ,ge	49	200	100	2.8	*45	500	10	15	25	1.5	Mega life, TI
	2N653	MO	pnp,AJ,ge	49	200	100	2.8	*30	250	5	10	20	1.5	SY, US
	2N1186	MO	pnp,AJ,ge	49	200	100	2.7	*60	500	5	5	–	1.5	
A 23	2N43A*	GI	pnp,AJ,ge	50	150	100	2	*45	–	10	18	40	3.5	*MIL, GE, TI
	2N320	GE	pnp,AJ,ge	50	225	85	4	20	200	16	–	25	2.5	MO, TI
	2N331	BE	pnp,AJ,ge	50	200	85	–	*30	200	16	9	–	1.16	IND, MO, GI
	2N363	IND	pnp,AJ,ge	50	150	85	2.5	30	200	10	–	–	–	RA, US
	2N422	RA	pnp,FA,ge	50	150	85	–	10	100	6	6.5	–	0.8	
	2N917	FA	npn,DP,si	*50	300	200	1.71	15	–	0.0004	–	*1.0	*800	
	2N918	FA	npn,DP,si	*50	300	200	1.71	15	–	0.0004	–	*1.0	*900	MO
	2N941	SSD	pnp,AJ,si	50	250	175	1.7	8	50	.001	–	7	16	
	2N942	SSD	pnp,AJ,si	50	250	175	1.7	8	50	.001	–	7	10	TO-18
	2N1173	WE	npn,A,ge	50	–	100	3.3	*20	200	150	3.0	25	–	
A 24	2N1174	WE	pnp,A,ge	50	–	100	3.3	*20	200	100	3.0	25	–	
	2N1273	TI	pnp,AJ,ge	50	150	85	2.5	*15	150	3	6.5	–	–	
	2N1274	TI	pnp,AJ,ge	50	150	85	2.5	*25	150	3	6.5	–	–	
	2N1383	TI	pnp,AJ,ge	50	200	85	3.3	*25	200	14	7.0	–	1.5	
	2N1589	TR	N-G-5	50	150	–	1.00	*15	25	–	–	5	5	
	2N1590	TR	N-G-5	50	150	–	1.00	*30	25	–	–	5	5	
	2N1591	TR	N-G-5	50	150	–	1.00	*60	25	–	–	5	5	
	2N1917	SSD	pnp,AJ,si	50	250	175	1.7	8	50	.001	–	7	16	KF
	2N1918	SSD	pnp,AJ,si	50	250	175	1.7	8	50	.001	–	7	10	KF
	2N2271	SY	pnp,AJ,ge	50	250	100°C	3.3	*20	500	10	–	–	0.01	
A 25	2N2354	SY	npn,AJ,ge	50	180	85	3.0	*20	150	10	–	–	–	
	BCY10	AMP	si	50	312	150	2.5	*32	500	0.02	7	100	1.5	
	TR-320	IND	pnp,AJ,ge	50	150	85	2.5	30	200	7.5	–	20	2.5	2N320
	2N214	SY	npn,AJ,ge	50-100	180	85	3	*40	100	50	–	–	0.01	Matched
	2N228	SY	npn,AJ,ge	50-100	180	85	3	*40	100	100	–	–	0.01	
	2N241A	SY	pnp,AJ,ge	50-100	200	85	3.3	*30	200	16	–	–	10	
	2N270	SY	pnp,AJ,ge	50-100	150	85	2.5	*25	75	12	–	–	0.01	
	2N321	SY	pnp,AJ,ge	50-100	200	85	3.3	*25	200	16	–	–	10	TI
	2N1059	SY	npn,AJ,ge	50-100	180	75	3.6	*20	100	50	–	–	0.01	
	2N408	SY	pnp,AJ,ge	50-135	150	85	2.5	*20	70	14	–	–	–	
A 26	2N109	SY	pnp,AJ,ge	50-150	50	85	0.9	*25	75	12	–	–	–	
	2N217	SY	pnp,AJ,ge	50-150	–	85	–	*25	75	12	–	–	10	
	2N323	SY	pnp,AJ,ge	50-150	140	85	2.3	*16	100	16	–	–	800	
	2N1374	SY	pnp,AJ,ge	50-150	150	100	2	*25	200	100	–	–	–	TI, KF
	2N1375	SY	pnp,AJ,ge	50-150	150	100	2	*45	200	100	–	–	–	TI,KF
	2N526A	MO	pnp,AJ,ge	53-90	225	100	3	*45	500	10	15	40	6.5	"Meg-A-Life"
	2N188A	GE	pnp,AJ,ge	54	200	85	4	25	200	16	–	40	1.2	
	2N191	GE	pnp,AJ,ge	54	75	85	2	25	50	16	15	40	1.2	Driver
	2N758A	TR	N-M	54	500	–	0.30	60	100	0.1	–	5	100	
	CK22B	RA	pnp,AJ,ge	54	75	65	1.25	35	100	10	6.5	–	–	Submin.
A 27	CK66B	RA	pnp,AJ,ge	54	75	85	1.25	35	100	10	–	–	–	Submin.
	CK66C	RA	pnp,AJ,ge	54	75	85	1.25	35	100	10	–	–	–	Submin.
	CK261	RA	npn,AJ,ge	54	75	85	1.25	35	100	10	–	–	–	Submin.
	CK262	RA	npn,AJ,ge	54	75	85	1.25	35	100	–	–	–	–	Submin.
	2N566	IND	pnp,AJ,ge	55	150	85	2.5	30	300	3	12	20	1	US, GI
	2N1097	GE	pnp,AJ,ge	55	140	85	4	16	100	16	–	25	–	Driver, TI
	2N1144	GE	pnp,AJ,ge	55	140	85	4	16	100	16	–	40	–	Driver
	CK27A	RA	pnp,AJ,ge	55	80	85	–	15	400	2	–	14	11	micromin RF switch
	OC58	AMP	pnp,PADT,ge	55	10	55	–	*7	10	1.5	–	–	1.6	
	2N596	GI	npn,AJ,ge	60	150	85	1.67	20	–	2	16	15	6	Bilateral, TI
A 28	2N633	IND	pnp,AJ,ge	60	150	85	2.5	35	200	10	–	–	0.8	RA, US
	2N937	SSD	pnp,AJ,si	60	385	160	2.85	30	50	.005	18	70	0.5	NA
	2N940	SSD	pnp,AJ,si	60	250	175	1.7	35	100	.001	–	7	2	
	2N957	FA	npn,DD,si	*60	800	150	6.5	20	–	1.0	–	*4.0	*400	
	2N1475	SSD	pnp,AJ,si	60	250	175	1.7	60	100	.005	–	7	1	
	OC60	AMP	pnp,PADT,ge	60	10	55	–	*7	10	1.5	–	–	1.6	
	TS602	TS	pnp,AJ,ge	*60	200	100	–	*12	400	20	–	–	–	
	TS604	TS	pnp,AJ,ge	*60	200	100	–	*20	400	20	–	–	–	
	AC107	AMP	pnp,ge	60	80	75	0.6	*-15	5	2.0	3	–	2	
	2N220	RCA	pnp,AJ,ge	65	20	–	–	*10	2	12	6	–	*0.85	

A *continued*

Cross Index Key	Type No.	Mfr.	Type	h_{fe} *h_{FE} **G_m	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	*V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	Remarks
A 29	2N175	RCA	pnp,AJ,ge	65	20	–	–	*10	2	12	6	–	*0.85	
	2N398A	MO	pnp,AJ,ge	65	150	100	2	105	200	12	–	–	1	GI, TI
	2N407	RCA	pnp,AJ,ge	65	150	71	–	*20	70	14	–	–	–	SY
	2N408	RCA	pnp,AJ,ge	65	150	71	–	*20	70	14	–	–	–	
	2N649	RCA	npn,AJ,ge	65	100	–	–	*20	50	14	–	–	–	
	2N759A	TR	N-M	65	500	–	0.30	60	100	0.1	–	5	100	
	2N1448	IND	pnp,AJ,ge	65	200	85	3.33	45	400	5	6	20	4	
	2N1452	IND	pnp,AJ,ge	65	200	85	3.33	45	400	7.5	9	20	2.2	
	OC74	AMP	pnp,PADT,ge	65	550	75	–	20	300	10	–	–	1.5	
	2N2043	MO	pnp,AJ,ge	65-100	200	100	2.67	105	200	25	–	25	0.75	TI
A 30	2N2043A	MO	pnp,AJ,ge	65-100	200	100	2.67	105	200	25	–	25	0.75	"Meg-A-Life", TI
	2N323	GE	pnp,AJ,ge	68	140	85	4	18	100	16	–	25	2.5	Driver, MO
	2N281	AMP	pnp,PADT,ge	70	165	75	–	*32	250	4.5	–	–	0.9	
	2N282	AMP	pnp,ge	70	167	75		*-32	250	4.5	–	–	0.9	
	2N361	IND	pnp,AJ,ge	70	150	85	2.5	45	200	10	–	–	–	RA, US
	2N591	RCA	pnp,AJ,ge	70	100	–	–	*32	40	7	–	–	0.7	SY
	2N647	RCA	npn,AJ,ge	70	100	–	–	*25	50	14	–	–	–	
	2N735	TI	npn,MS,si	70	1.0	175	–	80	50	1	20	5	50	TO-18, TR, NA
	2N739	TI	npn,DM,si	70	1w	175	–	*125	70	1	–	–	–	NA
	2N1352	IND	pnp,AJ,ge	70	150	85	2.5	30	200	2.5	–	18	2.5	KF
A 31	2N1565	TI	npn,MS,si	70	1.2	175	–	*80	50	1	20	5	50	NA
	2N1573	TI	npn,DM,si	70	1.2w	175	–	*125	50	1	–	–	–	
	2N213	SY	npn,AJ,ge	70-250	150	85	2.3	*40	100	50	–	–	0.01	
	2N1251	SY	npn,AJ,ge	70-250	150	85	2.5	*20	100	50	–	–	7.5	
	TR-383	IND	pnp,AJ,ge	72	200	85	3.33	25	200	7.5	–	20	1.8	2N383
	2N527A	MO	pnp,AJ,ge	72-121	225	100	3	*45	500	10	15	40	7.0	"Meg-A-Life"
	2N241	GE	pnp,AJ,ge	73	100	85	3	25	200	16	–	40	1.3	SO
	2N109	RCA	pnp,AJ,ge	75	150	–	–	25	70	14	–	–	–	
	2N192	GE	pnp,AJ,ge	75	75	85	2	25	50	16	15	40	1.5	
	2N217	RCA	pnp,AJ,ge	75	150	–	–	25	70	14	–	–	–	
A 32	2N361	US	pnp,AJ,ge	*75	150	85	–	30	200	10	13	–	1.5	
	2N1192	MO	pnp,AJ,ge	75	200	100	2.7	*40	200	2	10	–	2	TI
	2N1443	NA	pnp,AJ,si	75	400	200	2.28	50	100	0.01	12	25	1	audio/med. power
	2N1672	GI	npn,AJ,ge	75	120	85	0.5	*40	–	5	–	–	–	Trixie driver
	C620	CT	pnp,AJ,si	**75	250	160	2	10	50	–	3.5	15	–	tg FE
	C622	CT	pnp,AJ,si	**75	250	160	2	10	50	–	1.5	15	–	tg FE
	C624	CT	pnp,AJ,si	**75	250	160	2	10	50	–	0.4	15	–	tg FE
	GT-74	GI	pnp,AJ,ge	75	150	100	2	25	–	5	6	35	–	
	GT-81	GI	pnp,AJ,ge	75	150	100	2	25	–	5	16	35	–	
	TR-323	IND	pnp,AJ,ge	75	150	85	2.5	16	200	7.5	–	20	2.5	2N323
A 33	2N1376	SY	pnp,AJ,ge	75-150	150	100	2	*25	200	100	–	–	–	TI
	2N1431	SY	npn,AJ,ge	75-150	180	75	3.6	*25	100	50	–	–	10	
	2N2712	GE	npn,P,si	*75-225	200	100	2.67	*18	100	0.05μa	2.8	*9	–	
	2N2716	GE	npn,P,si	75-225	200	100	2.67	*18	25	0.05μa	2.8	5	–	
	2N1950	IND	npn,DM,si	75-250	600	175	4	20	–	0.01	–	–	–	
	2N1951	IND	npn,DM,si	75-250	600	175	4	30	–	0.01	–	–	–	
	2N1952	IND	npn,DM,si	75-250	600	175	4	40	–	0.01	–	–	–	
	2N1279	TR	N-GJ	*76	150	–	1.00	*40	25	–	–	5	15	
	2N120	TI	npn,GR,si	76-333	150	175	1	*30	25	2	20	–	7	TR
	2N336	TI	npn,GR,si	76-333	150	175	1	45	25	2	20	–	13	TR, GE, NA, RA, AMP
A 34	2N336A	NA	npn,MS,si	76-333	500	175	2.8	45	–	0.5	–	–	–	TI
	2N760	NA	npn,DM,si	76-333	500	200	2.5	45	–	0.2	–	–	–	TI
	2N760A	NA	npn,DM,si	76-333	500	200	2.5	60	–	0.1	–	–	–	TI, TR
	2N1153	NA	npn,DM,si	76-333	150	175	0.86	45	25	2	–	7	1	TR, TI
	2N321	GE	pnp,AJ,ge	80	225	85	4	20	200	16	–	25	3	MO
	2N527	SY	pnp,AJ,ge	80	225	85	3.7	*45	500	10	–	–	3.3	TS, TI
	2N651	MO	pnp,AJ,ge	80	200	100	2.8	*45	500	3	5	–	2	US, SY, TI
	2N651A	MO	pnp,AJ,ge	80	200	100	2.8	*45	500	10	15	–	2.0	TI
	2N654	MO	pnp,AJ,ge	80	200	100	2.8	*30	250	5	10	–	2.0	US, TI
	2N780	TI	npn,DM,si	80	1w	175	–	45	50	.0005	–	–	–	
A 35	2N1187	MO	pnp,AJ,ge	80	200	100	2.7	*60	500	5	5	–	2	
	2N1370	TI	pnp,AJ,ge	80	150	85	2.5	25	150	3	6.5	–	2.0	GI, KF
	2N1371	TI	pnp,AJ,ge	80	150	85	2.5	25	150	3	6.5	–	2.0	KF
	2N1374	TI	pnp,AJ,ge	80	250	100	3.3	25	200	3	6.5	–	2	KF
	2N1375	TI	pnp,AJ,ge	80	250	100	3.3	45	200	3	6.5	–	2	KF
	2N1382	TI	pnp,AJ,ge	80	200	85	–	25	200	14	6.5	–	2	
	2N1449	IND	pnp,AJ,ge	80	200	85	3.33	45	400	5	6	20	5	
	2N1926	GE	pnp,AJ,ge	80	225	85	–	40	500	4	–	–	–	MO
	CK28A	RA	pnp,AJ,ge	80	80	85	–	12	400	80	–	14	17	micromin RF switch
	OC59	AMP	pnp,PADT,ge	80	10	55	–	*7	10	1.5	–	–	2.2	

SHOCKLEY SEMICONDUCTOR DEVICES

TYPE E 4-LAYER DIODES

1-N SERIES

Type	Switching Voltage (V_s) in volts 25°C	Switching Voltage (V_s) in volts —40° to 85°C	Holding Current (I_h) in milliamps 25°C	Holding Current (I_h) in milliamps —40°C
1N3831	20±4	14–25	0.5–15	40 max
1N3832	25±4	19–30	0.5–15	40 max
1N3833	30±4	23–36	0.5–15	40 max
1N3834	35±4	28–41	0.5–15	40 max
1N3835	40±4	32–46	0.5–15	40 max
1N3836	45±4	37–51	0.5–15	40 max
1N3837	50±4	41–57	0.5–15	40 max
1N3838	100±10	80–115	0.5–15	40 max

Type	Switching Voltage (V_s) in volts 25°C	Switching Voltage (V_s) in volts —40° to 85°C	Holding Current (I_h) in milliamps 25°C	Holding Current (I_h) in milliamps 85°C
1N3839	20±4	14–25	14–50	5 min
1N3840	25±4	19–30	14–50	5 min
1N3841	30±4	23–36	14–50	5 min
1N3842	35±4	28–41	14–50	5 min
1N3843	40±4	32–46	14–50	5 min
1N3844	45±4	37–51	14–50	5 min
1N3845	50±4	41–57	14–50	5 min
1N3846	100±10	80–115	14–50	5 min

COMMERCIAL SERIES

Type	Switching Voltage (V_s) in volts	Holding Current (I_h) in milliamps
4E20–8	20±4	1–15
4E20–28	20±4	14–45
4E30–8	30±4	1–15
4E30–28	30±4	14–45
4E40–8	40±4	1–15
4E40–28	40±4	14–45
4E50–8	50±4	1–15
4E50–28	50±4	14–45
4E100–8	100±10	1–15
4E100–28	100±10	14–45
4E200–8	200±20	1–15
4E200–28	200±20	14–45

MIL-LINE SERIES

Type	Switching Voltage (V_s) in volts 25°C	Switching Voltage (V_s) in volts —60° to 125°C	Holding Current (I_h) in milliamps
4E20M–8	20±4	14–25	1–15
4E20M–28	20±4	14–25	14–45
4E30M–8	30±4	23–36	1–15
4E30M–28	30±4	23–36	14–45
4E40M–8	40±4	32–46	1–15
4E40M–28	40±4	32–46	14–45
4E50M–8	50±4	41–57	1–15
4E50M–28	50±4	41–57	14–45
4E100M–8	100±10	80–115	1–15
4E100M–28	100±10	80–115	14–45
4E200M–8	200±20	160–230	1–15
4E200M–28	200±20	160–230	14–45

SERIES A (BROAD SPEC)

Type	Switching Voltage (V_s) in volts	Holding Current (I_h) in milliamps
4E20A	20±6	0.5–60
4E30A	30±6	0.5–60
4E40A	40±6	0.5–60
4E50A	50±6	0.5–60

TYPE J 4-LAYER DIODES

COMMERCIAL SERIES

Type	Switching Voltage (V_s) in volts	Holding Current (I_h) in milliamps
4J50–5	50±5	1–10
4J50–25	50±5	9–45
4J100–5	100±10	1–10
4J100–25	100±10	9–45
4J200–5	200±20	1–10
4J200–25	200±20	9–45

MIL-LINE SERIES for extended temperature ranges

Type	Switching Voltage (V_s) in volts 25°C	Switching Voltage (V_s) in volts —60° to 105°C	Holding Current (I_h) in milliamps
4J50M–5	50±5	41–57	1–10
4J50M–25	50±5	41–57	9–45
4J100M–5	100±10	80–115	1–10
4J100M–25	100±10	80–115	9–45
4J200M–5	200±20	160–230	1–10
4J200M–25	200±20	160–230	9–45

TYPE G 4-LAYER DIODES

COMMERCIAL SERIES

Type	Switching Voltage (V_s) in volts	Holding Current (I_h) in milliamps
4G50	50±5	1–50
4G100	100±10	1–50
4G200	200±20	1–50

MIL-LINE SERIES for extended temperature ranges

Type	Switching Voltage (V_s) in volts 25°C	Switching Voltage (V_s) in volts —60° to 105°C	Holding Current (I_h) in milliamps
4G50M	50±5	41–57	1–50
4G100M	100±10	80–115	1–50
4G200M	200±20	160–230	1–50

New! NPN HIGH FREQUENCY SILICON POWER TRANSISTOR

MAXIMUM RATINGS at 25°C base temperature unless otherwise stated

	3TX002	3TX003	3TX004
BVCBO	100 V	100 V	60 V
I_C	5 A	5 A	5 A
$P_{AVERAGE}$	60 W	45 W	45 W
R_T	2.5°C/W	3.3°C/W	3.3°C/W
Temperature–Storage	–65 to 200°C	–65 to 200°C	–65 to 200°C
Temperature–Operating	–65 to 175°C	–65 to 175°C	–65 to 175°C

CHARACTERISTICS at 25°C unless otherwise stated

	Condition	3TX002	3TX003	3TX004
F_T min	10 V, 2.5 A	150 MC	150 MC	150 MC
Beta min	5 V, 5 A	30	10	10
VCE max	5 A, 0.5 A	1V	2V	3V
ICBO max	150°C 3TX002 - 80 V	10 MA	10 MA	10 MA
	3TX003 - 80 V	10 MA	10 MA	10 MA
	3TX004 - 50 V	10 MA	10 MA	10 MA

A MAJOR SOURCE FOR 4-LAYER DIODES AND HIGH FREQUENCY SILICON POWER TRANSISTORS.

For further information on these and other Shockley solid-state devices, call or write your nearest Clevite distributor or contact:

CLEVITE TRANSISTOR, Palo Alto Plant, 1801 Page Mill Road, Palo Alto, California

CLEVITE TRANSISTOR
A Division of Clevite Corporation

ON READER-SERVICE CARD CIRCLE 441

A *continued*

Cross Index Key	Type No.	Mfr.	Type	h_{fe} *h_{FE} **G_n	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/^oC	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	Remarks
A 36	TR-321	IND	pnp,AJ,ge	80	150	85	2.5	30	200	7.5	–	20	3.1	2N321
	2N543A	TR	npn,DG,si	80-200	200	200	–	45	25	0.02	20	7	15	
	2N736A	TI	M,si	80-200	1000	–	–	80	100	–	–	–	–	
	2N1566A	TI	M,si	80-200	1200	–	–	80	100	–	–	–	–	
	TNT841	TR	npn,MESA,si	80-330	100amb	175	0.66	45	50	0.1μa	–	*8	50	
	2N2648	GI	pnp,AJ,ge	80-500	250	100	3.3	*35	1	3μa	–	*18	*10	
	2N527	GE	pnp,AJ,ge	81	225	100	4	*45	50	10	6	25	3.3	MO
	2N324	GE	pnp,AJ,ge	85	140	85	4	18	100	16	–	25	3	Driver, MO, TI
	2N466	MO	pnp,AJ,ge	90	200	100	2.5	*35	100	6	15	–	1	US, GI, RA, SY, TI
	2N1247	TI	npn,PL,si	*90	600	175	4.0	6	30	0.005μa	4	7	60	
A 37	2N1706	TS	–	90	200	100	–	*25	400	10	–	–	3	TI
	2N1707	TS	–	90	200	100	–	*30	400	15	–	–	3	TI
	CK66A	RA	pnp,AJ,ge	90	80	85	–	20	100	2	22	–	1.2	micromin
	OC75	AMP	pnp,AJ,ge	90	125	75	–	*30	50	5	–	–	0.75	
	OC75N	AMP	pnp,ge	90	110	75	0.45	*-30	10	4.5	15	–	–	
	2N2171	TS	pnp,AJ,ge	*90-*250	500	100	6.7	*50	400	10	3.5	*20	**7.5	
	2N1376	TI	pnp,AJ,ge	95	250	100	25	45	200	7	5.5	40	2	KF
	2N1377	TI	pnp,AJ,ge	95	250	100	3.3	45	200	3	5.5	–	2	KF
	2N2375	PH	pnp,AJ,ge	95	250	100	3.3	*35	500	2	–	*14	*15	Output
	2N207	PH	pnp,AJ,ge	100	50	65	1.25	*12	20	4	5	–	**2	
A 38	2N207A	PH	pnp,AJ,ge	100	50	65	1.25	*12	20	4	2	–	**2	
	2N207B	PH	pnp,AJ,ge	100	50	65	1.25	*12	20	4	2	–	**2	
	2N360	RA	pnp,AJ,ge	100	150	85	2.5	20	400	10	–	–	1.2	IND, US
	2N362	IND	pnp,AJ,ge	100	150	85	2.5	20	100	200	–	–	–	RA, US
	2N534	PH	pnp,AJ,ge	100	25	65	–	*50	25	8	–	–	–	
	2N535	PH	pnp,AJ,ge	100	50	85	–	*20	20	6	10	–	**2	
	2N535A	PH	pnp,AJ,ge	100	50	85	–	*20	20	6	5	–	**2	
	2N535B	PH	pnp,AJ,ge	100	50	85	–	*20	20	6	0	–	**2	
	2N568	IND	pnp,AJ,ge	100	150	85	2.5	30	300	3	12	20	1.5	US, GI
	2N632	IND	pnp,AJ,ge	100	150	85	2.5	30	200	10	–	–	1	RA, US, GI
A 39	2N736	TI	npn,MS,si	100	1.0	175	–	*80	50	1	20	5	50	TO-18, TR, FA, NA
	2N740	TI	npn,DM,si	100	1w	175	–	*125	100	1	–	–	–	TR, NA
	2N1380	TI	pnp,AJ,ge	100	250	100	3.3	12	200	3	5.5	40	2	
	2N1381	TI	pnp,AJ,ge	100	250	100	3.3	25	200	3	5.5	40	2	
	C621	CT	pnp,AJ,si	**100	250	160	2	10	50	–	3.5	15	–	tg FE
	C623	CT	pnp,AJ,si	**100	250	160	2	10	50	–	1.5	15	–	tg FE
	C625	CT	pnp,AJ,si	**100	250	160	2	10	50	–	0.4	15	–	tg FE
	2N1574	TI	npn,DM,si	100	1.2w	175	–	*125	50	1	–	–	–	TR
	TR383	IND	pnp,AJ,ge	100	150	85	3	25	200	10	–	50	1.8	2N383
	4JX1A547	GE	pnp,AJ,ge	*100-*200	150	75	3.0	*-20	100	6μa	6	*12	*10	
A 40	2N213A	SY	npn,AJ,ge	100-250	180	85	2.5	*40	100	50	–	–	10	
	2N930	TI	npn,PL,si	*100-300	600	175	4.0	45	30	0.01μa	2	*6	60	
	2N1944	IND	npn,DM,si	100-300	600	175	4	20	–	0.01	–	–	–	
	2N1945	IND	npn,DM,si	100-300	600	175	4	30	–	0.01	–	–	–	
	2N1946	IND	npn,DM,si	100-300	600	175	4	40	–	0.01	–	–	–	
	2N1947	IND	npn,DM,si	100-300	600	175	4	20	0.01	–	–	–	–	
	2N1948	IND	npn,DM,si	100-300	600	175	4	30	–	0.01	–	–	–	
	2N1949	IND	npn,DM,si	100-300	600	175	4	40	–	0.01	–	–	–	
	2N2388	TI	npn,PL,si	**100-300	1200	175	8.0	45	30	0.01μa	2	*6	60	
	CK67B	RA	pnp,AJ,ge	108	75	85	1.25	35	100	10	–	–	–	Submin.
A 41	CK67C	RA	pnp,AJ,ge	108	75	85	1.25	35	100	10	–	–	–	Submin.
	2N265	GE	pnp,AJ,ge	110	75	85	2	25	50	16	15	40	1.5	Driver
	2N1705	TS	–	110	200	100	–	*18	400	10	–	–	4	TI
	GT-109	GI	pnp,AJ,ge	110	150	100	2	*25	–	6	16	35	–	
	2N508	GE	pnp,AJ,ge	112	140	85	4	18	100	16	–	25	3.5	Driver, MO, TI
	2N1018	KF	pnp,AJ,ge	120	80	85	–	8	400	2	–	14	25	micromin RF switch
	2N2431	AMP	pnp,ge	120	165	75	3.3	*32	150	10	–	–	1.7	
	ST1290	TR	N-GJ	120	200	–	0.80	20	50	75	–	4	10	
	2N2586	TI	npn,PL,si	*120-360	600	175	4.0	45	30	0.002μa	1.5	*6	60	
	2N2430	AMP	npn,ge	125	280	90	3.3	*32	30	–	–	–	25	
A 42	2N2614	RCA	pnp,AJ,ge	125	100	100	2.2	*20	50	6.5	–	–	10	
	2N2706	AMP	pnp,ge	125	280	90	0.37	*-32	200	–	4	–	2.5	
	2N2707	AMP	np,ge	125	280	90	0.37	*32	200	–	4	–	2.5	
	AC127	AMP	npn,ge	125	280	90	3.3	*32	30	–	–	–	2.5	
	TR-508	IND	pnp,AJ,ge	125	150	85	2.5	16	200	8	–	20	3.5	2N508
	2N652	MO	pnp,AJ,ge	130	200	100	2.7	*45	500	3	5	–	2.5	SY, US, TI
	2N652A	MO	pnp,AJ,ge	130	200	100	2.8	*45	500	10	15	–	2.5	TI
	2N655	MO	pnp,AJ,ge	130	200	100	2.8	*30	250	5	10	–	2.5	US, TI
	2N1188	MO	pnp,AJ,ge	130	200	100	2.7	*60	500	5	5	–	2.5	
	2N1248	TI	npn,PL,si	*130	600	175	4.0	6	30	0.010μa	4	7	60	

FACTS, CIRCUIT APPLICATIONS, TEST DATA, AS PRESENTED IN SEMINARS CONDUCTED AROUND THE COUNTRY

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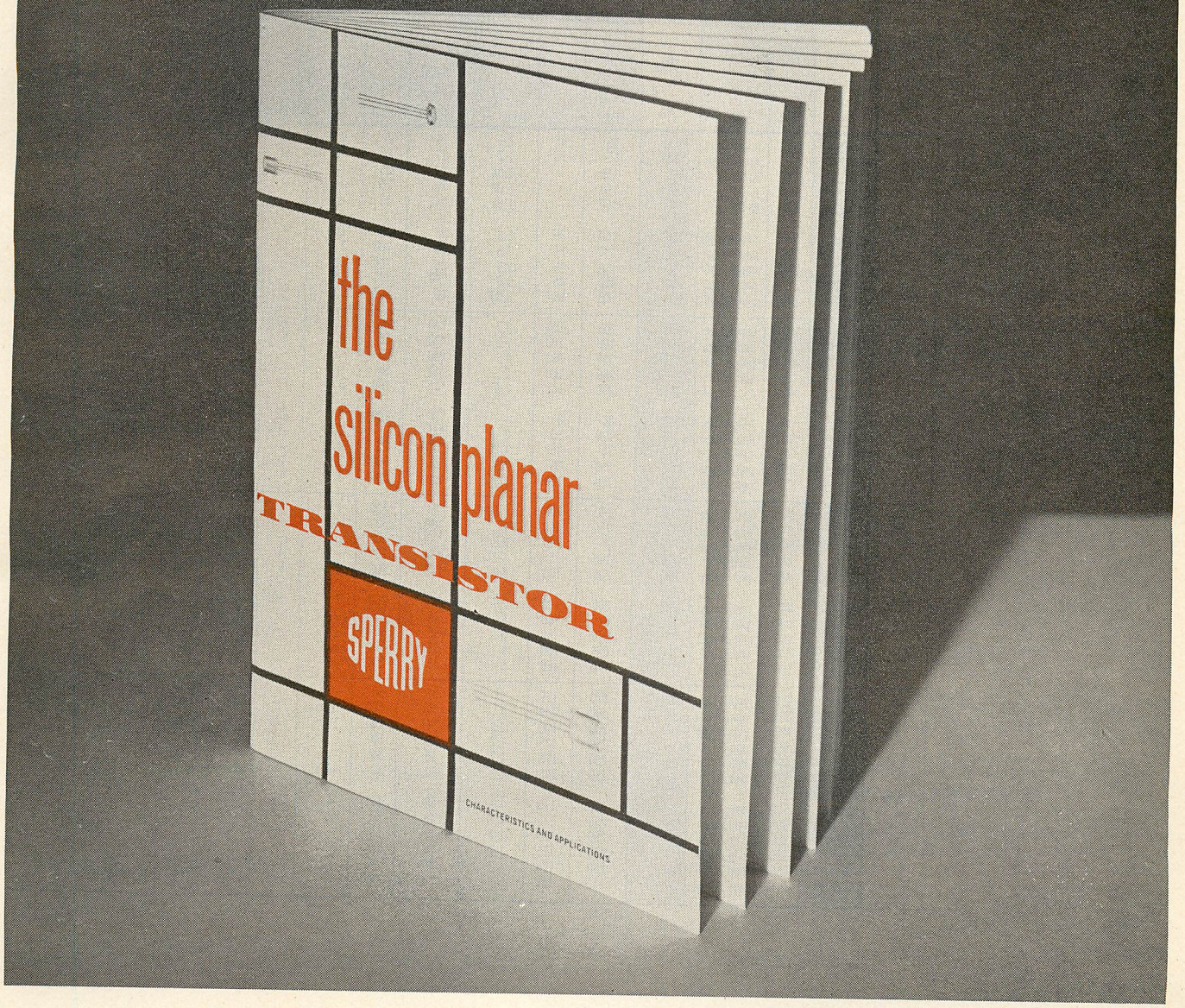

The First Complementary Silicon Planar Transistors for a broad range of applications are discussed in a new 32-page brochure. ☐ The aim of this "printed seminar" is to familiarize potential users of advanced silicon planar transistors with the advantages and applications of Sperry's new low-level, low-noise, high beta complementary NPN and PNP transistors. The brochure comprehensively reviews the advantages in reducing weight, volume and cost of equipment in circuit applications in addition to detailed parameter distribution and variation curves. ☐ Requests for the Sperry Silicon Planar Transistor Brochure are to be made on company letterhead. ☐ Sales Offices: Chicago, Illinois; Los Angeles, California; Oakland, New Jersey; Medford, Massachusetts; Sykesville, Maryland; Bethpage, Long Island, New York. ☐ *SPERRY SEMICONDUCTOR, Norwalk, Connecticut.*

SPERRY
DIVISIONS OF SPERRY RAND CORPORATION

ON READER-SERVICE CARD CIRCLE 442

A *continued*

Cross Index Key	Type No.	Mfr.	Type	h_{fe} *h_{FE} **G_m	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	Remarks
A 43	2N78	GE	npn,RG,ge	*135	65	85	1.1	15v	20	0.7	12	*3	*9	
	2N78A	GE	npn,RG,ge	*135	65	85	1.1	20	20	0.7	12	3	9	
	2N1592	TR	N-G5	140	150	–	1.00	*15	25	–	–	5	5	
	2N1593	TR	N-GJ	140	150	–	1.00	30	25	–	–	5	5	
	2N1594	TR	N-GJ	140	150	–	1.00	*60	25	–	–	5	5	
	2N359	RA	pnp,AJ,ge	150	150	85	2.5	45	200	10	–	–	1	IND, US
	2N570	IND	pnp,AJ,ge	150	150	IT	2.5	30	300	3	12	20	2	GI
	2N631	IND	pnp,AJ,ge	150	150	85	2.5	25	200	10	–	–	1.2	RA
	2N1008A	SY	pnp,AJ,ge	150	400	85	6.6	*40	300	500	–	–	25	BE
	2N1471	IND	pnp,AJ,ge	150	200	85	3.33	12	200	2.5	–	18	5	
A 44	2N1193	MO	pnp,AJ,ge	160	200	100	2.7	*40	200	2	10	–	2.5	TI
	2N2613	RCA	pnp,AJ,ge	160	100	100	2.2	*13	10	4	5	–	*10	
	C632	CT	pnp,AJ,si	**175	250	160	2	250	50	–	–	2	–	tg FE
	C633	CT	pnp,AJ,si	**175	250	160	2	350	50	–	–	2	–	tg FE
	2N467	MO	pnp,AJ,ge	180	200	100	2.5	*35	100	6	–	–	1.2	IND, SY, US, TI
	CK67A	RA	pnp,AJ,ge	180	80	85	–	15	100	2	22	–	–	micromin
	2N467	GI	pnp,AJ,ge	200	120	85	2	*35	–	10	16	40	0.5	MO, RA, US
	2N169A	GE	npn,RG,ge	*200	75	85	1.25	*25	25	0.9	6	*2.4	*9	
	2N572	IND	pnp,AJ,ge	200	150	85	2.5	30	300	3	12	20	3	GI
	2N1378	TI	pnp,AJ,ge	200	250	100	3.3	12	200	3	4	40	3	
A 45	2N1379	TI	pnp,AJ,ge	200	250	100	3.3	25	200	3	4	40	3	
	C631	CT	pnp,AJ,si	**200	250	160	2	150	50	–	–	2	–	tg FE
	2N2374	PH	pnp,AJ,ge	210	250	100	3.3	*35	500	2	–	*14	**15	Output, TI
	2N2429	AMP	pnp,ge	220	165	75	3.3	*32	30	–	4	–	2.3	
	2N1185	MO	pnp,AJ,ge	260	200	100	2.7	*45	500	5	5	–	3	
	2N1194	MO	pnp,AJ,ge	280	200	100	2.7	*40	200	2	10	–	3	TI
	C640	CT	pnp,AJ,si	**200	675	160	5	35	50	–	–	8	20	tg FE
	C641	CT	pnp,AJ,si	**400	675	160	5	35	50	–	–	8	30	tg FE
	C642	CT	pnp,AJ,si	**600	675	160	5	35	50	–	–	8	40	tg FE
	C643	CT	pnp,AJ,si	**900	675	160	5	35	50	–	–	8	50	tg FE
A 46	C644	CT	pnp,AJ,si	12,000	675	160	5	35	50	–	–	8	60	tg FE
	SST610	SSE	npn,DM,si	12,000	500	150	4	*60	500	0.3ma	8	20	*0.120	
	2N461	MO	pnp,AJ,ge	–	200	100	2.8	*45	100	10	20	–	0.7	USAF, TI
	2N943	SSD	pnp,AJ,si	–	250	175	1.7	18	50		–	7	1	
	2N944	SSD	pnp,AJ,si	–	250	175	1.7	18	50		–	7	1	
	2N945	SSD	pnp,AJ,si	–	250	175	1.7	50	50	–	–	7	1	
	2N946	SSD	pnp,AJ,si	–	250	175	1.7	80	50	–	–	7	1	
	2N1919	SSD	pnp,AJ,si	–	250	175	1.7	18	50	–	–	7	1	
	2N1920	SSD	pnp,AJ,si	–	250	175	1.7	18	50	–	–	7	1	
	2N1921	SSD	pnp,AJ,si	–	250	175	1.7	50	50	–	–	7	1	
	2N1922	SSD	pnp,AJ,si	–	250	175	1.7	80	50	–	–	7	1	
	2N2376	PH	pnp,AJ,ge	–	250	100	3.3	*35	500	2	–	*14	**15	m. pair 2N2375, TI

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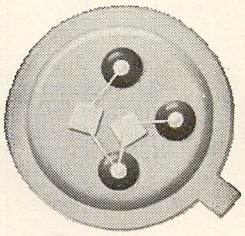
high gain



New Darlington Amplifier Transistor In 4 Lead TO-18 Package features very high beta – as high as 2,000 minimum at 100 μA . . . very low leakage – as low as 1nA maximum at 30 volts . . . low noise, typically 2 db. ☐ These microelectronic devices contain two interconnected NPN silicon planar transistors which provide extremely high current gain in a single TO-18 package. ☐ The design economies and characteristics of these devices are particularly well-suited for high impedance amplifier inputs, low noise amplifiers and high gain stages. ☐ Production quantities are presently available for new Sperry types; 2N2723, 2N2724 and 2N2725. ☐ Sales Offices: Chicago, Illinois; Los Angeles, California; Oakland, New Jersey; Medford, Massachusetts; Sykesville, Maryland; Bethpage, L. I., New York. ☐ For complete details, write for technical bulletin. *SPERRY SEMICONDUCTOR, Norwalk, Connecticut.*

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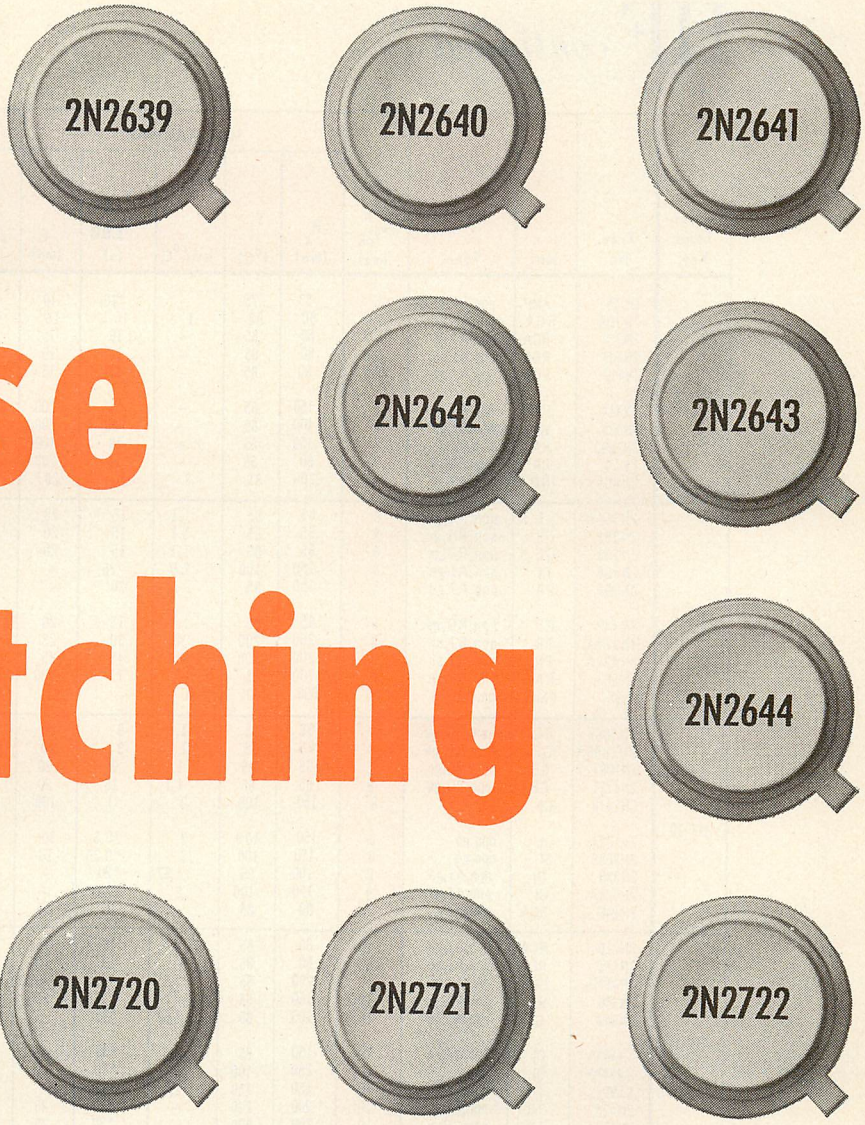
ON READER-SERVICE CARD CIRCLE 443

HIGH FREQUENCY

Includes types ranging up to and above the vhf range. In order of increasing $f_{\alpha e}$, $f_{\alpha b}$, or f_T.

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	Remarks
HF 1	2N444A	GI	npn,AJ,ge	1	150	100	2	*40	–	25	2	12	14	TI
	2N707	PSI	npn,TDP,si	1	.006	175	56	–	12	.005	300	6	.2	
	2N988	PSI	npn,TDP,si	1	.006	175	20	–	70	.05	250	8	.32	
	2N989	PSI	npn,TDP,si	1	.006	175	20	–	70	.05	250	11	.63	
	2N1024	SSD	pnp,AJ,si	**1	250	175	1.7	15	100	9	0.025	–	7	NA, KF
HF 2	2N1025	SSD	pnp,AJ,si	**1	250	175	1.7	35	100	9–22	0.025	–	7	NA, KF
	2N916	PSI	npn,TDP,si	1.2	.006	200	45	–	120	.001	300	–	–	
	2N2656	PSI	npn,TDP,si	1.2	.006	200	25	200	50	.01	250	10	.05	
	PT720	PSI	npn,TDP,si	1.2	.006	200	25	200	80	5	250	15	.05	
	PT886	PSI	npn,TDP,si	1.6	.01	175	22	–	–	.3	180	–	.150	
	PT887	PSI	npn,TDP,si	1.6	.01	175	45	–	–	.3	180	6	.750	
	PT888	PSI	npn,TDP,si	1.6	.01	175	45	–	–	.3	180	4	1.000	
	2N94	SY	npn,AJ,ge	2	150	85	2.5	*20	50	50	50	–	–	
	2N139	SY	pnp,AJ,ge	2(min.)	80	85	.75	*20	15	22-110	50	–	–	
	2N193	SY	npn,AJ,ge	2	150	85	2.5	*18	50	9	50	–	–	
HF 3	2N194	SY	npn,AJ,ge	2	150	85	2.5	*18	50	10	50	–	–	Mixer
	2N194A	SY	npn,AJ,ge	2	150	85	2.5	*18	50	10	50	–	–	Converter
	2N211	SY	npn,AJ,ge	2	50	70	1.1	*10	50	5-15	20	–	–	
	2N233A	SY	npn,AJ,ge	2	150	85	2.5	*18	50	30	50	–	–	
	2N413A	SY	pnp,AJ,ge	2	150	85	2.5	*15	200	–	10	–	–	GI
	2N515	SY	npn,AJ,ge	2	50	75	1	*18	10	25-50	50	–	–	
	2N516	SY	npn,AJ,ge	2	50	75	1	*18	10	5-15	50	–	–	
	2N517	SY	npn,AJ,ge	2	50	75	1	*18	10	10-60	50	–	–	
	2N519A	GI	pnp,AJ,ge	2	150	100	2	*25	–	25	1	12	14	IND, KF
	2N1026	SSD	pnp,AJ,si	**2	250	175	1.7	35	100	18-44	0.025	–	7	KF, NA
HF 4	2N1469	SSD	pnp,AJ,si	**2	150	150	1.2	35	100	36	25	–	7	KF
	2N1840	PSI	npn,TDP,si	2	.013	175	25	500	15	.3	180	–	–	
	2N413	RA	pnp,FA,ge	2.5	150	85	–	18	200	30	2.0	7	–	IND, US, KF, GI
	2N1342	PSI	npn,TDP,si	2.8	.018	175	150	300	12	.01	190	8	.7	
	2N356	RCA	pnp,AJ,ge	3	100	85	1.67	20	–	–	5	–	12	GI, SY, TI
	2N438	GI	npn,AJ,ge	3	100	85	1.67	*30	–	–	10	–	12	TI
	2N438A	GI	npn,AJ,ge	3	150	85	2.5	*30	–	–	10	–	12	RA, TI
	2N445A	GI	npn,AJ,ge	3	150	100	2	*30	–	70	2	12	14	TI
	2N481	US	pnp,AJ,ge	3	200	85	3	30	20	50	3	–	14	
	2N1302	TI	npn,ge	3	150	100	2.0	*25	300	20*	3	3.6	12	
HF 5	2N1564	PSI	npn,TDP,si	3	.02	175	80	50	30	.01	190	–	–	
	2N1565	PSI	npn,TDP,si	3	.02	175	80	50	60	.01	190	–	–	
	2N1566	PSI	npn,TDP,si	3	.02	175	80	50	130	.01	190	–	–	
	2N1889	PSI	npn,TDP,si	3	.017	200	100	–	80	.001	190	–	–	
	2N1890	PSI	npn,TDP,si	3	.017	200	100	–	200	.001	190	–	–	
	2N1893	PSI	npn,TDP,si	3	.017	200	120	500	80	.001	190	–	–	
	2N1893A	PSI	npn,TDP,si	3	.017	200	140	500	90	.001	190	–	–	
	2N1506A	PSI	npn,TDP,si	3.5	.02	200	80	500	60	.005	190	10	1.3	
	2N482	IND	pnp,AJ,ge	3.5	150	85	2.5	*14	200	50	3	–	12	US, TI
	TR-482	IND	pnp,AJ,ge	3.5	150	85	2.5	14	200	20	3	–	12	
HF 6	PT1558	PSI	npn,TDP,si	4	.023	200	80	–	40	.005	210	10	1	
	2N212	SY	npn,AJ,ge	4	150	85	2.5	*18	50	20	50	–	–	Converter
	2N385	SY	npn,AJ,ge	4	150	100	2.0	*25	–	–	35	–	4	GI, TI
	2N414A	SY	pnp,AJ,ge	4	150	85	2.5	*15	200	–	20	–	–	KF,GI,AMP
	2N1027	SSD	pnp,AJ,si	**4	250	175	1.7	15	100	18	0.025	–	7	KF
	2N1058	SY	npn,AJ,ge	4	50	75	1	*18	–	15	50	–	–	Converter
	2N94A	SY	npn,AJ,ge	5	150	85	2.5	*20	50	19	50	–	–	
	2N292	GE	npn,AJ,ge	5	65	85	.9	15	20	6-44	5	–	–	
	2N388A	RCA	npn,ge	5	150	–	–	*40	200	30*	–	–	–	TI
	2N395	RA	pnp,AJ,ge	5	150	85	–	25	–	40	2.0	–	12	TO-5 RF Switch, TI, RCA
HF 7	2N439	GT	npn,AJ,ge	5	100	85	1.67	*30	–	–	10	–	12	SY, TI
	2N439A	RA	npn,AJ,ge	5	150	85	2.5	*30	–	–	10	–	12	TI
	2N448	GE	npn,RG,ge	5	65	85	1.1	15	20	25	5	–	2.4	
	2N520A	GI	pnp,AJ,ge	5	150	100	2	*25	–	100	1	12	14	IND, KF, TV
	2N634	GE	npn,AJ,ge	5	150	85	2.5	*20	–	–	5	–	12	TI
	2N483	IND	pnp,FA,ge	5.5	150	85	–	*12	20	60	3.0	–	–	US, TI
	2N357	RCA	npn,AJ,ge	6	100	85	1.67	*20	–	–	5	–	12	GI, SY, TI
	2N377	SY	npn,AJ,ge	6	150	100	2.0	*25	–	–	5	–	12	TI
	2N446A	GI	npn,AJ,ge	6	150	100	2	*30	–	120	2	12	14	TI
	2N483	US	pnp,AJ,ge	6	150	85	2.5	12	20	65	1.5	10	*12	

NEWEST
MICROELECTRONIC



close matching

9 New Differential Amplifier Transistors feature close matching of characteristics: $\triangle V_{BE}$ as low as 5 mV maximum. ☐ Other features include: temperature tracking of V_{BE} — $\triangle (V_{BE_1} - V_{BE_2}) / \triangle T$ as low as $10\mu V/°C$.; extremely high beta — up to 50 min. at $1\mu A$ matched to within 10%; and low noise typically 2db. Extremely low leakage — as low as 1nA max. at 30 volts. ☐ Because these devices eliminate common-mode signals and allow use of balanced inputs to minimize input drift, they find application in low drift DC amplifiers, operational amplifiers, telemetry, comparators and analog-digital converters. These new microelectronic devices have two closely matched low-level NPN silicon planar transistors, electrically isolated but thermally connected, in a single 6-lead TO-5 package. Production quantities are presently available. ☐ Sales Offices: Chicago, Illinois; Los Angeles, California; Oakland, New Jersey; Medford, Massachusetts; Sykesville, Maryland; Bethpage, L. I., New York. ☐ Write today for technical bulletin. *SPERRY SEMICONDUCTOR, Norwalk, Connecticut.*

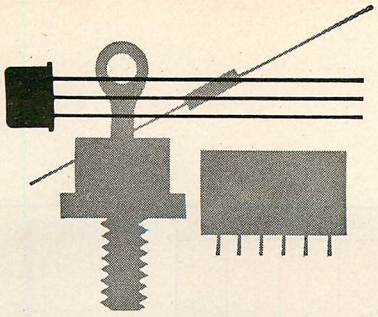
SPERRY
DIVISIONS OF SPERRY RAND CORPORATION

ON READER-SERVICE CARD CIRCLE 444

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} $*f_T$ $**f_{ab}$ (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} $*V_{CBO}$ (v)	I_C (ma)	CHARACTERISTICS h_{fe} $*h_{FE}$	I_{CO} (μa)	NF (db)	C_{oe} $*C_{ob}$ (pf)	Remarks
HF 8	OC45	AMP	pnp,PADT,ge	6	83	75	–	*15	10	100	0.5	–	–	
	2N139	RCA	pnp,AJ,ge	6.8	80	85	1	16	15	48	6	8	–	SY
	2N218	RCA	pnp,AJ,ge	6.8	80	85	–	16	15	48	6	–	–	
	2N409	RCA	pnp,AJ,ge	6.8	80	85	–	13	15	48	10	–	–	SY
	2N410	RCA	pnp,AJ,ge	6.8	80	85	–	13	15	75	10	–	–	
	2N414	RA	pnp,FA,ge	7	150	85	–	*15	200	60	2.0	6	–	IND, US, TS, GE, RCA, AMP, TI
	2N439	GI	npn,AJ,ge	7	100	85	–	*20	400	45	3	–	9	TO-5 RF Switch, SY
	2N1090	RA	npn,AJ,ge	7	150	85	–	18	100	50	3	–	9	TO-5 RF Switch
	CK14	RA	pnp,FA,ge	7	80	85	–	15	200	60	2.0	6	–	
	2N485	IND	pnp,AJ,ge	7.5	200	85	3	30	20	50	3	–	12	US
HF 9	2N168A	GE	npn,RG,ge	8	65	85	1.1	15	20	40	5	–	2.4	
	2N169	GE	npn,RG,ge	8	65	85	1.1	15	20	72	5	–	2.4	
	2N293	GE	npn,RG,ge	8	65	85	1.1	15	20	25	5	–	2.4	
	2N388	GI	npn,AJ,ge	8	150	100	2.0	*25	–	–	5	–	12	SY, TI
	2N396	RA	pnp,AJ,ge	8	150	85	–	20	–	60	2.0	–	12	TI
	2N449	GE	npn,RG,ge	8	65	85	1.1	15	20	72	5	–	2.4	
	2N471A	TR	npn,GJ,si	8	200	200	30	30	25	10-25	.02	22	7	TI
	2N472A	TR	npn,GJ,si	8	200	200	45	45	25	10-25	.02	22	7	TI
	2N581	RA	pnp,AJ,ge	8	100	85	–	15	100	30	3	–	12	TO-5 RF Switch, RCA
	2N957	PSI	npn,TDP,si	.8	.006	150	40	–	*45	.01	250	–	–	
HF 10	2N1086	GE	npn,RG,ge	8	65	85	1.1	9	20	40	3	–	2.4	
	2N1086A	GE	npn,RG,ge	8	65	85	1.1	9	20	40	3	–	2.4	
	2N1087	GE	npn,RG,ge	8	65	85	1.1	9	20	40	3	–	2.4	
	2N1121	GE	npn,RG,ge	8	65	85	1.1	15	20	72	5	–	2.4	
	2N1478	GI	pnp,fe	8	150	100	2	*1	100	70	5	–	15	
	2N1624	GI	npn,ge	8	150	100	2	*0.5	30	120	5	–	20	
	2N2085	GI	npn,ge	8	150	100	2	*0.25	10	100	5	–	20	
	2N358	GI	npn,AJ,ge	9	100	85	1.67	*20	–	–	5	–	12	SY, TI
	2N521A	GI	pnp,AJ,ge	9	150	100	2	*25	–	150	1	12	14	
	2N140	RCA	pnp,AJ,ge	10	80	85	–	16	15	75	6	8	–	SY
HF 11	2N219	RCA	pnp,AJ,ge	10	80	85	–	16	15	75	6	–	–	
	2N411	RCA	pnp,AJ,ge	10	80	85	–	13	15	75	10	–	–	SY
	2N414B	IND	pnp,AJ,ge	10	200	85	2.5	14	200	90	3	–	12	IND, KF
	2N416	RA	pnp,FA,ge	10	150	85	–	*12	200	80	2.0	4	–	IND, US, GI, TS, KF, AMP
	2N440	GI	npn,AJ,ge	10	100	85	1.67	*30	–	–	10	–	12	SY, TI
	2N440A	GI	npn,AJ,ge	10	150	85	2.5	*30	–	–	10	–	12	RA, TI
	2N447A	GI	npn,AJ,ge	10	150	100	2	*30	–	150	2	12	14	TI
	ST905	TR	npn,GR,si	10	150	150	1.0	*30	–	65	0.1	25	7	
	2N473	TR	npn,GR,si	10	200	200	–	*15	25	20-50	.02	20	7	TI
	2N474	TR	npn,GR,si	10	200	200	–	*30	25	20-50	.02	20	7	TI
HF 12	2N474A	TR	npn,GJ,si	10	200	200	–	30	25	20-50	.02	20	7	TI
	2N475	TR	npn,GR,si	10	200	200	–	*45	25	20-50	.02	20	7	TI
	2N484	US	pnp,FA,ge	10	150	85	–	*12	20	90	3.0	–	–	TI
	2N2425	KF	pnp,AJ,si	10	375	200	–	50	50	60	0.1	10	7	
	2N118A	TR	npn,GR,si	11	150	175	–	*30	25	19-90	0.1	27	7	JAN, TI
	2N478	TR	npn,GR,si	11	200	200	–	*15	25	40-100	0.2	20	7	TI
	2N479	TR	npn,GR,si	11	200	200	–	30	25	40-100	.02	20	7	TI
	2N479A	TR	npn,GJ,si	11	200	200	–	30	25	40-100	.02	20	7	TI
	2N480	TR	npn,GR,si	11	200	200	–	45	25	40-100	.02	20	7	TI
	2N1417	TR	npn,GR,si	11	150	150	–	*15	25	30-200	0.1	19	7	AMP
HF 13	2N1418	TR	npn,GR,si	11	150	150	–	30	25	30-200	0.1	19	7	NA
	ST15	TR	npn,GR,si	11	200	200	–	15	25	10-100	.02	22	7	
	ST35	TR	npn,GR,si	11	200	200	–	30	25	10-100	.02	22	7	2N332
	ST45	TR	npn,GR,si	11	200	200	–	45	25	10-100	.02	22	7	
	ST904A	TR	npn,GR,si	11	150	150	1.0	30	–	60	0.1	25	7	
	ST910	TR	npn,GR,si	11	150	150	1.0	*30	–	140	0.1	20	7	
	2N397	RA	pnp,AJ,ge	12	150	85	–	15	–	80	2.0	–	12	TO-5, RF Switch, KF, TI, RCA
	2N486	IND	pnp,AJ,ge	12	–	85	3	30	20	100	3	–	12	RA, US
	2N751	RA	npn,DJ,si	12	150	175	0.75	20	50	4	0.01	–	6	
	4C28	GE	npn,GD,si	12	150	125	–	*40	25	15	2	20	*20	
HF 14	4C29	GE	npn,GD,si	12	150	125	–	*40	25	30	2	20	*20	
	4C30	GE	npn,GD,si	12	150	125	–	*40	25	55	2	20	*20	
	4C31	GE	npn,GD,si	12	150	125	–	*40	25	115	2	20	*20	
	2N541	TR	npn,GR,si	15	200	200	–	*15	25	80-200	0.2	20	7	NA, TI
	2N542	TR	npn,GR,si	15	200	200	–	*30	25	80-200	0.2	20	7	NA, TI
	2N542A	TR	npn,GJ,si	15	200	200	–	30	25	80-200	0.2	20	7	
	2N543	TR	npn,GR,si	15	200	200	–	*45	25	80-200	0.2	20	7	NA, TI
	2N602A	GI	pnp,DR,ft	15	120	85	2	*30	50	50	5	25	7	
	2N1091	RA	npn,AJ,ge	15	150	85	–	15	100	70	3	–	9	TO-5 RF switch
	2N2424	KF	pnp,AJ,si	15	375	200	–	40	50	80	0.1	10	7	

HUGHES SEMICONDUCTOR BUYERS' GUIDE



HUGHES® DIODES

Silicon MICROSEAL* Diodes — Zener and Computer Types With or without welded leads, or in circuit arrays (0.062" dia .x 0.030" thick). Rated 150 mW free air (minimum), 500 mW mounted in circuit boards, to 1 watt infinite heat sink. Microminiature devices for high density circuit applications. Representative Types are E.I.A. equivalents: 1N46-59, 1N625-27, 1N903-08, 1N914, 1N916, 1N1934-37, 1N3064 and 1N3067.

Silicon Zener Diodes Power Dissipation up to 500 mW. Hard backs with extremely low noise and dynamic impedance. Stable alloy process. Excellent voltage regulation as low as ±3% at low current level. Representative Types: 1N702-726A, 1N746-759A, 1N957-975B, 1N761-769, 1N1929-1937.

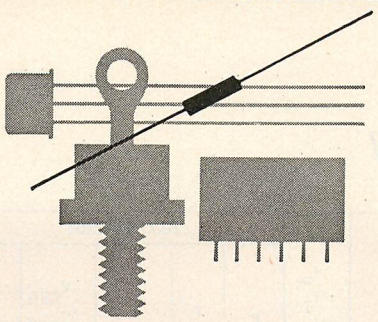
Silicon Capacitor Diodes Medium Q devices with good stability and low leakage. Capacitance ranges from 20 to 100 pf (tolerance as low as ±5%) with maximum bias voltage variations up to 150 volts. Representative Types: 1N950-956.

Silicon Computer Diodes Diffused planar passivated. Inversive working voltages to 100 volts. Recovery times as low as 2 nsec using a sampling scope circuit. Representative Types: 1N903-08, 1N914, 1N916, 1N3064 and 1N3067.

Germanium Point Contact Diodes The first industry standard subminiature glass general purpose and computer diode. Proven stability with inverse working voltages to 190 volts. Recovery times as low as 0.75 nsec using a sampling scope. Representative Types: 1N198B, 1N933, HPS, 1600 series.

Germanium Gold Bonded Diodes General purpose and computer applications. Recovery times as low as 3.5 nsec. Improved rugged mechanical stability withstands 30,000 G's centrifuge and 3,000 G's shock. Representative Types: 1N270, 1N276, 1N277 and HD1800 series.

Silicon General Purpose Alloy Diodes and Rectifiers Power Dissipation to 250 mW. Forward currents to 0.2 amps. Oxide-coated (surface passivated) units with working inverse voltages up to 1,000 volts. Representative Types: 1N456-459, 1N482B-488B, 1N846-889.



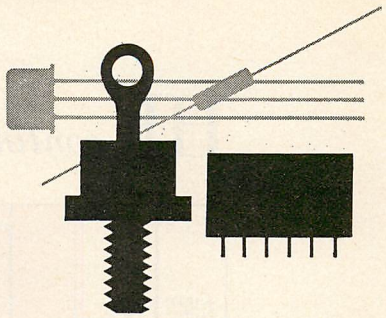
HUGHES TRANSISTORS

PNP Silicon Alloy Junction Transistors 2N1034, 2N1035, 2N1036, 2N1037, 2N1228 through 2N1234, 2N1238 through 2N1244, 2N327A, 2N328A, (also USA 2N328A), 2N329A, HA7597, HA7598, HA7599, HA7520 through HA7529, HA7530, through HA7539 . . . available in the standard TO-5 package or the Hughes coaxial package with up to 5 watts power dissipation. Manufactured by the evaporative-fusion technique which creates unusually low saturation resistance. Retain highly uniform characteristics from batch to batch, making possible much closer tolerances in the design of small-signal, high-temperature and amplifier circuits.

PNP Silicon Double Diffused Planar Transistors 2N1254, 2N1255, 2N1256, 2N1257, 2N1258, 2N1259, HA9048, HA9049, 2N1196, 2N1197, (also USA 2N1197), 2N869, 2N995 . . . most types available in any package configuration . . . TO-5, TO-18, TO-46, the Hughes MICROSEAL transistor...or any industry standard package. Offer many outstanding features: low collector capacitance, good low- and high-level gain characteristics, low leakage currents, low stored base charge, typical f_t of 75 mc. High breakdown voltages in combination with gains, plus exceptionally fast-switching capabilities, make these superior general purpose units.

2N1131, 2N1131A, 2N1132, 2N1132A, 2N1132B, 2N1991 . . . available in any package configuration . . . TO-5, TO-18, TO-46, the Hughes MICROSEAL transistor . . . or any industry standard package. Used extensively in advanced missile, satellite and computer applications. Feature high breakdown voltages, exceptionally low leakage currents, typically 20 nanoamps, measured at stringent bias conditions. Most types offer guaranteed switching times of less than 50 nanoseconds.

NPN Silicon Double Diffused Planar Transistors 2N706, 2N706A, 2N706B, 2N707, 2N726, 2N753 Planar, 2N1613, 2N708 Planar, 2N743, 2N744 Epitaxial, 2N913, 2N914 Planar Epitaxial...available in any package configuration . . . TO-5, TO-18, TO-46, the Hughes MICROSEAL transistor...or any industry standard package.



HUGHES RECTIFIERS

Miniature High-Power Rectifiers These 1 amp devices are available from 50 to 3,000 volts PIV in the DO-7 package.

Standard Metal Package Rectifiers Available at ratings of 6, 12, 20 and 35 amps. PIV ratings are from 50 to 1,000 volts for the 6 and 12 amp packages. (DO-4 and DO-10), and from 50 to 600 volts in the 20 and 35 amp packages (DO-5 and DO-11).

Fast-Switch Rectifiers Hughes' new HF series (1 to 30 amp) "Golden Line" rectifiers have recovery times of less than 200 nanoseconds. Typical room temperature reverse leakage currents at rated PIV of 15 to 80 μamps for 1 to 30 amp devices, respectively. Maximum forward voltage drop of less than 1.4 volts at rated current.

Stacked Rectifiers and Assemblies Custom designed stacked rectifiers are available up to 60 kv with currents up to 20 amp. These designs make use of the R-C compensation to assure long life and high reliability.

Bridge assemblies for 3-phase and single-phase designs and potted configurations available—minimum deliveries and costs.

HUGHES PACKAGED ASSEMBLIES

Packaged Assemblies Standard and custom assemblies encapsulated in epoxy. These offer impressive savings in time, money and space.

Typical assemblies include: single-phase and 3-phase bridges, voltage doublers and quadruplers, ring modulators, matched pairs, matched quads, phase detectors, computer modules, cartridge rectifiers or any custom units.

For more details on any of these products contact your nearest Hughes representative. Or write: Hughes Semiconductor Division Marketing Department, Newport Beach, California.

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PACKAGED ASSEMBLIES • CRYSTAL FILTERS

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Creating a new world with electronics

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HUGHES AIRCRAFT COMPANY
SEMICONDUCTOR DIVISION

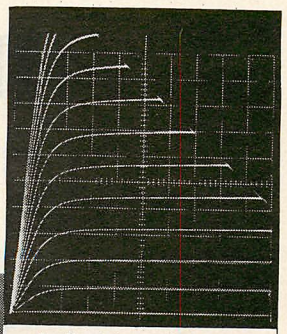
ON READER-SERVICE CARD CIRCLE 445

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P (mw)	T_j (°C)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS *h_{FE}	I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	Remarks
	OC44	AMP	pnp,PADT,ge	15	83	75	–	*15	10	100	0.5	–	–	
	2N388A	TI	npn,AJ,ge	**16	150	–	–	40	200	*60-180	5	–	20*	
	2N476	TR	npn,GJ,si	17	200	200	–	*15	25	30-60	.02	19	8	TI
	2N477	TR	npn,GJ,si	17	200	200	–	*30	25	30-60	.02	19	8	TI
	2N522A	GI	pnp,AJ,ge	17	150	100	2	*25	–	200	1	12	14	KF, TI
HF 15														
	2N582	RA	pnp,AJ,ge	18	100	85	–	*14	100	60	3	–	12	TO-5 RF switch, TI
	2N1118	PH	pnp,SAT,si	18	150	140	1.3	*25	50	20	–	–	*6	SPR, KF, MIL
	2N1118A	PH	pnp,SAT,si	18	150	140	1.3	*25	50	25	–	–	*6	SPR
	2N232	PH	pnp,SBT,ge	20	9	55	0.9	*4.5	4.5	39	6	–	*6	SPR
	2N417	RA	pnp,FA,ge	20	150	85	–	*10	200	140	2.0	4	–	IND, US, GI, TS, KF, TI
	2N602	GI	pnp,Dr,ge	20	120	85	2	*20	–	–	3	14	4	TI
	2N1899	PSI	npn,DM,si	20	125 w	150	1000	140	10a	10	20ma	–	600	hi freq., hi pwr
	2N1902	PSI	npn,DM,si	20	125	150	1	140	10a	10	20	–	–	
	2N1903	PSI	npn,DM,si	20	125	150	1	140	10a	10	20	–	–	
	2N1904	PSI	npn,DM,si	20	125	150	1	140	10a	10	20	–	–	
HF 16														
	2N1907	TI	pnp,AD,ge	*20	150 w	–	–	100	20a	*10	0.3ma	–	–	
	2N1908	TI	pnp,AD,ge	*20	150 w	–	–	130	20a	*10	0.3ma	–	–	
	2N2551	HU	pnp,A,si	*20	400	160	3.0	.150	.1	*90	6	*1.0	200	
	PT900	PSI	npn,DM,si	20	125 w	150	1000	80	10a	3	40	–	600	hi freq., hi powr.
	PT901	PSI	npn,Ms,si	20	125 w	150	1000	140	10a	10	30	–	600	Hi frequency,
	2N495	PH	pnp,SA,si	21	150	140	1.3	*25	50	30	.002	–	*6	MIL
	2N523A	GI	pnp,AJ,ge	23	150	100	2	*20	–	300	1	12	14	IND,KF
	2N1428	PH	pnp,SAT,si	23	100	140	0.86	*6	50	45	.001	–	*7	
	2N1429	PH	pnp,SAT,si	23	100	140	0.86	*6	50	45	.001	–	*7	
	2N1677	PH	pnp,SAT,si	23	100	140	0.87	*4.5	50	50	.001	–	*7	SPR, chopper
HF 17														
	2N1065	GI	pnp,Dr,ge	25	120	85	2	*40	–	–	4	12	3	
	2N1900	PSI	npn,DM,si	25	125 w	150	1000	140	5a	10	20ma	–	600	hi freq., hi pwr.
	2N1901	PSI	npn,DM,si	25	125 w	150	1000	140	a	15	20ma	–	600	hi freq., hi pwr.
	2N274	RCA	pnp,Dr,ge	30	120	85	–	*40	10	60	16	–	–	
	2N370	RCA	pnp,Dr,ge	30	24	85	–	*40	10	60	20	–	–	SY
	2N371	RCA	pnp,Dr,ge	30	80	85	–	20	10	–	20	–	–	SY
	2N372	RCA	pnp,Dr,ge	30	80	85	–	20	10	60	20	–	–	Mixer, SY
	2N373	RCA	pnp,Dr,ge	30	80	85	–	25	10	60	8	–	–	SY
	2N374	RCA	pnp,Dr,ge	30	80	85	–	25	10	60	8	–	–	converter, SY
	2N1224	RCA	pnp,Dr,ge	30	120	85	–	*40	10	60	12	–	–	GI, AMP, SY
HF 18														
	2N1226	RCA	pnp,Dr,ge	30	120	85	–	*60	10	60	16	–	–	AMP
	2N1395	RCA	pnp,Dr,ge	30	120	85	–	*40	10	90	16	–	–	AMP
	2N1709	PSI	npn,DM,si	30	130	175	86.7	75	1.2a	–	–	–	40	Hi freq., hi pwr.
	2N1710	PSI	npn,DM,si	30	130	175	86.7	60	1.2a	–	50	*	40	Hi freq., hi pwr.
	2N1750	PH	pnp,SBT,ge	30	15	75	0.5	*14	5	*18	2	–	*6	
	2N2225	KF	pnp,AJ,ge	30	225	100	–	15	500	300	–	3	10	
	2N2595	SSD	pnp,DP,si	*30	4.0	200	2.3	60	–	15-60	25na	–	*6	
	2N2598	SSD	pnp,DP,si	*30	4.0	200	2.3	80	–	15-60	25na	–	6	
	MHT-6001	MH	npn,DP,si	30	40 w	175	270	*100	5a	10-120	1	–	–	
	2N1425	RCA	pnp,Dr,ge	33	80	71	–	24	10	50	12	–	–	
HF 19														
	2N1426	RCA	pnp,Dr,ge	33	80	71	–	24	10	130	12	–	–	
	2N1524	RCA	pnp,Dr,ge	33	80	71	0.4	24	10	60	16	–	2	GI
	2N1525	RCA	pnp,Dr,ge	33	80	71	0.4	24	10	60	16	–	2	GI
	2N1526	RCA	pnp,Dr,ge	33	80	71	0.4	24	10	130	16	–	–	GI
	2N1527	RCA	pnp,Dr,ge	33	80	71	0.4	24	10	130	16	–	–	GI
	2N934	RCA	pnp,ge	*35	150	–	–	13	200	*60	–	–	–	
	2N603	GI	pnp,Dr,ge	40	120	85	2	*30	–	–	3	14	3	TI
	2N603A	GI	pnp,DR,ft	40	120	85	2	*30	50	60	5	25	5	
	2N750	RA	npn,DJ,si	40	150	175	0.75	50	50	7	10	–	6	
	2N1633	RCA	pnp,Dr,ge	40	80	71	0.4	34	10	75	16	–	–	GI
HF 20														
	2N1634	RCA	pnp,Dr,ge	40	80	71	0.4	34	10	75	16	–	–	GI
	2N1638	RCA	pnp,Dr,ge	40	80	71	0.4	34	10	75	7	–	2	GI
	2N3746	RCA	pnp,Dr,ge	40	80	71	–	34	20	.985	16	–	3.8	
	2N640	RCA	pnp,Dr,ge	42	80	85	0.75	34	10	60	5	–	–	GI
	2N641	RCA	pnp,Dr,ge	42	80	85	0.75	34	10	60	7	–	–	GI
	2N642	RCA	pnp,Dr,ge	42	80	85	0.75	34	10	60	7	–	–	GI
	2N754	TR	npn,DJ,si	44	300	175	–	*60	50	20-80	1	–	8	
	2N755	TR	npn,DJ,si	44	300	175	–	*100	50	20-80	1	–	8	
	2N839	TR	npn,DJ,si	44	300	175	–	*45	25	20-45	0.1	15	–	TMT839 (150mw)
	2N840	TR	npn,DJ,si	44	300	175	–	*45	25	40-90	0.1	15	8	TMT840 (150mw)
HF 21														
	TMT842	TR	npn,DJ,si	44	150	175	–	*45	25	20	0.1	–	6	
	2N1196	HU	pnp,MS,si	45	385	200	2	70	–	–	–	–	4	
	2N1631	RCA	pnp,Dr,ge	45	80	71	0.4	34	10	80	16	–	2	GI
	2N1632	RCA	pnp,Dr,ge	45	80	71	0.4	34	10	80	16	–	2	GI
	2N1635	RCA	pnp,Dr,ge	45	80	71	0.4	34	10	75	16	–	–	GI

TEKTRONIX TRANSISTOR-CURVE TRACER

INVALUABLE TOOL FOR EVALUATING SEMICONDUCTOR DEVICES



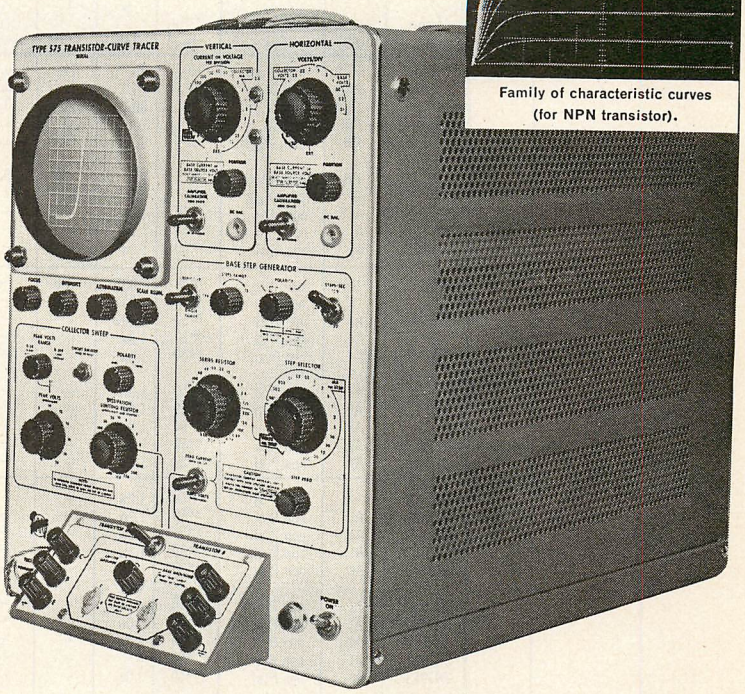
Family of characteristic curves (for NPN transistor).

With a Type 575, you can plot and measure 7 different transistor characteristics. You can display 4 to 12 curves per family—with input current from 1 microampere/step to 200 milliamperes/step or input voltage from 10 millivolts/step to 200 millivolts/step—in repetitive or single-family presentations. You can select either common-emitter or common-base configurations.

The Type 575 provides 20-ampere collector displays (10-ampere average supply current), two ranges of collector supply (0 to 20 volts, 0 to 200 volts), and 2.4-ampere base supply (positive or negative base stepping).

Add a Type 175 Adapter and you extend the range of collector displays 10 times and the range of base supply 5 times.

You can also test diodes under a wide variety of conditions and observe waveform characteristics on the 5-inch crt with a high degree of accuracy.



Type 575 Calibrated Displays

Vertical Axis—Collector Current, 16 steps from 0.01 ma/div to 1000 ma/div. Pushbuttons are provided for multiplying each current step by 2 and dividing by 10, increasing the current range to 0.001 ma/div to 2000 ma/div.

Horizontal Axis—Collector Voltage, 11 steps from 0.01 v/div to 20 v/div.

Both Axes—Base Voltage, 6 steps from 0.01 v/div to 0.5 v/div. Base Current, 17 steps from 0.001 ma/div to 200 ma/div. Base Source Voltage, 5 steps from 0.01 v/div to 0.2 v/div.

Type 575 Transistor-Curve Tracer $1075

U.S. Sales Prices f.o.b. Beaverton, Oregon

HIGH-CURRENT ADAPTER

For measuring high-powered semiconductor devices which exceed the current capabilities of a Type 575, ask your Tektronix Field Engineer about the Type 175 High-Current Adapter. Not intended for separate use, the Type 175 depends upon the circuitry and crt of a Type 575 to provide *200-ampere collector displays, three ranges of collector supply, and 12-ampere base supply*—for calibrated displays with Collector Current on the Vertical Axis and either Collector Voltage or Base Voltage on the Horizontal Axis.

Type 175 Transistor-Curve Tracer
High-Current Adapter $1475

HIGH-VOLTAGE TYPE 575

Supplied on order from your Tektronix Field Engineer is a special model of the Type 575 Transistor-Curve Tracer. Although similar to the Type 575, the special model provides much higher diode breakdown test voltage (*variable from zero to 1500 volts* at a maximum current of 1 milliampere) and also much higher Collector Supply (*up to 400 volts*, at 0.5 ampere).

For complete specifications of this special model—call your Tektronix Field Engineer.

Type 575 Mod 122C $1325

. . . for more information about evaluating semiconductor devices with a Type 575 or other Tektronix test equipment, please call your Tektronix Field Engineer. He will be glad to assist you.

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ON READER-SERVICE CARD CIRCLE 446

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} $*f_T$ $**f_{ab}$ (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} $*V_{CBO}$ (v)	I_C (ma)	CHARACTERISTICS h_{fe} $*h_{FE}$	I_{CO} (μa)	NF (db)	C_{oe} $*C_{ob}$ (pf)	Remarks
	2N1636	RCA	pnp,Dr,ge	45	80	71	0.4	34	10	75	16	–	–	GI
	2N1637	RCA	pnp,Dr,ge	45	80	71	0.4	34	10	80	5	–	–	GI
	2N1639	RCA	pnp,Dr,ge	45	80	71	0.4	34	10	75	7	–	2	GI
	2N344	PH	pnp,SB,ge	50	20	55	1.33	*5	5	22	0.7	–	*3	SPR
	2N345	PH	pnp,SA,ge	50	20	55	1.33	*5	5	35	0.7	–	*3	SPR
HF 22														
	2N393	PH	pnp,MA,ge	50	25	100	0.63	*6	50	155	5	–	*2	SPR,GI
	2N604	GI	pnp,Dr,ge	50	120	85	2	*30	–	–	4	14	3	TI
	2N738	AI	npn,P,si	**50	1.0w	–	–	*125	–	*15	.01	–	*8.0	
	2N739	AI	npn,P,si	**50	1.0w	–	–	*125	–	*30	.01	–	*8.0	
	2N740	AI	npn,P,si	**50	1.0w	–	–	*125	–	*60	1.0	–	*8.0	
	2N759	GE	npn, si	**50	500	200	–	45	–	36	0.2	–	8	Planar Passivated
	2N760	GE	npn,si	**50	500	200	–	45	–	76	0.2	–	8	Planar Passivated
	2N760A	AI	npn,P,si	**50	1.50w	–	–	*60	–	*205	0.01	–	*8.0	
	2N870	AI	npn,P,si	**50	1.8w	–	–	*100	–	*200	.01	–	*8.0	
	2N871	AI	npn,P,si	**50	1.8w	–	–	*100	–	*200	0.01	–	*8	
HF 23														
	2N910	AI	npn,P,si	**50	1.8w	–	–	*100	–	*75	2.05	–	*8.0	
	2N911	AI	npn,P,si	**50	1.8w	–	–	*100	–	*35	2.05	–	*8.0	
	2N912	AI	npn,P,si	**50	1.8w	–	–	*100	–	*15	2.05	–	*8.0	
	2N956	AI	npn,P,si	**50	1.8w	–	–	*75	–	*200	0.01	–	*8	
	2N998	AI	npn,P,si	**50	1.8w	–	–	*100	–	*5000	.01	–	*8.0	
	2N1564	AI	npn,P,si	**50	1.2w	–	–	*80	–	*15	1.0	–	*8.0	
	2N1565	AI	npn,P,si	**50	1.2w	–	–	*80	–	*30	.01	–	*8.0	
	2N1566	AI	npn,P,si	**50	1.2w	–	–	*80	–	*60	.01	–	*8.0	
	2N1572	AI	npn,P,si	**50	1.2w	–	–	*125	–	*15	1.0	–	*8.0	
	2N1573	AI	npn,P,si	**50	1.2w	–	–	*125	–	*30	1.0	–	*8.0	
HF 24														
	2N1574	AI	npn,P,si	**50	1.2w	–	–	*125	–	*60	1.0	–	*8.0	
	2N1889	AI	npn,P,si	**50	3.0w	–	–	*100	–	*200	0.01	–	*8	
	2N1890	AI	npn,P,si	**50	3.0w	–	–	*100	–	*200	0.01	–	*8	
	2N1972	AI	npn,P,si	**50	–	–	–	–	–	–	–	–	*8.0	
	2N1973	AI	npn,P,si	**50	3.0w	–	–	*100	–	*75	2.5	–	*8	
	2N1974	AI	npn,P,si	**50	3.0w	–	–	*100	–	*35	2.5	–	*8	
	2N1975	AI	npn,P,si	**50	3.0w	–	–	*100	–	*15	2.05	–	*8.0	
	2N1983	AI	npn,P,si	**50	2.0w	–	–	*50	–	2.0	5.0	–	*8.0	
	2N1984	AI	npn,P,si	**50	2.0w	–	–	*50	–	2.0	5.0	–	*8.0	
	2N1985	AI	npn,P,si	**50	2.0w	–	–	*50	–	*85	5.0	–	*8.0	
HF 25														
	2N1986	AI	npn,P,si	**50	2.0w	–	–	*50	–	*130	5.0	–	*8.0	
	2N1987	AI	npn,P,si	**50	2.0w	–	–	*50	–	*60	5.0	–	*8.0	
	2N1988	AI	npn,P,si	**50	2.0w	–	–	*100	–	*85	5.0	–	*8.0	
	2N1989	AI	npn,P,si	**50	2.0w	–	–	*100	–	*40	5.0	–	*8.0	
	2N1990	AI	npn,P,si	**50	2.0w	–	–	*100	–	*20	–	–	*8.0	
	2N2060	AI	npn,P,si	**50	1.5w	–	–	*100	–	*50	–	–	*8.0	
	2N2223	AI	npn,P,si	**50	1.6w	–	–	*100	–	*150	.01	–	*8.0	
	2N2223A	AI	npn,P,si	**50	1.6w	–	–	*100	–	*150	.01	–	*8.0	
	2N2453	AI	npn,P,si	**50	0.6w	–	–	*60	–	*80	.005	–	*8.0	
	2N2483	AI	npn,P,si	**50	1.2w	–	–	*60	–	–	.01	–	*8.0	
HF 26														
	2N2484	AI	npn,P,si	**50	1.2w	–	–	*60	–	*30	.01	–	*8.0	
	2N2590	SSD	pnp,DP,si	*50	4.0	200	2.3	60	–	30-80	25na	–	*5	
	3N36	GE	npn,MB,ge	50	30	85	0.5	6	20	2.2	3	–	2	tetrode
	ASA-2	AI	npn,P,si	**50	75w	–	–	*60	–	*45	.01	–	*8.0	
	ASA-31	AI	npn,P,si	**50	–	–	–	–	–	–	–	–	*8.0	
	ASA-51	AI	npn,P,si	**50	–	–	–	–	–	–	–	–	*8.0	
	ASA-100	AI	npn,P,si	**50	–	–	–	–	–	–	–	–	*8.0	
	ASA-1000	AI	npn,P,si	**50	–	–	–	–	–	–	–	–	*8.0	
	ASA-1003	AI	npn,P,si	**50	–	–	–	–	–	–	–	–	*8.0	
	ASA-1004	AI	npn,P,si	**50	–	–	–	–	–	–	–	–	*8.0	
HF 27														
	2N1197	HU	pnp,Ms,si	55	385	200	2	70	–	–	–	–	4	
	2N604A	GI	pnp,DR,ft	60	120	85	2	*30	50	70	5	25	5	
	TRS100	IND	npn,DM,si	*60	600	300	4	*150	500	*30	0.01	–	10	
	TRS101	IND	npn,DM,si	*60	600	300	4	*180	500	*25	0.01	–	15	
	TRS301	IND	npn,DM,si	*60	600	300	4	*300	500	*30	0.01	–	25	
	2N128	PH	pnp,SB,ge	60	25	85	0.82	*10	5	40	0.6	10	*2.5	SPR, MIL
	2N841	TR	npn,DJ,si	64	300	175	–	45	25	80-330	0.1	15	8	TMT841 (150 mw)
	TMT843	TR	npn,DJ,si	64	150	175	–	45	25	40	0.1	–	6	
	2N929	AI	npn,P,si	**70	0.1w	–	–	*45	–	*200	.01	–	*8.0	
	2N930	AI	npn,P,si	**70	0.1w	–	–	*45	–	*200	.01	–	*8.0	
HF 28														
	2N990	AMP	pnp,PADT,ge	70	67	75	1.33	20	10	75	–	–	–	RF, Mixer, Oscillator
	2N991	AMP	pnp,PADT,ge	70	67	75	1.33	*20	10	75	–	–	–	RF, Mixer, Oscillator
	2N992	AMP	pnp,PADT,ge	70	67	75	1.33	*20	10	75	–	–	–	RF, Mixer, Oscillator
	2N1335	PSI	npn,MS,si	70	2.3w	150	24	120	75	13	8	–	4	High freq., high power
	2N1336	PSI	npn,MS,si	70	2.3w	150	24	120	75	13	8	–	4	High freq., high power

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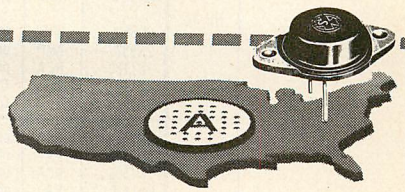


THE AVNET SYSTEM

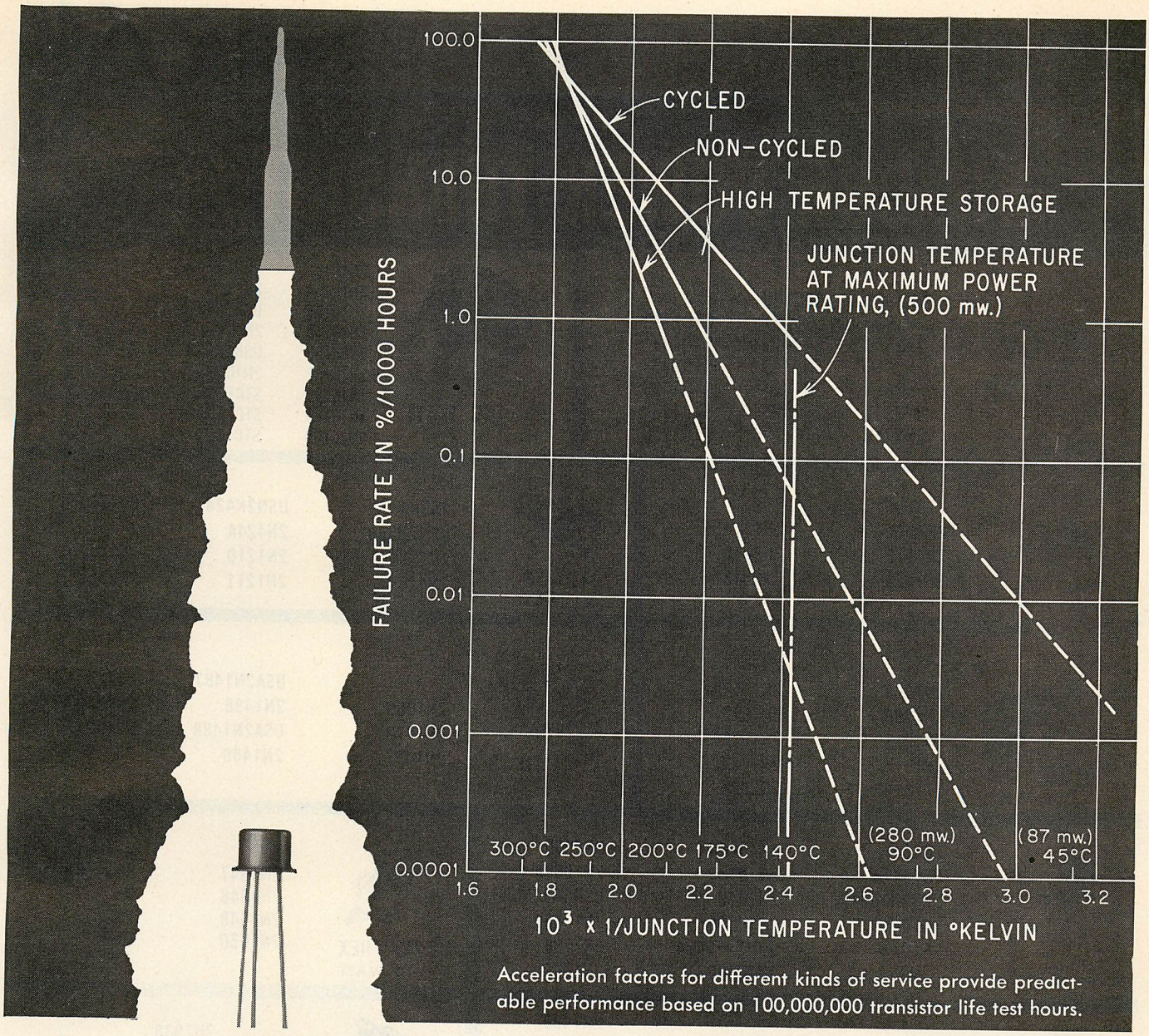
Men/Methods/Materials/Management

AVNET ELECTRONICS CORP.

ON READER-SERVICE CARD CIRCLE 447

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} $*f_T$ $**f_{ab}$ (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} $*V_{CBO}$ (v)	I_C (ma)	CHARACTERISTICS h_{fe} $*h_{FE}$	I_{CO} (μa)	NF (db)	C_{oe} $*C_{ob}$ (pf)	Remarks
HF 29	2N1337	PSI	npn,MS,si	70	2.8w	150	24	120	75	13	8	–	4	High freq., high power
	2N1339	PSI	npn,MS,si	70	2.8w	150	24	120	75	–	8	–	4	High freq., high power
	2N1340	PSI	npn,MS,si	70	2.8w		24	120	75	–	8	–	4	High freq., high power
	2N1341	PSI	npn,MS,si	70	2.8w	150	24	120	75	–	8	–	4	High freq., high power
	2N1505	PSI	npn,MS,si	70	3w	175	0.2	50	–	7	–	–	20	high freq., high power
	2N1506	PSI	npn,MS,si	70	3w	175	.2	60	9	–	–	–	8	High freq., high power
	2N1516	AMP	pnp,PADT,ge	*70	83	–	1.7	*20	10	100	–	–	–	RF-IF
	2N1517A	AMP	pnp,PADT,ge	*70	100	–	1.7	*40	10	150	–	–	–	
	2N2509	AI	npn,P,si	**70	1.20w	–	–	*125	–	–	.001	–	*8.0	
	2N2510	AI	npn,P,si	**70	1.20w	–	–	*100	–	–	.005	–	*8.0	
HF 30	2N2591	SSD	pnp,DP,si	*70	4.0	200	2.3	60	–	50-135	25na	–	*5	
	2N346	PH	pnp,SB,ge	75	20	55	1.3	*5	5	35	0.7	–	*3	SPR
	2N993	AMP	pnp,PADT,ge	75	83	75	1.7	*20	10	75	–	–	–	RF, Mixer, Osc., IF AM rec.
	2N2671	AMP	pnp,AD,ge	75	100	75	0.6	*32	10	150	–	–	–	
	2N2672	AMP	pnp,AD,ge	75	100	85	0.6	*32	10	15	1.2	1.5	–	
	2N2089	AMP	pnp,PADT,ge	75	100	85	0.6	*32	10	150	–	–	–	RF, Mixer, Osc., IF AM rec.
	2N2090	AMP	pnp,PADT,ge	75	67	75	.75	*32	10	150	–	–	–	RF, Mixer, Osc., IF AM rec.
	2N2091	AMP	pnp,PADT,ge	75	83	75	1.7	*20	10	150	–	–	–	RF, Mixer, Osc., IF AM rec.
	2N2092	AMP	pnp,PADT,ge	75	100	85	0.6	*32	10	150	–	–	–	IF, Mixer FM rec.
	2N2093	AMP	pnp,PADT,ge	75	100	85	1.7	*25	10	150	–	–	–	RF in FM rec.
HF 31	2N696	FA	npn,DP,si	80	2w	175	13.3	40	–	40	0.1	–	18	RA,MO,PSI,TR,TI,IND,SY,GI,US
	2N698	FA	npn,DP,si	80	2w	175	13.3	*80	–	30	0.1	–	12	RA, IND, TR, NA, GI, TI, PSI
	2N699	FA	npn,DP,si	80	2w	175	13.3	80	–	65	.01	–	12	RA, NA, MH, GI, TI, US, PSI
	2N706	FA	npn,DP,si	80	1w	175	6.7	25	–	12	.005	–	5	RA, NA, CL, GI, TI, TR, GE, MO
	2N1252	FA	npn,DP,si	80	2w	175	13.3	20	–	35	0.1	–	30	RA, TR. TI
	2N2511	AI	npn,P,si	**80	1.20w	–	–	*80	–	*80	.005	–	*8.0	
	2N2596	SSD	pnp, DP, si	*80	4.0	200	2.3	60	–	40-100	25na	–	*6	
	2N2597	SSD	pnp, DP, si	*80	4.0	200	2.3	60	–	80-200	25na	–	*6	
	2N2599	SSD	pnp, DP, si	*80	4.0	200	2.3	80	–	40-100	25na	–	*6	
	2N2600	SSD	pnp, DP, si	*80	4.0	200	2.3	80	–	80-200	25na	–	*6	
HF 32	MHT-4401	MH	npn,EP,si	80	4w	200	23	*60	500	20-120	1	–	30	
	MHT-4402	MH	npn,EP,si	80	4w	200	23	*120	500	20-120	2	–	20	
	MHT-4501	MH	npn,EP,si	80	10w	200	57	*60	1a	20-120	1	–	25	
	MHT-4502	MH	npn,EP,si	80	10w	200	57	*120	1a	20-120	2	–	29	
	2N844	TR	npn,DJ,si	86	300	175	–	*60	50	40-120	1	–	8	
	2N845	TR	npn,DJ,si	86	300	175	–	*100	50	40-120	1	–	8	
	2N2592	SSD	pnp,DP,si	*90	4.0	200	2.3	60	–	100-200	25na	–	*5	
	3N37	GE	npn,MB,ge	90	30	85	0.5	6	20	1.1	3	–	1.5	tetrode
	2N384	RCA	pnp,Dr,ge	100	80	85	–	30	10	60	16	–	–	
	2N697	FA	npn,DP,si	100	2w	175	13.3	40	75	0.01	–	18	–	RA,PSI,TR,US,MO,SY,NA,GI,TI
HF 33	2N702	GI	npn,si	100	360	175	2.4	*5	10	40	0.05	–	–	CL
	2N703	GI	npn,si	100	360	175	2.4	*5	10	70	0.5	–	–	CL
	2N735A	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	40-100	5na	–	*6	
	2N736B	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	80-200	5na	–	*6	
	2N739A	SSD	npn, DP, si	*100	4.0	200	2.3	80	–	40-100	5na	–	*6	
	2N740A	SSD	npn, DP, si	*100	4.0	200	2.3	80	–	80-200	5na	–	*6	
	2N758B	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	18-90	5na	–	*6	
	2N759B	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	36-90	5na	–	*6	
	2N760B	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	76-333	5na	–	*6	
	2N920	GI	npn,DM,si	100	1.2w	200	6.7	25	220	4	.005	–	5	(CL, Epitaxial)
HF 34	2N921	GI	npn,DM,si	100	1.2w	200	6.7	50	200	4	.005	–	4	(CL, Epitaxial)
	2N922	GI	npn,DM,si	100	1.2w	200	6.7	50	200	4	.005	–	4	(CL, Epitaxial)
	2N929A	SSD	npn, DP, si	*100	4.0	200	2.3	45	–	60-350	2na	4	*6	
	2N930A	SSD	npn, DP, si	*100	4.0	200	2.3	45	–	150-600	2na	3	*6	
	2N979	SPR	pnp,MD,ge	*100	60	100	0.8	*20	100	50*	18	–	*2.5	
	2N980	SPR	pnp,MD,ge	*100	60	100°c	0.8	*12	100	*70	1	–	*1.5	
	2N987	AMP	pnp,PADT,ge	100	86	90	1.33	*40	10	100	–	–	–	RF, Mixer, Osc.
	2N1180	RCA	pnp,Dr,ge	100	80	71	–	30	10	80	12	–	–	
	2N1224	GI	DR,ft	100	120	85	2	*12	1.5	60	5	–	5	
	2N1226	GI	DR,ft	100	120	85	2	*12	1.5	60	5	–	5	
HF 35	2N1225	RCA	pnp,Dr,ge	100	120	85	–	*40	10	60	12	–	–	AMP
	2N1253	FA	npn,DP,si	100	2w	175	13.3	20	–	45	0.1	–	30	RH, TI
	2N1396	RCA	pnp,Dr,ge	100	120	85	–	*40	10	90	16	–	–	AMP
	2N1420	FA	npn,DP,si	*100	2	175	0.013	30	–	130	0.01	–	–	GI, PSI
	2N1427	GI	MADT	100	60	100	0.8	*6	10	25	3	–	3.5	
	2N1499A	GI	MADT	100	60	100	0.8	*20	40	50	3	–	3	SPR
	2N1613	FA	npn,DP,si	100	3w	200	17.2	75	–	80	.0004	–	18	RA, GI, TI, MO, GE, PSI
	2N1748	PH	pnp,MD,ge	100	60	100	.8	*25	–	45	1.5	–	*1.3	
	2N1748A	PH	pnp,MD,ge	100	60	100	0.8	25	50	70	1.5	–	1.3	
	2N1749	PH	pnp,MD,ge	100	75	100	1	*40	10	45	1.5	–	*1.3	



General Electric transistors exceed Minuteman 99.999% reliability objective

General Electric has completed a silicon transistor reliability improvement program for the MINUTEMAN airborne guidance and control system where data on a single product has been accumulated for over 100,000,000 life test hours . . . unsurpassed in the semiconductor industry. The result is reliability without parallel. For instance, final-phase testing of 4,650 G.E. MINUTEMAN transistors to approximately 24,000,000 transistor hours at 288 mw resulted in ZERO failures. The MINUTEMAN Part transistor made by General Electric substantially exceeds the MINUTEMAN objective of an average failure rate of 0.001%/1000 hours in continuous operation at 87 mw (25°C ambient) (see graph).

You can have this kind of reliability in *your* military and commercial applications. Just check the chart for MINUTEMAN Part Numbers, similar EIA Types, and additional MINUTEMAN Types, all produced simultaneously on the same production lines and under the same exacting conditions.

For complete specifications see your G-E Semiconductor District Sales Manager, or write Section 11E151. Semiconductor Products Department, General Electric Company, Electronics Park, Syracuse, New York. In Canada: Canadian General Electric, 189 Dufferin St., Toronto, Ontario. Export: International General Electric, 159 Madison Ave., New York 16, N.Y.

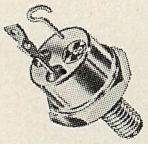
Transistor Minuteman Part No.	Silicon Transistor Description	Maximum Dissipation	V_{B_2E}	Nearest EIA Type No.	"Additional Minuteman Types"*
551B	Unijunction	600 mw	60	2N489	MM/2N490/M MM/2N491/M MM/2N492/M MM/2N493/M MM/2N494/M
703B	Fixed-Bed Grown-diffused	500 mw	60	2N335A	MM/2N332/M MM/2N333/M MM/2N336/M
801B	Grown-diffused	250 mw	45	2N337	MM/2N338

* Furnished to either A, B or M MINUTEMAN level units.

GENERAL ELECTRIC

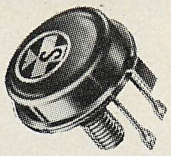
ON READER-SERVICE CARD CIRCLE 448

SILICON POWER TRANSISTORS



7/8″ HEX
200 WATT

2N1936 2N2820
2N1937 2N2821 STC1728
2N2815 2N2822 STC1731
2N2816 2N2823 STC1733
2N2817 2N2824 STC1736
2N2818 2N2825 STC1738
2N2819 STC1726 STC1750



150 WATT

2N1015 USN2N1016B STC1015C
2N1015A 2N1016C STC1015D
2N1015B USN2N1016C STC1015E
2N1015C 2N1016D STC1016
2N1015D USN2N1016D STC1016A
2N1015E 2N1016E STC1016B
2N1016 STC1015 STC1016C
2N1016A STC1015A STC1016D
2N1016B STC1015B STC1016E

TO–36
75 WATT

2N1511 2N1514
2N1512 2N2015
2N1513 2N2016

TO–53
85 WATT

2N389 USN2N424 2N1250
USN2N389 2N424A 2N1620
2N389A 2N1210 2N1722
2N424 2N1211 2N2383

11/16″ HEX
85 WATT

2N1208 2N1617
2N1209 2N1617A
2N1212 2N1618
2N1616 2N1618A
2N1616A 2N1724
2N2384

TO–3
75 WATT

2N1069 USA2N1487 USA2N1489
2N1070 2N1488 2N1490
2N1487 USA2N1488 USA2N1490
2N1489 2N1702

"F"
40 WATT

2N1047 2N1048A 2N1050
2N1047A 2N1048B 2N1050A
USN2N1047A 2N1049 USN2N1050A
2N1047B 2N1049A 2N1050B
2N1048 USN2N1049A 2N1768
USN2N1048A 2N1049B 2N1769

7/16″ HEX
40 WATT

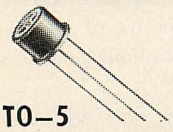
2N1647 2N2150
2N1648 2N2151
2N1649 2N2828
2N1650 2N2829

TO–8
25 WATT

2N1067 2N1484 2N1486
2N1068 USA2N1484 USA2N1486
2N1483 2N1485 2N1701
USA2N1483 USA2N1485 2N2035
2N2308

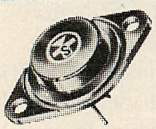
TO-37
17.5 WATT

2N2036
STC1800
STC1810
STC1850



TO–5
5 WATT

2N497 2N549 2N656 2N116 2N1480 2N1482
2N498 2N550 2N656A 2N1117 USA2N1480 USA2N1482
2N547 2N551 2N657 2N1479 2N1481 2N1700
2N548 2N552 2N657A USA2N1479 USA2N1481 2N2033
2N2034

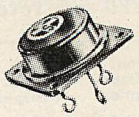


PNP
TO–3
75 WATT

STC5080
STC5081
STC5082
STC5083
STC5084
STC5085

PNP–11/16″ HEX
85 WATT

STC5580 STC5583
STC5581 STC5584
STC5582 STC5585



PNP
TO–53
85 WATT

2P389
2P389A
2P424
2P424A

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	Remarks
	2N1958A	SYL	npn,P,si	*100	600	175	–	*60	1000	*20-60	0.2	–	*14	
	2N1959A	SYL	npn,P,si	*100	600	175	–	*60	1000	*40-120	0.2	–	*14	
	2N2084	AMP	pnp,PADT,ge	100	125	90	1.93	*40	10	100	–	–	–	RF, Mixer, Osc. on FM rec.
	2N2243	TI	npn,PE,si	*100	2800	200	16.0	*80	1000	*40-*120	.001	–	*12	
	2N2243A	TI	npn,PE,si	*100	2800	200	16.0	*80	1000	*40-*120	.001	–	*12	
HF 36														
	2N2459	SSD	npn,DP,si	*100	4.0	200	2.3	60	–	30-80	2na	–	*5	
	2N2463	SSD	npn,DP,si	*100	1.8	200	2.8	60	–	30-80	2na	–	*5	
	2N2515	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	40-100	5na	–	*6	
	2N2516	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	80-200	5na	–	*6	
	2N2518	SSD	npn, DP, si	*100	4.0	200	2.3	80	–	40-100	5na	–	*6	
	2N2519	SSD	npn, DP, si	*100	4.0	200	2.3	80	–	80-200	5na	–	*6	
	2N2520	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	18-90	5na	–	*6	
	2N2521	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	36-90	5na	–	*6	
	2N2522	SSD	npn, DP, si	*100	4.0	200	2.3	60	–	76-333	5na	–	*6	
	2N2523	SSD	npn, DP, si	*100	4.0	200	2.3	45	–	60-350	2na	4	*6	
HF 37														
	2N2524	SSD	npn, DP, si	*100	4.0	200	2.3	45	–	150-600	2na	3	*6	
	2N2601	SSD	pnp, DP, si	*100	4.0	200	2.3	60	–	18-90	25na	–	*6	
	2N2602	SSD	pnp, DP, si	*100	4.0	200	2.3	60	–	36-90	25na	–	*6	
	2N2603	SSD	pnp, DP, si	*100	4.0	200	2.3	60	–	76-333	25na	–	*6	
	2N2604	SSD	pnp, DP, si	*100	4.0	200	2.3	45	–	60-350	10na	4	*6	
	2N2605	SSD	pnp, DP, si	*100	4.0	200	2.3	45	–	150-600	10na	3	*6	
	2N2800	MO	npn,PE,si	*100	800	200	4.57	*50	–	*30/90	0.1	–	*25	
	2N2801	MO	npn,PE,si	*100	800	200	4.57	*50	–	*75/225	0.1	–	*25	
	3N34	TI	npn,GD,si	100	125	150	1	30	20	4	0.4	20	–	tetrode
	OC171	AMP	pnp,DJ,ge	100	60	75	2	*20	5	–	2	–	–	
HF 38														
	2N1752	PH	pnp,MD,ge	106	60	100	0.8	*12	50	250	0.8	–	*1	
	2N2593	SSD	pnp,DP,si	*110	4.0	200	2.3	60	–	150-275	25na	–	*5	
	2N497	RA	npn,MS,si	120	4w	175	26.5	60	500	25	0.1	–	20	NA, GE, TI, PSI
	2N498	RA	npn,MS,si	120	4w	175	26.5	100	500	25	0.1	–	20	NA, GE, TI, PSI
	2N656	RA	npn,MS,si	120	4w	175	26.5	60	500	60	0.1	–	20	NA, GE, TI, PSI
	2N657	RA	npn,MS,si	120	4w	175	26.5	100	500	60	0.1	–	20	NA, GE, TI, PSI
	2N1023	RCA	pnp,Dr,ge	120	120	85	–	40	10	60	12	–	–	
	2N1066	RCA	pnp,Dr,ge	120	120	85	–	40	10	60	12	–	–	AMP
	2N1397	RCA	pnp,Dr,Ge	120	120	85	–	*40	10	90	16	–	–	AMP
	2N1409	RA	npn,MS,si	120	2.8w	150	22.5	30	500	30	0.1	–	20	PSI
HF 39														
	2N1410	RA	npn,MS,si	120	2.8w	150	22.5	30	500	50	0.1	–	20	PSI,GI
	2N1420	RA	npn,DD,si	120	2w	175	13.2	*60	500	200	.003	–	20	PSI, TR, GI, TI, MO
	2N2460	SSD	npn,DP,si	*120	4.0	200	2.3	60	–	50-130	2na	–	*5	
	2N2464	SSD	npn,DP,si	*120	1.8	200	2.8	60	–	50-130	2na	–	*5	
	2N2798	SPR	pnp,ED,ge	*120	75	100	1.0	*25	100	*30	3	–	*4	
	PT600	PSI	npn,DM,si	120	13w	175	86.7	60	–	12	1	–	40	hi freq. hi pwr.
	PT601	PSI	npn,DM,si	120	13w	175	86.7	60	–	14	1	–	40	hi freq. hi pwr.
	2N715	TI	npn,MS,si	125	1.2w	175	8	*50	–	1	.001	–	3	NA, MO
	2N716	TI	npn,MS,si	125	1.2w	175	8	*70	–	1	.001	–	3	NA, MO
	2N1507	RA	npn,DD,si	120	2w	175	13.2	60	500	200	0.003	–	20	TI
HF 40														
	2N1785	PH	pnp,MD,ge	125	45	85	0.75	*10	50	150	2	–	*1.5	
	2N1786	PH	pnp,MD,ge	125	45	85	.75	*10	50	250	2	–	*1.7	
	2N1787	PH	pnp,MD,ge	125	45	85	0.75	*15	50	120	1.5	–	*1.5	
	2N1864	PH	pnp,MD,ge	125	60	100	.8	*20	50	60	1.5	–	*1.6	
	2N2188	TI	pnp,AD,ge	**125	125	–	–	40	30	90	3	–	–	
	2N2190	TI	pnp,AD,ge	**125	125	–	–	60	30	90	3	–	–	
	2N1748A	PH	pnp,MD,ge	*132	60	100	0.8	*25	50	70	1.5	–	*1.3	
	2N929	GI	npn,PL,si	*140	1.8w	175	3.33	45	–	40-120	3na	–	*5	
	2N930	GI	npn,PL,si	*140	1.8w	175	3.33	45	–	100-300	3na	–	*5	
	2N1177	RCA	pnp,Dr,ge	140	80	71	–	30	10	100	12	–	–	
HF 41														
	2N1178	RCA	pnp,Dr,ge	140	80	71	–	30	10	40	12	–	–	
	2N1179	RCA	pnp,Dr,ge	140	80	71	–	30	10	80	12			
	2N2461	SSD	npn,DP,si	*140	4.0	200	2.3	60	–	100-180	2na	–	*5	
	2N2465	SSD	npn,DP,si	*140	1.8	200	2.8	60	–	100-180	2na	–	*5	
	3N35	TI	npn,GD,si	150	125	150	1	30	20	4	0.4	14	–	Tetrode
	2N728	TR	npn,JD,si	150	300	175	–	15	25	20	2.5	–	8	
	2N729	TR	npn,DJ,si	150	300	175	–	30	25	20	2.5	–	8	
	2N1726	PH	pnp,MD,ge	150	60	100	0.8	*20	50	150	1.5	–	*1.5	
	2N1727	PH	pnp,MD,ge	150	60	100	0.8	*20	50	200	1.5	–	*1.5	
	2N1728	PH	pnp,MD,ge	150	60	100	0.8	*20	50	120	1.5	–	*1.5	
HF 42														
	2N1788	PH	pnp,MD,ge	150	60	100	0.8	*35	50	150	1.5	–	*1.5	
	2N1789	PH	pnp,MD,ge	150	60	100	0.8	*35	50	200	1.5	–	*1.5	
	2N1790	PH	pnp,MD,ge	150	60	100	0.8	*35	50	120	1.5	–	*1.5	
	2N2189	TI	pnp,AD,ge	**150	125	–	–	40	30	135	3	–	–	
	2N2191	TI	pnp,AD,ge	**150	125	–	–	60	30	135	3	–	–	

The high-voltage barrier to passivated PNP transistors has finally been broken —but it took a new manufacturing process to overcome the obstacles.

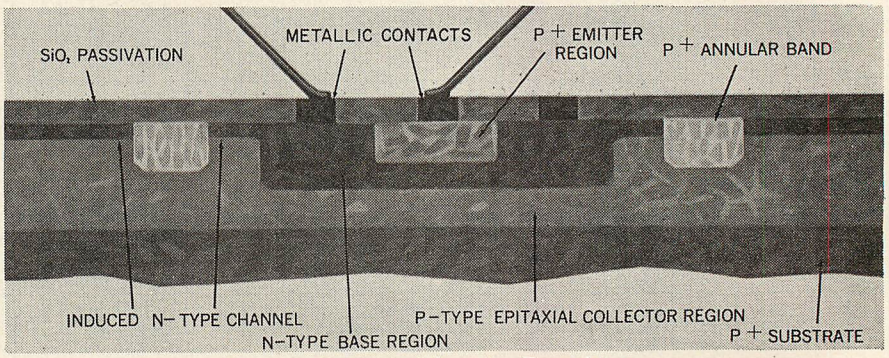
Now from MOTOROLA Epitaxial, Passivated PNP SILICON TRANSISTORS Made by the Annular* Process

Some new words are being added to the dictionary of semiconductor terms—words like Annular* and Band-Guard†, words that relate to a new manufacturing process which will have a strong influence on transistor design and promises to open new areas for transistor applications. The Annular manufacturing process provides a new degree of freedom from surface effects for semiconductor products.

For years, the industry had been working to design high voltage silicon PNP transistors with the low leakage currents normally associated with NPN types, surface passivated by the planar process. For PNP devices, planar techniques proved inadequate since any attempt to increase voltage ratings beyond approximately 20 volts (through increasing collector material resistivity) induced a phenomenon, called channeling, which actually increased leakage current far beyond tolerable levels.

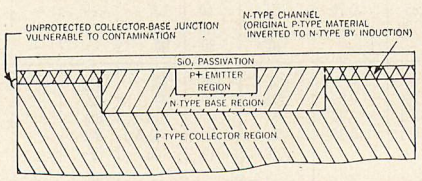
Channeling is a condition whereby the surface portion of a transistor collector region actually changes polarity and becomes an extension of the base region. The base-collector junction, therefore, rather than coming to the top surface where it is protected from the environment by a silicon oxide coating, extends to the unprotected edges of the transistor where it is subject to contamination and surface damage. This phenomenon circumvents the passivation advantages of planar designs and results in excessive leakage currents.

The formation of channels has been traced to effects of ionized or polarized particles on or within the passivating oxide coating which create an electrical environment that tends to alter the apparent polarity of the material directly beneath the oxide—an effect which is particularly pronounced in lightly doped P-type material. The channels are random in nature and erratic in characteristics, and can be highly sensitive to radiation bombardment.



Cross Section of Annular Transistor

As a result of channeling, some manufacturers have reverted to earlier silicon mesa structures or have deliberately circumvented the oxide passivation in planar transistors in order to produce high voltage devices. These methods have yielded high voltage ratings but other characteristics of the resulting transistors do not compare favorably with those of surface passivated devices.



Cross Section of Planar Transistor

Now, Motorola has overcome these obstacles—but it has taken a new manufacturing process to do so. Rather than trying to eliminate the channel, Motorola, in a new series of "Band-Guard" transistors, has deliberately introduced a channel whose controlled characteristics completely overshadow the variable effects of any randomly induced channel, thus providing a high degree of performance stability. Moreover the controlled channel is terminated close to the base region by a diffused annular band of the same polarity as the collector region but with a resistivity level impervious to channeling. The collector-base junction, therefore, is properly terminated underneath the oxide coating where it is protected against environmentally induced leakage currents. The resultant "Band-Guard" PNP silicon devices, for the first time, combine the low-leakage characteristics of passivated junctions with the high-voltage characteristics of non-passivated, or mesa structures.

And, if theoretical analysis of this process is confirmed by tests now in progress, they will prove to be more resistant to radiation, thus heralding improved performance and greater reliability of space equipment.

Though initially devised for the production of high voltage silicon PNP transistors, there are strong indications that the Annular process yields major benefits for NPN and field effect transistors and other semiconductor devices as well.

In view of these considerations, there is little doubt that the new, Motorola developed Annular process will take its place among the major milestones in the advancement of the semiconductor art.

*Patents Pending †Trademark of Motorola Inc.

NOW FROM MOTOROLA

2N2800 2N2838 2N722

EPITAXIAL PASSIVATED

2N1132 2N2801 2N1132B

PNP SILICON TRANSISTORS

2N1132A 2N722 2N2837

. . . made by the new ANNULAR PROCESS

Four new Motorola PNP silicon transistors made by the Annular process and featuring high speed . . . high voltage . . . low leakage . . . and surface passivation and stability, are now immediately available as types 2N2800, 2N2801, 2N2837, and 2N2838. Called "Band-Guard" transistors, the new devices reflect performance advantages inherent in an Annular, oxide-passivated, epitaxially fabricated transistor.

Annular Process — Provides a new degree of freedom from surface effects of adverse environments. Gives a new degree of performance stability by eliminating sub-surface leakage paths to the unprotected edges of the device. Makes possible combined high voltage *and* true silicon oxide passivation.

Oxide Surface Passivation — Prevents contamination of the junction by external agents. Makes possible the low collector leakage current (1/10th that of other PNP units) of Motorola's "Band-Guard" transistors.

Epitaxial Structure — Gives lower saturation voltage (⅓ lower) and twice the frequency response (120 mc) of ordinary PNP devices.

Other types supplied as "Band-Guard" units include 2N1132, 2N1132A, 2N1132B, and 2N722.

Motorola passivated, epitaxial "Band-Guard" transistors are immediately available from your Motorola Seminconductor Distributor or District Office. For full electrical specifications write: Technical Information Center, Motorola Semiconductor Products, Inc., Box 955, Phoenix 1, Arizona.

"Band-Guard" Transistor Performance Ratings

Characteristic	2N2800 (TO-5 pkg)	2N2801 (TO-5 pkg)	2N2837 (TO-18 pkg)	2N2838 (TO-18 pkg)	Unit
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_E = 0)	50	50	50	50	Vdc
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc, I_B = 0)	35	35	35	35	Vdc
Collector Cutoff Current (V_{CE} = 25 Vdc, V_{BE} = 0.5 Vdc)	100	100	100	100	nAdc
DC Forward Current Transfer Ratio (I_C = 150 mAdc, V_{CE} = 10 Vdc)*	30-90	75-225	30-90	75-225	—
Current-Gain — Bandwidth Product (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 100 mc)	120	120	120	120	mc

*Pulse Test: Pulse Width ≦ 300 μsec, duty cycle ≦ 2%

. . . also supplied as "Band-Guard" types:

Characteristic	2N1132 (TO-5 pkg)	2N1132A (TO-5 pkg)	2N1132B (TO-5 pkg)	2N722 (TO-18 pkg)	Unit
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)	50	60	70	50	Vdc
Collector-Emitter Breakdown Voltage (I_C = 100 mAdc pulsed)	35	40	45	35	Vdc
Collector Cutoff Current (V_{CB} = 30 Vdc, I_E = 0) / (V_{CB} = 50 Vdc, I_E = 0)	1.0 / —	— / .5	— / .01	1.0 / —	μAdc
DC Forward Current Transfer Ratio (I_C = 150 mAdc, V_{CE} = 10 Vdc)	30-90	30-90	30-90	30-90	—
Current-Gain — Bandwidth Product (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 20 mc)	60	60	60	60	mc

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ON READER-SERVICE CARD CIRCLE 450

A-43-034

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} *f_T **f_{ab} (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	Remarks
HF 43	2N2654	AMP	pnp,AD,ge	150	100	75	0.50	*25	10	65	–	18.8	–	
	2N2797	SPR	pnp,ED,ge	*150	75	100°c	1.0	*20	100	*50	2	–	*3.5	
	2N1499A	PH	pnp,MD,ge	*160	60	100	0.8	*20	100	*70	0.6	–	*1.5	
	2N2462	SSD	npn,DP,si	*160	4.0	200	2.3	60	–	150-230	2na	–	*5	
	2N2466	SSD	npn,DP,si	*160	1.8	200	2.8	60	–	150-230	2na	–	*5	
	2N1500	PH	pnp,MD,ge	*175	60	100	0.8	*15	50	*70	1	–	*1.5	
	2N1500	GI	MADT	175	60	100	0.8	*0.5	10	70	5	–	3	
	2N1746	PH	pnp,MD,ge	175	60	100	0.8	*20	50	70	1	–	*1.2	
	2N2207	AMP	pnp,AD,ge	175	260	75	0.25	*70	50	200	–	–	–	
	2N2512	AMP	pnp,AD,ge	175	260	75	0.25	*70	50	200	–	–	–	
HF 44	2N1840	PSI	npn,TDP,si	180	2	175	.013	25	500	15	.3	–	–	
	2N2494	AMP	pnp,AD,ge	180	100	85	1.67	*20	10	60	2.0	6	–	
	2N2495	AMP	pnp,AD,ge	180	100	85	1.67	*20	10	60	2.0	6	–	
	2N2496	AMP	pnp,AD,ge	180	100	85	1.67	*20	10	60	2.0	6	–	
	PT886	PSI	npn,TDP,si	180	1.6	175	.01	22	–	–	.3	–	–	
	PT887	PSI	npn,TDP,si	180	1.6	175	.01	45	–	–	.3	–	–	
	PT888	PSI	npn,TDP,si	180	1.6	175	.01	45	–	–	.3	–	–	
	2N1566	PSI	npn,TDP,si	190	3	175	.02	80	50	130	.01	–	–	
	2N1889	PSI	npn,TDP,si	190	3	200	.017	100	–	80	.001	–	–	
	2N1890	PSI	npn,TDP,si	190	3	200	.017	100	–	200	.001	–	–	
HF 45	2N1342	PSI	npn,TDP,si	190	2.8	175	.018	150	300	12	.01	–	–	
	2N1506A	PSI	npn,TDP,si	190	3.5	200	.02	80	500	60	.005	–	–	
	2N1564	PSI	npn,TDP,si	190	3	175	.02	80	50	30	.01	–	–	
	2N1565	PSI	npn,TDP,si	190	3	175	.02	80	50	60	.01	–	–	
	2N1893	PSI	npn,TDP,si	190	3	200	.017	120	500	80	.001	–	–	
	2N1893A	PSI	npn,TDP,si	190	3	200	.017	140	500	90	.001	–	–	
	2N957	FA	npn,DD,si	*200	800	150	6.5	20	–	*60	–	–	–	
	2N995	FA	pnp,DP,si	*200	1200	200	6.9	15	–	*60	0.0002	–	*7.5	
	2N996	FA	pnp,DP,si	*200	1200	200	6.9	12	–	*75	0.0002	–	*7.5	
	2N2318	GI	npn,si	200	360	200	2.1	*1	20	60	0.05	–	5	
HF 46	2N2319	GI	npn,si	200	300	200	1.7	*1	20	60	0.05	–	5	
	2N2320	GI	npn,si	200	600	200	3.4	*1	20	60	0.05	–	5	
	2N2403	NA	npn,si	200	8000	200	45.2	60	0.001	20-60	1	–	25	
	2N2404	NA	npn,si	200	8000	200	45.2	60	0.001	40-120	1	–	25	
	2N2618	SYL	npn,MESA,si	*200	600	250	–	*60	750	*25	0.25	–	*14	
	2N2618/46	SYL	npn,MESA,si	*200	400	250	–	*60	750	*25	0.25	–	*14	
	MM799	MO	npn,PE,si	*200	20w	175	133	*60	–	*10	0.5	–	–	
	MM800	MO	npn,PE,si	*200	25w	175	167	*60	–	*10	0.5	–	–	
	MM801	MO	npn,PE,si	*300	4w	175	26.7	*60	–	*10	0.5	–	–	
	2N1506	PSI	npn,MS,si	210	3w	175	0.2	60	9	–	–	–	8	High freq., high power
HF 47	2N2781	PSI	npn,TDP,si	210	13	175	.087	75	2a	30	.5	–	–	
	2N2782	PSI	npn,TDP,si	210	13	175	.087	100	2a	30	.5	–	–	
	2N2783	PSI	npn,TDP,si	210	13	175	.087	100	2a	30	.1	–	–	
	PT531	PSI	npn,TDP,si	210	13	175	.087	75	2a	30	.1	–	–	
	PT612	PSI	npn,TDP,si	210	13	175	.087	75	2a	30	.5	–	–	
	PT1558	PSI	npn,TDP,si	210	4	200	.023	80	–	40	.005	–	–	RF amp
	PADT28	AMP	pnp,PADT,ge	*220	100	–	1.7	*35	10	120	–	–	–	
	2N1746	PH	pnp,MD,ge	235	60	100	0.8	20	50	–	2	–	3	SPR,GI
	2N588	PH	npn,MD,ge	250	30	85	0.75	*15	50	–	1.8	3.8	–	TI
	2N710	MO	pnp,MS,ge	250	300	100	4	*15	50	40	.2	–	–	
HF 48	2N957	PSI	npn,TDP,si	250	.8	150	.006	40	–	*45	.01	–	–	
	2N988	PSI	npn,TDP,si	250	1	175	.006	20	–	70	.05	–	–	
	2N989	PSI	npn,TDP,si	250	1	175	.006	20	–	70	.05	–	–	
	2N1491	RCA	npn,MS,si	250	3w	175	20	30	50	50	10	–	–	
	2N1837	PSI	npn,DM,si	250	2w	175	13.3	80	–	9	.001	–	11	Hi freq., hi power
	2N1837A	PSI	npn,DM,si	250	2.8w	175	18.6	80	–	9	.001	–	11	Hi freq., hi power
	2N1838	PSI	npn,DM,si	250	2w	175	13.3	45	–	9	0.1	–	9	Hi freq., hi power
	2N1839	PSI	npn,DM,si	250	2w	175	13.3	45	–	9	0.1	–	9	Hi freq., hi pwr.
	2N2485	CS	npn,MS,si	*250	8.7w	200	50	120	1a	*10	500	–	*8	
	2N2486	CS	npn,MS,si	*250	8.7w	200	50	140	1a	*10	500	–	*8	
HF 49	2N2649	CS	npn,MS,si	*250	8.7w	200	50	65	1a	*10	500	–	*8	
	2N2650	CS	npn,MS,si	*250	8.7w	200	50	140	1a	*10	500	–	*8	
	2N2656	PSI	npn,TDP,si	250	1.2	200	.006	25	200	50	.01	–	–	
	2N2799	SPR	pnp,ED,ge	*250	75	100	1.0	*15	100	*30	3	–	*4	
	PT720	PSI	npn,TDP,si	250	1.2	200	.006	25	200	80	5	–	–	
	SN230	CS	npn,MS,si	*250	18w	175	120	65	2a	*10	500	–	*25	
	SN234	CS	npn,MS,si	*250	18w	175	120	140	2a	*10	500	–	*25	
	2N502	PH	pnp,MD,ge	*260	60	85	1.0	*20	–	65	1	–	*1.0	SPR
	2N502A	PH	pnp,MD,ge	*260	75	100	1.0	*30	–	65	1.3	6	*1.0	SPR
	2N1492	RCA	npn,MS,si	275	3w	175	20	60	50	50	10	–	–	

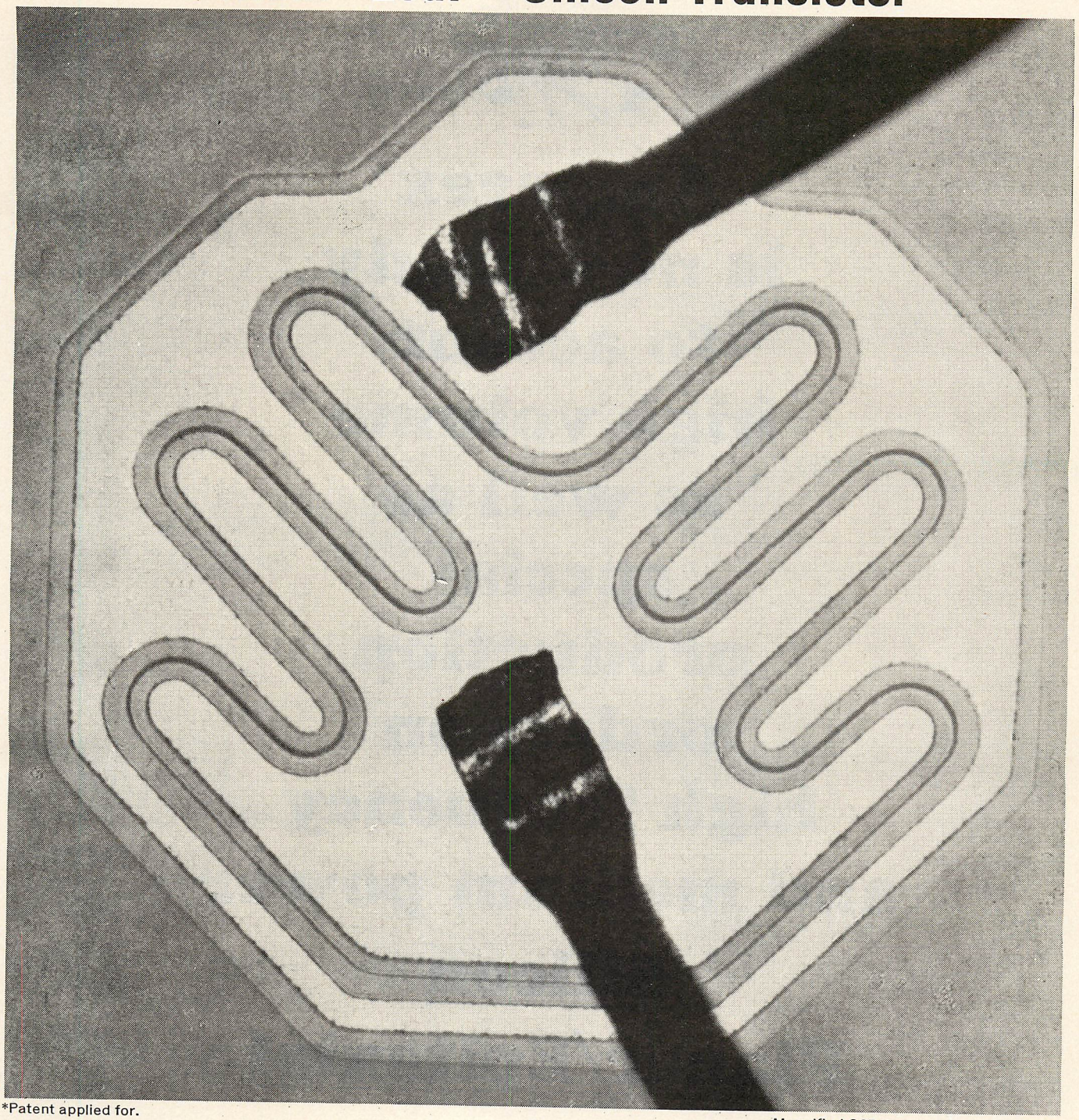
HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} $*f_T$ $**f_{ab}$ (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} $*V_{CBO}$ (v)	I_C (ma)	CHARACTERISTICS h_{fe} $*h_{FE}$	I_{CO} (μa)	NF (db)	C_{oe} $*C_{ob}$ (pf)	Remarks
	2N2635	TI	pnp,EM,ge	*295	300	100	4.0	*30	100	100	1	–	*3.5	
	2N695	MO	pnp,DM,ge	300	75	100	1	15	50	40	0.2	–	3.5	GE
	2N707	PSI	npn,TDP,si	300	1	175	.006	56	–	12	.005	–	–	
	2N834	GI	npn,si	300	360	200	2.1	*40	10	40	0.5	–	4	CL
	2N835	GI	npn,si	300	360	200	21	*25	10	30	0.5	–	4	CL
HF 50														
	2N916	PSI	npn,TDP,si	300	1.2	200	.006	45	–	120	.001	–	–	
	2N960	TI	pnp,EM,ge	*300	150	–	–	15	150	*20	3	–	*4	
	2N961	TI	pnp,EM,ge	*300	150	–	–	12	150	*20	3	–	*4	
	2N962	TI	pnp,EM,ge	*300	150	–	–	12	150	*20	3	–	*4	
	2N964	TI	pnp,EM,ge	*300	150	–	–	15	150	*40	3	–	*4	
	2N965	TI	pnp,EM,ge	*300	150	–	–	12	150	*40	3	–	*4	
	2N966	TI	pnp,EM,ge	*300	150	–	–	12	150	*40	3	–	*4	
	2N985	TI	pnp,EM,ge	*300	150	–	–	15	200	*60	3	–	*6	
	2N1493	RCA	npn,MS,si	300	3w	175	20	100	50	50	10	–	–	
	2N2242	GI	npn,si	300	360	200	2.1	*40	10	80	0.1	–	6	
HF 51														
	2N2381	MO	pnp,EM,ge	*300	750	100	10	*30	500	*25	1	–	*3.5	
	2N2382	MO	pnp,EM,ge	*300	750	100	10	*45	500	*25	1	–	*3.5	
	2N2795	SPR	pnp,ED,ge	*300	75	100°c	1.0	*15	100	*50	3	–	*3	
	2N2796	SPR	pnp,ED,ge	*300	75	100°c	1.0	*12	100	*30	3	–	*4	
	2N503	PH	pnp,MD,ge	320	25	85	0.5	*20	50	4.2	3	–	*1.0	SPR
	2N703	SYL	npn,P,si	*320	300	200	–	*25	200	*40-100	–	–	*6	
	2N706	SYL	npn,P,si	*320	300	200	–	*25	200	*20	.5	–	–	
	2N706A	SYL	npn,P,si	*320	300	200	–	*25	200	*20-60	.5	–	*5	
	2N706B	SYL	npn,P,si	*320	300	200	–	*25	200	*20-60	.5	–	*5	
	2N706C	SYL	npn,P,si	*320	300	200	–	*40	200	*20-60	.025	–	*5	
HF 52														
	2N706/46	SYL	npn,P,si	*320	400	200	–	*25	200	*20	.5	–	*6	
	2N706A/46	SYL	npn,P,si	*320	400	200	–	*25	200	*20-60	.5	–	*5	
	2N706B/46	SYL	npn,P,si	*320	400	200	–	*25	200	*20-60	.5	–	*5	
	2N706C/46	SYL	npn,P,si	*320	400	200	–	*40	200	*20-60	.025	–	*5	
	2N706/51	SYL	npn,P,si	*320	300	200	–	*25	200	*20	.5	–	*6	
	2N706A/51	SYL	npn,P,si	*320	300	200	–	*25	200	*20-60	.5	–	*5	
	2N706B/51	SYL	npn,P,si	*320	300	200	–	*25	200	*20-60	.5	–	*5	
	2N706C/51	SYL	npn,P,si	*320	300	200	–	*40	200	*20-60	.025	–	*5	
	2N968	MO	pnp,DM,ge	*320	300	100	4	*15	–	35	3	–	4.0	RA
	2N969	MO	pnp,DM,ge	*320	300	100	4	*12	–	35	3	–	4.0	RA
HF 53														
	2N970	MO	pnp,DM,ge	*320	300	100	4	*12	–	35	3	–	4.0	RA
	2N971	MO	pnp,DM,ge	*320	300	100	4	*7	–	35	10	–	4.0	RA
	2N972	MO	pnp,DM,ge	*320	300	100	4	*15	–	75	3	–	4.0	RA
	2N973	MO	npn,DM,ge	*320	300	100	4	*12	–	75	3	4.0	–	RA
	2N974	MO	npn,DM,ge	*320	300	100	4	*12	–	75	3	4.0	–	RA
	2N975	MO	npn,DM,ge	*320	300	100	4	*7	–	75	10	4.0	–	RA
	2N2256	MO	npn,ME,si	*320	1000	175	6.67	*7	100	30	3	4	–	CL
	2N2257	MO	npn,ME,si	*320	1000	175	6.67	*7	100	50	3	4	–	CL
	2N2258	MO	pnp,ME,ge	*320	300	100	4	*7	100	30	3	4	–	Epitaxial
	2N2259	MO	pnp,ME,ge	*320	300	100	4	*7	100	50	3	4	–	Epitaxial
HF 54														
	2N499	PH	pnp,MD,ge	340	30	85	9.75	30	50	8.5	1.0	–	1.3	GI, SPR
	2N743	SYL	npn,P,si	*350	300	200	–	*20	–	*20-60	1.0	–	*5	
	2N743/46	SYL	npn,P,si	*350	400	200	–	*20	–	*20-60	1.0	–	*5	
	2N743/51	SYL	npn,P,si	*350	300	200	–	*20	–	*20-60	1.0	–	*5	
	2N744	SYL	npn,P,si	*350	300	200	–	*20	–	*40-120	1.0	–	*5	
	2N744/46	SYL	npn,P,si	*350	400	200	–	*20	–	*40-120	1.0	–	*5	
	2N744/51	SYL	npn,P,si	*350	300	200	–	*20	–	*40-120	1.0	–	*5	
	2N784A	SYL	npn,P,si	*350	300	200	–	*40	200	*25-150	.025	–	*3.5	
	2N784A/46	SYL	npn,P,si	*350	400	200	–	*40	200	*25-150	.025	–	*3.5	
	2N784A/51	SYL	npn,P,si	*350	300	200	–	*40	200	*25-150	.025	–	*3.5	
HF 55														
	2N914	FA	npn,DP,si	*350	1200	200	6.9	*15	–	55*	0.004	–	4.5	CL, MO
	2N915	FA	npn,DP,si	*350	1200	200	6.9	50	–	*100	0.005	–	*3.0	
	2N984	SPR	pnp,MD,ge	*350	60	100	0.8	10	100	*50	5.0	–	*2.5	
	2N1962	SYL	npn,P,si	*350	400	200	–	*40	200	*20-80	0.25	–	*3.5	
	2N2170	SPR	pnp,MD,ge	*350	60	100	0.8	10	100	*50	5.0	–	*3.0	
	2N2397	SYL	npn,P,si	*350	300	200	–	*25	200	*25-125	0.10	–	*5	
	2N2787	GI	npn,PE,si	*350	3w	175	5.33	35	–	20-60	2na	–	*5	
	2N2788	GI	npn,PE,si	*350	3w	175	5.33	35	–	40-120	2na	–	*5	
	2N2789	GI	npn,PE,si	*350	3w	175	5.33	35	–	100-300	2na	–	–	
	2N2790	GI	npn,PE,si	*350	1.8w	175	3.33	35	–	20-60	2na	–	*5	
HF 56														
	2N2791	GI	npn,PE,si	*350	1.8w	175	3.33	35	–	40-120	2na	–	*5	
	2N2792	GI	npn,PE,si	*350	1.8w	175	3.33	35	–	100-300	2na	–	*5	
	2N741	MO	pnp,MS,ge	360	300	100	4	*15	100	25	.2	7	6	
	2N741A	MO	pnp,DM,ge	360	300	100	4	*20	100	25	0.2	7	6	Amp VHF
	2N1407	TI	pnp,MS,ge	375	75	100	1	30	50	6	2	7	–	

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} *f_T **f_{ab} (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	*V_{CBO} V_{CEO} (v)	I_C (ma)	CHARACTERISTICS *h_{FE} h_{fe}	I_{CO} (μa)	NF (db)	*C_{ob} C_{oe} (pf)	Remarks
	2N708	SYL	npn,P,si	*400	300	200	–	*40	–	*30-120	.025	–	*6	
	2N708/46	SYL	npn,P,si	*400	400	200	–	*40	–	*30-120	.025	–	*6	
	2N708/51	SYL	npn,P,si	*400	300	200	–	*40	–	*30-120	.025	–	*6	
	2N743	TI	npn,PE,si	*400	1000	175	6.67	*25	200	*20-*60	.002	–	*3.5	
	2N828A	MO	pnp,DJEM,ge	*400	300	100	4	*15	200	*40	3	–	*2.2	
HF 57	2N829	MO	pnp,DJEM,ge	*400	300	100	4	*15	200	*80	3	–	*2.2	
	2N916	FA	npn,DP,si	*400	1200	200	6.9	25	–	*80	0.002	–	*4.0	
	2N947	FA	npn,DP,si	*400	1200	200	6.9	–	–	*50	0.005	–	–	
	2N2217	MO	npn,DD,si	*400	3	175	5.33	*60	–	20-60	0.01	–	–	PI. Epitaxial
	2N2218	MO	npn,DD,si	*400	3	175	5.33	*60	–	40-120	0.01	–	–	PI. Epitaxial
	2N2219	MO	npn,DD,si	*400	3	175	5.33	*60	–	100-300	0.01	–	–	PI. Epitaxial
	2N2220	MO	npn,DD,si	*400	1.8	175	3.33	*60	–	20-60	0.01	–	–	PI. Epitaxial
	2N2221	MO	npn,DD,si	*400	1.8	175	3.33	*60	–	40-120	0.01	–	–	PI. Epitaxial
	2N2222	MO	npn,DD,si	*400	1.8	175	3.33	*60	–	100-300	0.01	–	–	PI. Epitaxial
	2N2537	MO	pnp,PE,si	*400	800	200	4.57	*60	–	*50/150	0.25	–	8	
HF 58	2N2538	MO	npn,PE,si	*400	800	200	4.57	*60	–	*100/300	0.25	–	*8	
	2N2539	MO	npn,PE,si	*400	500	200	2.86	*60	–	*50/150	0.25	–	*8	
	2N2540	MO	npn,PE,si	*400	500	200	2.86	*60	–	*100/300	0.25	–	*8	
	MM719	MO	npn,PE,si	*400	3w	200	17.1	*60	–	*40	0.5	–	–	
	2N835	SYL	npn,P,si	*425	300	200	–	*25	200	–	–	–	–	
	2N835/46	SYL	npn,P,si	*425	400	200	–	*25	200	–	–	–	–	
	2N835/51	SYL	npn,P,si	*425	300	200	–	*25	200	–	–	–	–	
	2N708	FA	npn,DP,si	*450	1200	200	6.9	15	–	*50	0.004	–	*5.0	CL
	2N744	TI	npn,PE,si	*450	1000	175	6.67	*25	200	*40-*120	.002	–	*3.5	
	2N834	SYL	npn,P,si	*450	300	200	–	*40	200	*25	0.5	–	*4	
HF 59	2N834/46	SYL	npn,P,si	*450	400	200	–	*40	200	*25	0.5	–	*4	
	2N834/51	SYL	npn,P,si	*450	300	200	–	*40	200	*25	0.5	–	*4	
	2N835	MO	npn,DDM,si	*450	300	175	2	*25	200	40	0.5	–	–	Epitaxial
	2N914	SYL	npn,P,si	*450	300	200	–	*40	–	*30-120	.025	–	*6	
	2N914/46	SYL	npn,P,si	*450	400	200	–	*40	–	*30-120	.025	–	*6	
	2N914/51	SYL	npn,P,si	*450	300	200	–	*40	–	*30-120	.025	–	*6	
	2N982	SPR	pnp,MD,ge	*450	60	100	0.8	15	100	*70	3.0	–	*2.5	
	2N983	SPR	pnp,MD,ge	*450	60	100	0.8	15	100	*65	3.0	–	*2.5	
	2N1405	TI	pnp,MS,ge	450	75	100	1	30	50	8	2	5	–	
	2N1406	TI	pnp,MS,ge	450	75	100	1	30	50	8	2	6	–	
HF 60	2N2168	SPR	pnp,MD,ge	*450	60	100	0.8	15	100	*70	3.0	–	*2.5	
	2N2169	SPR	pnp,MD,ge	*450	60	100	0.8	15	100	*65	3.0	–	*2.5	
	2N960	MO	pnp,DM,ge	*460	300	100	4	*15	100	40	0.4	–	2.2	Epitaxial
	2N961	MO	pnp,DM,ge	*460	300	100	4	*12	100	40	0.4	–	2.2	Epitaxial, RA
	2N962	MO	pnp,DM,ge	*460	300	100	4	*12	100	40	0.4	–	2.2	Epitaxial, RA
	2N963	MO	npn,DM,ge	*460	300	100	4	*12	100	40	5	–	2.2	Epitaxial, RA
	2N964	MO	npn,DM,ge	*460	300	100	4	*15	100	70	0.4	–	2.2	Epitaxial, RA
	2N964A	MO	npn,DM,ge	*460	300	100	4	*15	100	80	0.4	–	2.2	Epitaxial, RA
	2N965	MO	npn,DM,ge	*460	300	100	4	*12	100	70	0.4	–	2.2	Epitaxial, RA
	2N966	MO	npn,DM,ge	*460	300	100	4	*12	100	70	0.4	–	2.2	Epitaxial, RA
HF 61	2N967	MO	npn,DM,ge	*460	300	100	4	*12	100	70	5	–	2.2	Epitaxial, RA
	2N1143	TI	pnp,DB,ge	480	750	100	10	25	100	8	.7	–	1.5	PG=22db @ 200mc, MO
	2N1561	MO	pnp,MS,ge	500	3w	100	40	*25	500	10db	1.5	–	7	High freq., high power
	2N1562	MO	pnp,MS,ge	500	3w	100	40	*25	500	10db	1.5	–	7	High freq., high power
	2N2095	SPR	pnp,ED,ge	*500	1w	100	–	*30	300	–	0.2	–	6.5	
	2N2098	SPR	pnp,ED,ge	*500	1w	100	–	*30	300	–	2	–	6.5	
	2N2501	MO	pnp,PE,si	*500	360	200	2.06	*40	–	*50/150	–	–	*4	
	2N700	MO	pnp,DM,ge	600	75	100	1	*25	50	10db	0.4	6	1.1	UHF Amp.
	2N700A	MO	pnp,DM,ge	600	75	100	1	*25	50	5db200mc	0.4	6	1.1	MIL
	2N709	SYL	npn,P,si	*600	300	200	–	*15	–	*20-120	.005	–	*3	
HF 62	2N709/46	SYL	npn,P,si	*600	400	200	–	*15	–	*20-120	.005	–	*3	
	2N709/51	SYL	npn,P,si	*600	300	200	–	*15	–	*20-120	.005	–	*3	
	2N1142	TI	pnp,DB,ge	600	750	100	10	30	100	10	0.7	–	1.5	PG=26db @ 200mc,MO
	2N2368	FA	npn,DP,si	*650	1200	200	6.9	15	–	*40	0.1	–	*2.5	
	2N2369	FA	npn,DP,si	*650	1200	200	6.9	15	–	*70	0.1	–	*2.5	
	2N1645	WE	pnp,DJ,ge	700	–	100	12.5	*35	300	50	1.5	–	10	
	2N537	WE	pnp,DG,ge	750	250	100	3.3	–	100	10	2	–	2.8	U.S. MIL only
	2N1094	WE	pnp,DM,ge	750	150	100	2.0	–	40	13	1.2	–	4	U.S., MIL only
	2N1141	TI	pnp,DB,ge	750	750	100	10	*35	100	12	0.7	–	1.5	PG=30db @ 200mc, MO
	2N1195	WE	pnp,DM,ge	750	250	100	4.0	*30	50	13	1.2	–	4	TI, MO
HF 63	2N709	FA	npn,DP,si	*800	1000	200	5.0	6.0	–	*55	0.005	–	*2.5	
	2N709A	SYL	npn,P,si	*800	300	200	–	*15	–	*30-90	.050	–	*3	
	2N709A/46	SYL	npn,P,si	*800	400	200	–	*15	–	*30-90	.050	–	*3	
	2N709A/51	SYL	npn,P,si	*800	300	200	–	*15	–	*30-90	.050	–	*3	
	2N917	FA	npn,DP,si	*800	300	200	1.71	15	–	*50	0.0005	–	*1.0	

Bendix "Leaf"* Silicon Transistor



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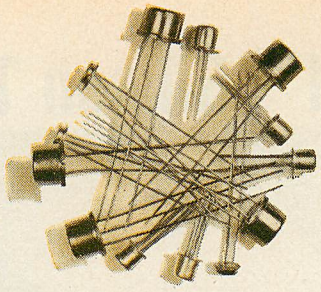

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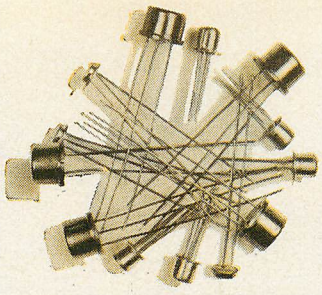

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JAN-2N697M—MIL-S-19500/99B
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2N911 2N1973
2N912 2N1974
2N929 2N1975

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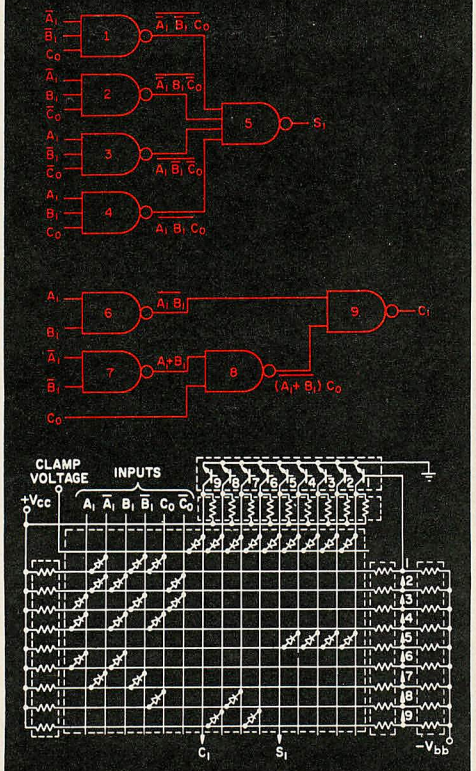

Above is the logic diagram for a full adder and its equivalent BIPCO circuit. Note how "total function" logic is performed with matrices of diodes and strips of transistors and resistors. Since the interconnections are always the same, other functions (counting, decoding, accumulating, etc.) can be performed by simply changing the arrangement of the diodes within the matrix. You can specify parameters, logic levels.

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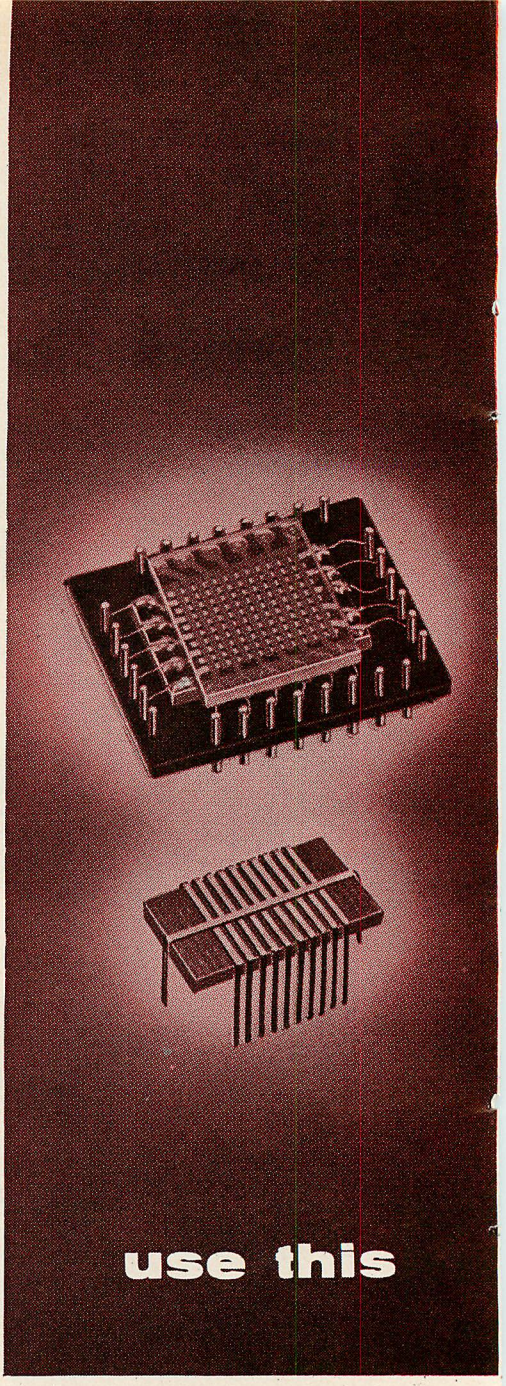

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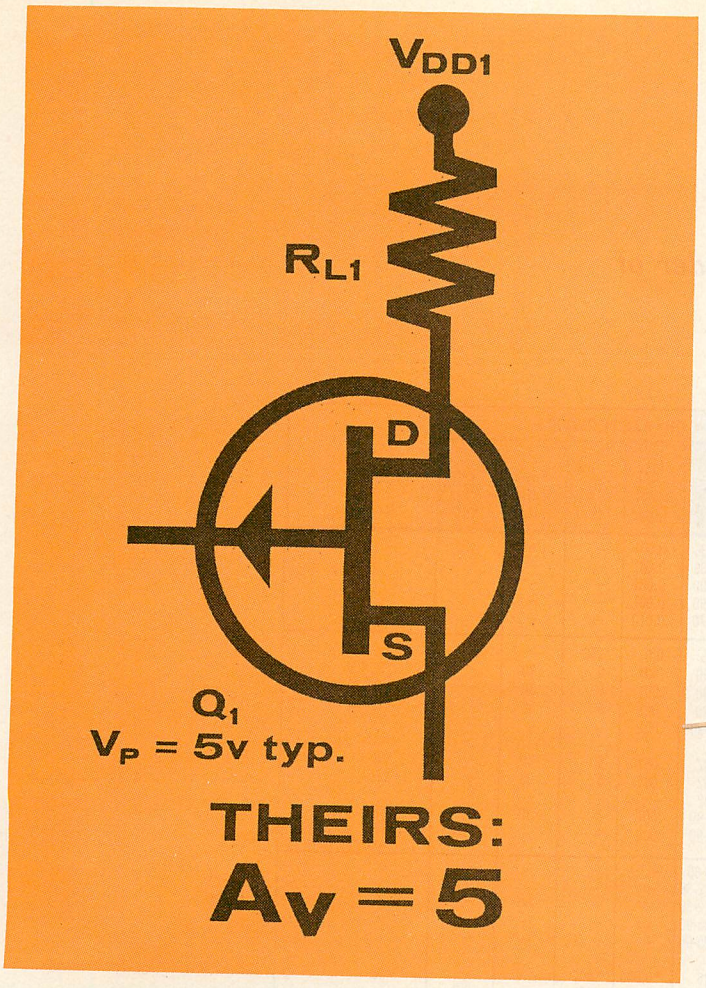
HF *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} *f_T **f_{ab} (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	NF (db)	C_{oe} *C_{ob} (pf)	Remarks
	2N2416	TI	pnp,DM,ge	*800	75	100	1.0	*15	20	20	1	3.4	*1.2	
	2N918	FA	npn,DP,si	*900	300	200	1.71	15	–	*50	0.0005	–	1.0	MO
	2N2415	TI	pnp,DM,ge	*900	75	100	1.0	*15	20	30	1	2.4	*1.2	
	2N797	TI	npn,MS,ge	*1000	150	–	–	7	150	*40	1.0	–	*4	
	2N955	RCA	npn,DDM,ge	*1000	150	100	–	*12	150	10	0.6	–	**4	
HF 64														
	2N2808	RA	pnp,PE,si	*1000	300	200	–	*30	–	*5	0.002	7.5	*0.7	
	2N2784	SYL	npn,P,si	*1200	300	200	–	*15	–	*40-120	.005	–	*3	
	2N2784 46	SYL	npn,P,si	*1200	400	200	–	*15	–	*40-120	.005	–	*3	
	2N2784 51	SYL	npn,P,si	*1200	300	200	–	*15	–	*40-120	.005	–	*3	
	2N218	SY	pnp,AJ,ge	–	80	85	1.3	*20	–	22-110	50	–	–	
	2N231	SPR	pnp,SBT,ge	–	9	55	*0.9	*4.5	3	66	3	–	–	
	2N233	SY	npn,AJ,ge	–	50	75	1	*10	50	10	50	–	–	
	2N247	SY	pnp,Dr,ge	–	80	100	1	*40	10	20-175	50	–	–	
	2N312	SY	npn,AJ,ge	–	75	85	–	*15	–	–	60	–	12	GI, TI
	2N410	SY	pnp,AJ,ge	–	50	75	1	*20	–	22-110	5	–	–	
HF 65														
	2N504	SPR	pnp,MD,ge	–	30	85	–	*35	50	16	100	–	–	GI
	2N544	SY	pnp,DJ,ge	–	80	85	1.3	*18	10	20-175	4	–	–	
	2N624	SY	pnp,DJ,ge	–	100	100	1.3	*20	–	20	30	–	–	
	2N706A	GE	npn,si	–	300	175	–	25	–	2.0	0.5	–	5.0	Planar, Epitaxial, RA
	2N706C	SY	npn,DM,si	–	360	200	2	40	50	20-60	.025	–	–	CL, RA
	2N708	GE	npn,si	–	360	200	–	40	–	3.0	0.5	–	6.0	Planar Epitaxial CL, MO
	2N717	GE	npn,si	–	0.4	175	–	60	–	–	1.0	–	35	Planar Passivated, RA
	2N718	GE	npn,si	–	0.4	175	–	60	–	–	1.0	–	35	Planar Passivated, CL, PSI
	2N718A	GE	npn,si	–	0.5	200	–	75	–	30	10μa	12	25	Planar Passivated, PSI
	2N719	GE	npn,si	–	0.4	175	–	120	–	15	2.0	–	20	Planar Passivated, PSI
HF 66														
	2N719A	GE	npn,si	–	0.5	200	–	120	1.0amp	15	10μa	–	15	Planar Passivated, PSI
	2N720	GE	npn,si	–	0.4	175	–	120	–	30	2.0	–	20	Planar Passivated, PSI
	2N720A	GE	npn,si	–	0.5	200	–	120	–	30	–	–	15	Planar Passivated, PSI
	2N743	SY	npn,MS,si	–	300	175	2	*20	200	20-60	1	–	–	Epitaxial, CL, GI, NA, TI, MO
	2N744	SY	npn,MS,si	–	300	175	2	*20	200	40-120	1	–	–	Epitaxial, CL, GI, NA, TI, MO
	2N753	TI	npn,MS,si	–	1w	175	6.7	25	50	–	0.5	–	5	GI, NA, GE, CL
	2N768	SPR	pnp,MD,ge	–	35	100	–	*12	100	40	1	–	–	PH
	2N769	SPR	pnp,MD,ge	–	35	100	–	*12	100	55	0.3	–	–	PH
	2N781	SY	pnp,MS,ge	–	150	100	2	15	*200	25	3	–	–	Epitaxial, GE
	2N782	SY	pnp,MS,ge	–	150	100	2	*12	200	20	3	–	–	Epitaxial, GE
HF 67														
	2N783	SY	npn,MS,si	–	300	175	2	40	200	20-60	.25	–	–	Epitaxial, CL, GI, MO
	2N784	SY	npn,MS,si	–	300	175	2	30	200	25	.25	–	–	(CL, Epitaxial), GI
	2N828	GE	pnp,ge	–	150	100	–	15	200	3.0	3.0	–	6.0	Mesa Epitaxial, RCA
	2N834	GE	npn,si	–	300	175	–	40	200	3.5	0.5	–	4.0	Planar Epitaxial CL
	2N849/TI-430	TI	npn,EP,si	–	1000	–	–	15	30	*20-*60	–	–	–	
	2N850/TI-431	TI	npn,EP,si	–	1000	–	–	15	30	*40-*120	–	–	–	
	2N851/TI-422	TI	npn,EP,si	–	1000	–	–	12	200	*20-*60	–	–	–	
	2N852/TI-423	TI	npn,EP,si	–	1000	–	–	12	200	*40-*120	–	–	–	
	2N914	GE	npn,si	–	360	200	–	40	–	3.0	25mμa	–	6.0	Planar Epitaxial
	2N915	GE	npn,si	–	360	200	–	70	–	2.5	10	–	3.5	Planar Passivated
HF 68														
	2N929	SYL	npn,P,si	–	300	200	–	*45	–	–	–	–	–	
	2N930	SYL	npn,P,si	–	300	200	–	*45	–	–	–	–	–	
	2N955	RCA	npn,MS,ge	–	150	–	–	12	100	*60	–	–	–	
	2N960	GE	pnp,ge	–	150	100	–	15	150	20	3.0	–	4.0	Mesa Epitaxial, RA
	2N961	GE	pnp,ge	–	150	100	–	12	150	20	3.0	–	4.0	Mesa Epitaxial
	2N962	GE	pnp,ge	–	150	100	–	12	150	20	3.0	–	4.0	Mesa Epitaxial
	2N964	GE	pnp,ge	–	150	100	–	15	150	20	3.0	–	4.0	Mesa Epitaxial
	2N965	GE	pnp,ge	–	150	100	–	12	150	20	3.0	–	4.0	Mesa Epitaxial
	2N966	GE	pnp,ge	–	150	100	–	12	150	20	3.0	–	4.0	Mesa Epitaxial
	2N994	GE	pnp,ge	–	200	150	–	15	150	20	3.0	–	6.0	Mesa Epitaxial
HF 69														
	2N1158	PH	pnp,MD,ge	–	60	100	0.8	*20	100	50	5	–	*3	
	2N1158A	PH	pnp,MD,ge	–	75	100	1	*20	100	50	5	–	*2.8	
	2N1204	SPR	pnp,MD,ge	–	200	100	–	*20	500	40	7	–	–	
	2N1264	SY	pnp,DD,ge	–	50	75	1	*20	10	15	50	–	–	PH, MO
	2N1266	SY	pnp,AJ,ge	–	80	85	1.3	*10	–	10	100	–	–	
	2N1398	TI	pnp,MS,ge	–	50	85	–	30	10	2.3	10	5	–	
	2N1399	TI	pnp,MS,si	–	50	85	–	30	10	2.3	10	6	–	
	2N1400	TI	pnp,MS,ge	–	50	85	–	30	10	1.6	10	–	–	
	2N1401	TI	pnp,MS,ge	–	50	85	–	30	10	2	10	–	–	
	2N1401A	TI	pnp,MS,ge	–	50	85	–	30	10	2	10	–	–	
HF 70														
	2N1402	TI	pnp,MS,ge	–	50	85	–	30	10	2.2	10	–	–	
	2N1450	SY	pnp,AJ,ge	–	120	100	1.6	*30	100	20	10	–	–	GI
	2N1494	SPR	pnp,MD,ge	–	400	100	–	*20	500	15	7	–	–	PH, MO
	2N1515	AMP	pnp,PADT,ge	–	83	75	–	*20	10	60	–	–	–	OC169
	2N1646	SY	pnp,MS,ge	–	150	100	2	*15	50	20	3	–	–	

HF *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ $*f_T$ $**f_{\alpha b}$ (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} $*V_{CBO}$ (v)	I_C (ma)	CHARACTERISTICS h_{fe} $*h_{FE}$	I_{CO} (μa)	NF (db)	C_{oe} $*C_{ob}$ (pf)	Remarks
	2N1676	PH	pnp,SAT,si	–	100	140	–	*4.5	50	10.5	.001	–	–	SPR, chopper
	2N1677	PH	pnp,SAT,si	–	100	140	–	4.5	50	50	0.001	–	–	Spr. Chopper
	2N1684	SY	pnp,AJ,ge	–	100	100	1.3	*25	100	–	5	–	–	
	2N1711	GE	npn,si	–	0.8	200	–	75	–	50	10	8	25	Planar Passivated, RA
	2N1742	PH	pnp,MD,ge	–	60	125	–	*20	55	*33	0.8	4.9	–	
HF 71	2N1743	PH	pnp,MD,ge	–	60	125	–	*20	50	*33	0.8	10	–	
	2N1744	PH	pnp,MD,ge	–	60	125	–	*20	50	*33	0.8	–	–	
	2N1745	PH	pnp,MD,ge	–	60	100	0.8	*20	50	*33	1	–	–	
	2N1747	PH	pnp,MD,ge	–	60	100	0.8	*20	50	70	1	–	–	
	2N1782	SY	pnp,AJ,ge	–	100	100	1.3	*30	100	30-150	6	–	–	
	2N1783	SY	pnp,AJ,ge	–	100	100	1.3	*30	100	30-90	5	–	–	
	2N1784	SY	pnp,AJ,ge	–	100	100	1.3	*30	100	20	4	–	–	
	2N1841	WE	npn,DM,si	–	1250	150	100	75	2000	30	.1	–	–	
	2N1865	PH	pnp,MD,ge	–	60	100	0.8	*20	50	70	2	–	–	
	2N1866	PH	pnp,MD,ge	–	60	100	0.8	*35	50	70	1	–	–	
HF 72	2N1867	PH	pnp,MD,ge	–	60	100	0.8	*35	50	50	1	–	–	
	2N1868	PH	pnp,MD,ge	–	60	100	0.8	*20	50	*33	1.5	–	–	
	2N1893	GE	npn,si	–	0.8	200	–	120	–	30	15	–	15	Planar Passivated
	2N1958	SY	npn,MS,si	–	600	175	4	*60	500	20-60	0.5	–	18	Epitaxial
	2N1959	SY	npn,MS,si	–	600	175	4	*60	500	40-120	0.5	–	18	Epitaxial
	2N1960	SY	pnp,MS,ge	–	150	100	2	*15	200	25	3	–	–	Epitaxial
	2N1961	SY	pnp,MS,ge	–	150	100	2	*12	200	20	3	–	–	Epitaxial
	2N1962	SY	npn,MS,si	–	400	175	2.6	*40	200	20-60	.25	–	3	Epitaxial
	2N1963	SY	npn,MS,si	–	400	175	2.6	*30	200	25	.25	–	3.5	Epitaxial
	2N1964	SY	npn,MS,si	–	400	175	2.6	*60	500	20-60	0.5	–	18	Epitaxial
HF 73	2N1965	SY	npn,MS,si	–	400	175	2.6	*60	500	40-120	0.5	–	18	Epitaxial
	2N1969	SY	pnp,AJ,ge	–	150	100	2	*30	400	50-200	5	–	20	TI
	2N2192	GE	npn,si	–	0.8	200	–	60	1.0a	2.5	10mμa	–	20	Planar Epitaxial
	2N2192A	GE	npn,si	–	0.8	200	–	60	1.0a	2.5	10mμa	–	20	Planar Epitaxial
	2N2193	GE	npn,si	–	0.8	200	–	80	1.0a	2.5	10mμa	–	20	Planar Epitaxial
	2N2193A	GE	npn,si	–	0.8	200	–	80	1.0a	2.5	10mμa	–	20	Planar Epitaxial
	2N2194	GE	npn,si	–	0.8	200	–	60	1.0a	2.5	10mμa	–	20	Planar Epitaxial
	2N2194A	GE	npn,si	–	0.8	200	–	60	1.0a	2.5	–	–	–	Planar Epitaxial
	2N2195A	GE	npn,si	–	0.6	200	–	45	1.0amp	2.5	100mμ	–	20	Planar Epitaxial, RA
	2N2360	PH	pnp,MD,ge	–	60	125	0.75	*20	50	*33	0.8	–	–	
HF 74	2N2361	PH	pnp,MD,ge	–	60	125	0.75	*20	50	*33	0.8	–	–	
	2N2362	PH	pnp,MD,ge	–	60	120	2	*20	50	*33	0.8	–	–	
	2N2363	TI	pnp,MS,ge	–	125	–	–	60	30	135	3	–	–	
	2N2389	TI	npn,PL,si	–	2000	–	–	35	600	*40-*120	–	–	–	
	2N2395	TI	npn,PL,si	–	2000	–	–	40	300	*20-*60	–	–	–	
	2N2396	TI	npn,PL,si	–	2000	–	–	40	300	*40-*120	–	–	–	
	2N2398	PH	pnp,MD,ge	–	60	100	2	*20	50	*33	0.8	–	–	
	2N2399	PH	pnp,MD,ge	–	60	100	2	*20	50	*33	0.8	–	–	
	2N2410	TI	npn,PE,si	–	2500	–	–	30	800	*30-*120	–	–	–	
	2N2411	TI	pnp,PE,si	–	1000	–	–	20	100	*20-*60	–	–	–	
HF 75	2N2412	TI	pnp,PE,si	–	1000	–	–	20	100	*40-*120	–	–	–	
	10B551	GE	npn,GP,si	–	100	125	1.0	*40	–	*30-120	50mμa	–	6.0	
	10B553	GE	npn,PE,si	–	100	125	1.0	*40	–	*30-120	.5	–	6.0	
	10B555	GE	npn,PE,si	–	100	125	1.0	*25	–	20	.5	–	6.0	
	10B556	GE	npn,PE,si	–	100	125	1.0	*25	–	*20-60	.5	–	6.0	
	10C573	GE	npn,P,si	–	100	125	1.0	*45	–	36-90	0.2	–	*8	
	10C574	GE	npn,P,si	–	100	125	1.0	*45	–	73-333	0.2	–	*8	
	11B551	GE	npn,P,si	–	100	125	1.0	*60	–	*20-60	.5	–	–	
	11B552	GE	npn,P,si	–	100	125	1.0	*60	–	*40-120	.5	–	–	
	11B554	GE	npn,P,si	–	100	125	1.0	*60	–	*40-120	25mμa	12	*25	
HF 76	11B555	GE	npn,P,si	–	100	125	1.0	*60	–	*100-300	25mμa	12	*25	
	11B556	GE	npn,P,si	–	100	125	1.0	*100	–	*40-120	25mμa	–	*15	
	11B560	GE	npn,P,si	–	100	125	1.0	*100	–	*40-120	.5	–	–	
	GT1665	GI	pnp,AJ,ge	–	150	100	2	*100	–	25	4	–	–	Drift
	MA-1	SPR	pnp,MAT,ge	–	25	75	–	6	50	40	10	–	–	
	MA-2	SPR	pnp,MAT,ge	–	20	75	–	3	50	40	10	–	–	
	PT850	PSI	npn,DM,si	–	2w	175	13.3	120	–	2	2	–	–	hi freq., hi pwr.
	PT850A	PSI	npn,DM,si	–	2.8w	175	18.6	120	–	2	2	–	–	hi freq., hi pwr.
HF 77	SO-1	SPR	pnp,SBT,ge	–	20	65	–	5	5	10	10	–	–	
	SO-2	SPR	pnp,SBT,ge	–	15	65	–	3	5	10	10	–	–	
	SO-3	SPR	pnp,SBT,ge	–	20	65	–	5	5	10	10	–	–	
	ST3031	TR	npn,DJ,si	–	150	175	–	–	–	–	–	–	–	



■ WHY DO LOW PINCH-OFF UNIFETS* GIVE HIGHER VOLTAGE AMPLIFICATION?

BECAUSE A_V IS INVERSELY PROPORTIONAL TO V_P WHEN $V_{DD1} = V_{DD2}$ AND $V_{DS1} = V_{DS2}$. YOU ALSO GET GREATER BIAS STABILITY AND WIDER DYNAMIC RANGE. AVAILABLE NOW IN FOUR g_m VALUES AS SHOWN. WRITE FOR FILE #841, THE DESCRIPTIVE PAPER ON LOW V_P UNIFET APPLICATIONS.

Low Pinch-off UNIFETs *(Unipolar Field-Effect Transistors) now available:

Typical	2N2841	2N2842	2N2843	2N2844	
V_P	0.8	0.8	0.8	0.8	v
g_m	90	270	800	2000	μmho
I_{DSS}	−50	−150	−450	−1000	μa
NF at 1kc	0.5	0.5	0.5	0.5	db
Pinch-off: 1.7v max.—Gate-drain breakdown: 20v min.—TO-18 package					

AMPLIFICATION CALCULATIONS FOR HIGH PINCH-OFF vs. LOW PINCH-OFF UNIFETS

For all UNIFETs, it can be shown that:

$g_{mo}\dagger = \frac{2.5\ I_{DSS}\dagger\dagger}{V_P}$ within about 20%

When $V_{DD1} = V_{DD2} = -15v$ and $V_{DS1} = V_{DS2} = -5v$

then $I_{DSS1}\ R_{L1} = 10v$ and $I_{DSS2}\ R_{L2} = 10v$

Available voltage amplification, $A_v = g_m\ R_L$

From these equations, it can be shown that $A_{v1} = \frac{25}{V_{P1}}$ and $A_{v2} = \frac{25}{V_{P2}}$

since $V_{P1} = 5v$ $V_{P2} = 0.8v$

$A_{v1} = 5$ $A_{v2} = 31$

† g_m when $V_{GS} = 0$. †† Drain-source current when $V_{GS} = 0$.

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ON READER-SERVICE CARD CIRCLE 454

POWER

Types rated at one watt and higher. In order of increasing power dissipation.

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 1	2N2038	TR	npn	0.6	0.03	200	45	0.5	12-36	0.001	–	–	–	
	2N2039	TR	npn	0.6	0.03	200	75	0.5	12-36	0.001	–	–	–	
	2N2040	TR	npn	0.6	0.03	200	45	0.5	30-90	0.001	–	–	–	
	2N2041	TR	npn	0.6	0.03	200	75	0.5	30-90	0.001	–	–	–	
	2N2198	TR	npn	0.6	0.025	200	80	–	20-70	0.010	–	–	–	
P 2	2N957	PSI	npn,TPD,si	0.8w	0.006	150	40	–	*45	0.01	250	–	–	
	2N339	TI	npn,GR,si	1.0	0.008	150	55	.06	9-90	.001	6	30	–	TR, PSI
	2N340	TI	npn,GR,si	1.0	0.008	150	85	.06	9-90	.001	6	30	–	TR
	2N341	TI	npn,GR,si	1.0	0.008	150	*125	.06	9-90	.001	6	30	–	TR
	2N341A	TR	npn,DJ,si	1	0.008	200	*125	.1	15-90	.001	–	–	–	
	2N342	TI	npn,GR,si	1.0	0.008	150	60	.06	9-32	.001	6	30	–	TR
	2N342A	TI	npn,GR,si	1.0	0.008	150	85	.06	9-32	.001	6	30	–	TR
	2N342B	TI	npn,GJ,si	1.0	–	–	85	0.6	9-32	–	–	–	–	
	2N343	TI	npn,GR,si	1.0	0.008	150	60	.06	28-90	.001	8	30	–	TR
	2N343A	TR	npn,DJ,si	1	.008	150	*60	–	29-90	.001	–	–	–	TR
P 3	2N343B	TI	npn,GJ,si	1.0	–	–	65	0.6	28-90	–	–	–	–	
	2N497A	BE	npn,PL,si	1	–	200	60	–	*12-36	–	–	–	–	
	2N498A	BE	npn,PL,si	1	–	200	60	–	*12-36	–	–	–	–	
	2N656A	BE	npn,PL,si	1	–	200	60	–	*30-90	–	–	–	–	
	2N657A	BE	npn,PI,si	1	–	200	100	–	*30-90	–	–	–	–	
	2N706	FA	npn,DD,si	1.0	0.0067	175	*25	–	*45	*0.005	*400	–	–	MO
	2N707	PSI	npn,TDP,si	1	.006	175	56	–	12	.005ma	300	6	0.2	
	2N709	FA	npn,DP,si	1.0	0.005	200	6.0	–	*55	*0.005	*800	–	–	
	2N988	PSI	npn,TPD,si	1	0.006	175	20	–	70	0.05	250	8	0.32	
	2N989	PSI	npn,TPD,si	1	0.006	175	20	–	70	0.05	250	11	0.63	
P 4	2N1048A	BE	npn,DM,si	1	–	165	120	0.5	*12-36	–	–	–	–	
	2N1206	TR	npn,GR,si	1.0	10	200	60	–	15-19	1	–	–	–	
	2N1207	TR	npn,GR,si	1.0	10	200	*125	–	15-90	1	–	–	–	
	2N2017	GE	npn,MS,si	1.0	–	200	60	–	30	10	–	–	–	BE
	2N2106	GE	npn,MS,si	1.0	–	150	60	–	12-36	200*	15	–	–	BE
	2N2107	GE	npn,MS,SI	1.0	–	150	60	–	30-90	200*	15	–	–	BE
	2N2108	GE	npn,MS,si	1.0	–	150	60	–	30	200*	15	–	–	BE
	2N2726	GE	npn,DM,si	1.0	–	200	*200	–	*30-90	*1.0	–	–	–	
	2N2727	GE	npn,DM,si	1.0	–	200	*200	–	*75-150	*1.0	–	–	–	
	7A30	GE	npn,DM,si	1.0	–	150	*50	–	*12-36	*10	15mc	–	–	
P 5	7A31	GE	npn,DM,si	1.0	–	150	*50	–	*30-90	*10	15mc	–	–	
	7A32	GE	npn,DM,si	1.0	–	150	*50	–	*75-200	*10	15mc	–	–	
	2N708	FA	npn,DP,si	1.2	0.0069	200	15	–	*50	*0.004	*450	–	–	MO
	2N869	FA	pnp,DP,si	1.2	0.0069	200	18	–	*50	0.0001	150	–	–	
	2N914	FA	npn,DP,si	1.2	0.0069	200	*15	–	*55	*0.004	*370	–	–	CL, MO
	2N915	FA	npn,DP,si	1.2	0.0069	200	50	–	*100	*0.005	*350	–	–	
	2N916	FA	npn,DP,si	1.2	0.0069	200	25	–	*80	*0.002	*400	–	–	RA
	2N947	FA	npn,DP,si	1.2	0.0069	200	–	–	*50	*0.005	*400	–	–	
	2N995	FA	pnp,DP,si	1.2	0.0069	200	15	–	*60	0.0002	200	–	–	
	2N996	FA	pnp,DP,si	1.2	0.0069	200	12	–	*75	0.0002	200	–	–	
P 6	2N1566	TI	npn,MS,si	1.2	–	175	*80	50	100	1	50	–	–	TR,NA
	2N2368	FA	npn,DP,si	1.2	0.0069	200	15	–	*40	*0.1	*650	–	–	
	2N2369	FA	npn,DP,si	1.2	0.0069	200	15	–	*70	*0.1	*650	–	–	
	2N2656	PSI	npn,EM,si	1.2	0.006	200	25	200	50	0.01	250	10	0.05	
	PT720	PSI	npn,TPD,si	1.2	0.006	200	25	200	80	5	250	15	0.05	
	2N721	TR	pnp,PL,si	1.25	.010	200	*30		*20	*1	*50,000			
	2N722	TR	pnp,PL,si	1.25	.010	200	*50		*25	*1	*60,000			
	2N978	TR	pnp,PL,si	1.25	.010	200	*30		*15	*5	*40,000			
	2N717	FA	npn,DD,si	1.5	0.010	175	–	–	*40	*0.01	*80	–	–	RA, PSI
	2N718	FA	npn,DD,si	1.5	0.010	175	–	–	*80	*0.01	*100	–	–	RA, PSI
P 7	2N719	FA	npn,DD,si	1.5	0.010	175	–	–	*40	*0.01	*90	–	–	RA, PSI
	2N720	FA	npn,DD,si	1.5	0.010	175	–	–	*65	*0.01	*100	–	–	RA, PSI
	2N721	FA	pnp,DD,si	1.5	0.010	175	35	–	*30	*0.01	*70	–	–	
	2N722	FA	pnp,DD,si	1.5	0.010	175	35	–	*60	*0.01	*80	–	–	
	2N2786	AMP	pnp,ge	1.5	35	75	*34	150	*40	–	–	10	0.5	0.5w @80mc
	PT886	PSI	npn,TPD,si	1.6	0.01	175	22	–	–	0.3	180	–	150	
	PT887	PSI	npn,TPD,si	1.6	0.01	175	45	–	–	0.3	180	6.0	750	
	PT888	PSI	npn,TPD,si	1.6	0.01	175	45	–	–	0.3	180	4.0	1000	
	2N718A	FA	npn,DP,si	1.8	0.0103	200	–	–	*80	*0.0003	*100	–	–	
	2N719A	FA	npn,DP,si	1.8	0.0103	200	60	–	*40	*0.0003	*80	–	–	PSI

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I_{CBO}

0.1

μa@V_{CB}=60V

(I_C max=)

10A

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2N2812
2N2813
2N2814
(NPN)

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2N2812	80	60	8	40-120
2N2813	120	80	8	20-60
2N2814	120	80	8	40-120

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ON READER-SERVICE CARD CIRCLE 455

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	Remarks
P 8	2N720A	FA	npn,DP,si	1.8	0.0103	200	80	–	*80	*0.0003	*100	–	–	PSI
	2N870	FA	npn,DP,si	1.8	0.0103	200	60	–	*80	*0.0003	*70	–	–	RA
	2N871	FA	npn,DP,si	1.8	0.0103	200	60	–	*200	*0.0003	*90	–	–	RA
	2N910	FA	npn,DP,si	1.8	0.0103	200	60	–	*135	*0.0003	*80	–	–	RA, PSI
	2N911	FA	npn,DP,si	1.8	0.0103	200	60	–	*70	*0.0003	*70	–	–	RA
	2N912	FA	npn,DP,si	1.8	0.0103	200	60	–	*42	*0.0003	*60	–	–	RA
	2N956	FA	npn,DP,si	1.8	0.0103	200	–	–	*200	*0.0003	*100	–	–	PSI
	2N1890	PSI	npn,TPD,si	1.8	0.01	200	100	–	200	0.001	190	–	–	
	2N696	FA	npn,DD,si	2.0	0.0133	175	–	–	*40	*0.01	*60	–	–	RA, PSI
P 9	2N697	FA	npn,DD,si	2.0	0.0133	175	–	–	*75	*0.01	*80	–	–	RA, PSI
	2N699	FA	npn,DD,si	2.0	0.0133	175	–	–	*65	*0.01	*100	–	–	RA
	2N1131	FA	pnp,DD,si	2.0	0.0133	175	35	–	*30	*0.01	*70	–	–	
	2N1132	FA	pnp,DD,si	2.0	0.0133	175	35	–	*60	*0.01	*90	–	–	MO
	2N1252	FA	npn,DD,si	2.0	0.0133	175	–	–	*35	*0.1	*80	–	–	RA
	2N1253	FA	npn,DD,si	2.0	0.0133	175	–	–	*45	*0.1	*110	–	–	RA
	2N1420	FA	npn,DD,si	2.0	0.0133	175	–	–	*150	*0.01	*130	–	–	PSI
	2N1840	PSI	npn,TPD,si	2	0.013	175	25	500	15	0.3	180	–	–	
	2N1983	FA	npn,DD,si	2.0	0.016	150	25	–	4.0	*1.0	*10	–	–	RA
	2N1984	FA	npn,DD,si	2.0	0.016	150	25	–	4.0	*1.0	*10	–	–	RA
P 10	2N1985	FA	npn,DD,si	2.0	0.016	150	25	–	4.0	*1.0	*50	–	–	RA
	2N1986	FA	npn,DD,si	2.0	0.016	150	25	–	*100	*1.0	*80	–	–	RA
	2N1987	FA	npn,DD,si	2.0	0.016	150	25	–	*50	*1.0	*80	–	–	RA
	2N1988	FA	npn,DD,si	2.0	0.016	150	45	–	*70	*1.0	*80	–	–	RA
	2N1989	FA	npn,DD,si	2.0	0.016	150	45	–	*40	*1.0	*80	–	–	RA
	2N1990	FA	npn,DD,si	2.0	0.016	150	–	–	*40	–	*50	–	–	RA
	2N1991	FA	npn,DD,si	2.0	0.016	150	20	–	*30	*1.0	*50	–	–	RA
	2N2303	FA	pnp,DP,si	2.0	0.0133	175	-35	–	*120	*0.005	*90	–	–	
	2N1335	PSI	npn,MS,si	2.8	0.024	150	.120	.075	13	.008	70	–	–	high freq. high pwr.
	2N1336	PSI	npn,MS,si	2.8	0.024	150	120	.075	13	.008	70	–	–	high freq., high pwr.
P 11	2N1339	PSI	npn,MS,si	2.8	0.024	150	120	.075	–	.008	70	–	–	high freq., high pwr.
	2N1340	PSI	npn,MS,si	2.8	0.024	150	120	.075	–	.008	70	–	–	high freq., high pwr.
	2N1341	PSI	npn,MS,si	2.8	0.024	150	120	.075	–	.008	70	–	–	high freq., high pwr.
	2N1342	PSI	npn,TPD,si	2.8	0.018	175	150	300	12	0.01	190	8	0.7	
	2N698	FA	npn,DP,si	3.0	0.0172	200	60	–	*40	*0.0003	*70	–	–	RA, PSI
	2N1505	PSI	npn,MS,si	3	0.2	175	50	–	7	–	70	–	–	high freq., high pwr., BE
	2N1506	PSI	npn,MS,si	3	0.2	175	60	–	9	–	70	–	–	high freq., high pwr., BE
	2N1506A	BE	npn,PL,si	3	–	200	50	–	*10-100	–	–	–	–	
	2N1561	MO	pnp,MS,si	3	.04	100	*25	.25	10	.0015	500 mc	–	–	high freq., high pwr.
	2N1562	MO	pnp,MS,ge	3	.04	100	*25	.25	10	.0015	450 mc	–	–	high freq., high pwr.
P 12	2N1564	PSI	npn,TPD,si	3	0.02	175	80	50	30	0.01	190	–	–	
	2N1565	PSI	npn,TPD,si	3	0.02	175	80	50	60	0.01	190	–	–	
	2N1566	PSI	npn,TPD,si	3	0.02	175	80	50	130	0.01	190	–	–	
	2N1613	TR	npn,PL,si	3	.017	200	*75	–	*20	10na	*60,000			
	2N1613	FA	npn,DP,si	3.0	0.0172	200	–	–	*80	*0.0003	*80	–	–	
	2N1692	MO	pnp,MS,ge	3	.04	100	*25	.25	10 db	.0015	500 mc	6	0.5	
	2N1693	MO	pnp,MS,ge	3	.04	100	*25	.25	10 db	.0015	–	6	.4	
	2N1711	TR	npn,PL,si	3	.017	200	*75	–	*100	10na	*70,000			
	2N1711	FA	npn,DP,si	3.0	0.0172	200	–	–	*130	*0.0003	*100	–	–	PSI
	2N1890	FA	npn,DP,si	3.0	0.0172	200	60	–	*200	*0.0003	*90	–	–	RA
P 13	2N1893	FA	npn,DP,si	3.0	0.0172	200	–	–	–	*0.0003	*70	–	–	RA
	2N1893	PSI	npn,TPD,si	3	0.017	200	120	500	80	0.001	190	–	–	
	2N1893A	PSI	npn,TPD,si	3	0.017	200	140	500	90	0.001	190	–	–	
	2N1973	FA	npn,DP,si	3.0	0.0172	200	60	–	*135	*0.0003	*80	–	–	
	2N1974	FA	npn,DP,si	3.0	0.0172	200	60	–	*70	*0.0003	*70	–	–	
	2N1975	AMF	npn,DP,si	3.0	0.0172	200	60	–	*42	*0.0003	*60	–	–	
	2N2049	FA	npn,DP,si	3.0	0.0172	200	–	–	3.0	*0.0003	–	–	–	
	2N2224	BE	npn,PL,si	3	–	200	*40	–	*40-120	–	–	–	–	
	MM719	MO	npn,PE,si	3	17.1	200	*60	–	*40	*0.5	*400	–	0.8	
	2N1506A	PSI	npn,TPD,si	3.5	0.02	200	80	500	60	0.005	190	10	1.3	
P 14	2N497	TI	npn,DJ,si	4.0	.023	200	60	200	12-36	10	9 mc	–	–	TR, FA, NA, BE, RCA
	2N498	TI	npn,DJ,si	4.0	.023	200	100	200	12-36	10	9 mc	–	–	TR, FA, NA, BE
	2N656	TI	npn,DJ,si	4.0	.023	200	60	200	30-90	10	8 mc	–	–	TR, FA, NA, BE, RCA,GE
	2N657	TI	npn,DJ,si	4.0	.023	200	100	200	30-90	10	8 mc	–	–	TR, FA, NA, BE, GE
	TAG200	FA	npn,DP,si	4.0	0.0228	200	–	–	*80	–	*60	–	–	
	2N1479	RCA	npn,DJ,si	4	–	175	60	1.5	50	10	1.5 mc	–	–	TR
	2N1480	RCA	npn,DJ,si	4	–	175	100	1.5	50	10	1.5 mc	–	–	TR
	2N1481	RCA	npn,DJ,si	4	–	175	60	1.5	50	10	1.5 mc	–	–	TR
	2N1482	RCA	npn,DJ,si	4	–	175	100	1.5	50	10	1.5 mc	–	–	TR
	2N1615	TR	npn,ME,si	4	.023	200	*100		*25	*10	*25,000			

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 15	MHT-4401	MH	npn,EP,si	4	0.023	200	*60	0.5	20-120	0.001	80m	–	–	Vce (sat)=1v
	MHT-4402	MH	npn,EP,si	4	0.023	200	*120	0.5	20-120	0.002	80m	–	–	Vce (sat)=2 v
	MM801	MO	npn,PE,si	4	26.7	175	*60	–	*10	*0.5	*300	–	6	
	PT1588	PSI	npn,TPD,si	4	0.023	200	80	–	40	0.005	210	10	1	
	ST4341	TR	npn,ME,si	4	.023	200	*80		*15	*80	*15,000			
	2N699B	FA	npn,DP,si	5.0	0.035	200	–	–	–	*0.0004	*100	–	–	PSI
	2N1067	STC	npn,DJ,si	5	28.6	175	60	0.5	35	5	1.5	–	–	RCA, AMF
	2N1700	RCA	npn,si	5	–	–	*60	1.0	*20	–	–	–	–	TR
	2N2102	RCA	npn,TDP,si	5	–	–	120	1.0	35*	–	–	–	–	BE
	2N2270	RCA	npn,TDP,si	5	–	–	60	1.0	35*	–	–	–	–	BE
P 16	2N2297	FA	npn,DP,si	5.0	0.0286	200	–	–	*35	*0.0004	*90	–	–	
	2N1216	SY	npn,AJ,ge	6	0.1	85	*45	2	40-100	3	7	–	–	
	2N2038	TR	npn,DJ,si	6	.03	200	45	0.5	12-36	.001	–	–	–	
	2N2039	TR	npn,DJ,si	6	.03	200	75	0.5	12-36	.001	–	–	–	
	2N2040	TR	npn,DJ,si	6	.03	200	45	0.5	30-90	.001	–	–	–	
	2N2041	TR	npn,DJ,si	6	.03	200	75	0.5	30-90	.001	–	–	–	
	OC30	AMP	pnp,PADT,ge	6.7	75	75	*32	1.4	35	.012	–	–	–	
	2N326	SY	npn,AJ,ge	7	0.11	85	*35	2	45	3	150	–	–	
	7F1	GE	npn,DM,si	7		175	*80	–	*12-36	*50	–	–	–	
	7F2	GE	npn,MS,si	7		175	*80	–	*30-90	*50	–	–	–	
P 17	7F3	GE	npn,DM,si	7	–	175	*120	–	*12-36	*50	–	–	–	
	7F4	GE	npn,DM,si	7	–	175	*120	–	*30-90	*50	–	–	–	
	2N1172	DE	pnp,AJ,ge	7.5	.1	100	*40	1.5		0.100	17	34	–	driver
	2N1183	RCA	pnp,AJ,ge	7.5	–	100	45	3	20	.03	500	–	–	
	2N1183A	RCA	pnp,AJ,ge	7.5	–	100	60	3	20	.03	500	–	–	
	2N1183B	RCA	pnp,AJ,ge	7.5	–	100	80	3	20	.03	500	–	–	
	2N1184	RCA	pnp,AJ,ge	7.5	–	100	45	3	40	.03	500	–	–	
	2N1184A	RCA	pnp,AJ,ge	7.5	–	100	60	3	40	.03	500	–	–	
	2N1184B	RCA	pnp,AJ,ge	7.5	–	100	80	3	40	.03	500	–	–	
	2N1609	DE	pnp,AJ,ge	7.5	10.0	100	60	1.5	*30/75	100	15	32	–	
P 18	2N1610	DE	pnp,A,ge	7.5	10.0	100	60	1.5	*50/125	100	15	32	–	
	2N1610	KF	pnp,AJ,ge	7.5	.1	100	*80	1½	*35	*20	–	–	–	
	2N1612	KF	pnp,AJ,ge	7.5	.1	100	*60	1½	*35	*20	–	–	–	
	2N2403	NA	npn,si	8	0.045	200	60	1	20-60	0.001	200mc	12	1.2	
	2N2404	NA	npn,si	8	0.045	200	60	1	40-120	0.001	200mc	12	1.2	
	2N2485	CS	npn,MS,si	8.7	.05	200	120	1	*10	*500	*250	7	5	
	2N2486	CS	npn,MS,si	8.7	.05	200	140	1	*10	*500	*250	5	3	
	2N2649	CS	npn,MS,si	8.7	.05	200	65	1	*10	*500	*250	5	2	
	2N2650	CS	npn,MS,si	8.7	.05	200	140	1	*10	*500	*250	6.5	4.5	
	2N122	TI	npn,GR,si	8.75	.070	150	120	140	3	10	1	28	–	
P 19	2N176	SY	pnp,AJ,ge	10	0.15	90	*30	3	4.5	0.3	–	35.5	–	RCA, MO, BE
	2N350	SY	pnp,AJ,ge	10	0.13	100	*40	3	40	–	5	32	–	MO, BE
	2N351	RCA	pnp,AJ,ge	10	1	90	40	3	65	3	–	33.5	4	MO, SY, BE
	2N376	RCA	pnp,AJ,ge	10	1	90	40	3	78	3	–	35	4	MO, BE
	2N669	MO	pnp,AJ,ge	10	1.5	90	30	3	90	0.3	5	40	2	BE, CL
	2N1068	IND	npn,AJ,si	10	0.133	175	60	1.5	38	0.5	–	–	–	STC, RCA, AMF, BE
	2N1714	TI	npn,MS,si	10	.134	175	60	1	–	.002	20 mc	–	–	
	2N1715	TI	npn,MS,si	10	.134	175	100	1	–	.002	20 mc	–	–	
	2N1716	TI	npn,MS,si	10	.134	175	60	1	–	.002	20 mc	–	–	
	2N1717	TI	npn,MS,si	10	.134	175	100	1	–	.002	20 mc	–	–	RA
P 20	2N1718	TI	npn,MS,si	10	.134	175	60	1	–	.002	20 mc	–	–	RA
	2N1719	TI	npn,MS,si	10	.134	175	100	1	–	.002	20 mc	–	–	RA
	2N1720	TI	npn,MS,si	10	.134	175	60	1	–	.002	20 mc	–	–	RA
	2N1721	TI	npn,MS,si	10	.134	175	100	1	–	.002	20 mc	–	–	
	2N1755	CL	pnp,AJ,ge	10	2.5	95	*40	3	–	7	15	30-75	–	
	2N1756	CL	pnp,AJ,ge	10	2.5	95	*60	3	–	7	15	30-75	–	
	2N1757	CL	pnp,AJ,ge	10	2.5	95	*80	3	–	7	8	30-75	–	
	2N1758	CL	pnp,AJ,ge	10	2.5	95	*100	3	–	7	8	30-75	–	
	2N1759	CL	pnp,AJ,ge	10	2.5	95	*40	3	–	7	10	60-150	–	
	2N1760	CL	pnp,AJ,ge	10	2.5	95	*60	3	–	7	10	60-150	–	
P 21	2N1761	CL	pnp,AJ,ge	10	2.5	95	*80	3	–	7	6	60-150	–	
	2N1762	CL	pnp,AJ,ge	10	2.5	95	*100	3	–	7	6	60-150	–	
	CDT1310	CL	pnp,AJ,ge	10	1.5	95	*40	5	–	15	5	40-120	–	
	CDT1311	CL	pnp,AJ,ge	10	1.5	95	*60	5	–	15	5	40-120	–	
	CDT1312	CL	pnp,AJ,ge	10	1.5	95	*80	5	–	15	5	40-120	–	
	CDT1313	CL	pnp,AJ,ge	10	1.5	95	*100	5	–	15	5	40-120	–	
	CST1739	CL	pnp,AJ,ge	10	2.5	95	*40	3	–	3	7	28-39	–	
	CST1740	CL	pnp,AJ,ge	10	2.5	95	*40	3	–	3	7	28-33	–	
	CST1741	CL	pnp,AJ,ge	10	2.5	95	*40	3	–	3	7	32-35	–	
	CST1742	CL	pnp,AJ,ge	10	2.5	95	*40	3	–	3	7	34-37	–	

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS w/ °C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	Remarks
P 22	CST1743	CL	pnp,AJ,ge	10	2.5	95	*40	3	–	3	7	36-39	–	
	CST-1744	CL	pnp,AJ,ge	10	2.5	95	*80	3	–	3	7	28-37	–	
	CST1745	CL	pnp,AJ,ge	10	2.5	95	*80	3	–	3	7	28-33	–	
	CST1746	CL	pnp,AJ,ge	10	2.5	95	*80	3	–	3	7	32-37	–	
	CTP1104	CL	pnp,AJ,ge	10	2.0	85	40	3	–	2	4	28	1.2	
	CTP1105	CL	pnp,AJ,ge	10	2.0	85	40	3	–	2	5	30	1.2	
	CTP1108	CL	pnp,AJ,ge	10	2.0	85	20	3	–	2	4	27	0.6	
	CTP1109	CL	pnp,AJ,ge	10	2.0	90	20	3	–	2	6	35	0.6	
	CTP1111	CL	pnp,AJ,ge	10	2.0	90	80	3	–	5	4	29	1.2	
	MHT-4501	MH	npn,EP,si	10	0.057	200	*60	1	20-120	0.001	80m	–	–	Vce (sat)=1 v
P 23	MHT-4502	MH	npn,EP,si	10	0.057	200	*120	1	20-120	0.002	80m	–	–	Vce (sat)=2 v
	2N301	RCA	pnp,AJ,ge	11	–	91	40	3	70	0.1	–	–	–	BE
	2N1314	AMP	pnp,PADT,ge	11	–	90	*32	3.5	33	<0.1	150	–	–	
	2N301A	SY	pnp,AJ,ge	12	0.2	85	*60	2	–	5	5	35	–	CL, RCA, BE
	2N1666	AMP	pnp,PADT,ge	13	–	90	*80	6	32	<100	200	–	–	
	2N1709	PSI	npn,DM,si	13	86.7	175	75	1.2a	–	10max	240mc	10 db	–	hi freq., hi pwr.
	2N1710	PSI	npn,DM,si	13	86.7	175	60	1.2a	–	10max	30	8 db	–	hi freq., hi pwr.
	2N2781	PSI	npn,TDP,si	13	.087	175	75	2	30	.5	210	5	3.2	
	2N2782	PSI	npn,TDP,si	13	.087	175	100	2	30	.5	210	5	3.2	
	2N2783	PSI	npn,TDP,si	13	.087	175	100	2	30	.1	210	5	3.5	
P 24	PT531	PSI	npn,TDP,si	13	.087	175	75	2	30	.1	210	10	3.0	
	PT612	PSI	npn,TDP,si	13	.087	175	75	2	30	.5	210	10	5	
	2N307	BE	pnp,AJ,ge	15	2.0	75	35	1.0	–	.35	–	–	–	2N234A
	2N1658	MH	pnp,AJ,ge	15	0.2	100	*80	1	30-90	0.5	700	–	–	
	2N1659	MH	pnp,AJ,ge	15	0.2	100	*60	1	30-90	0.5	700	–	–	
	2N2196	GE	npn,MS,si	15	–	175	80	–	30	75μa	15	–	–	
	2N2197	GE	npn,MS,si	15	–	175	80	30	*75	15	–	–		
	2N2201	GE	npn,DM,si	15		175	*120	–	*30-90	*50	–	–	–	
	2N2202	GE	npn,DM,si	15		175	*120	–	*30-90	*50	–	–	–	
	2N2203	GE	npn,DM,si	15		175	*120	–	*30-90	*50	–	–	–	
P 25	2N2204	GE	npn,DM,si	15		175	*120	–	*30-90	*50	–	–	–	
	2N2611	GE	npn,DM,si	15	–	175	*120	–	*12-36	*50	–	–	–	
	7B1	GE	npn,DM,si	15		175	*80	–	*12-36	*50	–	–	–	
	7B2	GE	npn,DM,si	15		175	*80	–	*30-90	*50	–	–	–	
	7B3	GE	npn,MS,si	15	–	175	120	–	12	50	15	–	–	
	7C1	GE	npn,DM,si	15		175	*80	–	*12-36	*50	–	–	–	
	7C2	GE	npn,DM,si	15		175	*80	–	*30-90	*50	–	–	–	
	7C3	GE	npn,DM,si	15		175	*120	–	*12-36	*50	–	–	–	
	7D1	GE	npn,DM,si	15		175	*80	–	*12-36	*50	–	–	–	
	7D2	GE	npn,DM,si	15		175	*80	–	*30-90	*50	–	–	–	
P 26	7D3	GE	npn,DM,si	15		175	*120	–	*12-36	*50	–	–	–	
	7E1	GE	npn,DM,si	15		175	*80	–	*12-36	*50	–	–	–	
	7E2	GE	npn,DM,si	15		175	*80	–	*12-36	*50	–	–	–	
	7E3	GE	npn,DM,si	15		175	*120	–	*12-36	*50	–	–	–	
	7G1	GE	npn,DM,si	15	–	175	*80	–	*12-36	*50	–	–	–	
	7G2	GE	npn,DM,si	15	–	175	*80	–	*30-90	*50	–	–	–	
	7G3	GE	npn,DM,si	15	–	175	*120	–	*12-36	*50	–	–	–	
	7G4	GE	npn,DM,si	15	–	175	*120	–	*30-90	*50	–	–	–	
	2N307A	SY	pnp,AJ,ge	17	0.34	75	*35	2	25	–	5	33	–	BE
	SN230	CS	npn,MS,si	18	.12	175	65	2	*10	*500	*250	5.7	7.5	
P 27	SN231	CS	npn,MS,si	18	.12	175	140	2	*10	*500	*250	8.5	14	
	SN232	CS	npn,MS,si	18	.12	175	65	2	*10	*500	*250	4	5	
	SN234	CS	npn,MS,si	18	.12	175	140	2	*10	*500	*250	6	8	
	2N155	CL	pnp,AJ,ge	20	.33	85	*30	3	20	2	5	–	2	BE
	2N156	RA	pnp,AJ,ge	20	0.33	85	30	3	20	1	5	–	2	KF
	2N158	RA	pnp,AJ,ge	20	0.33	85	60	3	20	1	5	–	2	KF
	2N158A	RA	pnp,AJ,ge	20	0.33	85	80	3	20	1	5	–	2	KF
	2N255	BE	pnp,AJ,ge	20	2.0	85	15	3	–	1.0	–	–	19-26	2N234A
	2N255A	BE	pnp,AJ,ge	20	0.5	85	15	3	–	1.0	5	25	2	
	2N256	BE	pnp,AJ,ge	20	2.0	85	30	3	–	1.0	–	–	22-29	2N234A
P 28	2N256A	BE	pnp,AJ,ge	20	0.5	85	25	3	–	1	5	25	2	
	2N401	BE	pnp,AJ,ge	20	1.2	90	40	3	–	1.3	–	30	5	
	2N1042	TI	pnp,AJ,ge	20	.27	100	40	3	20-60	0.75	–	–	–	BE, KF
	2N1043	TI	pnp,AJ,ge	20	.27	100	60	3	20-60	0.75	–	–	–	BE, KF
	2N1044	TI	pnp,AJ,ge	20	.27	100	80	3	20-60	0.75	–	–	–	BE, KF
	2N1045	TI	pnp,AJ,ge	20	.27	100	100	3	20-60	0.75	–	–	–	BE, KF
	2N1294	SY	npn,AJ,ge	20	0.33	85	*60	3	30min	0.5	5	–	2	
	2N1295	SY	pnp,AJ,ge	20	0.33	85	*80	3	30min	0.5	5	–	2	
	2N1326	KF	pnp,AJ,ge	20	0.33	85	100	3	30min	0.5	5	–	2	TO-10
	2N1437	KF	pnp,AJ,ge	20	0.33	85	100	3	20min	0.5	5	–	2	TO-13

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 29	2N1438	KF	pnp,AJ,ge	20	0.33	85	100	3	20min	0.5	5	–	2	TO-10
	2N1465	KF	pnp,AJ,ge	20	0.33	85	120	3	20min	0.5	5	–	2	TO-13
	2N1466	KF	pnp,AJ,ge	20	0.33	85	120	3	20min	0.5	5	–	2	TO-10
	2N1504	KF	pnp,AJ,ge	20	0.33	85	80	3	20min	0.5	5	–	2	
	2N2552	KF	pnp,AJ,ge	20	.27	100	*40	1	*33	*40	10	–	–	
	2N2553	KF	pnp,AJ,ge	20	.27	100	*60	1	*33	*40	10	–	–	
	2N2554	KF	pnp,AJ,ge	20	.27	100	*80	1	*33	*40	10	–	–	
	2N2555	KF	pnp,AJ,ge	20	.27	100	*100	1	*33	*40	10	–	–	
	2N2556	KF	pnp,AJ,ge	20	.27	100	*40	1	*33	*40	10	–	–	
	2N2557	KF	pnp,AJ,ge	20	.27	100	*60	1	*33	*40	10	–	–	
P 30	2N2558	KF	pnp,AJ,ge	20	.27	100	*80	1	*33	*40	10	–	–	
	2N2559	KF	pnp,AJ,ge	20	.27	100	*100	1	*33	*40	10	–	–	
	2N2560	KF	pnp,AJ,ge	20	.27	100	*40	3	*25	*40	10	–	–	
	2N2561	KF	pnp,AJ,ge	20	.27	100	*60	3	*25		10	–	–	
	2N2562	KF	pnp,AJ,ge	20	.27	100	*80	3	*25	*40	10	–	–	
	2N2563	KF	pnp,AJ,ge	20	.27	100	*100	3	*25	*40	10	–	–	
	CDT1319	CL	pnp,AJ,ge	20	1.5	100	*40	5	20-60	15	5	–	–	
	CDT1320	CL	pnp,AJ,ge	20	1.5	100	*60	5	20-60	15	5	–	–	
	CDT1321	CL	pnp,AJ,ge	20	1.5	100	*80	5	20-60	15	5	–	–	
	CDT1322	CL	pnp,AJ,ge	20	1.5	*100	100	5	20-60	15	5	–	–	
P 31	CK 31	RA	pnp,AJ,ge	20	0.33	85	80	3	–	1	5	–	–	
	CK-312	RA	pnp,AJ,ge	20	0.33	85	100	3	–	1	5	–	–	
	CK-313	RA	pnp,AJ,ge	20	0.33	85	120	3	–	1	5	–	–	
	CK-314	RA	pnp,AJ,ge	20	0.33	85	150	3	–	1	5	–	–	
	CK-315	RA	pnp,AJ,ge	20	0.33	85	200	3	–	1	5	–	–	
	MM799	MO	npn,PE,si	20	133	175	*60	–	*10	*0.5	*200	–	12	
	2N234A	BE	pnp,AJ,ge	25	1.2	90	30	3	–	1	–	–	34	
	2N235A	BE	pnp,AJ,ge	25	1.2	90	40	3	–	1.0	–	–	36	CL
	2N235B	BE	pnp,AJ,ge	25	1.2	90	40	3	–	1.0	–	–	38	CL
	2N236A	BE	pnp,AJ,ge	25	1.2	95	40	3	–	1.0	–	–	35	CL
P 32	2N285A	BE	pnp,AJ,ge	25	1.2	95	40	3	–	1.0	–	–	39	hFE 20 min., CL
	2N296	SY	pnp,AJ,ge	25	0.33	100	*60	2	20	2.0	4	–	–	BE
	2N399	BE	pnp,AJ,ge	25	1.2	90	40	3	–	1.5	–	33	–	
	2N400	BE	pnp,AJ,ge	25	1.2	95	40	3	–	1.3	–	35	6	
	2N1146	CL	pnp,AJ,ge	25	0.7	95	*40	15	–	25	4	–	–	BE
	2N1146A	CL	pnp,AJ,ge	25	0.7	95	*60	15	–	25	4	–	–	BE
	2N1146B	CL	pnp,AJ,ge	25	0.7	95	*80	15	–	25	4	–	–	BE
	2N1146C	CL	pnp,AJ,ge	25	0.7	95	*100	15	–	25	4	–	–	BE
	2N1147	CL	pnp,AJ,ge	25	0.7	95	*40	15	–	25	4	–	–	solder lugs, BE
	2N1147A	CL	pnp,AJ,ge	25	–	95	*60	15	–	25	4	–	–	solder lugs, BE
P 33	2N1147B	CL	pnp,AJ,ge	25	–	95	*80	15	–	25	4	–	–	solder lugs, BE
	2N1147C	CL	pnp,AJ,ge	25	–	95	*100	15	–	25	4	–	–	solder lugs, BE
	2N1483	RCA	npn,DJ,si	25	–	200	60	3	45	15	1.25mc	–	–	STC, AMF
	2N1484	RCA	npn,DJ,si	25	–	200	100	3	45	15	1.25mc	–	–	STC, AMF
	2N1485	RCA	npn,DJ,si	25	–	200	60	3	45	15	1.25mc	–	–	STC, AMF
	2N1486	RCA	npn,DJ,si	25	–	200	100	3	45	15	1.25mc	–	–	STC, AMF
	B-177	BE	pnp,AJ,ge	25	1.2	90	30	3	–	1.0	–	36	–	
	B-178	BE	pnp,AJ,ge	25	1.2	90	30	3	–	1.0	–	30-36	–	
	B-179	BE	pnp,AJ,ge	25	1.2	90	40	3	–	1.0	–	25-30	–	
	CTP1500	CL	pnp,AJ,ge	25	1.0	95	100	15	30-75	8	–	–	–	
P 34	CTP1503	CL	pnp,AJ,ge	25	1.0	95	80	15	30-75	8	–	–	–	
	CTP1504	CL	pnp,AJ,ge	25	1.0	95	60	15	30-75	8	–	–	–	
	CTP1508	CL	pnp,AJ,ge	25	1.0	95	40	15	30-75	8	–	–	–	
	CTP1544	CL	pnp,AJ,ge	25	1.0	95	60	25	25-75	15	3	–	–	
	CTP1545	CL	pnp,AJ,ge	25	1.0	95	80	25	25-75	15	3	–	–	
	CTP1552	CL	pnp,AJ,ge	25	1.0	95	40	25	25-75	15	3	–	–	
	CTP1553	CL	pnp,AJ,ge	25	1.0	95	100	25	25-75	15	3	–	–	
	MM800	MO	npn,PE,si	25	167	175	*60	–	*10	*0.5	*200	–	17	
	2N236B	BE	pnp,AJ,ge	30	–	85	40	3	–	1.0	5	37	4	CL
	2N242	SY	pnp,AJ,ge	30	0.33	100	*45	2.0	–	3.0	–	36	–	CL, BE, TS, SO
P 35	2N257	BE	pnp,AJ,ge	30	2.0	90	40	3	–	–	–	–	33	CL
	2N268	BE	pnp,AJ,ge	30	2.0	90	–	3	–	2	–	–	35	SY, CL
	ST7530	TR	npn,ME,si	30		150	40	2	*20		*8,000			
	ST7120	TR	npn,ME,si	30@100		160	*45	5	*20		*8,000			
	ST7130	TR	npn,ME,si	30@100		160	*45	5	*20		*8,000			
	2N538	MH	pnp,AJ,ge	32	0.45	100	*80	3	20-50	2	400	–	–	KF
	2N539	MH	pnp,AJ,ge	32	0.45	100	*80	3.0	30-75	2	400	–	–	(MH, JAN2N 539), KF
	2N540	MH	pnp,AJ,ge	32	0.45	100	*80	3.0	45-113	2		–	–	KF
	2N1202	MH	pnp,AJ,ge	32	0.45	100	*80	3	40-120	2	400	–	–	KF
	2N1203	MH	pnp,AJ,ge	32	0.45	100	*120	3	25-75	2	400	–	–	KF

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 36	2N1261	MH	pnp,AJ,ge	32	0.45	100	*80	3	20-50	2	400	–	–	KF
	2N1262	MH	pnp,AJ,ge	32	0.45	100	*80	3	30-75	2	400	–	–	KF
	2N1263	MH	pnp,AJ,ge	32	0.45	100	*80	3	45-113	2	400	–	–	KF
	2N1501	MH	pnp,AJ,ge	32	0.45	100	*60	3	25-100	2	400	–	–	KF
	2N1502	MH	pnp,AJ,ge	32	0.45	100	*40	3	25-100	2	400	–	–	KF
	CA2D2	MH	pnp,AJ,ge	32	0.45	100	20	3	*20	4	400	–	–	
	2N463	WE	pnp,AJ,ge	35	–	100	60	5	60	0.1	4	–	–	
	2N1011	BE	pnp,AJ,ge	35	0.2	95	80	3	30-75	15	–	–	–	MO
	2N256	DE	pnp,A,ge	37	2.0	100	*30	3	–	3	5	25	–	
	2N307	DE	pnp,A,ge	37	2.0	100	*35	3	*20	15	3	–	–	
P 37	2N663	DE	pnp,A,ge	37	2.0	100	*50	4	*25/75	4	15	–	–	
	2N178	MO	pnp,AJ,ge	40	1.4	90	*40	3	50	–	6	30	–	
	2N554	MO	pnp,AJ,ge	40	1.4	90	*15	3	50	–	6	35	–	BE
	2N555	MO	pnp,AJ,ge	40	1.4	90	*30	3	50	–	6	35	–	BE
	2N1047	STC	npn,AJ,si	40	0.2	200	80	2	12-36	.015	–	–	–	TR, TI, BE
	2N1047A	TI	npn,MS,si	40	.228	200	80	0.5	12-36	.0015	8 mc	–	–	TR, BE
	2N1047B	TI	npn,DM,si	40	–	–	80	0.75	12*-36*	–	90	–	–	BE
	2N1047C	BE	npn,DM,si	40	–	165	80	8	*12-36	–	–	–	–	
	2N1048	STC	npn,DJ,si	40	0.2	200	120	2	12-36	.015	–	–	–	TR, TI, BE
	2N1048A	TI	npn,MSI,si	40	.228	200	120	0.5	12-36	.0015	8 mc	–	–	TR, STC, BE
P 38	2N1048B	TI	npn,DM,si	40	–	–	120	0.75	30*-90*	–	–	–	–	STC, BE
	2N1048C	BE	npn,DM,si	40	–	165	120	8	*12-36	–	–	–	–	
	2N1049	STC	npn,DJ,si	40	0.2	200	80	2	30-90	.015	–	–	–	TR, TI, BE
	2N1049A	TI	npn,MS,si	40	.228	200	80	0.5	30-90	.0015	7 mc	–	–	TR, STC, BE
	2N1049B	STC	npn,D,si	40	–	–	80	–	–	–	–	–	–	BE
	2N1049C	BE	npn,DM,si	40	–	200	80	8	*30-90	–	–	–	–	
	2N1050	STC	npn,DJ,si	40	0.2	200	120	2	30-90	.015	–	–	–	TR, TI, BE
	2N1050A	TI	npn,MS,si	40	.228	200	120	5	30-90	7 mc	–	–	–	TR, STC, BE
	2N1050B	TI	npn,DM,si	40	–	–	120	0.75	30*-90*	–	–	–	–	STC, BE
	2N1050C	BE	npn,DM,si	40	–	200	120	8	*30-90	–	–	–	–	
P 39	2N1647	TR	npn,DJ,si	40	.27	175	*80	3	15-45	.025	10 mc	–	–	BE
	2N1648	TR	npn,DJ,si	40	.27	175	*120	3	15-45	.025	10 mc	–	–	BE
	2N1649	TR	npn,DJ,si	40	.27	175	*80	3	30-90	.025	10 mc	–	–	BE
	2N1650	TR	npn,DJ,si	40	.27	175	*120	3	30-90	.025	10 mc	–	–	BE
	2N1690	STC	npn,D,si	40	–	–	80	–	–	–	–	–	–	TI
	2N1691	TI	npn,DM,si	40	–	–	120	0.5	*20-*60	–	–	–	–	STC
	2N1886	TR	npn,DJ,si	40	.27	175	60	5	20-80	.35	8 mc	–	–	
	2N2018	TR	npn,DJ,si	40	.27	175	*150	–	20-60	.01	10 mc	–	–	
	2N2019	TR	npn,DJ,si	40	.27	175	*200	–	20-60	.01	10 mc	–	–	
	2N2020	TR	npn,DJ,si	40	.27	175	*150	–	40-120	.01	10 mc	–	–	
P 40	2N2021	TR	npn,DJ,si	40	.27	175	*200	–	40-120	.01	10 mc	–	–	Planar
	MHT-6001	MH	npn,DP,si	40	–	175	100	3	10-120	0.001	30m	–	–	MO
	2N1120	BE	pnp,AJ,ge	45	1.0	95	*80	15	20-50	15	–	–	–	CL, BE
	2N250	TI	pnp,AJ,ge	50	.27	100	30	5	60	2	–	30	–	BE, CL
	2N251	TI	pnp,AJ,ge	50	.27	100	60	5	60	2	–	30	–	
	2N553	DE	pnp,AJ,ge	50	1.5	100	*80	5	–	0.02	25	–	–	BE
	2N665	DE	pnp,AJ,ge	50	1.5	100	*80	5	–	0.02	25	–	–	JAN2N665
	2N1014	RCA	pnp,AJ,ge	50	1.0	100	100	10	75	0.1	–	26	30	
	2N1069	STC	npn,DJ,si	50	.29	175	60	4	20	1	1	–	–	RCA, AMF, FT, BE
	2N1070	STC	npn,DJ,si	50	.29	175	60	4	20	1	1	–	–	RCA, AMF, FT, BE
P 41	2N1722	TI	npn,MS,si	50	.67	175	80	7.5	–	1	20 mc	–	–	STC
	2N1724	TI	npn,MS,si	50	.67	175	80	7.5	–	1	20 mc	–	–	
	2N1905	RCA	pnp,Dr,ge	50	0.7	–	60	10	90	.15	–	–	–	
	2N1906	RCA	pnp,Dr,ge	50	0.7	–	100	10	125	.15	–	–	–	
	2N2266	MH	pnp,AJ,ge	50	0.5	125	*100	5.0	25-75	2	400	–	–	
	2N2267	MH	pnp,AJ,ge	50	0.5	125	*120	5.0	25-75	2	400	–	–	
	2N1722	TR	npn,PL,si	50@100		175	80	7.5	*20	–	*10,000			
	2N1724	TR	npn,PL,si	50@100		175	80	7.5	*20		*10,000			
	2N1704	NA	npn,si	50-200	500	175	3.3	45	100	0.1	–	15	60	
	2N1657	RA	npn,DB,si	55	.33	200	60	2	50	10	10 mc	–	–	
P 42	2N419	BE	pnp,AJ,ge	60	1.2	95	45	3	–	0.5	–	–	5	
	2N639	BE	pnp,AJ,ge	60	1.2	100	40	5	15-30	1.0	–	–	–	CL
	2N639A	BE	pnp,AJ,ge	60	1.2	100	70	5	15-30	1.0	–	–	–	CL
	2N639B	BE	pnp,AJ,ge	60	1.2	100	80	5	15-30	2.2	–	–	–	CL
	2N1073	BE	pnp,AJ,ge	60	1.0	100	40	10	20-6	2.0	1.5	–	–	
	2N1073A	BE	pnp,AJ,ge	60	1.0	100	80	10	20-6	1.5	–	–	–	
	2N1073B	BE	pnp,AJ,ge	60	1.0	100	120	10	20-6	2.0	1.5	–	–	DE
	2N1136	BE	pnp,AJ,ge	60	1.2	100	40	6	–	0.5	–	–	–	CL
	2N1136A	BE	pnp,AJ,ge	60	1.2	100	70	6	–	2	–	–	–	CL
	2N1136B	BE	pnp,AJ,ge	60	1.2	100	80	6	–	2	–	–	–	CL

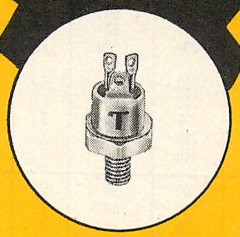
SILICON PLANAR POWER TRANSISTORS

PNP 2N2875

Features remarkably high beta linearity over wide range of collector currents. Dissipates up to 15 Watts of power at 100°C case.

Type	DC Current Gain @ I_C= 500mA (β)	Typical Collector Saturation Voltage @ I_C= 500mA (Volts)	Minimum Sustaining Voltage @ I_C= 50mA (Volts)	Typical Cut-Off Frequency @ I_C= 100mA (Mc)	Power Dissipation Rating @ 100°C Case (Watts)
2N2875	20-60	1.0	50	30	15

IN A 7/16" STUD-MOUNTED PACKAGE



NPN 2N2866-7

Features extremely low RCS of 0.75 Ohms Max. Dissipates up to 20 Watts of power at 100°C case. High beta linearity.

Type	DC Current Gain @ I_C= 500mA (β)	Typical Collector Saturation Voltage @ I_C= 1 Amp (Volts)	Minimum Sustaining Voltage @ I_C= 50mA (Volts)	Typical Cut-Off Frequency @ I_C= 100mA (Mc)	Power Dissipation Rating @ 100°C Case (Watts)
2N2866	20-60	0.4	80	15	20
2N2867	40-120	0.4	80	15	20

TRANSITRON'S NEW STATE-OF-THE-ART SILICON PLANAR TRANSISTORS FEATURE GREATER RELIABILITY, LOWER RCS, AND PERMIT FURTHER CIRCUIT SIMPLIFICATION IN DEMANDING POWER CATEGORIES.

Drawing heavily upon its broad experience in silicon power transistor development and stud-mounted packaging, Transitron introduces its new PNP 2N2875 and NPN 2N2866-7 intermediate power silicon transistors. They combine all the recognized advantages of planar construction with the efficiency of 7/16" hex base stud-mounted packaging, which solves a variety of annoying mounting problems. And, because they complement each other, extensive circuit simplification is now practical within power applications.

These highly reliable silicon planar power transistors are the product of the same intensive Transitron Total Reliability Program that produced the popular 7/16" NPN 2N1647-50 and 2N2018-21 series for modern military ICBM systems. Continuous lot control from ingot stage, thorough product improvement documentation, and comprehensive failure analysis have enabled Transitron Product Engineering to develop units which will satisfy the strictest requirements.

The 2N2875 and the 2N2866-7, and other complementing PNP and NPN silicon power transistors, are available through your Transitron Distributor.

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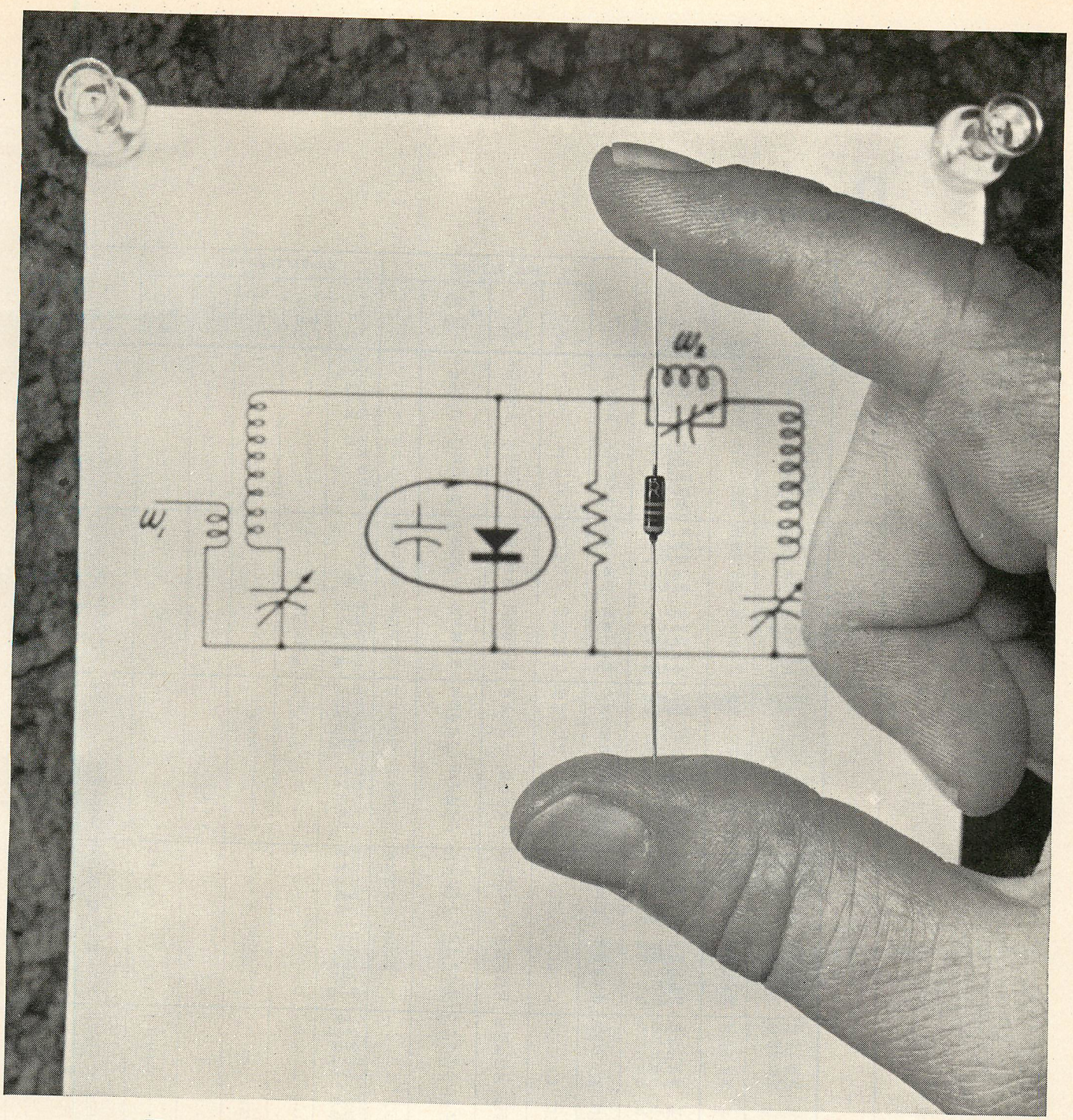
P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	Remarks
P 43	2N1137	BE	pnp,AJ,ge	60	1.2	100	40	6	–	0.5	–	–	–	CL
	2N1137A	BE	pnp,AJ,ge	60	1.2	100	70	6	–	2	–	–	–	CL
	2N1137B	BE	pnp,AJ,ge	60	1.2	100	80	6	–	2	–	–	–	CL
	2N1138	BE	pnp,AJ,ge	60	1.2	100	40	6	–	0.5	–	–	–	CL
	2N1138A	BE	pnp,AJ,ge	60	1.2	100	70	6	–	2.0	–	–	–	CL
	2N1138B	BE	pnp,AJ,ge	60	1.2	100	80	6	–	2	–	–	–	CL
	2N1210	TR	npn,DJ,si	60	.27	175	*60	5	15-75	50	15 mc	–	–	STC, FN, FT
	2N1211	TR	npn,DJ,si	60	.27	175	*80	5	15-75	50	15 mc	–	–	STC, FN, FT
	2N1487	RCA	npn,DJ,si	60	–	175	60	6	30	25	1 mc	–	–	STC, FT, AMF, BE
	2N1488	RCA	npn,DJ,si	60	–	175	100	6	30	25	1 mc	–	–	STC, FT, AMF, BE
P 44	2N1489	RCA	npn,DJ,si	60	–	175	60	6	30	25	1 mc	–	–	STC, FT, AMF, BE
	2N1490	RCA	npn,DJ,si	60	–	175	100	6	30	25	1.25mc	–	–	STC, FT, AMF, BE
	2N1616	TR	npn,DJ,si	60	.27	175	60	5	15-75	50	15 mc	–	–	AMF, FT, STC, BE
	2N1617	TR	npn,DJ,si	60	.27	175	70	5	15-75	50	15 mc	–	–	AMF, FT, STC, BE
	2N1618	TR	npn,DJ,si	60	.27	175	80	5	15-75	50	15 mc	–	–	AMF, FT, STC, BE
	ST440	TR	npn,DJ,si	60	.27	150	60	5	10	1	–	–	–	STC
	ST450	TR	npn,DJ,si	60	.27	150	*60	5	10	1	–	–	–	
	2N2137	MO	pnp,AJ,ge	62.5	0.83	100	*30	3	30-60	2	20	–	–	
	2N2137A	MO	pnp,AJ,ge	62.5	0.83	100	30	3	30-60	2	20	–	–	"Meg-A-Life"
	2N2138	MO	pnp,AJ,ge	62.5	0.83	100	45	3	30-60	2	20	–	–	"Meg-A-Life"
P 45	2N2139	MO	pnp,AJ,ge	62.5	0.83	100	60	30	30-60	2	20	–	–	"Meg-A-Life"
	2N2140	MO	pnp,AJ,ge	62.5	0.83	100	75	3	30-60	2	20	–	–	"Meg-A-Life"
	2N2141	MO	pnp,AJ,ge	62.5	0.83	100	90	3	30-60	2	20	–	–	"Meg-A-Life"
	2N2142	MO	pnp,AJ,ge	62.5	0.83	100	30	3	50-100	2	20	–	–	"Meg-A-Life"
	2N2143	MO	pnp,AJ,ge	62.5	0.83	100	45	3	50-100	2	20	–	–	"Meg-A-Life"
	2N2144	MO	pnp,AJ,ge	62.5	0.83	100	60	3	50-100	2	20	–	–	"Meg-A-Life"
	2N2145	MO	pnp,AJ,ge	62.5	0.83	100	75	3	50-100	2	20	–	–	"Meg-A-Life"
	2N2146	MO	pnp,AJ,ge	62.5	0.83	100	90	3	50-100	2	20	–	–	"Meg-A-Life"
	2N301	DE	pnp,A,ge	75	1.0	100	*40	3	*62.5	3	5	–	–	
	2N301A	DE	pnp,A,ge	75	1.0	100	*60	3	*62.5	3	5	–	–	
P 46	2N174A	TS	npn,AJ,ge	75-95	–	95	*80	15	*37	8	10	–	–	MO, SO, DE
	2N1511	RCA	npn,si	75	–	–	60	6	15*	–	–	–	–	STC
	2N1512	RCA	npn,si	75	–	–	100	6	*15	–	–	–	–	STC
	2N1513	RCA	npn,si	75	–	–	60	6	*25	–	–	–	–	STC
	2N1514	RCA	npn,si	75	–	–	100	6	*25	–	–	–	–	STC
	2N1703	RCA	npn,si	75	–	–	60	5	*15	–	–	–	–	STC
	2N2101	AMF	npn,MESA,si	75	0.5	200	*60	3.0	*15-60	*1	1.5mc	–	–	
	3N45	MH	pnp,AJ,ge	75	1.0	100	*60	12	30-120	3.0	750	–	–	
	3N46	MH	pnp,AJ,ge	75	1.0	100	*80	12	20-80	3.0	450	–	–	
	3N47	MH	pnp,AJ,ge	75	1.0	100	*40	12	30-120	3	750	–	–	
P 47	3N48	MH	pnp,AJ,ge	75	1.0	100	*60	12	20-80	3	450	–	–	
	2N424	TI	npn,DJ,si	85	.48	200	80	2	12-60	10	6 mc	–	–	STC, TR, RA, FT, AMF, BE
	2N389	TI	npn,DJ,si	85	.48	200	60	2	12-60	10	7 mc	–	–	STC, TR, RA, AMF, FT, BE
	2N389A	STC	npn,D,si	85	–	–	60	–	–	–	–	–	–	AMF, BE
	2N424	TI	npn,DJ,si	85	.48	200	*80	2	12.60	10	6 mc	–	–	STC, TR, RA, FN, FT
	2N1619	TR	npn,DJ,si	85	.27	200	80	5	30	0.1	15 mc	–	–	
	2N1660	RA	npn,DB,si	85	0.5	200	60	2	90	10	40 mc	–	–	
	2N1661	RA	npn,DB,si	85	0.5	200	80	2	90	10	40 mc	–	–	
	2N1662	RA	npn,DB,si	85	0.5	200	100	2	90	10	40 mc	–	–	
	2N1894	RA	npn,DB,si	85	0.5	200	60	2	30	.01	–	–	–	
P 48	2N1895	RA	npn,DB,si	85	0.5	200	80	2	30	.01	–	–	–	
	2N1896	RA	npn,DB,si	85	0.5	200	60	2	90	.01	–	–	–	
	2N1897	RA	npn,DB,si	85	0.5	200	80	2	90	.01	–	–	–	
	2N1898	RA	npn,DB,si	85	0.5	200	100	2	90	.01	–	–	–	
	2N2383	STC	npn,DJ,si	85	0.5	180	80	5	*20-*60	*3.0	*3.0mc	–	–	5Q. Flange
	2N2384	STC	npn,DJ,si	85	0.5	180	80	5	*20-*60	*3.0	*3.0mc	–	–	1tex Stud
	2N2526	MO	pnip,AD,ge	85	1	110	80	10	*20-50	3	–	–	–	
	2N2527	MO	pnip,AD,ge	85	1	110	120	10	*20-50	3	–	–	–	
	2N2528	MO	pnip,AD,ge	85	1	110	160	10	*20-50	3	–	–	–	
	STC1101	STC	npn,DJ,si	85	–	200	60	6	10-50	.025	1 mc	–	–	
P 49	STC1102	STC	npn,DJ,si	85	–	200	100	6	10-50	.025	1 mc	–	–	
	STC1103	STC	npn,DJ,si	85	–	200	60	6	25-75	.025	1 mc	–	–	
	STC1104	STC	npn,DJ,si	85	–	200	100	6	25-75	.025	1 mc	–	–	
	2N176	DE	pnp,A,ge	90	0.8	100	*40	7	*25/90	3	4	25	–	
	2N255A	DE	pnp,A,ge	90	0.8	100	*15	5	–	5	–	25	–	
	2N256A	DE	pnp,A,ge	90	0.8	100	*25	5	–	5	5	–	–	
	2N297A	MO	pnp,AJ,ge	90	1.2	100	*60	3	40-100	3	5	–	–	DE, BE, CL
	2N350A	MO	pnp,AJ,ge	90	1.4	100	*50	3	30	3	5	33	–	BE, CL
	2N351A	MO	pnp,AJ,ge	90	1.4	100	*50	4	45	3	5	33	–	BE, CL
	2N376A	MO	pnp,AJ,ge	90	1.4	100	*50	5	60	3	5	35	–	BE, CL



Raytheon introduces new F7 series of 63 VHF-UHF varactor diodes

Now available for use in medium power frequency multipliers and converters, these new Raytheon varactor diodes offer outstanding series resistance characteristics, a wide variety of types, and parameters maintained to close tolerances. The new F7 series varactors are mounted in standard glass packages with axial leads and are usable in frequency multipliers from 2 Mc to 2 Gc at input power levels from 0.1 to 10 watts. For immediate delivery contact your nearest Raytheon Field Office or, *Raytheon Company, Semiconductor Division, 350 Ellis Street, Mountain View, California.*

Cutoff frequency:	30-100 Gc
Normalization power:	5-20 kw
Reverse breakdown voltage:	45-120 v in 15 v steps
Junction capacitance at BVR:	1.8-8.2 pf in 10% EIA values
Series resistance:	0.33-2.2 ohm in 20% EIA values
Power dissipation:	1 watt
Price:	$15.00 (1-24) $9.90 (25-99)
Availability:	standard values in stock, others 10-30 days

RAYTHEON

ON READER-SERVICE CARD CIRCLE 457

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 50	2N379	DE	pnp,A,ge	90	.8	100	*80	7	*20/90	8	3	–	–	
	2N380	DE	pnp,A,ge	90	.8	100	*60	7	*20/90	8	3	–	–	
	2N627	MO	pnp,AJ,ge	90	1.2	100	*40	10	10-30	4	5	38	–	BE, CL
	2N628	MO	pnp,AJ,ge	90	1.2	100	*60	10	10-30	4	5	38	–	BE, CL
	2N629	MO	pnp,AJ,ge	90	1.2	100	*80	10	10-30	4	5	38	–	BE, CL
	2N630	MO	pnp,AJ,ge	90	1.2	100	*100	10	10-30	4	5	38	–	BE, CL
	2N677	BE	pnp,AJ,ge	90	1.2	100	50	15	45	1	–	–	–	CL
	2N677A	BE	pnp,AJ,ge	90	1.2	100	60	15	45	1	–	–	–	CL
	2N677B	BE	pnp,AJ,ge	90	1.2	100	90	15	45	1	–	–	–	CL
	2N677C	BE	pnp,AJ,ge	90	1.2	100	100	15	45	1	–	–	–	CL
P 51	2N678	BE	pnp,AJ,ge	90	1.2	100	150	15	75	1	–	–	–	CL
	2N678A	BE	pnp,AJ,ge	90	1.2	100	60	15	75	1	–	–	–	CL
	2N678B	BE	pnp,AJ,ge	90	1.2	100	90	15	75	1	–	–	–	CL
	2N678C	BE	pnp,AJ,ge	90	1.2	100	100	15	75	1	–	–	–	CL
	2N1031	BE	pnp,AJ,ge	90	0.8	100	30	15	20-60	1.0	–	–	–	CL
	2N1031A	BE	pnp,AJ,ge	90	0.8	100	40	15	20-60	1.0	–	–	–	CL
	2N1031B	BE	pnp,AJ,ge	90	0.8	100	70	15	20-60	1.0	–	–	–	CL
	2N1031C	BE	pnp,AJ,ge	90	0.8	100	80	15	20-60	2.0	–	–	–	CL
	2N1032	BE	pnp,AJ,ge	90	0.8	100	30	15	50-100	1.0	–	–	–	CL
	2N1032A	BE	pnp,AJ,ge	90	0.8	100	40	15	50-100	1.0	–	–	–	CL
P 52	2N1032B	BE	pnp,AJ,ge	90	0.8	100	70	15	50-100	2.0	–	–	–	CL
	2N1032C	BE	pnp,AJ,ge	90	0.8	100	80	15	50-100	2	–	–	–	CL
	2N1073	DE	pnp,A,ge	90	0.8	110	*40	10	*20/60	10	30	–	–	
	2N1073A	DE	pnp,A,ge	90	0.8	110	*80	10	*20/60	10	30	–	–	
	2N1073B	DE	pnp,A,ge	90	0.8	110	*120	10	*20/60	10	30	–	–	
	2N1162	MO	pnp,AJ,ge	90	1.2	100	50	25	15-65	3	4	–	–	CL, BE
	2N1162A	MO	pnp,AJ,ge	90	1.2	100	*50	25	15-65	15	4	–	–	BE, CL
	2N1163	MO	pnp,AJ,ge	90	1.2	100	*50	25	15-65	3	4	–	–	CL, BE
	2N1163A	MO	pnp,AJ,ge	90	1.2	100	*50	25	15-65	15	4	–	–	BE
	2N1164	MO	pnp,AJ,ge	90	1.2	100	*80	25	15-65	3	4	–	–	CL, BE
P 53	2N1164A	MO	pnp,AJ,ge	90	1.2	100	*80	25	15-65	15	4	–	–	BE
	2N1165	MO	pnp,AJ,ge	90	1.2	100	*80	25	15-65	3	4	–	–	CL, BE
	2N1165A	MO	pnp,AJ,ge	90	1.2	100	*80	25	15-65	15	4	–	–	BE
	2N1166	MO	pnp,AJ,ge	90	1.2	100	*80	25	15-65	3	4	–	–	CL, BE
	2N1166A	MO	pnp,AJ,ge	90	1.2	100	*100	25	15-65	15	4	–	–	BE
	2N1167	MO	pnp,AJ,ge	90	1.2	100	*100	25	15-65	3	4	–	–	CL, BE
	2N1167A	MO	pnp,AJ,ge	90	1.2	100	*100	25	15-65	15	4	–	–	BE
	2N1358M	DE	pnp,A,ge	90	0.8	110	*80	15	25/50	4	5.0	–	–	
	2N1359	MO	pnp,AJ,ge	90	1.2	100	*50	3	35-90	3	7	–	–	BE
	2N1360	MO	pnp,AJ,ge	90	1.2	100	*50	3	60-140	3	5	–	–	BE
P 54	2N1362	MO	pnp,AJ,ge	90	1.2	100	*100	3	35-90	3	7	–	–	BE
	2N1363	MO	pnp,AJ,ge	90	1.2	100	*100	3	60-140	3	5	–	–	BE
	2N1364	MO	pnp,AJ,ge	90	1.2	100	*120	3	35-90	3	7	–	–	BE
	2N1365	MO	pnp,AJ,ge	90	1.2	100	*120	3	60-140	3	5	–	–	BE
	2N1529	MO	pnp,AJ,ge	90	1.2	100	*40	5	20-40	2	10	–	–	CL, BE
	2N1529A	MO	pnp,AJ,ge	90	1.2	100	*40	5	20-40	2	10	–	–	BE
	2N1530	MO	pnp,AJ,ge	90	1.2	100	*40	5	20-40	2	10	–	–	CL, BE
	2N1530A	MO	pnp,AJ,ge	90	1.2	100	*60	5	20-40	2	10	–	–	BE
	2N1531	MO	pnp,AJ,ge	90	1.2	100	*80	5	20-40	2	10	–	–	CL, BE
	2N1531A	MO	pnp,AJ,ge	90	1.2	100	*80	5	20-40	2	10	–	–	BE
P 55	2N1532	MO	pnp,AJ,ge	90	1.2	100	*100	5	20-40	2	10	–	–	CL, BE
	2N1532A	MO	pnp,AJ,ge	90	1.2	100	*100	5	20-40	2	10	–	–	BE
	2N1533	MO	pnp,AJ,ge	90	1.2	100	*120	5	20-40	2	10	–	–	CL, BE
	2N1534	MO	pnp,AJ,ge	90	1.2	100	*40	5	*35-70	2	8.5	–	–	CL, DE, BE
	2N1534A	MO	pnp,AJ,ge	90	1.2	100	*40	5	35-70	2	8.5	–	–	BE
	2N1535	MO	pnp,AJ,ge	90	1.2	100	*60	5	*35-70	2	8.5	–	–	CL, DE, BE
	2N1535A	MO	pnp,AJ,ge	90	1.2	100	*60	5	35-70	2	8.5	–	–	BE
	2N1536	MO	pnp,AJ,ge	90	1.2	100	*80	5	*35-70	2	8.5	–	–	CL, DE, BE
	2N1536A	MO	pnp,AJ,ge	90	1.2	100	*80	5	35-70	2	8.5	–	–	BE
	2N1537	MO	pnp,AJ,ge	90	1.2	100	100	5	35-70	2	8.5	–	–	CL, DE, BE
P 56	2N1537A	MO	pnp,AJ,ge	90	1.2	100	*100	5	35-70	2	8.5	–	–	BE
	2N1538	MO	pnp,AJ,ge	90	1.2	100	*120	5	35-70	2	8.5	–	–	CL, BE
	2N1539	MO	pnp,AJ,ge	90	1.2	100	*40	5	50-100	2	4	–	–	CL, BE
	2N1539A	MO	pnp,AJ,ge	90	1.2	100	*40	5	50-100	2	4	–	–	BE
	2N1540	MO	pnp,AJ,ge	90	1.2	100	*60	5	50-100	2	4	–	–	CL, BE
	2N1540A	MO	pnp,AJ,ge	90	1.2	100	*60	5	50-100	2	4	–	–	BE
	2N1541	MO	pnp,AJ,ge	90	1.2	100	*80	5	50-100	2	4	–	–	CL, BE
	2N1541A	MO	pnp,AJ,ge	90	1.2	100	*80	5	50-100	2	4	–	–	BE
	2N1542	MO	pnp,AJ,ge	90	1.2	100	*100	5	50-100	2	4	–	–	CL, BE
	2N1542A	MO	pnp,AJ,ge	90	1.2	100	*100	5	50-100	2	4	–	–	BE

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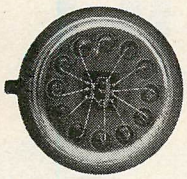
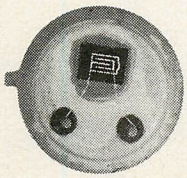
MICRO-CIRCUITS



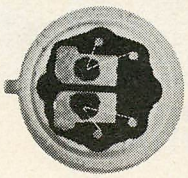
Using advanced diffusion techniques in conjunction with precise process control and thin film technology, Amelco offers both digital and analog integrated circuits. Stock items consist of nor logic building blocks; a wide variety of package configurations is possible. Micro-circuits offer the advantages of low cost, design simplicity, size, weight and power reductions.

FIELD EFFECT TRANSISTORS



Amelco FET's are N-Channel silicon planar devices which offer very high input impedance, negative temperature coefficient, low leakage current, low capacitance, low noise figure and all proven mechanical advantages of silicon double diffused transistors. FET's provide circuit simplicity, tiny size. Standard package, TO-18; also available in TO-5, TO-46, and TO-51 outlines.

SPECIAL ASSEMBLIES



Amelco Special Assemblies (ASA's) consist of any combination of those devices which are a standard product, mounted in a single header. ASA's in general are any specially selected multiple transistor combination such as Differential Amplifiers and Darlington configurations.

MICRO-CHIP TRANSISTORS

All standard Amelco transistors are available in Micro-Chip form for ultra-small assemblies. The semiconductor chip is bonded to a molybdenum substrate; junctions and surfaces are protected by a passivated surface of silicon oxide. The chip is coated for mechanical protection and is individually packed with conductive strips connected to the Micro-Chip's leads for testing in the package.

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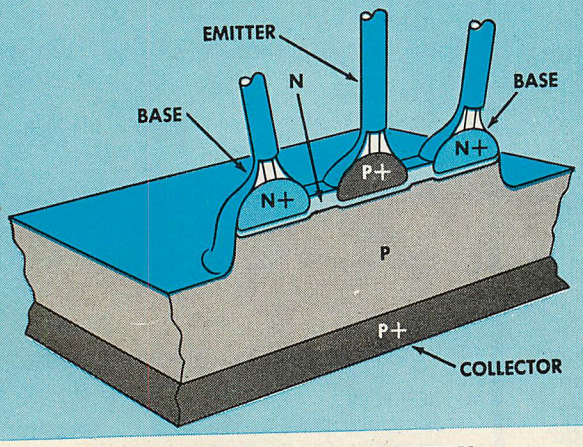
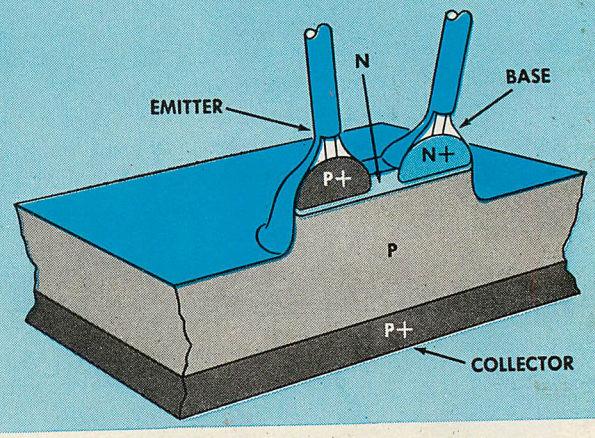


3-DOT SMALL GEOMETRY gives you

Low $r_{bb'}$ · High f_T

as in the P.A.D.T. 2N2495

you need STABLE HIGH GAIN



2-DOT SMALL GEOMETRY gives you

Stable High Gain
Low, low Capacity · High f_T

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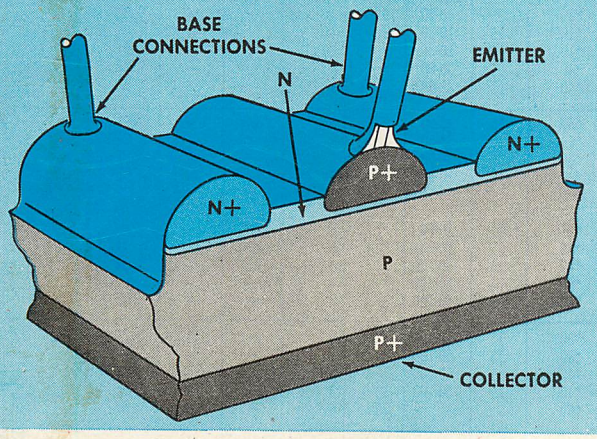

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High f_T · High Beta

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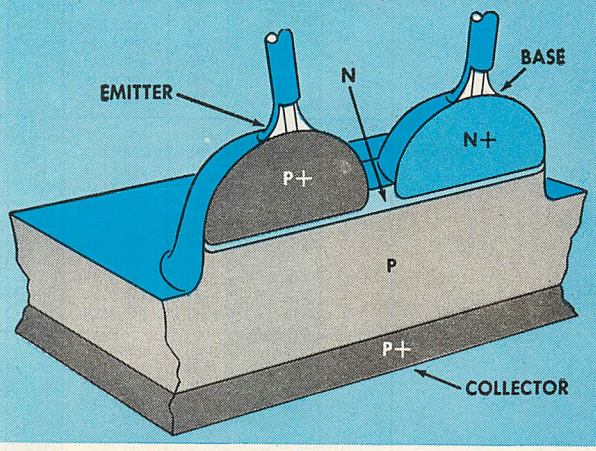

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ON READER-SERVICE CARD CIRCLE 459

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 57	2N1543	MO	pnp,AJ,ge	90	1.2	100	*120	5	50-100	2	4	–	–	CL, BE
	2N1544	MO	pnp,AJ,ge	90	1.2	100	*40	5	75-150	2	4	–	–	CL, BE
	2N1544A	MO	pnp,AJ,ge	90	1.2	100	*40	5	75-150	2	4	–	–	BE
	2N1545	MO	pnp,AJ,ge	90	1.2	100	*60	5	75-150	2	4	–	–	CL, BE
	2N1545A	MO	pnp,AJ,ge	90	1.2	100	*60	5	75-150	2	4	–	–	BE
	2N1546	MO	pnp,AJ,ge	90	1.2	100	*80	5	75-150	2	4	–	–	CL, BE
	2N1546A	MO	pnp,AJ,ge	90	1.2	100	*80	5	75-150	2	4	–	–	BE
	2N1547	MO	pnp,AJ,ge	90	1.2	100	*100	5	75-150	2	4	–	–	CL, BE
	2N1547A	MO	pnp,AJ,ge	90	1.2	100	*100	5	75-100	2	4	–	–	BE
	2N1548	MO	pnp,AJ,ge	90	1.2	100	*120	5	75-150	2	4	–	–	CL, BE
P 58	2N1549	MO	pnp,AJ,ge	90	1.2	100	*40	15	10-30	3	10	–	–	CL, BE
	2N1549A	MO	pnp,AJ,ge	90	1.2	100	*40	15	10-30	3	10	–	–	BE
	2N1550	MO	pnp,AJ,ge	90	1.2	100	*60	15	10-30	3	10	–	–	CL, BE
	2N1550A	MO	pnp,AJ,ge	90	1.2	100	*60	15	10-30	3	10	–	–	BE
	2N1551	MO	pnp,AJ,ge	90	1.2	100	*80	15	10-30	2	10	–	–	CL, BE
	2N1551A	MO	pnp,AJ,ge	90	1.2	100	*80	15	10-30	3	10	–	–	BE
	2N1552	MO	pnp,AJ,ge	90	1.2	100	*100	15	10-30	2	10	–	–	CL, BE
	2N1552A	MO	pnp,AJ,ge	90	1.2	100	*100	15	10-30	3	10	–	–	BE
	2N1553	MO	pnp,AJ,ge	90	1.2	100	*40	15	30-60	2	6	–	–	CL, BE
	2N1553A	MO	pnp,AJ,ge	90	1.2	100	*40	15	30-60	3	6	–	–	BE
P 59	2N1554	MO	pnp,AJ,ge	90	1.2	100	*60	15	30-60	2	6	–	–	CL, BE
	2N1554A	MO	pnp,AJ,ge	90	1.2	100	*60	15	30-60	3	6	–	–	BE
	2N1555	MO	pnp,AJ,ge	90	1.2	100	*80	15	30-60	3	6	–	–	CL, BE
	2N1555A	MO	pnp,AJ,ge	90	1.2	100	*80	15	30-60	3	6	–	–	BE
	2N1556	MO	pnp,AJ,ge	90	1.2	100	*100	15	30-60	3	6	–	–	CL, BE
	2N1556A	MO	pnp,AJ,ge	90	1.2	100	*100	15	30-60	3	6	–	–	BE
	2N1557	MO	pnp,AJ,ge	90	1.2	100	*40	15	50-100	3	6	–	–	CL, BE
	2N1557A	MO	pnp,AJ,ge	90	1.2	100	*40	15	50-100	3	6	–	–	BE
	2N1558	MO	pnp,AJ,ge	90	1.2	100	*60	15	50-100	3	5	–	–	CL, BE
	2N1558A	MO	pnp,AJ,ge	90	1.2	100	*60	15	50-100	3	5	–	–	BE
P 60	2N1559	MO	pnp,AJ,ge	90	1.2	100	*80	15	50-100	3	5	–	–	CL, BE
	2N1559A	MO	pnp,AJ,ge	90	1.2	100	*80	15	50-100	3	5	–	–	BE
	2N1560	MO	pnp,AJ,ge	90	1.2	100	*100	15	50-100	3	5	–	–	CL, BE
	2N1560A	MO	pnp,AJ,ge	90	1.2	100	*100	15	50-100	3	5	–	–	BE
	2N392	DE	pnp,AJ,ge	94	.8	100	*60	5	–	0.065	6	–	–	BE
	2N669	DE	pnp,AJ,ge	94	1.2	100	*40	3	–	0.065	10	–	–	
	2N1159	DE	pnp,AJ,ge	94	0.8	100	*80	5	–	0.065	10	–	–	BE
	2N1160	DE	pnp,AJ,ge	94	0.8	100	*80	7	–	0.065	10	–	–	BE
	2N1168	DE	pnp,AJ,ge	94	0.8	100	*50	5	–	0.065	10	–	–	BE, CL
	3N49	MH	pnp,AJ,ge	94	1.25	100	*60	15	30-120	3	750	–	–	
P 61	3N50	MH	pnp,AJ,ge	94	1.25	100	*80	15	20-80	3	450	–	–	
	3N51	MH	pnp,AJ,ge	94	1.25	100	*40	15	30-120	3	750	–	–	
	3N52	MH	pnp,AJ,ge	94	1.25	100	*60	15	20-80	3	450	–	–	
	151-04	WH	npn,AJ,si	100	1.4	150	*80	6.0	*11	10ma	25			
	151-07	WH	npn,AJ,si	100	1.4	150	*140	6.0	*11	10ma	25			
	152-04	WH	npn,AJ,si	100	1.4	150	*80	6.0	*18	10ma	25			
	152-05	WH	npn,AJ,si	100	1.4	150	*100	6.0	*18	10ma	25			
	152-08	WH	npn,AJ,si	100	1.4	150	*160	6.0	*18	10ma	25			
	151-05	WH	npn,AJ,si	100	1.4	150	*100	6.0	*11	10ma	25			
	151-06	WH	npn,AJ,si	100	1.4	150	*120	6.0	*11	10ma	25			
P 62	151-08	WH	npn,AJ,si	100	1.4	150	*160	6.0	*11	10ma	25			
	151-09	WH	npn,AJ,si	100	1.4	150	*180	6.0	*11	10ma	25			
	151-10	WH	npn,AJ,si	100	1.4	150	*200	6.0	*11	10ma	25			
	152-06	WH	npn,AJ,si	100	1.4	150	*120	6.0	*18	10ma	25			
	152-07	WH	npn,AJ,si	100	1.4	150	*140	6.0	*18	10ma	25			
	152-09	WH	npn,AJ,si	100	1.4	150	*180	6.0	*18	10ma	25			
	152-10	WH	npn,AJ,si	100	1.4	150	*200	6.0	18	10ma	25			
	2N1084	TR	pnp,PL,si	5@100	.050	200	*60		*20	*10	*25,000			
	2N1085	TR	npn,ME,si	5@100	.050	200	60		*40	*15	*15,000			
	2N1157A	MH	pnp,AJ,ge	100	1.43	95	*80	30	50	20	75	–	–	
P 63	2N1206	TR	npn,ME,si	3@100	.030	200	60		15	*1	*30,000			
	2N1207	TR	npn,ME,si	3@100	.030	200	125		15	*1	*30,000			
	2N1651	BE	pnp,DJ,ge	100	1.2	110	60	25	30	2.0	–	–	–	Sat. volt=1.0v
	2N1652	BE	pnp,DJ,ge	100	1.2	110	100	25	30	2.0	–	–	–	Sat. volt=0.5v
	2N1653	BE	pnp,DJ,ge	100	1.2	110	120	25	30	2.0	–	–	–	Sat. volt=0.5v
	2N1675	WE	npn,D, ge	100	–	150	100	10	12	0.008	50mc	–	100	
	2N1936	TI	npn,MS,si	100	1.34	175	60	15	–	20	7 mc	–	–	
	2N1937	TI	npn,MS,si	100	1.34	175	80	15	–	20	7 mc	–	–	
	2N1899	PSI	npn,DM,si	125	1	150	140	10	10	20	20	10	100	hi freq., hi power
	2N1900	PSI	npn,DM,si	125	1	150	140	5	10	20	20	–	–	hi freq., hi power

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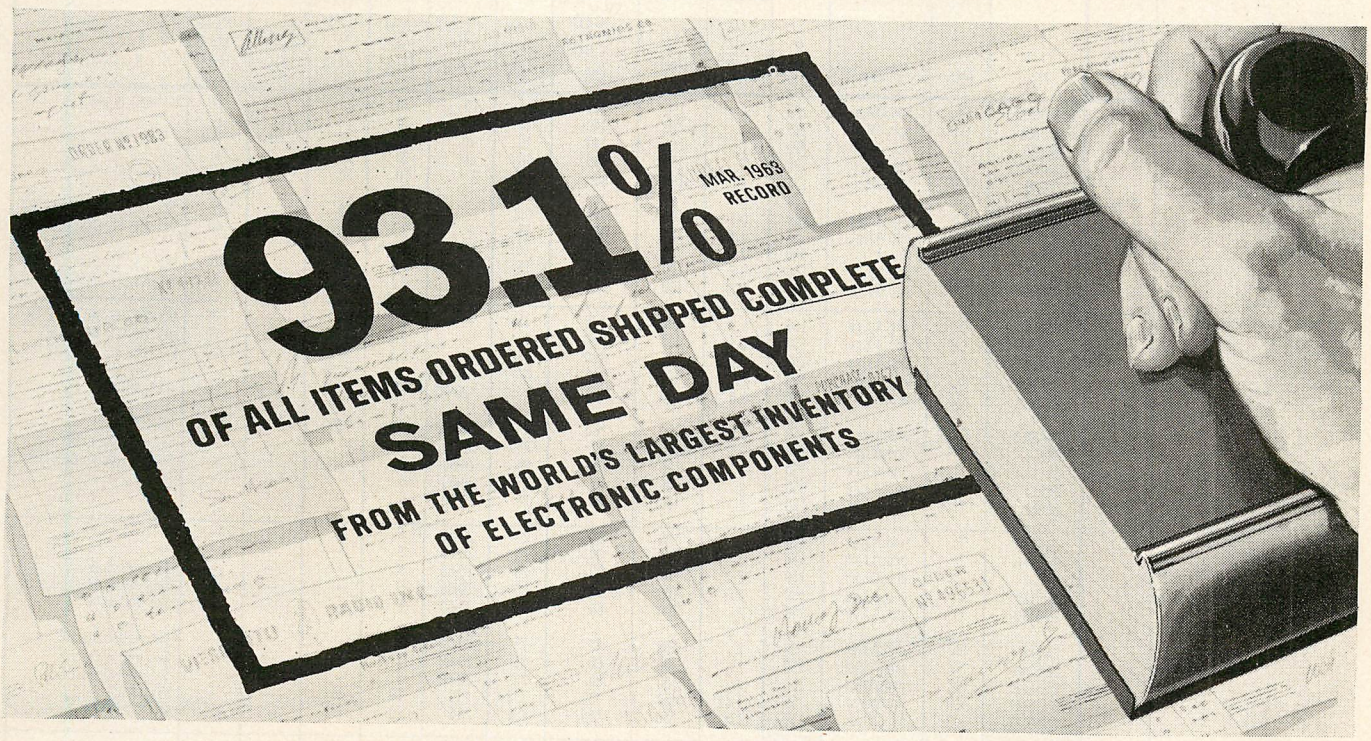

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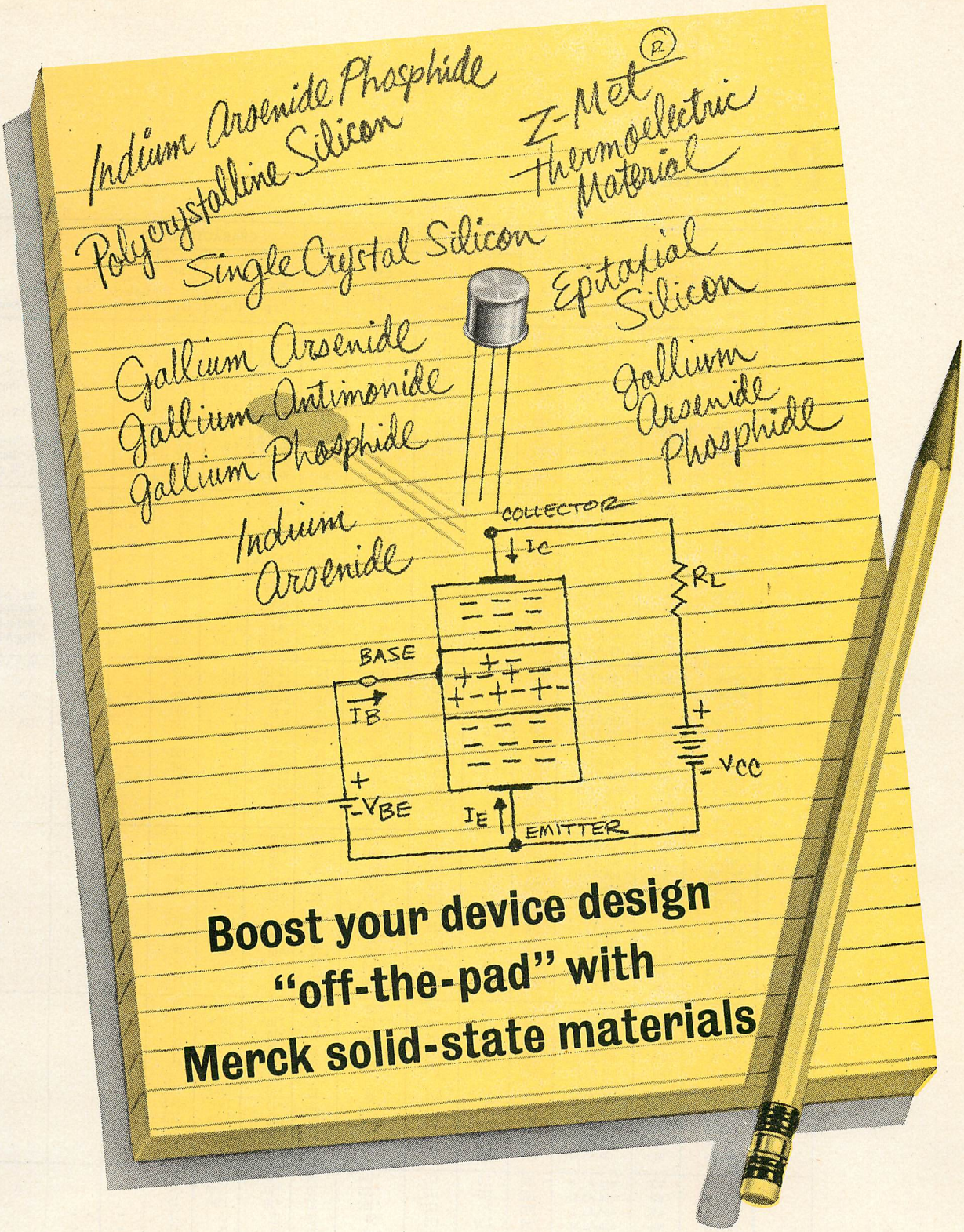
ON READER-SERVICE CARD CIRCLE 460

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 64	2N1901	PSI	npn,DM,si	125	1	150	140	5	10	20	20	–	–	hi freq., hi pwr.
	2N1902	PSI	npn,DM,si	125	1	150	140	10	10	20	20	–	–	
	2N1903	PSI	npn,DM,si	125	1	150	140	10	10	20	20	10	100	
	2N1904	PSI	npn,DM,si	125	1	150	140	10	10	20	20	–	–	
	PT900	PSI	npn,DM,si	125	1	150	80	10	3	10	20	10	100	hi freq., hi power
	2N173	DE	pnp,AJ,ge	150	0.5	100	*60	0.5	–	0.1	10	–	20	MO, TS, TI, RCA, SO, BE
	2N174	DE	pnp,AJ,ge	150	0.5	100	*80	15	–	0.1	10	–	40	TS, MO, TI, RCA, SO, BE
	2N229	WH	npn,AJ,si	150	2.0	150	*200	10	*100	10ma	30			
	2N277	DE	pnp,AJ,ge	150	0.5	100	*40	15	–	0.1	10	–	20	MO, TS, TI, RCA, SO, BE
	2N278	DE	pnp,AJ,ge	150	0.5	100	*50	15	–	0.1	10	–	20	MO, TS, TI, RCA, BE, SO
P 65	2N441	DE	pnp,AJ,ge	150	0.5	100	*40	15	–	0.1	10	–	20	MO, TS, TI, RCA, BE
	2N442	DE	pnp,AJ,ge	150	0.5	100	*50	15	–	0.1	10	–	20	MO, TS, TI, RCA, BE
	2N443	DE	pnp,AJ,ge	150	0.5	100	*60	15	–	0.1	10	–	20	MO, TS, TI, RCA, BE
	2N456A	CL	pnp,A,ge	150	0.5	100	*40	7	*30-90	*0.5	*200	–	–	USA, Mil
	2N457A	CL	pnp,A,ge	150	0.5	100	*60	7	*30-90	*0.5	*200	–	–	USA, Mil
	2N458A	CL	pnp,A,ge	150	0.5	100	*80	7	*30-90	*0.5	*200	–	–	USA, Mil
	2N511	TI	pnp,AJ,ge	150	2	100	40	25	20-60	5	–	–	–	Sat. volt=0.2v, BE
	2N511A	TI	pnp,AJ,ge	150	2	100	60	25	20-60	5	–	–	–	Sat. volt=0.2v, BE
	2N511B	TI	pnp,AJ,ge	150	2	100	80	25	20-60	5	–	–	–	BE
	2N512	TI	pnp,AJ,ge	150	2	100	40	25	20-60	5	–	–	–	
P 66	2N512A	TI	pnp,AJ,ge	150	2	100	60	25	20-60	5	–	–	–	
	2N512B	TI	pnp,AJ,ge	150	2	100	80	25	20-60	5	–	–	–	
	2N513	TI	pnp,AJ,ge	150	2	100	40	25	20-60	5	–	–	–	Sat. volt=0.4v
	2N513A	TI	pnp,AJ,ge	150	2	100	60	25	20-60	5	–	–	–	Sat. volt=0.4v
	2N513B	TI	pnp,AJ,ge	150	2	100	80	25	20-60	5	–	–	–	Sat. volt=0.4v
	2N514	TI	pnp,AJ,ge	150	2	100	40	25	20-60	5	–	–	–	Sat. volt=0.5v, BE
	2N514A	TI	pnp,AJ,ge	150	2	100	60	25	20-60	5	–	–	–	Sat. volt=0.5v, BE
	2N514B	TI	pnp,AJ,ge	150	2	100	80	25	20-60	5	–	–	–	Sat. volt=0.5v, BE
	2N1015	WH	npn,AJ,si	150	1.43	150	*30	7.5	*10	10	25	–	–	STC, AMF
	2N1015A	WH	npn,AJ,si	150	1.43	150	*60	7.5	*10	10	25	–	–	AMF
P 67	2N1015B	WH	npn,AJ,si	150	1.43	150	*100	7.5	*10	10	25	–	–	AMF
	2N1015C	WH	npn,AJ,si	150	1.43	150	*150	7.5	*10	10	25	–	–	AMF
	2N1016	WH	npn,AJ,si	150	1.43	150	*30	7.5	*10	10	30	–	–	
	2N1016A	AMF	npn,FJ,si	150	1.4	150	60	7.5	8	10	–	–		
	2N1016B	AMF	npn,FJ,si	150	1.4	150	100	75	8	10	–	–		
	2N1016D	WH	npn,AJ,si	150	1.43	150	*200	7.5	*10	10	30	–	–	
	2N1021	TI	pnp,AJ,ge	150	2	100	*100	10	*30-90	2	–	–	–	DE, BE
	2N1022	TI	pnp,AJ,ge	150	2	100	*120	10	*30-90	2	–	–	–	DE, BE
	2N1099	DE	pnp,AJ,ge	150	0.5	100	*80	15	–	0.1	10	–	40	TS, MO, TI, RCA, SO, BE
	2N1100	DE	pnp,AJ,ge	150	0.5	100	*100	15	–	0.1	10	–	40	TS, MO, RCA, SO, BE
P 68	2N1358A	DE	pnp,A,ge	150	0.5	110	*100	15	*25/50	4	5.0	–	–	
	2N1412USN	DE	pnp,A,ge	150	0.5	110	*100	15	*25/50	4	5.0	–	–	
	2N1907	TI	pnp,AD,ge	150	2	100	100	20	10	10	–	–	–	
	2N1908	TI	pnp,AD,ge	150	2	100	130	20	10	10	–	–	–	
	2N1980	TI	pnp,AJ,ge	150	2	100	*50	15	50	6	–	–	–	TS
	2N1981	TI	pnp,AJ,ge	150	2	100	*70	15	50	6	–	–	–	TS
	2N1982	TI	pnp,AJ,si	150	2	100	*90	15	50	6	–	–	–	TS
	2N2015	RCA	npn,si	150	–	–	100	10	10	*15	–	–	–	
	2N2016	RCA	npn,si	150	–	–	130	10	*15	–	–	–	–	
	2N2233	WH	npn,AJ,si	150	2.0	150	*200	10	*400	10ma	35			
P 69	2N2226	WH	npn,F,si	150	2	150	*50	10	100	10	11	–	–	
	2N2227	WH	npn,F,si	150	2	150	*100	10	100	10	11	–	–	
	2N2228	WH	npn,F,si	150	2	150	*150	10	100	10	11	–	–	
	2N2231	WH	npn,F,si	150	2	150	*100	10	400	10	11	–	–	
	2N2230	WH	npn,F,si	150	2	150	*50	10	400	10	11	–	–	
	2N2232	WH	npn,F,si	150	2	150	*150	10	400	10	11	–	–	
	2N2330	MO	npn,DDP,si	150	0.8	175	5.33	*30	–	50	0.1	–	7	Epitaxial
	2N2331	MO	npn,DDP,si	150	0.5	175	3.33	*30	–	50	0.1	–	7	Epitaxial
	2N2580	DE	npn,D,si	150	0.7	150	400	10	*10/40	5	50	–	–	
	2N2581	DE	npn,D,si	150	0.7	150	400	10	*25/65	5	50	–	–	
P 70	2N2582	DE	npn,D,si	150	0.7	150	500	10	*10/40	5	50	–	–	
	2N2583	DE	npn,D,si	150	0.7	150	500	10	*25/65	5	50	–	–	
	2N2075	MO	pnp,AJ,ge	170	2	110	80	15	25-100	4.0	10	–	–	SO
	2N2075A	MO	pnp,AJ,ge	170	2	110	80	15	25-100	4.0	10	–	–	"Meg-A-Life"
	2N2076	MO	pnp,AJ,ge	170	2	110	70	15	25-100	4.0	10	–	–	SO, "Meg-A-Life"
	2N2077	MO	pnp,AJ,ge	170	2	110	50	15	25-100	4.0	10	–	–	SO, "Meg-A-Life"
	2N2078	MO	pnp,AJ,ge	170	2	110	40	15	25-100	4.0	10	–	–	SO, "Meg-A-Life"
	2N2079	MO	pnp,AJ,ge	170	2	110	80	15	40-160	4.0	10	–	–	SO, "Meg-A-Life"
	2N2080	MO	pnp,AJ,ge	170	2	110	70	15	40-160	4.0	10	–	–	SO, "Meg-A-Life"
	2N2081	MO	pnp,AJ,ge	170	2	110	50	15	40-160	4.0	10	–	–	SO, "Meg-A-Life"



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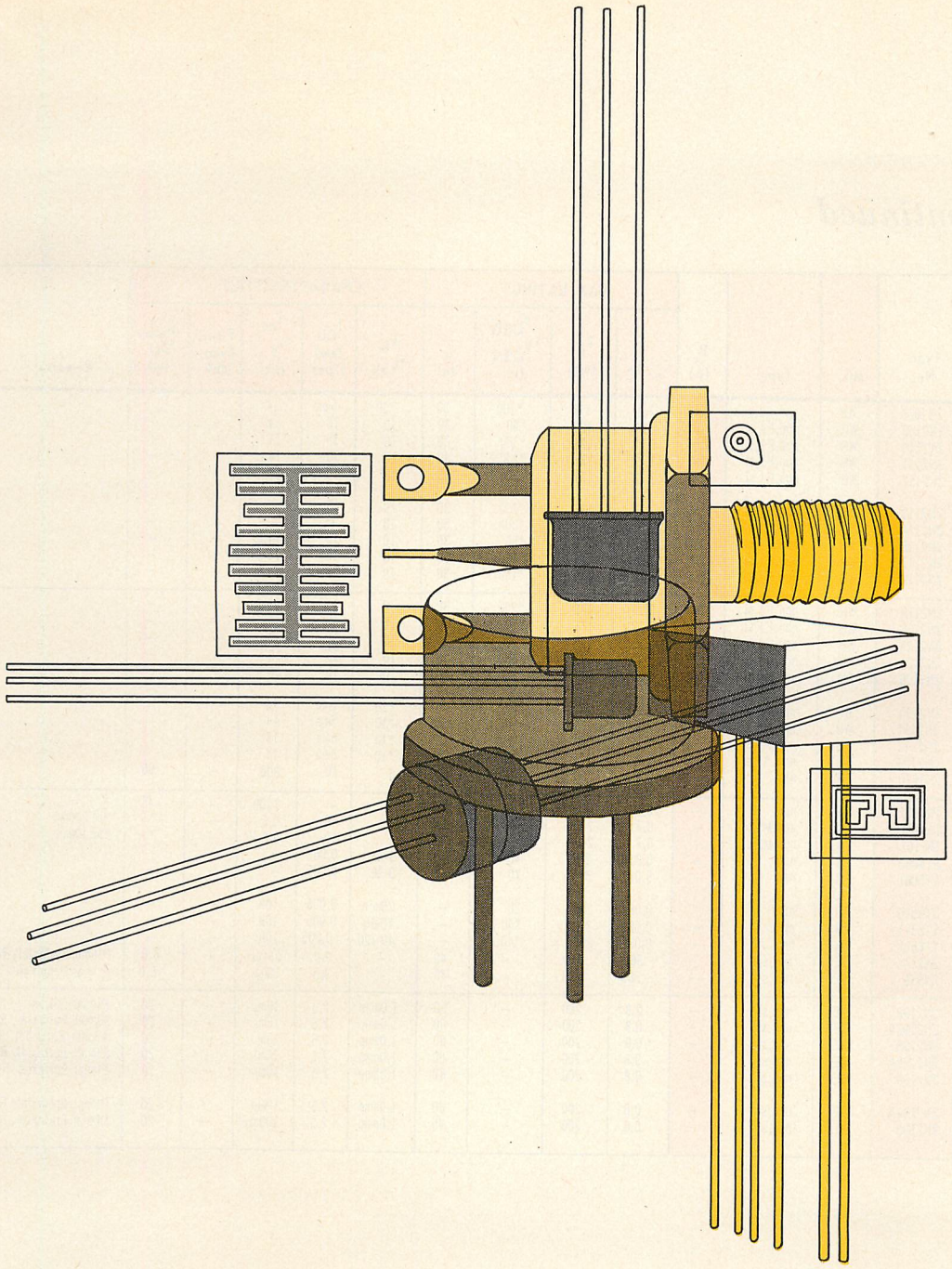
RESEARCH and PRODUCTION FOR BETTER SOLID-STATE MATERIALS

ON READER-SERVICE CARD CIRCLE 461

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 71	2N2082	MO	pnp,AJ,ge	170	2	110	*40	15	*70	4	10	–	–	
	2N2082A	MO	pnp,AJ,ge	170	2	110	*40	15	*70	4	10	–	–	
	2N2152	MO	pnp,AJ,ge	170	2	110	45	30	50-100	4.0	2.7	–	–	SO, "Meg-A-Life"
	2N2152A	MO	pnp,AJ,ge	170	2	110	45	30	50-100	4.0	2.7	–	–	"Meg-A-Life"
	2N2153	MO	pnp,AJ,ge	170	2	110	60	30	50-100	4.0	2.7	–	–	SO, "Meg-A-Life"
	2N2154	MO	pnp,AJ,ge	170	2	110	75	30	50-100	4.0	2.7	–	–	SO, "Meg-A-Life"
	2N2155	MO	pnp,AJ,ge	170	2	110	90	30	50-100	4.0	2.7	–	–	SO
	2N2156	MO	pnp,AJ,ge	170	2	110	45	30	80-160	4.0	2.7	–	–	SO, "Meg-A-Life"
	2N2157	MO	pnp,AJ,ge	170	2	110	60	30	80-160	4.0	2.7	–	–	SO, "Meg-A-Life"
	2N2158	MO	pnp,AJ,ge	170	2	110	75	30	80-160	4.0	2.7	–	–	SO, "Meg-A-Life"
P 72	2N2490	MO	pnp,AJ,ge	170	2	110	*70	15	*20-40	3	10	–	–	
	2N2491	MO	pnp,AJ,ge	170	2	110	*60	15	*25-50	3	10	–	–	
	2N2492	MO	pnp,AJ,ge	170	2	110	*80	15	*25-50	2	10	–	–	
	2N2493	MO	pnp,AJ,ge	170	2	110	*100	15	*25-50	3	10	–	–	
	2N2728	MO	pnp,AJ,ge	170	2	110	*15	50	*40-130	*30	–	–	–	
	MP500	MO	pnp,AJ,ge	170	2	110	45	60	30-60	4.0	3.6	–	–	
	MP500A	MO	pnp,AJ,ge	170	2	110	45	60	30-60	4.0	3.6	–	–	"Meg-A-Life"
	MP501	MO	pnp,AJ,ge	170	2	110	60	60	30-60	4.0	3.6	–	–	"Meg-A-Life"
	MP502	MO	pnp,AJ,ge	170	2	110	75	60	30-60	4.0	3.6	–	–	"Meg-A-Life"
	MP504	MO	pnp,AJ,ge	170	2	110	45	60	50-100	4.0	3.6	–	–	"Meg-A-Life"
P 73	MP505	MO	pnp,AJ,ge	170	2	110	60	60	50-100	4.0	3.6	–	–	"Meg-A-Life"
	MP506	MO	pnp,AJ,ge	170	2	110	75	60	50-100	4.0	3.6	–	–	"Meg-A-Life"
	2N574	MH	pnp,AJ,ge	187	2.5	100	*60	10	9-22	7	100	–	–	USA
	2N574A	MH	pnp,AJ,ge	187	2.5	100	*80	10	9-22	20	100	–	–	
	2N575	MH	pnp,AJ,ge	187	2.5	100	*60	25	19-42	7	150	–	–	USA
	2N575A	MH	pnp,AJ,ge	187	2.5	100	*80	25	19-42	20	150	–	–	
	2N1157	MH	pnp,AJ,ge	187	2.5	100	*60	40	38-84	7	200	–	–	
	DA3F3	MH	pnp,AJ,ge	187	2.5	100	*60	25	35	20	175	–	–	
	2N2739	WH	npn,AJ,si	200	2.0	175	*50	20	*10	15ma	14			
	2N2740	WH	npn,AJ,si	200	2.0	175	*200	20	*10	15ma	14			
P 74	2N2741	WH	npn,AJ,si	200	2.0	175	*150	20	*10	15ma	14			
	2N2742	WH	npn,AJ,si	200	2.0	175	*200	20	*10	15ma	14			
	2N2745	WH	npn,AJ,si	200	2.0	175	*50	20	*10	15ma	14.5			
	2N2746	WH	npn,AJ,si	200	2.0	175	*100	20	*10	15ma	14.5			
	2N2747	WH	npn,AJ,si	200	2.0	175	*150	20	*10	15ma	14.5			
	2N2748	WH	npn,AJ,si	200	2.0	175	*200	20	*10	15ma	14.5			
	2N2751	WH	npn,AJ,si	200	2.0	175	*50	20	*10	15ma	16			
	2N2752	WH	npn,AJ,si	200	2.0	175	*100	20	*10	15ma	16			
	2N2753	WH	npn,AJ,si	200	2.0	175	*150	20	*10	15ma	16			
	2N2754	WH	npn,AJ,si	200	2.0	175	*200	20	*10	15ma	16			
P 75	2N2757	WH	npn,AJ,si	200	2.0	175	*50	30	*10	15ma	14			
	2N2758	WH	npn,AJ,si	200	2.0	175	*100	30	*10	15ma	14			
	2N2759	WH	npn,AJ,si	200	2.0	175	*150	30	*10	15ma	14			
	2N2760	WH	npn,AJ,si	200	2.0	175	*200	30	*10	15ma	14			
	2N2761	WH	npn,AJ,si	200	2.0	175	*250	30	*10	15ma	14			
	2N2763	WH	npn,AJ,si	200	2.0	175	*50	30	*10	15ma	14.5			
	2N2764	WH	npn,AJ,si	200	2.0	175	*100	30	*10	15ma	14.5			
	2N2765	WH	npn,AJ,si	200	2.0	175	*150	30	*10	15ma	14.5			
	2N2766	WH	npn,AJ,si	200	2.0	175	*200	30	*10	15ma	14.5			
	2N2769	WH	npn,AJ,si	200	2.0	175	*50	30	*10	15ma	16			
P 76	2N2771	WH	npn,AJ,si	200	2.0	175	*150	30	*10	15ma	16			
	2N2772	WH	npn,AJ,si	200	2.0	175	*200	30	*10	15ma	16			
	2N2776	WH	npn,AJ,si	200	2.0	175	*100	30	*10	15ma	16			
	2N1809	WH	npn,AJ,si	250	2.22	175	*50	30	10	15	17	–	–	
	2N1810	WH	npn,AJ,si	250	2.22	175	*100	30	10	15	17	–	–	
	2N1811	WH	npn,AJ,si	250	2.22	175	*150	30	10	15	17	–	–	
	2N1812	WH	npn,AJ,si	250	2.22	175	*200	30	10	15	17	–	–	
	2N1813	WH	npn,FJ,si	250	2.22	175	*250	30	10	15	–	–	–	
	2N1814	WH	npn,FJ,si	250	2.22	175	*300	30	10	15	–	–	–	
	2N1816	WH	npn,AJ,si	250	2.22	175	*50	30	10	15	18	–	–	
P 77	2N1817	WH	npn,AJ,si	250	2.22	175	*100	30	10	15	18	–	–	
	2N1818	WH	npn,AJ,si	250	2.22	175	*150	30	10	15	18	–	–	
	2N1819	WH	npn,AJ,si	250	2.22	175	*200	30	10	15	18	–	–	
	2N1823	WH	npn,AJ,si	250	2.22	175	*50	30	10	15	19	–	–	
	2N1824	WH	npn,AJ,si	250	2.22	175	*100	30	10	15	19	–	–	
	2N1825	WH	npn,AJ,si	250	2.22	175	*150	30	10	15	19	–	–	
	2N1826	WH	npn,AJ,si	250	2.22	175	*200	30	10	15	19	–	–	
	2N1830	WH	npn,AJ,si	250	2.22	175	*50	30	*10	5ma	14			
	2N1831	WH	npn,AJ,si	250	2.22	175	*100	30	*10	5ma	14			
	2N1832	WH	npn,AJ,si	250	2.22	175	*150	30	*10	5ma	14			



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ON READER-SERVICE CARD CIRCLE 462

P *continued*

Cross Index Key	Type No.	Mfr.	Type	P_c (w)	MAX. RATINGS				CHARACTERISTICS					Remarks
					w/°C	T_j (°C)	V_{CEO} *V_{CBO} (v)	I_c (a)	h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	f_{ae} *f_T (kc)	Powr. Gain (db)	Powr. Out. (w)	
P 78	2N1833	WH	npn,AJ,si	250	2.22	175	*200	30	*10	5ma	14			
	2N2109	WH	npn,FJ,si	250	2.22	175	*50	30	10	15	14	–	–	
	2N2110	WH	npn,FJ,si,	250	2.22	175	*100	30	10	15	14	–	–	
	2N2111	WH	npn,FJ,si	250	2.22	175	*150	30	10	15	14	–	–	
	2N2112	WH	npn,FJ,si	250	2.22	175	*200	30	10	15	14	–	–	
	2N2113	WH	npn,FJ,si	250	2.22	175	*250	30	10	15	–	–	–	
	2N2114	WH	npn,FJ,si	250	2.22	175	*300	30	10	15	–	–	–	
	2N2116	WH	npn,FJ,si	250	2.22	175	*50	30	10	15	14.5	–	–	
	2N2117	WH	npn,FJ,si	250	2.22	175	*100	30	10	15	14.5	–	–	
	2N2118	WH	npn,FJ,si	250	2.22	175	*150	30	10	15	14.5	–	–	
P 79	2N2119	WH	npn,FJ,si	250	2.22	175	*200	30	10	15	14.5	–	–	
	2N2123	WH	npn,FJ,si	250	2.22	175	*50	30	10	15	16	–	–	
	2N2124	WH	npn,FJ,si	250	2.22	175	*100	30	10	15	16	–	–	
	2N2125	WH	npn,FJ,si	250	2.22	175	*150	30	10	15	16	–	–	
	2N2126	WH	npn,FJ,si	250	2.22	175	*200	30	10	15	16	–	–	
	2N2130	WH	npn,AJ,si	250	2.22	175	*50	30	*10	5ma	14			
	2N2131	WH	npn,AJ,si	250	2.22	175	*100	30	*10	5ma	14			
	2N2132	WH	npn,AJ,si	250	2.22	175	*150	30	*10	5ma	14			
	2N2133	WH	npn,AJ,si	250	2.22	175	*200	30	*10	5ma	14			
	2N1620	TR	npn	–	0.4	200°C	*100	5	8	10	800	–	60	
P 80	2N2032	TR	npn	–	0.9	200°C	*45	5	12	–	1200	–	45	
	SN-101	CS	npn,MS,si	–	8.7	200	–	140	1	40	0.5	–	*3	*at 200mc
	SN-102	CS	npn,MS,si	–	8.7	200	–	120	1	40	0.5	–	*5	*at 100mc
	ST5060	TR	npn	–	0.025	200	40	–	9-36	0.005	–	–	–	
	ST5061	TR	npn	–	0.025	200	70	–	9-36	0.005	–	–	–	
	ST6510	TR	npn	–	0.088	200	20	–	20min	0.005	10K	–	–	
	ST6511	TR	npn	–	0.088	200	*40	–	20-60	0.005	10K	–	–	
	ST6512	TR	npn	–	0.088	200	*40	–	40-120	0.005	10K	–	–	
	2N914	GE	npn,si	–	360	200	–	40	–	3.0	25mμ	–	6.0	Planar Epitaxial, RA
	2N916	GE	npn,si	–	360	200	–	45	–	3.0	10mμ	–	6.0	Planar Passivated, RA
P 81	2N2192	GE	npn,si	–	0.8	200	–	60	1.0amp	2.5	10mμ	–	20	Planar Epitaxial, RA
	2N2192A	GE	npn,si	–	0.8	200	–	60	1.0amp	2.5	10mμ	–	20	Planar Epitaxial, RA
	2N2193	GE	npn,si	–	0.8	200	–	80	1.0amp	2.5	10mμ	–	20	Planar Epitaxial, RA
	2N2193A	GE	npn,si	–	0.8	200	–	80	1.0amp	2.5	10mμ	–	20	Planar Epitaxial, RA
	2N2194	GE	npn,si	–	0.8	200	–	60	1.0amp	2.5	10mμ	–	20	Planar Epitaxial, RA
	2N2194A	GE	npn,si	–	0.8	200	–	60	1.0amp	2.5	10mμ	–	20	Planar Epitaxial, RA
	2N2195	GE	npn,si	–	0.6	200	–	45	1.0amp	2.5	100mμ	–	20	Planar Epitaxial, RA

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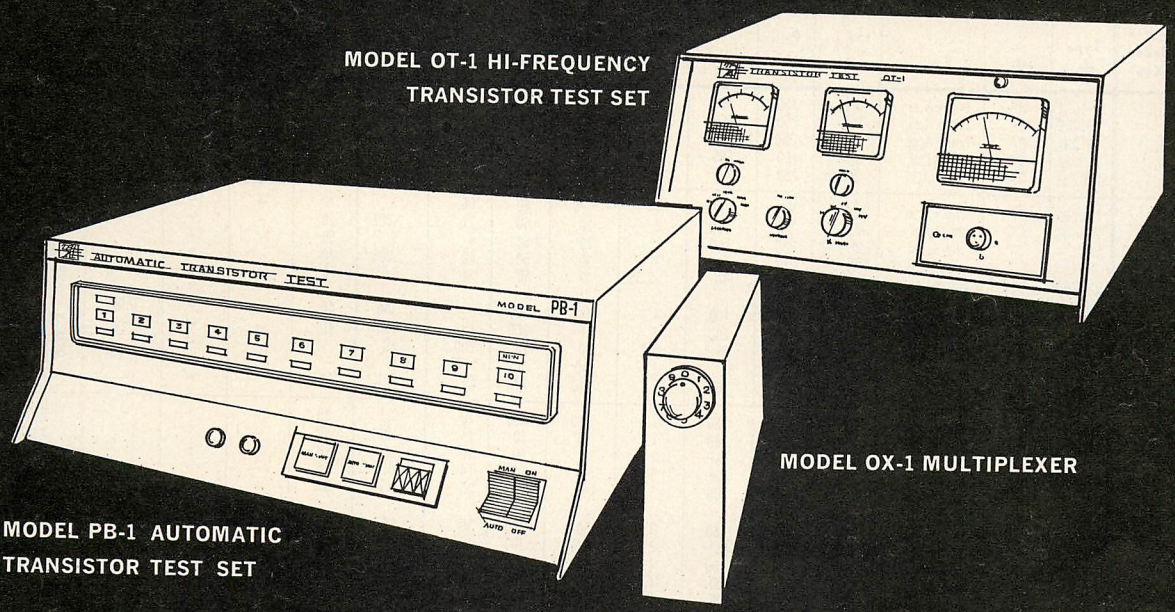
3 NEW B/A INSTRUMENTS



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ON READER-SERVICE CARD CIRCLE 463

LOW LEVEL SWITCHING

Generally types rated under one watt. In order of $f_{\alpha e}$ ($f_{\alpha b}$ or f_T where noted).

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/^oC	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS *h_{FE}	I_{CO} (μa)	C_{oe} *C_{ob} (pf)	SWITCHING t_r (μsec) *ton (nsec)	t_s (μsec) **t_{off} (nsec)	$V_{ce(sat)}$ (v)	Remarks
LL 1	2N1034	RA	pnp,FA,si	0.2	250	160	–	*40	50	15	5	70	–	–	–	SSD, NA, KF
	2N1275	RA	pnp,FA,si	0.2	250	160	.54	80	100	15	.005	60	–	–	–	KF
	2N1037	RA	pnp,FA,ge	0.25	250	160	–	*35	50	30	5	70	–	–	–	SSD, NA, KF
	2N329A	CT	pnp,AJ,si	0.3	250	160	3	35	50	28	.005	70	–	–	–	
	2N1035	RA	pnp,FA,si	0.3	250	160	–	*35	50	30	5	70	–	–	–	SSD, NA, KF, AMP
LL 2	2N1036	RA	pnp,FA,si	0.4	250	160	–	*30	50	60	5	70	–	–	–	SSD, NA, KF
	2N1640	CT	pnp,AJ,si	0.4	250	160	2	20	50	11	.001	50	–	–	–	KF
	C301	CT	pnp,AJ,si	0.4	250	160	2	70	50	4	5	50	–	–	–	
	2N328A	CT	pnp,AJ,si	0.5	250	160	3	30	50	60	.005	70	–	–	–	KF
	2N329A	SSD	pnp,AJ,si	**0.5	385	160	2.85	30	50	*88	0.1	70	–	–	–	KF, RA
	2N1057	GE	pnp,AJ,ge	0.5	240	100	4	45	300	–	300	40	–	–	0.08	
	2N327A	WT	pnp,AJ,si	0.7	–	200	3	.3	200	15	100	70	–	–	–	RA, KF, SD
	2N670	PH	pnp,AJ,ge	0.7	300	85	5.0	40	2a	200	20	–	–	–	0.3	Pulse Amp.
	2N2670	PH	pnp,AJ,ge	**0.7	300	85	–	*40	2a	*100	20	–	–	–	0.3	Pulse Amp
	2N1234	HU	pnp,AJ,si	0.8	400	160	3	110	100	21	0.1	95	–	–	–	TO-5 Package, KF
LL 3	2N1244	HU	pnp,AJ,si	0.8	1000	160	7.4	110	200	20	0.1	95	–	–	–	Coaxial package
	2N1641	CT	pnp,AJ,si	0.8	250	160	2	10	50	15	.001	50	–	–	–	
	C302	CT	pnp,AJ,si	0.8	250	160	2	8	50	12	.2	50	–	–	–	
	2N327A	HU	pnp,AJ,si	1.0	385	160	3	50	100	14	0.1	95	–	–	–	RA, SSD, KF
	2N328A	HU	pnp,AJ,si	1.0	385	160	3	50	100	25	0.1	95	–	–	–	WT, RA, SSD, JA, KF
	2N329A	HU	pnp,AJ,si	1.0	385	160	3	50	100	50	10	95	–	–	–	WT, RA, SSD, NA, KF
	2N331	RCA	pnp,AJ,ge	1.0	200	85	3	*30	200	–	16	–	–	–	–	BE, US, MO
	2N1056	GE	pnp,AJ,ge	1.0	240	100	4	50	300	25	25	40	–	–	0.09	Neon indicator
	2N2370	NA	pnp,si	1.0	200	200	1.4	15	50	15	0.005	15	–	–	–	2.5db NF
	2N2371	NA	pnp,si	1.0	200	200	1.4	15	50	20	0.005	15	–	–	–	2.5 db NF
LL 4	2N2372	NA	pnp,si	1.0	150	200	0.86	15	50	15	0.005	15	–	–	–	2.5 db NF
	2N2373	NA	pnp,si	1.0	150	200	0.86	15	50	20	0.005	15	–	–	–	2.5 db NF
	TS605	TS	pnp,AJ,ge	**1.0	150	100	–	12	400	*15	10	–	–	–	–	
	TS606	TS	pnp,AJ,ge	**1.0	150	100	–	20	400	*15	10	–	–	–	–	
	2N1228	HU	pnp,AJ,si	1.2	400	160	3	*15	100	20	0.1	95	–	–	–	WT,KF, SSD
	2N1229	HU	pnp,AJ,si	1.2	400	160	3	15	100	36	0.1	95	–	–	–	WT, NA, KF, AMP, SSD
	2N1230	HU	pnp,FJ,si	1.2	400	200	–	*35	500	14	0.1	100	–	–	–	WT, NA, KF, SSD, AMP
	2N1231	HU	pnp,FJ,si	1.2	400	200	–	*35	500	24	0.1	100	–	–	–	WT, NA, KF, SSD, AMP
	2N1232	HU	pnp,FJ,si	1.2	400	200	–	65	500	14	0.1	100	–	–	–	WT, NA, KF, SSD, AMP
	2N1233	HU	pnp,FJ,si	1.2	400	200	–	65	500	24	0.1	100	–	–	–	WT, NA, KF, SSD, AMP
LL 5	2N1234	HU	pnp,FJ,si	1.2	400	200	–	110	500	14	0.1	100	–	–	–	WT, NA, KF, SSD
	2N1238	HU	pnp,AJ,si	1.2	1000	160	7.4	15	200	20	0.1	95	–	–	–	Coaxial package
	2N1239	HU	pnp,AJ,si	1.2	1000	160	7.4	15	200	36	0.1	95	–	–	–	Coaxial package
	2N1240	HU	pnp,AJ,si	1.2	1000	160	7.4	35	200	20	0.1	95	–	–	–	Coaxial package
	2N1241	HU	pnp,AJ,si	1.2	1000	160	7.4	35	200	36	0.1	95	–	–	–	Coaxial package
	2N1242	HU	pnp,AJ,si	1.2	1000	160	7.4	60	200	20	0.1	95	–	–	–	Coaxial package
	2N1243	HU	pnp,AJ,si	1.2	1000	160	7.4	60	200	36	0.1	95	–	–	–	
	2N1642	CT	pnp,AJ,si	1.2	250	160	2	6	50	23	.005		–	–	–	
	C106	CT	pnp,AJ,si	1.2	250	160	2	10	50	50	50	50	–	–	–	Field effect
	OC122	AMP	pnp,AJ,ge	1.3	300	90	4.5	*32	500	180	–	–	–	–	–	
LL 6	2N312	SY	npn,AJ,ge	1.5	100	85	1.66	15	200	–	15	–	1.5	2	0.075	
	2N519	IND	pnp,AJ,ge	1.5	150	85	2.5	15	200	25	2	14	–	–	–	US, KF, TI
	2N519A	IND	pnp,AJ,ge	1.5	150	85	2.5	25	200	25	1	14	1.3	0.7	–	US, KF
	B1154	BE	pnp,AJ,ge	1.5	400	100	.15	40	300	–	10	20	1.5	–	.25	
	B1154A	BE	pnp,AJ,ge	1.5	400	100	.15	60	300	–	15	20	1.5	–	.25	
	OC123	AMP	pnp,AJ,ge	1.5	300	90	4.5	*50	500	160	–	–	–	–	–	
	2N328A	SSD	pnp,FA,si	2	385	160	2.85	40	50	30	5	70	–	–	–	KF
	2N536	PH	pnp,AJ,ge	**2	50	85	–	*20	30	50	4.0	–	–	–	0.07	
	2N679	SY	npn,AJ,ge	2	150	85	2.5	20	200	–	25	–	5	5	0.3	
	2N1220	SSD	pnp,AJ,si	**2	250	175	1.7	25	100	*9	0.1	18	–	–	–	
LL 7	2N1222	SSD	pnp,AJ,si	**2	250	175	1.7	25	100	10	.005	*18	–	–	–	
	2N1223	SSD	pnp,AJ,si	**2	250	175	1.7	40	100	6	0.1	15	–	–	–	–
	2N1446	IND	pnp,AJ,ge	2	200	85	3.33	45	400	30	5	–	–	–	–	
	OC80	AMP	pnp,PADT,ge	2	550	75	–	*32	600	85	10					
	2N438	SY	npn,AJ,ge	2.5	100	85	1.6	30	–	20	10	–	0.7	–	–	
	2N817	RA	npn,AJ,ge	2.5	75	85	1.25	30	400	20	10	20	–	–	–	Submin
	2N818	RA	npn,AJ,ge	2.5	75	85	1.25	30	400	20	10	20	–	–	–	Submin
	2N356	SY	npn,AJ,ge	3	100	85	1.6	20	500	–	25	–	1.0	0.3	0.6	GI
	2N356A	GI	npn,AJ,ge	3	150	100	2	30	500	60	3	14	1.5	0.3	0.18	SY, TI
	2N520	KF	pnp,AJ,ge	3	150	100	2	20	–	20(min)	25	–	–	–	–	TI

LL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (mw)	T_j (°C)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	C_{oe} *C_{ob} (pf)	SWITCHING t_r (μsec) *t_{on} (nsec)	t_s (μsec) *t_{off} (nsec)	$V_{ce(sat)}$ (v)	Remarks
LL 8	2N801	RA	pnp,AJ,ge	3	75	85	1.25	30	400	30	4	20	–	–	–	Submin
	2N802	RA	pnp,AJ,ge	3	75	85	1.25	30	400	30	4	20	–	–	–	Submin
	2N1051	WE	npn,D,si	3	250	150	4.0	40	100	30	0.1	7.0	–	–	–	
	2N1302	TI	npn,AJ,ge	**3	150	–	–	25	300	*20	6	*20	–	–	0.4	
	2N1447	IND	pnp,AJ,ge	3	200	85	3.33	45	400	45	5	–	–	–	–	
	2N1993	TI	npn,A,ge	**3	300	100	4.0	*30	300	*120	4	*13	0.2	0.7	0.07	
	2N1353	IND	pnp,AJ,ge	3.5	200	85	3.33	15	200	70	2.5	12	.6	.4	0.1	KF, US
	2N385A	SY	npn,AJ,ge	4	150	100	2	*40	200	30-110	40	–	–	–	–	GI, TI
	2N404A	RCA	pnp,AJ,ge	4	150	100	–	40	150	30	5	20	–	–	–	GI,IND,TS,KF, TI
	2N425	SY	pnp,AJ,ge	4	150	85	2.5	20	400	–	2.0	14	1.0	0.3	0.2	RA, IND, TS, US, KF, GI
LL 9	2N799	RA	pnp,AJ,ge	4	75	85	1.25	25	150	30	5	20	–	–	–	Submin
	2N800	RA	pnp,AJ,ge	4	75	85	1.25	25	150	20	5	20	–	–	–	Submin
	2N824	RA	npn,AJ,ge	4	75	85	1.25	25	100	40	5	20	–	–	–	Submin
	2N1027	SSD	pnp,AJ,si	**4	250	176	1.7	*18	100	18	.025	7	–	–	–	NA, SSD, KF
	2N1028	SSD	pnp,AJ,si	**4	250	175	1.7	*10	100	9	.025	7	–	–	–	NA, KF
	2N1404	TI	pnp,A,ge	**4	300	100	4.0	*25	300	*90	3	*13	0.18	0.8	0.08	
	2N1448	IND	pnp,AJ,ge	4	200	85	3.33	45	400	65	5		–	–	–	
	2N1605A	SY	npn,AJ,ge	4	200	100	2.6	40	200	40	10	20	–	–	–	
	2N1780	SY	npn,AJ,ge	4	100	100	1.3	25	100	30-110	10	20	–	–	–	GI, RCA
	2N1781	SY	npn,AJ,ge	4	100	100	1.3	25	100	40	5	20	–	–	–	
LL 10	2N1808	TI	npn,A,ge	**4	300	85	5.0	*25	300	*120	3	*13	0.2	0.7	0.07	
	2N2000	TI	pnp,AJ,ge	4	300	100	4	50	750		8	30	–	–	–	
	2N395	GE	pnp,AJ,ge	**4.5	500	100	6.67	*30	200	*100	6	*14	0.55	0.5	0.6	TI, KF, PH
	2N520	IND	pnp,AJ,ge	4.5	150	85	2.5	15	200	40	1	14	–	–	–	US, KF
	2N520A	IND	pnp,AJ,ge	4.5	150	85	2.5	25	200	100	1	14	0.9	0.7	–	US, KF, TI
	2N1169	SY	npn,AJ,ge	4.5	120	85	2	25	400	20	50	20	–	–	–	RCA
	2N1170	SY	npn,AJ,ge	4.5	120	85	2	25	400	20	50	20	–	–	–	RCA
	2N1302	TI	npn,AJ,ge	4.5	150	85	2.5	25	300	–	5	11	.70	.50	.1v	TO-5, SY, GI, RCA
	2N1303	TI	pnp,AJ,ge	4.5	150	85	2.5	*30	300	–	3	16	.40	.90	.1v	GI, KF, AMP
	2N1354	IND	pnp,AJ,ge	4.5	200	85	3.33	30	200	70	2.5	12	.55	.5	0.1	KF, US
LL 11	2N123	SY	pnp,AJ,ge	5	100	85	1.66	15	125	30-150	0.6		–	–	0.2	
	2N315	GI	pnp,AJ,ge	5	100	85	2	*20	500	–	1	14	1.0	0.2	0.12	KF, IND, US
	2N315A	GI	pnp,AJ,ge	5	150	100	2	*30	500	70	1	14	0.9	0.4	0.12	IND, US, KF
	2N388A	RCA	npn,AJ,ge	5	150	100	–	*40	200	*30	5	20	1	0.7	–	
	2N396A	SY	pnp,AJ,ge	5	150	100	2	30	200	30-150	6	–	–	–	–	TS,KF,GE,GI,RCA
	2N414	SY	pnp,AJ,ge	5	150	85	2.5	*30	200	30-90	5	–	–	–	–	KF, GI, US, TS
	2N439	SY	npn,AJ,ge	5	100	85	1.66	*20	–	–	10	–	0.5	0.7	0.25	TI
	2N450	GE	pnp,AJ,ge	5	150	85	2.5	12	125	–	6	20	–	–	0.2	
	2N576	SY	npn,AJ,ge	5	200	100	2.6	20	400	–	20	–	2	1	0.4	
	2N578	RCA	pnp,AJ,ge	5	120	71	–	20	400	15	**3	–	0.85	0.33	0.2	IND,US,KF,GI
LL 12	2N585	RCA	npn,AJ,ge	5	120	71	–	25	200	40	3	–	0.35	0.25	0.1	SY, GI, TI
	2N658	RA	pnp,FA,ge	5	150	85	–	16	1a	–	2.5	12	–	–	0.25	KF
	2N803	RA	pnp,AJ,ge	5	75	85	1.25	30	400	40	4	20	–	–	–	Submin
	2N804	RA	pnp,AJ,ge	5	75	85	1.25	30	400	40	4	20	–	–	–	Submin
	2N815	RA	npn,AJ,ge	5	75	85	1.25	25	200	60	10	20	–	–	–	Submin
	2N816	RA	npn,AJ,ge	5	75	85	1.25	25	200	60	10	20	–	–	–	Submin
	2N819	RA	npn,AJ,ge	5	75	85	1.25	30	400	30	10	20	–	–	–	Submin
	2N820	RA	npn,AJ,ge	5	75	85	1.25	30	400	30	10	20	–	–	–	Submin
	2N825	RA	pnp,AJ,ge	5	75	85	1.25	30	200	30	6	20	–	–	–	Submin
	2N826	RA	pnp,AJ,ge	5	75	85	1.25	30	200	30	6	20	–	–	–	
LL 13	2N1012	GI	npn,AJ,ge	5	150	100	2	*40	–	–	5	10	0.1	0.1	0.1	
	2N1219	SSD	pnp,AJ,si	**5	250	175	1.7	25	100	*18	0.1	15	–	–	–	KF, TI
	2N1221	SSD	pnp,AJ,si	**5	250	175	1.7	25	100	20	.005	*15	–	–	–	
	2N1348	IND	pnp,AJ,ge	5	200	85	3.33	40	400	95	5	12	–	–	–	
	2N1449	IND	pnp,AJ,ge	5	200	85	3.33	45	400	80	5	–	–	–	–	
	2N1994	TI	npn,AJ,ge	5	150	85	2.5	30	300	–	5	11	1.1	1.5	–	
	GT1658	GI	npn,AJ,ge	5	150	100	2	*30	–	50	3	10	–	–	–	
	KGS1005	KF	pnp,AJ,ge	5	200	85	5.2	30	400	40	12	–	–	–	–	
	2N357	SY	npn,AJ,ge	6	100	85	1.6	*15	500	–	25	–	1.2	.7	.20	GI, TI
	2N357A	GI	npn,AJ,ge	6	150	100	2	30	500	90	3	14	0.5	0.5	0.18	SY, TI
LL 14	2N377	SY	npn,AJ,ge	6	150	100	2	*20	200	–	10	–	2.5	0.7	–	GE, GI TI
	2N426	SY	pnp,AJ,ge	6	150	85	2.5	*20	400	–	2	14	1.0	0.3	0.22	RA, TS, GI, US, TI, KF
	2N789	RA	npn,DB,si	6	–	–	1.4	45	25	15	.002	5	–	–	–	Submin
	2N902	RA	npn,DB,si	6	–	–	–	45	25	15	.002	5	–	–	–	Submin
	2N1319	RCA	pnp,AJ,ge	6	120	71	–	20	400	30	2.5		–	–	–	TI
	2N1343	IND	pnp,AJ,ge	6	150	85	2.5	20	400	40	3	12	20	–	–	
	2N1997	TI	npn,AJ,ge	6	250	100	3.3	45	–	4	15	–	1.0	–	–	
	2N2181	PH	pnp,SAT,si	*6	150	140	1.3	*25	50	10	0.01	*12	–	–	–	
	2N2182	PH	pnp,SAT,si	*6	150	140	1.3	*25	50	10	0.01	*12	–	–	–	Chopper
	2N2183	PH	pnp,SAT,si	*6	150	140	1.3	*15	50	10	0.01	*12	–	–	–	2N2181
																Chopper

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ULTRA HIGH SPEED SWITCHES

TYPE*	Maximum Ratings			Characteristics							
	T_S °C.	V_{CB} volts	P_T @25°C. mw	I_{CBO} max. μa	h_{FE} min.	$V_{CE(SAT)}$ max. volts	f_T min. mc	C_{ob} max. pf	t_s max. nsec	t_{on} max. nsec	t_{off} max. nsec
2N709	300	15	300	0.05	20	0.30	600	3	6	15	15
T-2877	300	15	300	0.05	20	0.30	500	3	8	17	17

*TO-18 case—collector internally connected to case.

CORE DRIVERS/PULSE AMPLIFIERS

TYPE*	V_{CB} max. volts	f_T @ 50 ma mc	h_{FE} @ 150 ma
2N1893	120	50	40
2N1613	75	60	40

*TO-5 case—collector internally connected to case.

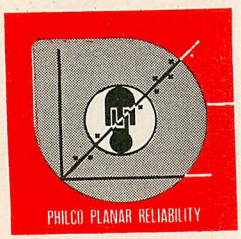
100 mc LOW-NOISE AMPLIFIER

Industry's Newest Silicon Amplifier Standard

TYPE	Power Gain	Maximum Noise Figure	Minimum BV_{CEO}
T-2857*	15-22db@100 mc	5db@100 mc	20 volts

The new Philco T-2857 is industry's first silicon amplifier transistor to be functionally tested at 100 mc for fixed-matched, fixed neutralized, and fixed-bias performance. This insures interchangeability in practical communications circuits.

*TO-18 case with 4 leads—collector isolated from case.



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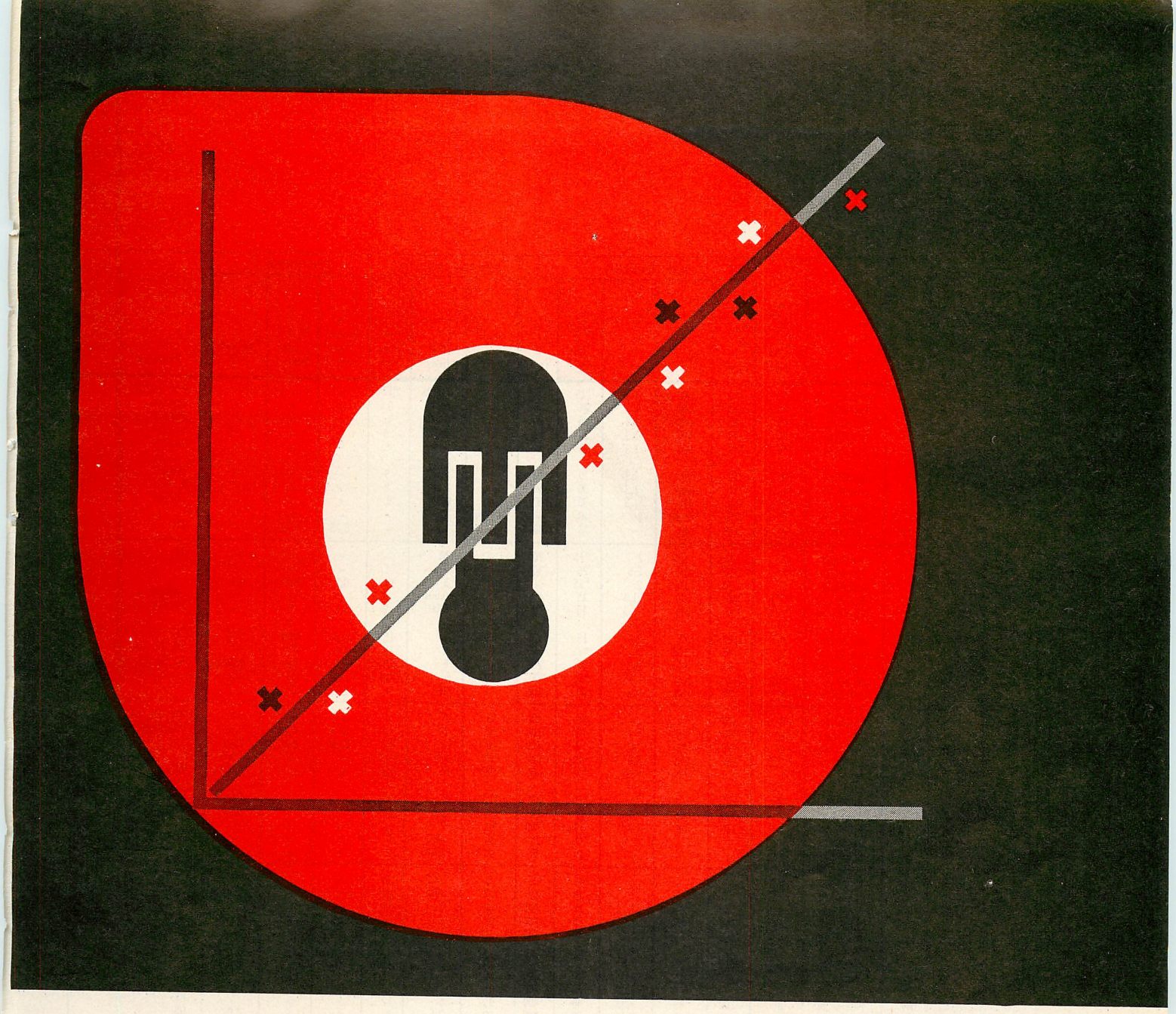

VERY HIGH SPEED SWITCHES

These Philco Types Feature Industry's Best Combination of Voltage, Switching Speed, and Beta.

TYPE†	Maximum Ratings					Characteristics							
	T_S °C.	V_{CBO} volts	V_{CEO} volts	P_T @ 25° C. mw	I_C ma	I_{CBO} max. μa	h_{FE} min.	V_{CE} (SAT) max. volts	f_T min. mc	C_{ob} max. pf	t_s max. nsec	t_{on} max. nsec	t_{off} max. nsec
2N2710	300	40	20	360	500	0.03	40	0.25	500	4	15	20	35
2N2651	300	40	20	360	500	0.03	25	0.25	350	4	25	35	75
2N914	300	40	15	360	500	0.025	30	0.25	300	6	20	40 @ 200 ma	40 @ 200 ma
2N834	175	40	30**	300	200	0.50	25	0.25	350	4	25	35	75
2N784A	300	40	15	350	200	0.025	25	0.19	300	3.5	15	20	40
2N708	300	40	15	360		0.025	30	0.40	300	6	25		
2N706	175	25	20*	300	50	0.5	20	0.60	200	6	60		

*V_{CER} **V_{CES} † TO-18 case—collector internally connected to case.

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LL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **f_{ab} (mc)	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/^oC	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	C_{oe} *C_{ob} (pf)	SWITCHING t_r (μsec) *t_{on} (nsec)	t_s (μsec) *t_{off} (nsec)	$V_{ce(sat)}$ (v)	Remarks
LL 15	2N2184	PH	pnp,SAT,si	*6	150	140	1.3	*15	50	*15	0.0003	*12	–	–	–	Pair 2N2183
	2N2274	PH	pnp,SP,si	*6	150	140	1.3	25	50	10	0.045	9	–	–	–	Chopper
	2N2275	PH	pnp,SP,si	*6	150	140	1.3	25	50	10	0.045	9	–	–	–	2N2274
	2N2276	PH	pnp,SP,si	*6	150	140	1.3	15	50	10	0.003	9	–	–	–	chopper
	2N2277	PH	pnp,SP,si	*6	150	140	1.3	15	50	10	0.003	9	–	–	–	2N2276
	2N2185	PH	pnp,SP,si	*6.5	150	140	1.3	30	50	–	0.001	9	–	–	–	chopper
	2N2186	PH	pnp,SP,si	*6.5	150	140	1.3	30	50	–	0.001	9	–	–	–	M. Pair
	2N2187	PH	pnp,SP,si	*6.5	150	140	1.3	30	50	–	0.001	9	–	–	–	2N2185
	2N100	SY	npn,AJ,ge	7	150	100	2	40	–	25(min)	15	–	–	–	–	
	2N1090	RCA	npn,AJ,ge	7	120	85	–	25	400	50	4	–	0.25	0.20	–	GI
LL 16	2N1114	SY	npn,AJ,ge	7	150	100	2	*15	200	–	30	–	–	–	–	TI
	2N1995	TI	npn,AJ,ge	7	150	85	2.5	25	300	–	5	11	–	–	–	
	GT123	GI	pnp,AJ,ge	7	150	150	2	*25	–	40	3	15	0.9	0.5	0.1	
	2N2278	PH	pnp,SAT,si	*7.6	150	140	1.3	15	50	–	0.001	9	–	–	–	Chopper
	2N2279	PH	pnp,SAT,si	*7.6	150	140	1.3	15	50	–	0.001	9	–	–	–	2N2278
	2N123	GE	pnp,AJ,ge	8	150	85	2.5	15	125	0.987	6	15	0.45	0.90	0.15	SY
	2N388	GI	npn,AJ,ge	8	150	100	2	*25	500	–	5	10	0.6	0.4	–	SY, GE, RA, TI
	2N396	GE	pnp,AJ,ge	8	200	100	3.3	20	200	–	6	12	0.4	0.6	0.08	TI, GI, SY, KF
	2N396A	PH	pnp,AJ,ge	**8	500	100	6.67	*30	200	*100	6	*14	.2	.25	.15	
	2N576A	SY	npn,AJ,ge	8	200	100	2.6	40	400	–	40	–	2	1	0.4	
LL 17	2N579	RCA	pnp,AJ,ge	8	120	71	–	20	400	30	3	–	0.36	0.33	0.2	IND, US, KF, GI
	2N581	RCA	pnp,AJ,ge	8	150	85	–	18	100	30	3	12	0.20	0.20	0.35	US,IND,GI,KF,TI
	2N583	RCA	pnp,AJ,ge	8	120	85	–	18	100	30	3	12	0.20	0.20	0.35	
	2N597	PH	pnp,AJ,ge	**8	250	100	3.3	*45	500	*70	3.5	*15	–	–	0.085	
	2N598	PH	pnp,AJ,ge	8	250	100	3.3	*35	500	125*	3	*15	–	–	0.085	KF-MIL
	2N600	PH	pnp,AJ,ge	*8	750	100	10	*35	500	*125	3	*15	–	–	0.085	MIL
	2N662	RA	pnp,FA,ge	8	150	85	–	11	1a	–	2.5	12	–	–	0.25	KF
	2N714	RCA	pnp,AJ,ge	8	150	85	–	30	200	80	2	11	–	–	–	
	2N790	RA	npn,DB,si	8	–	–	1.4	45	25	30	.002	8	–	–	–	Submin
	2N792	RA	npn,DB,si	8	–	–	1.4	45	25	60	.002	5	–	–	–	Submin
LL 18	2N903	RA	npn,DB,si	8	–	–		45	25	30	.002	20	–	–	–	Submin
	2N905	RA	npn,DB,si	8	–	–		45	25	80	.002	20	–	–	–	Submin
	2N1280	IND	pnp,AJ,ge	8	200	85	3.33	16	400	60	5	10	.10	–	–	
	2N1284	IND	pnp,AJ,ge	8	150	85	2.5	20	400	90	2	15	.45	.9	15	
	2N1304	TI	npn,AJ,ge	8	150	85	2.5	*25	300	110	5	16	.45	.50	.1v	TO-5,GI,SY,GE,AMP
	2N1305	TI	pnp,AJ,ge	8	150	85	2.5	*30	300	100	3	11	.28	.80	.1v	TO-5, KF, GI, AMP
	2N1347	IND	pnp,AJ,ge	8	150	85	2.5	20	200	80	2.5	12	–	–	–	
	2N1350	IND	pnp,AJ,ge	8	200	85	3.33	50	400	95	10	12	–	–	–	KF
	2N1351	IND	pnp,AJ,ge	8	200	85	3.33	40	400	65	5	12	–	–	–	KF
	2N1355	IND	pnp,AJ,ge	8	200	85	3.33	30	200	80	2.5	12	.4	.6	0.08	US
LL 19	2N1356	IND	pnp,AJ,ge	8	200	100	2.66	30	200	80	2.5	12	.4	.6	0.08	US
	2N1478	PH	pnp,AJ,ge	**8	250	100	3.3	*30	500	*70	3.5	*15	–	–	.085	
	2N1685	SY	npn,AJ,ge	8	100	100	1.3	25	200	40	10	20	–	–	–	
	2N2001	TI	pnp,AJ,ge	8	300	100	4	30	750	–	5	30	–	–	–	
	2N2177	SSD	pnp,AJ,si	**8	100	175	0.7	6	50	*95	*0.5	10	–	–	–	
	2N2178	SSD	pnp,AJ,si	**8	100	175	0.7	6	50	*95	*0.5	10	–	–	–	
	2N167	GE	npn,GJ,ge	9	65	85	1.1	30	75	0.985	1.5	2.5	0.4	0.7	0.35	USAF2N167-MIL
	2N358	GI	npn,AJ,ge	9	100	85	2	20	500	60	3	14	0.4	0.5	0.18	SY, TI
	2N358A	SY	npn,AJ,ge	9	150	100	2	*30	500	25-75	5	14	–	–	–	GI
	2N394	GE	pnp,AJ,ge	9	150	85	2.5	10	200	–	6	12	–	–	0.04	KF
LL 20	2N823	RA	npn,AJ,ge	9	75	85	1.25	25	100	40	5	20	–	–	–	Submin
	2N1198	GE	npn,RG,ge	9	65	85	1.1	25	75	–	1.5	2.5	0.4	0.7	0.35	
	2N2274	PH	pnp,SP,si	*9	150	140	1.3	*25	50	*15	.003	*6	–	–	–	Chopper
	2N2275	PH	pnp,SP,si	*9	150	140	1.3	*25	50	*15	.003	*6	–	–	–	pair 2N2274
	2N2276	PH	pnp,SP,si	*9	150	140	1.3	*15	50	*15	.003	*6	–	–	–	chopper
	2N2277	PH	pnp,SP,si	*9	150	140	1.3	*15	50	10	0.003	*9	–	–	–	pair 2N2276
	2N397	RCA	pnp,AJ,ge	10	150	85	–	30	200	*40	6	*20	–	–	0.2	
	2N440	SY	npn,AJ,ge	10	100	85	1.66	*15	–	–	10	–	0.3	0.7	0.25	GI,TI
	2N518	GE	pnp,AJ,ge	10	150	85	2.5	12	125	–	6	12	0.8	0.9	0.15	
	2N521	IND	pnp,AJ,ge	10	150	85	2.5	15	200	70	1	14	–	–	–	US, KF
LL 21	2N521A	IND	pnp,AJ,ge	10	150	85	2.5	25	200	150	1	14	0.2	0.5	–	US, KF
	2N600	PH	pnp,AJ,ge	10	750	100	10	35	500	–	10	15	–	–	0.085	
	2N659	RA	pnp,FA,ge	10	150	85	–	14	1a	–	2.5	12	–	–	0.25	KF, GI
	2N745	RA	npn,MS,si	10	150	175	0.75	45	50	22	10	3	–	–	–	Submin
	2N805	RA	pnp,AJ,ge	10	75	85	1.25	30	400	60	4	20	–	–	–	Submin
	2N806	RA	pnp,AJ,ge	10	75	85	1.25	30	400	60	4	20	–	–	–	Submin
	2N821	RA	npn,AJ,ge	10	75	85	1.25	30	400	40	10	20	–	–	–	Submin
	2N822	RA	npn,AJ,ge	10	75	85	1.25	30	400	40	10	20	–	–	–	Submin
	2N1281	IND	pnp,AJ,ge	10	200	85	3.33	16	400	90	5	10	.9	–	–	
	2N1349	IND	pnp,AJ,ge	10	200	85	3.33	40	400	110	5	12	–	–	–	

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Epitaxial Junction PNP Silicon Transistors

Featuring

HIGH V_{eb}

ULTRA LOW LEAKAGE

LOW OFFSET VOLTAGE

HIGH FREQUENCY

RELIABILITY

These transistors are available in TO-5, TO-18, TO-46 and Molytab packages.

Typical Specifications for Low Level Chopper Circuits

Characteristic	Type Designation		
	C9001	C9002	C9003
V_{cb} and V_{eb} ($I_b = 10^{-10}$a)	15v	25v	40v
V_{ce}	10v	20v	35v
I_{cbo} and I_{ebo} (100°C)	3nA	3nA	3nA
V_o ($I_b = 200\ \mu$a; $I_e = 0$)	0.3mV	0.5mV	0.8mV
Beta at 1mc ($I_c = 1$ma; $V_{ce} = 6$v)	30	20	10
Dissipation (case temp. =25°C)	2 watts	2 watts	2 watts
Max. Operating Temperature	200°C	200°C	200°C
Package	TO-46	TO-46	TO-46

In addition, virtually all present PNP types can be supplied in this new construction in quantities and at competitive prices for direct replacement in existing circuits.

Write or call to discuss your requirements.

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ON READER-SERVICE CARD CIRCLE 465

LL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/^oC	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	C_{oe} *C_{ob} (pf)	SWITCHING t_r (μsec) *t_{on} (nsec)	t_s (μsec) *t_{off} (nsec)	$V_{ce(sat)}$ (v)	Remarks
LL 22	2N1996	TI	npn,AJ,ge	10	150	85	2.5	20	300	–	5	11	–	–	–	
	2N1998	TI	pnp,AJ,ge	10	250	100	3.3	35	400	–	4	15	–	–	–	
	2N2185	PH	pnp,SP,si	10	150	140	1.3	*30	50	–	0.001	*6	–	–	–	Chopper
	2N2186	PH	pnp,SP,si	10	150	140	1.3	*30	50	–	0.001	*9	–	–	–	Chopper
	2N2187	PH	pnp,SP,si	10	150	140	1.3	*30	50	–	0.001	*6	–	–	–	Pair 2N2185
	2N2648	GI	pnp,AJ,ge	**10	250	100	3.3	*35	1a	*80-500	3	*18	.12	.6	.2	
	R212	TS	pnp,AJ,ge	**10.	0–	85	–	30	400	*20	–	*200	5	*20	–	
	2N427	GI	pnp,AJ,ge	11	150	100	2	*30	–	–	2	14	0.43	0.3	0.105	KF, TS, TI, IND, RA, US
	2N791	RA	npn,DB,si	11	–	–	1.4	45	25	60	.002	5	–	–	–	Submin
	2N904	RA	npn,DB,si	11	–	–	–	45	25	60	.002	20	–	–	–	Submin
LL 23	2N316	GI	pnp,AJ,ge	12	100	85	2	*20	500	–	1	14	0.4	0.4	0.14	KF
	2N316A	GI	pnp,AJ,ge	12	150	100	2	*30	500	130	1	14	0.4	0.4	0.14	IND, US, KF
	2N397	GE	pnp,AJ,ge	12	200	100	3.3	15	200	–	6	12	0.3	0.7	0.07	TI, KF
	2N404	RCA	pnp,AJ,ge	12	120	85	–	*25	100	–	5	–	0.17	0.20	0.12	US,GE,RA,GI,SY,KF, PH, TI, AMP
	2N428A	GI	pnp,ge	12	150	100	2	*0.25	10	100	5	20	0.43	0.3	0.22	
	2N635	GE	npn,AJ,ge	12	150	85	2.5	20	300	–	5	–	–	–	–	
	2N1306	TI	npn,AJ,ge	12	150	85	2.5	*25	300	110	5	16	.22	.50	.1v	TO-5,GI,SY,GE,AMP
	2N1307	TI	pnp,AJ,ge	12	150	85	2.5	*30	300	110	3	11	.20	.80	.1v	TO-5, GI, KF,AMP
	2N1313	IND	pnp,AJ,ge	12	175	85	–	*30	400	80	–	14	–	–	–	KF, TI
	2N1344	IND	pnp,AJ,ge	12	150	85	2.5	15	400	90	5	12	0.7	0.3	–	KF
LL 24	2N1345	IND	pnp,AJ,ge	12	150	85	2.5	10	400	60	3	14	.3	.4	–	KF
	2N1346	IND	pnp,AJ,ge	12	150	85	2.5	12	400	125	2.5	14	.3	.4	.10	KF
	2N1357	IND	pnp,AJ,ge	12	200	85	3.33	30	200	85	2.5	12	.3	.7	0.07	
	2N2278	PH	pnp,SAT,si	*12	150	140	1.3	*15	50	–	0.001	*6	–	–	–	Chopper
	2N2279	PH	pnp,SAT,si	*12	150	140	1.3	*15	50	–	0.001	*6	–	–	–	Pair 2N2278
	2N269	RCA	pnp,AJ,ge	13	120	85	–	25	100	40	2	–	0.17	0.20	0.12	
	2N793	RA	npn,DB,si	13	–	–	1.4	45	25	150	.002	5	–	–	–	Submin
	2N906	RA	npn,DB,si	13	–	–	–	45	25	150	.002	20	–	–	–	Submin
	2N1091	RCA	npn,AJ,ge	13	120	85	–	25	400	70	4	–	0.20	0.17	–	GI
	2N582	SY	pnp,AJ,ge	14	120	71	2.6	*25	100	40(min)	5	–	–	–	–	KF, RCA, TI
LL 25	2N584	RCA	pnp,AJ,ge	**14	120	85	–	25	100	60	2	12	0.15	0.17	0.2	US
	2N807	RA	pnp,AJ,ge	14	75	85	1.25	25	100	40	5	20	–	–	–	Submin
	2N808	RA	pnp,AJ,ge	14	75	85	1.25	25	100	40	5	20	–	–	–	Submin
	2N858	PH	pnp,SP,si	14	150	140	1.3	*40	50	33	.1	5	–	–	–	SPR
	2N859	PH	pnp,SP,si	14	150	140	1.3	*40	50	65	.1	5	–	–	–	SPR
	2N860	PH	pnp,SA,si	14	150	140	1.3	*25	50	33	.1	5	–	–	–	SPR
	2N862	PH	pnp,SP,si	14	150	140	1.3	*15	50	33	.1	5				SPR
	2N580	RCA	pnp,AJ,ge	15	120	71	–	20	400	45	3	–	0.16	0.29	0.2	GI,IND,US,TS,KF
	2N636A	SY	npn,AJ,ge	15	150	100	2	*25	300	100-300	6	20	–	–	–	TI
	2N660	RA	pnp,FA,ge	15	150	85	–	11	1a	–	2.5	12	–	–	0.25	KF, TI
LL 26	2N1282	IND	pnp,AJ,ge	15	200	85	3.33	16	400	100	5	10	.8	–	–	
	2N1316	IND	pnp,AJ,ge	15	200	85	3.33	30	400	100	2	14	–	–	–	KF
	2N1317	IND	pnp,AJ,ge	15	200	85	3.33	20	400	95	3	14	–	–	–	KF
	2N1318	IND	pnp,AJ,ge	15	200	85	3.33	10	400	85	4	14	–	–	–	
	2N1999	TI	pnp,AJ,ge	15	250	100	3.33	30	400	–	4	15	–	–	–	
	2N388A	TI	npn,AJ,ge	**16	150	–	–	40	200	*60-*180	5	*20	–	–	–	
	2N599	PH	pnp,AJ,ge	*16	250	100	3.3	*30	500	*175	3.5	*15	–	–	0.07	MIL
	2N601	PH	pnp,AJ,ge	16	750	100	10.0	*30	500	*175	3.5	*15	–	–	*0.07	
	2N2280	PH	pnp,SAT,si	*16	150	140	1.3	10	50	–	0.003	10	–	–	–	Chopper
	2N2281	PH	pnp,SAT,si	*16	150	140	1.3	10	50	–	0.003		10	–	–	2N2280
LL 27	2N428	GI	pnp,AJ,ge	17	150	100	2	*30	–	–	2	14	0.43	0.3	0.22	SY, RA, IND, US, PH, TS, TI, KF, GE
	2N636	GE	npn,AJ,ge	17	150	85	2.5	*20	300	–	5.	–	–	–	–	TI
	2N522	IND	pnp,AJ,ge	18	150	85	2.5	15	200	120	1	14	–	–	–	US,KF
	2N522A	IND	pnp,AJ,ge	18	150	85	2.5	*25	200	200	1	14	0.2	0.5	–	US,KF,TI
	2N582	RCA	pnp,AJ,ge	18	120	85	–	25	100	60	5	–	0.15	0.17	0.2	TS,GI,IND,SY,KF
	2N584	RCA	pnp,AJ,ge	18	120	85	–	25	100	60	2	12	0.15	0.17	0.2	US
	2N1308	TI	npn,AJ,ge	18	150	85	2.5	*25	300	200	5	15	–	–	–	TO-5,SY,GE,AMP
	2N1309	TI	pnp,AJ,ge	18	150	85	2.5	*30	300	210	3	11	–	–	–	TO-5, KF, GI, AMP
	2N2165	SPR	pnp,SP,si	*18	150	–	1.3	*30	–	2.5–4.5	0.02	*10	–	–	–	
	2N2166	SPR	pnp,SP,si	*18	150	–	1.3	*15	–	2.5–4.5	0.02	*10	–	–	–	
LL 28	2N2377	SPR	pnp,SP,si	18	150	140	1.3	*25	50	20	.002	–	–	–	–	TO-18
	2N317	GI	pnp,AJ,ge	20	100	85	2	*30	500	–	1	14	0.3	0.4	0.18	US, IND, KF
	2N317A	GI	pnp,AJ,ge	20	150	100	2	*30	500	180	1	14	0.3	0.4	0.18	IND, US, KF, PH
	2N337	TI	npn,GD,si	20	125	150	.001	*45	20	19	1	–	0.05	0.02	1.5	TR, RA, GE, AMP
	2N417	IND	pnp,AJ,ge	20	200	85	3	*30	200	140	2	12	–	–	–	KF, US, TI
	2N496	PH	pnp,SAT,si	20	150	140	1.3	*10	50	*25	.001	*6	–	–	.06	MIL
	2N661	RA	pnp,FA,ge	20	150	85	–	9	1a	–	2.5	12	–	–	0.25	KF, TI
	2N746	RA	npn,MS,si	20	150	175	0.75	45	50	45	10	3	–	–	–	Submin
	2N1008	BE	pnp,AJ,ge	20	400	85	6.6	20	300	100	10	–	–	–	0.25	
	2N1008A	BE	pnp,AJ,ge	20	400	85	6.6	40	300	100	10	–	–	–	0.25	

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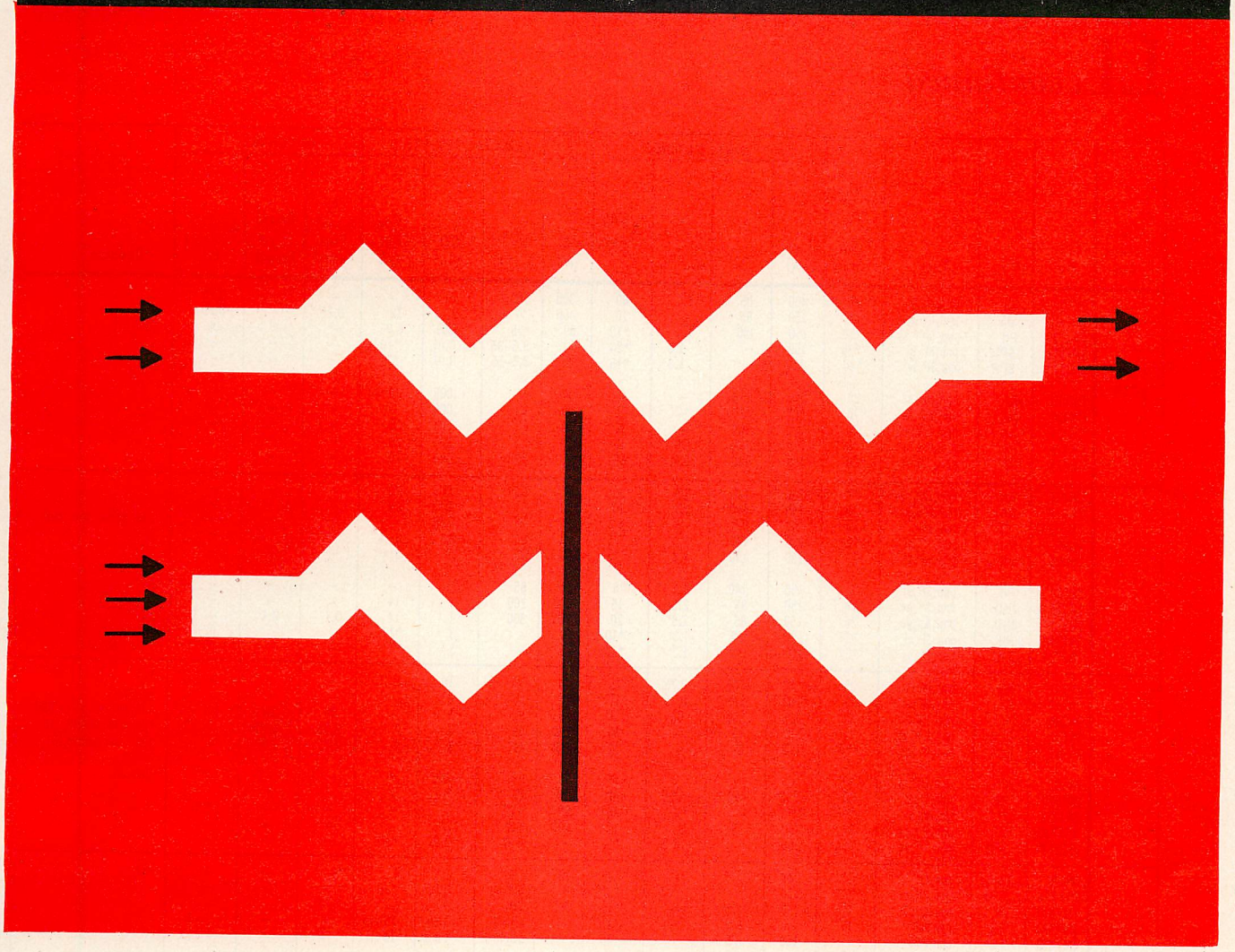

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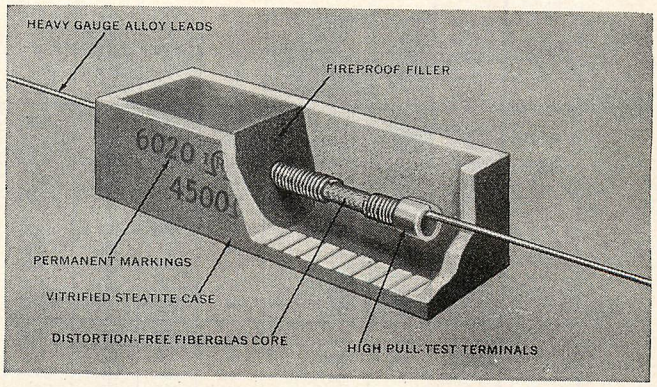


IRC

ON READER-SERVICE CARD CIRCLE 466

LL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/^oC	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	C_{oe} *C_{ob} (pf)	SWITCHING t_r (μsec) *t_{on} (nsec)	t_s (μsec) *t_{off} (nsec)	$V_{ce(sat)}$ (v)	Remarks
	2N1008B	BE	pnp,AJ,ge	20	400	85	6.6	60	300	100	10	–	–	–	0.25	
	2N1017	US	pnp,FA,ge	20	150	85	–	10	400	--	2	12	0.25	–	0.25	KF
	2N1119	PH	pnp,SAT,si	*20	150	140	1.3	*10	50	*25	.001	6.0	–	–	.06	SPR-MIL
	2N2162	SPR	pnp,SP,si	*20	150	–	1.3	*30	–	3.5–35	0.01	*10	–	–	–	
	2N2163	SPR	pnp,SP,si	*20	150	–	1.3	*15	–	3.5–35	0.01	*10	–	–	–	
LL 29																
	CK419	RA	npn,FA,si	20	385	160	–	40	50	15	.005	35	–	–	–	
	CK420	RA	npn,FA,si	20	385	160	–	35	50	30	.005	–	–	–	–	
	CK421	RA	npn,FA,si	20	385	160	–	30	50	60	.005	20	–	–	–	
	CK474	RA	npn,DB,si	20	250	180	1.9	40	50	15	.005	20	–	–	–	
	CK475	RA	npn,DB,si	20	250	180	1.9	35	50	30	.005	20	–	–	–	
	CK476	RA	npn,DB,si	20	250	180	1.9	30	50	60	.005	20	–	–	–	
	CK477	RA	npn,DB,si	20	250	180	1.9	30	50	65	.005	20	–	–	–	
	TMT1543	TR	npn,MS	20	30	150	–	6	–	15	0.01		–	–	–	Low noise, low level unit
	2N861	PH	pnp,SP,si	22	150	140	1.3	*25	50	65	0.1	5	–	–	–	SPR
	2N863	PH	pnp,SP,si	22	150	140	1.3	*15	50	65	.1	5	–	–	–	SPR
LL 30																
	2N864	PH	pnp,SP,si	22	150	140	1.3	*6	50	65	.1	–	–	–	–	SPR
	2N523	IND	pnp,AJ,ge	24	150	85	2.5	15	200	200	1	14	–	–	–	US, KF
	2N523A	IND	pnp,AJ,ge	24	150	85	2.5	20	200	300	1	14	0.1	0.4	–	US, KF
	2N2280	PH	pnp,SP,si	*24	150	140	1.3	*10	50	–	3	*7	–	–	.05	Chopper
	2N2281	PH	pnp,SP,si	*24	150	140	1.3	*10	50	–	3	*7	–	–	.05	Pair 2N2280
	2N747	RA	npn,MS,si	25	150	175	0.75	25	50	30	10	6	–	–	–	
	2N748	RA	npn,MS,si	25	150	175	0.75	30	50	10	6	–	–	–	–	Submin
	2N338	TI	npn,GD,si	30	125	150	.001	*45	20	39	1	–	.06	.02	1.5	TR, RA, NA, GE, AMP
	2N643	RCA	pnp,DR,ge	30*	120	71	–	30	100	45	3	2	0.03	0.006	–	*gain-bandwidth, GI
	2N645	RCA	pnp,Dr,ge	**30	120	85	–	30	100	45	3	2	0.01	0.002	–	*gain bandwidth, GI
LL 31																
	2N907	RA	npn,DB,si	30	–	–	–	45	25	35	.002	20	–	–	–	Submin
	2N1060	WE	npn,D,ge	30	250	150	2.0	40	50	20	0.1	5	–	–	–	
	2N1276	TI	npn,MS,si	**30	150	–	–	40	25	9-22	–	–	–	–	*200	
	KGS1004	KF	pnp,AJ,ge	32	200	85	3	10	400	120	12	–	–	–	–	
	2N2167	SPR	pnp,SP,se	*36	150	–	1.3	*12	–	4–9	0.02	*10	–	–	–	
	2N842	TR	npn,GJ,si	44	300	175	–	*45	25	20	0.1	6	–	–	–	NA
	2N2164	SPR	pnp,SP,si	*44	150	–	1.3	*12	–	6.0-40	0.02	*10	–	–	–	
	TMT842	TR	npn,DJ,si	44	150	175	–	*45	25	20	.1	6	–	–	–	
	TMT840	TR	npn,MS	45	150	175	–	*45	–	40-90	1 max	15 max	–	–	2 max	
	TMT839	TR	npn,MS	45	150	175	–	*45	–	20-45	1 max	15 max	–	–	2 max	
LL 32																
	2N908	RA	npn,DB,si	45	–	–	–	45	25	75	.002	20	–	–	–	Submin
	2N337A	GE	npn,GD,si	**50	500	175	3.33	*45	20	*55	0.001	*2	.06	.09	–	
	2N644	RCA	pnp,DR,ge	*50	120	71	–	30	100	45	3	–	0.015	0.004	–	*gain bandwidth, GI
	2N2349	GE	npn,GD,si	**50	150	200	–	*40	25	*250	1.0	*4	–	–	1.5	
	2N2677	GE	npn,GD,si	**50	250	–	1.66	*45	25	120	.1	*3	.06	.09	0.8	
	ST3030	TR	npn,DJ,si	50	100	150	0.8	15	–	–	50	4	.04	.07	40	
	TMT1131	TR	pnp,MS	50	150	200	–	*50	–	*15-45	1 max	45max	–	–	1.5 max	
	TNT842	TR	npn,MESA,si	*50	100	175	0.66	45	50	*20	0.1	*6	0.04	0.01	0.05	
	TNT843	TR	npn,MESA,si	*50	100	175	0.66	45	50	*45	0.1	*6	0.04	0.01	0.05	
	2N865	PH	pnp,SP,si	52	150	140	1.3	*10	50	150	.1	5	–	–	–	SPR
LL 33																
	2N1254	HU	pnp,MS,si	55	250	160	1.8	30	–	25	0.2	8	–	.015	.015	TO-5 package
	2N1256	HU	pnp,MS,si	55	250	160	1.8	40	–	25	0.2	8	–	–	–	TO-5 package
	2N1258	HU	pnp,MS,si	55	250	160	1.8	30	–	25	0.2	8	–	–	–	TO-5 package
	2N1427	PH	pnp,MA,ge	60	25	85	–	*6	50	120	.5	*3.5	–	–	.1	
	2N1779	SY	npn,AJ,ge	60	100	100	1.3	25	100	25	10	10	–	–	–	
	2N2244	NA	npn,si	60	500	200	2.85	200	100	40-120	0.01	8	–	–	–	
	2N2245	NA	npn,si	60	500	200	2.85	20	100	80-250	0.01	8	–	–	–	
	2N2246	NA	npn,si	60	500	200	2.85	20	100	150-450	0.01	8	–	–	–	
	2N2247	NA	npn,si	60	500	200	2.85	45	100	40-120	0.01	8	–	–	–	
	2N2248	NA	npn,si	60	500	200	2.85	45	100	80-250	0.01	8	–	–	–	
LL 34																
	2N2249	NA	npn,si	60	500	200	2.85	45	100	150-450	0.01	8	–	–	–	
	2N2250	NA	npn,si	60	500	200	2.85	20	100	40-120	0.01	8	–	–	–	4db NF
	2N2251	NA	npn,si	60	500	200	2.85	20	100	80-250	0.01	8	–	–	–	4db NF
	2N2252	NA	npn,si	60	500	200	2.85	20	100	150-450	0.01	8	–	–	–	4db NF
	2N2253	NA	npn,si	60	500	200	2.85	45	100	40-120	0.01	8	–	–	–	4db NF
	2N2254	NA	npn,si	60	500	200	2.85	45	100	80-250	0.01	8	–	–	–	4db NF
	2N2255	NA	npn,si	60	500	200	2.85	45	100	150-450	0.01	8	–	–	–	4db NF
	2N2693	TI	npn,PE,si	*60	600	175	4.0	30	30	*60	.001	*3.4	0.7	0.6	0.1	For 100 ua Switching
	2N2694	TI	npn,PE,si	*60	600	175	4.0	20	30	*30	.001	*3.4	0.7	1.0	0.1	For 100 ua Switching
	TMT1132	TR	pnp,MS	60	150	200	–	*50	–	*30-90	1 max	45 max	–	–	1.5 max	
LL 35																
	2N843	TR	npn,DJ,si	64	300	175	–	*45	25	40	.1	6	–	–	–	
	TMT843	TR	npn,DJ,si	64	150	175	–	*45	25	40	.1	6	–	–	–	
	TMT841	TR	npn,MS	65	150	175	–	*45	–	80-330	1 max	15max	–	–	2 max	
	2N560	WE	npn,DD,si	70	500	150	4.0	60	100	20	0.1	8	0.06	0.05	.5	US, NA
	2N645	RCA	pnp,DR,ge	70	120	85	–	30	100	45	3	2	0.01	0.002	–	Gain band width, GI

HITACHI TRANSISTORS

SPECIFY "MESA" TYPE TRANSISTORS FOR HIGH FREQUENCY USE

2SA233, 2SA234, 2SA235

Hitachi PNP germanium diffused "Mesa" type transistors provide outstanding high frequency characteristics compared with conventional alloy junction or drift transistors.

Exclusive "Mesa" type transistors are indispensable for FM receivers used in tuner circuits and intermediate frequency amplifiers and also in TV receivers in intermediate frequency amplifiers. They can be used effectively in short-wave converters, medium wave converters and all high frequency applications.

For superior performance, specify Hitachi "Mesa" type transistors . . . another engineering achievement from one of the world leaders in electronics.

Maximum Ratings (Ta=25°C)

Items	Symbol	Unit	2SA233	2SA234	2SA235
Collector Voltage	V_{CBO}	V	−20	−20	−20
Emitter Voltage	V_{EBO}	V	− 0.5	− 0.5	− 0.5
Collector Current	I_C	mA	−10	−10	−10
Emitter Current	I_E	mA	10	10	10
Junction Temperature	T_j	°C	85	85	85
Collector Dissipation	P_C	mW	80	80	80
Ambient Temperature	T_A	°C	60	60	60

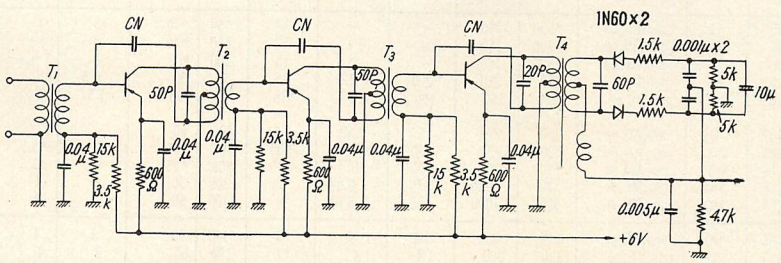
Characteristics (Ta=25°C)

Items	Symbol	Conditions for measurement	Unit	2SA233	2SA234	2SA235
Max. Collector Cut-off-Current	I_{CBO}	$V_C=-20V$ $I_E=0$	μA	−30	−30	−30
Max. Emitter Cut-off-Current	I_{EBO}	$V_E=-0.5V$ $I_C=0$	μA	−50	−50	−50
Current Amplification Factor	h_{fe}	$V_C=-6V$ $I_E=1mA$		50	60	80
Alpha Cut-off Frequency	$f\alpha_b$	$V_C=-6V$ $I_E=1mA$	Mc	90	110	125

Typical Operation (Ta=25°C)

Items	Conditions for Measurement	Unit	2SA233	2SA234	2SA235
Power Gain at FM Radio Frequency	$V_C=-6V$ $I_E=1mA$ $f_S=100Mc/s$ $R_g=75\Omega$ $R_L=2k\Omega$	db	—	—	12
Mixer Gain at FM Radio Frequency	$V_C=-6V$ $I_E=1mA$ $f_S=100Mc/s$ $f_{osc}=110.7Mc$ $R_g=3k\Omega$ $R_L=15k\Omega$	db	—	—	13

10.7 Mc Intermediate Frequency Amplifier Circuit



LL *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} *f_T **f_{ab} (mc)	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	C_{oe} *C_{ob} (pf)	SWITCHING t_r (μsec) *t_{on} (nsec)	t_s (μsec) *t_{off} (nsec)	$V_{ce(sat)}$ (v)	Remarks
LL 36	2N1411	PH	pnp,MA,ge	*70	50	100	0.67	15	50	100	1.0	3.0	75	–	0.08	
	2N2180	PH	pnp,MA,ge	*70	50	100	0.67	15	50	100	1.0	3.0	75	–	0.08	
	2N1255	HU	pnp,MS,si	75	250	160	1.8	15	–	30	0.2	8	–	–	–	TO-5 Package
	OC46	AMP	pnp,PADT,ge	73	83	75	–	*20	125	80	3	–	–	–	–	
	2N1257	HU	pnp,MS,si	75	250	160	1.8	30	–	40	0.2	8	–	–	–	TO-5 Package
	OC139	AMP	npn,PADT,ge	73.5	100	75	–	*20	250	45	0.8	–	–	–	–	
	OC140	AMP	npn,PADT,ge	74.5	100	75	–	*20	250	75	0.8	–	–	–	–	
	2N1259	HU	pnp,MS,si	75	250	160	1.8	50	–	50	0.2	8	–	–	%	TO-5 Package
	OC47	AMP	pnp,PADT,ge	75.5	83	75	–	*20	125	<200	<3	–	–	–	–	
	2N706	FA	npn,DP,si	*80	1w	175	6.7	20	–	45	0.005	5	0.02	–	–	IND, TI, RCA, PH, CL, MO
LL 37	TMT696	TR	npn,MS	80	150	200	–	*60	–	*20-60	1max	35max	–	–	1.5max	
	2N702	TI	npn,DJ,si	100	150	175	.002	20	50	15-45	.5	–	–	–	.6	FA, NA, GI
	2N2800	MO	pnp, PE,si	*100	800	200	4.57	*50	–	*30/90	0.01	*25	25	100	0.4	
	2N2801	MO	pnp, PE,si	*100	800	200	4.57	*50	–	*75/225	0.1	*25	25	100	0.4	
	TMT697	TR	npn,MS	100	150	200	–	60	–	*40-120	1max	35max	–	–	1.5max	
	2N1507	RA	npn,DD,si	120	1w	175	13.2	60	500	200	.003	20	80	600	.07	TI
	2N2188	TI	pnp,AD,ge	**125	125	–	–	40	30	90	3	–	–	–	–	
	2N2190	TI	pnp,AD,ge	**125	125	–	–	60	30	90	3	–	–	–	–	
	2N703	TI	npn,MS,si	*150	600	–	–	25	50	*40-*120	–	–	–	–	0.5	
	2N1139	TR	npn,GR,si	150	500	175	–	15	25	20	.25	8	12	10	0.7	
LL 38	2N2189	TI	pnp,AD,ge	**150	125	–	–	40	30	135	3	–	–	–	–	
	2N2191	TI	pnp,AD,ge	**150	125	–	–	60	30	135	3	–	–	–	–	
	2N2330	MO	npn,DDP,si	150	800	175	5.33	*30	–	50	0.1	7	–	–	–	
	2N2331	MO	npn,DDP,si	150	500	175	3.33	*30	–	50	0.1	7	–	–	–	
	2N501	PH	pnp,MD,ge	175	60	100	0.8	*15	50	–	1.0	1.75	0.013	0.007	0.08	SPR, GI
	2N501A	PH	pnp,MD,ge	175	175	60	0.8	*15	50	–	1.0	1.1	0.013	0.007	1.0	SPR, GI
	2N768	PH	pnp,MD,ge	*175	35	100	0.46	12	100	40	1	1.6	–	–	0.09	
	2N2411	TI	pnp,PE,si	200	1000	200	5.71	20	100	*20-60	.001	*4	.008	.050	0.1	
	2N2086	PH	npn,MS,si	*225	600	175	4.0	*120	500	*70	2.0	*7.4	0.06	0.085	0.43	
	2N2087	PH	npn,MS,si	*225	600	175	4.0	*120	500	*65	2.0	*7.4	0.055	0.065	0.39	
LL 39	2N2400	PH	pnp,MD,ge	225*	150	100	2.0	*12	100	*60	3	*2.2	–	0.1	0.13	
	2N1495	PH	pnp,MD,ge	*240	250	100	3.3	*40	500	*60	7	*4.0	0.03	–	0.18	
	2N1495	PH	pnp,MD,ge	*240	250	100	3.3	40	500	60	4	4.0	30	–	0.18	MO
	2N1496	PH	pnp,MD,ge	*240	500	100	6.67	40	500	60	4	4.0	30	–	0.18	MO
	2N2048	PH	pnp,MD,ge	250*	150	100	2.0	*20	100	125	1.0	*1.5	0.035	–	.19	
	2N2380	PH	npn,MS,si	*270	600	175	4.0	*80	500	70	4	*7.4	0.06	0.06	0.6	
	2N2380A	PH	npn,MS,si	*270	600	175	4.0	*80	500	70	4	*7.4	0.06	0.06	0.4	
	2N2478	PH	npn,MS,si	*275	2000	175	4	*120	500	*70	2	*7.4	.055	.065	.45	
	2N559	WE	pnp,DG,ge	300	150	100	4.0	*15	50	25	3	–	0.002	0.003	.3	
	2N705	TI	pnp,AJ,ge	300	300	100	4	*15	50	6	.3	5	0.03	0.075	0.2	MO,SY,GE,RA, AMP
LL 40	2N708	PH	npn,PL,si	*300	1200	200	2.1	*40	–	*120	.025	*6	–	.025	.4	
	2N710	TI	pnp,MS,ge	300	100	300	4	*15	50	6	.3	5	.06	.075	80	SY,MO,RCA,GE,RA, AMP
	2N711	TI	pnp,MS,ge	300	300	100	–	*12	50	6	0.3	5	.07	0.1	90	MO,SY,RCA,GE,RA,AMP
	2N711A	TI	pnp,MS,ge	*300	150	–	–	7	100	*25-*150	1.5	*6	–	–	0.5	MO
	2N711B	TI	pnp,MS,ge	*300	150	–	–	7	100	*30-*150	1.5	*6	–	–	0.45	MO
	2N784A	PH	npn,PL,si	*300	1000	175	6.85	*40	200	*150	.025	*3.5	–	.015	.19	
	2N960	TI	pnp,EM,ge	*300	150	–	–	15	150	*20	3	*4	–	–	0.5	
	2N961	TI	pnp,EM,ge	*300	150	–	–	12	150	*20	3	*4	–	–	0.5	
	2N962	TI	pnp,EM,ge	*300	150	–	–	12	150	*20	3	*4	–	–	0.5	
	2N964	TI	pnp,EM,ge	*300	150	–	–	15	150	*40	3	*4	–	–	0.5	
LL 41	2N965	TI	pnp,EM,ge	*300	150	–	–	12	150	*40	3	4	–	–	0.5	
	2N966	TI	pnp,EM,ge	*300	150	–	–	12	150	*40	3	*4	–	–	0.5	
	2N985	TI	pnp,EM,ge	*300	150	–	–	15	200	*60	3	*6	–	–	0.6	
	2N1992	WE	npn,D,si	300	350	200	2.0	15	50	30	0.5	5	–	20ns	0.25	
	2N2401	PH	pnp,MD,ge	*300	150	100	2.0	*15	100	*90	1.5	*2.2	–	0.09	0.12	
	2N2717	AMP	pnp,AD,ge	300	275	75	0.50	*-15	300	50	–	–	.020	.040	–	
	2N2381	MO	pnp, EM,ge	*300	750	100	10	*30	500	*25	1	*3.5	8	20	0.25	
	2N2382	MO	pnp, EM,ge	*300	750	100	10	*45	500	*25	1	*3.5	8	20	0.25	
	2N2256	MO	npn,ME,si	320	1000	175	6.67	*7	100	30	3	4	3	4	–	
	2N2257	MO	npn,ME,si	320	1000	175	6.67	*7	100	50	3	4	3	4	–	
LL 42	2N2258	MO	pnp,ME,ge	320	300	100	4	*7	100	30	3	4	4	3	–	Epitaxial
	2N2259	MO	pnp,ME,ge	320	300	100	4	*7	100	50	3	4	4	3	–	Epitaxial
	2N2402	PH	pnp,MD,ge	*325	150	100	2.0	*18	100	170	1.5	*2.2	–	0.075	0.11	
	2N707A	MO	npn,DM,si	350	1w	175	6.7	*70	–	30	.01	4	–	–	–	Epitaxial, GI
	2N537	WE	pnp,D,ge	400	250	100	3.3	*30	100	9	0.1	–	–	–	–	
	2N706A	MO	npn,DM,si	400	1w	175	6.7	*25	–	4	.005	4.5	.018	.016	–	MO,SY,TI,NA,HU,GI,TI,PH,CL,DP
	2N706B	MO	npn,DM,si	400	1w	175	6.7	*25	–	4	.005	4.5	.018	.016	–	MO,SY,PSI,TI,HU,NA,GI,CL,DP
	2N828	MO	pnp,DM,si	400	500	175	4	*15	200	4	.4	3.5	–	–	–	Epitaxial, SY, RA
	2N828A	MO	pnp, DJEM,ge	*400	300	100	4	*15	200	*40	3	*2.2	–	30	0.11	
	2N829	MO	pnp, DJEM,ge	*400	300	100	4	*15	200	*80	3	*2.2	–	30	0.11	

LL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/°C	V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	C_{oe} *C_{ob} (pf)	SWITCHING t_r (μsec) *t_{on} (nsec)	t_s (μsec) *t_{off} (nsec)	$V_{ce(sat)}$ (v)	Remarks
LL 43	2N1195	WE	pnp,D,ge	400	300	100	4.0	*30	50	25	5	2.5	–	–	–	
	2N1204	PH	pnp,MD,ge	*400	200	100	2.67	*20	500	30	4	*5.0	0.015	–	03	
	2N1204A	PH	pnp,MD,ge	*400	200	100	2.67	*20	50 0	45	4	*5.0	0.015	–	0.3	
	2N1494A	PH	pnp,MD,ge	*400	400	100	5.3	*20	500	*45	4	*5.0	0.015	–	0.3	
	2N2096	SPR	pnp,ED,ge	*400	750	100	–	25	500	*40	12	*20	35	70	0.6	
	2N2097	SPR	pnp,ED,ge	*400	750	100	–	40	500	*50	12	*20	20	50	0.5	
	2N2099	SPR	pnp,ED,ge	*400	750	100	–	25	500	*40	12	*20	35	70	0.6	
	2N2100	SPR	pnp,ED,ge	*400	750	100	–	40	500	*50	12	*20	20	50	0.5	
	2N2537	MO	npn, PE,si	*400	800	200	4.57	*60	–	*50/150	0.25	*8	*40	*40	0.25	
	2N2538	MO	npn, PE,si	*400	800	200	4.57	*60	–	*100/300	0.25	*8	*40	*40	0.45	
LL 44	2N2539	MO	npn, PE,si	*400	500	200	2.86	*60	–	*50/150	0.25	*8	*40	*40	0.45	
	2N2540	MO	npn, PE,si	*400	500	200	2.86	*60	–	*100/300	025	*8	*40	*40	0.45	
	NS345	NA	npn,DM,si	400	500	175	2.8	30		80-200		5	–	–	–	
	2N744	TI	npn,PE,si	450	1000	175	6.67	12	200	*40-120	.002	*3.5	.003	.009	0.2	
	2N779A	PH	pnp,MD,ge	450	60	100	.8	*15	50	–	1	1.9	–	–	–	SPR
	2N779B	PH	pnp,MD,ge	*450	150	100	2.0	15	100	125	0.5	1.4	13	–	0.09	
	2N835	MO	npn,DDM,si	450	300	175	2	*25	200	40	0.5	–	–	–	0.3	Epitaxial
	2N846A	PH	pnp,MD,ge	450	60	100	.8	*15	50	–	1	1.9	–	–	–	SPR
	2N834	MO	npn,DM,si	500	1w	175	6.7	*40	200	5	.01	2.8	.015	.016	–	SY,PH,CL,DP, GI
	2N2501	MO	pnp, PE,si	*500	360	200	2.06	*40	–	*50/150	–	*4	–	–	0.2	
LL 45	2N2651	PH	npn,PL,si	*600	1200	200	2.1	*40	500	*50	.012	*2.85	–	.007	.2	
	2N1094	WE	pnp,D,ge	600	150	100	2.0	30	40	25	5.0	2.5	–	–	–	
	2N559	WE	pnp,DG,ge	750	150	100	0.5	15	50	25	5	–	0.002	0.003	–	US, MIL only
	2N2710	PH	npn,PL,si	*650	1200	200	2.1	*40	500	*65	.012	*2.85	–	.015	.2	
	2N1385	TI	pnp,MS,ge	750	750	100	8	25	100	30	5	1.3	.001	.002	4	TO-5, non saturated
	2N768	PH	pnp,MD,ge	*900	35	100	0.46	*12	100	*40	1	*1.6	–	–	0.09	
	2N769	PH	pnp,MD,ge	900	35	100	0.46	*12	100	55	0.3	1.5	–	–	0.13	SPR
	2N918	FA	npn,DP,si	*900	300	200	1.71	15	–	*50	0.0003	*1.0	–	–	0.3	MO
	2N976	PH	pnp,MD,ge	*900	100	100	1.33	*15	100	*80	3	*1.5	0.007	–	0.12	
	2N797	TI	npn,MS,ge	*1000	150	–	–	7	150	*40	1.0	*4	–	–	0.44	
LL 46	2N2205	RCA	–	1000	–	–	25	200	*20	–	–	–	–	0.025	–	TO-18
	2N2206	RCA	–	1000	–	–	25	–	*40	–	–	–	0.035	–	–	
	2N167A	GE	npn,AJ,ge	–	65	85	–	30	75	30	0.6	–	–	–	–	
	2N240	PH	pnp,SBT,ge	–	25	85	0.82	*6	15	30	0.5	*4	–	–	–	SPR-MIL
	2N269	RCA	pnp,AJ,ge	–	120	85	–	*25	100	*50	5	–	–	–	0.15	
	2N335B	GE	npn,GJ,si	–	500	175	–	60	25	52	1	–	–	–	–	
	2N336A	GE	npn,GJ,si	–	500	175	–	45	25	75	1	11	–	–	–	
	2N377A	SY	npn,AJ,ge	–	150	100	2	*40	200	20-60	40		Tr+td=2.5usGC (max)			GI, TI
	2N388A	SY	npn,AJ,ge	–	150	100	2	25	200	60-180	40	–	Tr+td=usGC (max)			GI
	2N398	RCA	pnp,AJ,ge	–	50	55	–	*105	100	60	6	–	–	–	0.3	GI, KF, MO, TI
LL 47	2N399A	GE	pnp,AJ,ge	–	150	100	–	15	200	70	2	–	–	–	–	
	2N438A	SY	npn,AJ,ge	–	150	85	2.5	*25	200	15(min)	10	–	0.7	–	–	GI, TI
	2N439A	SY	npn,AJ,ge	–	150	85	2.5	*25	200	30(min)	10	–	0.5	–	–	GI, TI
	2N440A	SY	npn,AJ,ge	–	200	85	3.3	*25	200	40	10	–	0.3	–	–	GI, TI
	2N496	PH	pnp,SB,si	–	150	140	1.3	10	50	5.0	1	6	–	–	0.08	
	2N556	SY	npn,AJ,ge	–	100	85	1.66	20	200	–	25	–	3.5	2	0.5	tz=3.5 ns max
	2N557	SY	npn,AJ,ge	–	100	85	1.66	20	200	–	25	–	6.5	2.5	0.5	
	2N558	SY	npn,AJ,ge	–	100	85	1.66	15	200	–	15	–	3.5	2	0.75	
	2N586	RCA	pnp,AJ,ge	–	250	85	–	45	250	55	8	–	–	–	0.25	
	2N587	SY	npn,AJ,ge	–	150	85	2.5	*40	200	20	10	30	–	–	–	TI
LL 48	2N597	PH	pnp,AJ,ge	–	250	100	3.3	45	400	–	5	15	–	–	0.085	
	2N634A	GE	npn,AJ,ge	–	150	85	–	20	300	55	6	–	–	–	–	TI
	2N635A	GE	npn,AJ,ge	–	150	–	85	20	300	100	6	–	–	–	–	TI
	2N636A	GE	npn,AJ,ge	–	150	85	–	15	300	190	6	–	–	–	–	
	2N705A	RA	pnp,EM,ge	–	–	100	–	15	100	*40	3.0	8.0	–	50	0.20	
	2N706	FA	npn,PL,si	–	1200	175	6.7	*25	50	20	–	*5	.02	–	0.6	GI,TR,SY,NA,IND,TI,RCA,CL,PH
	2N707	FA	npn,DP,si	–	1w	175	6.7	28	–	12	.005	5	.02	–	–	(Epitaxial, MO), GI, CL
	2N708	SY	npn,DP,si	–	360	200	2.0	*40	–	15	0.025	6	–	25	0.40	Epitaxial, CL
	2N709	AI	npn,P,si		– 0.3w	–	–	*15	–	*75	.001	*3.0	–	–	–	
	2N710A	RA	pnp,EM,ge	–	150	100	–	15	50	*34	3.0	8.0	–	50	0.50	–
LL 49	2N711A	RA	pnp,EM,ge	–	–	100	–	15	100	*25-*150	1.5	6.0	–	120	0.55	
	2N725	SY	pnp,DM,ge	–	150	100	2	15	50	20	3	–	0.1	–	–	GE
	2N781	RA	pnp,EM,ge	–	–	100	–	15	200	*25	3.0	–	–	20	0.16	
	2N782	RA	pnp,EM,ge	–	–	100	–	12	200	*20	30	–	–	35	0.20	
	2N784A	SY	npn,DP,si	–	360	200	2.0	40	200	25	0.025	3.5	20	15	0.19	Epitaxial
	2N794	RCA	pnp,DM,ge	–	150	85	2.5	13	100	50	1	8	–	–	–	
	2N795	RCA	pnp,DM,ge	–	150	85	2.5	13	100	50	1	8	–	–	–	
	2N835	CL	npn,DP,si	–	1.2w	175	6.7	25	200	20	0.5	4	0.02	0.035	–	
	2N849/ TI431	TI	npn,EP,si	–	1000	–	–	15	30	*20-*60	–	–	–	–	0.6	
	2N850/ TI431	TI	npn,EP,si	–	1000	–	–	15	30	*40-*120	–	–	–	–	0.6	

LL *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} *f_T **f_{ab} (mc)	MAX. RATINGS P_c (mw)	T_j (^oC)	mw/°C	*V_{CEO} *V_{CBO} (v)	I_C (ma)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (μa)	C_{oe} *C_{ob} (pf)	SWITCHING t_r (μsec) *ton (nsec)	t_s (μsec) *t_{off} (nsec)	$V_{ce(sat)}$ (v)	Remarks
LL 50	2N914	SY	npn,DP,si	–	360	200	2.0	*40	–	30	0.025	6	40	20	0.7	Epitaxial, CL
	2N917	AI	npn,P,si	–	0.3w	–	–	*30	–	*35	.0001	*1.7	–	–	–	
	2N1119	PH	pnp,SAT,si	–	150	140	1.3	10	50	5.0	.001	6.0	–	–	–	SPR
	2N1122	PH	pnp,MA,ge	–	25	85	0.63	12	50	8	5.0	6.0	–	–	0.1	SPR, GI
	2N1122A	PH	pnp,MA,ge	–	25	85	0.63	15	50	8	5.0	6.0	–	–	0.1	SPR, GI
	2N1175	GE	pnp,AJ,ge	–	200	85	–	25	200	80	6	–	–	–	–	MO, TI
	2N1175A	GE	pnp,AJ,ge	–	200	85	–	25	200	80	6	–	–	–	–	TI
	2N1213	RCA	pnp,MESA,ge	–	75	85	–	25	100	–	3	–	.015	.05	–	
	2N1214	RCA	pnp,MESA,ge	–	75	85	–	25	100	–	3	–	.015	.05	–	
	2N1215	RCA	pnp,MESA,ge	–	75	85	–	25	100	–	3	–	.015	.05	–	
LL 51	2N1216	RCA	pnp,MESA,ge	–	75	85	–	25	100	–	3	–	.015	.05	–	
	2N1217	GE	npn,AJ,ge	–	75	85	–	20	25	40	.6	–	–	–	–	
	2N1252	AI	npn,P,si	–	2w	–	–	*30	–	*35	.10	*20	–	–	–	
	2N1253	AI	npn,P,si	–	2w	–	–	*30	–	*45	.10	*20	–	–	–	
	2N1277	GE	npn,GJ,si	–	150	150	–	*30	25	20	.001	–	–	–	–	TI
	2N1278	GE	npn,GJ,si	–	150	150	–	*30	25	33	.001	–	–	–	–	TI
	2N1279	GE	npn,GJ,si	–	150	150	–	*30	25	80	.001	–	–	–	–	TI
	2N1288	GE	npn,BG,ge	–	75	85	–	10	50	50	2	–	–	–	–	
	2N1289	GE	npn,MB,ge	–	75	85	–	15	100	50	2	–	–	–	–	
	2N1299	SY	npn,AJ,ge	–	150	100	2	40	200	35-110	0.1	–	Rise + Fall time = 1.5 usGC			
LL 52	2N1300	RCA	pnp,DM,ge	–	150	85	2.5	13	100	50	1	8	–	–	–	TI
	2N1301	RCA	pnp,DM,ge	–	150	85	2.5	13	100	50	1	8	–	–	–	TI
	2N1384	RCA	pnp,DR,ge	–	240	85	4	30	500	50	4	–	–	–	–	
	2N1404	TI	pnp,AJ,ge	–	150	85	2.5	25	300	–	3	16	–	–	–	
	2N1411	PH	pnp,MA,ge	–	25	85	–	*5	50	*75	0.3	*3.0	–	–	–	MIL
	2N1413	GE	pnp,AJ,ge	–	200	85	–	25	200	36	8	–	–	–	–	TI
	2N1414	GE	pnp,AJ,ge	–	200	85	–	25	200	52	8	–	–	–	–	MO, TI
	2N1450	RCA	pnp,DR,ge	–	120	85	–	30	100	20	10	–	–	–	–	GI
	2N1473	SY	npn,AJ,ge	–	200	75	4	40	400	25-80	100	–	–	–	–	
	2N1499	PH	pnp,MD,ge	–	30	85	.75	*30	50	8.5	1	*1.3	–	–	–	MIL
LL 53	2N1614	GE	pnp,AJ,ge	–	240	85	–	40	300	32	25	–	–	–	–	
	2N1683	RCA	pnp,DM,ge	–	150	85	2.5	13	100	75	1	8	–	–	–	TI
	2N1694	GE	npn,AJ,ge	–	75	85	–	20	25	30	0.6	–	–	–	–	
	2N1708	RCA		–	1000	–	–	25	200	*20	–	–	–	0.025	–	
	2N1754	PH	pnp,MD,ge	–	50	85	.83	*13	100	–	1	1.5	–	–	–	GI, SPR
	2N1808	TI	npn,AJ,ge	–	150	85	2.5	25	300	–	5	11	–	–	–	
	2N1954	RA	pnp,AJ,ge	–	375	100	0.2	60	1a	90	10	–	–	–	–	
	2N1955	RA	pnp,AJ,ge	–	375	100	0.2	60	1a	100	10	–	–	–	–	
	2N1956	RA	pnp,AJ,ge	–	375	100	0.2	60	1a	90	–	–	–	–	–	
	2N1957	RA	pnp,AJ,ge	–	375	100	0.2	60	1a	90	10	–	–	–	–	
LL 54	2N2002	NA	pnp,AJ,si	–	250	175	1.67	30	100		.001	8	–	–	–	
	2N2003	NA	pnp,AJ,si	–	250	175	1.67	30	100	–	.001	8	–	–	–	
	2N2004	NA	pnp,AJ,si	–	250	175	1.67	50	100	–	.003	8	–	–	–	
	2N2005	NA	pnp,AJ,si	–	250	175	1.67	50	100	–	.0015	8	–	–	–	
	2N2006	NA	pnp,AJ,si	–	250	175	1.67	60	100	–	.002	8	–	–	–	
	2N2007	NA	pnp,AJ,si	–	250	175	1.67	60	100	–	.005	8	–	–	–	
	2N2175	SSD	pnp,AJ,si	–	100	175	0.7	6	50	*80	*0.2	10	–	–	–	
	2N2176	SSD	pnp,AJ,si	–	100	175	0.7	6	50	*80	*0.2	10	–	–	–	
	2N2282	BE	pnp,DAP,ge	–	5	110	67	60	3a	60	50	75pf	2.5	1.5	0.2	
	2N2283	BE	pnp,DAP,ge	–	5	110	67	100	3a	60	50	75pf	2.5	1.5	0.2	
LL 55	2N2284	BE	pnp,DAP,ge	–	5	110	67	200	3a	60	50	75pf	2.5	1.5	0.2	
	2N2368	AI	npn,P,si	–	1.2w	–	–	*40	–	*40	.01	*2.5	–	–	–	
	2N2369	AI	npn,P,si	–	1.2w	–	–	*40	–	*75	.01	*2.5	–	–	–	
	2N2378	SPR	pnp,SP,si	–	150	140	1.3	*10	50	5.0	0.001	6.0	–	–	–	TO-18
	2N2713	GE	npn,PE,si	–	200	100	2.67	*18	200	*30-90	0.5	–	85	85	0.30	
	2N2714	GE	npn,PE,si	–	200	100	2.67	*18	200	75-225	0.5	–	85	85	0.30	
	4D20	GE	npn,GD,si	–	–	150	1.5	*40	25	*15-50	1	*4	0.1	0.1	1.5	
	4D21	GE	npn,GD,si	–	–	150	1.5	*40	25	*40-135	1	4	0.1	0.1	1.5	
	4D22	GE	npn,GD,si	–	–	150	1.5	*40	25	*120-250	1	*4	0.1	0.1	1.5	
	4D24	GE	npn,GD,si	–	–	125	1.25	*40	25	*15-50	1	*4	–	–	–	
LL 56	4D25	GE	npn,GD,si	–	–	125	1.25	*40	25	*40-135	1	*4	–	–	–	
	4D26	GE	npn,GD,si	–	–	125	1.25	*40	25	*120-250	1	*4	–	–	–	
	10B551	GE	npn,PE,si	–	100	125	1.0	*40	–	*30-120	50	*6	45	25	0.25	
	10B553	GE	npn,PE,si	–	100	125	1.0	*40	–	*30-120	0.5	*6	–	60	0.4	
	10B555	GE	npn,PE,si	–	100	125	1.0	*25	–	*20	0.5	*6	–	25	0.6	
	10B556	GE	npn,PE,si	–	100	125	1.0	*25	–	*20-60	0.5	*6	–	25	0.6	
	SST610	SSE	npn	–	500	–	0.25	14v	500	10,000	–	35pf	–	–	1.5v	TO5 Package

SILICON FIELD EFFECT TRANSISTORS

2N2386

2N2794

These P-channel diffused silicon transistors embody all the desirable characteristics inherent in the field effect design – low input capacitance and high impedance. Use of an S-shaped gate configuration contributes to the exceptionally low capacitance ■ Tung-Sol's wide application experience with injection transistors and vacuum tubes – features of which are combined in the field effect transistor – is an important consideration for anyone seeking a competent source of this advanced semiconductor device ■ Write for complete technical information. Tung-Sol Electric Inc., Newark 4, N. J. TWX: 201-621-7977

TYPICAL ELECTRICAL CHARACTERISTICS (25°C)

	TEST	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
2N2386	Drain Current	I_{DSS}	$V_{DS}=-10V, V_{GS}=0$		3.0		mA
	Forward Transadmittance	Y_{FS}	$V_{DS}=-10V, V_{GS}=0$ f= 1Kc	1000		3000	μmho
2N2794	Drain Current	I_{DSS}	$V_{DS}=-10V, V_{GS}=0$	1.5		5	mA
	Forward Transadmittance	Y_{FS}	$V_{DS}=-10V, V_{GS}=0$ f= 1Kc	1000		3000	μmho

CENTER LINE QUALITY

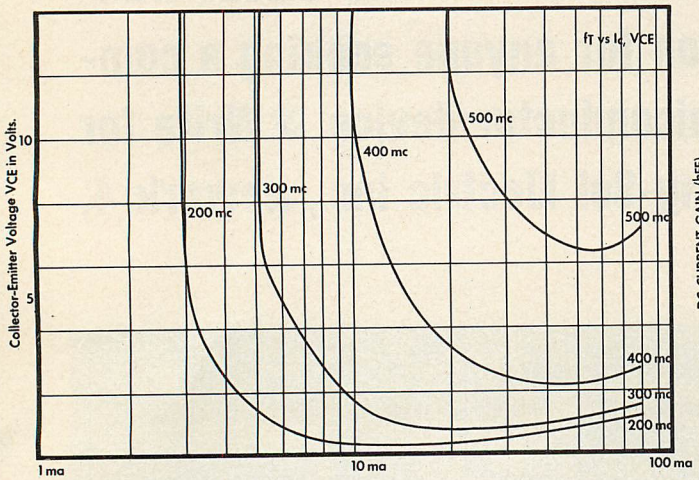
TUNG-SOL

ON READER-SERVICE CARD CIRCLE 468

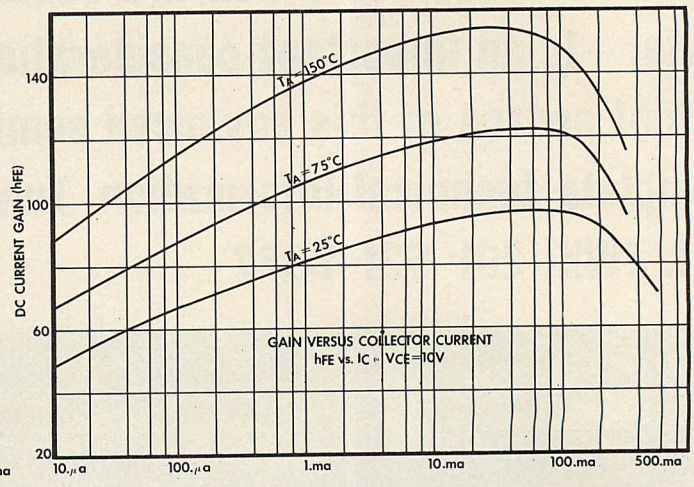
0.5 AMP INTERDIGITATED PASSIVATED SILICON PLANAR EPITAXIAL TRANSISTORS

2N2217	2N2220
2N2218	2N2221
2N2219	2N2222
(TO—5)	(TO—18)

CONTOURS OF CONSTANT BANDWIDTH PRODUCT (f_T)



PULSED DC CURRENT GAIN vs COLLECTOR CURRENT



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HIGH LEVEL SWITCHING

Generally types rated at one watt and above. In order of $f_{\alpha e}$ ($f_{\alpha b}$ or f_T where noted).

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ $*f_T$ $**f_{\alpha b}$ (kc)	MAX. RATINGS					CHARACTERISTICS				SWITCHING			Remarks
					P_c (w)	T_j (°C)	w/°C	V_{CEO} $*V_{CBO}$ (v)	I_C (a)	h_{fe} $*h_{FE}$	I_{CO} (ma) (*μa)	Powr. Gain (db)	Powr. Out (w)	t_r (μsec)	t_s (μsec)	$V_{ce(sat)}$ (μa)	
HL 1	2N1830	WH	npn,AJ,si	0.014	250	175	2.22	*50	30	*10	5	–	8	3.0	0.87		
	2N1831	WH	npn,AJ,si	0.014	250	175	2.22	*100	30	*10	5	–	8	3.0	0.87		
	2N1832	WH	npn,AJ,si	0.014	250	175	2.22	*150	30	*10	5	–	8	3.0	0.87		
	2N1833	WH	npn,AJ,si	0.014	250	175	2.22	*200	30	*10	5	–	8	3.0	0.87		
	2N2109	WH	npn,AJ,si	0.014	250	175	2.22	*50	30	*10	5	–	4	1.3	0.4	0.4	
HL 2	2N2110	WH	npn,AJ,si	0.014	250	175	2.22	*100	30	*10	5	–	4	1.3	0.4	0.4	
	2N2111	WH	npn,AJ,si	0.014	250	175	2.22	*150	30	*10	5	–	4	1.3	0.4	0.4	
	2N2112	WH	npn,AJ,si	0.014	250	175	2.22	*200	30	*10	5	–	4	1.3	0.4	0.4	
	2N2113	WH	npn,AJ,si	0.014	250	175	2.22	*250	30	*10	5	–	4	1.3	0.4	0.4	
	2N2114	WH	npn,AJ,si	0.014	250	175	2.22	*300	30	*10	5	–	4	1.3	0.4	0.4	
	2N2130	WH	npn,AJ,si	0.014	250	175	2.22	*50	30	*10	5	–	8	3.0	0.87		
	2N2131	WH	npn,AJ,si	0.014	250	175	2.22	*100	30	*10	5	–	8	3.0	0.87		
	2N2132	WH	npn,AJ,si	0.014	250	175	2.22	*150	30	*10	5	–	8	3.0	0.87		
	2N2133	WH	npn,AJ,si	0.014	250	175	2.22	*200	30	*10	5	–	8	3.0	087		
	2N2116	WH	npn,AJ,si	0.0145	250	175	2.22	*50	30	*10	5	–	5.6	1.4	0.63	1.4	
HL 3	2N2117	WH	npn,AJ,si	0.0145	250	175	2.22	*100	30	*10	5	–	5.6	1.4	0.63	0.63	
	2N2118	WH	npn,AJ,si	0.0145	250	175	2.22	*150	30	*10	5	–	5.6	1.4	0.63	0.63	
	2N2119	WH	npn,AJ,si	0.0145	250	175	2.22	*200	30	*10	5	–	5.6	1.4	0.63	0.63	
	2N2123	WH	npn,AJ,si	0.016	250	175	2.22	*50	30	*10	5	–	6.4	1.5	0.74	0.74	
	2N2124	WH	npn,AJ,si	0.016	250	175	2.22	*100	30	*10	5	–	6.4	1.5	0.74	0.74	
	2N2125	WH	npn,AJ,si	0.016	250	175	2.22	*150	30	*10	5	–	6.4	1.5	0.74	0.74	
	2N2126	WH	npn,AJ,si	0.016	250	175	2.22	*200	30	*10	5	–	6.4	1.5	0.74	0.74	
	2N1238	HU	pnp,FJ,si	0.8	1.0	200	–	15	0.5	14	0.1	–	–	–	–	–	
	2N1239	HU	pnp,FJ,si	0.8	1.0	200	–	15	0.5	32	0.1	–	–	–	–	–	
	2N1240	HU	pnp,FJ,si	1.0	1.0	200	–	35	0.5	14	0.1	–	–	–	–	–	
HL 4	2N1241	HU	pnp,FJ,si	1.0	1.0	200	–	35	0.5	24	0.1	–	–	–	–	–	
	2N1242	HU	pnp,FJ,si	1.0	1.0	200	–	65	0.5	14	0.1	–	–	–	–	–	
	2N1243	HU	pnp,FJ,si	1.0	1.0	200	–	65	0.5	24	0.1	–	–	–	–	–	
	2N1244	HU	pnp,FJ,si	1.2	1.0	200	–	110	0.5	14	0.1	–	–	–	–	–	
	2N1073	BE	pnp,DJ,ge	1.5	35	100	1.5	*40	10	*20-6	2.0	–	–	–	–	1.0	DE
	2N1073A	BE	pnp,DJ,ge	1.5	35	100	1.5	*80	10	*20-6	2.0	–	–	–	–	1.0	DE
	2N1073B	BE	pnp,DJ,ge	1.5	35	100	1.5	*120	10	*20-6	2.0	–	–	–	–	1.0	DE
	B-1085	BE	pnp,DJ,ge	1.5	60	100	1.0	120	10	5a	2.0	–	–	–	–	0.75	
	OC22	AMP	pnp,PADT,ge	2.5	10	75	–	*32	1	150	30	–	–	–	–	–	
	OC23	AMP	pnp,PADT,ge	2.5	10	75	–	*40	1	150	30	–	–	–	–	–	
HL 5	OC24	AMP	pnp,PADT,ge	2.5	10	75	–	*32	1	150	30	–	–	–	–	–	
	2N1518	DE	pnp,AJ,ge	4	70	100	1.2	*50	25	15-60	100	–	40	20	7	0.3	SO
	2N1519	DE	pnp,AJ,ge	4	70	100	1.2	*80	25	15-60	100	–	40	20	7	0.3	SO
	2N1520	DE	pnp,AJ,ge	4	70	100	1.2	*50	35	17-18	100	–	40	20	7	0.3	
	2N1521	DE	pnp,AJ,ge	4	70	100	1.2	*80	35	25-100	100	–	40	20	7	0.3	SO
	2N1522	DE	pnp,AJ,ge	4	70	100	1.2	*50	50	25-100	100	–	40	20	7	0.3	SO
	2N1523	DE	pnp,AJ,ge	4	70	100	1.2	*80	50	25-100	100	–	40	20	7	0.3	SO
	2N297	BE	pnp,AJ,ge	5	35	90	1.5	50	5	–	3	–	–	–	–	1.02	
	2N297A	CL	pnp,AJ,ge	5	12	95	2.0	*60	5	–	3	–	–	–	–	1.0	BE, DE, MO, SO
	2N618	CL	pnp,AJ,ge	5	14	90	1.5	*80	3	–	3	–	–	–	–	0.8	MO, BE
HL 6	2N375	CL	pnp,AJ,ge	7	–	95	–	*80	3	–	3	–	–	–	–	1.0	MO,BE
	2N378	TS	pnp,AJ,ge	7	50	100	1.2	20	5	30	0.5	–	–	–	–	–	BE
	2N379	CL	pnp,AJ,ge	7	5	85	0.3	80	3	–	5	–	–	–	–	1	TS, BE
	2N380	TS	pnp,AJ,ge	7	50	100	0.8	30	5	–	0.5	–	–	–	–	–	BE, CL
	2N458	TI	pnp,AJ,ge	7	50	95	0.72	80	5	–	1	–	–	12	12.5	0.24	CL, BE
	2N459	TS	pnp,AJ,ge	7	50	100	0.8	60	5	–	0.5	–	–	–	–	–	BE, CL
	2N1011	DE	pnp,AJ,ge	7	70	100	0.1	*80	5	–	100	–	–	5	2	0.3	2N1011 Sig. C., MO, BE, CL
	2N2230	WH	npn,AJ,si	7	150	2.0	*50	10	*400	10	–	–	12	3.5	2.2		
	2N2231	WH	npn,AJ,si	7	150	150	2.0	*100	10	*400	10	–	–	12	3.5	2.2	
	2N2232	WH	npn,AJ,si	7	150	150	2.0	*150	10	*400	10	–	–	12	3.5	2.2	
HL 7	2N2233	WH	npn,AJ,si	7	150	150	2.0	*200	10	*400	10	–	–	12	3.5	2.2	
	2N456A	DE	pnp,AJ,ge	10	94	100	1.2	*40	7	–	0.065	–	–	10	5	–	TI, BE, CL
	2N457A	DE	pnp,AJ,ge	10	94	100	1.2	*60	0.065	–	0.065	–	–	10	5	–	TI, BE, CL
	2N458A	DE	pnp,AJ,ge	10	94	100	1.2	*80	7	–	0.065	–	–	10	5	–	TI, BE, CL
	2N1038	TI	pnp,AJ,ge	10	20	100	0.27	40	3	33	50	–	–	–	–	–	BE, KF
	2N1039	TI	pnp,AJ,ge	10	20	100	0.27	60	3	33	50	–	–	–	–	–	BE, KF
	2N1040	TI	pnp,AJ,ge	10	20	100	0.27	80	3	33	50	–	–	–	–	–	BE, KF
	2N1358	DE	pnp,AJ,ge	10	150	100	2	*80	15	–	0.1	–	40	15	5	0.3	TS, TI, RCA, MO, SO, BE
	2N1412	DE	pnp,AJ,ge	10	150	100	2	*100	15	–	100	–	40	15	5	0.3	TS, RCA, MO, SO, BE
	2N1970	DE	pnp,AJ,ge	10	150	100	2	*100	15	–	0.1	–	–	10	5	–	SO, MO

HL *continued*

Cross Index Key	Type No.	Mfr.	Type	f_{ae} *f_T **f_{ab} (kc)	MAX. RATINGS P_c (w)	T_j (°C)	w/°C	V_{CEO} †V_{CBO} (v)	I_C (a)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	Powr. Gain (db)	Powr. Out (w)	SWITCHING t_r (μsec)	t_s (μsec)	$V_{ce(sat)}$ (μa)	Remarks
HL 8	2N2226	WH	npn,AJ,si	10	150	150	2.0	*50	10	*100	10	–	–	8	3	2.2	
	2N2227	WH	npn,AJ,si	10	150	150	2.0	*100	10	*100	10	–	–	8	3	2.2	
	2N2228	WH	npn,AJ,si	10	150	150	2.0	*150	10	*100	10	–	–	8	3	2.2	
	2N2564	KF	pnp,AJ,ge	10	20	100	.27	*40	3	*25	*40	–	–	–	–	.5	
	2N2565	KF	pnp,AJ,ge	10	20	100	.27	*60	3	*25	*40	–	–	–	–	.5	
	2N2566	KF	pnp,AJ,ge	10	20	100	.27	*80	3	*25	*40	–	–	–	–	.5	
	2N2567	KF	pnp,AJ,ge	10	20	100	.27	*100	3	*25	*40	–	–	–	–	.5	
	2N1809	WH	npn,AJ,si	14	250	175	2.22	*50	30	*10	5	–	–	4	1.3	0.4	
	2N1810	WH	npn,AJ,si	14	250	175	2.22	*100	30	*10	5	–	–	4	1.3	0.4	
	2N1811	WH	npn,AJ,si	14	250	175	2.22	*150	30	*10	5	–	–	4	1.3	0.4	
HL 9	2N1812	WH	npn,AJ,si	14	250	175	2.22	*200	30	*10	5	–	–	4	1.3	0.4	
	2N1813	WH	npn,AJ,si	14	250	175	2.22	*250	30	*10	5	–	–	4	1.3	0.4	
	2N1814	WH	npn,AJ,si	14	250	175	2.22	*300	30	*10	5	–	–	4	1.3	0.4	
	2N2739	WH	npn,AJ,si	14	200	175	2.0	*50	20	*10	15	–	–	9	2	0.4	
	2N2740	WH	npn,AJ,si	14	200	175	2.0	*100	20	*10	15	–	–	9	2	0.4	
	2N2741	WH	npn,AJ,si	14	200	175	2.0	*150	20	*10	15	–	–	9	2	0.4	
	2N2742	WH	npn,AJ,si	14	200	175	2.0	*200	20	*10	15	–	–	9	2	0.4	
	2N2757	WH	npn,AJ,si	14	200	175	2.0	*50	30	*10	15	–	–	9	2	0.4	
	2N2758	WH	npn,AJ,si	14	200	175	210	*100	30	*10	15	–	–	9	2	0.4	
	2N2759	WH	npn,AJ,si	14	200	175	2.0	*150	30	*10	15	–	–	9	2	0.4	
HL 10	2N2760	WH	npn,AJ,si	14	200	175	2.0	*200	30	*10	15	–	–	9	2	0.4	
	2N2761	WH	npn,AJ,si	14	200	175	2.0	*250	30	*10	15	–	–	9	2	0.4	
	2N1816	WH	npn,AJ,si	14.5	250	175	2.22	*50	30	*10	5	–	–	5.6	1.4	0.63	
	2N1817	WH	npn,AJ,si	14.5	250	175	2.22	*100	30	*10	5	–	–	5.6	1.4	0.63	
	2N1818	WH	npn,AJ,si	14.5	250	175	2.22	*150	30	*10	5	–	–	5.6	1.4	0.63	
	2N1819	WH	npn,AJ,si	14.5	250	175	2.22	*200	30	*10	5	–	–	5.6	1.4	0.63	
	2N2745	WH	npn,AJ,si	14.5	200	175	20	*50	20	*10	15	–	–	12	1.3	0.63	
	2N2746	WH	npn,AJ,si	14.5	200	175	2.0	*100	20	*10	15	–	–	12	1.3	0.63	
	2N2747	WH	npn,AJ,si	14.5	200	175	2.0	*150	20	*10	15	–	–	12	1.3	0.63	
	2N2748	WH	npn,AJ,si	14.5	200	175	2.0	*200	20	*10	15	–	–	12	1.3	0.63	
HL 11	2N2763	WH	npn,AJ,si	14.5	200	175	2.0	*50	30	*10	15	–	–	12	1.3	0.63	
	2N2764	WH	npn,AJ,si	14.5	200	175	2.0	*100	30	*10	15	–	–	12	1.3	0.63	
	2N2765	WH	npn,AJ,si	14.5	200	175	2.0	*150	30	*10	15	–	–	12	1.3	0.63	
	2N2766	WH	npn,AJ,si	14.5	200	175	2.0	*200	30	*10	15	–	–	12	1.3	0.63	
	2N1046	TI	pnp,AD,ge	15	150	100	2	100	10	40	10	–	–	–	–	1.0	
	2N1046A	TI	pnp,AD,ge	15	150	100	2	130	10	20	10	–	–	–	–	–	
	2N1046B	TI	pnp,AD,ge	15	150	100	2	130	10	10	10	–	–	–	–	–	
	2N1823	WH	npn,AJ,si	16	250	175	2.22	*50	30	*10	5	–	–	6.4	1.5	0.74	
	2N1824	WH	npn,AJ,si	16	250	175	2.22	*100	30	*10	5	–	–	6.4	1.5	0.74	
	2N1825	WH	npn,AJ,si	16	250	175	2.22	*150	30	*10	5	–	–	6.4	1.5	0.74	
HL 12	2N1826	WH	npn,AJ,si	16	250	175	2.22	*200	30	*10	5	–	–	6.4	1.5	0.74	
	2N2751	WH	npn,AJ,si	16	200	175	2.0	*50	20	*10	15	–	–	16	1.5	0.74	
	2N2752	WH	npn,AJ,si	16	200	175	2.0	*100	20	*10	15	–	–	16	1.5	0.74	
	2N2753	WH	npn,AJ,si	16	200	175	2.0	*150	20	*10	15	–	–	16	1.5	0.74	
	2N2754	WH	npn,AJ,si	16	200	175	2.0	*200	20	*10	15	–	–	16	1.5	0.74	
	2N2769	WH	npn,AJ,si	16	200	175	2.0	*50	30	*10	15	–	–	–	–	–	
	2N2770	WH	npn,AJ,si	16	200	175	2.0	*100	30	*10	15	–	–	16	1.5	0.74	
	2N2771	WH	npn,AJ,si	16	200	175	2.0	*150	30	*10	15	–	–	16	1.5	0.74	
	2N2772	WH	npn,AJ,si	16	200	175	2.0	*200	30	*10	15	–	–	16	1.5	0.74	
	2N1611	DE	pnp,AJ,ge	17	7.5	100	0.1	*60	1.5	–	10	–	0.4w	3	1	0.3	
HL 13	2N1612	DE	pnp,AJ,ge	17	7.5	100	0.1	*60	1.5	–	10	–	0.4w	3	1	0.3	
	2N1015	WH	npn,FJ,si	25	150	150	1.4	*30	7.5	8	10	–	–	5	1	1.5	
	2N1015A	WH	npn,FJ,si	25	150	150	1.4	*60	7.5	8	10	–	–	5	1	1.5	
	2N1015B	WH	npn,FJ,si	25	150	150	1.4	*100	7.5	8	10	–	–	5	1	1.5	
	2N1015C	WH	npn,FJ,si	25	150	150	1.4	150	7.5	8	10	–	–	5	1	1.5	AMF
	2N1015D	WH	npn,FJ,si	25	150	150	1.4	*200	7.5	8	10	–	–	5	1	1.5	
	2N1015E	WH	npn,FJ,si	25	150	150	1.4	*250	7.5	8	10	–	–	–	–	–	
	2N1016	WH	npn,FJ,si	25	150	150	1.4	30	7.5	8	10	–	–	5	1	2.5	STC, AMF
	2N1016A	WH	npn,FJ,si	25	150	150	1.4	60	7.5	8	10	–	–	5	1	25	STC, AMF
	2N1016B	WH	npn,FJ,si	25	150	150	1.4	100	7.5	8	10	–	–	5	1	2.5	STC, AMF
HL 14	2N1016C	WH	npn,FJ,si	25	150	150	1.4	150	7.5	8	10	–	–	5	1	2.5	AMF
	2N1016D	WH	npn,FJ,si	25	150	150	1.4	*200	7.5	8	10	–	–	5	1	2.5	
	2N1016E	WH	npn,FJ,si	25	150	150	1.4	*250	7.5	8	10	–	–	–	–	–	
	2N1971	DE	pnp,AJ,ge	25	50	100	0.7	*80	4	–	0.02	–	–	5	2	–	
	151-04	WH	npn,AJ,si	25	100	150	1.4	*80	6.0	*11	10	–	–	8	2	0.6	
	151-05	WH	npn,AJ,si	25	100	150	1.4	*100	6.0	*11	10	–	–	8	2	0.6	
	151-06	WH	npn,AJ,si	25	100	150	1.4	*120	6.0	*11	10	–	–	8	2	0.6	
	151-07	WH	npn,AJ,si	25	100	150	1.4	*140	6.0	*11	10	–	–	8	2	0.6	
	151-08	WH	npn,AJ,si	25	100	150	1.4	*160	6.0	*11	10	–	–	8	2	0.6	
	151-09	WH	npn,AJ,si	25	100	150	1.4	*180	6.0	*11	10	–	–	8	2	0.6	

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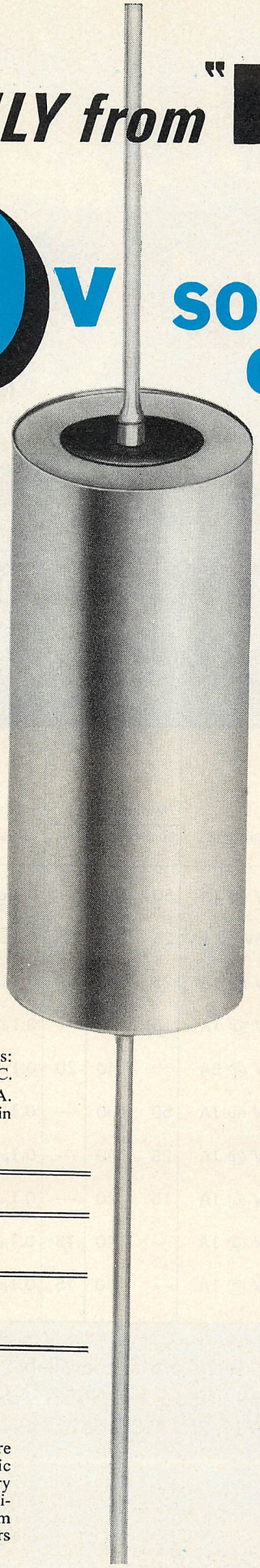
100v

J-SERIES
(POLAR TYPE)
SOLID TANTALUM CAPACITORS

75
60
50
35
20
15
10
6

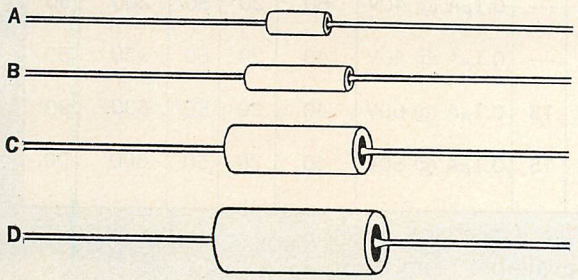


J-Series • Actual Size

Microfarads: .0047 to 330

Temperatures: −80 to +125°C.

4 cases conform to MIL-C-26655A. 100v units presently available only in military cases A and B.



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0.1 to 2.7 Microfarads

Temperature Range:
100v at 85°C. • 67v at 125°C.

KEMET was first to bring you high-voltage solid tantalums—50, 60, and 75 volts—three big contributions in 2½ years!

Now KEMET pioneers with true *quantity* production of 100-volt units—in hermetically sealed A and B case sizes conforming to Style CS12 and Style CS13 in MIL-C-26655A.

These new 100-volt capacitors show the same resistance to shock and vibration, the same stability of electrical parameters with temperature change, and the same low levels of leakage current as the lower-voltage J-Series units. Also, the maximum dissipation factor has been reduced to 3%—the lowest ever—or one-half the usual J-Series m.d.f.

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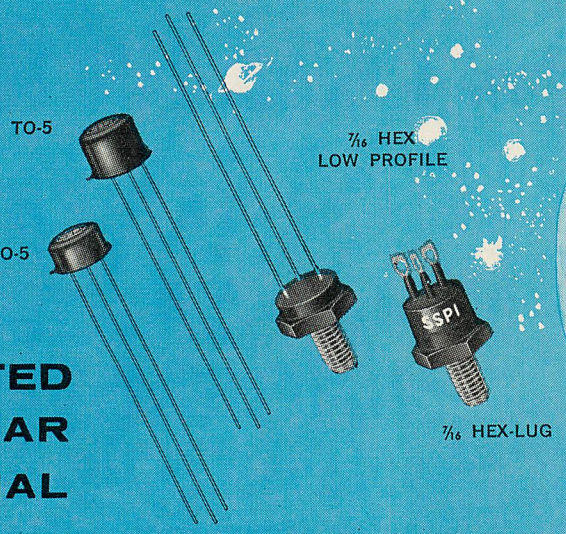
ON READER-SERVICE CARD CIRCLE 470

SSPI — TN SERIES



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WIDE RANGE PERFORMANCE

CIRCUIT MINIATURIZATION

PASSIVATED PLANAR EPITAXIAL

SILICON NPN POWER TRANSISTORS

A NEW GENERATION OF MINIATURE SILICON POWER TRANSISTORS FROM SSPI OFFERING SIGNIFICANTLY IMPROVED PERFORMANCE, "DESIGNED IN" RELIABILITY, AND REDUCED SIZE . . . AT COMPETITIVE PRICES.

Type	Package	Power Dissipation (Case Temp.)	Voltage Ratings V_{CBO}	Voltage Ratings V_{CEO} (Sus)	Operating Current Range	V_{CE}(sat)@I_C	Minimum h_{FE} 50mA	Minimum h_{FE} 1A	Minimum h_{FE} 5A	Maximum I_{CBO}@V_{CB}	Typical f_t Mc	Typical Saturated Switching Times nanoseconds I_C=1A I_{B1}=I_{B2}=100mA Delay	Rise	Storage	Fall
2N2849	PANCAKE TO-5	5W @ 125°C	100	80	Up to 5A	0.4V @ 1A	50	100	—	0.1μA @ 80V	80	20	40	350	50
2N2850		5W @ 125°C	100	80	"	0.25V @ 1A	25	40	—	0.1μA @ 80V	60	20	50	200	50
2N2851		5W @ 125°C	100	80	"	0.4V @ 1A	25	40	—	0.1μA @ 80V	60	20	50	200	50
2N2852		5W @ 125°C	100	80	"	0.4V @ 1A	15	20	—	0.1μA @ 80V	40	20	60	150	50
2N2853		5W @ 125°C	60	40	"	1.5V @ 5A	—	40	20	0.1μA @ 40V	60	20	50	250	50
2N2854		5W @ 125°C	60	40	"	0.4V @ 1A	50	100	—	0.1μA @ 40V	80	20	40	350	50
2N2855		5W @ 125°C	60	40	"	0.4V @ 1A	25	40	—	0.1μA @ 40V	60	20	50	200	50
2N2856		5W @ 125°C	60	40	"	0.4V @ 1A	15	20	—	0.1μA @ 40V	40	20	60	150	50
2N2657	TO-5	4W @ 100°C	80	50	"	0.5V @ 1A	—	40	15	0.1μA @ 60V	40	20	50	600	90
2N2658	TO-5	4W @ 100°C	100	70	"	0.5V @ 1A	—	40	15	0.1μA @ 60V	40	20	50	600	90

All of the above types optionally available in any of the 4 packages shown.

In addition to the above Preferred Types, the following Types are also available from SSPI:

2N497, 2N498 • 2N545, 2N546, 2N547, 2N548, 2N549, 2N551 • 2N656, 2N657 • 2N1052, 2N1054, 2N1055 2N1116, 2N1117 • 2N1714, 2N1715, 2N1716, 2N1717, 2N1718 2N1719, 2N1720, 2N1721

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ELECTRONIC INDUSTRIES ASSOCIATION EIA MEMBER

HL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ $*f_T$ $**f_{\alpha b}$ (kc)	MAX. RATINGS P_c (w)	T_j (°C)	w/°C	V_{CEO} $*V_{CBO}$ (v)	I_C (a)	CHARACTERISTICS h_{fe} $*h_{FE}$	I_{CO} (ma) (*μa)	Powr. Gain (db)	Powr. Out (w)	SWITCHING t_r (μsec)	t_s (μsec)	$V_{ce(sat)}$ (μa)	Remarks
HL 15	151-10	WH	npn,AJ,si	25	100	150	1.4	*200	6.0	*11	10	–	–	8	2	0.6	
	152-04	WH	npn,AJ,si	25	100	150	1.4	*80	6.0	*18	10	–	–	8	2	0.9	
	152-05	WH	npn,AJ,si	25	100	150	1.4	*100	6.0	*18	10	–	–	8	2	0.9	
	152-06	WH	npn,AJ,si	25	100	150	1.4	*120	6.0	*18	10	–	–	8	2	0.9	
	152-07	WH	npn,AJ,si	25	100	150	1.4	*140	6.0	*18	10	–	–	8	2	0.9	
	152-08	WH	npn,AJ,si	25	100	150	1.4	*160	60	*18	10	–	–	8	2	0.9	
	152-09	WH	npn,AJ,si	25	100	150	1.4	*180	6.0	*18	10	–	–	8	2	0.9	
	152-10	WH	npn,AJ,si	25	100	150	1.4	*200	6.0	*18	10	–	–	8	2	0.9	
	2N2310	RA	npn,DD,si	50	3	175	0.02	60	0.5	20	–	–	–	–	–	–	Microbloc TO-46
	2N2311	RA	npn,DD,si	50	3	175	0.02	100	0.5	20	–	–	–	–	–	–	Microbloc
HL 16	2N2312	RA	npn,DD,si	60	3	175	0.02	60	0.5	60	–	–	–	–	–	–	Microbloc
	2N2313	RA	npn,DD,si	60	3	175	0.02	100	0.5	60	–	–	–	–	–	–	Microbloc
	2N2314	RA	npn,DD,si	80	3	175	0.02	60	0.5	40	0.003	–	–	–	–	–	Microbloc
	2N2243	TI	npn,PE,si	100	2800	200	16.0	80	1	*40-120	.001	–	–	.040	.100	0.2	
	2N2243A	TI	npn,PE,si	100	2800	200	16.0	80	1	*40-120	.001	–	–	.040	.100	0.2	
	RT697M	RA	npn,DD,si	100	3	175	0.02	60	0.5	70	0.003	–	–	–	–	–	Microbloc
	RT699M	RA	npn,DD,si	100	3	175	0.02	120	0.5	65	0.01	–	–	–	–	–	Microbloc
	RT1613M	RA	npn,DD,si	100	3	175	0.02	75	0.5	45	0.001	–	–	–	–	–	Microbloc
	RT1420M	RA	npn,DD,si	130	3	175	0.02	60	0.5	175	0.003	–	–	–	–	–	Microbloc
	2N1015D	WH	npn,AJ,si	150	1.43	150	*200	7.5	*10	10ma	25	–					Microbloc
HL 17	2N1016A	WH	npn,AJ,si	150	1.43	150	*60	7.5	*10	10ma	30	–					
	2N1016B	WH	npn,AJ,si	150	1.43	150	*100	7.5	*10	10ma	30	–					
	2N1016C	WH	npn,AJ,si	150	1.43	150	*150	7.5	*10	10ma	30	–					
	2N1667	AMP	pnp,PADT,ge	200	30	90	–	–	6	90	0.1	–	–	–	–	–	AMP
	2N1668	AMP	pnp,PADT,ge	200	30	90	–	–	6	50	0.1	–	–	–	–	–	AMP
	2N1669	AMP	pnp,PADT,ge	200	30	90	–	–	–	70	0.1	–	–	–	–	–	AMP
	OC28	AMP	pnp,PADT,ge	200	13	90	–	*80	6	32	<100	–	–	–	–	–	
	OC29	AMP	pnp,PADT,ge	200	13	90	–	*60	6	90	<100	–	–	–	–	–	
	OC35	AMP	pnp,PADT,ge	200	13	90	–	*60	6	50	<100	–	–	–	–	–	
	OC36	AMP	pnp,PADT,ge	200	13	90	–	*80	6	70	<100	–	–	–	–	–	
HL 18	2N418	BE	pnp,AJ,ge	400	60	100	1.2	100	4	60	1.0	–	–	–	–	0.5	CL
	2N420	BE	pnp,AJ,ge	400	60	100	1.2	65	4	60	1.0	–	–	15	–	1.7	CL
	2N420A	BE	pnp,AJ,ge	400	60	100	1.2	90	15	60	1.0	–	–	–	–	0.5	CL
	2N637	BE	pnp,AJ,ge	400	60	100	1.2	60	6	45	1.0	–	–	–	–	0.7	CL
	2N637A	BE	pnp,AJ,ge	400	60	100	1.2	90	6	45	1.0	–	–	–	–	0.7	CL
	2N637B	BE	pnp,AJ,ge	400	60	100	1.2	100	6	45	1.0	–	–	–	–	0.7	CL
	2N638	BE	pnp,AJ,ge	400	60	100	1.2	60	6	30	1.0	–	–	–	–	0.7	CL
	2N638A	BE	pnp,AJ,ge	400	60	100	1.2	90	6	30	1.0	–	–	–	–	0.7	CL
	2N638B	BE	pnp,AJ,ge	400	60	100	1.2	100	6	30	1.0	–	–	–	–	0.7	CL
	2N456	TI	pnp,AJ,ge	430	50	100	0.67	40	5	30-90	0.2	–	–	12	12.5	0.24	RCA, BE, CL
HL 19	2N457	TI	pnp,AJ,ge	430	50	100	0.67	60	5	30-90	0.6	–	–	12	12.5	0.24	RCA, BE, CL
	2N671	PH	pnp,AJ,ge	700	1	85	0.017	40	2	100	20	–	–	–	–	–	Infinite heat sink
	2N2350	GE	npn,PE,si	–	5	200	28.5	*60	1.0	2.5	10mμa	–	–	–	–	0.35	
	2N2350A	GE	npn,PE,si	–	5	200	28.5	*60	1.0	2.5	10mμa	–	–	–	–	0.25	
	2N2467	KF	pnp,AJ,ge	–	5	110	.07	*60	.5	*45	*40	–	–	–	–	.1	
	2N2468	KF	pnp,AJ,ge	–	5	110	.07	*100	.5	*45	*40	–	–	–	–	.1	
	2N2469	KF	pnp,AJ,ge	–	5	110	.07	*200	5	*45	*40	–	–	–	–	.1	
	2N2526	MO	pnp,AD,ge	–	85	110	1	*80	10	*20/50	3	–	–	5.5	1.2	0.5	
	2N2527	MO	pnp,AD,ge	–	85	110	1	*120	10	*20/50	3	–	–	5.5	1.2	0.5	
	2N2528	MO	pnp,AD,ge	–	85	110	1	*160	10	*20/50	3	–	–	5.5	1.2	0.5	
	2N2728	MO	pnp,AJ,ge	–	170	110	2	*15	50	–	*30	–	–	7	8	.075	

HL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (w)	T_j (°C)	w/°C	V_{CEO} *V_{CBO} (v)	I_C (a)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	Powr. Gain (db)	Powr. Out (w)	SWITCHING t_r (μsec)	t_s (μsec)	$V_{ce(sat)}$ (μq)	Remarks
HL 20	STC1103	STC	npn,DJ,si	1.0	85	200	0.425	60	6	25-75	0.025	–	–	–	–	–	
	STC1104	STC	npn,DJ,si	1.0	85	200	0.425	100	6	25-75	0.025	–	–	–	–	–	
	2N673	PH	pnp,AJ,ge	*1.1	1.0	85	–	*40	2	*100	*20	–	–	–	–	0.3	Infinite heat sink
	2N424A	STC	npn,DM,si	2	85	200	0.4	60	3	12-60	10	–	–	–	–	–	AMF
	2N1620	STC	npn,DM,si	2	85	200	0.425	100	5	15-75	1	–	–	–	–	–	AMF
	2N1701	STC	npn,DM,si	2	25	200	0.125	60	2.5	20-80	0.1	–	–	–	–	–	AMF
	2N1702	STC	npn,DM,si	2	75	200	0.375	60	5	15-60	0.2	–	–	–	–	–	
	2N1768	STC	npn,DM,si	2	40	200	0.2	80	3	35-100	.015	–	–	–	–	–	
	2N1769	STC	npn,DM,si	2	40	200	0.2	100	3	35-100	.015	–	–	–	–	–	
	2N551	TR	npn,DJ,si	3	3	200	0.5	60	–	20-80	1.2	–	–	1.2	0.3	0.9	
HL 21	2N552	TR	npn,DJ,si	3	3	200	0.5	30	–	20-80	1.2	–	–	1.2	0.3	0.9	
	2N1055	TR	npn,DJ,si	3	3	200	0.045	100	–	20-80	0.001	–	–	–	–	–	
	2N547	TR	npn,DJ,si	4	5	200	0.5	60	–	20-80	1.2	–	–	0.7	0.2	3.0	
	2N548	TR	npn,DJ,si	4	5	200	0.5	30	–	20-80	0.5	–	–	0.7	0.2	2.0	
	2N549	TR	npn,DJ,si	4	5	200	0.5	60	–	20-80	0.5	–	–	0.7	0.2	1.5	
	2N550	TR	npn,DJ,si	4	5	200	0.5	30	–	20-80	0.5	–	–	0.7	0.2	1.5	
	2N1117	TR	npn,DJ,si	4	5	200	0.5	60	–	40	0.04	–	–	0.7	0.2	1.5	
	2N1116	TR	npn,DJ,si	6	5	200	0.5	60	–	40	1.2	–	–	0.7	0.2	3.0	
	2N1173	WE	npn,AJ,ge	6	–	100	3.33	*35	0.2	80	0.004	–	–	–	–	–	
	ST402	TR	npn,DJ,si	6	50	200	0.33	*60	3	30	20	–	–	0.25	0.5	6	
HL 22	ST403	TR	npn,DJ,si	6	50	200	0.33	*45	3	30	20	–	–	0.25	0.5	5	
	2N1174	WE	pnp,AJ,ge	7	–	100	3.33	*35	0.2	85	0.005	–	–	–	–	–	
	2N545	TR	npn,DJ,si	8	5	200	0.5	60	–	15	1.2	–	–	0.3	0.15	3.0	
	2N546	TR	npn,DJ,si	8	5	200	0.5	30	–	15	0.5	–	–	0.3	0.15	2.0	
	2N1052	TR	npn,DJ,si	8	5	200	.045	*60	–	15	0.001	–	–	–	–	–	
	2N1212	TR	npn,DJ,si	10	85	200	0.27	*60	3000	12-60	1000	–	–	–	–	3.5	STC
	2N2229	WH	npn,AJ,si	*10	150	150	2.0	*200	10	*100	10	–	–	8	3	2.2	
	2N1054	TR	npn,DJ,si	12	5	200	.045	*125	–	20-80	.0004	–	–	–	–	–	
	2N1208	TR	npn,DJ,si	12	85	200	0.27	*60	5	15	1.0	–	–	0.25	–	3	STC
	2N1209	TR	npn,DJ,si	12	85	200	0.27	*45	5	20	2.0	–	–	0.25	–	3	STC
HL 23	2N1250	TR	npn,DJ,si	12	85	200	0.27	60	5	15	1.0	–	–	0.25	–	3	STC
	ST401	TR	npn,DJ,si	12	85	200	0.27	*45	5	20	2.0	–	–	0.25	–	3	
	2N1907	TI	pnp,AD,ge	*20	150	–	–	100	20	*10	0.3	–	–	–	–	1.7	
	2N1908	TI	pnp,AD,ge	*20	150	–	–	130	20	*10	0.3	–	–	–	–	1.7	
	2N1072	WE	npn,DD,si	30	12	150	65	75	1	13	0.1	–	–	0.05	0.05	–	US, MIL only
	2N1041	TI	npn,AJ,ge	33	20	100	0.27	100	3	33	50	–	–	–	–	–	BE, KF
	2N498	FA	npn,DP,si	*50	4.0	200	22.8	100	–	*27	*0.0004	–	–	–	–	–	
	2N978	FA	pnp,DD,si	*50	1.75	150	0.010	20	–	*40	*0.1	–	–	–	–	–	
	2N1893	FA	npn,DP,si	*50	3	200	17.2	–	–	–	.0003	–	–	–	–	–	GI, TI
	2N1984	FA	npn,DM,si	*50	2	150	16.0	25	–	40	1.0	–	–	–	–	–	RA
HL 24	2N1985	FA	npn,DM,si	*50	2	150	16.0	25	–	4.0	1.0	–	–	–	–	–	RA
	2N1986	FA	npn,DM,si	*50	2.0	150	16.0	25	–	100	1.0	–	–	–	–	–	RA
	2N1987	FA	npn,DD,si	*50	2.0	150	16.0	25	–	50*	1.0	–	–	–	–	–	
	2N1988	FA	npn,DM,si	*50	2	150	16.0	45	–	70	1.0	–	–	–	–	–	RA
	2N1989	FA	npn,DM,si	*50	2	150	16.0	60	–	40	1.0	–	–	–	–	–	GI, RA
	2N1991	FA	pnp,DM,si	*50	2.0	150	16.0	*30	–	40	.005*	–	–	–	–	–	TR
	2N656	FA	pnp,DP,si	*60	4.0	200	0.0228	60	–	*60	*0.004	–	–	–	–	–	Microbloc
	2N657	FA	npn,DP,si	*60	4.0	200	0.0228		100	–	*60	*0.0004	–	–	–	–	
	2N912	FA	npn,DP,si	*60	1.8	200	10.3	60	–	42	.0003μa	–	–	–	–	–	
	2N1975	FA	npn,DP,si	*60	3	200	17.2	60	–	42	.003μa	–	–	–	–	.24	
HL 25	2N1978	FA	npn,DP,si	*60	30	200	0.17	40	–	40	*0.001	–	–	–	–	–	
	2N2102	RCA	npn,PL,si	*60	5	–	–	120	10	*20	–	–	–	–	–	–	
	2N2270	RCA	npn,PL,si	*60	5	–	–	60	1.0	*35	–	–	–	–	–	–	
	RT5202	RA	npn,DD,si	60	5	175	0.033	175	0.5	50	0.001	–	–	–	–	–	
	RT5230	RA	npn,DD,si	60	2	175	0.013	30	0.5	50	–	–	–	–	–	–	
	TA6200	FA	npn,DP,si	*60	4.0	200	0.0228	–	–	*80	–	–	–	–	–	–	
	2N526	SY	pnp,AJ,ge	64	225	100	3	*45	500	10	–	–	3				GE, TS, MO, TI
	2N1925	GE	pnp,AJ,ge	64	225	85	–	40	500	4	–	–	–				MO, TI
	2N698	FA	npn,DP,si	*70	3.0	200	22.8	*60	–	40	.0003	–	–	0.08	–	–	TR, NA, GI,
	2N721	FA	pnp,DP,si	*70	1.5	175	10.0	35	–	30	*0.01	–	–	–	–	–	TI
HL 26	2N870	FA	npn,DP,si	*70	1.8	200	10.3	60	–	80	0.0003	–	–	–	–	–	TI
	2N911	FA	npn,DP,si	*70	1.8	200	10.3	60	–	*70	*0.0003	–	–	–	–	–	
	2N1131	FA	pnp,DP,si	*70	2	175	13.3	*50	–	*30	*0.01	–	–	0.08	–	–	HU, TI, TR
	2N1409	PSI	npn,MS,si	70	2.8	150	0.024	30	0.5	30	10	7	1	0.06	0.1	0.8	Power gain F=70mc RA
	2N1410	PSI	npn,MS,si	70	2.8	150	0.024	45	0.5	60	10	7	1	0.042	0.17	0.8	RA, GI
	2N1889	FA	npn,DP,si	*70	3	200	17.2	60	–	*60	*0.0003	–	–	–	–	–	TI
	2N1974	FA	npn,DP,si	*70	3	200	17.2	60	–	*70	*0.0003	–	–	–	–	–	
	2N1987	FA	npn,DM,si	*70	2	150	0.0016	40	–	50	–	–	–	–	–	–	GI, RA
	2N696	FA	npn,DP, si	*80	2	175	13.3	*60	–	*40	0.01	–	–	0.08	0.03	–	TR, SY, NA, TI, MH
	2N717	FA	npn,DP,si	*80	1.5	175	10	*60	–	*40	0.01	–	–	0.08	–	–	GI, PSI, NA, RA, MH, TI, TR

HL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **$f_{\alpha b}$ (mc)	MAX. RATINGS P_c (w)	T_j (°C)	w/°C	V_{CEO} *V_{CBO} (v)	I_C (a)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	Powr Gain (db)	Powr. Out (w)	SWITCHING t_r (μsec)	t_s (μsec)	$V_{ce(sat)}$ (μa)	Remarks
	2N719	FA	npn,DP,si	*80	1.5	175	10	*60	–	*40	0.01	–	–	0.08	–	–	PSI, RA, GI, MH, TI, TR
	2N719A	FA	npn,DP,si	*80	1.8	200	10.3	60	–	*40	*0.0003	–	–	–	–	–	GI, TI
	2N722	FA	pnp,DP,si	*80	1.5	175	10	35	–	*60	*0.01	–	–	–	–	–	TI
	2N1132	FA	pnp,DP,si	*80	2	175	13.3	*50	–	*60	0.01	–	–	–	–	–	HU, TI, TR
	2N1252	FA	npn,DP,si	*80	2	175	13.3	–	–	*35	*0.1	–	–	0.08	0.05	–	TR, IND, PSI, TI, RA
HL 27																	
	2N1613	FA	npn,DP,si	*80	3	200	17.2	50	–	80	0.0004	17	–	0.08	–	–	RA, GI, TI, PSI
	RT482	RA	npn,DD,si	80	2	175	0.0134	20	0.5	50	0.02	–	–	–	–	–	
	RT483	RA	npn,DD,si	80	2	175	0.0134	40	0.5	40	0.02	–	–	–	–	–	
	RT484	RA	npn,DD,si	80	2	175	0.0134	40	0.5	70	0.02	–	–	–	–	–	
	RT698M	RA	npn,DD,si	80	3	175	0.02	120	0.5	40	0.01	–	–	–	–	–	Microbloc
	RT5151	RA	npn,DD,si	80	2	175	0.013	45	0.5	60	–	–	–	–	–	–	
	RT5152	RA	npn,DD,si	80	2	175	0.013	45	0.5	60	–	–	–	–	–	–	
	RT5203	RA	npn,DD,si	80	2	175	0.013	40	0.5	–	–	–	–	–	–	–	
	RT5204	RA	npn,DD,si	80	2	175	0.013	30	0.5	70	–	–	–	–	–	–	
	RT5212	RA	npn,DD,si	80	2	175	0.013	60	0.5	70	–	–	–	–	–	–	
HL 28																	
	2N699	FA	npn,DP,si	*100	2	175	13.3	80	–	65	0.01	–	–	0.08	–	–	NA, TR, PSI, RA, US
	2N718	FA	npn,DP,si	*100	1.5	175	10	40	–	75	0.01	–	–	0.08	–	–	NA, GI, PSI, RA, TI, TR
	2N718A	FA	npn,DP,si	*100	1.8	200	0.01	50	–	80	*0.0004	–	–	–	–	–	TI, RA
	2N720	FA	npn,DP,si	*100	1.5	175	10	80	–	65	0.01	–	–	0.08	–	–	PSI, RA, NA, GI, TI, TR
	2N720A	FA	npn,DP,si	*100	1.8	200	0.01	100	–	80	*0.0004	–	–	–	–	–	GI, RA
	2N730	TI	npn,MS,si	100	1.5	175	0.01	60	–	30	0.01	–	–	0.11	0.14	0.9	FA
	2N731	TI	npn,MS,si	100	1.5	175	0.01	60	–	60	0.01	–	–	0.11	0.14	0.9	FA
	2N871	FA	npn,DP,si	*100	1.8	200	0.01	80	–	130	0.0004	–	–	–	–	–	TI
	2N909	FA	npn,DM,si	*100	1.5	175	0.01	30	–	150	*0.01	–	–	–	–	–	TR
	2N910	FA	npn,DP,si	*100	1.8	200	0.01	80	–	100	0.005	–	–	–	–	–	RA
HL 29																	
	2N1060	WE	npn,MS,si	100	–	150	2	40	0.05	40	*0.001	–	–	–	–	–	
	2N1253	FA	npn,DP,si	*100	2	175	13.3	20	–	45	0.01	–	–	0.08	0.05	–	TR, IND, PSi,
	2N1420	FA	npn,DP,si	100	2w	175	13.3	30	–	130	0.1	–	20				RA, NA, GI, TI
	2N1444	WE	npn,DM,si	100	–	150	4	60	0.25	25	*0.002	–	–	–	–	–	
	2N1711	FA	npn,DP,si	*100	3	200	0.017	50	–	130	*0.0004	–	–	–	–	–	GI, TI, RA
	2N1890	FA	npn,DP,si	*100	3	200	0.017	80	–	130	*0.0004	–	–	–	–	–	TI, RA
	2N1972	FA	npn,DM,si	*100	2	175	0.013	30	–	150	*0.01	–	–	–	–	–	
	2N1973	FA	npn,DP,si	*100	3	200	0.017	80	–	100	*0.005	–	–	–	–	–	
	2N1983	FA	npn,DM,si	*100	2	150	0.0016	35	–	140	–	–	–	–	–	–	RA
	2N2315	RA	npn,DD,si	100	3	175	0.02	60	0.5	70	0.003	–	–	–	–	–	Microbloc, RA
HL 30																	
	2N2316	RA	npn,DD,si	100	3	175	0.02	120	0.5	65	0.01	–	–	–	–	–	Microbloc, RA
	2N2317	RA	npn,DD,si	100	3	175	0.02	75	0.5	45	0.001	–	–	–	–	–	Microbloc, RA
	2N869	FA	pnp,DP,si	*150	1.2	200	0.007	25	–	45	*0.0008	–	–	–	–	–	
	2N915	FA	npn,DP,si	*400	1.2	200	0.007	60	–	70	0.0003	–	–	–	–	–	
	2N916	FA	npn,DP,si	*400	1.2	200	6.9	25	–	80*	0.002*	–	–	–	–	–	CL, Epitaxial, RA
	2N947	FA	npn,DP,si	*400	1.2	200	0.0069	–	–	*50	*0.005	–	–	–	–	–	
	2N2217	MO	npn,DDPL,si	400	3	175	5.33	*60	–	20-60	0.01	–	–	–	–	–	Epitaxial
	2N2218	MO	npn,DDPL,si	400	3	175	5.33mw	*60	–	40-120	0.01	–	–	–	–	–	Epitaxial
	2N2219	MO	npn,DDPL,si	400	3	175	5.33mw	*60	–	100	0.01	–	–	–	–	–	Epitaxial
	2N2220	MO	npn,DDPL,si	400	1.8	175	3.33mw	*60	–	20-60	0.01	–	–	–	–	–	Epitaxial
HL 31																	
	2N2221	MO	npn,DDPL,si	400	1.8	175	3.33mw	*60	–	40-120	0.01	–	–	–	–	–	Epitaxial
	2N2222	MO	npn,DDPL,si	400	1.8	175	3.33mw	*60	–	100-300	0.01	–	–	–	–	–	Epitaxial
	2N2787	GI	npn,PE,si	*400	3	175	5.33	35	–	*20-60	2na	–	–	20ns	40ns	.2	
	2N2788	GI	npn,PE,si	*400	3	175	5.33	35	–	*40-120	2na	–	–	20ns	40ns	.2	
	2N2789	GI	npn,PE,si	*400	3	175	5.33	35	–	*100-300	2na	–	–	20ns	40ns	.2	
	2N2790	GI	npn,PE,si	*400	1.8	175	3.33	35	–	*20-60	2na	–	–	20ns	40ns	.2	
	2N2791	GI	npn,PE,si	*400	1.8	175	3.33	35	–	*40-120	2na	–	–	20ns	40ns	.2	
	2N2792	GI	npn,PE,si	*400	1.8	175	3.33	35	–	*100-300	2na	–	–	20ns	40ns	.2	
	2N708	FA	npn,DP,si	*450	1.2	200	6.9	15	–	*50	*0.004	–	–	–	–	–	GI, CL, MO
	2N914	FA	npn,DP,si	*450	1.2	200	0.007	20	–	50	0.0004	–	–	–	–	–	CL, Epitaxial, MO
HL 32																	
	2N2368	FA	npn,DP,si	*650	1.2	200	0.0069	15	–	*40	*0.1	–	–	–	–	–	
	2N2369	FA	npn,DP,si	*650	1.2	200	0.0069	15	–	*70	*0.1	–	–	–	–	–	
	2N1645	WE	pnp,D,ge	700	6.0	100	80.0	35	0.3	20	0.015	–	–	–	–	–	
	2N709	FA	npn,DP,si	*800	1.0	200	0.005	6.0	–	*55	*.005	–	–	–	–	–	
	2N917	FA	npn,DP,si	*800	0.3	200	0.00171	15	–	*50	*0.0003	–	–	–	–	–	
	2N918	FA	npn,DP,si	*900	0.3	200	0.00171	15	–	*50	*0.0003	–	–	–	–	–	MO
	2N268A	CL	pnp,AJ,ge	–	14	90	1.5	80	3	–	2	–	–	–	–	–	BE, 2N639A
	2N497A	GE	npn,MS,si	–	1	200	–	60	–	12	10	–	–	–	–	–	TI
	2N498A	GE	npn,DM,si	–	1	200	–	100	–	12	10	–	–	–	–	–	NA, TI
	2N656A	GE	npn,DM,si	–	1	200	–	60	–	30	10	–	–	–	–	–	NA, TI
HL 33																	
	2N657A	GE	npn,DM,si	–	1	200	–	100	–	30	10	–	–	–	–	–	NA, TI
	2N720A	TI	npn,PL,si	–	1.8	–	–	120	–	*40-*120	–	–	–	–	–	5.0	
	2N1751	BE	pnp,DAP,ge	–	–	110	1250	80	25	50	5	7	4	0.5	–	–	
	2N1813	WH	npn,FJ,si	–	250	175	2.22	*250	30	10	15	–	–	–	–	1.5	
	2N1814	WH	npn,FJ,si	–	250	175	2.22	*300	30	10	15	–	–	–	–	1.5	

HL *continued*

Cross Index Key	Type No.	Mfr.	Type	$f_{\alpha e}$ *f_T **f_{ab} (mc)	MAX. RATINGS P_c (w)	T_j (°C)	w/°C	V_{CEO} *V_{CBO} (v)	I_C (a)	CHARACTERISTICS h_{fe} *h_{FE}	I_{CO} (ma) (*μa)	Powr Gain (db)	Powr. Out (w)	SWITCHING t_r (μsec)	t_s (μsec)	$V_{ce(sat)}$ (μa)	Remarks
HL 34	2N1837	GE	npn,P,si	–	2	175	13.3	*80	–	*120	–	–	–	–	–	0.8	
	2N1837A	GE	npn,P,si	–	2.8	175	18.6	*80	–	*120	–	–	–	–	–	0.8	
	2N1841	WE	npn,D,si	–	100	150	100	60	2.0	25	0.0001	–	–	–	–	–	
	2N1990	FA	npn,DM,si	–	2	150	0.0016	–	–	40	–	–	–	–	–	–	GI, RA
	2N2243	GE	npn, PE,si	–	2.8	200	16.0	80	–	2.5	–	–	–	–	–	0.35	
	2N2243A	GE	npn,PE,si	–	2.8	200	16.0	80	–	2.5	–	–	–	–	–	0.16	
	2N2285	BE	pnp,DAP,ge	–	–	110	1250	60	25	50	5	7	4	0.4	–	–	
	2N2286	BE	pnp,DAP,ge	–	–	110	1250	100	25	50	5	7	4	0.4	–	–	
	2N2287	BE	pnp,DAP,ge	–	–	110	1250	120	25	50	5	7	4	0.4	–	–	
	2N2288	BE	pnp,DAP,ge	–	–	110	1250	40	10	50	5	7	4	0.5	–	–	
HL 35	2N2289	BE	pnp,DAP,ge	–	–	110	1250	80	10	50	5	7	4	0.5	–	–	
	2N2290	BE	pnp,DAP,ge	–	–	110	1250	120	10	50	5	7	4	0.5	–	–	
	2N2291	BE	pnp,DAP,ge	–	–	110	1250	40	10	75	5	7	4	0.5	–	–	
	2N2292	BE	pnp,DAP,ge	–	–	110	1250	80	10	75	5	7	4	0.5	–	–	
	2N2293	BE	pnp,DAP,ge	–	–	110	1250	120	10	75	5	7	4	0.5	–	–	
	2N2294	BE	pnp,DAP,ge	–	–	110	1250	40	10	75	5	7	4	0.5	–	–	
	2N2295	BE	pnp,DAP,ge	–	–	110	1250	80	10	75	5	7	4	0.5	–	–	
	2N2296	BE	pnp,DAP,ge	–	–	110	1250	120	10	75	5	7	4	0.5	–	–	
	2N2357	BE	pnp,DAP,ge	–	–	110	2000	170	50	50	5	7	4	0.5	–	–	
	2N2358	BE	pnp,DAP,ge	–	–	110	2000	170	50	50	5	7	4	0.5	–	–	
HL 36	2N2359	BE	pnp,DAP,ge	–	–	110	2000	170	50	50	5	7	4	0.5	–	–	
	2N2389	TI	npn,PL,si	–	2.0	–	–	35	0.6	*20-*120	–	–	–	–	–	1.5	
	2N2390	TI	npn,PL,si	–	2.0	–	–	35	0.6	*100-*300	–	–	–	–	–	1.5	
	2N2393	TI	pnp,PL,si	–	1.2	–	–	35	0.3	*20-*45	–	–	–	–	–	1.5	
	2N2394	TI	pnp,PL,si	–	2.0	–	–	35	0.3	*30-*90	–	–	–	–	–	1.5	
	2N2395	TI	npn, PL,si	–	2.0	–	–	40	0.3	*20-*60	–	–	–	–	–	1.0	
	2N2396	TI	npn,PL,si	–	2.0	–	–	40	0.3	*40-*120	–	–	–	–	–	1.0	
	2N2397	SY	npn,EP,si	–	300	200	1.7	35	200	25	0.10	2.5	25	20	0.3	–	TO-51 co-planar
	2N2410	TI	npn,PE,si	–	2.5	–	–	30	0.8	*30-*120	–	–	–	–	–	0.45	
	2N2455	SY	pnp,EP,ge	–	150	100	2.0	15	200	40	2.0	3.5	30	60	0.19	–	ft = 600 mc
HL 37	2N2456	SY	pnp,EP,ge	–	150	100	2.0	15	200	40	2.0	3.0	15	65	0.19	–	ft = 1000 mc
	PADT50	AMP	pnp,PADT,ge	–	16.5	75	–	75	0.75	–	–	–	–	–	–	–	
	RT5401	RA	npn,si	–	0.7	200	–	30	–	6.0	0.1	–	–	–	–	2.5	
	RT5402	RA	npn,si	–	0.7	200	–	30	–	6.0	0.1	–	–	–	–	2.0	
	RT5403	RA	npn,si	–	07	200	–	60	–	5.5	0.1	–	–	–	–	3.0	
	RT5404	RA	npn,si	–	0.7	200	–	60	–	5.5	0.1	–	–	–	–	2.0	
	ST8014	TR	pnp,DM,si	–	0.6	175	–	20	–	85	0.001	–	–	0.08	–	1.5	
	TN51	SSP	npn,PE,si	–	5	200	–	60	5	45	0.00002	–	–	–	0.3	0.5	7/16 Hex
	TN52	SSP	npn,PE,si	–	5	200	–	60	5	80	0.00002	–	–	–	0.3	0.5	7/16 Hex
	TN61	SSP	npn,PE,si	–	5	200	0.004	60	5	45	0.00002	–	–	–	0.3	0.5	Pancake
HL 38	TN62	SSP	npn,PE,si	–	5	200	0.004	60	5	80	0.00002	–	–	–	0.3	0.5	Pancake
	TN71	SSP	npn,PE,si	–	5	200	0.005	60	5	45	0.00002	–	–	–	0.3	0.5	TO-5
	TN72	SSP	npn,PE,si	–	5	200	0.005	60	5	80	0.00002	–	–	–	0.3	0.5	TO-5

FIELD EFFECT

In order of transconductance.

Cross Index Key	Type No.	Mfr.	Channel & Constructon	g_m (μmhos)	V_p (v)	I_{DSS} (ma)	C_{is} or $*C_{DG}$	BV_{DGO} or $*BV_{DGS}$ (v)	NF (db)
FE 1	18A1	GE	p,GD,si	30 min	1	0.05	5	-10	
	C620	CT	n,A,si	75	10	0.1	35	10	–
	C622	CT	n,A,si	75	10	0.1	35	10	–
	C624	CT	n,A,si	75	10	0.1	35	10	–
	2N2841	SI	p,DP,si	90	0.8	-50	4	*20	1.5
	18A2	GE	p,GD,si	100 min	1	0.25	5	-10	
	C621	CT	n,A,si	100	10	0.35	35	10	–
	C623	CT	n,A,si	100	10	0.35	35	10	–
	C625	CT	n,A,si	100	10	0.35	35	10	–
	2N2606	SI	p,DP,si	175	2	-0.17	4	*30	1.5
FE 2	C632	CT	n,A,si	175	250	1.0	23	250	–
	C633	CT	n,A,si	175	350	1.0	23	350	–
	C631	CT	n,A,si	200	150	1.0	23	150	–
	U-110	SI	p,DP,si	200	3	-0.31	4	*20	
	C610	CT	n,A,si	250	40	0.6	35	40	–
	C614	CT	n,A,si	250	40	0.6	35	40	–
	2N2842	SI	p,DP,si	270	0.8	-150	7	*20	1.5
	C611	CT	n,A,si	400	40	3.0	35	40	–
	18A3	GE	p,GD,si	500 min	1	0.75	5	-10	
	XF600	SIG	pn,DP,si	500	2-3	0.5	–	30	–
FE 3	2N2607	SI	p,DP,si	525	2	-0.52	7	*30	1.5
	FE200	AI	n,DP,si	600	10	1.0	*1.5	50	
	C612	CT	n,A,si	650	40	3.0	35	40	–
	C615	CT	n,A,si	750	40	1.5	35	40	–
	2N2843	SI	p,DP,si	800	0.8	-450	12	*20	1.5
	2N2386	TI, TS	p,DP,si	1000 min	8		50	20	
	2N2497	TI	p,DP,si	1000 min	5	-3 max	32	20	
	2N2500	TI	p,DP,si	1000 min	6	-6 max	32	20	
	2N2794	TS	p,DP,si	1000 min	–	0.01	6	20	–
	18A4	GE	p,GD,si	1000 min	2	2.0	5	-10	
FE 4	C613	CT	n,A,si	1000	40	3.0	35	40	–
	FG34	AI	n,DP,si	1000	20	10		50	
	FG35	AI	n,DP,si	1000	20			100	
	FG36	AI	n,DP,si	1000	20			150	
	FG37	AI	n,DP,si	1000	20			200	
	XF601	SIG	pn,DP,si	1000	2-3	1.0	–	30	–
	FE300	AI	n,DP,si	1250	1 0	3.0	*1.5	50	
	2N2498	TI	p,DP,si	1500 min	6	-6 max	32	20	
	18A5	GE	p,GD,si	1500 min	2	5.0	5	-10	
	2N2608	SI	p,DP,si	1600	2	-1.60	12	*30	1.5
FE 5	U-112	SI	p,DP,si	1900	3	-3.0	12	*20	
	2N2844	SI	p,DP,si	2000	0.8	-1000	25	*20	1.5
	18A6	GE	p,GD,si	2000 min	2	12.0	5	-10	
	C640	CT	n,A,si	2000	35	4.0	35	35	–
	2N2499	TI	p,DP,si	2500 min	8	-15 max	32	20	
	MM763	MO	n,P,si	3000	2	2	50	25	
	MM764	MO	n,P,si	3200	3	4	50	25	
	MM765	MO	n,P,si	3500	6.5	10	50	25	
	2N2609	SI	p,DP,si	3600	2	-3.60	25	*30	1.5
	C641	CT	n,A,si	4000	35	8.0	35	35	–
FE 6	C642	CT	n,A,si	6000	35	12.0	35	35	–
	C643	CT	n,A,si	9000	35	18.0	35	35	–
	C644	CT	n,A,si	12000	35	24.0	35	35	–
	C650	CT	n,A,si	–	45	–	–	45	–
	C651	CT	n,A,si	–	35	–	–	35	–
	C652	CT	n,A,si	–	25	–	–	25	–
	C653	CT	n,A,si	–	15	–	–	15	–

UNIJUNCTION

Listed by type number.

Cross Index Key	Type No.	Mfr.	Type	R_{BBO} (K)	η (max)	I_{EO} (μa)	I_p (μa)	$V_{E(sat)}$ (v)	V_{EB2} (v)	V_{OB1} (v)	Remarks
UNJ 1	2N489	GE	n,si	6.8	.62	12	20	5	60	3	TI
	2N489A	GE	n,si	6.8	.62	12	15	4	60	3	TI
	2N489B	GE	n,si	6.8	.62	0.20	6	4	60	3	TI
	2N490	GE	n,si	9.1	.62	120	20	5	60	3	TI
	2N490A	GE	n,si	9.1	.62	120	15	4	60	3	TI
	2N490B	GE	n,si	9.1	.62	0.20	6	4	60	3	TI
	2N490C	GE	n,si	9.1	.62	0.02	2	4	60	3	
	2N491	GE	n,si	6.8	.68	12	20	5	60	3	TI
	2N491A	GE	n,si	6.8	.68	12	15	4.3	60	3	TI
	2N491B	GE	n,si	6.8	.68	0.20	6	4.3	60	3	TI
UNJ 2	2N492	GE	n,si	9.1	.68	12	20	5	60	3	TI
	2N492A	GE	n,si	9.1	.68	12	15	4.3	60	3	TI
	2N492B	GE	n,si	9.1	.68	.20	6	4.3	60	3	TI
	2N492C	GE	n,si	9.1	.68	0.02	2	4.3	60	3	
	2N493	GE	n,si	6.8	.75	12	20	5	60	3	TI
	2N493A	GE	n,si	6.8	.75	12	15	4.6	60	3	TI
	2N493B	GE	n,si	6.8	.75	0.20	6	4.6	60	3	TI
	2N494	GE	n,si	9.1	.75	12	20	5	60	3	TI
	2N494A	GE	n,si	9.1	.75	12	15	4.6	60	3	TI
	2N494B	GE	n,si	9.1	.75	0.20	6	4.6	60	3	TI
UNJ 3	2N494C	GE	n,si	9.1	.75	0.02	2	4.6	60	3	
	2N2646	GE	n,si	9.1	.75	12	25	2	30	3	
	2N2647	GE	n,si	9.1	.75	12	25	2	30	6	
	2N2840	GE	n,si	9.1	–	1	10	–	30	–	
	2N2160	GE	n,si	12	80	12	25	–	60	3	
	2N2417	GE	n,si	6.8	.62	12	20	5	60	–	
	2N2417A	GE	n,si	6.8	.62	12	15	4	60	3	
	2N2417B	GE	n,si	6.8	.62	0.20	6	4	60	3	
	2N2418	GE	n,si	9.1	.62	12	25	5	60	–	
	2N2418A	GE	n,si	9.1	.62	12	15	4	60	3	
UNJ 4	2N2418B	GE	n,si	9.1	.62	0.20	6	4	60	3	
	2N2419	GE	n,si	6.8	.68	12	25	5	60	–	
	2N2419A	GE	n,si	6.8	.68	12	15	4.3	60	3	
	2N2419B	GE	n,si	6.8	.68	0.20	6	4.3	60	3	
	2N2420	GE	n,si	9.1	.68	12	25	5	60	–	
	2N2420A	GE	n,si	9.1	.68	12	15	4.3	60	3	
	2N2420B	GE	n,si	9.1	.68	0.20	6	4.3	60	3	
	2N2421	GE	n,si	6.8	.75	12	25	5	60	–	
	2N2421A	GE	n,si	6.8	.75	12	15	4.6	60	3	
	2N2421B	GE	n,si	6.8	.75	0.2	6	4.6	60	3	
UNJ 5	2N2422	GE	n,si	9.1	.75	12	25	5	60	–	
	2N2422A	GE	n,si	9.1	.75	12	15	4.6	60	3	
	2N2422B	GE	n,si	9.1	.75	0.2	6	4.6	60	3	
	2N1671	TI	pn,GJ,si	4.7-9.1	.47-.62	-12	25	5.0	–	–	
	2N1671A	TI	pn,GJ,si	4.7-9.1	.47-.62	-12	25	5.0	–	–	
	2N1671B	TI	pn,GJ,si	4.7-9.1	.47-.62	-0.2	6	5.0	–	–	
	2N2160	TI	pn,GJ,si	4.0-12.0	.47-.80	-12	25	–	–	–	

NEW

No.	Vcex Icex=5ma	Vce Sustaining	hFE Ic=5A	hFE Ic=10A	Vce Sat. Ic=5A	Vce Sat. Ic=10A	Vbe Sat. Ic=5A	Vbe Sat. Ic=10A
2N2580	400	325v	10 min. 40 max.		0.7v		1.5v	
2N2581	400	325v	25 min. 65 max.	10 min.		1.0v		1.7v
2N2582	500	325v	10 min. 40 max.		0.7v		1.5v	
2N2583	500	325v	25 min. 65 max.	10 min.		1.0v		1.7v

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ON READER-SERVICE CARD CIRCLE 473

How to Use the Cross Index

Types are listed in numerical sequence. EIA-registered types come first, followed by house-numbered types. The code following each type identifies its application category and the block of 10 types in which it is located. A3, for example, means the type can be found in the third block of the Audio section. Key to the letter codes is: A = audio and general purpose, P = power, HF = high frequency, LL = low-level switching, HL = high-level switching, FE = field effect, UNJ = unijunction.

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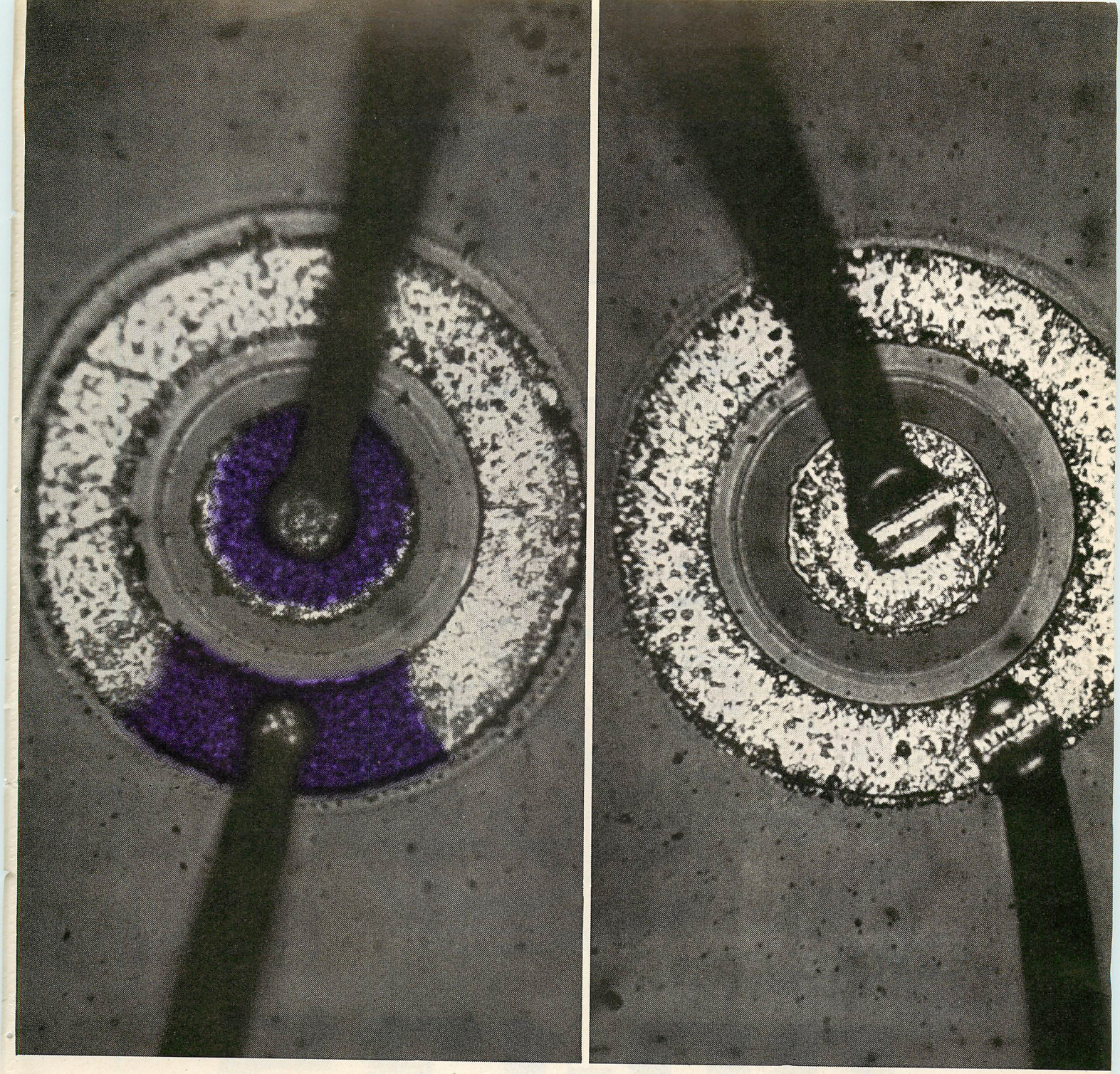

How Sylvania checked "purple plague" and boosted reliability

What you see above represents a victory over an insidious cause of semiconductor device failure—a problem faced by the whole industry—the "purple plague."

On the left, the blotches are a gold-aluminum-silicon alloy formed by reaction between the gold wires and aluminum base areas of the chip. Accelerated by high temperatures, this reaction increases series resistance and weakens the leads—bad news when reliability is essential.

Sylvania engineers departed from standard industry practice and developed a technique of bonding aluminum wires to aluminum, illustrated at the right. After long testing at worse-than-actual conditions, the clean Sylvania junctions confirm: no chemical reaction, no purple plague at the chip—a big step forward that means greater system reliability.

All Sylvania epitaxial planar devices now benefit from this victory. The broad, integrated capabilities that made it possible are being applied constantly to the improvement of Sylvania semiconductors.

Semiconductor Division, Sylvania Electric Products Inc., Woburn, Massachusetts.

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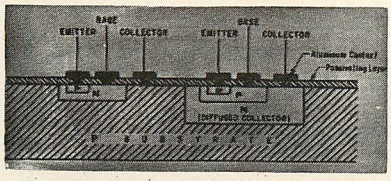
MINE TO MARKET

ON READER-SERVICE CARD CIRCLE 475

Transistors and allied products have been included for your convenience in the Transistor Data Chart section of the magazine. The Reader-Service numbers for the products can be circled on either the Reader-Service card in the main section or the special one in the back of this Data Chart.

Paired Transistors

Experimental products



Saturation voltage for model XT999, a monolithic NPN and PNP pair, is 0.3 v for I_c=10 ma and I_b=1 ma. An FET pair, model X-600, provides gms of approximately 1000 μmhos and has a pinch-off voltage of 2-3 v.

P&A: *$84-$95; 4 weeks.*

Mfr: Signetics Corp.

ON READER-SERVICE CARD CIRCLE 500

Transistors

Silicon planar

Eighty-one types are manufactured in the Leaf configuration. Collector saturation voltage is 0.2 v at I_C= 150 ma dc, I_B = 15 ma dc. Beta linearity is h_{FE} = 65 at I_C = 0.5 amp dc and 30 at 1 amp dc.

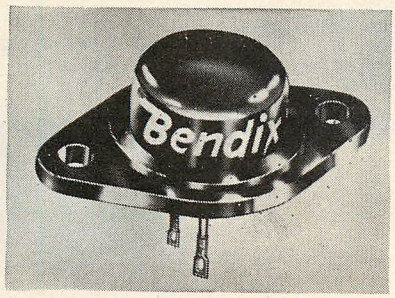
Price: *$1.05-$25.50 (100-999).*

Mfr: Bendix Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 501

Silicon Transistors

Diffused mesa



High-collector voltages, low-saturation voltages, fast-switching speeds and relatively fast betas are claimed for types 2N389, 2N424, 2N1015, etc. Diffused-mesa construction is said to have improved a present line of 41 silicon power transistors.

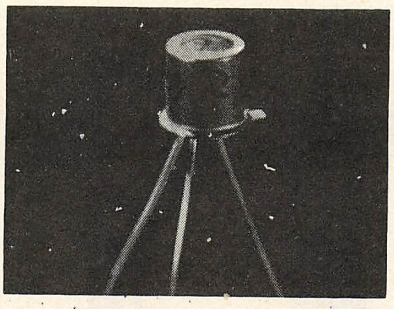
Price: *$1.05-$25.50 (100-999).*

Mfr: Bendix Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 502

Photo-Transistors

High sensitivity



Sensitivity radiation system range is 50-200 μa/mw/cm² for type 2N2452. Sensitivity illumination system range is 2.6-10.3 μa/ft-c. Unit is designed as a companion to type 2N986.

P&A: *$27 (1-99); 4 weeks.*

Mfr: Fairchild Semiconductor.

ON READER-SERVICE CARD CIRCLE 503

Power Transistors

150-w dissipation

A tight two-to-one h_{FE} ratio (50-100 at 3 amps) makes types 2N1539 through 2N1543 useful for power amplifier applications with critical stability requirements. The 150-w dissipation rating is said to be the highest available in the TO-3 diamond package.

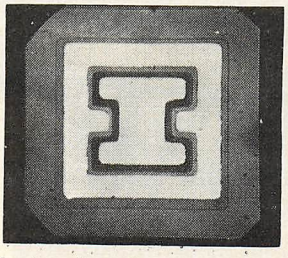
P&A: *$2.10-$10.40 (1-99); stock.*

Mfr: Texas Instruments Inc., Semiconductor-Components Div.

ON READER-SERVICE CARD CIRCLE 504

Silicon Transistors

Interdigitated "I" geometry



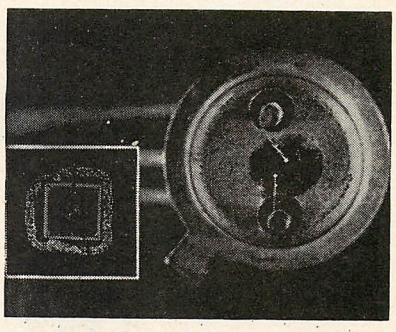
Collector breakdown voltages of 75 v min and typical total switching time of < 90 nsec are available in types 2N2787-2N2792. Noise levels as low as 0.5 db are offered in types 2N929 and 2N930, which are available singly, or as duals and matched duals.

Mfr: General Instruments Corp.

ON READER-SERVICE CARD CIRCLE 505

FETs

Planar-diffused silicon



P-channel UNIFETS have two different geometries with a 1.1 to 1 ratio of g_m to I_{DSS} and 6 v max pinch-off voltage. Storage temperature range is −65 to +200 C. Maximum gate-drain breakdown voltage of 20 v is guaranteed at I_G = 1 μa.

Price: *$9.50-$11.50 (over 100).*

Mfr: Siliconix, Inc.

ON READER-SERVICE CARD CIRCLE 506

Silicon Transistor

Planar epitaxial

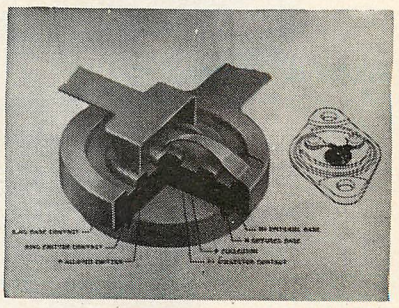
The 1.6 Gc type 2N2808 has an ac current gain of 5 at 200 Mc. It can be used as an rf amplifier to 500 Mc and as an oscillator to 1.6 Gc. Power gain is 20 db measured at 200 Mc; collector-to emitter voltage is 6 v, and collector current is 2 ma.

Mfr: Raytheon Co., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 507

Power Transistors

Breakdown voltage to 100 v



Fall time of types MP721A/B/C is 0.7 μsec at 8 amps collector current for TV flyback circuits. The epitaxial-base germanium units have a saturation voltage of 0.3 v, max, at 10 amps.

Mfr: Motorola Semiconductor, Inc.

ON READER-SERVICE CARD CIRCLE 508

Electronic Components
from Westinghouse

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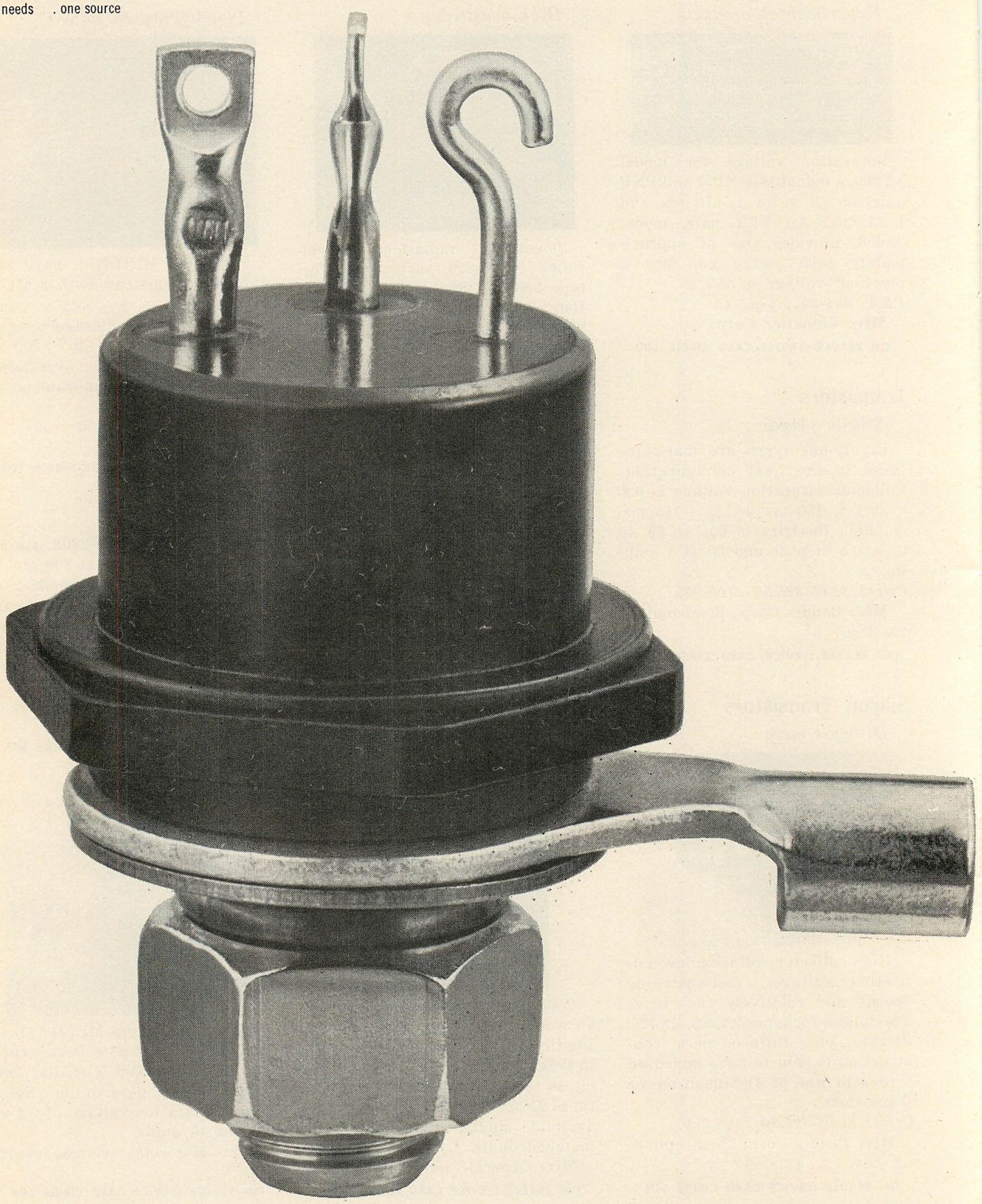


Power Transistors

Meet MIL-S-19500/102

Ratings of 150 w and 7.5 amp are available for these silicon devices. Type USN 2N1016Bm is rated at 100 v, and type USN 2N1016CM is rated at 150 v.

Guide: Insert bold-italic line

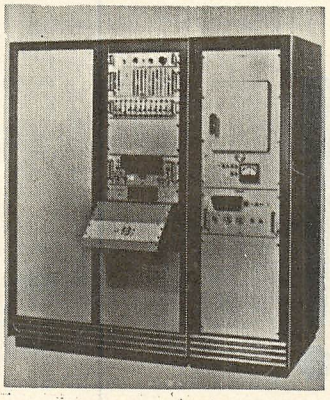
P&A: $32.55-$43.35 (100 or more).

Mfr: Westinghouse Electric Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 509

Transistor Tester

Pulse testing



Test parameters up to 500 v and 25 amps are provided by the TACT unit. Pulse duration can be varied from 100-500 μsec and 1-5 msec, and repetition rate from 2-100 pps. Test conditions are determined in a digital manner by prepunched cards.

Mfr: Texas Instruments Inc.

ON READER-SERVICE CARD CIRCLE 510

UHF Transistor

Low noise

Noise figure of the TA-2333 at 450 Mc is 4 db. Rf amplifier gain is 15 db, typical. Collector-to-base voltage is 30 v, min; collector-to-emitter, 20 v, min; total dissipation at 25 C free air, 200 mw.

P&A: $35 (1-99); stock.

Mfr: Radio Corp. of America.

ON READER-SERVICE CARD CIRCLE 511

Power Transistors

Vhf units

Power outputs up to 5 w at 200 Mc are provided by the 70 and 140 v series 100. In the 200 series, model SN230 features power outputs of 5 w at 130 Mc, and model SN231 features 10 w at 130 Mc.

Price: $95-$145 (1-49).

Mfr: National Semiconductor Corp.

ON READER-SERVICE CARD CIRCLE 512

Silicon Transistors

90-nsec switching

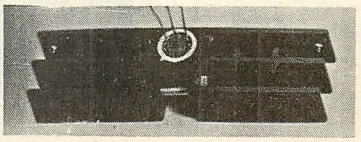
Interdigitated "I" geometry is featured in these diffused-silicoa devices. Types 2N2787-89 are available in the TO-5 case, and types 2N2790-92 are available in the TO-18 case. Collector breakdown voltages are specified at 75 v min; collector-to-emitter ratings exceed 35 v. Typical frequencies exceed 300 Mc.

Mfr: General Instruments Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 513

Heat Sink

Printed-circuit board



Natural convection unit is said to provide the maximum ratio of heat dissipation to volume occupied. It is claimed that the model 2704 substantially increases transistor performance by optimizing the effect of heat transfer coefficient available in free convection. Both the TO-5 and TO-9 transistor ca cases can be accommodated.

Mfr: Astro Dynamics, Inc.

ON READER-SERVICE CARD CIRCLE 514

Switching Transistors

25-amp

Diffused alloy power types 2N2636-38 switch clamped inductive loads in microseconds at peak powers of 100, 1500 and 2000 w. Switching times range from 1-5 μsec. Units can switch 25 amps at collector-emitter voltages of 40, 60 and 80 v.

P&A: $26.25-$38.25; stock.

Mfr: Bendix Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 515

Silicon Transistors

Medium-power vhf

Power output is 3.2 w, min, at 125 Mc. Types 2N2781, 2N2782 and 2N2783 can be used as drivers to reactive multiplier chains to achieve up to 2-1/2 w power in the Kc range.

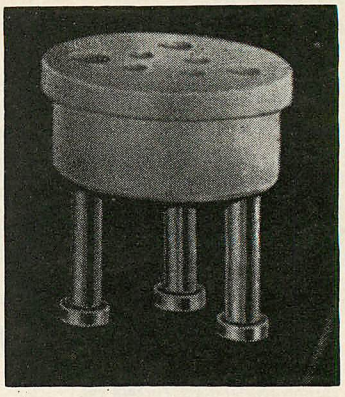
P&A: $39.90-$75; stock.

Mfr: TRW Electronics.

ON READER-SERVICE CARD CIRCLE 516

Transistor Holder

Teflon insulated



The component is mounted on the shoulder of the Teflon bushing in model RTC-304T. It has a major diameter of 0.325 in. and a minor diameter of 0.290 in. Three through-hole lugs are provided on a 0.200 in. pitch circle for TO-5 type JETEC headers.

Mfr: Sealectro Corp.

ON READER-SERVICE CARD CIRCLE 517

Voltage Tester

3 μsec current duration

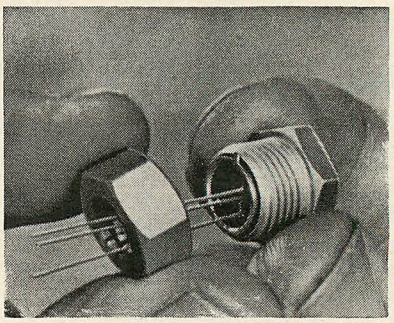
The time factor of the test, rather than the amount of current applied, is limited by model 1901A voltage breakdown tester. The duration of current avalanche through the test specimen is limited to 3 μsec. Selector switches on the front panel determine the range (1 or 4 Kv) and the amount of ohmic current flow (10 μa, 100 μa or 1 ma).

Mfr: Microdot, Inc.

ON READER-SERVICE CARD CIRCLE 518

Transistor Heat Sink

TO-5 and TO-9 packages

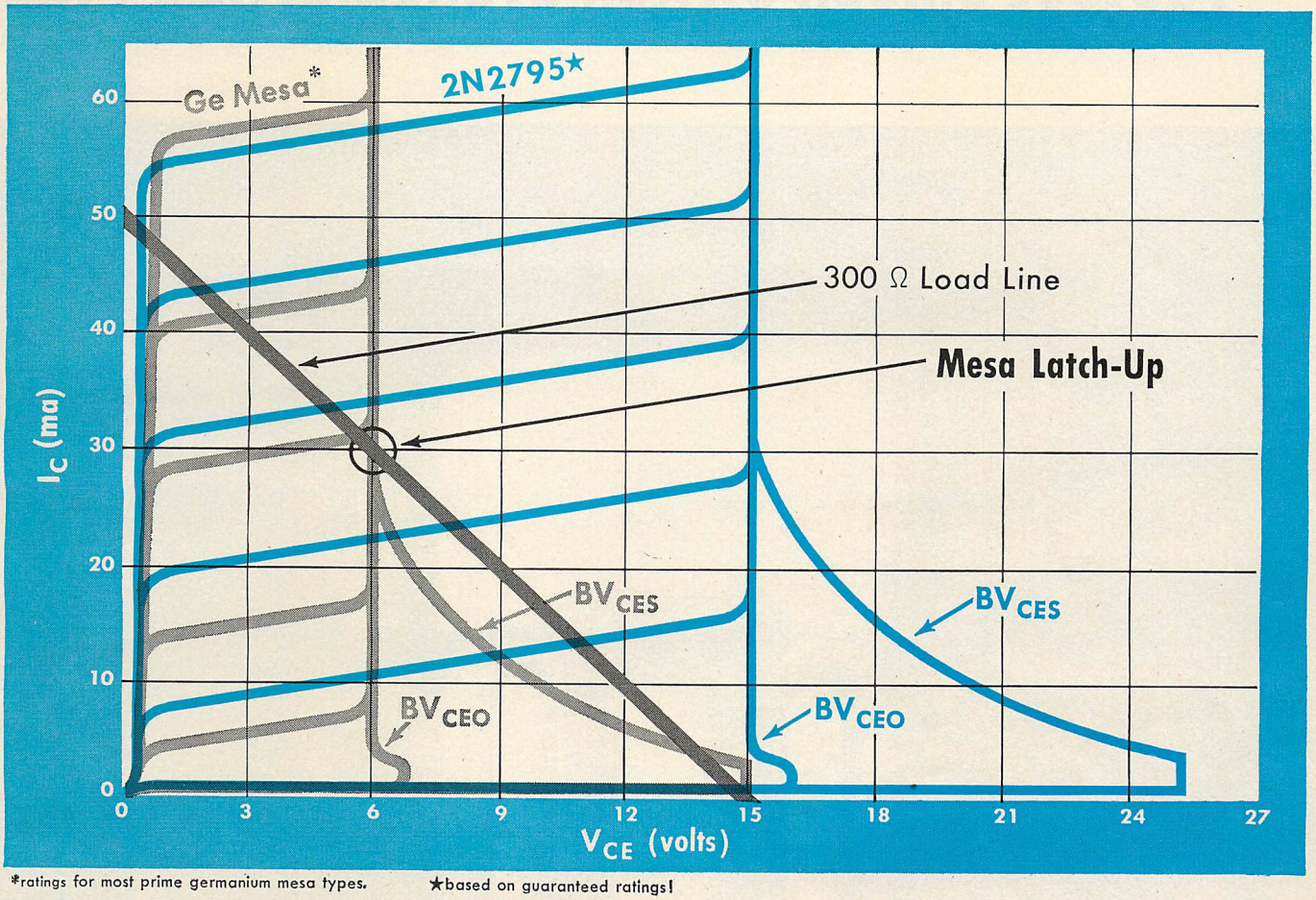


Conduction-cooled 1103 series is available in three finishes: uninsulated, electrically insulated and black anodized. Threaded two-piece construction tightens to grip both sides of transistor weld flange.

Mfr: Thermalloy Co.

ON READER-SERVICE CARD CIRCLE 519

SPRAGUE LOGIC TRANSISTORS GIVE SUPERIOR LATCH-UP PROTECTION!



*ratings for most prime germanium mesa types. ★based on guaranteed ratings!

For Guaranteed High Voltage Operation at High Speeds, Investigate Sprague ECDC® and MADT® Transistors

TO-18 CASE

Type No.	f_T (typical)	BV_{CES} (minimum)	BV_{CEO} (minimum)
2N2795	450 mc	25 volts	15 volts
2N2796	450 mc	20 volts	12 volts
2N984	350 mc	15 volts	10 volts
2N979	150 mc	20 volts	15 volts
2N980	150 mc	20 volts	12 volts
2N2048†	250 mc	20 volts	15 volts

(†TO-9 Case)

● For additional information on Sprague High Voltage Logic Transistors, write to the Technical Literature Service, Sprague Electric Company, 347 Marshall Street, North Adams, Massachusetts.

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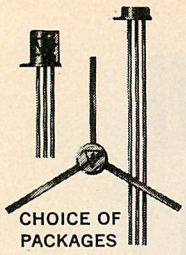
4ST-106-63

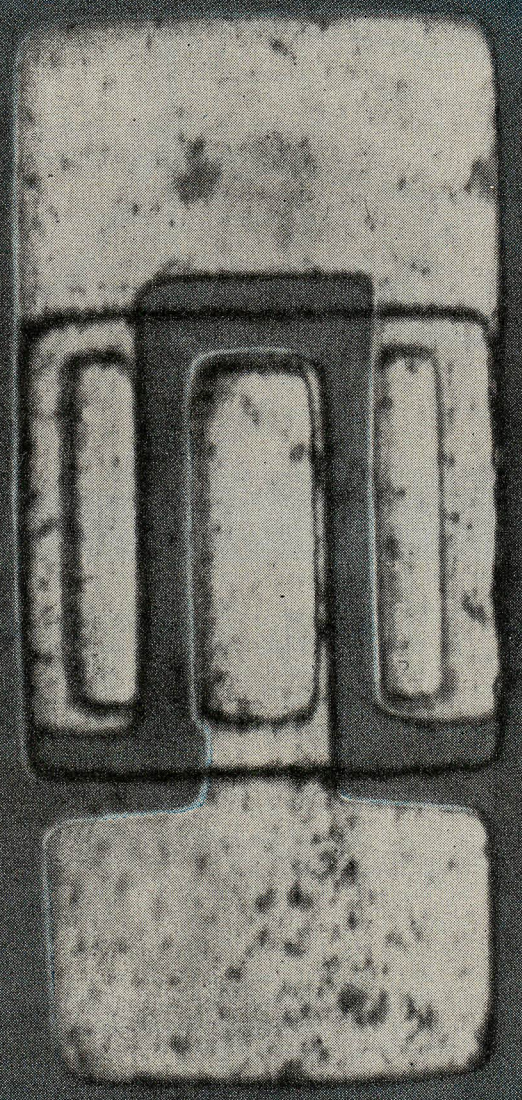


CHOICE OF PACKAGES

This is the micropower transistor—a new silicon epitaxial planar device that offers higher efficiency at microwatts or milliwatts. As a switch, or as an amplifier, the type 2N2784 offers capabilities beyond any now available! Typical: 1 KMC bandwidth—higher beta level at microamperes, with reduced falloff beyond 10 milliamperes.

This performance stems from advanced device design and refined photolithographic techniques plus Sylvania's exclusive skills in epitaxial technology. Unusually small

Fastest silicon switch available: new 1 KMC



Epitaxial construction, new 3-stripe configuration, and small size, produce new high switching speed ($T_{on} + T_{off} = 12$ nanoseconds) with low saturation voltages (typically 0.2 volts).

junction sizes and spacings, low capacitances, result in improved frequency response for both switching and amplifier applications.

The Sylvania 2N2784 and the 2N709 and 2N709A, which are members of the 2N2784 family, are all available in your choice of three packages—the TO-18, TO-46 "pancake," and the new TO-51 co-planar package.

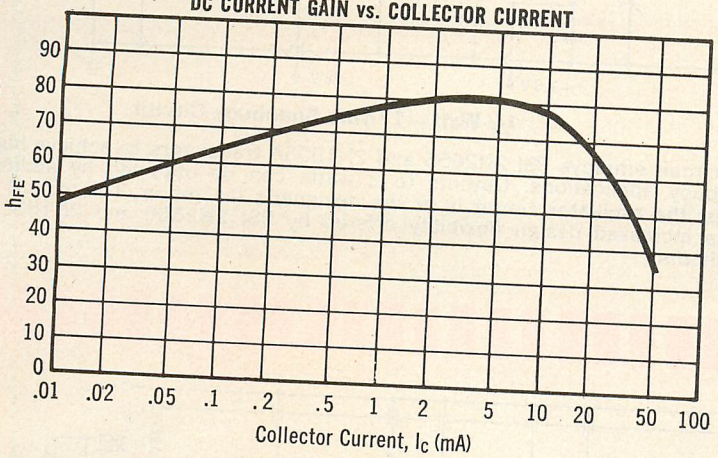
For more information, see your Sylvania salesman or write to Semiconductor Division, Sylvania Electric Products Inc., Woburn, Mass.

Sylvania epitaxial planar transistor 2N2784

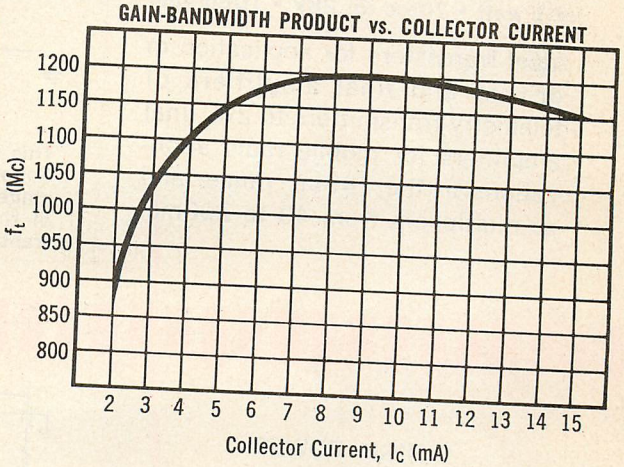
ON READER-SERVICE CARD CIRCLE 479

SYMBOL	CHARACTERISTICS	2N2784 Min	2N2784 Max	2N709 Min	2N709 Max	2N709A Min	2N709A Max	TEST CONDITIONS	
h_{FE}	DC Current Gain	40	120	20	120	30	90	I_C=10mA	V_{CE}=0.5V
h_{FE}	DC Current Gain	20		15		15		I_C=30mA	V_{CE}=1.0V
h_{FE} (−55°C)	DC Current Gain	10		10		10		I_C=10mA	V_{CE}=0.5V
V_{BE} (sat)	Base Saturation Voltage	.70	.85 V	.70	.85 V	.70	.85 V	I_C=3.0mA	I_B=0.15mA
V_{CE} (sat)	Collector Saturation Voltage		.26 V		.30 V		.30 V	I_C=3.0mA	I_B=0.15mA
C_{ob}	Output Capacitance		3.0 pf		3.0 pf		3.0 pf	I_E=0	V_{CB}=5.0V
C_{TE}	Emitter Transition Capacitance		2.0 pf		2.0 pf		2.0 pf	I_C=0	V_{EB}=0.5V
I_{CBO}	Collector Cutoff Current		5mμA		50mμA		5mμA	I_E=0	V_{CB}=5.0V
I_{CBO} (150°C)	Collector Cutoff Current		5.0 μA		5.0 μA		5.0 μA	I_E=0	V_{CB}=5.0V
BV_{CBO}	Collector to Base Breakdown Voltage	15	V	15	V	15	V	I_C=10μA	I_E=0
V_{CEO} (sust)	Collector to Emitter Sustaining Voltage	6.0	V	6.0	V	6.0	V	I_C=10mA (pulsed)	I_B=0
BV_{EBO}	Emitter to Base Breakdown Voltage	4.0	V	4.0	V	4.0	V	I_C=0	I_E=10μA
T_S	Charge Storage Time Constant		5.0 ns		6.0 ns		6.0 ns	I_C=I_{B1}=I_{B2}=5.0mA	
$t_{d}+_{r}$	Turn-on Time ($V_{BE(0)}$=−1.0V)		9 ns		15 ns		15 ns	I_C=10mA	I_{B1}=2mA
$t_{s}+_{f}$	Turn-off Time		9 ns		15 ns		15 ns	I_C=10mA	I_{B1}=I_{B2}=1.0mA
f_T	Gain-Bandwidth Product	1000	mc	600	mc	800	mc	I_C=5.0mA	V_{CE}=4.0V

DC CURRENT GAIN vs. COLLECTOR CURRENT



GAIN-BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



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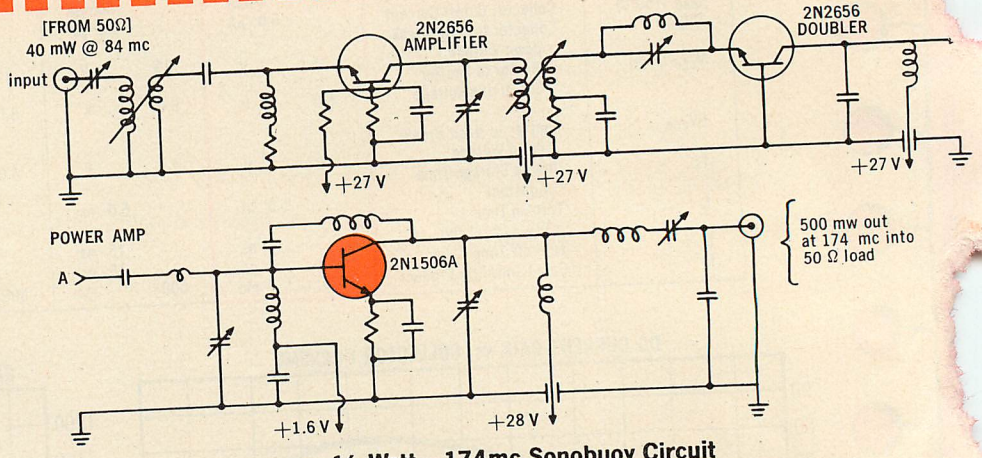
MEDIUM POWER VHF TRANSISTORS

2N1506A

• 1 watt • 70mc @ 28V • 10db gain

Ideal transistors for application in drivers and final amplifiers of telemetry transmitters to 2W, final amplifiers for mobile radio applications in the 140mc range, and as multipliers from 40 to 200mc.



½ Watt—174mc Sonobuoy Circuit

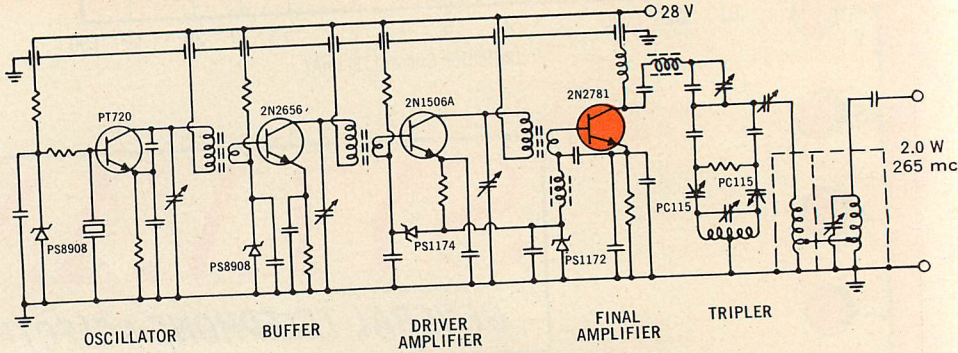
This circuit employs PSI 2N2656 and 2N1506A transistors to achieve high power for Sonobuoy applications. Outputs to 2 watts can be obtained by adding additional stages; the oscillator circuit is at the designer's discretion. This circuit is indicative of the increased design flexibility offered by PSI 2N2656 and 2N1506A silicon RF transistors.

HIGH POWER VHF TRANSISTORS

2N2781

• 5 watts • 30mc @ 28V • 12db gain

Use this series as final amplifiers in communications equipment, 2 to 5W telemetry equipment and mobile radio designs.



2 Watt—265mc Telemetry Circuit

Originally designed and engineered at PSI, this circuit applies a PSI PT720 as an oscillator, 2N2656 as a buffer, 2N1506A for the driver stage and a 2N2781 for the final, to deliver a conservative 2 watts at 265mc. This application is one of the first telemetry designs available using low cost, off-the-shelf units instead of state-of-the-art devices.

New PSI RF transistor application notes and bulletins:

• Summary of the State of the Art in the practical use of Communications Transistors • Citizens Band Transmitter • VHF Transistor Oscillator • Radio Frequency Applications, Types PT900 and 2N1900 • 50W, 30mc Amplifier • Class C—100 Watt—20 Megacycle Power Amplifier • Class C—100 Watt—10 Megacycle Power Amplifier • Class C—100 Watt—3 Megacycle Power Amplifier • 1W, 1Kmc Transmitter • 240mc PCM Transmitter • 5W, 30mc Power Gain Test Circuit • Inverter Design • Switching Application, Types PT900, 2N1899, 2N1901 • Pulse Driver for Inductive Elements and Magnetic Memories, Types PT900, 2N1899, 2N1901 • 3W, 125mc Amplifier • ½W Citizens Band Transmitter • 100W, 100mc Amplifier • 5W, 70mc Amplifier • 10W, 100mc Oscillator

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For the past five years, PSI has dedicated the major part of its transistor development and engineering efforts towards optimizing capabilities of silicon transistors in all communications equipment. Today PSI is a leading producer of RF transistors for high reliability space communications equipment in such projects as Mariner, OAO, Ranger, Relay, and Explorer. Realizing that component cost is a major factor in communications equipment design, PSI has had, as an early objective, the pricing of high performance RF devices at levels which will hasten the era of all-transistorized communications systems in many new fields.

Call PSI today to discuss your particular communications equipment design problems. Let PSI application engineering show you how you can design transistorized communications equipment on a vacuum tube budget through lower overall component costs due to lower voltage operation, lack of heater equipment, smaller power supplies, and greater efficiencies.

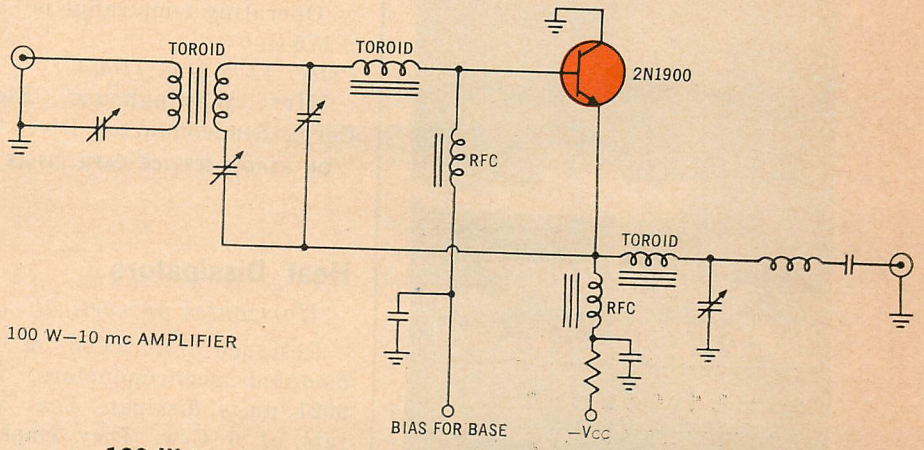
on a vacuum tube budget!

HIGH POWER
HF TRANSISTORS

2N1900

• 100 watts • 10mc @ 60V
• 10db gain

The PSI 2N1900 series is ideal for commercial, marine, and military PRC and VRC designs from 2 to 12mc, as 10 amp switchers in power conversion applications, and amplifiers in VLF transmitters up to 5KW.



100 Watt—10mc Amplifier for PRC, VRC and Marine Radio

This economical design employs optimum heat sinking to provide a substantial reduction in size over 100 watt tube amplifiers. This design employs a PSI 2N1900 in a **reliable,** cold-welded package to deliver 100 watts out at 10mc with greater than 10db gain.

LOW POWER/LOW NOISE
UHF TRANSISTORS

2N2656

• 50mW • 100mc @ 10V
• 10db gain

Apply these low noise figure units to your oscillator designs up to 50mW. These transistors also provide optimum performance in low to medium-level class A and B buffer amplifiers by delivering up to 200mW RF power with over 50% efficiency.

Pacific Semiconductors, Inc.
TRW Electronics
THOMPSON RAMO WOOLDRIDGE INC.

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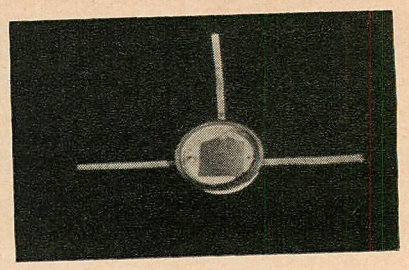
ON READER-SERVICE CARD CIRCLE 480

Transistor Package

Integral beryllia base



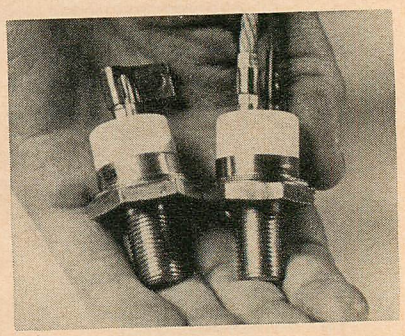
Packages of 5/8 in. and 3/4 in. diam, for devices in the 12-20 amp range, with two, three or four leads are included in this line. Glass-to-metal seals are said to be eliminated by the package, whose lower beryllia surface provides a direct path from the semiconductor material to a chassis or heat sink.

Mfr: National Beryllia Corp.

ON READER-SERVICE CARD CIRCLE 520

Silicon Transistors

6000 w peak



NPN silicon power units have voltage ratings of 50-200 v. Typical saturation resistance of series 2N1830 and 2N2130 is 0.035 ohms. Minute gain is 10 at 25 amps collector current. Dissipation is 250 w; peak power capability is 6000 w. Operating temp range is −65 to +175 C.

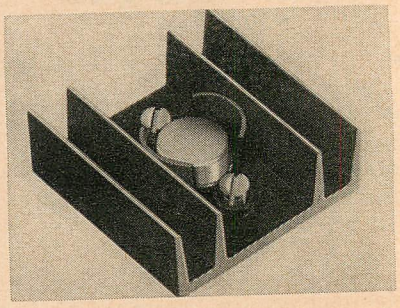
Price: $105-$198 (100+).

Mfr: Westinghouse Electric Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 521

Heat Dissipators

Horizontal or vertical



Designed for TO-8 or stud-mounted semiconductors, Series 9021 units dissipate heat at the rate of 6 C/w. They employ an extruded parallel fin design and may be used in either a vertical or horizontal position.

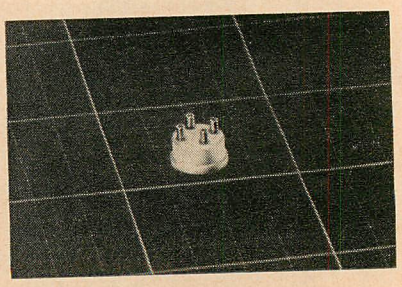
P&A: $0.50-$0.95; stock.

Mfr: Augat Inc.

ON READER-SERVICE CARD CIRCLE 522

Transistor Holder

Teflon-insulated



Providing 4 connections on a 0.200-in. diam pitch circle, the RTC-400T-L2 features lugs extending 0.070 in. below the Teflon body for circuitry connections. The major diameter is 0.325 in. and the minor diameter is 0.290 in. Over-all socket height is 0.225 in. and unit may be used on chassis thicknesses up to 0.093 in.

Mfr: Sealectro Corp.

ON READER-SERVICE CARD CIRCLE 523

Transistors

Power switching

Switching up to 1200 w in μsecs is afforded by these 10-amp, diffused alloy, power transistors. They feature a high cutoff frequency, f_{ab} = 1.5 Mc; and low saturation voltage, V_{ces} = −0.5 v dc, max at I_c = 5 amp, I_B = −0.5 amp. Series 2N2288-2290 are germanium pnp type units.

Mfr: Bendix Semiconductor.

ON READER-SERVICE CARD CIRCLE 524

Industrial Transistor

Mesa construction

Germanium epitaxial type TIX-316 has an h_{fe} of 35 min at 1 Kc, h_{fe} of 4.0 at 100 Mc; $R_b'C_c$ is 15 psec, max; C_{ob} is 3.0 pf, max; and NF is 4.5 db max at 200 Mc.

The device is packaged in a four-lead TO-18 case.

P&A: $2.93; 3 weeks.

Mfr: Texas Instruments Inc., Semiconductor-Components Div.

ON READER-SERVICE CARD CIRCLE 525

Transistors

Silicon unijunction

Useful in oscillators and timing circuits, types 2N2646 and 2N2647 feature maximum peak point emitter current of 25 μa (inter-base voltage = 25 v) and maximum valley point current of 18 ma (inter-base voltage = 20 v, R_{B2} = 100 ohms) at 25 C.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 526

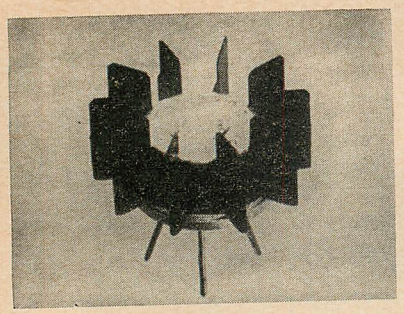
Germanium Transistors

Diffused-alloy

PNP types 2N2285 through 2N-2287 feature collector-emitter breakdown voltages of −30 to −80 v dc, min. Saturation voltage ($V_{CE(S)}$) is −0.65 v dc, max. Units are capable of switching up to 1600 w in 1-5 μsec.

Mfr: Bendix Corp., Semiconductor Div.

ON READER-SERVICE CARD CIRCLE 527



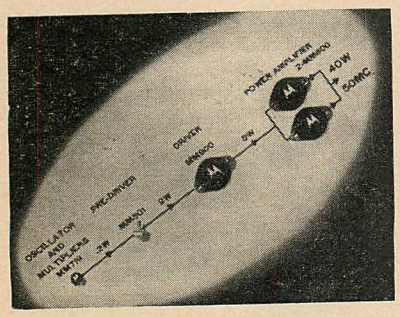
Transistor Heat Sink

Beryllium copper

For use with the TO-8 transistor, models 211, 213 and 215 feature a featherweight cooler which is said to provide rigid contact of large areas. Special tapered installation tools are available.

Mfr: Wakefield Engineering, Inc.

ON READER-SERVICE CARD CIRCLE 528



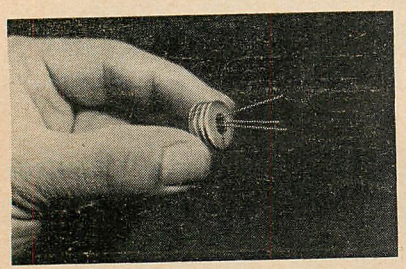
Silicon Transistors

High-power vhf

Two 50-Mc power devices, types MM800 amd MM799, have a guaranteed power gain of 7 db at 15 w output. Model MM801 is a medium power amplifier/driver with a power gain of 10 db for a 3.5 w power output at 50 Mc.

Mfr: Motorola Semiconductor Products, Inc.

ON READER-SERVICE CARD CIRCLE 529



Transistor Heat Sink

Convection cooled

Model 2211 dissipates approx 1 w at 150 C. It fits all TO-5 and TO-9 cases, regardless of case diameter. Dimensions are 5/8 in. in diameter by 5/16 in. high; total weight is 0.056 oz.

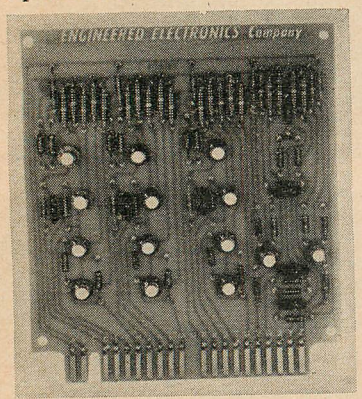
Price: $0.18 ea (+100), $0.10 ea (+1000).

Mfr: Thermalloy Co.

ON READER-SERVICE CARD CIRCLE 530

Digital Modules

Operate to 120 C



Nine basic circuit cards are offered in 1 and 10 Mc versions. Power required is ±12 v dc. Logic levels are 0 and 6 v dc. Card dimensions are 4-1/4 x 5 x 1/16 in.

Mfr: Engineered Electronics.

ON READER-SERVICE CARD CIRCLE 531

Planar Transistors

15-pf collector capacitance

A minimum current transfer ratio of up to 3 is available with types 2N910-912 and 2N1973-74. The series is designed for use in high frequency amplifier circuits.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 532

Silicon Transistors

Npn planar

Minimum current transfer ratio of types 2N1189 and 2N1890 is up to 3.0 at 25 C. Units are designed for high frequency amplifier and oscillator circuits.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 533

Transistors

Planar passivated

TO-5 size differential amplifiers, types 2N2480/80A offer maximum voltage differentials of 5-10 mv. At 25 C, the collector-to-emitter voltage is 5 v and the collector currents are 100 μa and 1 ma.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 534

Chopper Transistors

Double-emitter types

Breakdown voltage of types 3N74 through 3N79 is BV_{E1E2} ±18 v min at I_E ±10 μa). Emitter currents are as low as 2 na at ±15 v and offset voltages are ±50 μv for specified conditions with temperatures from −25 to +100 C.

Mfr: Texas Instruments Inc., Semiconductor-Components Div.

ON READER-SERVICE CARD CIRCLE 535

Kovar Tab Transistor

Npn silicon planar

Maximum collector leakage current for types 11B554-556 is 25 μa at 25 C. Units are silicon planar versions of TO-5 types 2N1613, 2N1711 and 2N1893.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 536

Silicon Transistor

High frequency

Interdigitated epitaxial planar device, type 2N2865, has a neutralized power gain of 18 db; oscillator output is 55 Mw at 500 Mc. Specifications include an NF of 4.5 db max at 200 Mc and an $R_b'C_c$ of 15 psec max.

Mfr: Texas Instruments Inc., Semiconductor-Components Div.

ON READER-SERVICE CARD CIRCLE 537

Chopper Transistors

Five-terminal devices

Planar epitaxial passivated types 2N2356/56A feature a collector leakage and emitter leakage current of 10 μa, max. At 25 C, either collector-to-base voltage is 25 v.

Mfr: General Electric Semiconductor Products Dept.

ON READER-SERVICE CARD CIRCLE 538

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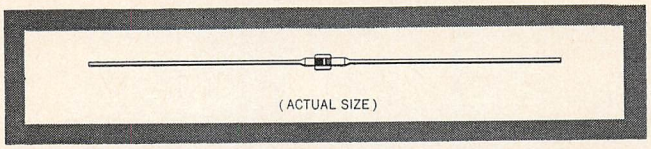

(ACTUAL SIZE)

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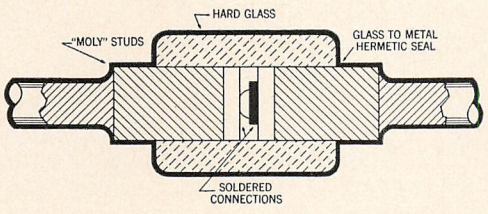
- **VERSATILE — replacement type for any of 276 silicon diodes.**



FDA 101

BV	75 Volts	Min.	@ I_R = 5.0 μA
I_R	0.1 μA	Max.	@ V_R = 50 V
V_F	1.0 V	Max.	@ I_F = 20 mA
t_{rr}	2.0 mμsec	Max.	@ I_f = 10 mA, V_r = 6.0 mA
C	3.0 pf	Max.	@ V_R = 0V

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SEMICONDUCTOR

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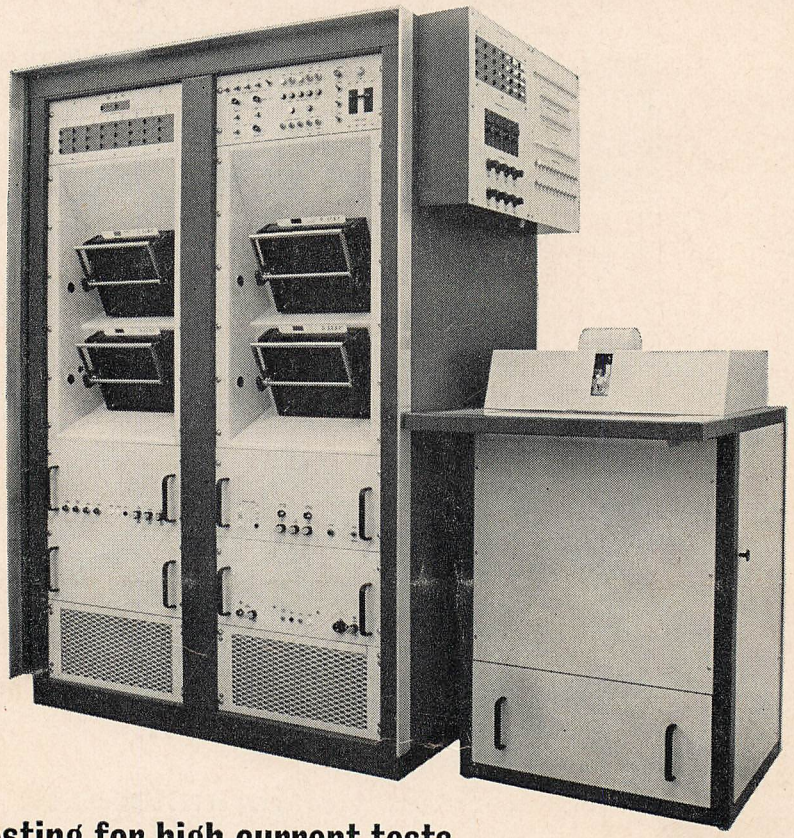
ON READER-SERVICE CARD CIRCLE 483

* A patented Fairchild process.

AUTOMATIC TRANSISTOR TESTER/SORTER



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- **Tests may be programmed in any order**

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ON READER-SERVICE CARD CIRCLE 484