SYMBOLS & CODES EXPLAINED

IN TYPE No. CROSS-INDEX & TECHNICAL SECTIONS

△ ☑ % Indicators of separate manufacturers producing same type number (non-JEDEC) whose characteristics are not the same. This manufacturer-identifying symbol (assigned by D.A.T.A.) is an integral part of the type number (in Type No. Cross Index, Technical Data Sections) to avoid the possibility of confusing the devices of one manufacturer with the devices of others.

RT ... Replacement Type; consult manufacturer.

SYMBOLS & CODES COMMON TO MORE THAN ONE TECHNICAL SECTION

LINE No.

- ▼ – New Type
- ♦ – Revised Specifications
- # – Non-JEDEC Type manufactured outside U.S.A.

TYPE No.

- † – Switching type, also listed in Section 12
- ∅ – Chopper, also listed in Section 13, Category 10
- * – These types also included elsewhere with other characteristics. See Type No. Cross Index for alternate line no.
- § – Radiation Resistant Devices, also listed in Section 13, Category 13.

STRUCTURE (All Sections Except 6 & 7)

A	–	Alloy
AN	–	Annular
D	–	Diffused or drift
DM	–	Diffused mesa
E	–	Epitaxial
EA	–	Epitaxial annular
EM	–	Epitaxial mesa
F	–	Fused
G	–	Grown
GA	–	Gallium Arsenide
H	–	Hometaxial
MA	–	Mico alloy
MD	–	Micro alloy diffused
ME	–	Mesa
MOS	–	Metal oxide silicon
PA	–	Precision alloy
PC	–	Point contact
PD	–	Precision alloy diffused
PE	–	Planar epitaxial
PL	–	Planar
S	–	Surface barrier
*	–	Matched pair
△	–	Switching, other uses
☑	–	Chopper, other uses
∅	–	Noise figure 8db or below
†	–	Plastic package
%	–	Overlay

2. GERMANIUM PNP | 3. GERMANIUM NPN | 4. SILICON PNP | 5. SILICON NPN--Low Power Transistors

LINE No.	TYPE No.	1 MAX. COLL. DISS. @25°C (W)	2 fab (Hz)	DERATE IN FREE AIR W/°C	T E M A X P	ABS MAX RATINGS @25°C BVcbo (V)	BVceo (V)	BVebo (V)	Ic (A)	MAX. Icbo @MAX Vcb (A)	TYPICAL 'h' PARAMETERS BIAS Vcb (V)	Ie (A)	hfe	COMMON EMITTER hoe (mhos)	hie (Ω)	hre X.0001	Cob (F)	STRUCTURE	DWG #L Y200 s/a TO200 Ser.	C E A D E
		1	2	3	4	5			6	7	8	9	10	11	12	13	14	15		

1

∅ – With infinite heat sink
Following symbols indicate temperature at which derating starts:
† – 40°C ☑ – 60°C $ – 100°C
* – 45°C § – 70°C ♦ – Min.
# – 50°C △ – 85°C

2

† – $f_{\alpha e}$
§ – Gain bandwidth product (f_t)
* – Maximum frequency of oscillation
∅ – Figure of merit (frequency for unity power gain)
△ – Minimum
☑ – Maximum

3

∅ – With infinite heat sink

4

*	– 50-65°C	A	– Ambient
∅	– 70-80°C	C	– Case
#	– 85-100°C	J	– Junction
♦	– 110-125°C	S	– Storage
†	– 130-135°C		
$	– 140-165°C		
§	– 170-200°C		
▼	– Over 200°C		

5

– BV_{CEX} or punch-through
∅ – BV_{CES} ☑ – $BV_{ceo(sus)}$
§ – BV_{CER} * – Pulsed
$ – Indicates min. valves given for BV_{cbo}, BV_{ceo}, and BV_{ebo}.

6

– Pulsed or Peak
$ – Minimum

7

∅ – At V_{CB} < Max. V_{CB} (See Mfr. Spec.)
– I_{CEX} $ – Typical
§ – I_{CES} * – I_{CER}
† – At Temp. > 25°C △ – I_{CEO}
♦ – At Temp. 25°C Case

8

∅ – V_{CE}

9

∅ – I_C △ – I_B

10

† – h_{FE} △ – Minimum
# – Pulsed ☑ – Maximum
§ – h_{FC}
* – Available in selected ranges

11 12 13

b – h parameters are h_{ob}, h_{ib}, h_{rb}
☑ – Maximum

14

☑ – Maximum $ – C_{cb} † – C_{re}

15

$ – Tetrode
# – Radiation Resistant Device (Also See Above)

2. GERMANIUM PNP - LOW POWER TRANSISTORS

IN ORDER OF (1) MAX COLLECTOR DISSIPATION (2) fab & (3) TYPE No.

LINE No.	3 TYPE No.	1 MAX. COLL. DISS. @25°C (W)	2 fab (Hz)	DERATE IN FREE AIR W/°C	T M E A M X P	ABS MAX RATINGS @25°C BVcbo (V)	BVceo (V)	BVebo (V)	Ic (A)	MAX. Icbo @MAX Vcb (A)	TYPICAL 'h' PARAMETERS BIAS Vcb (V)	BIAS Ie (A)	hfe	COMMON EMITTER hoe (mhos)	hie (Ω)	hre X.0001	Cob (F)	STRUC -TURE	DWG #L C Y200 E O s/a A D TO200 D E Ser.
1#	2SA132	80m	60.M		#J	9.0		.50	10m	.30u	3.0Ø	1.0m	80				6.5p	ME	
2#	2SA380	80m	60.M	1.3m	#S	25			10m	12uØ	6.0	1.0m	70				2.5p	D	TO1
3#	2SA130	80m	75.M		#J	9.0		.50	10m	.30u	3.0Ø	1.0m	80				6.5p	ME	
4#	2SA307	80m	75.M	1.3m	#J	40			10m	8.0uØ	6.0Ø	1.0m	70				2.2p	D	TO44
5#	2SA366	80m	75.M	1.3m	#J	9.0	9.0 Ø	.50	10m	30u	3.0Ø	1.0m	60				6.0p	ME	TO44
6#	NKT675	80m	75M§	1.6m	ØJ	20	20 Ø	1.0	10m	8.0uØ	4.5Ø	1.0mØ	40 Δ				3.0pØ	ME	TO1
7#	NKT677	80m	75M§	1.6m	ØJ	20	20 Ø	1.0	10m	8.0uØ	6.0Ø	1.0mØ	40 Δ				3.0pØ	ME	TO1
8#	2SA88	80m	90.M		#J	25		.50	10m	.50u	9.0Ø	1.5m	50				2.3p	D	
9#	2SA89	80m	90.M		#J	25		.50	10m	.50u	9.0Ø	1.5m	70				2.3p	D	
10#	2SA233	80m	90.M	1.3m	#J	20		.50	10m	30u	6.0Ø	1.0m	50				2.3p	ME	TO1
11	2N1180	80m	100M		#	30		.50	10m	12uØ	12Ø	1.0mØ	80				2.0p	D	TO45 H
12	2N1713	80m	100MΔ		#S	12	30	1.0	10m	12u	6.0Ø	1.0mØ	40 Δ				3.1p		TO7
13#	2SA360	80m	110M	1.3m	#J	20	20 Ø	.50	10m	30u	9.0Ø	1.0m	70				2.3p	ME	TO44
14#	2SA234	80m	120M			20		.50	10m	30u	6.0Ø	1.0mØ	70				2.1p	ME	TO44
15#	2SA235H	80m	125M			20		.50	10m	15u	6.0Ø	1.0m	30 Δ				2.1p	ME	TO44
16#	2SA361	80m	125M	1.3m	#J	20	20 Ø	.50	10m	30u	6.0Ø	1.0m	70				2.3p	ME	TO44
17#	2SA87	80m	130M		#J	25		.50	10m	.50u	9.0Ø	1.5m	100				2.3p	D	
18#	AF143	80m	130M	1.0m	#J	30	30	1.0	10m	8.0uØ	6.0Ø	1.5m	85				2.4p	D	TO7
19#	AF144	80m	130M	1.0m	#J	30	30	1.0	10m	8.0uØ	6.0Ø	1.5m	85				2.4p	D	TO7
20#	AF165	80m	130M	1.3m	#J	30	30 Ø	1.0	10m	8.0uØ	6.0Ø	1.5mØ	85				3.1p	D	TO44
21#	2SA235	80m	135M			20		.50	10m	30u	6.0Ø	1.0mØ	90				2.1p	ME	TO44
22	2N1177	80m	140M		#	30		1.0	10m	12uØ	12Ø	1.0mØ	100				2.0p	D	TO45 H
23	2N1178	80m	140M		#	30		1.0	10m	12uØ	12Ø	1.0mØ	40				2.0p	D	TO45 H
24	2N1179	80m	140M		#	30		1.0	10m	12uØ	12Ø	1.0mØ	80				2.0p	D	TO45 H
25#	2SA134	80m	140M		#J	20		.50	10m	.30u	6.0Ø	1.0m	70				2.5p	ME	
26#	154T1	80m	140M	1.1m	#J	12	12 §	1.0	6.0m	10u	6.0Ø	1.0mØ	30 Δ					PEB	R73
27#	NKT676	80m	140M	1.6m	ØJ		20 Ø		10m	8.0u	4.5	1.0m	40 Δ				2.0p		TO1
28#	2SA135	80m	150M		#J	20		.50	10m	.30u	6.0Ø	1.0m	70				2.5p	ME	
29#	155T1	80m	150M	1.1m	#J	12	12 §	1.0	6.0m	10u	6.0Ø	1.0mØ	30 Δ					PEB	R73
30#	156T1	80m	150M	1.1m	#J	12	12 §	1.0	6.0m	10u	6.0Ø	1.0mØ	15 Δ					PEB	R73
31#	AF142	80m	150M	1.0m	#J	30	30	1.0	10m	8.0uØ	6.0Ø	1.5m	85				2.4p	D	TO7
32#	AF164	80m	150M	1.3m	#J	30	30 Ø	1.0	10m	8.0uØ	6.0Ø	1.5mØ	85				3.1p	D	TO44
33#	157T1	80m	160M	1.1m	#J	12	12 §	1.0	6.0m	10u	6.0Ø	1.0mØ	15 Δ					PEB	R73
34#	2SA288	80m	250M§Δ	1.3m	#J	20		.50	10m	30u	6.0Ø	3.0m	10 Δ				1.2pØ	ME	TO7
35#	2SA289	80m	250M§Δ	1.3m	#J	20		.50	10m	30u	6.0Ø	3.0m	10 Δ				1.2pØ	ME	TO7
36#	2SA290	80m	250M§Δ	1.3m	#J	20		.50	10m	30u	6.0Ø	3.0m	10 Δ				1.2pØ	ME	TO7
37#	THP501	80m	280M	1.3m	#J	20		1.0	10m	20u	9.0	2.0m	65 Ø					Ø	TO12
38#	THP502	80m	280M	1.3m	#J	20		1.0	10m	20u	9.0	2.0m	55 Δ					Ø	TO12
39#	504T1	80m	300M§Δ	1.3m	#J	20	20 §	1.0	10m	10u	9.0Ø	2.0mØ	100 †Δ				2pØ	MD	R73
40#	159T1	80m	330M§	1.3m	#J	14	14 §	7.0	10m	10uØ	9.0Ø	2.0mØ	15 †Δ						R73
41#	505T1	80m	330M§Δ	1.3m	#J	20	20 §	1.0	10m	10u	9.0Ø	2.0mØ	30 †Δ				2pØ	MD	R73
42#	508T1	80m	330M§Δ	1.3m	#J	20	20 §	1.0	10m	10u	9.0Ø	2.0mØ	15 †Δ				2pØ	MD	R73
43#	160T1	80m	345M§	1.3m	#J	14	14 §	7.0	10m	10uØ	9.0Ø	2.0mØ	15 †Δ						R73
44#	161T1	80m	345M§	1.3m	#J	14	14 §	7.0	10m	10uØ	9.0Ø	2.0mØ	15 †Δ					Ø	R73
45#	501T1	80m	345M§Δ	1.3m	#J	20	20 §	1.0	10m	10u	9.0Ø	2.0mØ	30 †Δ				1.5pØ	MD	R73
46#	503T1	80m	345M§Δ	1.3m	#J	20	20 §	1.0	10m	10u	9.0Ø	2.0mØ	15 †Δ				1.5pØ	MD	R73
47#	162T1	80m	360M§	1.3m	#J	14	14 §	7.0	10m	10uØ	9.0Ø	2.0mØ	15 †Δ						R73
48#	506T1	80m	380M§Δ	1.3m	#J	20	20 §	1.0	10m	10u	9.0Ø	2.0mØ	30 †Δ				1.5pØ	MD	R73
49#	507T1	80m	380M§Δ	1.3m	#J	20	20 §	1.0	10m	10u	9.0Ø	2.0mØ	15 †Δ				1.5pØ	MD	R73
50#	2SA435	80m	400M			20		.50	10m	30u	6.0	3.0m	10 Δ				1.4p	ME	TO18
51#	2SC125	80m	700M		#	20		.50	10m	30u	6.0	3.0m	10 Δ				.90p	ME	TO7
52	2N1516	83m		1.6m	ØS	25		.50	10m	13uØ	1.0	6.0	20 †Δ				5.5pØ		TO7 G
53#	OC975	83m		1.6m	ØJ	30			10m		6.0	1.0m	36 Δ					AD	TO7 H
54#	2SA145	83m	6.0M	1.6m	ØJ	15		12	10m	12uØ	6.0	1.0m	50				12p	A	TO1
55#	2SA302	83m	6.0M	1.6m	ØJ	20		15	100m	3.0uØ		100m	20 †					A	R9
56#	2SA303	83m	9.0M	1.6m	ØJ	20		15	100m	3.0uØ		100m	50 †					A	R9
57#	2SA144	83m	12.M	1.7mØ	J	15		12	10m	12uØ	6.0	1.0m	100				11p	A	TO1
58#	OC43N	83m	12.M§Δ	1.7mØ	J	15	15	12	50m	10u	0.0	50mØ	50 †Δ					AΔ	TO1 A
59	2N1515	83m	70.M§	1.7mØ	J	20			10m	13uØ	6.0Ø	1.0m	100					AD	TO7 H
60	JAN2N1517	83m	70M§	1.6m	ØJ	20			10m	13uØ	6.0	1.0m	67 †				6.0p	AD	TO7
61	A411	83m	100M§Δ	600	JØ	40	10		10m	6.0uØ	6.0	1.0m	20 †Δ				1.5p†Ø	AD	TO72 J
62#	AFZ11	83m	140M§	1.7mØ	J	20	20 #	.50	10m	50u	6.0Ø	1.0mØ	70				2.0p	ADØ	TO72 G
63#	2SA308	83m	450M§	1.6m	ØJ	20		.30	5.0m	13uØ	12	1.0m	250				500f	AD	TO7
64#	2SA309	83m	600M§	1.6m	ØJ	20		.30	5.0m	13uØ	12	1.0m	250				500f	AD	TO7
65	A1378	86m	160M§	2.2m	#J	32	32 §	1.0	30m	3.0uØ	10	1.0m	50		30			PDØ	TO12
66	2N26	90m			*S	30	40	40	40m	.7mØ								PCΔ	
67	A1220	90m		11u		25	25 Ø	.30	15m	3.5uØ	10	2.0mØ	20 †					PD	TO18
68#	AF186G	90m		2.0m	ØJ	25	25	.30	15m	3.5u							1.9pØ	ADØ	TO12
69#	AF186W	90m		2.0m	ØJ	25	25	.30	15m	3.5u							1.9pØ	ADØ	TO12
70	GT1604	90m	.50M	1.8m	#S	10				6.0u	5.0Ø	1.0m	15				16p		TO9
71#	NKT255	90m	1.0M	1.5m	#J	9.0	9.0 Ø		10m	5.0u	4.5Ø	1.0mØ	25 Δ					A	TO22
72#	NKT265	90m	1.0M	1.5m	#J	9.0	9.0 Ø		10m	5.0u	4.5Ø	1.0mØ	25 Δ					A	TO5
73#	AC170	90m*	1.7M§	2.0m	#J	32	32 Ø	10	200m	25u	6.0Ø	2.0mØ	125	65m	2.5k	5.5	21p	A	R48a A
74#	AC171	90m*	2.3M§	2.0m	#J	32	32 Ø	10	200m	25u	6.0Ø	2.0mØ	200	83m	4.0k	6.0	21p	A	R48a A
75	GT1605	90m	6.5M	1.8m	#S	15		1.0		25u	9.0Ø	1.0m	30 Δ	3.0uØ			18pØ	A	TO9
76#	NKT5	90m	7.5MΔ	1.5m	#A	16	10	15	500m	5.0u	.50	10mØ	7.0 Δ				10p	Δ	R65
77#	NKT24	90m	7.5MΔ	1.5m	#A	16	10	10	500m	5.0u	.50Ø	10mØ	7.0 Δ				10p	AΔ	TO5
78#	NKT25	90m	7.5MΔ	1.5m	#A	16	10	10	500m	5.0u	.50Ø	10mØ	7.0 Δ				10p	AΔ	TO5
79#	38T1	90m	10.M	1.5m	#J	20			50m			10mØ	50 †						
80	GT1606	90m	10.M	1.8m	#S	15		1.0		25u	9.0Ø	.60m	50 Δ	3.0uØ			18pØ	A	TO9
81#	39T1	90m	15.M	1.5m	#J	14			50m			10mØ	100 †						
82#	NKT4	90m	15.MΔ	1.5m	#A	16	10	10	500m	5.0u	.50	10mØ	7.0 Δ				10p	Δ	R65
83#	AF256	90m*	330M§Ø	2.0m	#J	25	18	.30	10m	8.0uØ	12Ø	1.0mØ	10 †Δ				700ft†Ø	PL†Ø	MM11 A
84#	AF253	90m*	700M§Ø	2.0m	#J	20	15	.30	10m	5.0uØ	12Ø	2.0mØ	10 †Δ				.4p†	PL	MM12
85#	AF252	90m*	750M§Ø	2.0m	#J	20	15	.30	10m	5.0uØ	12Ø	2.0mØ	10 †Δ				.4p†	PL	MM12 A
86#	AF251	90m*	800M§Ø	2.0m	#J	20	15	.30	10m	5.0uØ	12Ø	2.0mØ	10 †Δ				.4p†	PL	MM12 A
87	TIX2000	90m	4.2G*	1.5m	#J	15		.50	25m	2.0uØ	6.0Ø	3.0mØ	10 †Δ				1.3p	ME	R38
88	PADT40	94m	300M	5.5m	Ø	20		2.5	50m		.90	30m	50				5.0p	AD	TO18
89	2N51	100m			*A	50		50	8.0m				.67					PCΔ	
90	2N649/5	100m			ØA	20		2.5	50m		1.0Ø	50mØ	65 †					A	TO5
91	JAN2N694	100m		1.3m	#J	30	15	1.0	50m	3.0uØ	6.0	2.0m	9.0 Δ		120		2.0pØ	Dt	TO28
92	2N2654	100m		2.0m	ØS	25		.50	10m	8.0uØ	6.0Ø	1.0mØ	25 †Δ				1.7pØ		TO12 G
93	2N2671	100m		2.0m	ØS	25		1.0	10m	8.0uØ	6.0Ø	1.0mØ	40 †Δ				2.5pØ		TO12 GØ
94	2N2672	100m		2.0m	#S	25		1.0	10m	8.0uØ	6.0Ø	1.0mØ	40 †Δ				2.5pØ		TO39 A
95	2N2672A	100m		2.0m	#S	32	32 Ø	2.0	10m	8.0uØ	6.0Ø	1.0mØ	40 †Δ				2.5pØ	AD	TO39
96	3N211†	100m			*A	60		50					2.5					PC$	
97#	AF186	100m		2.0m	ØJ	25			15m				20 †Δ				1.8p	AD	R96
98#	EW51	100m			*A	20			15m	2.2m			.67					PCΔ	
99	MA898	100m		1.6m	#J	25	25 Ø	10	100m	100u	6.0Ø	1.0m	20 Δ					A	TO5
100	MA899	100m		1.6m	#J	25	25 Ø	10	100m	100u	6.0Ø	1.0m	40 Δ					A	TO5
101	MA900	100m		1.6m	#J	25	25 Ø	10	100m	100u	6.0Ø	1.0m	90 Δ					A	TO5
102	MA901	100m		1.6m	#J	20	20 Ø	10	100m	100u	6.0Ø	1.0m	20 Δ					A	TO5 A
103	MA902	100m		1.6m	#J	15	15 Ø	5.0	100m	100u	6.0Ø	1.0m	15 Δ					A	TO5 A
104	MA903	100m		1.6m	#J	15	15 Ø	5.0	100m	100u	6.0Ø	1.0m	20 Δ					A	TO5 A
105	MA904	100m		1.6m	#J	15	15 Ø	5.0	100m	100u	6.0Ø	1.0m	180 Δ					A	TO5 A
106	SYL1592	100m			ØJ		15	10	200m		.40Ø	1.0mΔ	25 †				30p	A	
107	SYL2120	100m		1.3m	#J	15	15	3.5	50m	3.0uØ	.30Ø	10mØ	25 †Δ					DM	u1
108	T2351	100m		1.1m	#S	20	20 Ø	.40		50u	15	2.0m	6.0 Δ				.90p	MD	X13
109#	TK49C	100m		2.0m	Ø	20		20		8.0u*	0.0	5.0m	15 †Δ					A	R47a
110	2N1432	100m	.01M†	1.3m	#J	45	45 §	.50	10m	15u	15Ø	2.0mØ	60					D	TO33