

# SYMBOLS & CODES EXPLAINED

## IN TYPE No. CROSS-INDEX & TECHNICAL SECTIONS

- $\Delta$  } Indicators of separate manufacturers producing same type number (non-JEDEC) whose characteristics are not the same.
- $\square$  } 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.
- $\%$  } Technical Data Sections)
- RT ... Replacement Type; consult manufacturer.

## SYMBOLS & CODES COMMON TO MORE THAN ONE TECHNICAL SECTION

### LINE No.

- $\nabla$  - New Type
- $\blacklozenge$  - Revised Specifications
- # - Non-JEDEC Type manufactured outside U.S.A.

### TYPE No.

- $\dagger$  - Switching type, also listed in Section 12
- $\emptyset$  - 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.
- $\S$  - Radiation Resistant Devices, also listed in Section 13, Category 13.

### STRUCTURE (All Sections)

- A - Alloy Except 6 & 7)
- 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
- $\Delta$  - Switching, other uses
- $\square$  - Chopper, other uses
- $\emptyset$  - Noise figure 8db or below
- $\dagger$  - Plastic package
- $\%$  - Overlay

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

LINE No.	TYPE No.	MAX. COLL. DISS. @25°C (W)	DERATE IN FREE AIR W/°C (Hz)	M E X P	ABS. MAX. RATINGS @25°C			TYPICAL 'h' PARAMETERS					Cob (F)	STRUC-TURE	DWG # s/a TO200 Ser.	C E D E	
					$BV_{cbo}$ (V)	$BV_{ceo}$ (V)	$BV_{ebo}$ (V)	$I_{cbo}$ (A)	$I_{cbo}$ @MAX $V_{cb}$ (A)	$V_{cb}$ (V)	BIAS $I_e$ (A)	$h_{fe}$					COMMON $h_{oe}$ (mhos)
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	

$\emptyset$  - With infinite heat sink  
Following symbols indicate temperature at which derating starts:

$\dagger$ - 40°C	$\square$ - 60°C	$\S$ - 100°C
* - 45°C	$\S$ - 70°C	$\blacklozenge$ - Min.
# - 50°C	$\Delta$ - 85°C	

$\dagger$  -  $f_{ae}$   
 $\S$  - Gain bandwidth product ( $f_t$ )  
\* - Maximum frequency of oscillation  
 $\emptyset$  - Figure of merit (frequency for unity power gain)  
 $\Delta$  - Minimum  
 $\square$  - Maximum

$\emptyset$  - With infinite heat sink

* - 50-65°C	A - Ambient
$\emptyset$ - 70-80°C	C - Case
# - 85-100°C	J - Junction
$\blacklozenge$ - 110-125°C	S - Storage
$\dagger$ - 130-135°C	
$\S$ - 140-165°C	
$\square$ - 170-200°C	
$\nabla$ - Over 200°C	

$\emptyset$  -  $I_C$   $\Delta$  -  $I_B$

$\emptyset$  -  $V_{CE}$

$\emptyset$  - At  $V_{CB} < \text{Max. } V_{CB}$  (See Mfr. Spec.)  
# -  $I_{CEX}$   $\S$  - Typical  
 $\S$  -  $I_{CES}$  \* -  $I_{CER}$   
 $\dagger$  - At Temp.  $> 25^\circ\text{C}$   $\Delta$  -  $I_{CEO}$   
 $\blacklozenge$  - At Temp.  $25^\circ\text{C}$  Case

# - Pulsed or Peak  
 $\S$  - Minimum

# -  $BV_{CEX}$  or punch-through  
 $\emptyset$  -  $BV_{CES}$   $\square$  -  $BV_{ceo(sus)}$   
 $\S$  -  $BV_{CER}$  \* - Pulsed  
 $\$$  - Indicates min. values given for  $BV_{cbo}$ ,  $BV_{ceo}$ , and  $BV_{ebo}$ .

b - h parameters are  $h_{ob}$ ,  $h_{ib}$ ,  $h_{rb}$   
 $\square$  - Maximum

$\dagger$  -  $h_{FE}$   $\Delta$  - Minimum  
# - Pulsed  $\square$  - Maximum  
 $\S$  -  $h_{FC}$   
\* - Available in selected ranges

$\square$  - Maximum  $\S$  -  $C_{cb}$   $\dagger$  -  $C_{re}$

$\$$  - 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.	TYPE No.	1] MAX. COLL. DISS. @25°C (W)	2] DERATE IN AIR W/°C (Hz)	TEMPERATURE (°C)	ABS MAX RATINGS @25°C					MAX. I <sub>cb</sub> @ MAX V <sub>cb</sub> (A)	TYPICAL h <sub>FE</sub> PARAMETERS					Cob (F)	STRUCTURE	DWG # Y200 s/a TO200 Ser.	# C O D E
					V <sub>bcbo</sub> (V)	V <sub>veo</sub> (V)	V <sub>beo</sub> (V)	I <sub>c</sub> (A)	BIAS			COMMON EMITTER							
									V <sub>cb</sub> (V)		I <sub>e</sub> (A)	h <sub>fe</sub>	hoe (mhos)	hie (Ω)	hre (X.0001)				
1#	2SB174	225m	7.0M	0J	20				20u	1.0	300m	65						R8	
2#	2SB219	225m	1.0M	3.7m	30	25	10	200m	16u	1.0	20m	31			25p	A	TO5		
3#	2SB326	225m	1.0MΔ	#J	30		15	500m	10u	1.0	20m	65				A	TO5		
4#	2SB327	225m	1.0MΔ	#J	30		15	500m	10u	1.0	20m	110				A	TO5		
5#	2SB220	225m	1.5M	3.7m	30	25	10	200m	16u	1.0	20m	50			25p	A	TO5		
6#	2G319	225m	2.0M	3.7m	30	20	3.0	200m	16u	1.0	20m	35			27p	A	TO5		
7#	2G524†	225m	2.0M	3.7m	45	30	15	500m	10u	5.0	1.0m	30	650nb	3.1	4.0	27p	At	TO5	
8#	2G1024†	225m	2.0M	3.7m	70	40	20	500m	30u	5.0	1.0m	30	700nb	30	4.0	27p	At	TO5	
9#	2SB218	225m	2.0M	3.7m	80	40	15	500m	10u	1.0	200m	50			30p	A	TO5		
10#	2SB221	225m	2.0M	3.7m	30	25	10	200m	16u	1.0	20m	72			25p	A	TO5		
11#	2SB224	225m	2.0M	3.7m	45	30	15	500m	10u	1.0	20m	35			25p	A	TO5		
12#	2G320	225m	2.5M	3.7m	30	20	3.0	200m	16u	1.0	20m	54			27p	A	TO5		
13#	2G525†	225m	2.5M	3.7m	45	30	15	500m	10u	5.0	1.0m	44	600nb	3.1	5.0	27p	At	TO5	
14#	2G577	225m	2.5M	3.7m	70	30	20	500m	30u	5.0	1.0m	65	500nb	29	5.0	27p	AtΔ	TO5	
15#	2G1025†	225m	2.5M	3.7m	70	40	15	500m	30u	5.0	1.0m	44	640nb	29	4.5	27p	At	TO5	
16#	2SB222	225m	2.5M	3.7m	30	25	10	200m	16u	1.0	20m	97			25p	A	TO5		
17#	2SB225	225m	2.5M	3.7m	45	30	15	500m	10u	1.0	20m	53			25p	A	TO5		
18#	2G526†	225m	3.0M	3.7m	45	30	15	500m	10u	5.0	1.0m	64	420nb	30	6.5	27p	At	TO5	
19#	2G1026†	225m	3.0M	3.7m	70	40	20	500m	30u	5.0	1.0m	64	450nb	28	5.0	27p	At	TO5	
20#	2SB223	225m	3.0M	3.7m	30	25	15	200m	16u	1.0	20m	150			25p	A	TO5		
21#	2SB226	225m	3.0M	3.7m	45	30	15	500m	10u	1.0	20m	73			25p	A	TO5		
22#	2G321	225m	3.1M	3.7m	30	20	3.0	200m	16u	1.0	20m	85			27p	A	TO5		
23#	2G527†	225m	3.3M	3.7m	45	30	15	500m	10u	5.0	1.0m	81	370nb	29	8.0	27p	At	TO5	
24#	2G1027†	225m	3.3M	3.7m	70	40	20	500m	30u	5.0	1.0m	87	420nb	28	5.2	27p	At	TO5	
25#	2SB227	225m	3.3M	3.7m	45	30	15	500m	10u	1.0	20m	91			25p	A	TO5		
26#	2SA86	225m	50M	5.0m	45	30	1.0	10m	9.0	1.0m	80		8.5u	2.2k	1.7	2.2p	PC	R44	
27#	PET8350	225m	150M	2.3m	40	30	5.0	750m	0.5u	5.0	10m	65	140u	250	2.0	5p	PE	R110	
28#	PET8352	225m	150M	2.3m	40	30	5.0	750m	0.5u	5.0	10m	65	140u	250	2.0	5p	PE	R110	
29#	PET8351	225m	200M	2.3m	40	30	5.0	750m	0.5u	5.0	10m	125	200u	400	2.0	5p	PE	R110	
30#	PET8353	225m	200M	2.3m	40	30	5.0	750m	0.5u	5.0	10m	125	200u	400	2.0	5p	PE	R110	
31#	AFY39	225m	500M	2.2m	32	32	3.0	32m	4.0u	5.0	10m	15				ME	R96		
32#	2N509	225m	750M	3.0m	30	30	1.0	40m	5.0u	10	10m	20			2.5p	DA	R43		
33#	AS12	227m	4.5m	4.5m	32	32		600m	20u	6.0	600m	20				A	R43		
34#	AS13	227m	4.5m	4.5m	60	60		600m	20u	6.0	600m	20				A	R43		
35#	OC318	227m	1.5M	4.5m	20	20		300m	20u	1.0	300m	65				A	R43		
36#	2N1056	240m	500kΔ	4.0m	70	50	15	300m	25u	1.0	20m	18			60p	A	R32		
37#	2G270	240m	2.5M	4.0m	30	20		200m	16u	1.0	100m	40		120		A	TO5		
38#	2G271	240m	3.1M	4.0m	30	20		200m	16u	1.0	100m	75		200		A	TO5		
39#	2N1384†	240m	35.8M	4.0m	30	20		500m	50u	5.0	200m	50				A	TO11		
40#	SFT162	240m	70M	4.0m	70	50		10m	15u	12	6.0m	50			3p	D	TO44		
41#	2N2718†	240m	150MΔ	3.2m	20	12	3.5	400m	7.0u	2.7	170m	25			10p	D	TO5		
42#	2SB89	250m			25	25		150m	16u	6.0	1.0m	55		20u	1.8k	3.3	A	TO7	
43#	2SB89A	250m			45	45		150m	50u	1.0	150m	65				A	PC	R27	
44#	GA52996	250m			100			50m	3.0m										
45#	TF75	250m				13		125m			20m								
46#	2SB200	250m	500k†	5.0m	32	32	12	400m	40u	1.0	150m	30				A	R10		
47#	2SB200A	250m	500k†	5.0m	45	45	12	400m	40u	1.0	150m	30				A	R10		
48#	2SB202	250m	500k†	5.0m	32	32	12	400m	40u	1.0	150m	70				A	R10		
49#	T1000	250m	60M								85							TO25	
50#	T1001	250m	60M								120							TO25	
51#	2G381	250m	1.0MΔ		20	20	3.0	500m	6.0	1.0m	30			35p	A	Δ	R51		
52#	2G382	250m	1.0MΔ		30	30	10	500m	6.0	1.0m	40					A	R51		
53#	2G383	250m	1.0MΔ	3.8m	70	30	12	1	10u	1.0	50m	40				A	TO5		
54#	2G384	250m	1.0MΔ	3.8m	50	25	12	1	10u	1.0	50m	55				A	TO5		
55#	2G385	250m	1.0MΔ	3.8m	50	25	12	1	10u	1.0	50m	100				A	TO5		
56#	2G386	250m	1.0MΔ	3.8m	40	20	12	1	10u	1.0	50m	55				A	TO5		
57#	2G387	250m	1.0MΔ	3.8m	40	20	12	1	10u	1.0	50m	100				A	TO5		
58#	2SB268	250m	1.0M	4.1m	30	30	15	150m	10u	1.0	150m	70				A	R27		
59#	2SB317	250m	1.0M	4.2m	16	16	6.0	300m	14u	1.0	150m	60				A	R27		
60#	2SB89AH	250m	1.5M		45	45	12	150m	50u	6.0	1.0m	60		20u	1.8k	3.3	A	TO7	
61#	2SB89H	250m	1.5M		30	30	12	150m	12u	6.0	1.0m	60		20u	1.8k	3.3	A	TO7	
62#	2SA41	250m	6.0M		35	30	20	40m	50u	6.0	1.0m	45		23u	1.3k	2.9	10p	A	TO1
63#	2SA42	250m	6.0M		45	45	20	40m	50u	6.0	1.0m	45		21u	1.3k	2.7	10p	A	TO1
64#	2N1174†	250m	7.0M	3.3m	35	35	35	200m	10u	1.0	500u	85		170nb	5.8	8.3	15p	A	TO29
65#	ALZ10	250m	30M	5.0m	50	40	25	70	250m	30u	6.0	4.0m	40			15p	A	R95	
66#	2N1495A	250m	150M	3.3m	40	25	4.0	500m	2.0u	5.0	200m	25			6.5p	A	TO9		
67#	2N1403	250m	200M	3.0m	30	15	1.0	100m	7.0u	1.5	7.0m	25			6p	A	RO24		
68#	2N537	250m	600M	3.3m	30	30	1.0	100m	3.0u	10	10m	24		12ub	5.7	3.0p	D	TO29	
69#	2SA373	250m	640M		25	12	50	150m	15u	10	5.0m	40			3.2p	EM	TO5		
70#	XT200	250m	1.0G	3.3m	35	35	2.0	300m	5.0u						11p	D	TO9		
71#	AC142H-K	280m	1.5M	4.0m	35	35	10	1.2	14u		400m	80				A	TO1		
72#	2SB381	270m	1.3M		32	30	10	300m	10u	1.0	20m	42		500nb	27	3.5	A	TO5	
73#	2SB377	270m	1.4MΔ		32	30	10	150m	10u	6.0	50m	134				A	TO5		
74#	2SB382	270m	1.5M		32	30	10	300m	10u	1.0	20m	84		500nb	27	5.0	A	TO5	
75#	2SB383	270m	3.0M		32	30	10	500m	10u	1.0	20m	84				A	TO5		
76#	2N2786A	280m	225MΔ	4.3m	35	20	50	150m	10u	2.0	100m	33		30		5.0p	PD	TO39	
77#	2N1287	300m	2.5m	2.5m	25	25	15	300m	15u	5.0	10m	40				A	MD27		
78#	2N1287A	300m	2.5m	2.5m	25	25	15	300m	15u	5.0	10m	60				A	MD27		
79#	2N2100A†	300m	4.0m	4.0m	40	20	4.0	500m	12u	1.0	200m	30			20p	A	TO9		
80#	B1022	300m	2.5m		15	15	15	300m	25u	5.0	10m	20		2.0k			A	TO5	
81#	2SB201	300m	50M	4.5m	35	35	12	400m	30u	1.0	150m	60				A	TO5		
82#	AT128	300m	70M	5.0m	32	32	15	1	14u							A	TO1		
83#	2SB451	300m	1.0M	5.0m	25	25	6.0	1.0	30u	1.0	150m	80				A	R107		
84#	2SB452	300m	1.0M	5.0m	25	25	6.0	1.0	30u	1.0	150m	150				A	R107		
85#	2SB452A	300m	1.0M	5.0m															