

**SYMBOLS & CODES EXPLAINED**

**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 number.  
 § - 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  
 Δ - Switching, other uses  
 □ - Chopper, other uses  
 ∅ - Noise figure 8db or below  
 † - Plastic package  
 % - Overlay

**12. SWITCHING TRANSISTORS** \* THESE TYPES ALSO INCLUDED ELSEWHERE WITH OTHER CHARACTERISTICS SEE TYPE NO. CROSS INDEX FOR ADDITIONAL PAGE & LINE NO.

LINE No.	TYPE No.	fab (Hz)	MAX RISE TIME tr (s)	MAX DELAY TIME td (s)	MAX STORE TIME ts (s)	MAX FALL TIME tf (s)	MAX. Pc IN FREE AIR @ 25°C (W)	BIAS			MAX. SAT. RES. (Ω)	Cob (F)	r'bb X Cob (s)	STRUCTURE	DESCRIPTION	MAX. TEMP (°C)	DWG. No.	LCODE
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

† -  $f \alpha_e$   
 § - Gain bandwidth product ( $f_T$ )  
 \* - Maximum frequency of oscillation  
 ∅ - Figure of merit (frequency for unity power gain)  
 Δ - Minimum □ - Maximum

§ - Charge storage time constant  
 ▼ - Stored base charge - picocoulomb  
 ♦ - Total switching time  
 ∅ -  $T_{on} = t_r + t_d$   
 † - Typical Value

∅ -  $T_{off} = t_s + t_f$   
 † - Typical Value  
 \* -  $T_{on} + T_{off} = t_d + t_r + t_f + t_s$

∅ -  $V_{CE}$   
 ∅ -  $I_C$   
 Δ -  $I_B$   
 † -  $h_{fe}$   
 # - Pulsed  
 Δ - Minimum  
 □ - Maximum  
 \* - Available to selected range narrower than indicated  
 § -  $Y_{fs}$  in millimho (FET's only). Bias values are  $V_{DS}$  &  $I_D$   
 ∅ - With infinite heat sink  
 Following symbols indicate temperature at which derating starts:  
 † - 40°C § - 70°C  
 \* - 45°C ♦ - 100°C or greater  
 # - 50°C ∅ - 80°C  
 □ - 60°C Δ - Pulsed

† -  $r'_{bb}$   
 □ - Maximum  
 § -  $C_{cb}$   
 § -  $C_{iss}$  (FET's only)

§ - Tetrode  
 N - NPN or "N" Channel  
 P - PNP or "P" Channel  
 § - Field Effect Transistor  
 # - Radiation Resistant Device (See above also)

A - Ambient  
 C - Case  
 J - Junction  
 S - Storage

**13. MISCELLANEOUS TRANSISTORS**

LINE No.	TYPE No.	CATEGORY	STRUCTURE	MATERIAL	DWG. No.	LCODE	DESCRIPTION
1	2	3	4	5	6	7	8

- 1 - Avalanche Mode
- 2 - Bi-directional
- 3 - Field Effect
- 4 - Hook Collector
- 5 - Complementary Symmetry (PNP & NPN) Matched Pair
- 6 - Matched Pair
- 7 - Phototransistor
- 8 - Tetrode
- 9 - Unijunction: N-N-type emitter (P-type Base) P-P-type emitter (N-type Base)
- 10 - Chopper
- 11 - Unmatched Composite (Dual)
- 12 - Cryogenic
- 13 - Radiation Resistant Devices
- 14 - Pressure Sensitive
- 15 - Transistor chips
- 16 - Darlington
- 17 - Microwave

N - NPN or N Channel  
 P - PNP or P Channel (See above also)

Ge - Germanium  
 Si - Silicon

See "TECHNICAL TERM DEFINITIONS" Section

# 13. MISCELLANEOUS TRANSISTORS

IN ORDER OF (1) CATEGORY & (2) TYPE No.

LINE No.	TYPE No.	1 CATEGORY	U STRUC- TURE	M D W G #	L C E O D E	DESCRIPTION
1	SA2738*	6	N	Si L2t		Pt-6W;hFE1/2-90 min;VBE(1-2)-1.5mV max; $\Delta$ VBE(1-2)/ $\Delta$ T-3uV/deg.C
2	SA2739*	6	N	Si L2t		Pt-6W;hFE1/2-90 min;VBE(1-2)-2.5mV max; $\Delta$ VBE(1-2)/ $\Delta$ T-5uV/deg.C
3	SD5010*	6	P-MOS	Si L53		Pt-325mW(each side) at 25°C Case temp;vfs 1/2 800m min;VGS(1-2) 70mV.
4	SD5011*	6	P-MOS	Si L54		Pt-325mW(each side) at 25°C Case temp;vfs 1/2 800m min;VGS(1-2) 70mV.
5	SD5012*	6	P-MOS	Si L53		Pt-325mW(each side) at 25°C Case temp;vfs 1/2 800m min;VGS(1-2) 70mV.
6	SD5013*	6	P-MOS	Si L54		Pt-325mW(each side) at 25°C Case temp;vfs 1/2 800m min;VGS(1-2) 70mV.
7	SD5014*	6	P-MOS	Si L53		Pt-325mW(each side) at 25°C case temp;vfs 1/2 .80min;VGS 1/2-200mV max.
8	SD5015*	6	P-MOS	Si L54		Pt-325mW(each side) at 25°C case temp;vfs 1/2 .80min;VGS 1/2-200mV max.
9	SD5050*	6	N-MOS	Si L53		Pt-325mW(each side) at 25°C case temp;vfs 1/2 .80min;VGS 1/2-200mV max.
10	SD5051*	6	N-MOS	Si L54		Pt-325mW(each side) at 25°C case temp;vfs 1/2 .80min;VGS 1/2-200mV max.
11#	SL360	6	NPN	Si L44a		BVCEO 15V;VCE(sat) 400mV max;IC 10uA.
12	SMT100	6	P	Si L17a		VCBO-45V;IC-30mA max;Pt-60W;VBE(1-2)-20mV;Cob-6.0pf.
13	SMT101	6	P	Si L17a		VCBO-45V;IC-30mA max;Pt-60W;VBE(1-2)-10mV;hFE1/hFE2-80 min.
14	SMT102	6	P	Si L17a		VCBO-45V;IC-30mA max;Pt-60W;VBE(1-2)-10mV;hFE1/hFE2-80 min.
15	SMT103	6	P	Si L17a		VCBO-45V;IC-30mA max;Pt-60W;VBE(1-2)-5.0mV;hFE1/hFE2-90 min.
16	SMT104	6	P	Si L17a		VCBO-45V;IC-30mA max;Pt-60W;VBE(1-2)-5.0mV;hFE1/hFE2-90 min.
17	SMT105	6	P	Si L17a		VCBO-45V;IC-30mA max;Pt-60W;VBE(1-2)-5.0mV;hFE1/hFE2-90 min.
18	SP8300	6	N-PL	Si L8a		Pc-30W;BVCEO-40V;hFE-30 min;IC-10mA;ICBO-0.25uA max.
19	SP8302	6	N-PL	Si L8a		Pc-50W;BVCEO-100V;hFE-75 min;IC-10mA;ICBO-0.25mA max.
20	SP8303	6	N-PL	Si L8a		Pc-50W;BVCEO-100V;hFE-35 min;IC-10mA;ICBO-0.25mA max.
21	SP8304	6	N-PL	Si L8a		Pc-30W;BVCEO-40V;hFE-30 min;IC-10mA;ICBO-0.25uA max.
22	SP8307	6	P-PL	Si L8a		Pc-30W;BVCEO-20V;hFE-35 min;IC-10mA;ICBO-0.1uA max.
23	SP8309	6	N-PL	Si L8a		Pc-50W;BVCEO-75V;hFE-40 min;IC-150mA;ICBO-0.1uA max.
24	SP8310	6	N-PL	Si L8a		Pc-50W;BVCEO-75V;hFE-100 min;IC-150mA;ICBO-0.1uA max.
25	SP8311	6	N-PL	Si L8a		Pc-50W;BVCEO-120V;hFE-40 min;IC-150mA;ICBO-0.1uA max.
26	SP10801	6	N-DPL	Si TO89		hFE1/hFE2-0.8min; VBE1-VBE2-1.6mV max;NF-4.0db max
27	SP10810	6	P-DPE	Si TO89		hFE1/hFE2-0.8min; VBE1-VBE2-4.0mV max;hFE-35min at 10mA-1.0V
28	SU2074*	6	N	Si L21		Pt-300mW; gm 1/2-95 min;VGS(1-2)-15mV max; $\Delta$ VGS(1-2)/ $\Delta$ T-10uV/Deg.C
29	SU2075*	6	N	Si L21		Pt-300mW; gm 1/2-95 min;VGS(1-2)-15mV max; $\Delta$ VGS(1-2)/ $\Delta$ T-15uV/Deg.C
30	SU2076*	6	N	Si L21		Pt-250mW; gm 1/2-95 min;VGS(1-2)-15mV max; $\Delta$ VGS(1-2)/ $\Delta$ T-10uV/Deg.C
31	SU2077*	6	N	Si L21		Pt-250mW; gm 1/2-95 min;VGS(1-2)-15mV max; $\Delta$ VGS(1-2)/ $\Delta$ T-25uV/Deg.C
32	SU2078*	6	N	Si L21		Pt-250mW; gm 1/2-95min;VGS(1-2)-15mV max; $\Delta$ VGS(1-2)/ $\Delta$ T-35uV/Deg.C
33	SU2079*	6	N	Si L21		Pt-250mW; gm 1/2-95 min;VGS(1-2)-15mV max; $\Delta$ VGS(1-2)/ $\Delta$ T-60uV/Deg.C
34#	TA-M93	6	NPN	Si TO5		Dual 2N300;10% hFE match;5.0mV VBE match;hFE at 10uA-50 min.
35	U205*	6	N	Si TO71		Pt-30W;IG(1-2)-5.0nA max;VGS(1-2)-5.0mV max;gfs 1/2-95 min.
36	U206*	6	N	Si TO71		Pt-30W;IG(1-2)-5.0nA max;VGS(1-2)-10mV max;gfs 1/2-95 min.
37	U207*	6	N	Si TO71		Pt-30W;IG(1-2)-5.0nA max;VGS(1-2)-15mV max;gfs 1/2-95 min.
38	UD1000	6	P-PE	Si L38		Pt(Both Sides)-200mW;BVCEO-50V;V <sub>o</sub> (1-2)-100uV max;IB and IC-20mA.
39	UD2000	6	P-PE	Si L2n		Pt-400mW;BVCEO-50V;VBE1/2-5mV max;hFE1/2-90 min; $\Delta$ VBE1-2-10uV/degC
40	JAN1N4378	7	N $\Delta$	Si X69		Pt-50mW;ID-10nAmax;IL-9.0mAmax;tr-1.5uSmax;VCE-50V;VEC-8V.
41	2N318	7	P-A	Ge		Pc-50mW; VCE-12V max; Sens-25uA/ft can;fab-750kc.
42	2N577	7	P	Ge		Pt-25mW; IC-10mA; Idark-300uA; Photosens-30A/lumen.
43	800	7	N-G	Ge		Max. Coll. Dist. 65mW; BVCE 20V; IC 5.0mA; Max. Temp. 75 deg.C.
44#	BPX30	7	N $\Delta$	Si X8	A $\emptyset$	Pt-500mW;ICE(D)-1.0uA max;Sens-100mA/mW/cm <sup>2</sup> ;tr-3.0uSec;tf-3.0uSec.
45#	BPX59	7	N $\Delta$	Si X8k	A $\emptyset$	Darlington;Pt 200mW;Ic 5.0mA at EA 100;tr 200uS;tf 150uS;Max spectral Sens 780nm.
46#	BPY62	7	N-PE	Si X8a	A $\emptyset$	Pt-20W;IC-1.0mA min;at B-1000 lux;Sens-1.0uM;VCE-15V.
47#	BPY66	7	N-DPL	Si X52	A $\emptyset$	ID-1.0uA max;IL-80mA min;BVCEO-5.0V min.
48	CLR2090	7	N-PE $\Delta$	Si L3k		Darlington;Pd 250mW;BVCEO 40V min;IL 600uA min at 20uW/cm sq;tr 100uS;tf 150uS.
49	CLR2191	7	N-PE $\Delta$	Si L3k		Darlington;Pd 250mW;BVCEO 40V min;IL 4.0mA min at 20uW/cm sq;tr 100uS;tf 150uS.
50	CLT4160	7	N-PE $\Delta$	Si u85a		Pd 50mW;BVCEO 50V;BVCEO 5.0V, IL 3.0mA max;ID 10nA max;tr 1.5us typ;tf 1.5us typ.
51	CLT4170	7	N-PE $\Delta$	Si u85a		Pd 50mW;BVCEO 40V;BVCEO 5.0V, IL 5.0mA max;ID 10nA max;tr 1.5us typ;tf 1.5us typ.
52	EIP	7	P	Ge		Idk-10uA; Ilt-10mA; Sens-300uA/1m.
53	EP120	7	P $\emptyset$	Si R110c	DB	Pt 250mW;Sin 400nA/mW/cm sq;IG(DARK) 30pA max;I <sub>gss</sub> (DARK) 500pA max;Vp 10V max.
54	EP121	7	P $\emptyset$	Si R110c	DB	Pt 250mW;Sin 400nA/mW/cm sq;IG(DARK) 30pA max;I <sub>gss</sub> (DARK) 500pA max;Vp 15V max.
55	EP122	7	P $\emptyset$	Si R110c	DB	Pt 250mW;Sin 400nA/mW/cm sq;IG(DARK) 30pA max;I <sub>gss</sub> (DARK) 500pA max;Vp 4.0V max.
56	EP123	7	P $\emptyset$	Si R110c	DB	Pt 250mW;Sin 400nA/mW/cm sq;IG(DARK) 30pA max;I <sub>gss</sub> (DARK) 500pA max;Vp 10V max.
57#	ES3501	7	P-A	Ge R71		Pc-36mW at 45 deg. C;BVCEO-10V; Ic-10mA max;Photosens-20uA/ft.
58#	ES3511	7	P-A	Ge R88		Pc-50mW; BVCEO-25V; IC-20mA max; Photosens-1.0uA/Lux
59	FF400*	7	N-E $\Delta$	Si TO72	DH	IG(Light)-15nA/FC min;ID(Light)-30uA/FC typ;tr-30ns;tf-50ns.
60	FPM100	7	N-PL	Si X52		Pt-75mW max;ID-1.0uA max;IL-80mA max;BVCEO-5.0V min.
61	FPN100	7	N-PL	Si		Phototrans;Pd-75mW;ID-10uA max;IL-80mA min.
62	FPO100	7	N-PL	Si X52a		Pt-75mW max;ID-1.0uA max;IL-80mA max.
63	FPT100	7	N-PL $\Delta$	Si R124	A	Pt-100mWmax;ID-101nAmax;IC-25mA;tr-3.0uSec.
64	FSP5	7	N-PL	Si X8		Pc-50W max; BVCEO-100V; Photo-Sens-1.0uA/ft min.
65	GS100	7	N-PL $\Delta$	Si u54		Pt-50mW;IL-1.0mA min;ID-1.0nA;VCE (SAT)-30V;tr-7.0us max;tf-40us max.
66	GS102	7	N-PL $\Delta$	Si u54		Pt-50mW;IL-1.0mA min;ID-1.0nA;VCE (SAT)-30V;tr-7.0us max;tf-40us max.
67	GS170	7	N-PL $\Delta$	Si u54		Pt-50mW;IL-1.0mA min;ID-20nA;VCE (SAT)-30V;tr-7.0us max;tf-40us max.
68	GS172	7	N-PL $\Delta$	Si u54		Pt-50mW;IL-1.0mA min;ID-20nA;VCE (SAT)-30V;tr-7.0us max;tf-40us max.
69	GS300	7	N-PL $\Delta$	Si X90a		Pt-50mW;IL-1.0mA min;ID-1.0nA;VCE (SAT)-30V;tr-7.0us max;tf-40us max.
70	GS302	7	N-PL $\Delta$	Si X90a		Pt-50mW;IL-1.0mA min;ID-1.0nA;VCE (SAT)-30V;tr-7.0us max;tf-40us max.
71	GS370	7	N-PL $\Delta$	Si X90a		Pt-50mW;IL-1.0mA min;ID-20nA;VCE (SAT)-30V;tr-7.0us max;tf-40us max.
72	GS372	7	N-PL $\Delta$	Si X90a		Pt-50mW;IL-1.0mA min;ID-20nA;VCE (SAT)-30V;tr-7.0us max;tf-40us max.
73	GS600L	7	N-PL $\Delta$	Si X29		Pt-25W; IL-30mA; ID-10nA; VCE-10V max; Sens-75uA/ft
74	GS601	7	N-PL $\Delta$	Si X29		Pt-25W; IL-20mA; ID-20nA; VCE-5.0V max; Sens-50uA/ft
75	GS611	7	N-PL $\Delta$	Si X29		Pt-25W; IL-3.0mA;ID-(12V)-1.0nA;VCE-12V max;Sens-7.5uA/ft
76	GS614	7	N-PL $\Delta$	Si X29		Pt-150mW;IL-5.0mA min;ID-1.0nA;VCE (SAT)-30V;tr-1.5us max;tf-2.0us max.
77	GS680	7	N-PL $\Delta$	Si X29		Pt-25W; IL-40mA; ID-10nA; VCE-5.0V max; Sens-100uA/ft
78	HFA4202	7	N	Si X40		BVCEO-25V; fae-120Kc; Cob-9.0pf; hFE-400 typ.
79	ME510	7	N-PE	Si TO18		BVCEO-10V; Photosens-2.0uA/ft min. at VCE-5.0V, IB-0.0
80	MRD100*	7	NAN $\Delta$	Si u43	B	Pd-50mW;BVCEO-80V;BVCEO-40V;ICEO(dark)-100nAmax;Sens.Rad.CEO-100nA/mW/sq.cm.
81	MRD200	7	N-AN	Si X83		Pt-05W;ICEO(dark)-25nA;BVCEO-50V;Sens-2.0uA/lum/ft.sq. min.
82	MRD210	7	N	Si X83a		BVCEO-50V;ICEO-25nA at 25deg C;SICE-4uA/lum/ft-2min;LS-8um typ.
83	MRD250	7	N	Si X83a		BVCEO-50V;ICEO-25nA at 25deg C;SICE-8uA/lum/ft-2min;LS-8um typ.
84	OCP71	7	P	Ge R9		Pt-50mW; BVCEO-25V; IC-20mA; Sens-30A/lm
85#	OS13	7	P	Ge X1		Pc-15mW max; BVCEO-30; Ic-2mA max.
86#	OS15	7	N	Si X1		Pc-30mW max;BVCEO-30Vmax;Ic-200uA max; Photo-Sens-1uA/500 Lumen.
87#	OS16	7	N	Si X1		Pc-30mW max;BVCEO-30Vmax;Ic-200uA max; Photo-Sens-4uA/500 Lumen.
88#	OS17	7	N	Si X1		Pc-30mW max;BVCEO-30Vmax;Ic-200uA max; Photo-Sens-7uA/500 Lumen.
89	PD3L	7	P	Ge		Pc-10W max; BVCEO-50V; IC-5.0ma max.
90	PDB	7	P	Ge		Pc-20mW max; BVCEO-50V; IC-5.0ma max.
91	PFN3066*	7	N-E	Si TO18	DB	IGSS(light) 3.0nA/ft;ID(light) 2.0uA/ft.
92	PFN3069*	7	N-E	Si TO18	DB	IGSS(light) 8.0nA/ft;ID(light) 14uA/ft.
93	PFN3458*	7	N-E	Si TO18	DB	IGSS(light) 10nA/ft;ID(light) 35uA/ft.
94#	PH244N*	7	N-PE $\Delta$	Si X8f	DB $\emptyset$	Pd 300mW; IGSS(light) 15nA/FC;ID(light) 100uA/FC.
95	TL58	7	NPL $\Delta$	Si X69a		Pd-50mW;ID-25nAmax;IL-1.0mAmin;tr-2.0uSec;BVCEO-50V;BVCEO-8.0V;tf-15uSec.
96	TL78	7	N	Si		Pc-50mW max; fab-200Mc; IC-2.0mA max.
97	3N25	8	PGD	Ge		Pc-125W;R <sub>sat</sub> -300 ohms;ries-2.0 ohms min;Coep-3.0pf
98	3N35A	8	N	Si TO12		Pc-15W max; BVCEO-18V; IC-30mA max.
99	3N56	8	N $\Delta$	Si TO5		Pc-15W max; BVCEO-18V; IC-30mA max.
100	3N57	8	N $\Delta$	Si TO5		Pc-125mW;BVCEO-30V;Ic-10mA; Gain 18 db ICBO-2uA
101#	3S001	8	N-D	Si		Pc-125W max; fab-100Mc; BVCEO-30V; Ic-10mA max.
102#	3S002	8	N-GD	Si TO12		Pc-125mW;BVCEO-30V;Ic-10mA; Gain 20 db ICBO-2uA
103#	3S003	8	N-D	Si		Pc-125W max; fab-150Mc; BVCEO-30V; Ic-10mA max.
104#	3S004	8	N-GD S	Si TO1	2	Pc-2.5mW; fab-200Mc; BVCEO-15V; Ic-2.0mA max.
105	GTA3	8	P	Ge		
106	JAN2N489	9	P-N	Si R33		Pc-45W max;VE-60V max;ISR-62 max;RBB0-6.8k $\Omega$ max.
107	JAN2N490	9	P-N	Si R33		Pc-45W max;VE-60V max;ISR-62 max;RBB0-6.8k $\Omega$ max.
108	JAN2N491	9	P-N	Si R33		Pc-45W max;VE-60V max;ISR-68 max;RBB0-6.8k $\Omega$ max.
109	JAN2N492	9	P-N	Si R33		Pc-45W max;VE-60V max;ISR-68 max;RBB0-6.8k $\Omega$ max.
110	JAN2N493	9	P-N	Si R33		Pc-45W max;VE-60V max;ISR-75 max;RBB0-6.8k $\Omega$ max.