

## Numerical Index

### 2N3065-2N3173

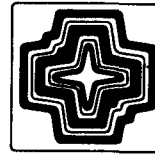
TYPE	MATERIAL	POLARITY	REPLACE- MENT	PAGE NUMBER	USE	MAXIMUM RATINGS						ELECTRICAL CHARACTERISTICS								
						P <sub>D</sub>	T <sub>J</sub>	V <sub>CB</sub>	V <sub>CE</sub>	I <sub>S</sub>	h <sub>FE</sub>	V <sub>CE(SAT)</sub>	f <sub>T</sub>	I <sub>S</sub>	f <sub>T</sub>	I <sub>S</sub>	I <sub>S</sub>			
						@ 25°C	°C	(volts)	(volts)	(mA)	(min)	(max)	(volts)	(MHz)	(volts)	(MHz)	(volts)	(mA)		
2N3065 2N3066, A thru 2N3071	S	P			AFA	400M	A	200	110	100	0	30	90	1.0M		30	E			
Field Effect Transistors, see Table on Page 1-166																				
2N3072	S	P			MNS	800M	A	200	60	60	0	30	130	50M	0.25	50M	25	E	130M	
2N3073	S	P			MNS	360M	A	200	60	60	0	30	130	50M	0.25	50M	25	E	130M	
2N3074	S	P			RFA	0.14W	A	85	30	25	S	25	300	3.5M						
2N3075	S	P			RFA	0.14W	A	85	35	25	S	20	250	3.0M						
2N3076	S	N			PHS	125W	C	175	140	50	0	30	90	7.0A	1.0	10A	60	E	50M	
2N3077	S	N			AFC	0.36W	A	200	80	60	0	100	400	10*	0.35	1.0M	120	E	15M	
2N3078	S	N			AFC	0.36W	A	200	80	60	0	40	120	10*	0.35	1.0M	50	E	15M	
2N3079	S	N			PMS	178W	C	150	200	200	0	7.0	40	5.0A	0.7	5.0A			30K	
2N3080	S	N			PMS	178W	C	150	300	300	0	7.0	40	5.0A	0.7	5.0A			30K	
2N3081	S	N			HSS	600M	A	200	70	50	0	20	500M	0.3	150M			150M		
2N3082	S	N			CHP	0.5W	A	200	25	7.0	0	100		0.25M				100M		
2N3083	S	N			CHP	0.5W	A	200	25	7.0	0	100		0.25M				100M		
2N3084	Field Effect Transistors, see Table on Page 1-166																			
2N3089, A thru 2N3091	Thyristors, see Table on Page 1-154																			
2N3106	S	N			MSS	0.8W	A	200	100	60	0	100	300	0.15A	1.0	1.0A	60	E	70M	
2N3107	S	N			MSS	800M	A	200	100	60	0	40	120	150M	0.25	150M			60M	
2N3108	S	N			MSS	800M	A	200	100	60	0	40	120	150M	0.25	150M			60M	
2N3109	S	N	2N2218A	8-114	MSS	0.8W	A	200	80	40	0	100	300	0.15A	1.0	1.0A	60	E	70M	
2N3110	S	N			MSS	800M	A	200	80	40	0	40	120	150M	0.25	150M			60M	
2N3112	Field Effect Transistors, see Table on Page 1-166																			
2N3113	S	N	2N3500	8-232	VID	800M	A	200	150	150	0	30	120	30M	1.0	50M	25	E	40M	
2N3114	S	N		8-175	HNS	0.4W	A	200	60	20	0	40	120	0.15A	0.5	0.15A			250M	
2N3115	S	N		8-175	HNS	0.4W	A	200	60	20	0	100	300	0.15A	0.5	0.15A			250M	
2N3116	S	N			AFC	360M	A	200	60	60	0	250	500	10*	0.35	1.0M	400	E	60M	
2N3117	S	N			RFA	1.0W	A	200	85	60	0	50	275	25M					250M	
2N3118	S	N			HSA	1.0W	A	200	100	80	0	50	200	100M					250M	
2N3119	S	N			MNS	800M	A	200	45	45	0	30	130	50M	0.25	50M	25	E	130M	
2N3120	S	P	2N2800	8-161	MNS	800M	A	200	45	45	0	30	130	50M	0.25	50M	25	E	130M	
2N3121	S	P	2N2837	8-161	MNS	360M	A	200	45	45	0	30	130	50M	0.25	50M	25	E	130M	
2N3122	S	N			AFA	800M	A	200	50	30	0	25	100	300M	1.5	300M			60M	
2N3123	S	N			HSS	0.8W	A	175	60	30	0	100	300	0.15A	0.4	0.15A			400M	
2N3124	S	P			LPA	90W	C	100	40	30	S	50	100	10A	0.5	10A	20	E	2.5K	
2N3125	S	P			LPA	90W	C	100	80	80	S	30	75	3.0A	1.5	3.0A	10	E	5.0K	
2N3126	S	P			LPA	90W	C	100	100	75	S	10	30	10A	1.0	10A	10	E	6.0K	
2N3127	S	P		9-43	RFA	0.1W	A	100	30	20	0	20	75	3.0M	0.3	5.0M	20	E	400M	
2N3128	S	P			AFA	0.15W	A	150	20	20	0	50	150	0.1M	0.25	1.0M	75	E	60M	
2N3129	S	N			AFA	0.15W	A	150	45	45	0	100	300	10M	0.25	1.0M	160	E	60M	
2N3130	S	N			AFA	0.15W	A	150	60	60	0	60	180	10M	0.25	1.0M	110	E	60M	
2N3131	S	N			HSS	0.15W	A	150	40	15	0	30	120	10M	0.25	1.0M			250M	
2N3132	S	P			PMS	90W	C	100	100	70	S	40	200	2.0A	1.5	5.0A			3.0K	
2N3133	S	P		8-194	HSS	0.6W	A	200	50	35	0	40	120	0.15A	0.6	0.15A			200M	
2N3134	S	P		8-194	HSS	0.6W	A	200	50	35	0	100	300	0.15A	0.6	0.15A			200M	
2N3135	S	P		8-194	HSS	0.4W	A	200	50	35	0	40	120	0.15A	0.6	0.15A			200M	
2N3136	S	P		8-194	HSS	0.4W	A	200	50	35	0	100	300	0.15A	0.6	0.15A			200M	
2N3137	S	N		9-47	RFA	600M	A	200	40	20	0			0.3	50M			500M		
2N3138	S	N			HPA	20W	C	200	65	65	0	10		1.0A				100M		
2N3139	S	N			HPA	20W	C	200	140	140	0	10		1.0A				100M		
2N3140	S	N			HPA	20W	C	200	65	65	0	10		1.0A				100M		
2N3141	S	N			HPA	20W	C	200	140	140	0	10		1.0A				100M		
2N3142	S	N			HPA	25W	C	200	65	65	0	10		1.0A				100M		
2N3143	S	N			HPA	25W	C	200	140	140	0	10		1.0A				100M		
2N3144	S	N			HPA	25W	C	200	65	65	0	10		1.0A				100M		
2N3145	S	N			HPA	25W	C	200	140	140	0	10		1.0A				100M		
2N3146	S	P	2N3616	7-121	LPA	150W	C	100	150	140	V	30	90	5.0A	0.4	5.0A	20	E	200K	
2N3147	S	P	2N3616	7-121	LPA	150W	C	100	180	160	V	30	90	5.0A	0.4	5.0A	20	E	200K	
2N3148	S	P			MSS	0.45M	A	100	11	6.0	0	70		2.0M	0.2	50M	80	E	25M	
2N3149	S	N			PMS	300W	C	200	80	80	0	10		50A	1.5	50A			0.1M	
2N3150	S	N			PMS	300W	C	200	100	100	0	10		50A	1.5	50A			0.1M	
2N3151	S	N			PMS	300W	C	200	150	150	0	10		50A	1.5	50A			0.1M	
2N3152	S	N			VID	25M	C	200	120	120	0	40		30M			20	E	200M	
2N3153	S	N			CHP	0.3W	A	200	15	15	0								30M	
2N3154	S	P			PMS	37.5W	C	100	40	25	0	60	180	0.5A	1.1	3.0A			15K	
2N3155	S	P			PMS	37.5W	C	100	60	40	0	60	180	0.5A	1.1	3.0A			15K	
2N3156	S	P			PMS	37.5W	C	100	80	55	0	60	180	0.5A	1.1	3.0A			15K	
2N3157	S	P			PMS	37.5W	C	100	100	65	0	60	180	0.5A	1.1	3.0A			15K	
2N3158	S	P			PMS	37.5W	C	100	40	25	0	30	75	0.5A	1.4	3.0A			10K	
2N3159	S	P			PMS	37.5W	C	100	60	40	0	30	75	0.5A	1.4	3.0A			10K	
2N3160	S	P			PMS	37.5W	C	100	80	55	0	30	75	0.5A	1.4	3.0A			10K	
2N3161	S	P			PMS	37.5W	C	100	100	65	0	30	75	0.5A	1.4	3.0A			10K	
2N3162	S	N	2N3411	11-33	DFA	300M	A	200	45	25	0	50	200	10M	0.5	10M			300M	
2N3163	S	P			HPA	85W	C	200	40	40	0	12	36	1.0A	0.75	1.0A	10	E	1.0M	
2N3164	S	P			HPA	85W	C	200	60	60	0	12	36	1.0A	0.75	1.0A	10	E	1.0M	
2N3165	S	P			HPA	85W	C	200	80	80	0	12	36	1.0A	0.75	1.0A	10	E	1.0M	
2N3166	S	P			HPA	85W	C	200	100	100	0	12	36	1.0A	0.75	1.0A	10	E	1.0M	
2N3167	S	P	MJ2267</																	

**GENERAL PURPOSE SWITCHING AND AMPLIFIER TRANSISTORS (SILICON)**

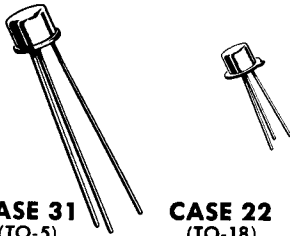
**Current versus Voltage**

BV <sub>CEO</sub> Min Volts	OPTIMUM COLLECTOR CURRENT									
	0 to 10 mA		10 mA to 100 mA		100 mA to 500 mA		500 mA to 1.0 A		1.0 A to 3.0 A	
	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
15 ↓ 29	2N916 2N2330 2N2331		2N916 2N1983 2N1984		2N696 2N697 2N718 2N1420 2N2195	2N1991				
30 ↓ 39			2N2218 2N2219 2N2221 2N2222	2N3133 2N3134 2N3135 2N3136	2N2218 2N2219 2N2221 2N2222 2N3299 2N3300 2N3301 2N3302	2N2800 2N2801 2N2837 2N2838 2N3133 2N3134 2N3135 2N3136				
49 ↓ 59	2N758 2N795 2N760 2N915 2N929 2N930 2N3946 2N3947	2N3250 2N3251 MM4048	2N2218A 2N2219A 2N2221A 2N2222A 2N2224 2N3946 2N3947	2N3250 2N3251	2N2194 2N2218A 2N2219A 2N2221A 2N2222A	2N2904 2N2905 2N2906 2N2907 2N3485 2N3486 2N4890	2N3192 2N3193	2N3244 2N3245	2N3506 2N3507	
60 ↓ 79	2N758A 2N759A 2N760A 2N929A 2N930A MM2483 MM2484	2N3798 2N3799 2N3250A 2N3251A	2N910 2N911 2N1990	2N3250A 2N3251A	2N656 2N699	2N2904A 2N2905A 2N2906A 2N2907A 2N3485A 2N3486A				
80 ↓ 99	2N739 2N740	2N3494 2N3496	2N720A 2N1893 2N2405	2N3494 2N3496	2N720A 2N3019 2N3020		2N3019 2N3020			
100 ↓ 149	2N4924	2N3495 2N3497 2N4928	2N3498 2N3499 2N4924	2N3495 2N3497 2N3634 2N3635 2N4928	2N3498 2N3499 2N4924	2N3634 2N3635				
150 ↓ 249	2N3114 2N4925 2N4926	2N4929 2N4930	2N3500 2N3501 2N4925 2N4926	2N3635 2N3637 2N4929 2N4930	2N3500 2N3501 2N4925	2N3636 2N3637				
250 UP	2N3742 2N4927	2N3743 2N4931	2N3742 2N4927	2N3743 2N4931						

## 2N3133 thru 2N3136 (SILICON)



$V_{CE0} = 35\text{ V}$   
 $I_C = 600\text{ mA}$   
 $f_T = 200\text{ MHz}$



PNP silicon annular Star transistors for high-speed switching and DC to UHF amplifier applications.

**CASE 31**  
(TO-5)

2N3133  
2N3134

**CASE 22**  
(TO-18)

2N3135  
2N3136

Collector connected to case

### MAXIMUM RATINGS

Rating	Symbol	2N3133 2N3134 (TO-5)	2N3135 2N3136 (TO-18)	Unit
Collector-Base Voltage	$V_{CB}$	50	50	Vdc
Collector-Emitter Voltage	$V_{CE0}$	35	35	Vdc
Emitter-Base Voltage	$V_{EB}$	4	4	Vdc
Collector Current	$I_C$	600	600	mA
Total Device Dissipation @ 25°C Case Temperature Derate Above 25°C	$P_D$	3 17.3	1.8 10.3	Watts mW/°C
Total Device Dissipation @ 25°C Ambient Temperature Derate Above 25°C	$P_D$	0.6 3.43	0.4 2.28	Watts mW/°C
Junction Temperature	$T_J$	-65 to +200		°C
Storage Temperature	$T_{stg}$	-65 to +200		°C

### SWITCHING CHARACTERISTICS (At 25°C unless otherwise noted)

Characteristic	Symbol	Typ	Max	Unit
Turn-On Time ( $V_{CC} = 30\text{ V}$ , $I_{CS} = 150\text{ mA}$ , $I_{B1} = 15\text{ mA}$ )	$t_{on}$	26	75	ns
Turn-Off Time ( $V_{CC} = 6\text{ V}$ , $I_{CS} = 150\text{ mA}$ , $I_{B1} = I_{B2} = 15\text{ mA}$ )	$t_{off}$	70	150	ns

**2N3133 thru 2N3136** (Continued)

**ELECTRICAL CHARACTERISTICS** (At 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
Collector Cutoff Current ( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 30 \text{ Vdc}$ , $I_E = 0$ , $T_A = 150^\circ\text{C}$ )	$I_{CBO}$	---	0.05 30	$\mu\text{Adc}$
Collector Cutoff Current ( $V_{CE} = 30 \text{ V}$ , $V_{BE} = 0.5 \text{ V}$ )	$I_{CEX}$	---	0.1	$\mu\text{Adc}$
Base Cutoff Current ( $V_{CE} = 30 \text{ V}$ , $V_{BE} = 0.5 \text{ V}$ )	$I_{BL}$	---	0.1	$\mu\text{Adc}$
Collector-Base Breakdown Voltage ( $I_C = 10 \mu\text{Adc}$ , $I_E = 0$ )	$BV_{CBO}$	50	---	Vdc
Collector-Emitter Breakdown Voltage* ( $I_C = 10 \text{ mAdc}$ , $I_B = 0$ )	$BV_{CEO}^*$	35	---	Vdc
Emitter-Base Breakdown Voltage ( $I_E = 10 \mu\text{Adc}$ , $I_C = 0$ )	$BV_{EBO}$	4	---	Vdc
Collector Saturation Voltage* ( $I_C = 150 \text{ mAdc}$ , $I_B = 15 \text{ mAdc}$ )	$V_{CE}(\text{sat})^*$	---	0.6	Vdc
Base-Emitter Saturation Voltage * ( $I_C = 150 \text{ mAdc}$ , $I_B = 15 \text{ mAdc}$ )	$V_{BE}(\text{sat})^*$	---	1.5	Vdc
DC Forward Current Transfer Ratio ( $I_C = 1.0 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ ) 2N3133, 2N3135 2N3134, 2N3136 ( $I_C = 150 \text{ mAdc}$ , $V_{CE} = 10 \text{ Vdc}$ )* 2N3133, 2N3135 2N3134, 2N3136	$h_{FE}$	25 50 40 100	--- --- 120 300	---
Output Capacitance ( $V_{CB} = 10 \text{ Vdc}$ , $I_E = 0$ , $f = 100 \text{ kHz}$ )	$C_{ob}$	---	10	pF
Input Capacitance ( $V_{BE} = 2 \text{ Vdc}$ , $I_C = 0$ , $f = 100 \text{ kHz}$ )	$C_{ib}$	---	40	pF
Current-Gain — Bandwidth Product ( $I_C = 50 \text{ mAdc}$ , $V_{CE} = 20 \text{ Vdc}$ , $f = 100 \text{ MHz}$ )	$f_T$	200	---	MHz

\*Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$