

TYPE	MATERIAL	POLARITY	REPLACE- MENT	PAGE NUMBER	USE	MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS									
						P _D @ 25°C	Ref Point	T _J °C	V _{CB} (volts)	V _{CE} — (volts)	Subscript	h _{FE} @ I _C		V _{CE(SAT)} @ I _C		h _{FE} —	Subscript	f _— Units	Subscript	
											(min)	(max)	Units	(volts)	Units			Units	Subscript	
2N4877 2N4881 thru 2N4886	S	N			LPA	10W	C	200	60	0	20	100	4.0A	1.0	4.0A			4.0M	T	
Field Effect Transistors, see Table on Page 1-166																				
2N4888 2N4889 2N4890 2N4891 thru 2N4894	S	P			AFA	300M	A	125	150	0	40	400	10M	0.5	10M			30M 40M	T T	
	S	P			AFA	300M	A	125	150	0	80	300	10M	0.5	10M					
	S	P		8-306	MSS	1.0W	A		60	0	50	250	150M	1.4	150M	5.0	E			
Unijunction Transistors, see Table on Page 1-174																				
2N4894 2N4895 2N4896	S	N			PMS	4.0W	C	200	120	0	100	300	2.0A	1.0	5.0A	4.0	E			
	S	N			PMS	4.0W	C	200	120	0	40	120	2.0A	1.0	5.0A	2.5	E			
2N4897	S	N			PMS	4.0W	C	200	150	0	40	120	2.0A	1.0	5.0A	2.5	E			
2N4898	S	P		7-172	LPA	25W	C	200	40	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4899	S	P		7-172	LPA	25W	C	200	60	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4900	S	P		7-172	LPA	25W	C	200	80	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4901	S	P		7-176	LPA	87.5W	C	200	40	0	20	80	1.0A	0.4	1.0A	20	E	4.0M	T	
2N4902	S	P		7-176	LPA	87.5W	C	200	60	0	20	80	1.0A	0.4	1.0A	20	E	4.0M	T	
2N4903	S	P		7-176	LPA	87.5W	C	200	80	0	20	80	1.0A	0.4	1.0A	20	E	4.0M	T	
2N4904	S	P		7-180	LPA	87.5W	C	200	40	0	25	100	2.5A	1.0	2.5A	40	E	4.0M	T	
2N4905	S	P		7-180	LPA	87.5W	C	200	60	0	25	100	2.5A	1.0	2.5A	40	E	4.0M	T	
2N4906	S	P		7-180	LPA	87.5W	C	200	80	0	25	100	2.5A	1.0	2.5A	40	E	4.0M	T	
2N4907	S	P			LPA	150W	C	200	40	0	20	80	4.0A	0.75	4.0A			4.0M	T	
2N4908	S	P			LPA	150W	C	200	60	0	20	80	4.0A	0.75	4.0A			4.0M	T	
2N4909	S	P			LPA	150W	C	200	80	0	20	80	4.0A	0.75	4.0A			4.0M	T	
2N4910	S	N		7-184	LPA	25W	C	200	40	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4911	S	N		7-184	LPA	25W	C	200	60	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4912	S	N		7-184	LPA	25W	C	200	80	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4913	S	N		7-188	LPA	87.5W	C	200	40	0	25	100	2.5A	1.0	2.5A	20	E	4.0M	T	
2N4914	S	N		7-188	LPA	87.5W	C	200	60	0	25	100	2.5A	1.0	2.5A	20	E	4.0M	T	
2N4915	S	N		7-188	LPA	87.5W	C	200	80	0	25	100	2.5A	1.0	2.5A	20	E	4.0M	T	
2N4918	S	P		5-47	LPA	30W	C	150	40	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4919	S	P		5-47	LPA	30W	C	150	60	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4920	S	P		5-47	LPA	30W	C	150	80	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4921	S	N		5-51	LPA	30W	C	150	40	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4922	S	N		5-51	LPA	30W	C	150	60	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4923	S	N		5-51	LPA	30W	C	150	80	0	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4924	S	N		9-114	RFA	1.0W	A	175	100	0	40	200	150M	0.4	50M			100M	T	
2N4925	S	N		9-114	RFA	1.0W	A	175	150	0	40	200	150M	0.4	50M			100M	T	
2N4926	S	N		9-115	RFA	1.0W	A	175	200	0	20	200	30M	2.0	30M	25	E	300M	T	
2N4927	S	N		9-115	RFA	1.0W	A	175	250	0	20	200	30M	2.0	30M	25	E	300M	T	
2N4928	S	P		8-307	HSA	1.0W	A	200	100	0	25	200	10M	0.5	10M			100M	T	
2N4929	S	P		8-307	HSA	1.0W	A	200	150	0	25	200	10M	0.5	10M			100M	T	
2N4930	S	P		8-307	HSA	1.0W	A	200	200	0	20	200	10M	5.0	10M			20M	T	
2N4931	S	P		8-307	HSA	1.0W	A	200	250	0	20	200	10M	5.0	10M			20M	T	
2N4937	S	P		11-47	DFA	600M	A	200	50	0	50	250	1.0M			50	E	300M	T	
2N4938	S	P		11-47	DFA	600M	A	200	50	0	50	250	1.0M			50	E	300M	T	
2N4939	S	P		11-47	DFA	600M	A	200	50	0	50	250	1.0M			50	E	300M	T	
2N4940	S	P		11-47	DFA	600M	A	200	50	0	50	250	1.0M			50	E	300M	T	
2N4941	S	P		11-47	DFA	600M	A	200	50	0	50	250	1.0M			50	E	300M	T	
2N4942	S	P		11-47	DFA	600M	A	200	50	0	50	250	1.0M			50	E	300M	T	
2N4948	S	N																		
Unijunction Transistors, see Table on Page 1-174																				
2N4957	S	P		9-117	LNA	200M	A	200	30	0	20	40	2.0M					1200M	T	
2N4958	S	P		9-117	LNA	200M	A	200	30	0	20	40	2.0M					1000M	T	
2N4959	S	P		9-117	LNA	200M	A	200	30	0	20	40	2.0M					1000M	T	
2N4964	S	P			LNA	200M	A	50	40	0	30	120	10*	0.4	10M	40	E			
2N4965	S	P			LNA	200M	A	50	40	0	80	400	10*	0.4	10M	100	E			
2N4966	S	N			LNA	200M	A	50	40	0	40	200	10*	0.4	10M	40	E			
2N4967	S	N			LNA	200M	A	50	40	0	100	600	10*	0.4	10M	100	E			
2N4968	S	N			LNA	200M	A	30	25	0	40	200	10*	0.4	10M	40	E			
2N4969	S	N			HSS	200M	A	50	30	0	40	120	150M	0.4	150M					
2N4970	S	N			HSS	200M	A	50	30	0	100	350	150M	0.4	150M					
2N4971	S	P			HSS	200M	A	50	40	0	40	120	150M	0.4	150M					
2N4972	S	P			HSS	200M	A	50	40	0	100	300	150M	0.4	150M					
2N4973	S	P			RFA	200M	A	20	15	0	20		3.0M	0.5	10M					
2N4974	S	P			SPP	800M	A	200	40	0	5000	9000	1.0*			25000	E	175M	T	
2N4975	S	P			SPP	800M	A	200	40	0	1000	4000	1.0*			15000	E	175M	T	
2N4977 thru 2N4979	S	N																		
Field Effect Transistors, see Table on Page 1-166																				
2N4994	S	N			RFC	200M	A		60	0	40	160	10M							
2N4995	S	N			RFC	200M	A		60	0	100	400	10M							
2N4996	S	N			RFC	200M	A		30	0	50		2M							
2N4997	S	N			RFC	200M	A		30	0	30	150	2M							
2N5010	S	N			AFA	2.0W	C		500	0	30	180	25M	1.4	25M					
2N5011	S	N			AFA	2.0W	C		600	0	30	180	25M	1.5	25M					
2N5012	S	N			AFA	2.0W	C		700	0	30	180	25M	1.6	25M					
2N5013	S	N			AFA	2.0W	C		800	0	30	180	20M	1.6	20M					
2N5014	S	N			AFA	2.0W	C		900	0	30	180	20M	1.6	20M					
2N5015	S	N			AFA	2.0W	C		1000	0	30	180	20M	1.8	20M					
2N5018 thru 2N5021	S	N																		
Field Effect Transistors, see Table on Page 1-166																				
2N5021	S	N			HSS	1.0W	A		50	0	25	100	500M	0.2	100M					
2N5022	S	P			HSS	1.0W	A		30	0	40	100	500M	0.17	100M					
2N5023	S	N			HPA	45W	C	300	75	0	20		2.0A	1.0	2.0A					
2N5025	S	N			HPA	45W	C	300	90	0	20		2.0A	1.0	2.0A					

GENERAL PURPOSE SWITCHING AND AMPLIFIER TRANSISTORS (SILICON)

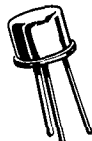
Current versus Voltage

BV _{CEO} 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	2N2192 2N2193	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						

2N4928 thru 2N4931

$V_{CEO} = 100 \text{ to } 250 \text{ V}$

$P_D = 0.6 \text{ to } 1.0 \text{ W}$



High-voltage PNP silicon annular transistors for use in general-purpose high-voltage applications.

CASE 79
(TO-39)

Collector connected to case

MAXIMUM RATINGS

Rating	Symbol	2N4928	2N4929	2N4930	2N4931	Unit
Collector-Emitter Voltage	V_{CEO}	100	150	200	250	Vdc
Collector-Base Voltage	V_{CB}	100	150	200	250	Vdc
Emitter-Base Voltage	V_{EB}	4.0	4.0	4.0	4.0	Vdc
Collector Current — Continuous	I_C	100	500	500	500	mA dc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	0.6 3.4	1.0 5.71	1.0 5.71	1.0 5.71	Watt mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	3.0 17.2	5.0 28.6	5.0 28.6	5.0 28.6	Watt mW/ $^\circ\text{C}$
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200				$^\circ\text{C}$

2N4928 thru 2N4931 (continued)

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Characteristic	Symbol	Min	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage* ($I_C = 10 \text{ mAdc}$, $I_B = 0$)	2N4928 2N4929 2N4930 2N4931	BV_{CEO}^*	100 150 200 250	- - - -	Vdc
Collector-Base Breakdown Voltage ($I_E = 0$, $I_C = 100 \mu\text{A}$)	2N4928 2N4929 2N4930 2N4931	BV_{CBO}	100 150 200 250	- - - -	Vdc
Emitter-Base Breakdown Voltage ($I_E = 100 \mu\text{A}$, $I_C = 0$)		BV_{EBO}	4.0	-	Vdc
Collector Cutoff Current ($V_{CB} = 50 \text{ Vdc}$, $I_E = 0$)	2N4928	I_{CBO}	-	0.5	μA
($V_{CB} = 75 \text{ Vdc}$, $I_E = 0$)	2N4929		-	0.5	
($V_{CB} = 150 \text{ Vdc}$, $I_E = 0$)	2N4930, 2N4931		-	1.0	
Emitter Cutoff Current ($V_{BE} = 3.0 \text{ Vdc}$, $I_C = 0$)	2N4928, 2N4929	I_{EBO}	-	0.5	μA
($V_{BE} = 3.0 \text{ Vdc}$, $I_C = 0$)	2N4930, 2N4931		-	1.0	

ON CHARACTERISTICS

DC Current Gain ($I_C = 1.0 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)	All Types	h_{FE}	20	-	-
($I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)*	2N4928, 2N4929		25	200	
($I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)*	2N4930, 2N4931		20	200	
($I_C = 50 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)*	2N4928, 2N4929		20	-	
($I_C = 30 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)*	2N4930, 2N4931		20	-	
Collector-Emitter Saturation Voltage* ($I_C = 10 \text{ mA}$, $I_B = 1.0 \text{ mA}$)	2N4928, 2N4929 2N4930, 2N4931	$V_{CE(sat)}^*$	- -	0.5 5.0	Vdc
Base-Emitter On Voltage ($I_C = 10 \text{ mA}$, $V_{CE} = 10 \text{ Vdc}$)		$V_{BE(on)}$	-	1.0	Vdc

DYNAMIC CHARACTERISTICS

Current-Gain-Bandwidth Product ($I_C = 20 \text{ mA}$, $V_{CE} = 20 \text{ Vdc}$, $f = 100 \text{ MHz}$)	2N4928, 2N4929	f_T	100	1,000	MHz
($I_C = 20 \text{ mA}$, $V_{CE} = 20 \text{ Vdc}$, $f = 20 \text{ MHz}$)	2N4930, 2N4931		20	200	
Collector-Base Capacitance ($V_{CB} = 20 \text{ Vdc}$, $I_E = 0$, $f = 140 \text{ kHz}$)	2N4928	C_{cb}	-	6.0	pF
($V_{CB} = 20 \text{ Vdc}$, $I_E = 0$, $f = 140 \text{ kHz}$)	2N4929		-	10	
($V_{CB} = 20 \text{ Vdc}$, $I_E = 0$, $f = 140 \text{ kHz}$)	2N4930, 2N4931		-	20	
Emitter-Base Capacitance ($V_{BE} = 2.0 \text{ Vdc}$, $I_C = 0$, $f = 140 \text{ kHz}$)	2N4928	C_{eb}	-	40	pF
($V_{BE} = 1.0 \text{ Vdc}$, $I_C = 0$, $f = 140 \text{ kHz}$)	2N4929		-	80	
($V_{BE} = 0.5 \text{ Vdc}$, $I_C = 0$, $f = 140 \text{ kHz}$)	2N4930, 2N4931		-	400	

*Pulse Width $\leq 300 \mu\text{s}$; Duty Cycle $\leq 2.0\%$