

TYPE	MATERIAL	POLARITY	REPLACE- MENT	PAGE NUMBER	USE	MAXIMUM RATINGS					ELECTRICAL CHARACTERISTICS									
						P _D @ 25°C	T _J °C	V _{CB} (volts)	V _{CE} — (volts)	Subscript	h _{FE} @ I _C		V _{CE(SAT)} @ I _C		h _{FE}		f _T		Subscript	
											(min)	(max)	Units	(volts)	Units			Units	Subscript	
2N4877 2N4881 thru 2N4886	S	N			LPA	10W	C 200		60	O	20	100	4.0A	1.0	4.0A			4.0M	T	
Field Effect Transistors, see Table on Page 1-166																				
2N4888	S	P			AFA	300M	A 125	150	150	O	40	400	10M	0.5	10M			30M	T	
2N4889	S	P			AFA	300M	A 125	150	150	O	80	300	10M	0.5	10M			40M	T	
2N4890	S	P		8-306	MSS	1.0W	A	60	40	O	50	250	150M	1.4	150M	5.0	E			
2N4891 thru 2N4894	S	N																		
Unijunction Transistors, see Table on Page 1-174																				
2N4895	S	N			PMS	4.0W	C 200	120	60	O	100	300	2.0A	1.0	5.0A	4.0	E			
2N4896	S	N			PMS	4.0W	C 200	120	60	O	40	120	2.0A	1.0	5.0A	2.5	E			
2N4897	S	N			PMS	4.0W	C 200	150	80	O	40	120	2.0A	1.0	5.0A	2.5	E			
2N4898	S	P		7-172	LPA	25W	C 200	40	40	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4899	S	P		7-172	LPA	25W	C 200	60	60	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4900	S	P		7-172	LPA	25W	C 200	80	80	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4901	S	P		7-176	LPA	87.5W	C 200	40	40	O	20	80	1.0A	0.4	1.0A	20	E	4.0M	T	
2N4902	S	P		7-176	LPA	87.5W	C 200	60	60	O	20	80	1.0A	0.4	1.0A	20	E	4.0M	T	
2N4903	S	P		7-176	LPA	87.5W	C 200	80	80	O	20	80	1.0A	0.4	1.0A	20	E	4.0M	T	
2N4904	S	P		7-180	LPA	87.5W	C 200	40	40	O	25	100	2.5A	1.0	2.5A	40	E	4.0M	T	
2N4905	S	P		7-180	LPA	87.5W	C 200	60	60	O	25	100	2.5A	1.0	2.5A	40	E	4.0M	T	
2N4906	S	P		7-180	LPA	87.5W	C 200	80	80	O	25	100	2.5A	1.0	2.5A	40	E	4.0M	T	
2N4907	S	P			LPA	150W	C 200		40	O	20	80	4.0A	0.75	4.0A			4.0M	T	
2N4908	S	P			LPA	150W	C 200		60	O	20	80	4.0A	0.75	4.0A			4.0M	T	
2N4909	S	P			LPA	150W	C 200		80	O	20	80	4.0A	0.75	4.0A			4.0M	T	
2N4910	S	N		7-184	LPA	25W	C 200	40	40	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4911	S	N		7-184	LPA	25W	C 200	60	60	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4912	S	N		7-184	LPA	25W	C 200	80	80	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4913	S	N		7-188	LPA	87.5W	C 200	40	40	O	25	100	2.5A	1.0	2.5A	20	E	4.0M	T	
2N4914	S	N		7-188	LPA	87.5W	C 200	60	60	O	25	100	2.5A	1.0	2.5A	20	E	4.0M	T	
2N4915	S	N		7-188	LPA	87.5W	C 200	80	80	O	25	100	2.5A	1.0	2.5A	20	E	4.0M	T	
2N4918	S	P		5-47	LPA	30W	C 150	40	40	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4919	S	P		5-47	LPA	30W	C 150	60	60	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4920	S	P		5-47	LPA	30W	C 150	80	80	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4921	S	N		5-51	LPA	30W	C 150	40	40	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4922	S	N		5-51	LPA	30W	C 150	60	60	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4923	S	N		5-51	LPA	30W	C 150	80	80	O	20	100	0.5A	0.6	1.0A	25	E	3.0M	T	
2N4924	S	N		9-114	RFA	1.0W	A 175	100	100	O	40	200	150M	0.4	50M			100M	T	
2N4925	S	N		9-114	RFA	1.0W	A 175	150	150	O	40	200	150M	0.4	50M			100M	T	
2N4926	S	N		9-115	RFA	1.0W	A 175	200	200	O	20	200	30M	2.0	30M	25	E	300M	T	
2N4927	S	N		9-115	RFA	1.0W	A 175	250	250	O	20	200	30M	2.0	30M	25	E	300M	T	
2N4928	S	P		8-307	HSA	1.0W	A 200	100	100	O	25	200	10M	0.5	10M			100M	T	
2N4929	S	P		8-307	HSA	1.0W	A 200	150	150	O	25	200	10M	0.5	10M			100M	T	
2N4930	S	P		8-307	HSA	1.0W	A 200	200	200	O	20	200	10M	5.0	10M			20M	T	
2N4931	S	P		8-307	HSA	1.0W	A 200	250	250	O	20	200	10M	5.0	10M			20M	T	
2N4937	S	P		11-47	DFA	600M	A 200	50	40	O	50	250	1.0M			50	E	300M	T	
2N4938	S	P		11-47	DFA	600M	A 200	50	40	O	50	250	1.0M			50	E	300M	T	
2N4939	S	P		11-47	DFA	600M	A 200	50	40	O	50	250	1.0M			50	E	300M	T	
2N4940	S	P		11-47	DFA	600M	A 200	50	40	O	50	250	1.0M			50	E	300M	T	
2N4941	S	P		11-47	DFA	600M	A 200	50	40	O	50	250	1.0M			50	E	300M	T	
2N4942	S	P		11-47	DFA	600M	A 200	50	40	O	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	30	O	20	40	2.0M					1200M	T	
2N4958	S	P		9-117	LNA	200M	A 200	30	30	O	20	40	2.0M					1000M	T	
2N4959	S	P		9-117	LNA	200M	A 200	30	30	O	20	40	2.0M					1000M	T	
2N4964	S	P			LNA	200M	A	50	40	O	30	120	10*	0.4	10M	40	E			
2N4965	S	P			LNA	200M	A	50	40	O	80	400	10*	0.4	10M	100	E			
2N4966	S	N			LNA	200M	A	50	40	O	40	200	10*	0.4	10M	40	E			
2N4967	S	N			LNA	200M	A	50	40	O	100	600	10*	0.4	10M	100	E			
2N4968	S	N			LNA	200M	A	30	25	O	40	200	10*	0.4	10M	40	E			
2N4969	S	N			HSS	200M	A	50	30	O	40	120	150M	0.4	150M					
2N4970	S	N			HSS	200M	A	50	30	O	100	350	150M	0.4	150M					
2N4971	S	P			HSS	200M	A	50	40	O	40	120	150M	0.4	150M					
2N4972	S	P			HSS	200M	A	50	40	O	100	300	150M	0.4	150M					
2N4973	S	P			RFA	200M	A	20	15	O	20		3.0M	0.5	10M					
2N4974	S	P			SPP	800M	A	200	40	O	5000	9000	1.0*			25000	E	175M	T	
2N4975	S	P			SPP	800M	A	200	40	O	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	45	O	40	160	10M							
2N4995	S	N			RFC	200M	A	60	45	O	100	400	10M							
2N4996	S	N			RFC	200M	A	30	18	O	50		2M							
2N4997	S	N			RFC	200M	A	30	18	O	30	150	2M							
2N5010	S	N			AFA	2.0W	C	500	500	R	30	180	25M	1.4	25M					
2N5011	S	N			AFA	2.0W	C	600	600	R	30	180	25M	1.5	25M					
2N5012	S	N			AFA	2.0W	C	700	700	R	30	180	25M	1.6	25M					
2N5013	S	N			AFA	2.0W	C	800	800	R	30	180	20M	1.6	20M					
2N5014	S	N			AFA	2.0W	C	900	900	R	30	180	20M	1.6	20M					
2N5015	S	N			AFA	2.0W	C	1000	1000	R	30	180	20M	1.8	20M					
2N5018 thru 2N5021	S	N																		
Field Effect Transistors, see Table on Page 1-166																				
2N5022	S	P			HSS	1.0W	A	50	50	O	25	100	500M	0.2	100M					
2N5023	S	P			HSS	1.0W	A	30	30	O	40	100	500M	0.17	100M					
2N5025	S	N			HPA	45W	C	300	75	O	20	</								

UNIUNION TRANSISTORS INDEX

2N489-2N4949

TYPE	REPLACEMENT	PAGE NUMBER	P _D (mW)	R _{BB} (kΩ)	η	I _V (min) (mA)	I _P (max) (μA)	I _{EO} @ V _{EB2} (μA @ V max)	V _{E(SAT)} I _E @ 50 mA
2N489			450	6.8	0.62	8.0	20	12 @ 60	5.0
2N489A			450	6.8	0.62	8.0	15	12 @ 60	4.0
2N489B			450	6.8	0.62	8.0	6.0	0.2 @ 60	4.0
2N490			450	9.1	0.62	8.0	20	12 @ 60	5.0
2N490A			450	9.1	0.62	8.0	15	12 @ 60	4.0
2N490B			450	9.1	0.62	8.0	6.0	0.2 @ 60	4.0
2N490C			450	9.1	0.51				
2N491			450	6.8	0.68	8.0	20	12 @ 60	5.0
2N491A			450	6.8	0.68	8.0	15	12 @ 60	4.3
2N491B			450	6.8	0.68	8.0	6.0	0.2 @ 60	4.3
2N492			450	9.1	0.68	8.0	20	12 @ 60	5.0
2N492A			450	9.1	0.68	8.0	15	12 @ 60	4.3
2N492B			450	9.1	0.68	8.0	6.0	0.2 @ 60	4.3
2N492C			450	9.1	0.56				
2N493			450	6.8	0.75	8.0	20	12 @ 60	5.0
2N493A			450	6.8	0.75	8.0	15		
2N493B			450	6.8	0.75	8.0	6.0	0.2 @ 60	5.0
2N494			450	9.1	0.75	8.0	20	12 @ 60	5.0
2N494A			450	9.1	0.75	8.0	15	12 @ 60	4.6
2N494B			450	9.1	0.75	8.0	6.0	0.2 @ 60	4.6
2N494C			450	9.1	0.62	8.0	2.0	0.02 @ 60	4.6
2N1671			450	9.1	0.62	8.0	25	12 @ 30	5.0
2N1671A			450	9.1	0.62	8.0	25	12 @ 30	5.0
2N1671B			450	9.1	0.62	8.0	6.0	0.2 @ 30	5.0
2N1671C			450	4.1 -9.1					
2N2160			450	4.0 -12	0.47 -0.80	8.0	25	12 @ 30	
2N2417			390	0.68	0.62	8.0	20	12 @ 60	5.0
2N2417A			390	0.68	0.62	8.0	20	12 @ 60	4.0
2N2417B			300	6.8	0.51 -0.62	8.0	6.0	0.2 @ 30	4.0
2N2418			390	0.68	0.62	8.0	20	12 @ 60	5.0
2N2418A			390	9.1	0.62	8.0	20	12 @ 60	4.0
2N2418B			300	9.1	0.51 - 0.62	8.0	6.0	0.2 @ 60	4.0
2N2419			390	4.7 -6.8	0.68	8.0	20	12 @ 60	5.0
2N2419A			390	6.8	0.68	8.0	20	12 @ 60	4.3
2N2419B			300	6.8	0.56 -0.68	8.0	6.0	0.2 @ 30	4.3
2N2420			390	9.1	0.68	8.0	20	12 @ 60	5.0
2N2420A			390	9.1	0.68	8.0	20	12 @ 60	4.3
2N2420B			300	9.1	0.56 -0.68	8.0	6.0	0.2 @ 30	4.3
2N2421			390	6.8	0.75	8.0	20	12 @ 60	5.0
2N2421A			390	6.8	0.75	8.0	20	12 @ 60	4.6
2N2421B			300	6.8	4.7 -6.8	8.0	6.0	0.2 @ 30	4.6
2N2422			390	9.1	0.75	8.0	20	12 @ 60	5.0
2N2422A			390	9.1	0.75	8.0	20	12 @ 60	4.6
2N2422B			300	9.1	0.62 -0.75	8.0	6.0	0.2 @ 30	
2N2646		4-70	300	4.7 (min)	0.56	4.0	25	12 @ 30	2.0
2N2647		4-70	300	4.7 (min)	0.68	8.0	2.0	0.2 @ 30	2.0
2N2840			300	4.7 -9.1	1.3 -1.5	0.70	10	1.0 @ 30	
2N3406			450			8.0			
2N3479			400	4.7 -9.1	0.47 -0.62	6.0	20	12 @ 30	5.0
2N3480			400	9.1	0.75	4.0	15	12 @ 30	5.0
2N3481			400	9.1	0.85	6.0	15	12 @ 30	5.0
2N3482			400	4.7 -6.8	0.51 -0.62	8.0	2.0	0.02 @ 30	5.0
2N3483			400	9.1	0.72	8.0	2.0	1.0 @ 30	5.0
2N3484			400	9.1	0.85	8.0	2.0	0.2 @ 30	5.0
2N3679			250	9.1	0.80	4.2			
2N3980		4-72	360	8.0					
2N4851		4-74	300	4.7 (min)	0.56 (min)	2.0	2.0	0.1 @ 30	2.5
2N4852		4-74	300	4.7 (min)	0.70 (min)	4.0	2.0	0.1 @ 30	2.5
2N4853		4-74	300	4.7 (min)	0.70 (min)	6.0	0.4	0.05 @ 30	2.5
2N4870		4-78	300	4.0 (min)	0.56 (min)	2.0	5.0	0.05 @ 30	2.5
2N4871		4-78	300	4.0 (min)	0.70 (min)	4.0	5.0	0.05 @ 30	2.5
2N4891			300	4.0 (min)	0.55 (min)	2.0	5.0	0.01 @ 30	4.0
2N4892			300	4.0 (min)	0.51 (min)	4.0	2.0	0.01 @ 30	4.0
2N4893			300	4.0 (min)	0.55 (min)	2.0	2.0	0.01 @ 30	4.0
2N4894			300	4.0 (min)	0.74 (min)	2.0	1.0	0.01 @ 30	4.0
2N4948		4-82	360	4.0 (min)	0.55 (min)	2.0	2.0	0.01 @ 30	2.5
2N4949		4-82	360	4.0 (min)	0.74 (min)	2.0	1.0	0.01 @ 30	2.5

2N4948
2N4949

$P_D = 360 \text{ mW}$
 $I_e = 50 \text{ mA}$



Silicon annular unijunction transistors designed for military and industrial use in pulse, timing, triggering, sensing, and oscillator circuits. The annular process provides low leakage current, fast switching and low peak-point currents as well as outstanding reliability and uniformity.

CASE 22A

(Lead 3 connected to case)

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
RMS Power Dissipation*	P_D	360*	mW
RMS Emitter Current	I_e	50	mA
Peak Pulse Emitter Current**	i_e	1.0**	Amp
Emitter Reverse Voltage	V_{B2E}	30	Volts
Storage Temperature Range	T_{stg}	-65 to +200	$^\circ\text{C}$

* Derate 2.4 mW/ $^\circ\text{C}$ increase in ambient temperature. Total power dissipation (available power to Emitter and Base-Two) must be limited by external circuitry. Interbase voltage (V_{B2B1}) limited by power dissipation,

$$V_{B2B1} = \sqrt{R_{BB} \cdot P_D}$$

** Capacitance discharge current must fall to 0.37 Amp within 3.0 ms and PRR ≤ 10 PPS.

2N4948, 2N4949 (continued)

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

Characteristic	Symbol	Min	Typ	Max	Unit
Intrinsic Standoff Ratio ($V_{B2B1} = 10\text{ V}$) Note 1	η	0.55 0.74	- -	0.82 0.86	-
Interbase Resistance ($V_{B2B1} = 3.0\text{ V}$, $I_E = 0$)	R_{BB}	4.0	7.0	12.0	k ohms
Interbase Resistance Temperature Coefficient ($V_{B2B1} = 3.0\text{ V}$, $I_E = 0$, $T_A = -65^\circ\text{C}$ to $+100^\circ\text{C}$)	αR_{BB}	0.1	-	0.9	%/ $^\circ\text{C}$
Emitter Saturation Voltage ($V_{B2B1} = 10\text{ V}$, $I_E = 50\text{ mA}$) Note 2	$V_{EB1(\text{sat})}$	-	2.5	3.0	Volts
Modulated Interbase Current ($V_{B2B1} = 10\text{ V}$, $I_E = 50\text{ mA}$)	$I_{B2(\text{mod})}$	12	15	-	mA
Emitter Reverse Current ($V_{B2E} = 30\text{ V}$, $I_{B1} = 0$) ($V_{B2E} = 30\text{ V}$, $I_{B1} = 0$, $T_A = 125^\circ\text{C}$)	I_{EB2O}	- -	5.0 -	10 1.0	nA μA
Peak Point Emitter Current ($V_{B2B1} = 25\text{ V}$)	I_P	- -	0.6 0.6	2.0 1.0	μA
Valley Point Current ($V_{B2B1} = 20\text{ V}$, $R_{B2} = 100\text{ ohms}$) Note 2	I_V	2.0	4.0	-	mA
Base-One Peak Pulse Voltage (Note 3, Figure 3)	V_{OB1}	3.0 6.0	5.0 8.0	- -	Volts
Maximum Oscillation Frequency (Figure 4)	$f_{(\text{max})}$	-	1.25	-	MHz

NOTES

1. Intrinsic standoff ratio.

η is defined by equation:

$$\eta = \frac{V_P - V_{EB1}}{V_{B2B1}}$$

Where V_P = Peak Point Emitter Voltage

V_{B2B1} = Interbase Voltage

V_{EB1} = Emitter to Base One Junction Diode Drop
($\approx 0.5\text{ V}$ @ $10\text{ }\mu\text{A}$)

2. Use pulse techniques: $PW \approx 300\text{ }\mu\text{s}$ duty cycle $\leq 2\%$ to avoid internal heating due to interbase modulation which may result in erroneous readings.

3. Base-One Peak Pulse Voltage is measured in circuit of Figure 3. This specification is used to ensure minimum pulse amplitude for applications in SCR firing circuits and other types of pulse circuits.

FIGURE 1 — UNIJUNCTION TRANSISTOR SYMBOL AND NOMENCLATURE

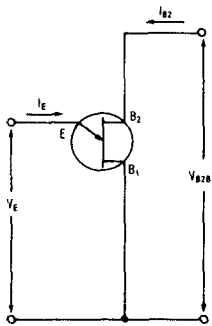


FIGURE 2 — STATIC EMITTER CHARACTERISTICS CURVES

(Exaggerated to Show Details)

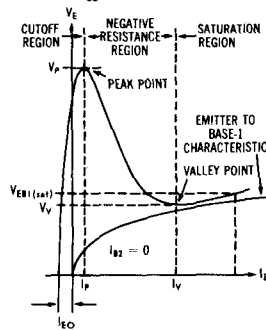


FIGURE 3 — V_{OB1} TEST CIRCUIT
(Typical Relaxation Oscillator)

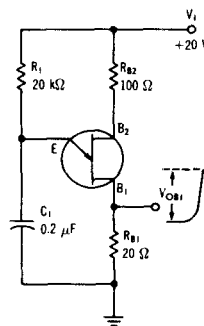


FIGURE 4 — $f_{(\text{max})}$ MAXIMUM FREQUENCY TEST CIRCUIT

