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
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

THYRISTOR SELECTOR GUIDE (continued)


BIDIRECTIONAL THYRISTORS — TRIACS (8.0 AMP RMS)

V _{BO(M)} Peak Blocking Voltage	50 V	MAC1-2		MAC2-2		MAC3-2		
	200 V	MAC1-4		MAC2-4		MAC3-4		
	400 V	MAC1-6		MAC2-6		MAC3-6		
		Case 85			Case 86		Case 87L	


BILATERAL TRIGGER DIODES (3-layer diodes)

	Type	V _(BR) Breakover Voltage (Both Directions)	I _{pulse} Peak Pulse Current @ 30 μs, 120 Hz	I _(BR) Breakover Current (Both Directions)	ΔV Switchback Voltage (Both Directions)
		Volts (Nom)	Amp (Max)	μA (Max)	Volts (Min)
	Case 29B	MPT28 MPT32	28 32	2.0 2.0	50 50

UNIUNCTION TRANSISTORS

	Type	I _p Peak Point Emitter Current	I _{EB20} Emitter Reverse Current	η Intrinsic Standoff Ratio		I _v Valley Point Current	P _D Power Dissipation	V _{B2B1} Interbase Voltage
		μA (Max)	μA (Max)	Min	Max	mA (Min)	mW	Volts
Case 29 (9)	2N4870 2N4871	5.0 5.0	1.0 1.0	0.56 0.70	0.75 0.85	2.0 4.0	300 300	35 35
	2N2646 2N2647 2N3980 2N4851 2N4852 2N4853	5.0 2.0 2.0 2.0 2.0 0.4	12.0 0.2 0.01 0.1 0.1 0.05	0.56 0.68 0.68 0.56 0.70 0.70	0.75 0.82 0.82 0.75 0.85 0.85	4.0 8.0 1.0 2.0 4.0 6.0	300 300 360 300 300 300	35 ↓ 35
Case 22A								

4-LAYER DIODES (Peak Pulse Current = 10 Amp @ PW = 50 μs Max)

	Type*	V _{(BR)F} Forward Breakover Voltage @ T _A = 25°C Volts	I _H Holding Current @ T _A = 25°C mA
		Min/Max	Min/Max
	I _F = 150 mA (Max)		
	1N5158(M4L3052) 1N5159(M4L3053) 1N5160(M4L3054)	8/10 9/11 10/12	1/20 1/20 1/20
	I _F = 180 mA (Max)		
	M4L20-3 M4L20M-3 M4L20-8	16/24 16/24 16/24	1/6 1/6 1/15
	M4L20M-8 M4L20-28 M4L20M-28 M4L20A	16/24 16/24 16/24 14/26	1/15 14/45 14/45 0.5/60
	M4L30-3 M4L30M-3 M4L30-8	26/34 26/34 26/34	1/6 1/6 1/15
	M4L30M-8 M4L30-28 M4L30M-28 M4L30A	26/34 26/34 26/34 24/36	1/15 14/45 14/45 0.5/60
	Case 51 (DO-7)		

	Type*	V _{(BR)F} Forward Breakover Voltage @ T _A = 25°C Volts	I _H Holding Current @ T _A = 25°C mA
		Min/Max	Min/Max
	I _F = 180 mA (Max)		
	M4L40-3 M4L40M-3 M4L40-8	36/44 36/44 36/44	1/6 1/6 1/15
	M4L40M-8 M4L40-28 M4L40M-28 M4L40A	36/44 36/44 36/44 34/46	1/15 14/45 14/45 0.5/60
	M4L50-3 M4L50M-3 M4L50-8	46/54 46/54 46/54	1/6 1/6 1/15
	M4L50M-8 M4L50-28 M4L50M-28 M4L50A	46/54 46/54 46/54 44/56	1/15 14/45 14/45 0.5/60

*Suffix "M" designates guaranteed V_{(BR)F} unit over the temperature range, T_A = -60 to +125°C.

2N2646 (SILICON)
2N2647

$V_{BB} = 35 \text{ V}$
 $I_e = 50 \text{ mA}$
 $P_D = 300 \text{ mW}$



Silicon annular PN unijunction transistors designed for use in pulse and timing circuits, sensing circuits and thyristor trigger circuits.

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	300*	mW
RMS Emitter Current	I_e	50	mA
Peak Pulse Emitter Current**	i_e	2**	Amp
Emitter Reverse Voltage	V_{B2E}	30	Volts
Interbase Voltage	V_{B2B1}	35	Volts
Operating Junction Temperature Range	T_J	-65 to +125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$

* Derate 3.0 mW/ $^\circ\text{C}$ increase in ambient temperature. The total power dissipation (available power to Emitter and Base-Two) must be limited by the external circuitry.

** Capacitor discharge — 10 μF or less, 30 volts or less.

2N2646, 2N2647 (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	0.56 0.68	— —	0.75 0.82	—
Interbase Resistance ($V_{B2B1} = 3\text{ V}$, $I_E = 0$)	R_{BB}	4.7	7.0	9.1	K ohms
Interbase Resistance Temperature Coefficient ($V_{B2B1} = 3\text{ V}$, $I_E = 0$, $T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$)	αR_{BB}	0.1	—	0.9	$\%/^\circ\text{C}$
Emitter Saturation Voltage ($V_{B2B1} = 10\text{ V}$, $I_E = 50\text{ mA}$) (Note 2)	$V_{EB1(sat)}$	—	3.5	—	Volts
Modulated Interbase Current ($V_{B2B1} = 10\text{ V}$, $I_E = 50\text{ mA}$)	$I_{B2(mod)}$	—	15	—	mA
Emitter Reverse Current ($V_{B2E} = 30\text{ V}$, $I_{B1} = 0$)	I_{EO}	— —	0.005 0.005	12 0.2	μA
Peak Point Emitter Current ($V_{B2B1} = 25\text{ V}$)	I_P	— —	1.0 1.0	5.0 2.0	μA
Valley Point Current ($V_{B2B1} = 20\text{ V}$, $R_{B2} = 100\text{ ohms}$) (Note 2)	I_V	4.0 8.0	6.0 10	— 18	mA
Base-One Peak Pulse Voltage (Note 3, Figure 3)	V_{OB1}	3.0 6.0	5.0 7.0	— —	Volts

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
($\approx 0.5\text{ V}$ @ $10\ \mu\text{A}$)

2. Use pulse techniques: $PW \approx 300\ \mu\text{s}$ 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

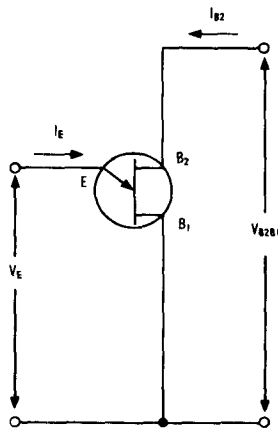


FIGURE 2 — STATIC EMITTER CHARACTERISTIC CURVES

(Exaggerated to Show Details)

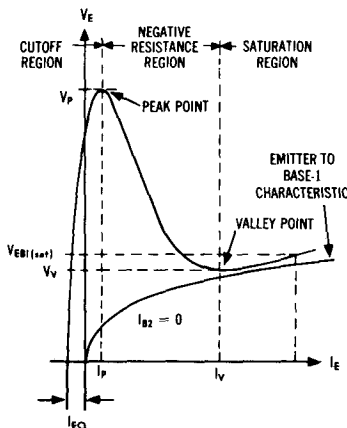


FIGURE 3 — V_{OB1} TEST CIRCUIT

(Typical Relaxation Oscillator)

