

# New Jersey Semi-Conductor Products, Inc.

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**2N4851** thru **2N4853** (SILICON)

SILICON ANNULAR UNIUNCTION TRANSISTORS

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

Rating	Symbol	Value	Unit
RMS Power Dissipation (1)	$P_D$	300	mW
RMS Emitter Current	$I_E$	50	mA
Peak-Pulse Emitter Current (2)	$i_E$	1.5	Amp
Emitter Reverse Voltage	$V_{D2E}$	30	Volts
Interbase Voltage (3)	$V_{D2D1}$	35	Volts
Operating Junction Temperature Range	$T_J$	-65 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +200	$^\circ\text{C}$

- \* Indicates JEDEC Registered Data
- (1) Derate 3.0 mW/ $^\circ\text{C}$  increase in ambient temperature.
- (2) Duty cycle < 1%, PRR = (see figure 6)
- (3) Based upon power dissipation at  $T_A = 25^\circ\text{C}$

FIGURE 1 — UNIUNCTION TRANSISTOR SYMBOL AND NOMENCLATURE

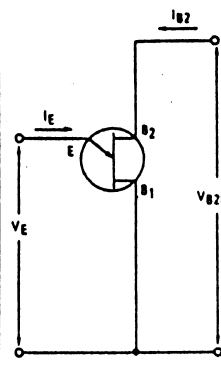
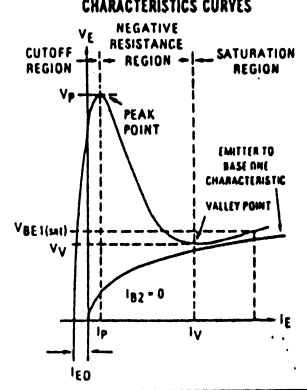


FIGURE 2 — STATIC EMITTER CHARACTERISTICS CURVES



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

Rating	Figure No.	Symbol	Min	Typ	Max	Unit
* Intrinsic Standoff Ratio (1) ( $V_{D2D1} = 10\text{ V}$ )	4, 8	$\rho$	0.56 0.70	—	0.75 0.85	—
* Interbase Resistance ( $V_{D2D1} = 3.0\text{ V}$ , $I_E = 0$ )	11, 12	$r_{D11}$	4.7	—	9.1	k ohms
* Interbase Resistance Temperature Coefficient ( $V_{D2D1} = 3.0\text{ V}$ , $I_E = 0$ , $T_A = -65$ to $+125^\circ\text{C}$ )	12	$\alpha r_{D11}$	0.2	—	0.8	%/ $^\circ\text{C}$
Emitter Saturation Voltage (2) ( $V_{D2D1} = 10\text{ V}$ , $I_E = 50\text{ mA}$ )		$V_{ED1(sat)}$	—	2.5	—	Volts
Modulated Interbase Current ( $V_{D2D1} = 10\text{ V}$ , $I_E = 50\text{ mA}$ )		$I_{D2(mod)}$	—	15	—	mA
* Emitter Reverse Current ( $V_{D2E} = 30\text{ V}$ , $I_{D1} = 0$ )	7	$I_{E1D20}$	—	—	0.1 0.05	$\mu\text{A}$
* Peak-Point Emitter Current ( $V_{D2D1} = 25\text{ V}$ )	9, 10	$I_P$	—	—	2.0 0.4	$\mu\text{A}$
* Valley-Point Current (2) ( $V_{D2D1} = 20\text{ V}$ , $R_{D2} = 100\text{ ohms}$ )	13, 14	$I_V$	2.0 4.0 6.0	—	—	mA
* Base-One Peak Pulse Voltage		$V_{OD1}$	3.0 5.0 6.0	—	—	Volts
* Maximum Frequency of Oscillation	5	$f_{(max)}$	1.0	1.25	—	MHz

- \* Indicates JEDEC Registered Data.
- (1) Intrinsic standoff ratio, is defined in terms of the peak-point voltage,  $V_P$ , by means of the equation:  $\rho = V_{D2D1} / V_P$ , where  $V_P$  is about 0.49 volt at  $25^\circ\text{C}$  @  $I_E = 10\text{ }\mu\text{A}$  and decreases with temperature at about  $2.5\text{ mV}/^\circ\text{C}$ . The test circuit is shown in Figure 4. Components  $R_1$ ,  $C_1$ , and the UJT form a relaxation oscillator; the remaining circuitry serves as a peak-voltage detector. The forward drop of Diode  $D_1$  compensates for  $V_P$ . To use, the "cal" button is pushed, and  $R_1$  is adjusted to make the current meter,  $M_1$ , read full scale. When the "cal" button is released, the value of  $\rho$  is read directly from the meter, if full scale on the meter reads 1.0.
- (2) Use pulse techniques:  $PW = 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2.0\%$  to avoid internal heating, which may result in erroneous readings.

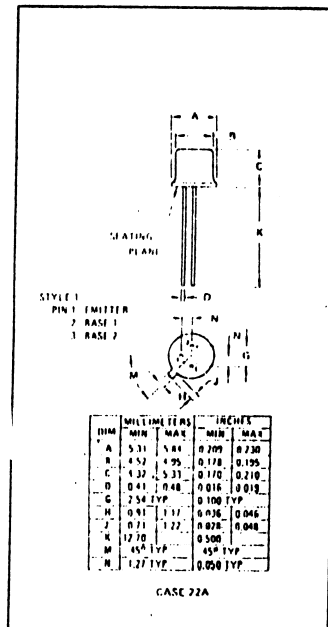


FIGURE 3 —  $V_{OD1}$  TEST CIRCUIT

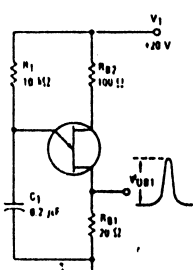


FIGURE 4 —  $\rho$  TEST CIRCUIT

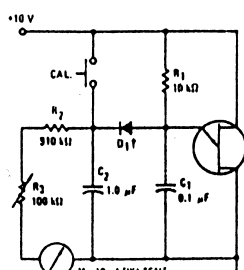


FIGURE 5 —  $f_{(max)}$  TEST CIRCUIT

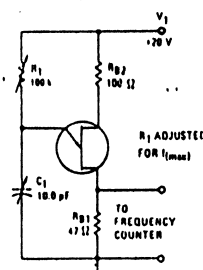


FIGURE 6 — PRR TEST CIRCUIT AND WAVEFORM

