2N4851 thru 2N4853 (SILICON)

CASE 22A
(TO-18 Modified)
Lead 3 connected to case

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

MAXIMUM RATINGS (T_A = 25°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**	1.5	Amp
Emitter Reverse Voltage	V_{B2E}	30	Volts
Interbase Voltage †	V_{B2B1}†	35	Volts
Operating Junction Temperature Range	T_J	-65 to +125	°C
Storage Temperature Range	T_{stg}	-65 to +200	°C

* Derate 3.0 mW/°C increase in ambient temperature.
** Duty cycle ≦ 1%, PRR = 10 PPS (see figure 6)
† Based upon power dissipation at T_A = 25°C

FIGURE 1 — UNIJUNCTION TRANSISTOR SYMBOL AND NOMENCLATURE

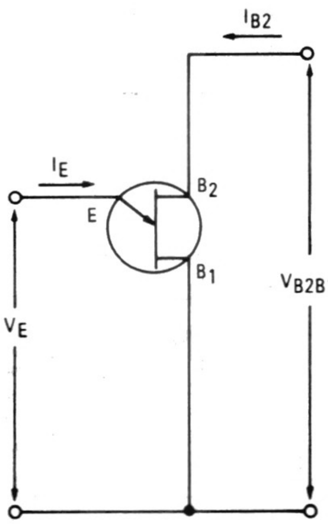


FIGURE 2 — STATIC EMITTER CHARACTERISTICS CURVES

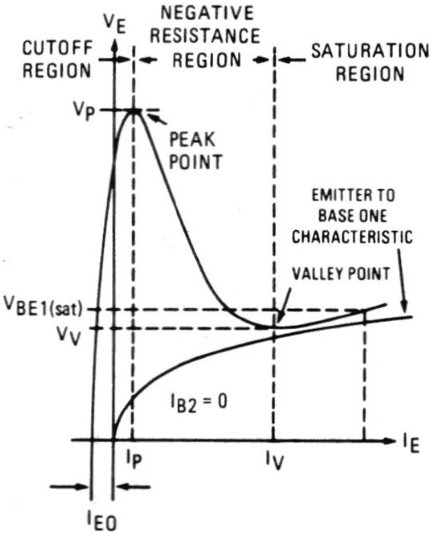
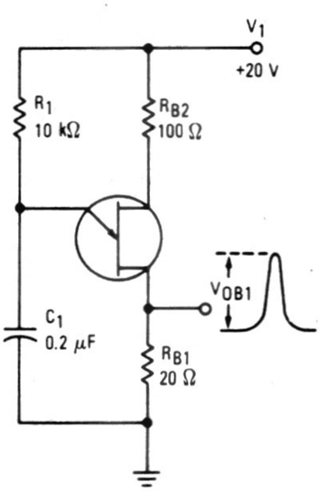


FIGURE 3 — V_{OB1} TEST CIRCUIT



2N4851 thru 2N4853 (continued)

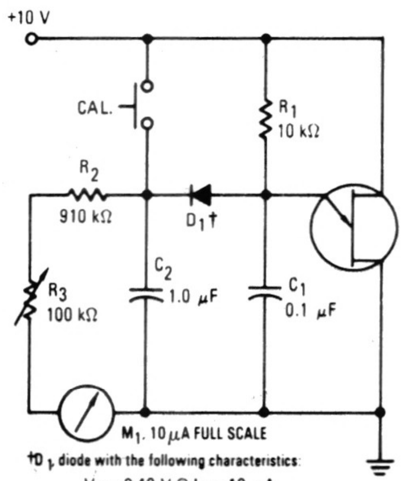
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic	Figure No.	Symbol	Min	Typ	Max	Unit
Intrinsic Standoff Ratio* (V_{B2B1} = 10 V) 2N4851 2N4852, 2N4853	4, 8	η*	0.56 0.70	— —	0.75 0.85	—
Interbase Resistance (V_{B2B1} = 3.0 V, I_E = 0)	11, 12	R_{BB}	4.7	—	9.1	k ohms
Interbase Resistance Temperature Coefficient (V_{B2B1} = 3.0 V, I_E = 0, T_A = -65 to +125°C)	12	αR_{BB}	0.2	—	0.8	%/°C
Emitter Saturation Voltage** (V_{B2B1} = 10 V, I_E = 50 mA)		$V_{EB1(sat)}$**	—	2.5	—	Volts
Modulated Interbase Current (V_{B2B1} = 10 V, I_E = 50 mA)		$I_{B2(mod)}$	—	15	—	mA
Emitter Reverse Current (V_{B2E} = 30 V, I_{B1} = 0) 2N4851, 2N4852 2N4853	7	I_{EB2O}	— —	— —	0.1 0.05	µA
Peak-Point Emitter Current (V_{B2B1} = 25 V) 2N4851, 2N4852 2N4853	9, 10	I_P	— —	— —	2.0 0.4	µA
Valley-Point Current** (V_{B2B1} = 20 V, R_{B2} = 100 ohms) 2N4851 2N4852 2N4853	13, 14	I_V**	2.0 4.0 6.0	— — —	— — —	mA
Base-One Peak Pulse Voltage 2N4851 2N4852 2N4853	3, 17	V_{OB1}	3.0 5.0 6.0	— — —	— — —	Volts
Maximum Frequency of Oscillation	5	$f_{(max)}$	1.0	1.25	—	MHz

* η, Intrinsic standoff ratio, is defined in terms of the peak-point voltage, V_P, by means of the equation: $V_P = \eta V_{B2B1} + V_F$, where V_F is about 0.49 volt at 25°C @ I_F = 10 µA and decreases with temperature at about 2.5 mV/°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_F. To use, the "cal" button is pushed, and R_3 is adjusted to make the current meter, M_1, read full scale. When the "cal" button is released, the value of η is read directly from the meter, if full scale on the meter reads 1.0.

** Use pulse techniques: PW ≈ 300 µs, duty cycle ≤ 2.0% to avoid internal heating, which may result in erroneous readings.

FIGURE 4 — η TEST CIRCUIT



†D_1, diode with the following characteristics:
V_F = 0.49 V @ I_F = 10 µA
I_R ≤ 2.0 µA @ V_R = 20 V

FIGURE 5 — $f_{(max)}$ TEST CIRCUIT

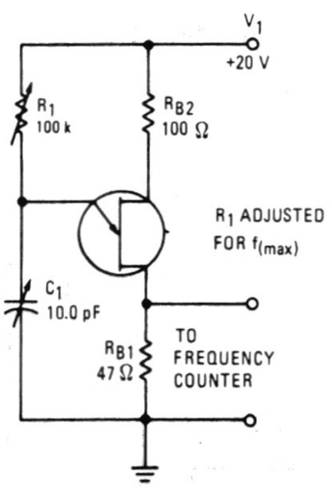
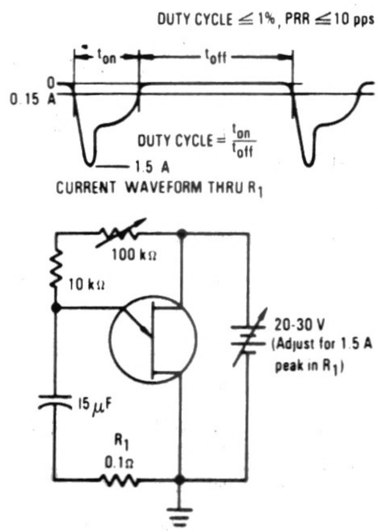


FIGURE 6 — PRR TEST CIRCUIT AND WAVEFORM



TYPICAL CHARACTERISTICS

VALLEY CURRENT

FIGURE 13 — EFFECT OF VOLTAGE

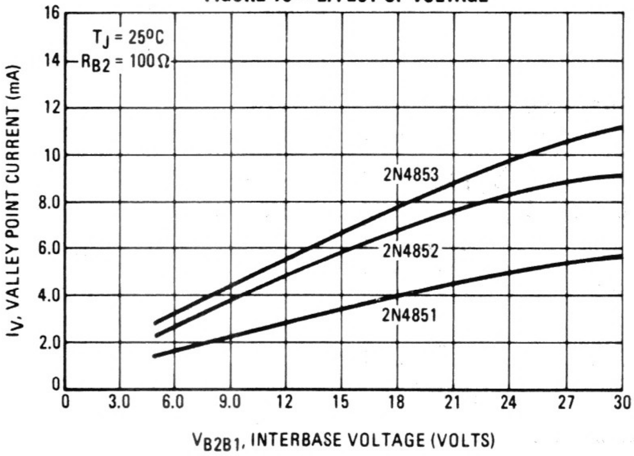
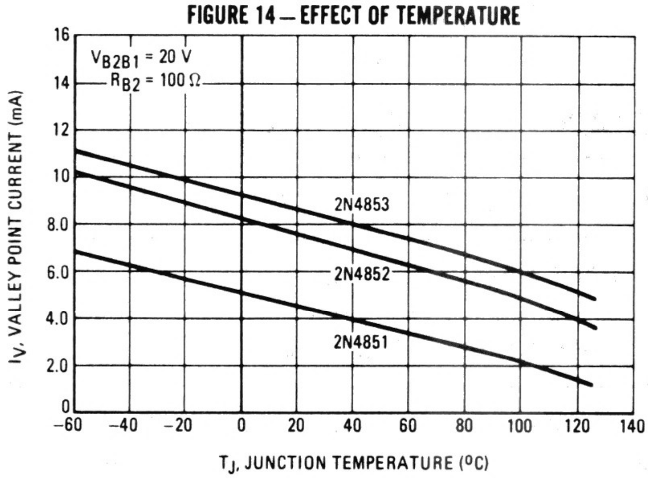


FIGURE 14 — EFFECT OF TEMPERATURE



VALLEY VOLTAGE

FIGURE 15 — EFFECT OF VOLTAGE

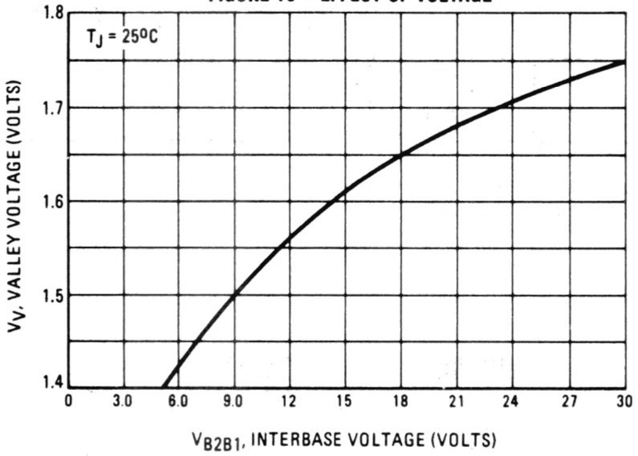


FIGURE 16 — EFFECT OF TEMPERATURE

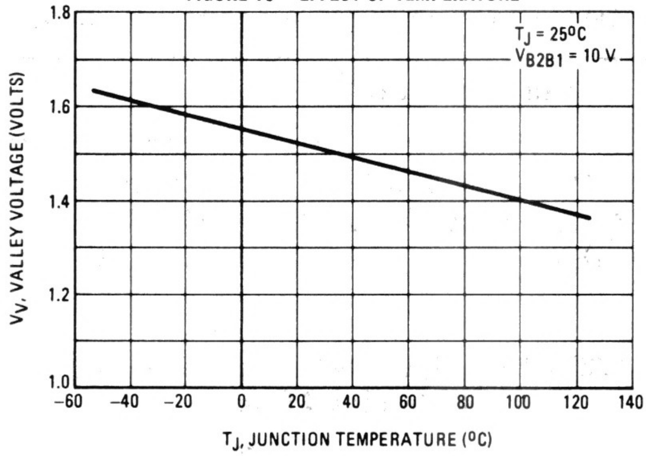
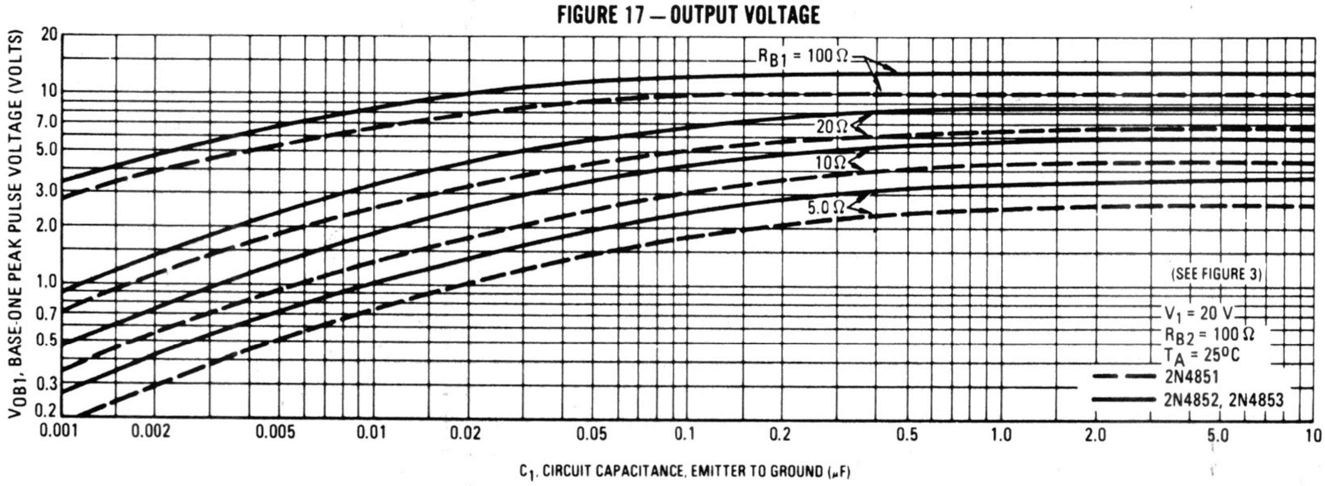


FIGURE 17 — OUTPUT VOLTAGE



2N4851 thru 2N4853 (continued)

TYPICAL CHARACTERISTICS

FIGURE 7 — EMITTER REVERSE CURRENT

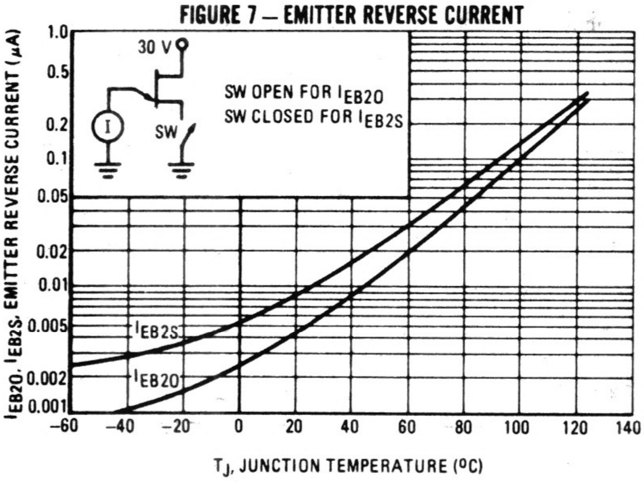
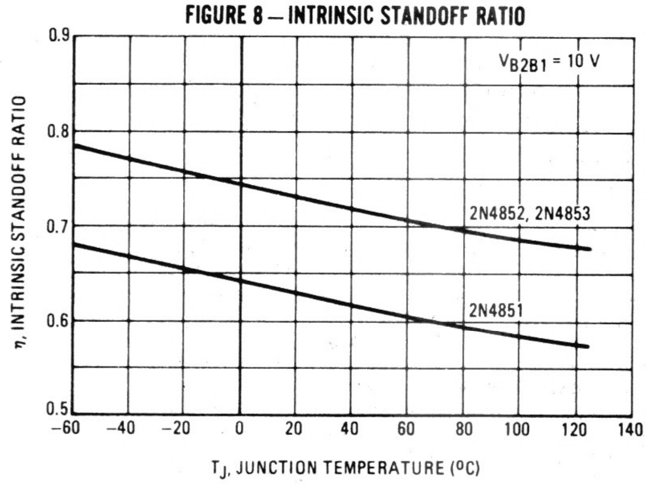


FIGURE 8 — INTRINSIC STANDOFF RATIO



PEAK POINT CURRENT

FIGURE 9 — EFFECT OF VOLTAGE

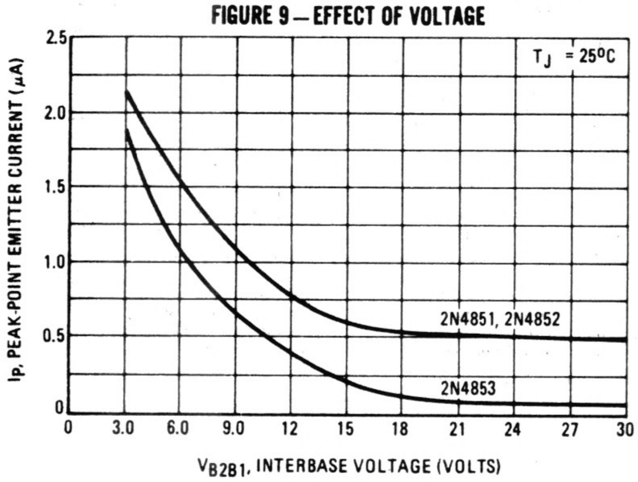
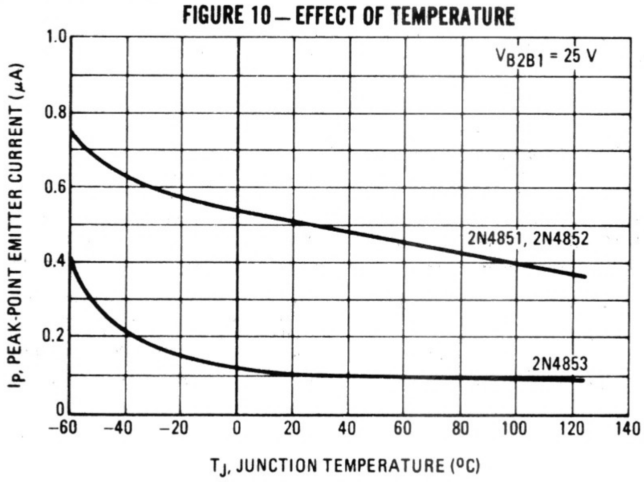


FIGURE 10 — EFFECT OF TEMPERATURE



INTERBASE RESISTANCE

FIGURE 11 — EFFECT OF VOLTAGE

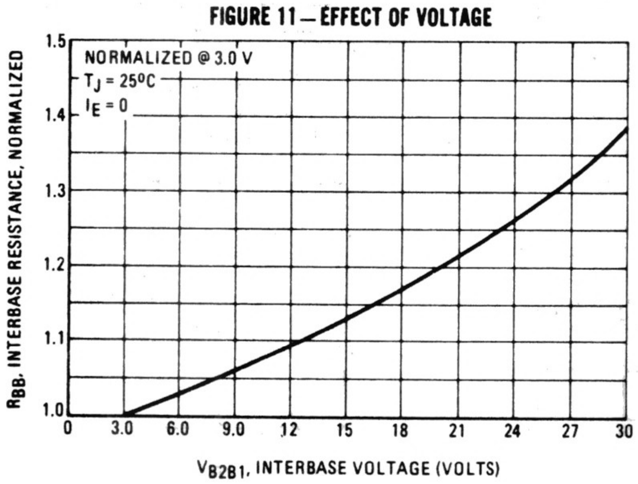


FIGURE 12 — EFFECT OF TEMPERATURE