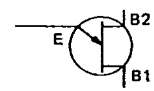
PN Unijunction Transistors
Silicon Unijunction Transistors

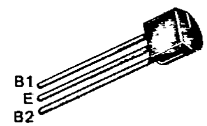
2N4870
2N4871

. . . designed for pulse and timing circuits, sensing circuits, and thyristor trigger circuits. These devices feature:

- Low Peak Point Current — 1 μA Typical
- Low Emitter Reverse Current — 5 nA Typical
- Passivated Surface for Reliability and Uniformity
- One-Piece Injection-Molded Unibloc‡ Plastic Package for Economy and Reliability
- High η for greater bandwidth

PN UJTs





CASE 29-04
(TO-226AA)
STYLE 9

Boca Semicondcutor Corp.
BSC

MAXIMUM RATINGS (T_A = 25° unless otherwise noted.)

Rating	Symbol	Value	Unit
RMS Power Dissipation, Note 1	P_D	300	mW
RMS Emitter Current	I_e	50	mA
Peak-Pulse Emitter Current, Note 2	i_e	1.5	Amp
Emitter Reverse Voltage	V_{B2E}	30	Volts
Interbase Voltage, Note 3	V_{B2B1}	35	Volts
Operating Junction Temperature Range	T_J	−55 to +125	°C
Storage Temperature Range	T_{stg}	−55 to +150	°C

Notes: 1. Derate 3 mW/°C increase in ambient temperature.
2. Duty cycle ≤ 1%, PRR = 10 PPS (see Figure 5).
3. Based upon power dissipation at T_A = 25°C.

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

Characteristic	Fig. No.	Symbol	Min	Typ	Max	Unit
Intrinsic Standoff Ratio, Note 1 (V_{B2B1} = 10 V) 2N4870 / 2N4871	4, 7	η	0.56 / 0.70	— / —	0.75 / 0.85	—
Interbase Resistance (V_{B2B1} = 3 V, I_E = 0)	10, 11	R_{BB}	4	6	9.1	k ohms
Interbase Resistance Temperature Coefficient (V_{B2B1} = 3 V, I_E = 0, T_A = −65 to +125°C)	11	αR_{BB}	0.10	—	0.90	%/°C
Emitter Saturation Voltage, Note 2 (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)	6	I_{EB2O}	—	0.005	1	μA
Peak-Point Emitter Current (V_{B2B1} = 25 V)	8, 9	I_P	—	1	5	μA
Valley-Point Current, Note 2 (V_{B2B1} = 20 V, R_{B2} = 100 ohms) 2N4870 / 2N4871	12, 13	I_V	2 / 4	5 / 7	— / —	mA
Base-One Peak Pulse Voltage 2N4870 / 2N4871	3, 16	V_{OB1}	3 / 5	6 / 8	— / —	Volts

Notes: 1. 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_R. 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.

2. Use pulse techniques: PW ≈ 300 μs, duty cycle ≤ 2% to avoid internal heating, which may result in erroneous readings.

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FIGURE 1 — UNIJUNCTION TRANSISTOR SYMBOL AND NOMENCLATURE

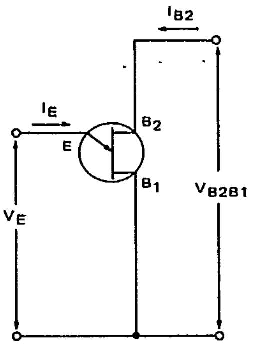

FIGURE 2 — STATIC EMITTER CHARACTERISTICS CURVES

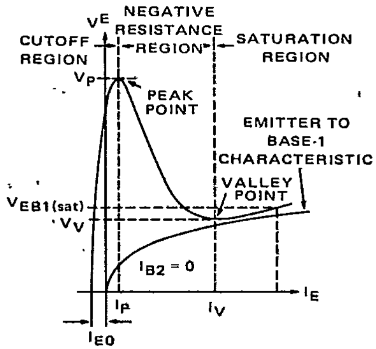

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FIGURE 3 — V_{OB1} TEST CIRCUIT

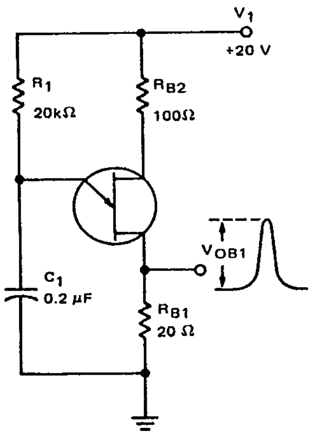
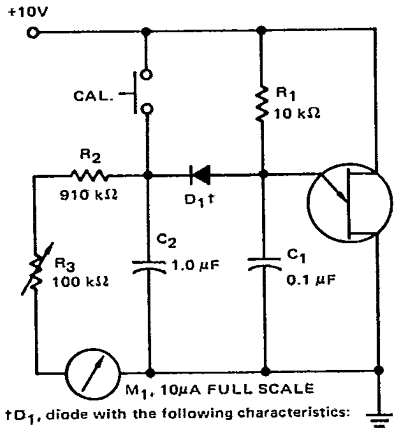


FIGURE 4 — η TEST CIRCUIT

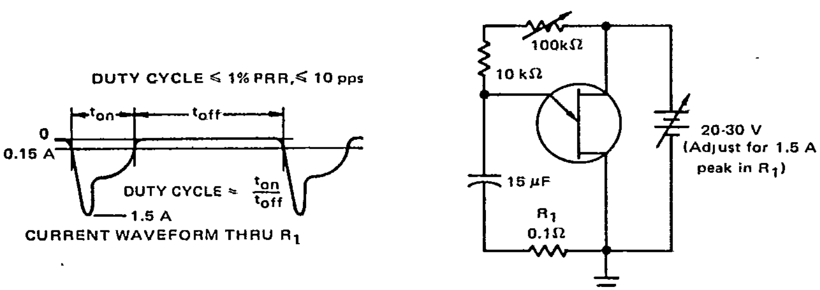


†D_1, diode with the following characteristics:

$V_F = 0.49$ V @ $I_F = 10$ µA

$I_R \leq 2.0$ µA @ $V_R = 20$ V

FIGURE 5 — PRR TEST CIRCUIT AND WAVEFORM



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TYPICAL CHARACTERISTICS

FIGURE 6 — EMITTER REVERSE CURRENT

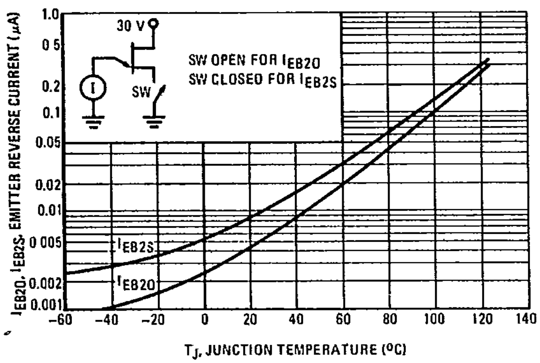
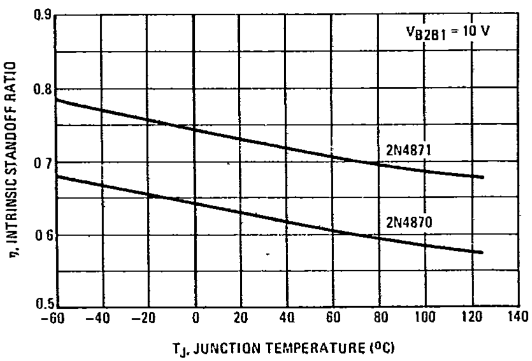


FIGURE 7 — INTRINSIC STANDOFF RATIO



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PEAK POINT CURRENT

FIGURE 8 — EFFECT OF VOLTAGE

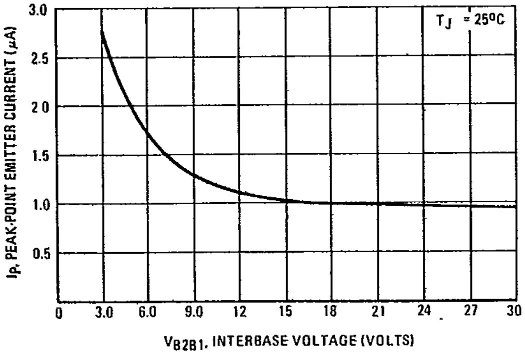
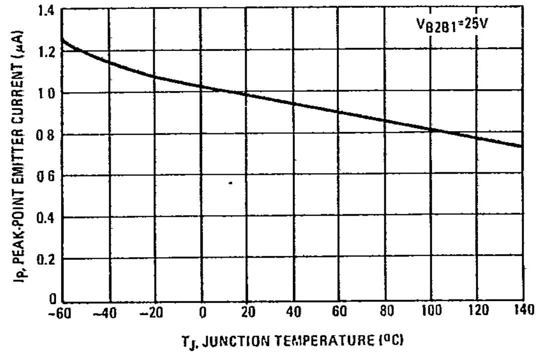


FIGURE 9 — EFFECT OF TEMPERATURE



INTERBASE RESISTANCE

FIGURE 10 — EFFECT OF VOLTAGE

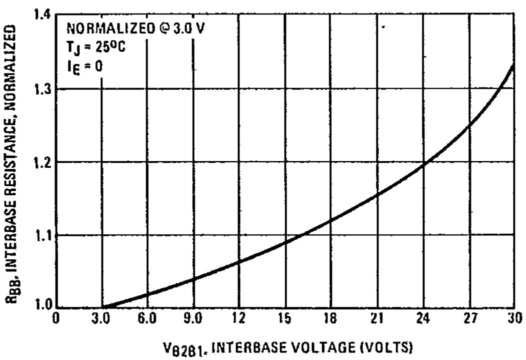
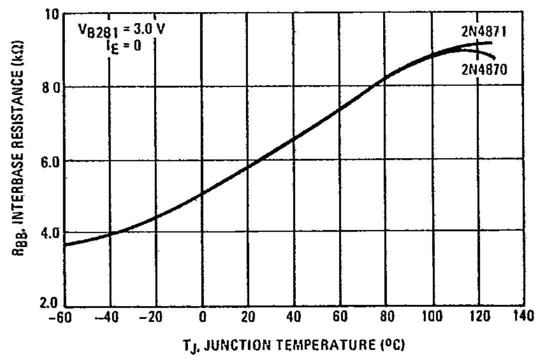


FIGURE 11 — EFFECT OF TEMPERATURE



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TYPICAL CHARACTERISTICS

VALLEY CURRENT

FIGURE 12 — EFFECT OF VOLTAGE

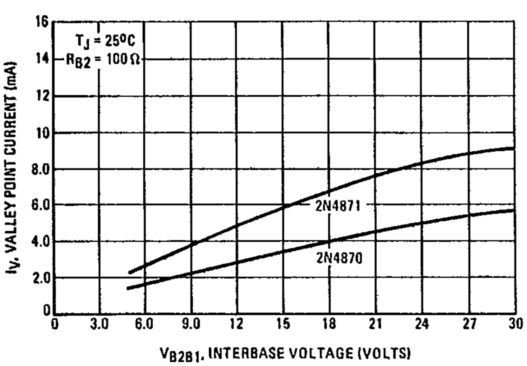
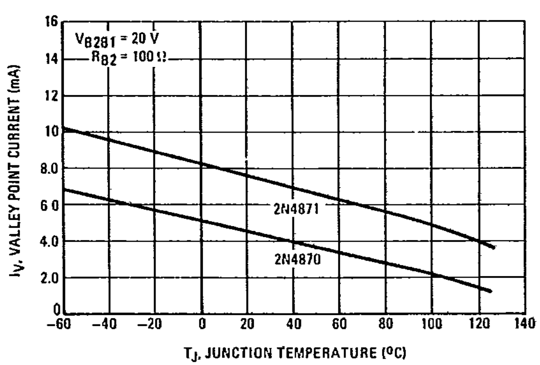


FIGURE 13 — EFFECT OF TEMPERATURE



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VALLEY VOLTAGE

FIGURE 14 — EFFECT OF VOLTAGE

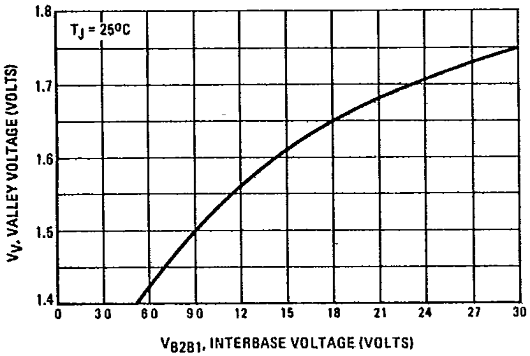


FIGURE 15 — EFFECT OF TEMPERATURE

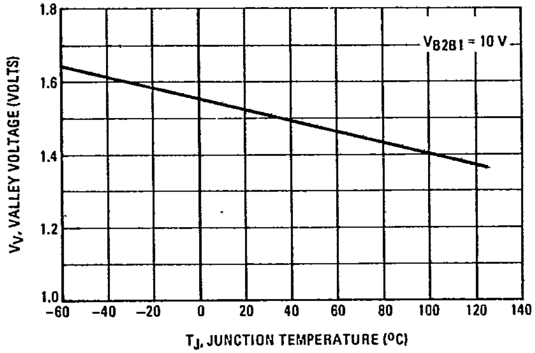
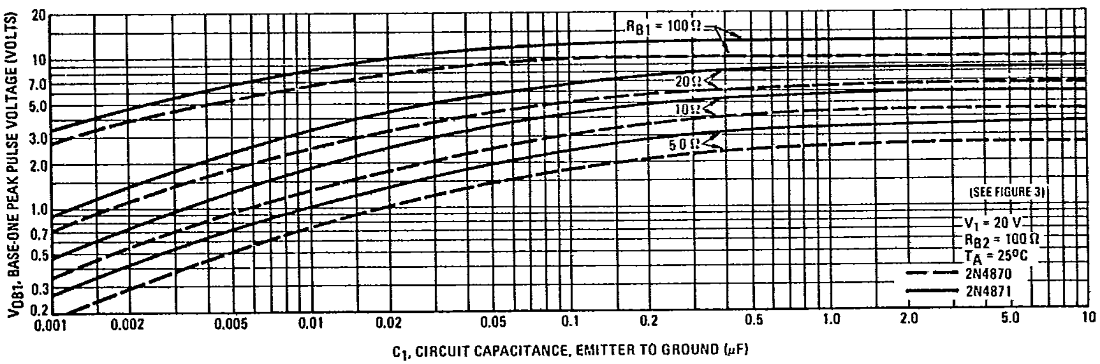


FIGURE 16 — OUTPUT VOLTAGE



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