

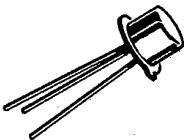
PN Unijunction Transistor

Silicon Annular Unijunction Transistor

- ... characterized primarily for low interbase-voltage operation in sensing, pulse triggering, and timing circuits.
- Low R_{BB} Spread — 6 to 8.5 k Ω
 - Low Peak-Point Current — $I_P = 4 \mu A$ (Max) @ $V_{B2B1} = 4 V$
 - Low Emitter Saturation Voltage — $V_{EB1(sat)} = 3 V$ (Max)
 - Narrow Intrinsic Standoff Ratio — $\eta = 0.72$ to 0.80

2N5431

PN UJT



CASE 22A-01
STYLE 1

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

Rating	Symbol	Value	Unit
RMS Power Dissipation, Note 1	P_D	360	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	-65 to +125	$^{\circ}C$
Storage Temperature Range	T_{stg}	-65 to +200	$^{\circ}C$

Notes: 1. Derate 3 mW/ $^{\circ}C$ increase in ambient temperature.
2. Duty Cycle $\leq 1\%$, PRR = 10 PPS (see Figure 5).
3. Based upon power dissipation at $T_A = 25^{\circ}C$.

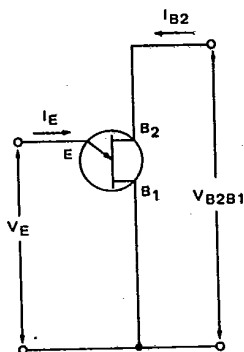
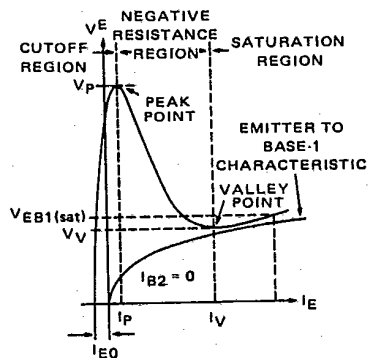
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Fig. No.	Symbol	Min	Max	Unit
Intrinsic Standoff Ratio, Note 1 ($V_{B2B1} = 10\text{ V}$)	4	η	0.72	0.80	—
Interbase Resistance ($V_{B2B1} = 3\text{ V}$, $I_E = 0$)		R_{BB}	6	8.5	$k\Omega$
Interbase Resistance Temperature Coefficient ($V_{B2B1} = 3\text{ V}$, $I_E = 0$, $T_A = 0$ to 100°C)		αR_{BB}	0.4	0.8	$\%/^\circ\text{C}$
Emitter Saturation Voltage, Note 2 ($V_{B2B1} = 10\text{ V}$, $I_E = 50\text{ mA}$)		$V_{EB1}(\text{sat})$	—	3	Volts
Modulated Interbase Current ($V_{B2B1} = 10\text{ V}$, $I_E = 50\text{ mA}$)		$I_{B2}(\text{mod})$	5	30	mA
Emitter Reverse Current ($V_{B2E} = 30\text{ V}$, $I_{B1} = 0$)		I_{EB20}	—	10	nA
Peak-Point Emitter Current ($V_{B2B1} = 25\text{ V}$) ($V_{B2B1} = 4\text{ V}$)		I_P	— —	0.4 4	μA
Valley-Point Current (2) ($V_{B2B1} = 20\text{ V}$, $R_{B2} = 100\text{ ohms}$)		I_V	2	—	mA
Base-One Peak Pulse Voltage ($V_{BB} = 4\text{ Volts}$)	3	V_{OB1}	1	—	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 0.45 volt at 25°C @ $I_F = 10\text{ }\mu\text{A}$ 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_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.

2. Use pulse techniques: $PW \approx 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$ to avoid internal heating, which may result in erroneous readings.

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FIGURE 1 — UNIJUNCTION TRANSISTOR
SYMBOL AND NOMENCLATUREFIGURE 2 — STATIC EMITTER
CHARACTERISTICS CURVES

T-37-21

FIGURE 3 - V_{OB1} TEST CIRCUIT

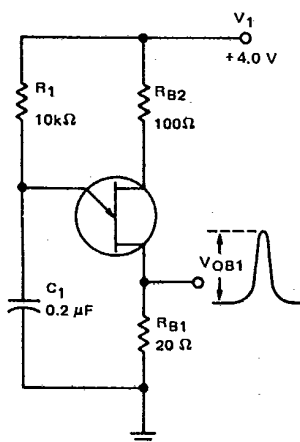


FIGURE 4 - η TEST CIRCUIT

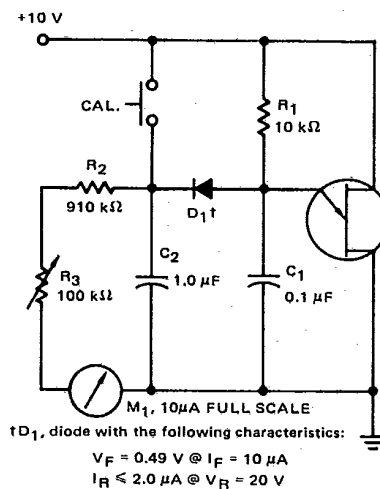


FIGURE 5 - PRR TEST CIRCUIT AND WAVEFORM

DUTY CYCLE $\leq 1.0\%$, PRR ≤ 10 PPS

