DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

2N5431

PN UNIJUNCTION TRANSISTOR

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
RMS power dissipation (1)	P_D	360	mW
RMS emitter current	I_e	50	mA
Peak pulse emitter current (2)	I_e	1.5	Amp
Emitter reverse voltage	V_{B2E}	30	Volts
Interbase voltage(3)	V_{B2B1}	35	Volts
Operating junction temperature range	T_J	-65 to +125	°C
Storage temperature range	T_{stg}	-65 to +200	°C

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

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

Characteristic	Symbol	Min	Max	Unit
Intrinsic standoff ratio (1) (V_{B2B1} = 10V)	η	0.72	0.80	-
Interbase resistance (V_{B2B1} = 3V, I_E = 0)	R_{BB}	6	8.5	kΩ
Interbase resistance temperature coefficient (V_{B2B1} = 3V, I_E = 0, T_A = 0 to 100°C)	αR_{BB}	0.4	0.8	%/°C
Emitter saturation voltage (2) (V_{B2B1} = 10V, I_E = 50mA)	$V_{EB1(sat)}$	-	3	Volts
Modulated interbase current (V_{B2B1} = 10V, I_E = 50mA)	$I_{B2(mod)}$	5	30	mA
Emitter reverse current (V_{B2E} = 30V, I_{B1} = 0)	I_{EB2O}	-	10	nA
Peak point emitter current (V_{B2B1} = 25V) (V_{B2B1} = 4V)	I_P	- -	0.4 4	µA
Valley point current (2) (V_{B2B1} = 20V, R_{B2} = 100ohms)	I_V	2	-	mA
Base one peak pulse voltage (V_{BB} = 4V)	V_{OB1}	1	-	Volts

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 0.45V at 25°C @ I_F = 10µA and decreases with temperature at about 2.5 mV/°C. 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. PW = 300µs, duty cycle ≤ 2% to avoid internal heating, which may result erroneous readings.

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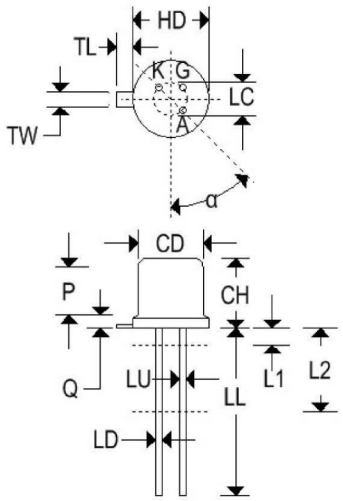
MECHANICAL CHARACTERISTICS

Case:	TO-18
Marking:	Body painted, alpha-numeric
Pin out:	See below



Dim	TO-18			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	0.178	0.195	4.520	4.950
CH	0.140	0.210	3.556	5.330
HD	0.209	0.230	5.310	5.840
LC	0.100 TP		2.540 TP	
LD	0.016	0.021	0.410	0.530
LL	0.500	0.750	12.700	19.050
LU	0.016	0.019	0.410	0.480
L_1	-	0.050	-	1.270
L_2	0.250	-	6.350	-
P	0.100	-	2.540	-
Q	-	0.040	-	1.020
TL	0.028	0.048	0.710	1.220
TW	0.036	0.046	0.910	1.170
α	45°TP		45°TP	

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FIGURE 1 – UNIJUNCTION TRANSISTOR
SYMBOL AND NOMENCLATURE

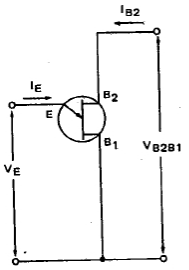

FIGURE 2 – STATIC EMITTER
CHARACTERISTICS CURVES

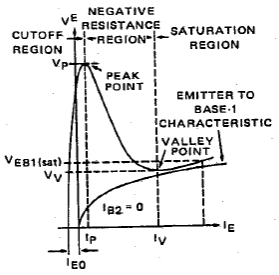

FIGURE 3 – V_{OB1} TEST CIRCUIT

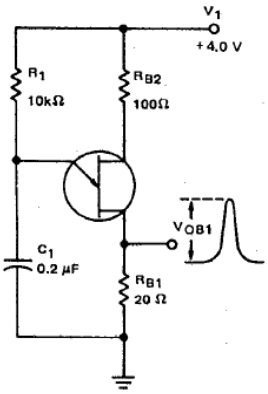

FIGURE 4 – η TEST CIRCUIT

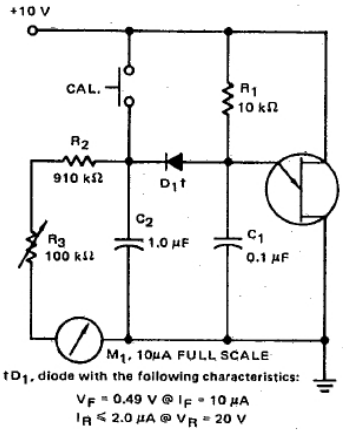

FIGURE 5 – PRR TEST CIRCUIT
AND WAVEFORM