DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

2N4948, 2N4949

PN UNIJUNCTION TRANSISTORS

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	1.0	Amp
Emitter reverse voltage	V_{B2E}	30	Volts
Storage temperature range	T_{stg}	-65 to 200	°C

Note 1: Derate 2.4mW/°C increase in ambient temperature. Total power dissipation must be limited by external circuitry. Interbase voltage limited by power dissipation: $V_{B2B1} = V(R_{BB}*P_{D)}$
Note 2: Capacitance discharge current must fail to 0.37A within 3.0ms and PRR ≤ 10PPS.

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

Characteristic		Symbol	Min	Typ	Max	Unit
Intrinsic standoff ratio (V_{B2B1} = 10V)(1)	2N4948 2N4949	η	0.55 0.74	- -	0.82 0.86	-
Interbase resistance (V_{B2B1} = 3.0V, I_E = 0)		R_{BB}	4.0	7.0	12.0	kohms
Interbase resistance temperature coefficient (V_{B2B1} = 3.0V, I_E = 0, T_A = -65° to 100°C		αR_{BB}	0.1	-	0.9	%/°C
Emitter saturation voltage (V_{B2B1} = 10V, I_E = 50mA)(2)		$V_{EB1(sat)}$	-	2.5	3.0	Volts
Modulated interbase current (V_{B2B1} = 10V, I_E = 50mA)		$I_{B2(mod)}$	12	15	-	mA
Emitter reverse current (V_{B2E} = 30V, I_{B1} = 0) (V_{B2E} = 30V, I_{B1} = 0, T_A = 125°C)		I_{EB20}	- -	5.0 -	10 1.0	nA µA
Peak point emitter current (V_{B2B1} = 25V)	2N4948 2N4949	I_P	- -	0.6 0.6	2.0 1.0	µA
Valley point current (V_{B2B1} = 20V, R_{B2} = 100ohms)(2)		I_V	2.0	4.0	-	mA
Base-one peak pulse voltage (3)	2N4949 2N4948	V_{OB1}	3.0 6.0	5.0 8.0	- -	Volts
Maximum oscillation frequency		$f_{(max)}$	-	1.25	-	MHz

Note 1: Intrinsic standoff ratio: $\eta = (V_P-V_{EB1})/V_{B2B1}$, where V_P = peak point emitter voltage, V_{B2B1} = interbase voltage, and V_{EB1} = emitter to base-one junction diode drop (≈ 0.45V @ 10µA)
Note 2: Use pulse techniques: PW ≈ 300µs duty cycle ≤ 2% to avoid internal heating due to interbase modulation which may result in erroneous readings.
Note 3: Base-one peak pulse voltage is measured in circuit of Figure 3. This specification is used to ensure minimum pulse amplitude for applications in SCR firing circuits and other types of pulse circuits.

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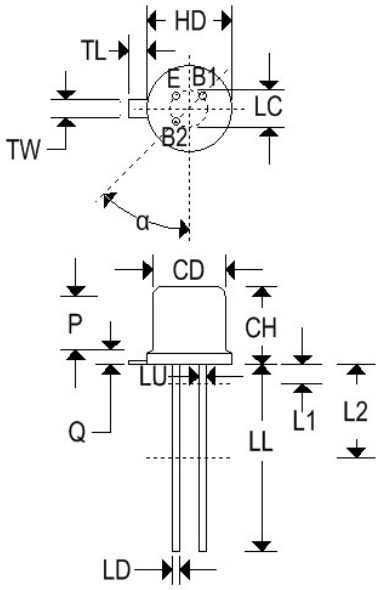
MECHANICAL CHARACTERISTICS

Case	TO-18
Marking	Alpha-numeric
Polarity	See below



Dim	TO-18			
	Inches		Millimeters	
	Min	Max	Min	Max
CD	0.178	0.195	4.520	4.950
CH	0.170	0.210	4.320	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	

FIGURE 1 – UNIJUNCTION TRANSISTOR SYMBOL AND NOMENCLATURE

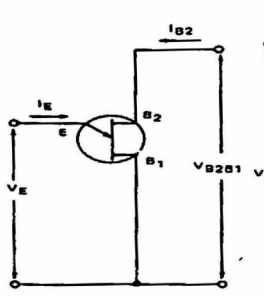


FIGURE 2 – STATIC EMITTER CHARACTERISTICS CURVES

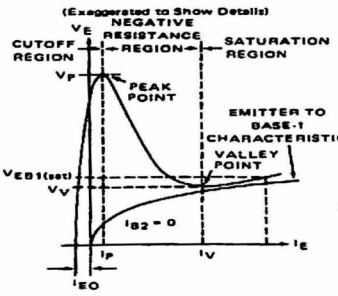


FIGURE 3 – V_{OB1} TEST CIRCUIT (Typical Relaxation Oscillator)

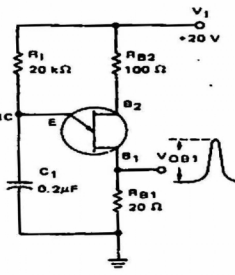


FIGURE 4 – F(max) MAXIMUM FREQUENCY TEST CIRCUIT