NOT RECOMMENDED FOR NEW DESIGNS

PN Unijunction Transistor

Silicon Annular PN Unijunction Transistor

2N3980

PN UJTs

. . . designed for military and industrial use in pulse, timing, sensing, and oscillator circuits. These devices feature:

- Low Peak Point Current — 2 μA max
- Fast Switching — to 1 MHz
- Low Emitter Reverse Current — 10 nA max
- Passivated Surface for Reliability and Uniformity

CASE 22A-01
STYLE 1

MAXIMUM RATINGS (T_A = 25°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	Amp
Emitter Reverse Voltage	V_{B2E}	30	Volts
Interbase Voltage	V_{B2B1}	35	Volts
Storage Temperature Range	T_{stg}	−65 to +200	°C

Notes: 1. Derate 2.4 mW/°C increase in ambient temperature. Total power dissipation (available power to Emitter and Base-Two) must be limited by the external circuitry.
2. Capacitance discharge current must fall to 0.37 Amp within 3 ms and PRR ≤ 10 PPS.

3

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

Characteristic	Symbol	Min	Typ	Max	Unit
Intrinsic Standoff Ratio (V_{B2B1} = 10 V) Note 1	η	0.68	—	0.82	—
Interbase Resistance (V_{B2B1} = 3 V, I_E = 0)	R_{BB}	4	6	8	k ohms
Interbase Resistance Temperature Coefficient (V_{B2B1} = 3 V, I_E = 0, T_A = −65°C to +100°C)	αR_{BB}	0.4	—	0.9	%/°C
Emitter Saturation Voltage (V_{B2B1} = 10 V, I_E = 50 mA) Note 2	$V_{EB1(sat)}$	—	2.5	3	Volts
Modulated Interbase Current (V_{B2B1} = 10 V, I_E = 50 mA)	$I_{B2(mod)}$	12	15	—	mA
Emitter Reverse Current (V_{B2E} = 30 V, I_{B1} = 0) (V_{B2E} = 30 V, I_{B1} = 0, T_A = 125°C)	I_{EB20}	— —	5 —	10 1	nA μA
Peak Point Emitter Current (V_{B2B1} = 25 V)	I_P	—	0.6	2	μA

(cont.)

Notes:
1. Intrinsic standoff ratio, η, is defined by equation:

$$\eta = \frac{V_P - (V_{EB1})}{V_{B2B1}}$$

Where V_P = Peak Point Emitter Voltage
V_{B2B1} = Interbase Voltage
V_F = Emitter to Base-One Junction Diode Drop (0.45 V @ 10 μA)

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

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

Characteristic	Symbol	Min	Typ	Max	Unit
Valley Point Current (V_{B2B1} = 20 V, R_{B2} = 100 ohms) Note 2	I_V	1	4	10	mA
Base-One Peak Pulse Voltage (Note 1, Figure 3)	V_{OB1}	6	8	—	Volts
Maximum Oscillation Frequency (Figure 4)	$f_{(max)}$	—	400	—	kHz

Notes:

1. Base-One Peak Pulse Voltage is measured in circuit of Figure 3. This specification is used to ensure minimum pulse amplitude for applications in ACR firing circuits and other types of pulse circuits.
2. Use pulse techniques: PW ≈ 300 μs duty cycle ≤ 2% to avoid internal heating due to interbase modulation which may result in erroneous readings.

FIGURE 1 – UNIJUNCTION TRANSISTOR SYMBOL AND NOMENCLATURE

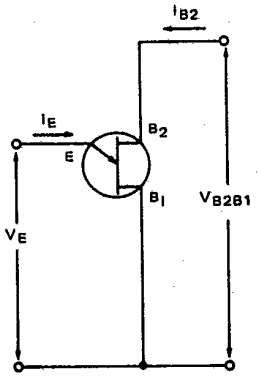

FIGURE 2 – STATIC EMITTER CHARACTERISTICS CURVES
(Exaggerated to Show Details)

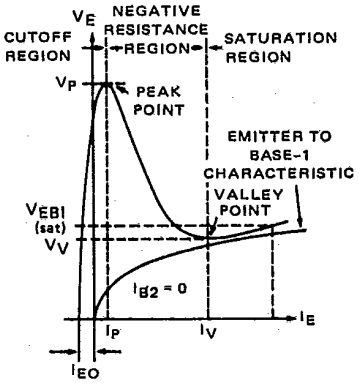

FIGURE 3 – V_{OB1} TEST CIRCUIT
(Typical Relaxation Oscillator)

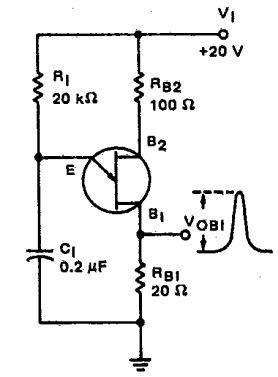

FIGURE 4 – f(max) MAXIMUM FREQUENCY TEST CIRCUIT