

# Boca Semiconductor Corp. (BSC)

## PN Unijunction Transistors

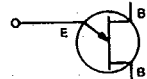
### Silicon PN Unijunction Transistors

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

- Low Peak Point Current — 2  $\mu$ A (Max)
- Low Emitter Reverse Current — 200 nA (Max)
- Passivated Surface for Reliability and Uniformity

**2N2646**  
**2N2647**

**PN UJT's**



**CASE 22A-01**  
**STYLE 1**

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

Rating	Symbol	Value	Unit
Power Dissipation, Note 1	$P_D$	300	mW
RMS Emitter Current	$I_E(\text{RMS})$	50	mA
Peak Pulse Emitter Current, Note 2	$i_E$	2	Amps
Emitter Reverse Voltage	$V_{B2E}$	30	Volts
Interbase Voltage	$V_{B2B1}$	35	Volts
Operating Junction Temperature Range	$T_J$	-65 to +125	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	$^\circ\text{C}$

\*Indicates JEDEC Registered Data.

Notes: 1. Derate 3 mW/ $^\circ\text{C}$  increase in ambient temperature. The total power dissipation (available power to Emitter and Base-Two) must be limited by the external circuitry.

2. Capacitor discharge — 10  $\mu$ F or less, 30 volts or less.

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

Characteristic		Symbol	Min	Typ	Max	Unit
Intrinsic Standoff Ratio ( $V_{B2B1} = 10\text{ V}$ ), Note 1	2N2646 2N2647	$\eta$	0.56 0.68	— —	0.75 0.82	—
Interbase Resistance ( $V_{B2B1} = 3\text{ V}$ , $I_E = 0$ )		$r_{BB}$	4.7	7	9.1	k ohms
Interbase Resistance Temperature Coefficient ( $V_{B2B1} = 3\text{ V}$ , $I_E = 0$ , $T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$ )		$\alpha r_{BB}$	0.1	—	0.9	%/°C
Emitter Saturation Voltage ( $V_{B2B1} = 10\text{ V}$ , $I_E = 50\text{ mA}$ ), Note 2		$V_{EB1}(\text{sat})$	—	3.5	—	Volts
Modulated Interbase Current ( $V_{B2B1} = 10\text{ V}$ , $I_E = 50\text{ mA}$ )		$I_{B2}(\text{mod})$	—	15	—	mA
Emitter Reverse Current ( $V_{B2E} = 30\text{ V}$ , $I_{B1} = 0$ )	2N2646 2N2647	$I_{EB20}$	— —	0.005 0.005	12 0.2	$\mu\text{A}$
Peak Point Emitter Current ( $V_{B2B1} = 25\text{ V}$ )	2N2646 2N2647	$I_P$	— —	1 1	5 2	$\mu\text{A}$
Valley Point Current ( $V_{B2B1} = 20\text{ V}$ , $R_{B2} \approx 100\text{ ohms}$ ), Note 2	2N2646 2N2647	$I_V$	4 8	6 10	— 18	mA
Base-One Peak Pulse Voltage (Note 3, Figure 3)	2N2646 2N2647	$V_{OB1}$	3 6	5 7	— —	Volts

\*Indicates JEDEC Registered Data.

## Notes:

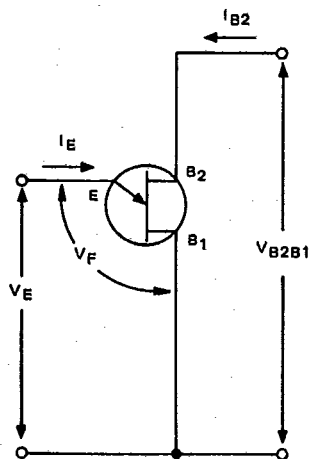
1. Intrinsic standoff ratio,

 $\eta$ , is defined by equation:

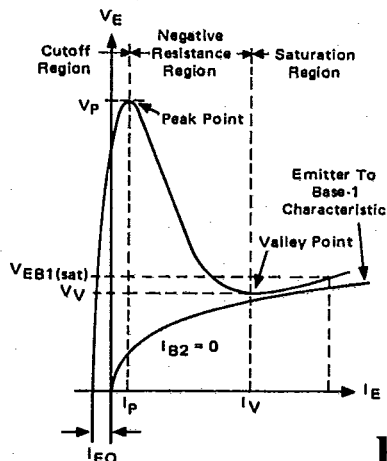
$$\eta = \frac{V_P - V_F}{V_{B2B1}}$$

Where  $V_P$  = Peak Point Emitter Voltage $V_{B2B1}$  = Interbase Voltage $V_F$  = Emitter to Base-One Junction Diode Drop  
( $\approx 0.45\text{ V}$  @  $10\text{ }\mu\text{A}$ )2. Use pulse techniques:  $PW \approx 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$  to avoid internal heating due to interbase modulation which may result in erroneous readings.

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.

**FIGURE 1**  
UNIJUNCTION TRANSISTOR SYMBOL  
AND NOMENCLATURE**FIGURE 2**  
STATIC EMITTER CHARACTERISTIC  
CURVES

(Exaggerated to Show Details)

**FIGURE 3 —  $V_{OB1}$  TEST CIRCUIT**  
(Typical Relaxation Oscillator)