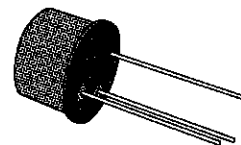


## HIGH-VOLTAGE, HIGH-CURRENT SWITCH

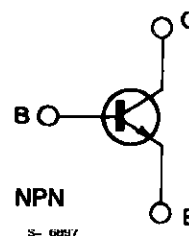
### DESCRIPTION

The BSX32 is a silicon planar epitaxial NPN transistor in Jedec TO-39 metal case. It is designed for high voltage, high current switching applications.



TO-39

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol         | Parameter                                                                                         | Value       | Unit             |
|----------------|---------------------------------------------------------------------------------------------------|-------------|------------------|
| $V_{CBO}$      | Collector-base Voltage ( $I_E = 0$ )                                                              | 65          | V                |
| $V_{CEO}$      | Collector-emitter Voltage ( $I_B = 0$ )                                                           | 40          | V                |
| $V_{EBO}$      | Emitter-base Voltage ( $I_C = 0$ )                                                                | 6           | V                |
| $I_C$          | Collector Current                                                                                 | 1           | mA               |
| $P_{tot}$      | Total Power Dissipation at $T_{amb} \leq 25^\circ\text{C}$<br>at $T_{case} \leq 25^\circ\text{C}$ | 0.8         | W                |
|                |                                                                                                   | 3.5         | W                |
| $T_{stg}, T_j$ | Storage and Junction Temperature                                                                  | - 55 to 200 | $^\circ\text{C}$ |

**THERMAL DATA**

|                  |                                     |     |     |               |
|------------------|-------------------------------------|-----|-----|---------------|
| $R_{th\ j-case}$ | Thermal Resistance Junction-case    | Max | 50  | $^{\circ}C/W$ |
| $R_{th\ j-amb}$  | Thermal Resistance Junction-ambient | Max | 219 | $^{\circ}C/W$ |

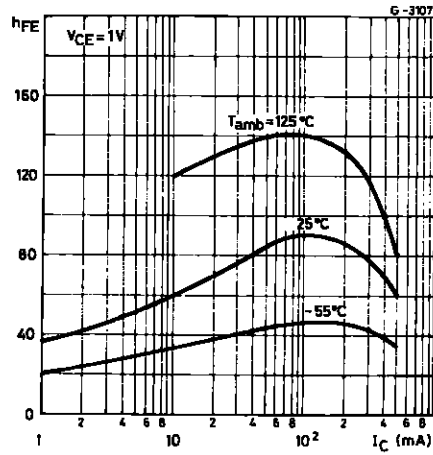
**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25^{\circ}C$  unless otherwise specified)

| Symbol          | Parameter                                            | Test Conditions                                                                                                                                                                                                        | Min.                             | Typ.                             | Max.                | Unit        |
|-----------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|---------------------|-------------|
| $I_{CBO}$       | Collector Cutoff Current<br>( $I_E = 0$ )            | $V_{CB} = 50\ V$                                                                                                                                                                                                       |                                  | 0.25                             | 4                   | $\mu A$     |
| $V_{(BR)CBO}$   | Collector-base Breakdown<br>Voltage ( $I_E = 0$ )    | $I_C = 100\ \mu A$                                                                                                                                                                                                     | 65                               |                                  |                     | V           |
| $V_{(BR)CEO}^*$ | Collector-emitter Breakdown<br>Voltage ( $I_B = 0$ ) | $I_C = 10\ mA$                                                                                                                                                                                                         | 40                               |                                  |                     | V           |
| $V_{(BR)EBO}$   | Emitter-base Breakdown<br>Voltage ( $I_C = 0$ )      | $I_E = 100\ \mu A$                                                                                                                                                                                                     | 6                                |                                  |                     | V           |
| $V_{CE(sat)}^*$ | Collector-emitter Saturation<br>Voltage              | $I_C = 100\ mA$ $I_B = 10\ mA$<br>$I_C = 500\ mA$ $I_B = 50\ mA$<br>$I_C = 1\ A$ $I_B = 100\ mA$                                                                                                                       |                                  | 0.17<br>0.36<br>0.6              | 0.25<br>0.5<br>0.85 | V<br>V<br>V |
| $V_{BE(sat)}^*$ | Base-emitter Saturation<br>Voltage                   | $I_C = 100\ mA$ $I_B = 10\ mA$<br>$I_C = 500\ mA$ $I_B = 50\ mA$<br>$I_C = 1\ A$ $I_B = 100\ mA$                                                                                                                       |                                  | 0.8                              | 0.9<br>1.5<br>2     | V<br>V<br>V |
| $h_{FE}^*$      | DC Current Gain                                      | $I_C = 10\ mA$ $V_{CE} = 1\ V$<br>$I_C = 100\ mA$ $V_{CE} = 1\ V$<br>$I_C = 500\ mA$ $V_{CE} = 1\ V$<br>$I_C = 1\ A$ $V_{CE} = 5\ V$<br>$V_{CE} = 1\ V$ $T_{amb} = -55^{\circ}C$<br>$I_C = 100\ mA$<br>$I_C = 500\ mA$ | 30<br>60<br>25<br>20<br>30<br>15 | 60<br>90<br>60<br>60<br>45<br>35 | 150                 |             |
| $f_T$           | Transition Frequency                                 | $I_C = 50\ mA$ $V_{CE} = 10\ V$<br>$f = 100\ MHz$                                                                                                                                                                      |                                  | 400                              |                     | MHz         |
| $C_{EBO}$       | Emitter-base Capacitance                             | $I_C = 0$ $V_{EB} = 0.5\ V$<br>$f = 1\ MHz$                                                                                                                                                                            |                                  | 40                               | 55                  | pF          |
| $C_{CBO}$       | Collector-base Capacitance                           | $I_E = 0$ $V_{CB} = 10\ V$<br>$f = 1\ MHz$                                                                                                                                                                             |                                  | 6                                | 10                  | pF          |
| $t_{on}^{**}$   | Turn-on Time                                         | $I_C = 500\ mA$ $V_{CC} = 30\ V$<br>$I_{B1} = 50\ mA$                                                                                                                                                                  |                                  | 22                               | 35                  | ns          |
| $t_{off}^{**}$  | Turn-off Time                                        | $I_C = 500\ mA$ $V_{CC} = 30\ V$<br>$I_{B1} = -I_{B2} = 50\ mA$                                                                                                                                                        |                                  | 40                               | 60                  | ns          |

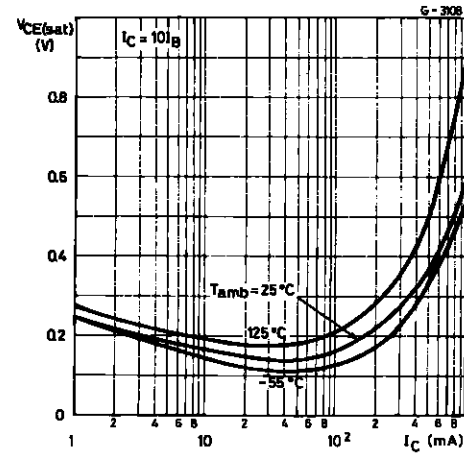
\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle = 1 %.

\*\* See test circuit.

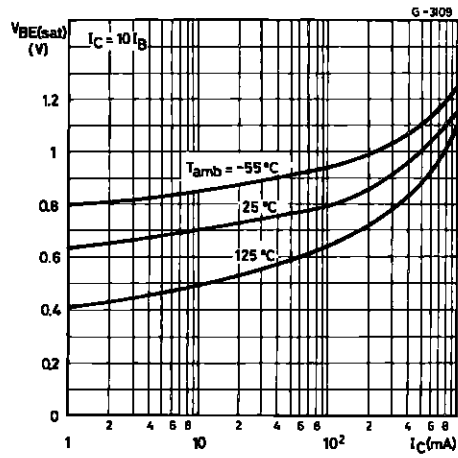
DC Current Gain.



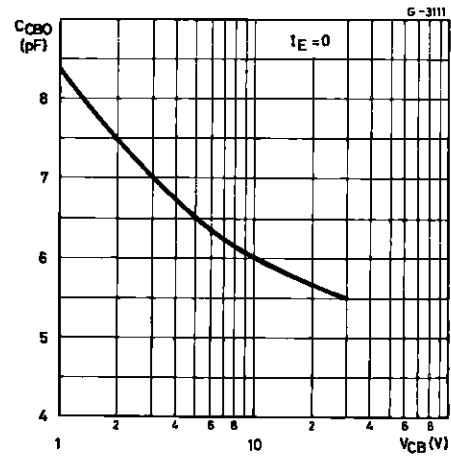
Collector-emitter Saturation Voltage.



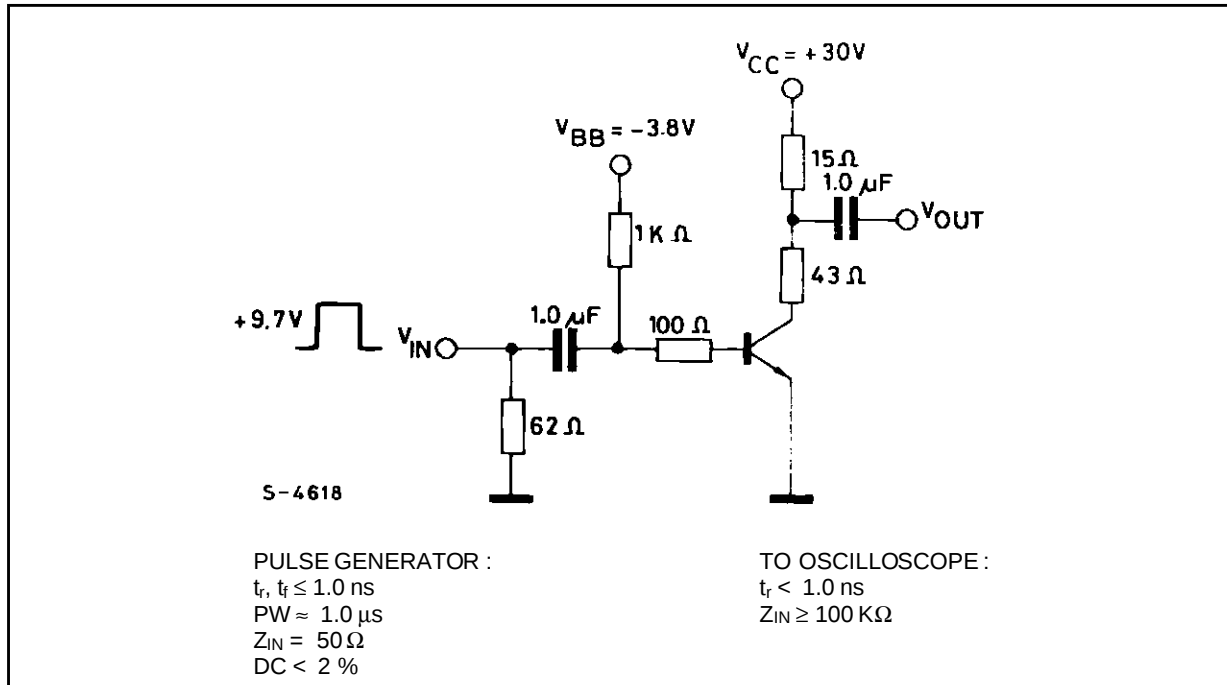
Base-emitter Saturation Voltage.



Collector-base Capacitance.

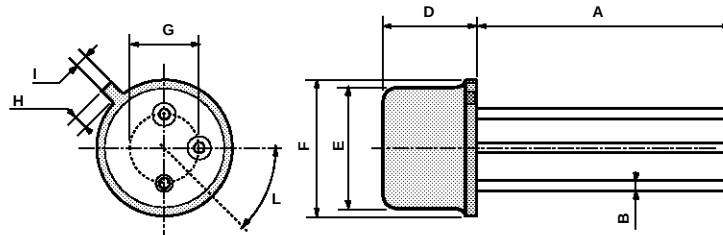


Test circuit for  $t_{on}$ ,  $t_{off}$ .



## TO39 MECHANICAL DATA

| DIM. | mm         |      |      | inch  |      |       |
|------|------------|------|------|-------|------|-------|
|      | MIN.       | TYP. | MAX. | MIN.  | TYP. | MAX.  |
| A    | 12.7       |      |      | 0.500 |      |       |
| B    |            |      | 0.49 |       |      | 0.019 |
| D    |            |      | 6.6  |       |      | 0.260 |
| E    |            |      | 8.5  |       |      | 0.334 |
| F    |            |      | 9.4  |       |      | 0.370 |
| G    | 5.08       |      |      | 0.200 |      |       |
| H    |            |      | 1.2  |       |      | 0.047 |
| I    |            |      | 0.9  |       |      | 0.035 |
| L    | 45° (typ.) |      |      |       |      |       |



P008B

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