

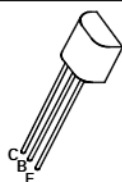
# NPN SILICON PLANAR MEDIUM POWER DARLINGTON TRANSISTORS

## BCX38A/B/C

ISSUE 1 – MARCH 94

### FEATURES

- \* 60 Volt  $V_{CE0}$
- \* Gain of 10K at  $I_C=0.5$  Amp
- \*  $P_{tot}=1$  Watt



E-Line  
T092 Compatible

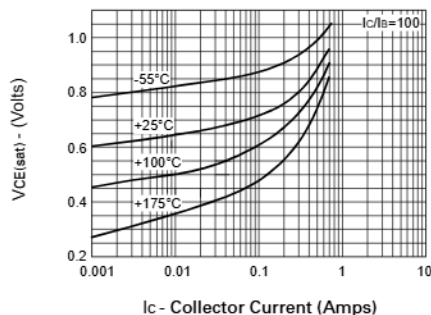
### ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                  | SYMBOL         | VALUE       | UNIT        |
|--------------------------------------------|----------------|-------------|-------------|
| Collector-Base Voltage                     | $V_{CBO}$      | 80          | V           |
| Collector-Emitter Voltage                  | $V_{CEO}$      | 60          | V           |
| Emitter-Base Voltage                       | $V_{EBO}$      | 10          | V           |
| Peak Pulse Current                         | $I_{CM}$       | 2           | A           |
| Continuous Collector Current               | $I_C$          | 800         | mA          |
| Power Dissipation at $T_{amb}=25^{\circ}C$ | $P_{tot}$      | 1           | W           |
| Operating and Storage Temperature Range    | $T_j; T_{stg}$ | -55 to +200 | $^{\circ}C$ |

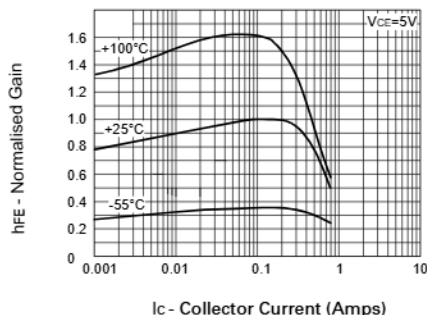
### ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}C$ ).

| PARAMETER                             | SYMBOL         | MIN.     | TYP.          | MAX. | UNIT | CONDITIONS.                                          |
|---------------------------------------|----------------|----------|---------------|------|------|------------------------------------------------------|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$  | 80       |               |      | V    | $I_C=10\mu A, I_E=0$                                 |
| Collector-Emitter Sustaining Voltage  | $V_{CEO(sus)}$ | 60       |               |      | V    | $I_C=10mA, I_B=0$                                    |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$  | 10       |               |      | V    | $I_E=10\mu A, I_C=0$                                 |
| Collector Cut-Off Current             | $I_{CBO}$      |          |               | 100  | nA   | $V_{CB}=60V, I_E=0$                                  |
| Emitter Cut-Off Current               | $I_{EBO}$      |          |               | 100  | nA   | $V_{EB}=8V, I_C=0$                                   |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$  |          |               | 1.25 | V    | $I_C=800mA, I_B=8mA^*$                               |
| Base-Emitter Turn-on Voltage          | $V_{BE(on)}$   |          |               | 1.8  | V    | $I_C=800mA, V_{CE}=5V^*$                             |
| Static Forward Current Transfer Ratio | BCX38A         | $h_{FE}$ | 500<br>1000   |      |      | $I_C=100mA, V_{CE}=5V^*$<br>$I_C=500mA, V_{CE}=5V^*$ |
|                                       | BCX38B         |          | 2000<br>4000  |      |      | $I_C=100mA, V_{CE}=5V^*$<br>$I_C=500mA, V_{CE}=5V^*$ |
|                                       | BCX38C         |          | 5000<br>10000 |      |      | $I_C=100mA, V_{CE}=5V^*$<br>$I_C=500mA, V_{CE}=5V^*$ |

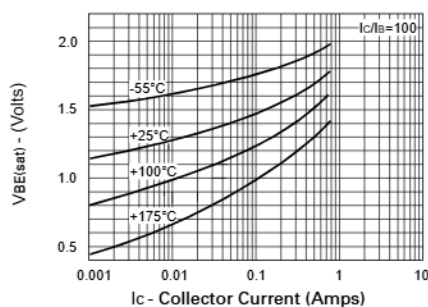
## TYPICAL CHARACTERISTICS



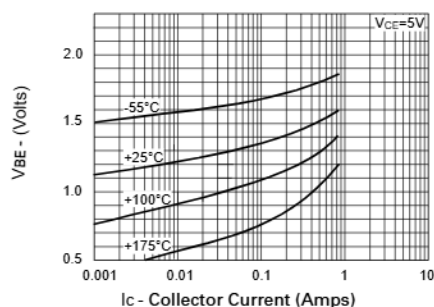
**$V_{CE(sat)}$  v  $I_C$**



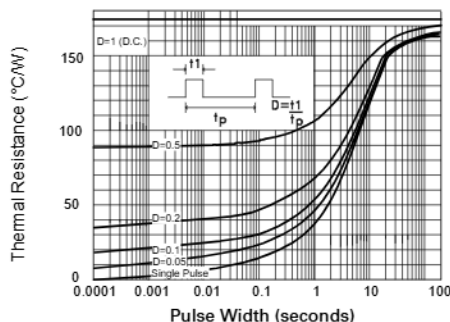
**$h_{FE}$  v  $I_C$**



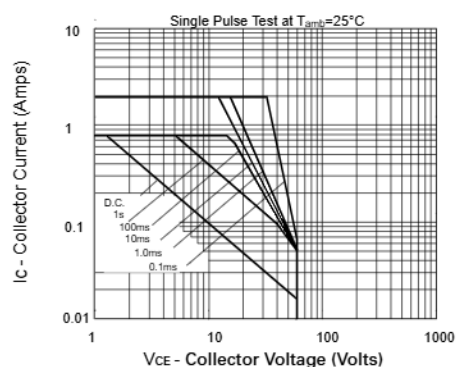
**$V_{BE(sat)}$  v  $I_C$**



**$V_{BE(on)}$  v  $I_C$**

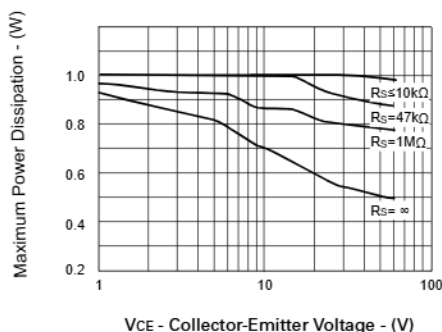


**Maximum transient thermal impedance**



**Safe Operating Area**

# BCX38A/B/C



The maximum permissible operational temperature can be obtained using the equation:

$$T_{amb(max)} = \frac{Power(max) - Power(actual)}{0.0057} + 25^\circ C$$

$T_{amb(max)}$  = Maximum operating ambient temperature

Power (max) = Maximum power dissipation figure, for a given  $V_{CE}$  and source resistance ( $R_S$ )

Power (actual) = Actual power dissipation in users circuit