# BUL742C

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

| Ordering Code | Marking | Package / Shipment |
|---|---|---|
| BUL742C | BUL742C | TO-220 / Tube |

- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

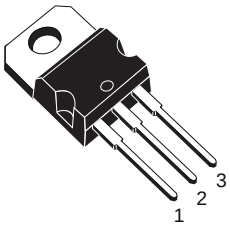
### APPLICATIONS:

- ELECTRONIC BALLAST FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

### DESCRIPTION

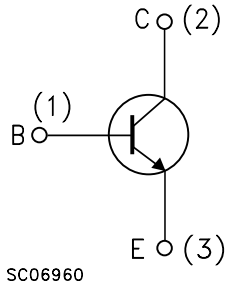
The device is manufactured using High Voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

Thanks to an increased intermediate layer, it has an intrinsic ruggedness which enables the transistor to withstand an high collector current level during breakdown condition, without using the transil protection usually necessary in typical converters for lamp ballast.




**TO-220**

**INTERNAL SCHEMATIC DIAGRAM**




### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CES}$ | Collector-Emitter Voltage ($V_{BE}$ = 0) | 1050 | V |
| $V_{CEO}$ | Collector-Emitter Voltage ($I_B$ = 0) | 400 | V |
| $V_{EBO}$ | Emitter-Base Voltage ($I_C$ = 0, $I_B$ < 2 A, $t_p$ < 10 ms) | $V_{(BR)EBO}$ | V |
| $I_C$ | Collector Current | 4 | A |
| $I_{CM}$ | Collector Peak Current ($t_p$ < 5 ms) | 8 | A |
| $I_B$ | Base Current | 2 | A |
| $I_{BM}$ | Base Peak Current ($t_p$ < 5 ms) | 4 | A |
| $P_{tot}$ | Total Dissipation at $T_c$ = 25 °C | 70 | W |
| $T_{stg}$ | Storage Temperature | –65 to 150 | °C |
| $T_j$ | Max. Operating Junction Temperature | 150 | °C |

## THERMAL DATA

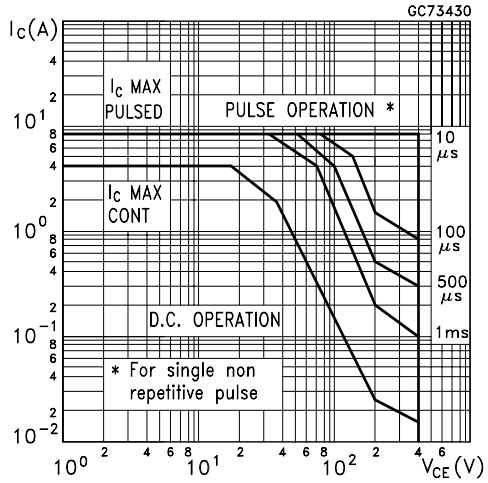
| | | | | |
|---|---|---|---|---|
| $R_{thj\text{-}case}$ | Thermal Resistance Junction-case | Max | 1.79 | °C/W |
| $R_{thj\text{-}amb}$ | Thermal Resistance Junction-ambient | Max | 62.5 | °C/W |

## ELECTRICAL CHARACTERISTICS ($T_j$ = 25 °C unless otherwise specified)

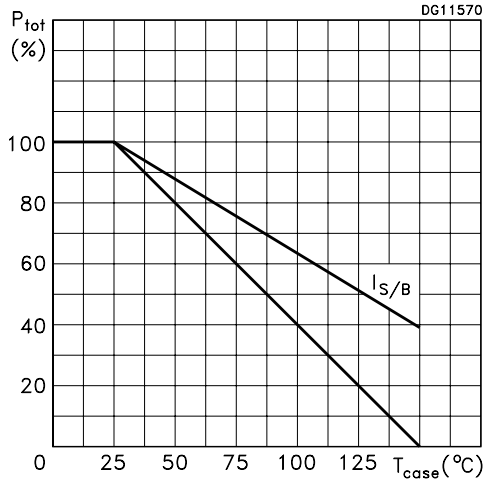
| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CES}$ | Collector Cut-off Current ($V_{BE}$ = 0) | $V_{CE}$ = 1050 V | | | | 100 | µA |
| $I_{CEO}$ | Collector Cut-off Current ($I_B$ = 0) | $V_{CE}$ = 400 V | | | | 250 | µA |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage ($I_C$ = 0) | $I_E$ = 1 mA | | 12 | | 24 | V |
| $V_{CEO(sus)}$* | Collector-Emitter Sustaining Voltage ($I_B$ = 0) | $I_C$ = 10 mA | | 400 | | | V |
| $V_{CE(sat)}$* | Collector-Emitter Saturation Voltage | $I_C$ = 1 A<br>$I_C$ = 3.5 A | $I_B$ = 0.2 A<br>$I_B$ = 1 A | | | 0.5<br>1.5 | V<br>V |
| $V_{BE(sat)}$* | Base-Emitter Saturation Voltage | $I_C$ = 3.5 A | $I_B$ = 1 A | | | 1.5 | V |
| $h_{FE}$* | DC Current Gain | $I_C$ = 0.1 A<br>$I_C$ = 0.8 A | $V_{CE}$ = 5 V<br>$V_{CE}$ = 3 V | 48<br>25 | | 100<br>50 | |
| $t_s$<br>$t_f$ | RESISTIVE LOAD<br>Storage Time<br>Fall Time | $I_C$ = 2 A<br>$I_{B1}$ = -$I_{B2}$ = 400 mA<br>$V_{BB(off)}$ = -5 V | $V_{CC}$ = 125 V<br>$t_p$ = 300 µs<br>(See Figure 1) | | 2.4<br>350 | | µs<br>ns |
| $E_{ar}$ | Repetitive Avalanche Energy | L = 2 mH<br>$V_{BE}$ = -5 V | C = 1.8 nF<br>(See Figure 2) | 6 | | | mJ |

* Pulsed: Pulse duration = 300 µs, duty cycle = 1.5 %.

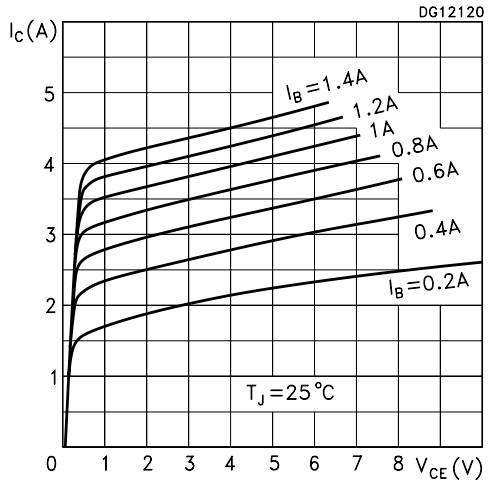
Safe Operating Area



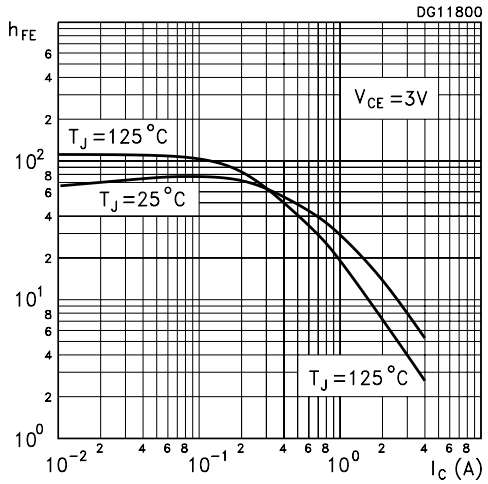

Derating Curve



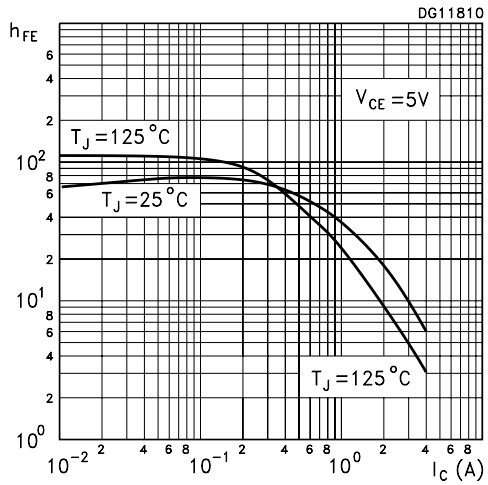

Output Characteristics



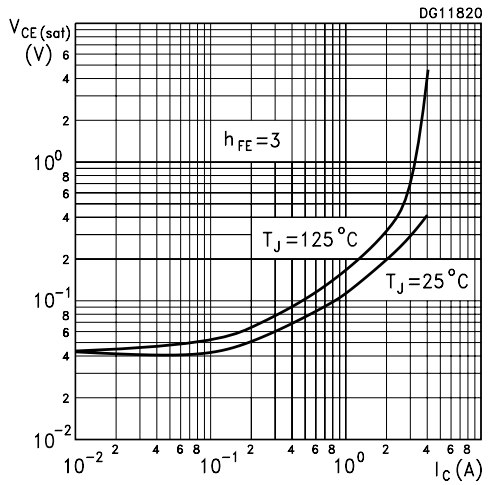

DC Current Gain



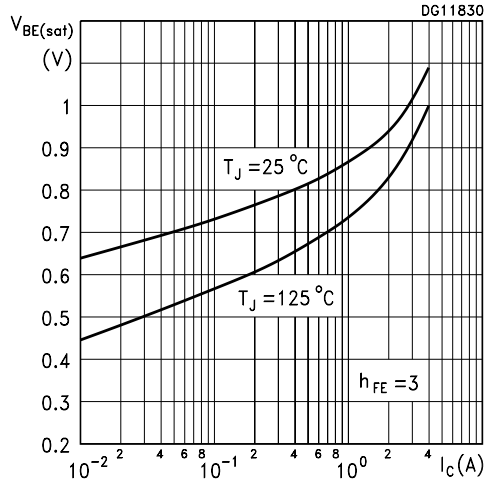

DC Current Gain



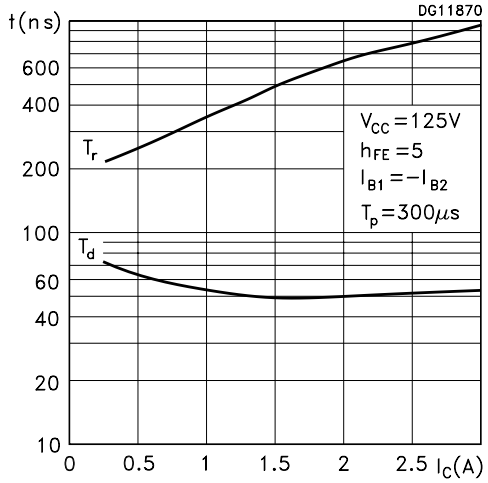

Collector-Emitter Saturation Voltage



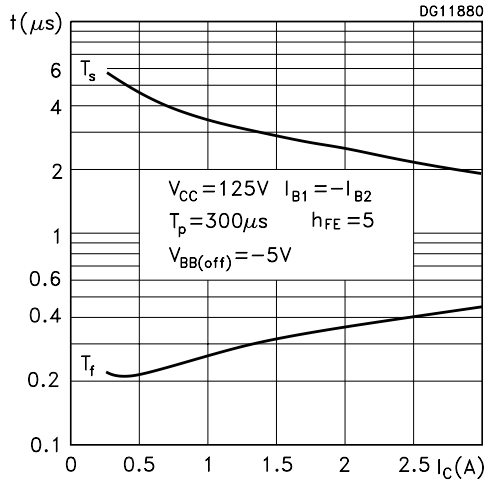
Base-Emitter Saturation Voltage



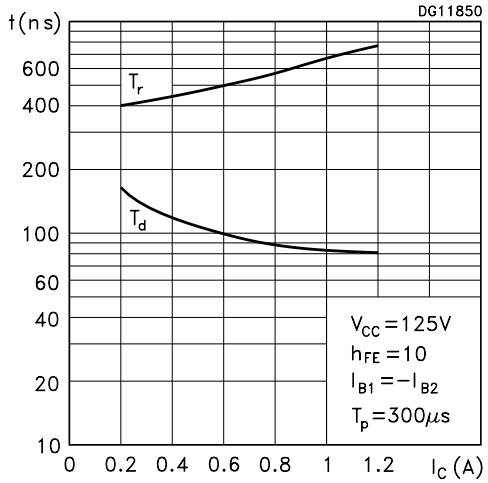

Resistive Load Switching On Times



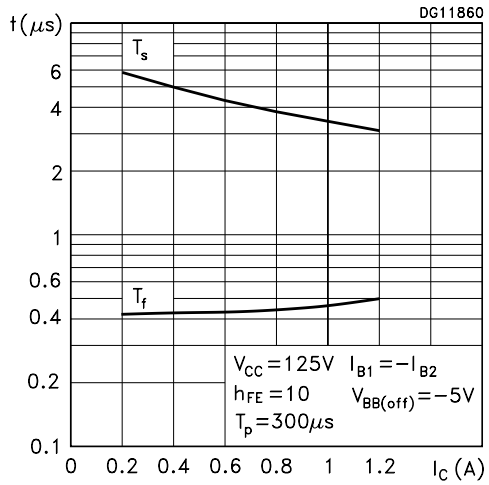

Resistive Load Switching Off Times




Resistive Load Switching On Times




Resistive Load Switching Off Times




Reverse Biased Safe Operating Area

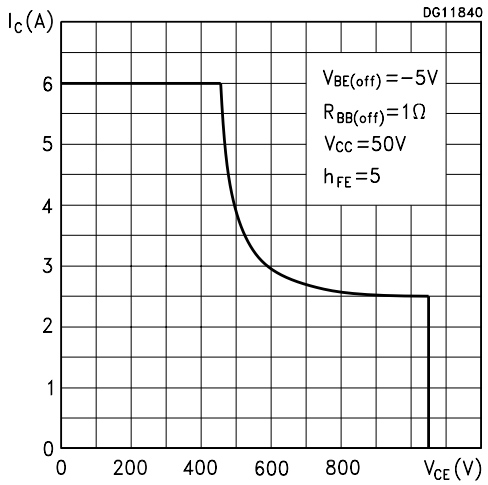


**Figure 1:** Resistive Load Switching Test Circuit

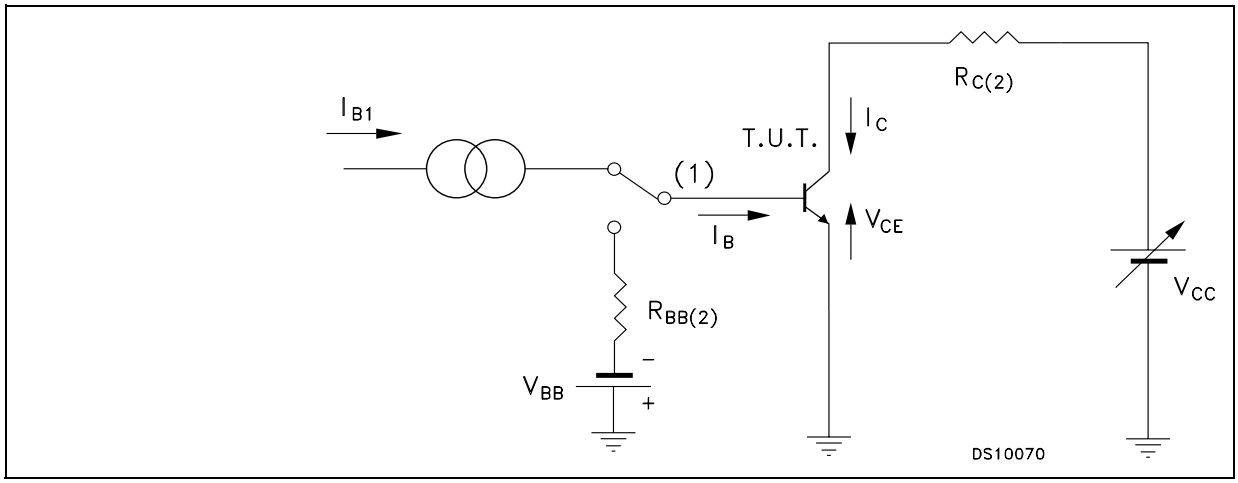
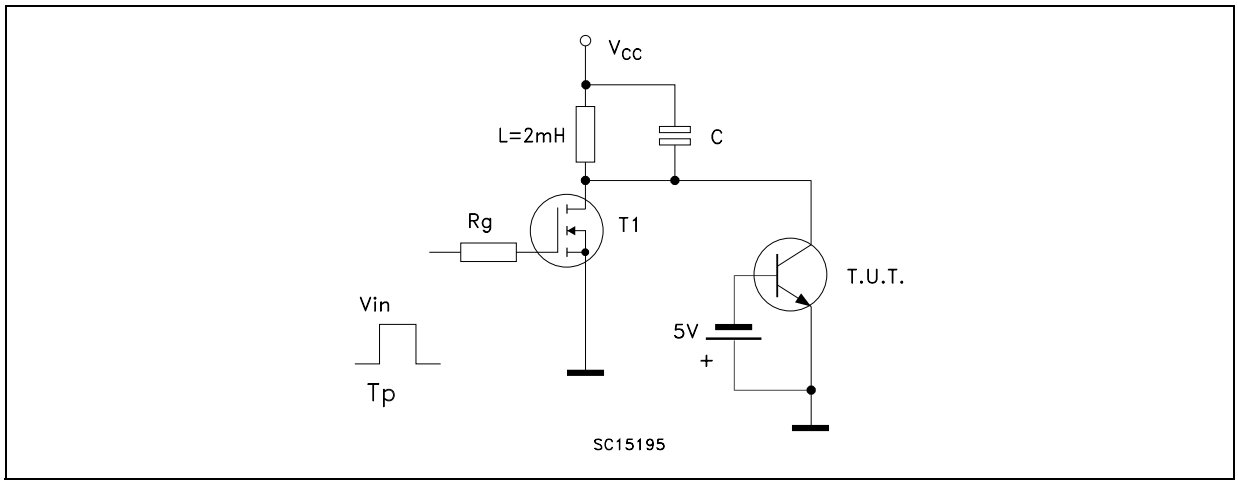
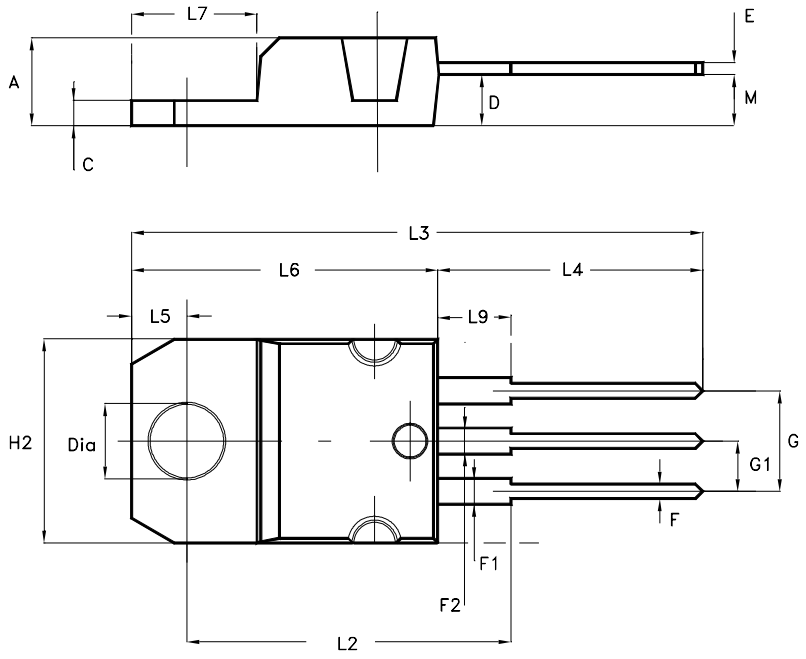



**Figure 2:** Energy Rating Test Circuit



## TO-220 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| C | 1.23 | | 1.32 | 0.048 | | 0.052 |
| D | 2.40 | | 2.72 | 0.094 | | 0.107 |
| E | 0.49 | | 0.70 | 0.019 | | 0.027 |
| F | 0.61 | | 0.88 | 0.024 | | 0.034 |
| F1 | 1.14 | | 1.70 | 0.044 | | 0.067 |
| F2 | 1.14 | | 1.70 | 0.044 | | 0.067 |
| G | 4.95 | | 5.15 | 0.194 | | 0.202 |
| G1 | 2.40 | | 2.70 | 0.094 | | 0.106 |
| H2 | 10.00 | | 10.40 | 0.394 | | 0.409 |
| L2 | | 16.40 | | | 0.645 | |
| L4 | 13.00 | | 14.00 | 0.511 | | 0.551 |
| L5 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| L6 | 15.25 | | 15.75 | 0.600 | | 0.620 |
| L7 | 6.20 | | 6.60 | 0.244 | | 0.260 |
| L9 | 3.50 | | 3.93 | 0.137 | | 0.154 |
| M | | 2.60 | | | 0.102 | |
| DIA. | 3.75 | | 3.85 | 0.147 | | 0.151 |




P011CI