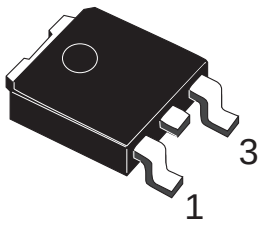
# BULD1101ET4

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

**PRELIMINARY DATA**

| Ordering Code | Marking | Shipment |
|---|---|---|
| BULD1101ET4 | BULD1101E | Tape & Reel |

- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- LARGE RBSOA
- SURFACE-MOUNTING DPAK (TO-252) POWER PACKAGE IN TAPE & REEL (SUFFIX "T4")




**DPAK**
**TO-252**
(Suffix "T4")

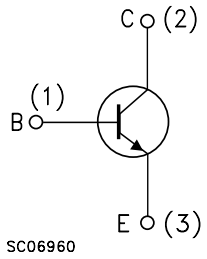
### APPLICATIONS

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING

### DESCRIPTION

The device is manufactured using High Voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability. It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining a wide RBSOA.

**INTERNAL SCHEMATIC DIAGRAM**




### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{CES}$ | Collector-Emitter Voltage ($V_{BE}$ = 0) | 1100 | V |
| $V_{CEO}$ | Collector-Emitter Voltage ($I_B$ = 0) | 450 | V |
| $V_{EBO}$ | Emitter-Base Voltage ($I_C$ = 0) | 12 | V |
| $I_C$ | Collector Current | 3 | A |
| $I_{CM}$ | Collector Peak Current ($t_p$ <5 ms) | 6 | A |
| $I_B$ | Base Current | 1.5 | A |
| $I_{BM}$ | Base Peak Current ($t_p$ <5 ms) | 3 | A |
| $P_{tot}$ | Total Dissipation at Tc = 25 $^oC$ | 35 | W |
| $T_{stg}$ | Storage Temperature | -65 to 150 | $^oC$ |
| $T_j$ | Max. Operating Junction Temperature | 150 | $^oC$ |

## THERMAL DATA

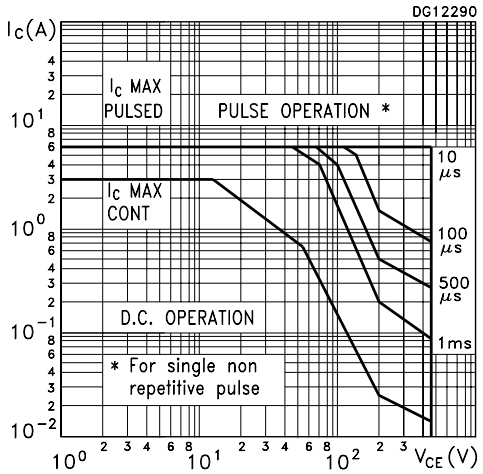
| | | | |
|---|---|---|---|
| $R_{thj\text{-}case}$ | Thermal Resistance Junction-Case Max | 3.57 | $^oC/W$ |
| $R_{thj\text{-}amb}$ | Thermal Resistance Junction-ambient Max | 100 | $^oC/W$ |

## ELECTRICAL CHARACTERISTICS ($T_{case}$ = 25 $^oC$ unless otherwise specified)

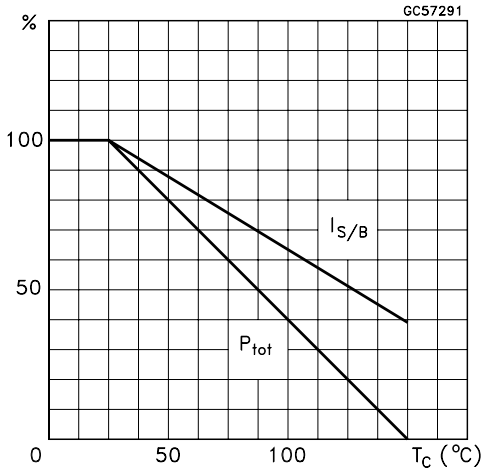
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CES}$ | Collector Cut-off Current ($V_{BE}$ = 0) | $V_{CE}$ = 1100 V | | | 100 | µA |
| $V_{(BR)EBO}$ | Emitter-BaseBreakdown Voltage ($I_C$ = 0) | $I_E$ = 1 mA | 12 | | 24 | V |
| $V_{CEO(sus)}$* | Collector-Emitter Sustaining Voltage ($I_B$ = 0) | $I_C$ = 100 mA | 450 | | | V |
| $V_{CE(sat)}$* | Collector-Emitter Saturation Voltage | $I_C$ = 1 A $I_B$ = 200 mA<br>$I_C$ = 1 A $I_B$ = 200 mA $T_j$ = 125$^oC$ | | 0.25<br>0.6 | 1<br>1.5 | V<br>V |
| $V_{BE(sat)}$* | Base-Emitter Saturation Voltage | $I_C$ = 1 A $I_B$ = 200 mA | | | 1.5 | V |
| $h_{FE}$* | DC Current Gain | $I_C$ = 250 mA $V_{CE}$ = 5 V<br>$I_C$ = 250 mA $V_{CE}$ = 5 V $T_j$ = 125$^oC$<br>$I_C$ = 2 A $V_{CE}$ = 5 V<br>$I_C$ = 2 A $V_{CE}$ = 5 V $T_j$ = 125$^oC$ | 20<br>23<br>6<br>4 | 38<br>44<br>10<br>7 | 80<br>85<br>18<br>16 | |
| $t_s$<br>$t_f$ | RESISTIVE LOAD<br>Storage Time<br>Fall Time | $I_C$ = 2.5 A $V_{CC}$ = 125 V<br>$V_{BB(off)}$ = -5 V $t_P$ = 300µs<br>$I_{B1}$ = -$I_{B2}$ = 0.5 A<br>(see figure 1) | | <br><br>400 | 2<br><br>700 | µs<br><br>ns |
| $E_{ar}$ | Repetitive Avalanche Energy | L = 2 mH C = 1.8 nF<br>$I_{BR} \leq$ 2.5A (see figure 2) | 6 | | | mJ |

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

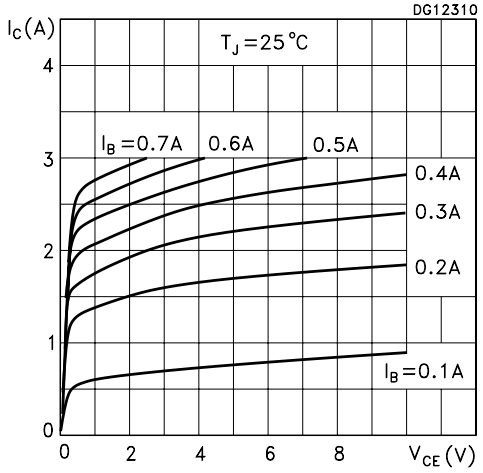
Safe Operating Area



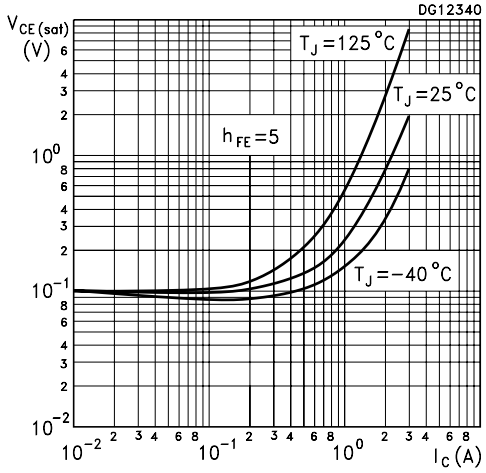

Derating Curve



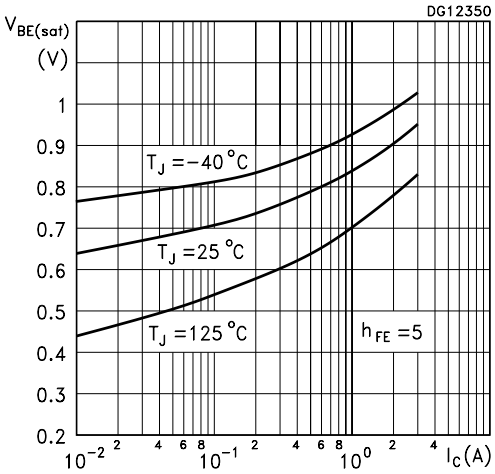

Output Characteristics



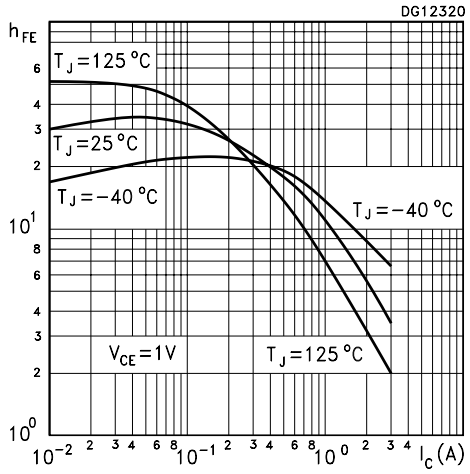

Collector-Emitter Saturation Voltage



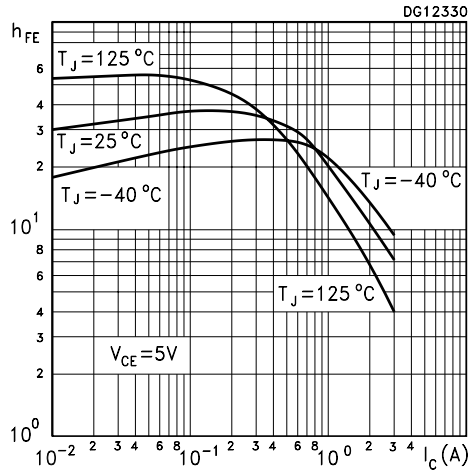

Base-Emitter Saturation Voltage



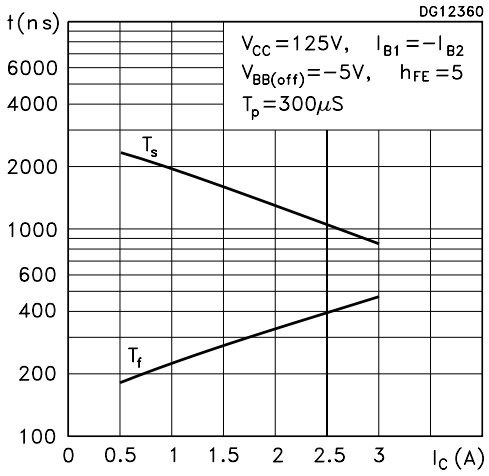

DC Current Gain



DC Current Gain




Resistive Load Switching Times




Reverse Biased Safe Operating Area

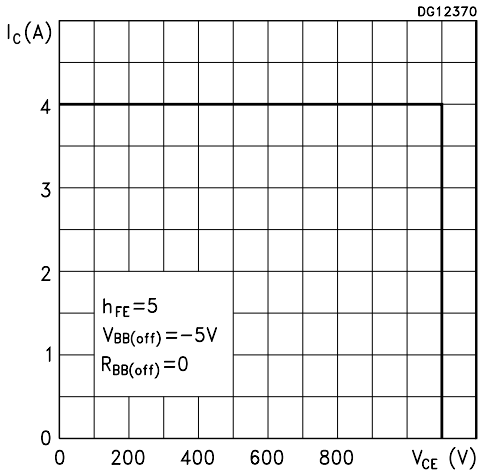


**Figure 1:** Resistive Load Switching Test Circuit

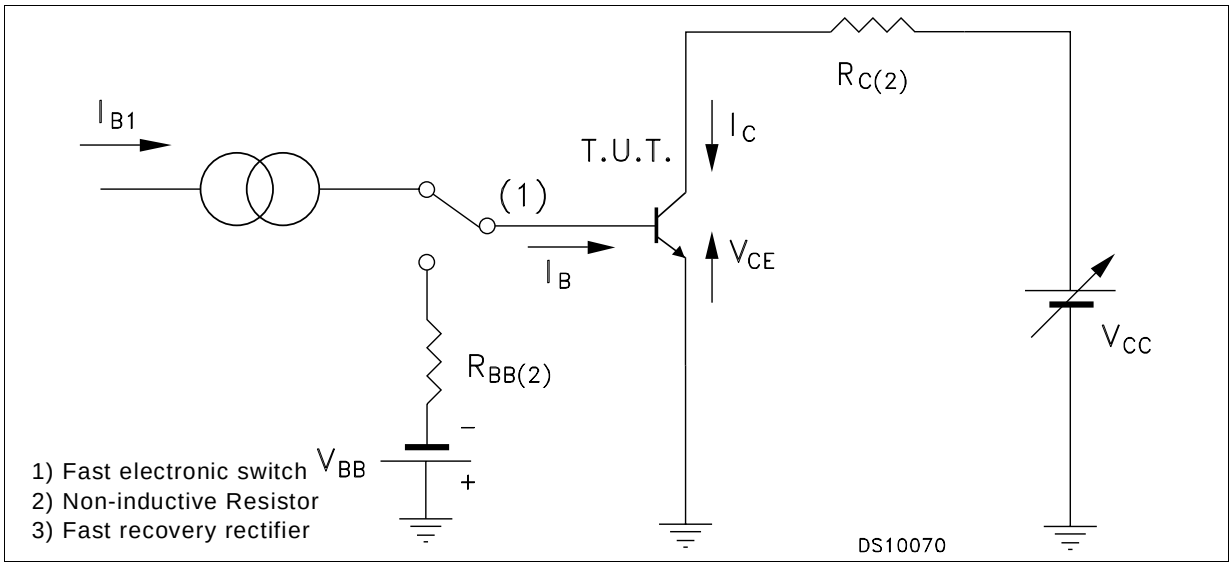
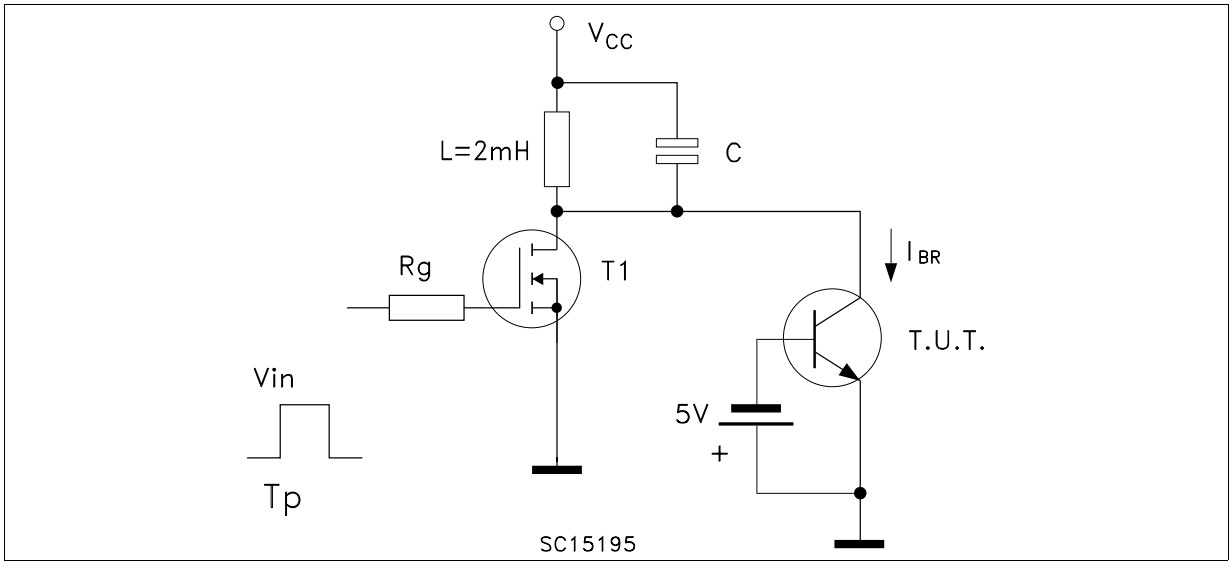



**Figure 2:** Energy Rating Test Circuit



## TO-252 (DPAK) MECHANICAL DATA

| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 2.20 | | 2.40 | 0.087 | | 0.094 |
| A1 | 0.90 | | 1.10 | 0.035 | | 0.043 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| B | 0.64 | | 0.90 | 0.025 | | 0.035 |
| B2 | 5.20 | | 5.40 | 0.204 | | 0.213 |
| C | 0.45 | | 0.60 | 0.018 | | 0.024 |
| C2 | 0.48 | | 0.60 | 0.019 | | 0.024 |
| D | 6.00 | | 6.20 | 0.236 | | 0.244 |
| E | 6.40 | | 6.60 | 0.252 | | 0.260 |
| G | 4.40 | | 4.60 | 0.173 | | 0.181 |
| H | 9.35 | | 10.10 | 0.368 | | 0.398 |
| L2 | | 0.8 | | | 0.031 | |
| L4 | 0.60 | | 1.00 | 0.024 | | 0.039 |
| V2 | $0^o$ | | $8^o$ | $0^o$ | | $0^o$ |