



# BULD1101ET4

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

PRELIMINARY DATA

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

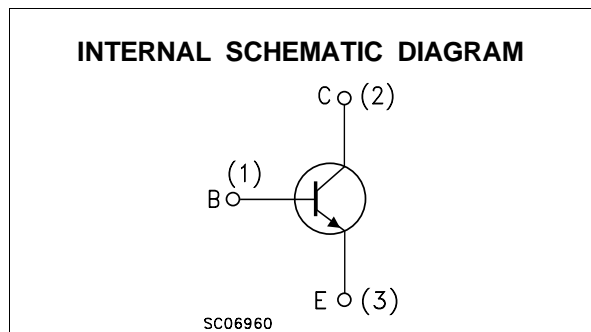
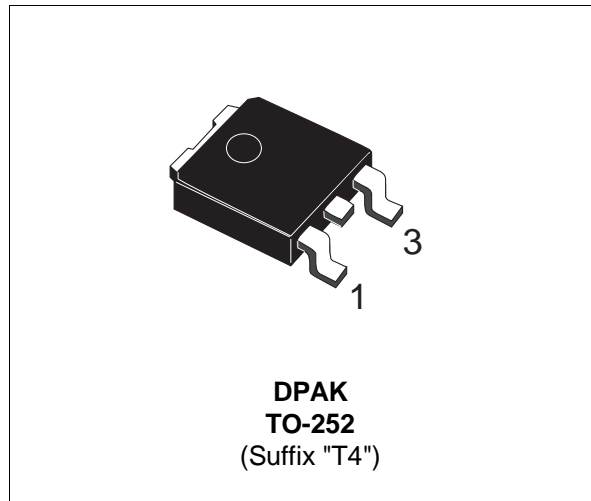
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- LARGE RBSOA
- SURFACE-MOUNTING DPAK (TO-252) POWER PACKAGE IN TAPE & REEL (SUFFIX "T4")

### 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.



### 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 $T_c = 25$ °C         | 35         | W    |
| $T_{stg}$ | Storage Temperature                        | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature        | 150        | °C   |

## BULD1101ET4

### THERMAL DATA

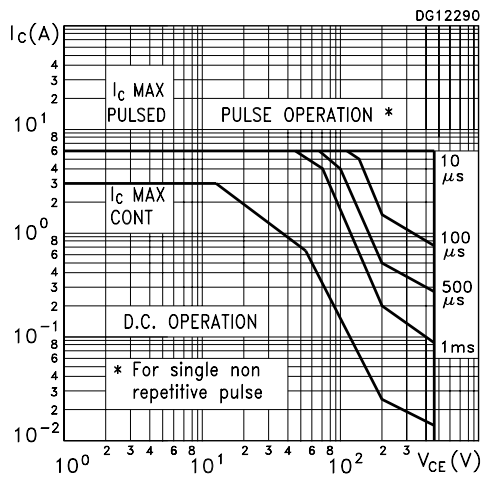
|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-Case    | Max | 3.57 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | Max | 100  | °C/W |

### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

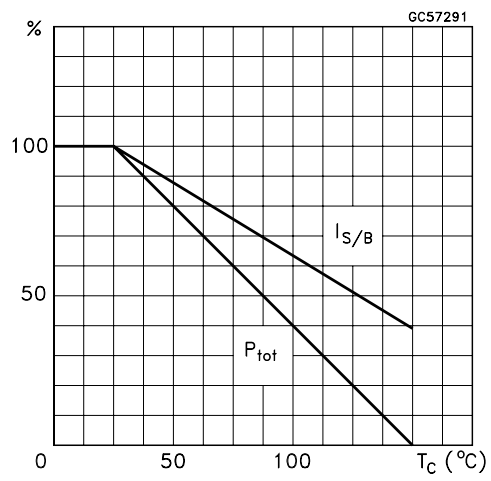
| Symbol                           | Parameter                                                 | Test Conditions                                                                                                                                                                                                                          | Min.               | Typ.                | Max.                 | Unit     |
|----------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------|----------------------|----------|
| I <sub>CES</sub>                 | Collector Cut-off Current (V <sub>BE</sub> = 0)           | V <sub>CE</sub> = 1100 V                                                                                                                                                                                                                 |                    |                     | 100                  | μA       |
| V <sub>(BR)EBO</sub>             | Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)       | I <sub>E</sub> = 1 mA                                                                                                                                                                                                                    | 12                 |                     | 24                   | V        |
| V <sub>CEO(sus)*</sub>           | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 100 mA                                                                                                                                                                                                                  | 450                |                     |                      | V        |
| V <sub>CE(sat)*</sub>            | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 1 A I <sub>B</sub> = 200 mA<br>I <sub>C</sub> = 1 A I <sub>B</sub> = 200 mA T <sub>j</sub> = 125°C                                                                                                                      |                    | 0.25<br>0.6         | 1<br>1.5             | V<br>V   |
| V <sub>BE(sat)*</sub>            | Base-Emitter Saturation Voltage                           | I <sub>C</sub> = 1 A I <sub>B</sub> = 200 mA                                                                                                                                                                                             |                    |                     | 1.5                  | V        |
| h <sub>FE*</sub>                 | DC Current Gain                                           | I <sub>C</sub> = 250 mA V <sub>CE</sub> = 5 V<br>I <sub>C</sub> = 250 mA V <sub>CE</sub> = 5 V T <sub>j</sub> = 125°C<br>I <sub>C</sub> = 2 A V <sub>CE</sub> = 5 V<br>I <sub>C</sub> = 2 A V <sub>CE</sub> = 5 V T <sub>j</sub> = 125°C | 20<br>23<br>6<br>4 | 38<br>44<br>10<br>7 | 80<br>85<br>18<br>16 |          |
| t <sub>s</sub><br>t <sub>f</sub> | RESISTIVE LOAD<br>Storage Time<br>Fall Time               | I <sub>C</sub> = 2.5 A V <sub>CC</sub> = 125 V<br>V <sub>BB(off)</sub> = -5 V t <sub>P</sub> = 300 μs<br>I <sub>B1</sub> = -I <sub>B2</sub> = 0.5 A<br>(see figure 1)                                                                    |                    | 400                 | 2<br>700             | μs<br>ns |
| E <sub>ar</sub>                  | Repetitive Avalanche Energy                               | L = 2 mH C = 1.8 nF<br>I <sub>BR</sub> ≤ 2.5 A (see figure 2)                                                                                                                                                                            | 6                  |                     |                      | mJ       |

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

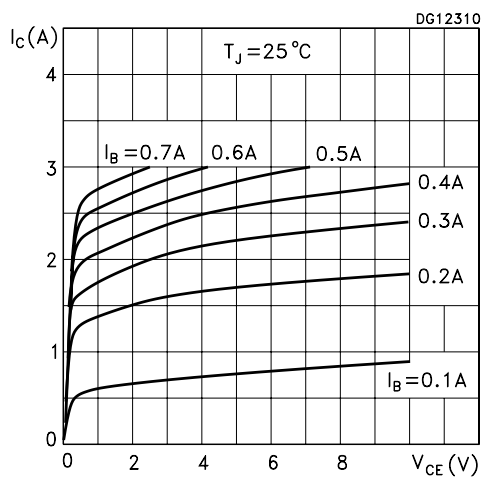
Safe Operating Area



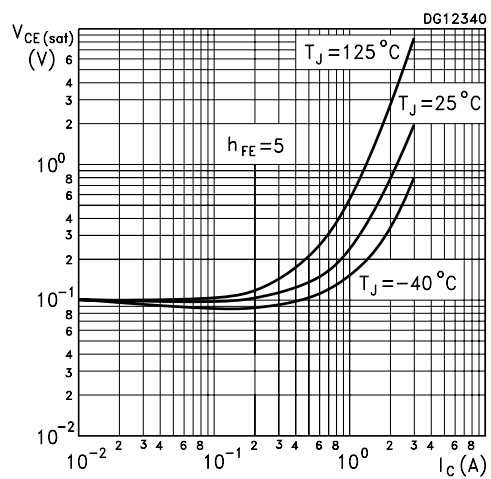
Derating Curve



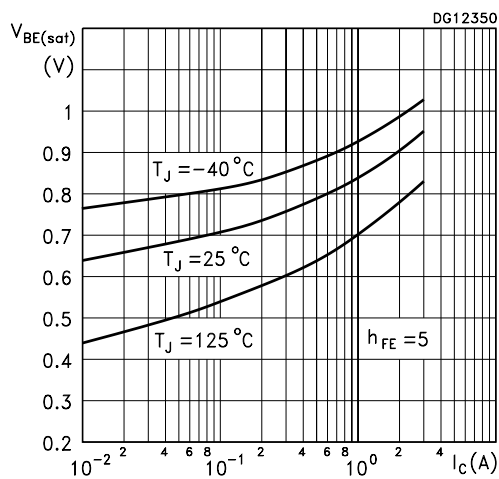
Output Characteristics



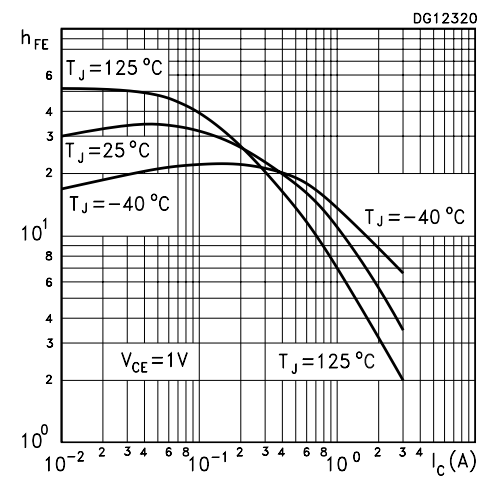
Collector-Emitter Saturation Voltage



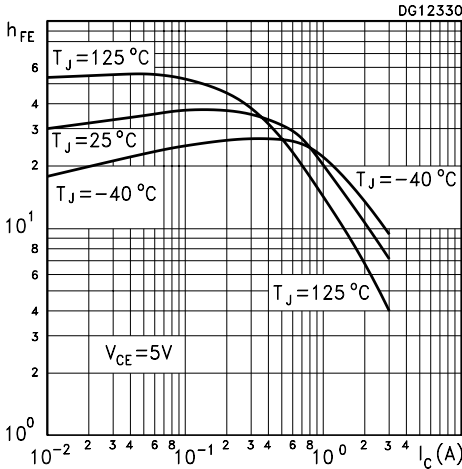
Base-Emitter Saturation Voltage



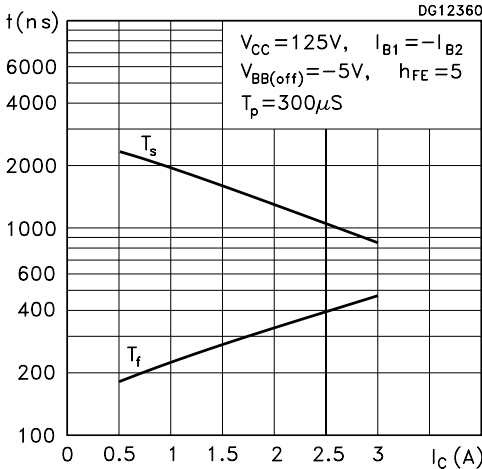
DC Current Gain



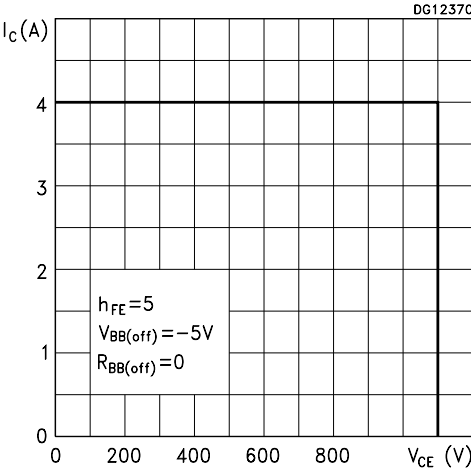
DC Current Gain



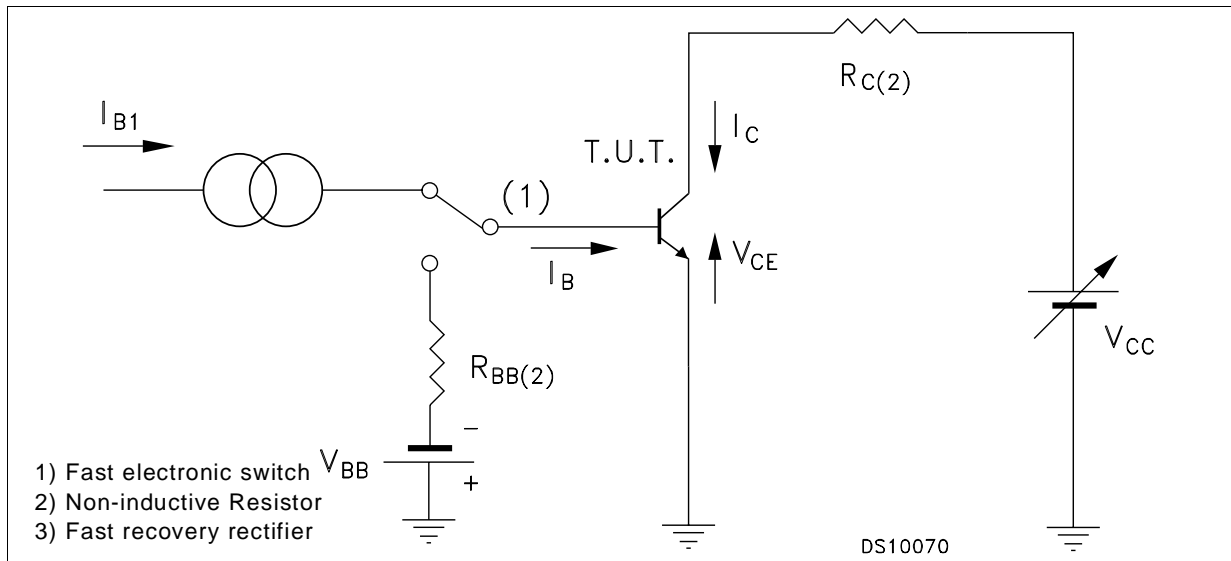
Resistive Load Switching Times



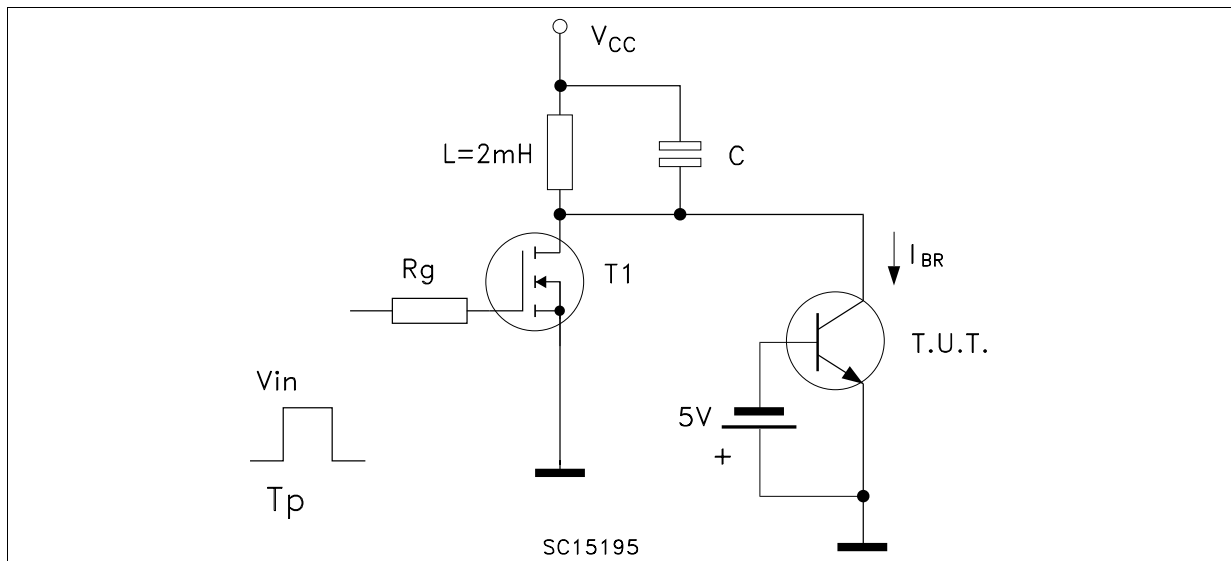
Reverse Biased Safe Operating Area



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

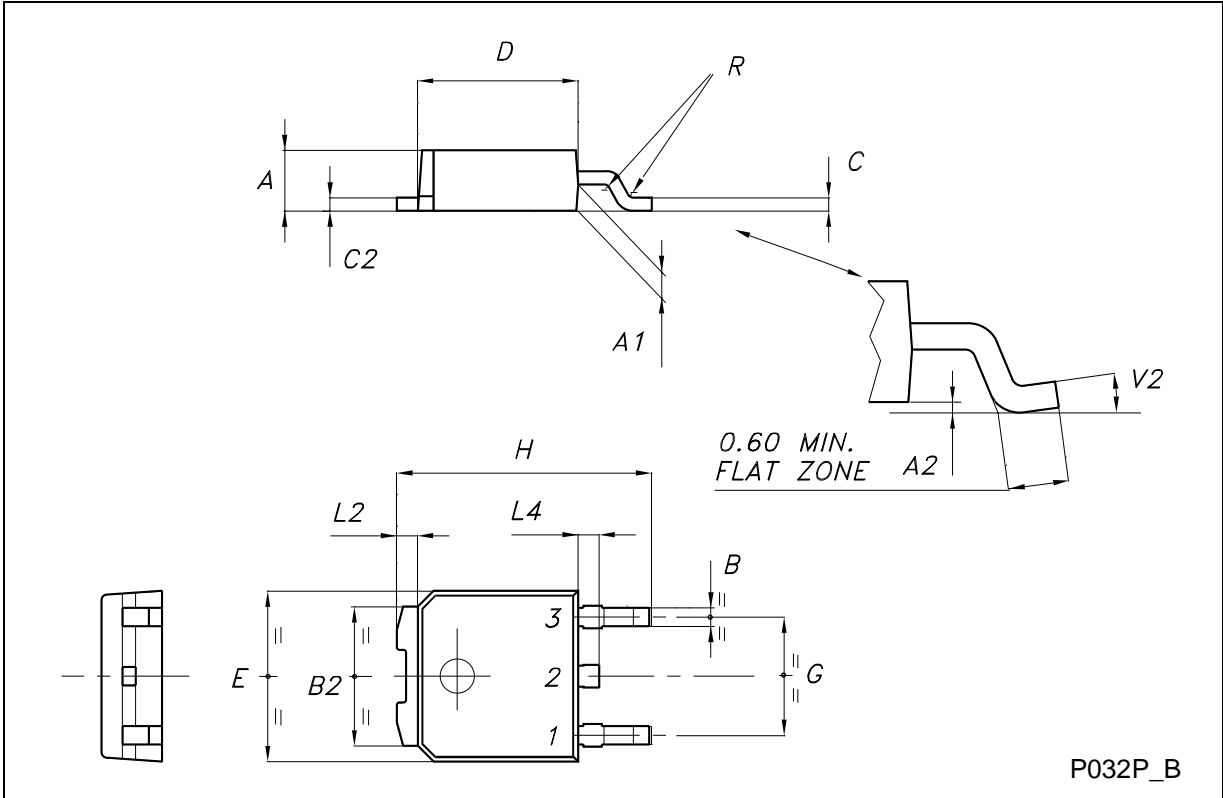


**Figure 2: Energy Rating Test Circuit**



**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°   |      | 8°    | 0°    |       | 0°    |



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