

## MEDIUM VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

PRELIMINARY DATA

- SGS-THOMSON PREFERRED SALESTYPE
- MEDIUM VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERISED AT 125°C
- THROUGH-HOLE IPAK (TO-251) POWER PACKAGE IN TUBE (SUFFIX "-1")

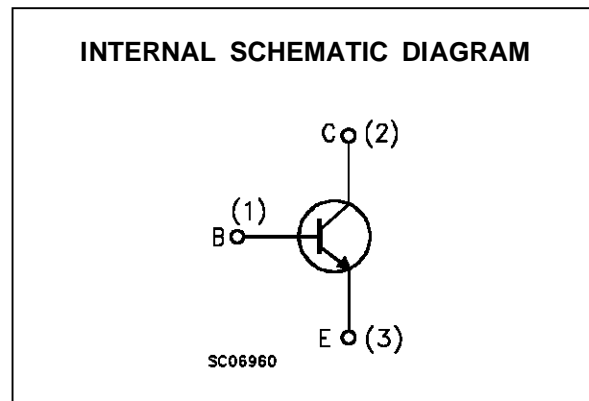
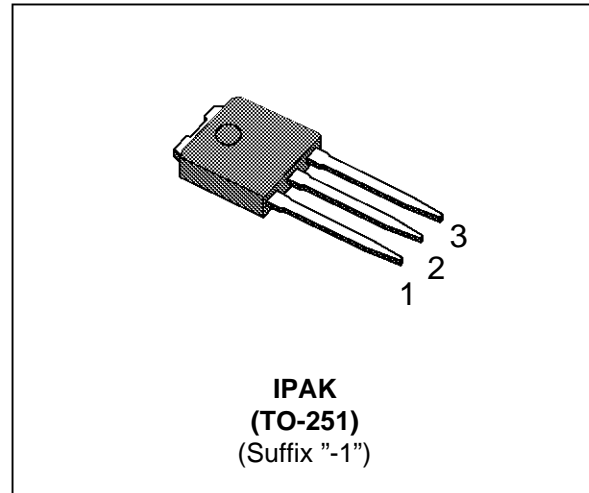
### APPLICATIONS

- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

### DESCRIPTION

The BULD26 is manufactured using medium voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability. It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining a wide RBSOA.

The BUL series is designed for use in lighting applications and low cost switch-mode power supplies.



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                   | Value      | Unit |
|-----------|---|------------|------|
| $V_{CES}$ | Collector-Emitter Voltage ( $V_{BE} = 0V$ ) | 600        | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )     | 300        | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )          | 10         | 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          | 20         | W    |
| $T_{stg}$ | Storage Temperature                         | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature         | 150        | °C   |

# BULD26

## THERMAL DATA

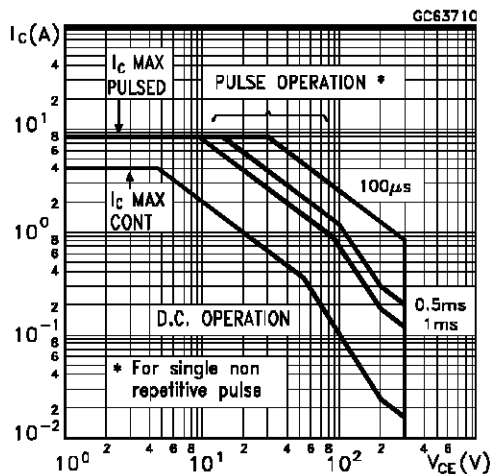
|                |                                     |     |      |               |
|----------------|-------------------------------------|-----|------|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-case    | Max | 6.25 | $^{\circ}C/W$ |
| $R_{thj-amb}$  | Thermal Resistance Junction-ambient | Max | 100  | $^{\circ}C/W$ |

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

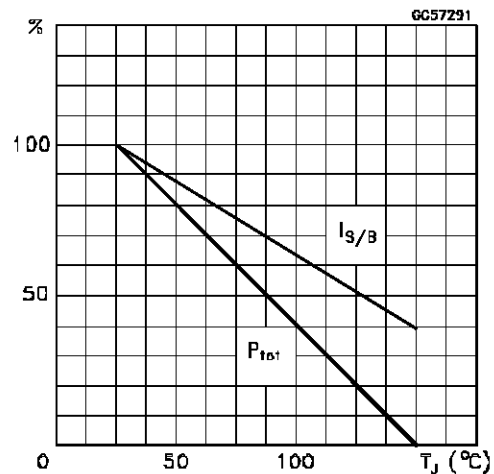
| Symbol         | Parameter                                   | Test Conditions  | Min. | Typ. | Max. | Unit    |
|----------------|---|--|------|------|------|---------|
| $I_{CES}$      | Collector Cut-off Current ( $V_{BE} = 0$ )  | $V_{CE} = 600 V$   |      |      | 100  | $\mu A$ |
|                |   | $V_{CE} = 600 V \quad T_j = 125^{\circ}C$  |      |      | 500  | $\mu A$ |
| $I_{CEO}$      | Collector Cut-off Current ( $I_B = 0$ )     | $V_{CE} = 300 V$   |      |      | 250  | $\mu A$ |
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage        | $I_C = 100 mA \quad L = 25 mH$   | 300  |      |      | V       |
| $V_{EBO}$      | Emitter-Base Voltage                        | $I_E = 10 mA$  | 10   |      |      | V       |
| $V_{CE(sat)*}$ | Collector-Emitter Saturation Voltage        | $I_C = 1 A \quad I_B = 0.2 A$  |      |      | 0.5  | V       |
|                |   | $I_C = 2 A \quad I_B = 0.4 A$  |      |      | 0.7  | V       |
|                |   | $I_C = 3 A \quad I_B = 0.6 A$  |      |      | 1    | V       |
| $V_{BE(sat)*}$ | Base-Emitter Saturation Voltage             | $I_C = 1 A \quad I_B = 0.2 A$  |      |      | 1.1  | V       |
|                |   | $I_C = 2 A \quad I_B = 0.4 A$  |      |      | 1.2  | V       |
|                |   | $I_C = 3 A \quad I_B = 0.6 A$  |      |      | 1.3  | V       |
| $h_{FE*}$      | DC Current Gain                             | $I_C = 10 mA \quad V_{CE} = 5 V$   | 10   |      |      |         |
|                |   | $I_C = 1 A \quad V_{CE} = 3 V$   | 15   |      | 45   |         |
| $t_s$<br>$t_f$ | INDUCTIVE LOAD<br>Storage Time<br>Fall Time | $I_C = 3 A \quad I_{B1} = 0.6 A$   |      | 0.8  | 1.5  | $\mu s$ |
|                |   | $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$<br>$V_{CL} = 250 V \quad L = 200 \mu H$                         |      | 65   | 130  | ns      |
| $t_s$<br>$t_f$ | INDUCTIVE LOAD<br>Storage Time<br>Fall Time | $I_C = 3 A \quad I_{B1} = 0.6 A$   |      | 1.1  |      | $\mu s$ |
|                |   | $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$<br>$V_{CL} = 250 V \quad L = 200 \mu H$<br>$T_j = 125^{\circ}C$ |      | 120  |      | ns      |

\* Pulsed: Pulse duration = 300  $\mu s$ , duty cycle 1.5 %

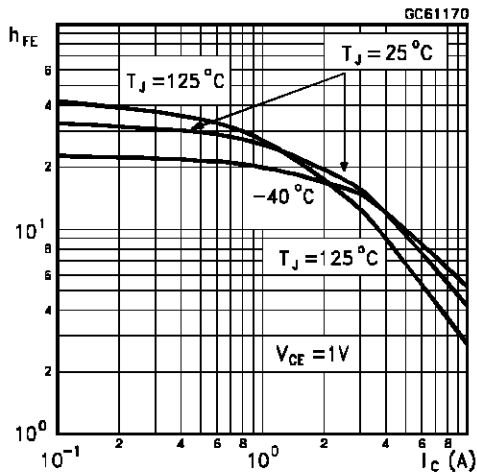
## Safe Operating Areas



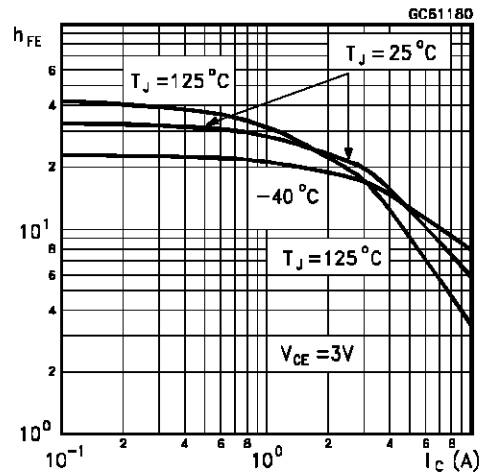
## Derating Curves



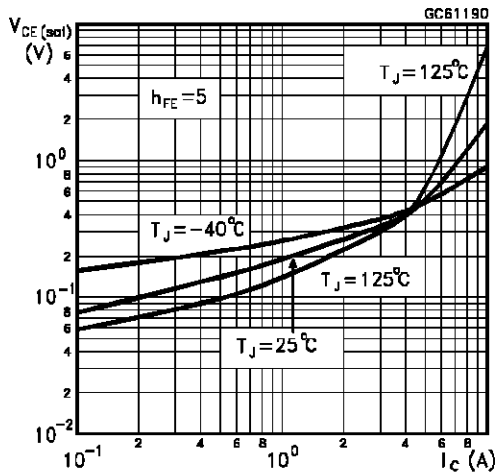
DC Current Gain



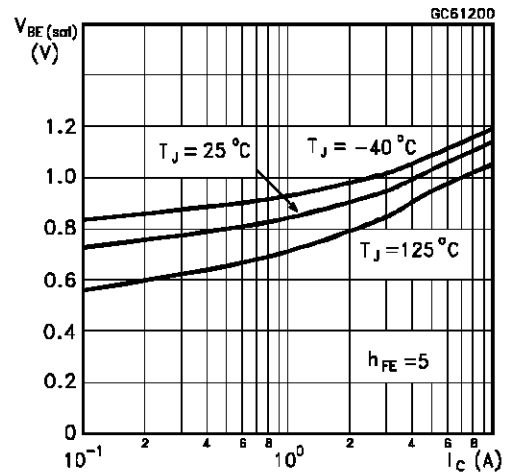
DC Current Gain



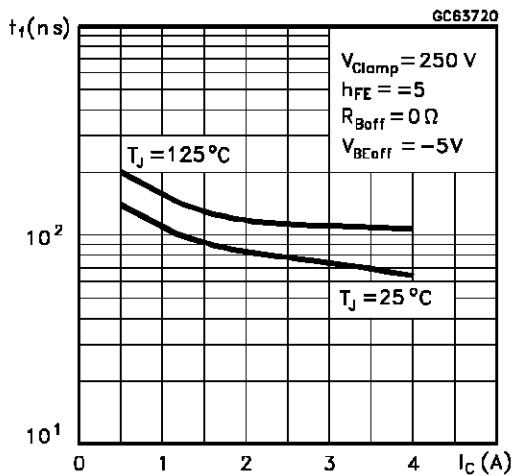
Collector-Emitter Saturation Voltage



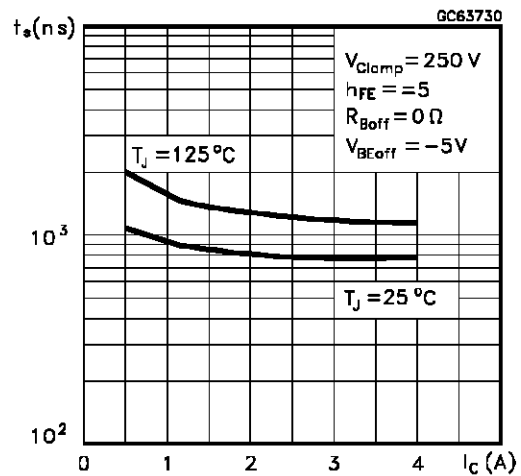
Base-Emitter Saturation Voltage



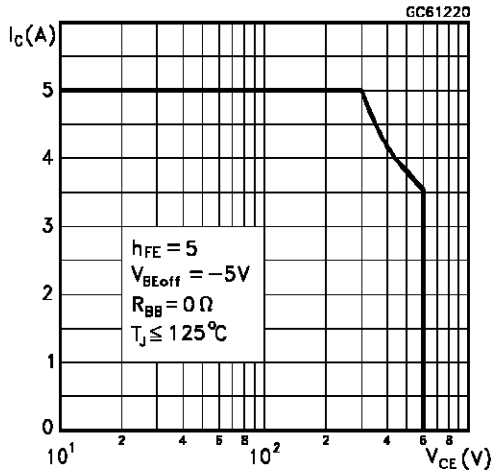
Inductive Fall Time



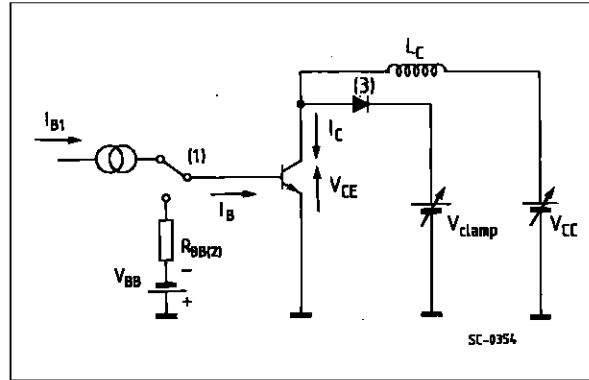
Inductive Storage Time



Reverse Biased SOA



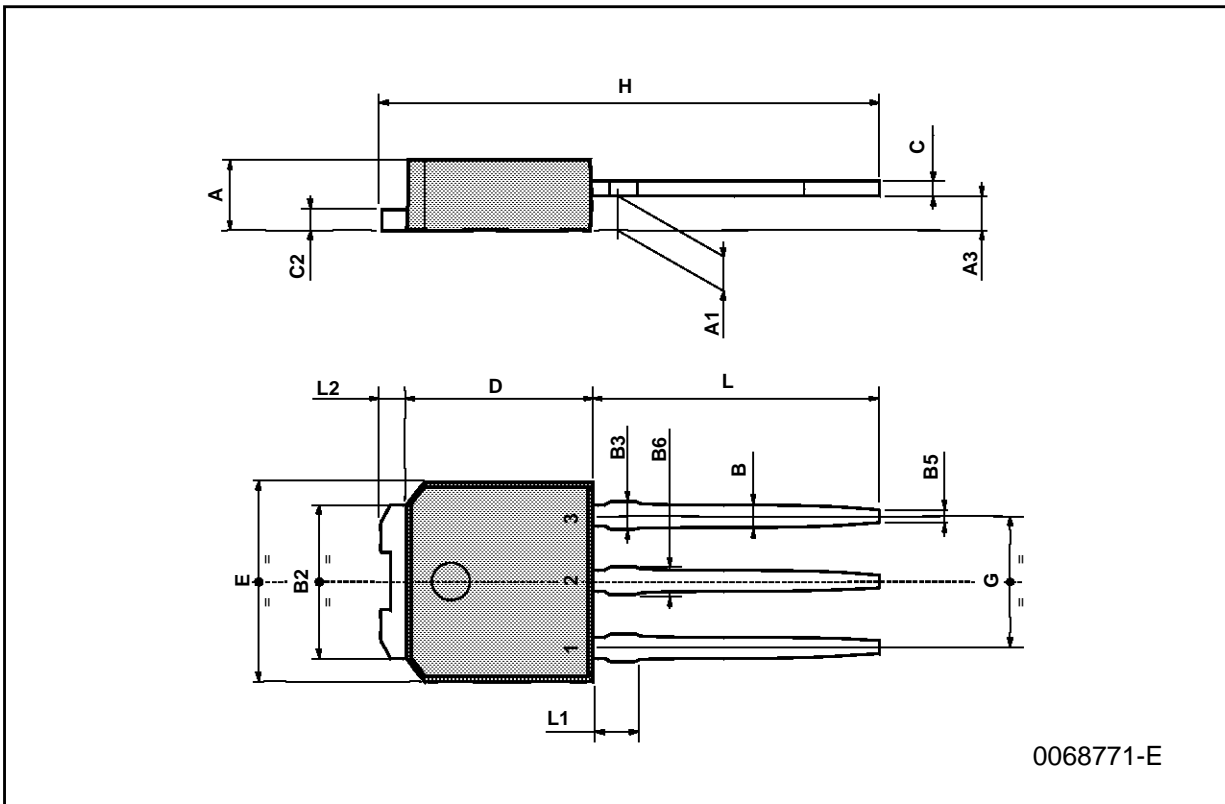
RBSOA and Inductive Load Switching Test Circuit



- (1) Fast electronic switch
- (2) Non-inductive Resistor
- (3) Fast recovery rectifier

**TO-251 (IPAK) MECHANICAL DATA**

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 2.2  |      | 2.4  | 0.086 |       | 0.094 |
| A1   | 0.9  |      | 1.1  | 0.035 |       | 0.043 |
| A3   | 0.7  |      | 1.3  | 0.027 |       | 0.051 |
| B    | 0.64 |      | 0.9  | 0.025 |       | 0.031 |
| B2   | 5.2  |      | 5.4  | 0.204 |       | 0.212 |
| B3   |      |      | 0.85 |       |       | 0.033 |
| B5   |      | 0.3  |      |       | 0.012 |       |
| B6   |      |      | 0.95 |       |       | 0.037 |
| C    | 0.45 |      | 0.6  | 0.017 |       | 0.023 |
| C2   | 0.48 |      | 0.6  | 0.019 |       | 0.023 |
| D    | 6    |      | 6.2  | 0.236 |       | 0.244 |
| E    | 6.4  |      | 6.6  | 0.252 |       | 0.260 |
| G    | 4.4  |      | 4.6  | 0.173 |       | 0.181 |
| H    | 15.9 |      | 16.3 | 0.626 |       | 0.641 |
| L    | 9    |      | 9.4  | 0.354 |       | 0.370 |
| L1   | 0.8  |      | 1.2  | 0.031 |       | 0.047 |
| L2   |      | 0.8  | 1    |       | 0.031 | 0.039 |



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