

**MEDIUM VOLTAGE FAST-SWITCHING
NPN POWER TRANSISTOR**

PRELIMINARY DATA

- SGS-THOMSON PREFERRED SALESTYPES
- 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
- INTEGRATED ANTIPARALLEL COLLECTOR-EMITTER DIODE

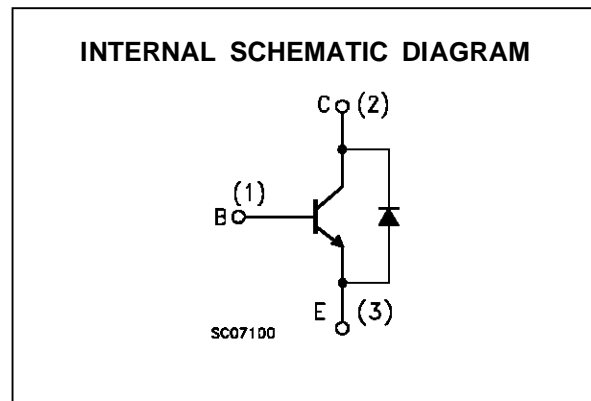
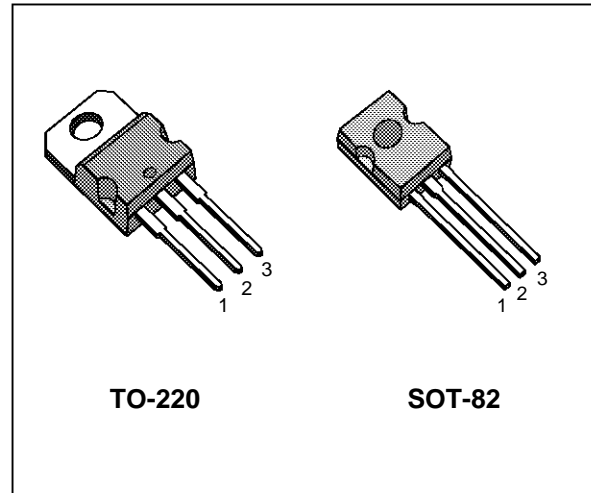
APPLICATIONS

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

DESCRIPTION

The BUL26D and BULK26D are manufactured using medium voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability. They use 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 |
|------------------|---|------------|---------|------|
| | | BUL26D | BULK26D | |
| V _{CES} | Collector-Emitter Voltage (V _{BE} = 0) | 600 | | V |
| V _{CEO} | Collector-Emitter Voltage (I _B = 0) | 300 | | V |
| V _{EBO} | Emitter-Base Voltage (I _C = 0) | 12 | | 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 | 60 | 50 | W |
| T _{stg} | Storage Temperature Range | -65 to 150 | | °C |
| T _j | Max. Operating Junction Temperature | 150 | | °C |

BUL26D

THERMAL DATA

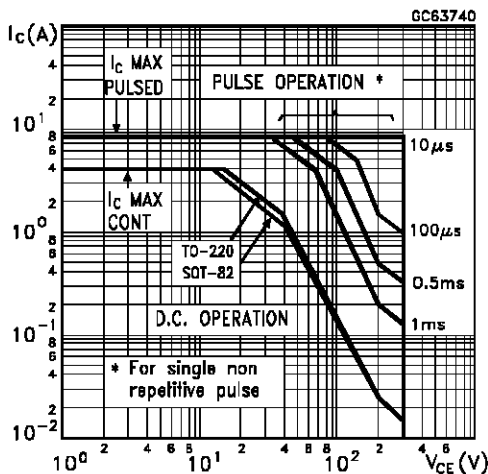
| | | | TO220 | SOT-82 | |
|----------------|-------------------------------------|-----|-------|--------|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-Case | Max | 2.08 | 2.5 | $^{\circ}C/W$ |
| $R_{thj-amb}$ | Thermal Resistance Junction-Ambient | Max | 62.5 | 62.5 | $^{\circ}C/W$ |

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

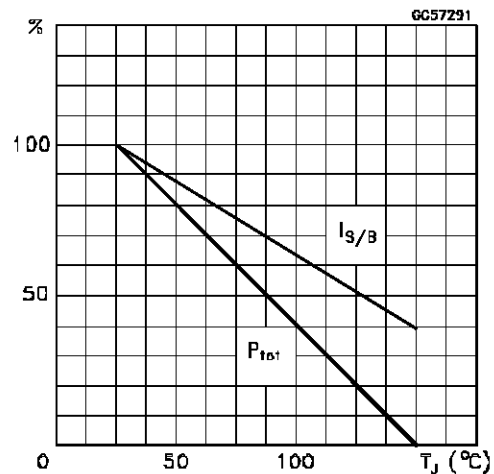
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------|---|--|------|------------|------------|---------------|
| I_{CES} | Collector Cut-off Current ($V_{BE} = 0$) | $V_{CE} = 600 V$ | | | 200 | μA |
| I_{CEO} | Collector Cut-off Current ($I_B = 0$) | $V_{CE} = 300 V$ | | | 250 | μA |
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage | $I_C = 100 mA$ | 300 | | | V |
| V_{EBO} | Emitter-Base Voltage | $I_E = 10 mA$ | 12 | | | 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 t_f | INDUCTIVE LOAD Storage Time Fall Time | $I_C = 3 A \quad I_{B1} = 0.6 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$ $V_{CL} = 250 V \quad L = 200 \mu H$ | | 0.8 70 | 1.3 130 | μs ns |
| | | $I_C = 3 A \quad I_{B1} = 0.6 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0 \Omega$ $V_{CL} = 250 V \quad L = 200 \mu H$ $T_j = 125^{\circ}C$ | | 1.2 100 | | μs ns |
| V_f | Diode Forward Voltage | $I_C = 2.5 A$ | | | 3 | V |

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

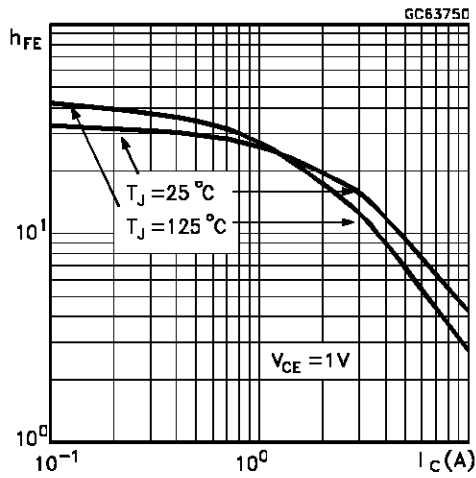
Safe Operating Areas



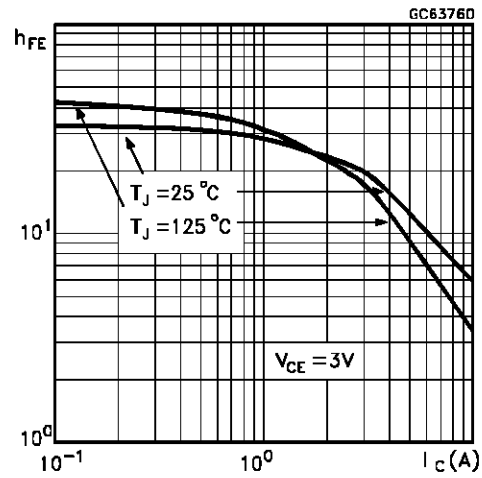
Derating Curves



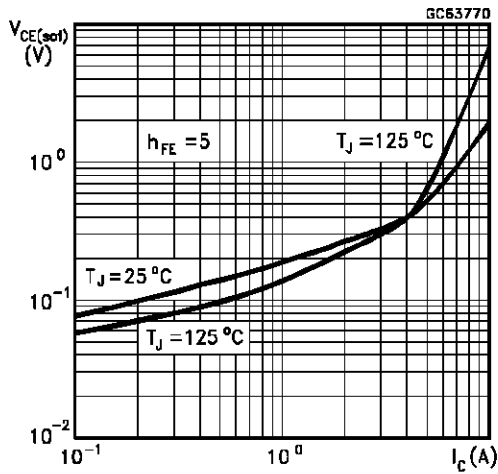
DC Current Gain



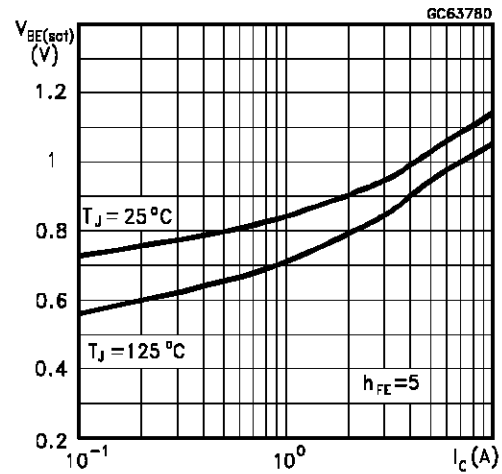
DC Current Gain



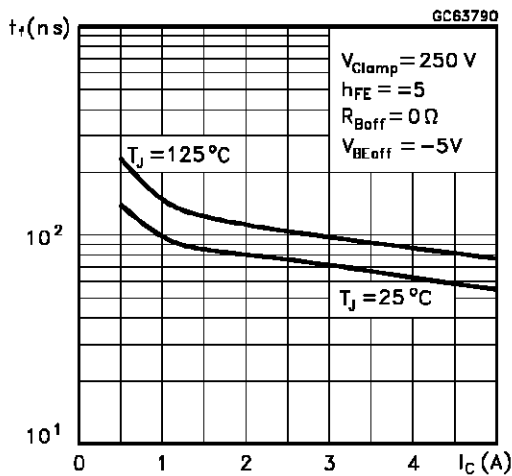
Collector-Emitter Saturation Voltage



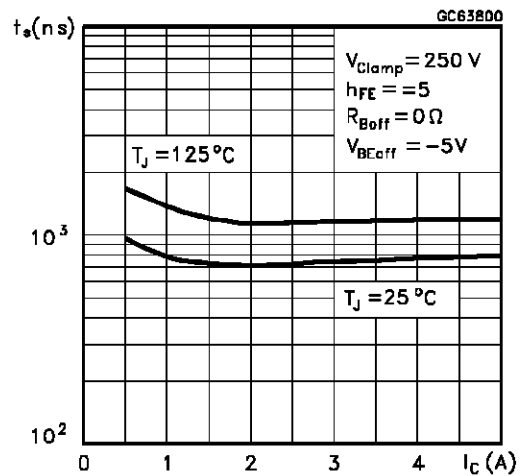
Base-Emitter Saturation Voltage



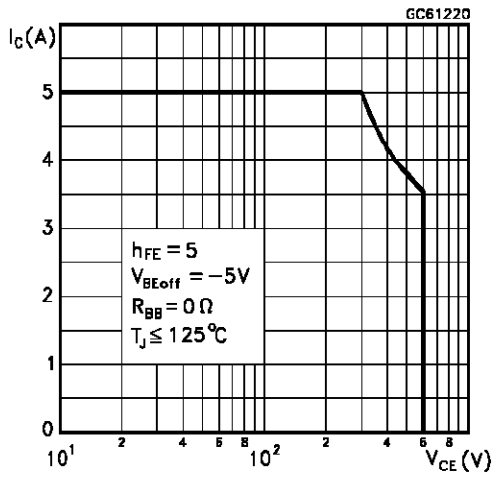
Inductive Fall Time



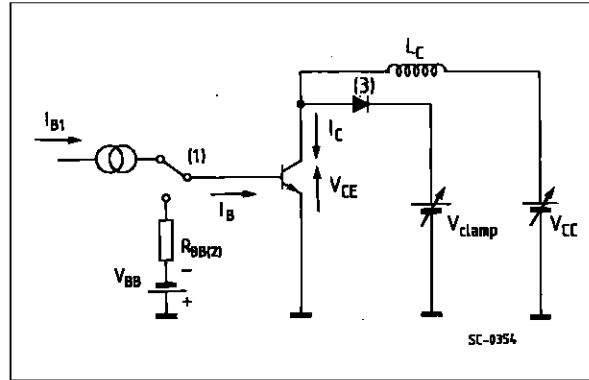
Inductive Storage Time



Reverse Biased SOA



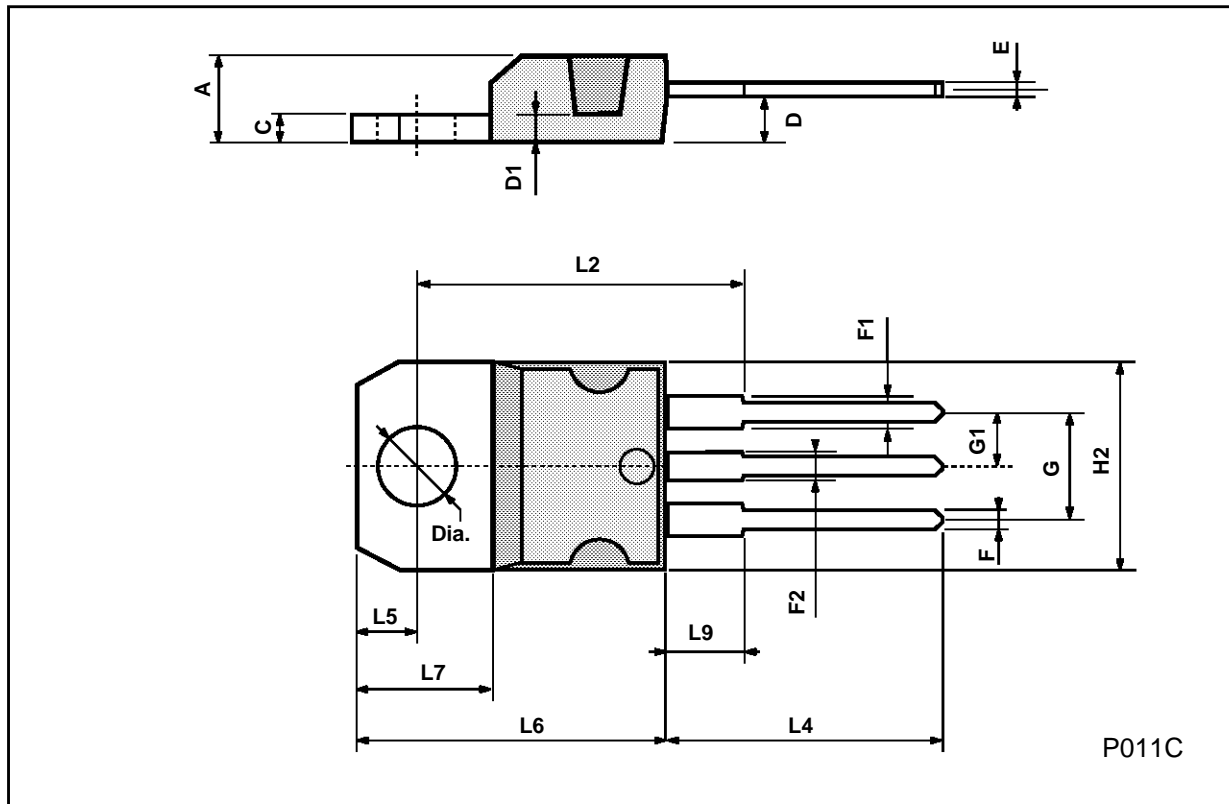
RBSOA and Inductive Load Switching Test Circuit



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

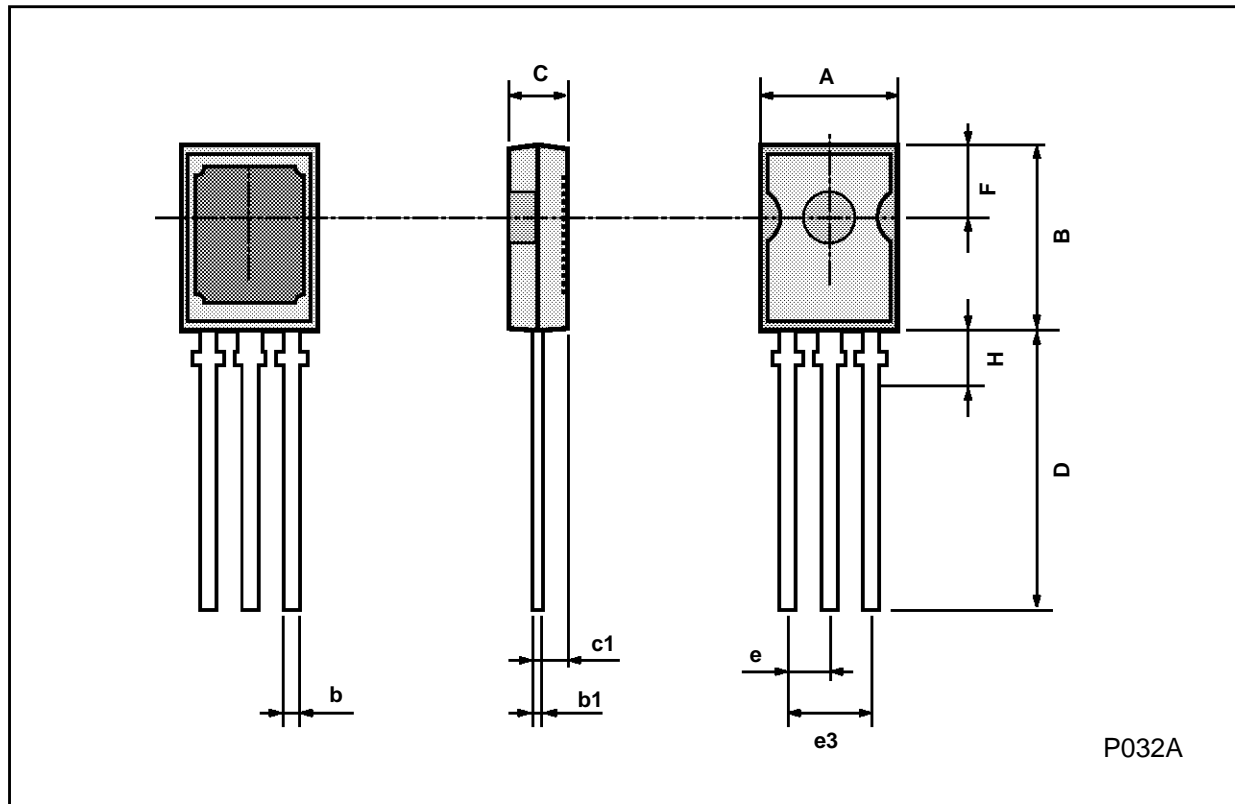
TO-220 MECHANICAL DATA

| 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 | | 0.051 |
| D | 2.40 | | 2.72 | 0.094 | | 0.107 |
| D1 | | 1.27 | | | 0.050 | |
| 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 | | 0.203 |
| G1 | 2.4 | | 2.7 | 0.094 | | 0.106 |
| H2 | 10.0 | | 10.40 | 0.393 | | 0.409 |
| L2 | | 16.4 | | | 0.645 | |
| L4 | 13.0 | | 14.0 | 0.511 | | 0.551 |
| L5 | 2.65 | | 2.95 | 0.104 | | 0.116 |
| L6 | 15.25 | | 15.75 | 0.600 | | 0.620 |
| L7 | 6.2 | | 6.6 | 0.244 | | 0.260 |
| L9 | 3.5 | | 3.93 | 0.137 | | 0.154 |
| DIA. | 3.75 | | 3.85 | 0.147 | | 0.151 |



SOT-82 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 7.4 | | 7.8 | 0.291 | | 0.307 |
| B | 10.5 | | 11.3 | 0.413 | | 0.445 |
| b | 0.7 | | 0.9 | 0.028 | | 0.035 |
| b1 | 0.49 | | 0.75 | 0.019 | | 0.030 |
| C | 2.4 | | 2.7 | 0.04 | | 0.106 |
| c1 | | 1.2 | | | 0.047 | |
| D | | 15.7 | | | 0.618 | |
| e | | 2.2 | | | 0.087 | |
| e3 | | 4.4 | | | 0.173 | |
| F | | 3.8 | | | 0.150 | |
| H | | | 2.54 | | 0.100 | |



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