

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

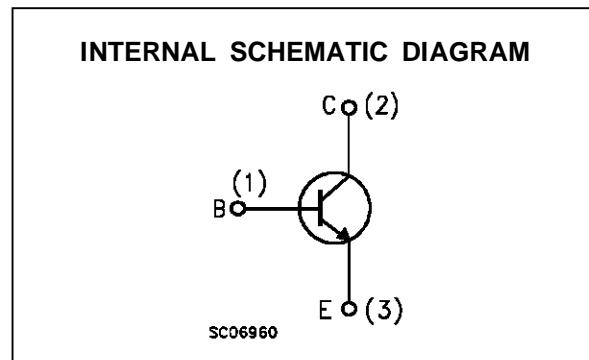
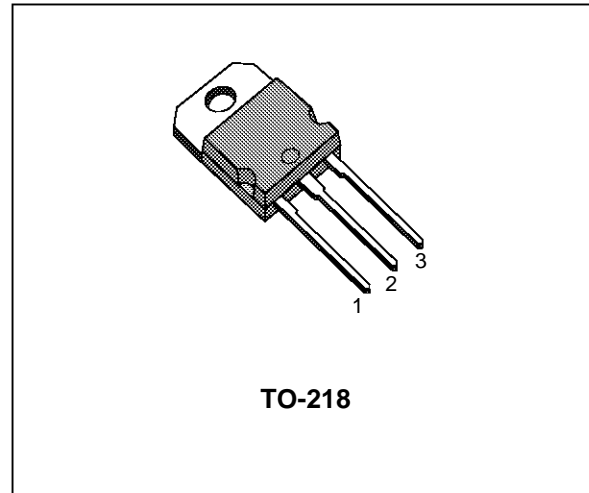
- SGS-THOMSON PREFERRED SALESTYPE
- HIGH VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- LOW BASE-DRIVE REQUIREMENTS
- VERY HIGH SWITCHING SPEED
- FULLY CHARACTERISED AT 125°C

APPLICATIONS

- ELECTRONIC TRANSFORMER FOR HALOGEN LAMPS
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

DESCRIPTION

The BUL810 is manufactured using high voltage Multipitaxial Mesa technology for cost-effective high performance. It uses a Hollow Emitter structure to enhance switching speeds. 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 ($V_{BE} = 0$) | 1000 | V |
| V_{CEO} | Collector-Emitter Voltage ($I_B = 0$) | 450 | V |
| V_{EBO} | Emitter-Base Voltage ($I_C = 0$) | 9 | V |
| I_C | Collector Current | 15 | A |
| I_{CM} | Collector Peak Current ($t_p < 5$ ms) | 22 | A |
| I_B | Base Current | 5 | A |
| I_{BM} | Base Peak Current ($t_p < 5$ ms) | 10 | A |
| P_{tot} | Total Dissipation at $T_c = 25$ °C | 125 | W |
| T_{stg} | Storage Temperature Range | -65 to 150 | °C |
| T_j | Max. Operating Junction Temperature | 150 | °C |

BUL810

THERMAL DATA

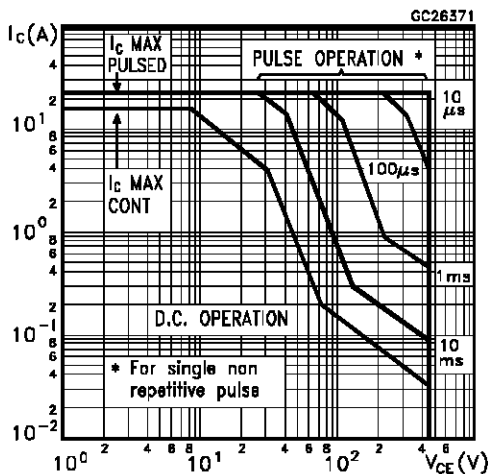
| | | | | |
|----------------|-------------------------------------|-----|------|---------------|
| $R_{thj-case}$ | Thermal Resistance Junction-Case | Max | 1 | $^{\circ}C/W$ |
| $R_{thj-amb}$ | Thermal Resistance Junction-Ambient | Max | 62.5 | $^{\circ}C/W$ |

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

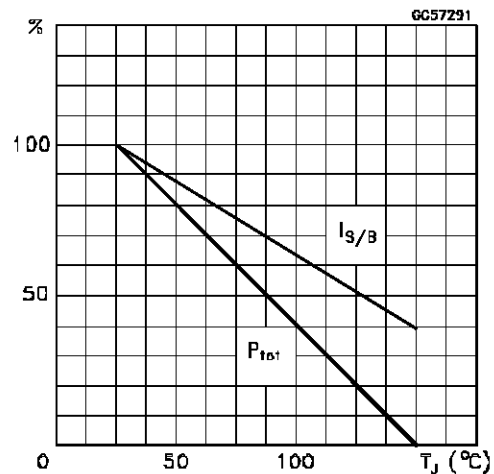
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------|---|--|----------|-----------|---------------|--------------------|
| I_{CES} | Collector Cut-off Current ($V_{BE} = 0$) | $V_{CE} = 1000 V$ $V_{CE} = 1000 V \quad T_j = 125^{\circ}C$ | | | 100 500 | μA μA |
| I_{CEO} | Collector Cut-off Current ($I_B = 0$) | $V_{CE} = 450 V$ | | | 250 | μA |
| $V_{CEO(sus)}$ | Collector-Emitter Sustaining Voltage | $I_C = 100 mA \quad L = 25 mH$ | 450 | | | V |
| V_{EBO} | Emitter-Base Voltage ($I_C = 0$) | $I_E = 10 mA$ | 9 | | | V |
| $V_{CE(sat)*}$ | Collector-Emitter Saturation Voltage | $I_C = 5 A \quad I_B = 1 A$ $I_C = 8 A \quad I_B = 1.6 A$ $I_C = 12 A \quad I_B = 2.4 A$ | | | 1 1.5 5 | V V V |
| $V_{BE(sat)*}$ | Base-Emitter Saturation Voltage | $I_C = 5 A \quad I_B = 1 A$ $I_C = 8 A \quad I_B = 1.6 A$ | | | 1.3 1.6 | V V |
| h_{FE*} | DC Current Gain | $I_C = 5 A \quad V_{CE} = 5 V$ $I_C = 10 mA \quad V_{CE} = 5 V$ | 10 10 | | 40 | |
| t_s t_f | INDUCTIVE LOAD Storage Time Fall Time | $I_C = 8 A \quad I_{B1} = 1.6 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0.4 \Omega$ $V_{CL} = 350 V \quad L = 200 \mu H$ | | 1.5 55 | 2.3 110 | μs ns |
| t_s t_f | INDUCTIVE LOAD Storage Time Fall Time | $I_C = 8 A \quad I_{B1} = 1.6 A$ $V_{BE(off)} = -5 V \quad R_{BB} = 0.4 \Omega$ $V_{CL} = 350 V \quad L = 200 \mu H$ $T_j = 100^{\circ}C$ | | 1.9 80 | | μs ns |

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

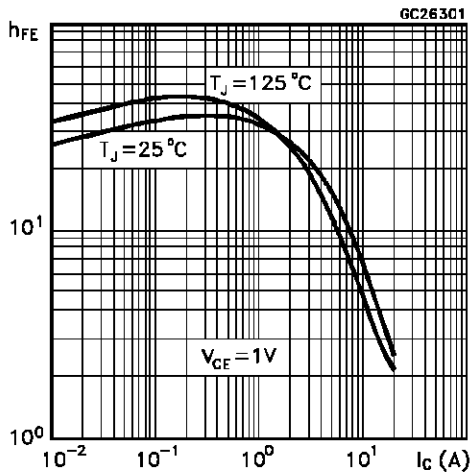
Safe Operating Areas



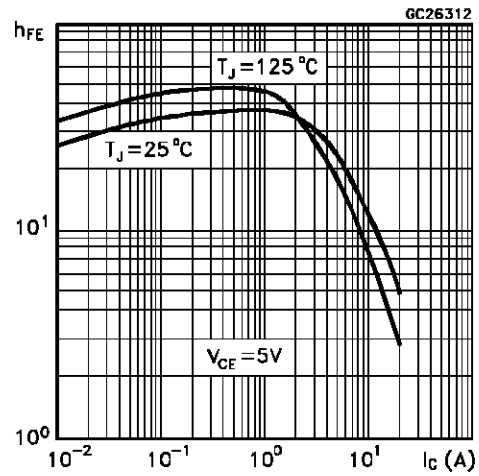
Derating Curves



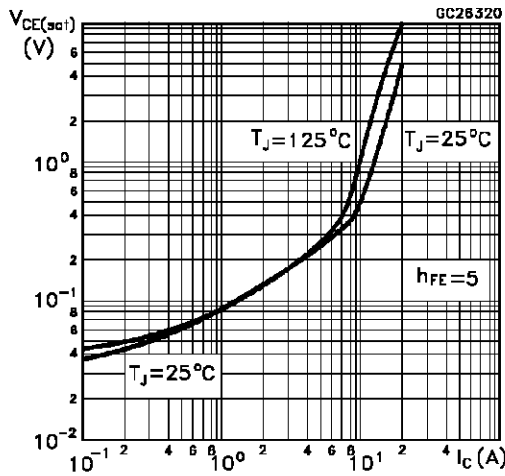
DC Current Gain



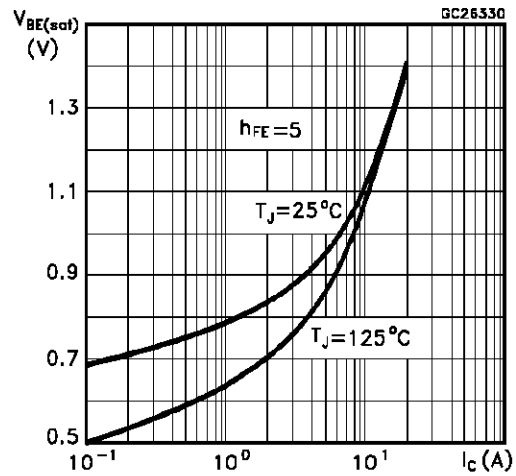
DC Current Gain



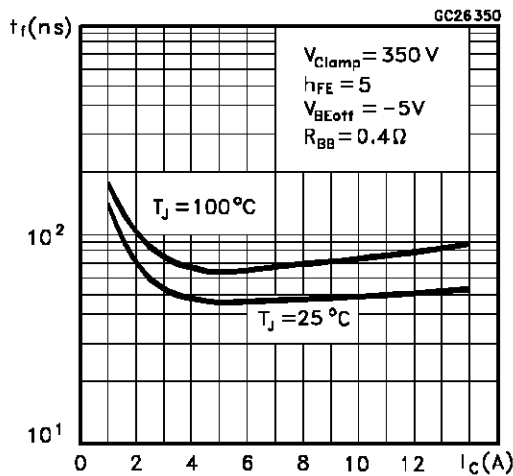
Collector Emitter Saturation Voltage



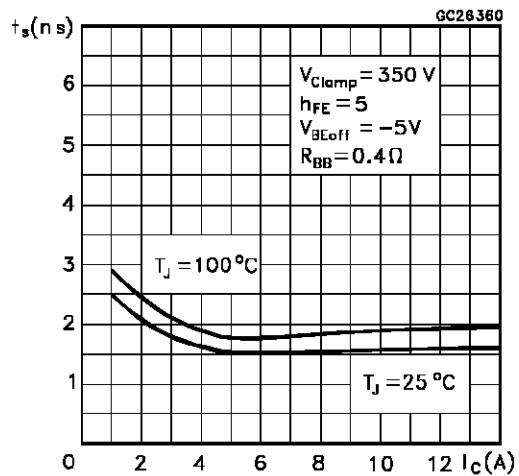
Base Emitter Saturation Voltage



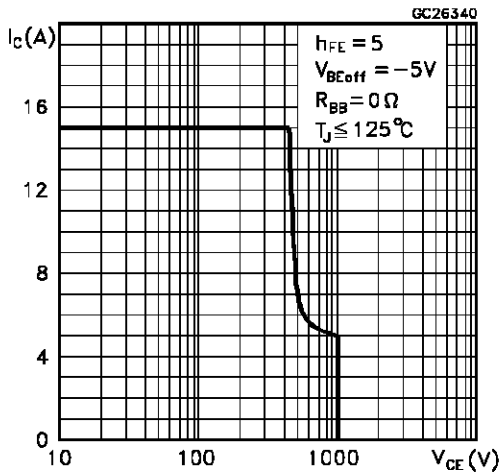
Inductive Fall Time



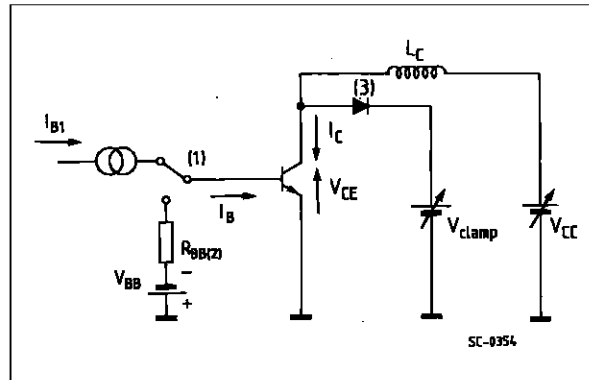
Inductive Storage Time



Reverse Biased SOA



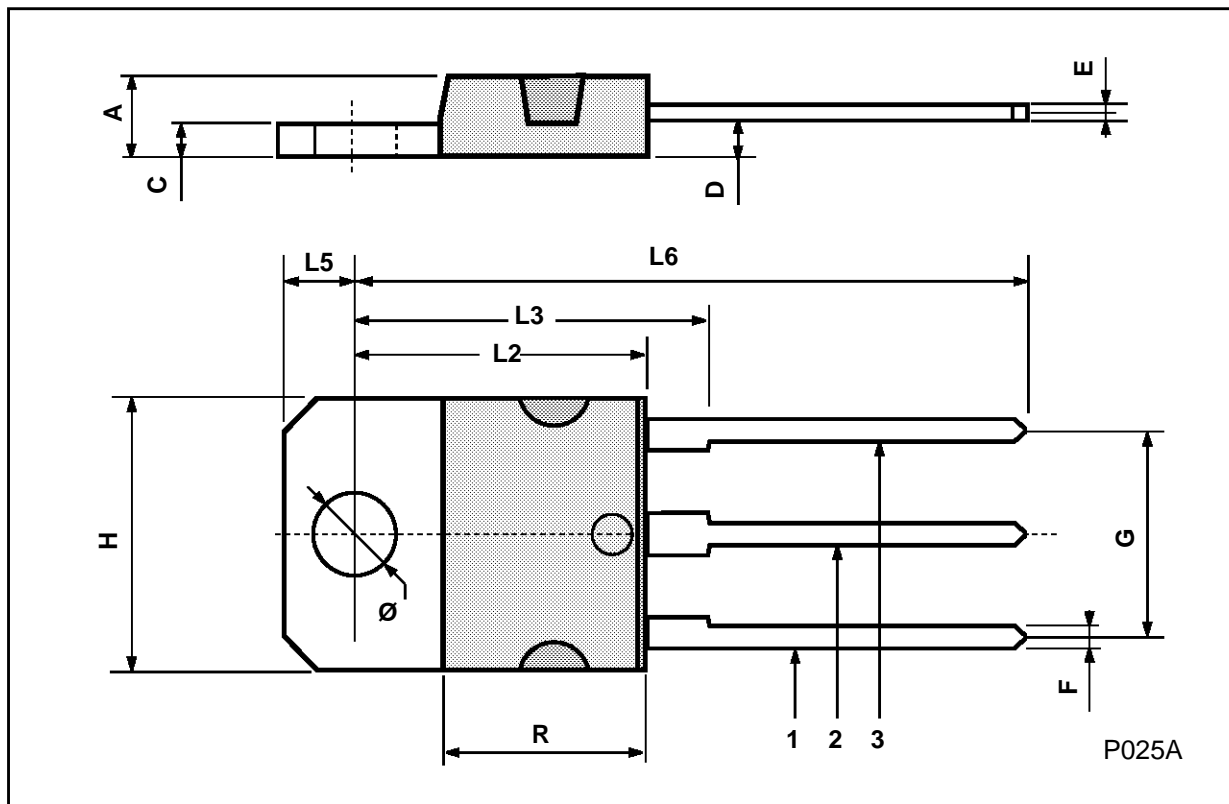
RBSOA and Inductive Load Switching Test Circuit



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

TO-218 (SOT-93) MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.7 | | 4.9 | 0.185 | | 0.193 |
| C | 1.17 | | 1.37 | 0.046 | | 0.054 |
| D | | 2.5 | | | 0.098 | |
| E | 0.5 | | 0.78 | 0.019 | | 0.030 |
| F | 1.1 | | 1.3 | 0.043 | | 0.051 |
| G | 10.8 | | 11.1 | 0.425 | | 0.437 |
| H | 14.7 | | 15.2 | 0.578 | | 0.598 |
| L2 | - | | 16.2 | - | | 0.637 |
| L3 | | 18 | | | 0.708 | |
| L5 | 3.95 | | 4.15 | 0.155 | | 0.163 |
| L6 | | 31 | | | 1.220 | |
| R | - | | 12.2 | - | | 0.480 |
| Ø | 4 | | 4.1 | 0.157 | | 0.161 |



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