

## HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- MEDIUM VOLTAGE CAPABILITY
- LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- VERY HIGH SWITCHING SPEED

**APPLICATIONS:**

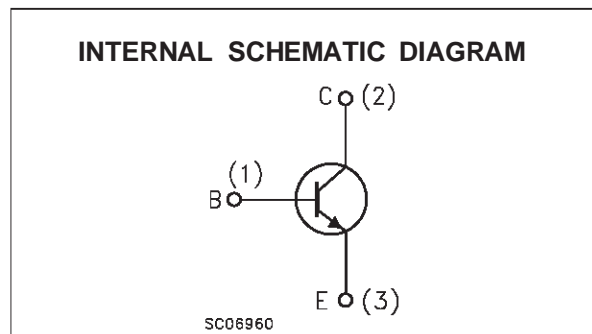
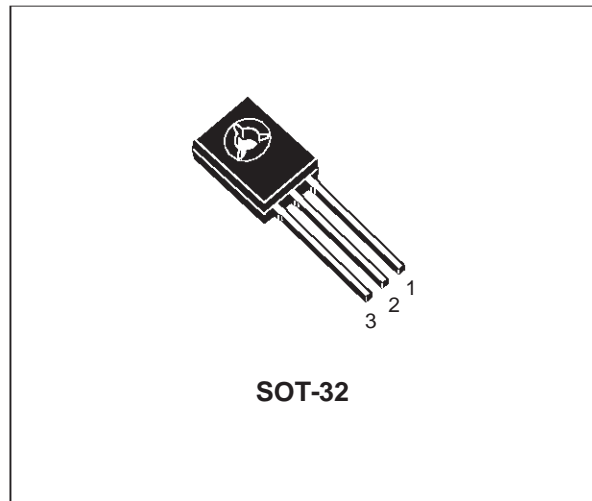
- ELECTRONIC BALLASTS FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

**DESCRIPTION**

The device is manufactured using high 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 the wide RBSOA.

The device 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 ( $V_{BE} = 0$ ) | 700        | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )    | 400        | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )         | 9          | V    |
| $I_C$     | Collector Current                          | 1.5        | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)     | 3          | A    |
| $I_B$     | Base Current                               | 0.75       | A    |
| $I_{BM}$  | Base Peak Current ( $t_p < 5$ ms)          | 1.5        | A    |
| $P_{tot}$ | Total Dissipation at $T_C = 25$ °C         | 40         | W    |
| $T_{stg}$ | Storage Temperature                        | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature        | 150        | °C   |

**THERMAL DATA**

|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 3.12 | °C/W |
| R <sub>thj-a</sub>    | Thermal Resistance Junction-ambient | Max | 89   | °C/W |

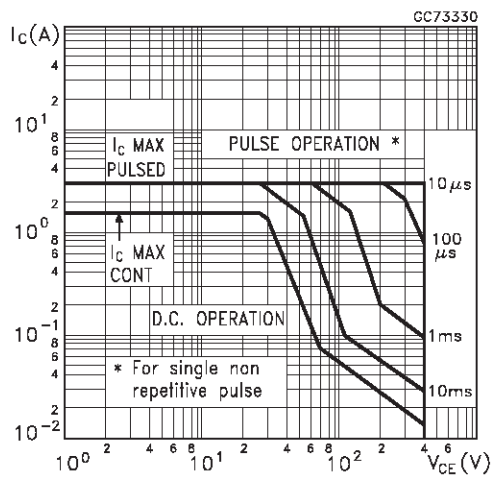
**ELECTRICAL CHARACTERISTICS** (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                 | Parameter   | Test Conditions  | Min.    | Typ. | Max.          | Unit        |
|------------------------|---|--|---------|------|---------------|-------------|
| I <sub>CEV</sub>       | Collector Cut-off Current (V <sub>BE</sub> = -1.5V)       | V <sub>CE</sub> = 700V<br>V <sub>CE</sub> = 700V<br>T <sub>J</sub> = 125°C   |         |      | 1<br>5        | mA<br>mA    |
| I <sub>EBO</sub>       | Emitter Cut-off Current (I <sub>C</sub> = 0)              | V <sub>EB</sub> = 9 V  |         |      | 1             | mA          |
| V <sub>CEO(sus)*</sub> | Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = 10 mA<br>L = 25mH   | 400     |      |               | V           |
| V <sub>CE(sat)*</sub>  | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 0.5 A<br>I <sub>C</sub> = 1 A<br>I <sub>C</sub> = 1.5 A     |         |      | 0.5<br>1<br>3 | V<br>V<br>V |
| V <sub>BE(sat)*</sub>  | Base-Emitter Saturation Voltage                           | I <sub>C</sub> = 0.5 A<br>I <sub>C</sub> = 1 A                               |         |      | 1.0<br>1.2    | V<br>V      |
| h <sub>FE</sub>        | DC Current Gain   | I <sub>C</sub> = 0.5 A<br>Group A<br>Group B<br>I <sub>C</sub> = 1 A         |         |      |               |             |
|                        |   | V <sub>CE</sub> = 2 V  | 8<br>15 |      | 20<br>35      |             |
|                        |   | V <sub>CE</sub> = 2 V  | 5       |      | 25            |             |
| t <sub>r</sub>         | RESISTIVE LOAD<br>Rise Time                               | I <sub>C</sub> = 1 A   |         |      | 1.0           | μs          |
| t <sub>s</sub>         | Storage Time  | I <sub>B1</sub> = 0.2 A  |         |      | 4.0           | μs          |
| t <sub>f</sub>         | Fall Time   | T <sub>p</sub> = 25 μs   |         |      | 0.7           | μs          |
| t <sub>s</sub>         | INDUCTIVE LOAD<br>Storage Time                            | I <sub>C</sub> = 1 A<br>V <sub>BE</sub> = -5 V<br>V <sub>clamp</sub> = 300 V |         |      | 0.8           | μs          |

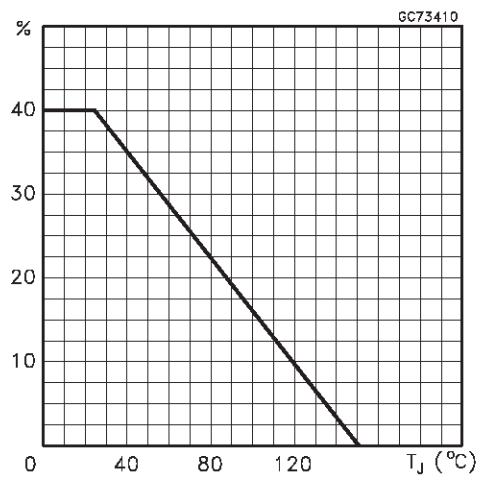
\* Pulsed: Pulse duration = 300μs, duty cycle = 1.5 %

Note : Product is pre-selected in DC current gain (GROUP A and GROUP B). SGS-THOMSON reserves the right to ship either groups according to production availability. Please contact your nearest SGS THOMSON MICROELECTRONICS sales office for delivery details.

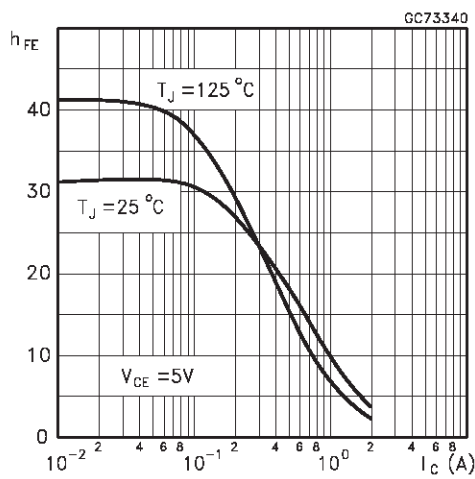
Safe Operating Areas



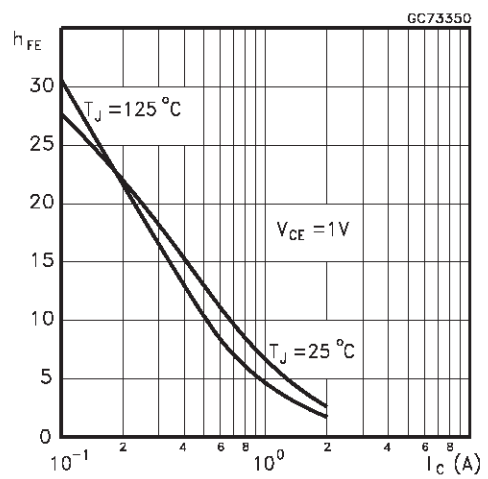
Derating Curve



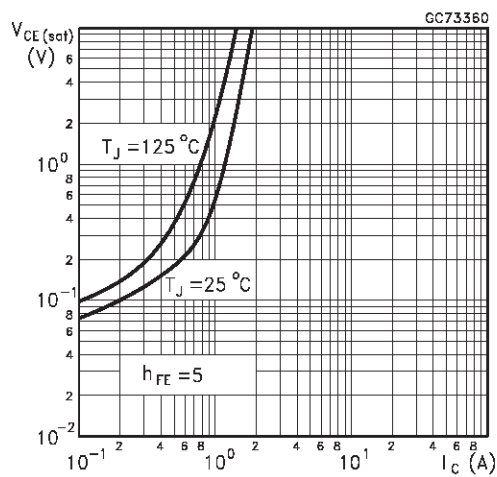
DC Current Gain



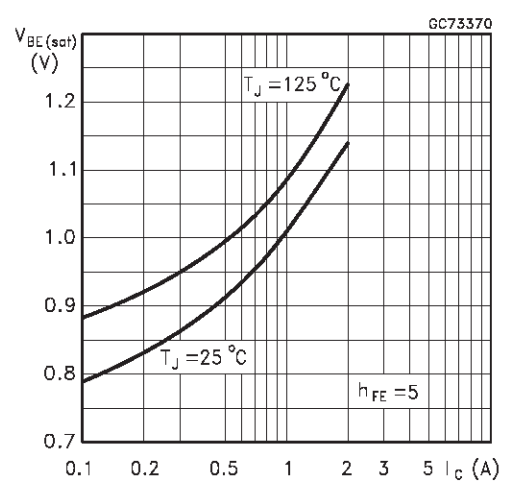
DC Current Gain



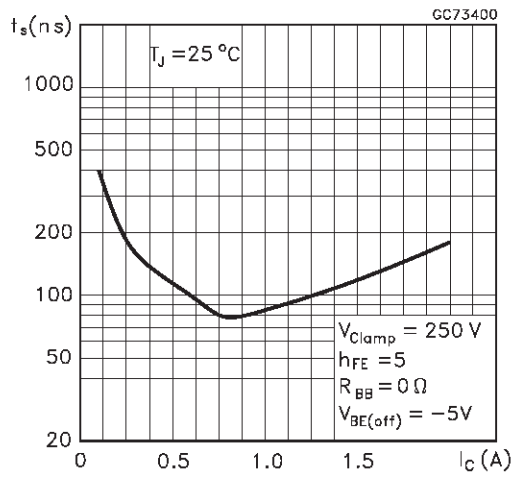
Collector Emitter Saturation Voltage



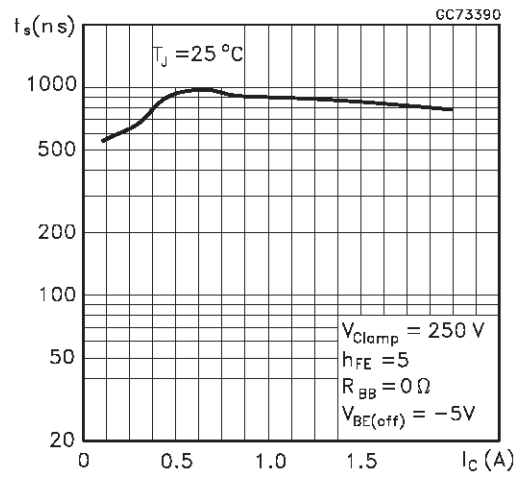
Base Emitter Saturation Voltage



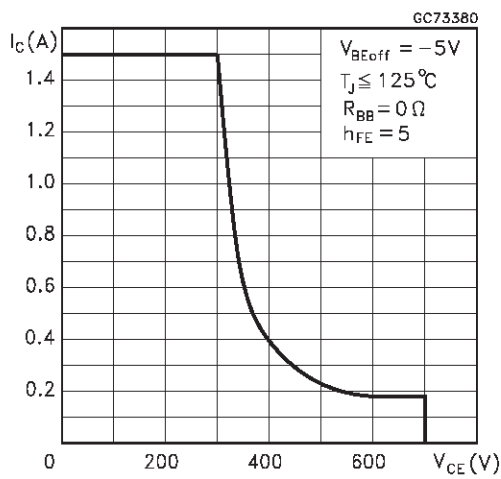
Inductive Fall Time

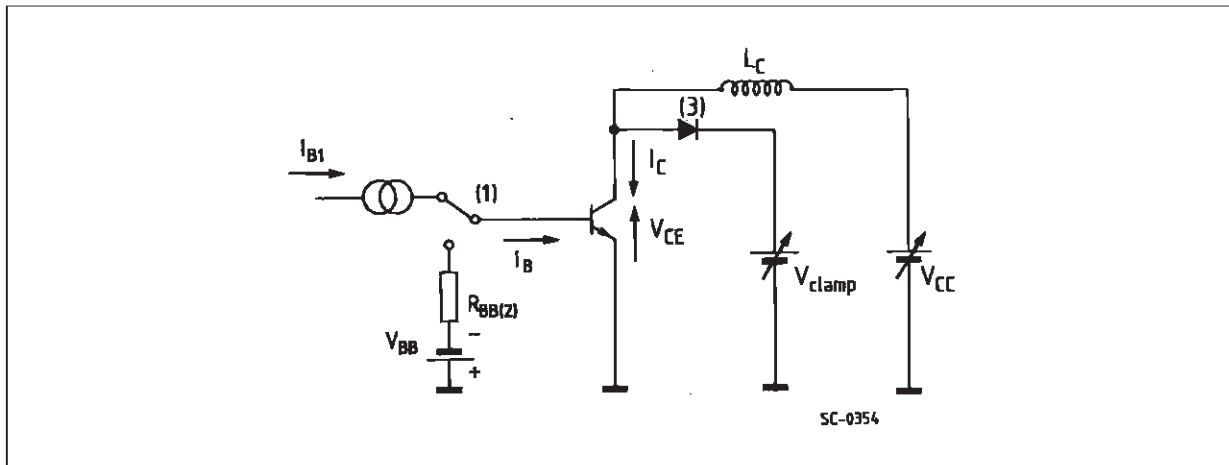
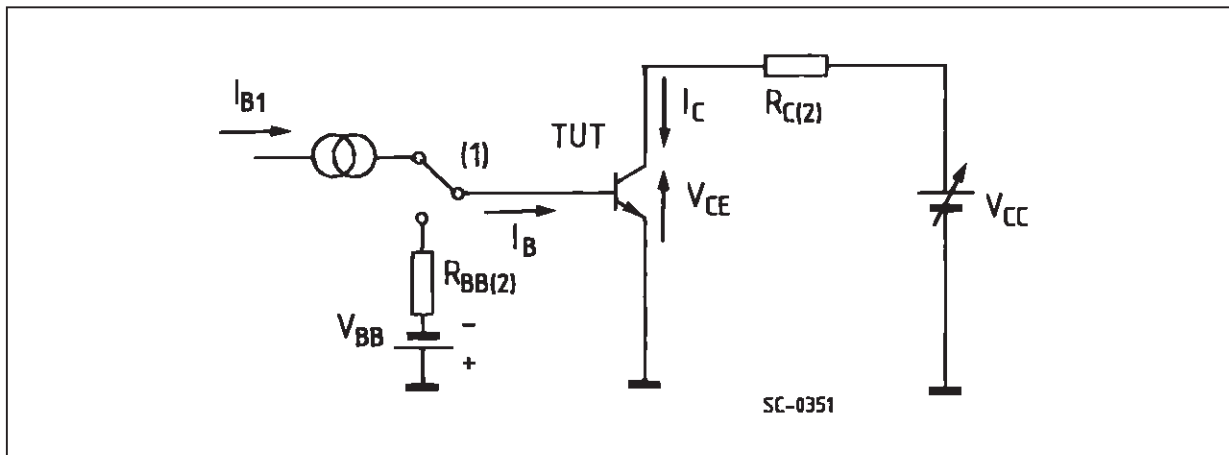


Inductive Storage Time



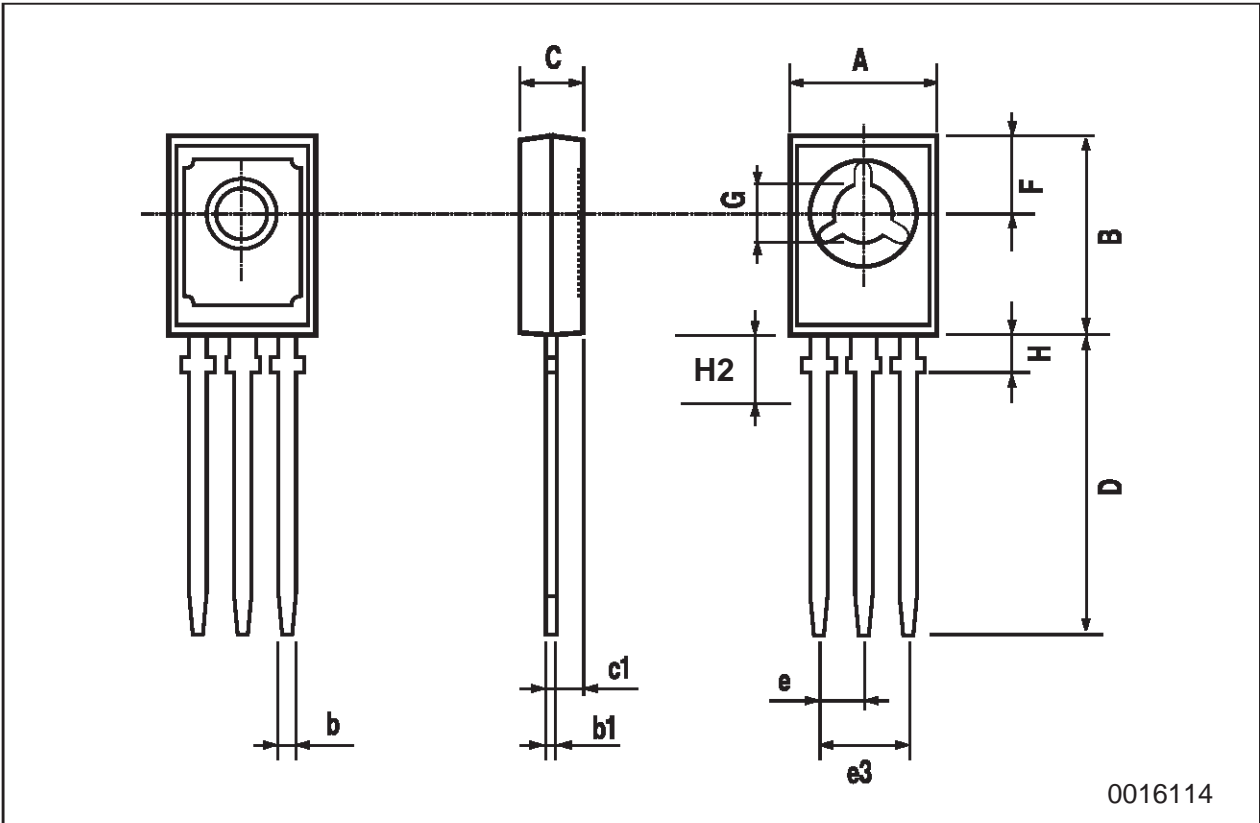
Reverse Biased SOA



**Figure 1:** Inductive Load Switching Test Circuits.**Figure 2:** Resistive Load Switching Test Circuits.

**SOT-32 (TO-126) MECHANICAL DATA**

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 7.4  |      | 7.8  | 0.291 |       | 0.307 |
| B    | 10.5 |      | 10.8 | 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  | 0.040 |       | 0.106 |
| c1   | 1.0  |      | 1.3  | 0.039 |       | 0.050 |
| D    | 15.4 |      | 16.0 | 0.606 |       | 0.629 |
| e    |      | 2.2  |      |       | 0.087 |       |
| e3   | 4.15 |      | 4.65 | 0.163 |       | 0.183 |
| F    |      | 3.8  |      |       | 0.150 |       |
| G    | 3    |      | 3.2  | 0.118 |       | 0.126 |
| H    |      |      | 2.54 |       |       | 0.100 |
| H2   |      | 2.15 |      |       | 0.084 |       |



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