



## BUL742C

# HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

| Ordering Code | Marking | Package / Shipment |
|---------------|---------|--------------------|
| BUL742C       | BUL742C | TO-220 / Tube      |

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

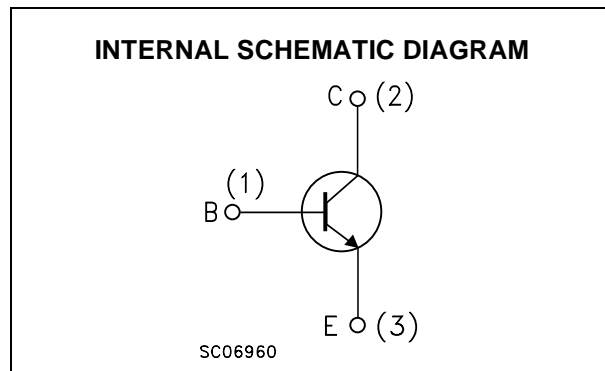
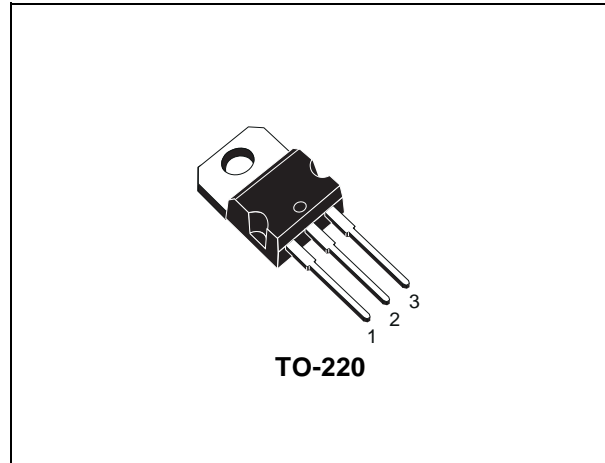
### APPLICATIONS:

- ELECTRONIC BALLAST FOR FLUORESCENT LIGHTING
- SWITCH MODE POWER SUPPLIES

### DESCRIPTION

The device is manufactured using High Voltage Multi Epitaxial Planar technology for high switching speeds and high voltage capability.

Thanks to an increased intermediate layer, it has an intrinsic ruggedness which enables the transistor to withstand an high collector current level during breakdown condition, without using the transil protection usually necessary in typical converters for lamp ballast.



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter  | Value         | Unit             |
|-----------|--|---------------|------------------|
| $V_{CES}$ | Collector-Emitter Voltage ( $V_{BE} = 0$ )                                 | 1050          | V                |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )                                    | 400           | V                |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0, I_B < 2 \text{ A}, t_p < 10 \text{ ms}$ ) | $V_{(BR)EBO}$ | V                |
| $I_C$     | Collector Current  | 4             | A                |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5 \text{ ms}$ )                            | 8             | A                |
| $I_B$     | Base Current   | 2             | A                |
| $I_{BM}$  | Base Peak Current ( $t_p < 5 \text{ ms}$ )                                 | 4             | A                |
| $P_{tot}$ | Total Dissipation at $T_C = 25 \text{ }^\circ\text{C}$                     | 70            | W                |
| $T_{stg}$ | Storage Temperature  | -65 to 150    | $^\circ\text{C}$ |
| $T_j$     | Max. Operating Junction Temperature  | 150           | $^\circ\text{C}$ |

## BUL742C

### THERMAL DATA

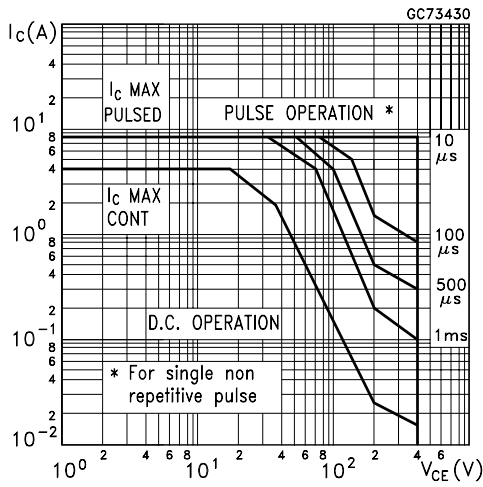
|                       |                                     |     |      |      |
|-----------------------|-------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case    | Max | 1.79 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient | Max | 62.5 | °C/W |

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

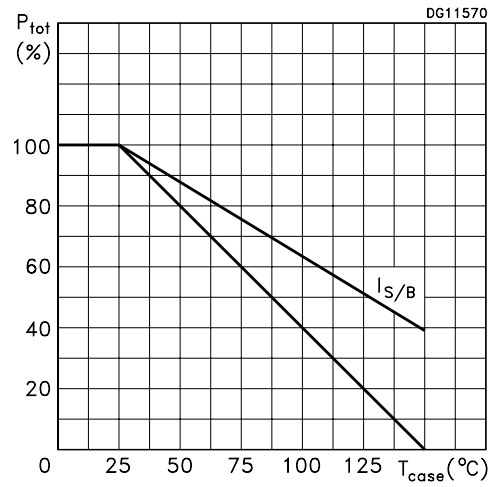
| Symbol                           | Parameter   | Test Conditions  |  | Min.     | Typ.       | Max.       | Unit     |
|----------------------------------|---|--|--|----------|------------|------------|----------|
| I <sub>CES</sub>                 | Collector Cut-off Current (V <sub>BE</sub> = 0)           | V <sub>CE</sub> = 1050 V   |  |          |            | 100        | μA       |
| I <sub>CEO</sub>                 | Collector Cut-off Current (I <sub>B</sub> = 0)            | V <sub>CE</sub> = 400 V  |  |          |            | 250        | 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> = 10 mA   |  | 400      |            |            | V        |
| V <sub>CE(sat)</sub> *           | Collector-Emitter Saturation Voltage                      | I <sub>C</sub> = 1 A<br>I <sub>C</sub> = 3.5 A   | I <sub>B</sub> = 0.2 A<br>I <sub>B</sub> = 1 A                       |          |            | 0.5<br>1.5 | V<br>V   |
| V <sub>BE(sat)</sub> *           | Base-Emitter Saturation Voltage                           | I <sub>C</sub> = 3.5 A   | I <sub>B</sub> = 1 A   |          |            | 1.5        | V        |
| h <sub>FE</sub> *                | DC Current Gain   | I <sub>C</sub> = 0.1 A<br>I <sub>C</sub> = 0.8 A   | V <sub>CE</sub> = 5 V<br>V <sub>CE</sub> = 3 V                       | 48<br>25 |            | 100<br>50  |          |
| t <sub>s</sub><br>t <sub>f</sub> | RESISTIVE LOAD<br>Storage Time<br>Fall Time               | I <sub>C</sub> = 2 A<br>I <sub>B1</sub> = -I <sub>B2</sub> = 400 mA<br>V <sub>BB(off)</sub> = -5 V | V <sub>CC</sub> = 125 V<br>t <sub>p</sub> = 300 μs<br>(See Figure 1) |          | 2.4<br>350 |            | μs<br>ns |
| E <sub>ar</sub>                  | Repetitive Avalanche Energy                               | L = 2 mH<br>V <sub>BE</sub> = -5 V   | C = 1.8 nF<br>(See Figure 2)   | 6        |            |            | mJ       |

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

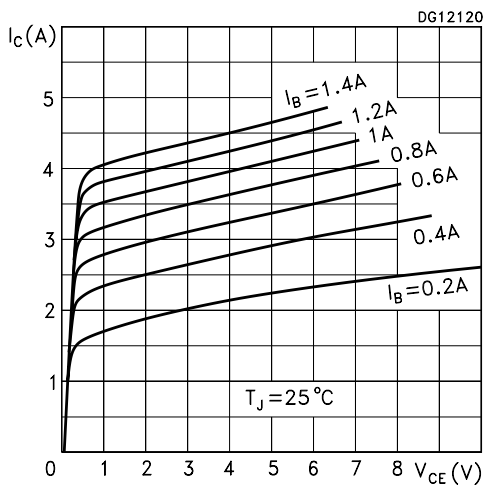
Safe Operating Area



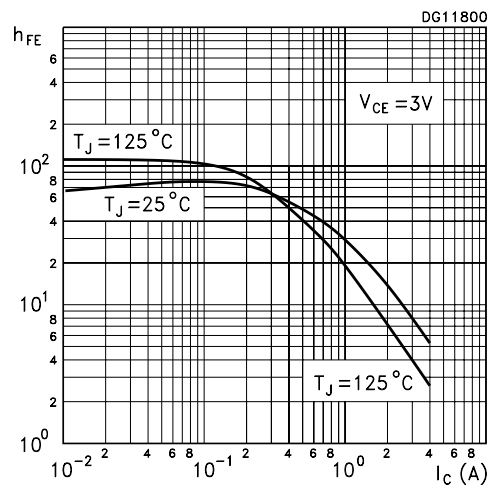
Derating Curve



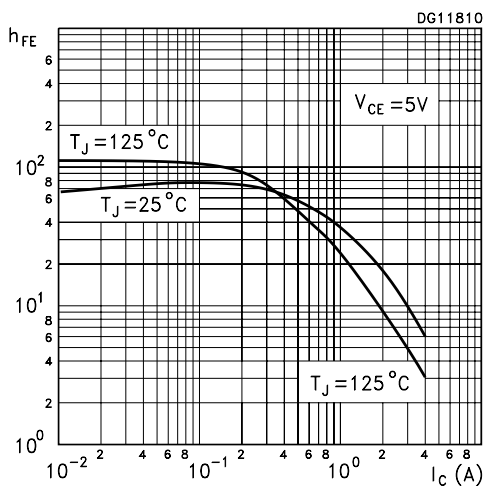
Output Characteristics



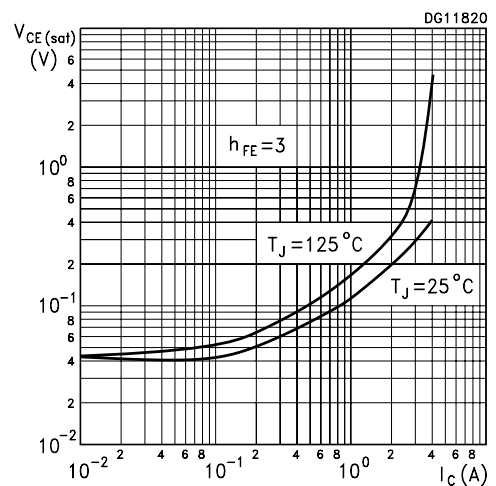
DC Current Gain



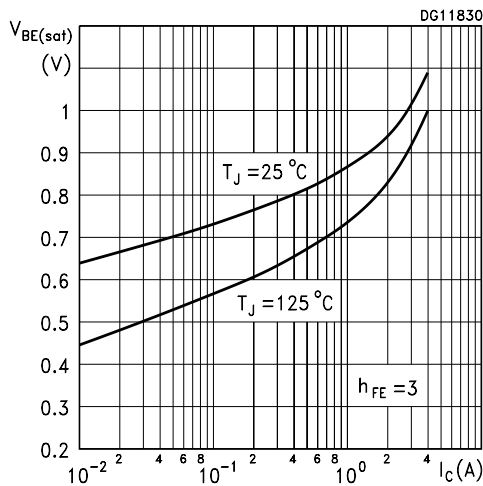
DC Current Gain



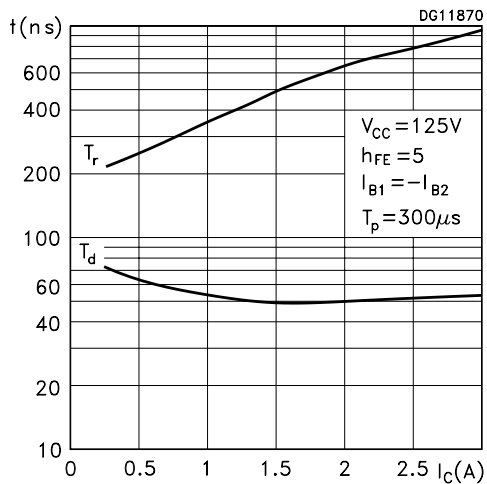
Collector-Emitter Saturation Voltage



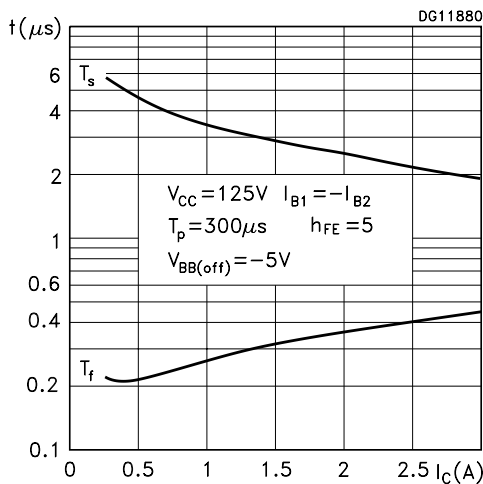
**Base-Emitter Saturation Voltage**



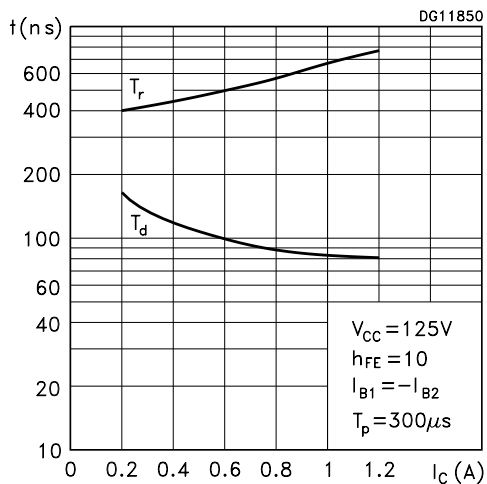
**Resistive Load Switching On Times**



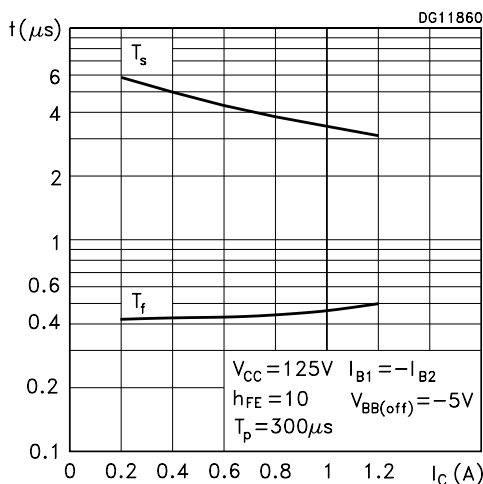
**Resistive Load Switching Off Times**



**Resistive Load Switching On Times**



**Resistive Load Switching Off Times**



**Reverse Biased Safe Operating Area**

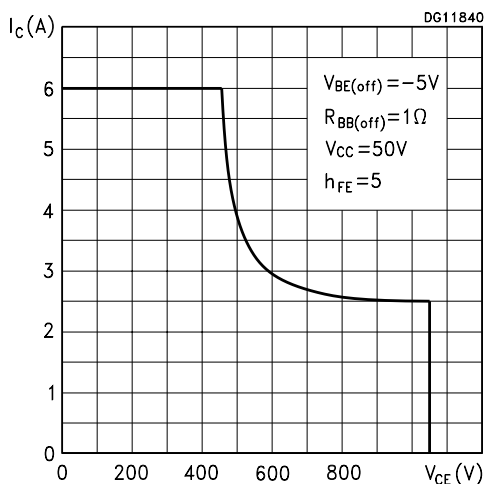


Figure 1: Resistive Load Switching Test Circuit

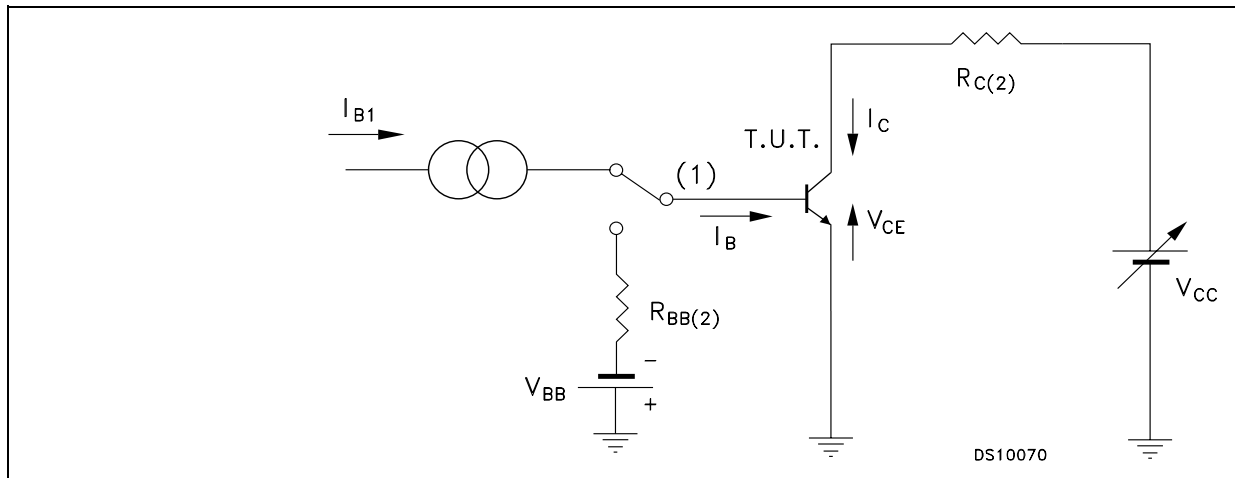
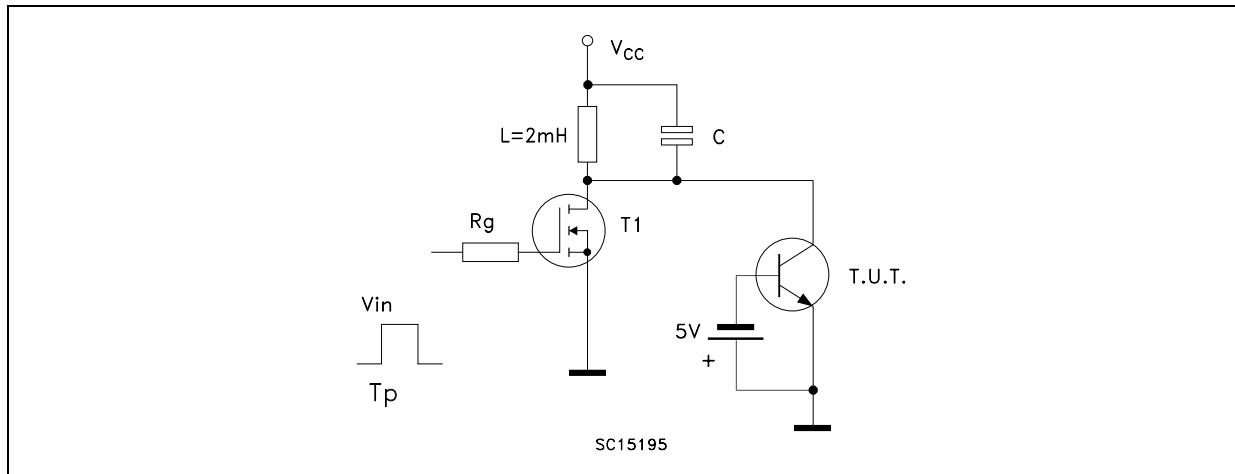
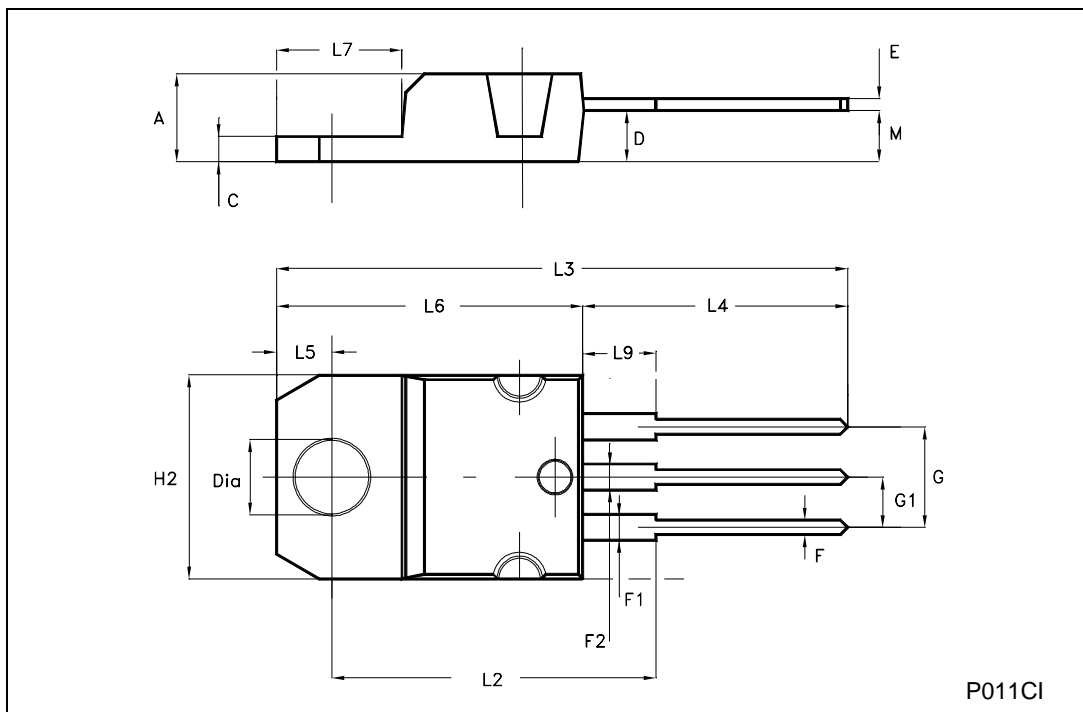


Figure 2: Energy Rating Test Circuit



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 |       | 0.052 |
| D    | 2.40  |       | 2.72  | 0.094 |       | 0.107 |
| 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 |       | 0.202 |
| G1   | 2.40  |       | 2.70  | 0.094 |       | 0.106 |
| H2   | 10.00 |       | 10.40 | 0.394 |       | 0.409 |
| L2   |       | 16.40 |       |       | 0.645 |       |
| L4   | 13.00 |       | 14.00 | 0.511 |       | 0.551 |
| L5   | 2.65  |       | 2.95  | 0.104 |       | 0.116 |
| L6   | 15.25 |       | 15.75 | 0.600 |       | 0.620 |
| L7   | 6.20  |       | 6.60  | 0.244 |       | 0.260 |
| L9   | 3.50  |       | 3.93  | 0.137 |       | 0.154 |
| M    |       | 2.60  |       |       | 0.102 |       |
| DIA. | 3.75  |       | 3.85  | 0.147 |       | 0.151 |



P011CI

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - Printed in Italy - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

© <http://www.st.com>