

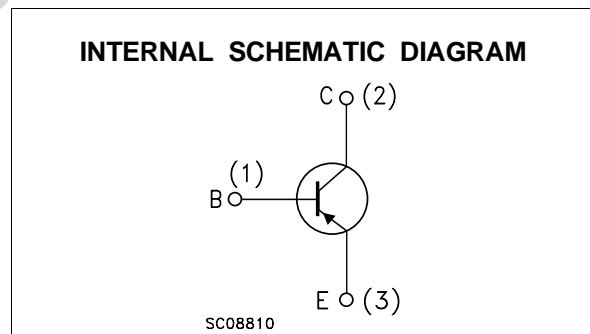
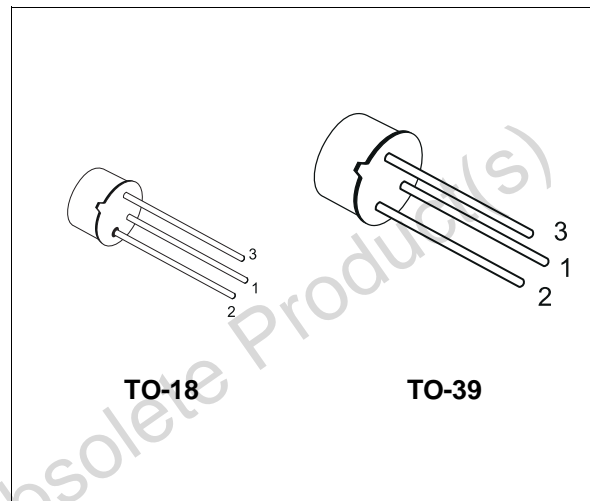


**2N2905A**  
**2N2907A**

## SMALL SIGNAL PNP TRANSISTORS

### DESCRIPTION

The 2N2905A and 2N2907A are silicon Planar Epitaxial PNP transistors in Jedec TO-39 (for 2N2905A) and in Jedec TO-18 (for 2N2907A) metal case. They are designed for high speed saturated switching and general purpose applications.



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                                 | Value      | Unit |
|-----------|---|------------|------|
| $V_{CBO}$ | Collector-Base Voltage ( $I_E = 0$ )      | -60        | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ )   | -60        | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )        | -5         | V    |
| $I_C$     | Collector Current                         | -0.6       | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)    | -0.8       | A    |
| $P_{tot}$ | Total Dissipation at $T_{amb} \leq 25$ °C |            |      |
|           | for <b>2N2905A</b>                        | 0.6        | W    |
|           | for <b>2N2907A</b>                        | 0.4        | W    |
|           | at $T_C \leq 25$ °C                       |            |      |
|           | for <b>2N2905A</b>                        | 3          | W    |
|           | for <b>2N2907A</b>                        | 1.8        | W    |
| $T_{stg}$ | Storage Temperature                       | -65 to 175 | °C   |
| $T_j$     | Max. Operating Junction Temperature       | 175        | °C   |

## 2N2905A/2N2907A

### THERMAL DATA

|                       |                                     |     | TO-39 | TO-18 |      |
|-----------------------|-------------------------------------|-----|-------|-------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-Case    | Max | 50    | 83.3  | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-Ambient | Max | 250   | 375   | °C/W |

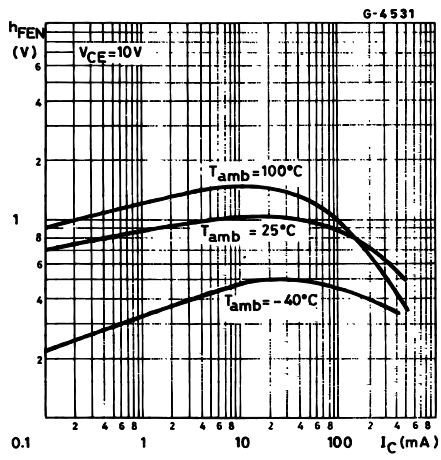
### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                | Parameter  | Test Conditions   | Min.                          | Typ. | Max.         | Unit     |
|-----------------------|--|---|-------------------------------|------|--------------|----------|
| I <sub>CBO</sub>      | Collector Cut-off Current (I <sub>E</sub> = 0)           | V <sub>CB</sub> = -50 V<br>V <sub>CB</sub> = -50 V T <sub>J</sub> = 150 °C  |                               |      | -10<br>-10   | nA<br>μA |
| I <sub>CEX</sub>      | Collector Cut-off Current (V <sub>BE</sub> = 0.5V)       | V <sub>CE</sub> = -30 V   |                               |      | -50          | nA       |
| I <sub>BEX</sub>      | Base Cut-off Current (V <sub>BE</sub> = 0.5V)            | V <sub>CE</sub> = -30 V   |                               |      | -50          | nA       |
| V <sub>(BR)CBO</sub>  | Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)    | I <sub>C</sub> = -10 μA   | -60                           |      |              | V        |
| V <sub>(BR)CEO*</sub> | Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = -10 mA   | -60                           |      |              | V        |
| V <sub>(BR)EBO</sub>  | Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)      | I <sub>E</sub> = -10 μA   | -5                            |      |              | V        |
| V <sub>CE(sat)*</sub> | Collector-Emitter Saturation Voltage                     | I <sub>C</sub> = -150 mA I <sub>B</sub> = -15 mA<br>I <sub>C</sub> = -500 mA I <sub>B</sub> = -50 mA  |                               |      | -0.4<br>-1.6 | V<br>V   |
| V <sub>BE(sat)*</sub> | Base-Emitter Saturation Voltage                          | I <sub>C</sub> = -150 mA I <sub>B</sub> = -15 mA<br>I <sub>C</sub> = -500 mA I <sub>B</sub> = -50 mA  |                               |      | -1.3<br>-2.6 | V<br>V   |
| h <sub>FE*</sub>      | DC Current Gain  | I <sub>C</sub> = -0.1 mA V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -1 mA V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -10 mA V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -150 mA V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -500 mA V <sub>CE</sub> = -10 V | 75<br>100<br>100<br>100<br>50 |      | 300          |          |
| f <sub>T</sub>        | Transition Frequency                                     | V <sub>CE</sub> = -20 V f = 100 MHz<br>I <sub>C</sub> = -50 mA  | 200                           |      |              | MHz      |
| C <sub>EBO</sub>      | Emitter-Base Capacitance                                 | I <sub>C</sub> = 0 V <sub>EB</sub> = -2 V f = 1MHz  |                               |      | 30           | pF       |
| C <sub>CBO</sub>      | Collector-Base Capacitance                               | I <sub>E</sub> = 0 V <sub>CB</sub> = -10 V f = 1MHz   |                               |      | 8            | pF       |
| t <sub>d**</sub>      | Delay Time   | V <sub>CC</sub> = -30 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -15 mA  |                               |      | 10           | ns       |
| t <sub>r**</sub>      | Rise Time  | V <sub>CC</sub> = -30 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -15 mA  |                               |      | 40           | ns       |
| t <sub>s**</sub>      | Storage Time   | V <sub>CC</sub> = -6 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -I <sub>B2</sub> = -15 mA  |                               |      | 80           | ns       |
| t <sub>f**</sub>      | Fall Time  | V <sub>CC</sub> = -6 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -I <sub>B2</sub> = -15 mA  |                               |      | 30           | ns       |
| t <sub>on**</sub>     | Turn-on Time   | V <sub>CC</sub> = -30 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -15 mA  |                               |      | 45           | ns       |
| t <sub>off**</sub>    | Turn-off Time  | V <sub>CC</sub> = -6 V I <sub>C</sub> = -150 mA<br>I <sub>B1</sub> = -I <sub>B2</sub> = -15 mA  |                               |      | 100          | ns       |

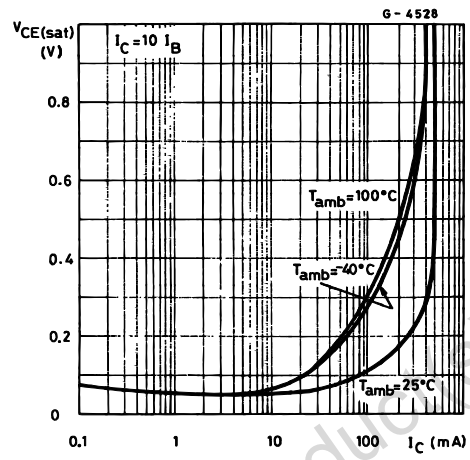
\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1 %

\*\* See test circuit

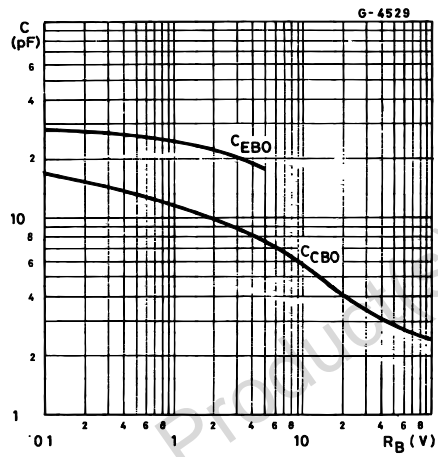
Normalized DC Current Gain.



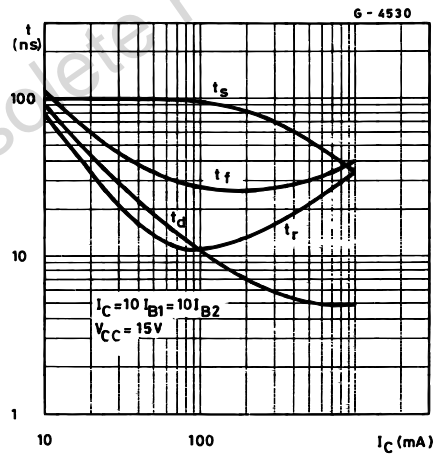
Collector Emitter Saturation Voltage.



Collector Base and Emitter-base capacitances.

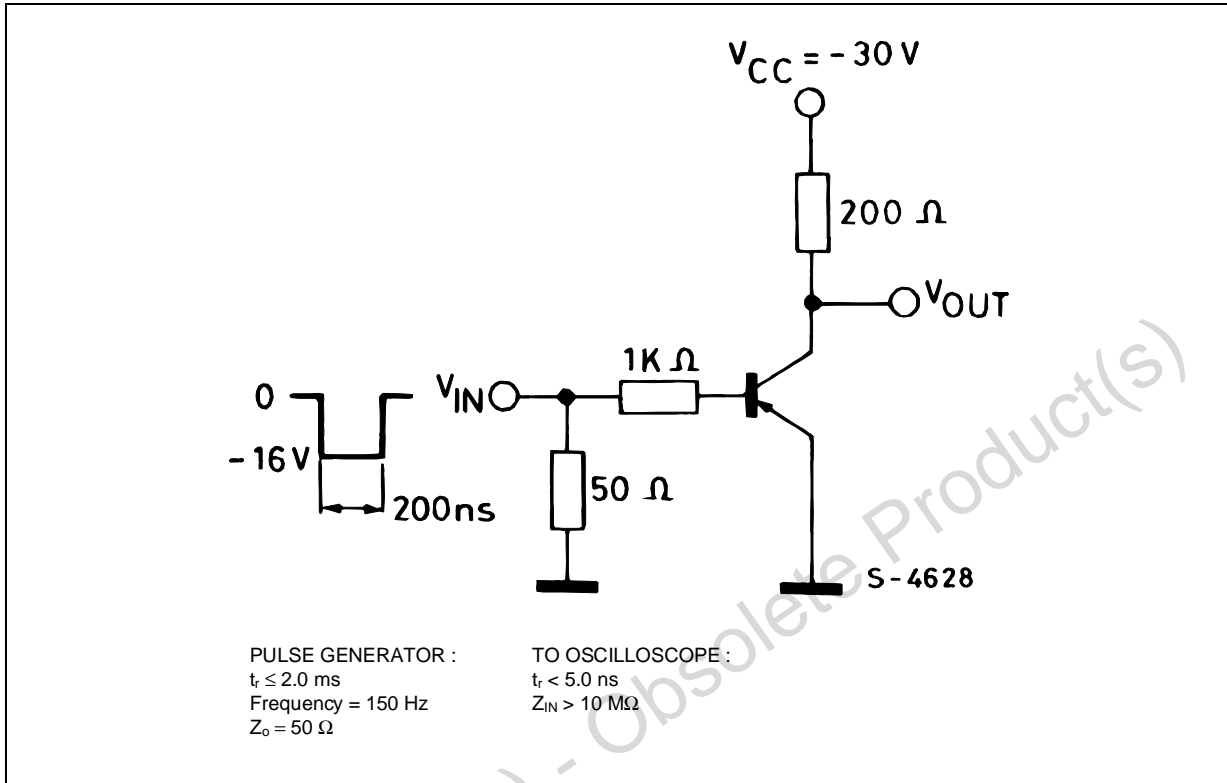


Switching Characteristics.

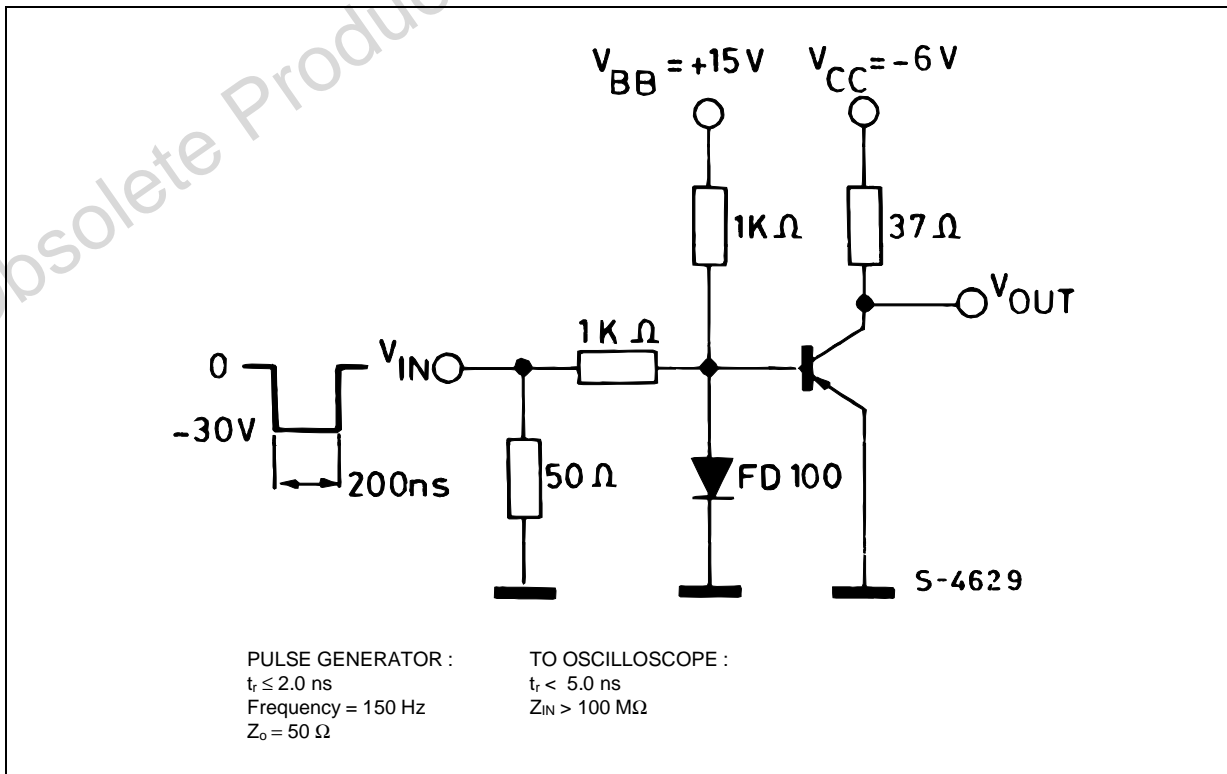


2N2905A/2N2907A

Test Circuit for  $t_{on}$ ,  $t_r$ ,  $t_d$ .

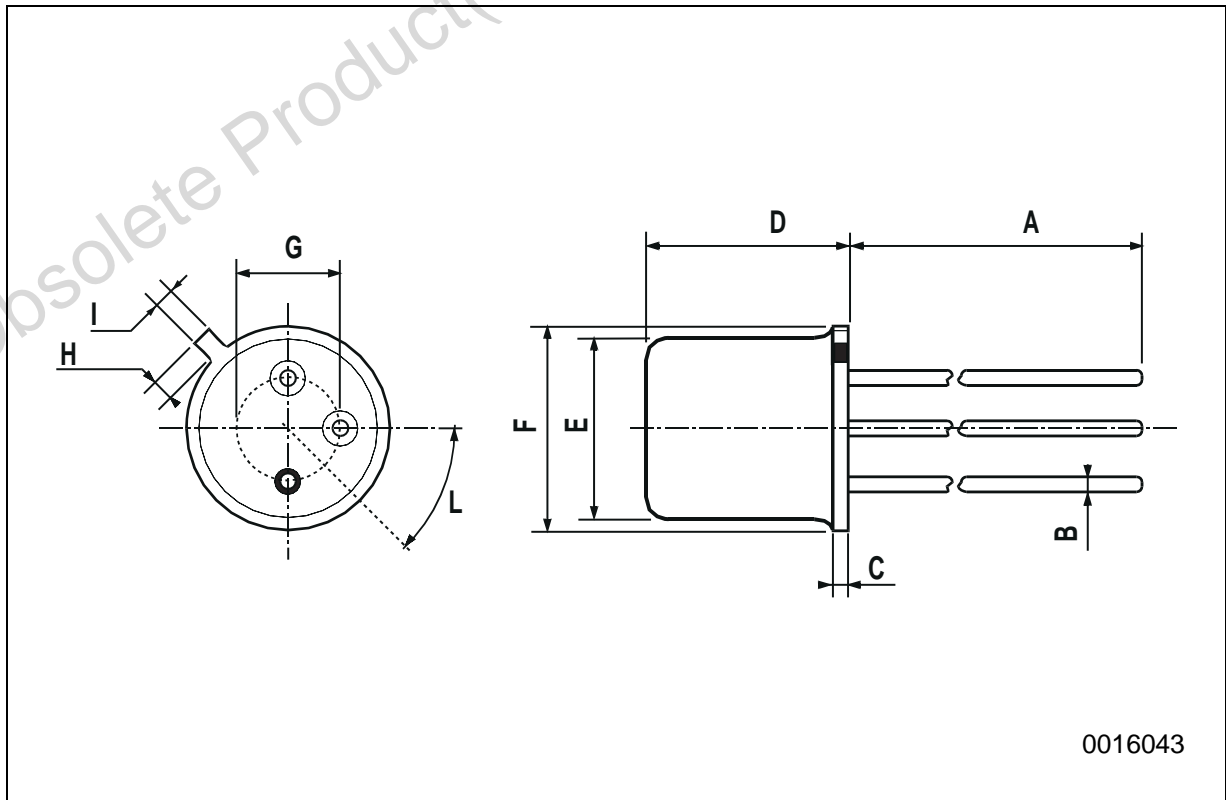


Test Circuit for  $t_{off}$ ,  $t_o$ ,  $t_f$ .



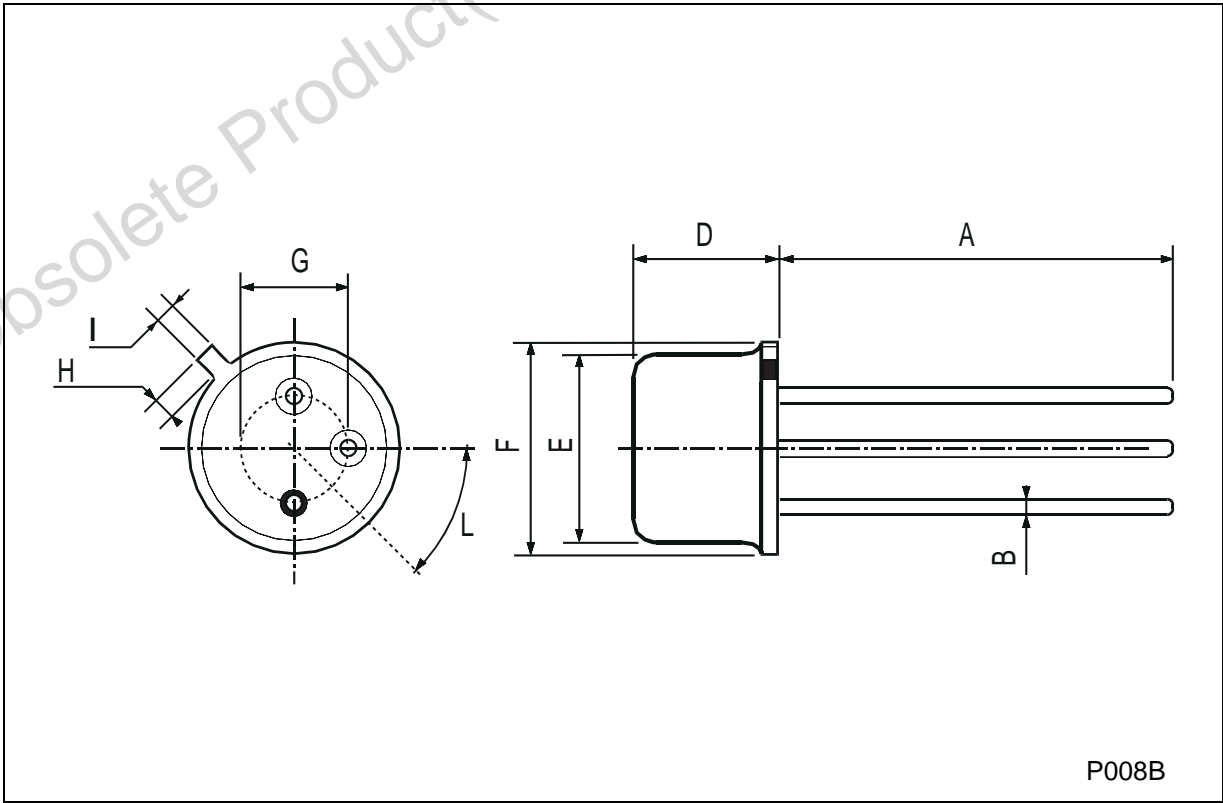
**TO-18 MECHANICAL DATA**

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |      | 12.7 |      |       | 0.500 |       |
| B    |      |      | 0.49 |       |       | 0.019 |
| D    |      |      | 5.3  |       |       | 0.208 |
| E    |      |      | 4.9  |       |       | 0.193 |
| F    |      |      | 5.8  |       |       | 0.228 |
| G    | 2.54 |      |      | 0.100 |       |       |
| H    |      |      | 1.2  |       |       | 0.047 |
| I    |      |      | 1.16 |       |       | 0.045 |
| L    | 45°  |      |      | 45°   |       |       |



**TO-39 MECHANICAL DATA**

| DIM. | mm         |      |      | inch  |      |       |
|------|------------|------|------|-------|------|-------|
|      | MIN.       | TYP. | MAX. | MIN.  | TYP. | MAX.  |
| A    | 12.7       |      |      | 0.500 |      |       |
| B    |            |      | 0.49 |       |      | 0.019 |
| D    |            |      | 6.6  |       |      | 0.260 |
| E    |            |      | 8.5  |       |      | 0.334 |
| F    |            |      | 9.4  |       |      | 0.370 |
| G    | 5.08       |      |      | 0.200 |      |       |
| H    |            |      | 1.2  |       |      | 0.047 |
| I    |            |      | 0.9  |       |      | 0.035 |
| L    | 45° (typ.) |      |      |       |      |       |



Obsolete Product(s) - Obsolete Product(s)

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. Specification 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 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>