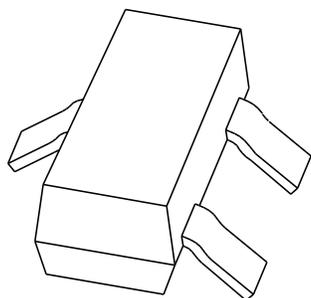


DATA SHEET



BAS678 High-speed diode

Product specification
Supersedes data of November 1993
File under Discrete Semiconductors, SC01

1996 Apr 23

High-speed diode

BAS678

FEATURES

- Small plastic SMD package
- High switching speed: max. 6 ns
- Continuous reverse voltage: max. 80 V
- Repetitive peak reverse voltage: max. 100 V
- Repetitive peak forward current: max. 600 mA
- Forward voltage: max. 1 V.

APPLICATIONS

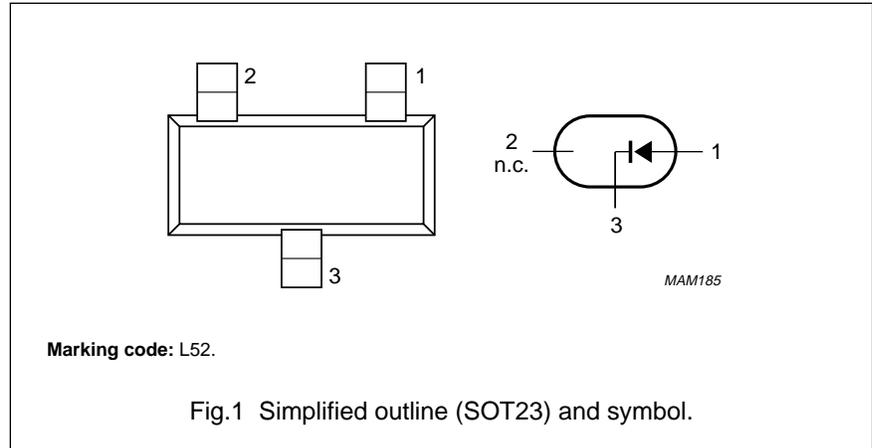
- High-speed switching in hybrid thick and thin-film circuits.

DESCRIPTION

The BAS678 is a high-speed switching diode fabricated in planar technology, and encapsulated in the small rectangular plastic SMD SOT23 package.

PINNING

| PIN | DESCRIPTION |
|-----|---------------|
| 1 | anode |
| 2 | not connected |
| 3 | cathode |



LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|-------------------------------------|--|------|---------------|-------------|
| V_{RRM} | repetitive peak reverse voltage | | – | 100 | V |
| V_R | continuous reverse voltage | | – | 80 | V |
| I_F | continuous forward current | see Fig.2; note 1 | – | 250 | mA |
| I_{FRM} | repetitive peak forward current | | – | 600 | mA |
| I_{FSM} | non-repetitive peak forward current | square wave; $T_j = 25\text{ °C}$ prior to surge; see Fig.4 $t = 1\ \mu\text{s}$ $t = 100\ \mu\text{s}$ $t = 10\ \text{ms}$ | – | 9 3 1.7 | A A A |
| P_{tot} | total power dissipation | $T_{amb} = 25\text{ °C}$; note 1 | – | 250 | mW |
| T_{stg} | storage temperature | | –65 | +150 | °C |
| T_j | junction temperature | | – | 150 | °C |

Note

1. Device mounted on an FR4 printed-circuit board.

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ELECTRICAL CHARACTERISTICS $T_j = 25\text{ °C}$; unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|----------|--------------------------|--|------|-----------------|---------------------------|
| V_F | forward voltage | see 3; $I_F = 200\text{ mA}$; d.c.; note 1 | – | 1.0 | V |
| I_R | reverse current | see Fig.5 $V_R = 10\text{ V}$ $V_R = 75\text{ V}$ $V_R = 75\text{ V}$; $T_j = 150\text{ °C}$ | – | 15 100 50 | nA nA μA |
| C_d | diode capacitance | $f = 1\text{ MHz}$; $V_R = 0$; see Fig.6 | – | 2 | pF |
| t_{rr} | reverse recovery time | when switched from $I_F = 400\text{ mA}$ to $I_R = 400\text{ mA}$; $R_L = 100\ \Omega$; measured at $I_R = 40\text{ mA}$; see Fig.7 | – | 6 | ns |
| V_{fr} | forward recovery voltage | when switched from $I_F = 10\text{ mA}$; $t_r = 20\text{ ns}$; see Fig.8 | – | 2 | V |

Note

- $T_{amb} = 25\text{ °C}$; device has reached the thermal equilibrium when mounted on an FR4 printed-circuit board.

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------|---|------------|-------|------|
| $R_{th\ j-tp}$ | thermal resistance from junction to tie-point | | 330 | K/W |
| $R_{th\ j-a}$ | thermal resistance from junction to ambient | note 1 | 500 | K/W |

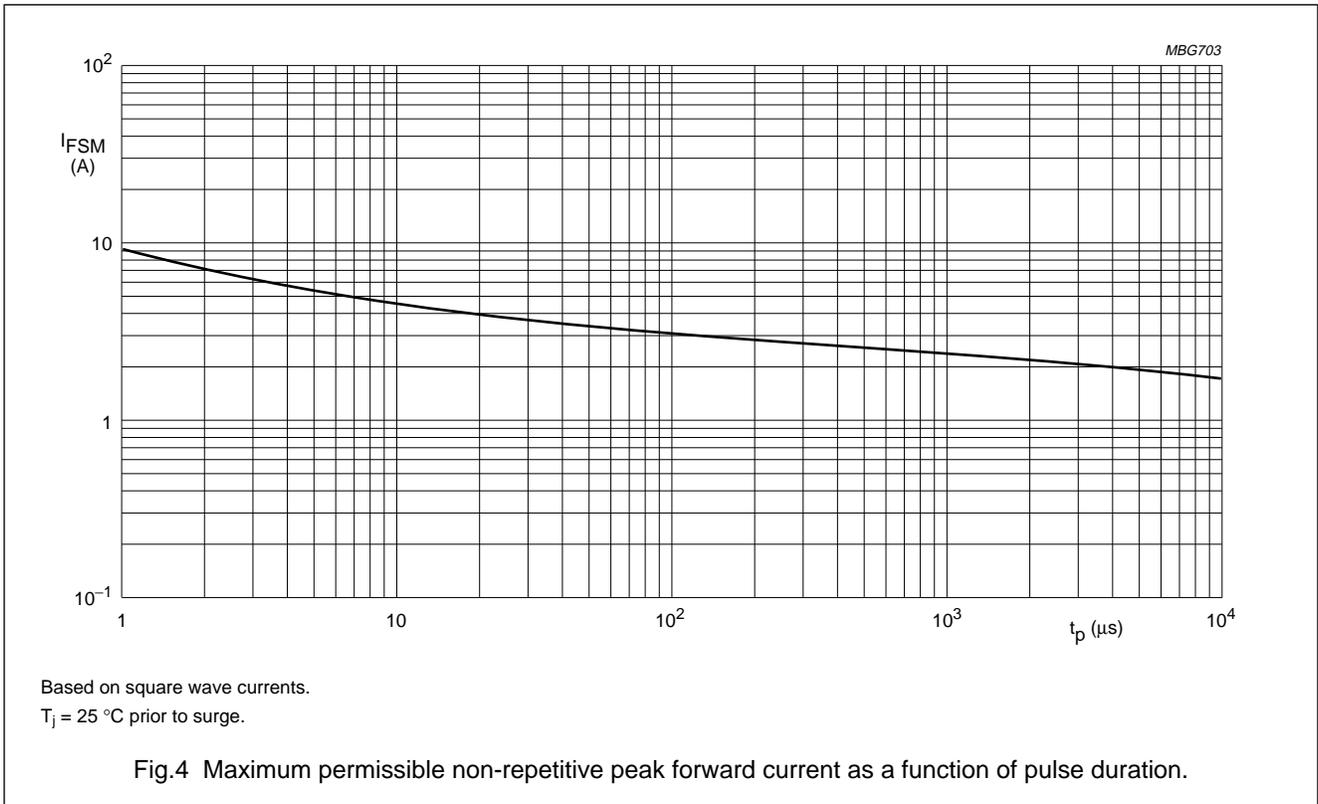
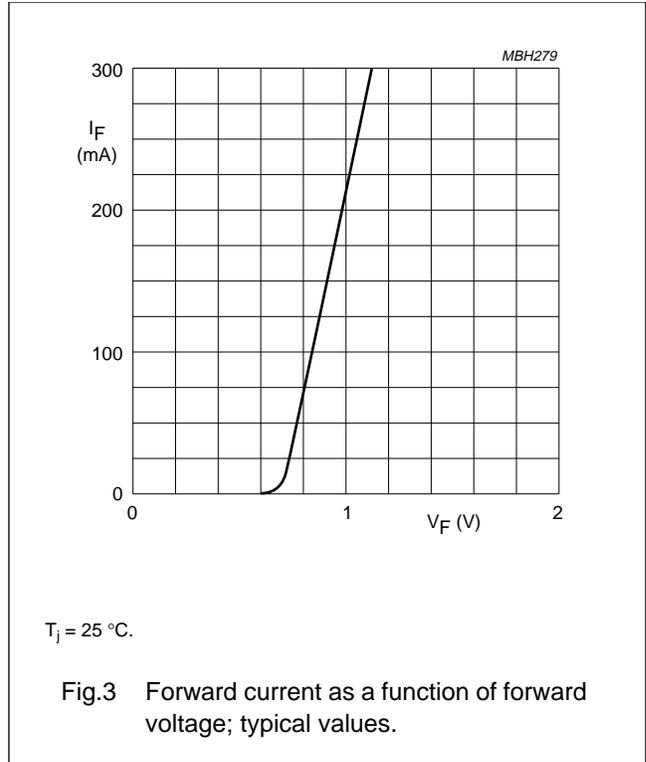
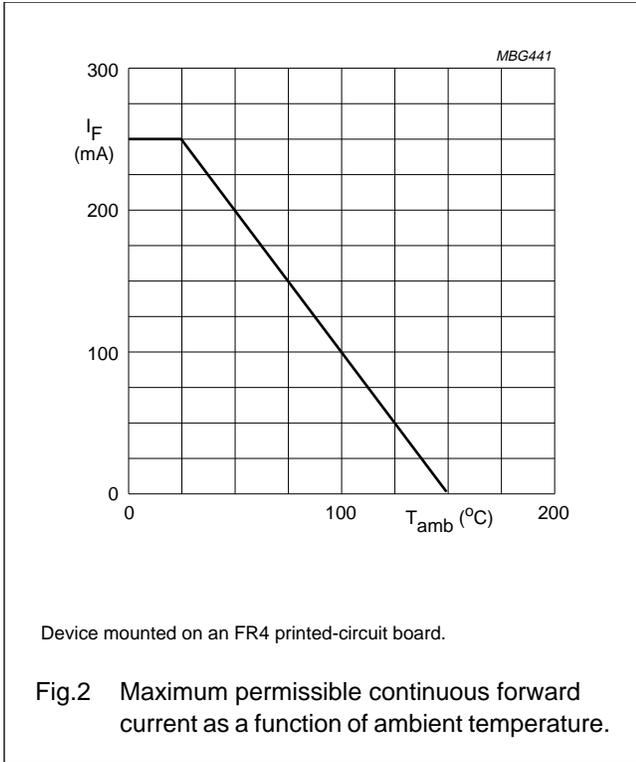
Note

- Device mounted on an FR4 printed-circuit board.

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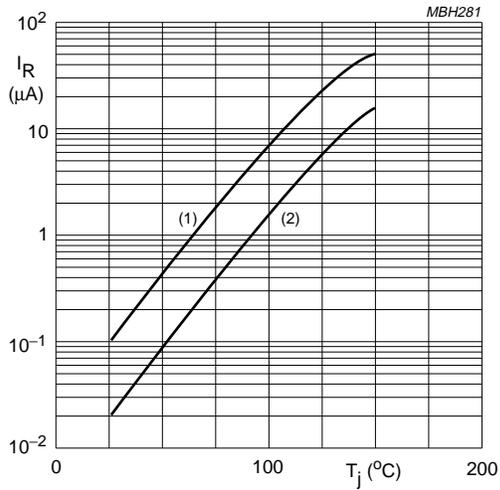
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GRAPHICAL DATA



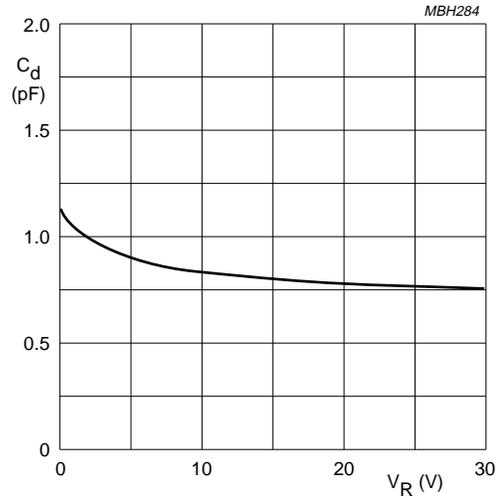
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- (1) $V_R = 75 \text{ V}$; maximum values.
- (2) $V_R = 75 \text{ V}$; typical values.

Fig.5 Reverse current as a function of junction temperature.

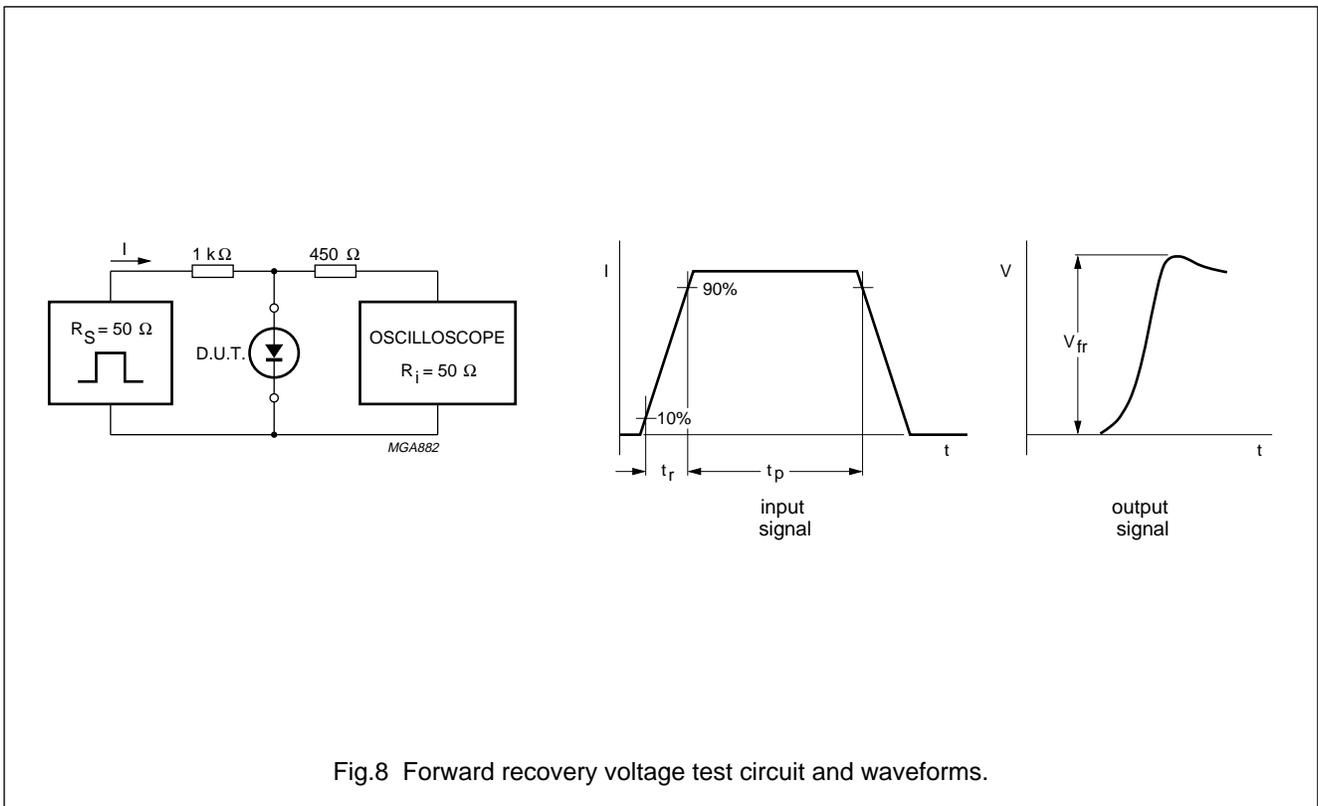
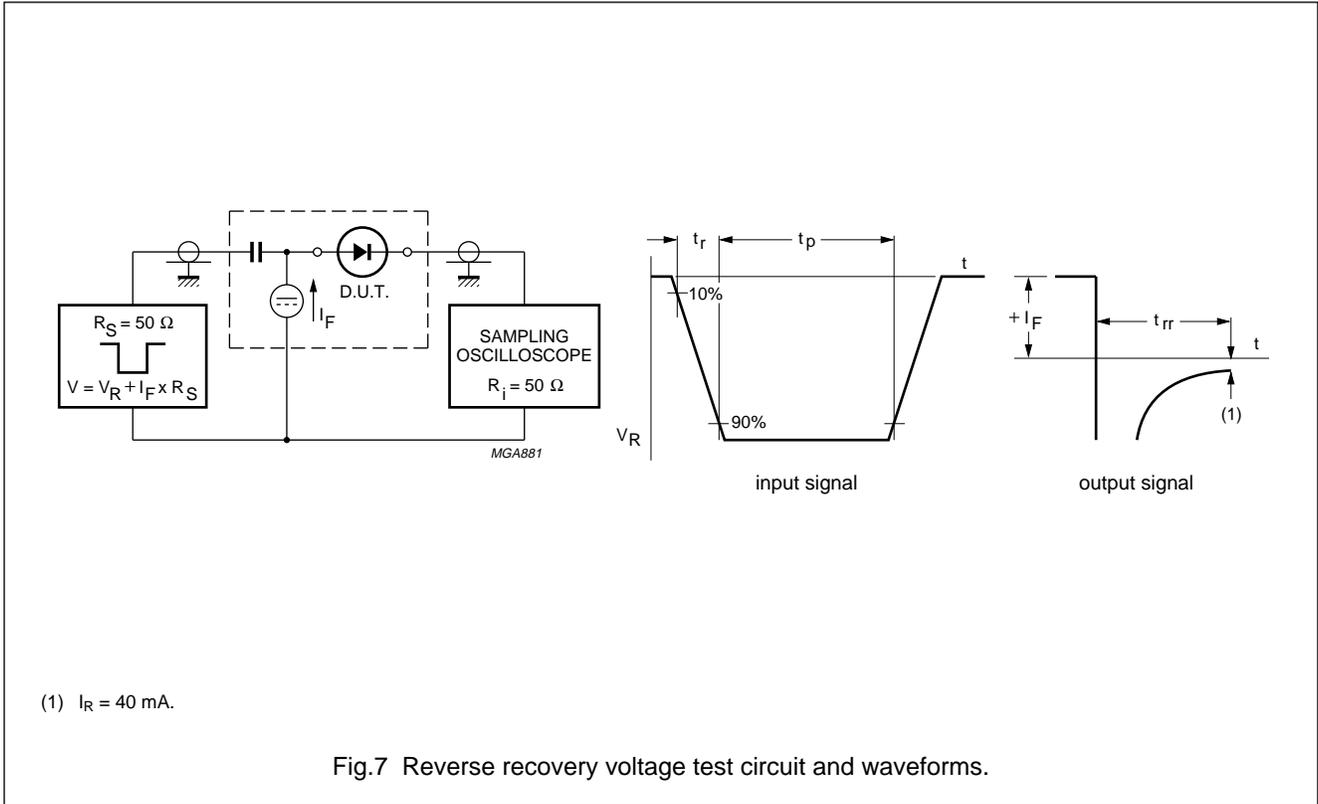


$f = 1 \text{ MHz}$; $T_j = 25 \text{ }^\circ\text{C}$.

Fig.6 Diode capacitance as a function of reverse voltage; typical values.

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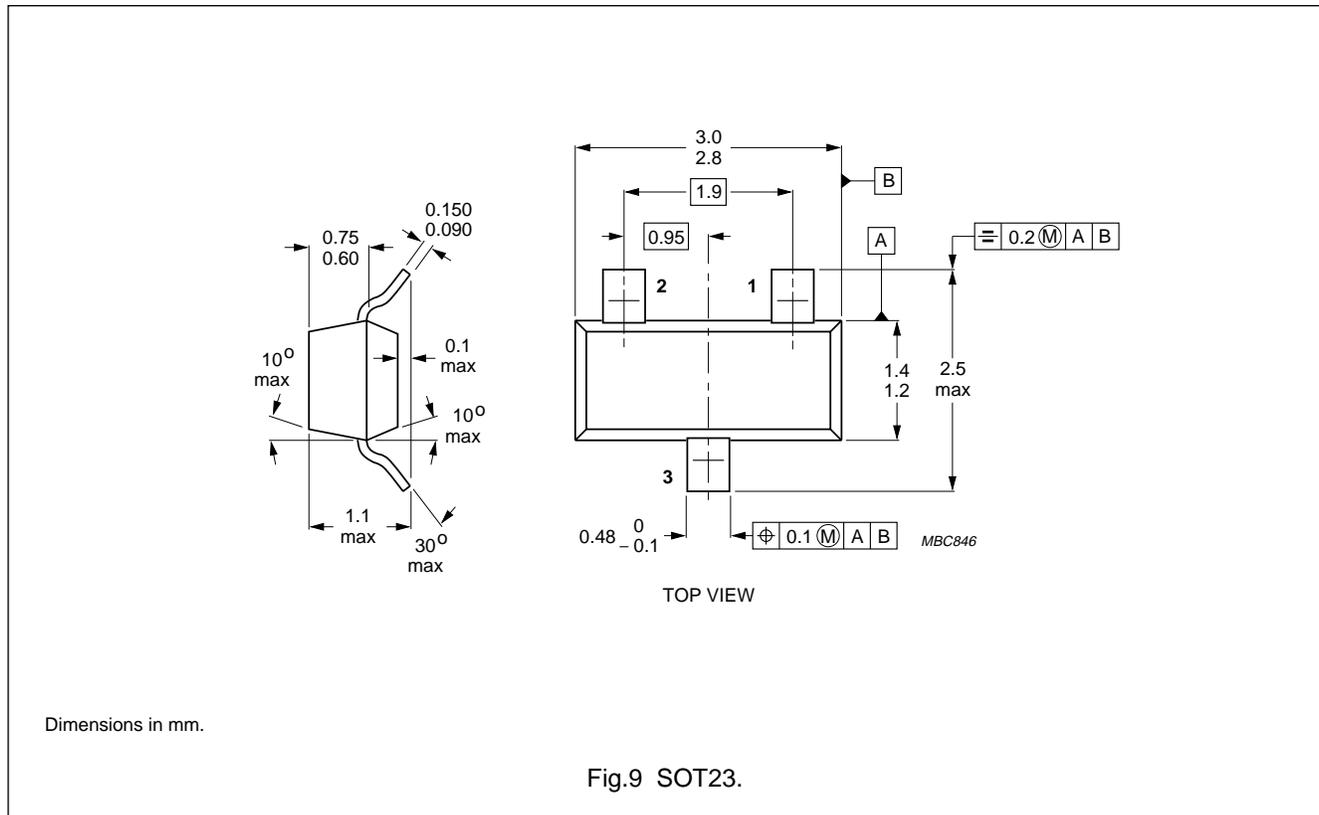
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PACKAGE OUTLINE



DEFINITIONS

| Data Sheet Status | |
|---|---|
| Objective specification | This data sheet contains target or goal specifications for product development. |
| Preliminary specification | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification | This data sheet contains final product specifications. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.