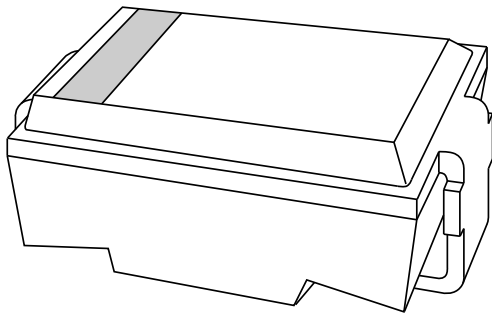


DATA SHEET



BYG50 series Controlled avalanche rectifiers

Preliminary specification
File under Discrete Semiconductors, SC01

1996 May 24

Controlled avalanche rectifiers

BYG50 series

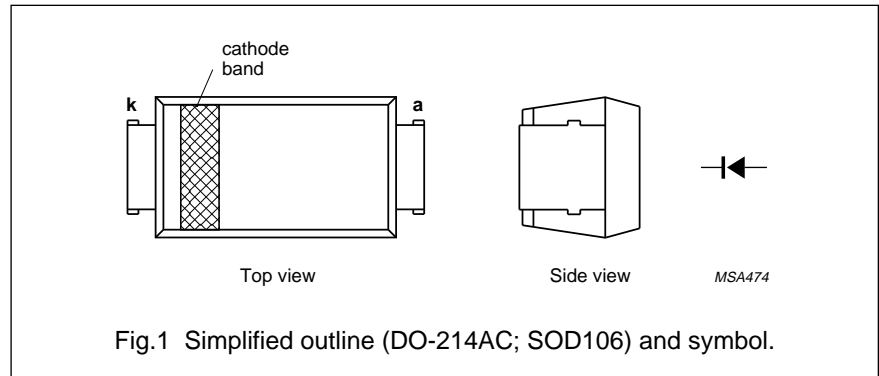
FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

DESCRIPTION

DO-214AC; SOD106 surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.



LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|--------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------|------|------|
| V _{RRM} | repetitive peak reverse voltage | | | | |
| | BYG50D | | – | 200 | V |
| | BYG50G | | – | 400 | V |
| | BYG50J | | – | 600 | V |
| | BYG50K | | – | 800 | V |
| | BYG50M | | – | 1000 | V |
| V _R | continuous reverse voltage | | | | |
| | BYG50D | | – | 200 | V |
| | BYG50G | | – | 400 | V |
| | BYG50J | | – | 600 | V |
| | BYG50K | | – | 800 | V |
| | BYG50M | | – | 1000 | V |
| I _{F(AV)} | average forward current | averaged over any 20 ms period; T _{TP} = 100 °C; see Fig.2 | – | 2.1 | A |
| | | averaged over any 20 ms period; Al ₂ O ₃ PCB mounting (see Fig.7); T _{amb} = 60 °C; see Fig.3 | – | 1.0 | A |
| | | averaged over any 20 ms period; epoxy PCB mounting (see Fig.7); T _{amb} = 60 °C; see Fig.3 | – | 0.7 | A |
| I _{FSM} | non-repetitive peak forward current | t = 10 ms half sinewave; T _j = T _{j,max} prior to surge; V _R = V _{RRMmax} | – | 30 | A |

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| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|----------------------------------------------|----------------------------------------------------------------------------------------------|------|------|------|
| E_{RSM} | non-repetitive peak reverse avalanche energy | $L = 120 \text{ mH}$; $T_j = T_{j \text{ max}}$ prior to surge; inductive load switched off | – | 10 | mJ |
| | BYG50D to J | | | | |
| | BYG50K and M | | – | 7 | mJ |
| T_{stg} | storage temperature | | –65 | +175 | °C |
| T_j | junction temperature | see Fig.4 | –65 | +175 | °C |

ELECTRICAL CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT | | | | |
|-------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------|------|------|------|------|--------|-----|---|---|
| V_F | forward voltage | $I_F = 1 \text{ A}$; $T_j = T_{j \text{ max}}$; see Fig.5 | – | – | 0.85 | V | | | | |
| | | $I_F = 1 \text{ A}$; see Fig.5 | – | – | 1.00 | V | | | | |
| $V_{(BR)R}$ | reverse avalanche breakdown voltage | $I_R = 0.1 \text{ mA}$ | | | | V | | | | |
| | | | | | | | BYG50D | 300 | – | – |
| | | | | | | | BYG50G | 500 | – | – |
| | | | | | | | BYG50J | 700 | – | – |
| | | | | | | | BYG50K | 900 | – | – |
| BYG50M | 1100 | – | – | | | | | | | |
| I_R | reverse current | $V_R = V_{RRM \text{ max}}$; see Fig.6 | – | – | 1 | μA | | | | |
| | | $V_R = V_{RRM \text{ max}}$; $T_j = 165 \text{ °C}$; see Fig.6 | – | – | 100 | μA | | | | |
| t_{rr} | reverse recovery time | when switched from $I_F = 0.5 \text{ A}$ to $I_R = 1 \text{ A}$; measured at $I_R = 0.25 \text{ A}$; see Fig.8 | – | 2 | – | μs | | | | |

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|-----------------------|-----------------------------------------------|------------|-------|------|
| $R_{th \text{ j-tp}}$ | thermal resistance from junction to tie-point | | 25 | K/W |
| $R_{th \text{ j-a}}$ | thermal resistance from junction to ambient | note 1 | 100 | K/W |
| | | note 2 | 150 | K/W |

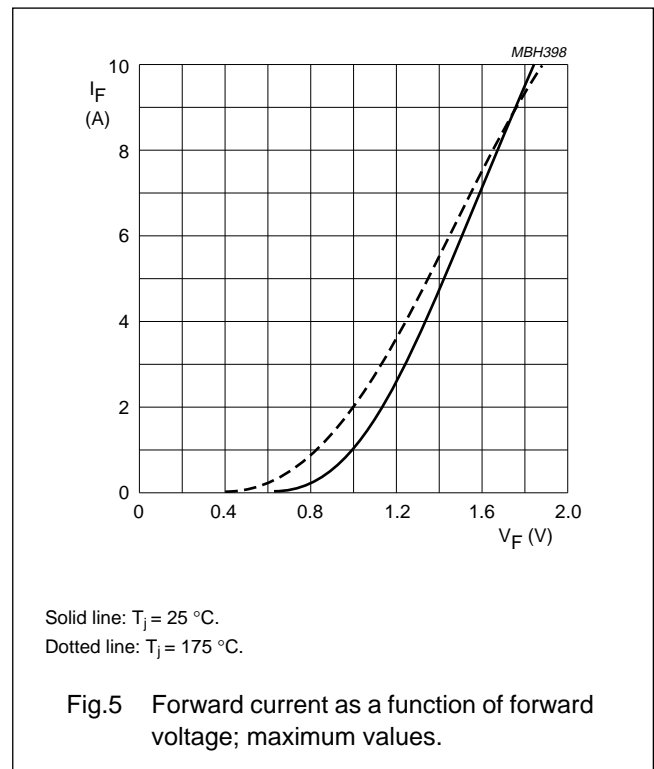
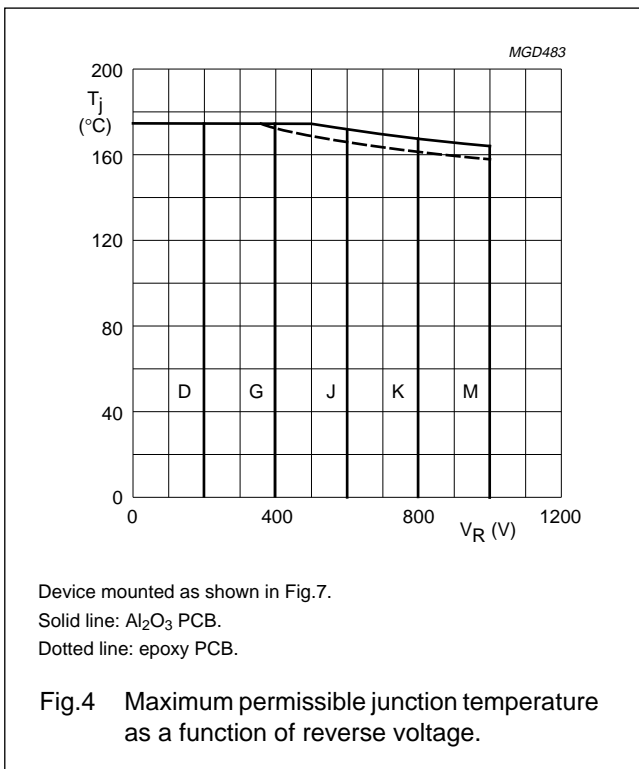
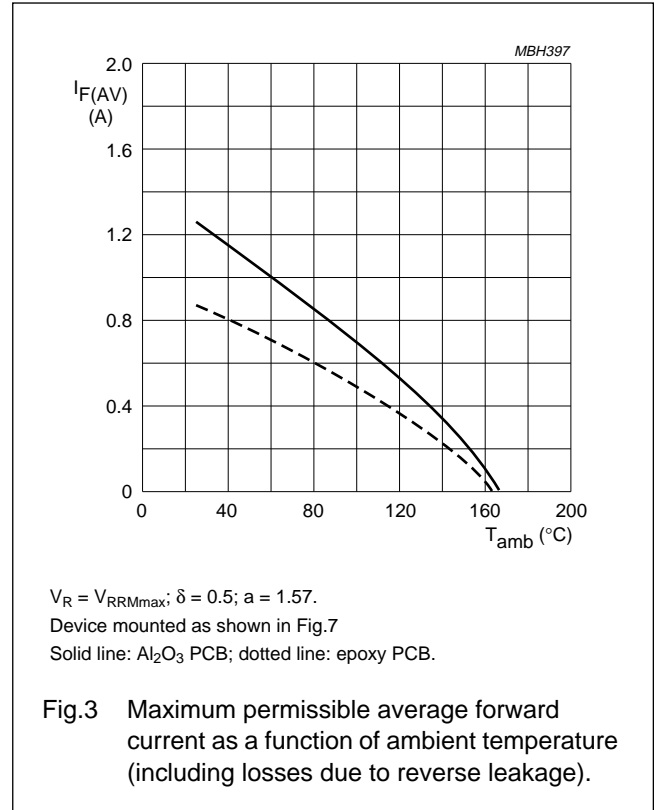
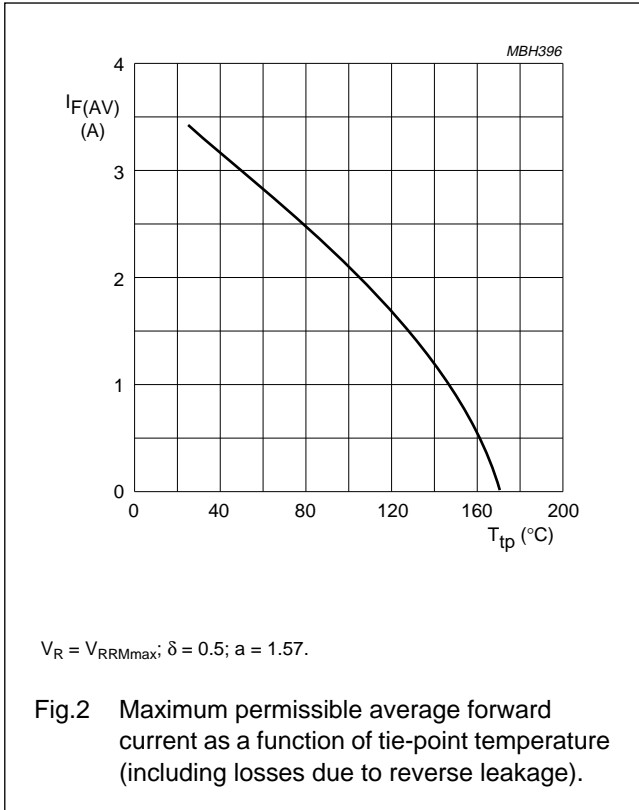
Notes

1. Device mounted on Al_2O_3 printed-circuit board, 0.7 mm thick; thickness of copper $\geq 35 \text{ μm}$, see Fig.7.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper $\geq 40 \text{ μm}$, see Fig.7.
For more information please refer to the "General Part of Handbook SC01".

Controlled avalanche rectifiers

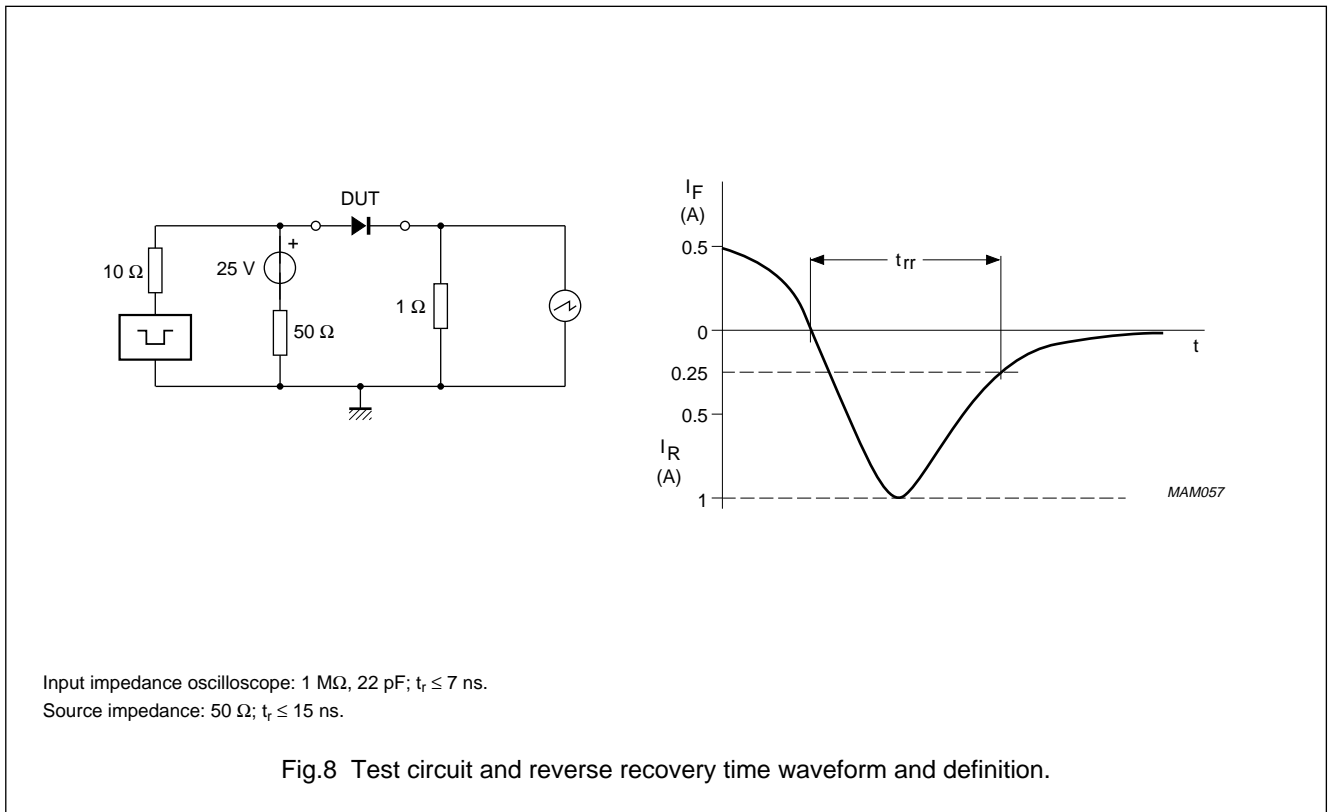
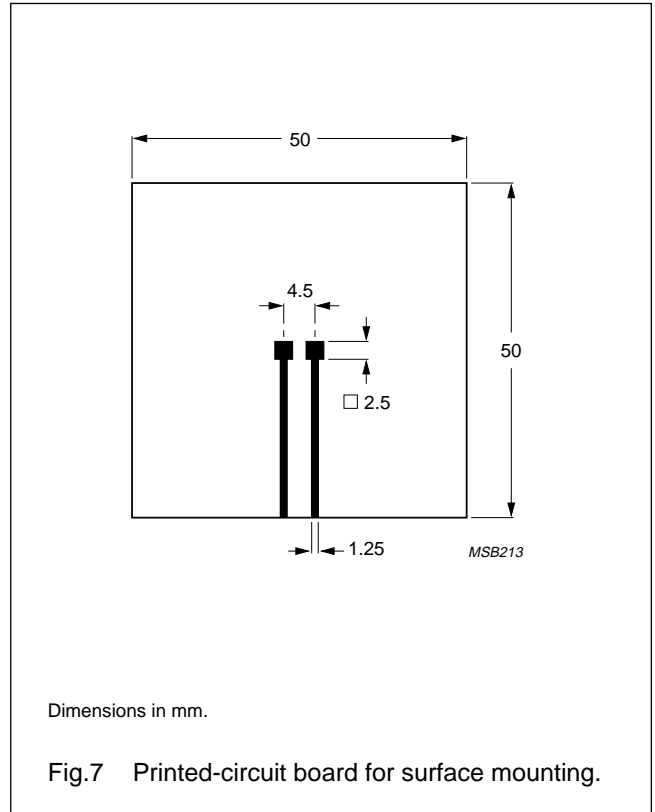
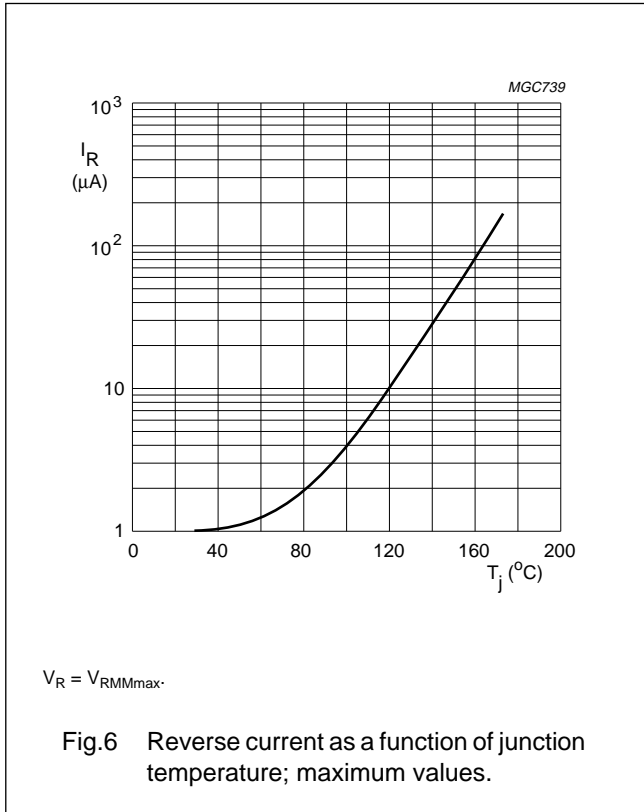
BYG50 series

GRAPHICAL DATA



Controlled avalanche rectifiers

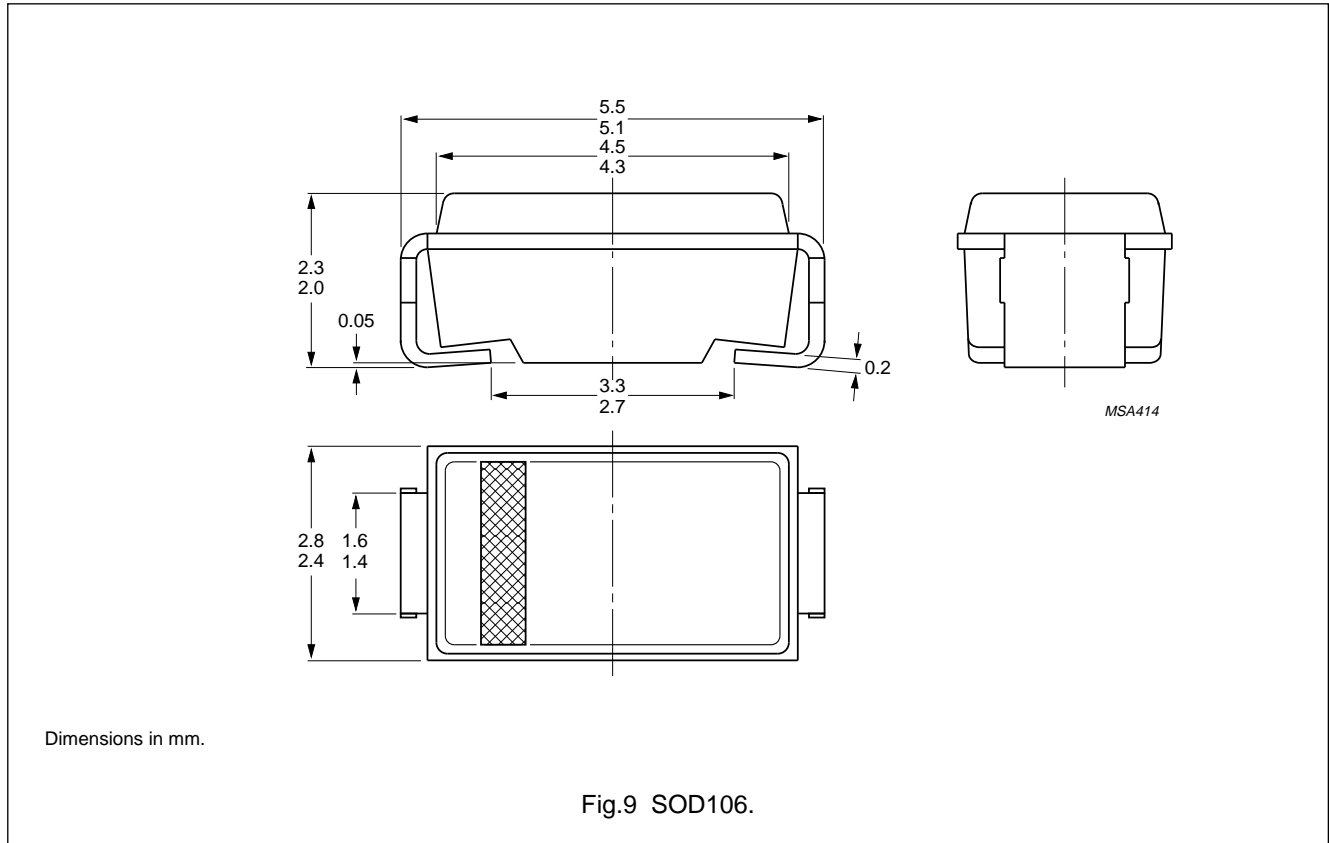
BYG50 series



Controlled avalanche rectifiers

BYG50 series

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.