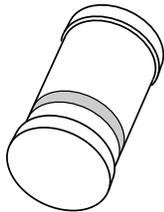


# DATA SHEET



## **BYD57 series** Fast soft-recovery controlled avalanche rectifiers

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

1996 Jun 05

# Fast soft-recovery controlled avalanche rectifiers

## BYD57 series

### FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Shipped in 8 mm embossed tape
- Smallest surface mount rectifier outline.

### DESCRIPTION

Cavity free cylindrical glass SOD87 package through Implotec™<sup>(1)</sup> technology. This package is

hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

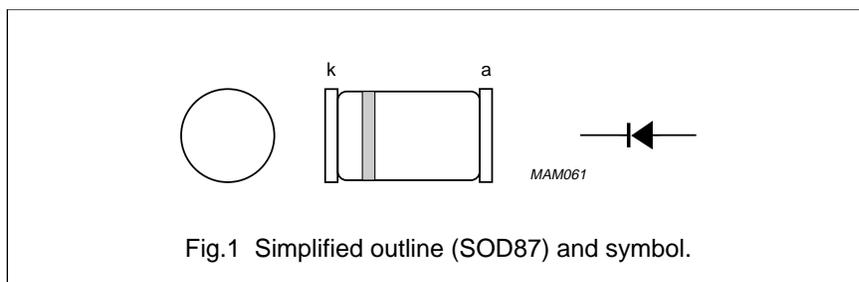


Fig.1 Simplified outline (SOD87) and symbol.

### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{RRM}$	repetitive peak reverse voltage				
	BYD57D		–	200	V
	BYD57G		–	400	V
	BYD57J		–	600	V
	BYD57K		–	800	V
	BYD57M		–	1000	V
$V_R$	continuous reverse voltage				
	BYD57D		–	200	V
	BYD57G		–	400	V
	BYD57J		–	600	V
	BYD57K		–	800	V
	BYD57M		–	1000	V
$I_{F(AV)}$	average forward current	$T_{tp} = 85\text{ °C}$ ; see Fig.2; averaged over any 20 ms period; see also Fig.6	–	1.0	A
		$T_{amb} = 60\text{ °C}$ ; PCB mounting (see Fig.11); see Fig.3; averaged over any 20 ms period; see also Fig.6	–	0.4	A
$I_{FRM}$	repetitive peak forward current	$T_{tp} = 85\text{ °C}$ ; see Fig.4	–	8.5	A
		$T_{amb} = 60\text{ °C}$ ; see Fig.5	–	3.0	A
$I_{FSM}$	non-repetitive peak forward current	$t = 10\text{ ms}$ half sinewave; $T_j = 25\text{ °C}$ prior to surge; $V_R = V_{RRMmax}$	–	5.0	A
$E_{RSM}$	non-repetitive peak reverse avalanche energy	$L = 120\text{ mH}$ ; $T_j = T_{jmax}$ prior to surge; inductive load switched off	–	10	mJ
$T_{stg}$	storage temperature		–65	+175	°C
$T_j$	junction temperature	see Fig.7	–65	+175	°C

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### ELECTRICAL CHARACTERISTICS

$T_j = 25\text{ }^\circ\text{C}$  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.8	–	–	2.1	V	
		$I_F = 1\text{ A}$ ; see Fig.8	–	–	3.6	V	
$V_{(BR)R}$	reverse avalanche breakdown voltage	$I_R = 0.1\text{ mA}$					
			BYD57D	300	–	–	V
			BYD57G	500	–	–	V
			BYD57J	700	–	–	V
			BYD57K	900	–	–	V
BYD57M	1100	–	–	V			
$I_R$	reverse current	$V_R = V_{RRM\text{ max}}$ ; see Fig.9	–	–	5	$\mu\text{A}$	
		$V_R = V_{RRM\text{ max}}$ ; $T_j = 165\text{ }^\circ\text{C}$ ; see Fig.9	–	–	100	$\mu\text{A}$	
$t_{rr}$	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.12					
			BYD57D to J	–	–	30	ns
	BYD57K and M	–	–	75	ns		
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; $V_R = 0\text{ V}$ ; see Fig.10	–	20	–	pF	
$\left  \frac{dI_R}{dt} \right $	maximum slope of reverse recovery current	when switched from $I_F = 1\text{ A}$ to $V_R \geq 30\text{ V}$ and $dI_F/dt = -1\text{ A}/\mu\text{s}$ ; see Fig.13					
			BYD57D to J	–	–	7	A/ $\mu\text{s}$
	BYD57K and M	–	–	6	A/ $\mu\text{s}$		

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-tp}}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\ j\text{-a}}$	thermal resistance from junction to ambient	note 1	150	K/W

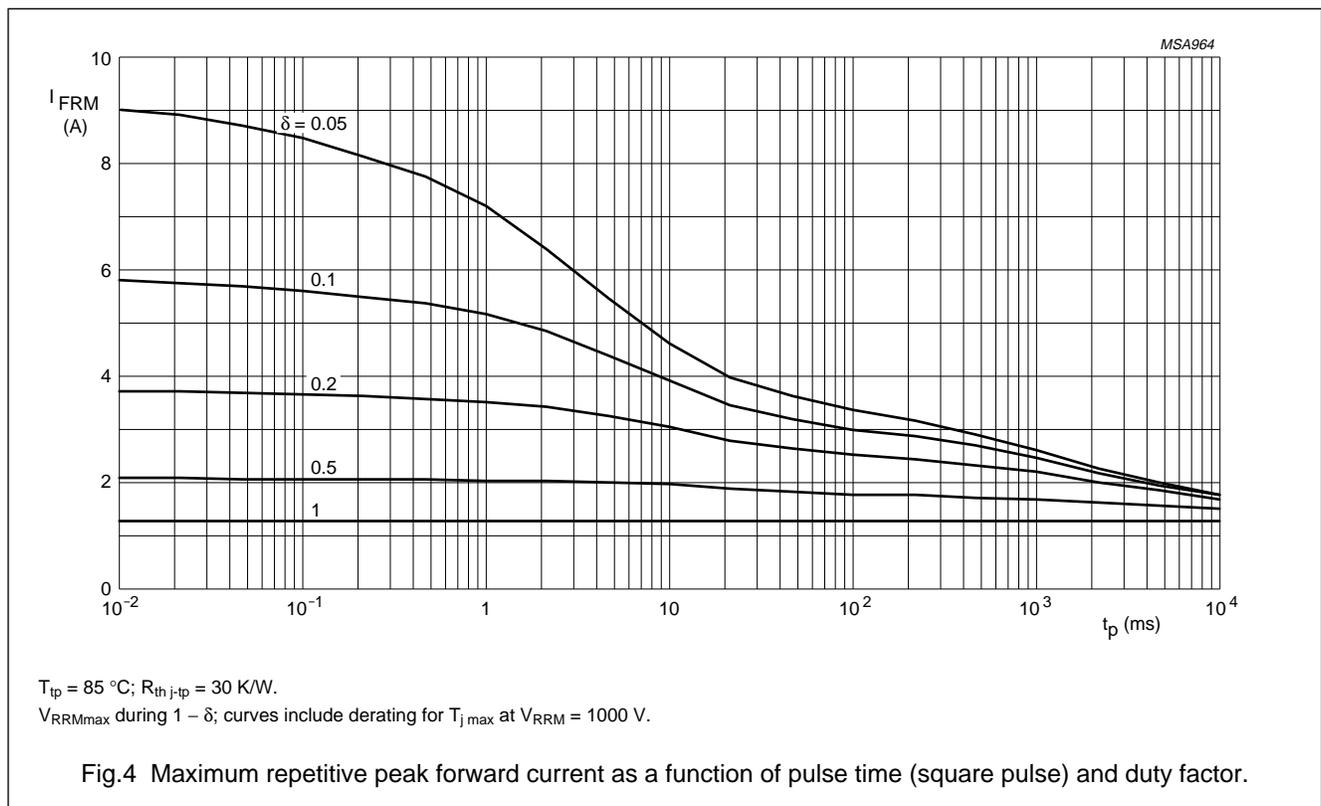
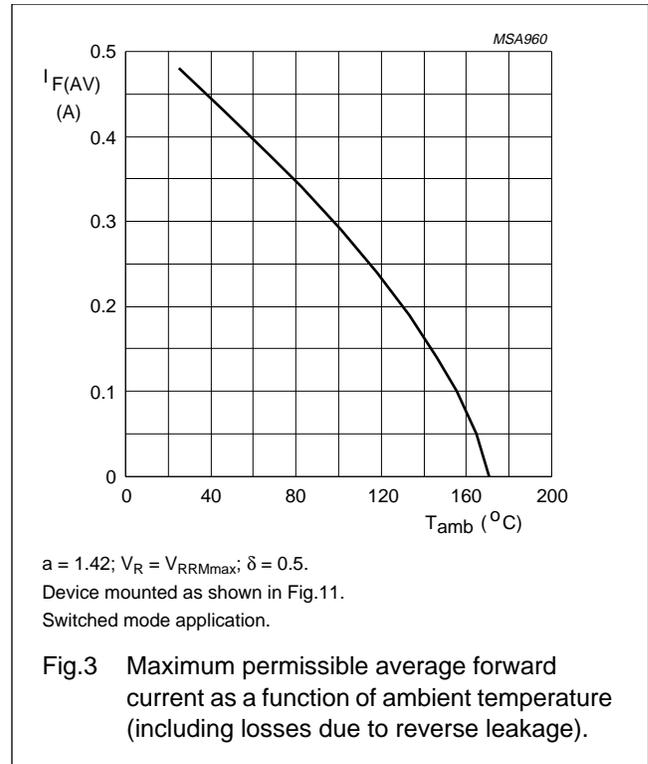
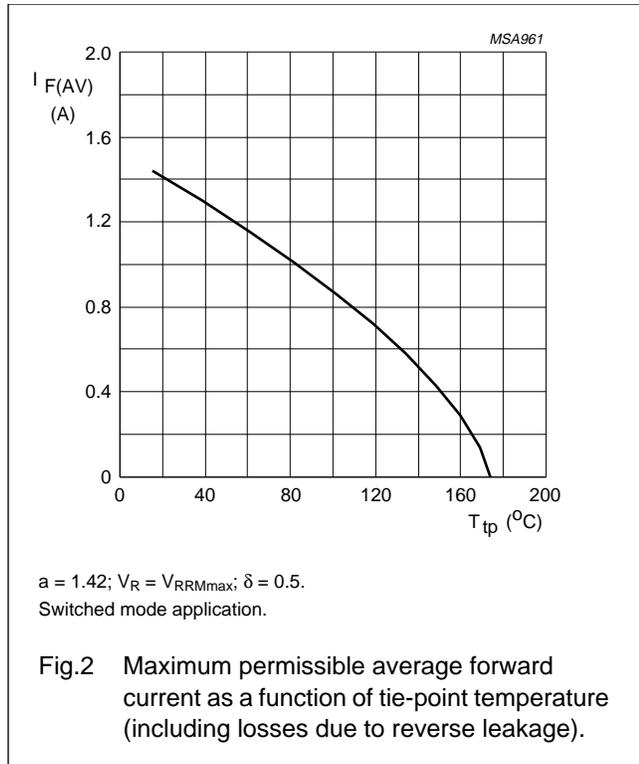
#### Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer  $\geq 40\text{ }\mu\text{m}$ , see Fig.11. For more information please refer to the 'General Part of Handbook SC01'.

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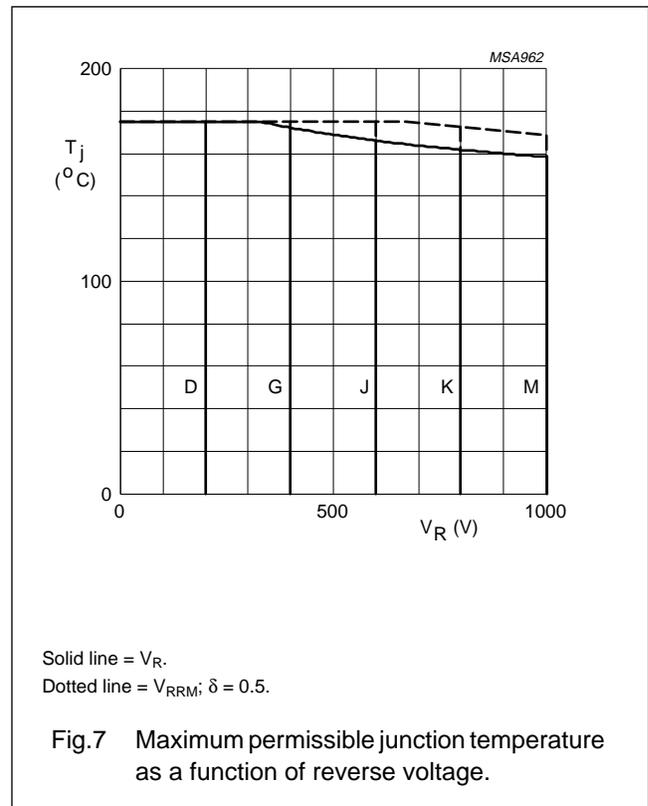
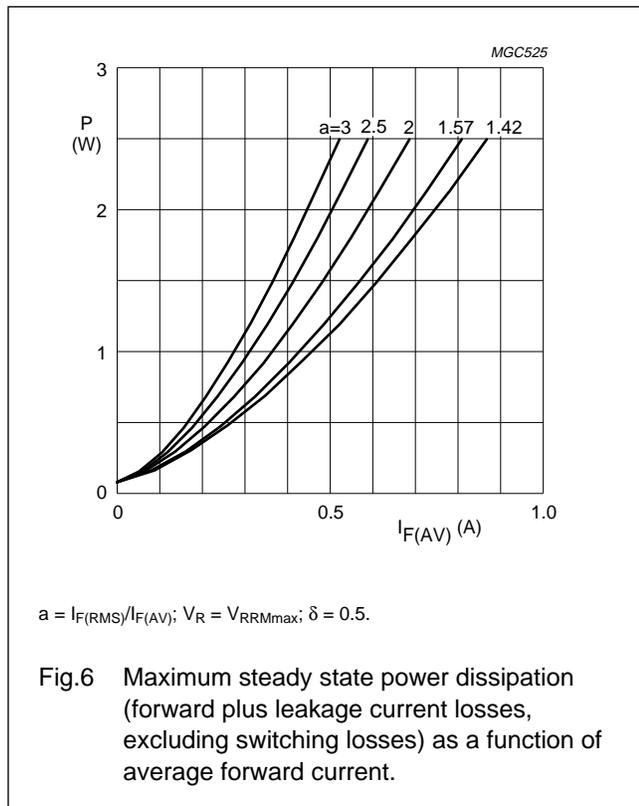
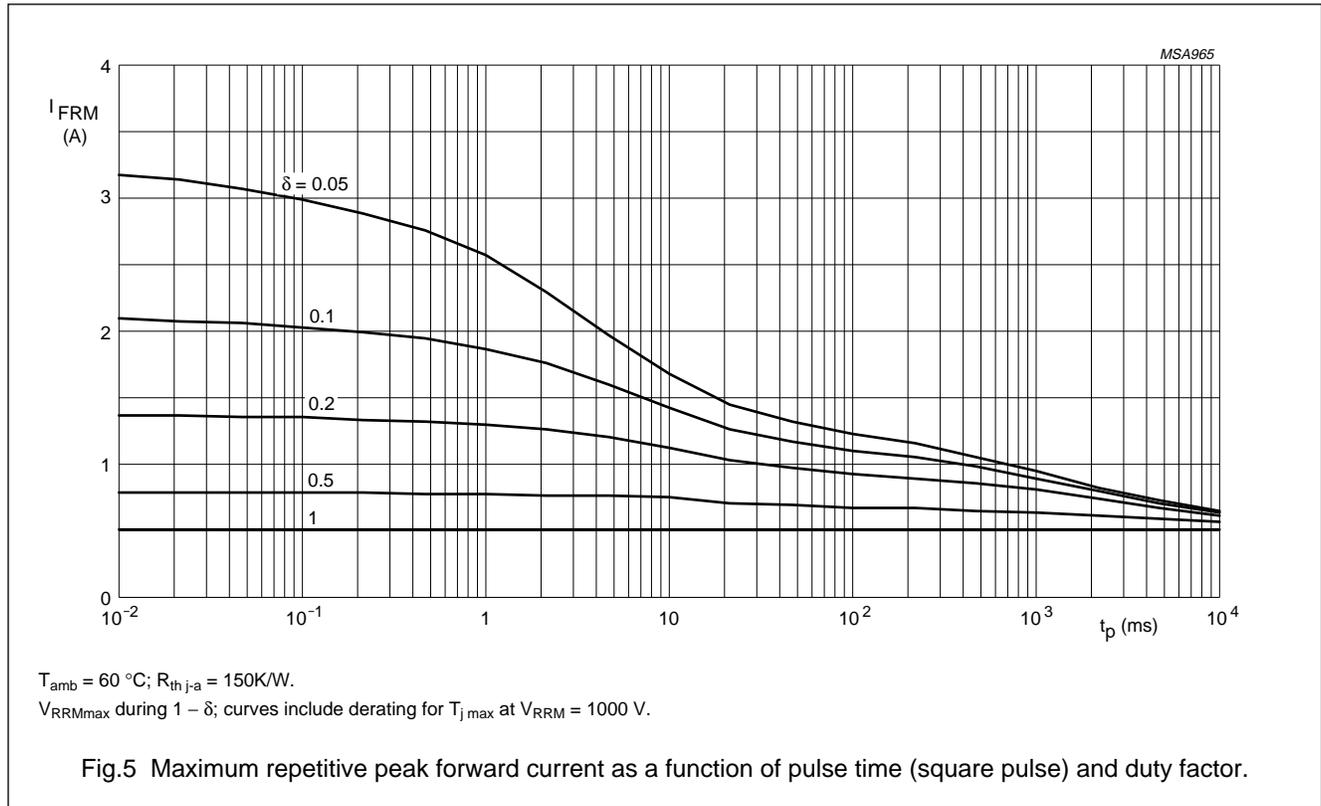
BYD57 series

GRAPHICAL DATA



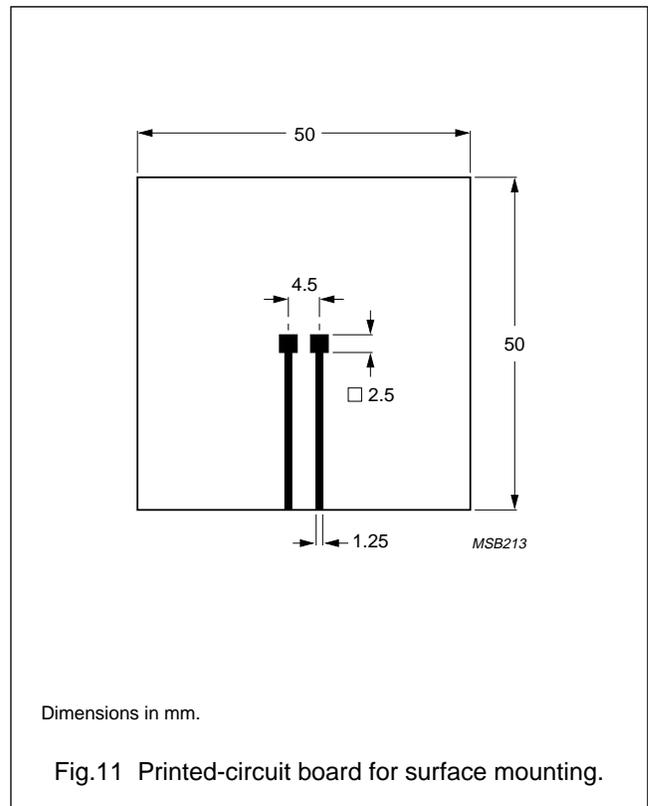
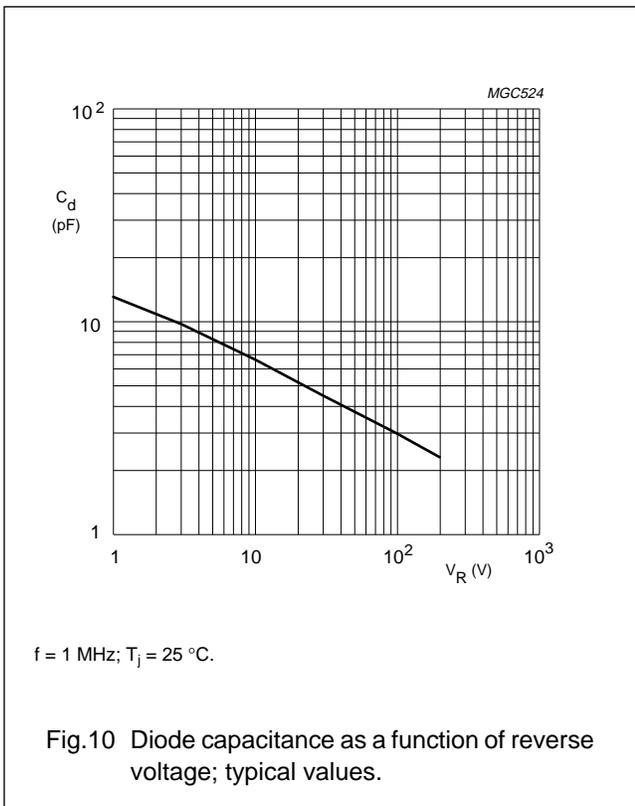
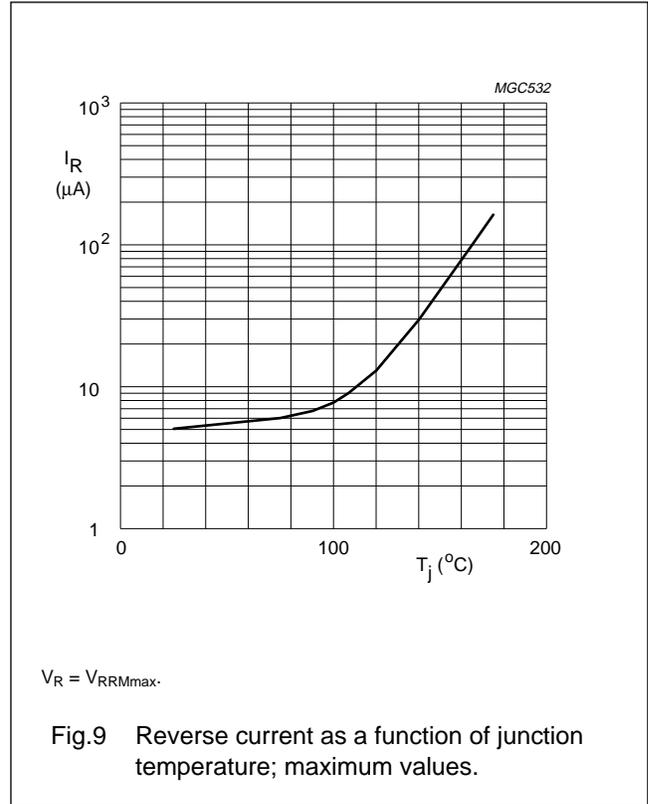
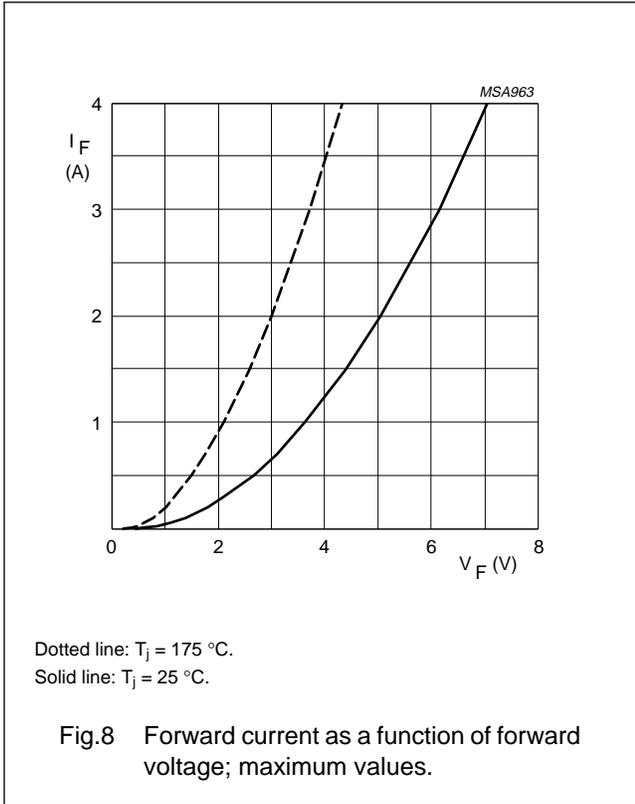
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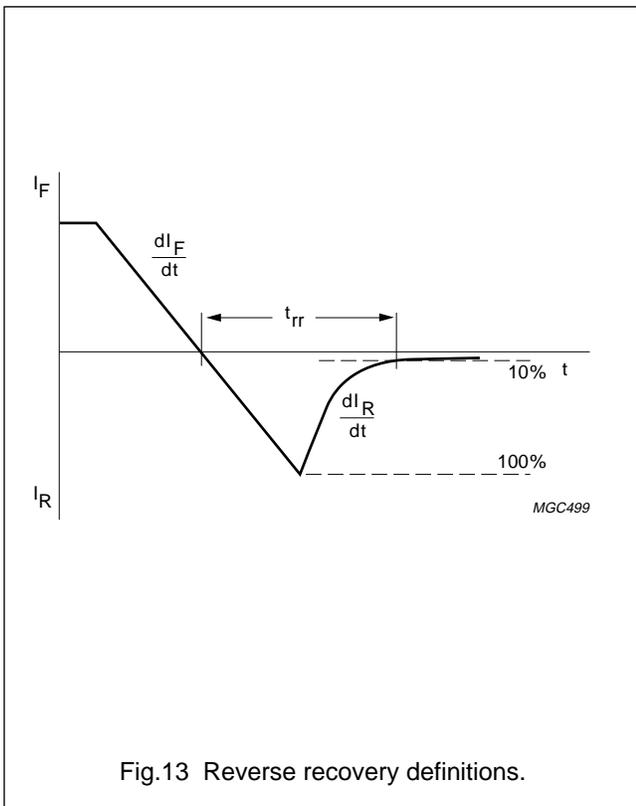
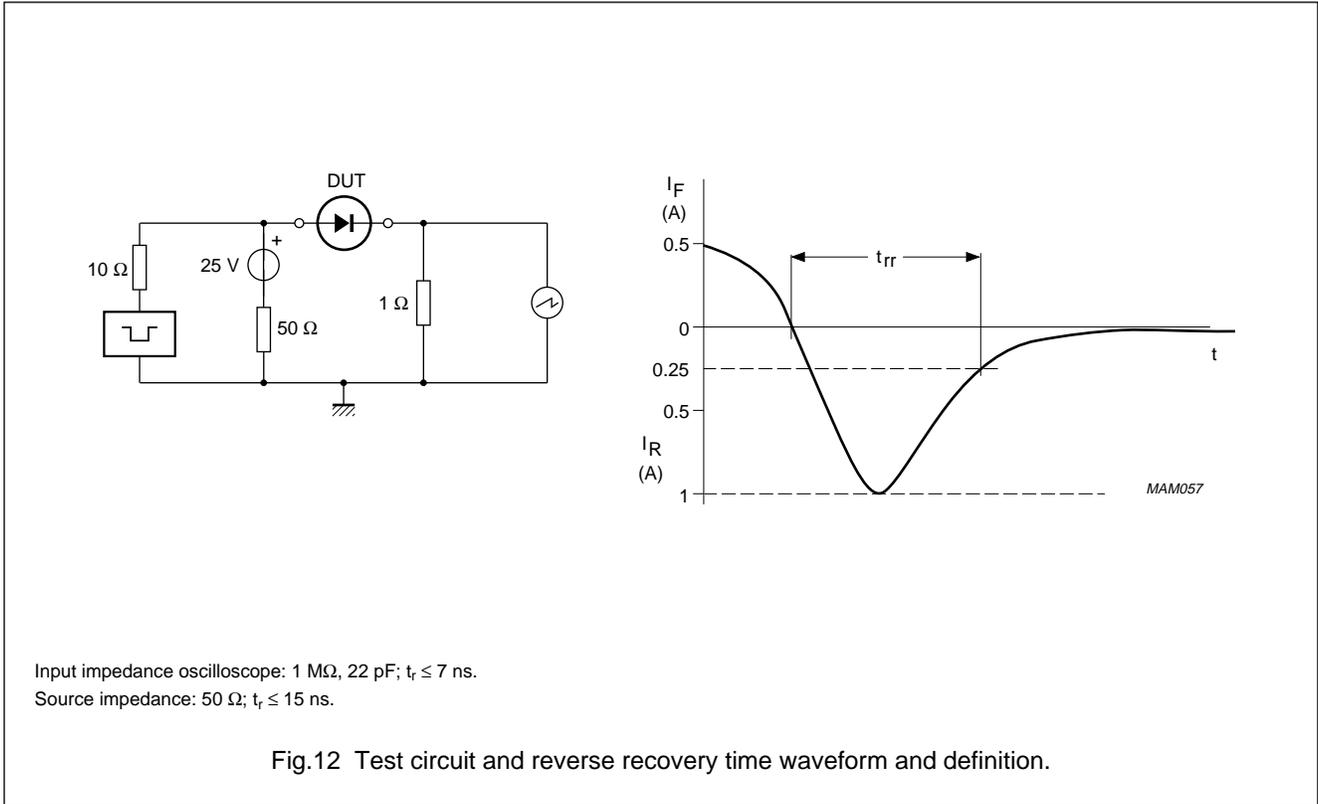
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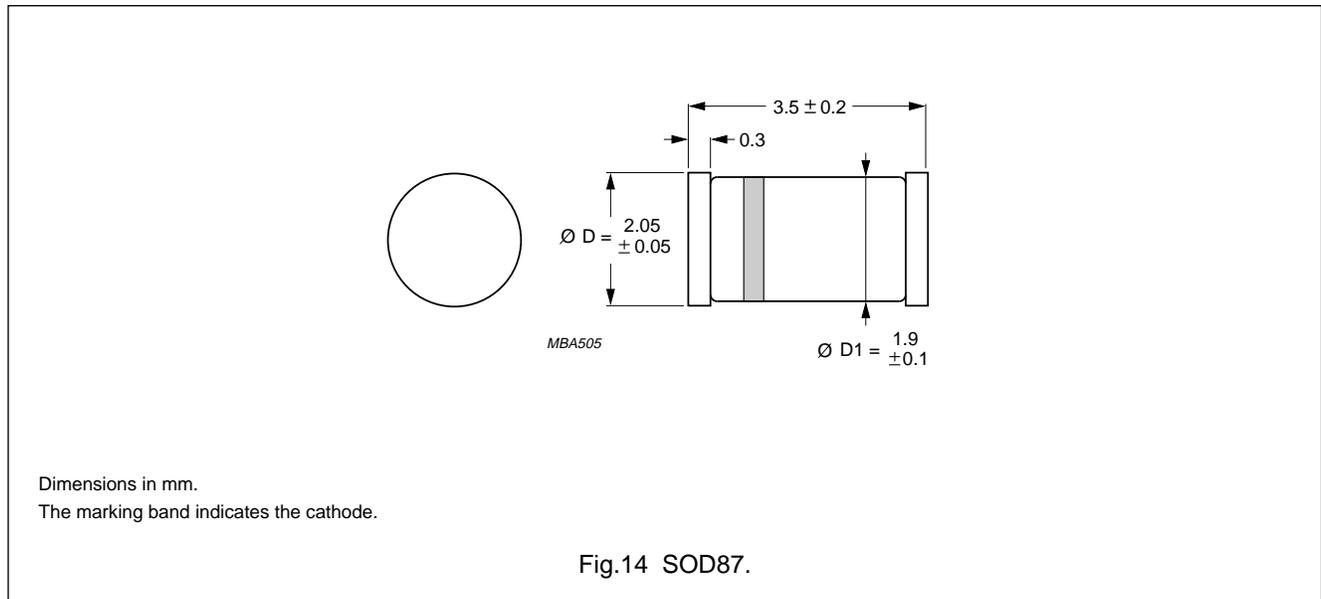
## BYD57 series



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PACKAGE OUTLINE



DEFINITIONS

<b>Data Sheet Status</b>	
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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
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.