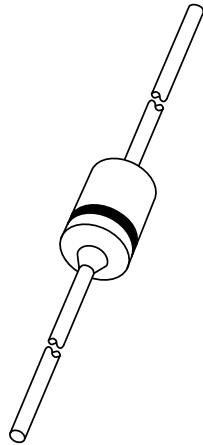


# DATA SHEET



## **BYD53 series**

**Fast soft-recovery controlled  
avalanche rectifiers**

Product specification  
Supersedes data of 1996 Sep 18

1998 Dec 04

## Fast soft-recovery controlled avalanche rectifiers

## BYD53 series

### FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack.

### DESCRIPTION

Cavity free cylindrical glass SOD81 package through Implotec™<sup>(1)</sup> technology. The SOD81 package is

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

(1) Implotec is a trademark of Philips.

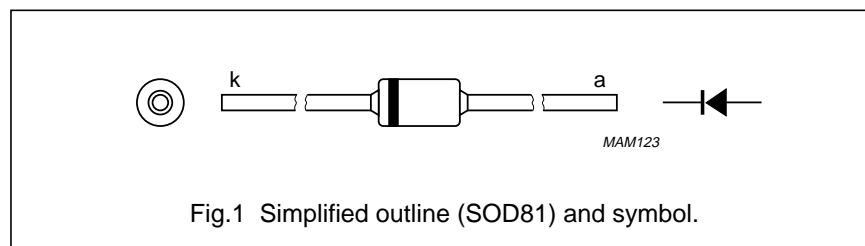


Fig.1 Simplified outline (SOD81) and symbol.

### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>RRM</sub>	repetitive peak reverse voltage				
	BYD53D		–	200	V
	BYD53G		–	400	V
	BYD53J		–	600	V
	BYD53K		–	800	V
	BYD53M		–	1000	V
	BYD53U BYD53V		–	1200 1400	V V
V <sub>R</sub>	continuous reverse voltage				
	BYD53D		–	200	V
	BYD53G		–	400	V
	BYD53J		–	600	V
	BYD53K		–	800	V
	BYD53M		–	1000	V
	BYD53U BYD53V		–	1200 1400	V V
I <sub>F(AV)</sub>	average forward current	T <sub>tp</sub> = 55 °C; lead length = 10 mm see Figs 2 and 3;			
	BYD53D to M BYD53U and V	averaged over any 20 ms period; see also Figs 10 and 11	–	0.75 0.85	A A
I <sub>F(AV)</sub>	average forward current	T <sub>amb</sub> = 65 °C; PCB mounting (see Fig.17); see Figs 4 and 5;			
	BYD53D to M BYD53U and V	averaged over any 20 ms period; see also Figs 10 and 11	–	0.40 0.45	A A
I <sub>FRM</sub>	repetitive peak forward current	T <sub>tp</sub> = 55 °C; see Figs 6 and 7			
	BYD53D to M BYD53U and V		–	6.5 8.25	A A

## Fast soft-recovery controlled avalanche rectifiers

## BYD53 series

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{FRM}$	repetitive peak forward current	$T_{amb} = 65\text{ }^{\circ}\text{C}$ ; see Figs 8 and 9	–	3.6	A
	BYD53D to M BYD53U and V			4.45	
$I_{FSM}$	non-repetitive peak forward current	$t = 10\text{ ms}$ half sine wave; $T_j = T_{j\text{max}}$ prior to surge; $V_R = V_{RRM\text{max}}$	–	5	A
$E_{RSM}$	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
$T_{stg}$	storage temperature		–65	+175	$^{\circ}\text{C}$
$T_j$	junction temperature	see Fig.12	–65	+175	$^{\circ}\text{C}$

### 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 Figs 13 and 14	–	–	2.1	V				
	BYD53D to M BYD53U and V				1.7	V				
$V_F$	forward voltage	$I_F = 1\text{ A}$ ; see Figs 13 and 14	–	–	3.6	V				
	BYD53D to M BYD53U and V				2.3	V				
$V_{(BR)R}$	reverse avalanche breakdown voltage	$I_R = 0.1\text{ mA}$								
	BYD53D						300	–	–	V
	BYD53G						500	–	–	V
	BYD53J						700	–	–	V
	BYD53K						900	–	–	V
	BYD53M						1100	–	–	V
	BYD53U BYD53V						1300 1500	–	–	V
$I_R$	reverse current	$V_R = V_{RRM\text{max}}$ ; see Fig.15	–	–	1	$\mu\text{A}$				
		$V_R = V_{RRM\text{max}}$ ; $T_j = 165\text{ }^{\circ}\text{C}$ ; see Fig.15	–	–	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.18	–	–	30	ns				
	BYD53D to J				75	ns				
	BYD53K and M BYD53U and V				150	ns				
$C_d$	diode capacitance	$f = 1\text{ MHz}$ ; $V_R = 0$ ; see Fig.16	–	20	–	pF				

## Fast soft-recovery controlled avalanche rectifiers

## BYD53 series

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$\left  \frac{dI_R}{dt} \right $	maximum slope of reverse recovery current	when switched from $I_F = 1$ A to $V_R \geq 30$ V and $dI_F/dt = -1$ A/ $\mu$ s; see Fig.19				
	BYD53D to J		–	–	7	A/ $\mu$ s
	BYD53K and M		–	–	6	A/ $\mu$ s
	BYD53U and V		–	–	5	A/ $\mu$ s

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	120	K/W

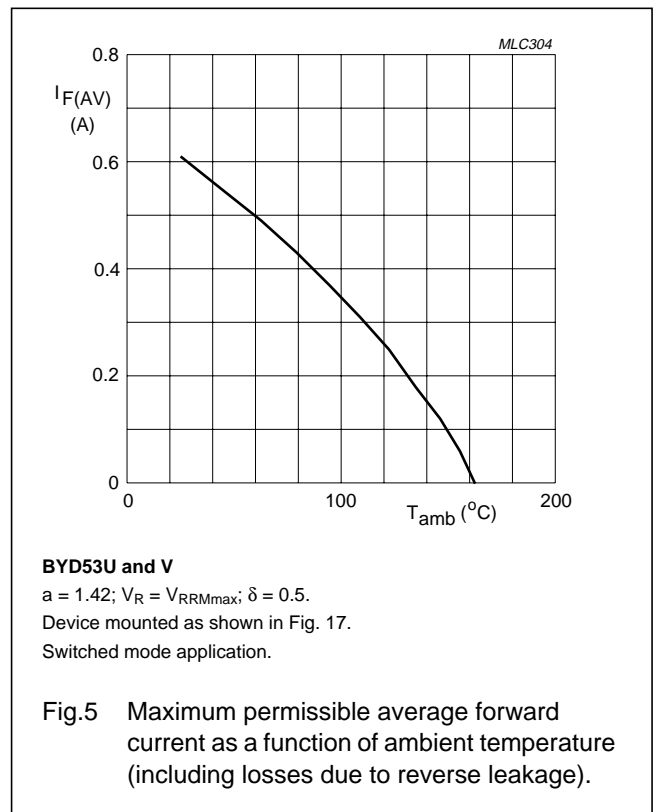
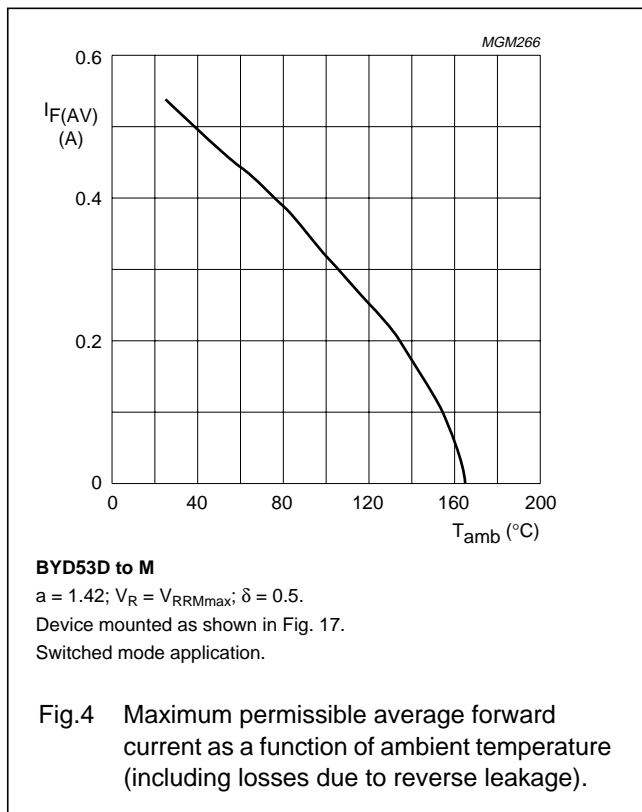
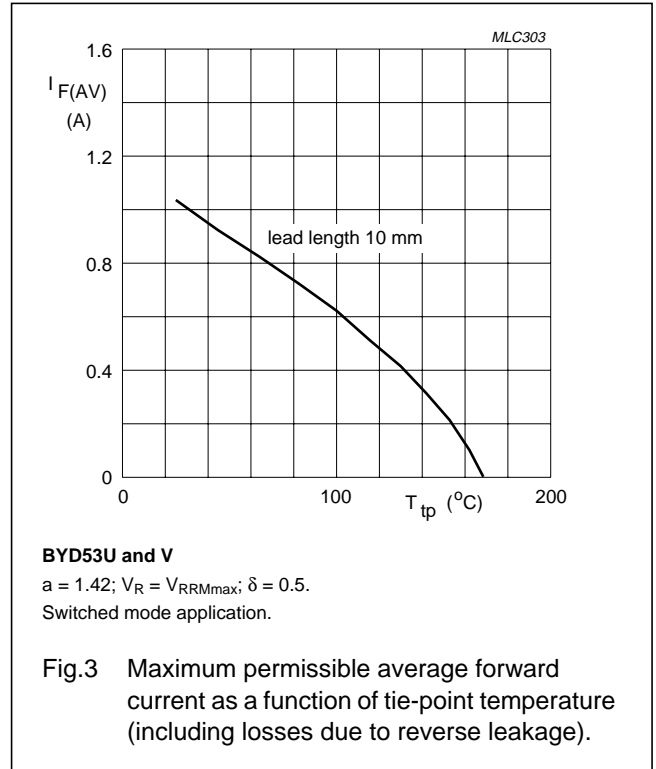
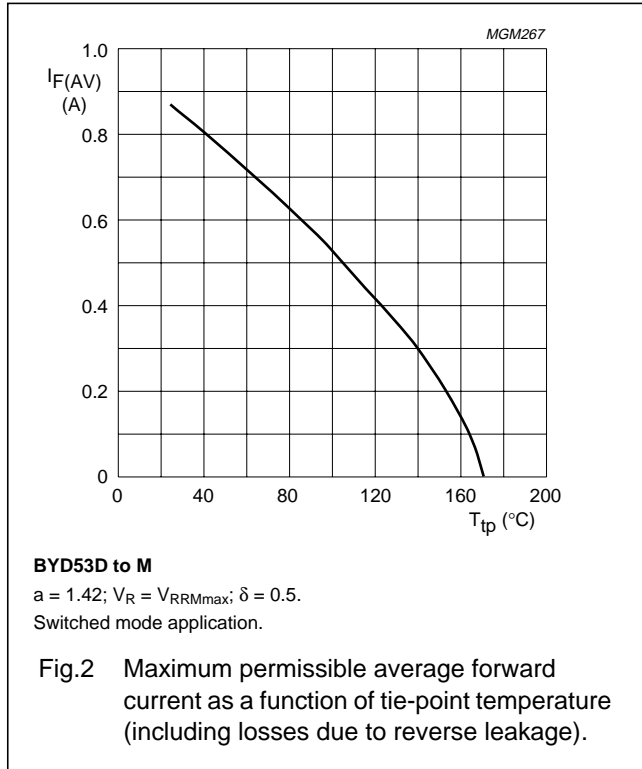
#### Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer  $\geq 40$   $\mu$ m, see Fig.17. For more information please refer to the 'General Part of associated Handbook'.

Fast soft-recovery controlled avalanche rectifiers

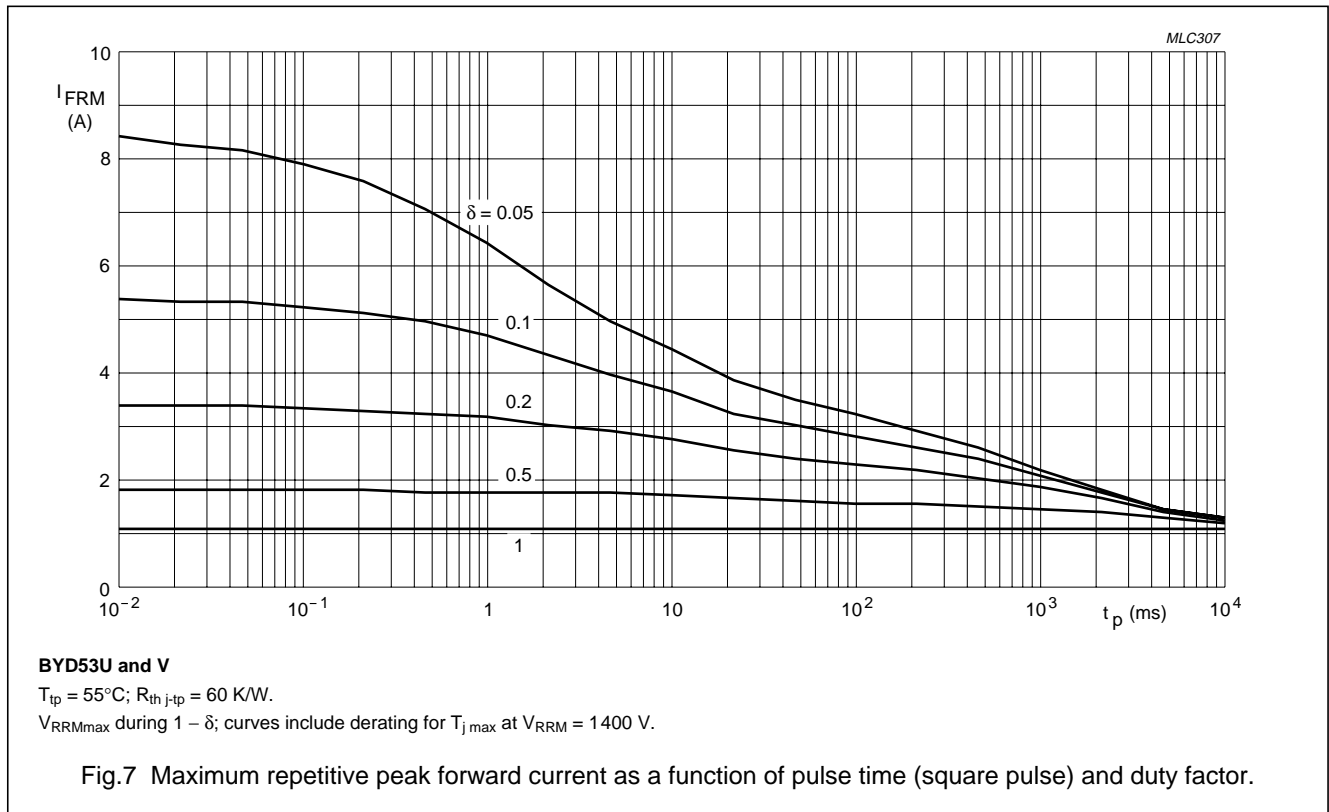
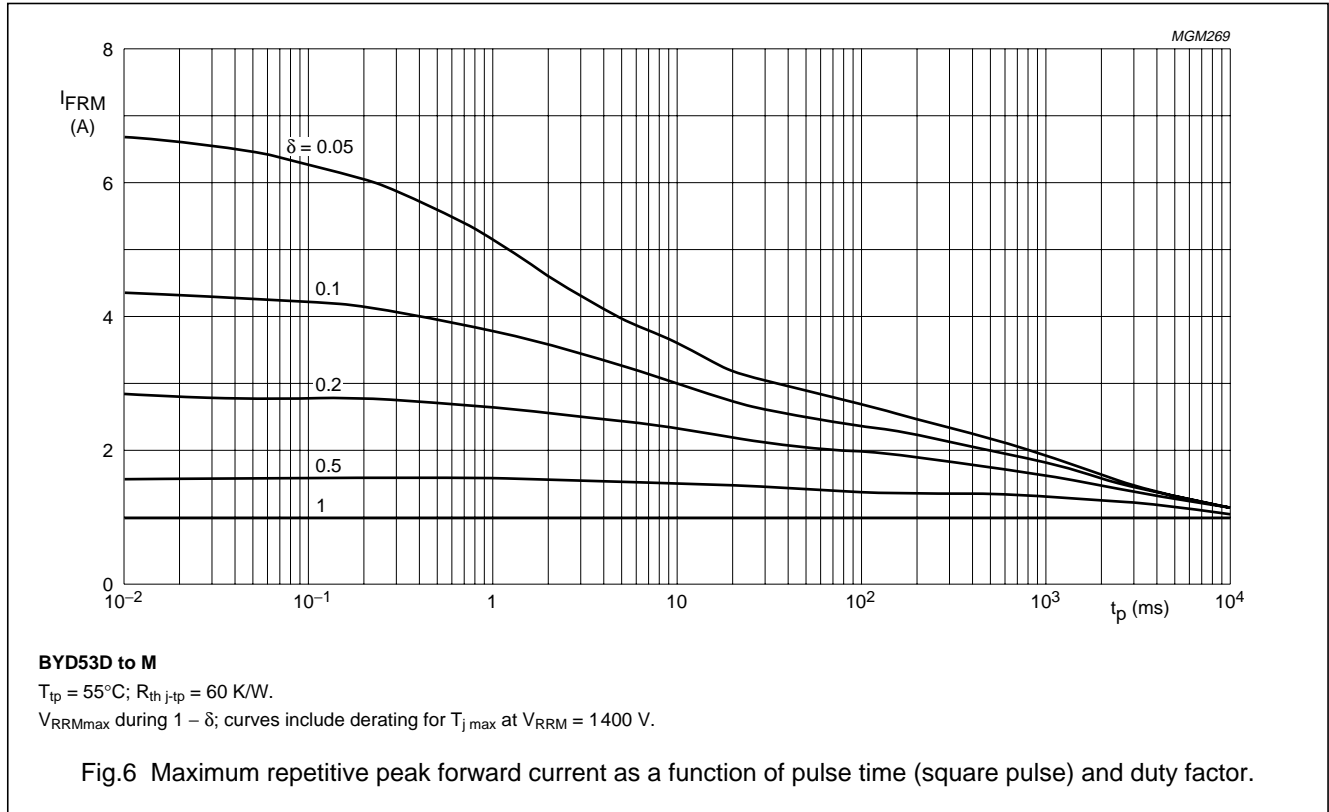
BYD53 series

GRAPHICAL DATA



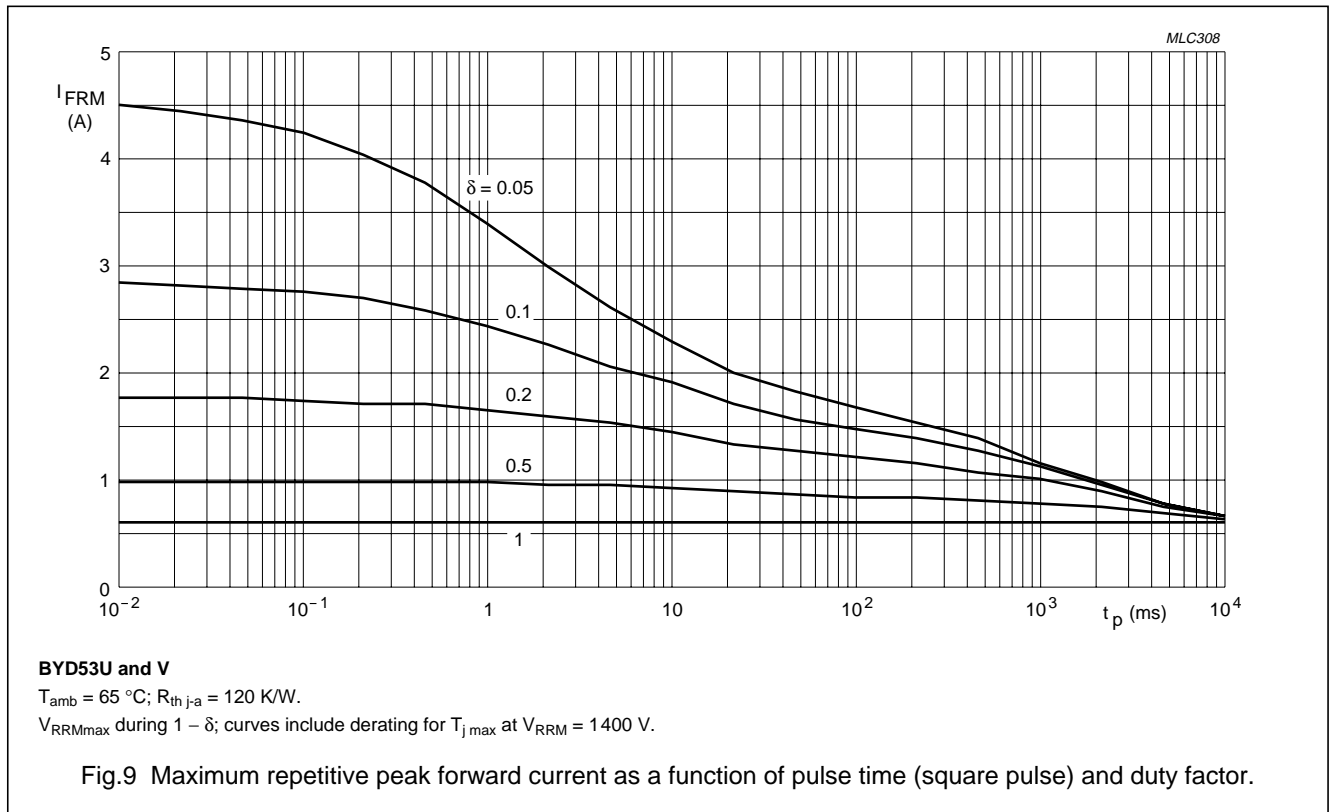
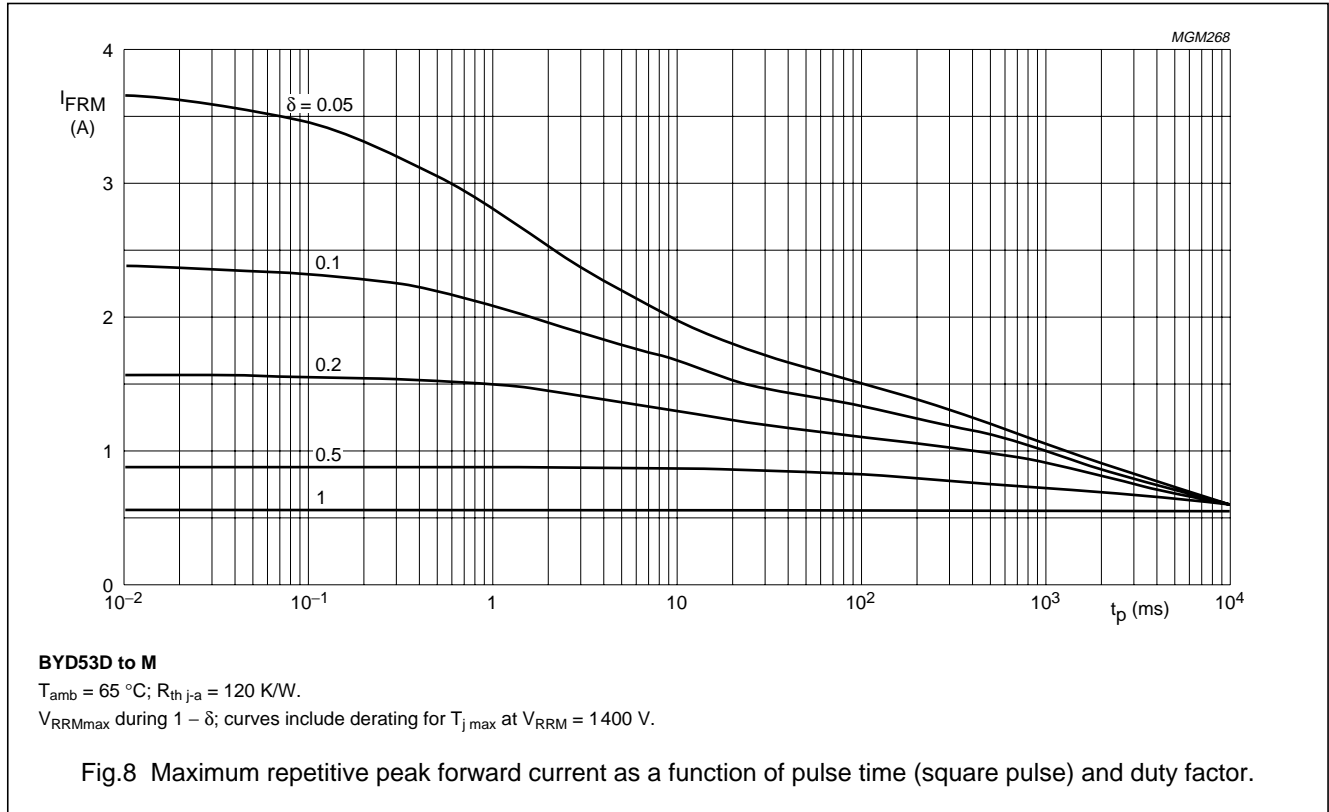
Fast soft-recovery controlled avalanche rectifiers

BYD53 series



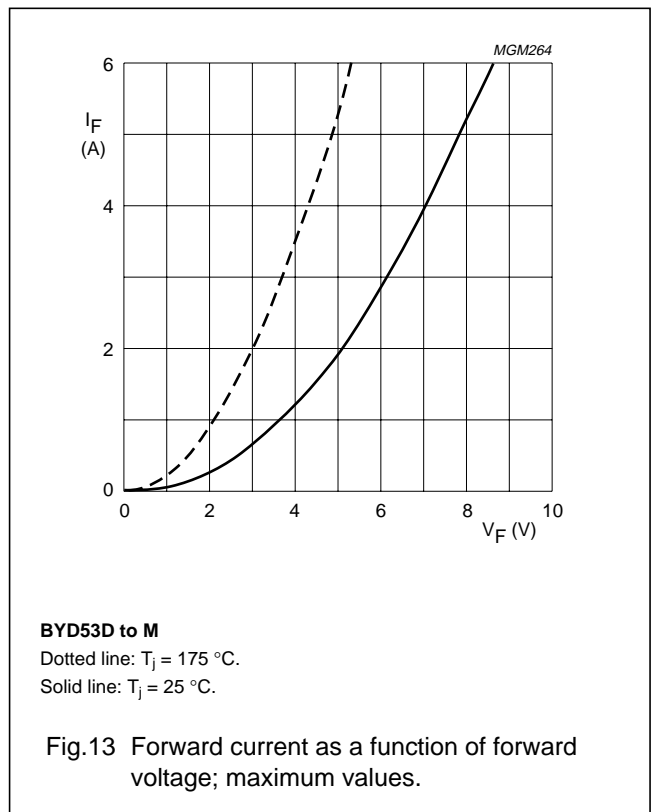
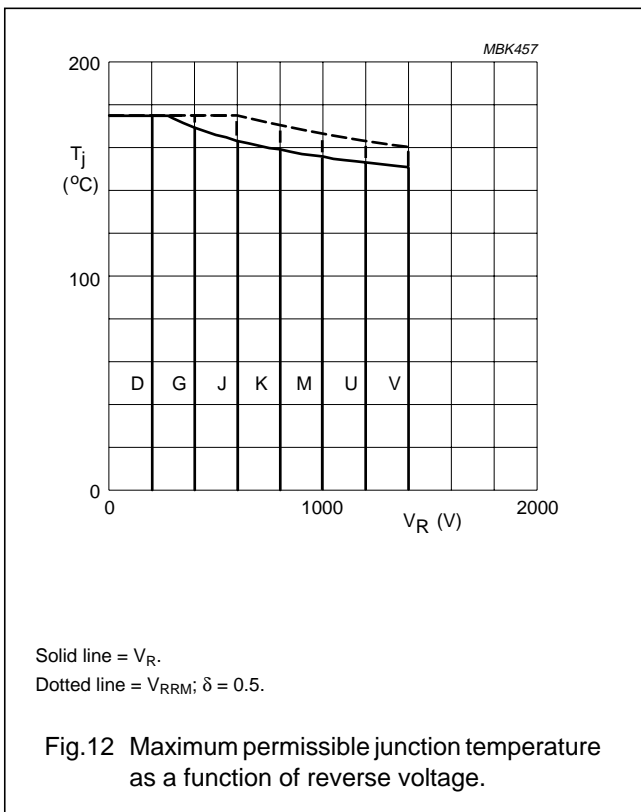
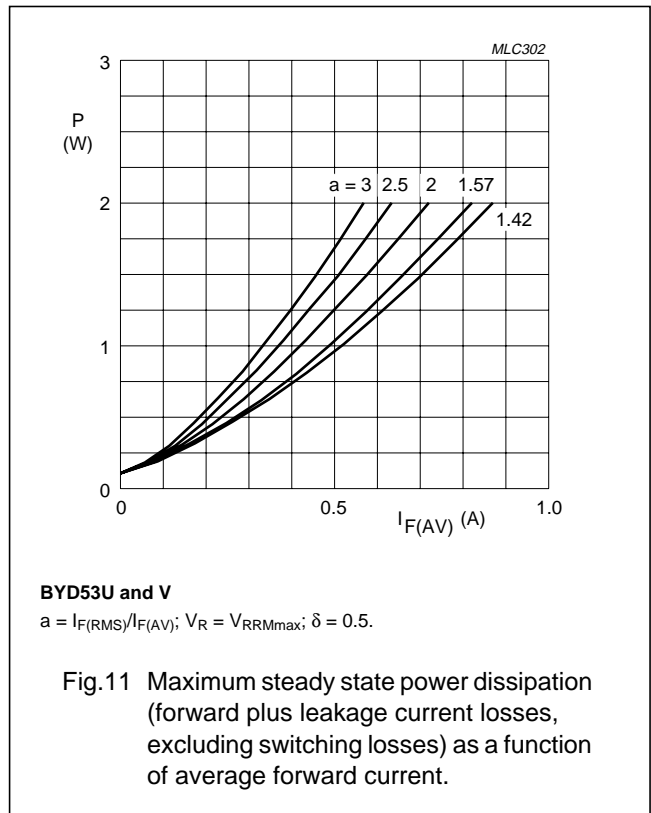
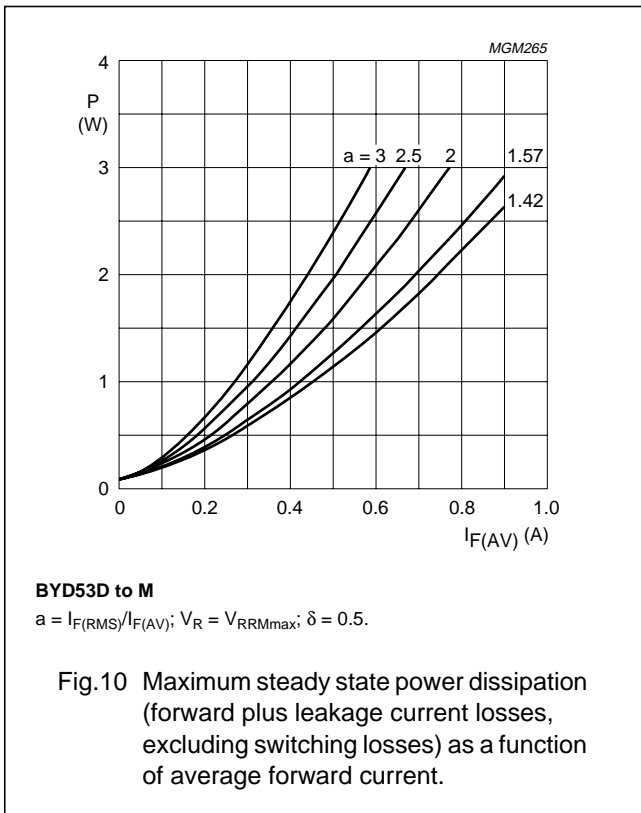
Fast soft-recovery controlled avalanche rectifiers

BYD53 series



Fast soft-recovery controlled avalanche rectifiers

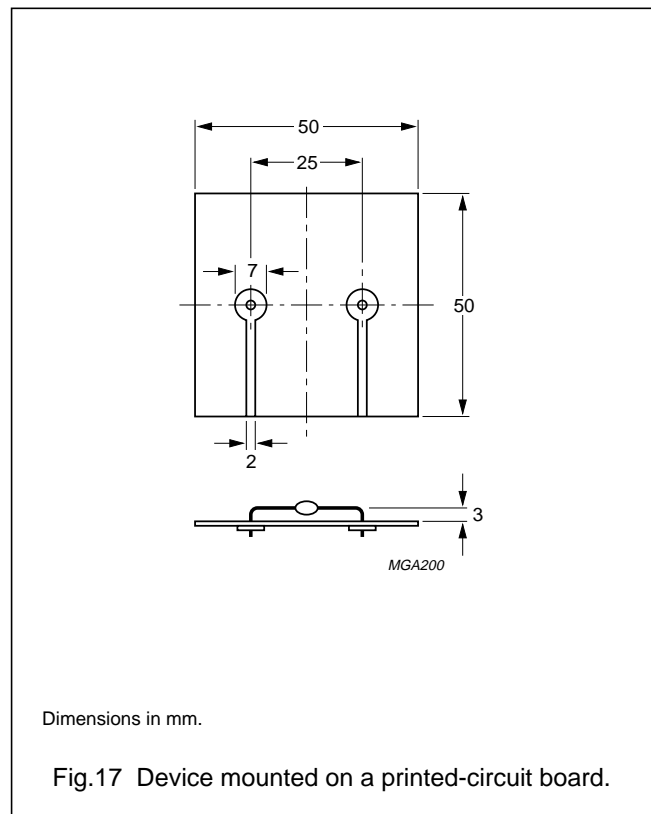
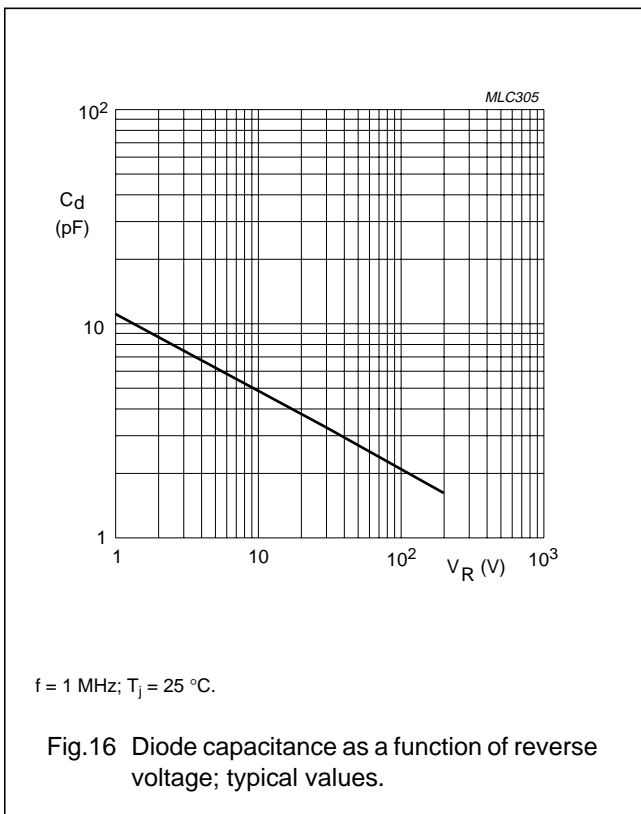
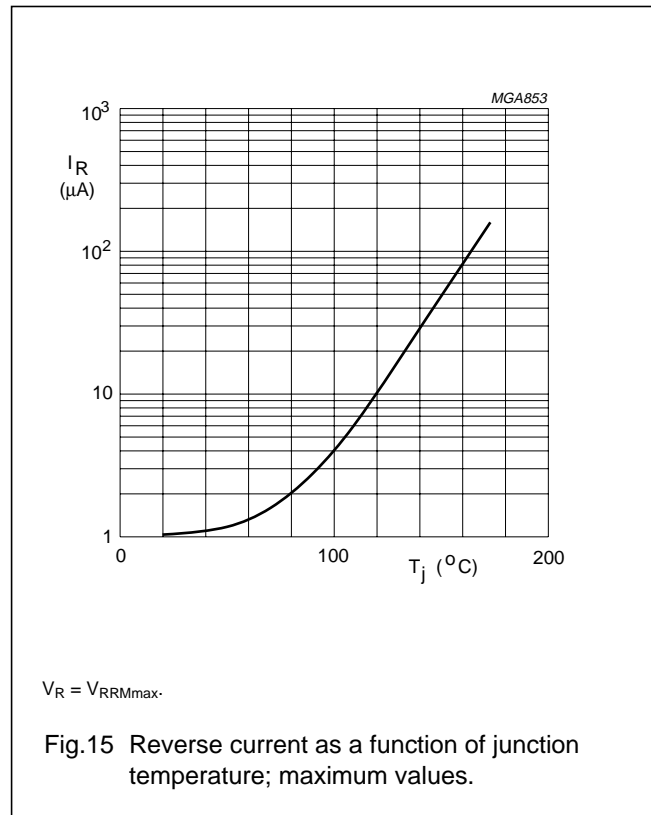
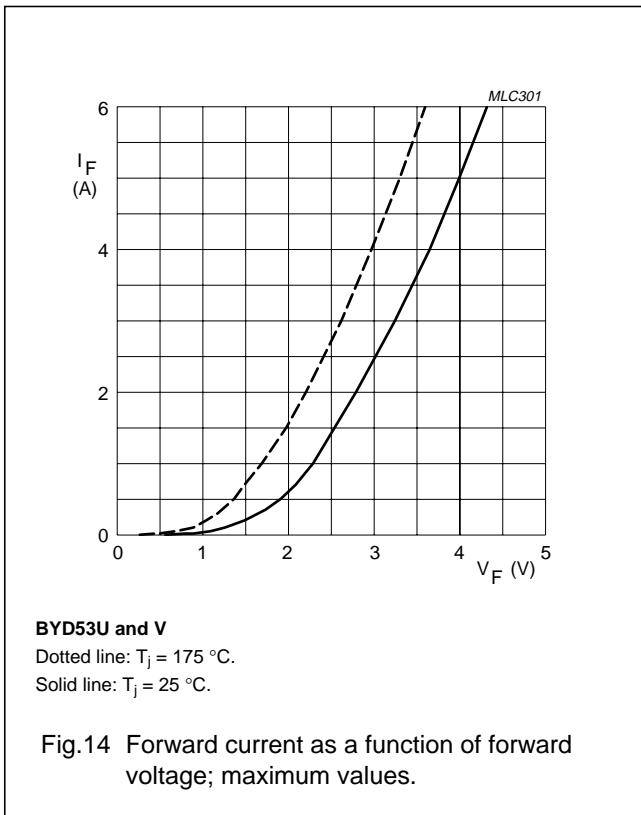
BYD53 series





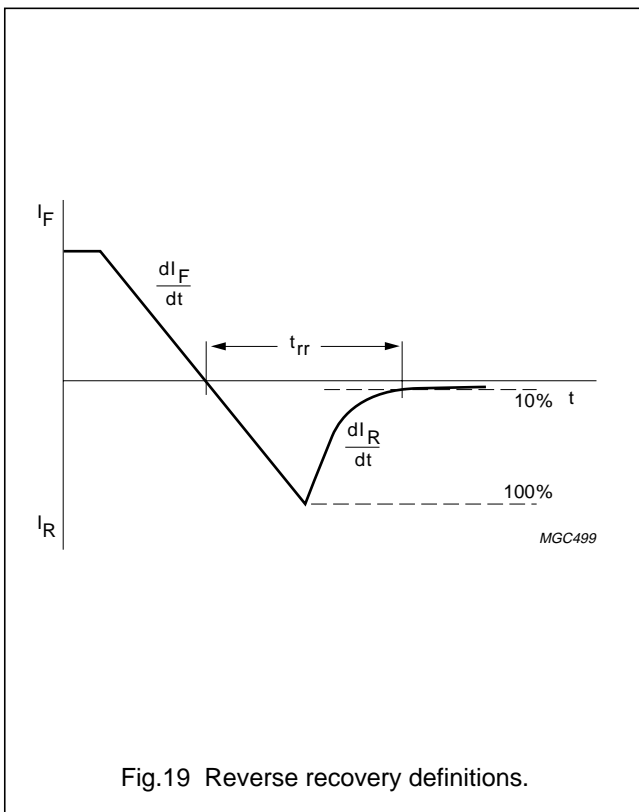
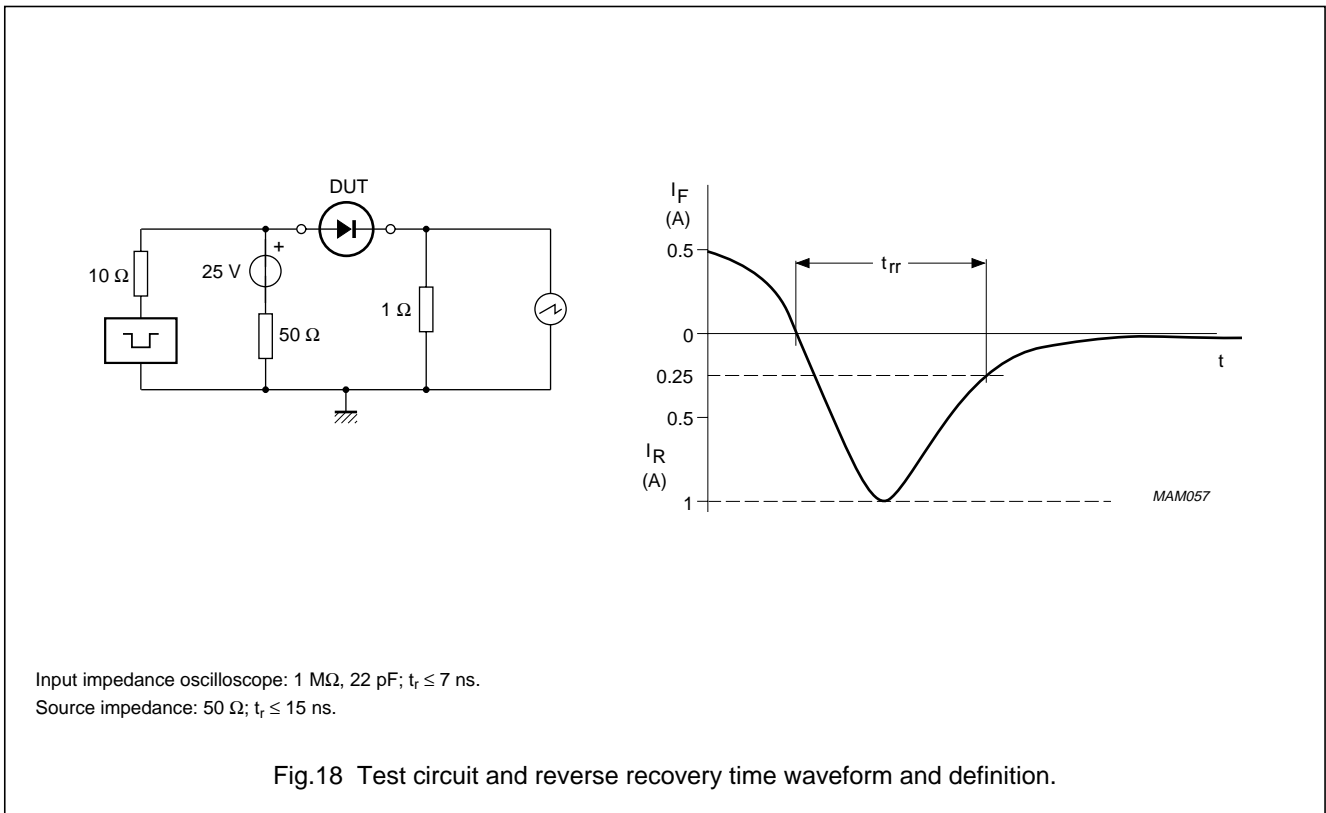
Fast soft-recovery controlled avalanche rectifiers

BYD53 series



Fast soft-recovery controlled avalanche rectifiers

BYD53 series



# Fast soft-recovery controlled avalanche rectifiers

## BYD53 series

### PACKAGE OUTLINE

Hermetically sealed glass package;  
Implotec™(1) technology; axial leaded; 2 leads

SOD81

**DIMENSIONS (mm are the original dimensions)**

UNIT	b max.	D max.	G max.	G <sub>1</sub> max.	L min.
mm	0.81	2.15	3.8	5	28

0 1 2 mm scale

**Notes**

- Implotec is a trademark of Philips.
- The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD81						97-06-20

### 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.	

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Printed in The Netherlands

135106/00/04/pp12

Date of release: 1998 Dec 04

Document order number: 9397 750 04887

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