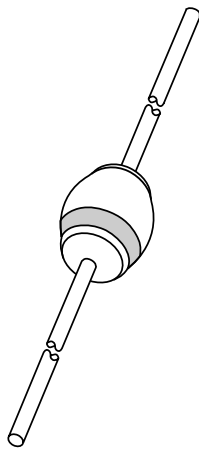


# DATA SHEET



## **BYV27 series** Ultra fast low-loss controlled avalanche rectifiers

Product specification  
Supersedes data of 1996 Oct 02

1997 Nov 24

# Ultra fast low-loss controlled avalanche rectifiers

## BYV27 series

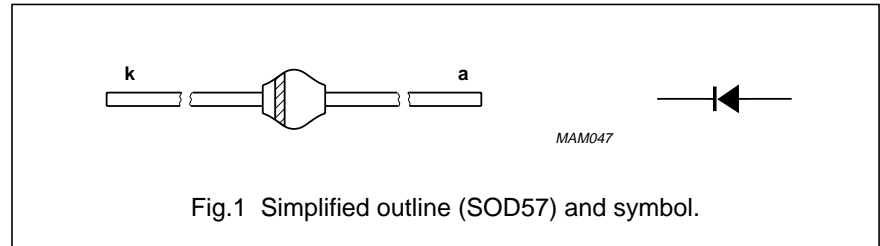
### FEATURES

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

### DESCRIPTION

Rugged glass SOD57 package, using a high temperature alloyed construction.

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



### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>R</sub> RM	repetitive peak reverse voltage				
	BYV27-50		–	50	V
	BYV27-100		–	100	V
	BYV27-150		–	150	V
	BYV27-200		–	200	V
	BYV27-300		–	300	V
	BYV27-400		–	400	V
	BYV27-500		–	500	V
V <sub>R</sub>	continuous reverse voltage				
	BYV27-50		–	50	V
	BYV27-100		–	100	V
	BYV27-150		–	150	V
	BYV27-200		–	200	V
	BYV27-300		–	300	V
	BYV27-400		–	400	V
	BYV27-500		–	500	V
I <sub>F(AV)</sub>	average forward current	T <sub>tp</sub> = 85 °C; lead length = 10 mm; see Figs 2, 3 and 4;	–	2.0	A
	BYV27-50 to 200	averaged over any 20 ms period; see also Figs 14, 15 and 16	–	1.9	A
	BYV27-300 and 400		–	1.6	A
I <sub>F(AV)</sub>	average forward current	T <sub>amb</sub> = 60 °C; printed-circuit board mounting (see Fig. 25);	–	1.30	A
	BYV27-50 to 200	see Figs 5, 6 and 7;	–	1.25	A
	BYV27-300 and 400	averaged over any 20 ms period; see also Figs 14, 15 and 16	–	1.10	A
	BYV27-500 and 600				

# Ultra fast low-loss controlled avalanche rectifiers

## BYV27 series

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{FRM}$	repetitive peak forward current	$T_{tp} = 85\text{ °C}$ ; see Figs 8, 9 and 10	–	20	A
	BYV27-50 to 400			16	A
$I_{FRM}$	repetitive peak forward current	$T_{amb} = 60\text{ °C}$ ; see Figs 11, 12 and 13	–	14	A
	BYV27-50 to 200			13	A
	BYV27-300 and 400 BYV27-500 and 600			11	A
$I_{FSM}$	non-repetitive peak forward current	$t = 10\text{ ms}$ half sine wave; $T_j = T_{j\text{ max}}$ prior to surge; $V_R = V_{RRM\text{ max}}$	–	50	A
	BYV27-50 to 400 BYV27-500 and 600			40	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	–	20	mJ
$T_{stg}$	storage temperature		–65	+175	°C
$T_j$	junction temperature	see Fig. 17	–65	+175	°C

### ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT			
$V_F$	forward voltage	$I_F = 2\text{ A}$ ; $T_j = T_{j\text{ max}}$ ; see Figs 18, 19 and 20	–	–	0.78	V			
	BYV27-50 to 200				0.82	V			
	BYV27-300 and 400 BYV27-500 and 600				1.00	V			
$V_F$	forward voltage	$I_F = 2\text{ A}$ ; see Figs 18, 19 and 20	–	–	0.98	V			
	BYV27-50 to 200				1.05	V			
	BYV27-300 and 400 BYV27-500 and 600				1.25	V			
$V_{(BR)R}$	reverse avalanche breakdown voltage	$I_R = 0.1\text{ mA}$							
	BYV27-50					55	–	–	V
	BYV27-100					110	–	–	V
	BYV27-150					165	–	–	V
	BYV27-200					220	–	–	V
	BYV27-300					330	–	–	V
	BYV27-400					440	–	–	V
	BYV27-500 BYV27-600					560 675	–	–	V
$I_R$	reverse current	$V_R = V_{RRM\text{ max}}$ ; see Fig. 21	–	–	5	μA			
		$V_R = V_{RRM\text{ max}}$ ; $T_j = 165\text{ °C}$ ; see Fig. 21	–	–	150	μA			

# Ultra fast low-loss controlled avalanche rectifiers

## BYV27 series

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$t_{rr}$	reverse recovery time	when switched from $I_F = 0.5$ A to $I_R = 1$ A; measured at $I_R = 0.25$ A; see Fig. 27	–	–	25	ns
	BYV27-50 to 200				50	ns
$C_d$	diode capacitance	$f = 1$ MHz; $V_R = 0$ ; see Figs 22, 23 and 24	–	100	–	pF
	BYV27-50 to 200				80	pF
	BYV27-300 and 400				65	pF
$\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. 26	–	–	4	A/ $\mu$ s
					BYV27-500 and 600	

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	100	K/W

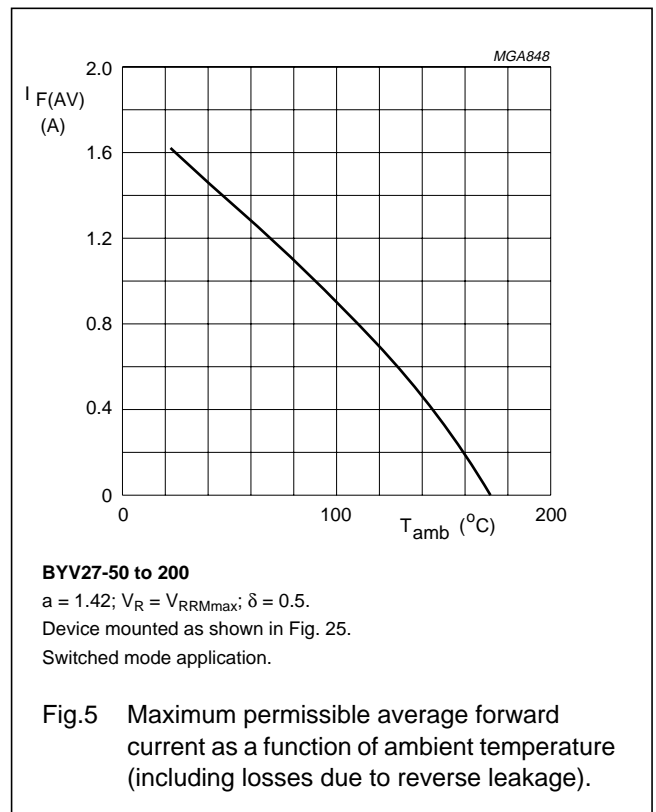
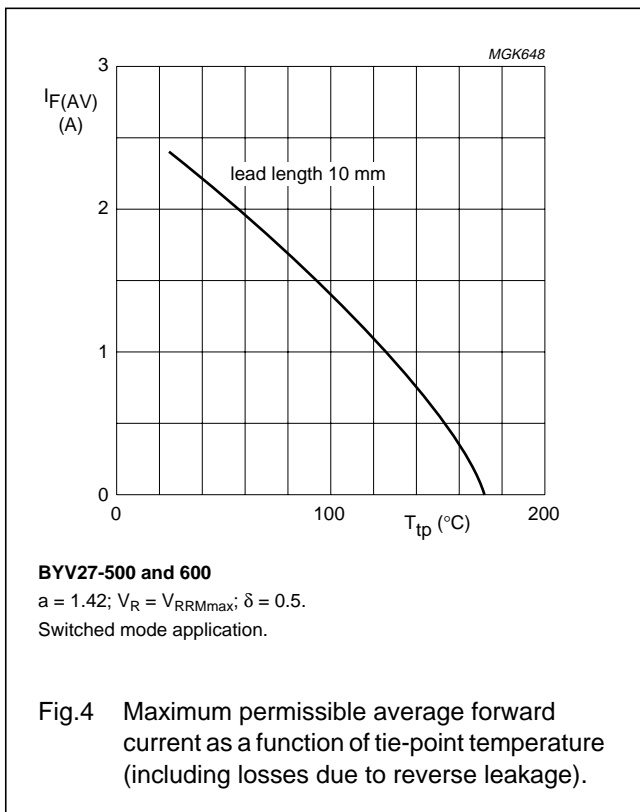
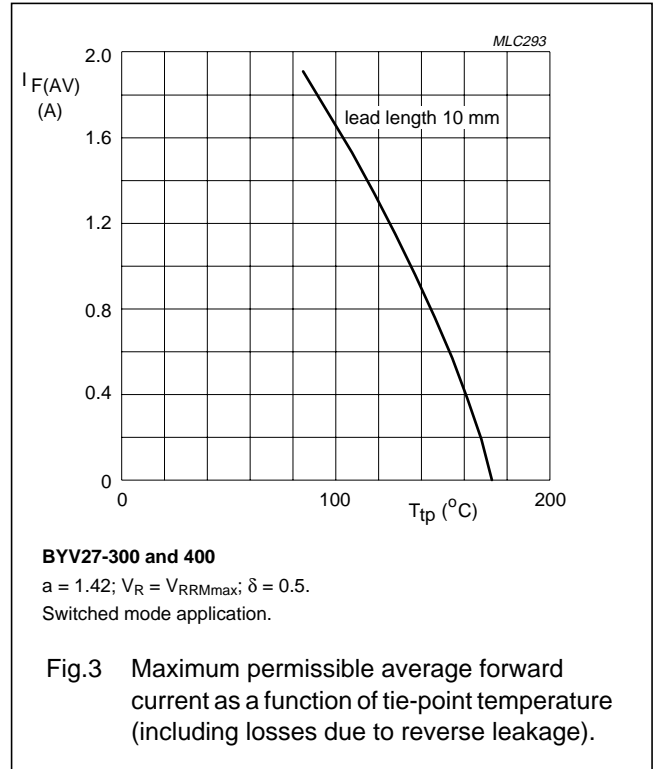
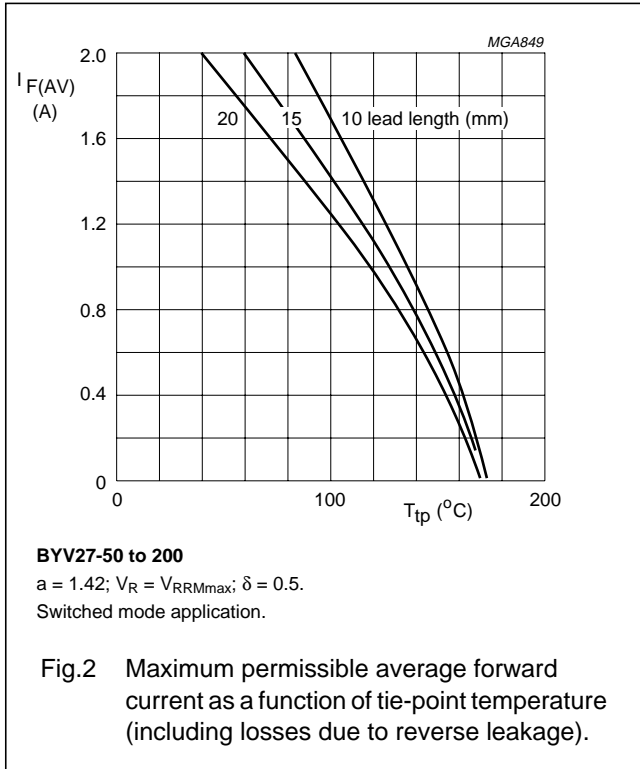
### Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer  $\geq 40$   $\mu$ m, see Fig. 25. For more information please refer to the "General Part of associated Handbook".

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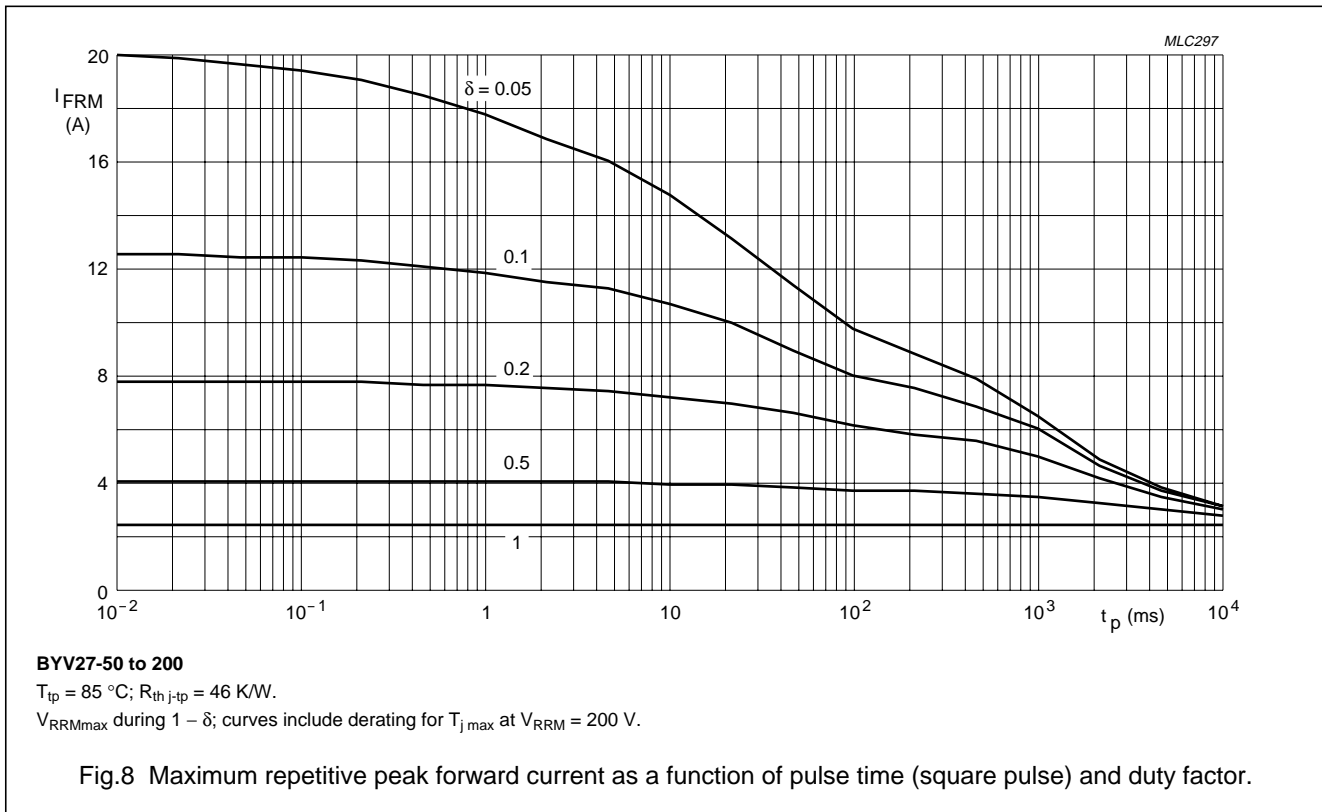
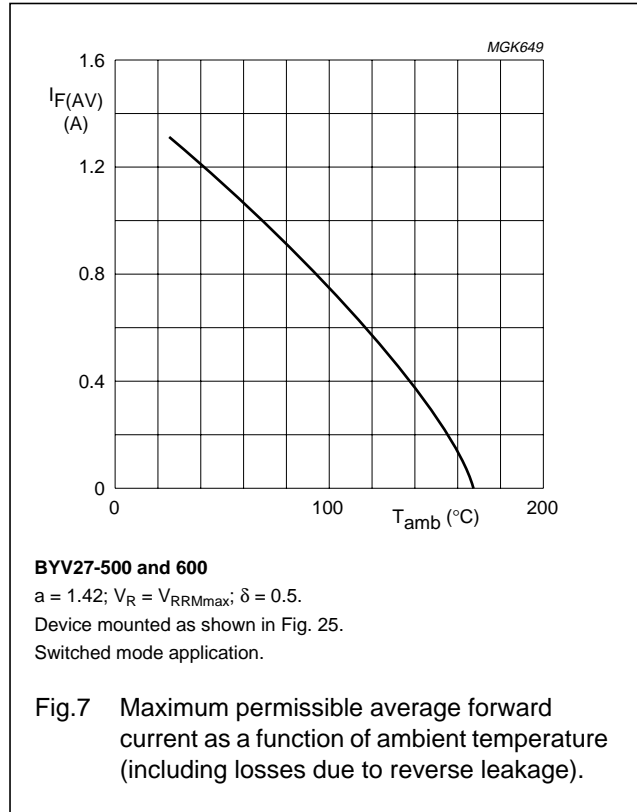
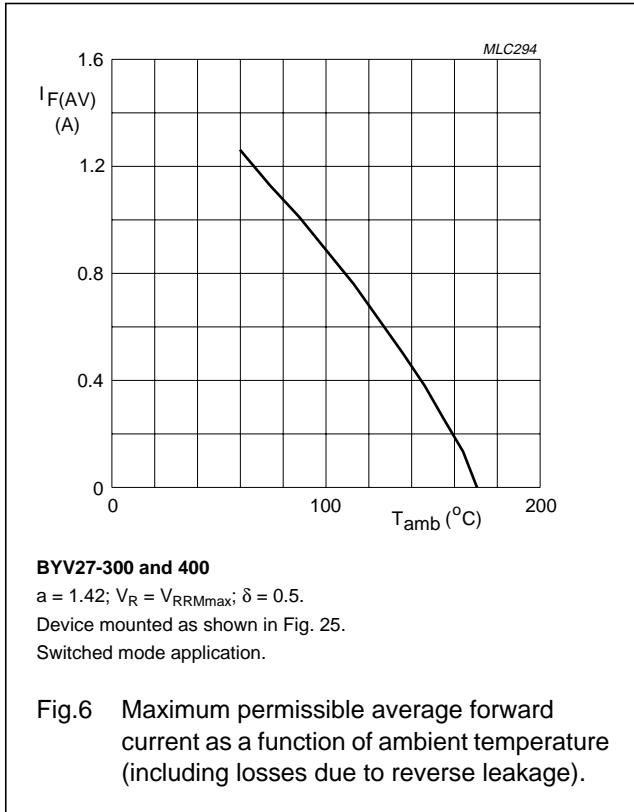
BYV27 series

GRAPHICAL DATA



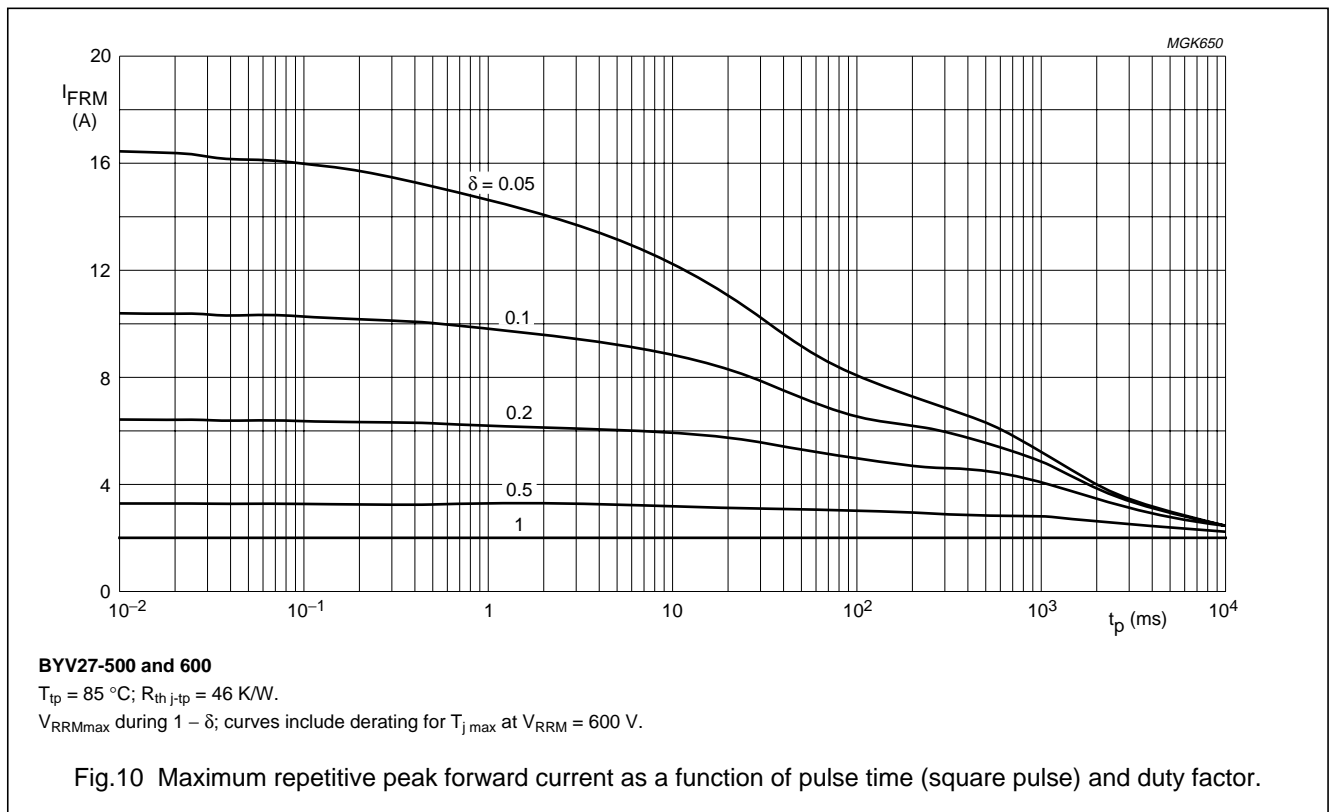
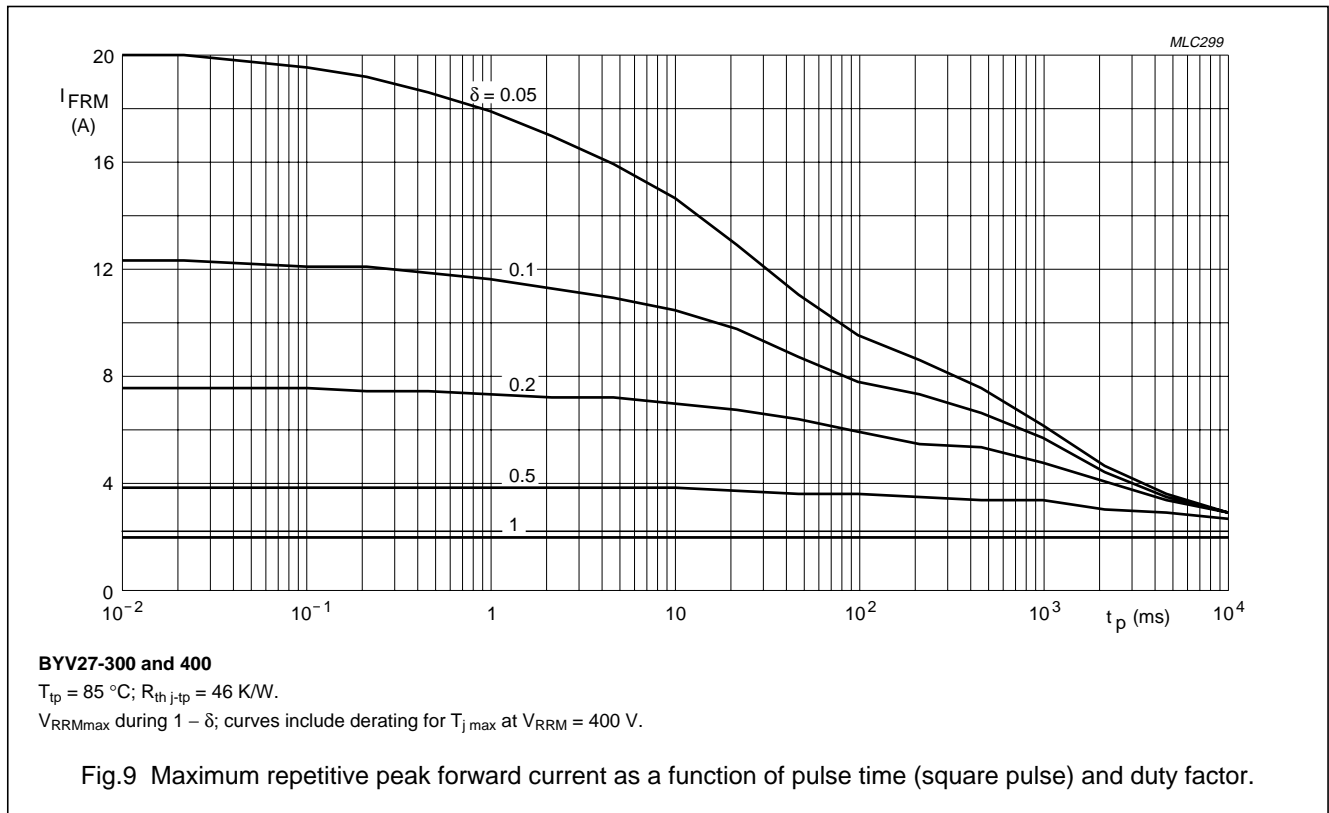
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BYV27 series



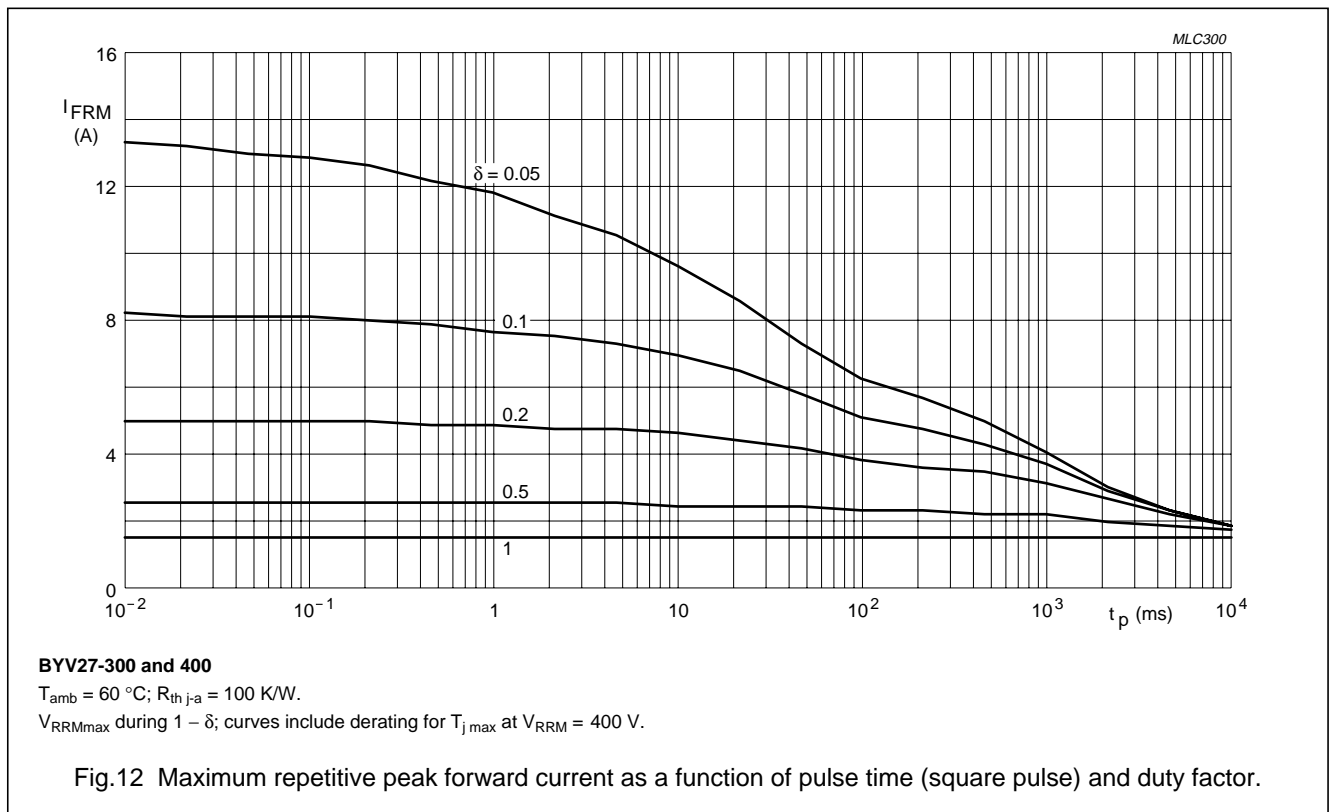
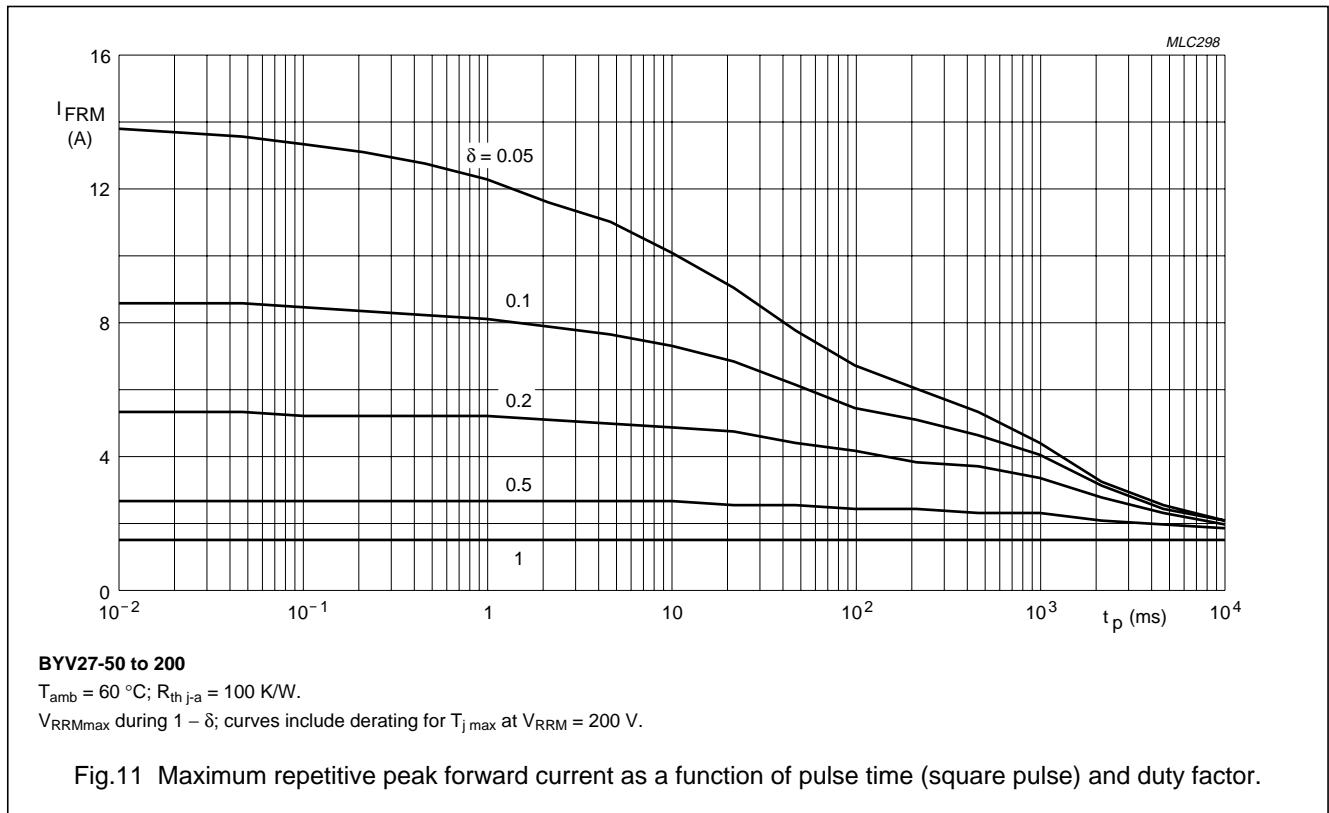
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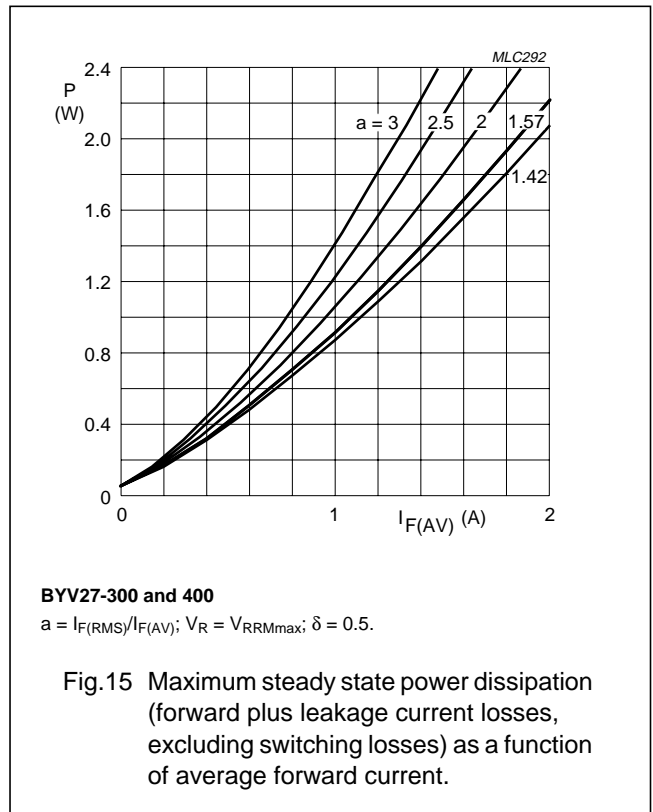
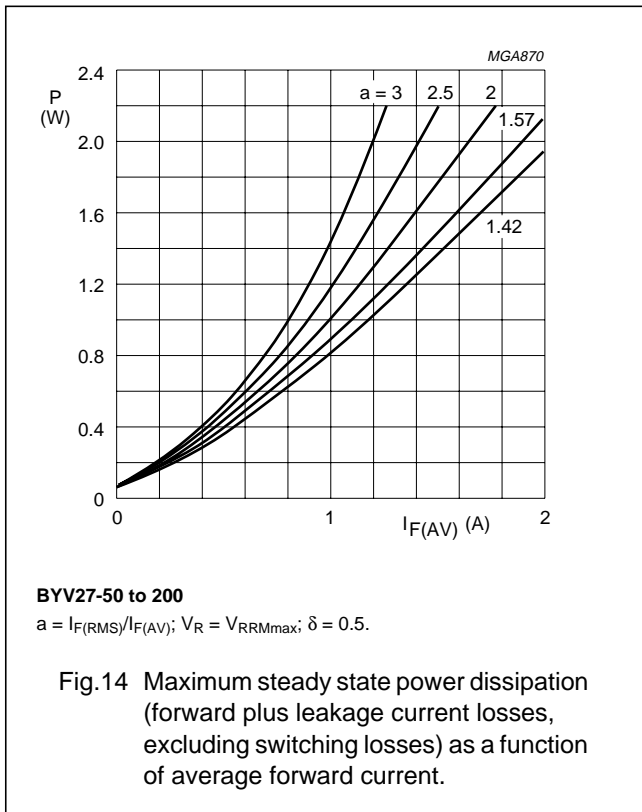
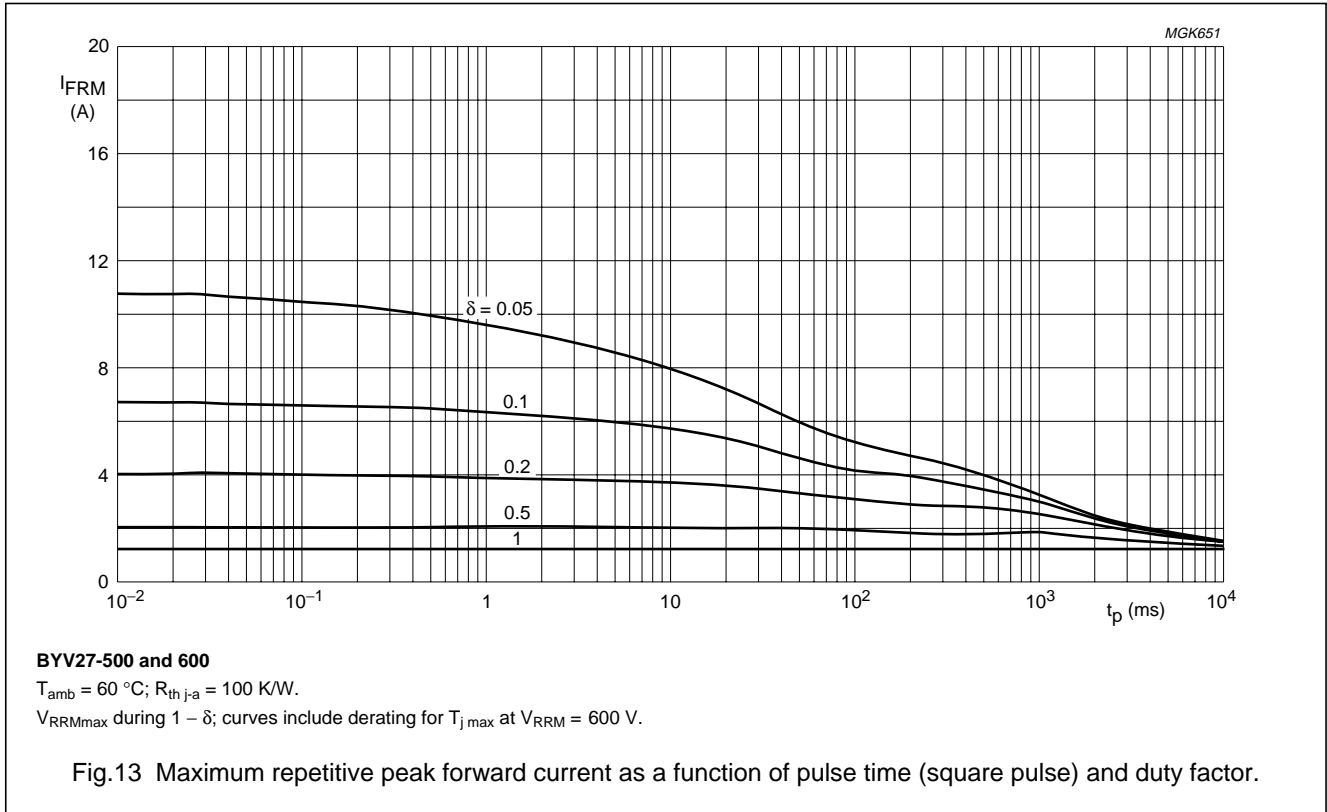
BYV27 series





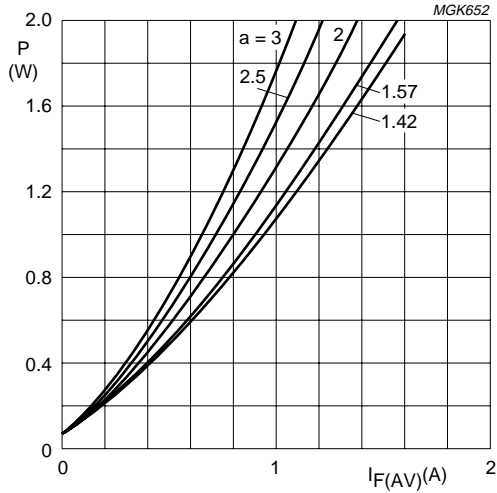
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Ultra fast low-loss  
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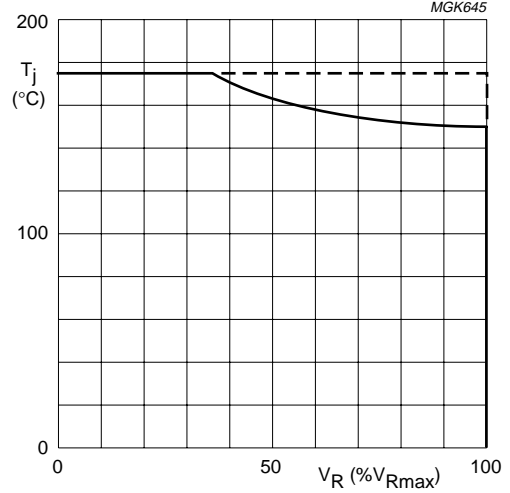
BYV27 series



**BYV27-500 and 600**

$a = I_{F(RMS)}/I_{F(AV)}$ ;  $V_R = V_{RRMmax}$ ;  $\delta = 0.5$ .

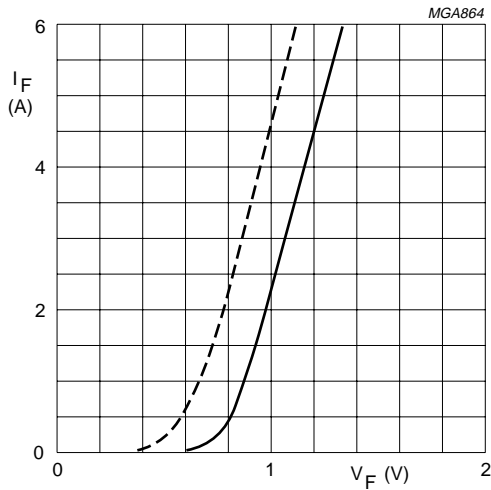
Fig. 16 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



Solid line =  $V_R$ .

Dotted line =  $V_{RRM}$ ;  $\delta = 0.5$ .

Fig. 17 Maximum permissible junction temperature as a function of maximum reverse voltage percentage.

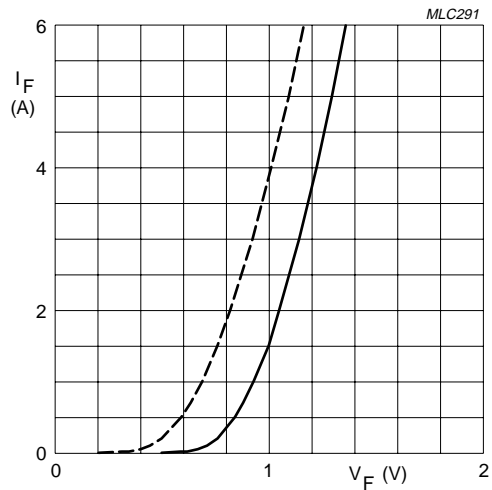


**BYV27-50 to 200**

Dotted line:  $T_j = 175$  °C.

Solid line:  $T_j = 25$  °C.

Fig. 18 Forward current as a function of forward voltage; maximum values.



**BYV27-300 and 400**

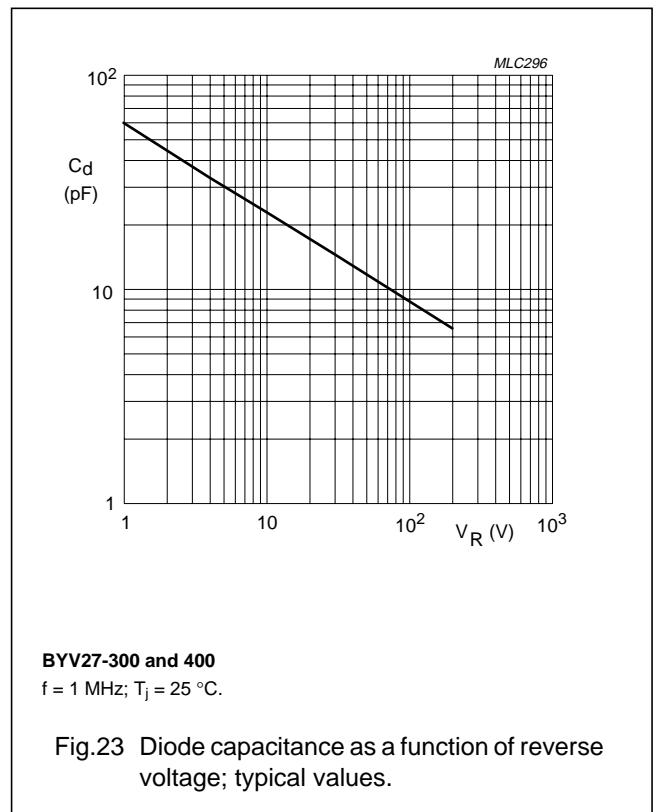
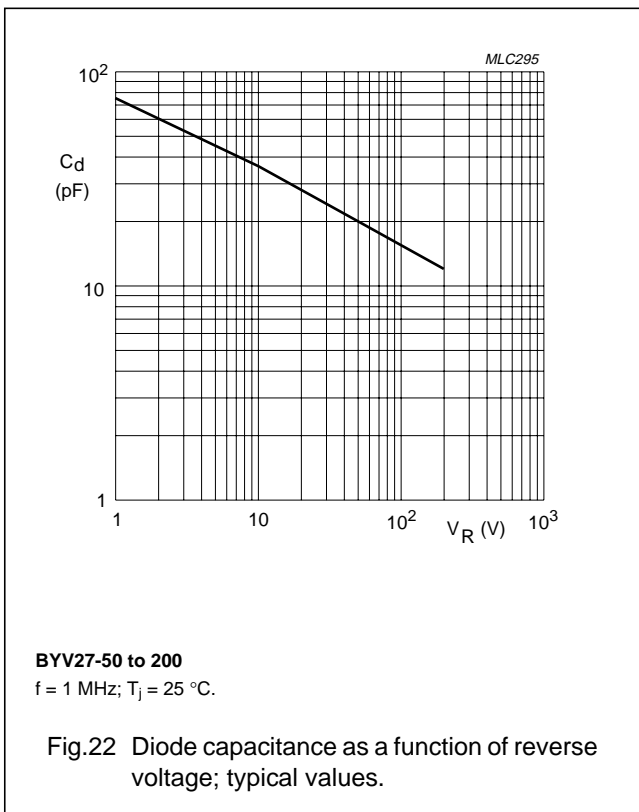
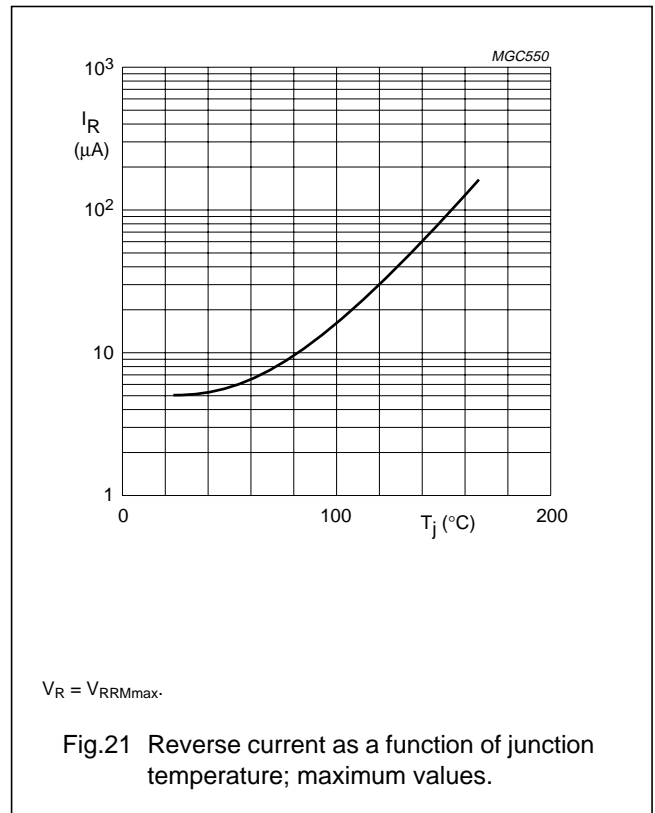
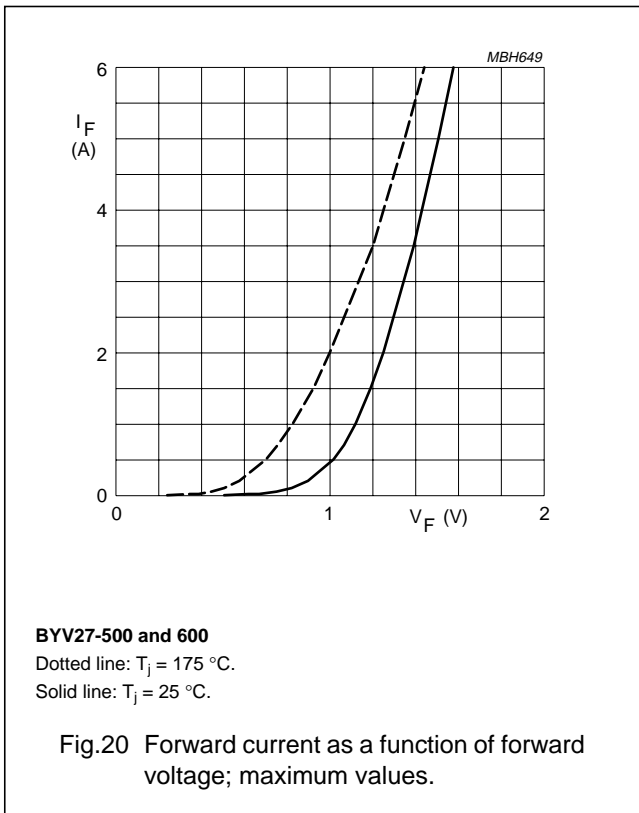
Dotted line:  $T_j = 175$  °C.

Solid line:  $T_j = 25$  °C.

Fig. 19 Forward current as a function of forward voltage; maximum values.

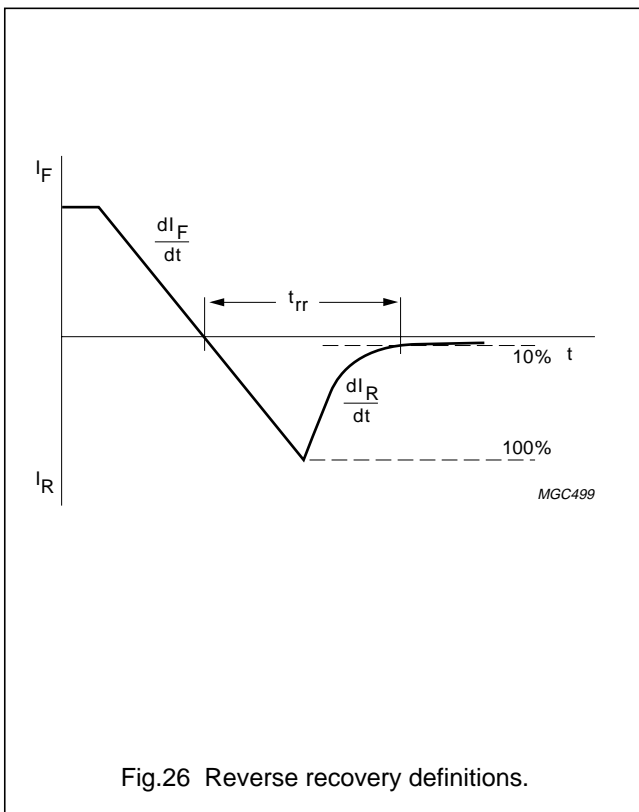
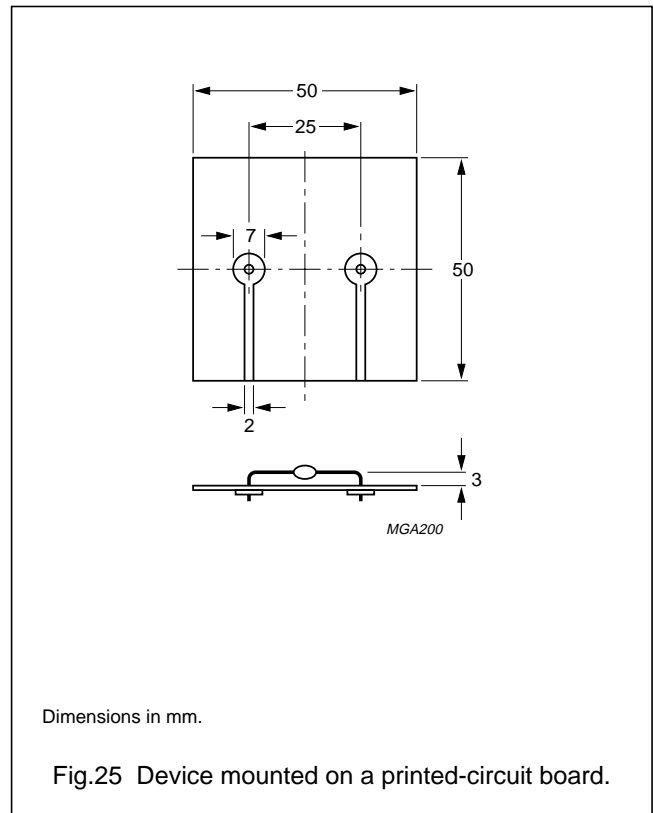
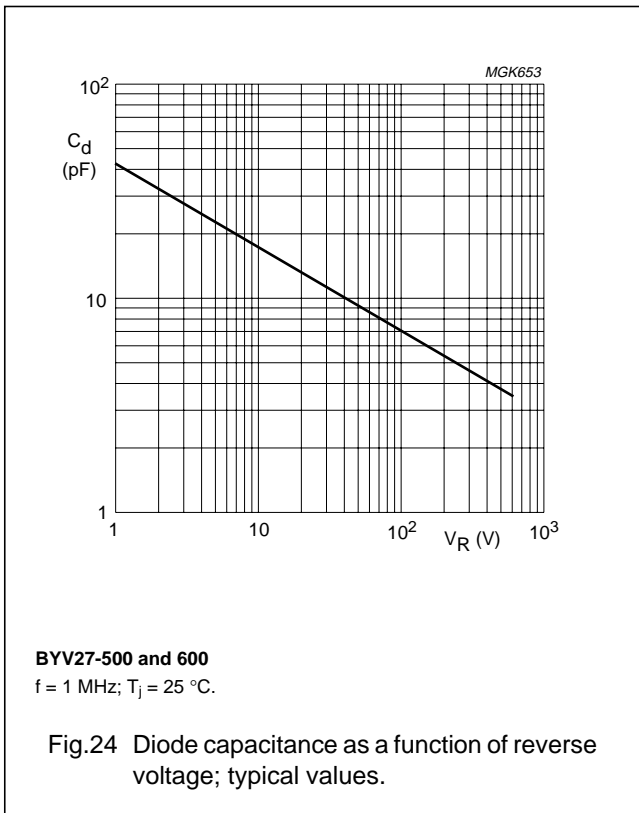
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controlled avalanche rectifiers

BYV27 series



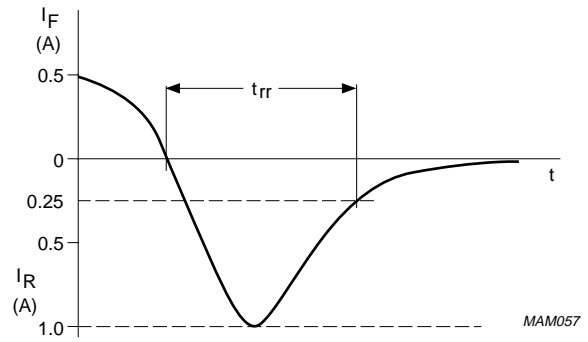
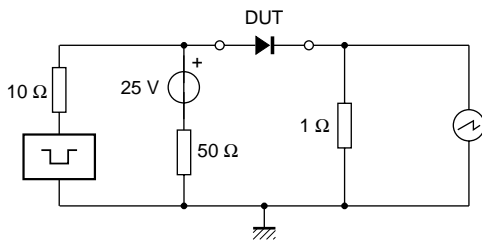
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BYV27 series



# Ultra fast low-loss controlled avalanche rectifiers

## BYV27 series



Input impedance oscilloscope: 1 MΩ, 22 pF;  $t_r \leq 7$  ns.  
Source impedance: 50 Ω;  $t_r \leq 15$  ns.

Fig.27 Test circuit and reverse recovery time waveform and definition.

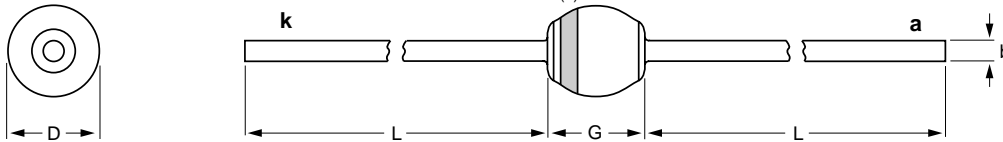
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PACKAGE OUTLINE

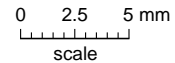
Hermetically sealed glass package; axial leaded; 2 leads

SOD57



DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G max.	L min.
mm	0.81	3.81	4.57	28



Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOD57					97-10-14

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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