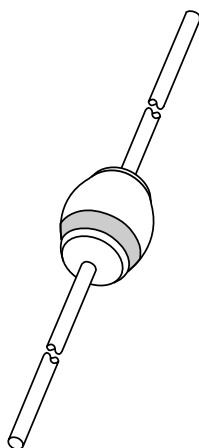


DATA SHEET



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

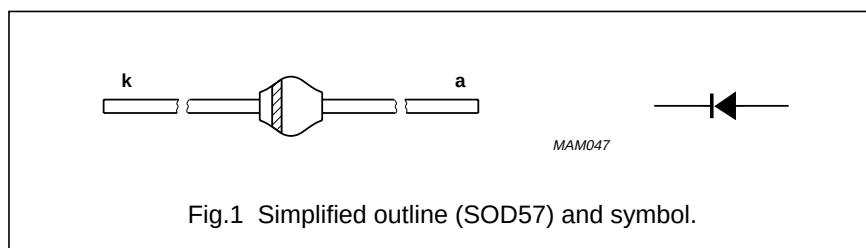
FEATURES

- 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_{RRM}	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
	BYV27-600		—	600	V
V_R	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
	BYV27-600		—	600	V
$I_{F(AV)}$	average forward current	$T_{tp} = 85\text{ °C}$; lead length = 10 mm; see Figs 2, 3 and 4;	—	2.0	A
	BYV27-50 to 200	averaged over any 20 ms period;	—	1.9	A
	BYV27-300 and 400	see also Figs 14, 15 and 16	—	1.6	A
$I_{F(AV)}$	average forward current	$T_{amb} = 60\text{ °C}$; 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 BYV27-50 to 400	$T_{tp} = 85\text{ }^{\circ}\text{C}$; see Figs 8, 9 and 10	–	20	A
	BYV27-500 and 600		–	16	A
I_{FRM}	repetitive peak forward current BYV27-50 to 200	$T_{amb} = 60\text{ }^{\circ}\text{C}$; see Figs 11, 12 and 13	–	14	A
	BYV27-300 and 400		–	13	A
	BYV27-500 and 600		–	11	A
I_{FSM}	non-repetitive peak forward current BYV27-50 to 400	$t = 10\text{ ms}$ half sine wave; $T_j = T_{j\text{ max}}$ prior to surge; $V_R = V_{RRM\text{ max}}$	–	50	A
	BYV27-500 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	$^{\circ}\text{C}$
T_j	junction temperature	see Fig. 17	–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 BYV27-50 to 200	$I_F = 2\text{ A}$; $T_j = T_{j\text{ max}}$; see Figs 18, 19 and 20	–	–	0.78	V
	BYV27-300 and 400		–	–	0.82	V
	BYV27-500 and 600		–	–	1.00	V
V_F	forward voltage BYV27-50 to 200	$I_F = 2\text{ A}$; see Figs 18, 19 and 20	–	–	0.98	V
	BYV27-300 and 400		–	–	1.05	V
	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		560	–	–	V
	BYV27-600		675	–	–	V
I_R	reverse current	$V_R = V_{RRM\text{ max}}$; see Fig. 21	–	–	5	μA
		$V_R = V_{RRM\text{ max}}$; $T_j = 165\text{ }^{\circ}\text{C}$; see Fig. 21	–	–	150	μA

Ultra fast low-loss controlled avalanche rectifiers

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

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

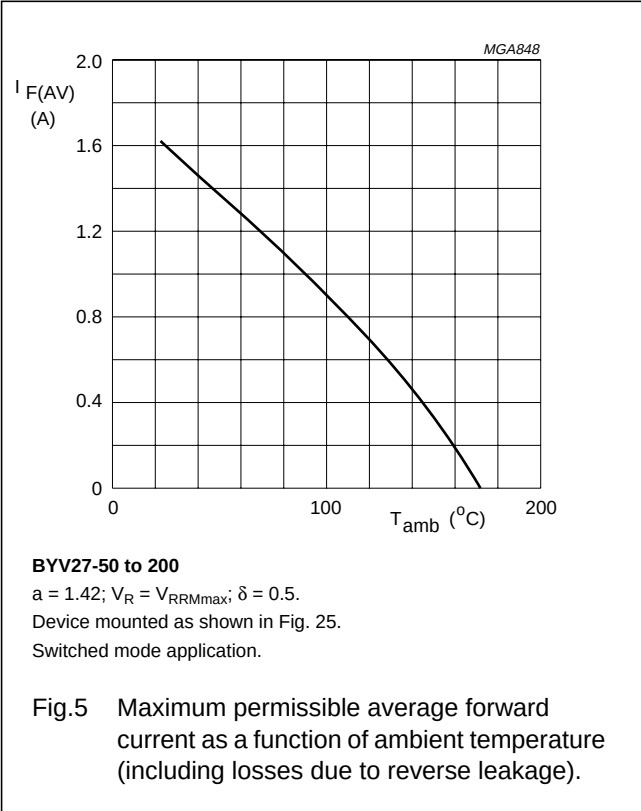
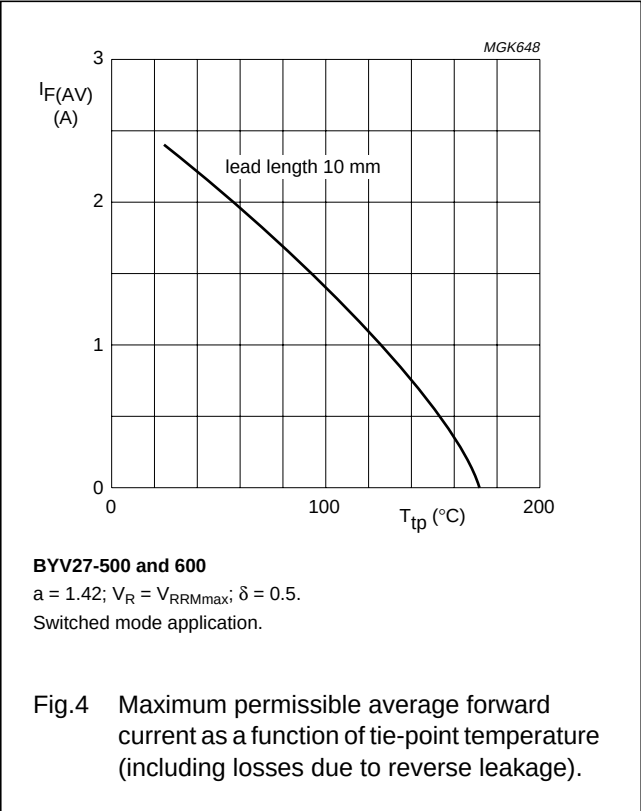
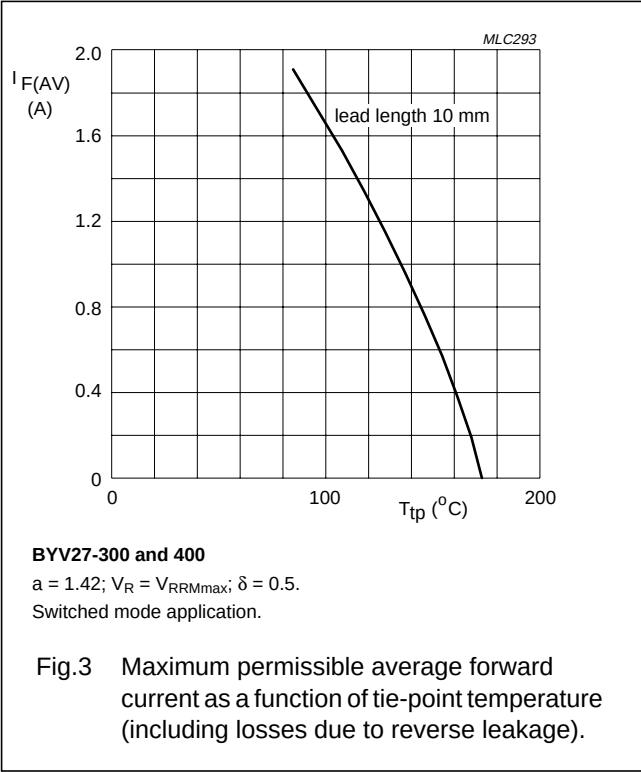
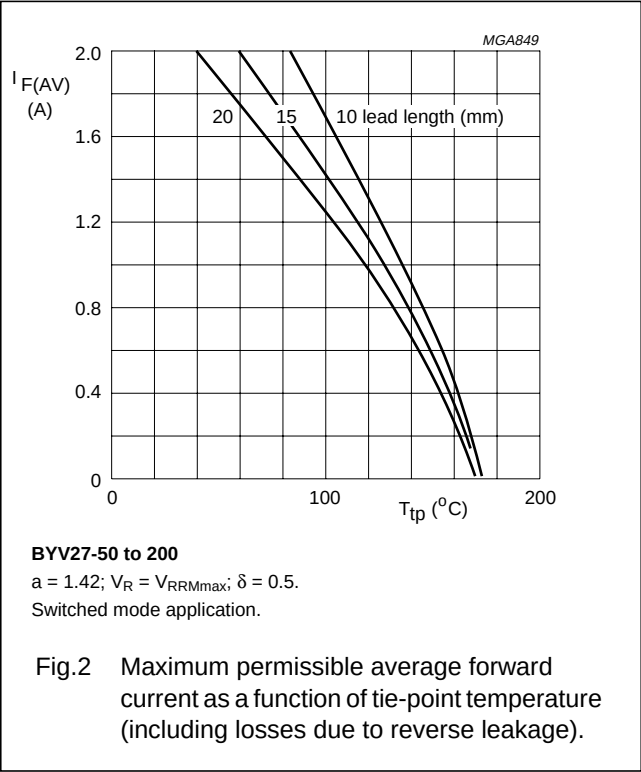
Note

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

Ultra fast low-loss
controlled avalanche rectifiers

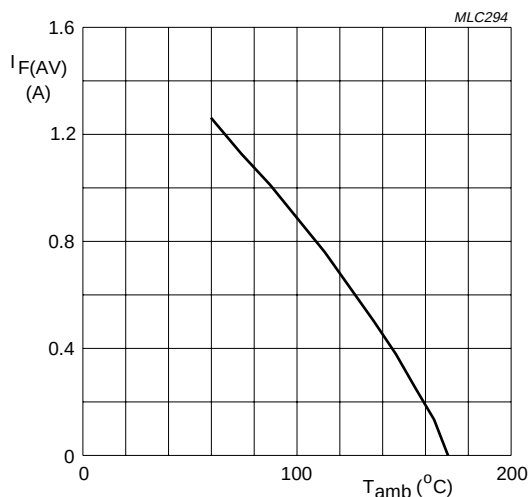
BYV27 series

GRAPHICAL DATA



Ultra fast low-loss controlled avalanche rectifiers

BYV27 series



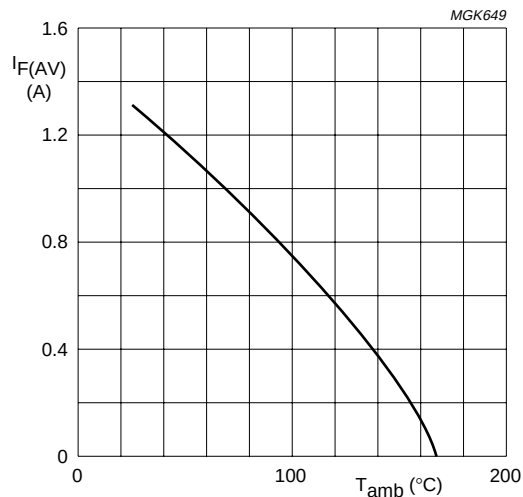
BYV27-300 and 400

$\alpha = 1.42$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig. 25.

Switched mode application.

Fig.6 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



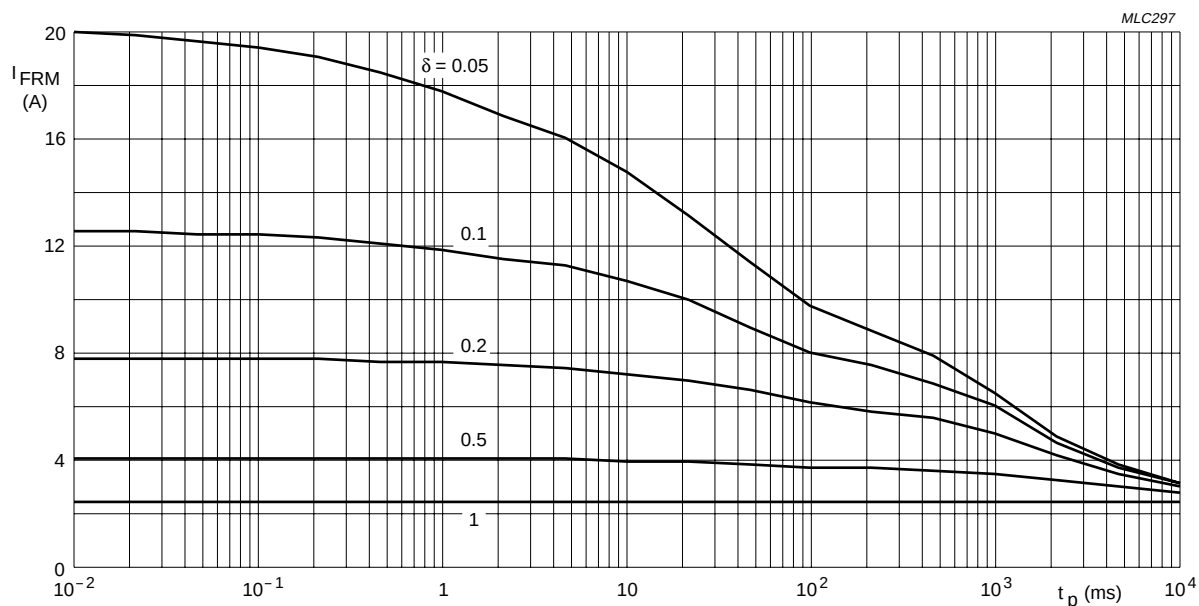
BYV27-500 and 600

$\alpha = 1.42$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig. 25.

Switched mode application.

Fig.7 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



BYV27-50 to 200

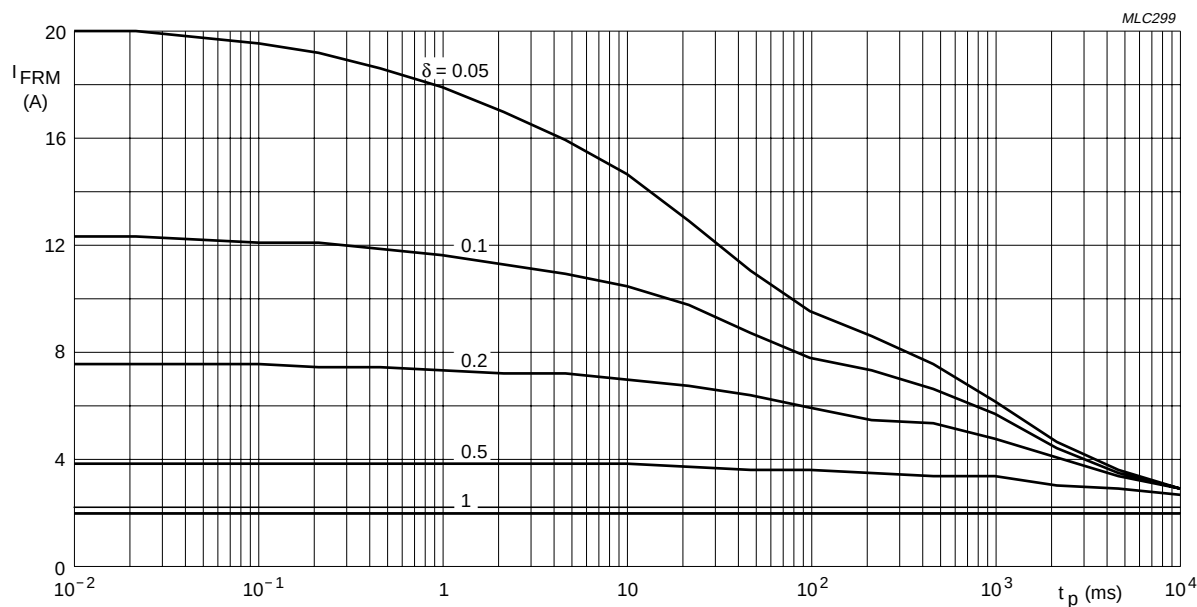
$T_{ip} = 85$ °C; $R_{th j-tp} = 46$ K/W.

V_{RRMmax} during $1 - \delta$; curves include derating for T_{jmax} at $V_{RRM} = 200$ V.

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

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BYV27 series

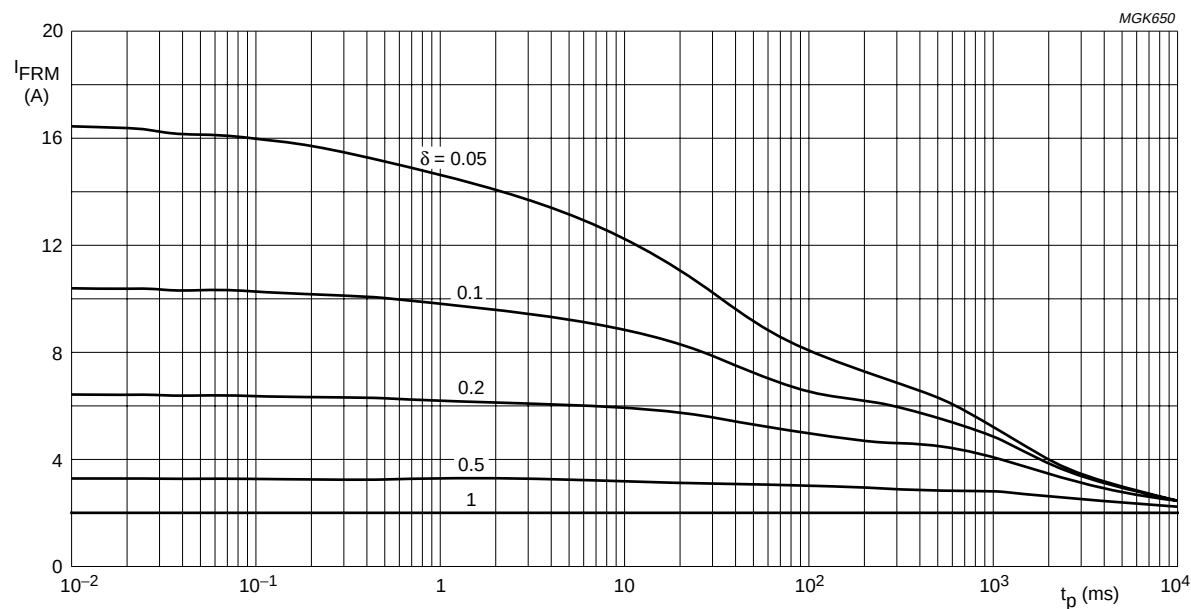


BYV27-300 and 400

$T_{ip} = 85^\circ\text{C}$; $R_{th j-tp} = 46 \text{ K/W}$.

V_{RRMmax} during $1 - \delta$; curves include derating for T_{jmax} at $V_{RRM} = 400 \text{ V}$.

Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYV27-500 and 600

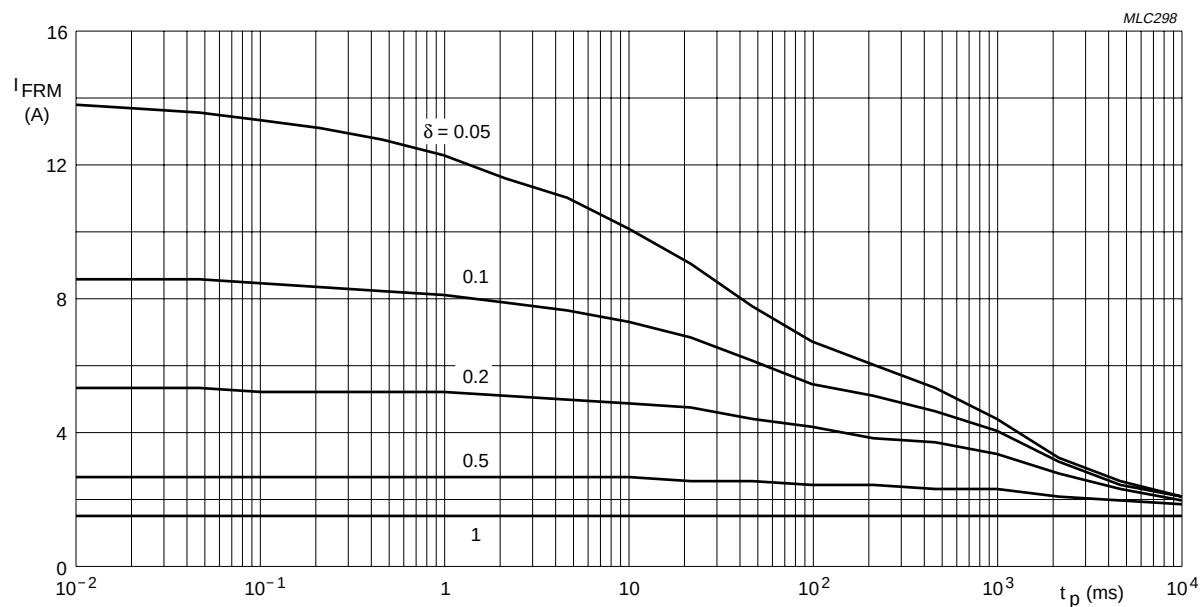
$T_{ip} = 85^\circ\text{C}$; $R_{th j-tp} = 46 \text{ K/W}$.

V_{RRMmax} during $1 - \delta$; curves include derating for T_{jmax} at $V_{RRM} = 600 \text{ V}$.

Fig.10 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

Ultra fast low-loss controlled avalanche rectifiers

BYV27 series

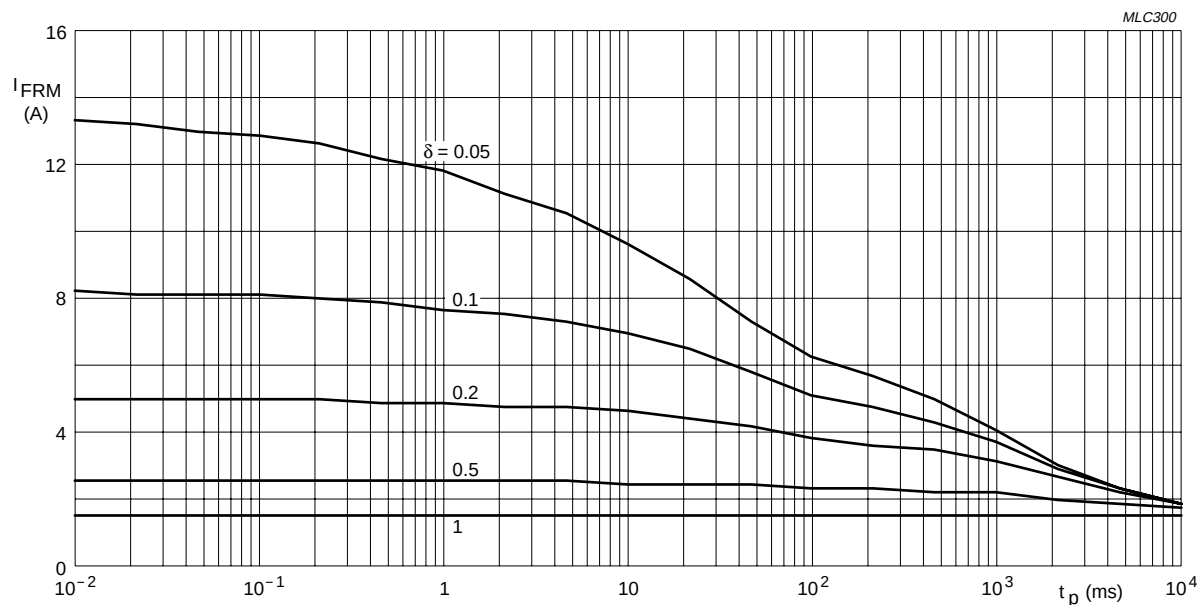


BYV27-50 to 200

$T_{amb} = 60^\circ\text{C}$; $R_{th\ j-a} = 100\text{ K/W}$.

V_{RRMmax} during $1 - \delta$; curves include derating for T_{jmax} at $V_{RRM} = 200\text{ V}$.

Fig.11 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYV27-300 and 400

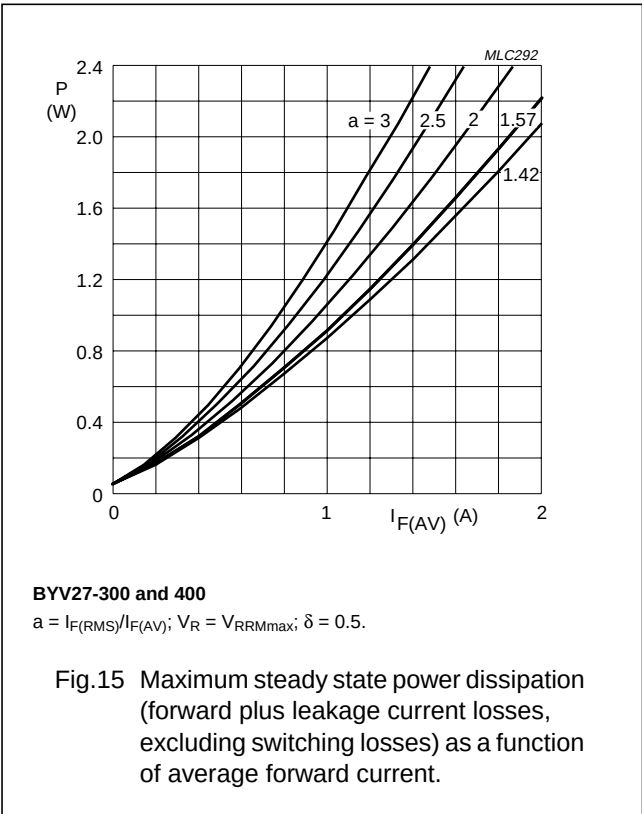
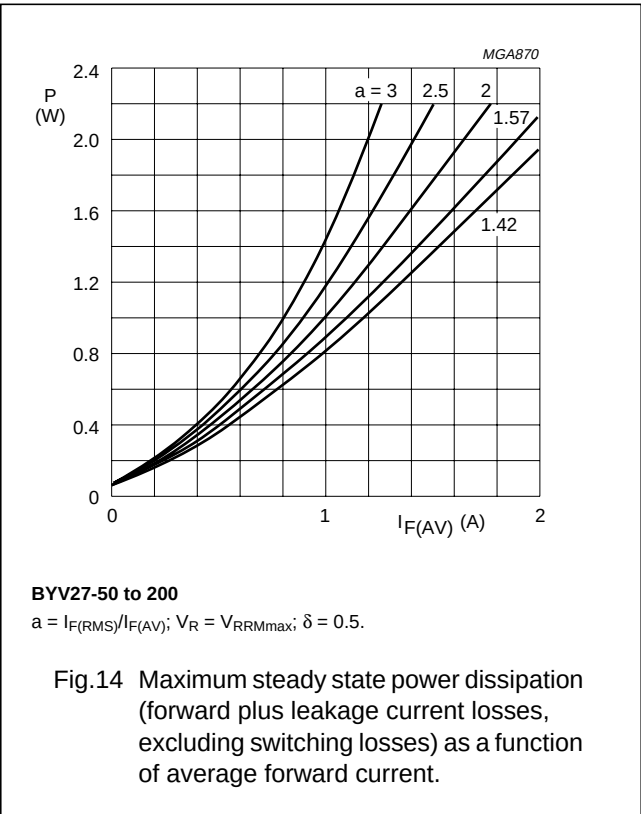
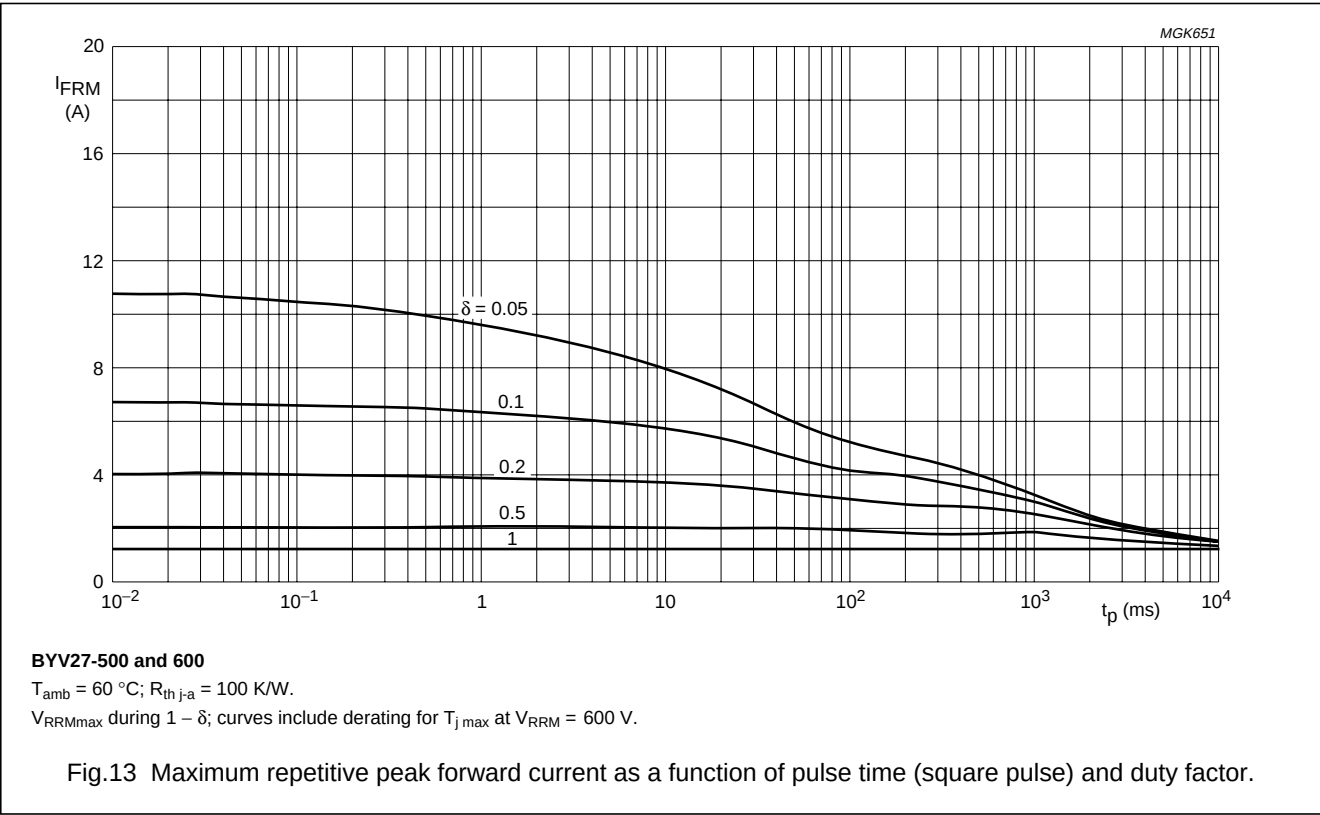
$T_{amb} = 60^\circ\text{C}$; $R_{th\ j-a} = 100\text{ K/W}$.

V_{RRMmax} during $1 - \delta$; curves include derating for T_{jmax} at $V_{RRM} = 400\text{ V}$.

Fig.12 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

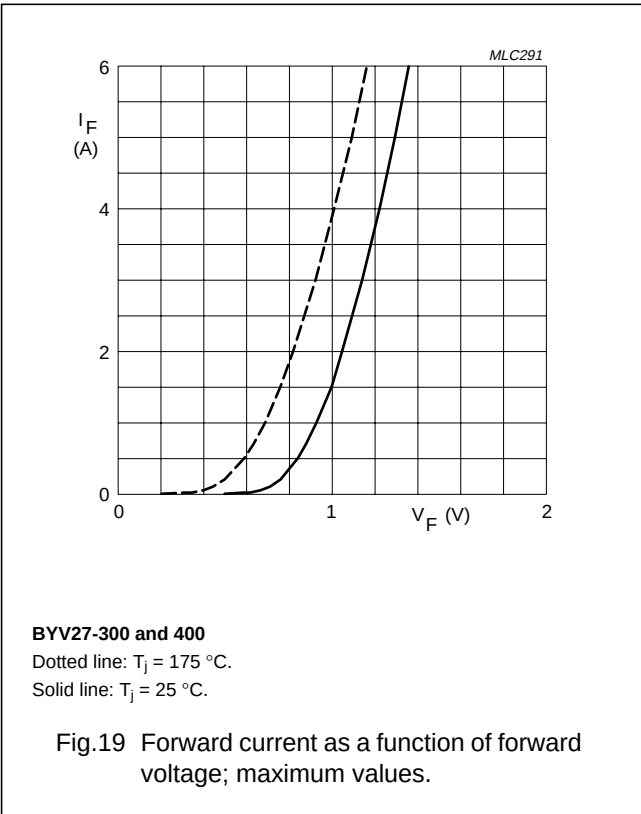
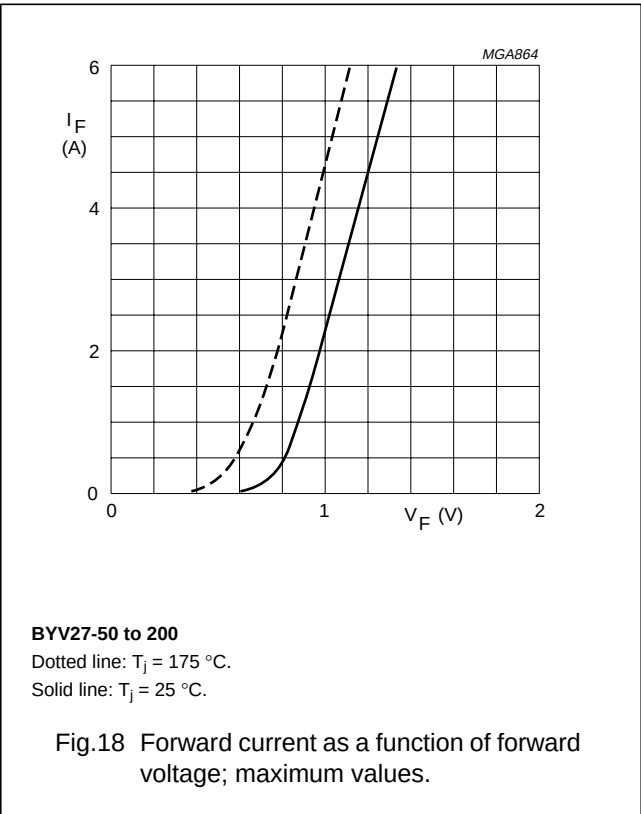
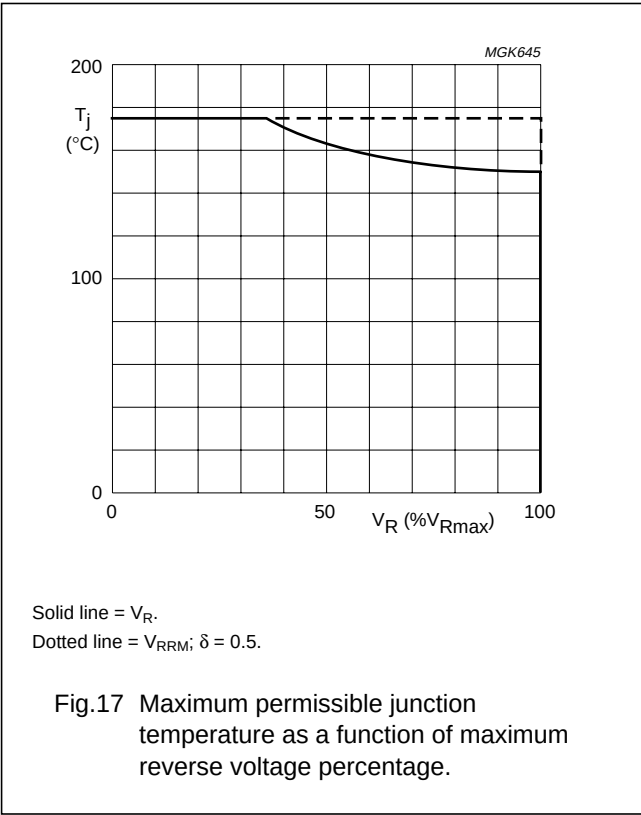
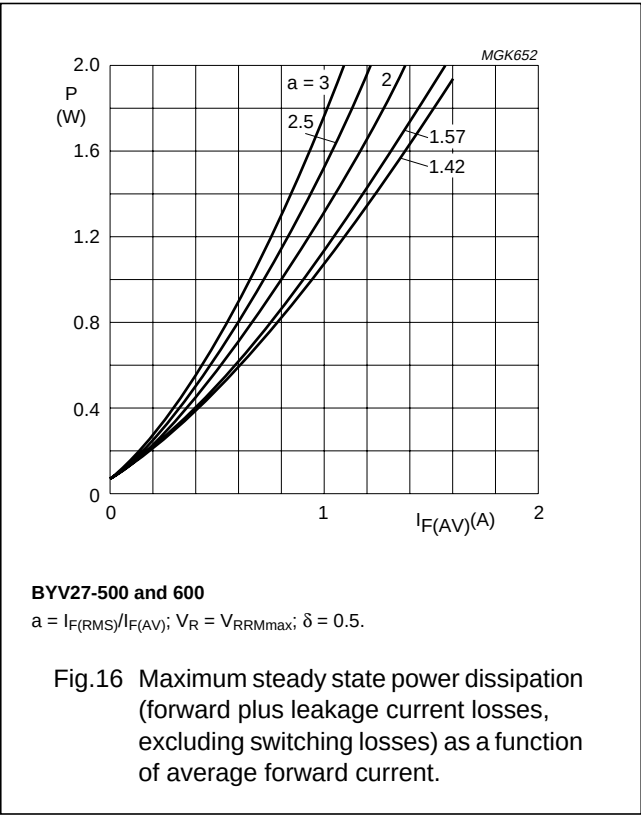
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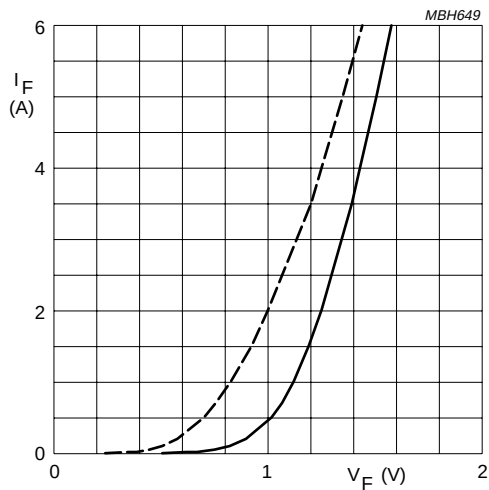
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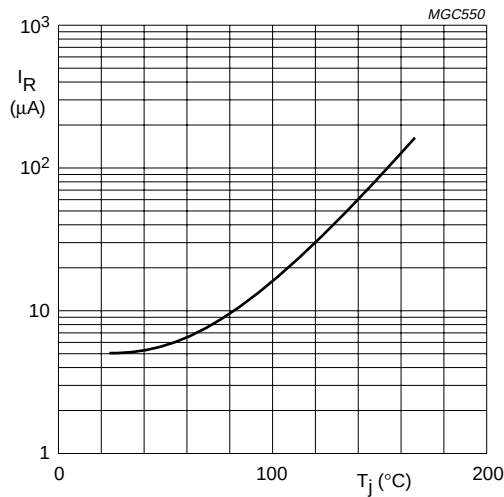
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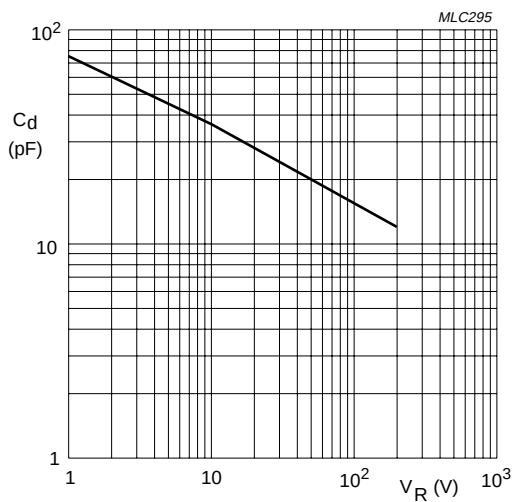
BYV27-500 and 600
Dotted line: $T_j = 175^\circ\text{C}$.
Solid line: $T_j = 25^\circ\text{C}$.

Fig.20 Forward current as a function of forward voltage; maximum values.



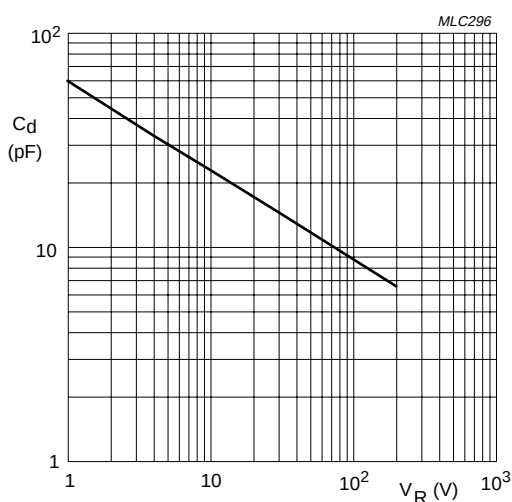
$V_R = V_{RRMmax}$.

Fig.21 Reverse current as a function of junction temperature; maximum values.



BYV27-50 to 200
 $f = 1\text{ MHz}$; $T_j = 25^\circ\text{C}$.

Fig.22 Diode capacitance as a function of reverse voltage; typical values.

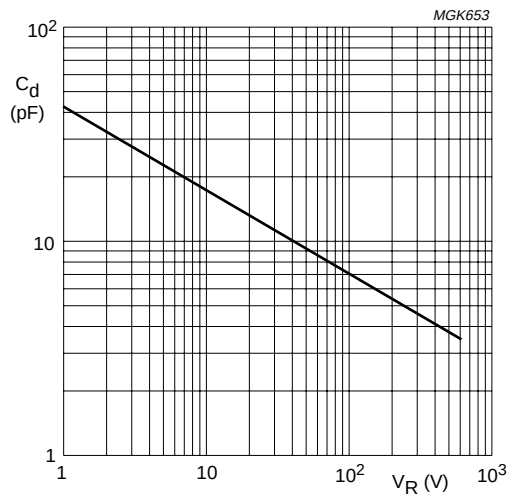


BYV27-300 and 400
 $f = 1\text{ MHz}$; $T_j = 25^\circ\text{C}$.

Fig.23 Diode capacitance as a function of reverse voltage; typical values.

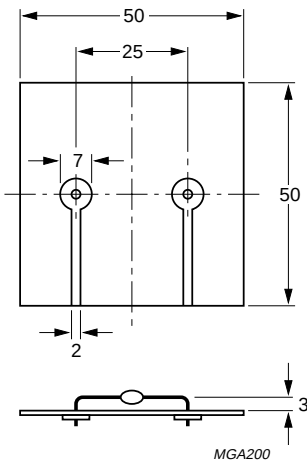
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BYV27-500 and 600
 $f = 1\text{ MHz}; T_j = 25\text{ }^{\circ}\text{C}.$

Fig.24 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

Fig.25 Device mounted on a printed-circuit board.

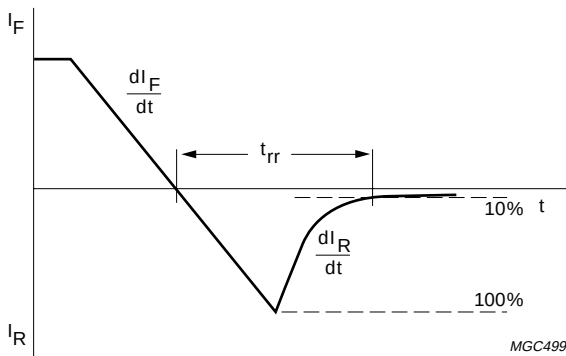
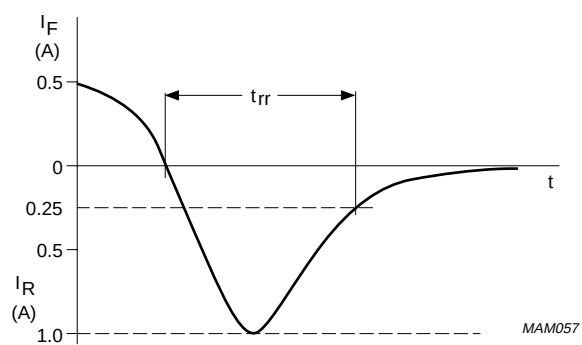
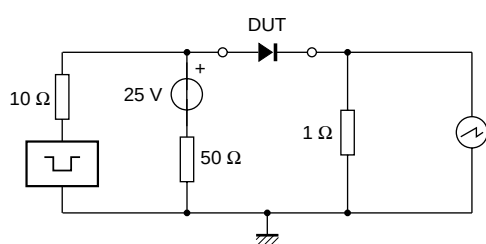


Fig.26 Reverse recovery definitions.

Ultra fast low-loss controlled avalanche rectifiers

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Input impedance oscilloscope: 1 M Ω , 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.

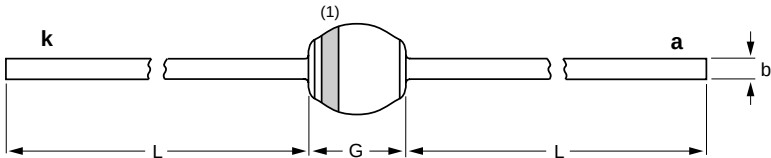
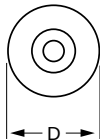
Ultra fast low-loss
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BYV27 series

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

02.55mm

scale

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.	

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.

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