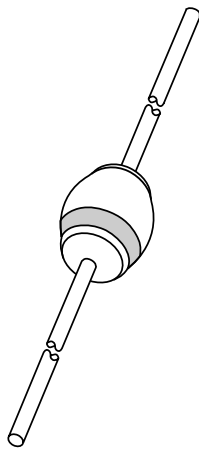


DATA SHEET



BYV27 series Ultra fast low-loss controlled avalanche rectifiers

Product specification
Supersedes data of 1996 Oct 02
File under Discrete Semiconductors, SC01

1997 Nov 24

Ultra fast low-loss controlled avalanche rectifiers

BYV27 series

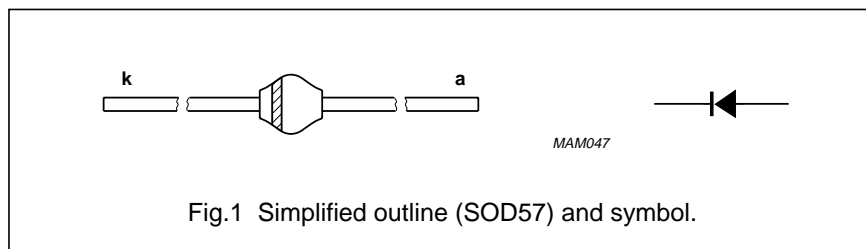
FEATURES

- 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
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
I _{F(AV)}	average forward current	T _{tp} = 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 _{F(AV)}	average forward current	T _{amb} = 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

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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			

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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/ μ s; see Fig. 26	–	–	4	A/ μ 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

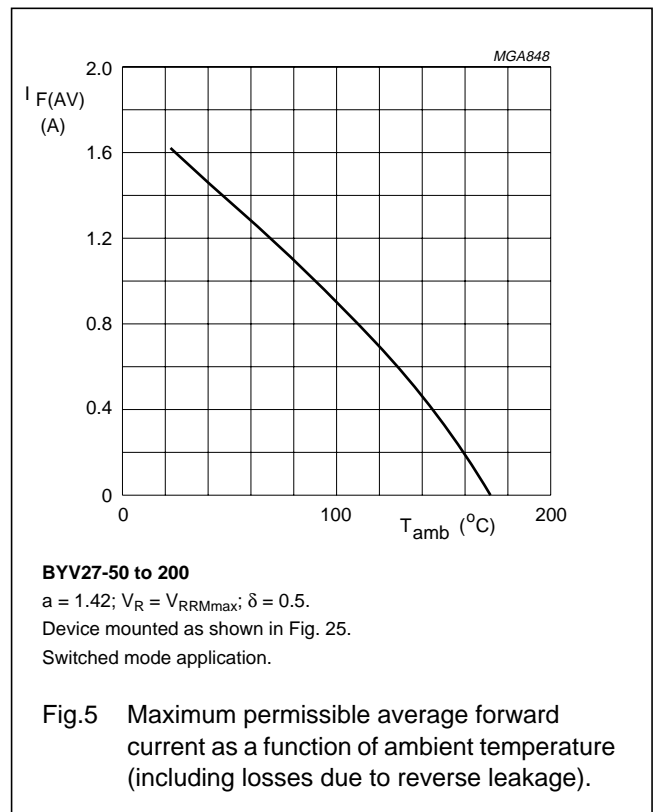
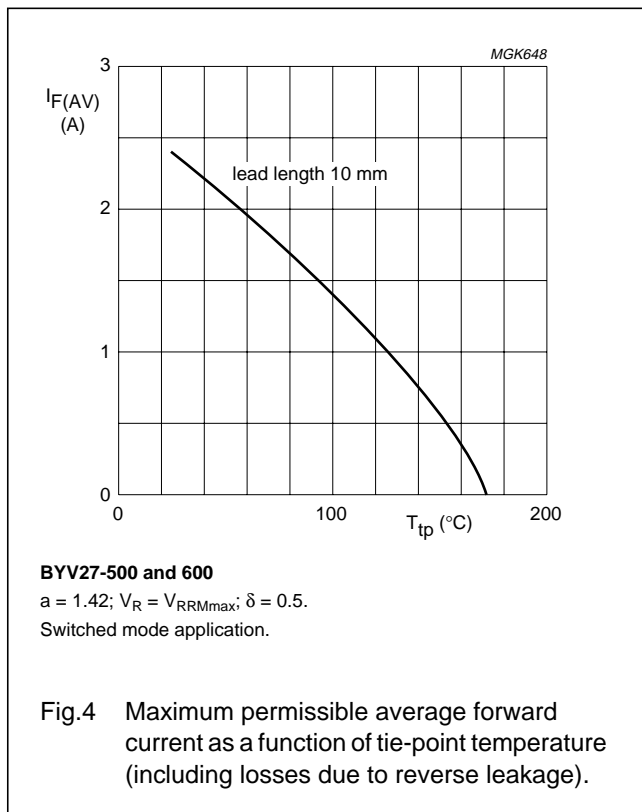
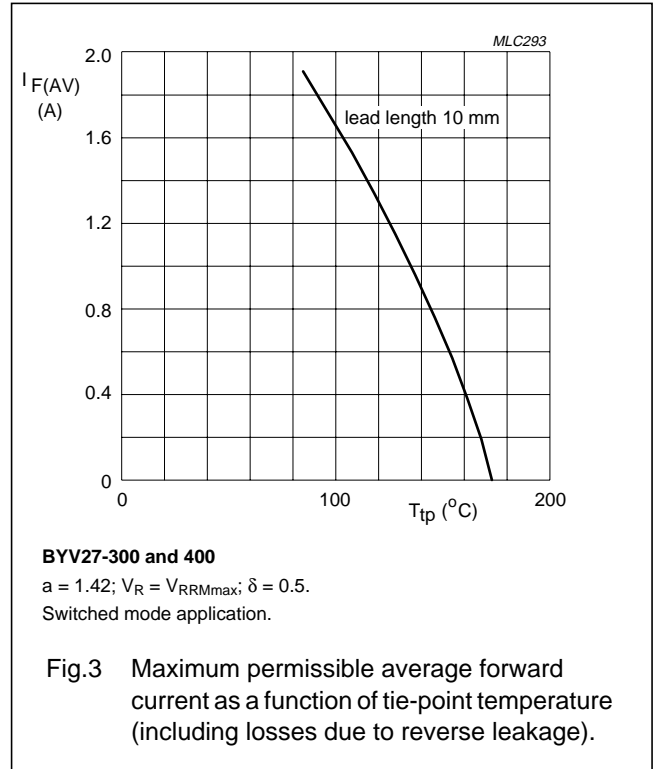
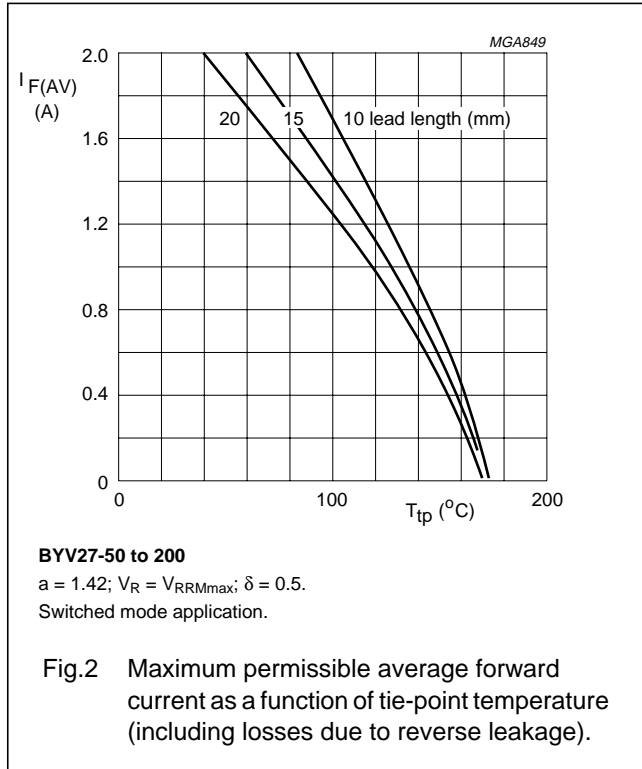
Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥ 40 μ m, see Fig. 25. For more information please refer to the 'General Part of Handbook SC01'.

Ultra fast low-loss
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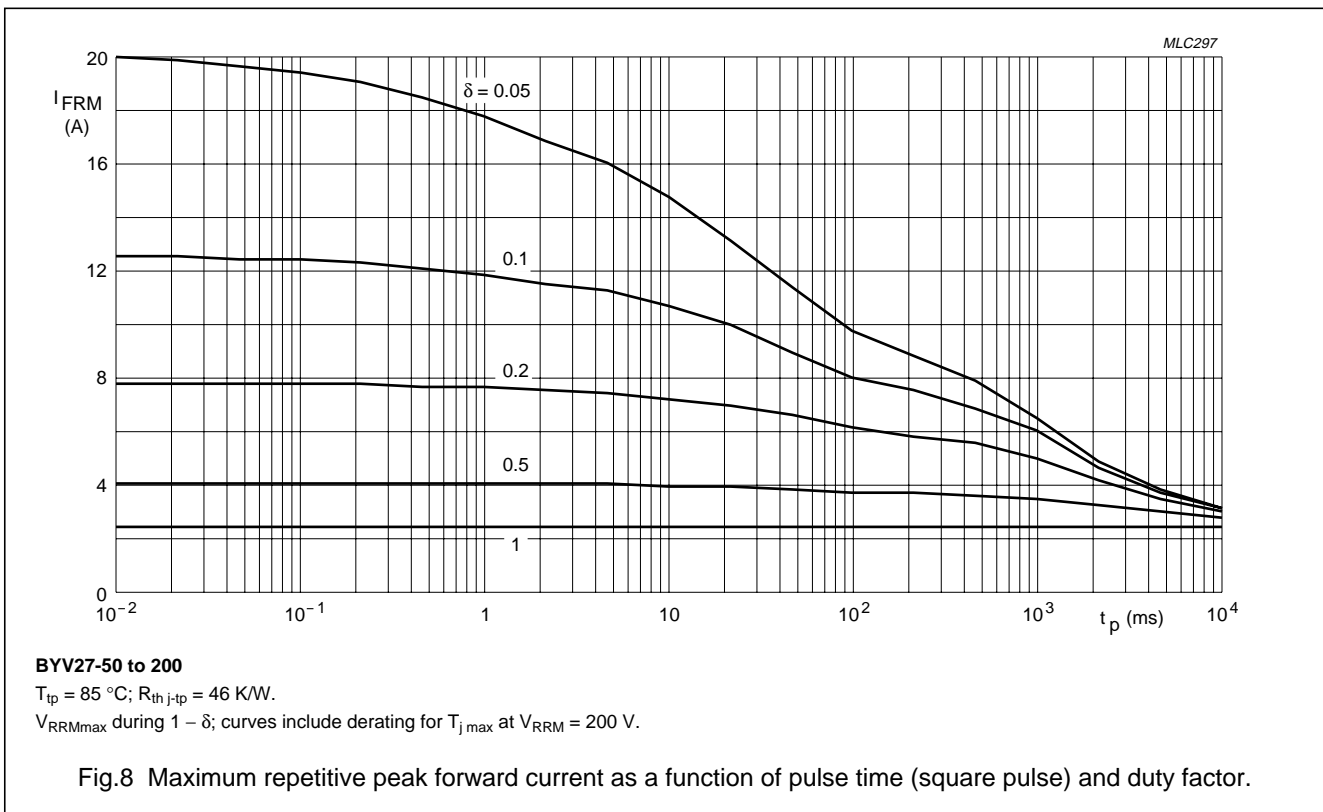
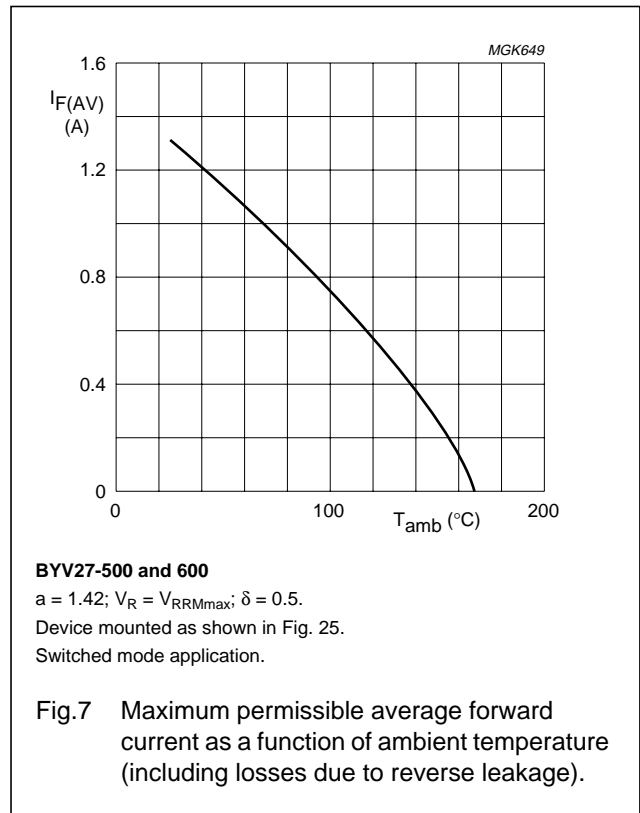
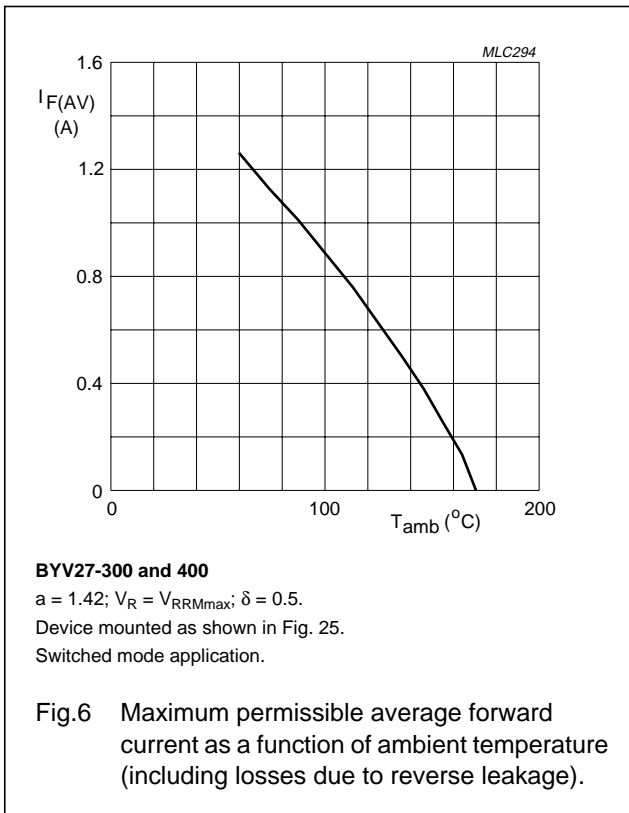
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GRAPHICAL DATA



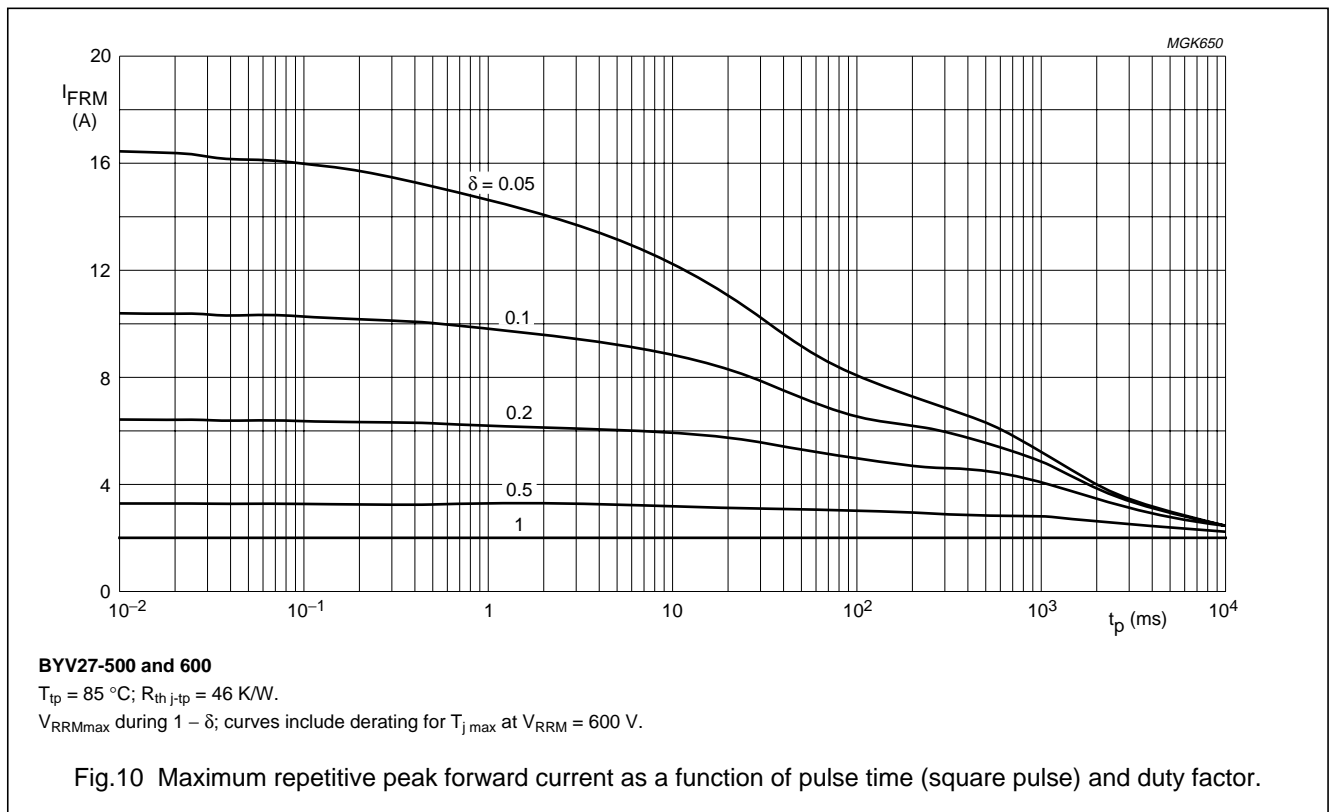
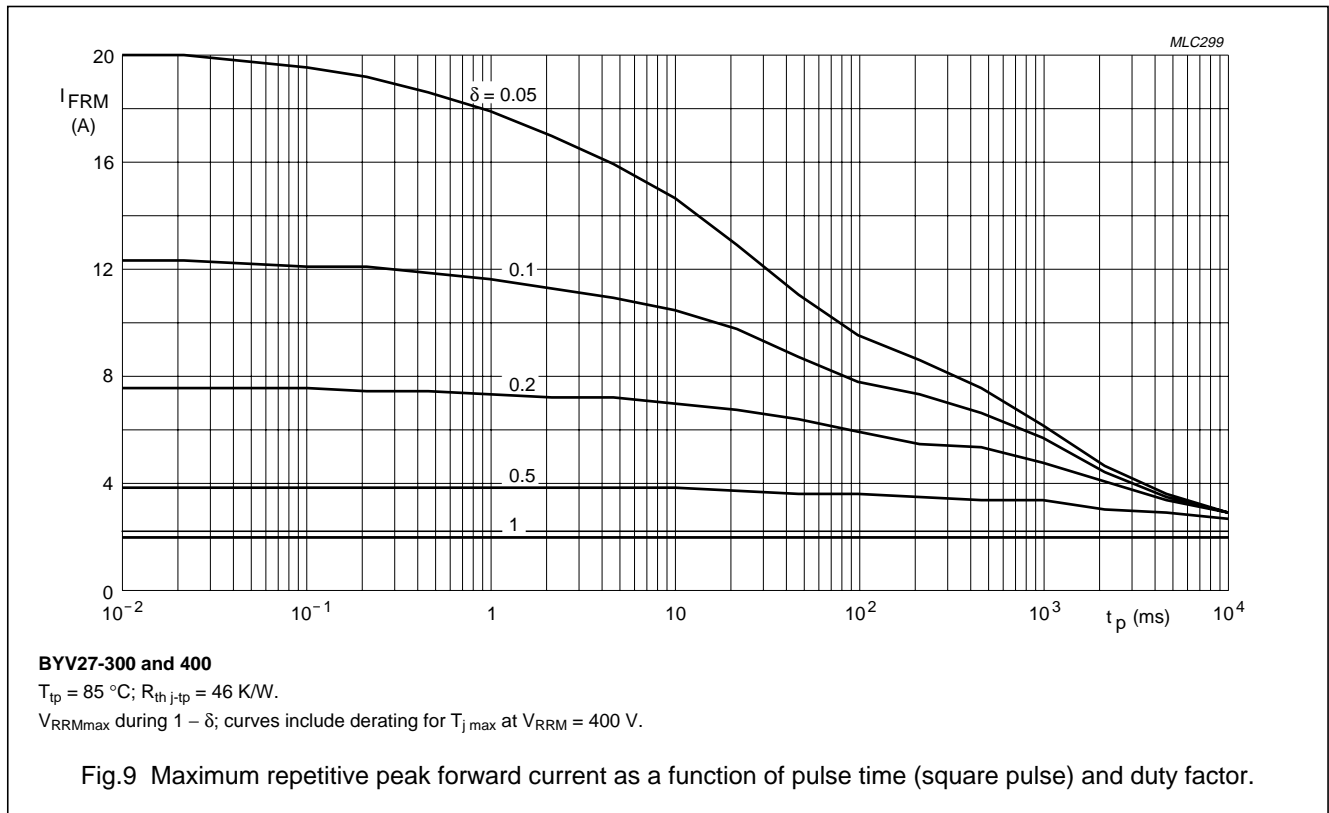
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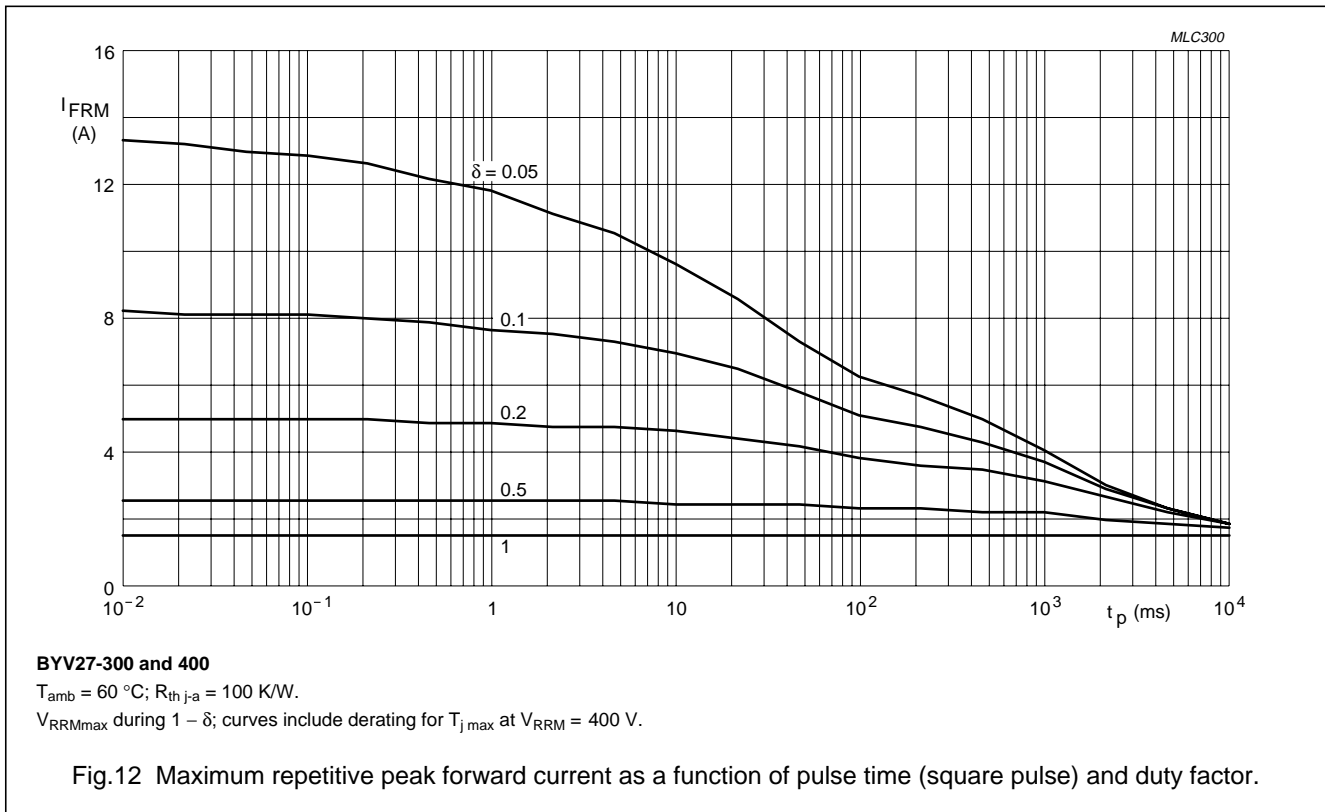
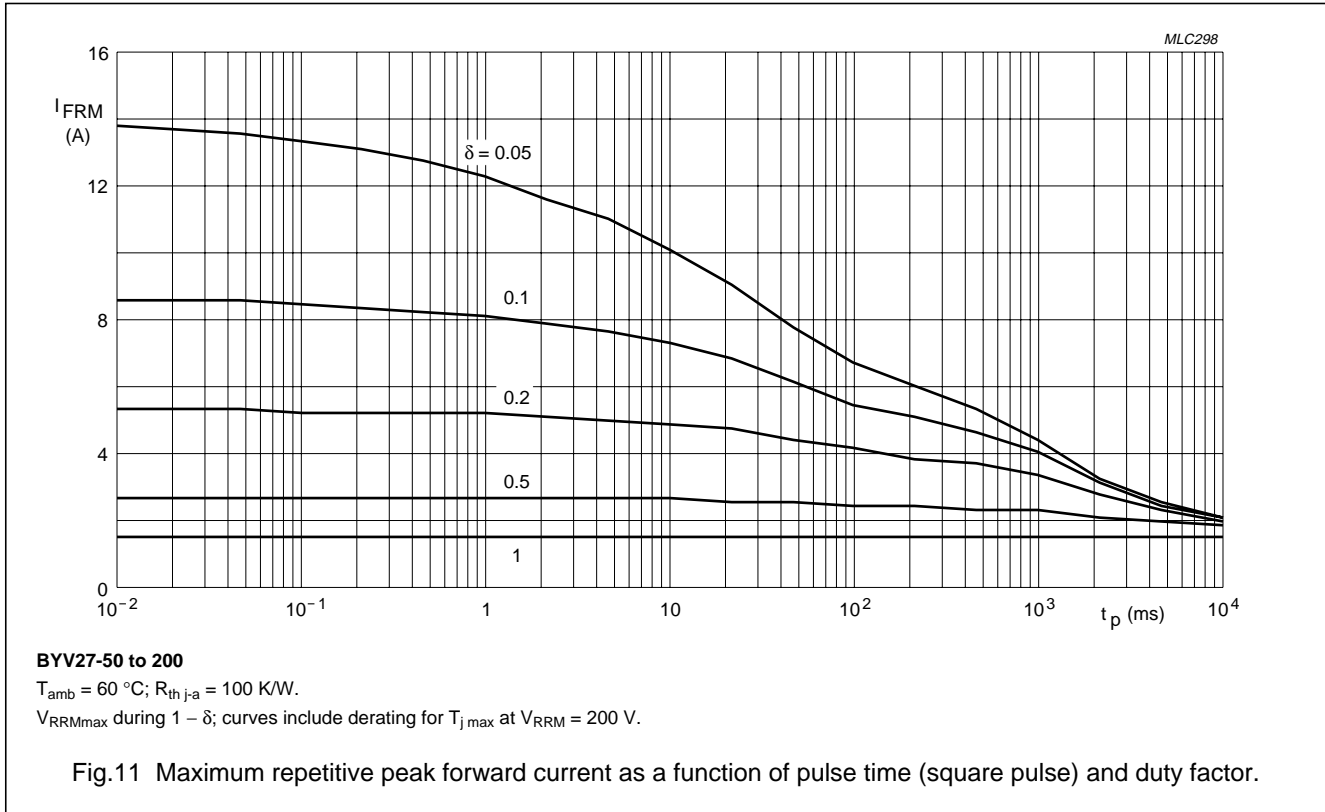
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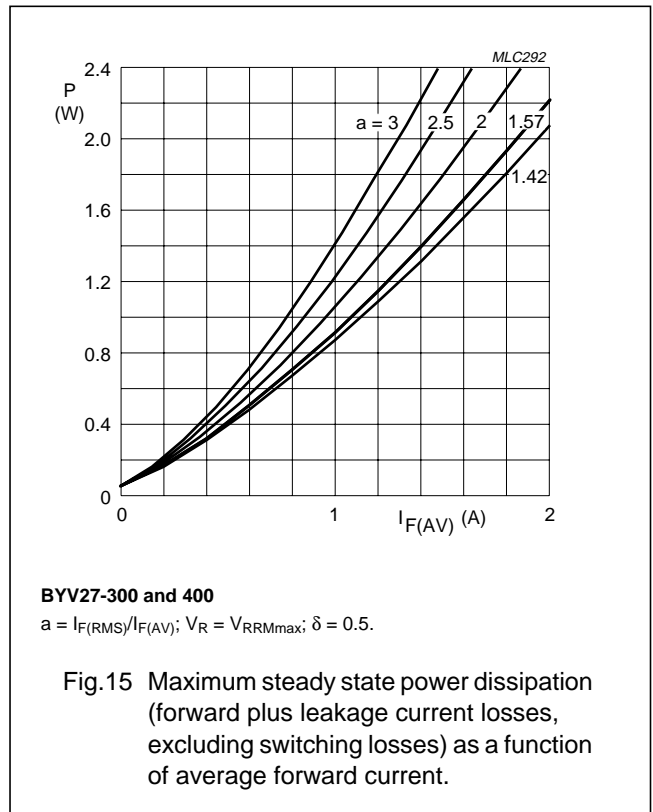
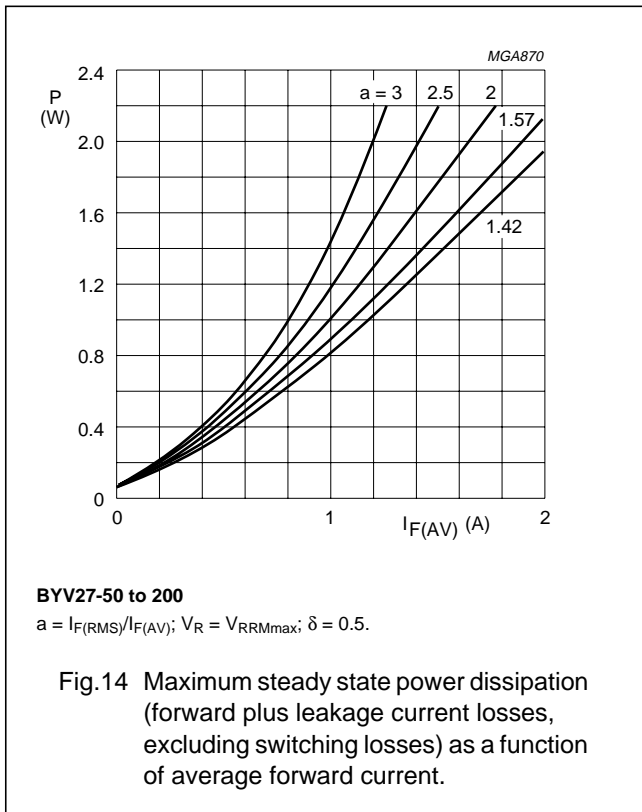
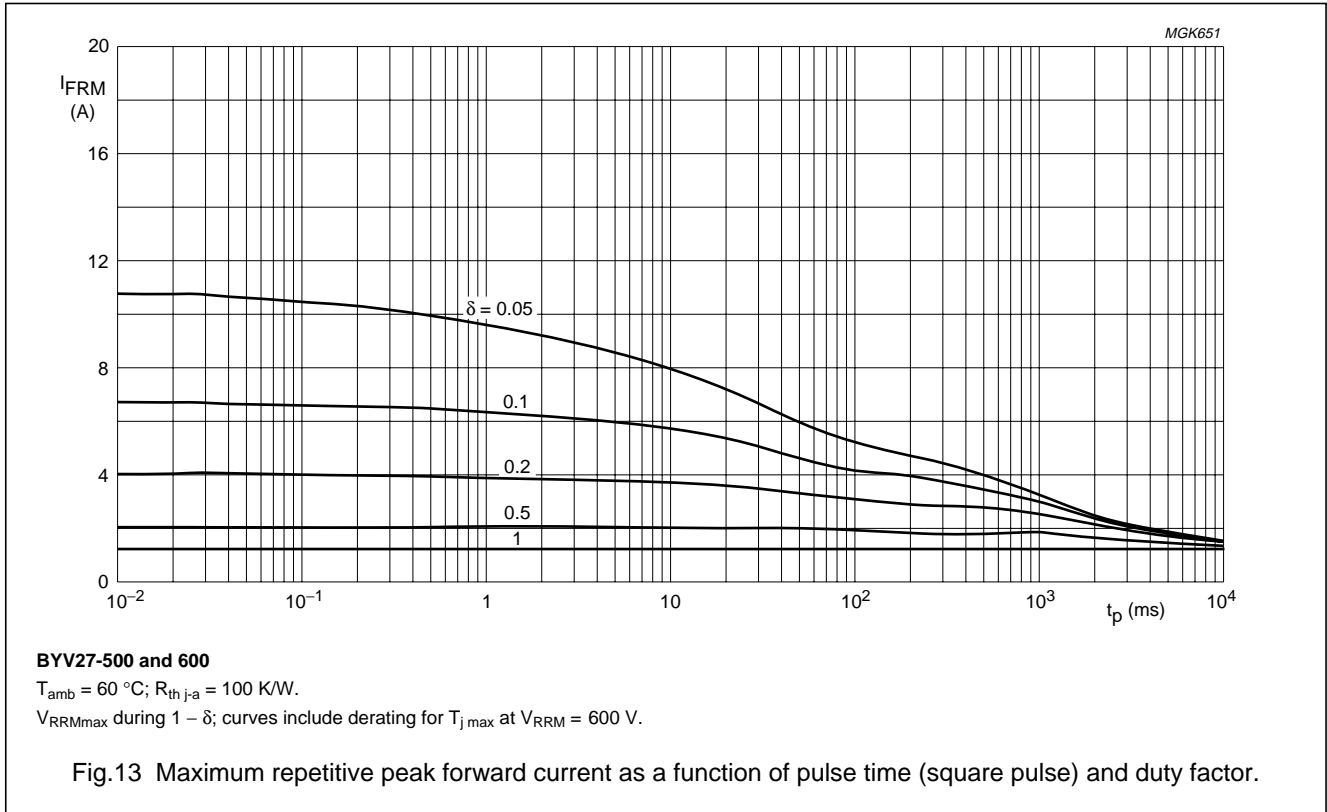
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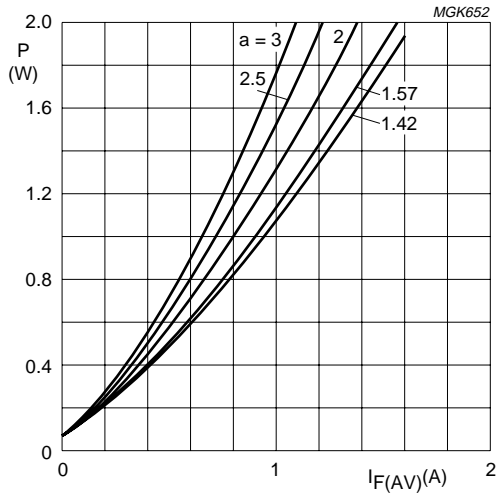
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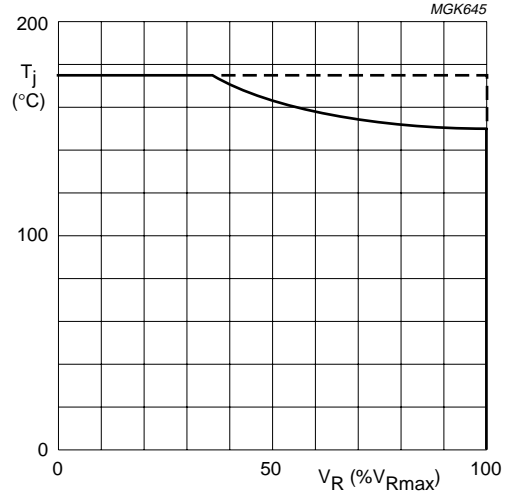
BYV27 series



BYV27-500 and 600

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

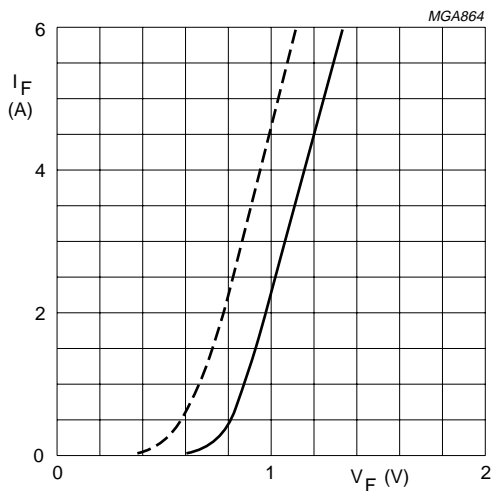
Fig. 16 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



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.

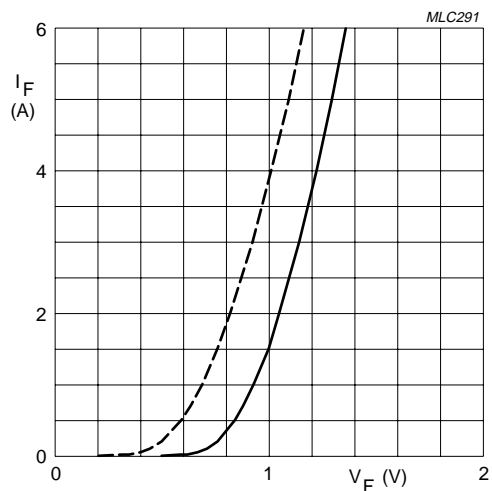


BYV27-50 to 200

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

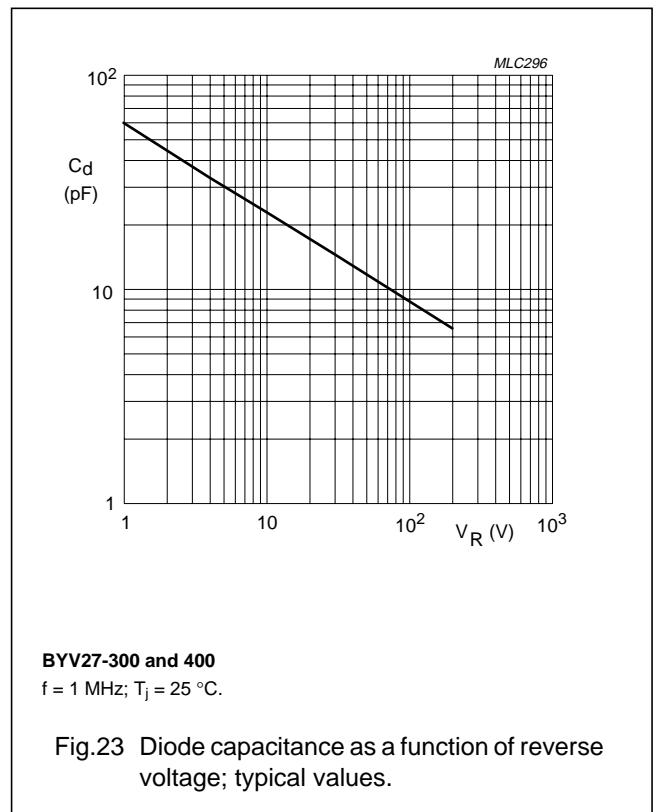
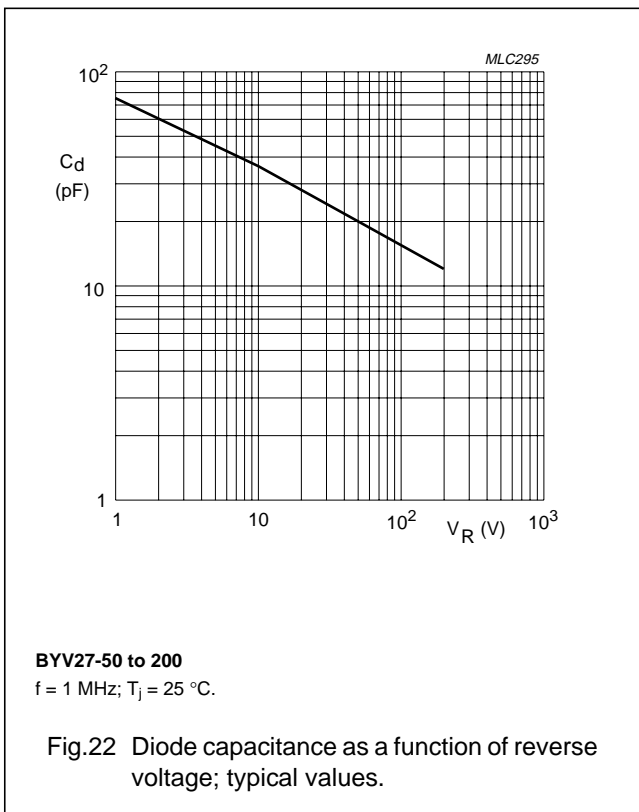
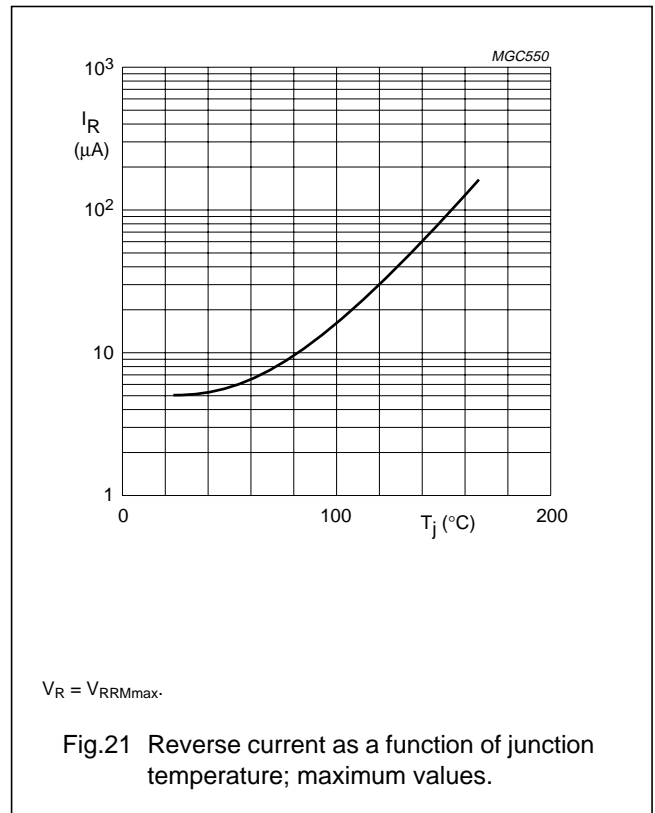
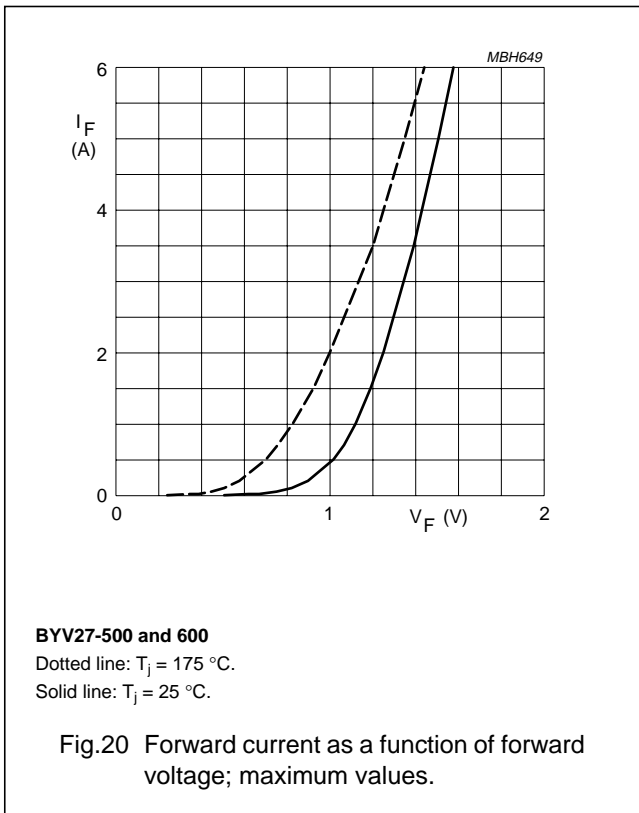
Dotted line: $T_j = 175$ °C.

Solid line: $T_j = 25$ °C.

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

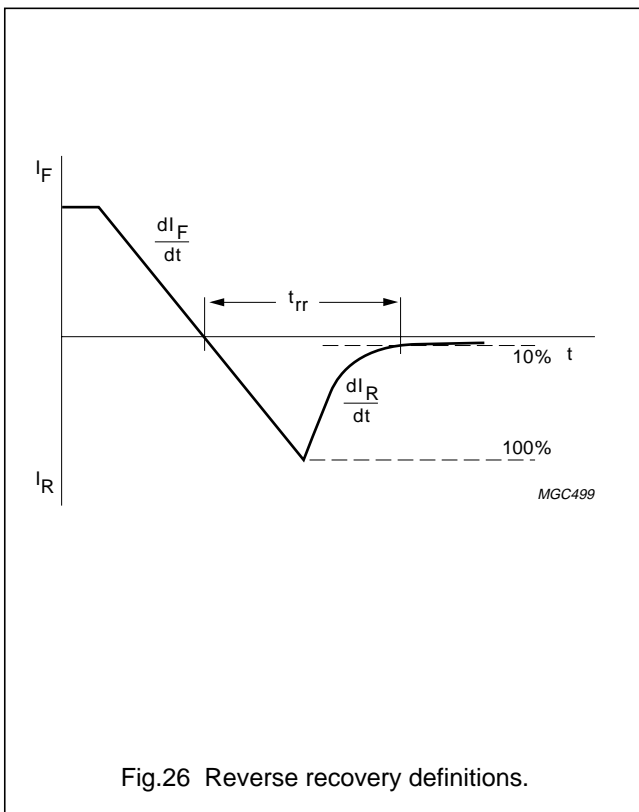
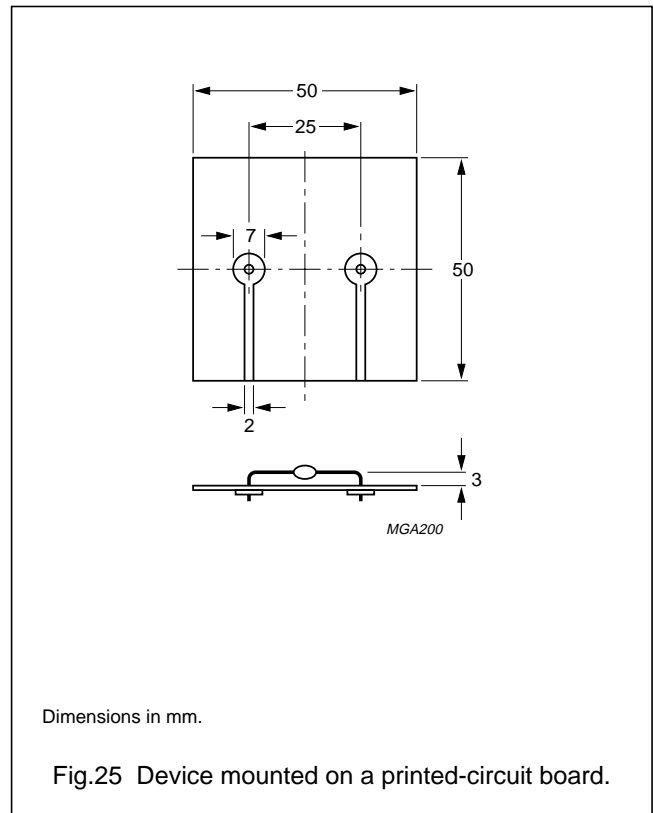
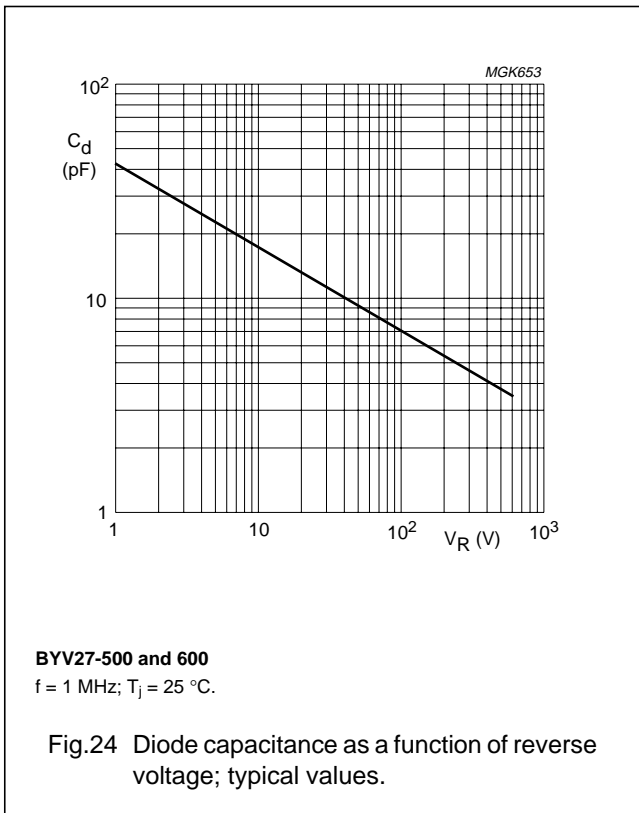
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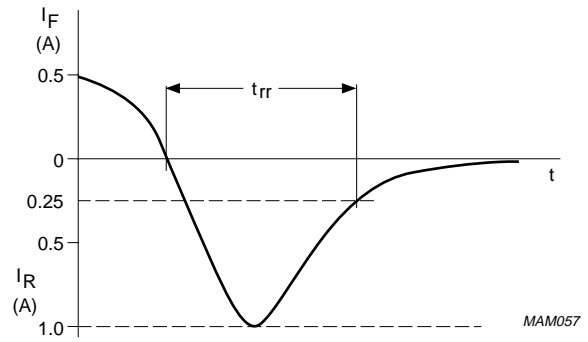
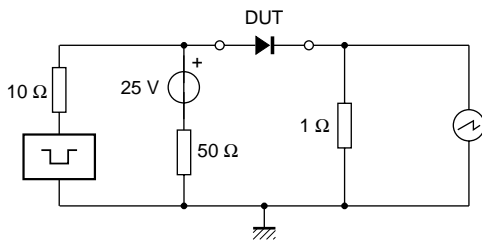
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Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

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

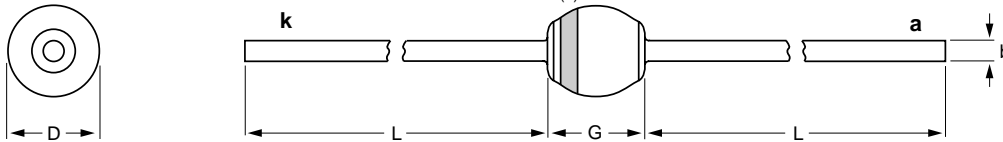
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PACKAGE OUTLINE

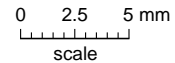
Hermetically sealed glass package; axial leaded; 2 leads

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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Argentina: see South America

Australia: 34 Waterloo Road, NORTH RYDE, NSW 2113,
Tel. +61 2 9805 4455, Fax. +61 2 9805 4466

Austria: Computerstr. 6, A-1101 WIEN, P.O. Box 213, Tel. +43 160 1010,
Fax. +43 160 101 1210

Belarus: Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
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Belgium: see The Netherlands

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China/Hong Kong: 501 Hong Kong Industrial Technology Centre,
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Tel. +852 2319 7888, Fax. +852 2319 7700

Colombia: see South America

Czech Republic: see Austria

Denmark: Prags Boulevard 80, PB 1919, DK-2300 COPENHAGEN S,
Tel. +45 32 88 2636, Fax. +45 31 57 0044

Finland: Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615800, Fax. +358 9 61580920

France: 51 Rue Carnot, BP317, 92156 SURESNES Cedex,
Tel. +33 1 40 99 6161, Fax. +33 1 40 99 6427

Germany: Hammerbrookstraße 69, D-20097 HAMBURG,
Tel. +49 40 23 53 60, Fax. +49 40 23 536 300

Greece: No. 15, 25th March Street, GR 17778 TAVROS/ATHENS,
Tel. +30 1 4894 339/239, Fax. +30 1 4814 240

Hungary: see Austria

India: Philips INDIA Ltd, Band Box Building, 2nd floor,
254-D, Dr. Annie Besant Road, Worli, MUMBAI 400 025,
Tel. +91 22 493 8541, Fax. +91 22 493 0966

Indonesia: see Singapore

Ireland: Newstead, Clonskeagh, DUBLIN 14,
Tel. +353 1 7640 000, Fax. +353 1 7640 200

Israel: RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,
TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

Italy: PHILIPS SEMICONDUCTORS, Piazza IV Novembre 3,
20124 MILANO, Tel. +39 2 6752 2531, Fax. +39 2 6752 2557

Japan: Philips Bldg 13-37, Kohnan 2-chome, Minato-ku, TOKYO 108,
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Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
Tel. +82 2 709 1412, Fax. +82 2 709 1415

Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,
Tel. +60 3 750 5214, Fax. +60 3 757 4880

Mexico: 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,
Tel. +9-5 800 234 7381

Middle East: see Italy

Netherlands: Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB,
Tel. +31 40 27 82785, Fax. +31 40 27 88399

New Zealand: 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. +64 9 849 4160, Fax. +64 9 849 7811

Norway: Box 1, Manglerud 0612, OSLO,
Tel. +47 22 74 8000, Fax. +47 22 74 8341

Philippines: Philips Semiconductors Philippines Inc.,
106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI,
Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

Poland: Ul. Lukiska 10, PL 04-123 WARSZAWA,
Tel. +48 22 612 2831, Fax. +48 22 612 2327

Portugal: see Spain

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Russia: Philips Russia, Ul. Usatcheva 35A, 119048 MOSCOW,
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Singapore: Lorong 1, Toa Payoh, SINGAPORE 1231,
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South Africa: S.A. PHILIPS Pty Ltd., 195-215 Main Road Martindale,
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South America: Al. Vicente Pinzon, 173, 6th floor,
04547-130 SÃO PAULO, SP, Brazil,
Tel. +55 11 821 2333, Fax. +55 11 821 2382

Spain: Balmes 22, 08007 BARCELONA,
Tel. +34 3 301 6312, Fax. +34 3 301 4107

Sweden: Kottbygatan 7, Akalla, S-16485 STOCKHOLM,
Tel. +46 8 632 2000, Fax. +46 8 632 2745

Switzerland: Allmendstrasse 140, CH-8027 ZÜRICH,
Tel. +41 1 488 2686, Fax. +41 1 481 7730

Taiwan: Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1,
TAIPEI, Taiwan Tel. +886 2 2134 2865, Fax. +886 2 2134 2874

Thailand: PHILIPS ELECTRONICS (THAILAND) Ltd.,
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Turkey: Talatpasa Cad. No. 5, 80640 GÜLTEPE/ISTANBUL,
Tel. +90 212 279 2770, Fax. +90 212 282 6707

Ukraine: PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,
252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes,
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United States: 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
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Printed in The Netherlands

117027/1200/04/pp16

Date of release: 1997 Nov 24

Document order number: 9397 750 02663

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