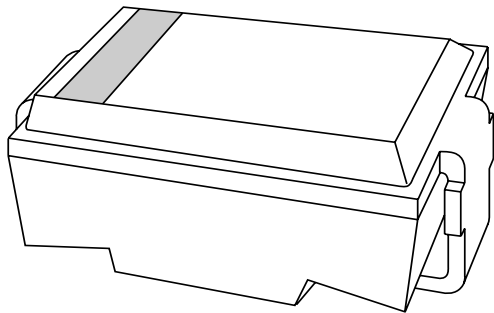


# DATA SHEET



## **BYG80 series** Ultra fast low-loss controlled avalanche rectifiers

Product specification  
Supersedes data of 1996 May 24  
File under Discrete Semiconductors, SC01

1997 Nov 25

# Ultra fast low-loss controlled avalanche rectifiers

## BYG80 series

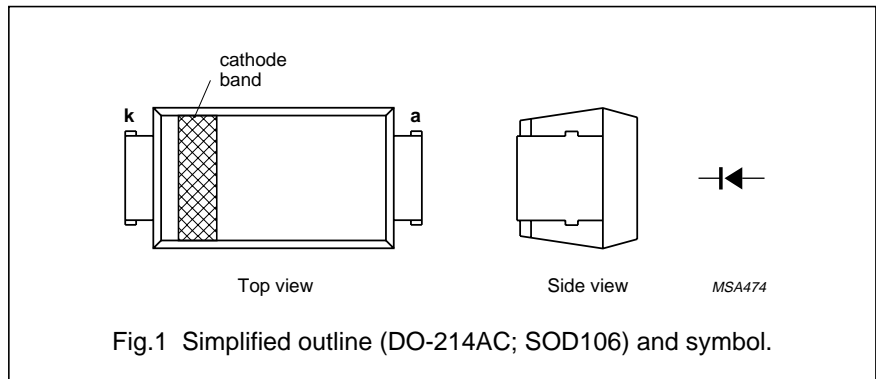
### FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- UL 94V-O classified plastic package
- Shipped in 12 mm embossed tape.

### DESCRIPTION

DO-214AC surface mountable package with glass passivated chip.

The well-defined void-free case is of a transfer-moulded thermo-setting plastic.



### 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				
	BYG80A		–	50	V
	BYG80B		–	100	V
	BYG80C		–	150	V
	BYG80D		–	200	V
	BYG80F		–	300	V
	BYG80G		–	400	V
	BYG80J		–	600	V
V <sub>R</sub>	continuous reverse voltage				
	BYG80A		–	50	V
	BYG80B		–	100	V
	BYG80C		–	150	V
	BYG80D		–	200	V
	BYG80F		–	300	V
	BYG80G		–	400	V
	BYG80J		–	600	V
I <sub>F(AV)</sub>	average forward current	T <sub>tp</sub> = 100 °C; see Figs 2, 3 and 4 averaged over any 20 ms period; see also Figs 17, 18 and 19			
	BYG80A to D		–	2.4	A
	BYG80F; BYG80G		–	2.3	A
I <sub>F(AV)</sub>	average forward current	T <sub>amb</sub> = 60 °C; AL <sub>2</sub> O <sub>3</sub> PCB mounting (see Fig.27); see Figs 5, 6 and 7 averaged over any 20 ms period; see also Figs 17, 18 and 19			
	BYG80A to D		–	1.25	A
	BYG80F; BYG80G		–	1.15	A
	BYG80J		–	0.95	A

## Ultra fast low-loss controlled avalanche rectifiers

## BYG80 series

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current BYG80A to D BYG80F; BYG80G BYG80J	$T_{amb} = 60\text{ °C}$ ; epoxy PCB mounting (see Fig.27); see Figs 5, 6 and 7 averaged over any 20 ms period; see also Figs 17, 18 and 19	–	0.95	A
			–	0.85	A
			–	0.65	A
$I_{FRM}$	repetitive peak forward current BYG80A to D BYG80F; BYG80G BYG80J	$T_{tp} = 100\text{ °C}$ ; see Figs 8, 9 and 10	–	21	A
			–	21	A
			–	18	A
$I_{FRM}$	repetitive peak forward current BYG80A to D BYG80F; BYG80G BYG80J	$T_{amb} = 60\text{ °C}$ ; $Al_2O_3$ PCB mounting; see Figs 11, 12 and 13	–	11	A
			–	11	A
			–	9	A
$I_{FRM}$	repetitive peak forward current BYG80A to D BYG80F; BYG80G BYG80J	$T_{amb} = 60\text{ °C}$ ; epoxy PCB mounting; see Figs 14, 15 and 16	–	8	A
			–	8	A
			–	6	A
$I_{FSM}$	non-repetitive peak forward current BYG80A to D BYG80F; BYG80G; BYG80J	$t = 8.3\text{ ms}$ half sine wave; $T_j = 25\text{ °C}$ prior to surge; $V_R = V_{RRMmax}$	–	36	A
			–	32	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.20	–65	+175	°C

### ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_F$	forward voltage BYG80A to D BYG80F; BYG80G BYG80J	$I_F = 1\text{ A}$ ; $T_j = T_{jmax}$ ; see Figs 21, 22 and 23	–	–	0.67	V
			–	–	0.73	V
			–	–	0.96	V
$V_F$	forward voltage BYG80A to D BYG80F; BYG80G BYG80J	$I_F = 1\text{ A}$ ; see Figs 21, 22 and 23	–	–	0.93	V
			–	–	0.98	V
			–	–	1.20	V

# Ultra fast low-loss controlled avalanche rectifiers

## BYG80 series

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)R}$	reverse avalanche breakdown voltage	$I_R = 0.1 \text{ mA}$				
	BYG80A		55	–	–	V
	BYG80B		110	–	–	V
	BYG80C		165	–	–	V
	BYG80D		220	–	–	V
	BYG80F		330	–	–	V
	BYG80G		440	–	–	V
	BYG80J		675	–	–	V
$I_R$	reverse current	$V_R = V_{RRMmax}$ ; see Figs 24 and 25	–	–	10	$\mu\text{A}$
$I_R$	reverse current	$V_R = V_{RRMmax}$ ; $T_j = 165 \text{ }^\circ\text{C}$ ; see Figs 24 and 25	–	–	100	$\mu\text{A}$
	BYG80A to D BYG80F; BYG80G and J		–	–	150	$\mu\text{A}$
$t_{rr}$	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.29	–	–	25	ns
	BYG80A to D BYG80F; BYG80G and J		–	–	50	ns
$C_d$	diode capacitance	$f = 1 \text{ MHz}$ ; $V_R = 0$ ; see Fig.26	–	90	–	pF
	BYG80A to D		–	70	–	pF
	BYG80F; BYG80G BYG80J		–	65	–	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.28	–	–	3	$\text{A}/\mu\text{s}$
	BYG80A to D BYG80F; BYG80G and J		–	–	4	$\text{A}/\mu\text{s}$

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th \text{ j-tp}}$	thermal resistance from junction to tie-point		25	K/W
$R_{th \text{ j-a}}$	thermal resistance from junction to ambient	note 1	100	K/W
		note 2	150	K/W

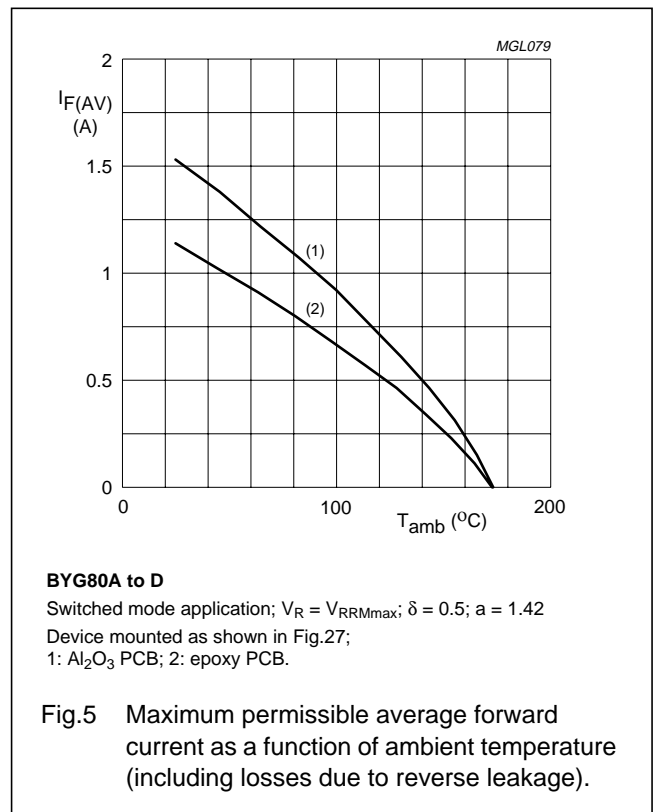
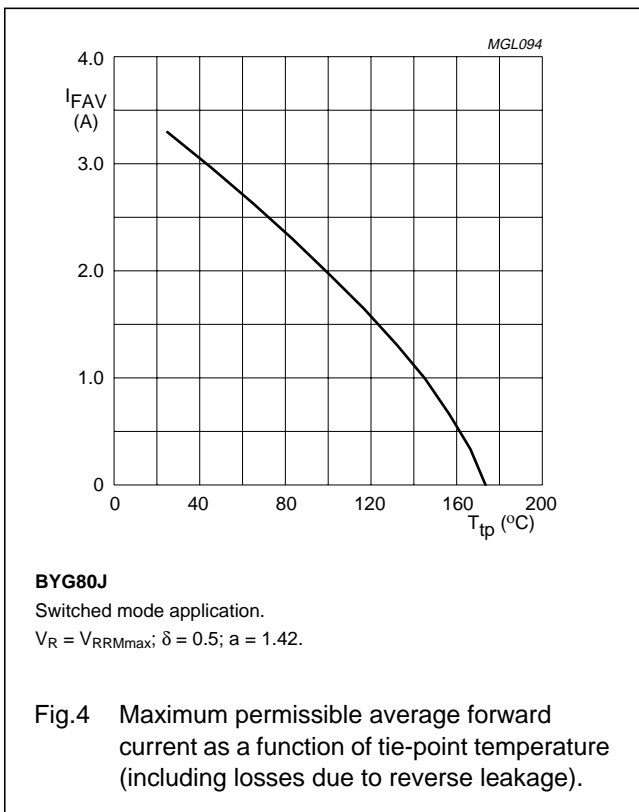
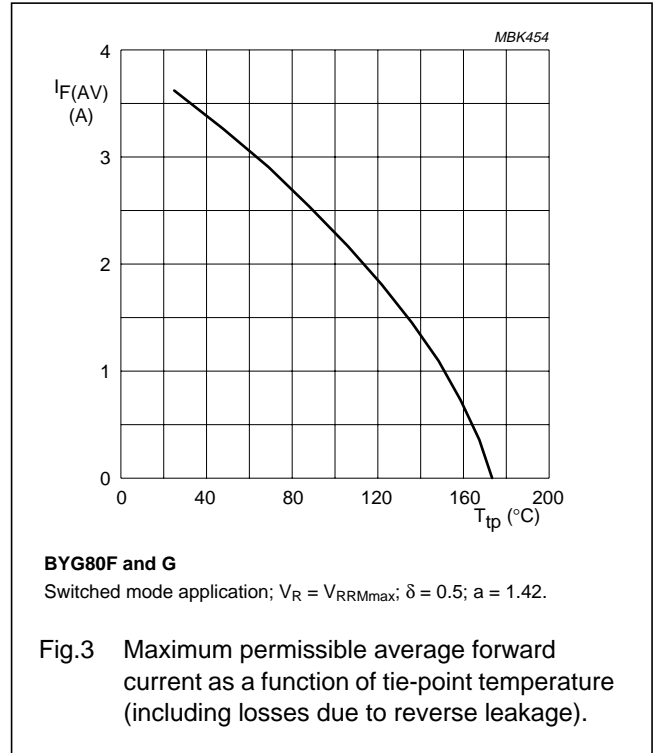
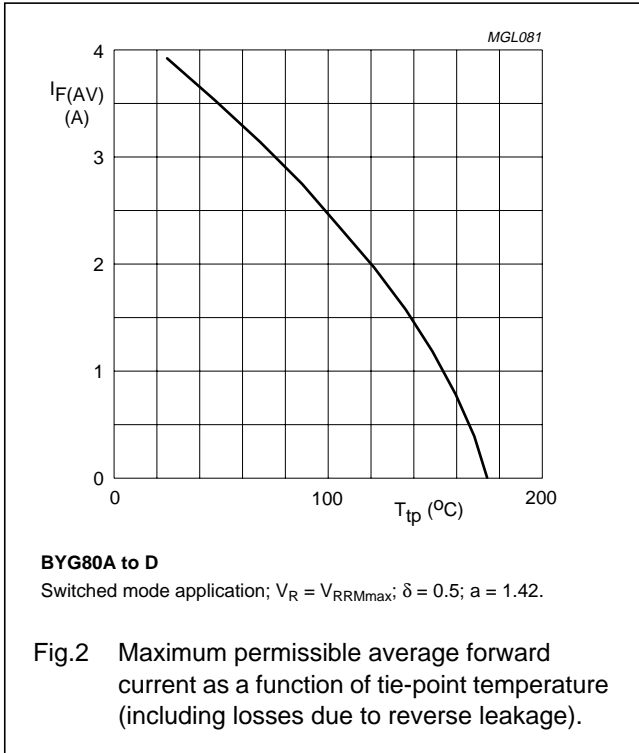
### Notes

1. Device mounted on  $\text{Al}_2\text{O}_3$  printed-circuit board, 0.7 mm thick; thickness of copper  $\geq 35 \mu\text{m}$ , see Fig.27.
2. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper  $\geq 40 \mu\text{m}$ , see Fig.27.  
For more information please refer to the 'General Part of Handbook SC01'.

Ultra fast low-loss  
controlled avalanche rectifiers

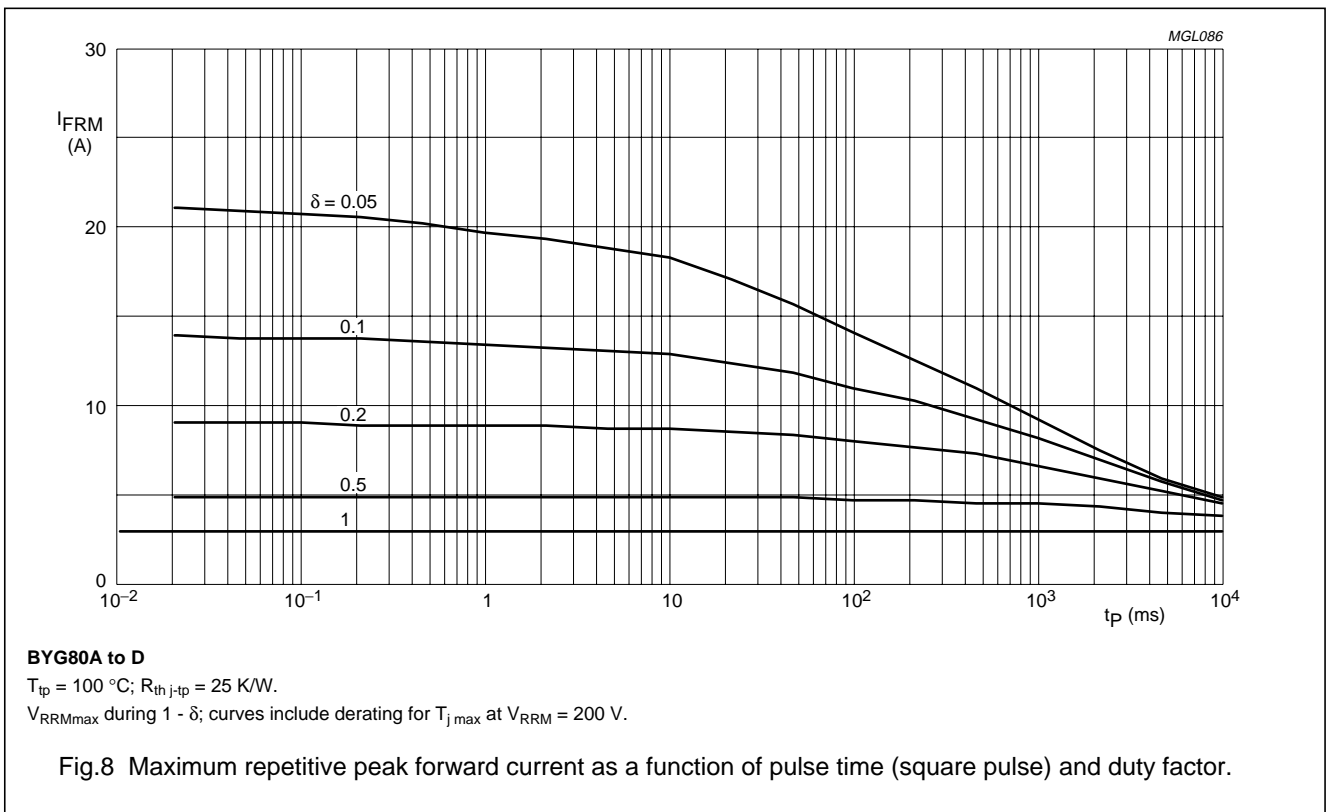
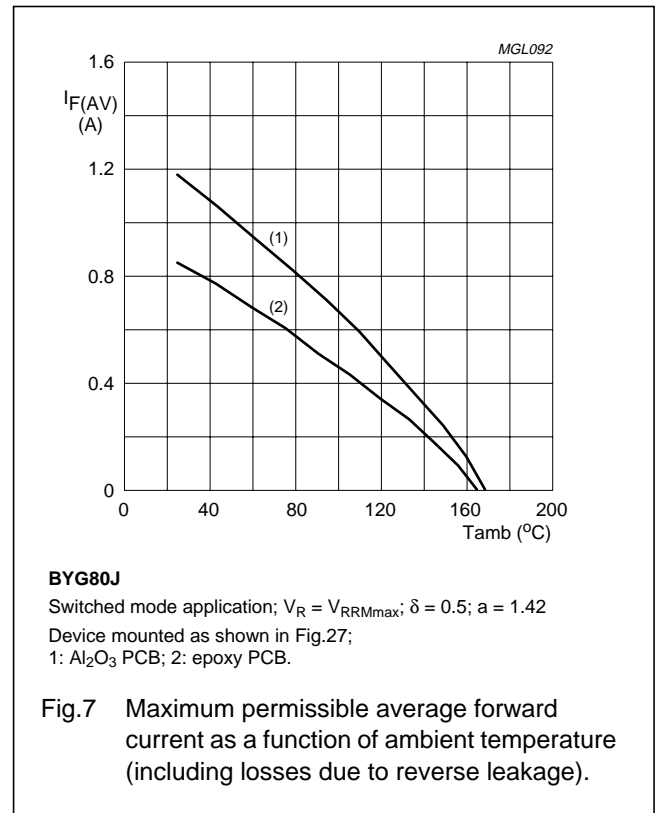
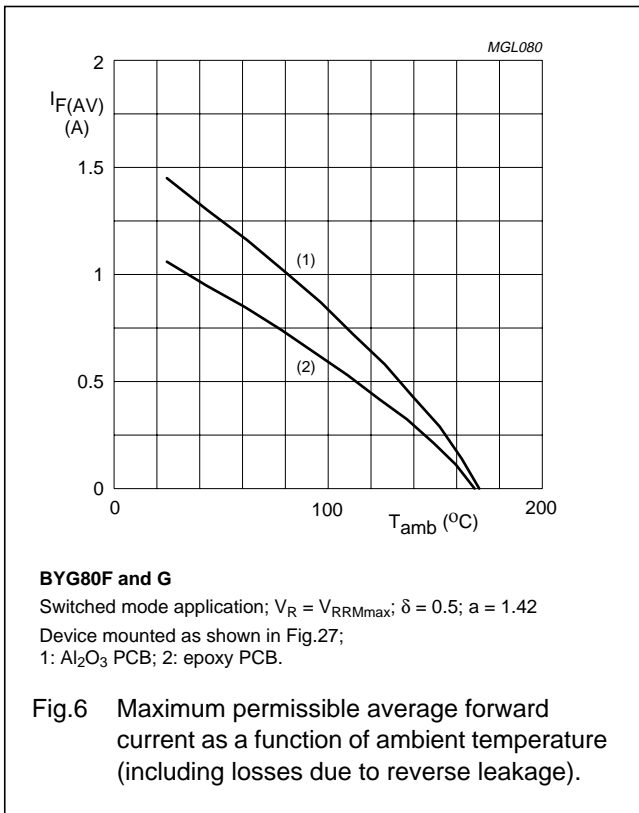
BYG80 series

GRAPHICAL DATA



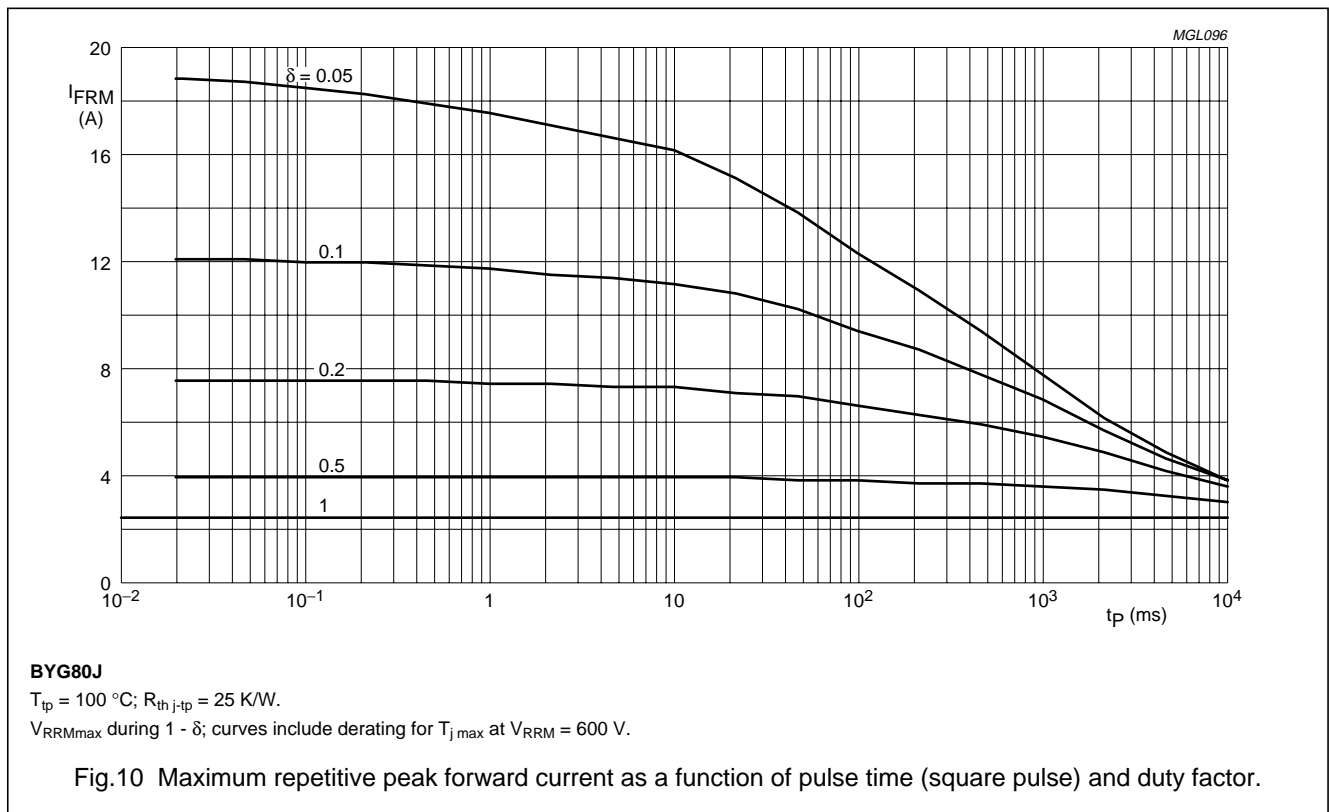
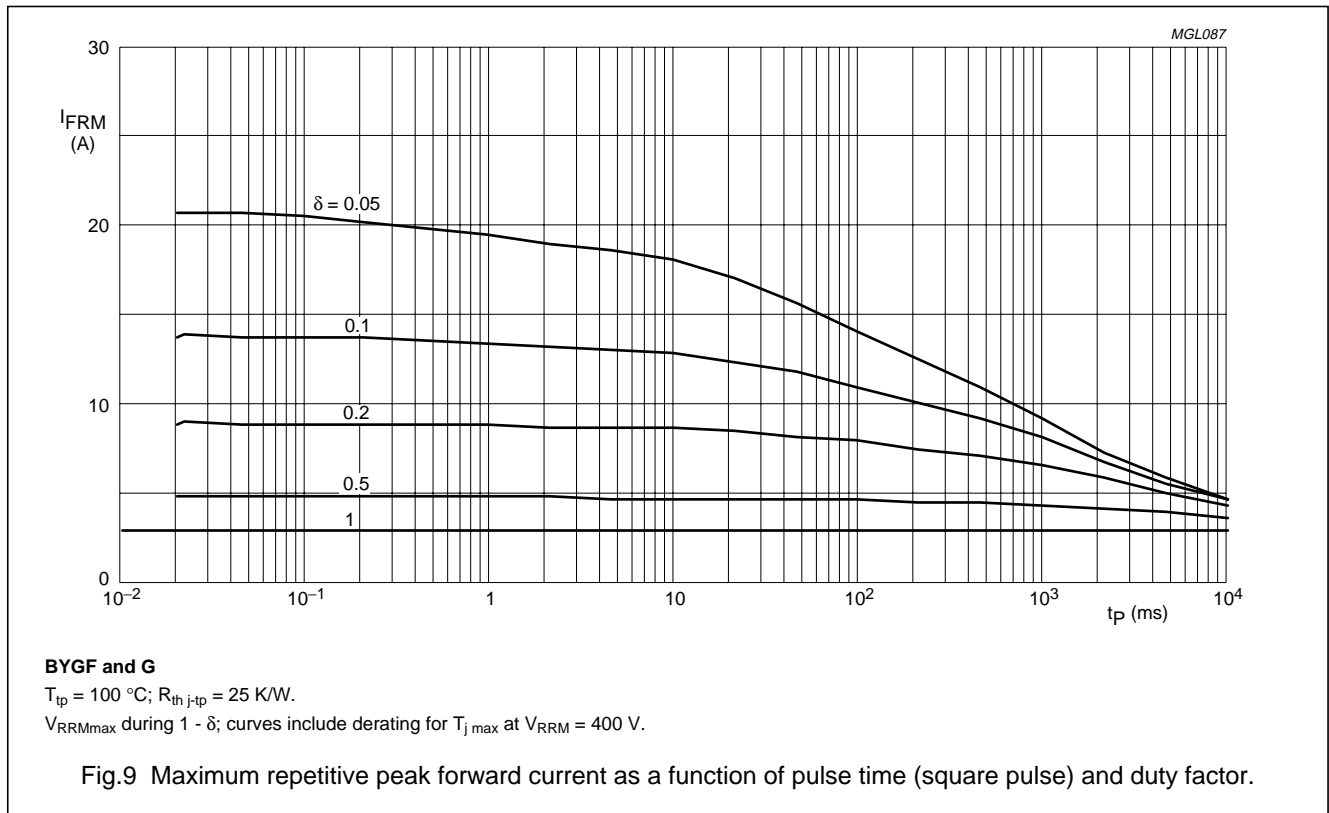
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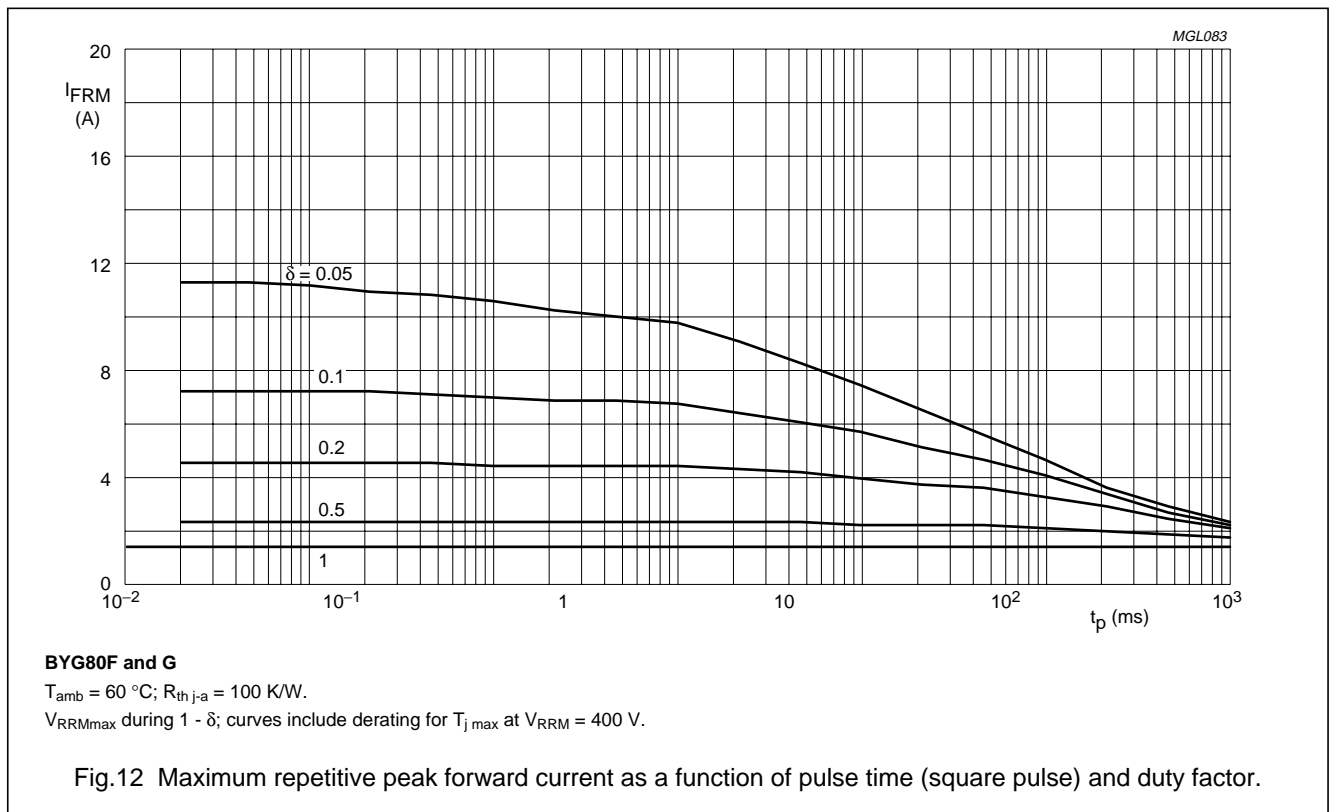
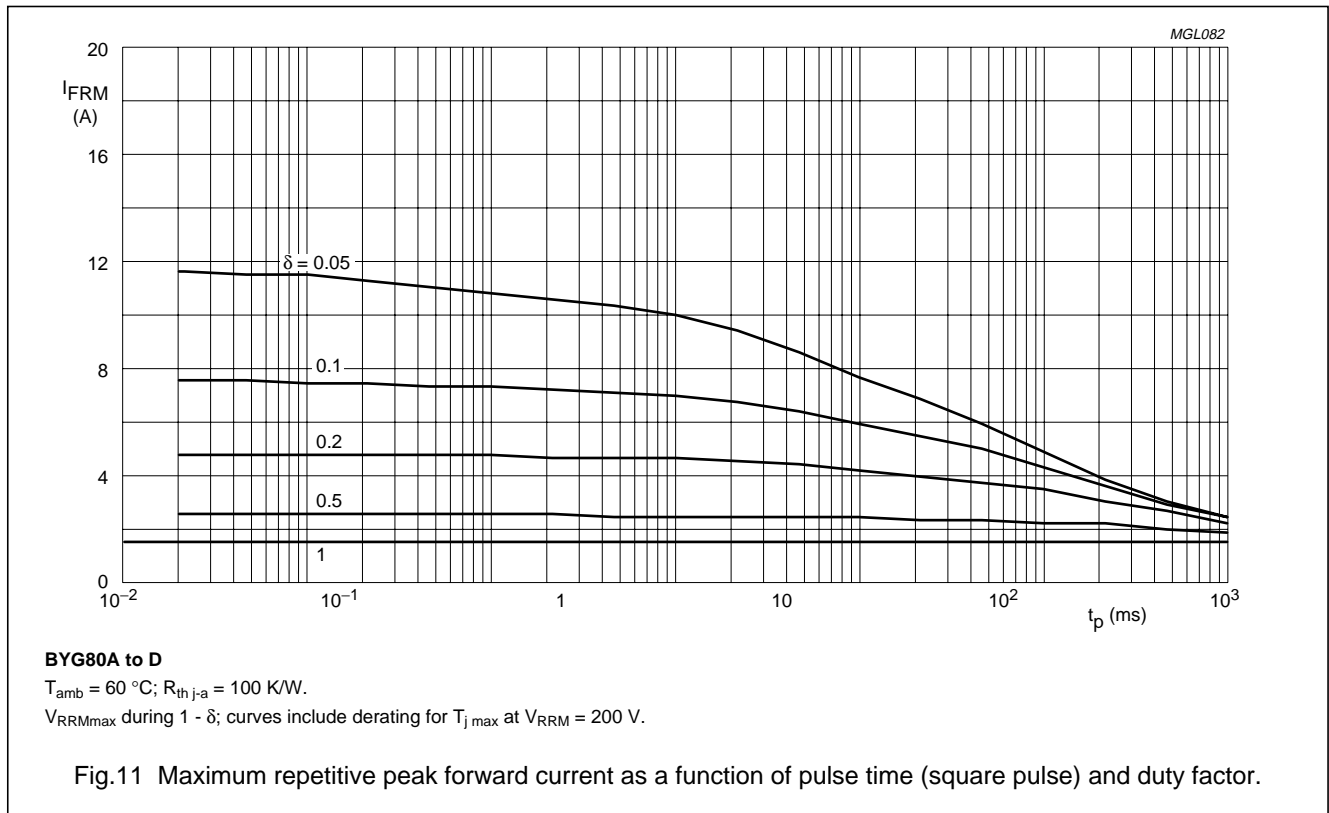
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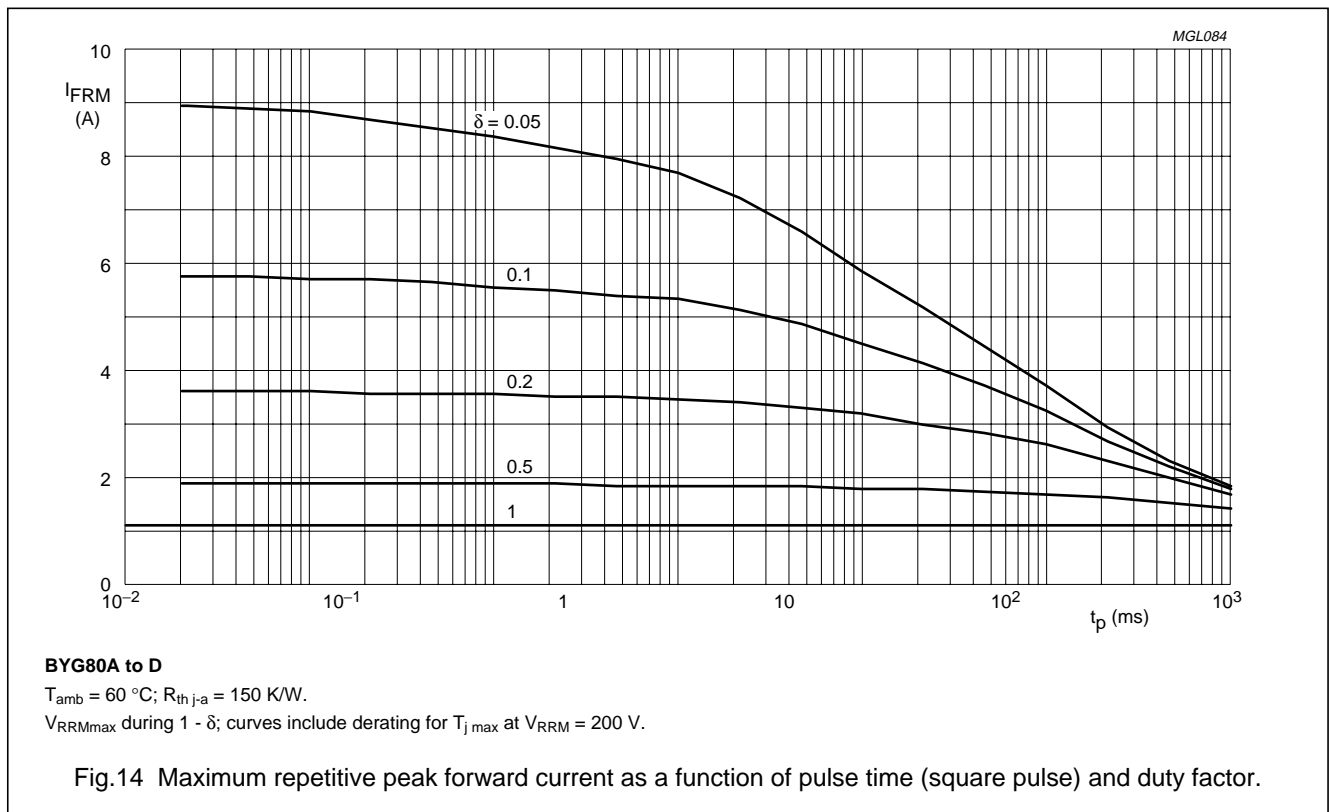
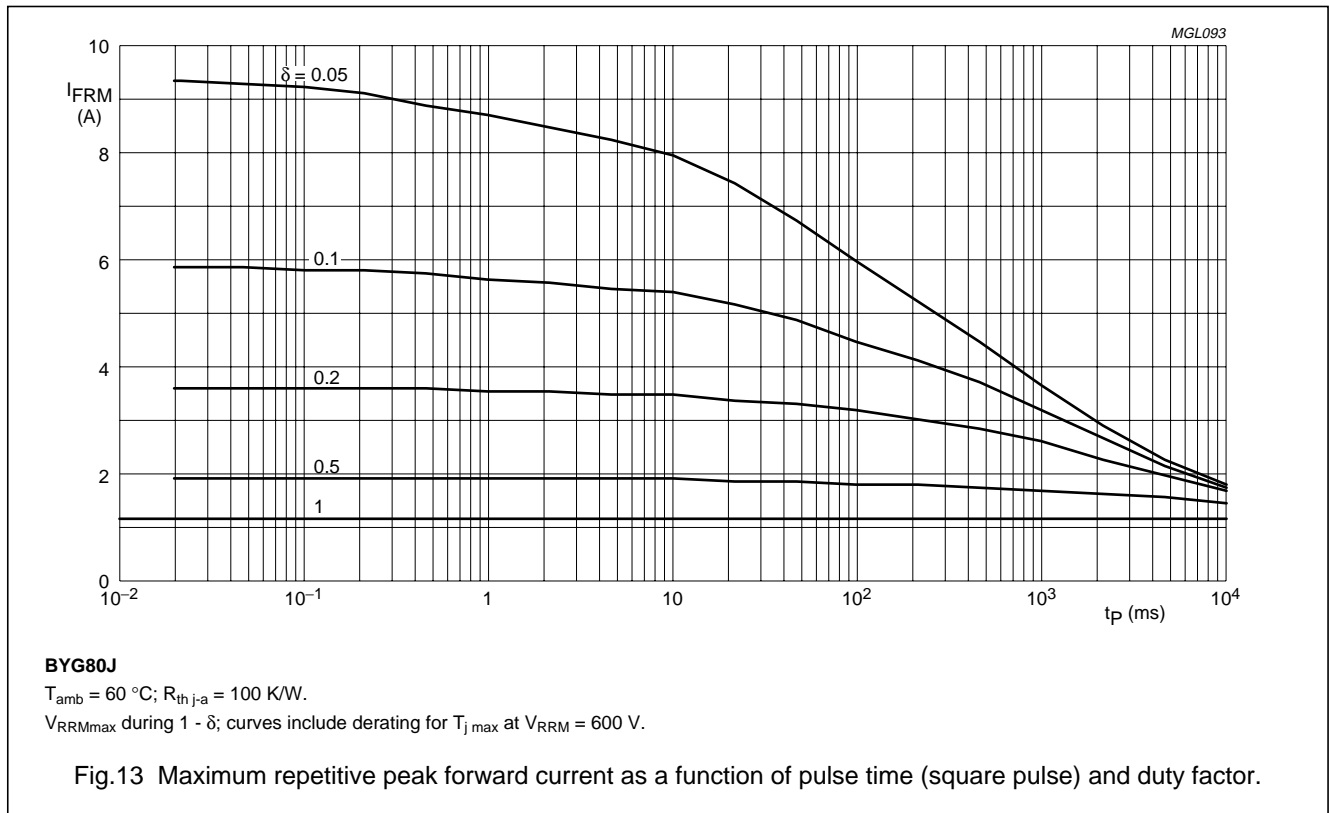
BYG80 series





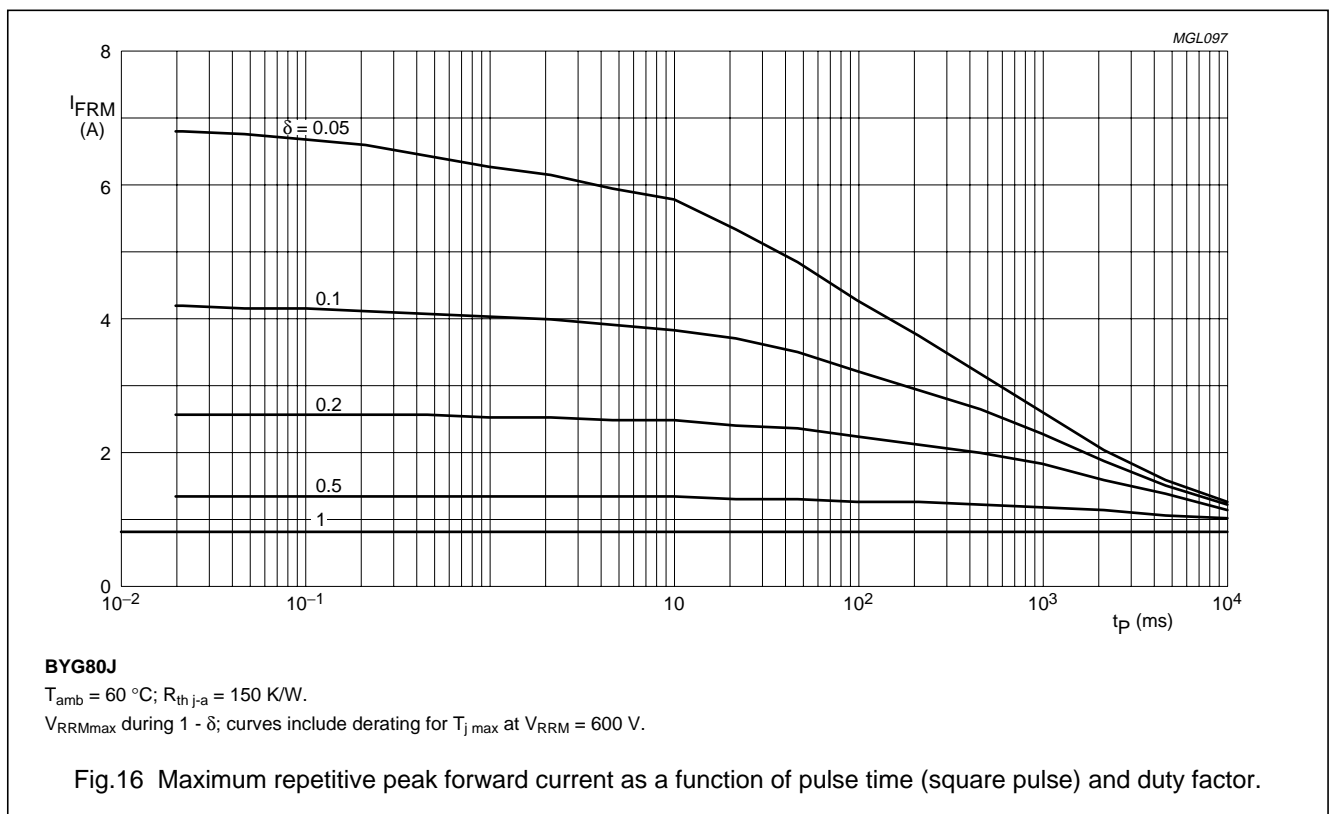
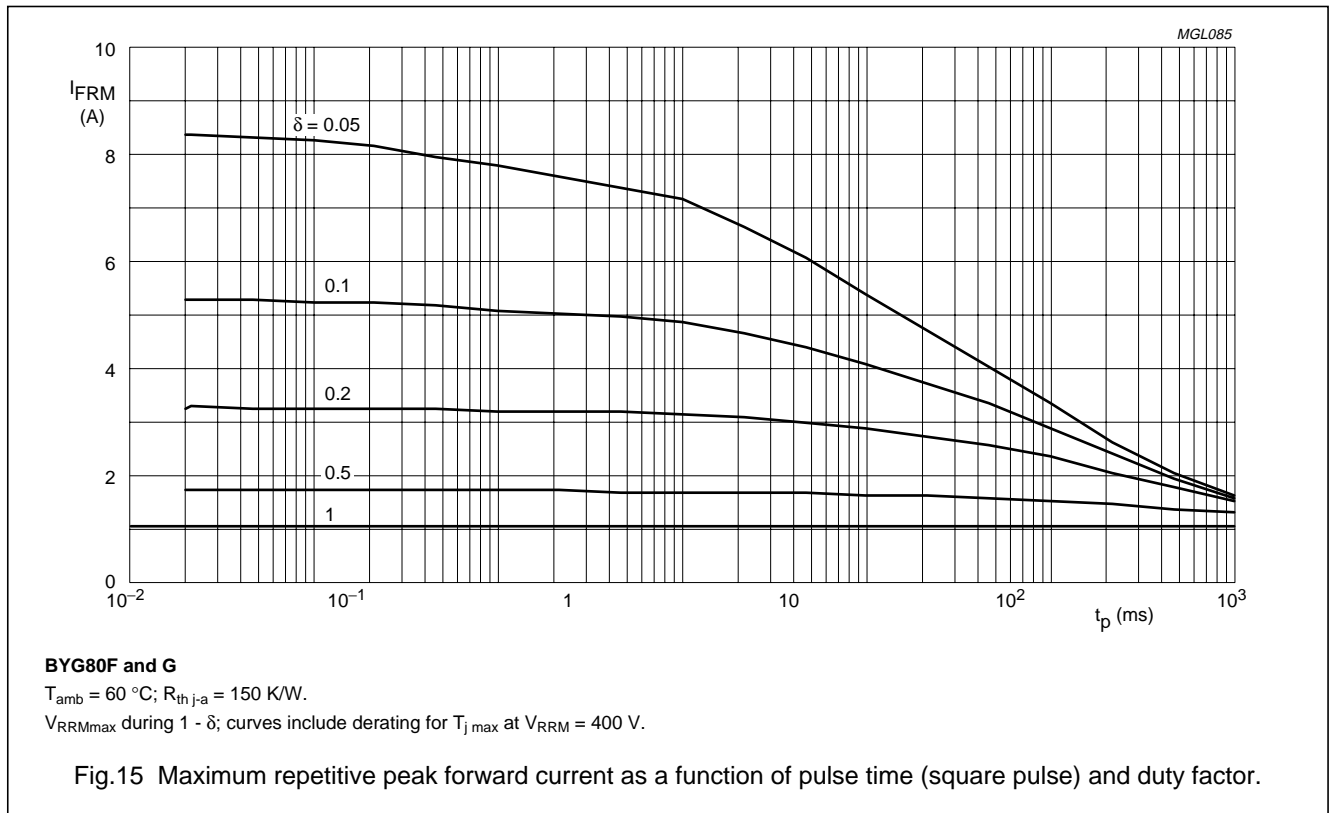
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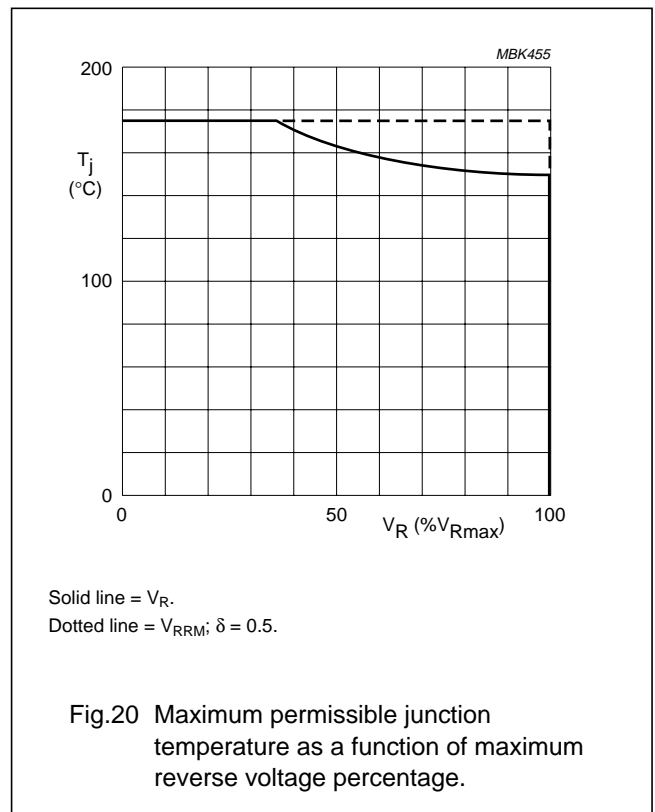
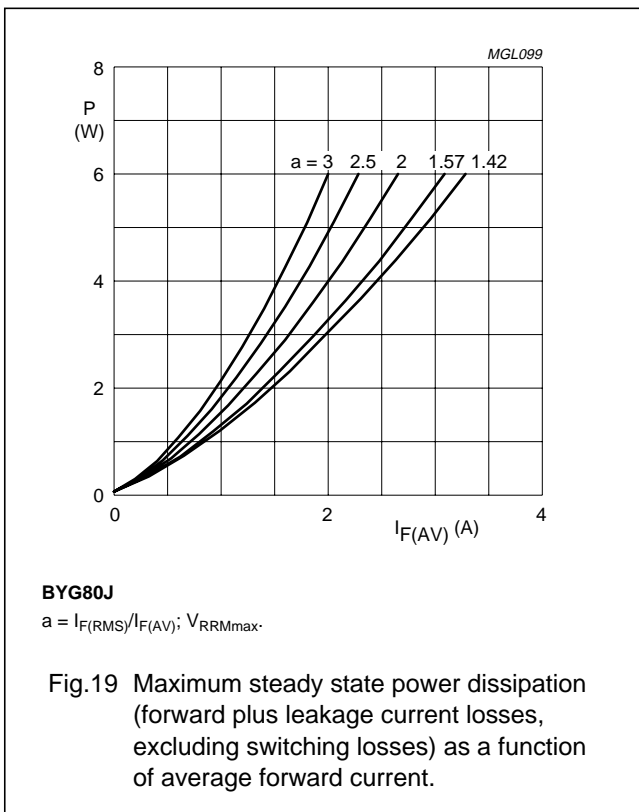
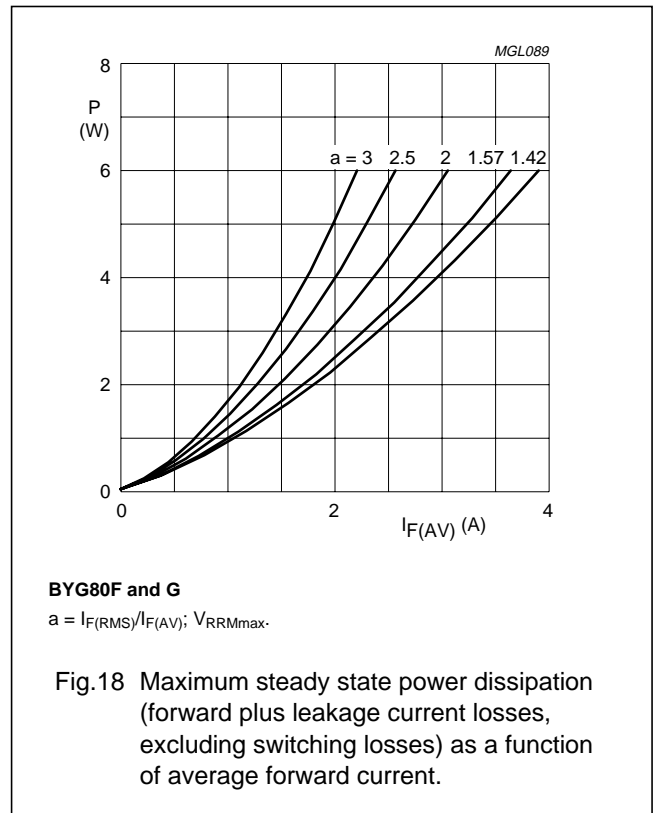
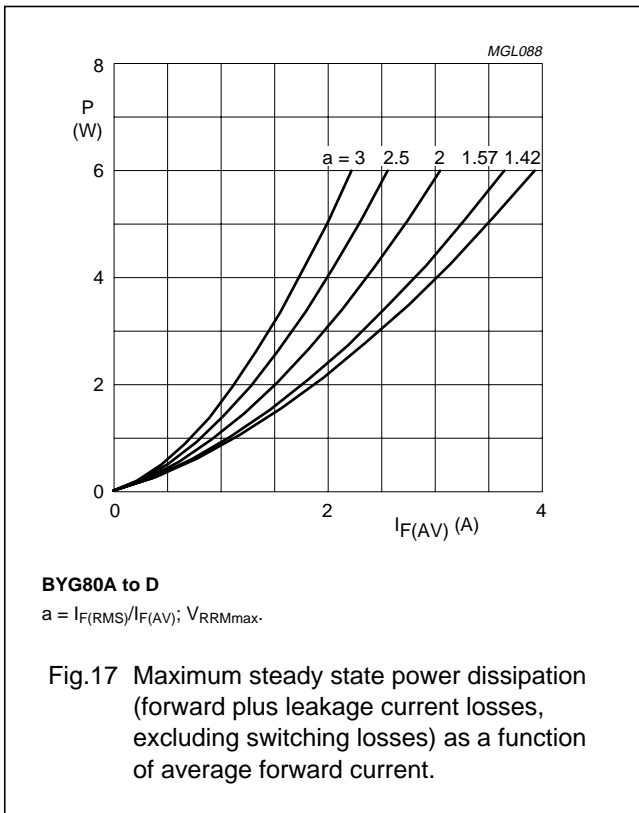
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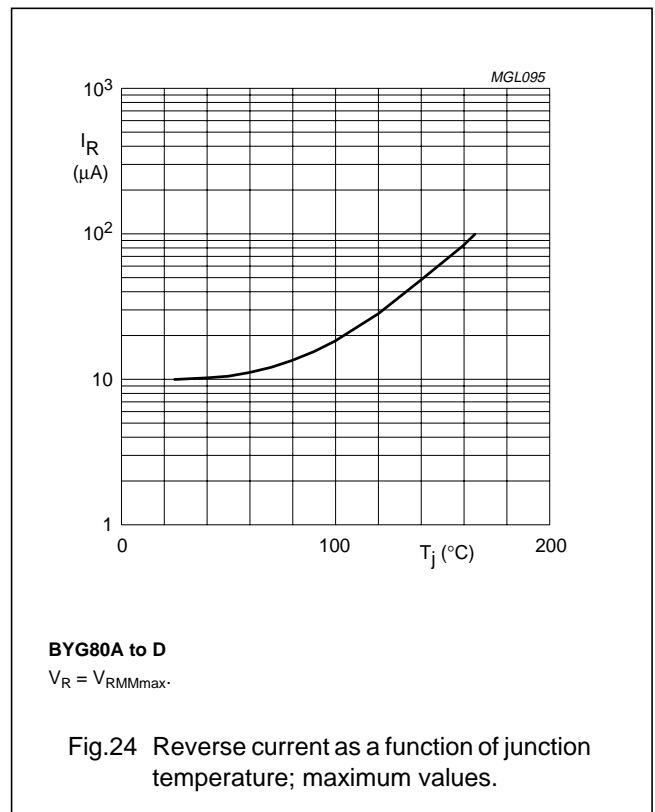
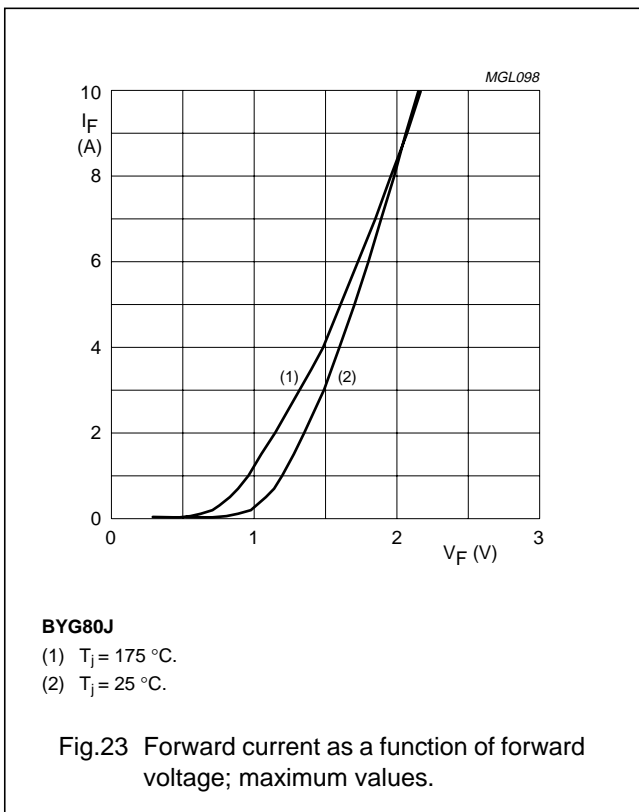
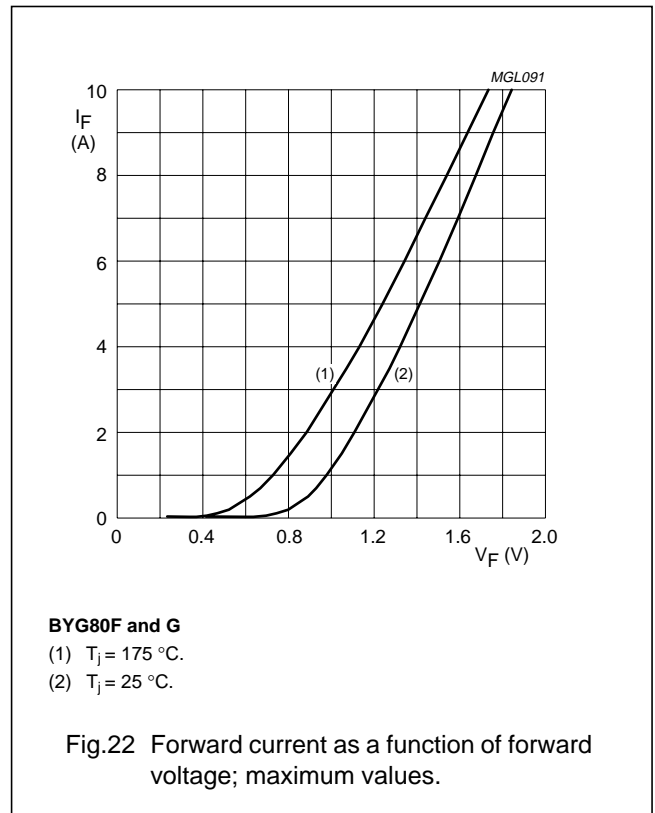
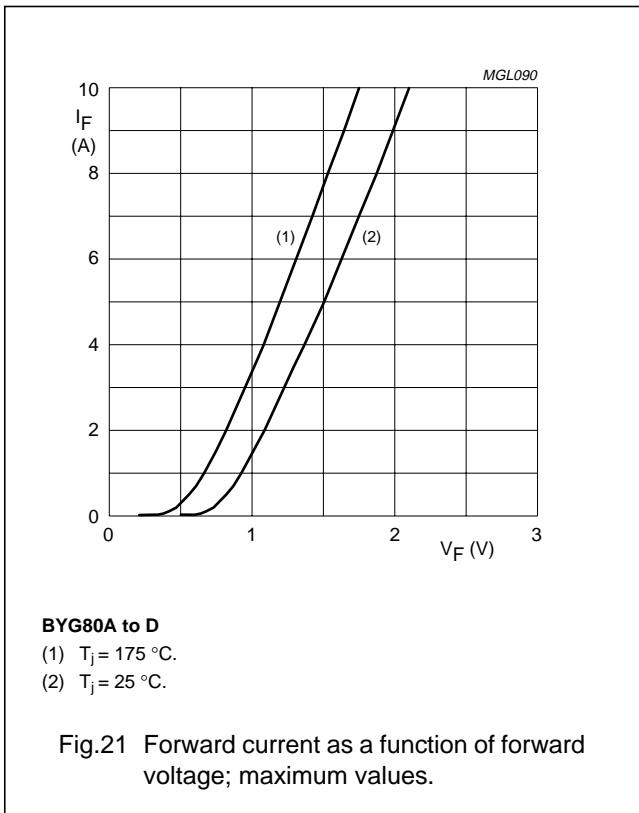
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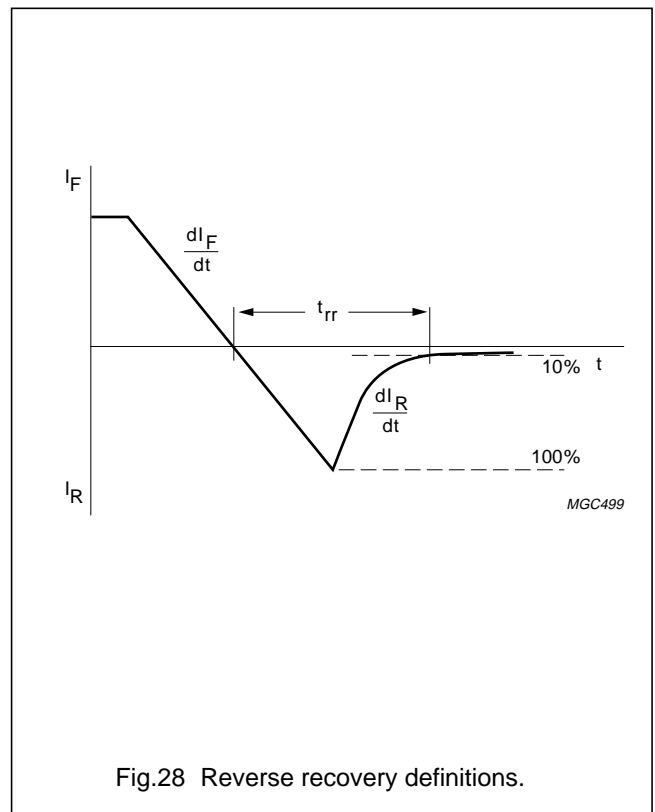
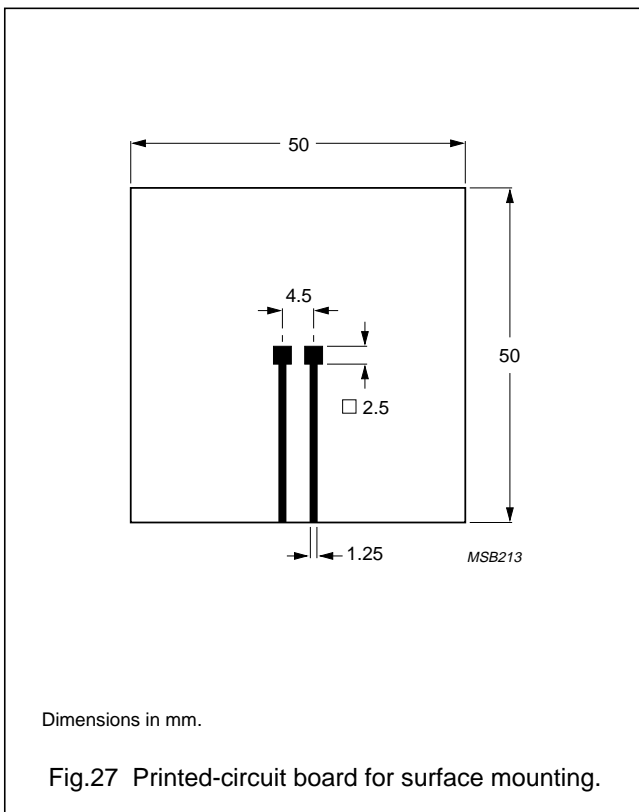
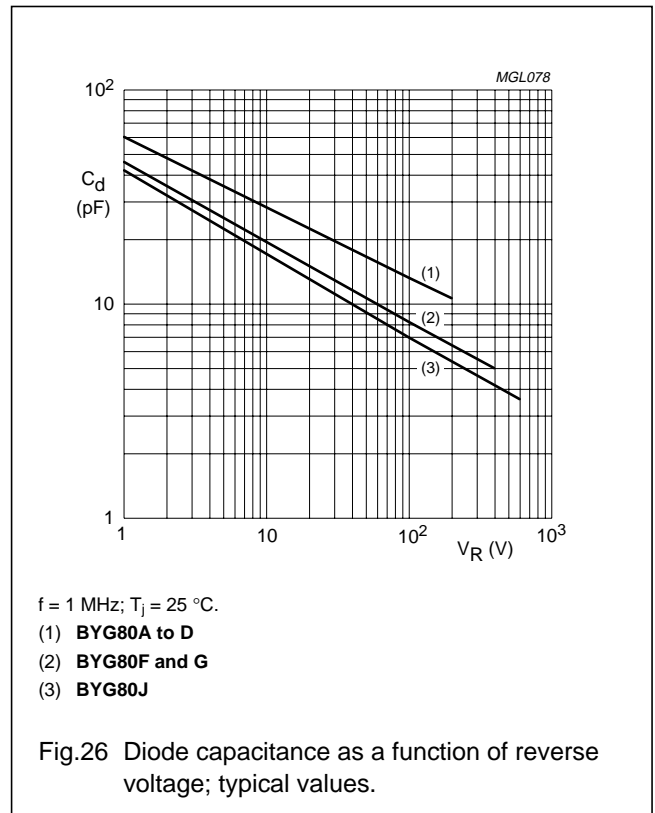
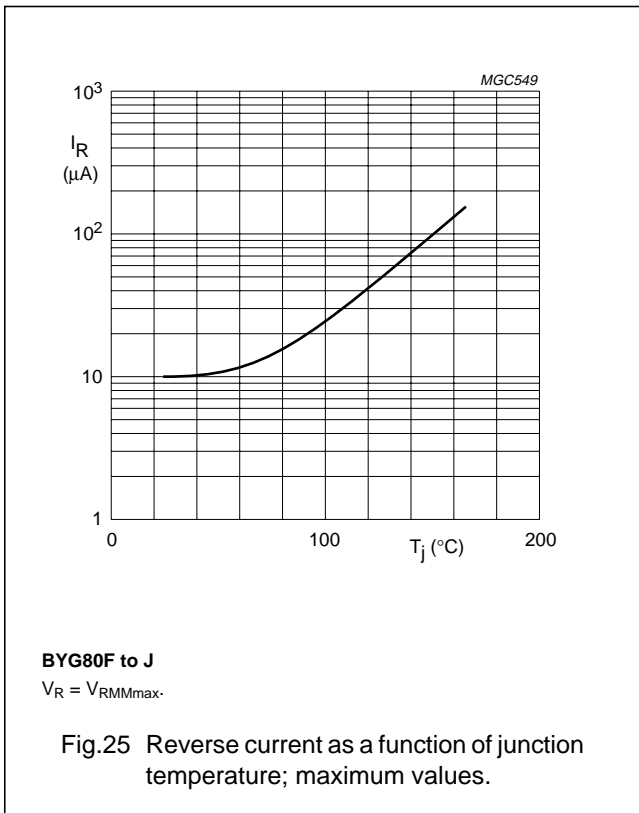
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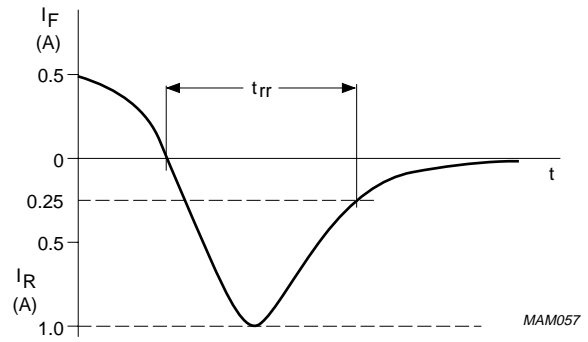
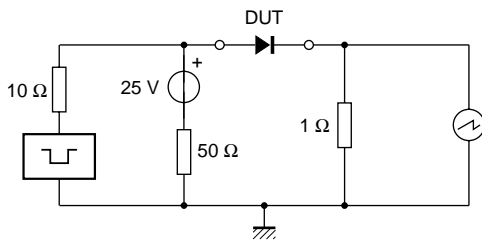
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# Ultra fast low-loss controlled avalanche rectifiers

## BYG80 series



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

Fig.29 Test circuit and reverse recovery time waveform and definition.

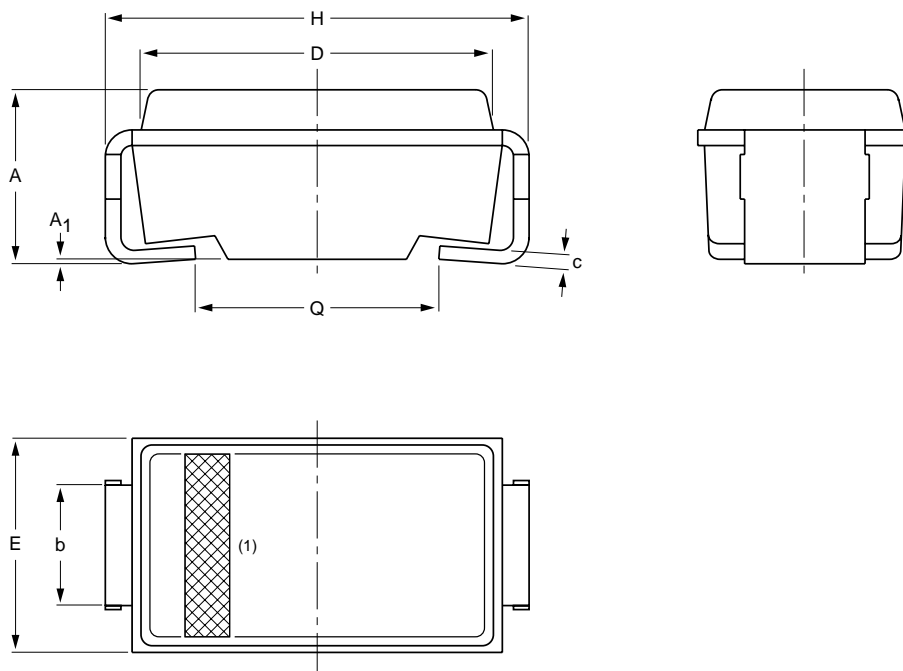
Ultra fast low-loss  
controlled avalanche rectifiers

BYG80 series

PACKAGE OUTLINE

Transfer-moulded thermo-setting plastic small rectangular surface mounted package;  
2 connectors

SOD106



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b	c	D	E	H	Q
mm	2.3 2.0	0.05	1.6 1.4	0.2	4.5 4.3	2.8 2.4	5.5 5.1	3.3 2.7

Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD106		DO-214AC				97-06-09

# Ultra fast low-loss controlled avalanche rectifiers

## BYG80 series

### 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.



Ultra fast low-loss  
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BYG80 series

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**NOTES**

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NOTES

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