

# Silicon Diode

## **BYG80A**

50V/2.4A

# DATASHEET

OEM – Philips

Source: Philips Databook 1999

## Ultra fast low-loss controlled avalanche rectifiers

## BYG80 series

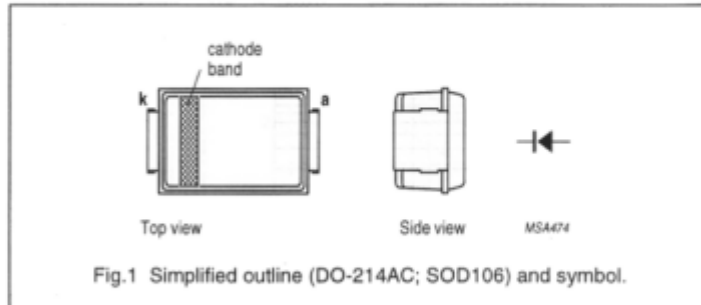
### FEATURES

- 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
$V_{RRM}$	repetitive peak reverse voltage				
	BYG80A		–	50	V
	BYG80B		–	100	V
	BYG80C		–	150	V
	BYG80D		–	200	V
	BYG80F		–	300	V
	BYG80G BYG80J		–	400 600	V
$V_R$	continuous reverse voltage				
	BYG80A		–	50	V
	BYG80B		–	100	V
	BYG80C		–	150	V
	BYG80D		–	200	V
	BYG80F		–	300	V
	BYG80G BYG80J		–	400 600	V
$I_{F(AV)}$	average forward current	$T_{tp} = 100\text{ }^{\circ}\text{C}$ ; 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 BYG80J		–	2.3 2.0	A
$I_{F(AV)}$	average forward current	$T_{amb} = 60\text{ }^{\circ}\text{C}$ ; $\text{Al}_2\text{O}_3$ 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 BYG80J		–	1.15 0.95	A

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SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	$T_{amb} = 60\text{ }^{\circ}\text{C}$ ; 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
	BYG80A to D		–	0.85	A
	BYG80F; BYG80G BYG80J		–	0.65	A
$I_{FRM}$	repetitive peak forward current	$T_{tp} = 100\text{ }^{\circ}\text{C}$ ; see Figs 8, 9 and 10	–	21	A
	BYG80A to D		–	21	A
	BYG80F; BYG80G BYG80J		–	18	A
$I_{FRM}$	repetitive peak forward current	$T_{amb} = 60\text{ }^{\circ}\text{C}$ ; $\text{Al}_2\text{O}_3$ PCB mounting; see Figs 11, 12 and 13	–	11	A
	BYG80A to D		–	11	A
	BYG80F; BYG80G BYG80J		–	9	A
$I_{FRM}$	repetitive peak forward current	$T_{amb} = 60\text{ }^{\circ}\text{C}$ ; epoxy PCB mounting; see Figs 14, 15 and 16	–	8	A
	BYG80A to D		–	8	A
	BYG80F; BYG80G BYG80J		–	6	A
$I_{FSM}$	non-repetitive peak forward current	$t = 8.3\text{ ms}$ half sine wave; $T_j = 25\text{ }^{\circ}\text{C}$ prior to surge; $V_R = V_{RRMmax}$	–	36	A
	BYG80A to D BYG80F; BYG80G; BYG80J		–	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	$^{\circ}\text{C}$
$T_j$	junction temperature	see Fig.20	–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	$I_F = 1\text{ A}$ ; $T_j = T_{jmax}$ ; see Figs 21, 22 and 23	–	–	0.67	V
	BYG80A to D		–	–	0.73	V
	BYG80F; BYG80G BYG80J		–	–	0.96	V
$V_F$	forward voltage	$I_F = 1\text{ A}$ ; see Figs 21, 22 and 23	–	–	0.93	V
	BYG80A to D		–	–	0.98	V
	BYG80F; BYG80G BYG80J		–	–	1.20	V

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

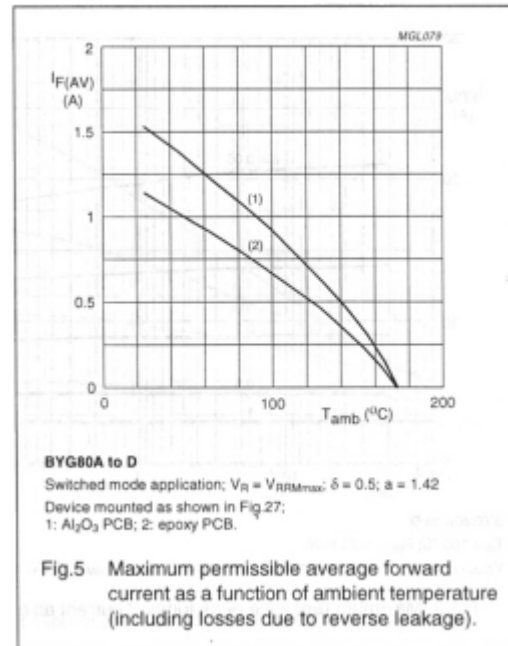
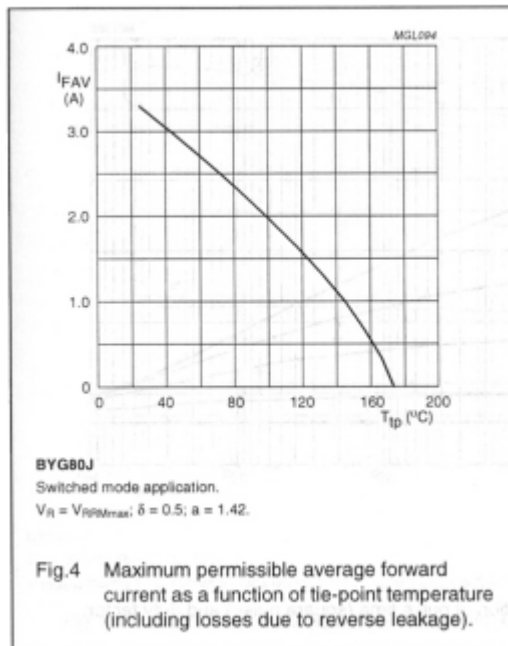
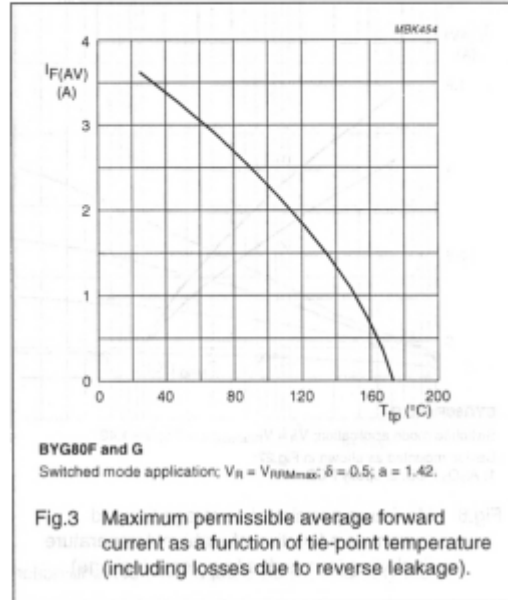
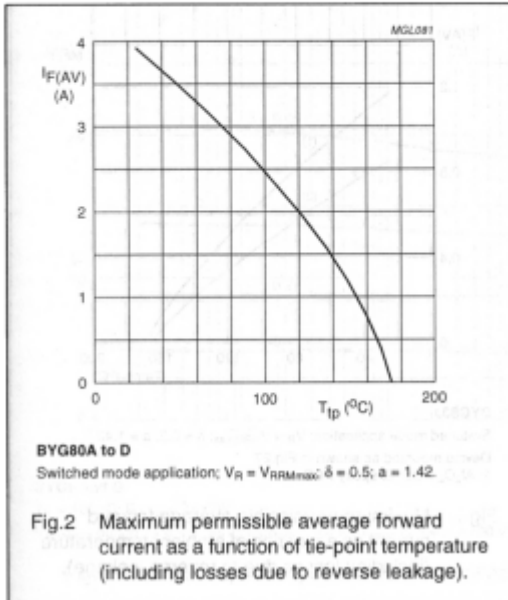
## Notes

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'.

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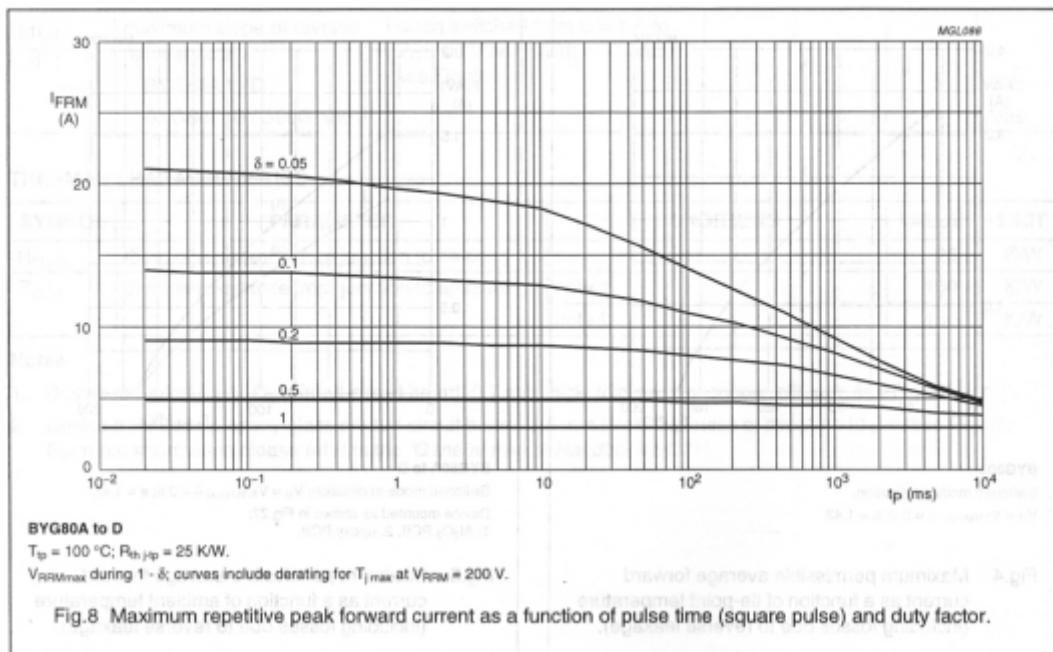
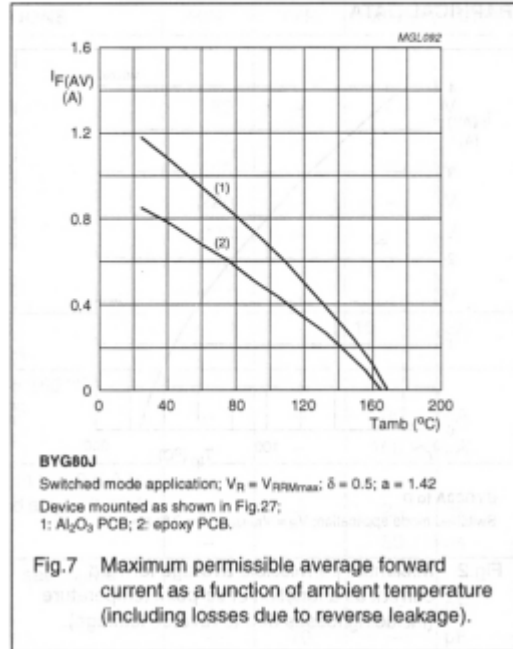
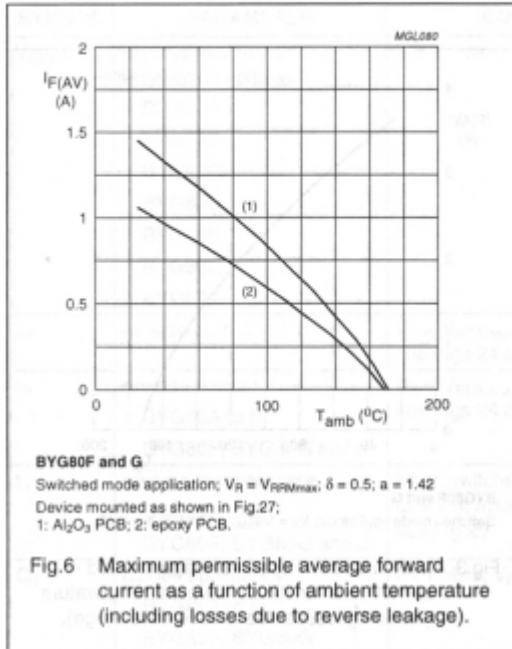
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GRAPHICAL DATA



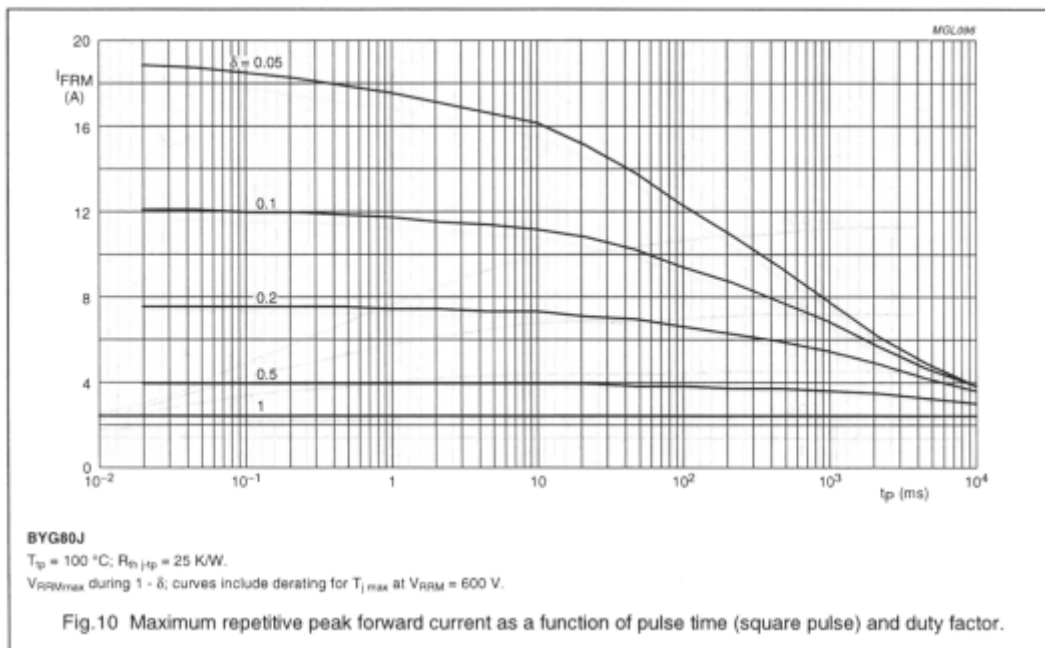
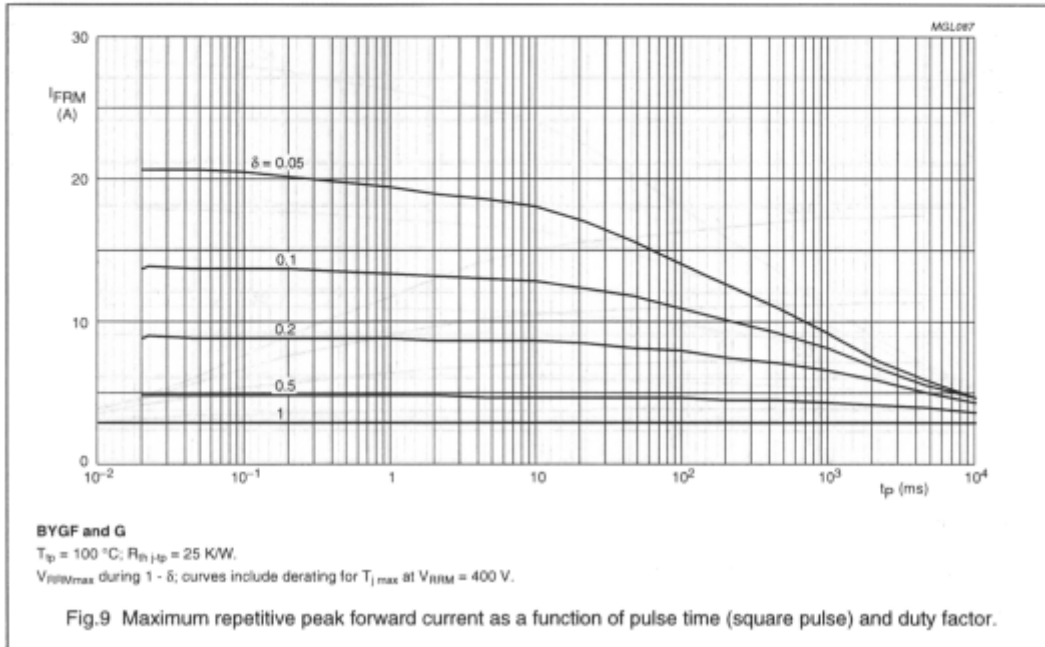
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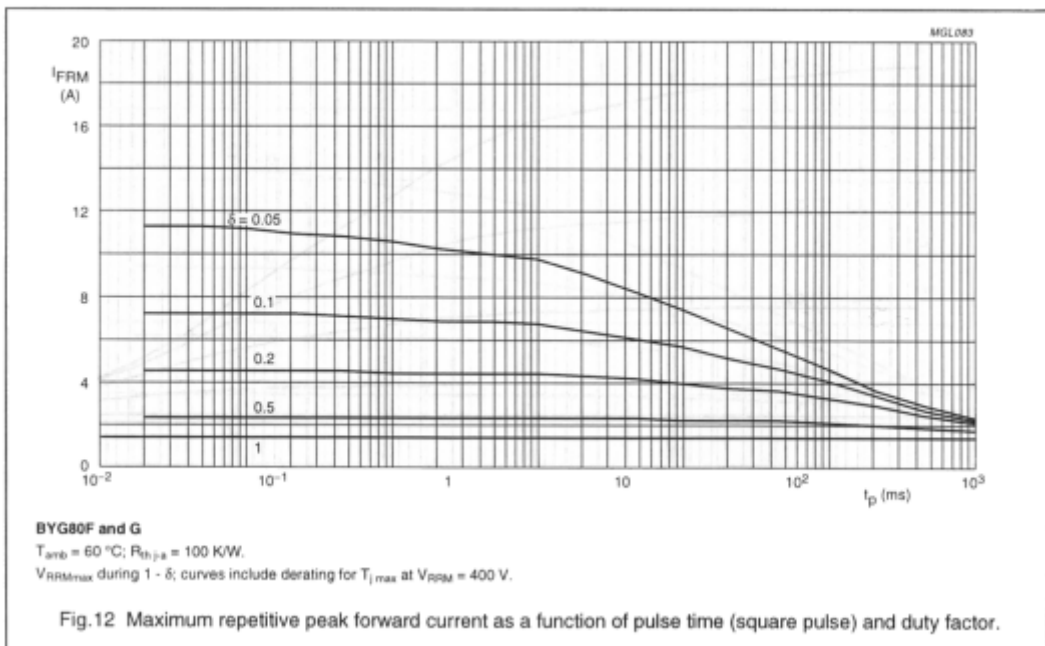
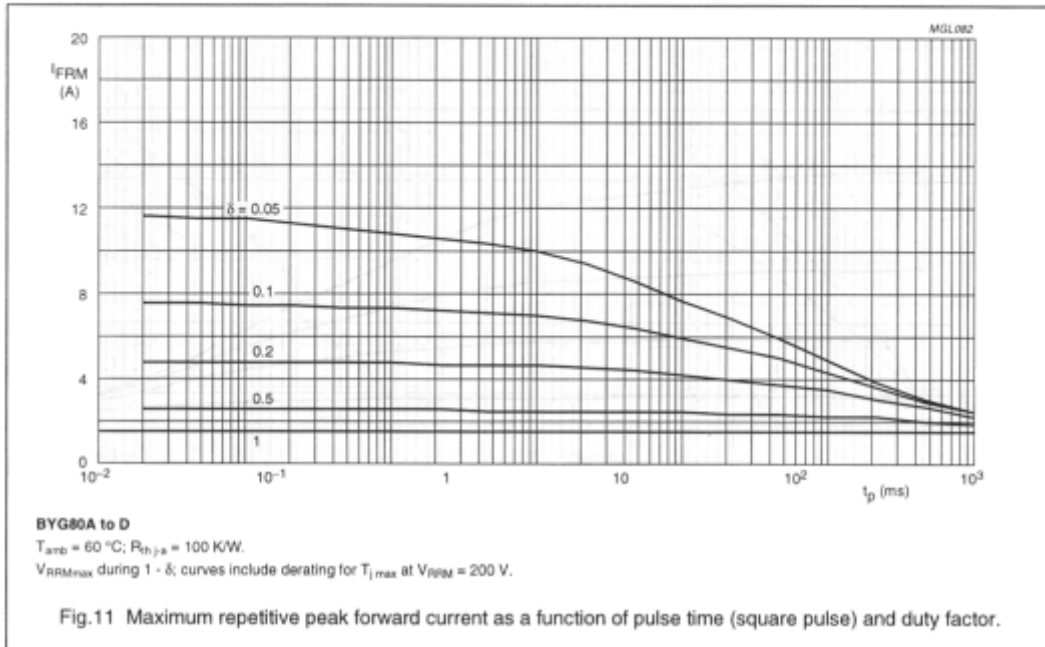
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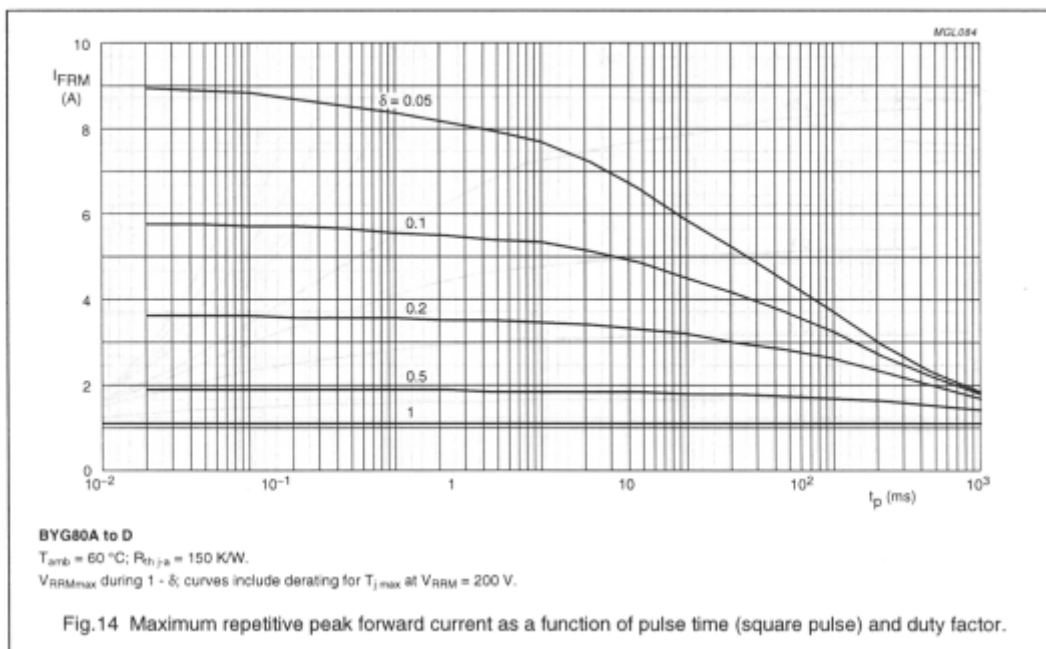
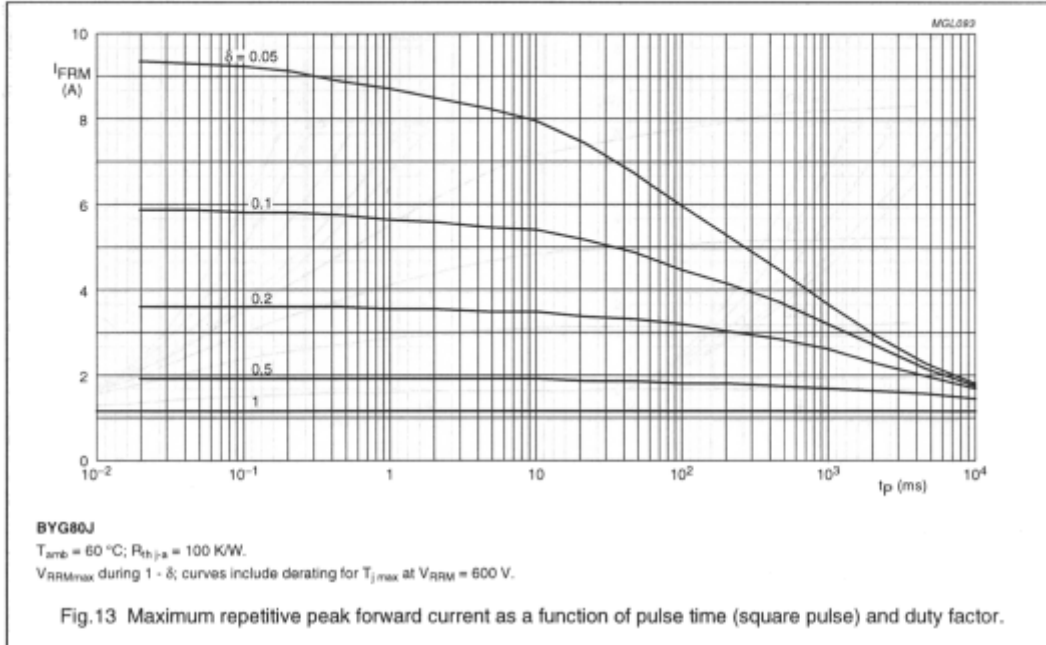
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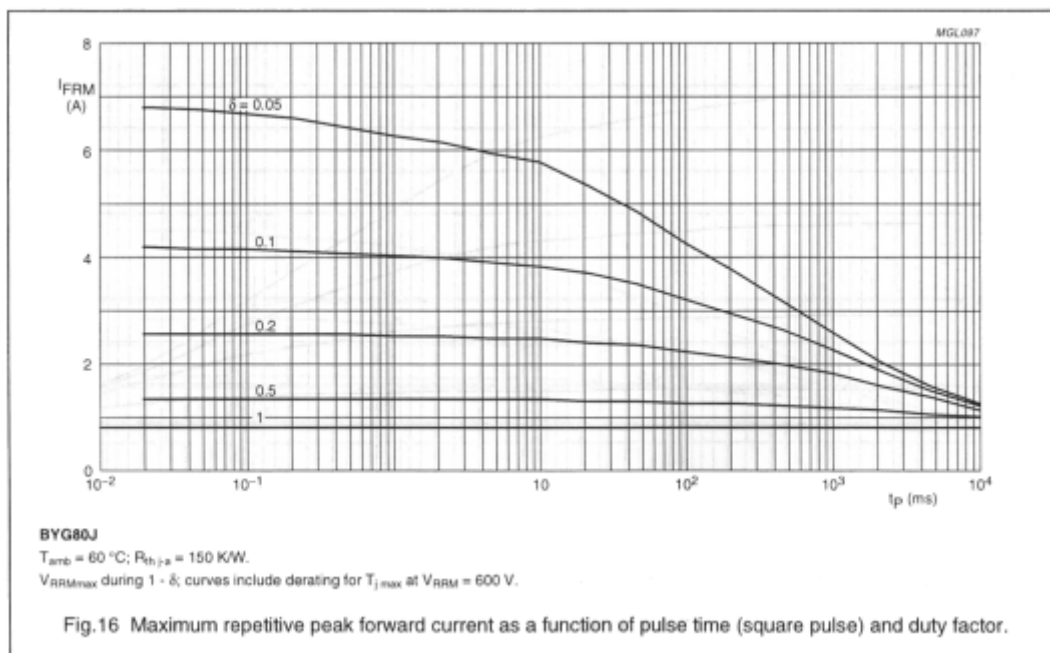
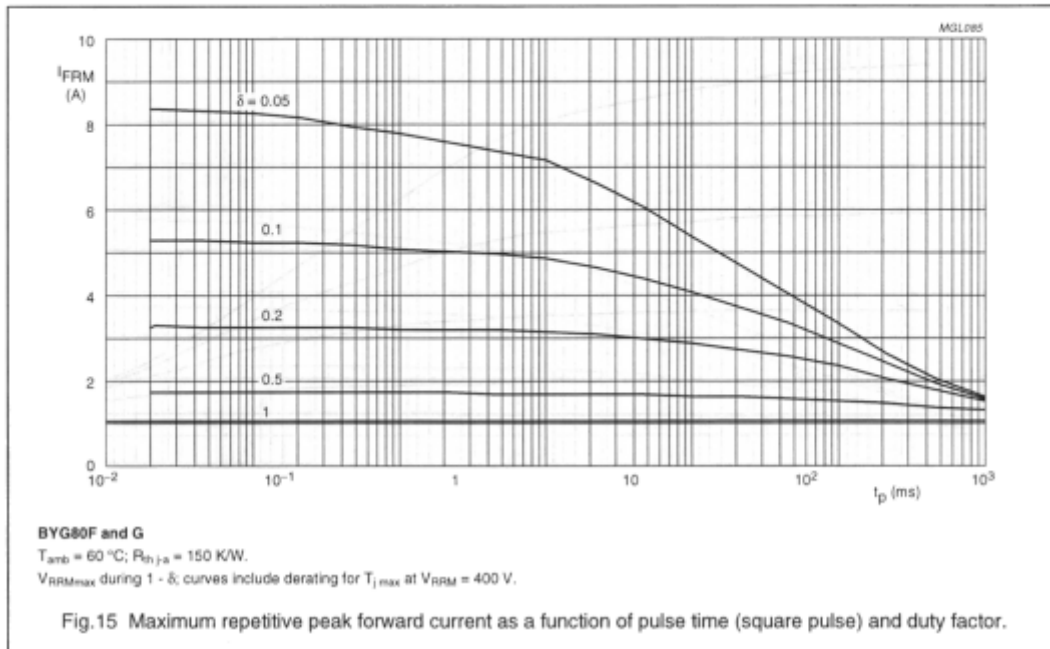
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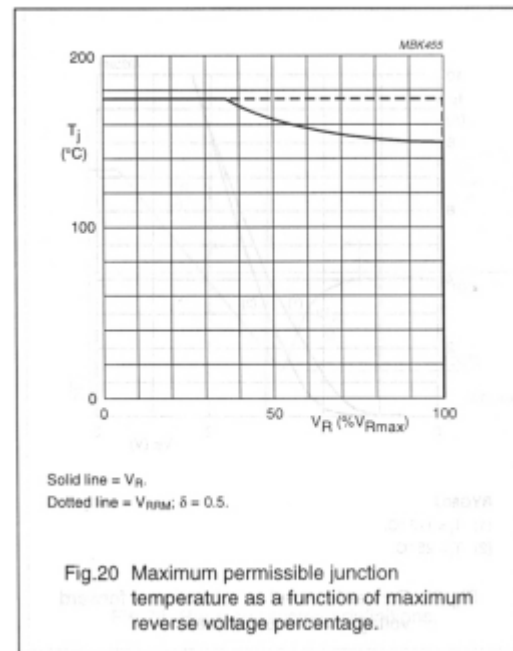
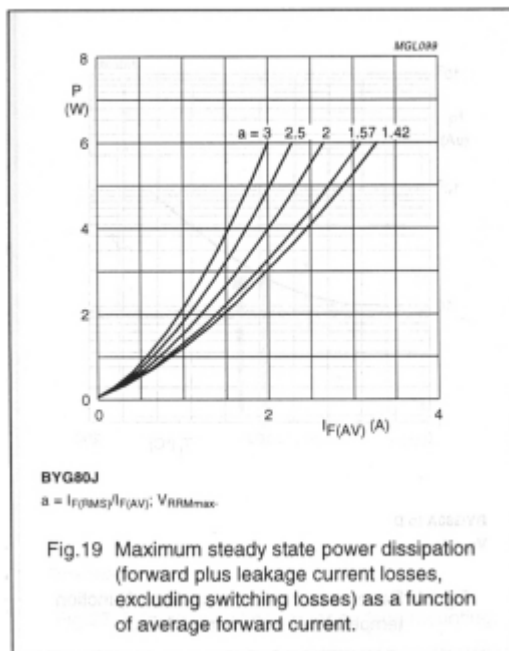
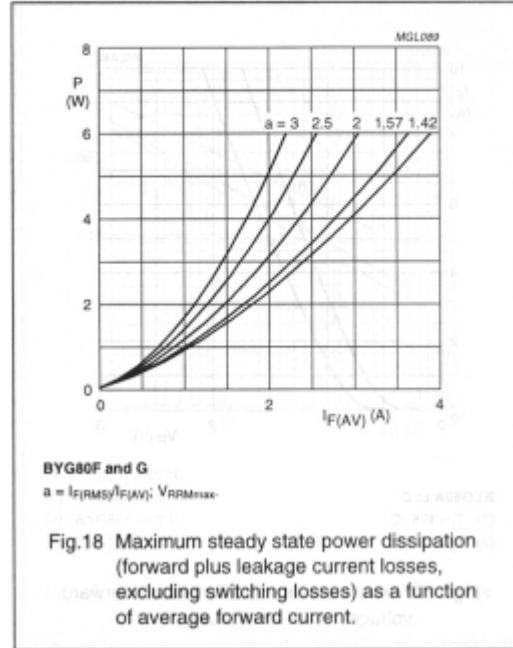
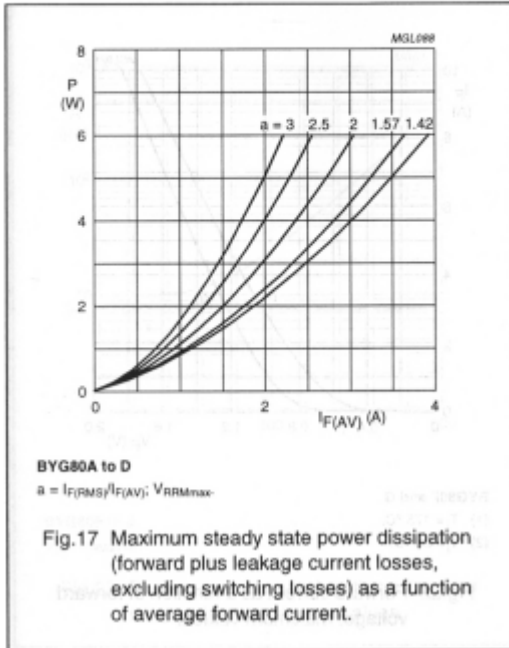
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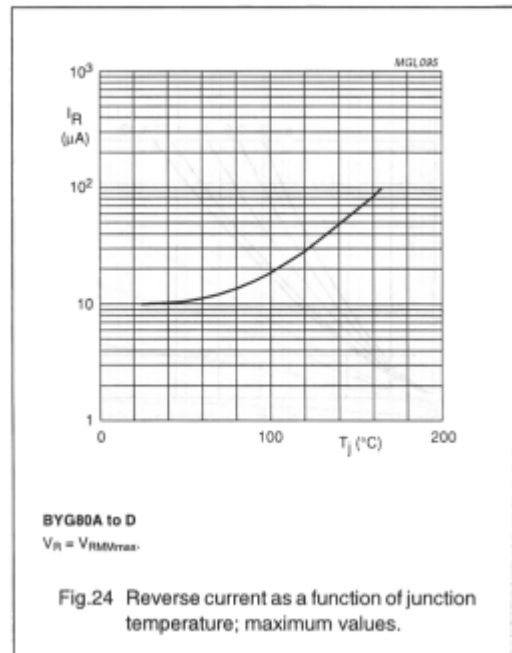
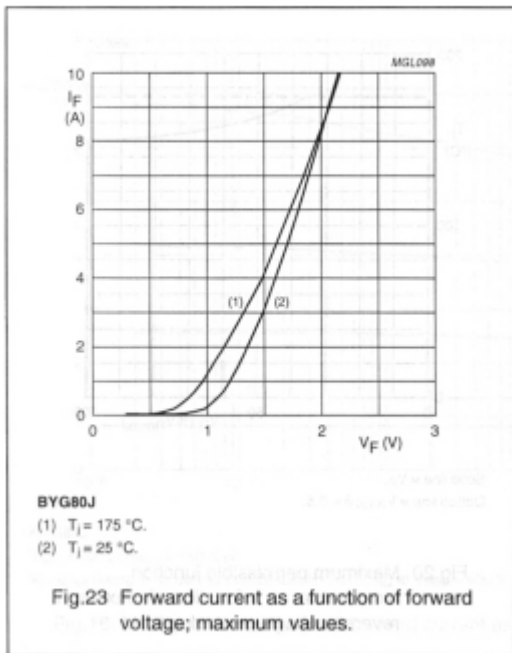
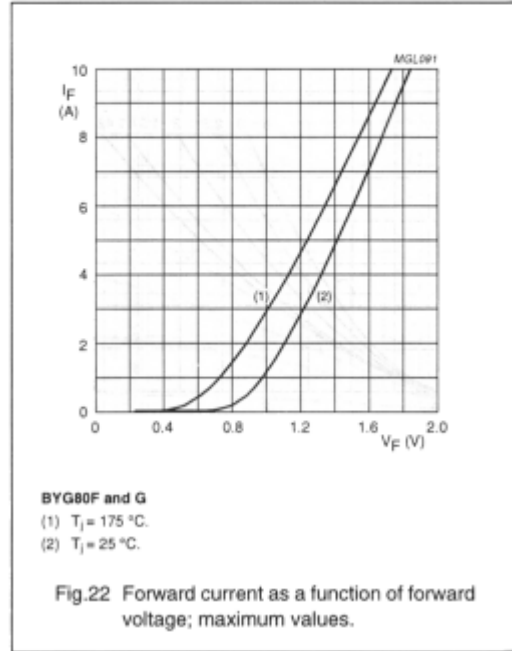
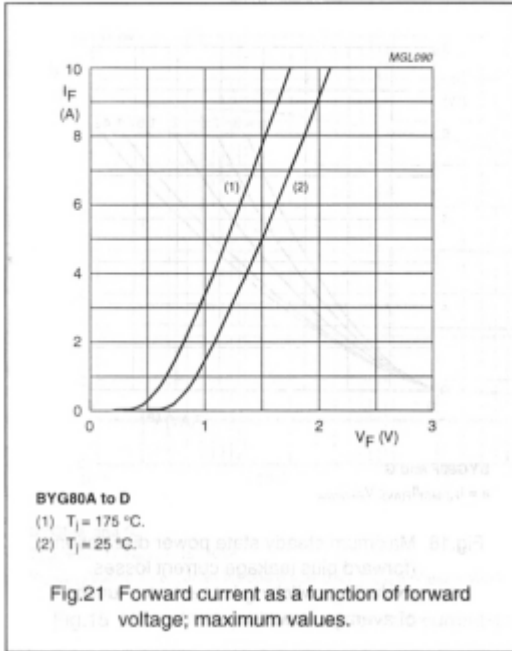
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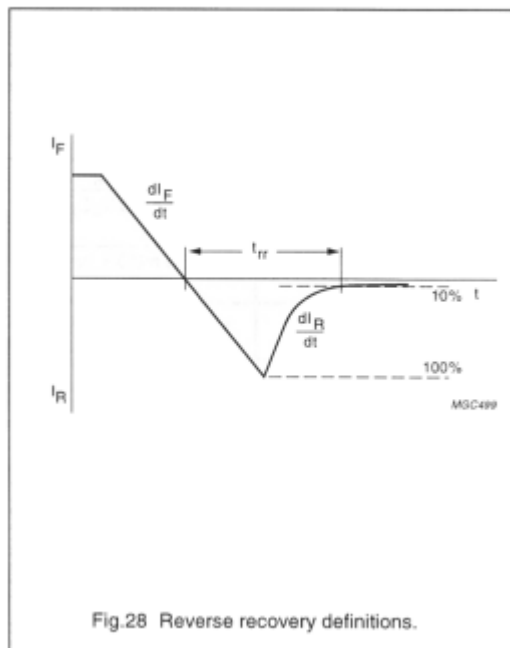
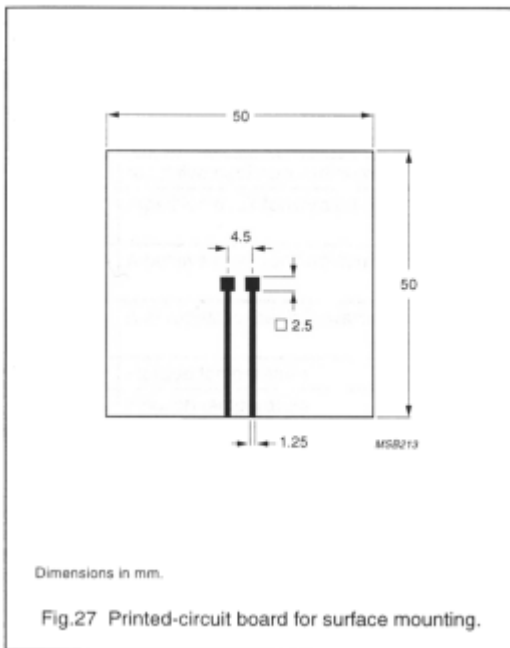
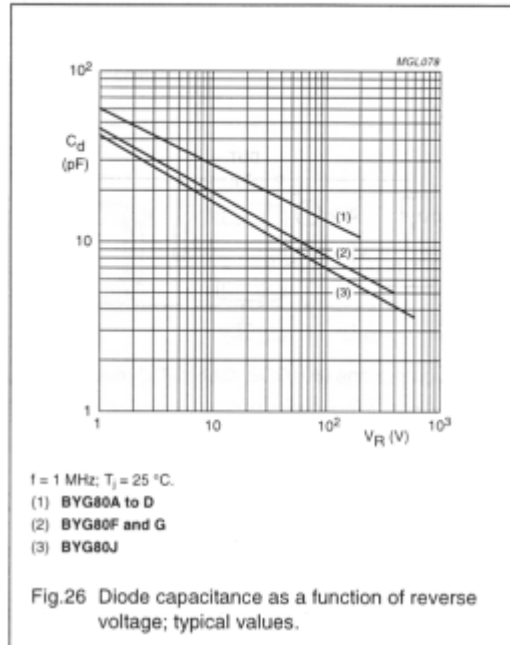
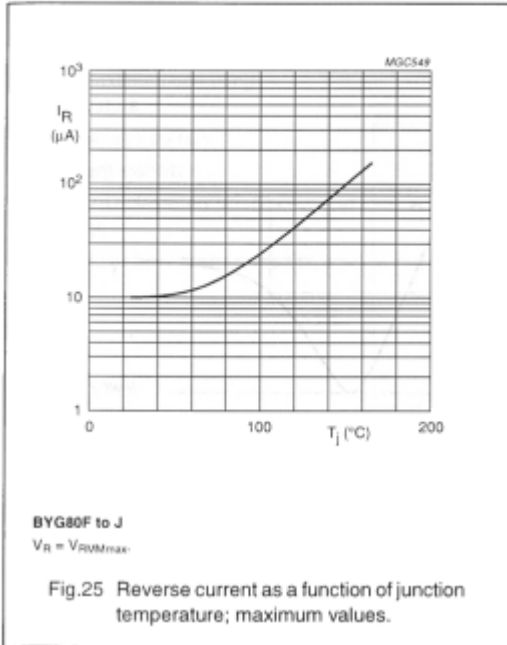
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