

# Silicon Diode

## **BYG80D**

200V/2.4A

# DATASHEET

OEM – Philips

Source: Philips Databook 1999

## Ultra fast low-loss controlled avalanche rectifiers

## BYG80 series

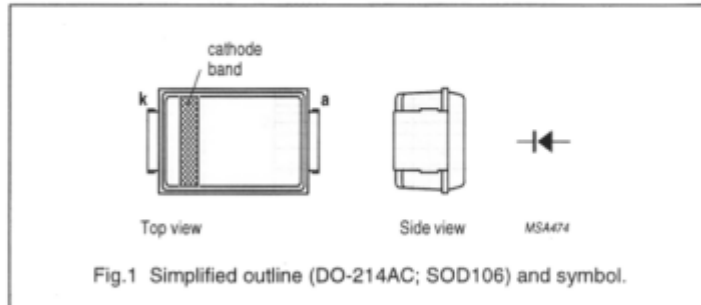
### FEATURES

- 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<br>BYG80J                |   | –    | 400<br>600   | V    |
| $V_R$       | continuous reverse voltage      |   |      |              |      |
|             | BYG80A                          |   | –    | 50           | V    |
|             | BYG80B                          |   | –    | 100          | V    |
|             | BYG80C                          |   | –    | 150          | V    |
|             | BYG80D                          |   | –    | 200          | V    |
|             | BYG80F                          |   | –    | 300          | V    |
|             | BYG80G<br>BYG80J                |   | –    | 400<br>600   | V    |
| $I_{F(AV)}$ | average forward current         | $T_{tp} = 100\text{ °C}$ ; 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<br>BYG80J        |   | –    | 2.3<br>2.0   | A    |
| $I_{F(AV)}$ | average forward current         | $T_{amb} = 60\text{ °C}$ ; $Al_2O_3$ 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<br>BYG80J        |   | –    | 1.15<br>0.95 | A    |

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| SYMBOL      | PARAMETER                                       | CONDITIONS   | MIN. | MAX. | UNIT |
|-------------|---|--|------|------|------|
| $I_{F(AV)}$ | average forward current                         | $T_{amb} = 60\text{ °C}$ ; epoxy PCB mounting<br>(see Fig.27); see Figs 5, 6 and 7<br>averaged over any 20 ms period;<br>see also Figs 17, 18 and 19 | –    | 0.95 | A    |
|             | BYG80A to D                                     |  | –    | 0.85 | A    |
|             | BYG80F; BYG80G<br>BYG80J                        |  | –    | 0.65 | A    |
| $I_{FRM}$   | repetitive peak forward current                 | $T_{tp} = 100\text{ °C}$ ; see Figs 8, 9 and 10  | –    | 21   | A    |
|             | BYG80A to D                                     |  | –    | 21   | A    |
|             | BYG80F; BYG80G<br>BYG80J                        |  | –    | 18   | A    |
| $I_{FRM}$   | repetitive peak forward current                 | $T_{amb} = 60\text{ °C}$ ; $Al_2O_3$ PCB mounting;<br>see Figs 11, 12 and 13   | –    | 11   | A    |
|             | BYG80A to D                                     |  | –    | 11   | A    |
|             | BYG80F; BYG80G<br>BYG80J                        |  | –    | 9    | A    |
| $I_{FRM}$   | repetitive peak forward current                 | $T_{amb} = 60\text{ °C}$ ; epoxy PCB mounting;<br>see Figs 14, 15 and 16   | –    | 8    | A    |
|             | BYG80A to D                                     |  | –    | 8    | A    |
|             | BYG80F; BYG80G<br>BYG80J                        |  | –    | 6    | A    |
| $I_{FSM}$   | non-repetitive peak forward current             | $t = 8.3\text{ ms}$ half sine wave; $T_j = 25\text{ °C}$<br>prior to surge; $V_R = V_{RRMmax}$   | –    | 36   | A    |
|             | BYG80A to D<br>BYG80F; BYG80G; BYG80J           |  | –    | 32   | A    |
| $E_{RSM}$   | non-repetitive peak reverse<br>avalanche energy | $L = 120\text{ mH}$ ; $T_j = T_{jmax}$ prior to surge;<br>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          | $I_F = 1\text{ A}$ ; $T_j = T_{jmax}$ ;<br>see Figs 21, 22 and 23 | –    | –    | 0.67 | V    |
|        | BYG80A to D              |   | –    | –    | 0.73 | V    |
|        | BYG80F; BYG80G<br>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<br>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                           | $V_R = V_{RRMmax}$ ;<br>see Figs 24 and 25  | -    | -    | 10   | $\mu\text{A}$          |
| $I_R$                            | reverse current                           | $V_R = V_{RRMmax}$ ; $T_J = 165 \text{ }^\circ\text{C}$ ;<br>see Figs 24 and 25   | -    | -    | 100  | $\mu\text{A}$          |
|                                  | BYG80A to D                               |   | -    | -    | 150  | $\mu\text{A}$          |
| $t_{rr}$                         | reverse recovery time                     | when switched from $I_F = 0.5 \text{ A}$ to<br>$I_R = 1 \text{ A}$ ; measured at $I_R = 0.25 \text{ A}$ ;<br>see Fig.29       | -    | -    | 25   | ns                     |
|                                  | BYG80A to D                               |   | -    | -    | 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                            |   | -    | 65   | -    | pF                     |
| $\left  \frac{dI_R}{dt} \right $ | maximum slope of reverse recovery current | when switched from $I_F = 1 \text{ A}$ to<br>$V_R \geq 30 \text{ V}$ and $dI_F/dt = -1 \text{ A}/\mu\text{s}$ ;<br>see Fig.28 | -    | -    | 3    | $\text{A}/\mu\text{s}$ |
|                                  | BYG80A to D                               |   | -    | -    | 4    | $\text{A}/\mu\text{s}$ |
|                                  | 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  |

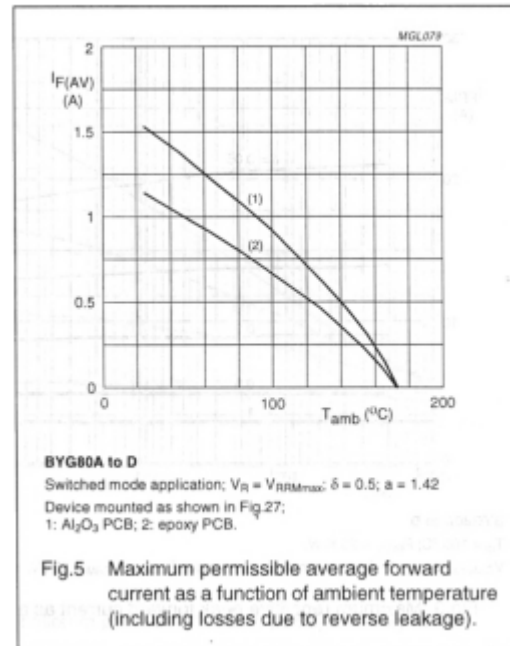
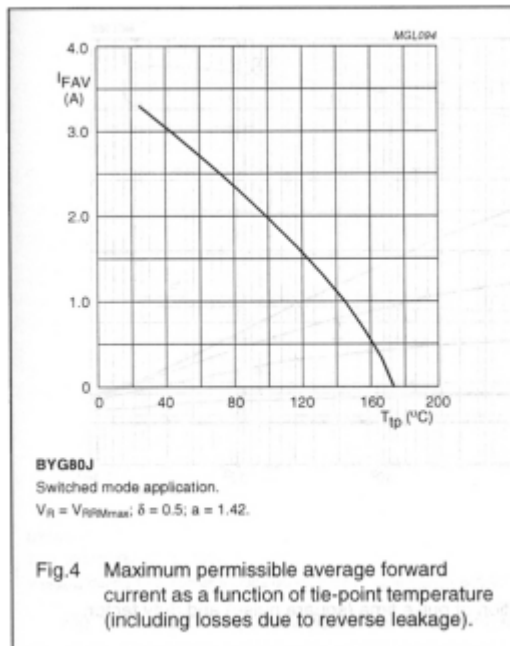
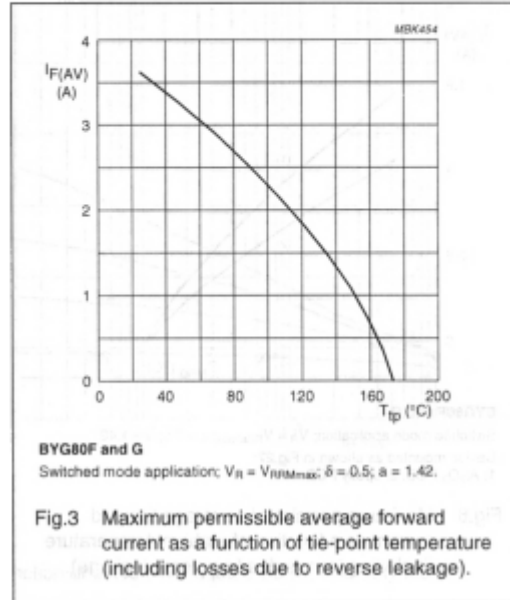
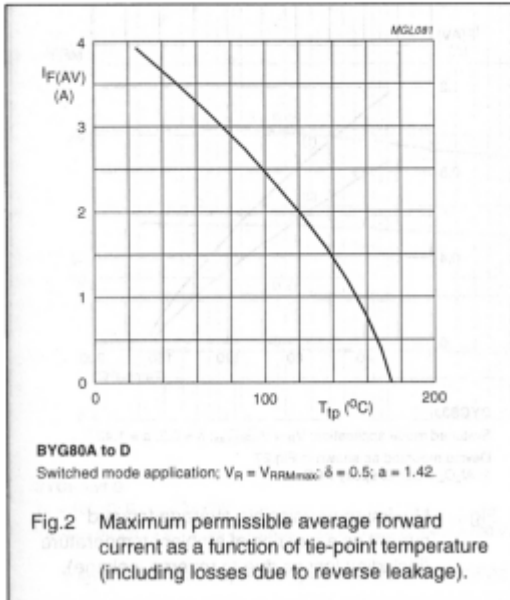
## Notes

- 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.
- 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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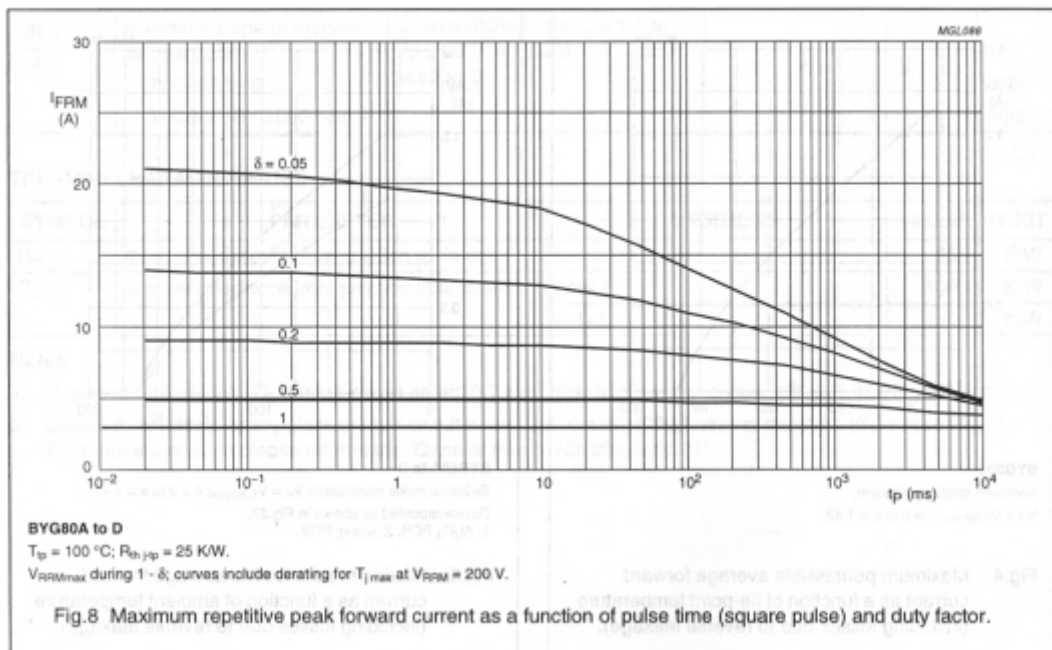
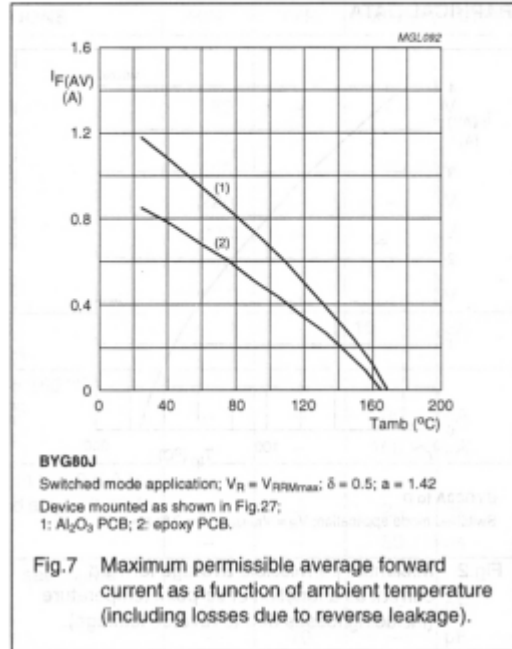
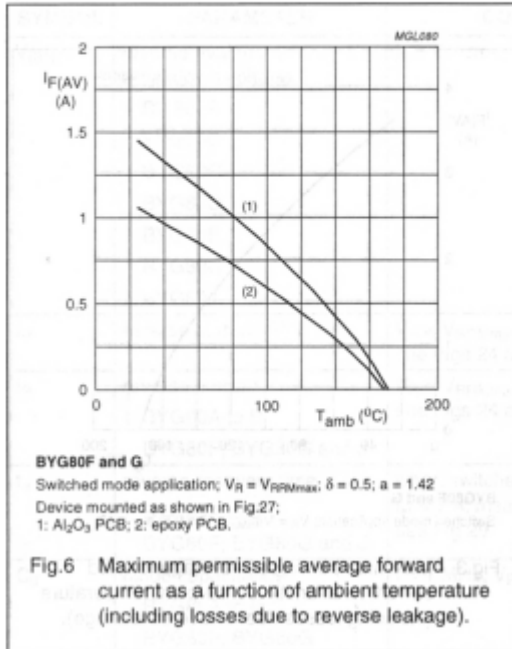
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GRAPHICAL DATA



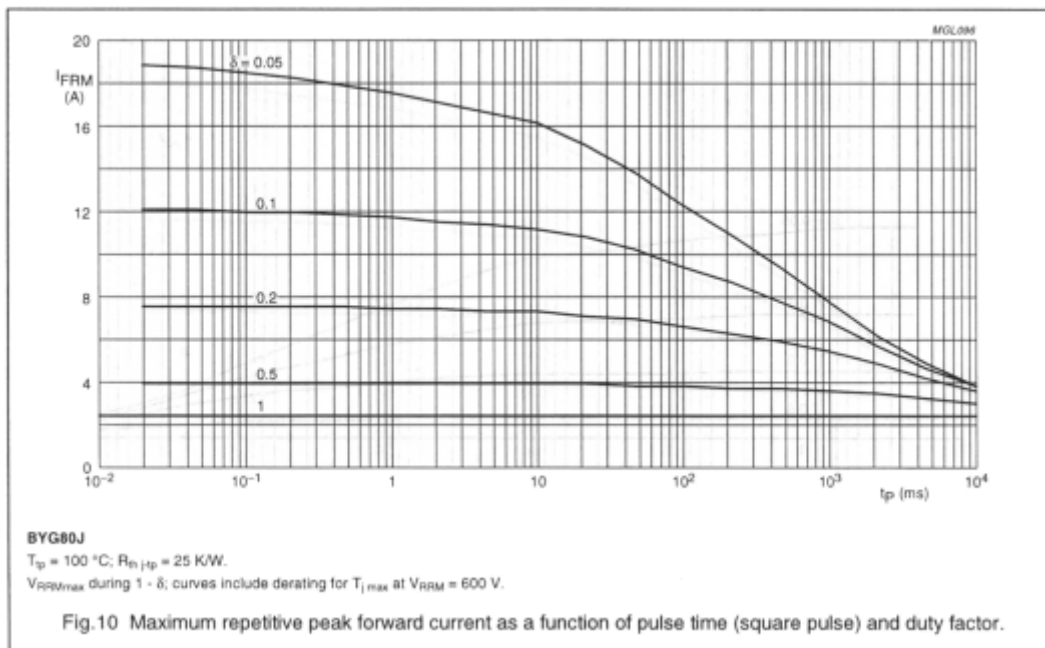
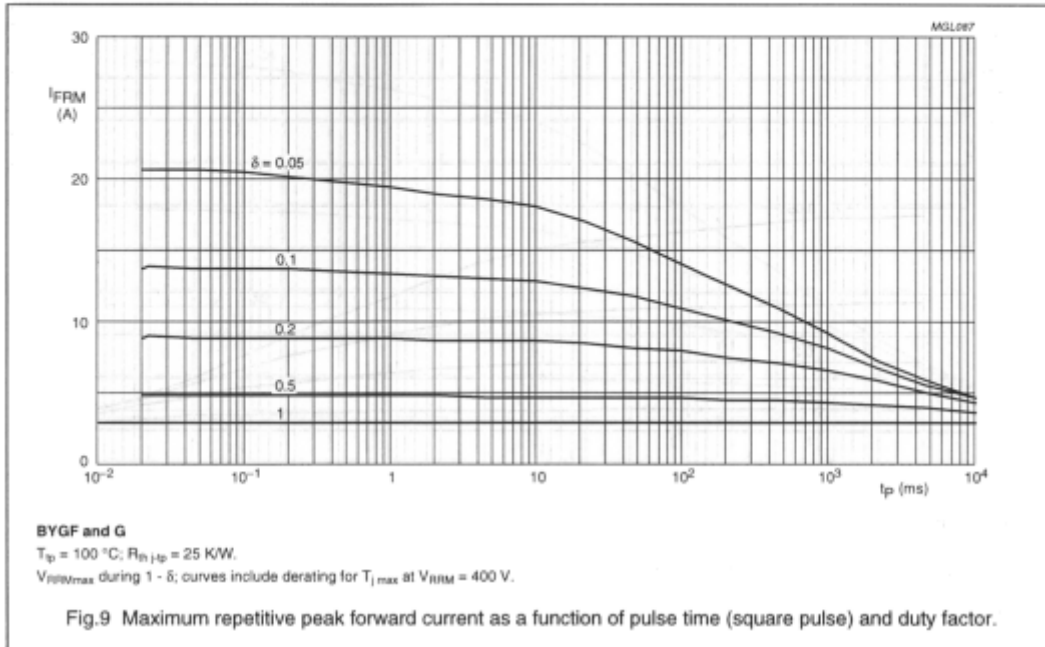
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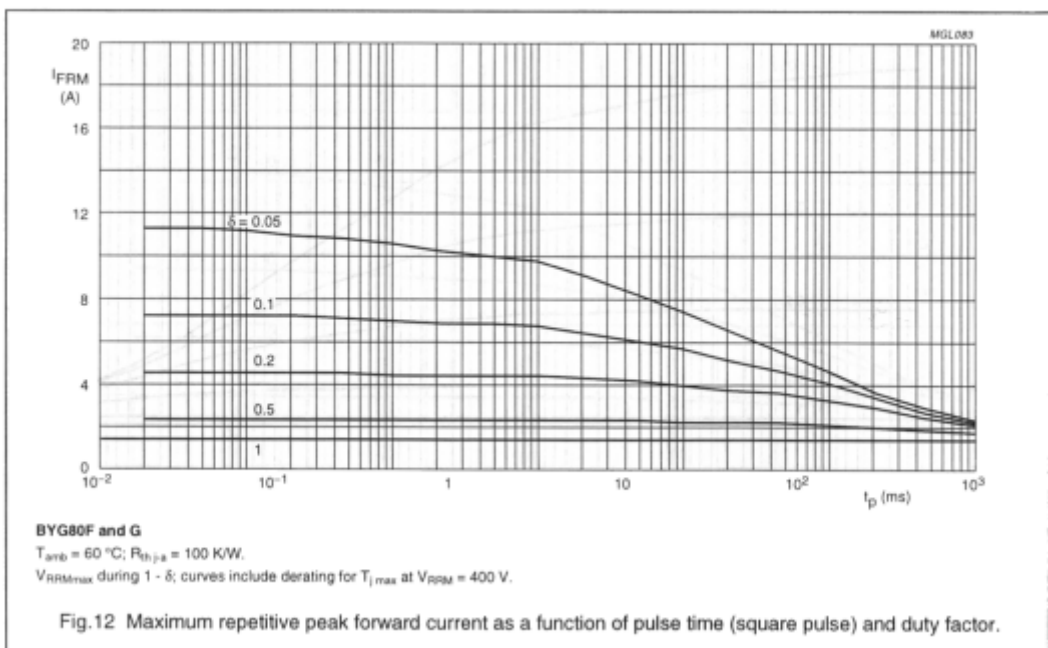
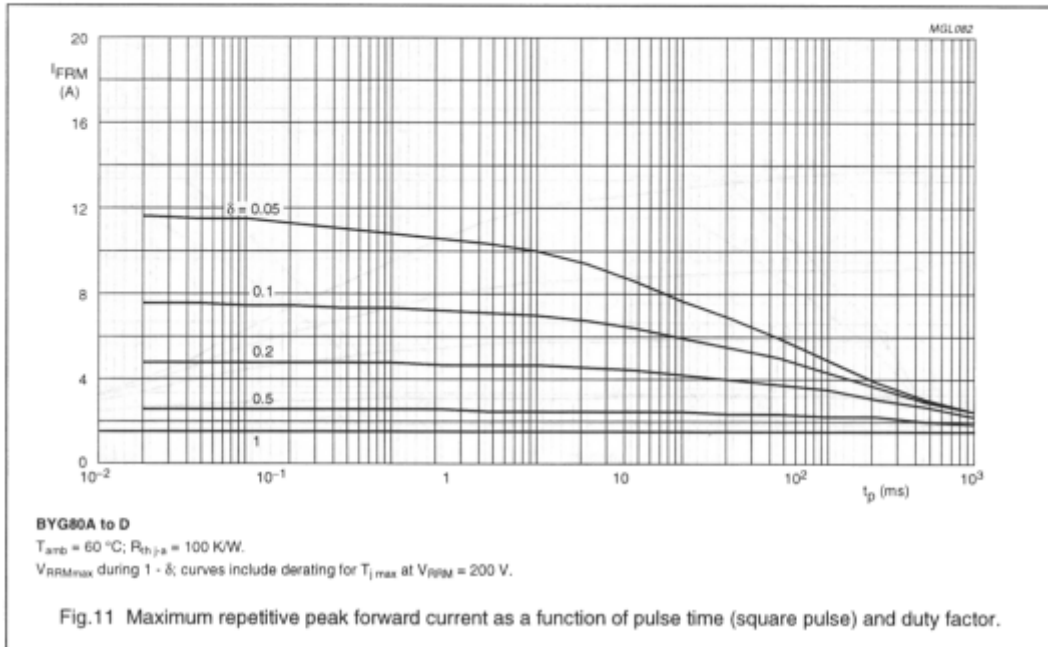
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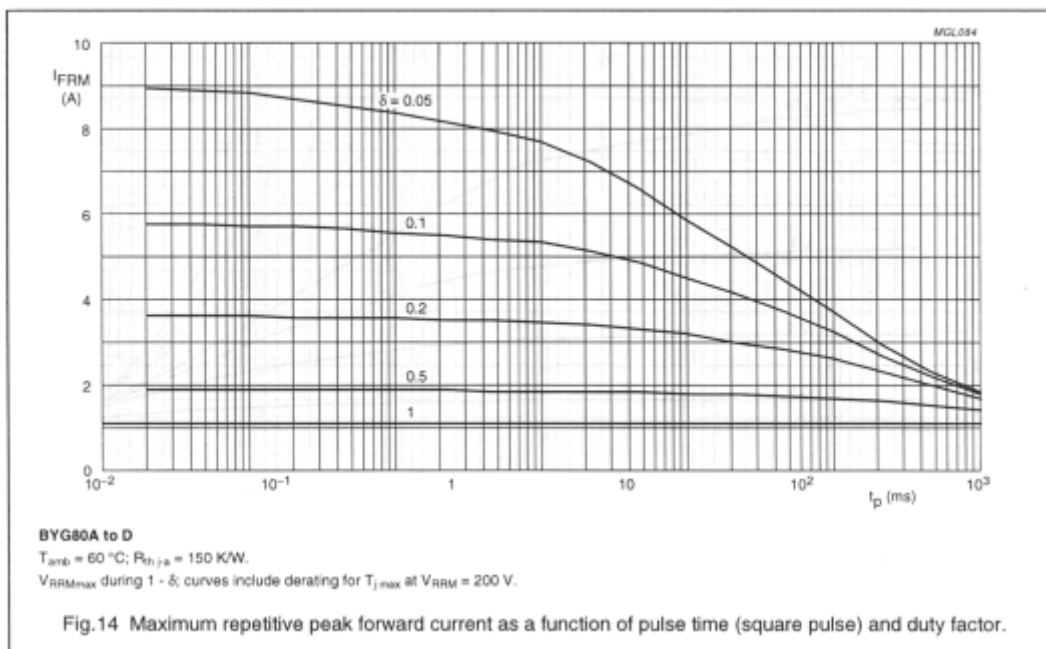
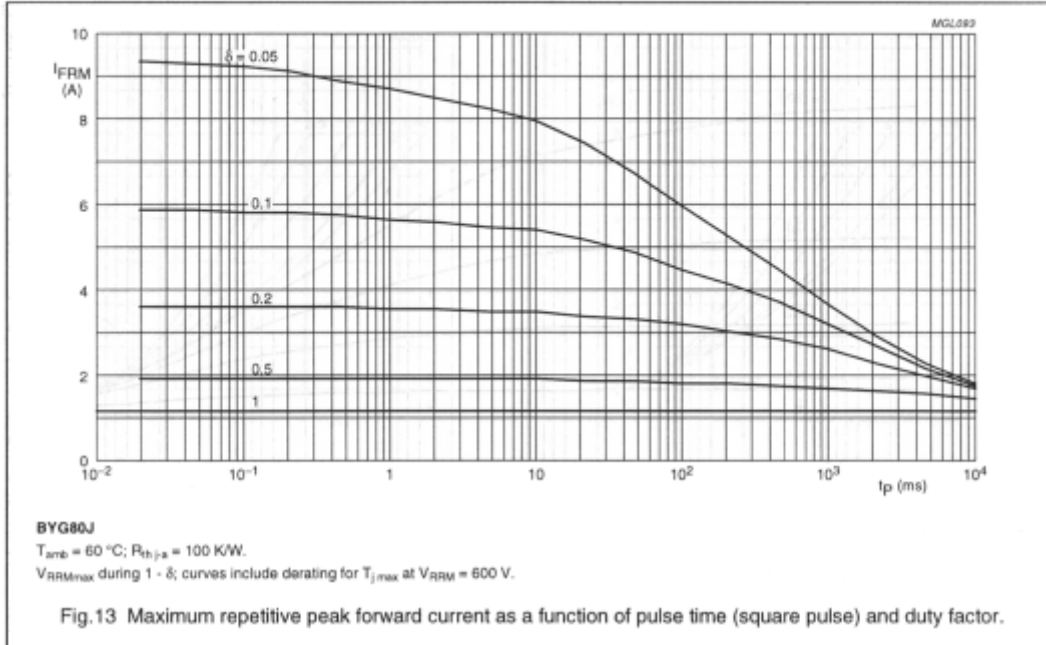
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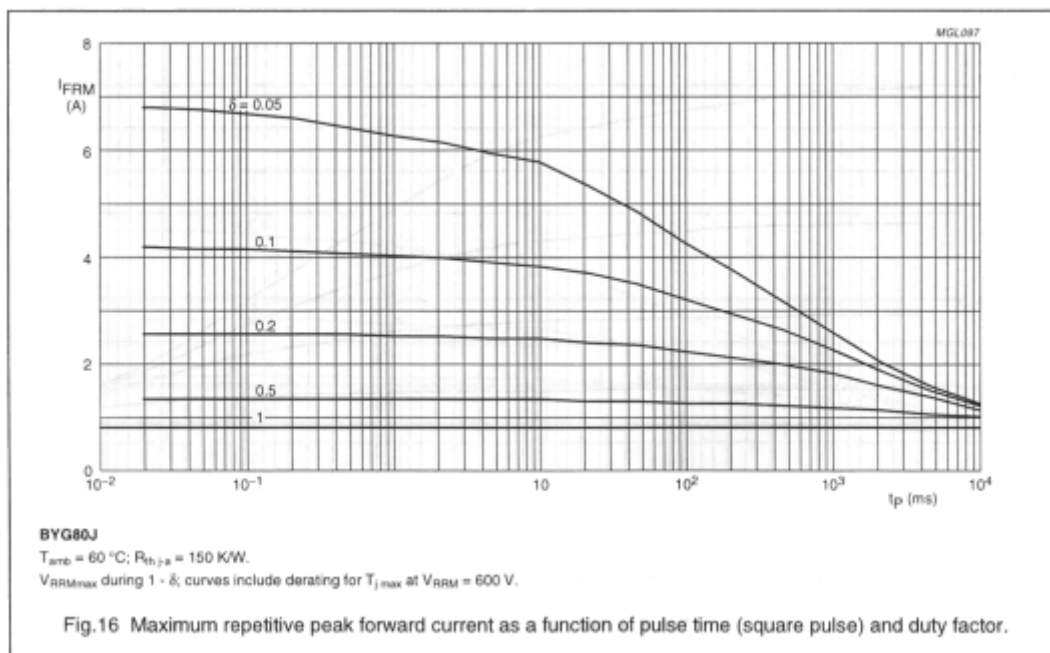
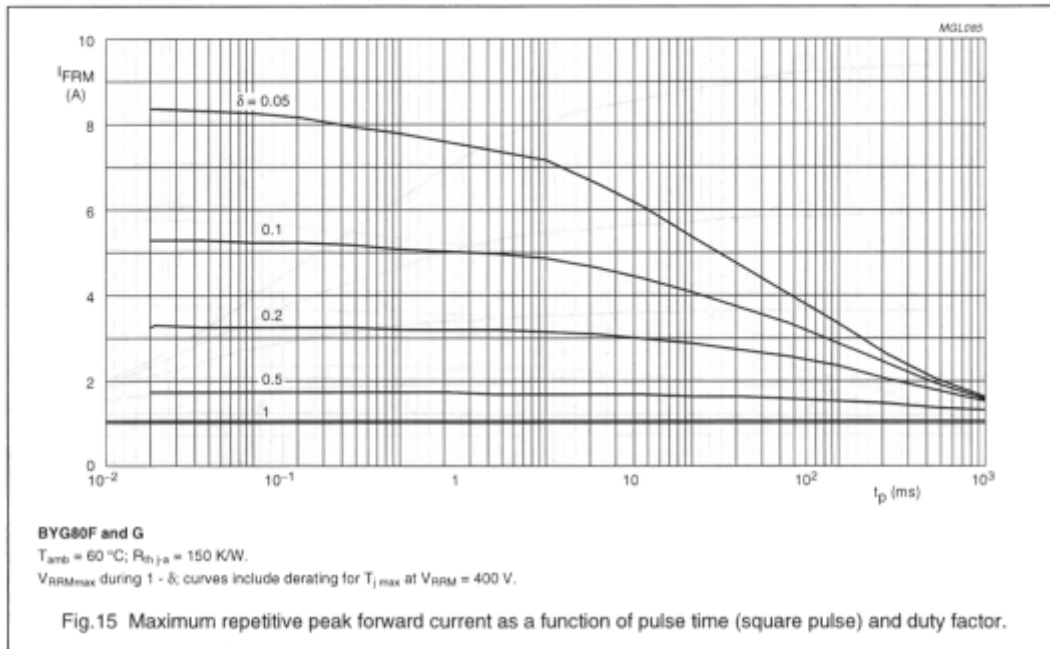
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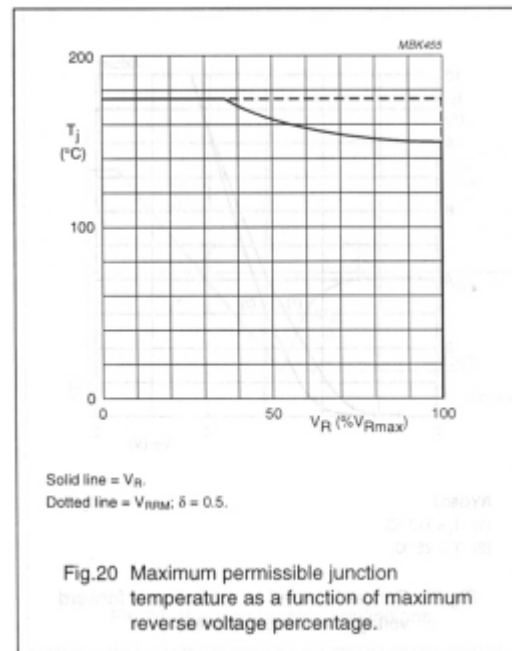
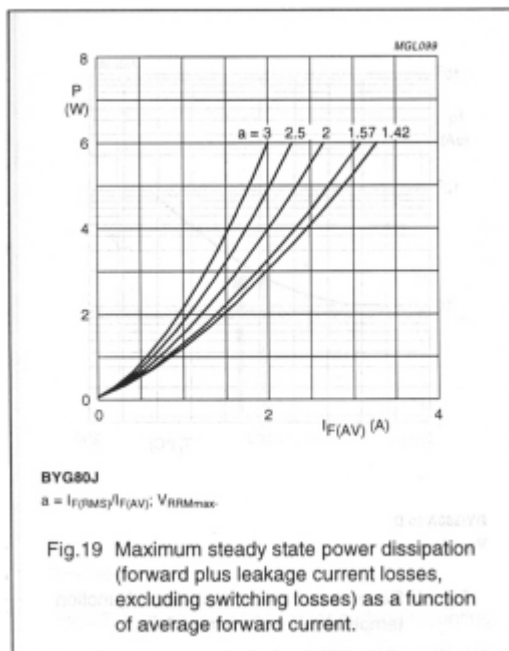
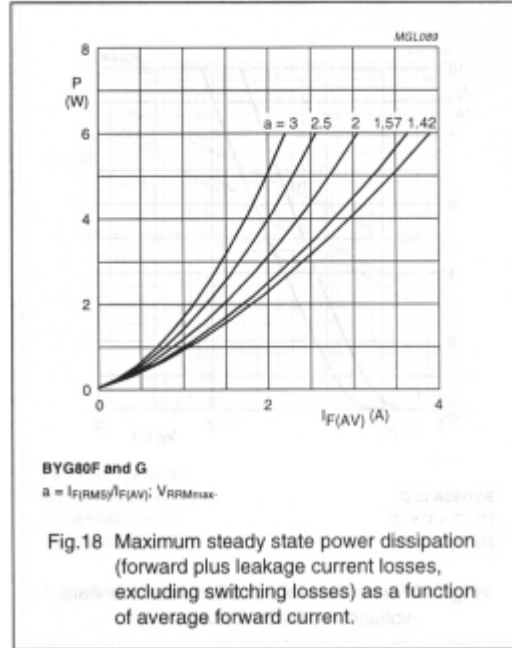
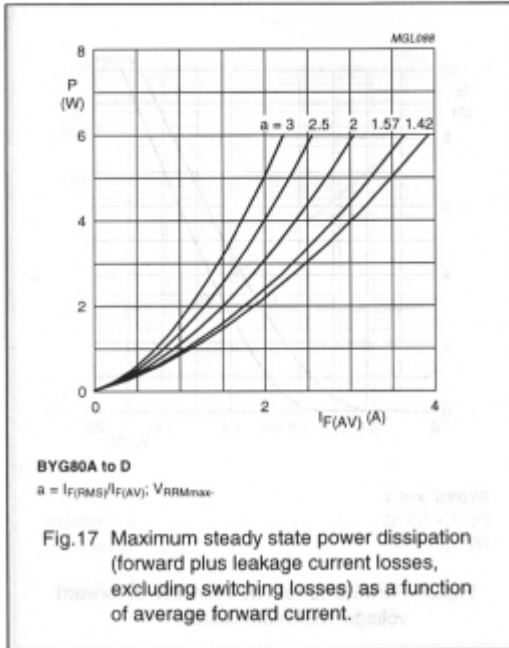
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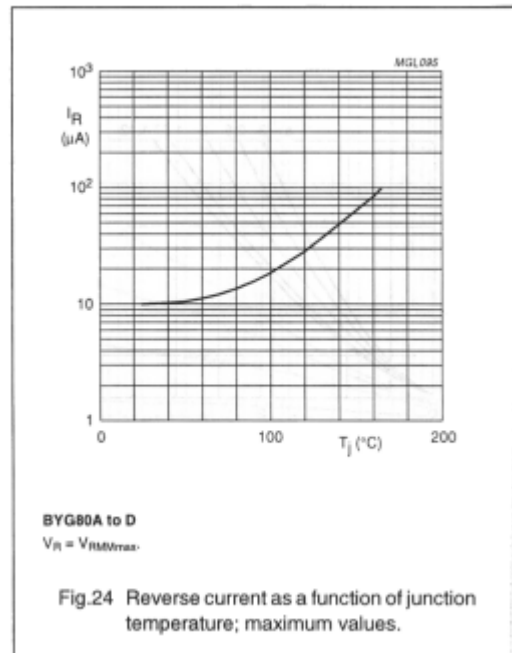
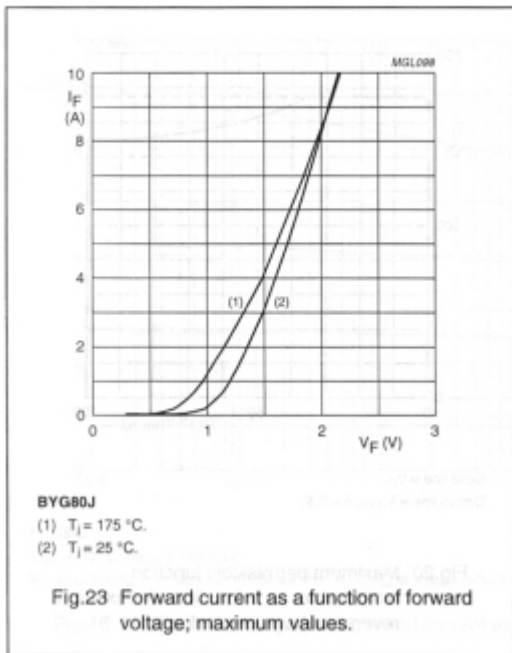
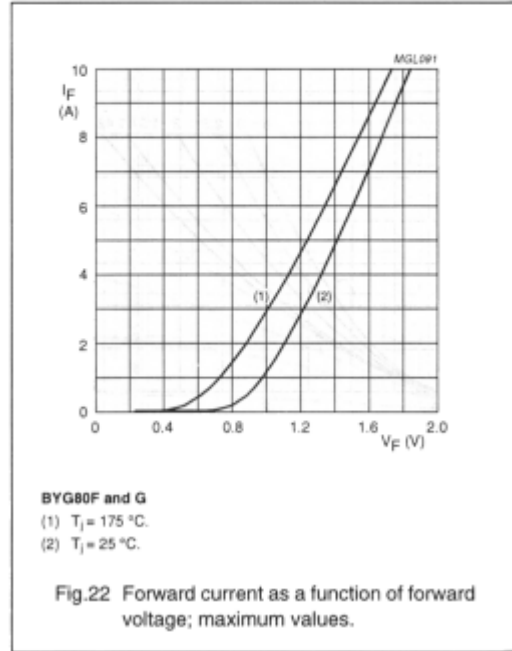
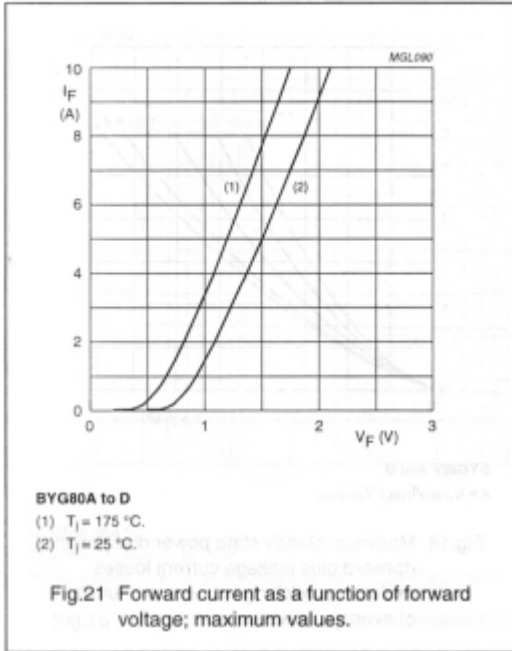
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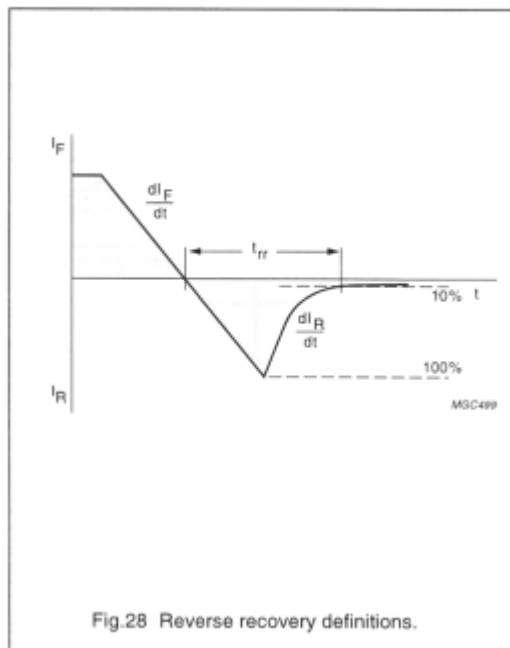
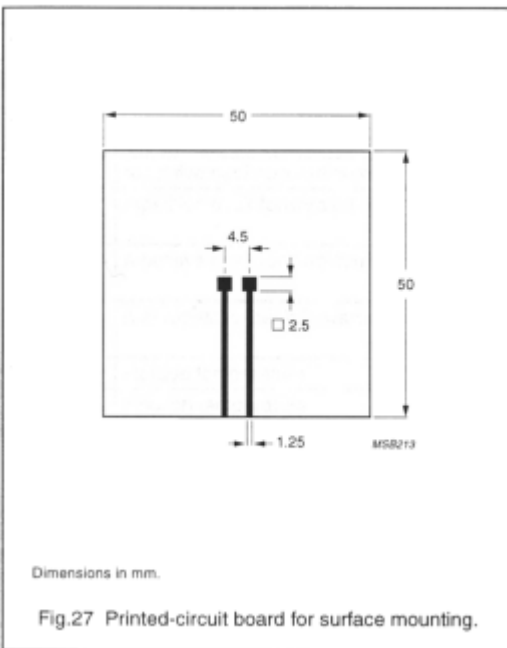
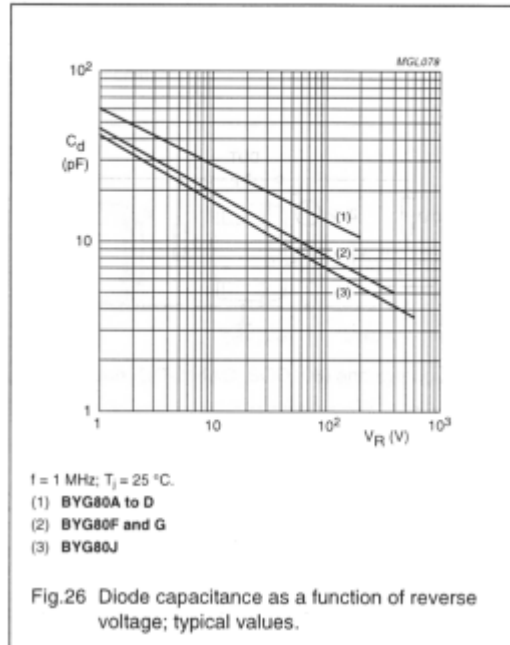
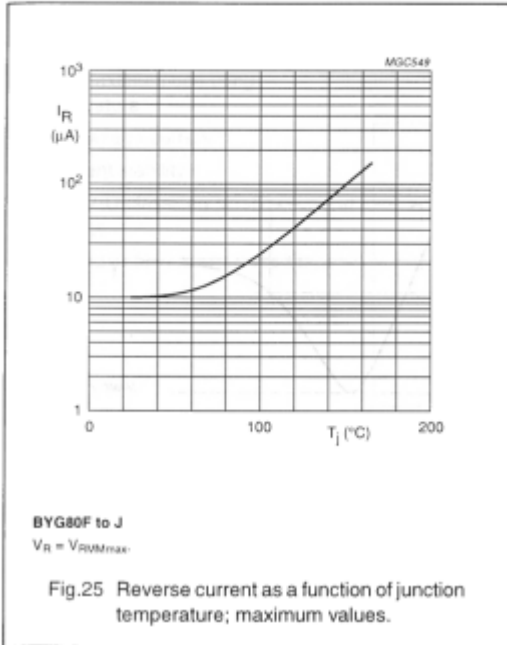
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