

Silicon Diode

BYV28-200

200V/3.5A

DATASHEET

OEM – Philips

Source: Philips Databook 1999

Ultra fast low-loss controlled avalanche rectifiers

BYV28 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Available in ammo-pack
- Also available with preformed leads for easy insertion.

DESCRIPTION

Rugged glass SOD64 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.



Fig.1 Simplified outline (SOD64) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|--------------------------------------|---|------|------------|------|
| V_{RRM} | repetitive peak reverse voltage | | | | |
| | BYV28-50 | | – | 50 | V |
| | BYV28-100 | | – | 100 | V |
| | BYV28-150 | | – | 150 | V |
| | BYV28-200 | | – | 200 | V |
| | BYV28-300 | | – | 300 | V |
| | BYV28-400 | | – | 400 | V |
| | BYV28-500 BYV28-600 | | – | 500 600 | V |
| V_R | continuous reverse voltage | | | | |
| | BYV28-50 | | – | 50 | V |
| | BYV28-100 | | – | 100 | V |
| | BYV28-150 | | – | 150 | V |
| | BYV28-200 | | – | 200 | V |
| | BYV28-300 | | – | 300 | V |
| | BYV28-400 | | – | 400 | V |
| | BYV28-500 BYV28-600 | | – | 500 600 | V |
| $I_{F(AV)}$ | average forward current | $T_{tp} = 85\text{ °C}$; lead length = 10 mm; see Figs 2 and 3; | – | 3.5 | A |
| | BYV28-50 to 400 BYV28-500 and 600 | averaged over any 20 ms period; see also Figs 10 and 11 | – | 3.1 | A |
| $I_{F(AV)}$ | average forward current | $T_{amb} = 60\text{ °C}$; printed-circuit board mounting (see Fig.20); | – | 1.9 | A |
| | BYV28-50 to 400 BYV28-500 and 600 | see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11 | – | 1.5 | A |

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| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-----------|--|--|------|------|------|
| I_{FRM} | repetitive peak forward current | $T_{ip} = 85\text{ °C}$; see Figs 6 and 7 | - | 32 | A |
| | BYV28-50 to 400 | | | 31 | A |
| I_{FRM} | repetitive peak forward current | $T_{amb} = 60\text{ °C}$; see Figs 8 and 9 | - | 17 | A |
| | BYV28-500 and 600 | | | 16 | A |
| I_{FSM} | non-repetitive peak forward current | $t = 10\text{ ms}$ half sine wave; $T_j = T_{j\text{max}}$ prior to surge; $V_R = V_{RRM\text{max}}$ | - | 90 | 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.12 | -65 | +175 | °C |

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT | |
|-------------|-------------------------------------|---|------|------|-----------------|---------------|----|
| V_F | forward voltage | $I_F = 3.5\text{ A}$; $T_j = T_{j\text{max}}$; see Figs 13, 14 and 15 | - | - | 0.80 | V | |
| | BYV28-50 to 200 | | | | 0.83 | V | |
| | BYV28-300 and 400 | | | | 0.98 | V | |
| V_F | forward voltage | $I_F = 3.5\text{ A}$; see Figs 13, 14 and 15 | - | - | 1.02 | V | |
| | BYV28-50 to 200 | | | | 1.05 | V | |
| | BYV28-300 and 400 | | | | 1.25 | V | |
| $V_{(BR)R}$ | reverse avalanche breakdown voltage | $I_R = 0.1\text{ mA}$ | | | | | |
| | BYV28-50 | | | | | 55 | V |
| | BYV28-100 | | | | | 110 | V |
| | BYV28-150 | | | | | 165 | V |
| | BYV28-200 | | | | | 220 | V |
| | BYV28-300 | | | | | 330 | V |
| | BYV28-400 | | | | | 440 | V |
| | BYV28-500 | | | | | 560 | V |
| I_R | reverse current | $V_R = V_{RRM\text{max}}$; see Fig.16 | - | - | 5 | μA | |
| | | $V_R = V_{RRM\text{max}}$; $T_j = 165\text{ °C}$; see Fig.16 | - | - | 150 | μA | |
| 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.22 | - | - | 25 | ns | |
| | | | | | BYV28-50 to 200 | 50 | ns |
| | BYV28-300 to 600 | | | | | | |

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| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|----------------------------------|---|---|------|------|------|------------------|
| C_d | diode capacitance | $f = 1 \text{ MHz}; V_R = 0;$ see Figs 17, 18 and 19 | - | 190 | - | pF |
| | BYV28-50 to 200 | | - | 150 | - | pF |
| | BYV28-300 and 400 BYV28-500 and 600 | | - | 125 | - | 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.21 | - | - | 4 | A/ μs |

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|-----------------------|---|---------------------|-------|------|
| $R_{th \text{ j-tp}}$ | thermal resistance from junction to tie-point | lead length = 10 mm | 25 | K/W |
| $R_{th \text{ j-a}}$ | thermal resistance from junction to ambient | note 1 | 75 | K/W |

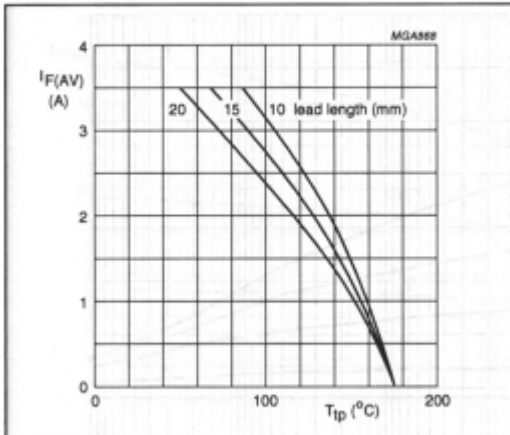
Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer $\geq 40 \mu\text{m}$, see Fig.20
For more information please refer to the 'General Part of Handbook SC01'.

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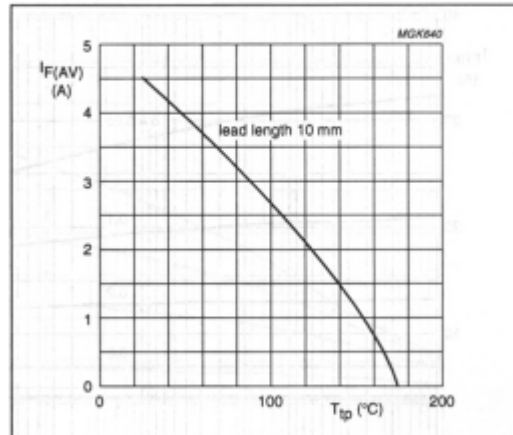
GRAPHICAL DATA



BYV28-50 to 400

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

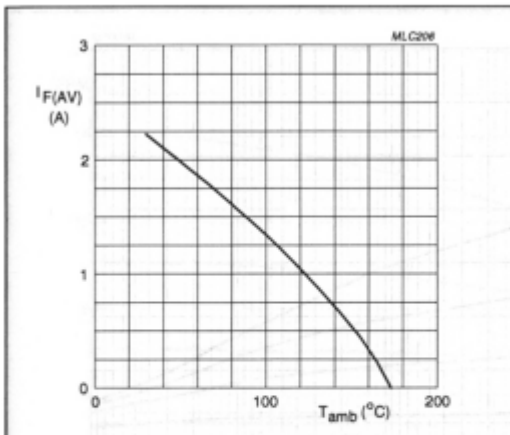
Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



BYV28-500 and 600

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

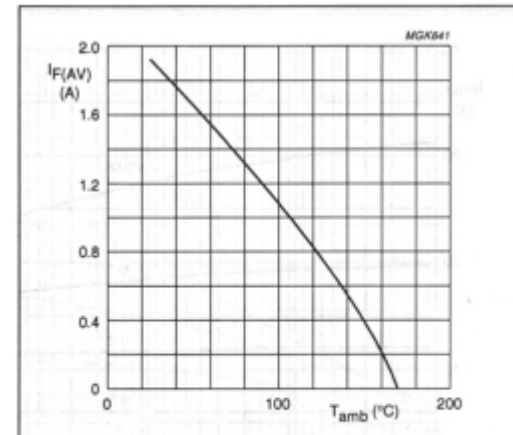
Fig.3 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



BYV28-50 to 400

$\alpha = 1.42$; $V_R = V_{RRMmax}$; $\delta = 0.5$; switched mode application.
Device mounted as shown in Fig.20.

Fig.4 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



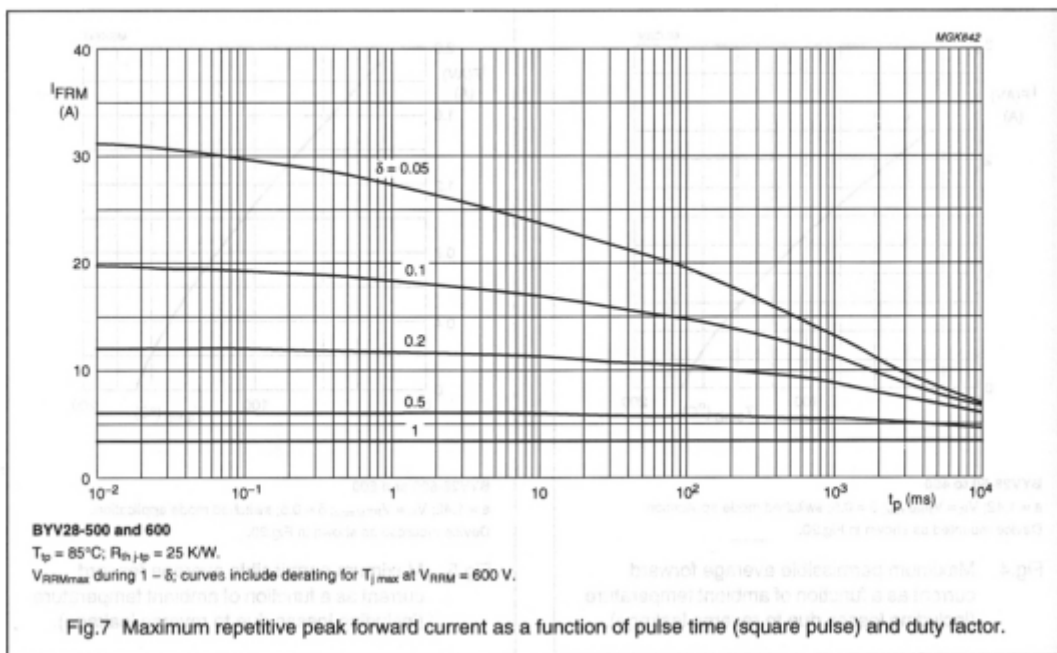
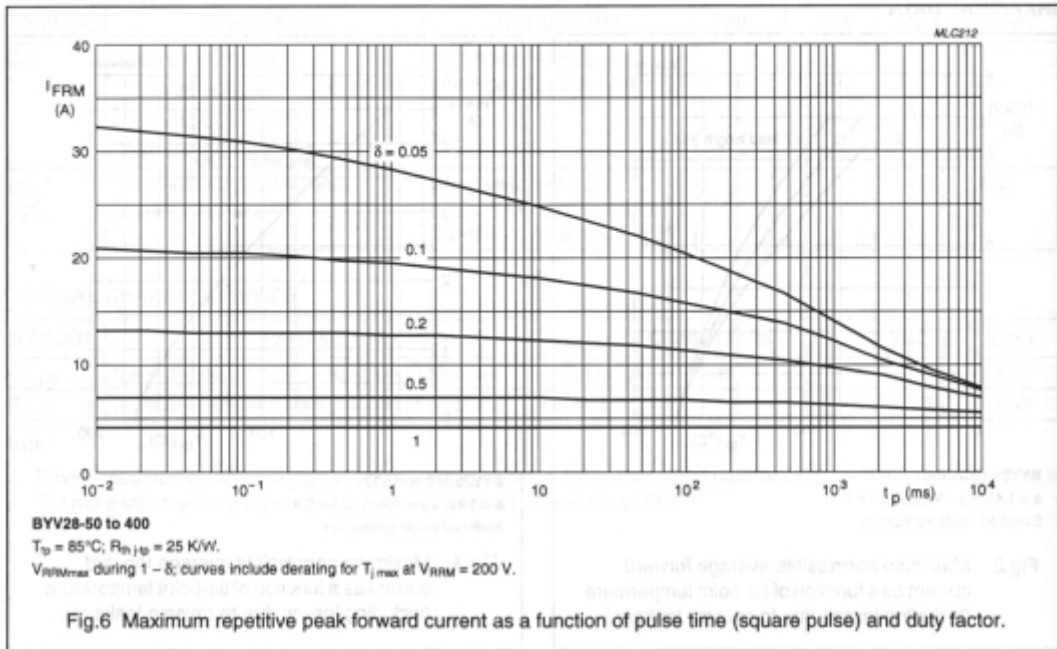
BYV28-500 and 600

$\alpha = 1.42$; $V_R = V_{RRMmax}$; $\delta = 0.5$; switched mode application.
Device mounted as shown in Fig.20.

Fig.5 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).

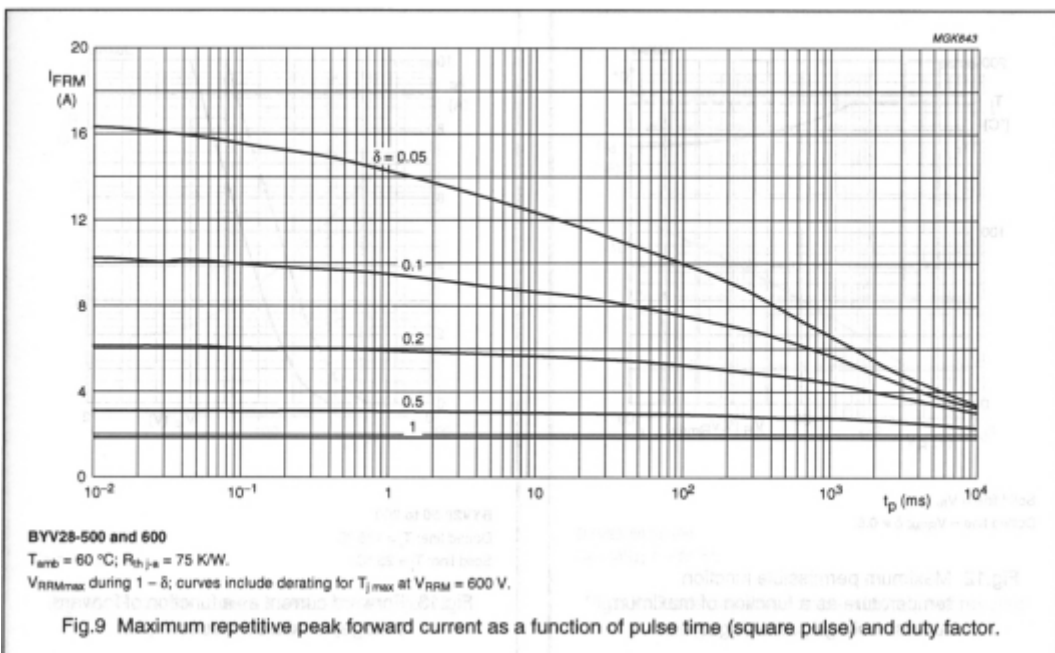
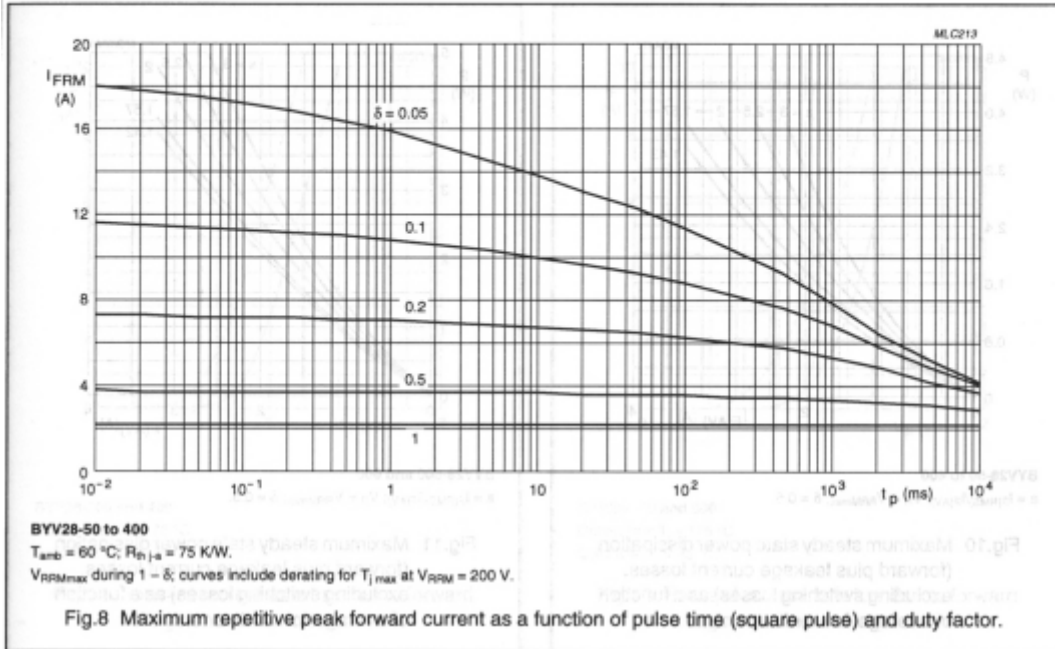
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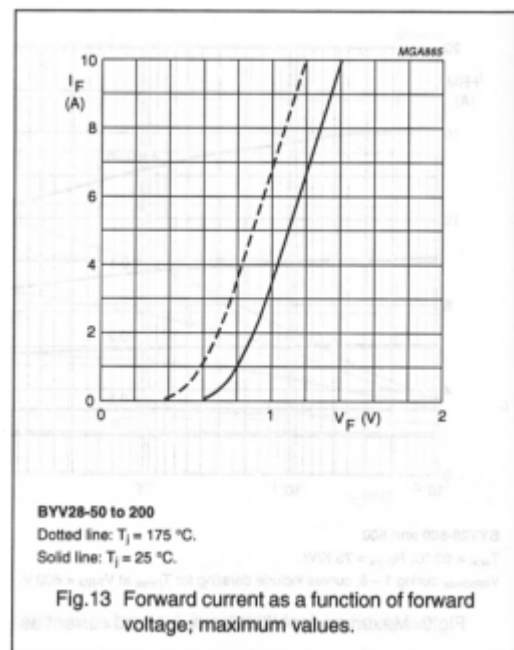
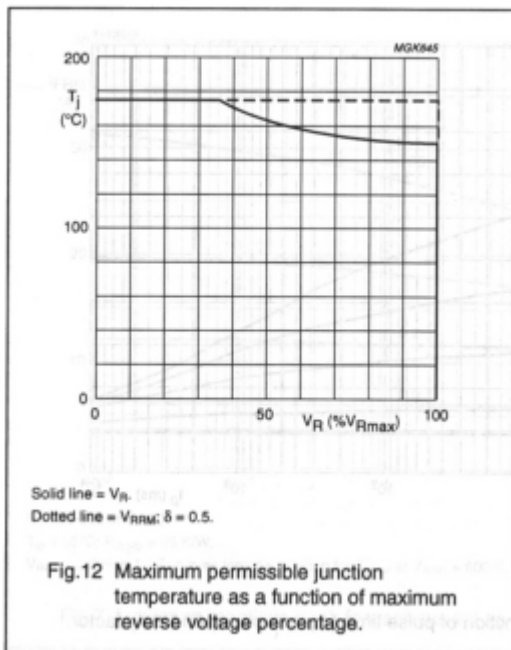
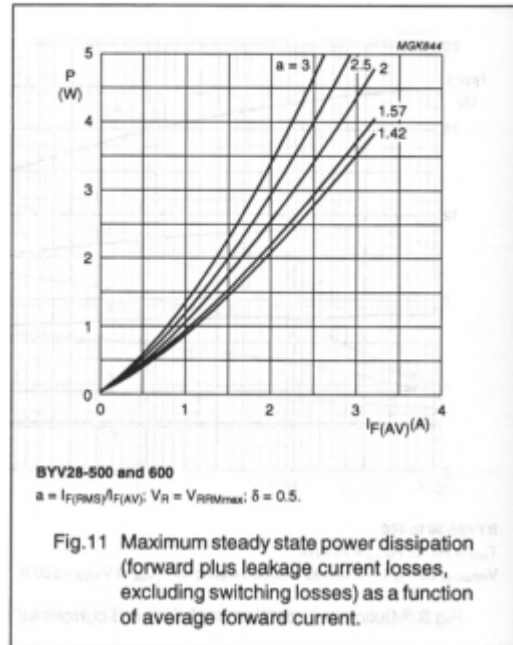
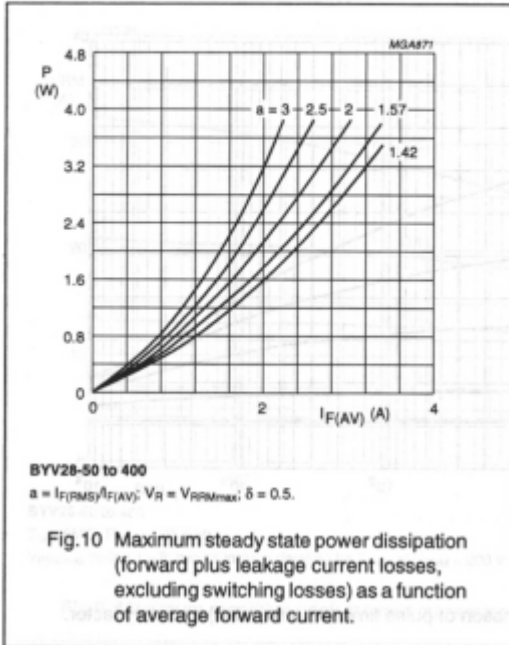
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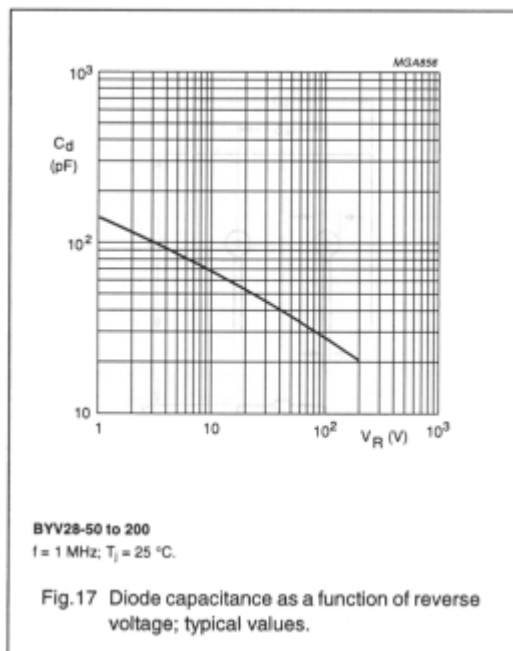
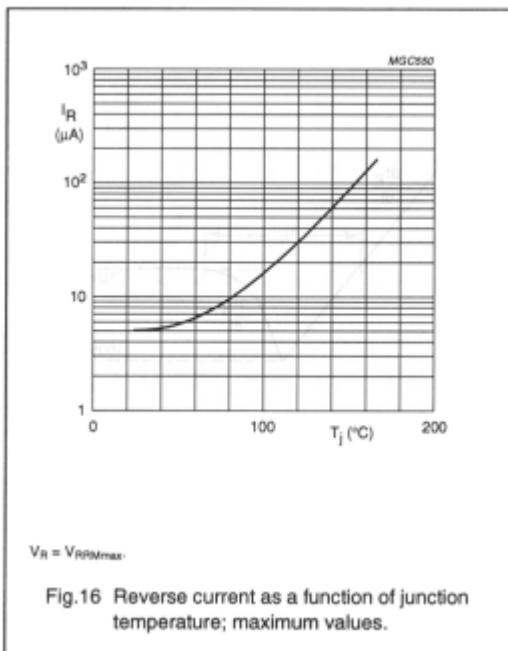
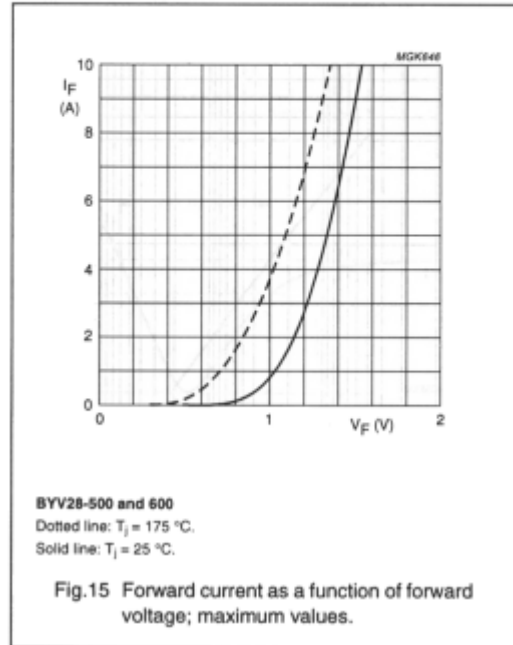
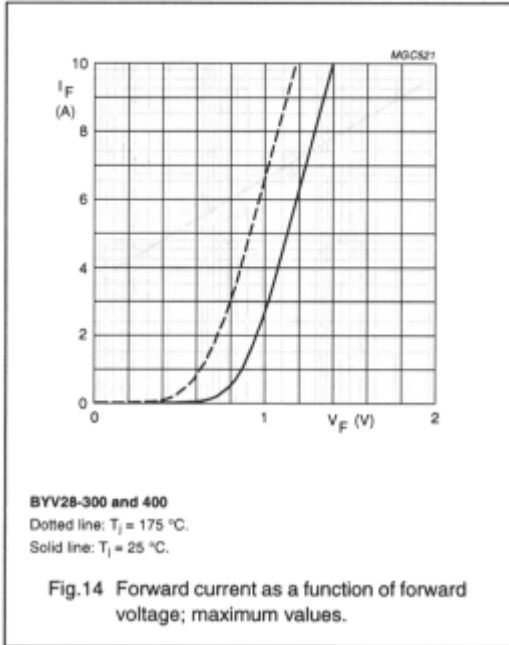
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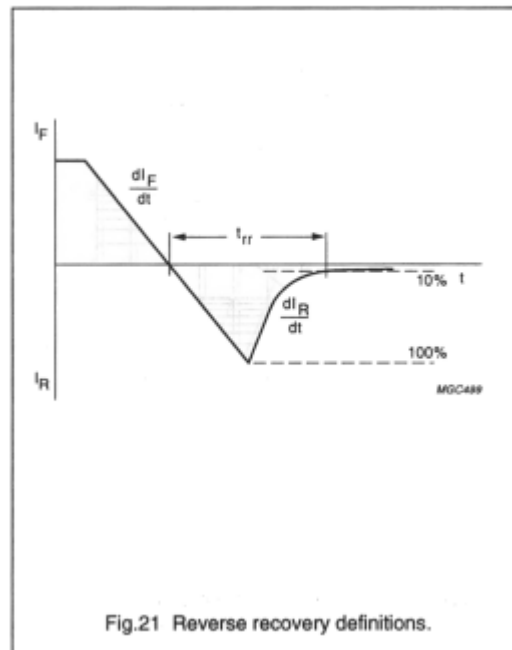
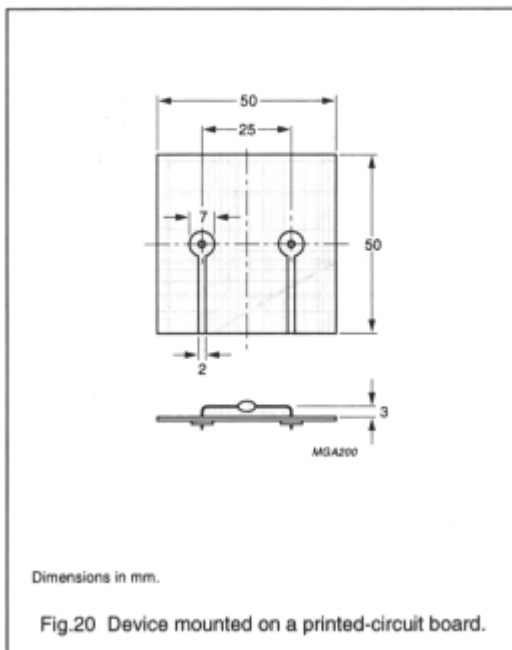
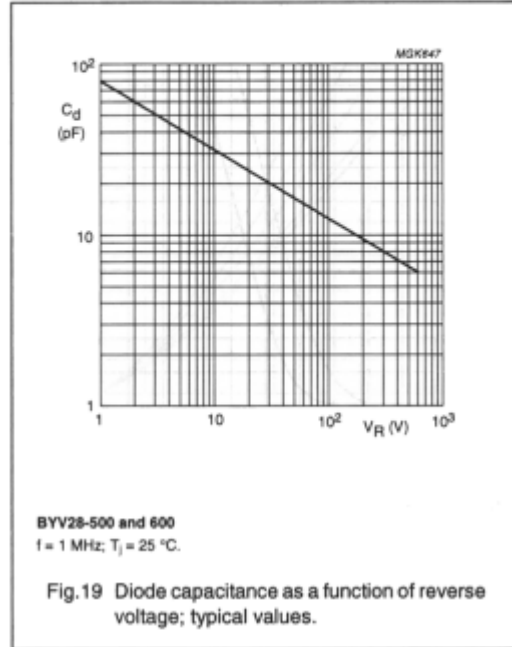
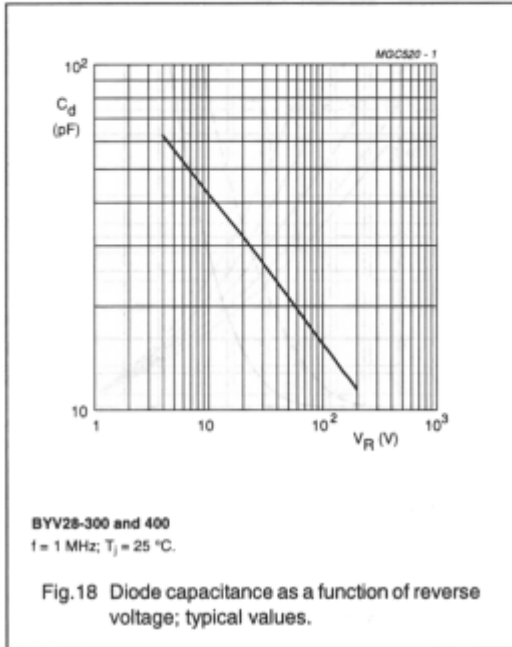
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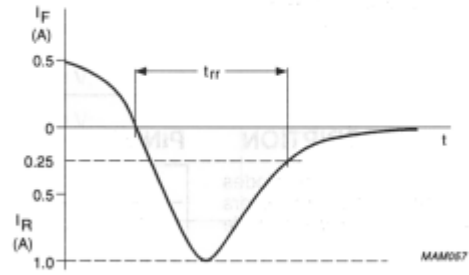
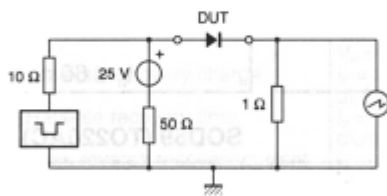
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Input impedance oscilloscope: 1 M Ω , 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω ; $t_r \leq 15$ ns.

Fig.22 Test circuit and reverse recovery time waveform and definition.