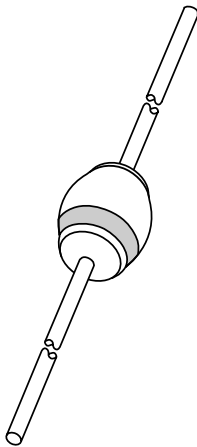


# DATA SHEET



## **BYV26 series** Fast soft-recovery controlled avalanche rectifiers

Product specification  
Supersedes data of February 1994

1996 May 30

## Fast soft-recovery controlled avalanche rectifiers

## BYV26 series

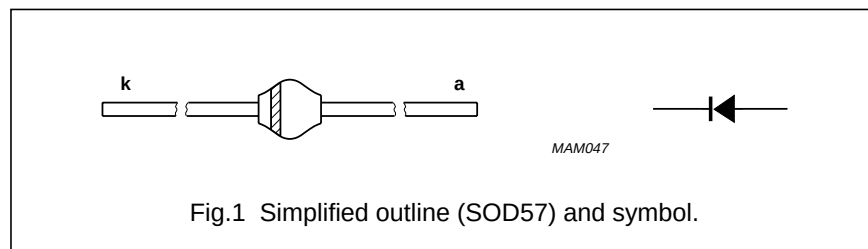
### FEATURES

- 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 |                                                                                       |      |      |      |
|             | BYV26A                          |                                                                                       | —    | 200  | V    |
|             | BYV26B                          |                                                                                       | —    | 400  | V    |
|             | BYV26C                          |                                                                                       | —    | 600  | V    |
|             | BYV26D                          |                                                                                       | —    | 800  | V    |
|             | BYV26E                          |                                                                                       | —    | 1000 | V    |
|             | BYV26F                          |                                                                                       | —    | 1200 | V    |
|             | BYV26G                          |                                                                                       | —    | 1400 | V    |
| $V_R$       | continuous reverse voltage      |                                                                                       |      |      |      |
|             | BYV26A                          |                                                                                       | —    | 200  | V    |
|             | BYV26B                          |                                                                                       | —    | 400  | V    |
|             | BYV26C                          |                                                                                       | —    | 600  | V    |
|             | BYV26D                          |                                                                                       | —    | 800  | V    |
|             | BYV26E                          |                                                                                       | —    | 1000 | V    |
|             | BYV26F                          |                                                                                       | —    | 1200 | V    |
|             | BYV26G                          |                                                                                       | —    | 1400 | V    |
| $I_{F(AV)}$ | average forward current         | $T_{tp} = 85\text{ }^{\circ}\text{C}$ ; lead length = 10 mm; see Figs 2 and 3;        |      |      |      |
|             | BYV26A to E                     | averaged over any 20 ms period; see also Figs 10 and 11                               | —    | 1.00 | A    |
| $I_{F(AV)}$ | average forward current         | $T_{amb} = 60\text{ }^{\circ}\text{C}$ ; PCB mounting (see Fig.19); see Figs 4 and 5; |      |      |      |
|             | BYV26F and G                    | averaged over any 20 ms period; see also Figs 10 and 11                               | —    | 0.65 | A    |
| $I_{FRM}$   | repetitive peak forward current | $T_{tp} = 85\text{ }^{\circ}\text{C}$ ; see Figs 6 and 7                              |      |      |      |
|             | BYV26A to E                     |                                                                                       | —    | 10.0 | A    |
| $I_{FRM}$   | BYV26F and G                    |                                                                                       | —    | 9.6  | A    |

# Fast soft-recovery controlled avalanche rectifiers

## BYV26 series

| SYMBOL    | PARAMETER                                                      | CONDITIONS                                                                                                | MIN. | MAX. | UNIT               |
|-----------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------|------|--------------------|
| $I_{FRM}$ | repetitive peak forward current<br>BYV26A to E<br>BYV26F and G | $T_{amb} = 60\text{ }^{\circ}\text{C}$ ; see Figs 8 and 9                                                 | –    | 6.0  | A                  |
| $I_{FSM}$ | non-repetitive peak forward current                            | $t = 10\text{ ms}$ half sine wave; $T_j = T_{j\text{ max}}$<br>prior to surge; $V_R = V_{RRM\text{ max}}$ | –    | 30   | A                  |
| $E_{RSM}$ | non-repetitive peak reverse<br>avalanche energy                | $I_R = 400\text{ mA}$ ; $T_j = T_{j\text{ max}}$ prior to<br>surge; inductive load switched off           | –    | 10   | mJ                 |
| $T_{stg}$ | storage temperature                                            |                                                                                                           | –65  | +175 | $^{\circ}\text{C}$ |
| $T_j$     | junction temperature                                           | see Figs 12 and 13                                                                                        | –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<br>BYV26A to E<br>BYV26F and G                                                               | $I_F = 1\text{ A}$ ; $T_j = T_{j\text{ max}}$ ;<br>see Figs 14 and 15                                                   | –                                                | –                               | 1.3                             | V                               |
| $V_F$       | forward voltage<br>BYV26A to E<br>BYV26F and G                                                               | $I_F = 1\text{ A}$ ;<br>see Figs 14 and 15                                                                              | –                                                | –                               | 2.50                            | V                               |
| $V_{(BR)R}$ | reverse avalanche breakdown<br>voltage<br>BYV26A<br>BYV26B<br>BYV26C<br>BYV26D<br>BYV26E<br>BYV26F<br>BYV26G | $I_R = 0.1\text{ mA}$                                                                                                   | 300<br>500<br>700<br>900<br>1100<br>1300<br>1500 | –<br>–<br>–<br>–<br>–<br>–<br>– | –<br>–<br>–<br>–<br>–<br>–<br>– | V<br>V<br>V<br>V<br>V<br>V<br>V |
| $I_R$       | reverse current                                                                                              | $V_R = V_{RRM\text{ max}}$ ; see Fig.16                                                                                 | –                                                | –                               | 5                               | $\mu\text{A}$                   |
|             |                                                                                                              | $V_R = V_{RRM\text{ max}}$ ;<br>$T_j = 165\text{ }^{\circ}\text{C}$ ; see Fig.16                                        | –                                                | –                               | 150                             | $\mu\text{A}$                   |
| $t_{rr}$    | reverse recovery time<br>BYV26A to C<br>BYV26D and E<br>BYV26F and G                                         | when switched from<br>$I_F = 0.5\text{ A}$ to $I_R = 1\text{ A}$ ;<br>measured at $I_R = 0.25\text{ A}$ ;<br>see Fig.20 | –<br>–<br>–                                      | –<br>–<br>–                     | 30<br>75<br>150                 | ns<br>ns<br>ns                  |
| $C_d$       | diode capacitance<br>BYV26A to C<br>BYV26D and E<br>BYV26F and G                                             | $f = 1\text{ MHz}$ ; $V_R = 0\text{ V}$ ;<br>see Figs 17 and 18                                                         | –<br>–<br>–                                      | 45<br>40<br>35                  | –<br>–<br>–                     | pF<br>pF<br>pF                  |

# Fast soft-recovery controlled avalanche rectifiers

## BYV26 series

| SYMBOL                           | PARAMETER                                 | CONDITIONS                                                                                     | MIN. | TYP. | MAX. | UNIT       |
|----------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------|------|------|------|------------|
| $\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/ $\mu$ S;<br>see Fig.21 | —    | —    | 7    | A/ $\mu$ S |
|                                  | BYV26A to C                               |                                                                                                | —    | —    | 6    | A/ $\mu$ S |
|                                  | BYV26D and E                              |                                                                                                | —    | —    | 5    | A/ $\mu$ S |
|                                  | BYV26F and G                              |                                                                                                | —    | —    | 5    | A/ $\mu$ S |

### 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  |

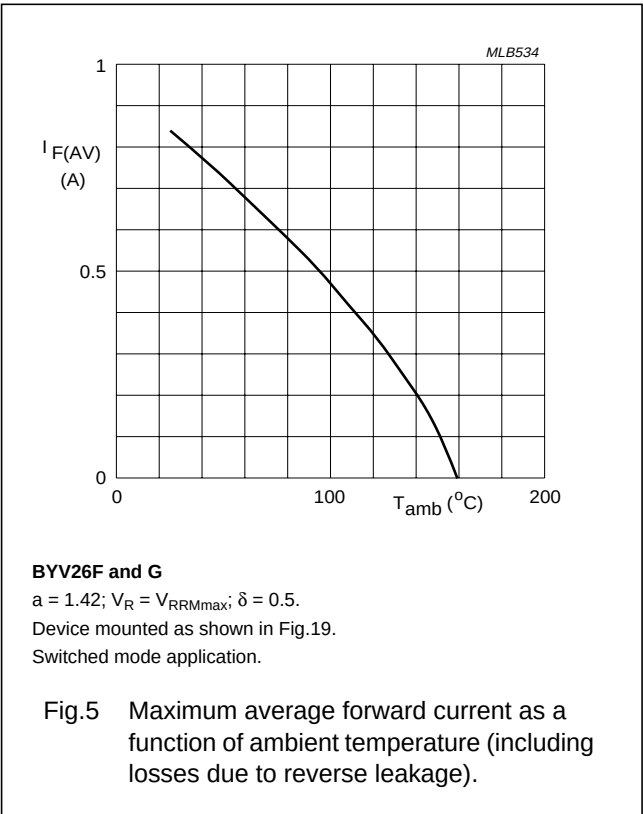
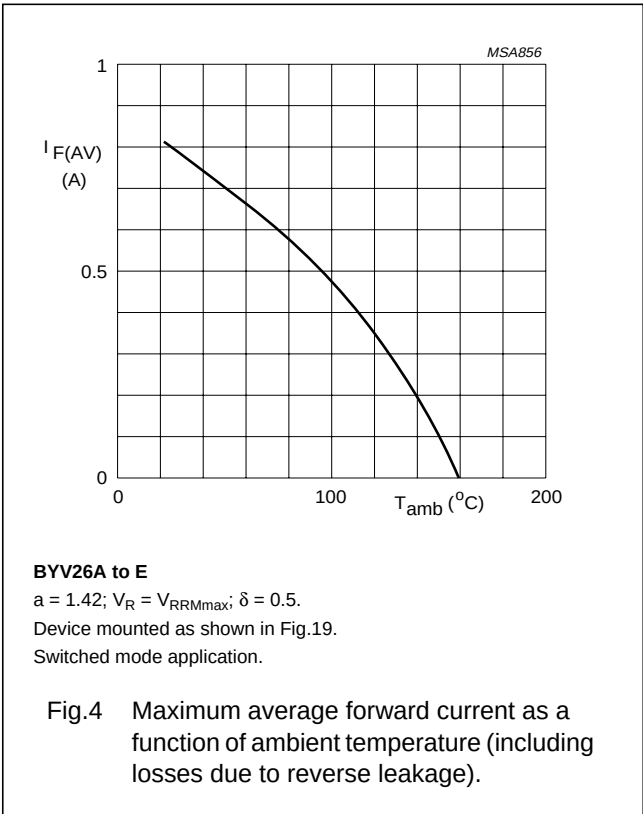
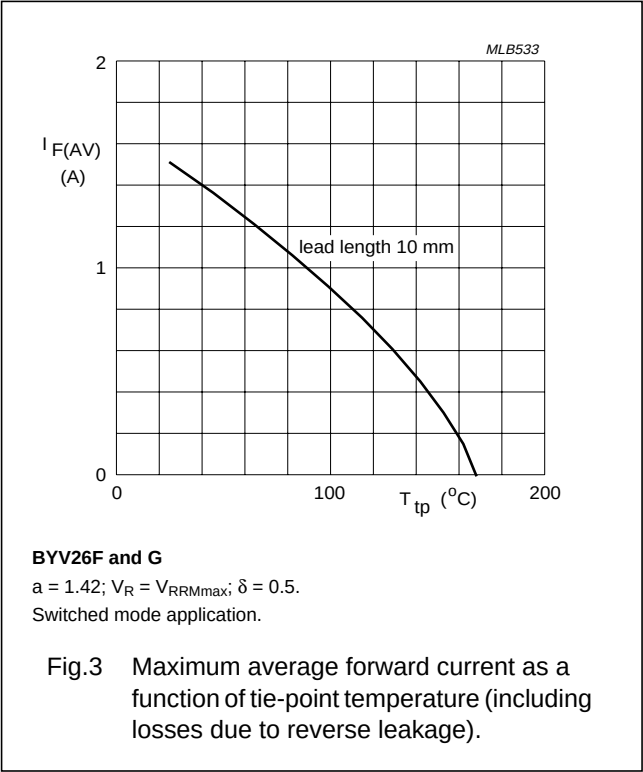
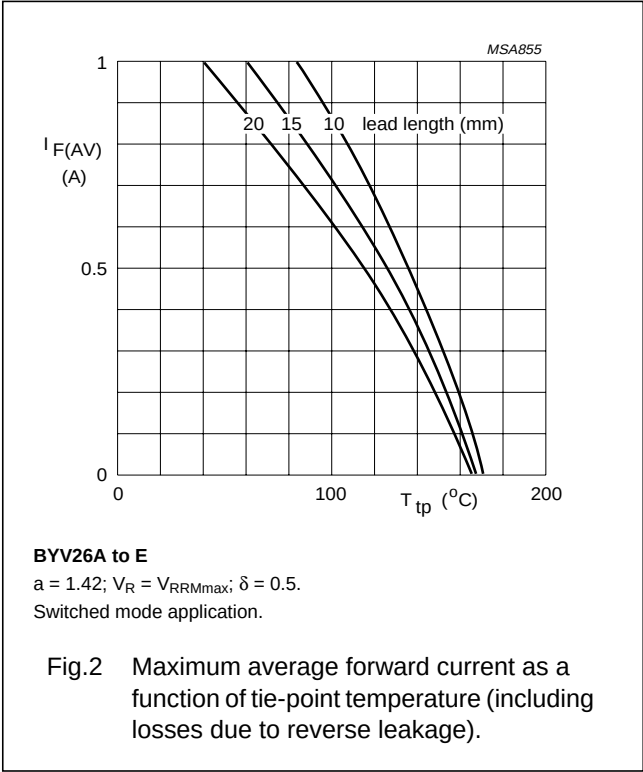
#### Note

1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer  $\geq 40$   $\mu$ m, see Fig.19. For more information please refer to the "General Part of associated Handbook".

Fast soft-recovery  
controlled avalanche rectifiers

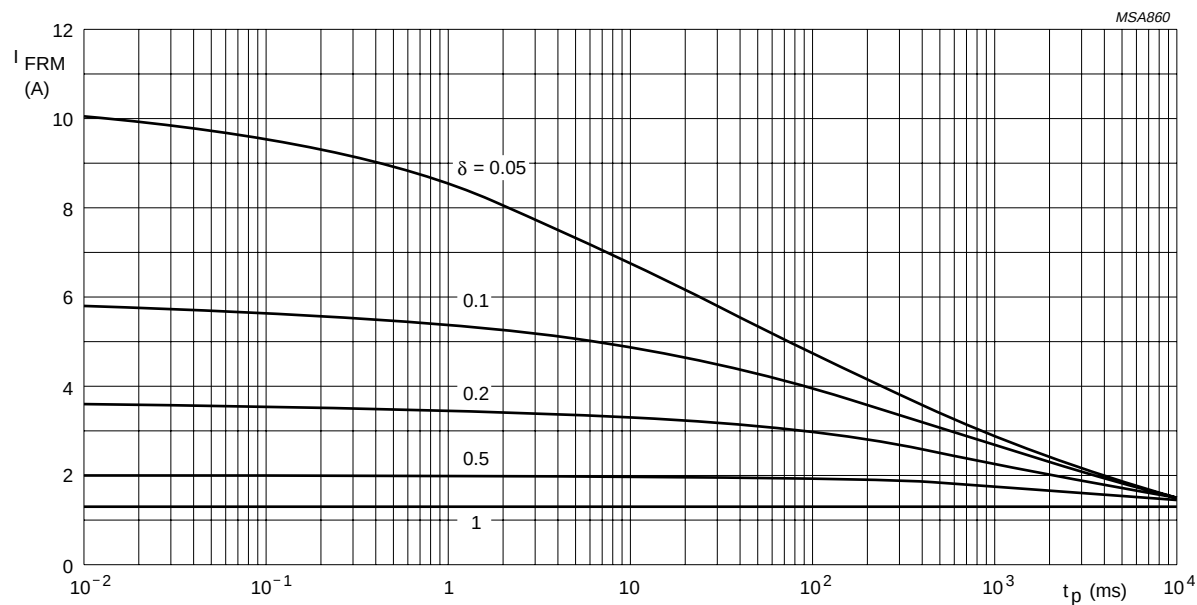
BYV26 series

GRAPHICAL DATA



# Fast soft-recovery controlled avalanche rectifiers

## BYV26 series

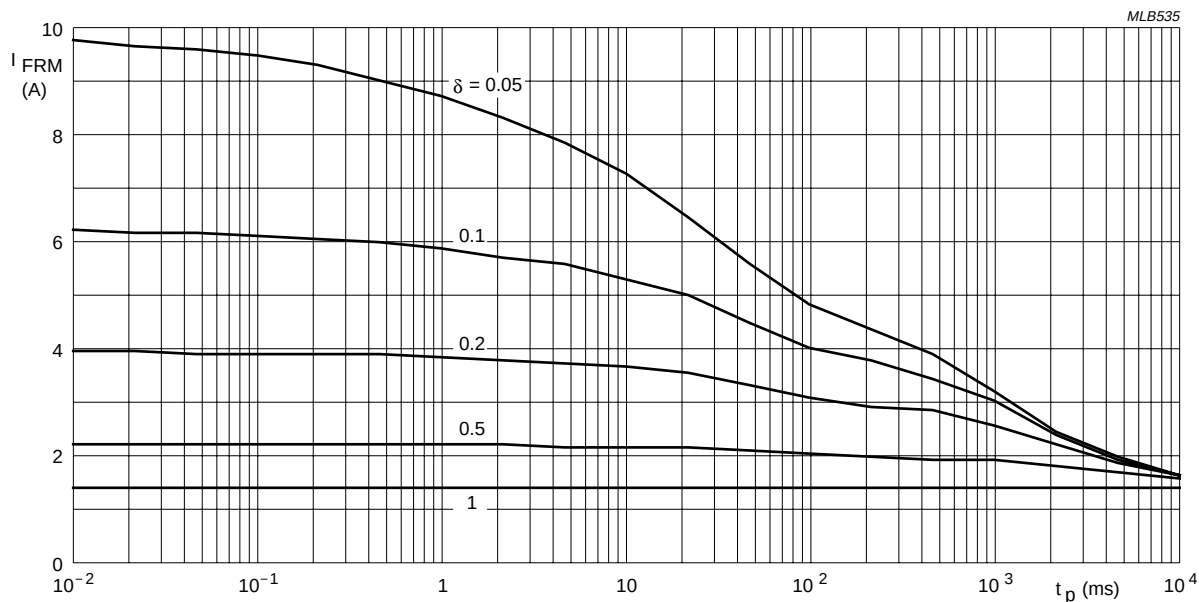


### BYV26A to E.

$T_{ip} = 85^\circ\text{C}$ ;  $R_{th\ j-ip} = 46\ \text{K/W}$ .

$V_{RRMmax}$  during  $1 - \delta$ ; curves include derating for  $T_{j\ max}$  at  $V_{RRM} = 1000\ \text{V}$ .

Fig.6 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



### BYV26F and G.

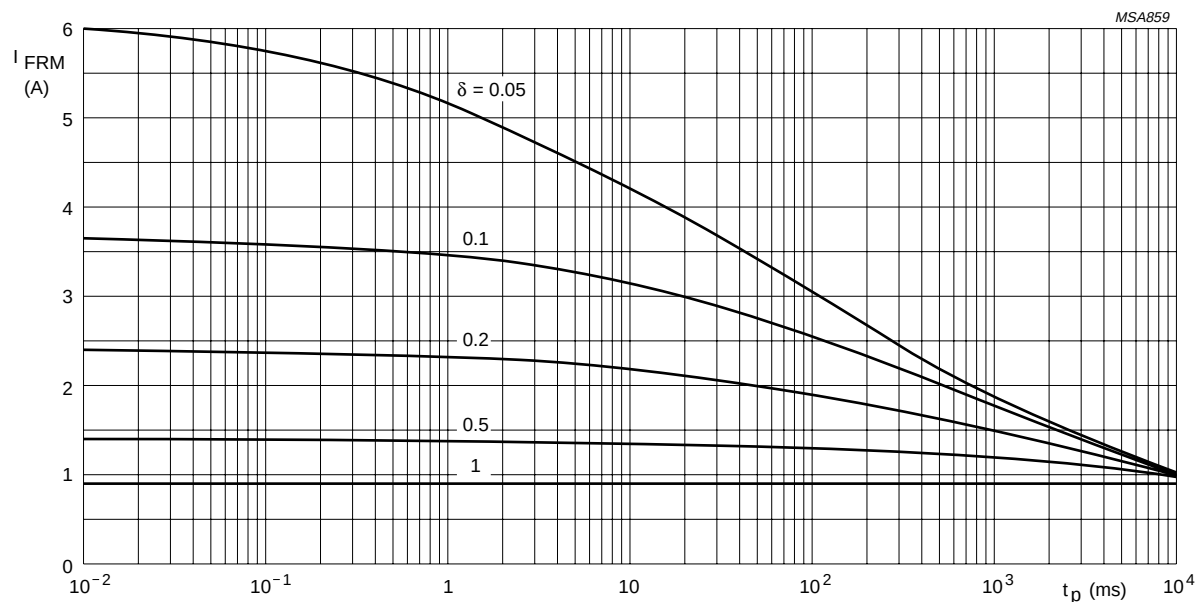
$T_{ip} = 85^\circ\text{C}$ ;  $R_{th\ j-ip} = 46\ \text{K/W}$ .

$V_{RRMmax}$  during  $1 - \delta$ ; curves include derating for  $T_{j\ max}$  at  $V_{RRM} = 1400\ \text{V}$ .

Fig.7 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

# Fast soft-recovery controlled avalanche rectifiers

## BYV26 series

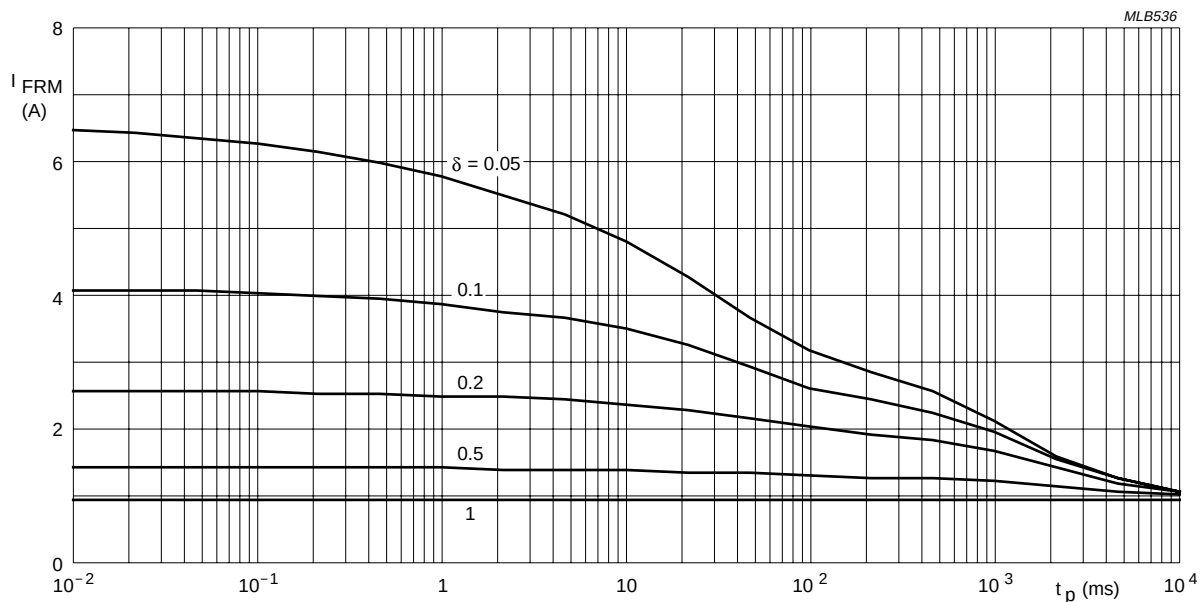


### BYV26A to E

$T_{amb} = 60\text{ }^{\circ}\text{C}$ ;  $R_{th\text{-}j\text{-}a} = 100\text{ K/W}$ .

$V_{RRMmax}$  during  $1 - \delta$ ; curves include derating for  $T_{jmax}$  at  $V_{RRM} = 1000\text{ V}$ .

Fig.8 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



### BYV26F and G

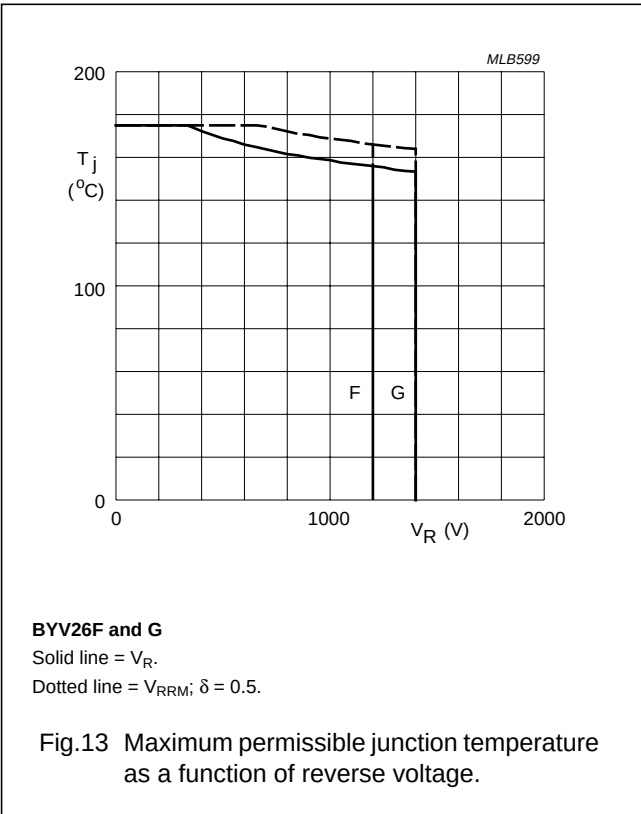
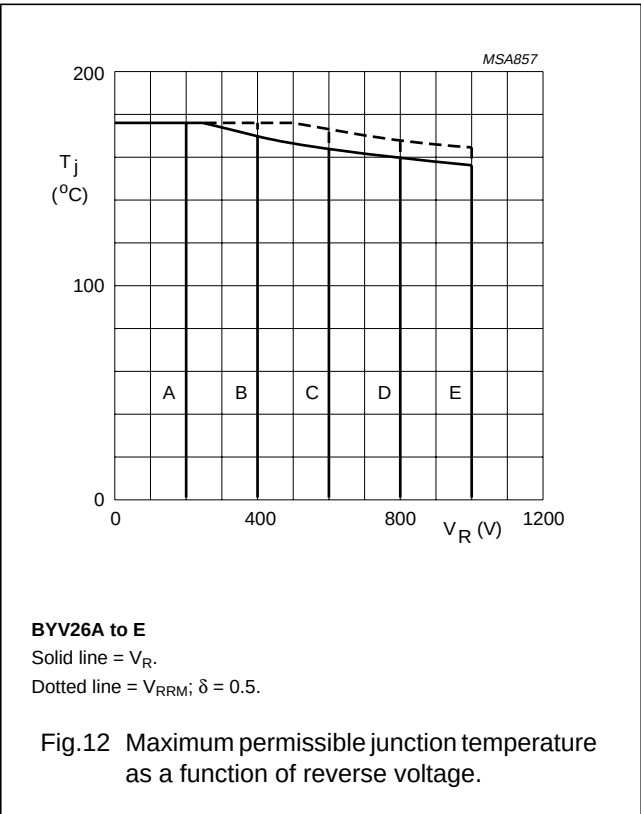
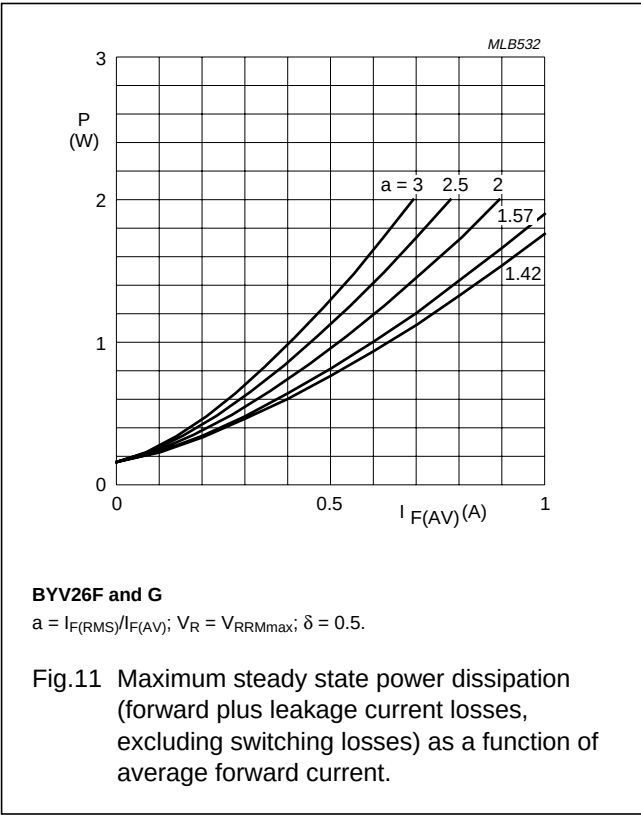
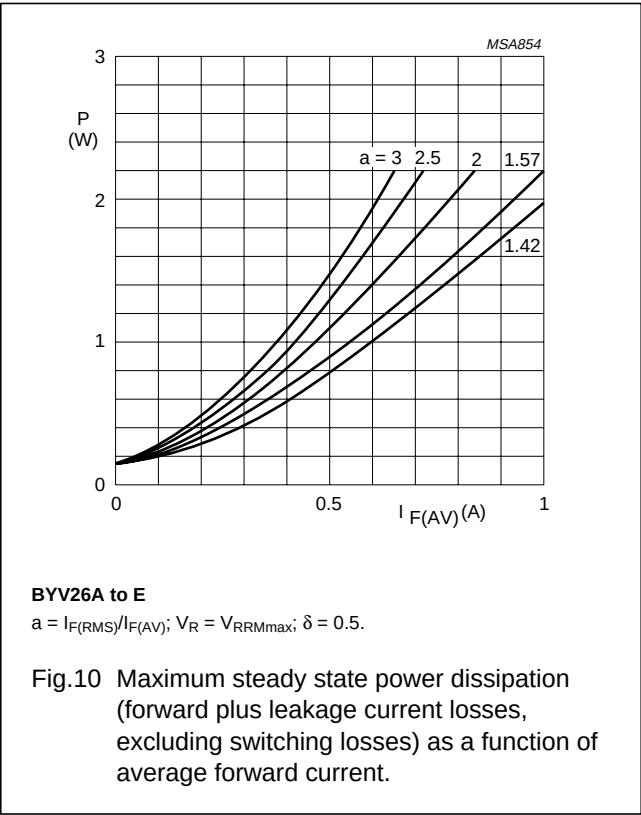
$T_{amb} = 60\text{ }^{\circ}\text{C}$ ;  $R_{th\text{-}j\text{-}a} = 100\text{ K/W}$ .

$V_{RRMmax}$  during  $1 - \delta$ ; curves include derating for  $T_{jmax}$  at  $V_{RRM} = 1400\text{ V}$ .

Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.

Fast soft-recovery  
controlled avalanche rectifiers

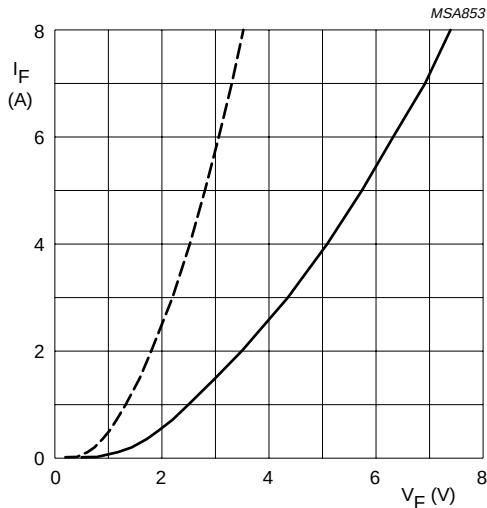
BYV26 series





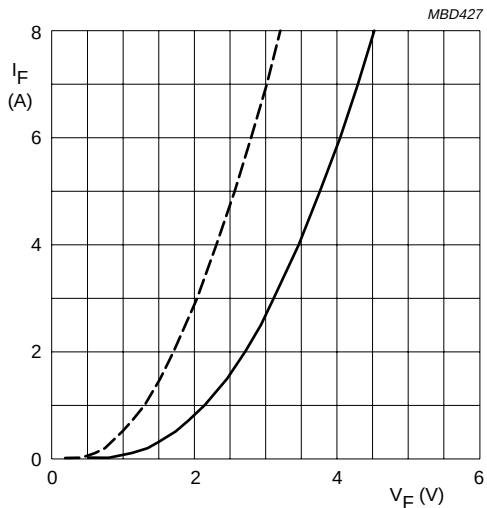
Fast soft-recovery  
controlled avalanche rectifiers

BYV26 series



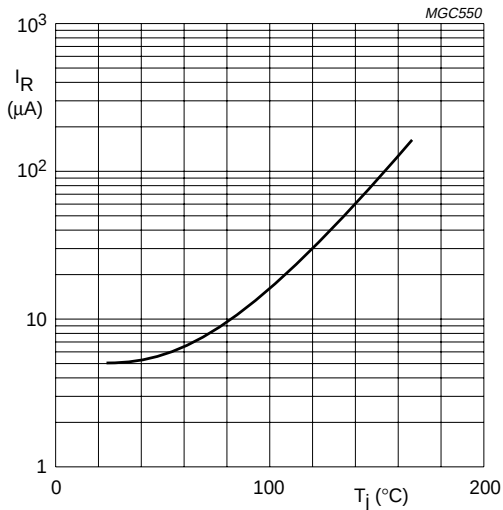
**BYV26A to E**  
Dotted line:  $T_j = 175\text{ }^{\circ}\text{C}$ .  
Solid line:  $T_j = 25\text{ }^{\circ}\text{C}$ .

Fig.14 Forward current as a function of forward voltage; maximum values.



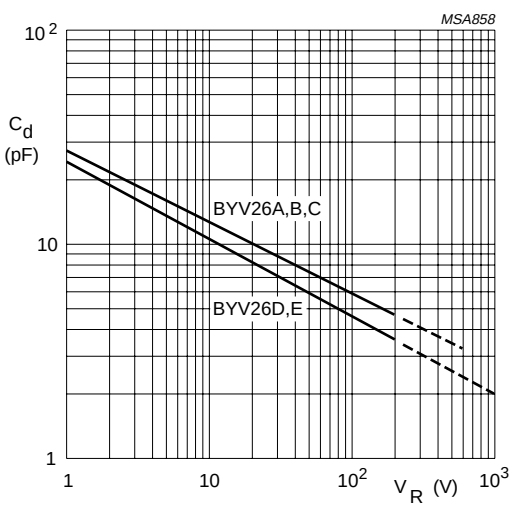
**BYV26F and G**  
Dotted line:  $T_j = 175\text{ }^{\circ}\text{C}$ .  
Solid line:  $T_j = 25\text{ }^{\circ}\text{C}$ .

Fig.15 Forward current as a function of forward voltage; maximum values.



$V_R = V_{RRMmax}$

Fig.16 Reverse current as a function of junction temperature; maximum values.

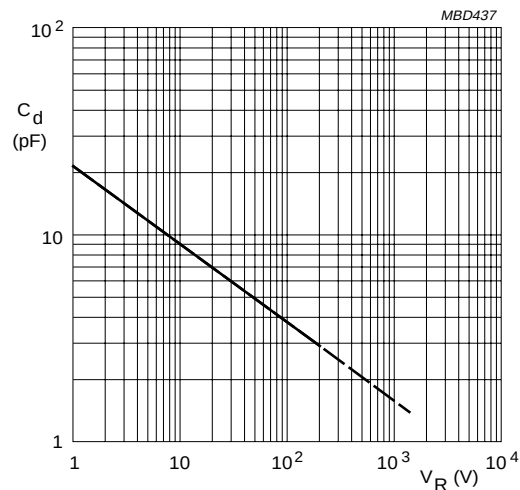


**BYV26A to E**  
 $f = 1\text{ MHz}$ ;  $T_j = 25\text{ }^{\circ}\text{C}$ .

Fig.17 Diode capacitance as a function of reverse voltage; typical values.

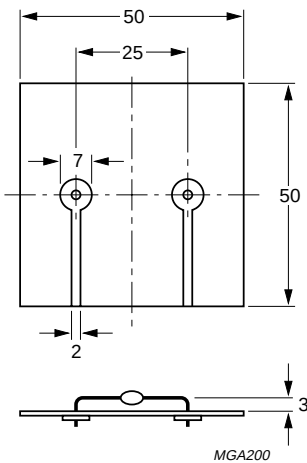
Fast soft-recovery  
controlled avalanche rectifiers

BYV26 series



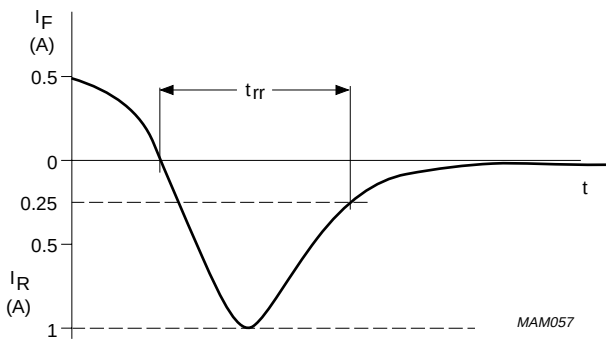
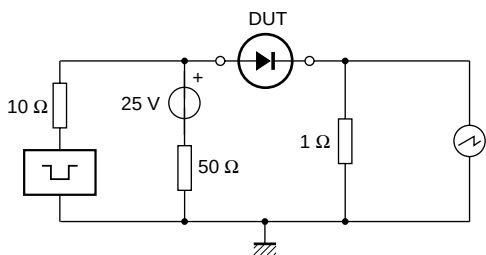
BYV26F and G  
 $f = 1\text{ MHz}$ ;  $T_j = 25\text{ }^\circ\text{C}$ .

Fig.18 Diode capacitance as a function of reverse voltage, typical values.



Dimensions in mm.

Fig.19 Device mounted on a printed-circuit board.



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

Fig.20 Test circuit and reverse recovery time waveform and definition.

## Fast soft-recovery controlled avalanche rectifiers

## BYV26 series

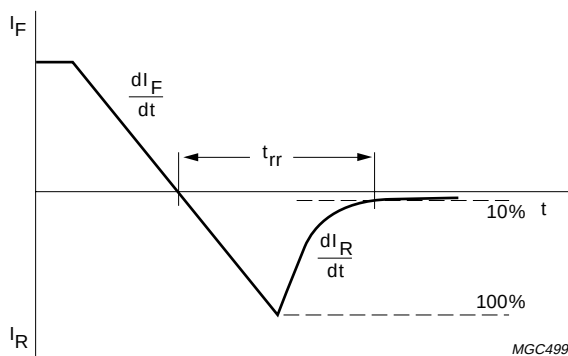
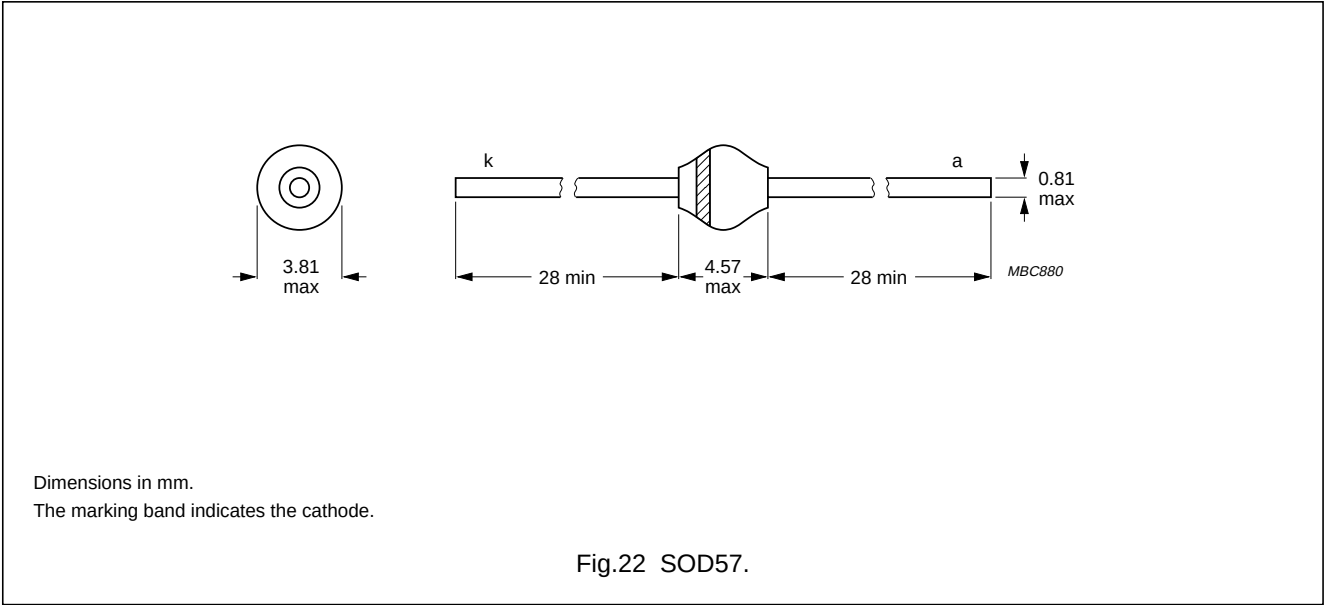


Fig.21 Reverse recovery definitions.

Fast soft-recovery  
controlled avalanche rectifiers

BYV26 series

PACKAGE OUTLINE



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.                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |

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.