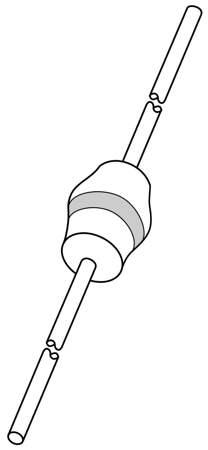
DATA SHEET



BYV26 series
Fast soft-recovery controlled avalanche rectifiers

Product specification
Supersedes data of February 1994
File under Discrete Semiconductors, SC01

1996 May 30

Philips Semiconductors

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.

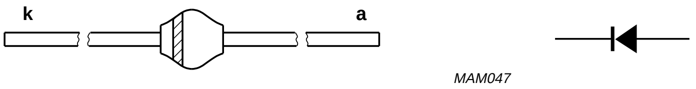


Fig.1 Simplified outline (SOD57) and symbol.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	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 °C; lead length = 10 mm; see Figs 2 and 3; averaged over any 20 ms period; see also Figs 10 and 11			
	BYV26A to E		–	1.00	A
	BYV26F and G		–	1.05	A
$I_{F(AV)}$	average forward current	T_{amb} = 60 °C; PCB mounting (see Fig.19); see Figs 4 and 5; averaged over any 20 ms period; see also Figs 10 and 11			
	BYV26A to E		–	0.65	A
	BYV26F and G		–	0.68	A
I_{FRM}	repetitive peak forward current	T_{tp} = 85 °C; see Figs 6 and 7			
	BYV26A to E		–	10.0	A
	BYV26F and G		–	9.6	A

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{FRM}	repetitive peak forward current	T_{amb} = 60 °C; see Figs 8 and 9			
	BYV26A to E		–	6.0	A
	BYV26F and G		–	6.4	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	30	A
E_{RSM}	non-repetitive peak reverse avalanche energy	I_R = 400 mA; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	10	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Figs 12 and 13	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Figs 14 and 15				
	BYV26A to E		–	–	1.3	V
	BYV26F and G		–	–	1.3	V
V_F	forward voltage	I_F = 1 A; see Figs 14 and 15				
	BYV26A to E		–	–	2.50	V
	BYV26F and G		–	–	2.15	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYV26A		300	–	–	V
	BYV26B		500	–	–	V
	BYV26C		700	–	–	V
	BYV26D		900	–	–	V
	BYV26E		1100	–	–	V
	BYV26F		1300	–	–	V
	BYV26G		1500	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.16	–	–	5	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.16	–	–	150	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.20				
	BYV26A to C		–	–	30	ns
	BYV26D and E		–	–	75	ns
	BYV26F and G		–	–	150	ns
C_d	diode capacitance	f = 1 MHz; V_R = 0 V; see Figs 17 and 18				
	BYV26A to C		–	45	–	pF
	BYV26D and E		–	40	–	pF
	BYV26F and G		–	35	–	pF

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/µs; see Fig.21				
	BYV26A to C		–	–	7	A/µs
	BYV26D and E		–	–	6	A/µs
	BYV26F and G		–	–	5	A/µs

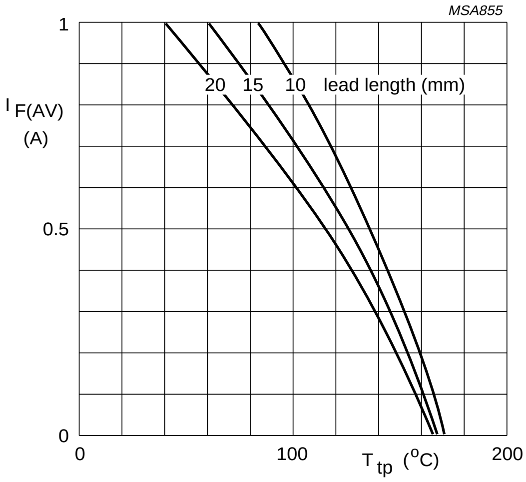
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	46	K/W
$R_{th\ j\text{-}a}$	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 ≥40 µm, see Fig.19. For more information please refer to the *‘General Part of Handbook SC01’*.

GRAPHICAL DATA

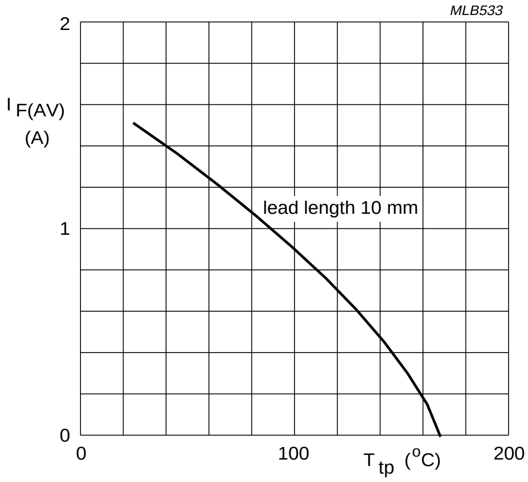


BYV26A to E

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

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

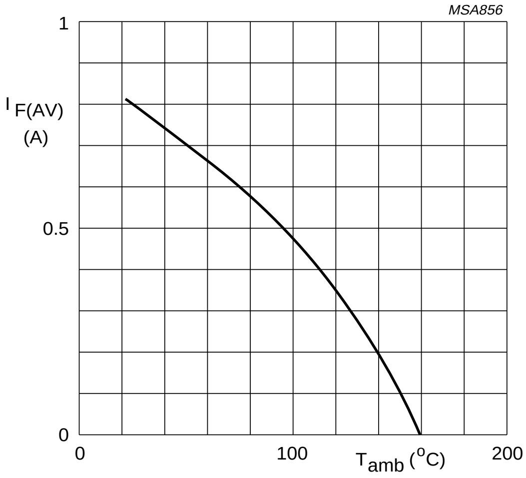


BYV26F and G

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Switched mode application.

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



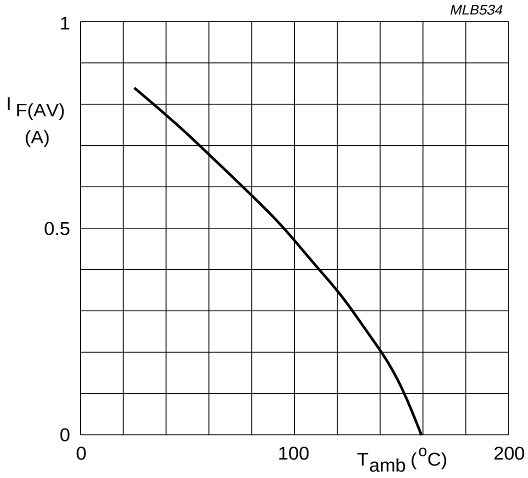
BYV26A to E

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.19.

Switched mode application.

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



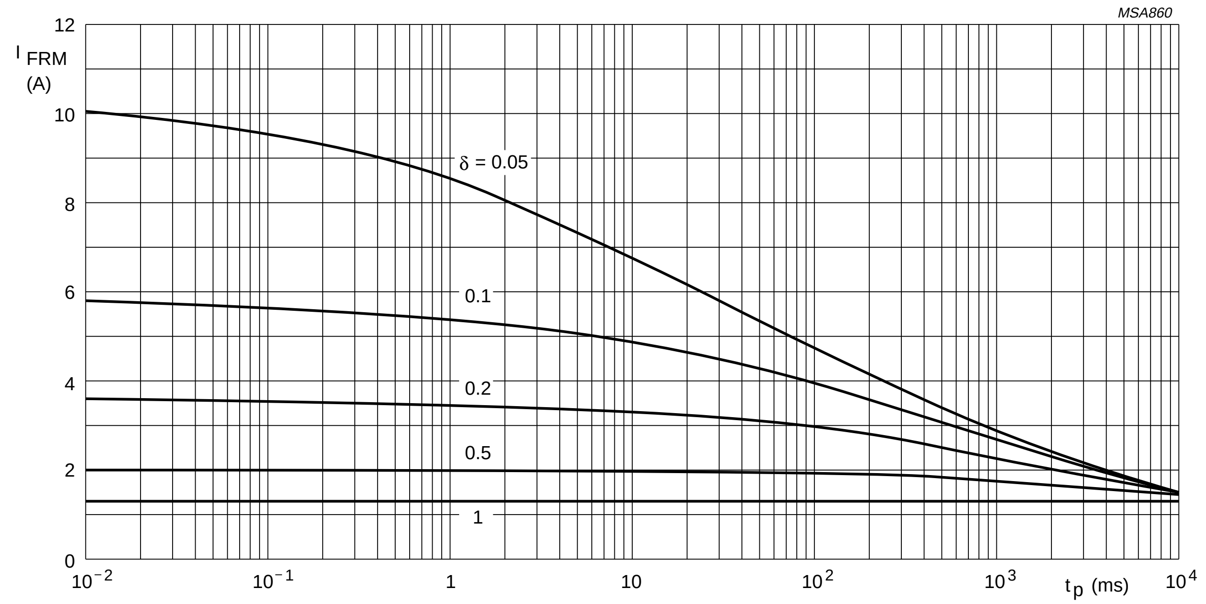
BYV26F and G

a = 1.42; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Device mounted as shown in Fig.19.

Switched mode application.

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

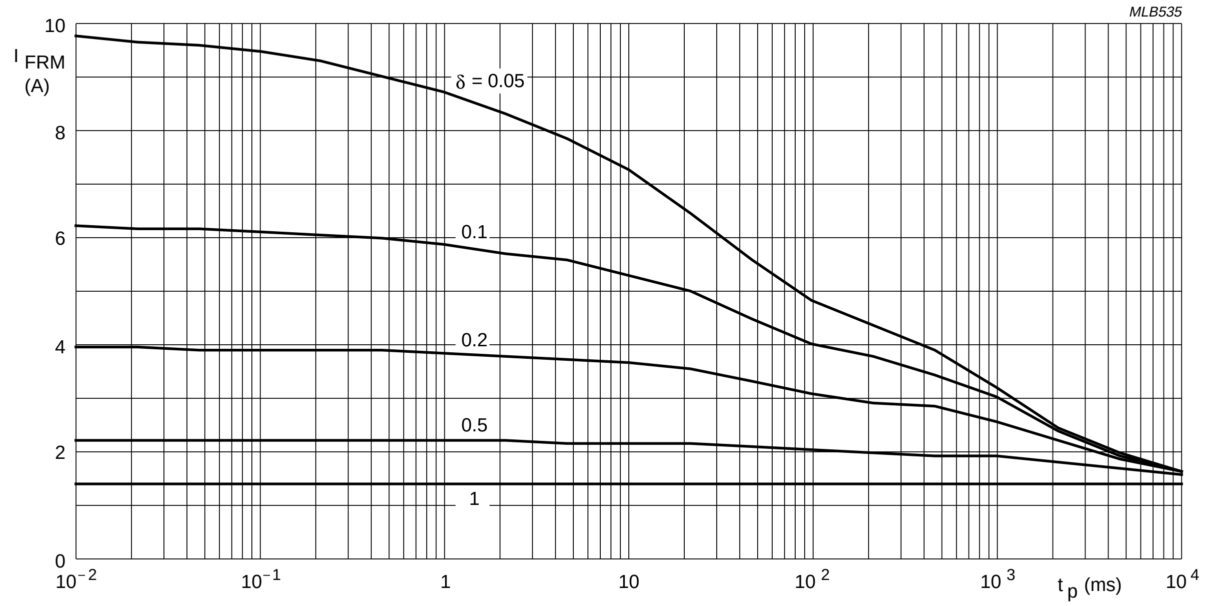


BYV26A to E.

T_{tp} = 85°C; $R_{th\ j\text{-}tp}$ = 46 K/W.

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

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

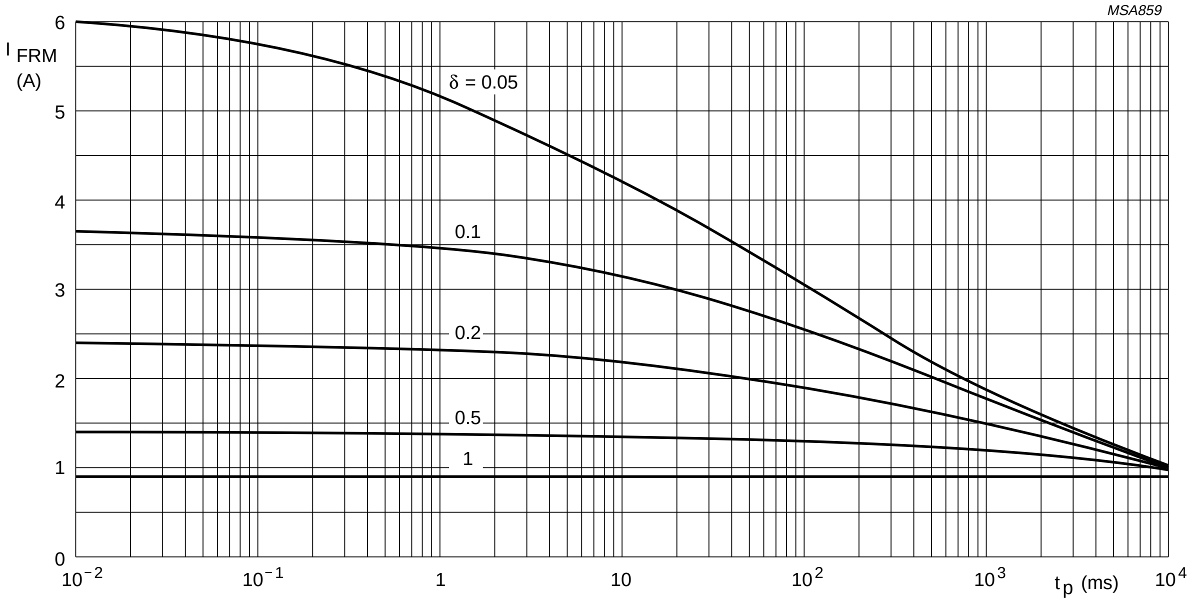


BYV26F and G.

T_{tp} = 85°C; $R_{th\ j\text{-}tp}$ = 46 K/W.

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

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

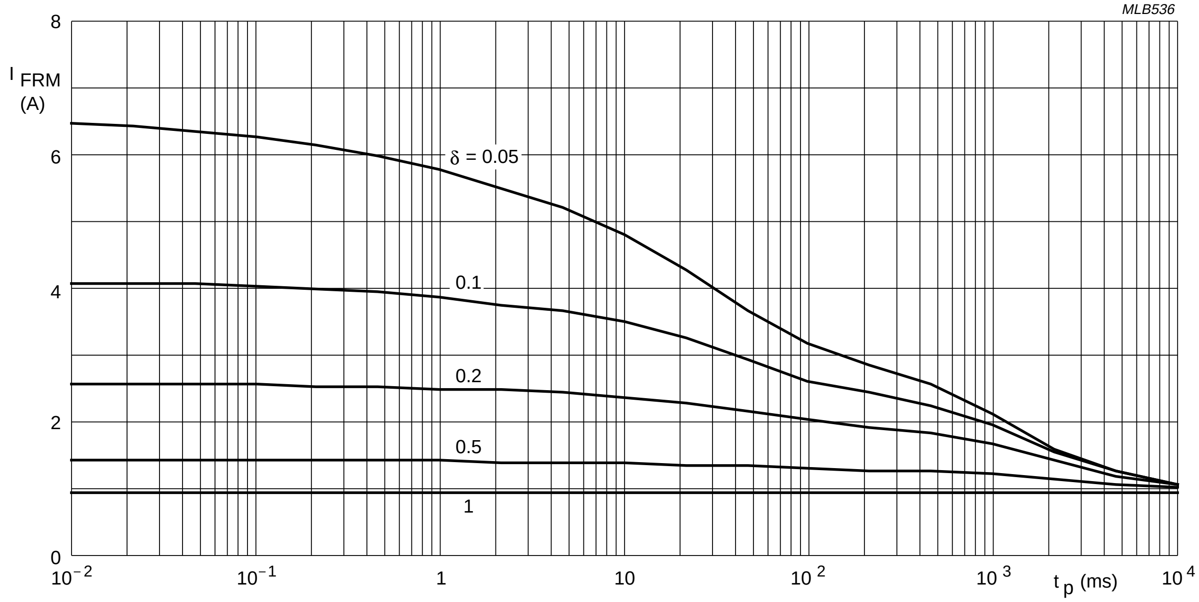


BYV26A to E

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

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

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

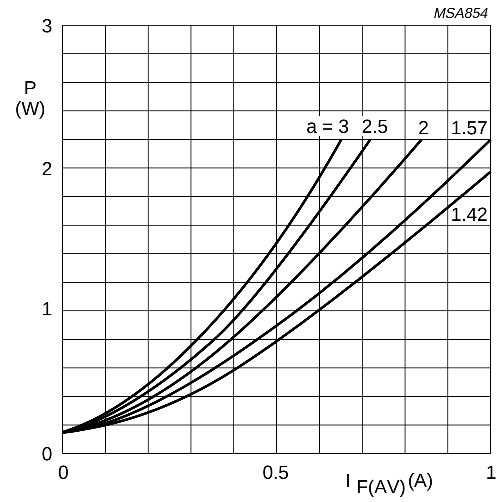


BYV26F and G

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

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

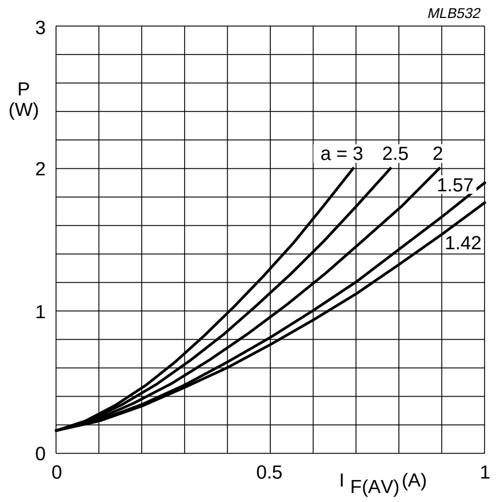
Fig.9 Maximum repetitive peak forward current as a function of pulse time (square pulse) and duty factor.



BYV26A to E

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

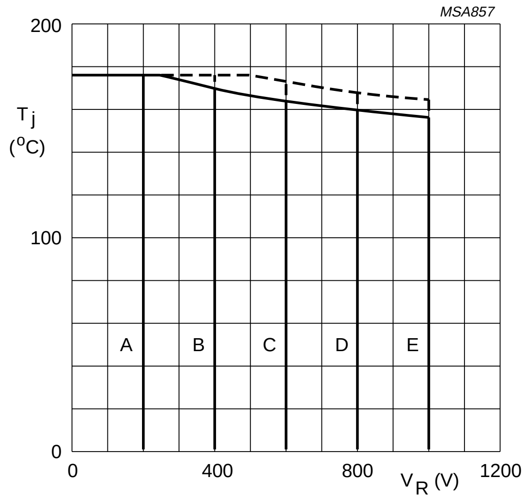
Fig.10 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



BYV26F and G

a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; $\delta = 0.5$.

Fig.11 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.

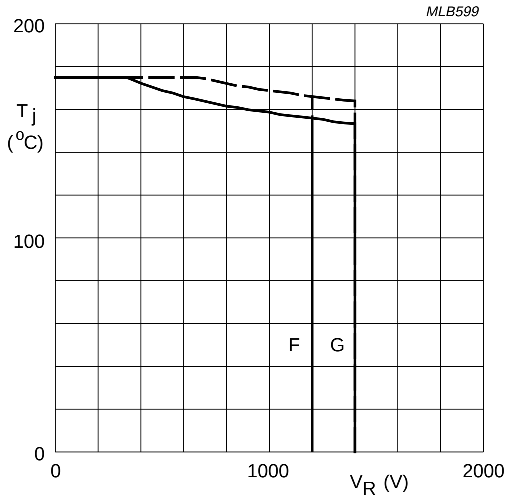


BYV26A to E

Solid line = V_R.

Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.12 Maximum permissible junction temperature as a function of reverse voltage.

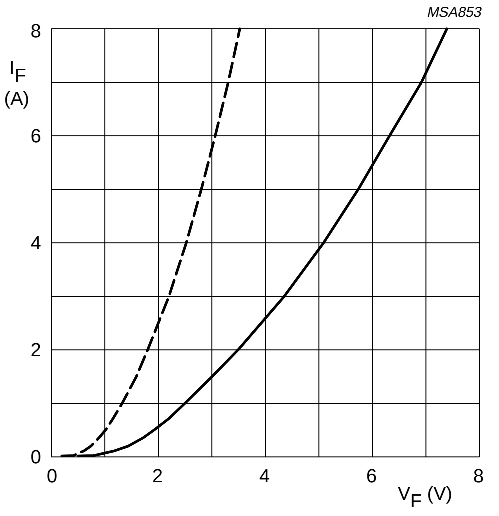


BYV26F and G

Solid line = V_R.

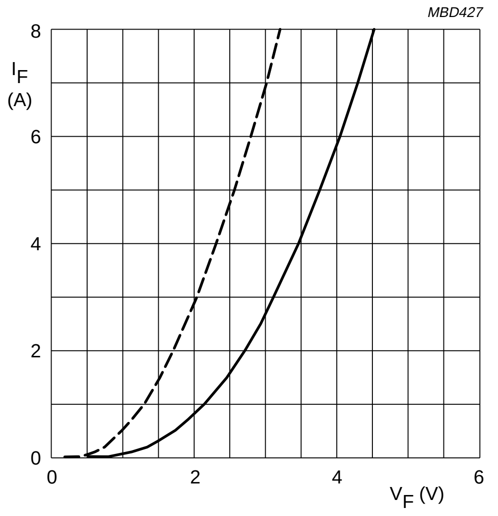
Dotted line = V_{RRM}; $\delta = 0.5$.

Fig.13 Maximum permissible junction temperature as a function of reverse voltage.



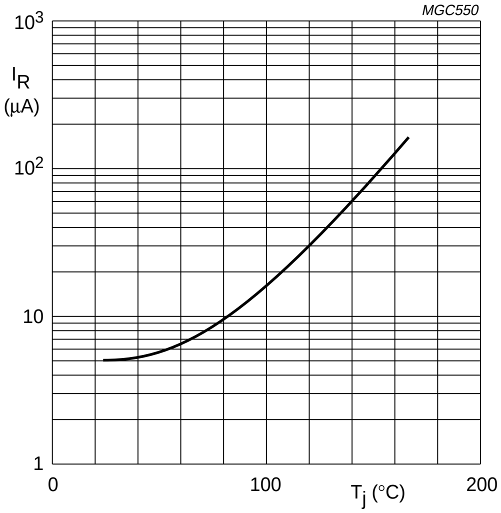
BYV26A to E
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

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



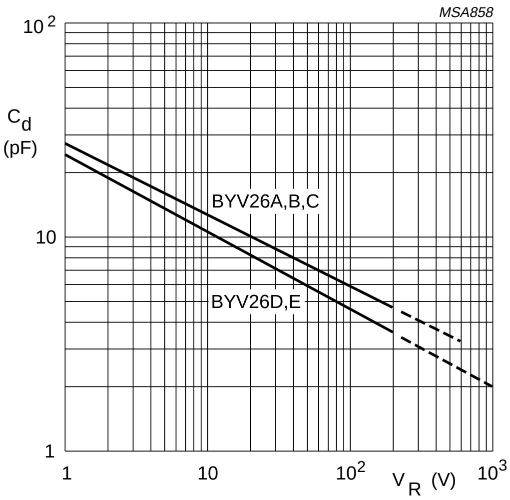
BYV26F and G
Dotted line: T_j = 175 °C.
Solid line: T_j = 25 °C.

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



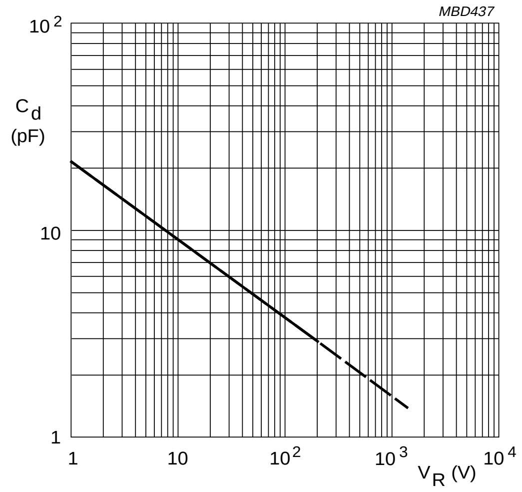
$V_R = V_{RRMmax}$.

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



BYV26A to E
f = 1 MHz; T_j = 25 °C.

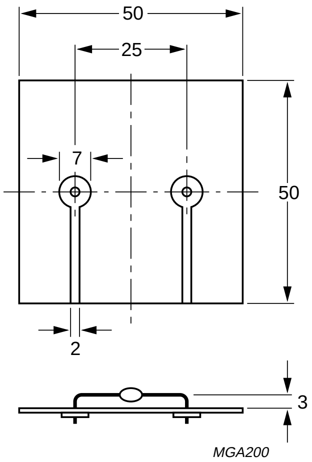
Fig.17 Diode capacitance as a function of reverse voltage, typical values.



BYV26F and G

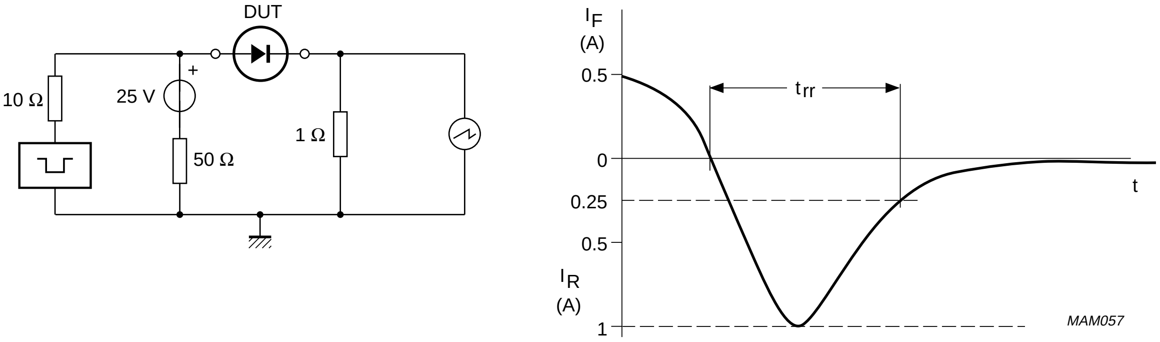
f = 1 MHz; T_j = 25 °C.

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 MΩ, 22 pF; $t_r \leq 7$ ns.

Source impedance: 50 Ω; $t_r \leq 15$ ns.

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

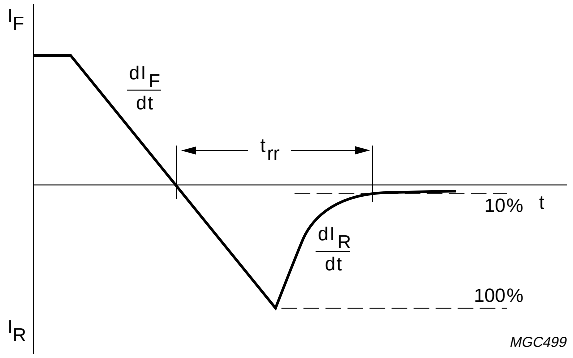
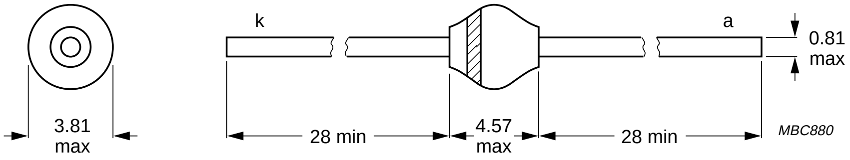


Fig.21 Reverse recovery definitions.

PACKAGE OUTLINE



Dimensions in mm.

The marking band indicates the cathode.

Fig.22 SOD57.

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

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