VERY FAST RECOVERY RECTIFIER DIODES

Glass-passivated, high-efficiency rectifier diodes in DO-4 metal envelopes, featuring low forward voltage drop, very fast reverse recovery times, very low stored charge and non-snap-off. They are intended for use in switched-mode power supplies, and high frequency circuits in general, where low conduction and switching losses are essential. The series consists of normal polarity (cathode to stud) types.

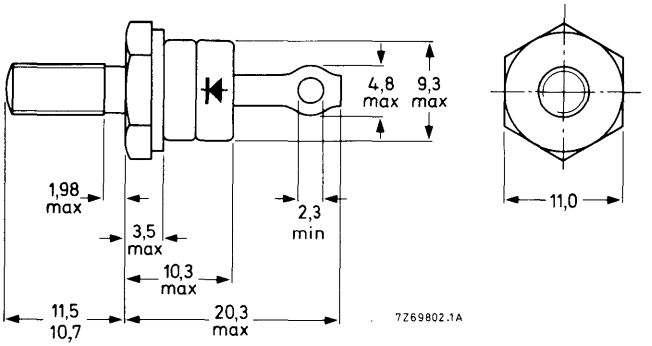
QUICK REFERENCE DATA

			BYW31-	50	100	150	
Repetitive peak reverse voltage	V_{RRM}	max.		50	100	150	V
Average forward current	$I_{F(AV)}$	max.			25		A
Forward voltage	V_F	<			0,85		V
Reverse recovery time	t_{rr}	<			50		ns

MECHANICAL DATA

Dimensions in mm

Fig. 1 DO-4: with metric M5 stud (ϕ5 mm); e.g. BYW31-50.
with 10-32 UNF stud (ϕ4,83 mm); e.g. BYW31-50U.



Net mass: 7 g

Diameter of clearance hole: max. 5,2 mm

Accessories supplied on request: 56295
(PTFE bush, 2 mica washers, plain washer, tag)

Supplied with device: 1 nut, 1 lock washer
Nut dimensions across the flats; M5: 8,0 mm
10-32 UNF: 9,5 mm

Torque on nut: min. 0,9 (9 kg cm)
max. 1,7 (17 kg cm)

Products available to CECC 50 009-002, available on request.

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Voltages *		BYW31–50	100	150	
Non-repetitive peak reverse voltage	V_{RSM}	max.	50	100	150 V
Repetitive peak reverse voltage	V_{RRM}	max.	50	100	150 V
Crest working reverse voltage	V_{RWM}	max.	50	100	150 V
Continuous reverse voltage	V_R	max.	50	100	150 V

Currents				
Average forward current; switching losses negligible up to 500 kHz				
sinusoidal; up to T_{mb} = 120 °C	$I_{F(AV)}$	max.	25	A
sinusoidal; at T_{mb} = 125 °C	$I_{F(AV)}$	max.	23	A
square-wave; δ = 0,5; up to T_{mb} = 119 °C	$I_{F(AV)}$	max.	28	A
square-wave; δ = 0,5; at T_{mb} = 125 °C	$I_{F(AV)}$	max.	23	A
R.M.S. forward current	$I_{F(RMS)}$	max.	40	A
Repetitive peak forward current	I_{FRM}	max.	320	A
Non-repetitive peak forward current t = 10 ms; half sine-wave; T_j = 150 °C prior to surge; with reapplied V_{RWMmax}	I_{FSM}	max.	320	A
I^2t for fusing (t = 10 ms)	I^2t	max.	500	A^2s

Temperatures			
Storage temperature	T_{stg}	−55 to +150	°C
Junction temperature	T_j	max. 150	°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	1,0	°C/W
From mounting base to heatsink				
a. with heatsink compound	$R_{th\ mb\text{-}h}$	=	0,3	°C/W
b. without heatsink compound	$R_{th\ mb\text{-}h}$	=	0,5	°C/W
Transient thermal impedance: t = 1 ms	$Z_{th\ j\text{-}mb}$	=	0,2	°C/W

MOUNTING INSTRUCTIONS

The top connector should neither be bent nor twisted; it should be soldered into the circuit so that there is no strain on it.

During soldering the heat conduction to the junction should be kept to a minimum.

* To ensure thermal stability: $R_{th\ j\text{-}a} \leqslant 6$ °C/W (continuous reverse voltage).

CHARACTERISTICS

Forward voltage				
I_F = 20 A; T_j = 100 °C	V_F	<	0,85	V*
I_F = 100 A; T_j = 25 °C	V_F	<	1,3	V*
Reverse current				
$V_R = V_{RWMmax}$; T_j = 100 °C	I_R	<	1,5	mA ←
Reverse recovery when switched from				
I_F = 1 A to $V_R \geqslant$ 30 V with $-dI_F/dt$ = 50 A/μs; T_j = 25 °C				
Recovery time	t_{rr}	<	50	ns
I_F = 2 A to $V_R \geqslant$ 30 V with $-dI_F/dt$ = 20 A/μs; T_j = 25 °C				
Recovered charge	Q_s	<	20	nC
Forward recovery when switched to I_F = 10 A with dI_F/dt = 10 A/μs				
Recovery voltage	V_{fr}	typ.	1,0	V

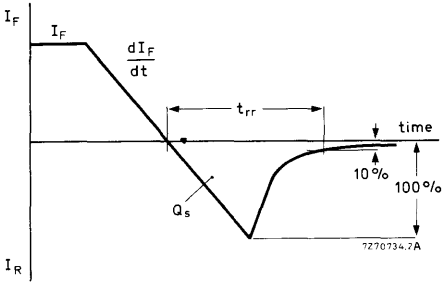


Fig. 2 Definitions of t_{rr} and Q_s.

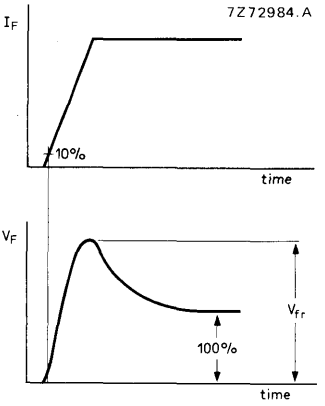


Fig. 3 Definition of V_{fr}.

* Measured under pulse conditions to avoid excessive dissipation.

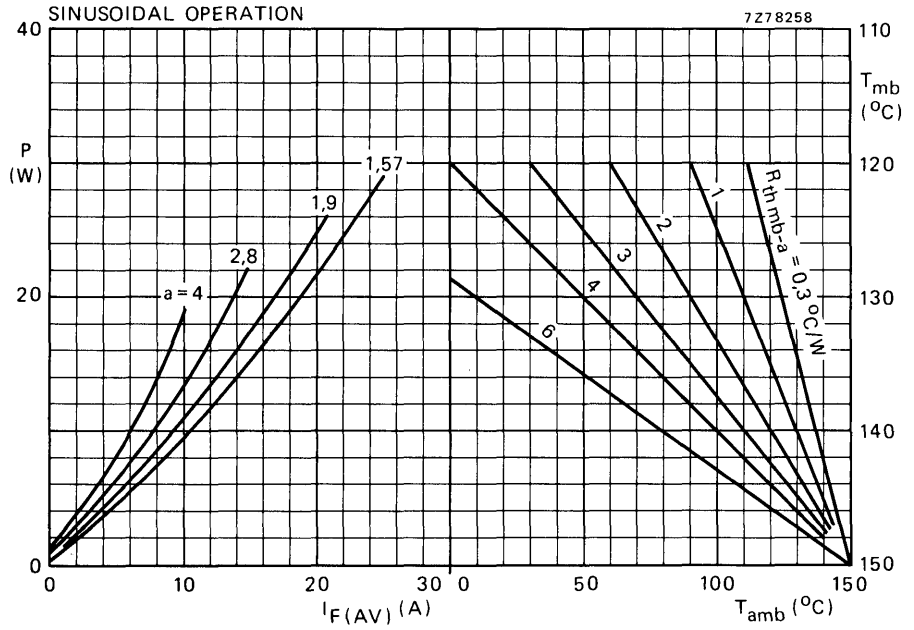


Fig. 4 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.
P = power including reverse current losses and switching losses up to f = 500 kHz.
a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

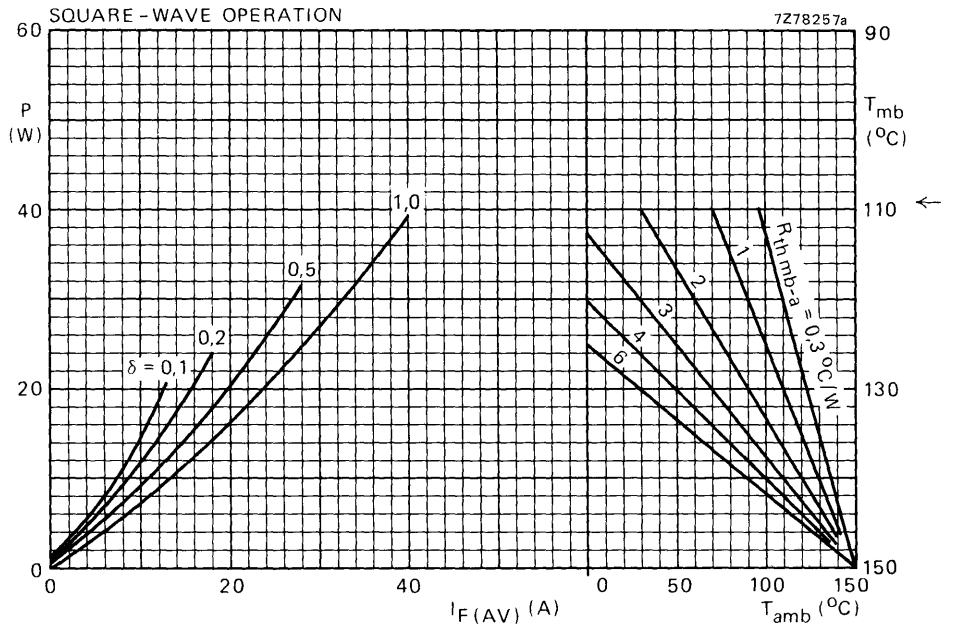
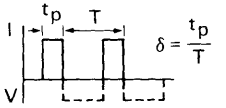


Fig. 5 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.
P = power including reverse current losses and switching losses up to f = 500 kHz.



$$I_{F(AV)} = I_{F(RMS)} \times \sqrt{\delta}$$

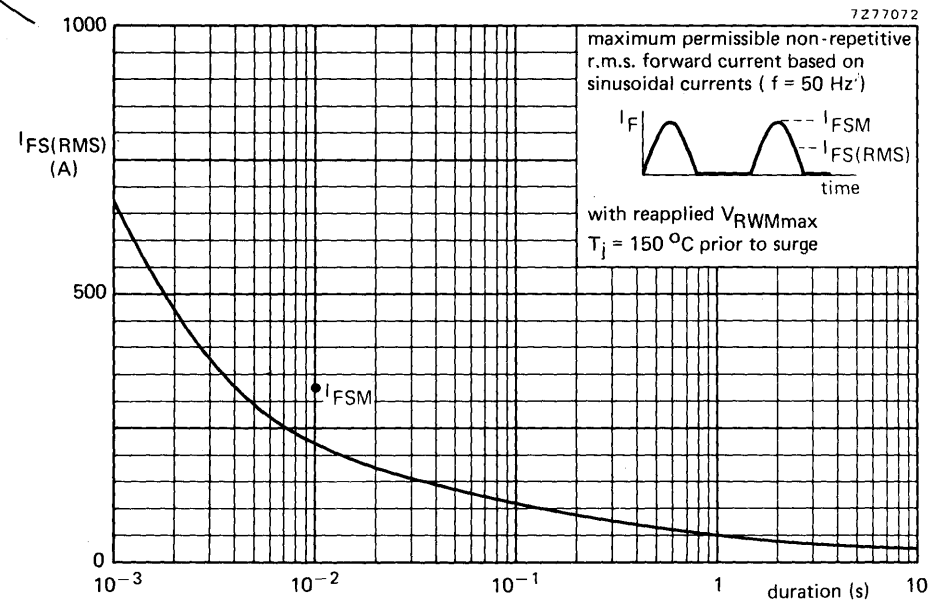


Fig. 6.

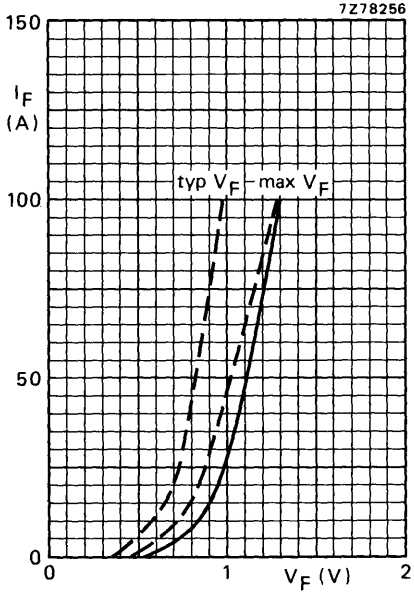


Fig. 7 ——— T_j = 25 °C; – – – T_j = 100 °C.

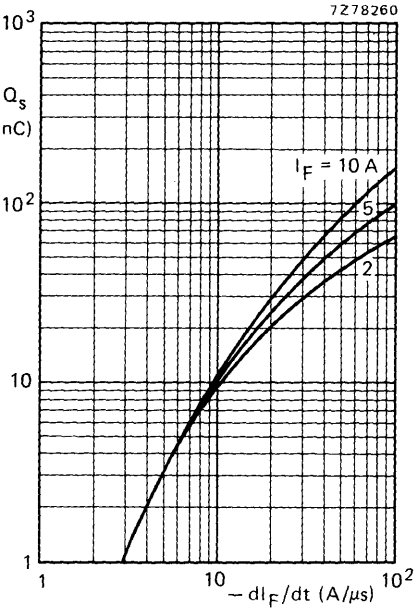


Fig. 8 T_j = 25 °C; maximum values.

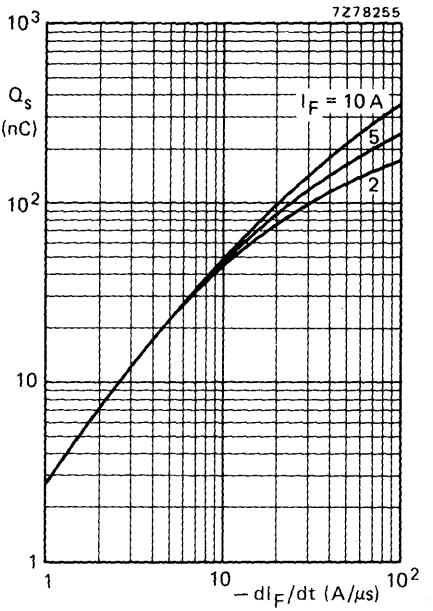
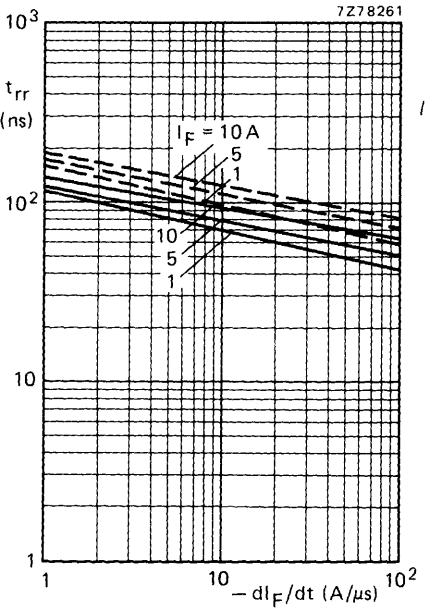
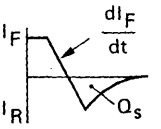


Fig. 9 T_j = 100 °C; maximum values.





Definition of Q_s in Figs 8 and 9.

Fig. 10 Maximum values; ——— T_j = 25 °C; – – – T_j = 100 °C.

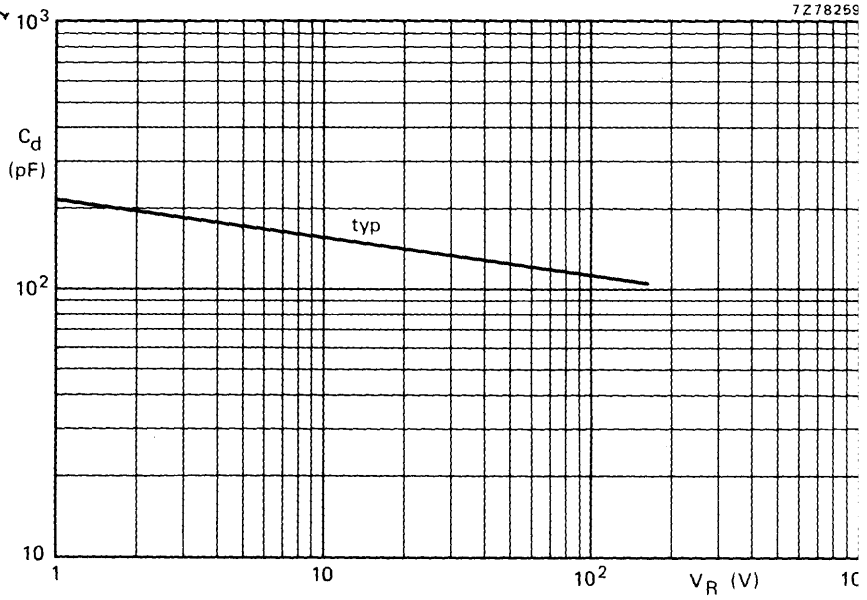


Fig. 11 f = 1 MHz; T_j = 25 °C.

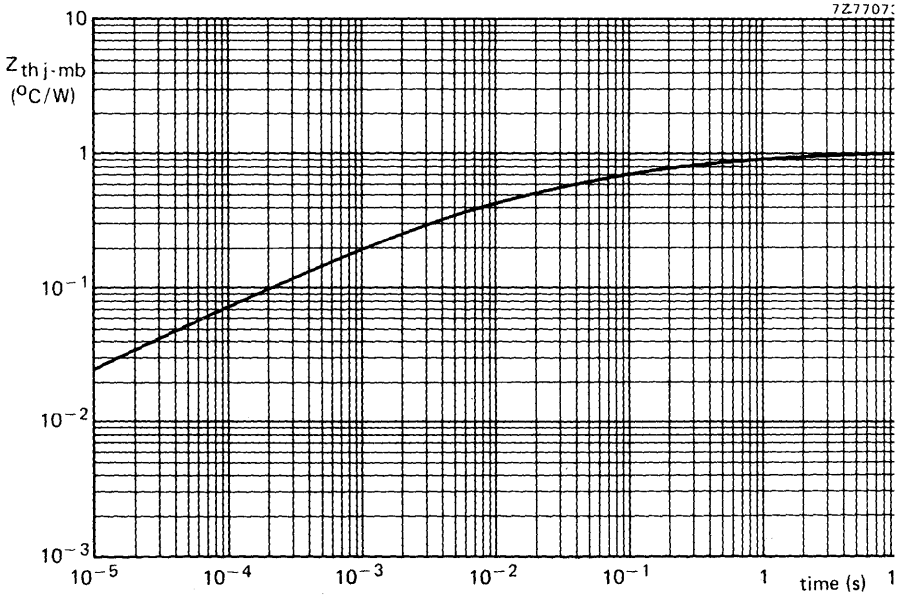


Fig. 12.