FAST SOFT-RECOVERY RECTIFIER DIODES

Fast soft-recovery diodes in DO-5 metal envelopes especially suitable for operation as main and commutating diodes in 3-phase a.c. motor speed control inverters and in high frequency power supplies in general.
The series consists of the following types:
Normal polarity (cathode to stud): BYW25–800 and BYW25–1000.
Reverse polarity (anode to stud): BYW25–800R and BYW25–1000R.

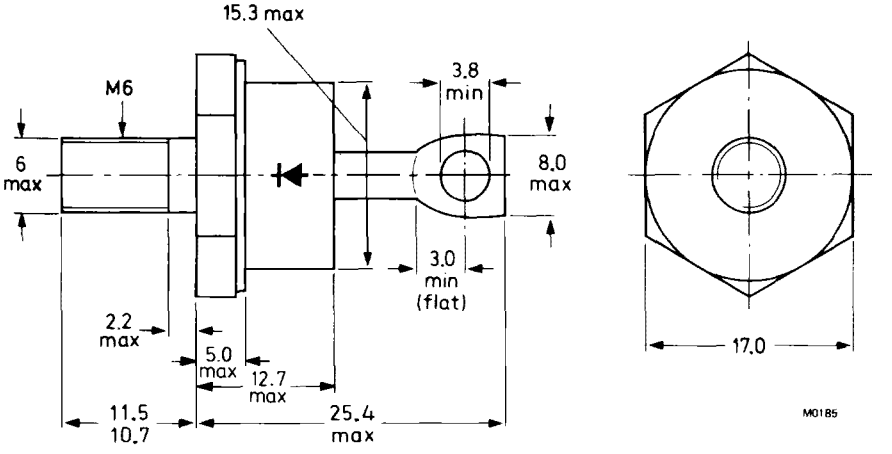
QUICK REFERENCE DATA

			BYW25–800(R)	1000(R)	
Repetitive peak reverse voltage	V_{RRM}	max.	800	1000	V
Average forward current	$I_{F(AV)}$	max.	40		A
Repetitive peak forward current	I_{FRM}	max.	600		A
Reverse recovery time	t_{rr}	<	450		ns

MECHANICAL DATA

Dimensions in mm

Fig.1 DO-5: with metric M6 stud (ϕ6 mm)



Net mass: 22 g
Diameter of clearance hole: max. 6.5 mm
Accessories supplied on request:
see ACCESSORIES section
The mark shown applies to normal polarity types.

Supplied with device: 1 nut, 1 lock washer
Torque on nut: min. 1.7 Nm (17 kg cm)
max. 3.5 Nm (35 kg cm)
Nut dimensions across the flats: 10 mm

RATINGS

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

Voltages*		BYW25–800(R)	1000(R)	
Non-repetitive peak reverse voltage	V_{RSM}	max. 1000	1200	V
Repetitive peak reverse voltage	V_{RRM}	max. 800	1000	V
Crest working reverse voltage	V_{RWM}	max. 650	850	V
Continuous reverse voltage	V_R	max. 650	850	V

Currents				
Average forward current; switching losses negligible up to 20 kHz				
sinusoidal; up to T_{mb} = 100 °C	$I_{F(AV)}$	max.	40	A
sinusoidal; at T_{mb} = 125 °C	$I_{F(AV)}$	max.	23	A
R.M.S. forward current	$I_{F(RMS)}$	max.	60	A
Repetitive peak forward current	I_{FRM}	max.	600	A
Non-repetitive peak forward current; t = 10 ms; half sine-wave; T_j = 150 °C prior to surge	I_{FSM}	max.	550	A
I^2t for fusing (t = 10 ms)	I^2t	max.	1500	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	$R_{th\ j\text{-}mb}$	=	0.6	°C/W
From mounting base to heatsink				
with heatsink compound	$R_{th\ mb\text{-}h}$	=	0.3	°C/W
without heatsink compound	$R_{th\ mb\text{-}h}$	=	0.5	°C/W

*To ensure thermal stability: $R_{th\ j\text{-}a} \leqslant 1$ °C/W (continuous reverse voltage).

CHARACTERISTICS

Forward voltage			
I_F = 35 A; T_j = 25 °C	V_F	<	1,55 V *
I_F = 150 A; T_j = 25 °C	V_F	<	2,25 V *
Reverse current			
V_R = 650 V; T_j = 125 °C	I_R	<	7 mA
Reverse recovery when switched from			
I_F = 10 A to V_R = 30 V with $-dI_F/dt$ = 50 A/μs; T_j = 25 °C			
Recovery time	t_{rr}	<	450 ns
I_F = 600 A to $V_R \geqslant$ 30 V with $-dI_F/dt$ = 70 A/μs; T_{mb} = 85 °C			
Recovery time	t_{rr}	<	1 μs
Maximum slope of the reverse recovery current when switched from I_F = 600 A to $V_R \geqslant$ 30 V; with $-dI_F/dt$ = 35 A/μs; T_j = 25 °C	$\lvert dI_R/dt \rvert$	<	100 A/μs

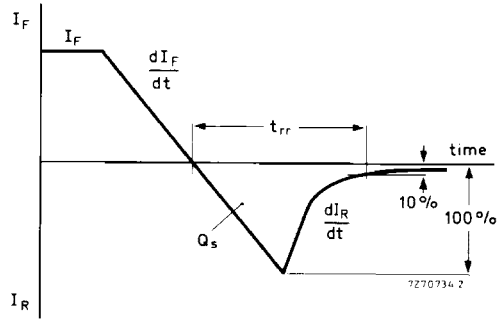


Fig. 2 Definitions of Q_s, t_{rr} and dI_R/dt.

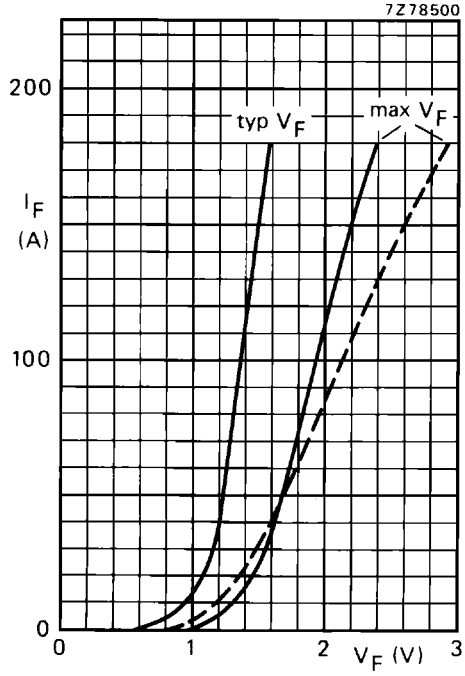


Fig. 3 —— T_j = 25 °C; – – – T_j = 150 °C.

* Measured under pulse conditions to avoid excessive dissipation.

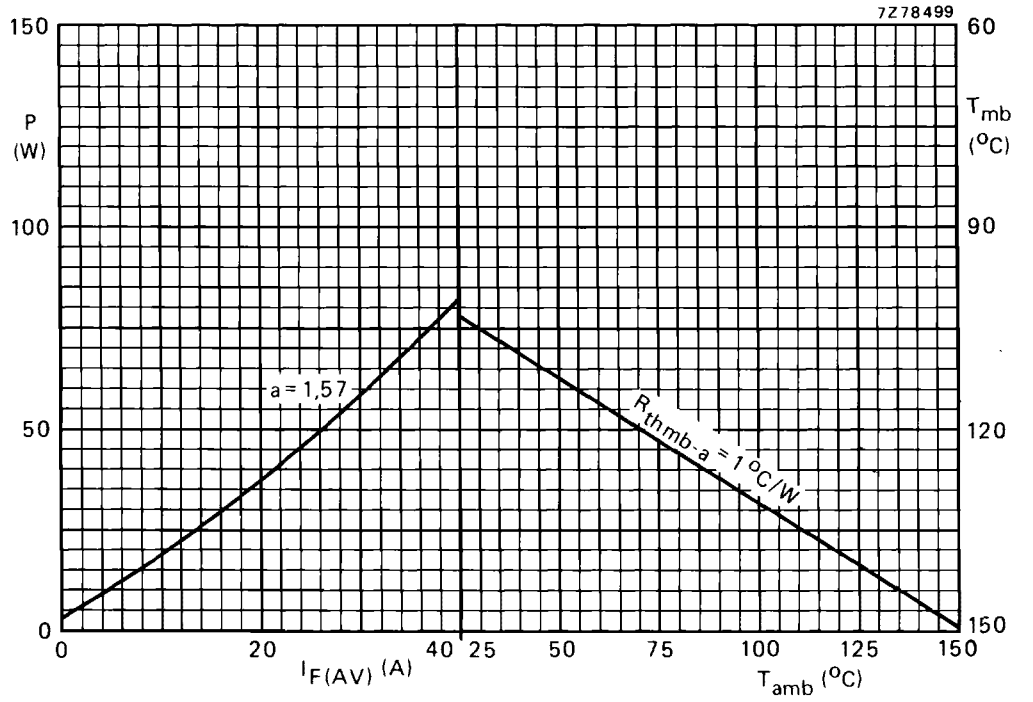


Fig. 4 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.
P = power including reverse current losses and switching losses up to f = 20 kHz.
$a = I_{F(RMS)}/I_{F(AV)}$.

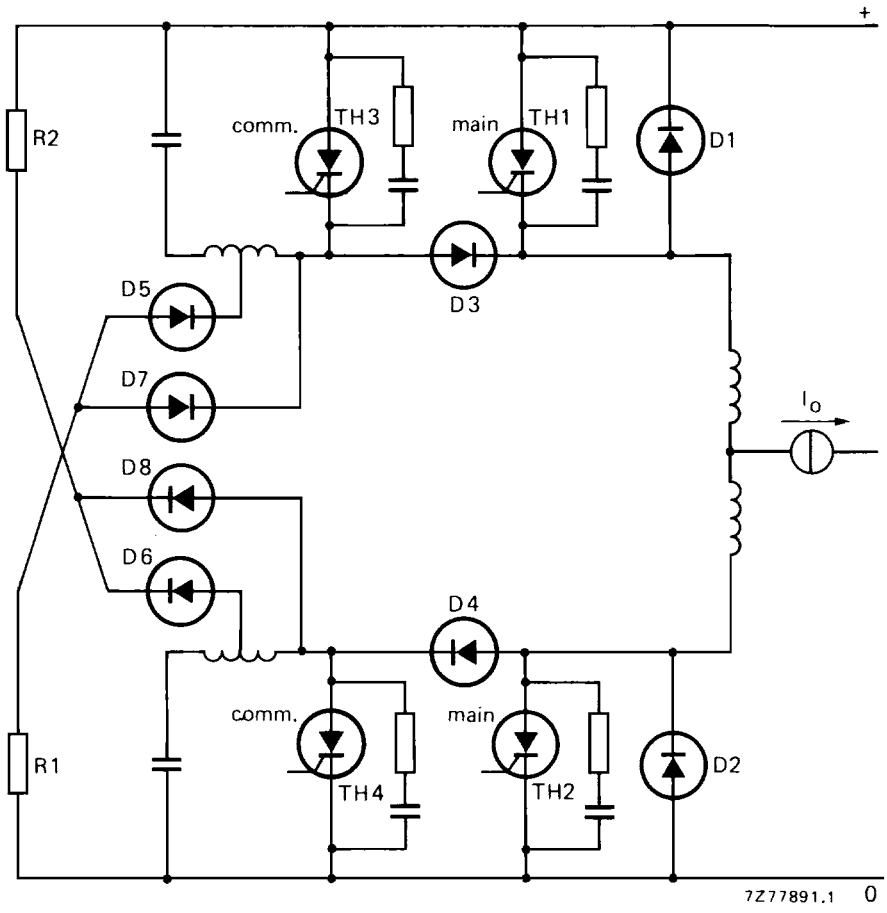


Fig. 5 One phase of a three-phase inverter for a.c. motor speed control.
D1 to D4 are BYW25 types.