FAST SOFT-RECOVERY RECTIFIER DIODE

The BYW25 is a fast soft-recovery rectifier diode in a DO-5 metal envelope especially suitable for operation as main and commutating diode in 3-phase a.c. motor speed control inverters and in high frequency power supplies in general.

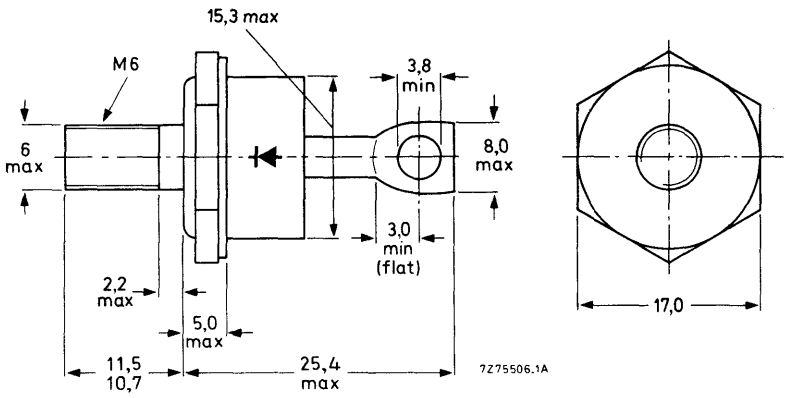
Two polarity versions are available:
Normal polarity (cathode to stud); BYW25.
Reverse polarity (anode to stud); BYW25R.

QUICK REFERENCE DATA

Repetitive peak reverse voltage	V_{RRM}	max.	800 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

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



Net mass: 22 g
Diameter of clearance hole: max. 6,5 mm
Torque on nut: min. 1,7 Nm (17 kg cm)
max. 3,5 Nm (35 kg cm)

Supplied with device: 1 nut, 1 lock washer
Nut dimensions across the flats: 10 mm
Supplied on request: accessories 56264A
(mica washer, insulating ring, tag)

RATINGS

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

Voltages *

Non-repetitive peak reverse voltage	V_{RSM}	max.	1000 V
Repetitive peak reverse voltage	V_{RRM}	max.	800 V
Continuous reverse voltage	V_R	max.	650 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

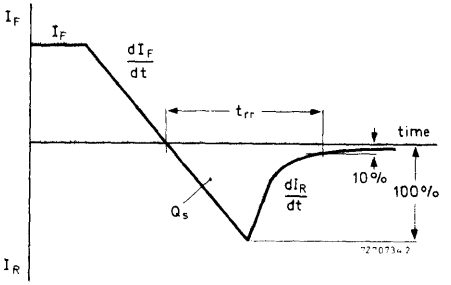


Fig. 2 Definitions of Q_s, t_{rr} and dI_R/dt.

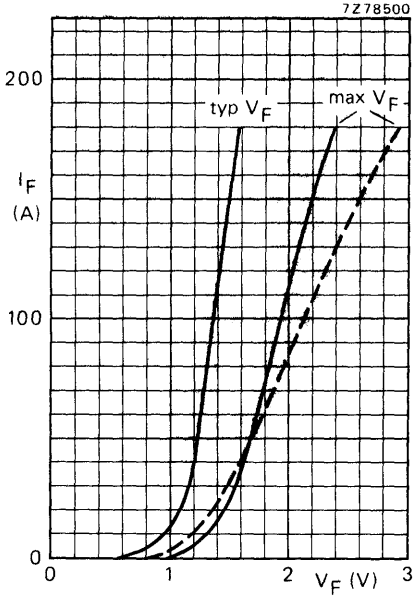


Fig. 3 —— T_j = 25 °C; – – – T_j = 150 °C.

* Measured under pulse conditions to avoid excessive dissipation.

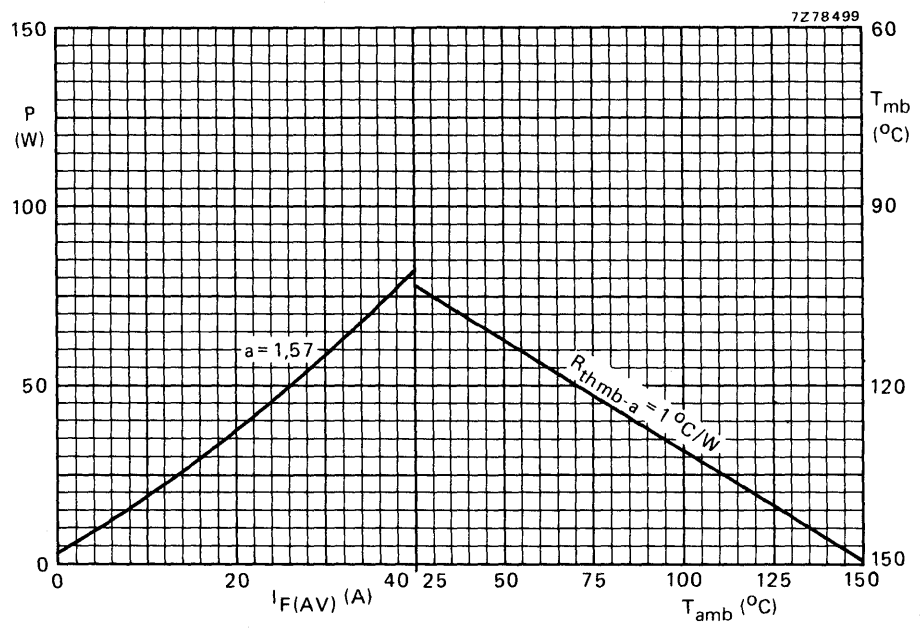


Fig. 4 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.
P = power including reverse current losses and switching losses up to f = 20 kHz.
$a = I_{F(RMS)}/I_{F(AV)}$.

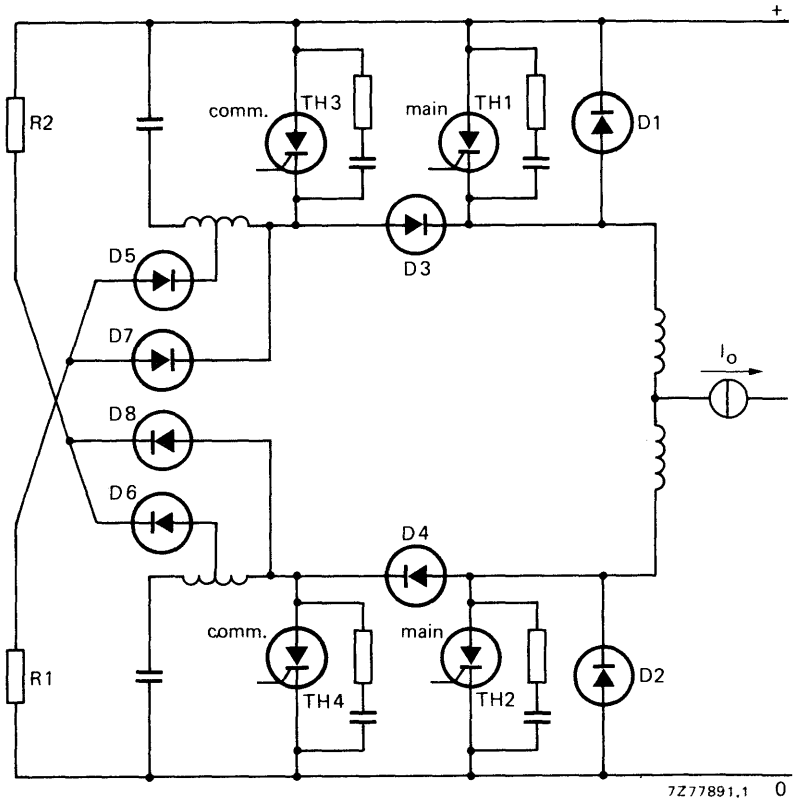


Fig. 5 One phase of a three-phase inverter for a.c. motor speed control.
D1 to D4 are BYW25 types.