

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.

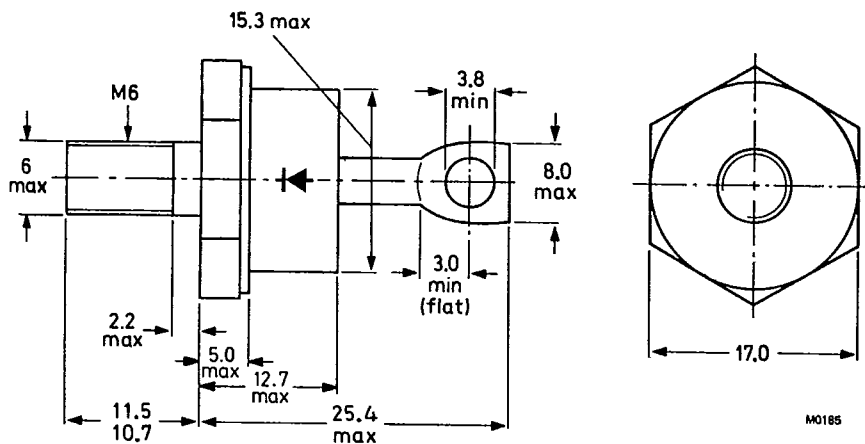
QUICK REFERENCE DATA

			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 ($\phi 6$ 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 $T_{mb} = 100^\circ\text{C}$
sinusoidal; at $T_{mb} = 125^\circ\text{C}$

$I_F(AV)$	max.	40	A
$I_F(AV)$	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;
 $T_j = 150^\circ\text{C}$ prior to surge

I_{FSM}	max.	550	A
-----------	------	-----	---

$I^2 t$ for fusing ($t = 10$ ms)

$I^2 t$	max.	1500	A^2s
---------	------	------	----------------------

Temperatures

Storage temperature

T_{stg}	-55 to +150	$^\circ\text{C}$
-----------	-------------	------------------

Junction temperature

T_j	max. 150	$^\circ\text{C}$
-------	----------	------------------

THERMAL RESISTANCE

From junction to mounting base

$R_{th\ j-mb}$	=	0.6	$^\circ\text{C/W}$
----------------	---	-----	--------------------

From mounting base to heatsink
with heatsink compound
without heatsink compound

$R_{th\ mb-h}$	=	0.3	$^\circ\text{C/W}$
$R_{th\ mb-h}$	=	0.5	$^\circ\text{C/W}$

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

CHARACTERISTICS

Forward voltage

$I_F = 35 \text{ A}; T_j = 25^\circ \text{C}$

$I_F = 150 \text{ A}; T_j = 25^\circ \text{C}$

$V_F < 1,55 \text{ V}^*$
 $V_F < 2,25 \text{ V}^*$

Reverse current

$V_R = 650 \text{ V}; T_j = 125^\circ \text{C}$

$I_R < 7 \text{ mA}$

Reverse recovery when switched from

$I_F = 10 \text{ A}$ to $V_R = 30 \text{ V}$ with $-dI_F/dt = 50 \text{ A}/\mu\text{s}; T_j = 25^\circ \text{C}$

Recovery time

$t_{rr} < 450 \text{ ns}$

$I_F = 600 \text{ A}$ to $V_R \geq 30 \text{ V}$ with $-dI_F/dt = 70 \text{ A}/\mu\text{s}; T_{mb} = 85^\circ \text{C}$

Recovery time

$t_{rr} < 1 \mu\text{s}$

Maximum slope of the reverse recovery current

when switched from $I_F = 600 \text{ A}$ to $V_R \geq 30 \text{ V};$

with $-dI_F/dt = 35 \text{ A}/\mu\text{s}; T_j = 25^\circ \text{C}$

$|dI_R/dt| < 100 \text{ A}/\mu\text{s}$

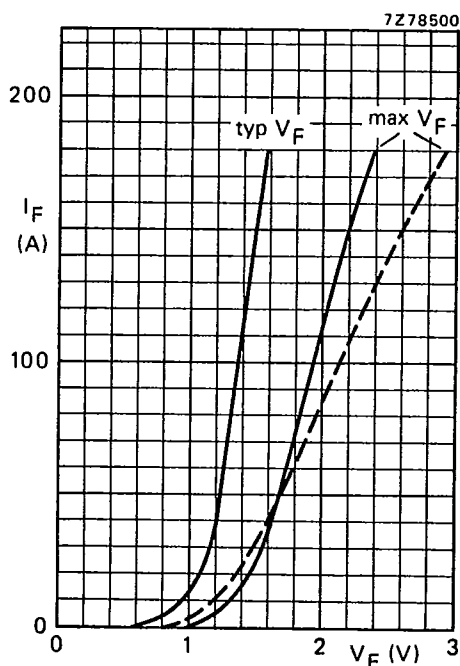


Fig. 3 — $T_j = 25^\circ \text{C}$; --- $T_j = 150^\circ \text{C}$.

* Measured under pulse conditions to avoid excessive dissipation.

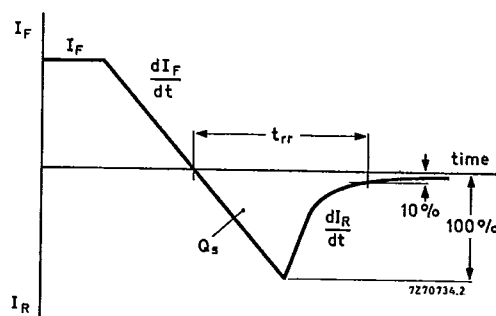


Fig. 2 Definitions of Q_s , t_{rr} and dI_R/dt .

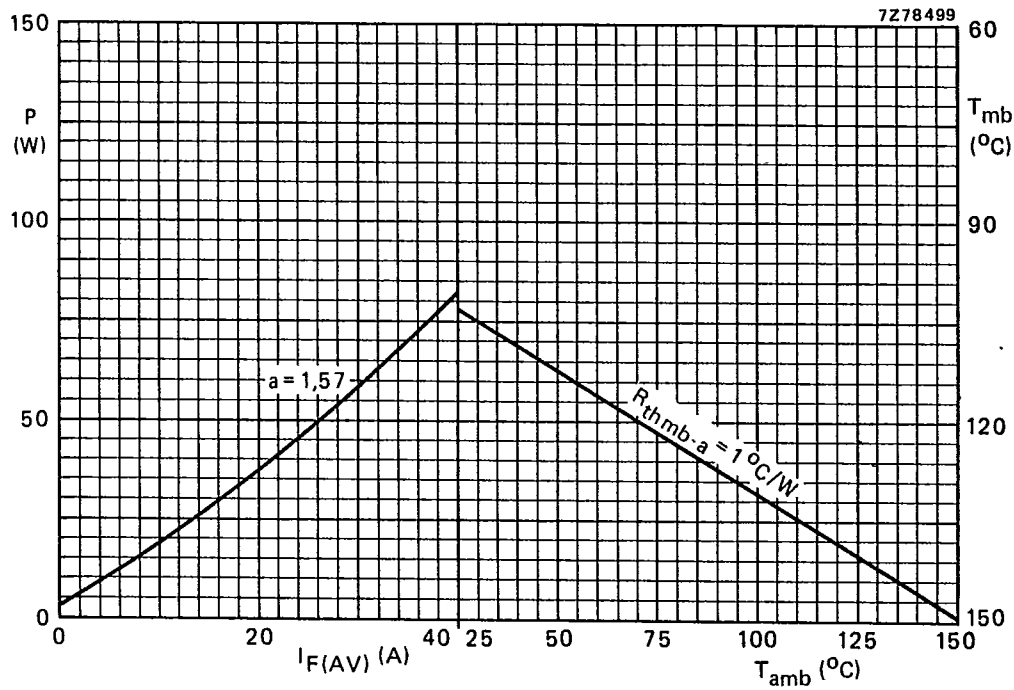
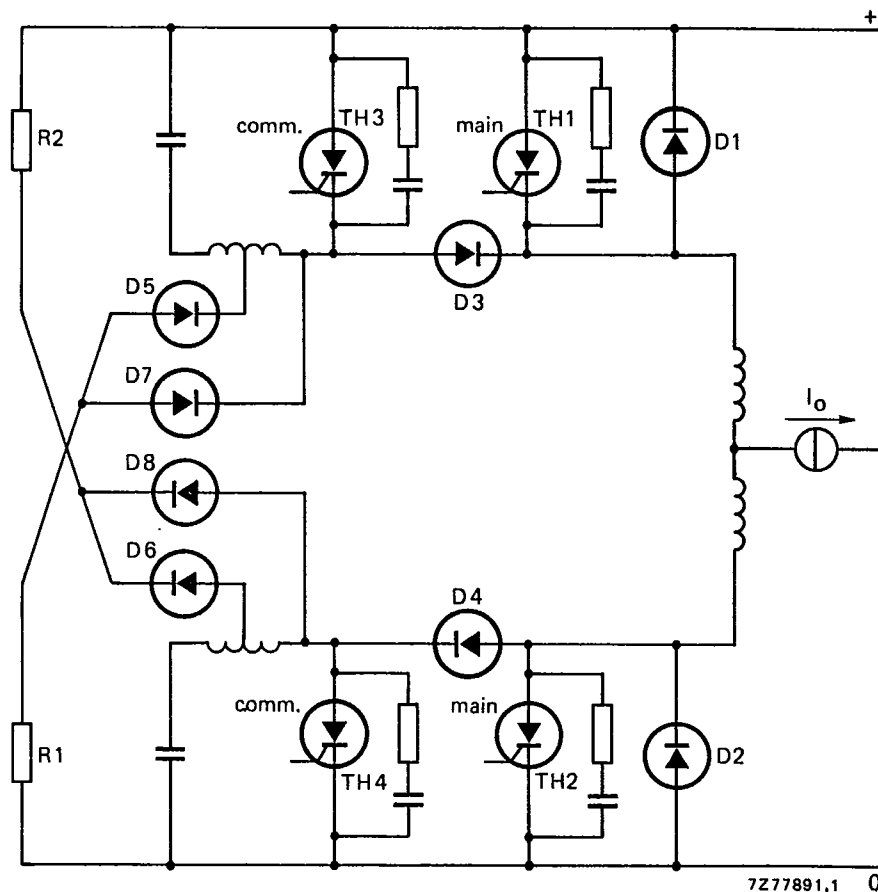


Fig. 4 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.

P = power including reverse current losses and switching losses up to $f = 20$ kHz.

$a = I_{F(RMS)}/I_{F(AV)}$.



7Z77891,1 0

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