FAST SOFT-RECOVERY RECTIFIER DIODES

Fast soft-recovery diodes in DO-4 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): BYV24-800 and BYV24-1000.
Reverse polarity (anode to stud): BYV24-800R and BYV24-1000R.

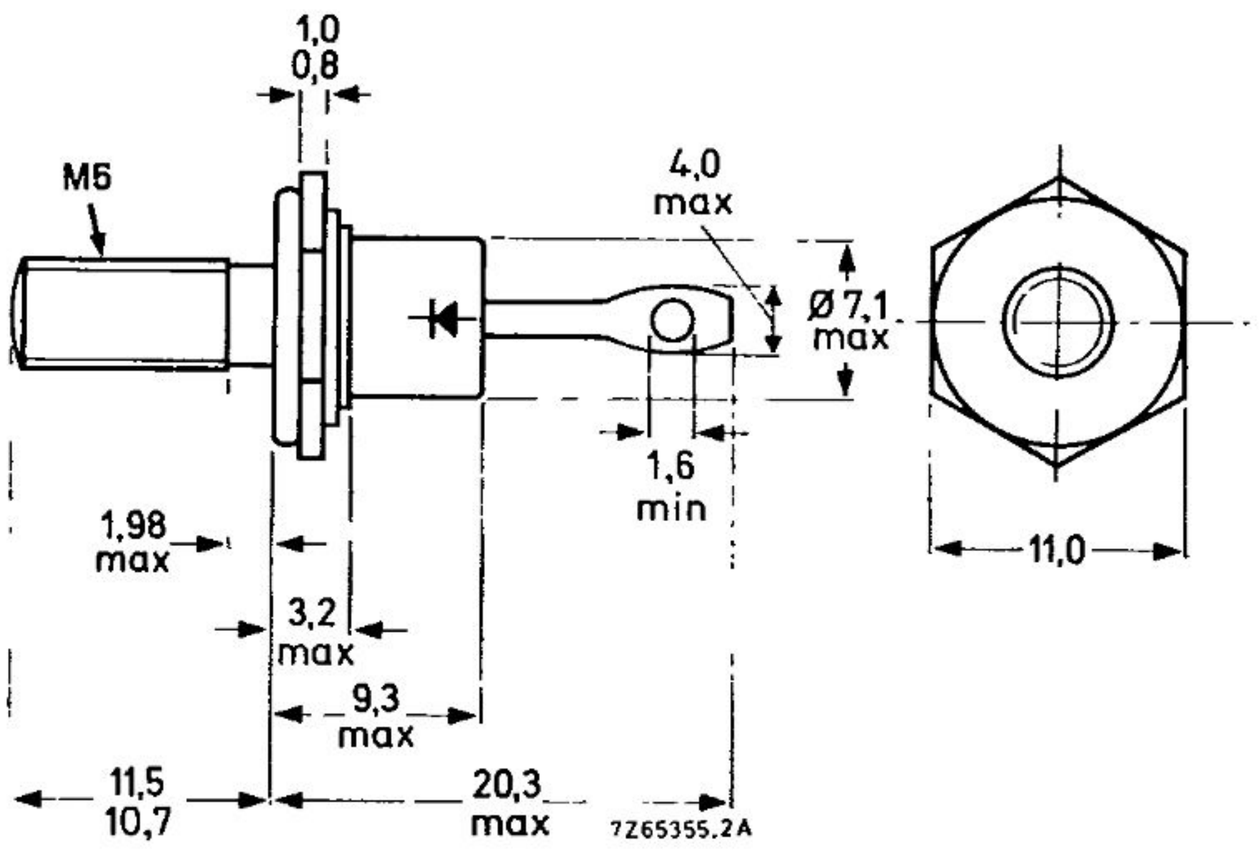
QUICK REFERENCE DATA

			BYV24-800(R)	1000(R)	
Repetitive peak reverse voltage	V_{RRM}	max.	800	1000	V
Average forward current	$I_{F(AV)}$	max.	12		A
Non-repetitive peak forward current	I_{FSM}	max.	150		A
Reverse recovery time	t_{rr}	<	450		ns

MECHANICAL DATA

Dimensions in mm

Fig. 1 DO–4: with metric M5 stud (ϕ5 mm)



Net mass: 6 g
Diameter of clearance hole: max 5.2 mm
Accessories supplied on request:
see ACCESSORIES section

Supplied with device: 1 nut, 1 lock washer.
Torque on nut: min. 0.9 Nm (9 kg cm)
max. 1.7 Nm (17 kg cm)
Nut dimensions across the flats: 8.0 mm.

The mark shown applies to the normal polarity types.

RATINGS

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

Voltages*

			BYV24–800(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				
sinusoidal; up to T_{mb} = 103 °C	$I_{F(AV)}$	max.	12	A
sinusoidal; at T_{mb} = 125 °C	$I_{F(AV)}$	max.	7	A
square-wave; δ = 0.5; up to T_{mb} = 103 °C	$I_{F(AV)}$	max.	14	A
square-wave; δ = 0.5; at T_{mb} = 125 °C	$I_{F(AV)}$	max.	8	A
R.M.S. forward current	$I_{F(RMS)}$	max.	20	A
Repetitive peak forward current	I_{FRM}	max.	120	A
Non-repetitive peak forward current				
t = 10 ms; half sine-wave;				
T_j = 150 °C prior to surge;				
without re-applied voltage	I_{FSM}	max.	150	A
with re-applied V_{RWMmax}	I_{FSM}	max.	120	A
I^2t for fusing (t = 10 ms)	I^2t	max.	72	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	$R_{th\ j\text{-}mb}$	=	2.0	°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
Transient thermal impedance; t = 1 ms	$Z_{th\ j\text{-}mb}$	=	0.85	°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: $R_{th\ j\text{-}a} \leqslant 8$ °C/W (continuous reverse voltage).

CHARACTERISTICS

Forward voltage				
I_F = 20 A; T_j = 25 °C	V_F	<	1.7	V*
Reverse current				
$V_R = V_{RWMmax}$; T_j = 125 °C	I_R	<	1.5	mA
Reverse recovery when switched from I_F = 10 A to $V_R \geqslant$ 30 V with $-dI_F/dt$ = 10 A/μs; T_j = 25 °C				
Recovery time	t_{rr}	<	450	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	<	800	nC
Maximum slope of the reverse recovery current when switched from I_F = 2 A to $V_R \geqslant$ 30 V; with $-dI_F/dt$ = 2 A/μs; T_j = 25 °C	$\lvert dI_R/dt \rvert$	<	7	A/μs

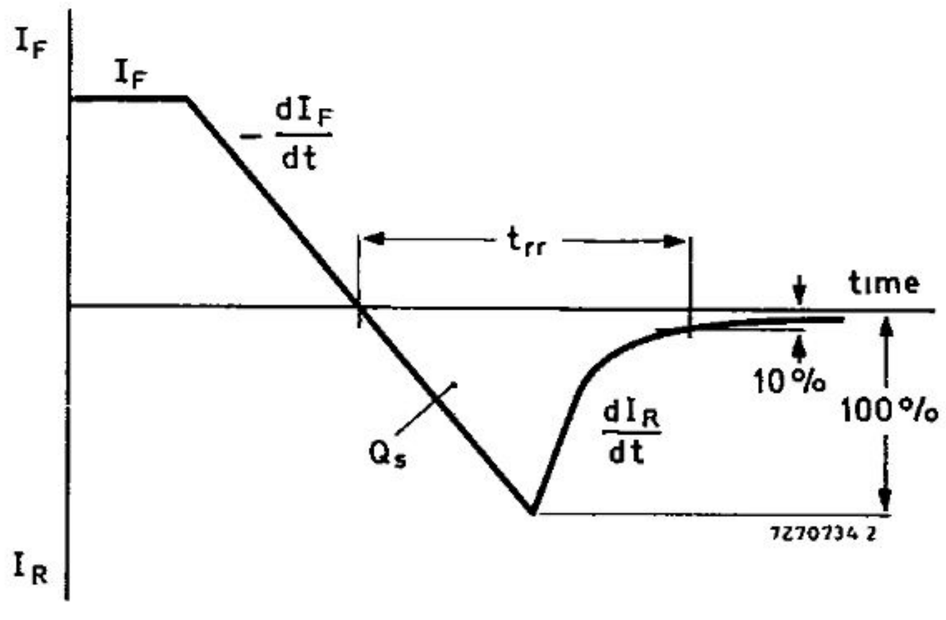


Fig.2 Definition of t_{rr} and Q_s.

*Measured under pulse conditions to avoid excessive dissipation.

SINUSOIDAL OPERATION

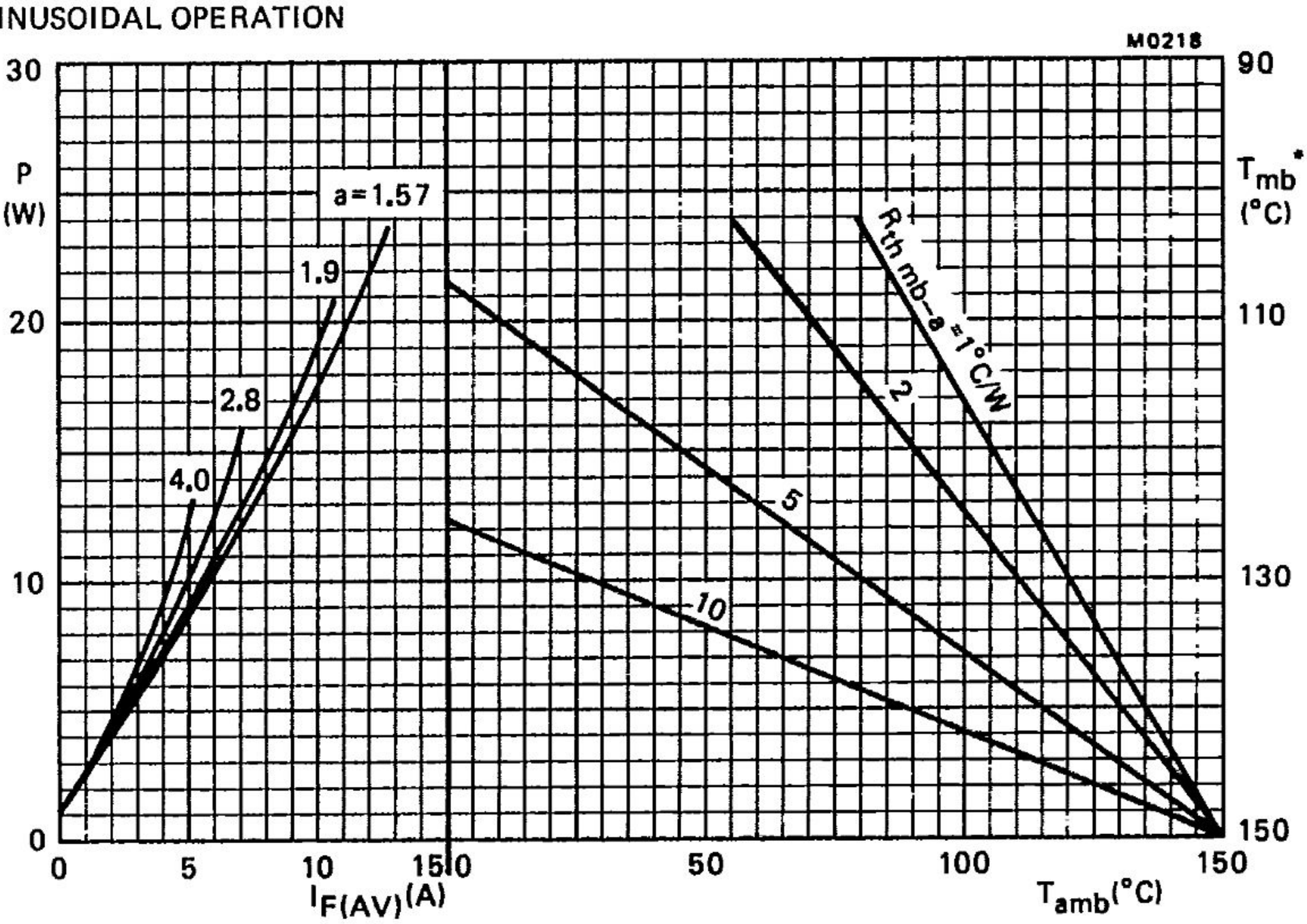


Fig.3 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.
P = power including reverse current losses but excluding switching losses.
a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

*T_{mb} scale is for comparison purposes and is correct only for $R_{th\ mb\text{-}a} < 8\ ^{o}C/W$.

SQUARE–WAVE OPERATION

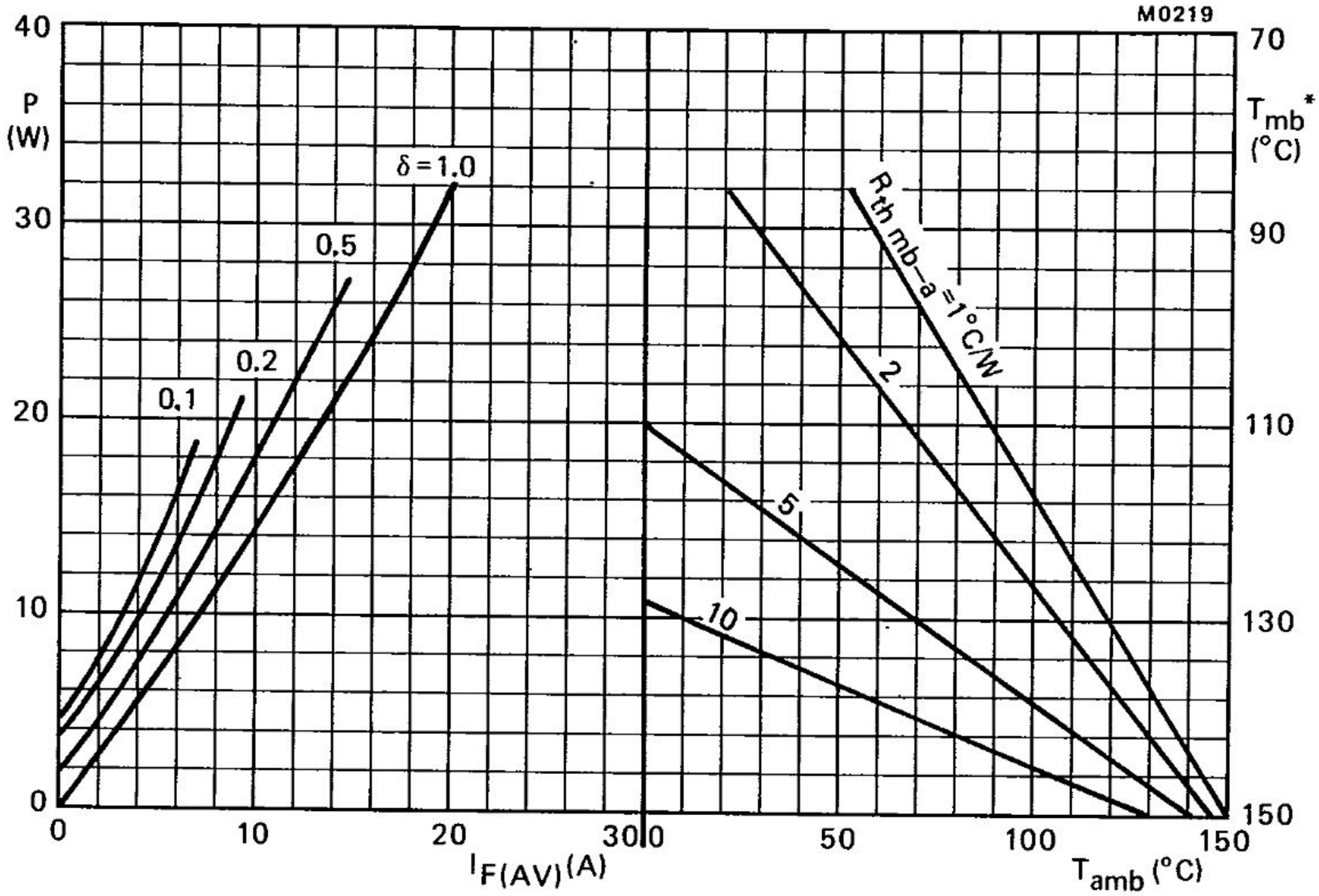
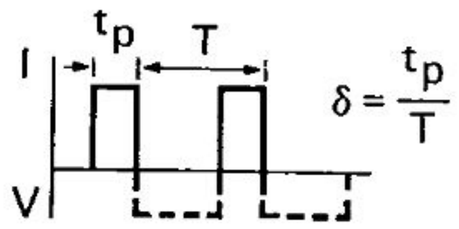


Fig.4 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.
P = power including reverse current losses but excluding switching losses.



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

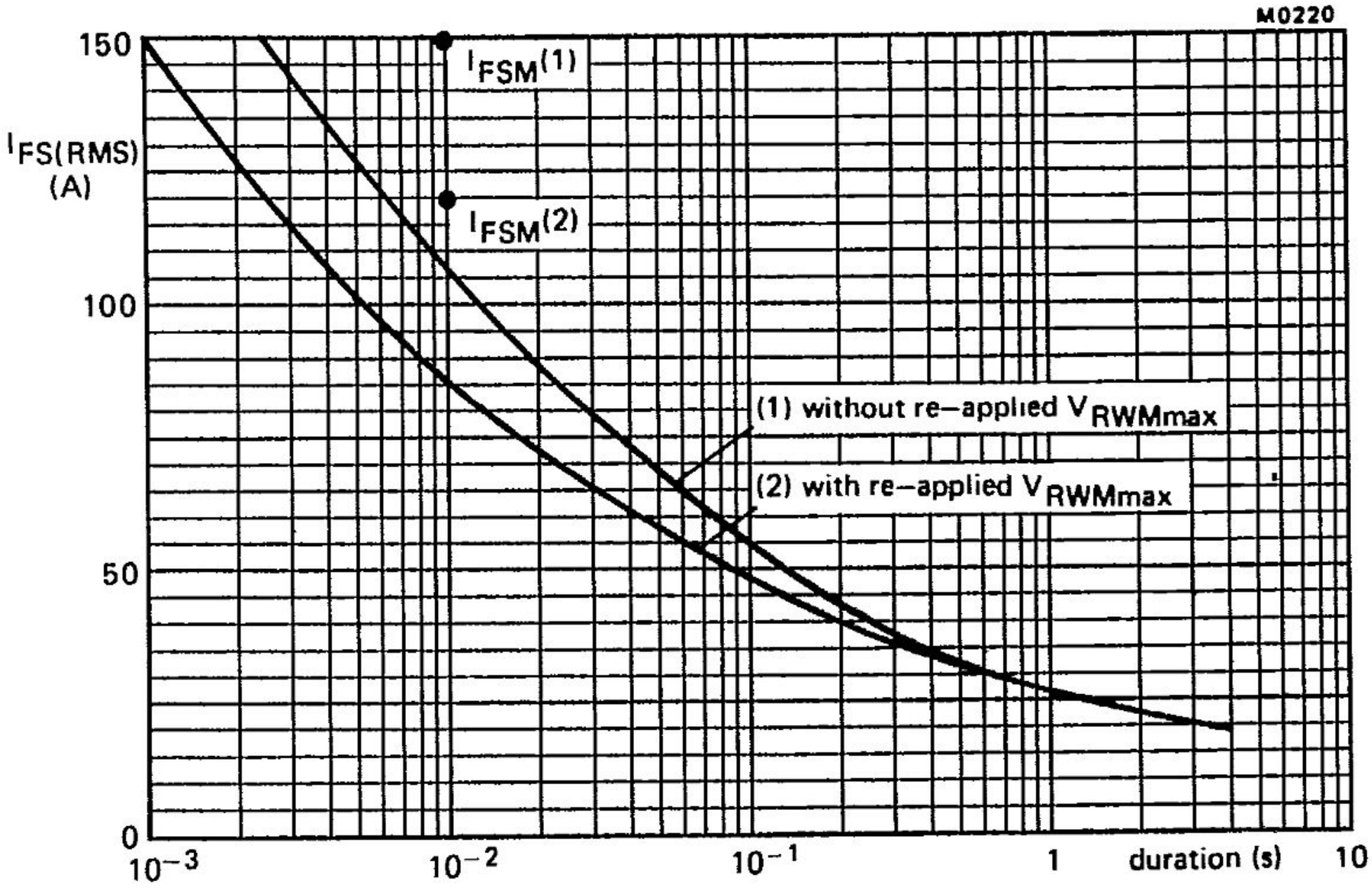
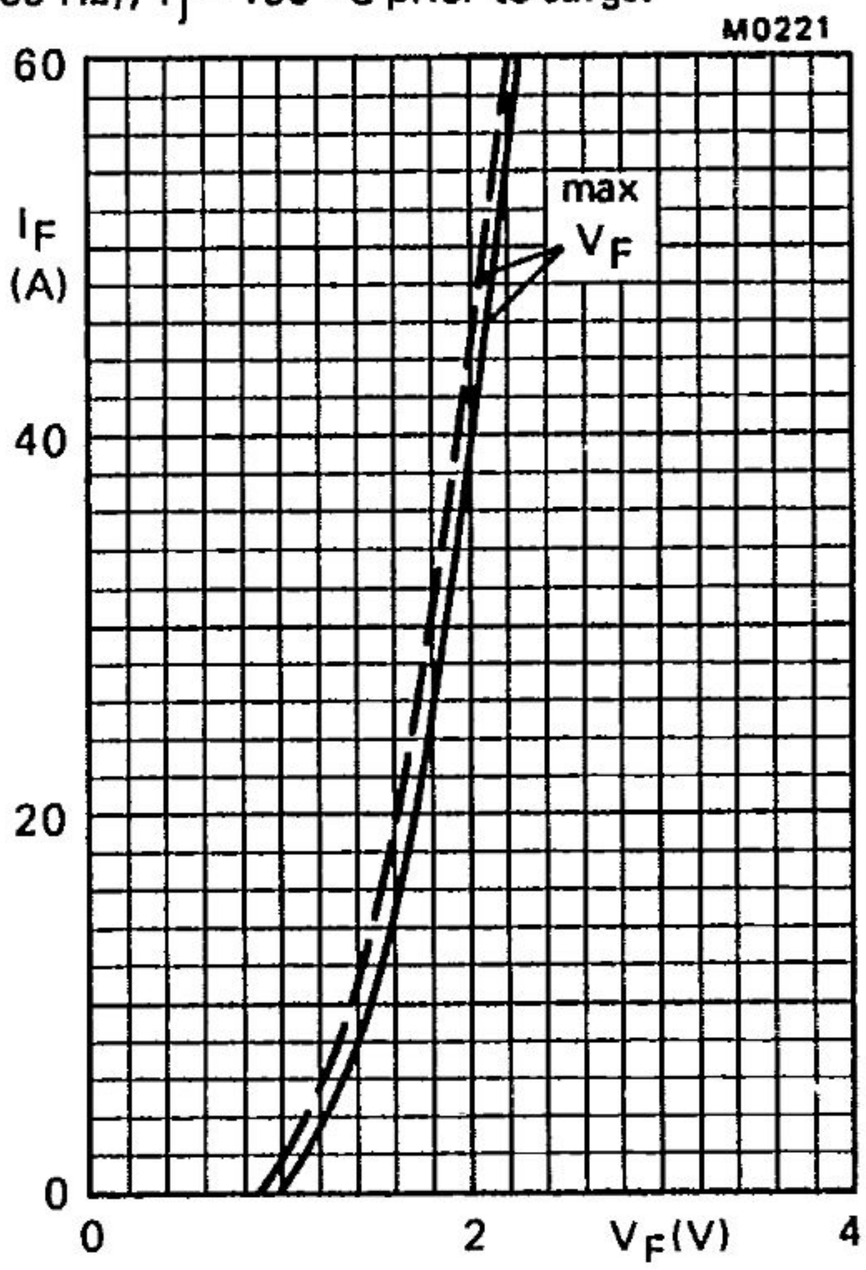


Fig.5 Maximum permissible non-repetitive r.m.s. forward current based on sinusoidal currents (f = 50 Hz); T_j = 150 °C prior to surge.



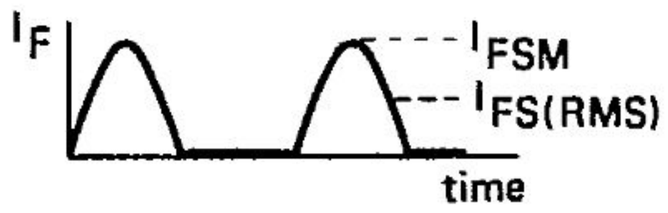


Fig.6 . —— T_j = 25 °C; – – – T_j = 100 °C.

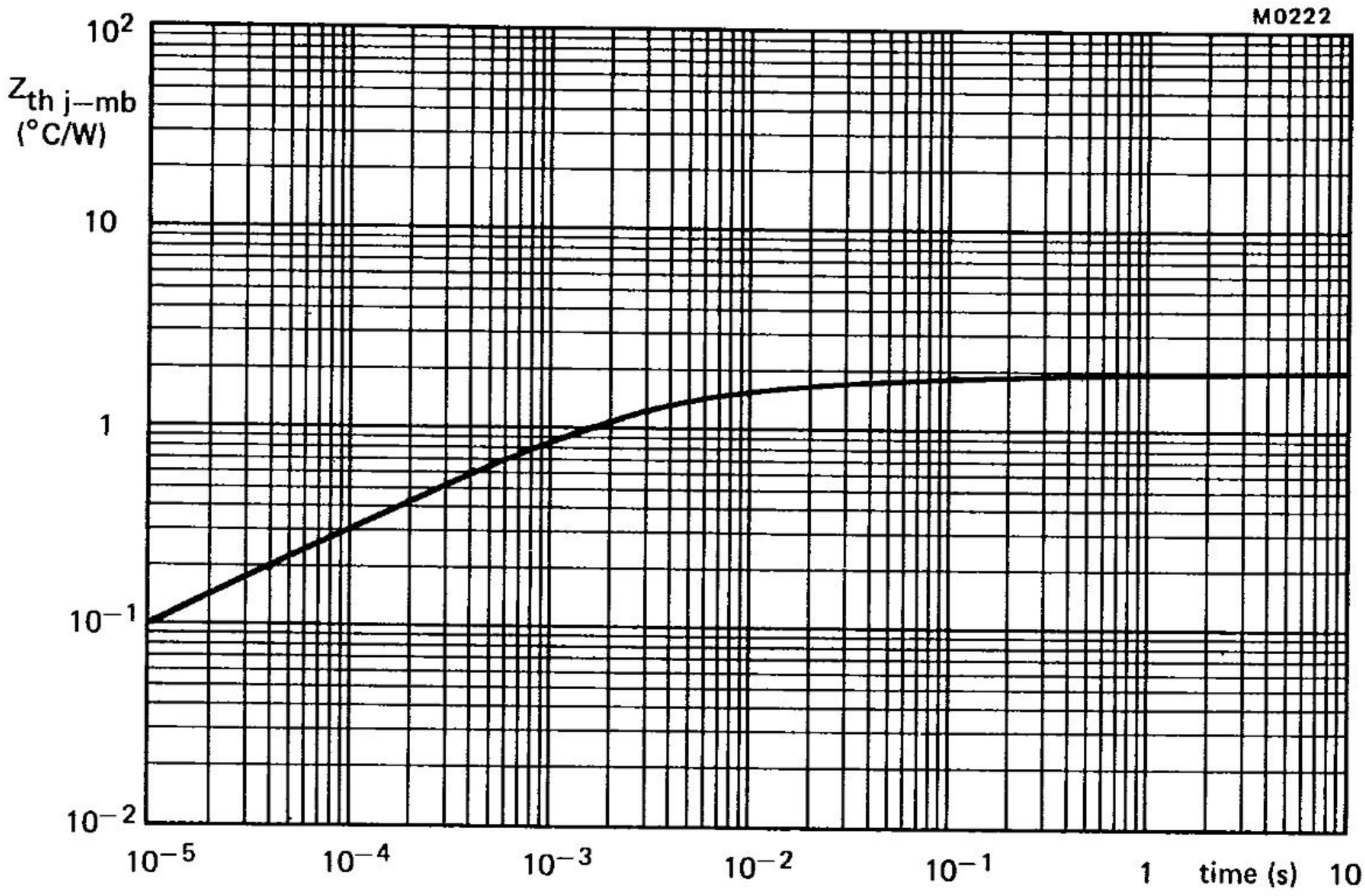


Fig.7