SILICON BRIDGE RECTIFIERS

Ready-for-use mains full-wave bridges, each consisting of four double-diffused silicon diodes, in a plastic encapsulation. The bridges are intended for use in equipment supplied from mains with r.m.s. voltages up to 280 V and are capable of delivering up to 1000 W into capacitive loads. They may be used in free air or clipped to a heatsink.

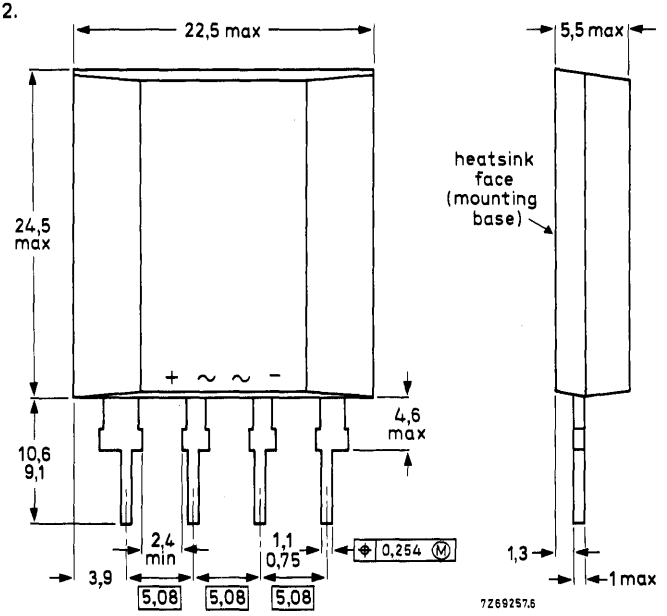
QUICK REFERENCE DATA

			BY224-400	600	
Input					
R.M.S. voltage	$V_{I(RMS)}$	max.	220	280	V
Repetitive peak voltage	V_{IRM}	max.	400	600	V
Non-repetitive peak current	I_{ISM}	max.		100	A
Peak inrush current	I_{IIM}	max.		200	A
Output					
Average current	$I_{O(AV)}$	max.		4,8	A

MECHANICAL DATA (see also Fig.1a)

Dimensions in mm

Fig. 1 SOT-112.



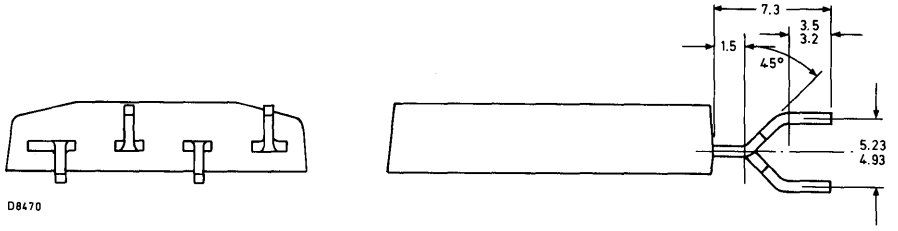
Net mass: 6,8 g

Accessories supplied on request: 56366 (clip); for mounting instructions see data 56366.

The sealing of the plastic withstands the accelerated damp heat test of IEC recommendation 68-2 (test D, severity IV, 6 cycles).

MECHANICAL DATA (continued)

→ Fig. 1a



A version with cranked pins (as shown in figure 1a) is available on request.

RATINGS

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

			BY224–400	600	
Input					
Non-repetitive peak voltage ($t \leqslant 10$ ms)	V_{ISM}	max.	400	600	V
Repetitive peak voltage	V_{IRM}	max.	400	600	V
Crest working voltage	V_{IWM}	max.	350	400	V
R.M.S. voltage (sine-wave)	$V_{I(RMS)}$	max.	220	280	V
Non-repetitive peak current half sine-wave; t = 20 ms; with reapplied V_{IWMmax}					
T_j = 25 °C prior to surge	I_{ISM}	max.		100	A
→ T_j = 150 °C prior to surge	I_{ISM}	max.		85	A
Peak inrush current (see Fig. 6)	I_{IIM}	max.		200	A
Output					
Average current (averaged over any 20 ms period; see Figs 2 and 3) heatsink operation up to T_{mb} = 90 °C	$I_{O(AV)}$	max.		4,8	A
free-air operation at T_{amb} = 45 °C; (mounting method 1a)	$I_{O(AV)}$	max.		2,5	A
Repetitive peak current	I_{ORM}	max.		50	A
→ **Temperatures**					
Storage temperature	T_{stg}			−40 to +150	°C
Junction temperature	T_j	max.		150	°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	4,0 °C/W

Influence of mounting method

1. Free-air operation

The quoted values of $R_{th\ j\text{-}a}$ should be used only when no loads of other dissipating components run to the same tie-point (see Fig. 3).

Thermal resistance from junction to ambient in free air

a. Mounted on a printed-circuit board with 4 cm^2 of copper laminate to + and − leads	$R_{th\ j\text{-}a}$	=	19,5 °C/W
b. Mounted on a printed-circuit board with minimal copper laminate	$R_{th\ j\text{-}a}$	=	25 °C/W

2. Heatsink mounted with clip (see mounting instructions)

Thermal resistance from mounting base to heatsink

a. With zinc-oxide heatsink compound	$R_{th\ mb\text{-}h}$	=	1,0 °C/W
b. Without heatsink compound	$R_{th\ mb\text{-}h}$	=	2,0 °C/W

MOUNTING INSTRUCTIONS

1. Soldered joints must be at least 4 mm from the seal.
2. The maximum permissible temperature of the soldering iron or bath is 270 °C; contact with the joint must not exceed 3 seconds.
3. Avoid hot spots due to handling or mounting; the body of the device must not come into contact with or be exposed to a temperature higher than 150 °C. ←
4. Leads should not be bent less than 4 mm from the seal. Exert no axial pull when bending.
5. Recommended force of clip on device is 120 N (12 kgf).
6. The heatsink should be in contact with the entire mounting base of the device and heatsink compound should be used.

CHARACTERISTICS

Forward voltage (2 diodes in series) I_F = 10 A; T_j = 25 °C	V_F	<	2,3 V*
Reverse current (2 diodes in parallel) $V_R = V_{IWMmax}$; T_j = 25 °C	I_R	<	200 μA

* Measured under pulse conditions to avoid excessive dissipation.

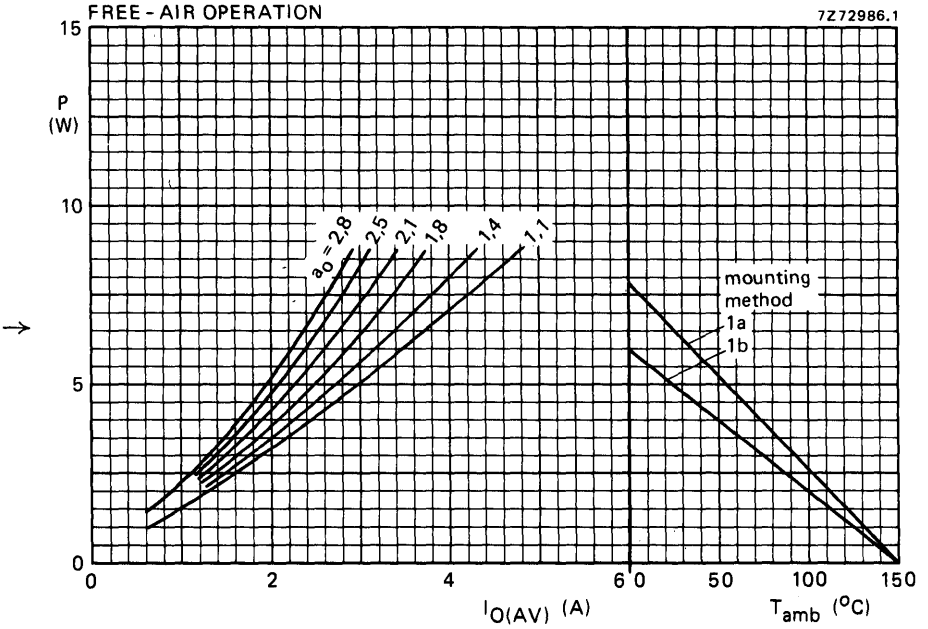


Fig. 2 The right-hand part shows the interrelationship between the power (derived from the left-hand graph) and the maximum permissible ambient temperature.

Output form factor $a_o = I_{O(RMS)}/I_{O(AV)} = 0{,}707 \times I_{F(RMS)}/I_{F(AV)}$ per diode.

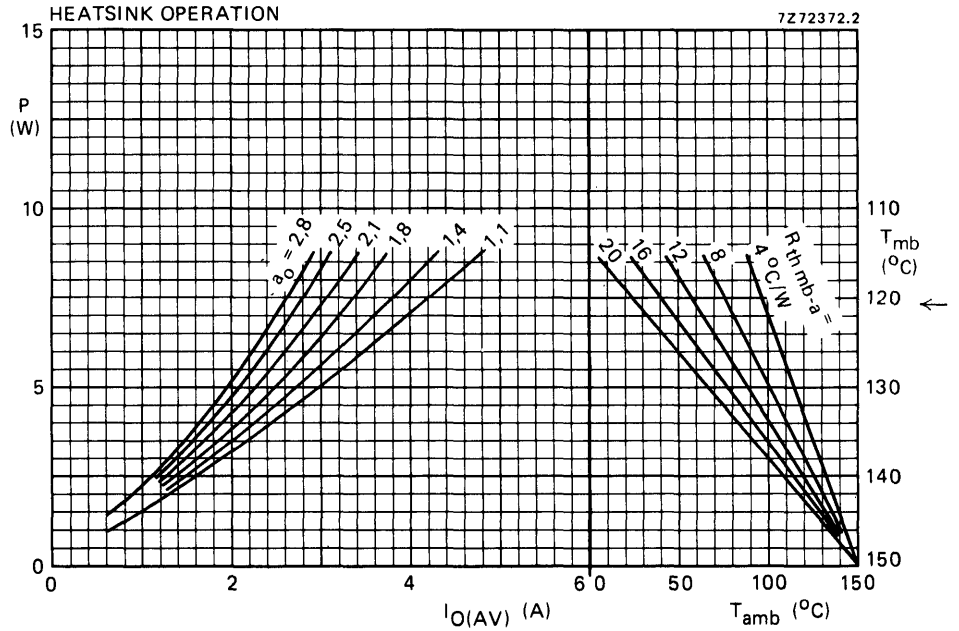


Fig. 3 The right-hand part shows the interrelationship between the power (derived from the left-hand graph) and the maximum permissible temperatures.

Output form factor $a_o = I_{O(RMS)}/I_{O(AV)} = 0{,}707 \times I_{F(RMS)}/I_{F(AV)}$ per diode.

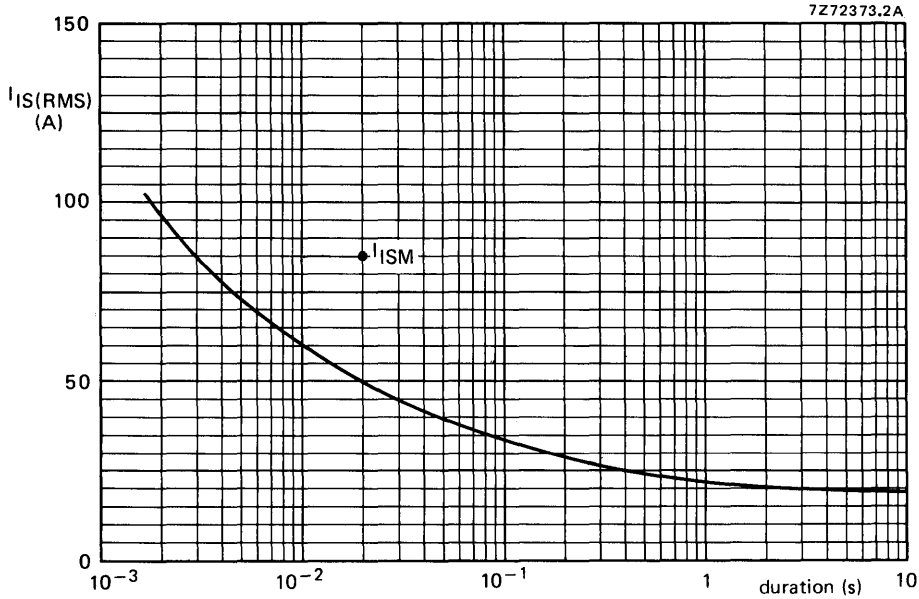
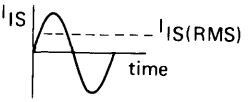


Fig.4 Maximum permissible non-repetitive r.m.s. input current based on sinusoidal currents (f = 50 Hz); → T_j = 150 °C prior to surge; with reapplied V_{IWMmax}.



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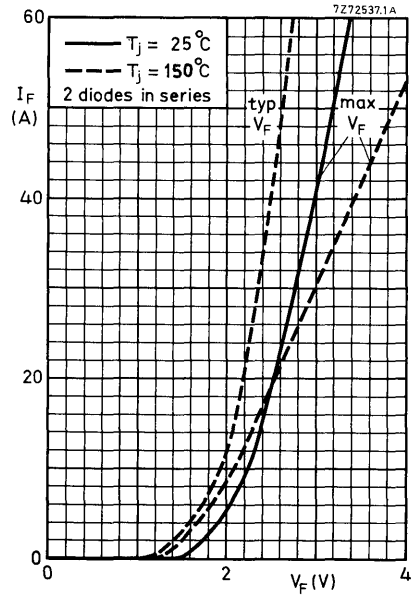
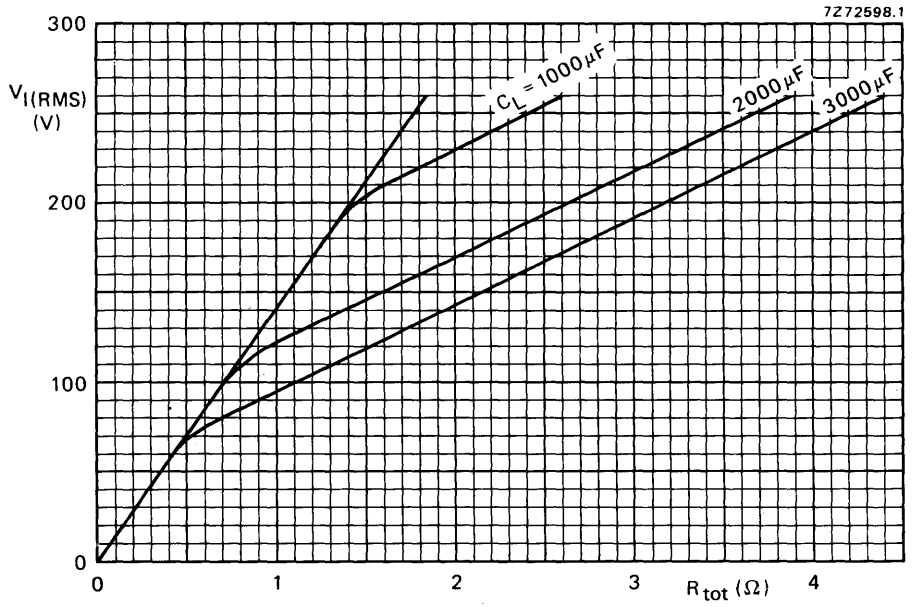
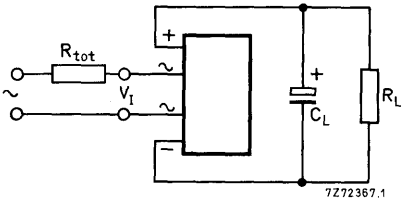


Fig.5



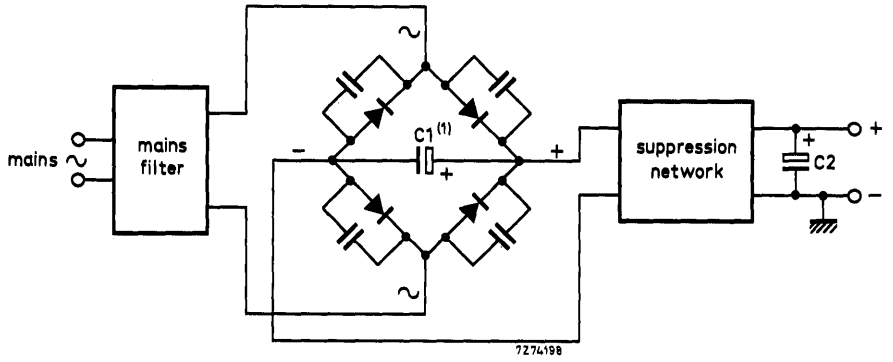


The graph takes the possibility of the following spreads into account:

mains voltage	+10%
capacitance	+50%
resistance	−10%

Fig. 6 Minimum value of the total series resistance R_{tot} (including the transformer resistance) required to limit the peak inrush current.

APPLICATION INFORMATION



(1) External capacitor.

Fig. 7 Because smoothing capacitor C2 is not always connected directly across the bridge (a suppression network may be sited between capacitor and bridge as shown), it is necessary to connect a capacitor of about 1 μF, C1, between the + and – terminals of the bridge. This capacitor should be as close to the bridge as possible, to give optimum suppression of mains transients.

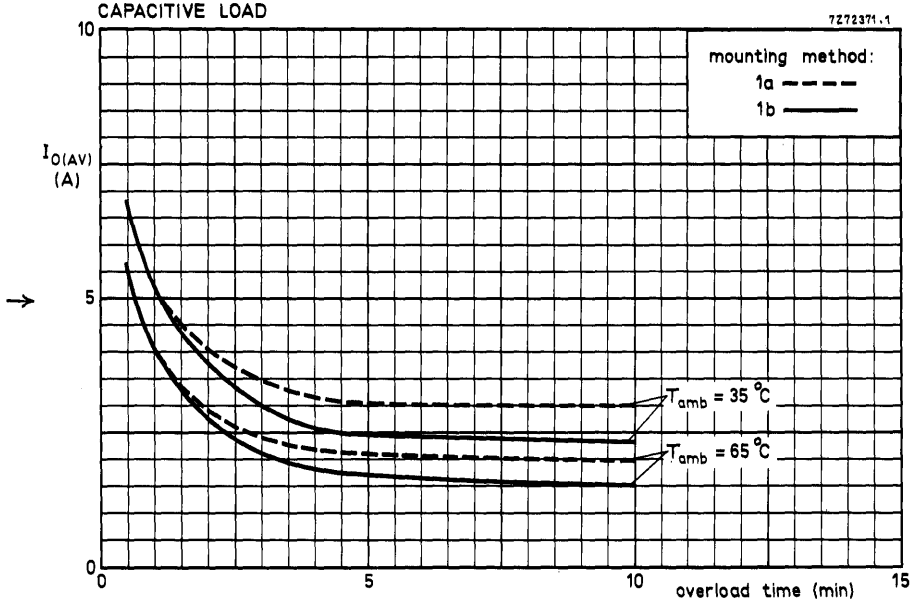


Fig.8