SILICON BRIDGE RECTIFIERS

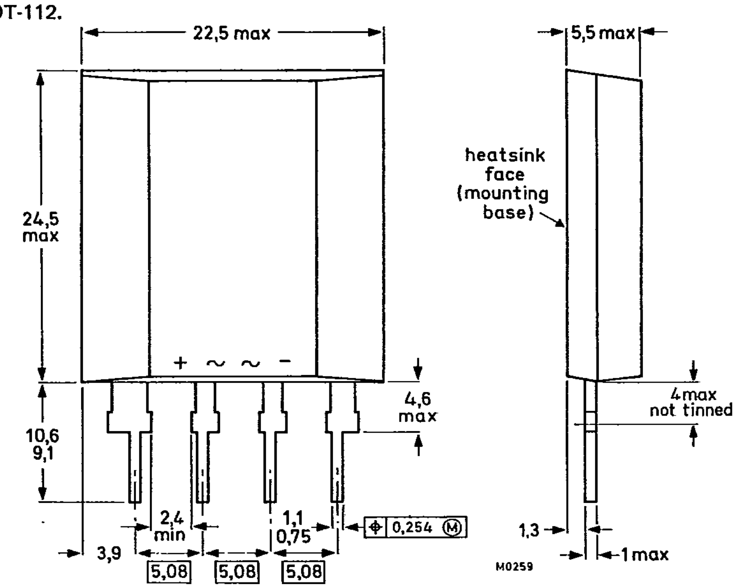
Ready-for-use mains full-wave bridges, each consisting of four double-diffused silicon diodes, in a plastic encapsulation. The bridges are intended for use in equipment supplied from mains with r.m.s. voltages up to 280 V and are capable of delivering up to 1000 W into capacitive loads. They may be used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

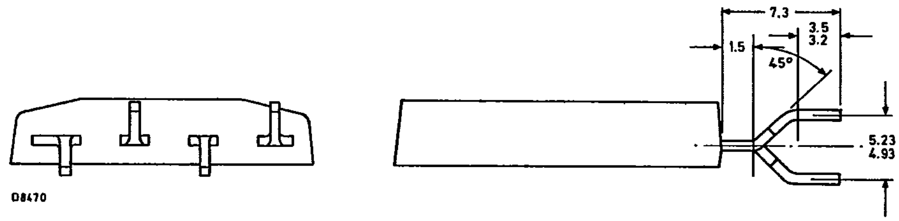
Fig. 1 SOT-112.



Net mass: 6,8 g
Accessories supplied on request: 56379 (clip); see Accessories and Mounting Instructions.
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 600V version with cranked pins (as shown in figure 1a) is available as type OF432.

RATINGS

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

			BY224–400	600	
Input					
Non-repetitive peak voltage ($t \leq 10$ 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.

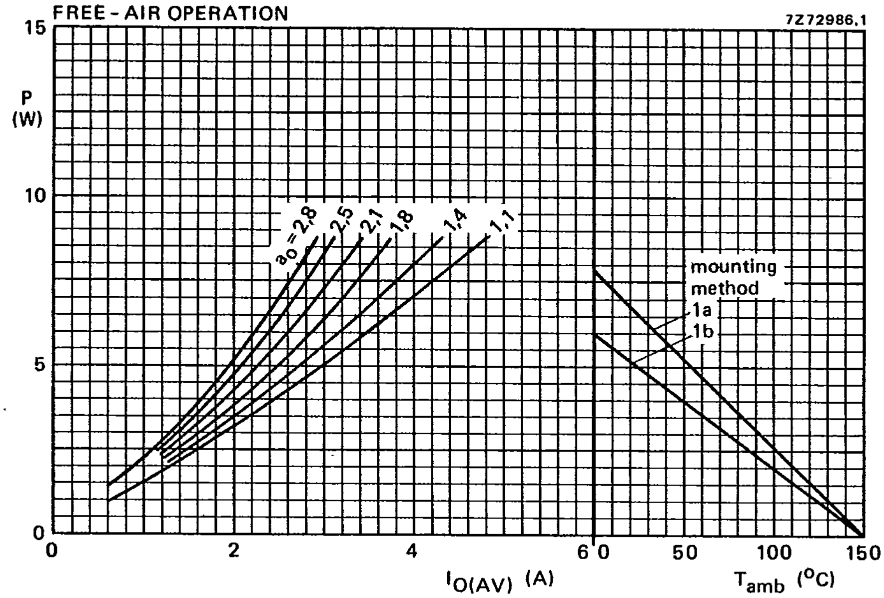


Fig. 2 The right-hand part shows the interrelationship between the power (derived from the left-hand graph) and the maximum permissible ambient temperature.
Output form factor $a_o = I_{O(RMS)}/I_{O(AV)} = 0{,}707 \times I_{F(RMS)}/I_{F(AV)}$ per diode.

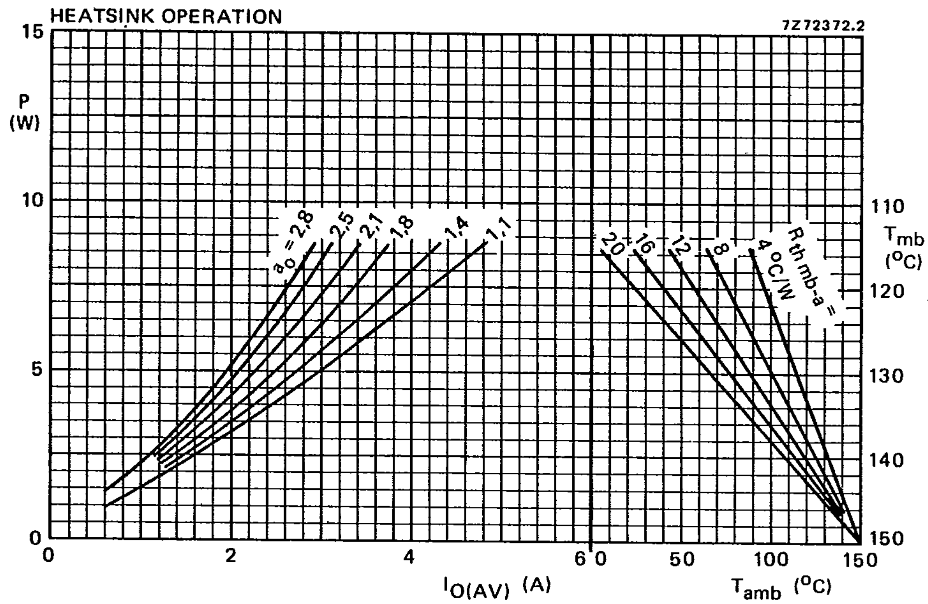


Fig. 3 The right-hand part shows the interrelationship between the power (derived from the left-hand graph) and the maximum permissible temperatures.

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

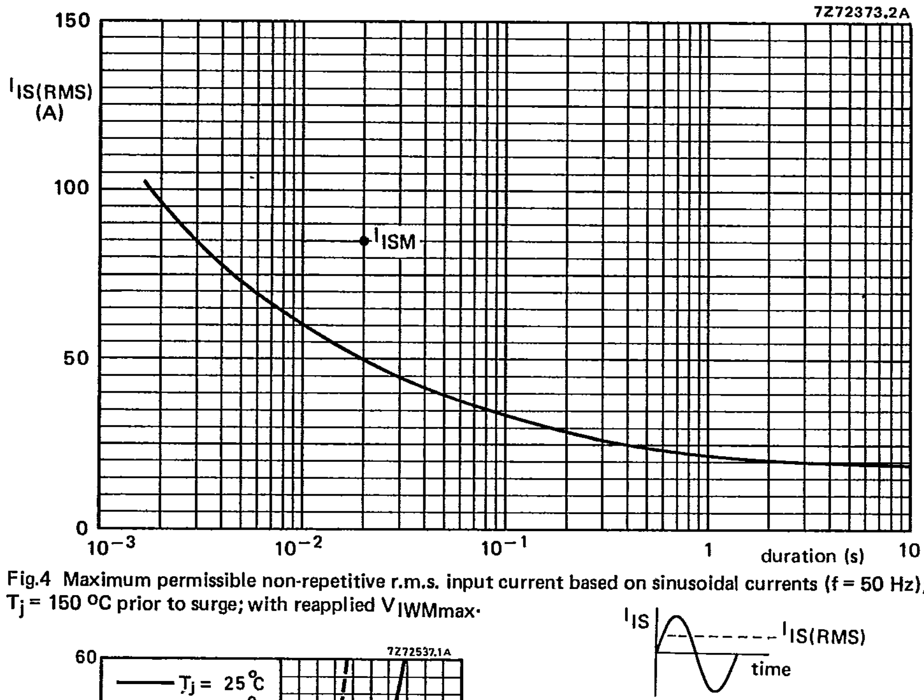


Fig.4 Maximum permissible non-repetitive r.m.s. input current based on sinusoidal currents (f = 50 Hz); T_j = 150 °C prior to surge; with reapplied V_{IWMmax}.

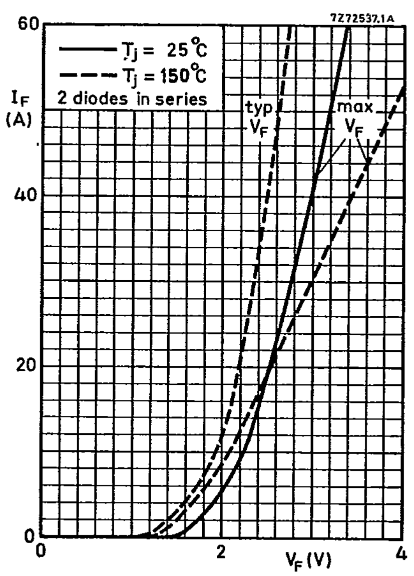
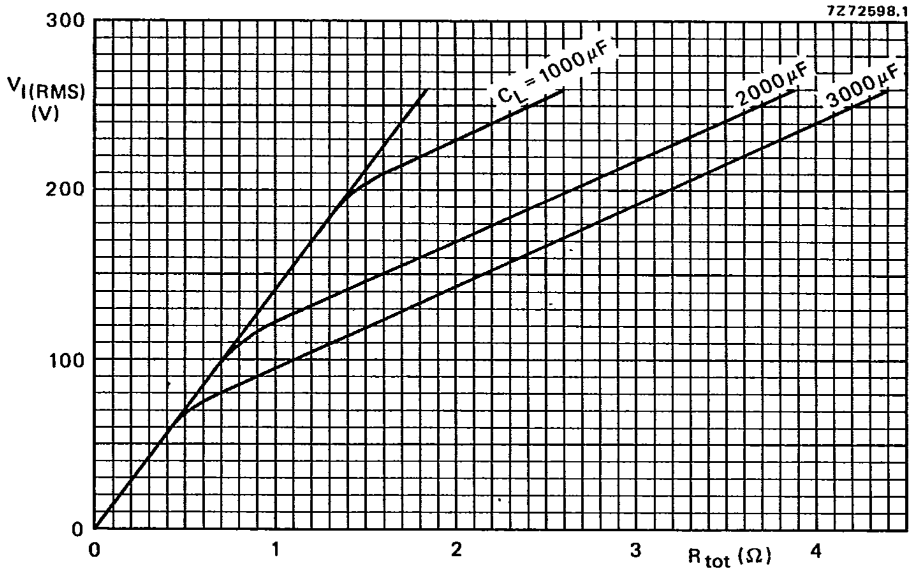
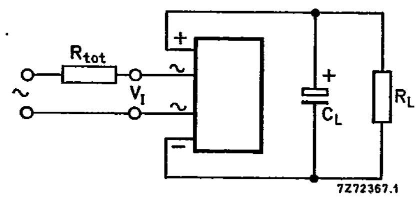


Fig.5



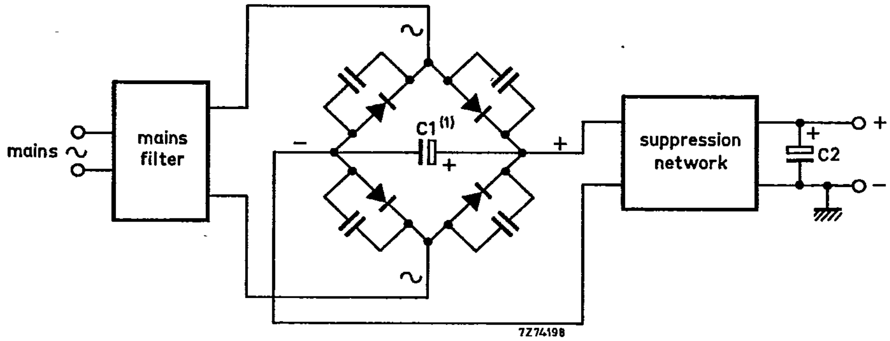


The graph takes the possibility of the following spreads into account:

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.

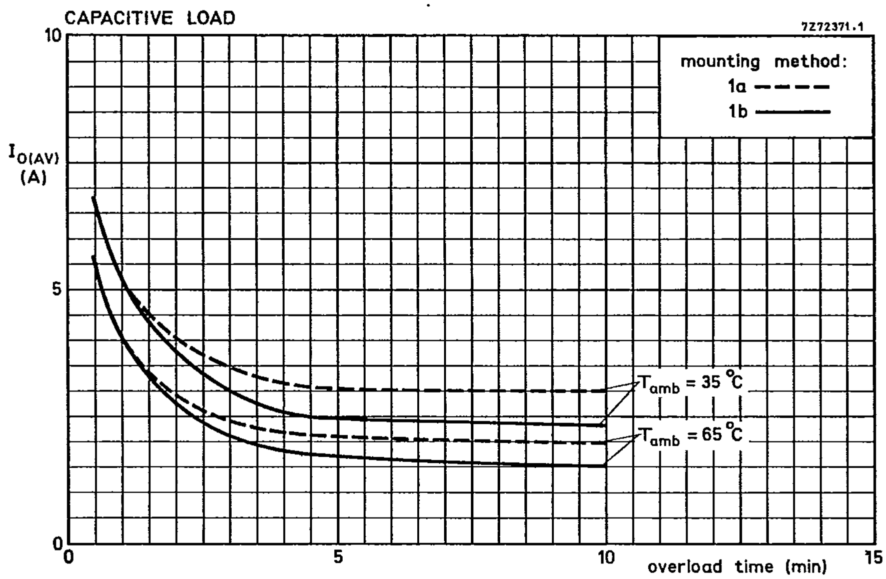


Fig.8