SILICON BRIDGE RECTIFIER

Ready-for-use full-wave bridge rectifier in a plastic encapsulation. The bridge is intended for use in equipment supplied from mains with r.m.s. voltages up to 280 V and is capable of delivering output currents up to 1.5 A.

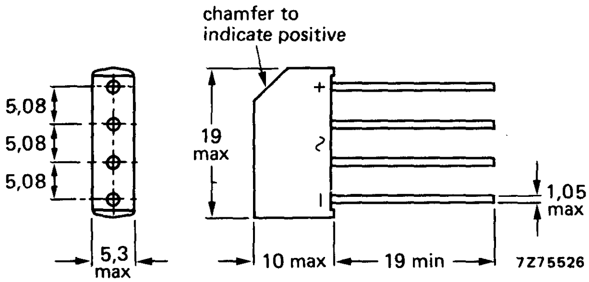
QUICK REFERENCE DATA

Input				
R.M.S. voltage	$V_{I(RMS)}$	max.	280	V
Repetitive peak voltage	V_{IRM}	max.	600	V
Non-repetitive peak current	I_{ISM}	max.	50	A
Output				
Average current	$I_{OA(V)}$	max.	1.5	A

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD–28



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

RATINGS

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

Input

Non-repetitive peak voltage ($t \leq 10$ ms)	V_{ISM}	max.	600	V
Repetitive peak voltage	V_{IRM}	max.	600	V
Crest working voltage	V_{IWM}	max.	400	V
R.M.S. voltage (sine-wave)	$V_{I(RMS)}$	max.	280	V
Non-repetitive peak current;* half sine-wave; t = 20 ms; with reapplied V_{IWMmax} T_j = 150 °C prior to surge	I_{ISM}	max.	50	A

Output

Average current (averaged over any 20 ms period; see Fig.3) free-air operation at T_{amb} = 45 °C; (mounting method a)	$I_{O(AV)}$	max.	1.5	A
Repetitive peak current	I_{ORM}	max.	10	A

Temperatures

Storage temperature	T_{stg}	−55 to +150		°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

Influence of mounting method

1. Free-air operation

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

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	$R_{th\ j\text{-}a}$	=	38	°C/W
b. Mounted on a printed-circuit board with minimal copper laminate; 1.5 mm lead length	$R_{th\ j\text{-}a}$	=	52	°C/W
c. Mounted on a printed-circuit board with minimal copper laminate; maximum lead length	$R_{th\ j\text{-}a}$	=	44	°C/W

MOUNTING INSTRUCTIONS

1. The maximum permissible temperature of the soldering iron or bath is 270 °C; it must not be in contact with the joint for more than 3 seconds.
2. 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.
3. Exert no axial pull when bending.

CHARACTERISTICS

Forward voltage (2 diodes in series)

$I_F = 2$ A; $T_j = 25$ °C	V_F	<	2.1	V*

*Measured under pulse conditions to avoid excessive dissipation.

OPERATING NOTES

The various components of junction temperature rise above ambient are illustrated below.

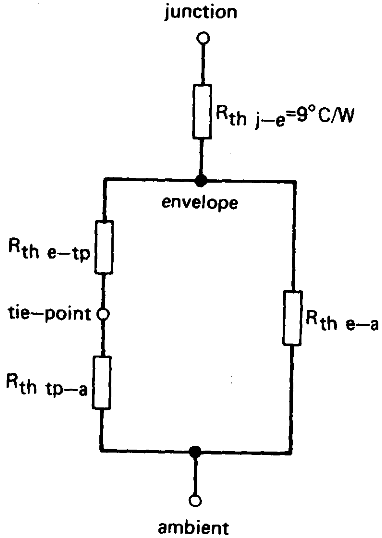


Fig.2

The thermal resistance between envelope and tie-point and between envelope and ambient depend on lead length:

lead length	1.5	5	10	15	max.	mm
$R_{th\ e\text{-}tp}$	1.2	4	8	12	15.2	°C/W
$R_{th\ e\text{-}a}$	110	87	73	65	60	°C/W

The thermal resistance between tie-point and ambient depends on the mounting method. For mounting on a 1.5 mm thick epoxy-glass printed-circuit board with a copper-thickness $\geqslant$ 40 μm, the following values apply:

1. Mounting with minimal copper laminate: $R_{th\ tp\text{-}a} = 70\ ^{o}C/W$
2. Mounted on a printed-circuit board with a copper laminate to the + and – lead of:

1 cm^2 : $R_{th\ tp\text{-}a} = 55\ ^{o}C/W$
2.25 cm^2 : $R_{th\ tp\text{-}a} = 45\ ^{o}C/W$
4 cm^2 : $R_{th\ tp\text{-}a} = 40\ ^{o}C/W$

Note: Any temperature can be calculated by using the dissipation graphs and the above thermal model.

FREE-AIR OPERATION

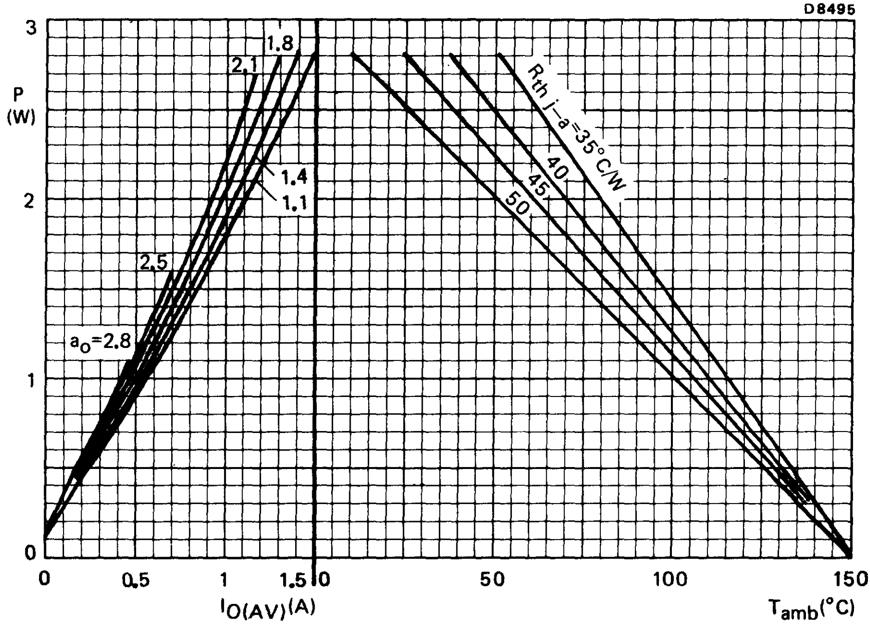


Fig.3 The right-hand part shows the interrelationship between the power (derived from the left-hand graph) and the maximum permissible ambient temperature.

Output form factor $a_o = I_{O(RMS)}/I_{O(AV)} = 0.707 \times I_{F(RMS)}/I_{F(AV)}$ per diode.

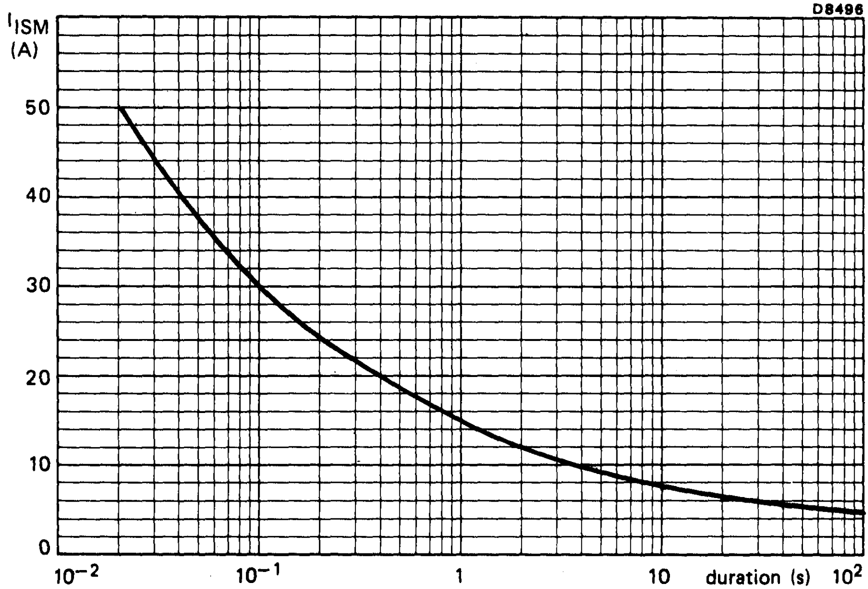


Fig.4 Maximum permissible non-repetitive peak input current based on sinusoidal currents (f = 50 Hz); T_j = 150 °C prior to surge; with reapplied V_{IWMmax};

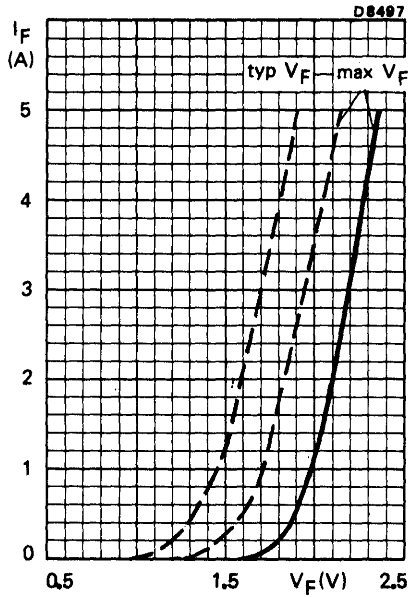
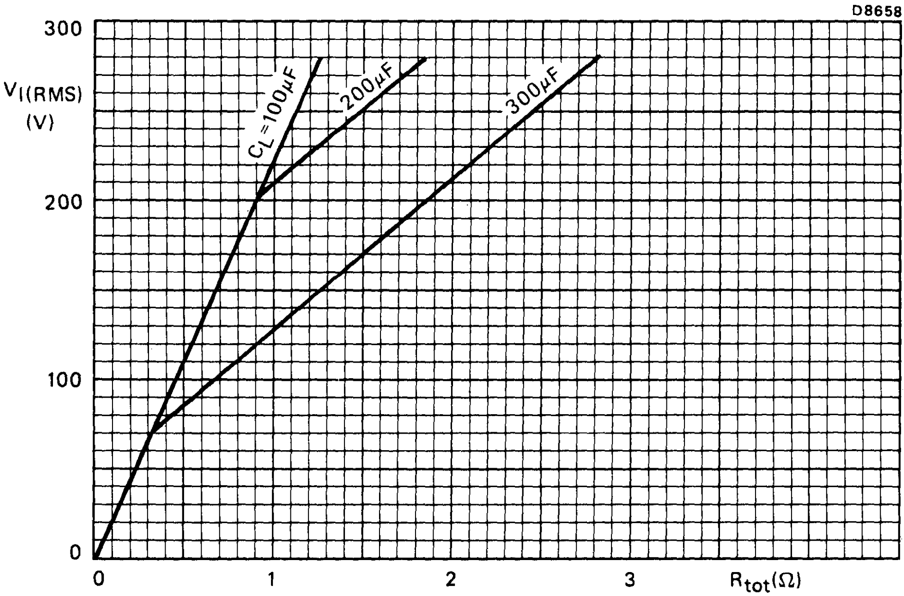
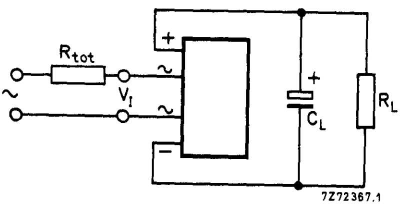


Fig.5 ——— T_j = 25 °C; – – – T_j = 150 °C; 2 diodes in series





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

input 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.