SILICON RECTIFIER DIODES

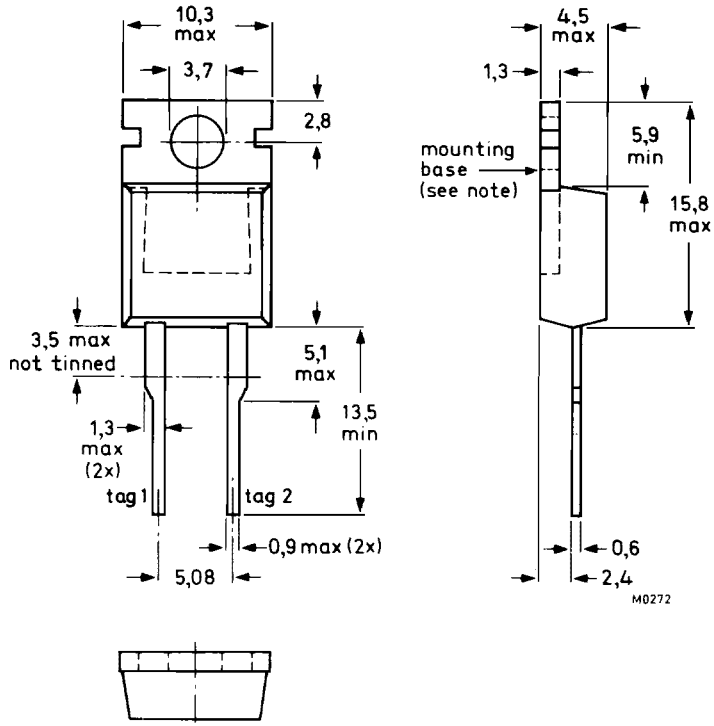
Glass-passivated double-diffused rectifier diodes in TO-220 plastic envelopes, intended for power rectifier applications.
The series consists of the following types:
Normal polarity (cathode to base plate): BY249–300 and BY249–600.
Reverse polarity (anode to base plate): BY249–300R and BY249–600R.

QUICK REFERENCE DATA

			BY249–300(R)	600(R)	
Repetitive peak reverse voltage	V_{RRM}	max.	300	600	V
Average forward current	$I_{F(AV)}$	max.	6.5		A
Non-repetitive peak forward current	I_{FSM}	max.	60		A

MECHANICAL DATA (see next page for polarity of connections) Dimensions in mm

Fig. 1 TO-220AC



Note: The exposed metal mounting base is directly connected to tag 1.

Accessories supplied on request: see data sheets Mounting instructions and accessories for TO-220 envelopes.

MECHANICAL DATA (continued)

Polarity of connections:

	BY249–300 BY249–600	BY249–300R BY249–600R
base plate	cathode	anode
tag 1	cathode	anode
tag 2	anode	cathode

RATINGS

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

Voltages*			BY249–300(R)	600(R)	
Non-repetitive peak reverse voltage	V_{RSM}	max.	300	600	V
Repetitive peak reverse voltage	V_{RRM}	max.	300	600	V
Crest working reverse voltage	V_{RWM}	max.	200	400	V
Continuous reverse voltage	V_R	max.	200	400	V
Currents					
Average forward current;					
sinusoidal; up to T_{mb} = 110 °C	$I_{F(AV)}$	max.		6.5	A
sinusoidal; at T_{mb} = 125 °C	$I_{F(AV)}$	max.		4.0	A
R.M.S. forward current	$I_{F(RMS)}$	max.		9.5	A
Repetitive peak forward current;					
t = 10 ms; half sine-wave	I_{FRM}	max.		60	A
Non-repetitive peak forward current;					
t = 10 ms; half sine-wave;					
T_j = 150 °C prior to surge;					
with re-applied V_{RWMmax}	I_{FSM}	max.		60	A
I^2t for fusing; t = 10 ms	I^2t	max.		18	A^2s
Temperatures					
Storage temperature	T_{stg}		−40 to +150		°C
Junction temperature	T_j	max.		150	°C

CHARACTERISTICS

Forward voltage				
I_F = 20 A; T_j = 25 °C	V_F	<	1.6	V**
I_F = 5 A; T_j = 100 °C	V_F	<	1.05	V**
Reverse current				
$V_R = V_{RWMmax}$; T_j = 125 °C	I_R	<	0.4	mA

*To ensure thermal stability, $R_{th\ j\text{-}a} < 15$ °C/W for continuous reverse voltage.

**Measured under pulse conditions to avoid excessive dissipation.

THERMAL RESISTANCE

From junction to mounting base $R_{th\ j\text{-}mb} = 4.2\ ^{o}C/W$

Transient thermal impedance; t = 1 ms $Z_{th\ j\text{-}mb} = 0.46\ ^{o}C/W$

Influence of mounting method

1. Heatsink mounted with clip (see mounting instructions)

Thermal resistance from mounting base to heatsink

a. with heatsink compound $R_{th\ mb\text{-}h} = 0.3\ ^{o}C/W$

b. with heatsink compound and 0.06 mm maximum mica insulator $R_{th\ mb\text{-}h} = 1.4\ ^{o}C/W$

c. with heatsink compound and 0.1 mm maximum mica insulator (56369) $R_{th\ mb\text{-}h} = 2.2\ ^{o}C/W$

d. with heatsink compound and 0.25 mm maximum alumina insulator (56367) $R_{th\ mb\text{-}h} = 0.8\ ^{o}C/W$

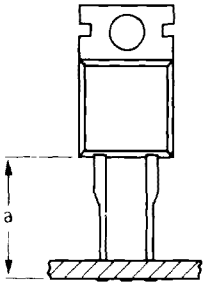
e. without heatsink compound $R_{th\ mb\text{-}h} = 1.4\ ^{o}C/W$

2. Free-air operation

The quoted value 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: mounted on a printed-circuit board at a = any lead length.

$R_{th\ j\text{-}a} = 60\ ^{o}C/W$

Fig. 2



MOUNTING INSTRUCTIONS

1. The device may be soldered directly into the circuit, but the maximum permissible temperature of the soldering iron or bath is 275 °C; it must not be in contact with the joint for more than 5 seconds. Soldered joints must be at least 4.7 mm from the seal.
2. The leads should not be bent less than 2.4 mm from the seal, and should be supported during bending. The bend radius must be no less than 1.0 mm.
3. It is recommended that the circuit connection be made to tag 1, rather than direct to the heatsink.
4. Mounting by means of a spring clip is the best mounting method because it offers:
   a. a good thermal contact under the crystal area and slightly lower $R_{th\ mb\text{-}h}$ values than screw mounting.
   b. safe isolation for mains operation.

   However, if a screw is used, it should be M3 cross-recess pan-head. Care should be taken to avoid damage to the plastic body.
5. For good thermal contact heatsink compound should be used between mounting base and heatsink. Values of $R_{th\ mb\text{-}h}$ given for mounting with heatsink compound refer to the use of a metallic-oxide loaded compound. Ordinary silicone grease is not recommended.
6. Rivet mounting (only possible for non-insulated mounting)
   Devices may be rivetted to flat heatsinks; such a process **must neither** deform the mounting tab, **nor** enlarge the mounting hole.

SINUSOIDAL OPERATION

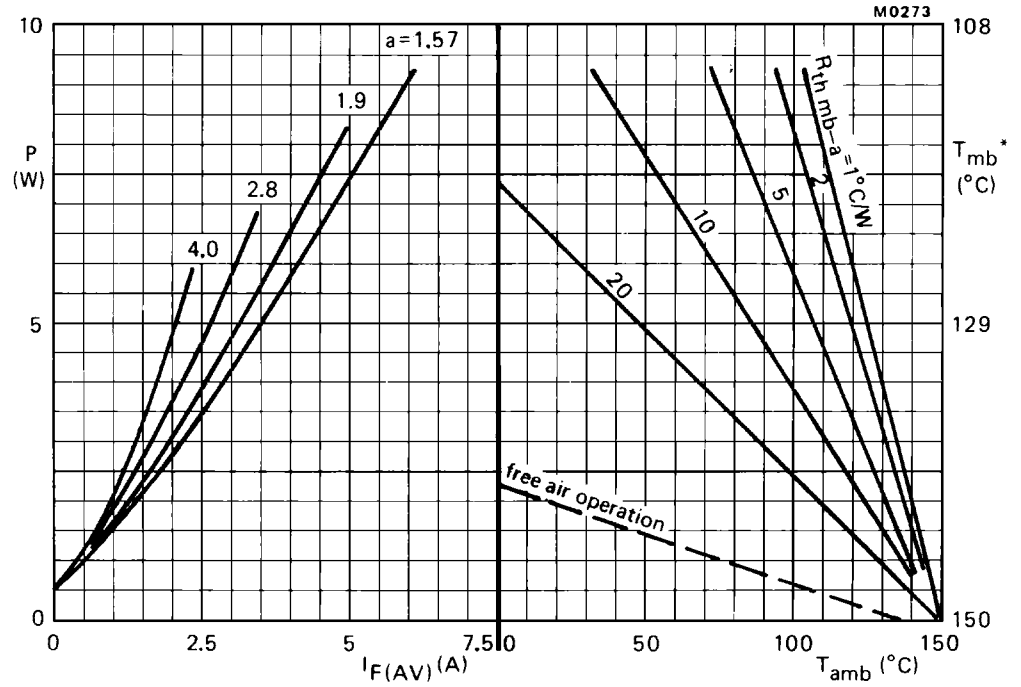


Fig. 3 The right-hand part shows the interrelationship between the power (derived from the left-hand part) and the maximum permissible temperatures.
a = form factor = $I_{F(RMS)}/I_{F(AV)}$.

*T_{mb} scale is for comparison purposes and is correct only for $R_{th\ mb-a} < 19.3$ °C/W.

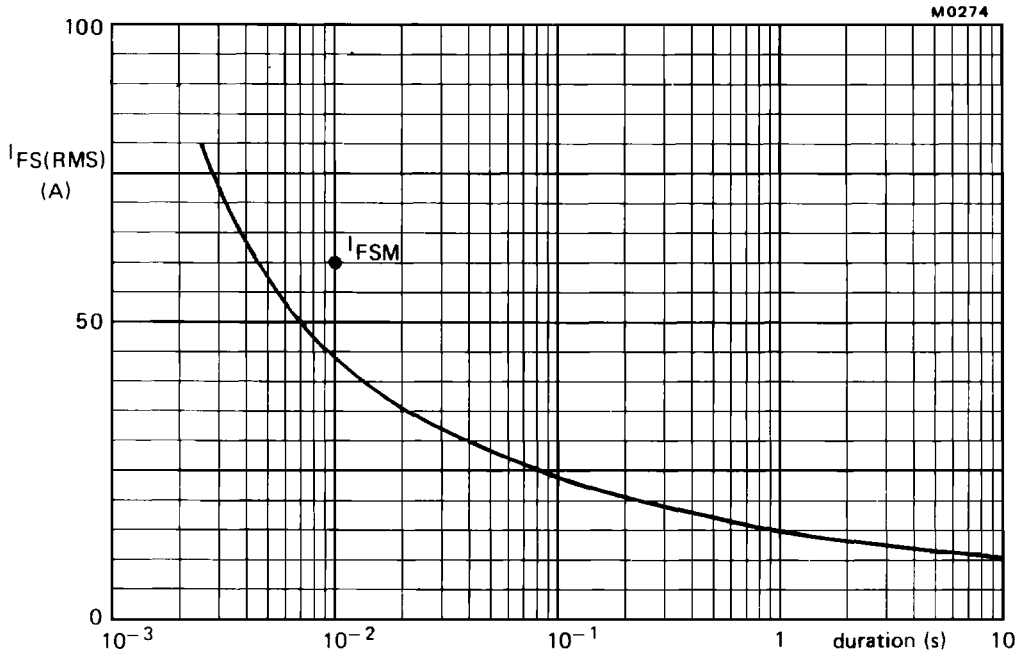
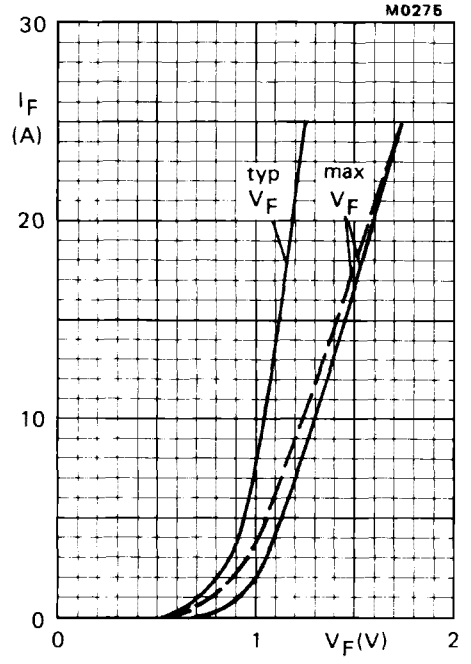


Fig. 4 Maximum permissible non-repetitive r.m.s. forward current based on sinusoidal currents (f = 50 Hz); T_j = 150 °C prior to surge.



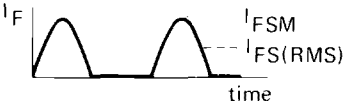


Fig. 5 ——T_j = 25 °C; – – – T_j = 100 °C

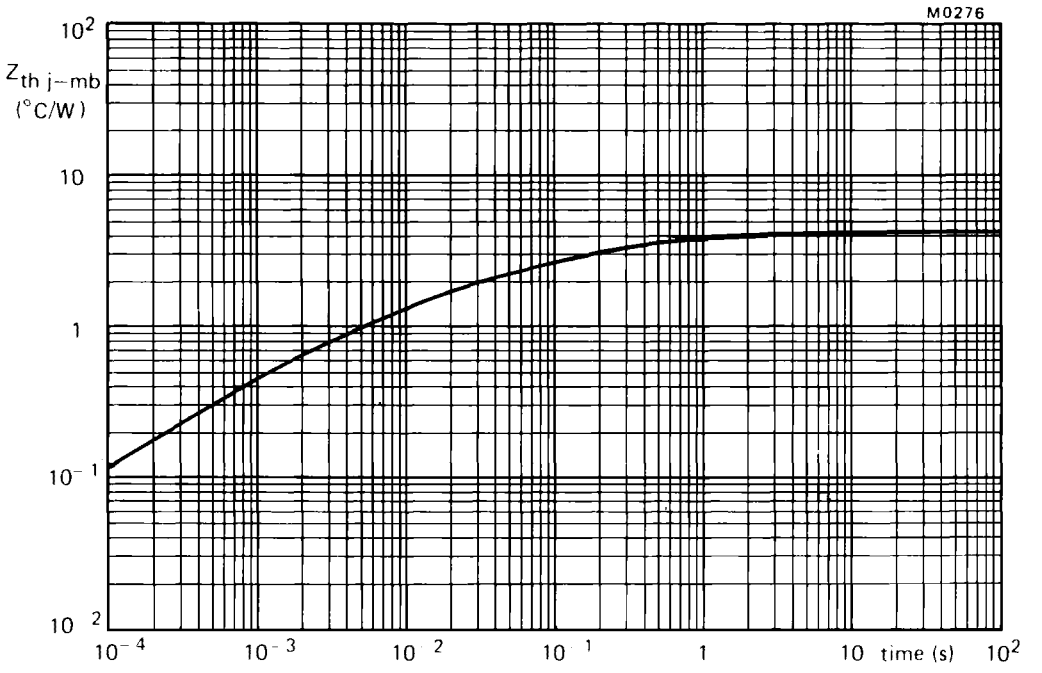


Fig. 6