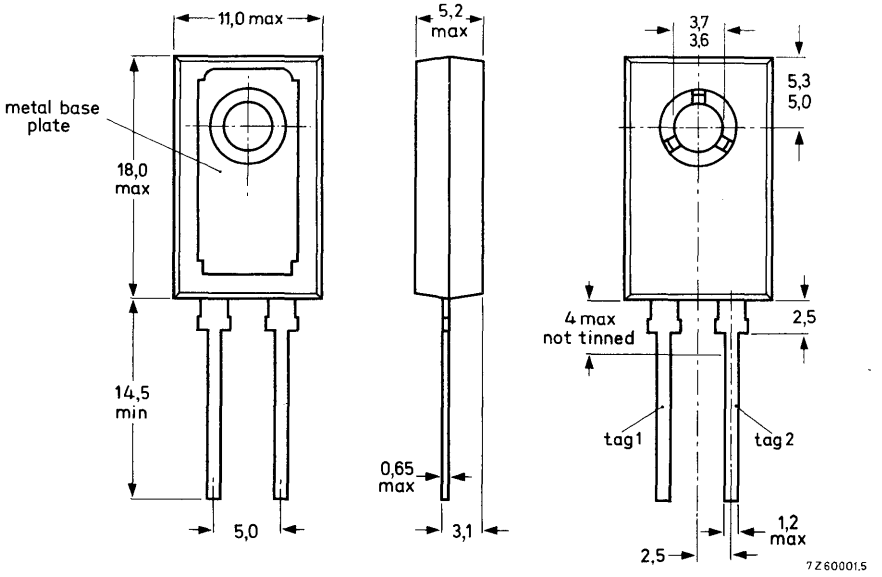
SILICON RECTIFIER DIODES

Plastic-encapsulated rectifier diodes intended for power rectifier applications. Normal and reverse polarity types are available.

QUICK REFERENCE DATA					
		BYX49-	300(R)	600(R)	1200(R)	
Repetitive peak reverse voltage	V_{RRM}	max.	300	600	1200	V
Average forward current	$I_{F(AV)}$	max.		6		A
Non-repetitive peak forward current	I_{FSM}	max.		40		A

MECHANICAL DATA (see also page 2) Dimensions in mm

SOD-38



The exposed metal base-plate is directly connected to tag 1.

Products approved to CECC 50 009-011, available on request

MECHANICAL DATA (continued)

Net mass: 2,5 g

Recommended diameter of fixing screw: 3,5 mm

Torque on screw
when using washer and heatsink compound: min. 0,95 Nm (9,5 kg cm)
max. 1,5 Nm (15 kg cm)

Accessories:
supplied with device: washer
available on request: 56316 (mica insulating washer)

POLARITY OF CONNECTIONS

	BYX49-300 to BYX49-1200	BYX49-300R to BYX49-1200R
Base-plate:	cathode	anode
Tag 1 :	cathode	anode
Tag 2 :	anode	cathode

All information applies to frequencies up to 400 Hz.

RATINGS Limiting values in accordance with the Absolute Maximum System (IEC134)

Voltages			BYX49- 300(R)	600(R)	1200(R)	
Continuous reverse voltage	V_R	max.	200	400	800	V
Crest working reverse voltage	V_{RWM}	max.	200	400	800	V
Repetitive peak reverse voltage (δ = 0,01)	V_{RRM}	max.	300	600	1200	V
Non-repetitive peak reverse voltage (t ≤ 10 ms)	V_{RSM}	max.	300	600	1200	V

Currents				
Average forward current (averaged over any 20 ms period) up to T_{mb} = 85 °C	$I_{F(AV)}$	max.	6,0	A
at T_{mb} = 120 °C	$I_{F(AV)}$	max.	3,0	A
without heatsink; at T_{amb} = 50 °C	$I_{F(AV)}$	max.	1,1	A
Forward current (d.c.)	I_F	max.	9,5	A
R.M.S. forward current	$I_{F(RMS)}$	max.	9,5	A
Repetitive peak forward current	I_{FRM}	max.	20	A
Non-repetitive peak forward current (t = 10 ms; half sine wave) T_j = 150 °C prior to surge	I_{FSM}	max.	40	A
I^2t for fusing (t = 10 ms)	I^2t	max.	8,0	A^2s

Temperatures				
Storage temperature	T_{stg}		−55 to +125	°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j\text{-}mb}$	=	4,5	°C/W
Transient thermal impedance; t = 1 ms	$Z_{th\ j\text{-}mb}$	=	0,3	°C/W

Influence of mounting method

1. Heatsink mounted

From mounting base to heatsink

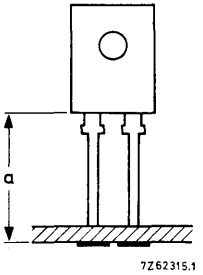
a. with heatsink compound	$R_{th\ mb\text{-}h}$	=	1,5	°C/W
b. with heatsink compound and 56316 mica washer	$R_{th\ mb\text{-}h}$	=	2,7	°C/W
c. without heatsink compound	$R_{th\ mb\text{-}h}$	=	2,7	°C/W
d. without heatsink compound; with 56316 mica washer	$R_{th\ mb\text{-}h}$	=	5	°C/W

2. Free air operation

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

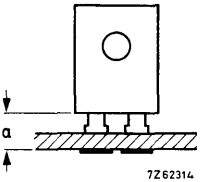
From junction to ambient in free air mounted on a printed circuit board at a = maximum lead length and with a copper laminate

a. > 1 cm^2 $R_{th\ j\text{-}a}$ = 50 °C/W
b. < 1 cm^2 $R_{th\ j\text{-}a}$ = 55 °C/W



at a lead-length a = 3 mm and with a copper laminate

c. > 1 cm^2 $R_{th\ j\text{-}a}$ = 55 °C/W
d. < 1 cm^2 $R_{th\ j\text{-}a}$ = 60 °C/W



CHARACTERISTICS

Forward voltage

I_F = 20 A; T_j = 25 °C	V_F	<	2,3	V [1]

Reverse current

$V_R = V_{RWMmax}$; T_j = 125 °C	I_R	<	200	μA

SOLDERING AND MOUNTING NOTES

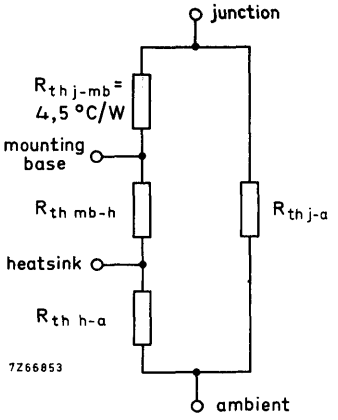
1. Soldered joints must be at least 2,5 mm from the seal.
2. The maximum permissible temperature of the soldering iron or bath is 270 °C; contact with the joint must not exceed 3 seconds.
3. The devices should not be immersed in oil, and few potting resins are suitable for re-encapsulation. Advice on these materials is available on request.
4. Leads should not be bent less than 2,5 mm from the seal; exert no axial pull when bending.
5. For good thermal contact heatsink compound should be used between base-plate and heatsink.

[1]) Measured under pulse conditions to avoid excessive dissipation.

OPERATING NOTES

Dissipation and heatsink considerations:

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

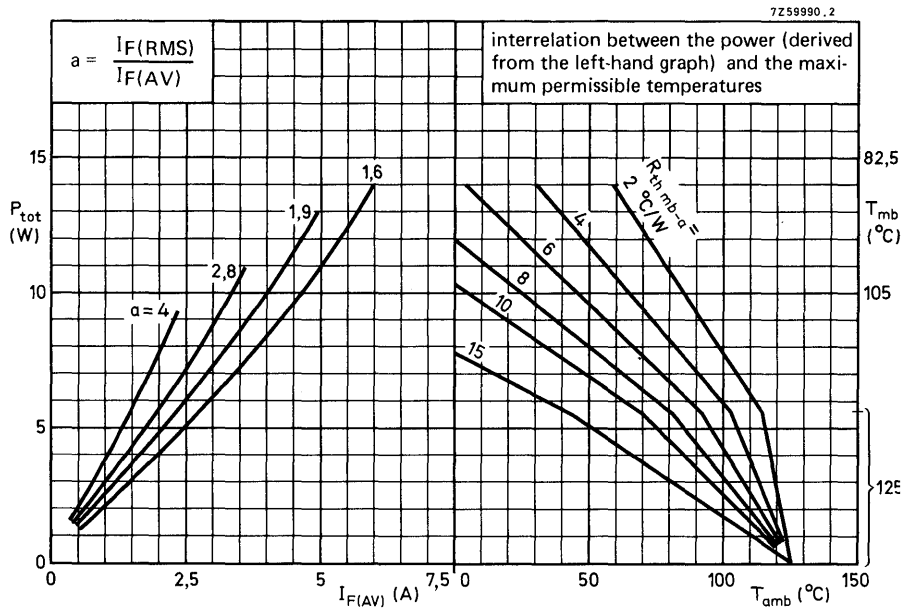


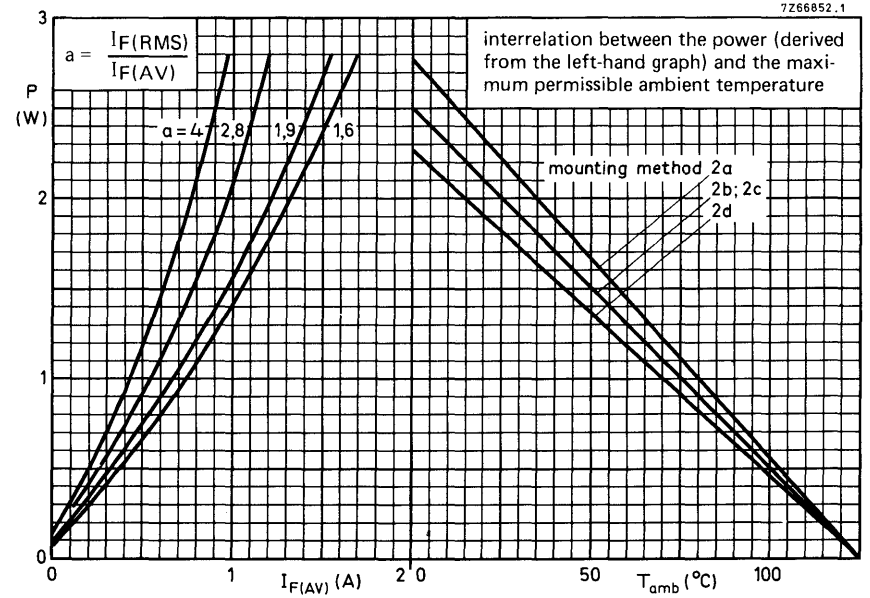
b. The method of using the graph on page 7 is as follows:
Starting with the curve of maximum dissipation as a function of $I_{F(AV)}$, for a particular current value trace upwards to meet the appropriate form factor curve. Trace horizontally until the $R_{th\ mb\text{-}a}$ curve is reached.
Finally trace upwards from the T_{amb} scale. The intersection determines the $R_{th\ mb\text{-}a}$ required.
The heatsink thermal resistance value ($R_{th\ h\text{-}a}$) can now be calculated from:

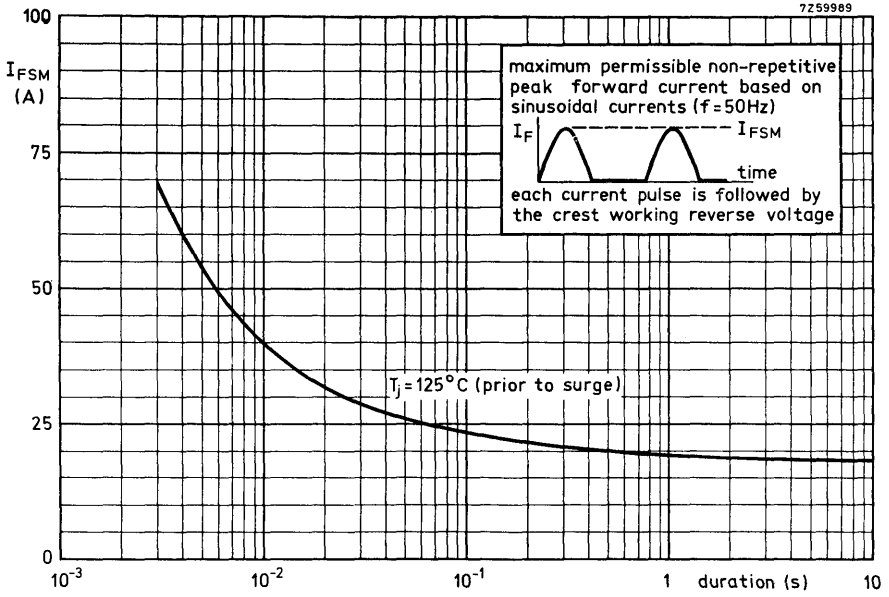
$$R_{th\ h\text{-}a} = R_{th\ mb\text{-}a} - R_{th\ mb\text{-}h}$$

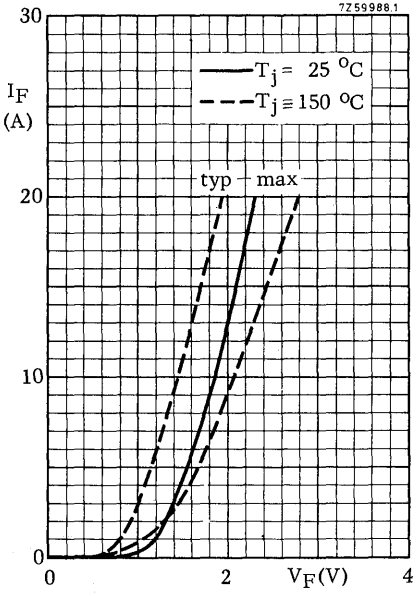
Any measurement of heatsink temperature should be made immediately adjacent to the device.

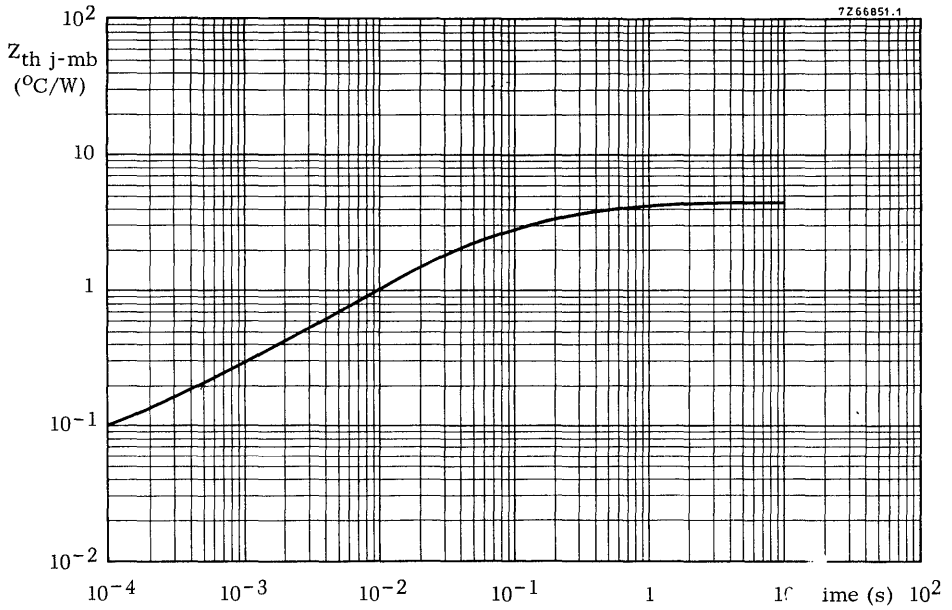
c. The heatsink curves are optimised to allow the junction temperature to run up to 150 °C ($T_{j\,max}$) whilst limiting T_{mb} to 125 °C (or less).


7Z59990.2
a = IF(RMS) / IF(AV)
interrelation between the power (derived from the left-hand graph) and the maximum permissible temperatures
Ptot (W)
IF(AV) (A)
a = 4
2,8
1,9
1,6
Rth mb-a = 2 °C/W
4
6
8
10
15
Tmb (°C)
Tamb (°C)
82,5
105
125


7Z66852.1
a = IF(RMS) / IF(AV)
interrelation between the power (derived from the left-hand graph) and the maximum permissible ambient temperature
P (W)
IF(AV) (A)
a = 4
2,8
1,9
1,6
mounting method 2a
2b; 2c
2d
Tamb (°C)


7Z59989
100
I_{FSM} (A)
75
50
25
0
10^{-3}
10^{-2}
10^{-1}
1
duration (s)
10
maximum permissible non-repetitive peak forward current based on sinusoidal currents (f=50Hz)
I_F
I_{FSM}
time
each current pulse is followed by the crest working reverse voltage
T_j=125°C (prior to surge)


7Z59988.1
30
I_F (A)
20
10
0
T_j= 25 °C
T_j= 150 °C
typ
max
0
2
V_F(V)
4


7Z66851.1
10^2
$Z_{th\ j\text{-}mb}$
(°C/W)
10
1
10^{-1}
10^{-2}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
1
ime (s)
10^2