CONTROLLED AVALANCHE RECTIFIER DIODES

Also available to BS9333—F005

Silicon diodes in a DO—4 metal envelope, capable of absorbing transients and intended for use in power rectifier application.
The series consists of the following types:
Normal polarity (cathode to stud): BYX39—600 to BYX39—1400.
Reverse polarity (anode to stud): BYX39—600R to BYX39—1400R.

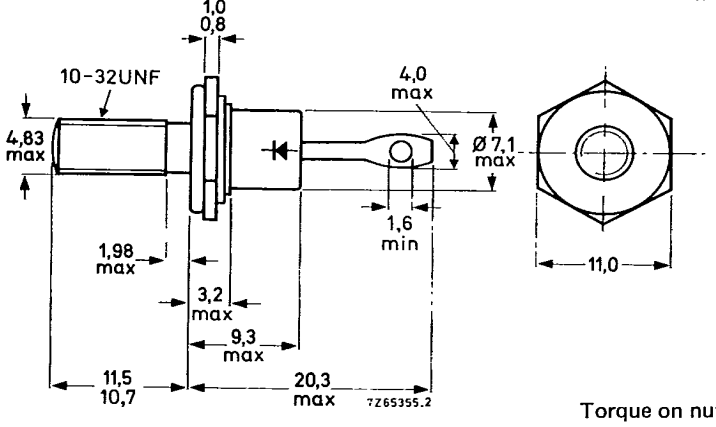
QUICK REFERENCE DATA

			BYX39—600(R)	800(R)	1000(R)	1200(R)	1400(R)	
Crest working reverse voltage	V_{RWM}	max.	600	800	1000	1200	1400	V
Reverse avalanche breakdown voltage	$V_{(BR)R}$	>	750	1000	1250	1450	1650	V
Average forward current	$I_{F(AV)}$		max.	9.5				A
Non-repetitive peak forward current	I_{FSM}		max.	125				A
Non-repetitive peak reverse power dissipation	P_{RSM}		max.	4				kW

MECHANICAL DATA

Dimensions in mm

Fig. 1 DO—4



Net mass: 6 g
Diameter of clearance hole: max. 5.2 mm
Accessories supplied on request:
see ACCESSORIES section

Supplied with device: 1 nut, 1 lock-washer.

Nut dimensions across the flats: 9.5 mm.

The mark shown applies to normal polarity types.

Torque on nut:
min. 0.9 Nm (9 kg cm),
max. 1.7 Nm (17 kg cm).

RATINGS

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

Voltages*			BYX39–600(R)	800(R)	1000(R)	1200(R)	1400(R)	
Continuous reverse voltage	V_R	max.	600	800	1000	1200	1400	V
Crest working reverse voltage	V_{RWM}	max.	600	800	1000	1200	1400	V

Currents				
Average forward current (averaged over any 20 ms period) up to T_{mb} = 85 °C	$I_{F(AV)}$	max.	9.5	A
at T_{mb} = 125 °C	$I_{F(AV)}$	max.	6.0	A
R.M.S. forward current	$I_{F(RMS)}$	max.	15	A
Repetitive peak forward current	I_{FRM}	max.	100	A
Non-repetitive peak forward current t = 10 ms (half sine-wave); T_j = 175 °C prior to surge; with reapplied V_{RWMmax}	I_{FSM}	max.	125	A
I^2t for fusing (t = 10 ms)	I^2t	max.	78	A^2s
Reverse power dissipation				
Average reverse power dissipation (averaged over any 20 ms period); T_j = 125 °C	$P_{R(AV)}$	max.	10	W
Repetitive peak reverse power dissipation t = 10 μs (square-wave; f = 50 Hz); T_j = 125 °C	P_{RRM}	max.	2	kW
Non-repetitive peak reverse power dissipation t = 10 μs (square-wave)				
T_j = 25 °C prior to surge	P_{RSM}	max.	4	kW
T_j = 175 °C prior to surge	P_{RSM}	max.	0.8	kW
Temperatures				
Storage temperature	T_{stg}		−55 to +175	°C
Junction temperature	T_j	max.	175	°C

*To ensure thermal stability: $R_{th\ j\text{-}a} \leq 5$ °C/W (continuouse reverse voltage) or ≤ 20 °C/W (a.c.)

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	50	°C/W
From junction to mounting base	$R_{th\ j\text{-}mb}$	=	4.5	°C/W
From mounting base to heatsink				
without heatsink compound	$R_{th\ mb\text{-}h}$	=	1.0	°C/W
with heatsink compound	$R_{th\ mb\text{-}h}$	=	0.5	°C/W
with mica washer	$R_{th\ mb\text{-}h}$	=	2.0	°C/W
Transient thermal impedance; t = 1 ms	$Z_{th\ j\text{-}mb}$	=	0.35	°C/W

CHARACTERISTICS

			BYX39–600(R)	800(R)	1000(R)	1200(R)	1400(R)	
Forward voltage								
I_F = 20 A; T_j = 25 °C	V_F	<	1.7	1.7	1.7	1.7	1.7	V*
Reverse avalanche breakdown voltage		>	750	1000	1250	1450	1650	V
I_R = 5 mA; T_j = 25 °C	$V_{(BR)R}$	<	2400	2400	2400	2400	2400	V
Reverse current								
$V_R = V_{RWMmax}$; T_j = 125 °C	I_R	<	200	200	200	200	200	μA

OPERATING NOTES

The top connector should neither be bent nor twisted; it should be soldered into the circuit so that there is no strain on it.

During soldering the heat conduction to the junction should be kept to a minimum.

*Measured under pulse conditions to avoid excessive dissipation.

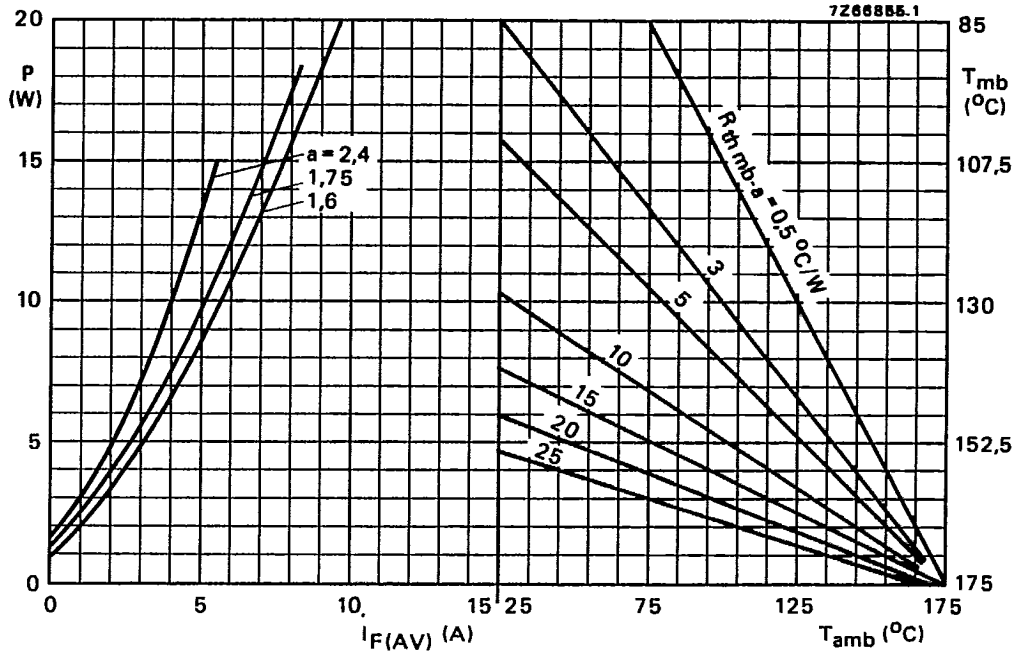


Fig.2

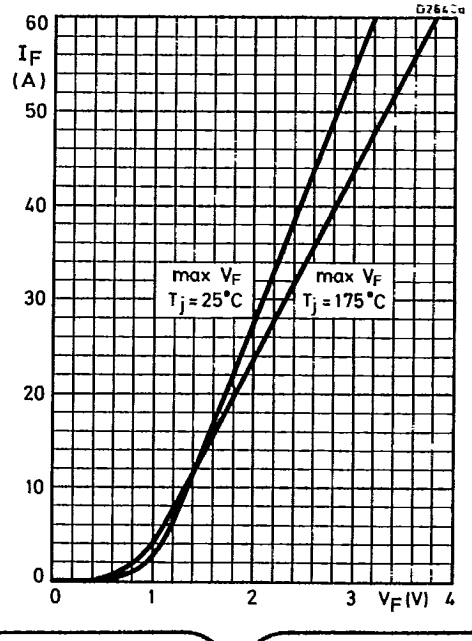


Fig.3

The right-hand part shows the inter-relationship between the power (derived from the left-hand part) and the maximum permissible temperatures.
P = dissipation excluding power in the avalanche region.
single phase: a = 1.6
3-phase : a = 1.75
6-phase : a = 2.4

$a = I_{F(RMS)}/I_{F(AV)}$

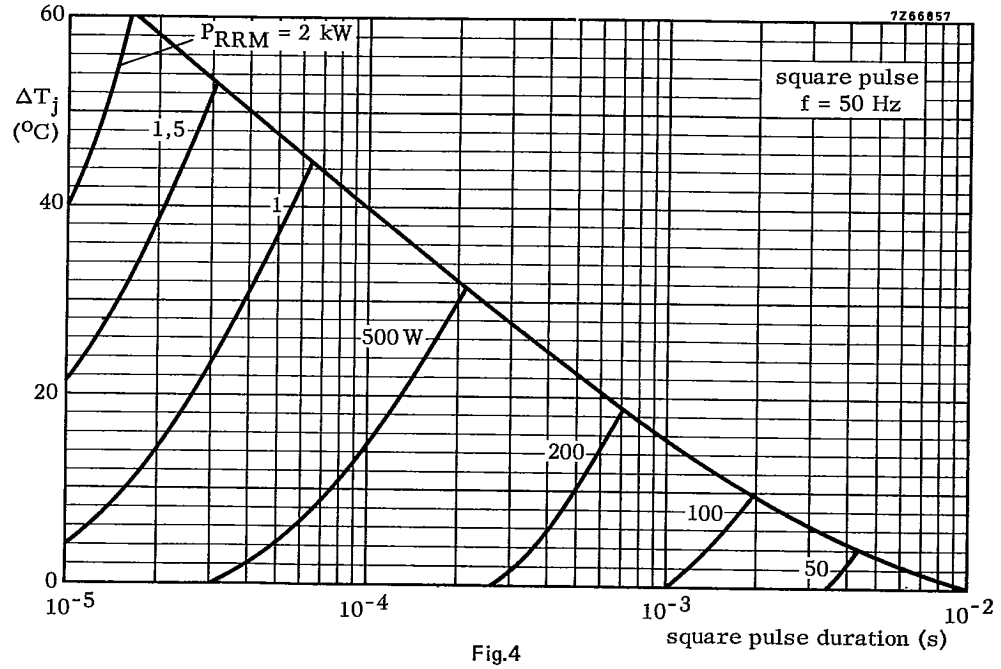


Fig.4

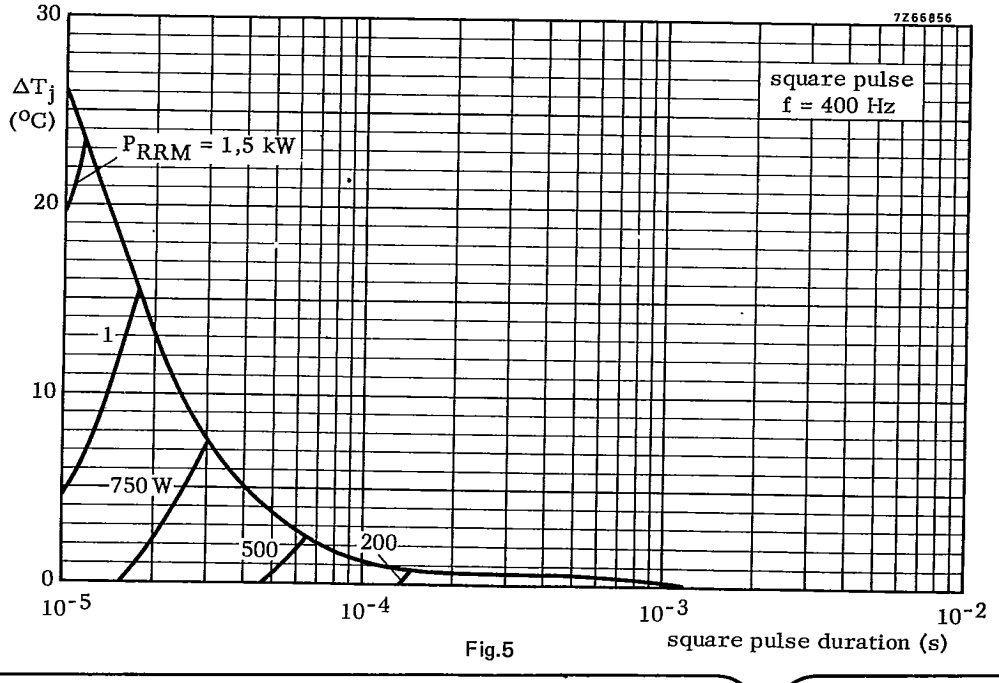


Fig.5

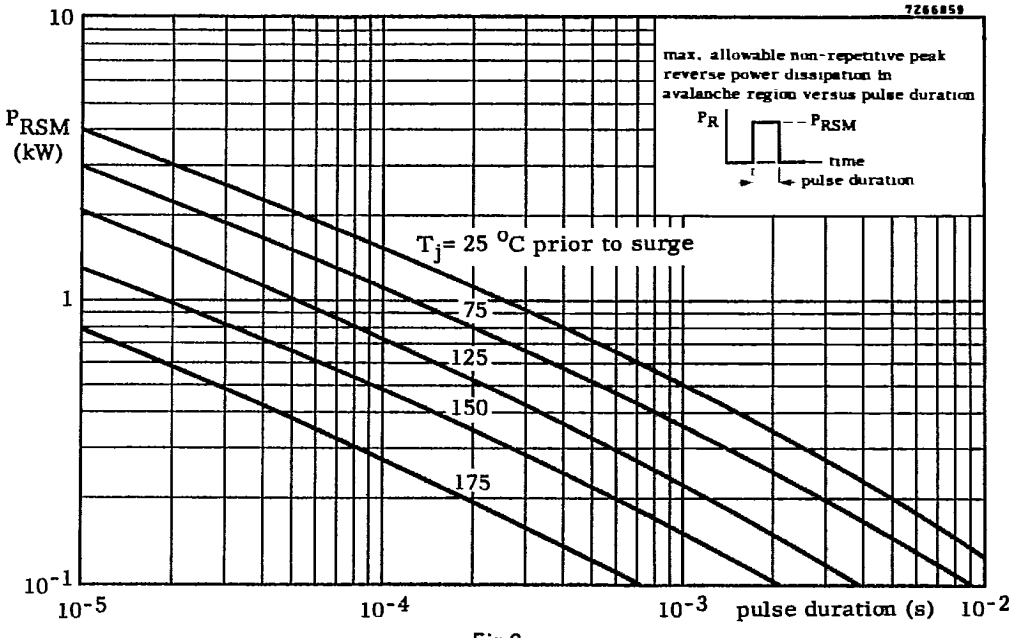


Fig.6

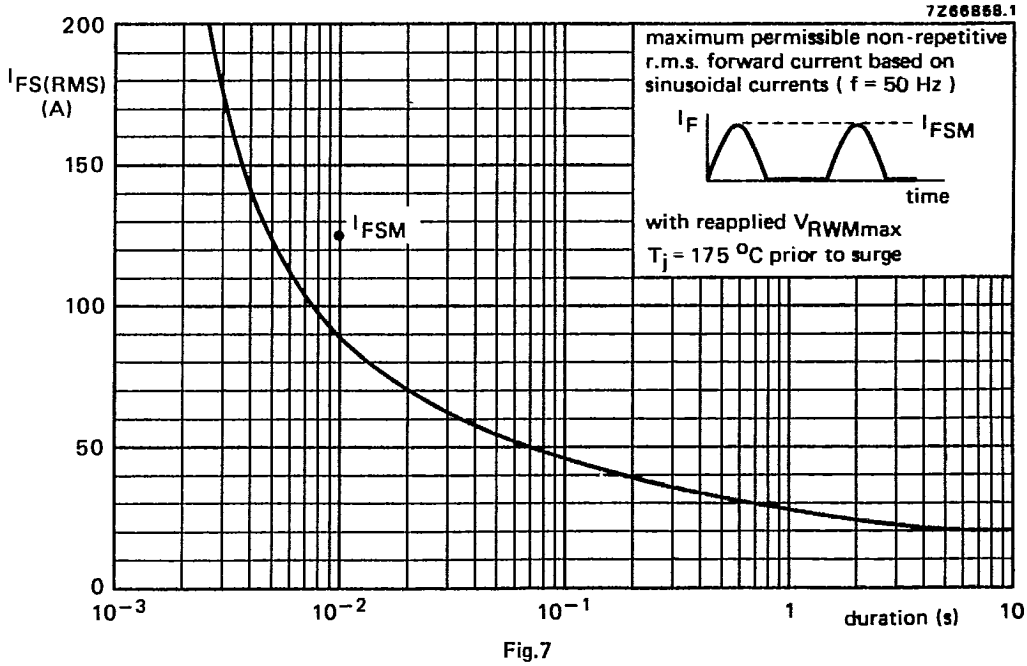


Fig.7