CONTROLLED AVALANCHE RECTIFIER DIODES

Glass passivated rectifier diode in hermetically sealed axial-leaded ID* envelope capable of absorbing reverse transients, intended for rectifier applications in colour television circuits as well as general purpose applications in telephony equipment.

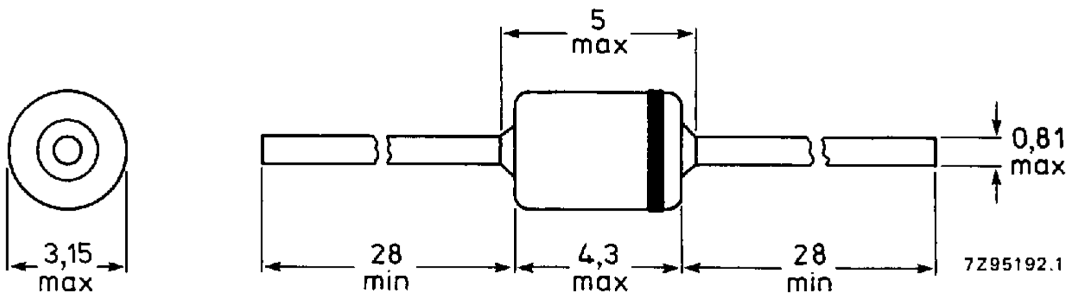
QUICK REFERENCE DATA

Crest working voltage	V_{RWM}	max.	800	V
Repetitive peak reverse voltage	V_{RRM}	max.	1250	V
Average forward current	$I_{F(AV)}$	max.	2	A
Non-repetitive peak forward current	I_{FSM}	max.	50	A
Non-repetitive peak reverse avalanche energy	E_{RSM}	max.	40	mJ
Junction temperature	T_j	max.	175	°C

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-84.



The marking band indicates the cathode.

RATINGS

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

Crest working voltage	V_{RWM}	max.	800 V
Repetitive peak reverse voltage ($\delta \leqslant 1\%$)	V_{RRM}	max.	1250 V
Continuous reverse voltage	V_R	max.	800 V
Average forward current (averaged over any 20 ms period)			
$T_{tp} = 45\ ^oC$; lead length 10 mm	$I_{F(AV)}$	max.	2 A
$T_{amb} = 60\ ^oC$; see Fig. 2	$I_{F(AV)}$	max.	1 A
Repetitive peak forward current $T_{tp} = 45\ ^oC$; f = 50 Hz; a = 4,5 (inclusive derating for $T_{j\,max}$ at V_{RRM} = 1250 V)	I_{FRM}	max.	20 A
Non-repetitive peak forward current t = 10 ms, half-sine wave (see Fig. 10)	I_{FSM}	max.	50 A
Non-repetitive peak reverse avalanche pulse energy; I_R = 0,8 A; $T_j = 25\ ^oC$ prior to surge; with inductive load switched off	E_{RSM}	max.	40 mJ
Storage temperature	T_{stg}	−65 to + 175 ^oC	
Junction temperature	T_j	max.	175 ^oC

THERMAL RESISTANCE

Influence of mounting method

1. Thermal resistance from junction to tie-point at a lead length of 10 mm	$R_{th\,j\text{-}tp}$	=	50 K/W
2. Thermal resistance from junction to ambient; device mounted on a 1,5 mm thick epoxy-glass printed-circuit board; Cu-thickness $\geqslant$ 40 μm; Fig. 2 (See "Thermal model")	$R_{th\,j\text{-}a}$	=	105 K/W

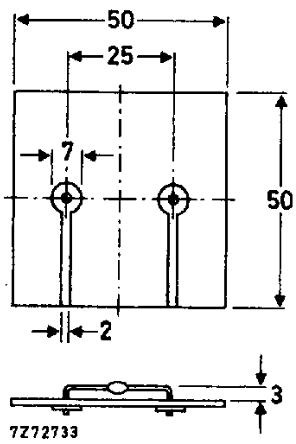


Fig. 2 Mounted on a printed-circuit board.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Forward voltage*			
I_F = 3 A	V_F	<	1,15 V
I_F = 3 A; $T_j = T_{j\,max}$	V_F	<	1,05 V
Reverse avalanche breakdown voltage			
I_R = 0,1 mA	$V_{(BR)R}$	>	1250 V
Reverse current			
$V_R = V_{RWM\,max}$**	I_R	<	1,0 µA
$V_R = V_{RWM\,max}$; T_j = 100 °C	I_R	<	10 µA
Reverse recovery when switched from I_F = 1 A to $V_R \geq$ 30 V with $-dI_F/dt$ = 5 A/µs			
recovery charge	Q_s	typ.	3 µC
recovery time	t_{rr}	typ.	2,5 µs
Diode cpacitance at f = 1 MHz			
V_R = 0	C_d	typ.	50 pF

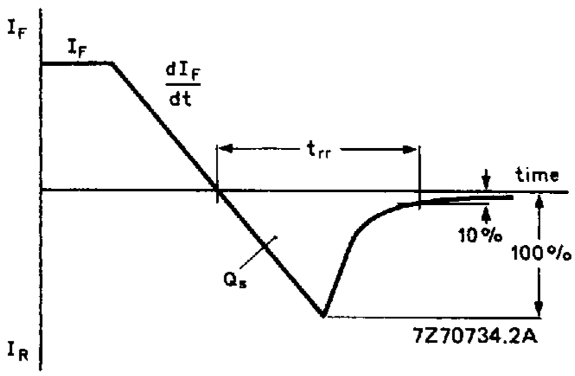


Fig. 3 Definitions of t_{rr}, Q_s and dI_F/dt.

* Measured under pulse conditions to avoid excessive dissipation.

** Illuminance ≤ 500 lux (daylight); relative humidity < 65%.

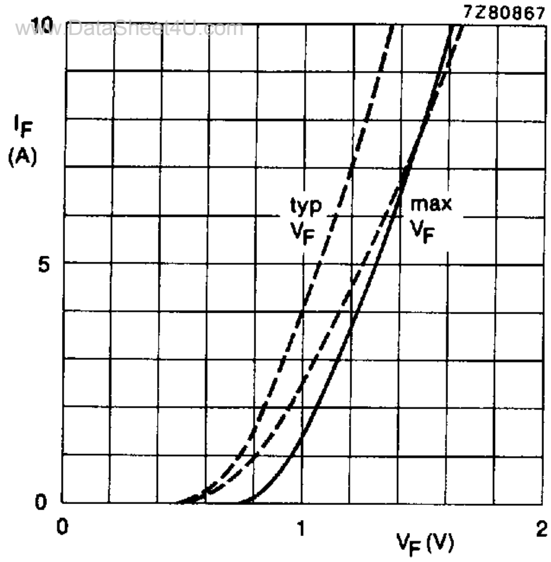


Fig. 4 Forward voltage;
——— $T_j = 25\ ^oC$;
– – – $T_j = 175\ ^oC$.

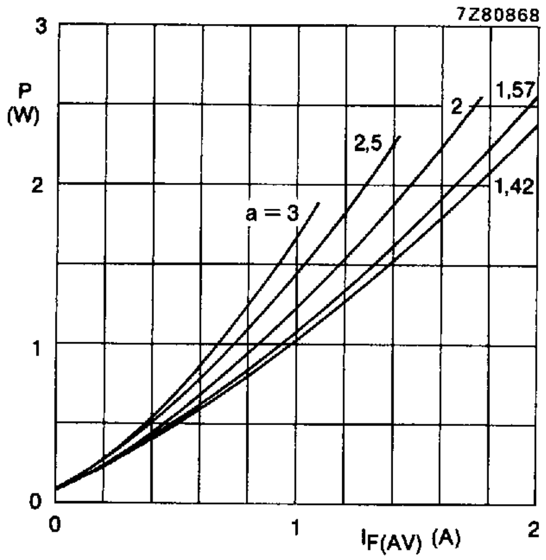


Fig. 5 Maximum values steady state power dissipation (forward plus leakage current) as a function of the average forward current.

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWM\,max}$.

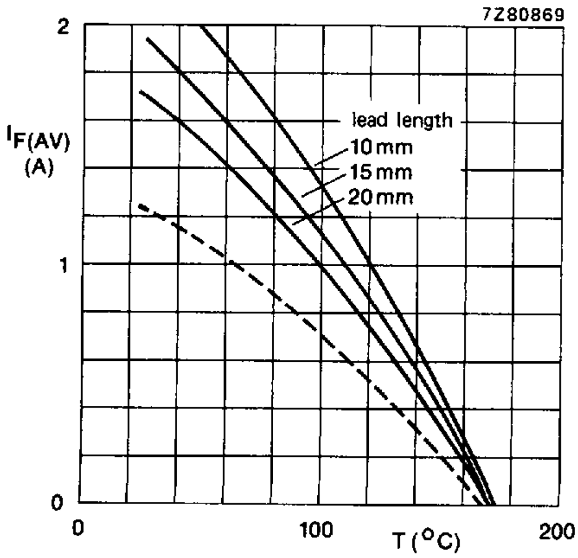


Fig. 6 Maximum average forward current as a function of temperature; the curves include losses due to reverse leakage.

$V_R = V_{RWM\,max}$, $\delta = 0,5$; a = 1,57.

– – – = ambient temperature and device mounted as shown in Fig. 2.

——— = tie-point temperature.

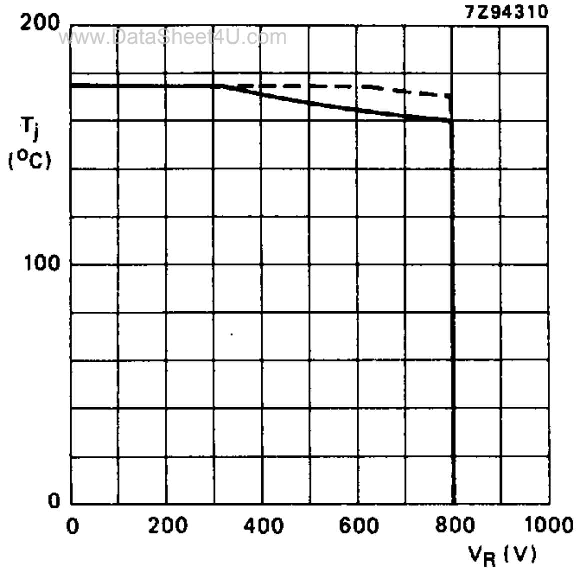


Fig. 7 Maximum permissible junction temperature as a function of reverse voltage; —— = V_R; – – – = V_{RWM}; δ = 0,5.
Device mounted as shown in Fig. 2.

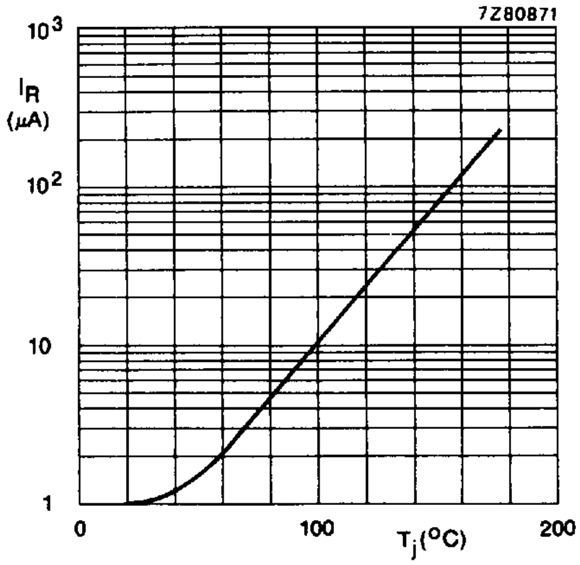


Fig. 8 Maximum values reverse current as a function of junction temperature; $V_R = V_{RWM\,max}$.

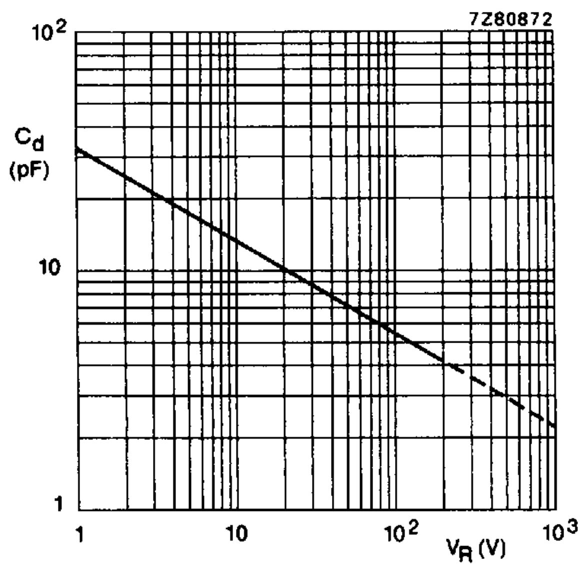


Fig. 9 Capacitance as a function of reverse voltage; f = 1 MHz; T_j = 25 °C; typical values.

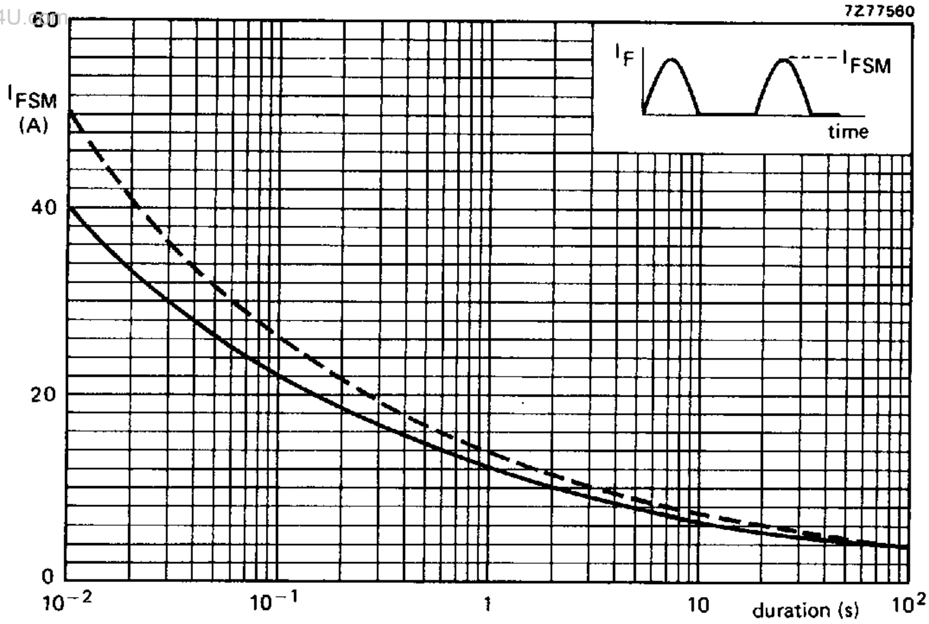
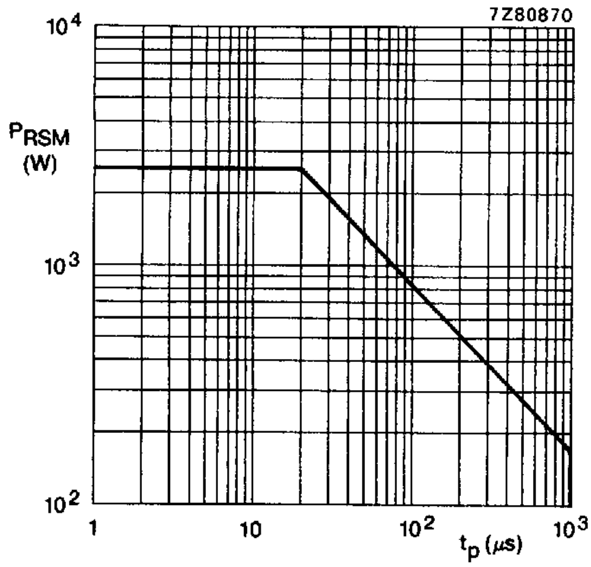


Fig. 10 Maximum permissible non-repetitive peak forward current based on sinusoidal currents; f = 50 Hz.

– – – T_j = 25 °C prior to surge; V_R = 0.

—— $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RWM\,max}$.



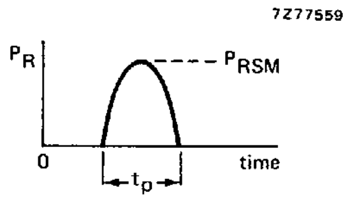


Fig. 11 Non-repetitive peak reverse power in the avalanche region; T_j = 25 °C prior to surge; typical values.