CONTROLLED AVALANCHE RECTIFIER DIODES

Double-diffused glass passivated rectifier diodes in hermetically sealed axial-leaded glass envelopes, capable of absorbing reverse transients.

They are intended for rectifier applications as well as general purpose applications in television and communication equipment.

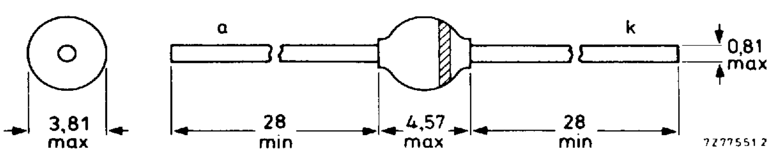
QUICK REFERENCE DATA

			1N5059	5060	5061	5062	
Crest working reverse voltage	V_{RWM}	max.	200	400	600	800	V
Reverse avalanche breakdown voltage	$V_{(BR)R}$	>	225	450	650	900	V
		<	1600	1600	1600	1600	V
Average forward current	$I_{F(AV)}$	max.	2,0				A
Non-repetitive peak forward current	I_{FSM}	max.	50				A
Non-repetitive peak reverse power dissipation	P_{RSM}	max.	1				kW
Junction temperature	T_j	max.	175				°C

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-57.



The marking band indicates the cathode.

Products approved to CECC 50 008-015.

RATINGS

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

			1N5059	5060	5061	5062	
Crest working reverse voltage	V_{RWM}	max.	200	400	600	800	V
Continuous reverse voltage	V_R	max.	200	400	600	800	V
Average forward current (averaged over any 20 ms period)							
T_{tp} = 35 °C; lead length 10 mm	$I_{F(AV)}$	max.	2,0				A
T_{amb} = 75 °C; Fig. 2	$I_{F(AV)}$	max.	0,8				A
Repetitive peak forward current	I_{FRM}	max.	12				A
Non-repetitive peak forward current t = 10 ms; half sine-wave; see Figs 7 and 10	I_{FSM}	max.	50				A
Non-repetitive peak reverse power dissipation							
t = 20 μs (half sine-wave) $T_j = T_{j\,max}$ prior to surge	P_{RSM}	max.	1				kW
t = 100 μs (half sine-wave) $T_j = T_{j\,max}$ prior to surge	P_{RSM}	max.	450				W
Storage temperature	T_{stg}		−65 to + 175				°C
Junction temperature	T_j	max.	175				°C

THERMAL RESISTANCE

Influence of mounting method

1. Thermal resistance from junction to tie-point at a lead length of 10 mm — $R_{th\,j\text{-}tp}$ = 46 K/W
2. Thermal resistance from junction to ambient when mounted on a 1,5 mm thick epoxy-glass printed-circuit board; Cu-thickness ≥ 40 μm; Fig. 2 (see "Thermal model") — $R_{th\,j\text{-}a}$ = 100 K/W

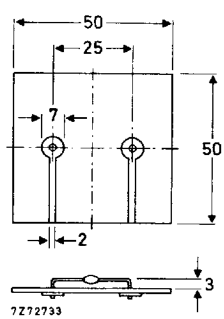


Fig. 2 Device mounted on a printed circuit board.

CHARACTERISTICS

			1N5059	5060	5061	5062	
Forward voltage; T_j = 25 °C *							
I_F = 1 A	V_F	<	1	1	1	1	V
I_F = 2,5 A	V_F	<	1,15	1,15	1,15	1,15	V
Reverse avalanche breakdown voltage		>	225	450	650	900	V
I_R = 0,1 mA; T_j = 25 °C	$V_{(BR)R}$	<	1600	1600	1600	1600	V
Reverse current							
$V_R = V_{RWMmax}$; T_j = 25 °C **	I_R	<	1,0	1,0	1,0	1,0	μA
$V_R = V_{RWMmax}$; T_j = 100 °C	I_R	<	10	10	10	10	μA
$V_R = V_{RWMmax}$; T_j = 165°C	I_R	<	150	150	150	150	μA
Reverse recovery time when switched from I_F = 0,5 A to I_R = 1 A		<		6			μs
at i_{rr} = 0,25 A	t_{rr}	typ.		3			μs

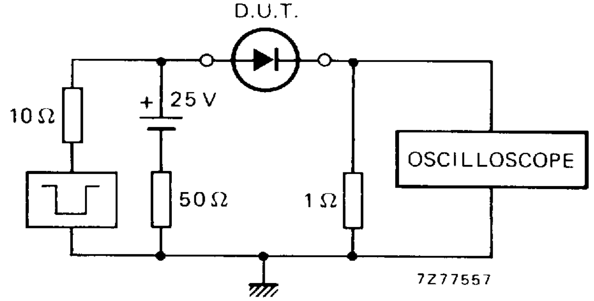


Fig. 3 Test circuit.
Input impedance oscilloscope 1 MΩ; 22 pF. Rise time ≤ 7 ns.
Source impedance 50 Ω. Rise time ≤ 15 ns.

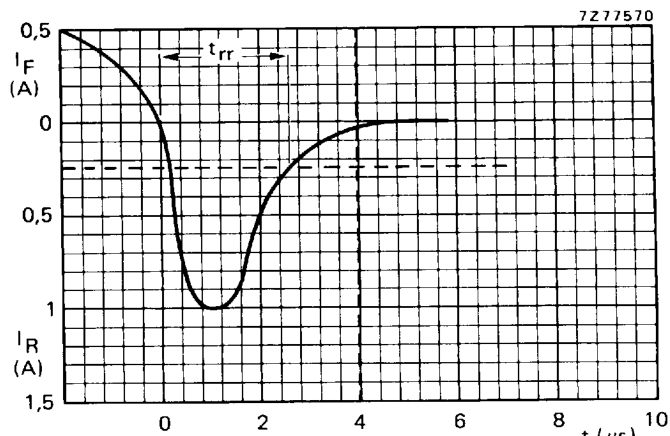


Fig. 4 Reverse recovery time characteristic.

Measured under pulse conditions to avoid excessive dissipation.
* Illuminance ≤ 500 lux (daylight); relative humidity < 65%.

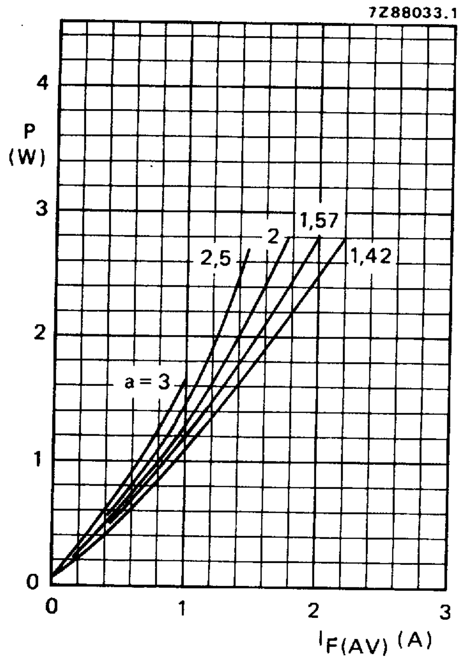


Fig. 5 Steady state power dissipation (forward plus leakage current excluding switching losses) as a function of the average forward current.

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RWMmax}$.

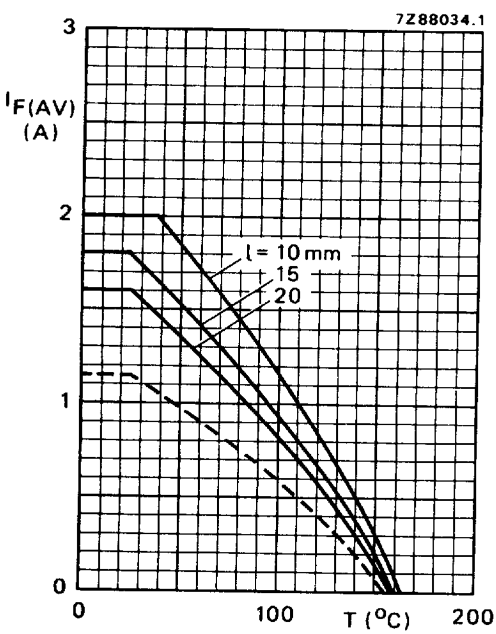


Fig. 6 Maximum average forward current as a function of the temperature.
The curves include losses due to reverse current.

a = 1,57; $V_R = V_{RWMmax}$; l = lead length
——— T = tie-point temperature
– – – – T = ambient temperature and device mounted as shown in Fig. 2.

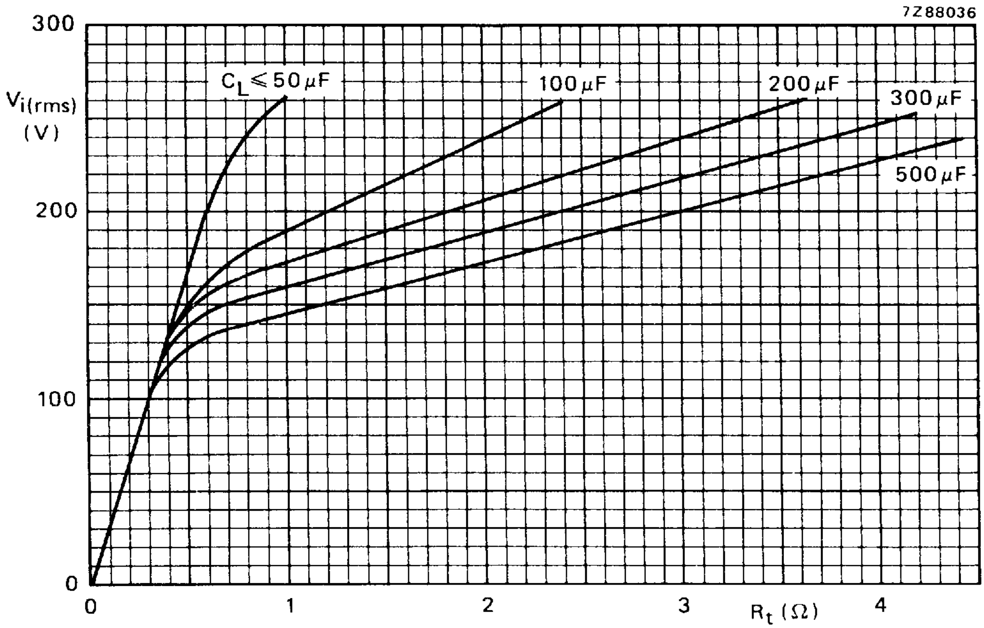


Fig. 7 Minimum values of series resistance (R_t), including the transformer resistance, required to limit the initial peak rectifier current with capacitive load. The possibility of the following spreads are taken into account: mains voltage + 10%; capacitance + 50%, resistance −10%.

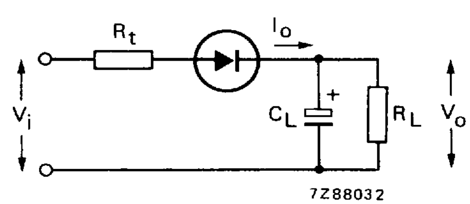


Fig. 8 Test circuit series resistance (R_t).

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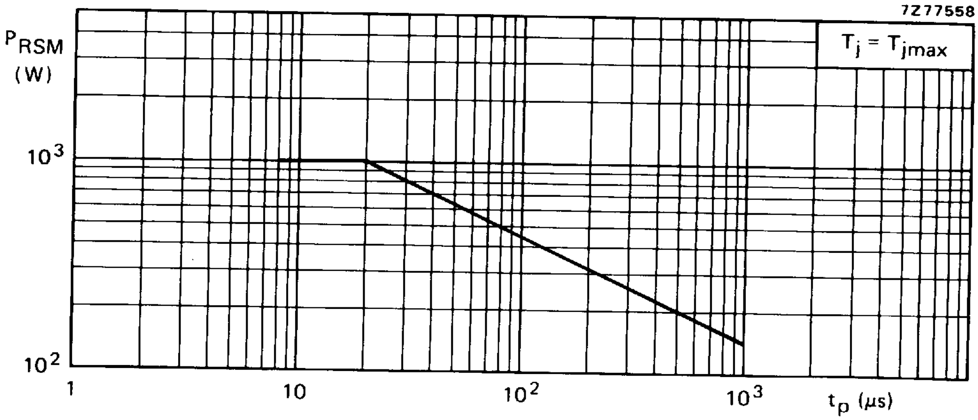
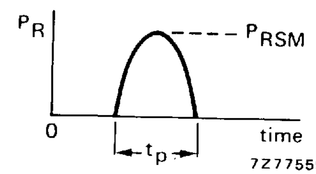


Fig. 9 Maximum permissible non-repetitive peak reverse power dissipation in the avalanche region.



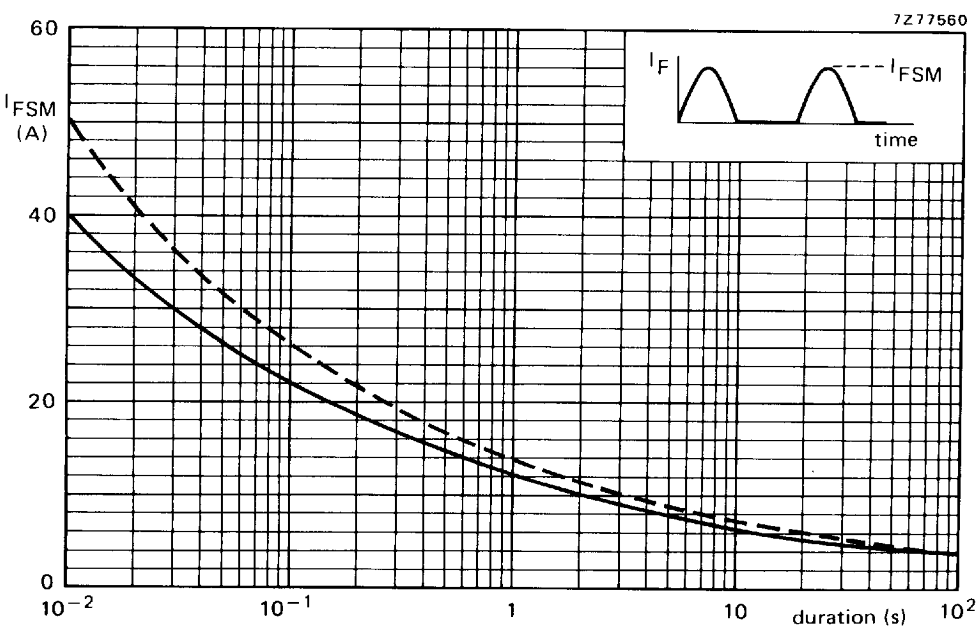


Fig. 10 Maximum permissible non-repetitive peak forward current based on sinusoidal currents (f = 50 Hz).
– – – T_j = 25 °C; $V_R = 0$
—— $T_j = T_{j\,max}$ prior to surge, $V_R = V_{RWMmax}$.

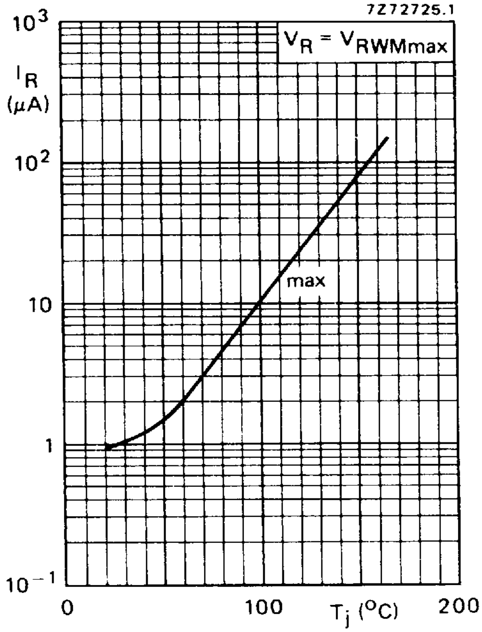


Fig. 11.

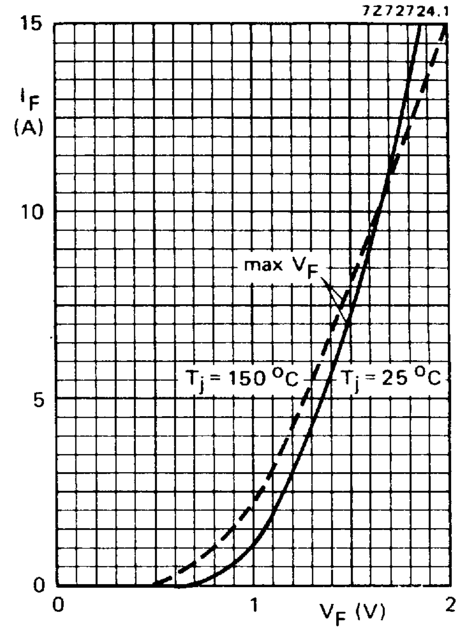


Fig. 12.

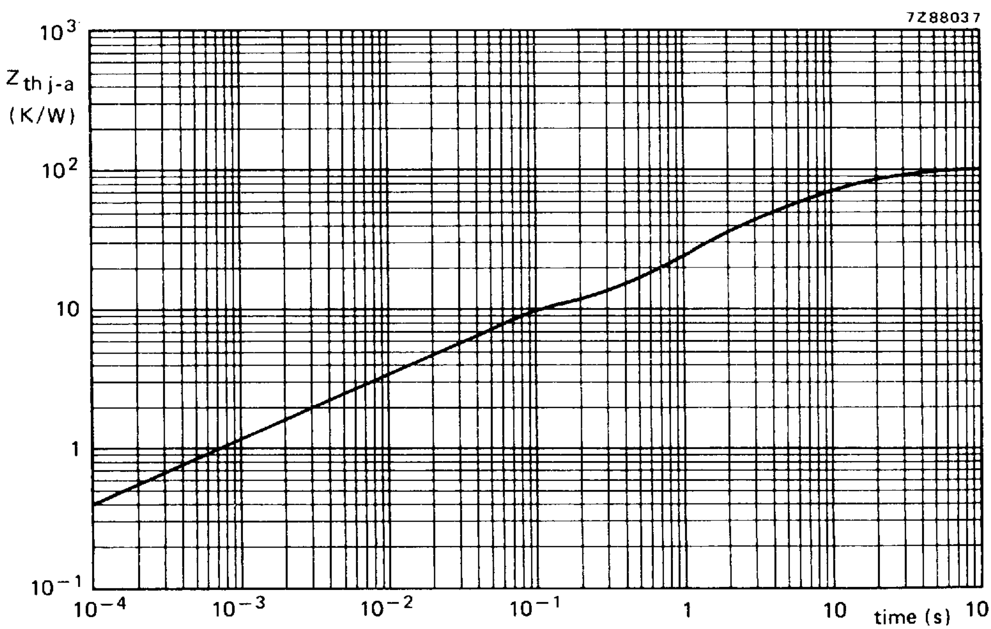


Fig. 13 Device mounted on a printed circuit board (see Fig. 2).