AVALANCHE FAST SOFT-RECOVERY RECTIFIER DIODES

Rectifier diodes in hermetically sealed axial-leaded ID* envelopes. They are intended for television and industrial applications, such as switched-mode power supplies, scan rectifiers in TV receivers and also for use in inverter and converter applications. The devices feature non-snap-off (soft-recovery) switching characteristics and are capable of absorbing reverse transient energy (e.g. during flashover in a picture tube).

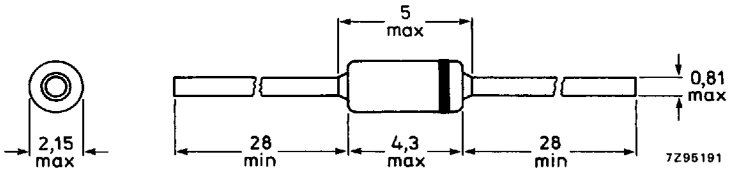
QUICK REFERENCE DATA

			BYD33D	G	J	K	M	
Repetitive peak reverse voltage	V_{RRM}	max.	200	400	600	800	1000	V
Continuous reverse voltage	V_R	max.	200	400	600	600	1000	V
Average forward current	$I_{F(AV)}$	max.		1,3			1,3	A
Non-repetitive peak forward current	I_{FSM}	max.		20			20	A
Non-repetitive peak reverse energy	E_{RSM}	max.		10			7	mJ
Reverse recovery time	t_{rr}	<		250			300	ns

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-81.



The marking band indicates the cathode.

* Implosion Diode.

RATINGS

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

			BYD33D	G	J	K	M	
Repetitive peak reverse voltage	V_{RRM}	max.	200	400	600	800	1000	V
Continuous reverse voltage	V_R	max.	200	400	600	800	1000	V

			BYD33D; G; J	K; M	
Average forward current (averaged over any 20 ms period)					
T_{tp} = 55 °C; lead length 10 mm	$I_{F(AV)}$	max.	1,3	1,3	A
T_{amb} = 65 °C; see Fig. 2	$I_{F(AV)}$	max.	0,7	0,7	A
Repetitive peak forward current					
T_{tp} = 55 °C; see Fig. 10	I_{FRM}	max.	12	12	A
T_{amb} = 65 °C; see Fig. 11	I_{FRM}	max.	7	7	A
Non-repetitive peak forward current t = 10 ms, half-sine wave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	I_{FSM}	max.	20	20	A
Non-repetitive peak reverse avalanche energy; I_R = 400 mA; $T_j = T_{j\,max}$, prior to surge; with inductive load switched off	E_{RSM}	max.	10	7	mJ
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 — $R_{th\,j\text{-}tp}$ = 60 K/W
2. Thermal resistance from junction to ambient; device mounted on a 1,5 mm thick epoxy-glass printed circuit board; Cu-thickness ⩾ 40 µm; Fig. 2 (see "Thermal Model") — $R_{th\,j\text{-}a}$ = 120 K/W

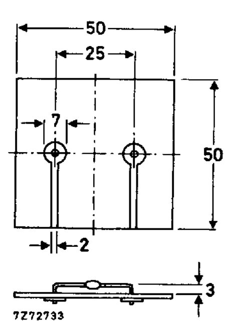


Fig. 2 Mounted on a printed-circuit board.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

			BYD33D	G	J	K	M	
Forward voltage*								
I_F = 1 A	V_F	<	1,3	1,3	1,3	1,3	1,3	V
I_F = 1 A; $T_j = T_{j\,max}$	V_F	<	1,1	1,1	1,1	1,1	1,1	V
Reverse avalanche breakdown voltage								
I_R = 0,1 mA	$V_{(BR)R}$	>	300	500	700	900	1100	V
Reverse current								
$V_R = V_{RRMmax}$**	I_R	<		1		1		μA
$V_R = V_{RRMmax}$; T_j = 165 °C	I_R	<		100		100		μA
Reverse recovery when switched from I_F = 1 A to $V_R \geqslant$ 30 V with $-dI_F/dt$ = 20 A/μs								
recovery charge	Q_s	<		250		400		nC
recovery time	t_{rr}	<		250		300		ns
Maximum slope of reverse recovery current when switched from I_F = 1 A to $V_R \geqslant$ 30 V with $-dI_F/dt$ = 1 A/μs	$\lvert dI_R/dt \rvert$	<		6		5		A/μs

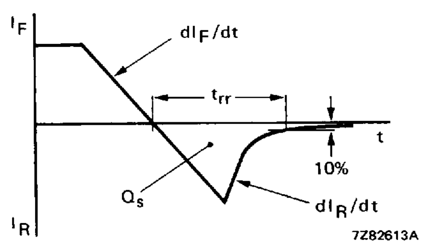


Fig. 3 Definitions of t_{rr}, Q_s, dI_F/dt and dI_R/dt.

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

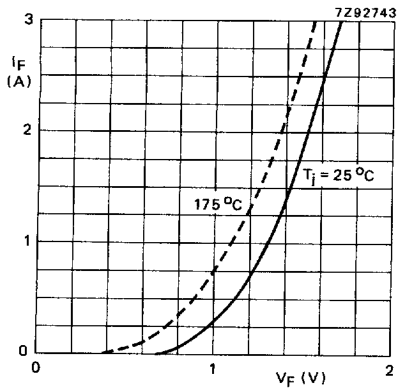


Fig. 4 Maximum forward voltage.

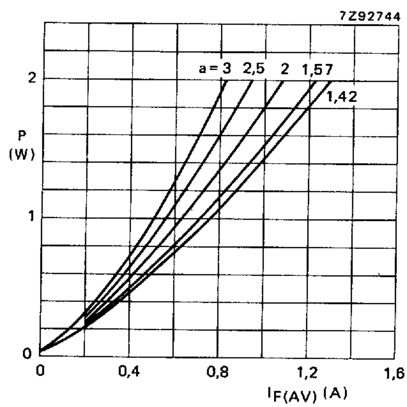
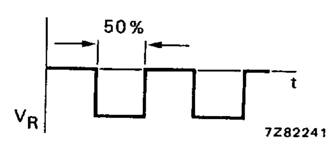


Fig. 5 Maximum values steady state power dissipation (forward plus leakage current) excluding switching losses as a function of the average forward current.

The graph is for switched-mode application.

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



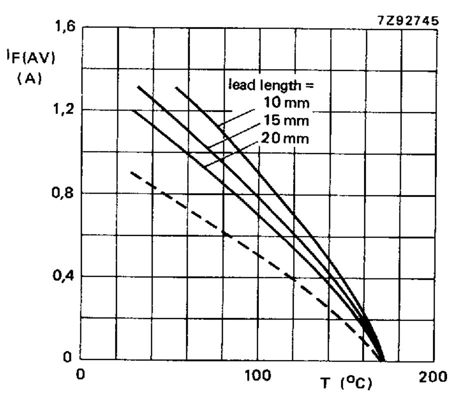


Fig. 6 Maximum average forward current as a function of temperature; the curves include losses due to reverse leakage.

The graph is for switched-mode application.

$V_R = V_{RRM\,max}$, $\delta = 0,5$; a = 1,42.

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

——— = tie-point temperature

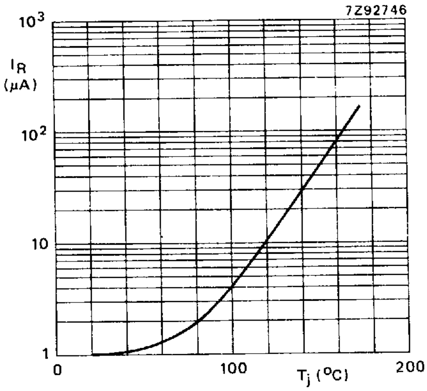


Fig. 7 Maximum values reverse current as a function of junction temperature; $V_R = V_{RRM\,max}$.

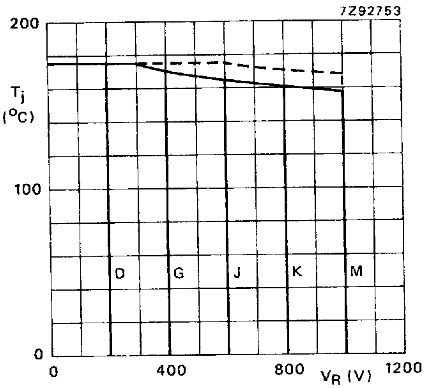


Fig. 8 Maximum permissible junction temperature as a function of reverse voltage;
—— = V_R; – – – = V_{RRM}, $\delta = 0{,}5$.

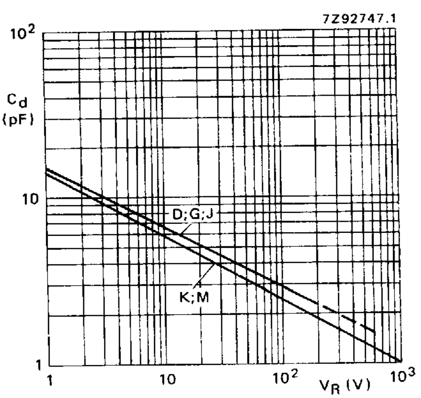


Fig. 9 Capacitance as a function of reverse voltage; f = 1 MHz; T_j = 25 °C; typical values.

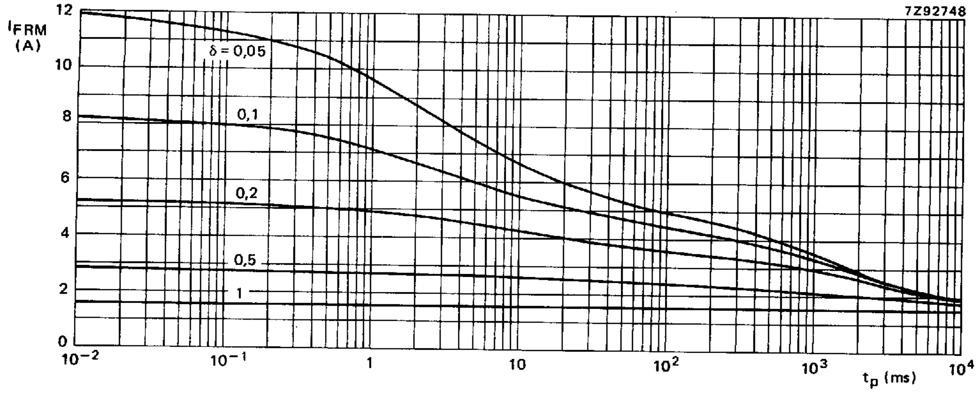


Fig. 10 Maximum repetitive peak forward current as a function of the pulse time (square pulse) and duty-factor δ at $T_{tie\text{-}point}$ = 55 °C; $R_{th\ j\text{-}tp}$ = 60 K/W; V_{RRM} during 1 − δ; the curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.

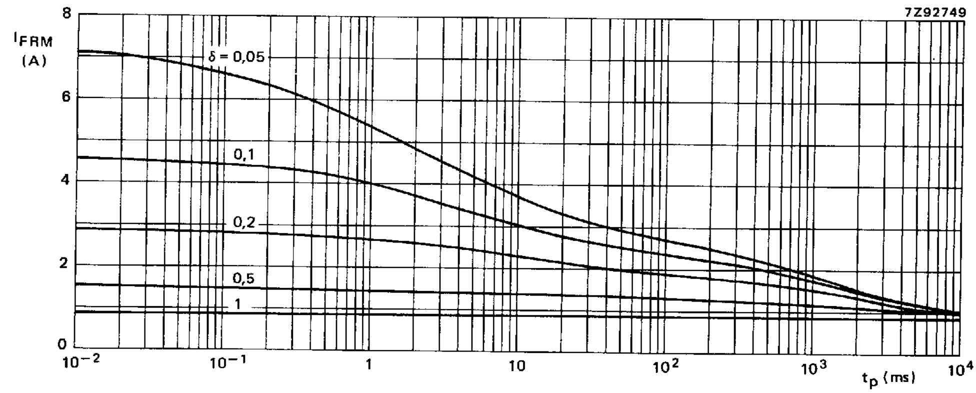


Fig. 11 Maximum repetitive peak forward current as a function of the pulse time (square pulse) and duty-factor δ at T_{amb} = 65 °C; $R_{th\ j\text{-}a}$ = 120 K/W; V_{RRM} during 1 − δ; the curves include derating for $T_{j\ max}$ at V_{RRM} = 1000 V.