EPITAXIAL AVALANCHE DIODES

Glass passivated rectifier diodes in hermetically sealed axial-leaded ID* envelopes. They feature low forward voltage drop, very fast recovery, very low stored charge, non-snap-off switching characteristics and are capable of absorbing reverse transient energy (e.g. during flashover in a picture tube). These properties make the diodes very suitable for use in switched-mode power supplies and in general high-frequency circuits, where low conduction and switching losses are essential.

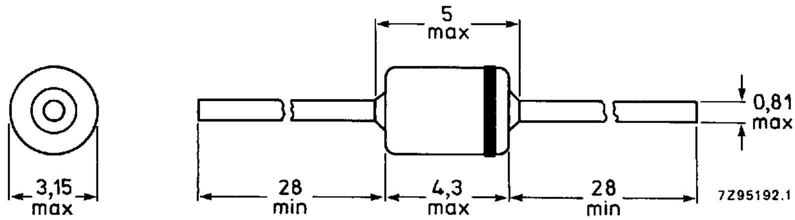
QUICK REFERENCE DATA

			BDY74A	B	C	D	E	F	G	
Repetitive peak reverse voltage	V_{RRM}	max.	50	100	150	200	250	300	400	V
Continuous reverse voltage	V_R	max.	50	100	150	200	250	300	400	V
Average forward current	$I_{F(AV)}$	max.	2,4	2,4	2,4	2,4	2,15	2,15	2,15	A
Non-repetitive peak forward current	I_{FSM}	max.	50	50	50	50	50	50	50	A
Non-repetitive peak reverse energy	E_{RSM}	max.	40	40	40	40	40	40	40	mJ
Reverse recovery time	t_{rr}	<	25	25	25	25	50	50	50	ns

MECHANICAL DATA

Dimensions in mm

Fig. 1 SOD-84.



The marking band indicates the cathode.

* Implosion diode.

RATINGS

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

			BYD74A	B	C	D	E	F	G	
Repetitive peak reverse voltage	V_{RRM}	max.	50	100	150	200	250	300	400	V
Continuous reverse voltage	V_R	max.	50	100	150	200	250	300	400	V
Average forward current square wave; δ = 0,5										
T_{tp} = 55 °C; lead length = 10 mm	$I_{F(AV)}$	max.	2,4	2,4	2,4	2,4	2,15	2,15	2,15	A
T_{amb} = 60 °C; Fig. 2	$I_{F(AV)}$	max.	1,35	1,35	1,35	1,35	1,2	1,2	1,2	A
Repetitive peak forward current										
T_{tp} = 55 °C; see Figs 11 and 13	I_{FRM}	max.	21	21	21	21	21	21	21	A
T_{amb} = 60 °C; see Figs 12 and 14	I_{FRM}	max.	13	13	13	13	12	12	12	A

Non-repetitive peak forward current (t = 10 ms; half sine-wave) $T_j = T_{j\,max}$ prior to surge; with reapplied V_{RRM}	I_{FSM}	max.	50	A
Non-repetitive peak reverse avalanche energy; with inductive load switched-off: I_R = 820 mA at T_j = 25 °C prior to surge	E_{RSM}	max.	40	mJ
I_R = 580 mA at $T_j = T_{j\,max}$ prior to surge	E_{RSM}	max.	20	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	$R_{th\,j\text{-}tp}$	=	50	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 (see "Thermal model")	$R_{th\,j\text{-}a}$	=	105	K/W

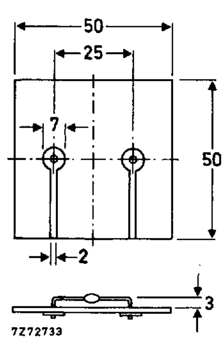
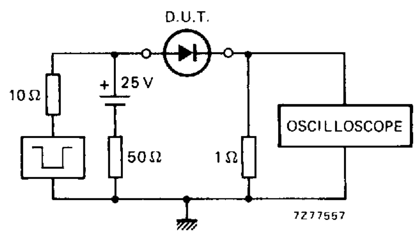


Fig. 2 Mounted on a printed-circuit board.

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

			BYD74A	B	C	D	E	F	G	
Reverse avalanche breakdown voltage I_R = 0,1 mA	$V_{(BR)R}$	>	55	110	165	220	275	330	440	V
Forward voltage* I_F = 2 A; $T_j = T_{j\,max}$	V_F	<	0,72	0,72	0,72	0,72	0,82	0,82	0,82	V
I_F = 2 A	V_F	<	0,94	0,94	0,94	0,94	1,05	1,05	1,05	V
Reverse current $V_R = V_{RRMmax}$; T_j = 25 °C	I_R	<	1	1	1	1	1	1	1	μA
$V_R = V_{RRMmax}$; T_j = 165 °C	I_R	<	150	150	150	150	150	150	150	μA
Reverse recovery time when switched from I_F = 0,5 A to I_R = 1 A; measured at I_R = 0,25 A. For definition see Figs 3 and 4	t_{rr}	<	25	25	25	25	50	50	50	ns



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

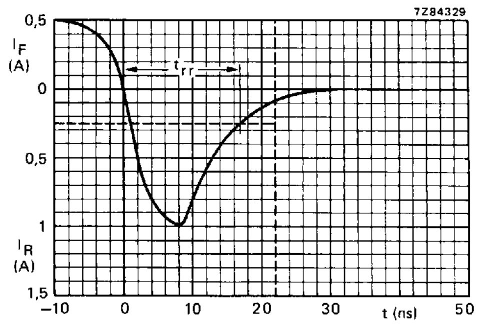


Fig. 4 Reverse recovery time characteristic.

* Measured under pulse conditions to avoid excessive dissipation.

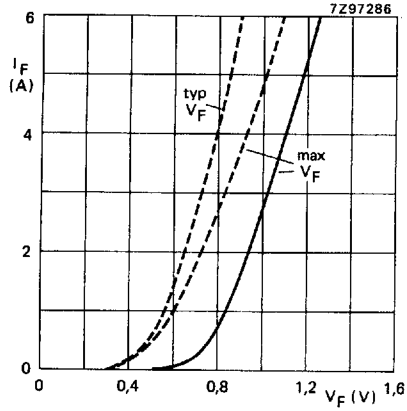


Fig. 5 **BYD74A; B; C; D.** Forward voltage;
—— $T_j = 25\ ^oC$; – – – $T_j = T_{j\ max}$.

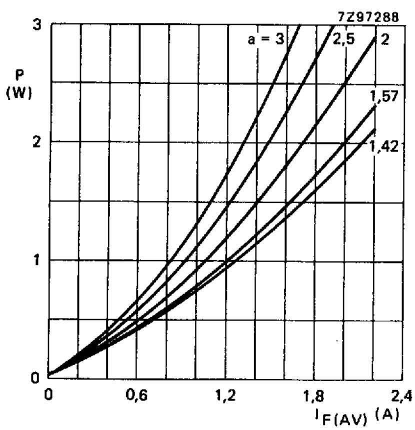


Fig. 6 **BYD74A; B; C; D.** Maximum values steady state power dissipation (forward plus leakage current) excluding switching losses as a function of the average forward current.

The graph is for switched-mode application.

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$, $\delta = 0,5$.

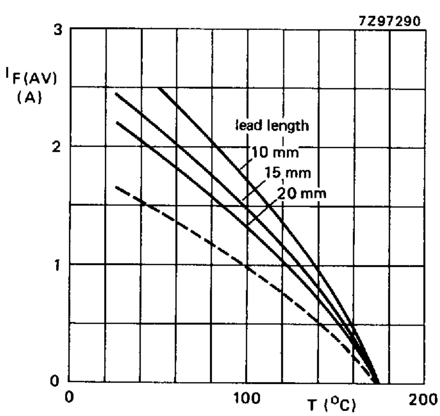


Fig. 7 **BYD74A; B; C; D.** Maximum average forward current as a function of temperature; the curves include losses due to reverse leakage.

The graph is for switched-mode application.

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

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

—— = tie-point temperature

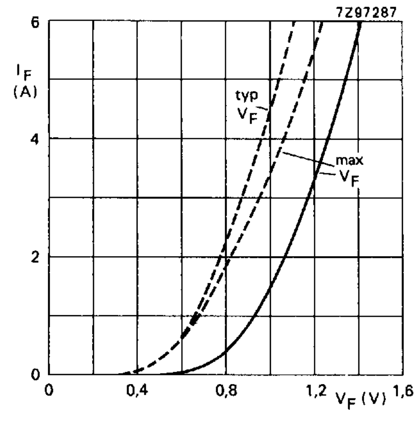


Fig. 8 **BYD74E; F; G.** Forward voltage;
—— T_j = 25 °C; – – – $T_j = T_{j\,max}$.

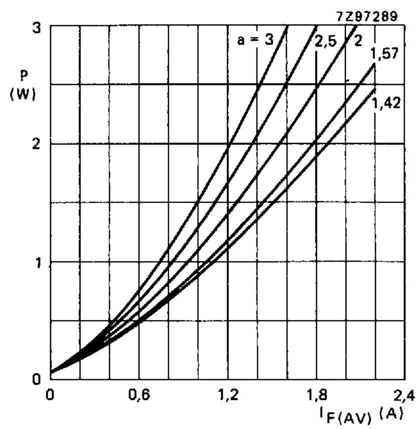


Fig. 9 **BYD74E; F; G.** Maximum values steady state power dissipation (forward plus leakage current) excluding switching losses as a function of the average forward current.

The graph is for switched-mode application.

$a = I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$, δ = 0,5.

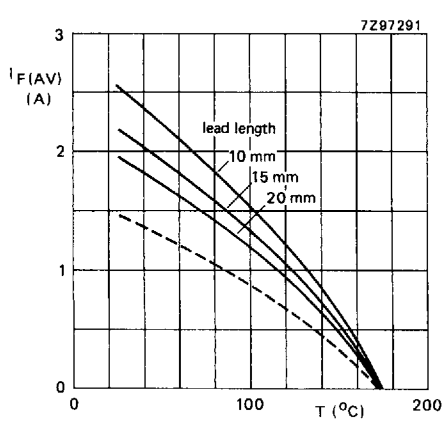


Fig. 10 **BYD74E; F; G.** Maximum average forward current as a function of temperature; the curves include losses due to reverse leakage.

The graph is for switched-mode application.

$V_R = V_{RRMmax}$, δ = 0,5; a = 1,42.

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

—— = tie-point temperature

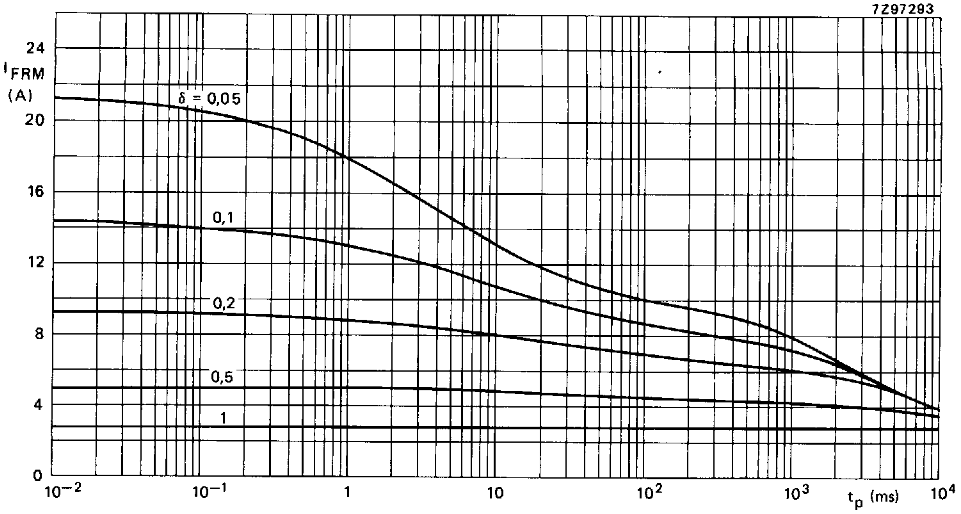


Fig. 11 **BYD74A; B; C; D.** Maximum repetitive peak forward current as a function of the pulse time (square pulse) and duty-factor δ at $T_{tie\text{-}point}$ = 55 °C; $R_{th\ j\text{-}tp}$ = 50 K/W; V_{RRM} during $1-\delta$; the curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

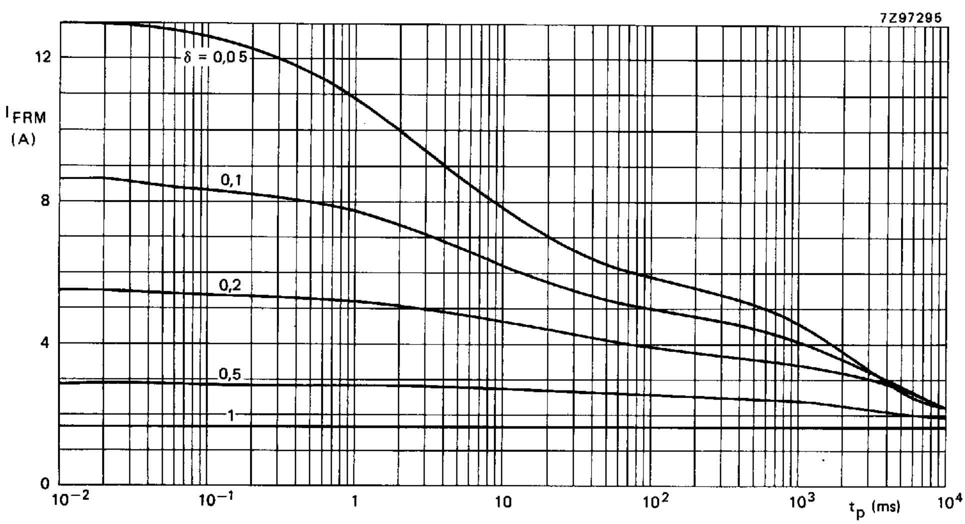


Fig. 12 **BYD74A; B; C; D.** Maximum repetitive peak forward current as a function of the pulse time (square pulse) and duty factor δ at T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 105 K/W; V_{RRM} during $1-\delta$; the curves include derating for $T_{j\ max}$ at V_{RRM} = 200 V.

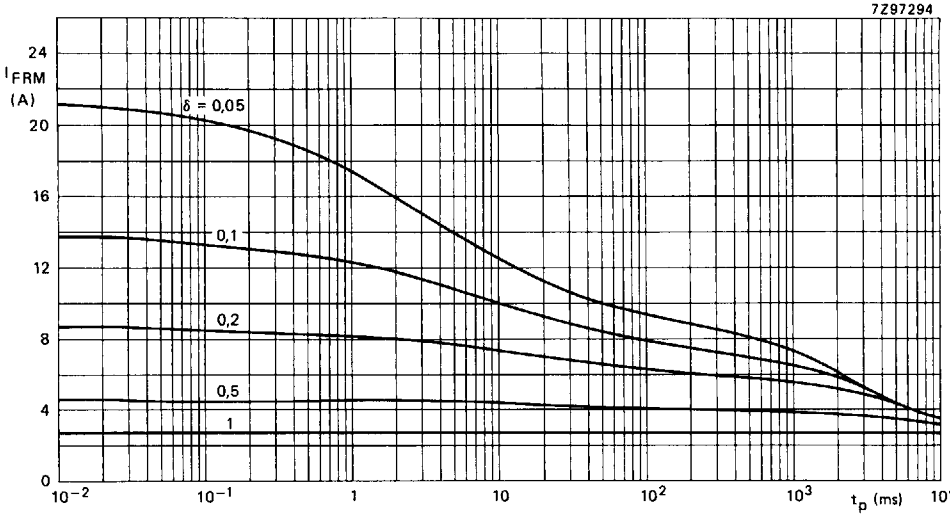


Fig. 13 **BYD74E; F; G.** Maximum repetitive peak forward current as a function of the pulse time (square pulse) and duty-factor δ at $T_{tie\text{-}point}$ = 55 °C; $R_{th\ j\text{-}tp}$ = 50 K/W; V_{RRM} during $1 - \delta$; the curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

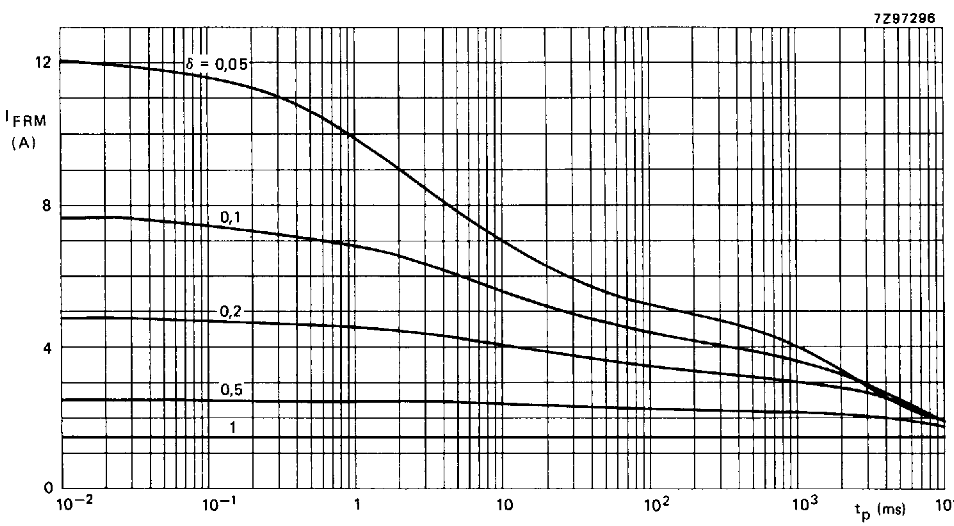


Fig. 14 **BYD74E; F; G.** Maximum repetitive peak forward current as a function of the pulse time (square pulse) and duty-factor δ at T_{amb} = 60 °C; $R_{th\ j\text{-}a}$ = 105 K/W; V_{RRM} during $1 - \delta$; the curves include derating for $T_{j\ max}$ at V_{RRM} = 400 V.

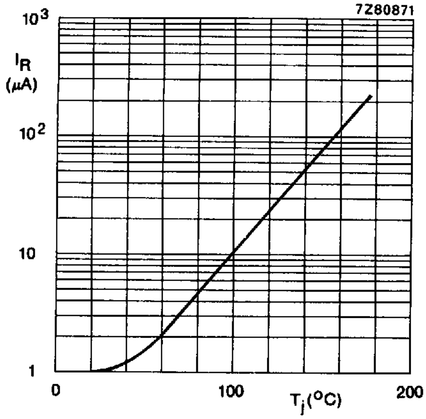


Fig. 15 Maximum values reverse current as a function of junction temperature; $V_R = V_{RRMmax}$.

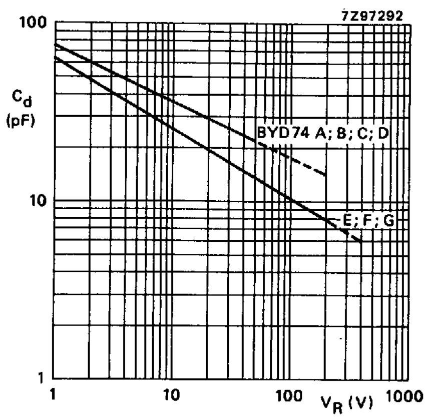


Fig. 16 Capacitance as a function of reverse voltage; f = 1 MHz; T_j = 25 °C; typical values.