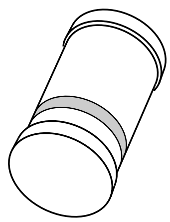
DATA SHEET



BYD17 series
Controlled avalanche rectifiers

Product specification
Supersedes data of November 1993
File under Discrete Semiconductors, SC01

1996 May 24

Philips
Semiconductors

PHILIPS

Controlled avalanche rectifiers BYD17 series

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Guaranteed avalanche energy absorption capability
- Shipped in 8 mm embossed tape
- Smallest surface mount rectifier outline.

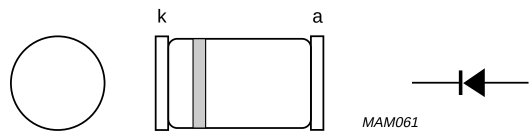


Fig.1 Simplified outline (SOD87) and symbol.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology.

This package is hermetically sealed and fatigue free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

MARKING

TYPE NUMBER	MARKING CODE
BYD17D	17D PH
BYD17G	17G PH
BYD17J	17J PH
BYD17K	17K PH
BYD17M	17M PH

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage				
	BYD17D		–	200	V
	BYD17G		–	400	V
	BYD17J		–	600	V
	BYD17K		–	800	V
	BYD17M		–	1000	V
V_{RWM}	crest working reverse voltage				
	BYD17D		–	200	V
	BYD17G		–	400	V
	BYD17J		–	600	V
	BYD17K		–	800	V
	BYD17M		–	1000	V
V_R	continuous reverse voltage				
	BYD17D		–	200	V
	BYD17G		–	400	V
	BYD17J		–	600	V
	BYD17K		–	800	V
	BYD17M		–	1000	V

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$I_{F(AV)}$	average forward current	T_{tp} = 105 °C; averaged over any 20 ms period; see Figs 2 and 4	–	1.5	A
		T_{amb} = 65 °C; PCB mounting (see Fig.9); averaged over any 20 ms period; see Figs 3 and 4	–	0.6	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms half sinewave; $T_j = T_{j\,max}$ prior to surge; $V_R = V_{RRMmax}$	–	20	A
E_{RSM}	non-repetitive peak reverse avalanche energy	L = 120 mH; $T_j = T_{j\,max}$ prior to surge; inductive load switched off	–	7	mJ
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature	see Fig.5	–65	+175	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 1 A; $T_j = T_{j\,max}$; see Fig.6	–	–	0.93	V
		I_F = 1 A; see Fig.6	–	–	1.05	V
$V_{(BR)R}$	reverse avalanche breakdown voltage	I_R = 0.1 mA				
	BYD17D		225	–	–	V
	BYD17G		450	–	–	V
	BYD17J		650	–	–	V
	BYD17K		900	–	–	V
	BYD17M		1100	–	–	V
I_R	reverse current	$V_R = V_{RRMmax}$; see Fig.7	–	–	1	µA
		$V_R = V_{RRMmax}$; T_j = 165 °C; see Fig.7	–	–	100	µA
t_{rr}	reverse recovery time	when switched from I_F = 0.5 A to I_R = 1 A; measured at I_R = 0.25 A; see Fig.10	–	3	–	µs
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; see Fig.8	–	21	–	pF

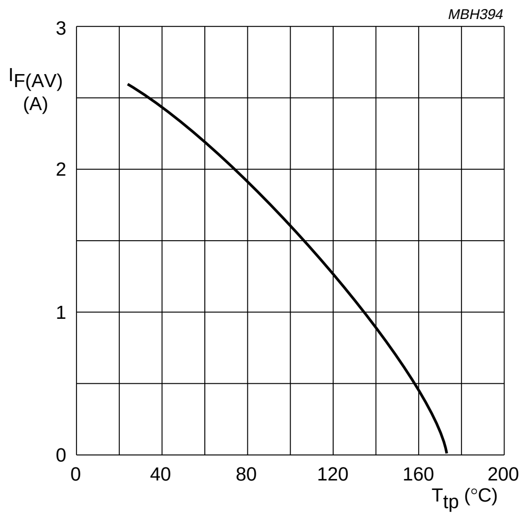
THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point		30	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	150	K/W

Note

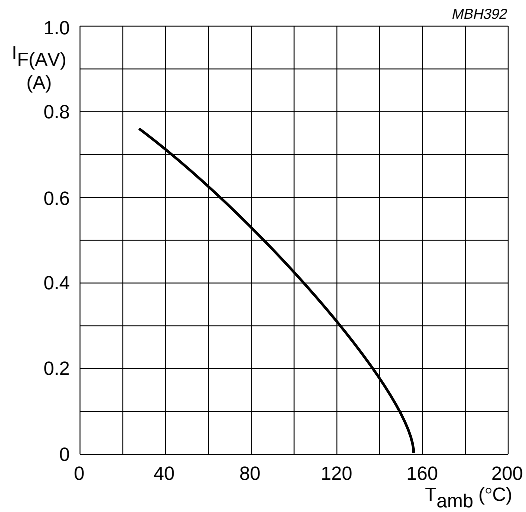
1. Device mounted on epoxy-glass printed-circuit board, 1.5 mm thick; thickness of copper ≥40 µm, see Fig.9.
   For more information please refer to the *“General Part of Handbook SC01”*.

GRAPHICAL DATA



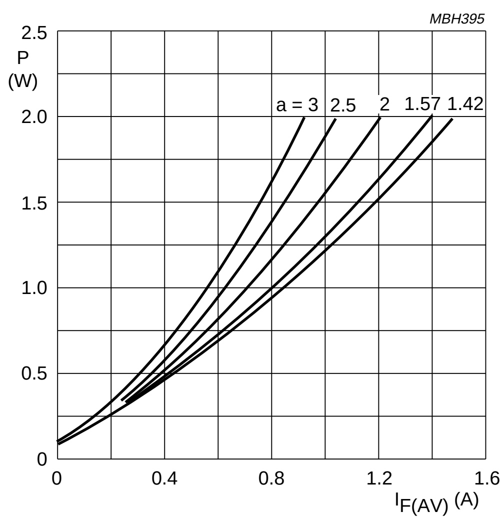
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature (including losses due to reverse leakage).



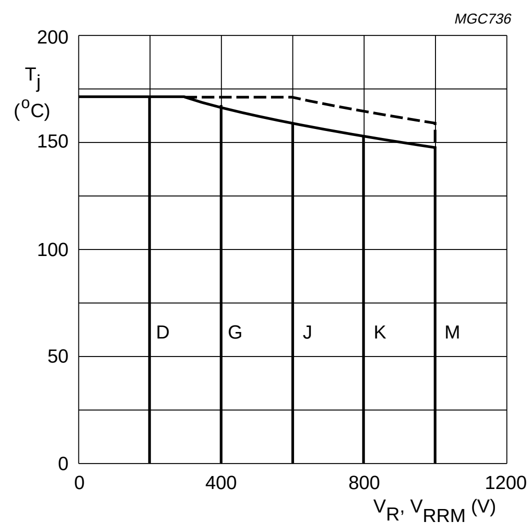
a = 1.57; $V_R = V_{RRMmax}$; δ = 0.5.
Device mounted as shown in Fig.9.

Fig.3 Maximum permissible average forward current as a function of ambient temperature (including losses due to reverse leakage).



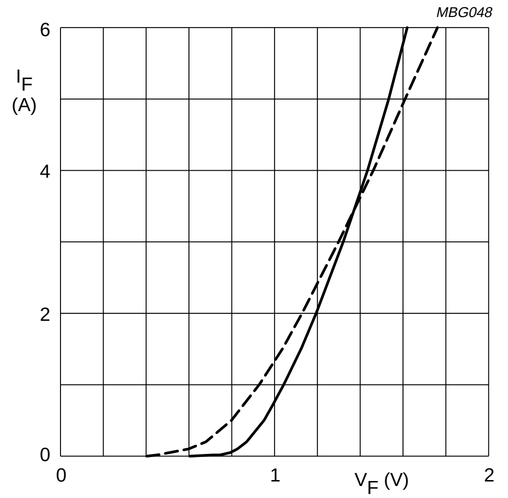
a = $I_{F(RMS)}/I_{F(AV)}$; $V_R = V_{RRMmax}$; δ = 0.5.

Fig.4 Maximum steady state power dissipation (forward plus leakage current losses, excluding switching losses) as a function of average forward current.



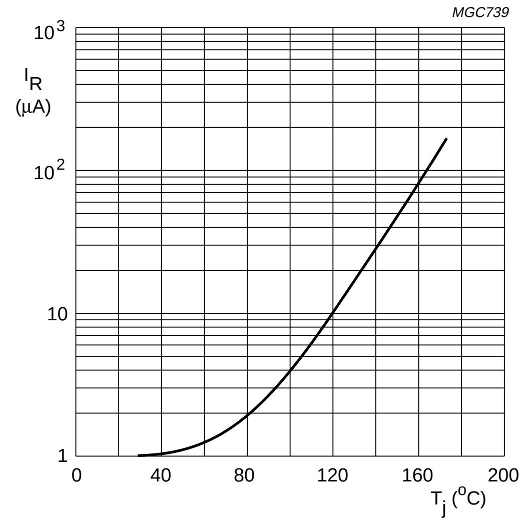
Solid line = V_R.
Dotted line = V_{RRM}; δ = 0.5.

Fig.5 Maximum permissible junction temperature as a function of reverse voltage.



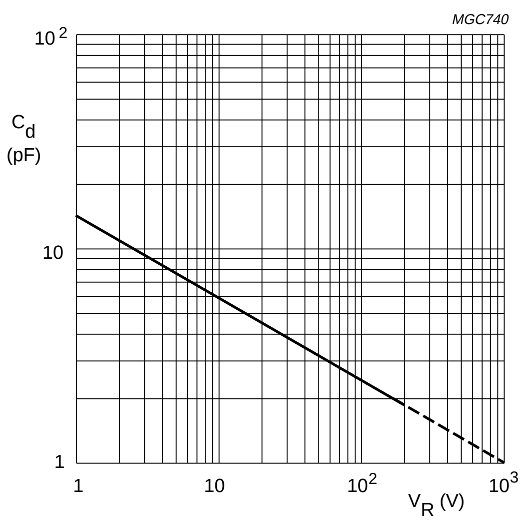
Solid line: T_j = 25 °C.
Dotted line: T_j = 175 °C.

Fig.6 Forward current as a function of forward voltage; maximum values.



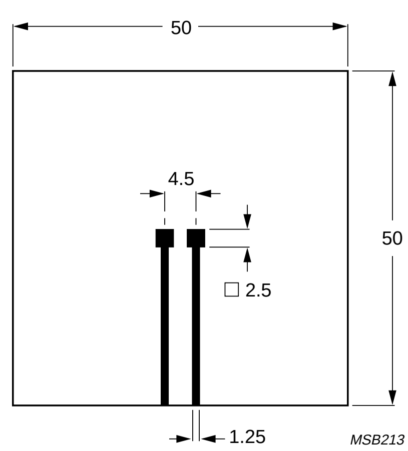
$V_R = V_{RRMmax}$.

Fig.7 Reverse current as a function of junction temperature; maximum values.



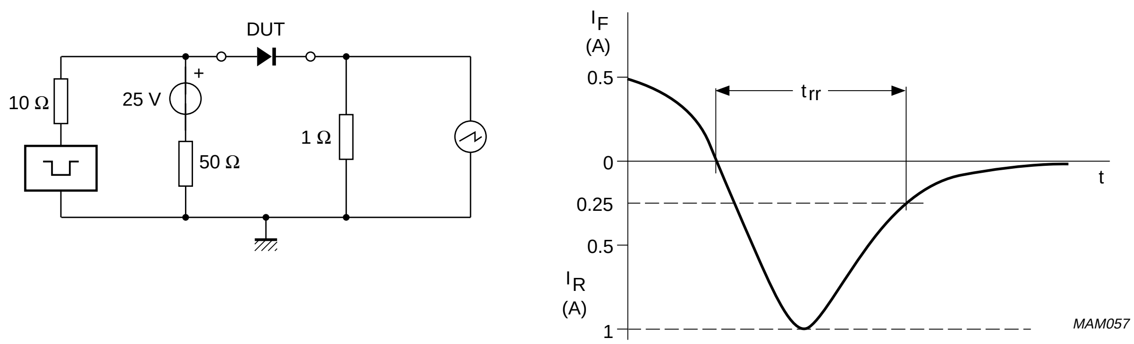
f = 1 MHz; T_j = 25 °C.

Fig.8 Diode capacitance as a function of reverse voltage; typical values.



Dimensions in mm.

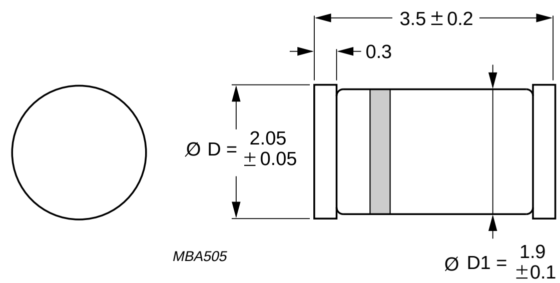
Fig.9 Printed-circuit board for surface mounting.



Input impedance oscilloscope: 1 MΩ, 22 pF; $t_r \le 7$ ns.
Source impedance: 50 Ω; $t_r \le 15$ ns.

Fig.10 Test circuit and reverse recovery time waveform and definition.

PACKAGE OUTLINE



Dimensions in mm.

Fig.11 SOD87.

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.