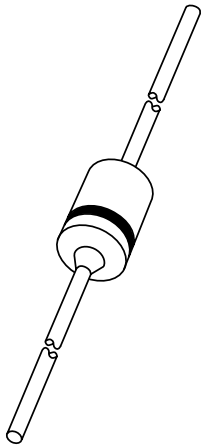
DATA SHEET



BAQ800
AM PIN diode

Product specification
File under Discrete Semiconductors, SC01

1997 Aug 26

Philips
Semiconductors

PHILIPS

AM PIN diode BAQ800

FEATURES

- Glass passivated
- High maximum operating temperature
- Low leakage current
- Excellent stability
- Available in ammopack.

APPLICATIONS

- RF attenuator with low distortion for frequencies above 100 kHz.

DESCRIPTION

Cavity free cylindrical glass package through Implotec™(1) technology. This package is hermetically sealed and stress free as coefficients of expansion of all used parts are matched.

(1) Implotec is a trademark of Philips.

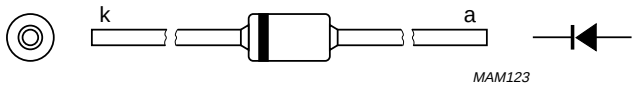


Fig.1 Simplified outline (SOD81) and symbol.

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{RRM}	repetitive peak reverse voltage		–	100	V
V_R	continuous reverse voltage		–	100	V
$I_{F(AV)}$	average forward current	T_{tp} = 25 °C; lead length = 10 mm; see Fig.2	–	1.25	A
		T_{amb} = 60 °C; printed-circuit board mounting (see Fig.17); see Fig.3	–	600	mA
T_{stg}	storage temperature		–65	+175	°C
T_j	junction temperature		–65	+150	°C

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified; all characteristics must be tested in the dark because of the light sensitivity of this product.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 100 mA; see Figs 4 and 5	–	0.9	1.1	V
		I_F = 100 mA; $T_j = T_{j\,max}$; see Figs 4 and 5	–	0.7	0.9	V
I_R	reverse current	V_R = 100 V; see Fig.14	–	–	0.1	μA
		V_R = 100 V; T_j = 125 °C; see Fig.14	–	–	30	μA
τ	charge carrier life time	when switched from I_F = 10 mA to I_R = 6 mA; measured at 10% of I_R; see Fig.15	10	20	–	μs
C_d	diode capacitance	f = 1 MHz; see Figs 6, 7, 8 and 9				
		V_R = 0	–	10	12	pF
		V_R = 2 V	–	5	6	pF
r_D	diode forward resistance	f = 100 kHz; see Figs 10 and 16				
		I_F = 10 μA	–	3100	6000	Ω
		I_F = 100 μA	–	380	800	Ω
		I_F = 1 mA	–	42	80	Ω
		I_F = 10 mA	–	5	10	Ω
r_s	diode series resistance	f = 100 kHz; see Figs 11, 12 and 13				
		V_R = 0	1000	2200	–	kΩ
		V_R = 2 V	5000	11000	–	kΩ
		f = 1 MHz; see Figs 11, 12 and 13				
		V_R = 0	25	50	–	kΩ
		V_R = 2 V	100	220	–	kΩ

THERMAL CHARACTERISTICS

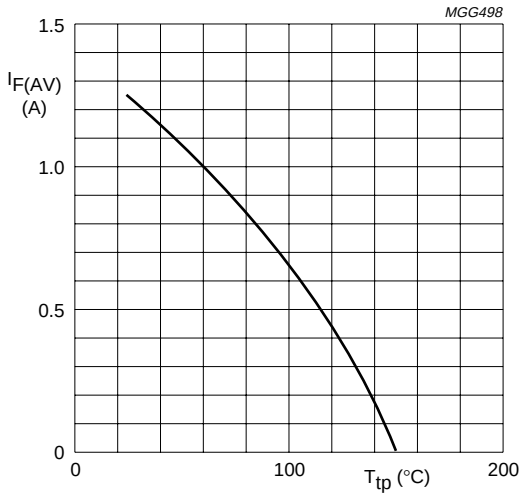
All characteristics must be tested in the dark because of the light sensitivity of this product.

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\,j\text{-}tp}$	thermal resistance from junction to tie-point	lead length = 10 mm	60	K/W
$R_{th\,j\text{-}a}$	thermal resistance from junction to ambient	note 1	120	K/W

Note

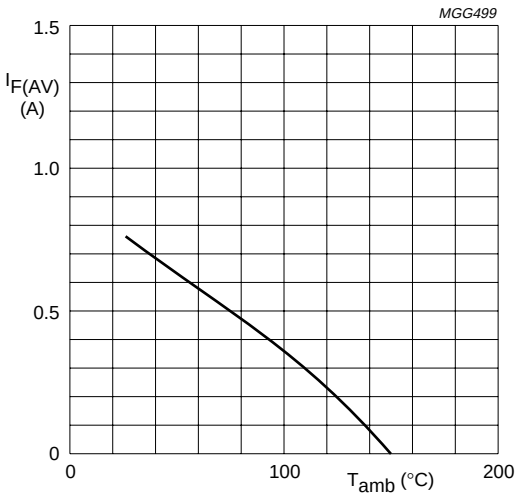
1. Device mounted on an epoxy-glass printed-circuit board, 1.5 mm thick; thickness of Cu-layer ≥40 μm, see Fig.17. For more information please refer to the *"General Part of Handbook SC01"*.

GRAPHICAL DATA



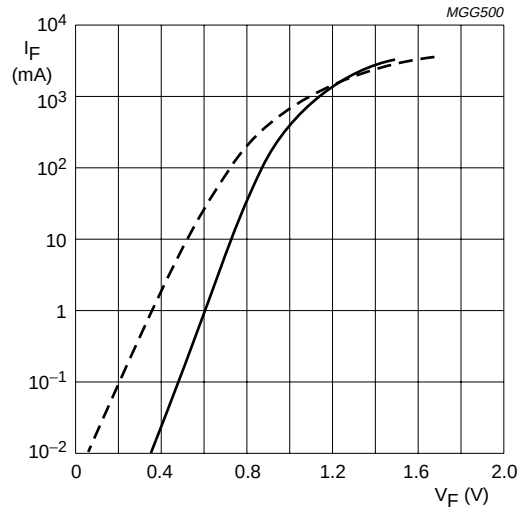
DC application.

Fig.2 Maximum permissible average forward current as a function of tie-point temperature.



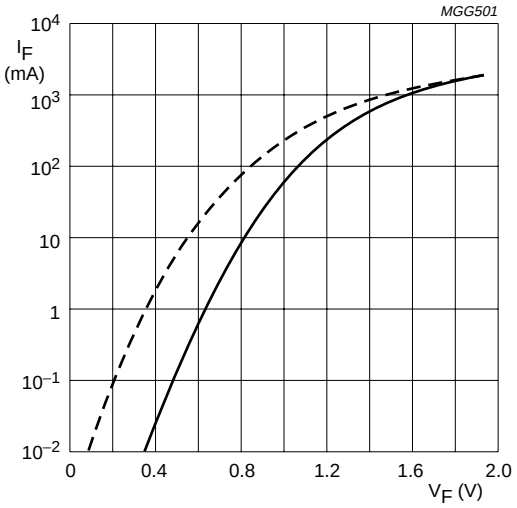
DC application.

Fig.3 Maximum permissible average forward current as a function of ambient temperature.



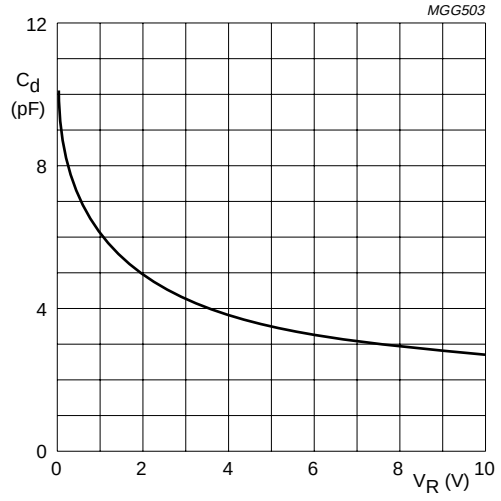
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.4 Forward voltage as a function of forward current; typical values.



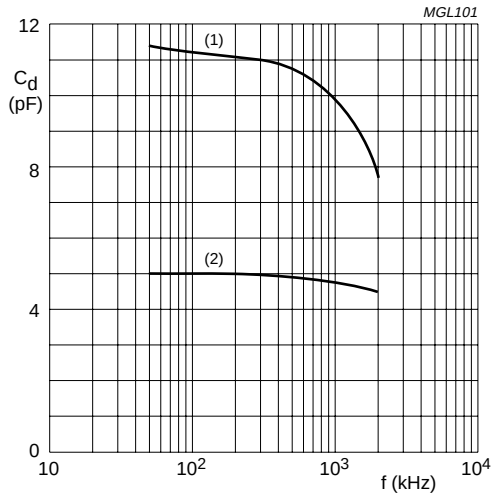
Dotted line: T_j = 150 °C.
Solid line: T_j = 25 °C.

Fig.5 Forward voltage as a function of forward current; maximum values.



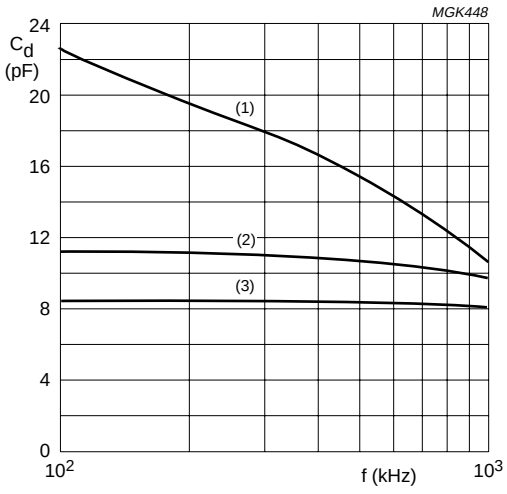
f = 1 MHz; T_j = 25 °C.

Fig.6 Diode capacitance as a function of reverse voltage; typical values.



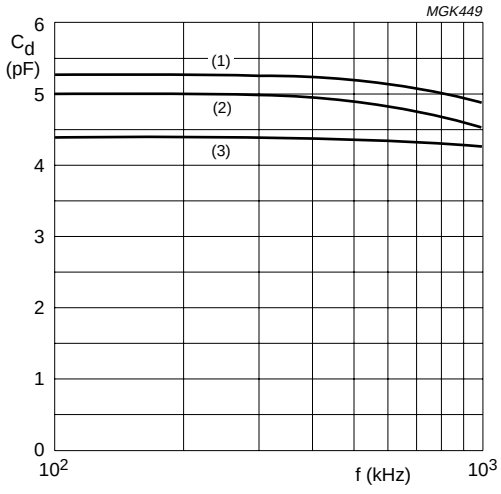
T_j = 25 °C.
(1) V_R = 0.
(2) V_R = 2 V.

Fig.7 Diode capacitance as a function of frequency; typical values.



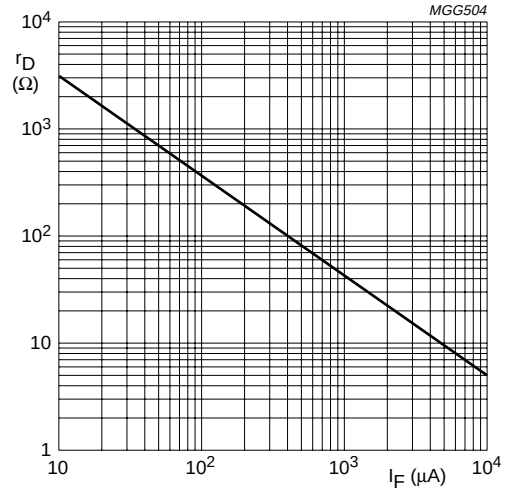
(1) T_j = 85 °C.
(2) T_j = 25 °C.
(3) T_j = –40 °C.
V_R = 0.

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



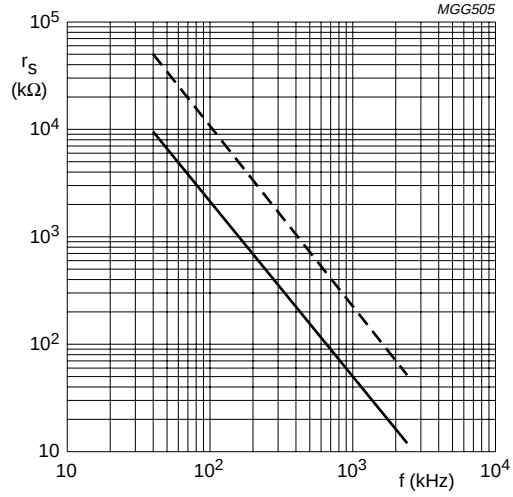
(1) T_j = 85 °C.
(2) T_j = 25 °C.
(3) T_j = –40 °C.
V_R = 2 V.

Fig.9 Diode capacitance as a function of frequency; typical values.



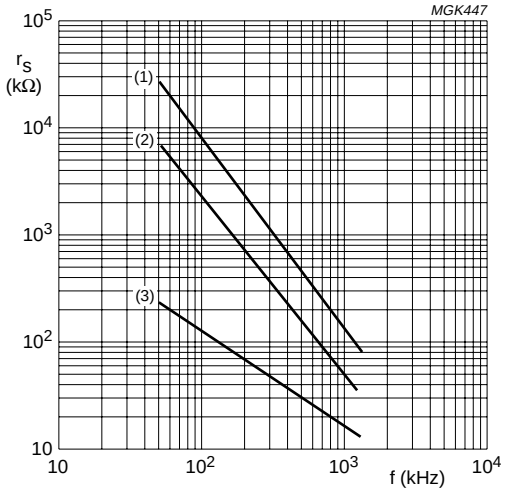
f = 100 kHz; see Fig.16.

Fig.10 Diode forward resistance as a function of forward current; typical values.



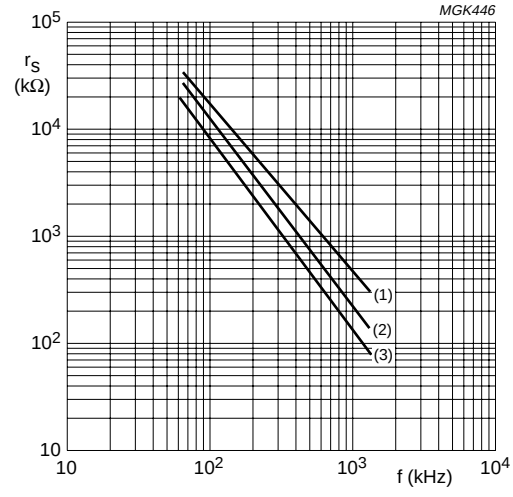
T_j = 25 °C.
Solid line: V_R = 0.
Dotted line: V_R = 2 V.

Fig.11 Diode series resistance as a function of frequency; typical values.



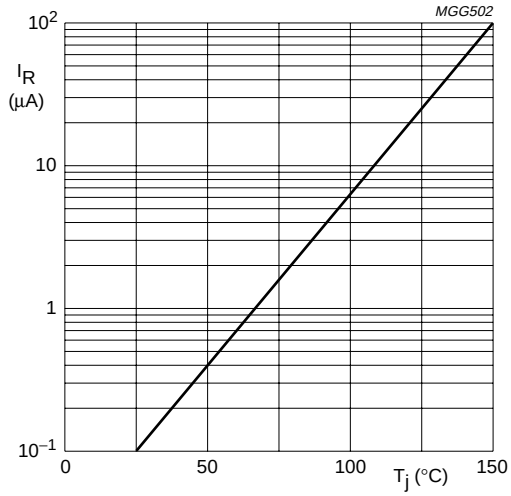
(1) T_j = –40 °C.
(2) T_j = 25 °C.
(3) T_j = 85 °C.
V_R = 0.

Fig.12 Diode series resistance as a function of frequency; typical values.



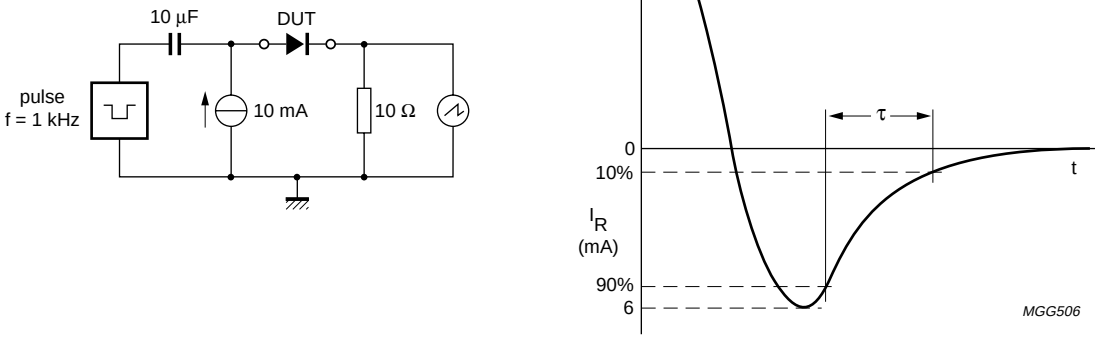
(1) T_j = –40 °C.
(2) T_j = 25 °C.
(3) T_j = 85 °C.
V_R = 2 V.

Fig.13 Diode series resistance as a function of frequency; typical values.



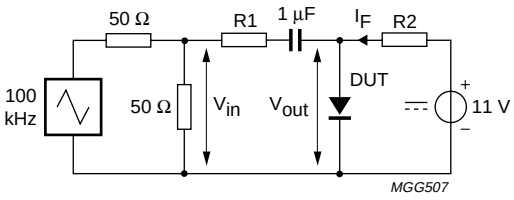
$V_R = V_{RRMmax.}$

Fig.14 Reverse current as a function of junction temperature; maximum values.



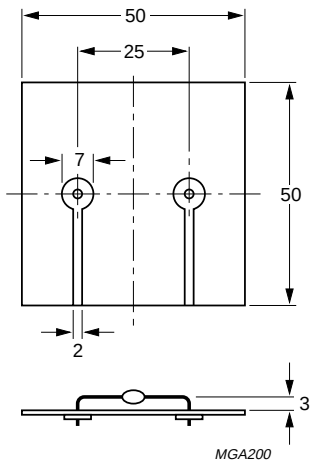
Input impedance of oscilloscope: 1 MΩ, 22 pF; $t_r \leq 7$ ns.
Source impedance: 50 Ω; $t_r \leq 15$ ns.

Fig.15 Charge carrier life time test circuit and definition.



I_F (mA)	R1 (Ω)	R2 (kΩ)
0.1	3000	100
1	300	10
10	30	1

Fig.16 Diode forward resistance test circuit.

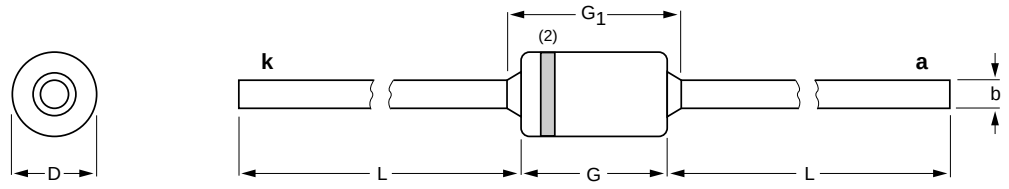


Dimensions in mm.

Fig.17 Device mounted on a printed-circuit board.

PACKAGE OUTLINE

Hermetically sealed glass package;
Implotec™(1) technology; axial leaded; 2 leads **SOD81**



DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G max.	G_1 max.	L min.
mm	0.81	2.15	3.8	5	28

0 1 2 mm
scale

Note

1. Implotec is a trademark of Philips.
2. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD81						97-06-20

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.	

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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.

NOTES

NOTES

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