

DATA SHEET

BAT93 Schottky barrier diode

Product specification
File under Discrete Semiconductors, SC01

December 1993

Philips Semiconductors



PHILIPS

Schottky barrier diode

BAT93

FEATURES

- Ultra-fast switching speed
- Low forward voltage
- Two-pin SMD package.

DESCRIPTION

Silicon epitaxial Schottky barrier diode with an integrated guard ring for stress protection. Intended for high speed switching, circuit protection and voltage clamping applications. The diode is encapsulated in a SOD123 SMD plastic package.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_R	continuous reverse voltage		30	V
I_F	continuous forward current		200	mA
V_F	forward voltage	$I_F = 10\text{ mA}$	400	mV
I_R	reverse current	$V_R = 25\text{ V}$	2	μA
T_j	junction temperature		150	$^{\circ}\text{C}$
C_d	diode capacitance	$V_R = 1\text{ V}$	10	pF

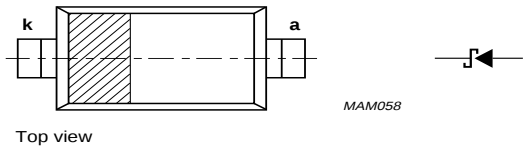


Fig.1 Simplified outline (SOD123) and symbol.

Schottky barrier diode

BAT93

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_R	continuous reverse voltage		–	30	V
I_F	continuous forward current		–	200	mA
I_{FRM}	repetitive peak forward current	$t_p \leq 1 \text{ s}$; $\delta \leq 0.5$	–	300	mA
I_{FSM}	non-repetitive peak forward current	$t_p < 10 \text{ ms}$	–	600	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25^\circ\text{C}$	–	250	mW
T_{stg}	storage temperature		–65	+150	$^\circ\text{C}$
T_{amb}	operating ambient temperature		–65	+150	$^\circ\text{C}$
T_j	junction temperature		–	150	$^\circ\text{C}$

THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
$R_{th\ j-a}$	from junction to ambient; note 1	500 K/W

Note

1. Printed-circuit board mounting (SOD123 standard conditions).

CHARACTERISTICS

$T_j = 25^\circ\text{C}$ unless otherwise specified.

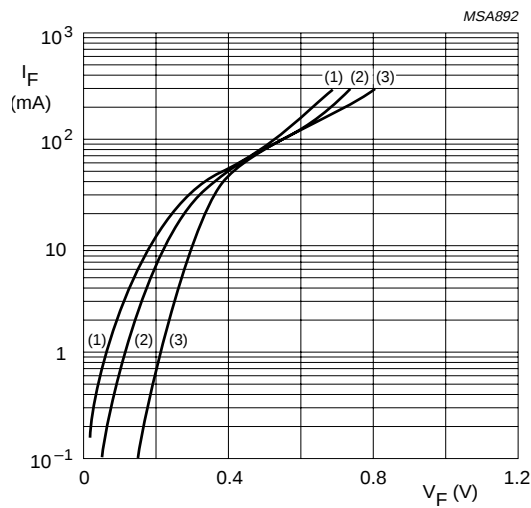
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_F	forward voltage	$I_F = 0.1 \text{ mA}$	–	240	mV
		$I_F = 1 \text{ mA}$	–	320	mV
		$I_F = 10 \text{ mA}$	–	400	mV
		$I_F = 30 \text{ mA}$	–	500	mV
		$I_F = 100 \text{ mA}$	–	800	mV
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 10 \mu\text{A}$	30	–	V
I_R	reverse current	$V_R = 25 \text{ V}$; note 1	–	2	μA
C_d	diode capacitance	$V_R = 1 \text{ V}$; $f = 1 \text{ MHz}$	–	10	pF
t_{rr}	reverse recovery time	when switched from $I_F = 10 \text{ mA}$ to $I_R = 10 \text{ mA}$; $R_L = 100 \Omega$; measured at $I_R = 1 \text{ mA}$	–	5	ns

Note

1. Pulsed test: $t_p = 300 \mu\text{s}$; $\delta = 0.02$.

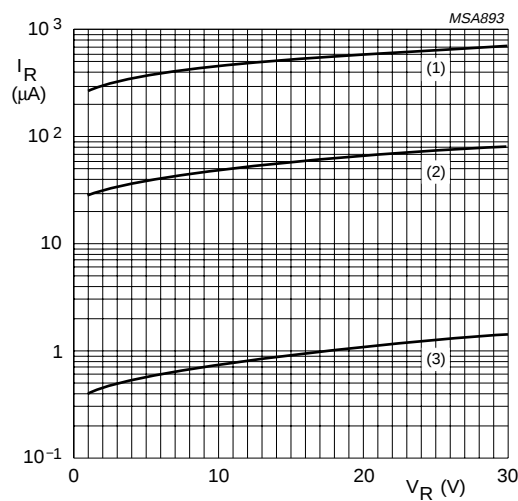
Schottky barrier diode

BAT93



- (1) $T_{amb} = 125^\circ\text{C}$.
- (2) $T_{amb} = 85^\circ\text{C}$.
- (3) $T_{amb} = 25^\circ\text{C}$.

Fig.2 Forward current as a function of forward voltage.



- (1) $T_{amb} = 125^\circ\text{C}$.
- (2) $T_{amb} = 85^\circ\text{C}$.
- (3) $T_{amb} = 25^\circ\text{C}$.

Fig.3 Reverse current as a function of reverse voltage.

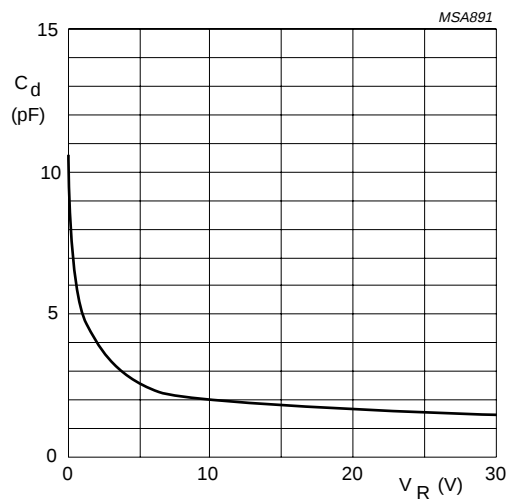


Fig.4 Diode capacitance as a function of reverse voltage.

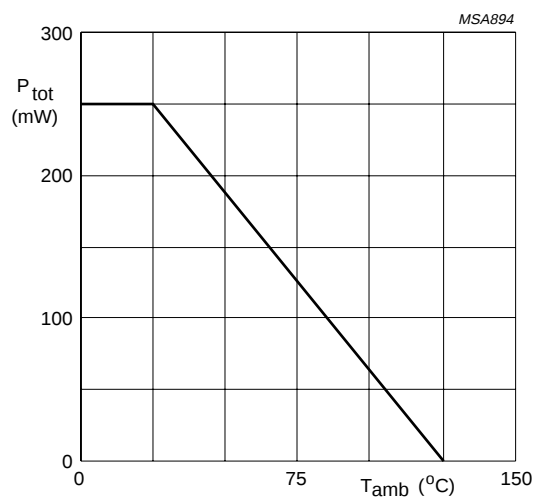
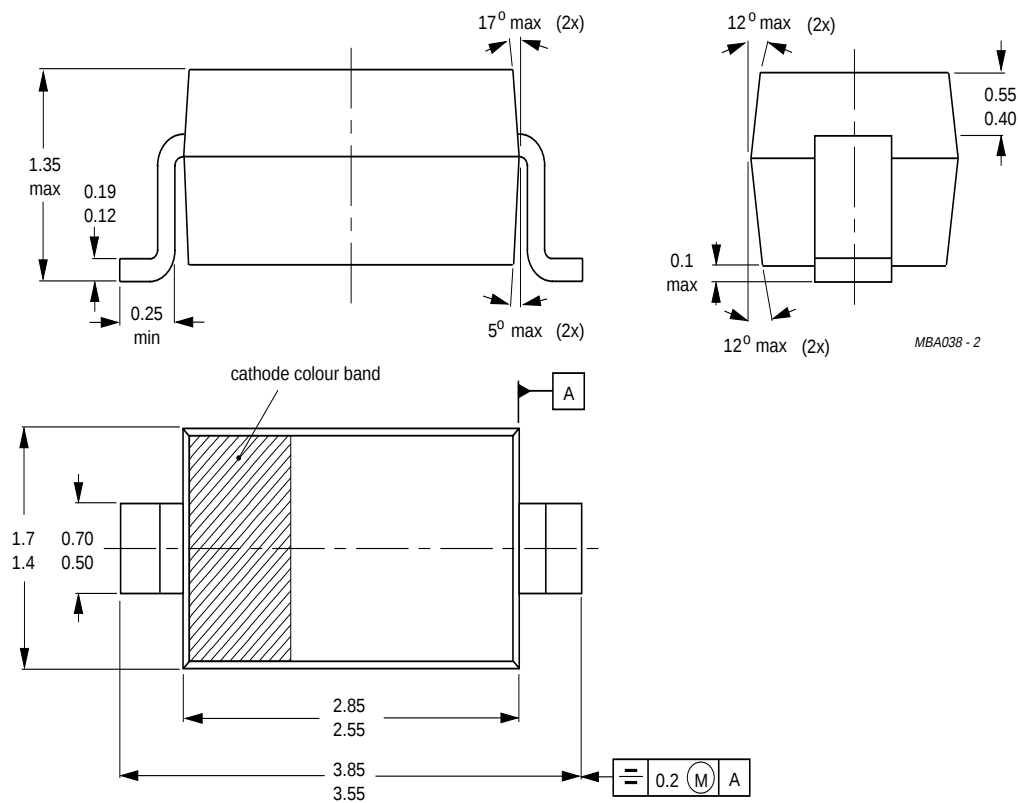


Fig.5 Power derating curve.

Schottky barrier diode

BAT93

PACKAGE OUTLINE



Dimensions in mm.

Fig.6 SOD123.

Schottky barrier diode

BAT93

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.

Schottky barrier diode

BAT93

NOTES

Philips Semiconductors – a worldwide company

Argentina: IEROD, Av. Juramento 1991 - 14.B, (1428) Buenos Aires,
Tel. (541)786 7633, Fax. (541)786 9367

Australia: 34 Waterloo Road, NORTH RYDE, NSW 2113,
Tel. (02)805 4455, Fax. (02)805 4466

Austria: Triester Str. 64, A-1101 WIEN, P.O. Box 213,
Tel. (01)60 101-1236, Fax. (01)60 101-1211

Belgium: Postbus 90050, 5600 PB EINDHOVEN, The Netherlands,
Tel. (31)40 783 749, Fax. (31)40 788 399

Brazil: Rua do Rocio 220 - 5th floor, Suite 51,
CEP: 04552-000-SÃO PAULO-SP, Brazil.
P.O. Box 7383 (01064-970).
Tel. (011)829-1166, Fax. (011)829-1849

Canada: INTEGRATED CIRCUITS:
Tel. (800)234-7381, Fax. (708)296-8556
DISCRETE SEMICONDUCTORS: 601 Milner Ave,
SCARBOROUGH, ONTARIO, M1B 1M8,
Tel. (0416)292 5161 ext. 2336, Fax. (0416)292 4477

Chile: Av. Santa Maria 0760, SANTIAGO,
Tel. (02)773 816, Fax. (02)777 6730

Colombia: Carrera 21 No. 56-17, BOGOTA, D.E., P.O. Box 77621,
Tel. (571)217 4609, Fax. (01)217 4549

Denmark: Prags Boulevard 80, PB 1919, DK-2300 COPENHAGEN S,
Tel. (032)88 2636, Fax. (031)57 1949

Finland: Sinikalliontie 3, SF-02630 ESPOO,
Tel. (9)0-50261, Fax. (9)0-520971

France: 4 rue du Port-aux-Vins, BP317,
92156 SURESNES Cedex,
Tel. (01)4099 6161, Fax. (01)4099 6427

Germany: P.O. Box 10 63 23, 20095 HAMBURG ,
Tel. (040)3296-0, Fax. (040)3296 213

Greece: No. 15, 25th March Street, GR 17778 TAVROS,
Tel. (01)4894 339/4894 911, Fax. (01)4814 240

Hong Kong: 15/F Philips Ind. Bldg., 24-28 Kung Yip St.,
KWAI CHUNG, Tel. (0)4245 121, Fax. (0)4806 960

India: PEICO ELECTRONICS & ELECTRICALS Ltd.,
Components Dept., Shivsagar Estate, Block 'A',
Dr. Annie Besant Rd., Worli, BOMBAY-400 018,
Tel. (022)4938 541, Fax. (022)4938 722

Indonesia: Philips House, Jalan H.R. Rasuna Said Kav. 3-4,
P.O. Box 4252, JAKARTA 12950,
Tel. (021)5201 122, Fax. (021)5205 189

Ireland: Newstead, Clonskeagh, DUBLIN 14,
Tel. (01)640 000, Fax. (01)640 200

Italy: Viale F. Testi, 327, 20162-MILANO,
Tel. (02)6752.1, Fax. (02)6752.3350

Japan: Philips Bldg 13-37, Kohnan 2-chome, Minato-ku, TOKIO 108,
Tel. (03)3740 5101, Fax. (03)3740 0570

Korea: (Republic of) Philips House, 260-199 Itaewon-dong,
Yongsan-ku, SEOUL, Tel. (02)794-5011, Fax. (02)798-8022

Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA,
SELANGOR, Tel. (03)757 5511, Fax. (03)757 4880

Mexico: Philips Components, 5900 Gateway East, Suite 200,
EL PASO, TX 79905, Tel. 9-5(800)234-7381, Fax. (708)296-8556

Netherlands: Postbus 90050, 5600 PB EINDHOVEN,
Tel. (040)78 37 49, Fax. (040)78 83 99

New Zealand: 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. (09)849-4160, Fax. (09)849-7811

Norway: Box 1, Manglerud 0612, OSLO,
Tel. (22)74 8000, Fax. (22)74 8341

Pakistan: Philips Markaz, M.A. Jinnah Rd., KARACHI-3,
Tel. (021)577 039, Fax. (021)569 1832

Philippines: PHILIPS SEMICONDUCTORS PHILIPPINES Inc,
106 Valero St. Salcedo Village, P.O. Box 911, MAKATI,
Metro MANILA, Tel. (02)810 0161, Fax. (02)817 3474

Portugal: Av. Eng. Duarte Pacheco 6, 1009 LISBOA Codex,
Tel. (01)683 121, Fax. (01)658 013

Singapore: Lorong 1, Toa Payoh, SINGAPORE 1231,
Tel. (65)350 2000, Fax. (65)251 6500

South Africa: 195-215 Main Road, Martindale,
P.O. Box 7430, JOHANNESBURG 2000,
Tel. (011)470-5433, Fax. (011)470-5494

Spain: Balmes 22, 08007 BARCELONA,
Tel. (93)301 6312, Fax. (93)301 4243

Sweden: Kottbygatan 7, Akalla. S-164 85 STOCKHOLM,
Tel. (0)8-632 2000, Fax. (0)8-632 2745

Switzerland: Allmendstrasse 140, CH-8027 ZÜRICH,
Tel. (01)488 2211, Fax. (01)481 7730

Taiwan: 69, Min Sheng East Road, Sec 3, P.O. Box 22978,
TAIPEI 10446, Tel. (2)509 7666, Fax. (2)500 5899

Thailand: PHILIPS ELECTRONICS (THAILAND) Ltd.,
60/14 MOO 11, Bangna - Trad Road Km. 3
Prakanong, BANGKOK 10260,
Tel. (2)399-3280 to 9, (2)398-2083, Fax. (2)398-2080

Turkey: Talatpasa Cad. No. 5, 80640 LEVENT/ISTANBUL,
Tel. (01)279 2770, Fax. (01)269 3094

United Kingdom: Philips Semiconductors Limited, P.O. Box 65, Philips
House, Torrington Place, LONDON, WC1E 7HD,
Tel. (071)436 41 44, Fax. (071)323 03 42

United States: INTEGRATED CIRCUITS:
811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
Tel. (800)234-7381, Fax. (708)296-8556
DISCRETE SEMICONDUCTORS: 2001 West Blue Heron Blvd.,
P.O. Box 10330, RIVIERA BEACH, FLORIDA 33404,
Tel. (800)447-3762 and (407)881-3200, Fax. (407)881-3300

Uruguay: Coronel Mora 433, MONTEVIDEO,
Tel. (02)70-4044, Fax. (02)92 0601

For all other countries apply to: Philips Semiconductors,
International Marketing and Sales, Building BAF-1,
P.O. Box 218, 5600 MD, EINDHOVEN, The Netherlands,
Telex 35000 phtchnl, Fax. +31-40-724825

SCD24

© Philips Electronics N.V. 1993

All rights are reserved. Reproduction in whole or in part is prohibited
without the prior written consent of the copyright owner.

The information presented in this document does not form part of any
quotation or contract, is believed to be accurate and reliable and may
be changed without notice. No liability will be accepted by the publisher
for any consequence of its use. Publication thereof does not convey nor
imply any license under patent- or other industrial or intellectual property
rights.

Printed in The Netherlands

9397 722 40011

Philips Semiconductors



PHILIPS