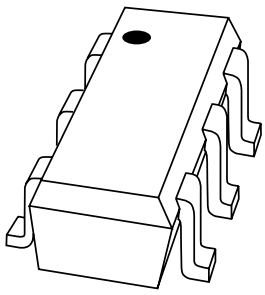
# DATA SHEET



# BAV99S
## High-speed switching diode array

Product specification
Supersedes data of 2001 Mar 02

2001 May 14

Philips
Semiconductors

PHILIPS

# High-speed switching diode array BAV99S

## FEATURES

- Small plastic SMD package
- High switching speed
- Two electrically isolated series configuration arrays
- Low capacitance.

## APPLICATIONS

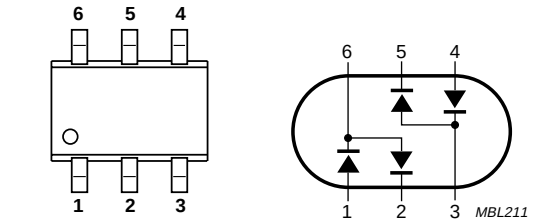
- General purpose switching in e.g. surface mounted circuits.
- Rail to rail (ESD) protection.

## DESCRIPTION

The BAV99S consists of four single die high speed switching diodes in two electrically isolated series configurations, encapsulated in the small SMD SC-88 (SOT363) plastic package.

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | anode (a1) |
| 2 | cathode (k2) |
| 3 | cathode (k3)/anode (a4) |
| 4 | anode (a3) |
| 5 | cathode (k4) |
| 6 | cathode (k1)/anode (a2) |




**Marking code:** K1.

Fig.1 Simplified outline (SC-88; SOT363) and symbol.

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|---|---|---|---|---|---|
| **Per diode** | | | | | |
| $V_{RRM}$ | repetitive peak reverse voltage | | – | 85 | V |
| $V_R$ | continuous reverse voltage | | – | 75 | V |
| $I_F$ | continuous forward current | | – | 200 | mA |
| $I_{FRM}$ | repetitive peak forward current | | – | 450 | mA |
| $I_{FSM}$ | non-repetitive peak forward current | square wave; $T_j$ = 25 °C prior to surge; see Fig.4 | | | |
| | | t = 1 μs | – | 4.5 | A |
| | | t = 1 ms | – | 1 | A |
| | | t = 1 s | – | 0.5 | A |
| $P_{tot}$ | total power dissipation | $T_s \leq 85$ °C; note 1 | – | 250 | mW |
| $T_{stg}$ | storage temperature | | –65 | +150 | °C |
| $T_j$ | junction temperature | | –65 | +150 | °C |

**Note**

1. Solder points at pins: 2, 3, 5 and 6.

## ELECTRICAL CHARACTERISTICS

$T_j$ = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MAX. | UNIT |
|---|---|---|---|---|
| **Per diode** | | | | |
| $V_F$ | forward voltage | see Fig.3 | | |
| | | $I_F$ = 1 mA | 715 | mV |
| | | $I_F$ = 10 mA | 855 | mV |
| | | $I_F$ = 50 mA | 1 | V |
| | | $I_F$ = 150 mA | 1.25 | V |
| $I_R$ | reverse current | see Fig.5 | | |
| | | $V_R$ = 75 V | 1 | µA |
| | | $V_R$ = 25 V; $T_j$ = 150 °C | 30 | µA |
| | | $V_R$ = 75 V; $T_j$ = 150 °C | 50 | µA |
| $C_d$ | diode capacitance | $V_R$ = 0; f = 1 MHz; see Fig.6 | 1.5 | pF |
| $t_{rr}$ | reverse recovery time | when switched from $I_F$ = 10 mA to $I_R$ = 10 mA; $R_L$ = 100 Ω; measured at $I_R$ = 1 mA; see Fig.7 | 4 | ns |
| $V_{fr}$ | forward recovery voltage | when switched to $I_F$ = 10 mA; $t_r$ = 20 ns; see Fig.8 | 1.75 | V |

## THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|
| $R_{th\ j\text{-}s}$ | thermal resistance from junction to soldering point | note 1 | ≤260 | K/W |

**Note**

1. Solder points at pins: 2, 3, 5 and 6.

## GRAPHICAL DATA

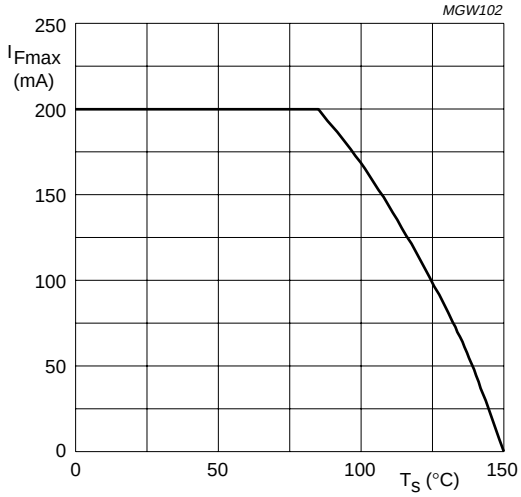
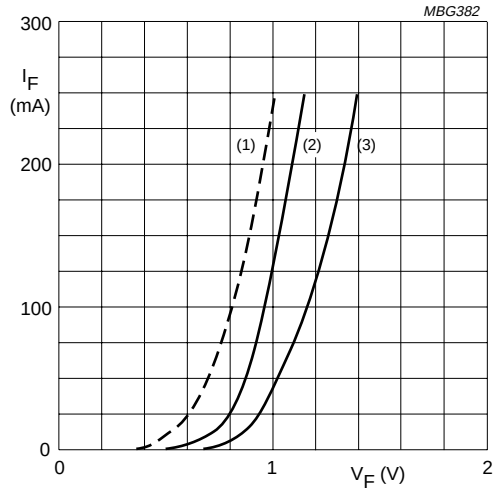
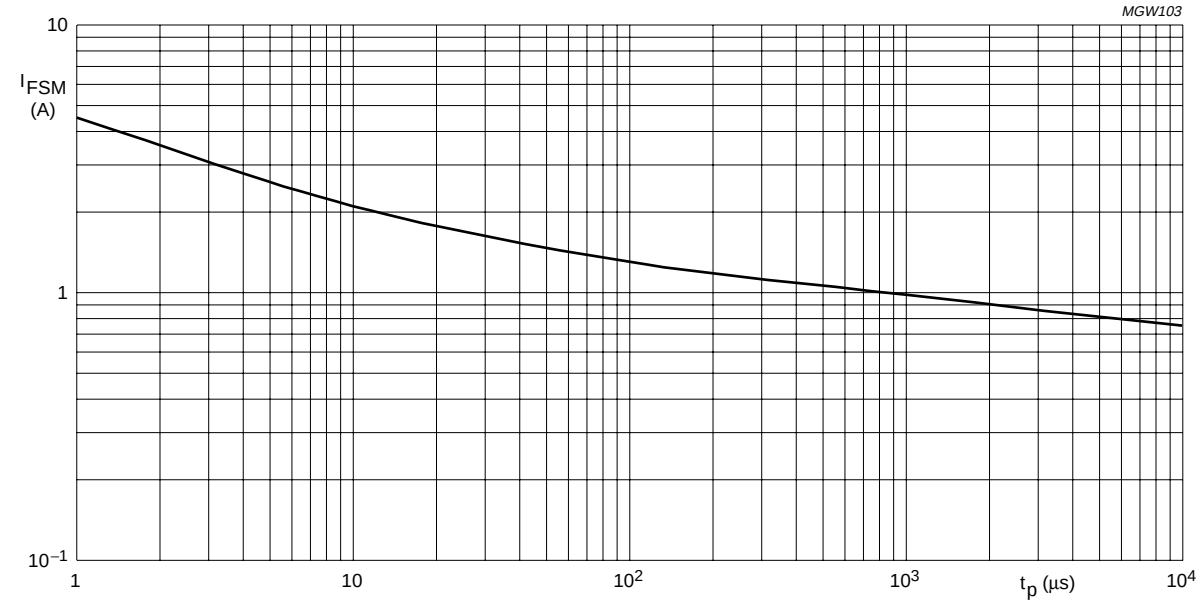



Fig.2 Maximum permissible continuous forward current as a function of soldering point temperature.




(1) $T_j$ = 150 °C; typical values.
(2) $T_j$ = 25 °C; typical values.
(3) $T_j$ = 25 °C; maximum values.

Fig.3 Forward current as a function of forward voltage.




Based on square wave currents.
$T_j$ = 25 °C prior to surge.

Fig.4 Maximum permissible non-repetitive peak forward current as a function of pulse duration.

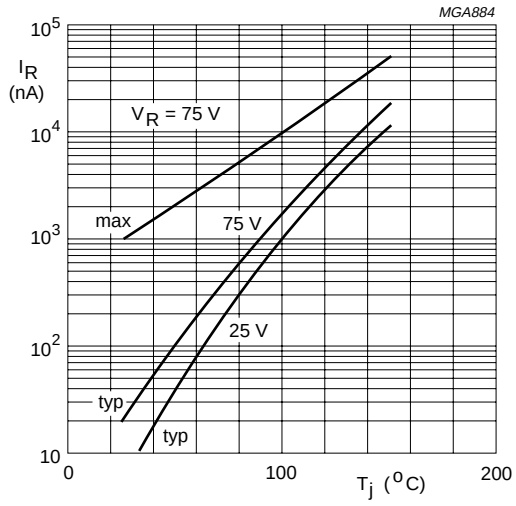
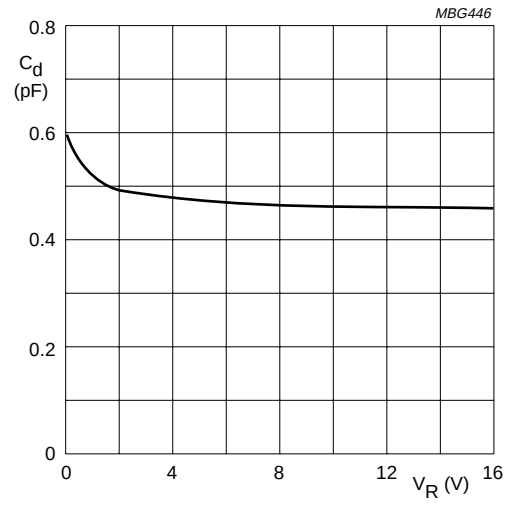
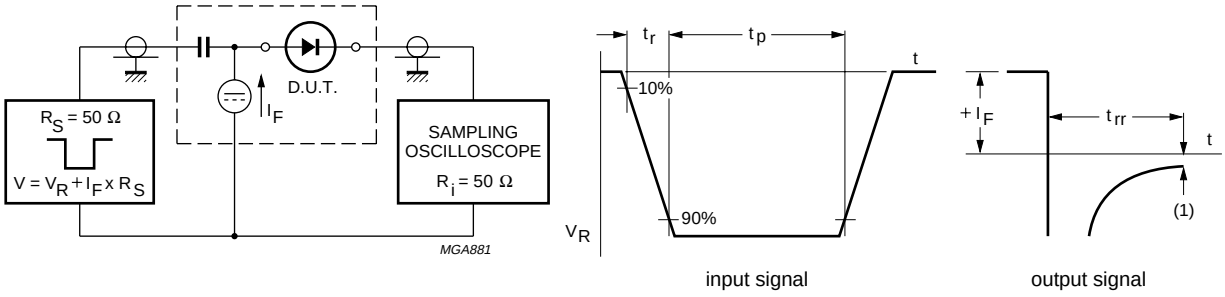



Fig.5 Reverse current as a function of junction temperature.



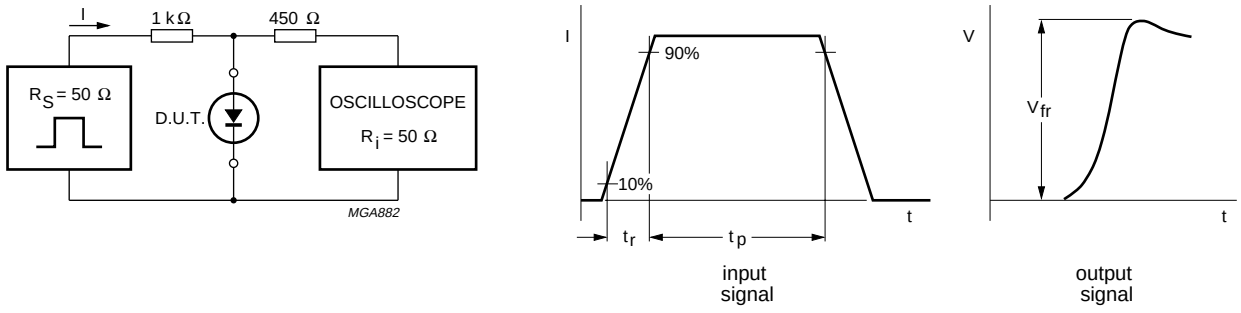

f = 1 MHz; $T_j$ = 25 °C.

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




(1) $I_R$ = 1 mA.
Input signal: reverse pulse rise time $t_r$ = 0.6 ns; reverse voltage pulse duration $t_p$ = 100 ns; duty factor δ = 0.05.
Oscilloscope: rise time $t_r$ = 0.35 ns.

Fig.7 Reverse recovery voltage test circuit and waveforms.

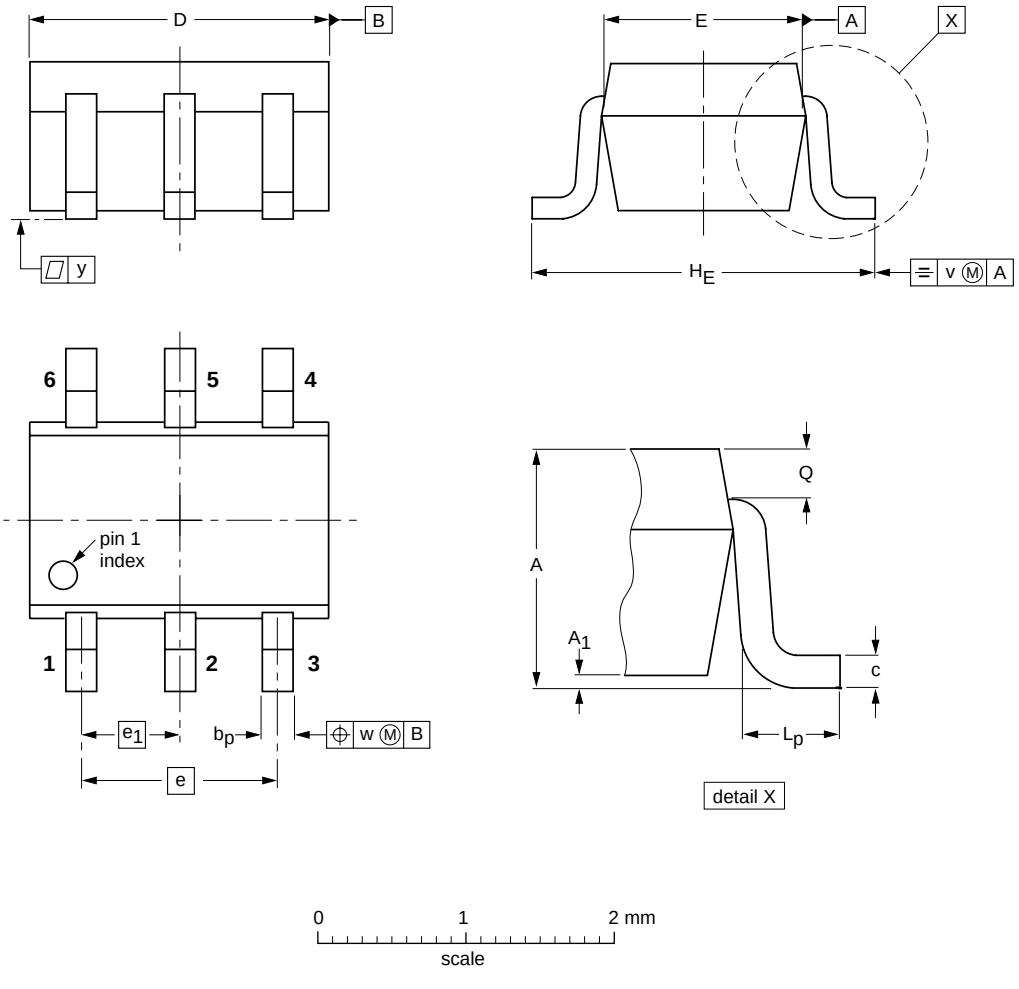



Input signal: forward pulse rise time $t_r$ = 20 ns; forward current pulse duration $t_p \geq$ 100 ns; duty factor δ ≤ 0.005.

Fig.8 Forward recovery voltage test circuit and waveforms.

## PACKAGE OUTLINE

**Plastic surface mounted package; 6 leads** **SOT363**




**DIMENSIONS (mm are the original dimensions)**

| UNIT | A | $A_1$ max | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w | y |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.1<br>0.8 | 0.1 | 0.30<br>0.20 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0 | 0.45<br>0.15 | 0.25<br>0.15 | 0.2 | 0.2 | 0.1 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | EIAJ | | | |
| SOT363 | | | SC-88 | | | 97-02-28 |

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# *Philips Semiconductors – a worldwide company*


**Argentina:** see South America

**Australia:** 3 Figtree Drive, HOMEBUSH, NSW 2140,
Tel. +61 2 9704 8141, Fax. +61 2 9704 8139

**Austria:** Computerstr. 6, A-1101 WIEN, P.O. Box 213,
Tel. +43 1 60 101 1248, Fax. +43 1 60 101 1210

**Belarus:** Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
220050 MINSK, Tel. +375 172 20 0733, Fax. +375 172 20 0773

**Belgium:** see The Netherlands

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**Bulgaria:** Philips Bulgaria Ltd., Energoproject, 15th floor,
51 James Bourchier Blvd., 1407 SOFIA,
Tel. +359 2 68 9211, Fax. +359 2 68 9102

**Canada:** PHILIPS SEMICONDUCTORS/COMPONENTS,
Tel. +1 800 234 7381, Fax. +1 800 943 0087

**China/Hong Kong:** 501 Hong Kong Industrial Technology Centre,
72 Tat Chee Avenue, Kowloon Tong, HONG KONG,
Tel. +852 2319 7888, Fax. +852 2319 7700

**Colombia:** see South America

**Czech Republic:** see Austria

**Denmark:** Sydhavnsgade 23, 1780 COPENHAGEN V,
Tel. +45 33 29 3333, Fax. +45 33 29 3905

**Finland:** Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615 800, Fax. +358 9 6158 0920

**France:** 7 - 9 Rue du Mont Valérien, BP317, 92156 SURESNES Cedex,
Tel. +33 1 4728 6600, Fax. +33 1 4728 6638

**Germany:** Hammerbrookstraße 69, D-20097 HAMBURG,
Tel. +49 40 2353 60, Fax. +49 40 2353 6300

**Hungary:** Philips Hungary Ltd., H-1119 Budapest, Fehervari ut 84/A,
Tel: +36 1 382 1700, Fax: +36 1 382 1800

**India:** Philips INDIA Ltd, Band Box Building, 2nd floor,
254-D, Dr. Annie Besant Road, Worli, MUMBAI 400 025,
Tel. +91 22 493 8541, Fax. +91 22 493 0966

**Indonesia:** PT Philips Development Corporation, Semiconductors Division,
Gedung Philips, Jl. Buncit Raya Kav.99-100, JAKARTA 12510,
Tel. +62 21 794 0040 ext. 2501, Fax. +62 21 794 0080

**Ireland:** Newstead, Clonskeagh, DUBLIN 14,
Tel. +353 1 7640 000, Fax. +353 1 7640 200

**Israel:** RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,
TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

**Italy:** PHILIPS SEMICONDUCTORS, Via Casati, 23 - 20052 MONZA (MI),
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**Japan:** Philips Bldg 13-37, Kohnan 2-chome, Minato-ku,
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**Korea:** Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
Tel. +82 2 709 1412, Fax. +82 2 709 1415

**Malaysia:** No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,
Tel. +60 3 750 5214, Fax. +60 3 757 4880

**Mexico:** 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,
Tel. +9-5 800 234 7381, Fax +9-5 800 943 0087

**Middle East:** see Italy

**Netherlands:** Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB,
Tel. +31 40 27 82785, Fax. +31 40 27 88399

**New Zealand:** 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. +64 9 849 4160, Fax. +64 9 849 7811

**Norway:** Box 1, Manglerud 0612, OSLO,
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04547-130 SÃO PAULO, SP, Brazil,
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TAIPEI, Taiwan Tel. +886 2 2134 2451, Fax. +886 2 2134 2874

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ISTANBUL, Tel. +90 216 522 1500, Fax. +90 216 522 1813

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252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

**United Kingdom:** Philips Semiconductors Ltd., 276 Bath Road, Hayes,
MIDDLESEX UB3 5BX, Tel. +44 208 730 5000, Fax. +44 208 754 8421

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