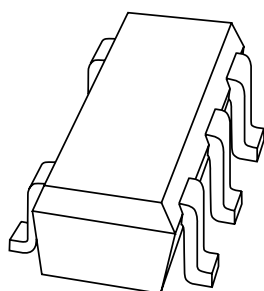


# DATA SHEET



## **BZA800AVL series** Quadruple low capacitance ESD suppressor

Product specification

2003 Apr 01

Quadruple low capacitance ESD suppressor

BZA800AVL series

FEATURES

- Low diode capacitance
- Low leakage current
- SOT353 (SC-88A) surface mount package
- Common anode configuration.

APPLICATIONS

- Communication systems
- Computers and peripherals
- Audio and video equipment.

DESCRIPTION

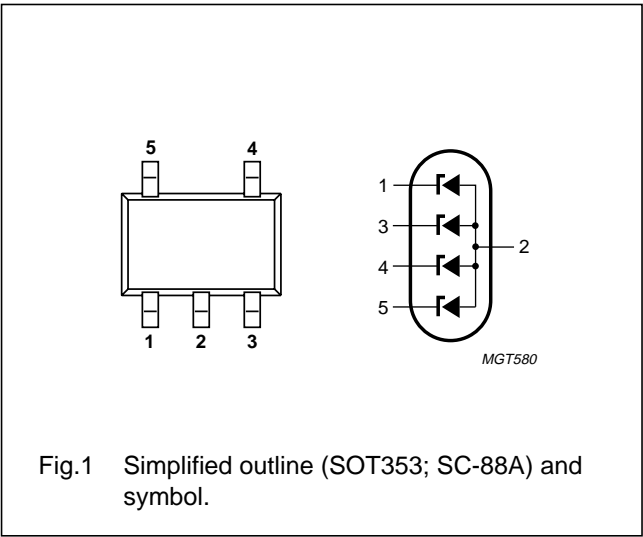
Monolithic transient voltage suppressor diode in a five lead SOT353 (SC-88A) package for 4-bit wide ESD transient suppression.

MARKING

TYPE NUMBER	MARKING CODE
BZA856AVL	R3
BZA862AVL	R2
BZA868AVL	R1

PINNING

PIN	DESCRIPTION
1	cathode 1
2	common anode
3	cathode 2
4	cathode 3
5	cathode 4



# Quadruple low capacitance ESD suppressor

## BZA800AVL series

### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Per diode</b>					
$I_Z$	working current	$T_{amb} = 25\text{ °C}$	–	note 1	mA
$I_F$	continuous forward current	$T_{amb} = 25\text{ °C}$	–	200	mA
$I_{FSM}$	non-repetitive peak forward current	$t_p = 1\text{ ms}$ ; square pulse	–	3.5	A
$P_{tot}$	total power dissipation	$T_{amb} = 25\text{ °C}$ ; note 2; see Fig.5	–	300	mW
$P_{ZSM}$	non repetitive peak reverse power dissipation	square pulse; $t_p = 1\text{ ms}$	–	6	W
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
ESD	electrostatic discharge	IEC 61000-4-2 (contact discharge)	30	–	kV
		HBM MIL-Std 883	10	–	kV

### Notes

- DC working current limited by  $P_{tot(max)}$ .
- Device mounted on standard printed-circuit board.

### ESD STANDARDS COMPLIANCE

STANDARD	CONDITIONS
IEC 61000-4-2, level 4 (ESD)	>15 kV (air); >8 kV (contact discharge)
HBM MIL-Std 883, class 3	>4 kV

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	all diodes loaded	410	K/W
$R_{th\ j-s}$	thermal resistance from junction to solder point; note 1	one diode loaded	200	K/W
		all diodes loaded	185	K/W

### Note

- Solder point of common anode (pin 2).

# Quadruple low capacitance ESD suppressor

## BZA800AVL series

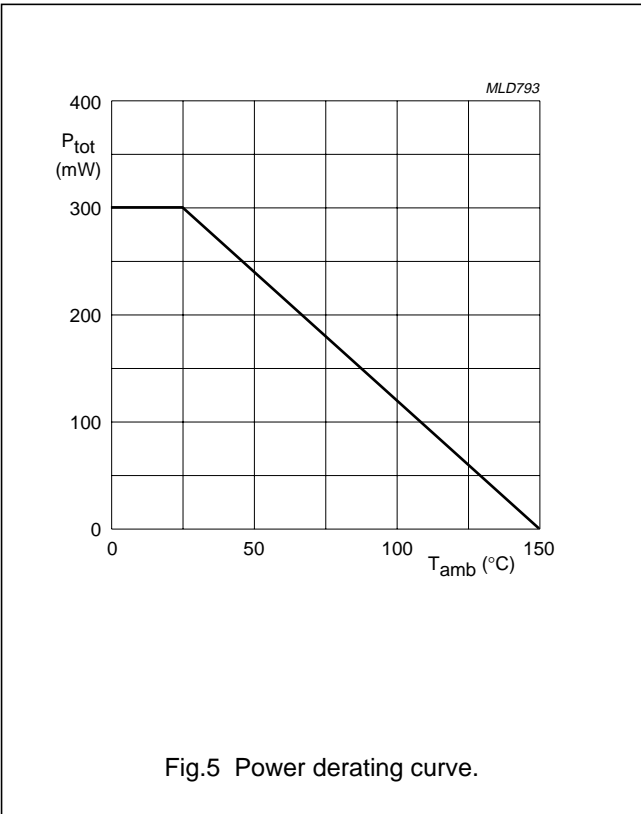
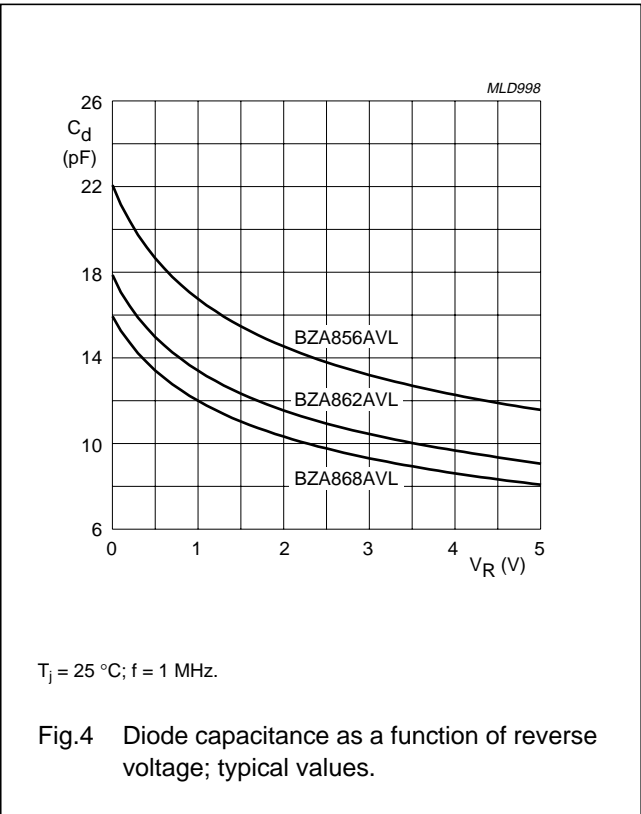
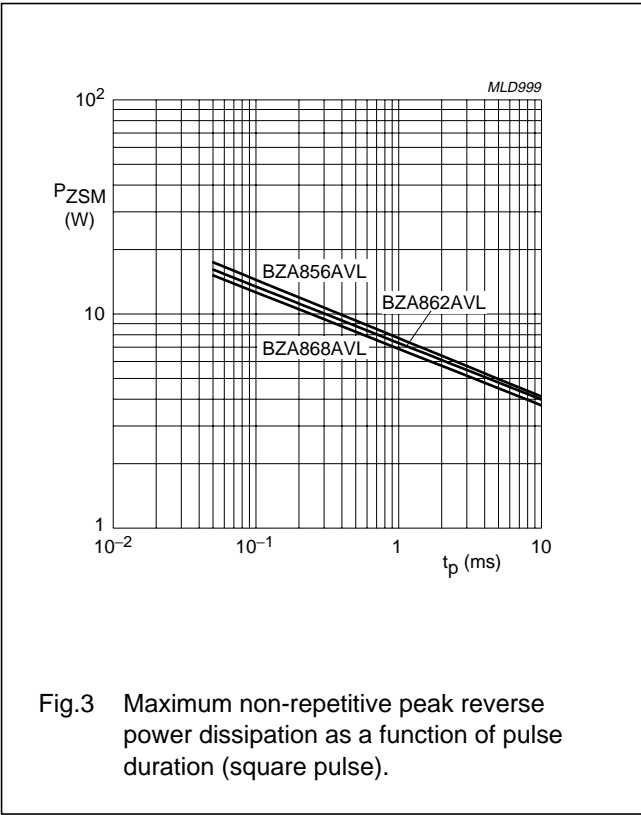
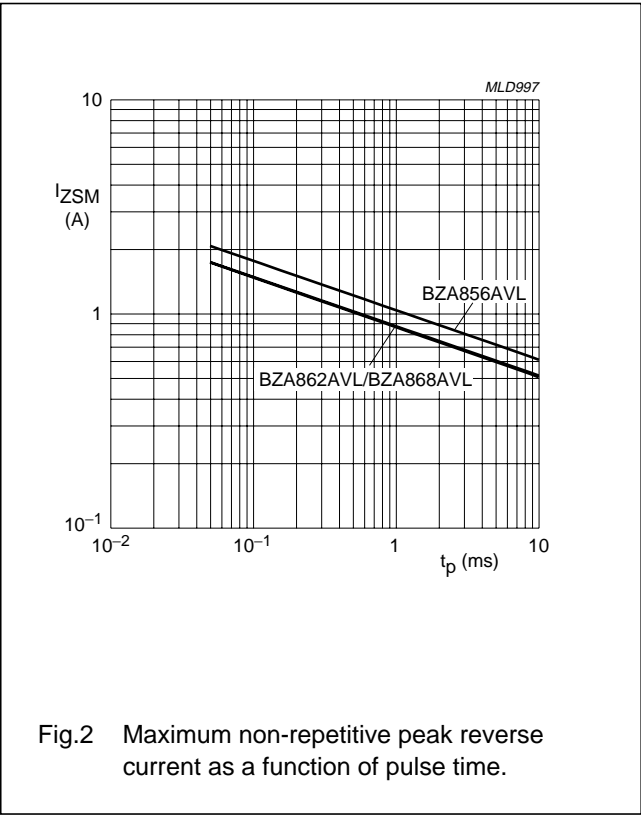
### ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_F$	forward voltage	$I_F = 200\text{ mA}$	–	–	1.2	V
$I_R$	reverse current					
	BZA856AVL	$V_R = 3\text{ V}$	–	–	200	nA
	BZA862AVL	$V_R = 4\text{ V}$	–	–	100	nA
	BZA868AVL	$V_R = 4.3\text{ V}$	–	–	20	nA
$V_Z$	working voltage	$I_Z = 1\text{ mA}$				
	BZA856AVL		5.32	5.6	5.88	V
	BZA862AVL		5.89	6.2	6.51	V
	BZA868AVL		6.46	6.8	7.14	V
$r_{dif}$	differential resistance	$I_Z = 1\text{ mA}$				
	BZA856AVL		–	–	200	$\Omega$
	BZA862AVL		–	–	150	$\Omega$
	BZA868AVL		–	–	100	$\Omega$
$S_Z$	temperature coefficient	$I_Z = 1\text{ mA}$				
	BZA856AVL		–	1.3	–	mV/K
	BZA862AVL		–	2.4	–	mV/K
	BZA868AVL		–	2.9	–	mV/K
$C_d$	diode capacitance	$f = 1\text{ MHz}; V_R = 0$				
	BZA856AVL		–	22	28	pF
	BZA862AVL		–	18	22	pF
	BZA868AVL		–	16	19	pF
	diode capacitance	$f = 1\text{ MHz}; V_R = 5\text{ V}$				
	BZA856AVL		–	12	17	pF
	BZA862AVL		–	9	12	pF
	BZA868AVL		–	8	11	pF
$I_{ZSM}$	non-repetitive peak reverse current	$t_p = 1\text{ ms}; T_{amb} = 25\text{ °C}$				
	BZA856AVL		–	–	0.90	A
	BZA862AVL		–	–	0.85	A
	BZA868AVL		–	–	0.80	A

Quadruple low capacitance ESD suppressor

BZA800AVL series



Quadruple low capacitance ESD suppressor

## BZA800AVL series

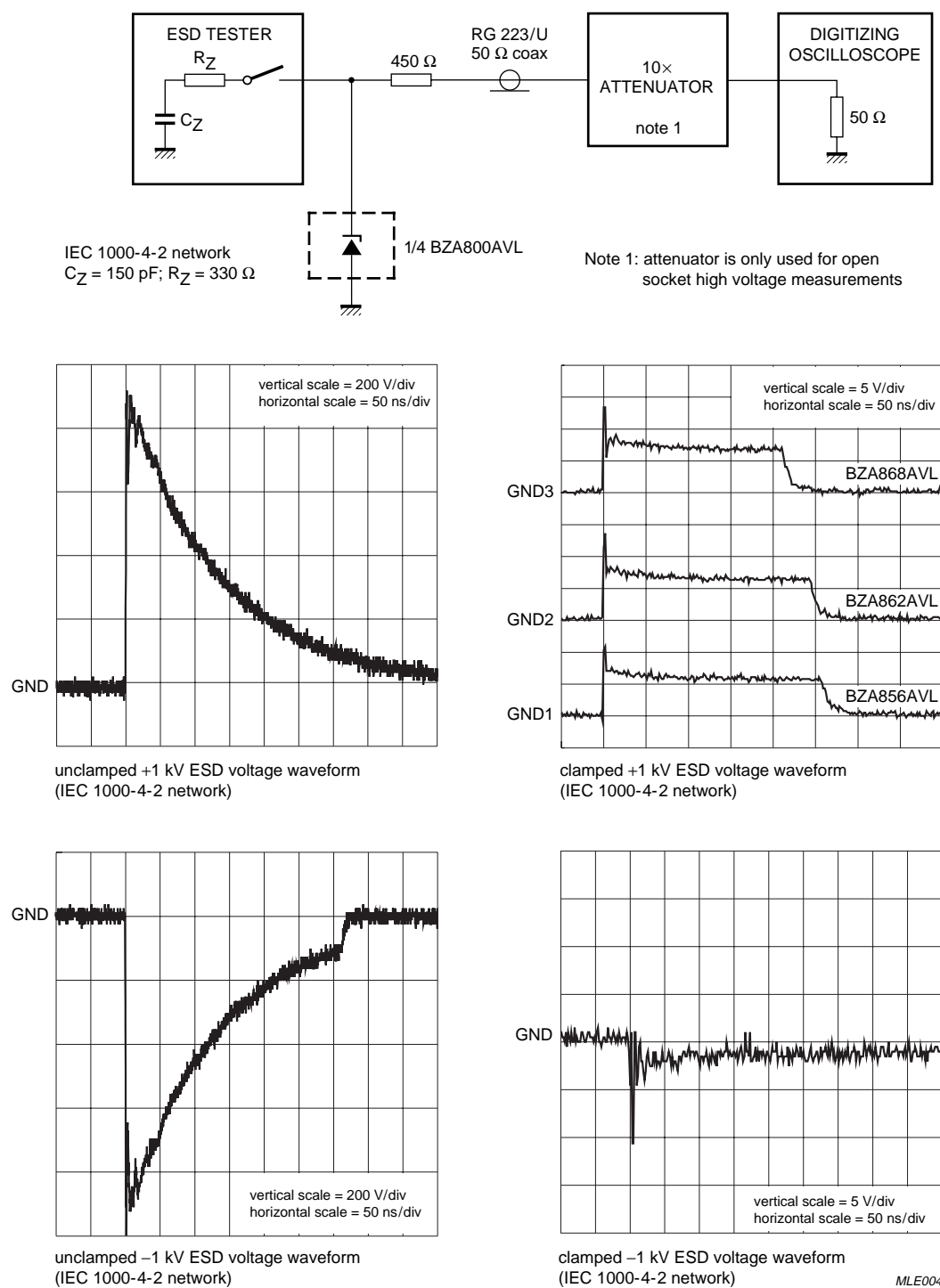


Fig.6 ESD clamping test set-up and waveforms.

# Quadruple low capacitance ESD suppressor

## BZA800AVL series

### APPLICATION INFORMATION

#### Typical common anode application

A quadruple transient suppressor in a SOT353 package makes it possible to protect four separate lines using only one package. Two simplified examples are shown in Figs.7 and 8.

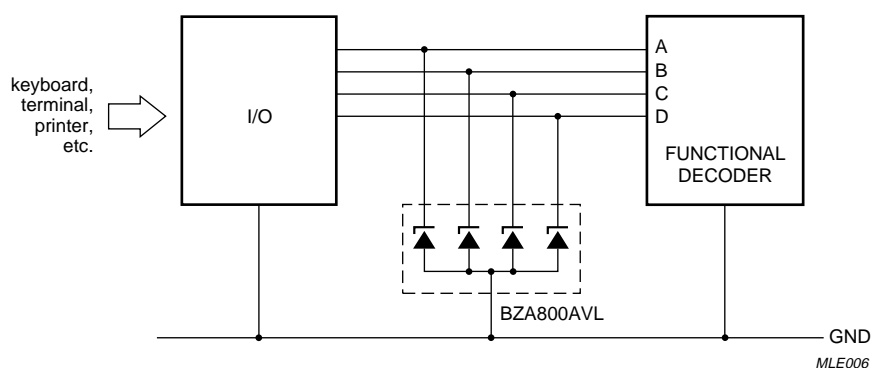


Fig.7 Computer interface protection.

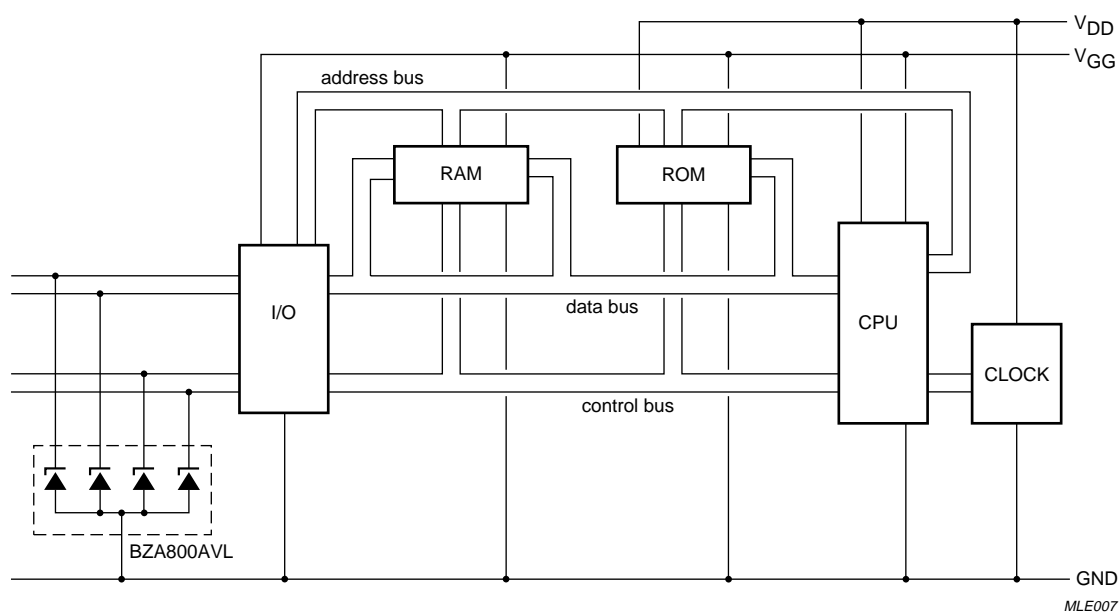


Fig.8 Microprocessor protection.

---

## Quadruple low capacitance ESD suppressor

## BZA800AVL series

---

### Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA800AVL is determined by the peak transient current and the rate of rise of that current ( $di/dt$ ). Since parasitic inductances can further add to the clamping voltage ( $V = L di/dt$ ) the series conductor lengths on the printed-circuit board should be kept to a minimum. This includes the lead length of the suppression element.

In addition to minimizing conductor length the following printed-circuit board layout guidelines are recommended:

1. Place the suppression element close to the input terminals or connectors
2. Keep parallel signal paths to a minimum
3. Avoid running protection conductors in parallel with unprotected conductors
4. Minimize all printed-circuit board loop areas including power and ground loops
5. Minimize the length of the transient return path to ground
6. Avoid using shared transient return paths to a common ground point.



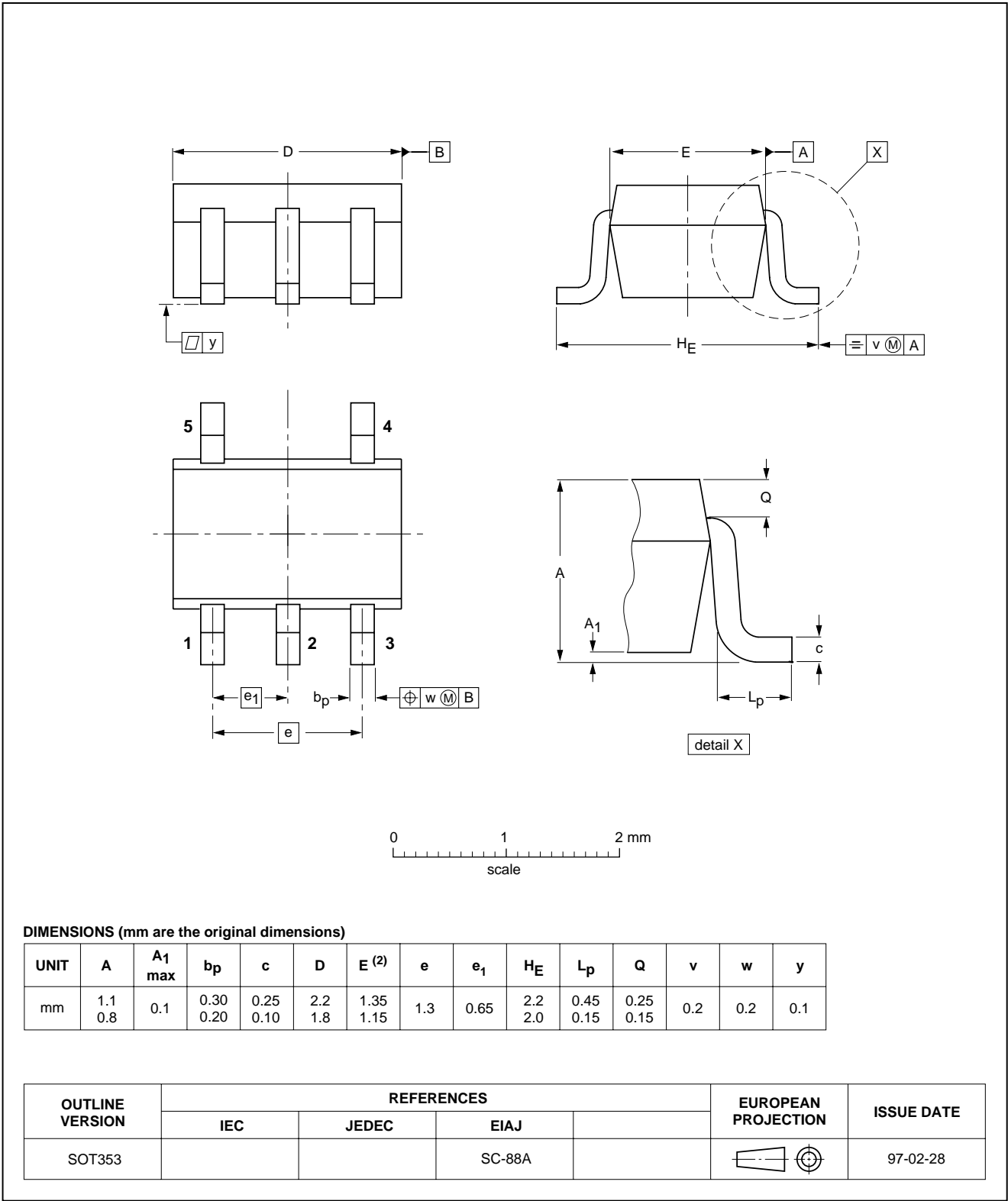
Quadruple low capacitance ESD suppressor

BZA800AVL series

PACKAGE OUTLINE

Plastic surface mounted package; 5 leads

SOT353



# Quadruple low capacitance ESD suppressor

# BZA800AVL series

## DATA SHEET STATUS

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

## Notes

1. Please consult the most recently issued data sheet before initiating or completing a design.
2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.
3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## DEFINITIONS

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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** — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

## DISCLAIMERS

**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 Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

**Right to make changes** — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

---

Quadruple low capacitance ESD suppressor

BZA800AVL series

---

**NOTES**

# ***Philips Semiconductors – a worldwide company***

## **Contact information**

For additional information please visit **<http://www.semiconductors.philips.com>**. Fax: **+31 40 27 24825**

For sales offices addresses send e-mail to: **[sales.addresses@www.semiconductors.philips.com](mailto:sales.addresses@www.semiconductors.philips.com)**.

© Koninklijke Philips Electronics N.V. 2003

SCA75

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

613514/01/pp12

Date of release: 2003 Apr 01

Document order number: 9397 750 10886

*Let's make things better.*

**Philips  
Semiconductors**



**PHILIPS**