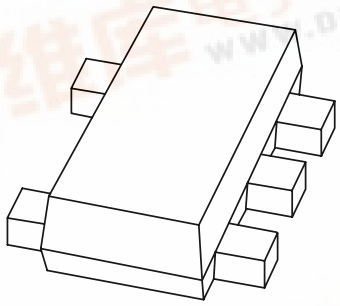
DATA SHEET



BZA900AVL series
Quadruple low capacitance ESD suppressor

Product specification
Supersedes data of 2003 Apr 15

2003 Oct 20

Philips Semiconductors

PHILIPS

Quadruple low capacitance ESD suppressor BZA900AVL series

FEATURES

- Low diode capacitance
- Low leakage current
- SOT665 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 SOT665 package for 4-bit wide ESD transient suppression.

MARKING

TYPE NUMBER	MARKING CODE
BZA956AVL	V3
BZA962AVL	V2
BZA968AVL	V1

PINNING

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

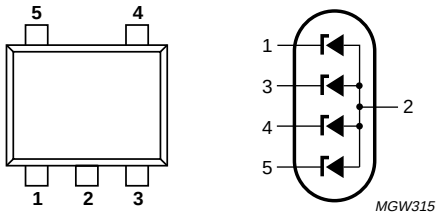


Fig.1 Simplified outline (SOT665) and symbol.

ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
BZA956AVL	–	plastic surface mounted package; 5 leads	SOT665
BZA962AVL	–	plastic surface mounted package; 5 leads	SOT665
BZA968AVL	–	plastic surface mounted package; 5 leads	SOT665

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_Z	working current	T_{amb} = 25 °C	–	note 1	mA
I_F	continuous forward current	T_{amb} = 25 °C	–	200	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	3.5	A
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 2; see Fig.5	–	335	mW
P_{ZSM}	non repetitive peak reverse power dissipation	square pulse; t_p = 1 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)	15	–	kV
		HBM MIL-Std 883	10	–	kV

Notes

1. DC working current limited by $P_{tot(max)}$.
2. 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
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	all diodes loaded	370	K/W
$R_{th\ j\text{-}s}$	thermal resistance from junction to solder point; note 1	one diode loaded	135	K/W
		all diodes loaded	125	K/W

Note

1. Solder point of common anode (pin 2).

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	forward voltage	I_F = 200 mA	–	–	1.2	V
I_R	reverse current					
	BZA956AVL	V_R = 3 V	–	–	200	nA
	BZA962AVL	V_R = 4 V	–	–	100	nA
	BZA968AVL	V_R = 4.3 V	–	–	20	nA
V_Z	working voltage	I_Z = 1 mA				
	BZA956AVL		5.32	5.6	5.88	V
	BZA962AVL		5.89	6.2	6.51	V
	BZA968AVL		6.46	6.8	7.14	V
r_{dif}	differential resistance	I_Z = 1 mA				
	BZA956AVL		–	–	200	Ω
	BZA962AVL		–	–	150	Ω
	BZA968AVL		–	–	100	Ω
S_Z	temperature coefficient	I_Z = 1 mA				
	BZA956AVL		–	1.3	–	mV/K
	BZA962AVL		–	2.4	–	mV/K
	BZA968AVL		–	2.9	–	mV/K
C_d	diode capacitance	f = 1 MHz; V_R = 0				
	BZA956AVL		–	22	28	pF
	BZA962AVL		–	18	22	pF
	BZA968AVL		–	16	19	pF
	diode capacitance	f = 1 MHz; V_R = 5 V				
	BZA956AVL		–	12	17	pF
	BZA962AVL		–	9	12	pF
	BZA968AVL		–	8	11	pF
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; T_{amb} = 25 °C				
	BZA956AVL		–	–	0.90	A
	BZA962AVL		–	–	0.85	A
	BZA968AVL		–	–	0.80	A

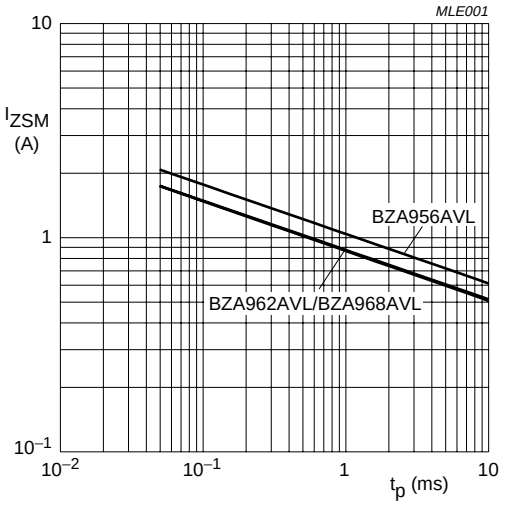


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.

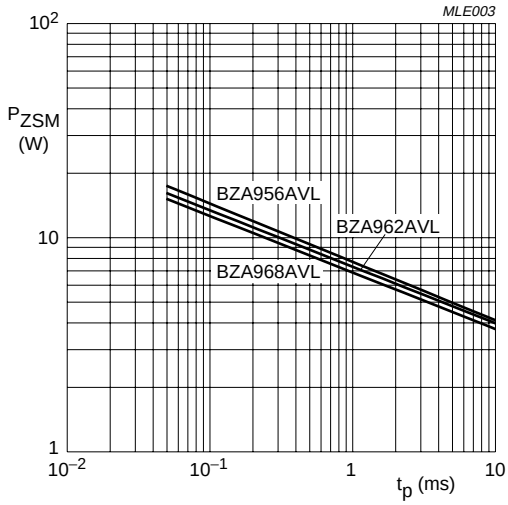
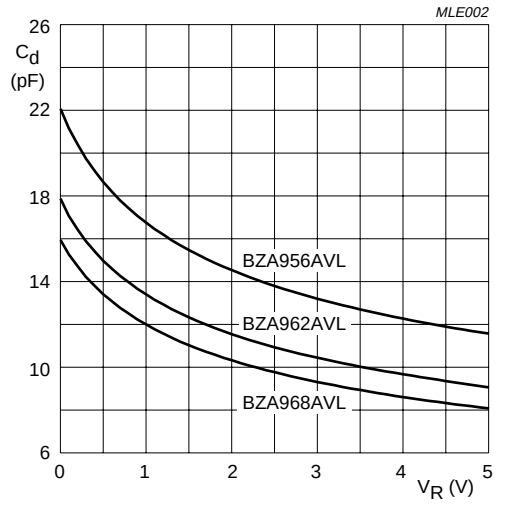


Fig.3 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



T_j = 25 °C; f = 1 MHz.

Fig.4 Diode capacitance as a function of reverse voltage; typical values.

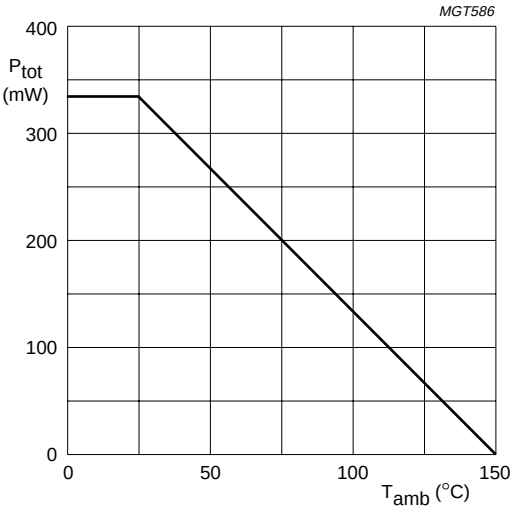
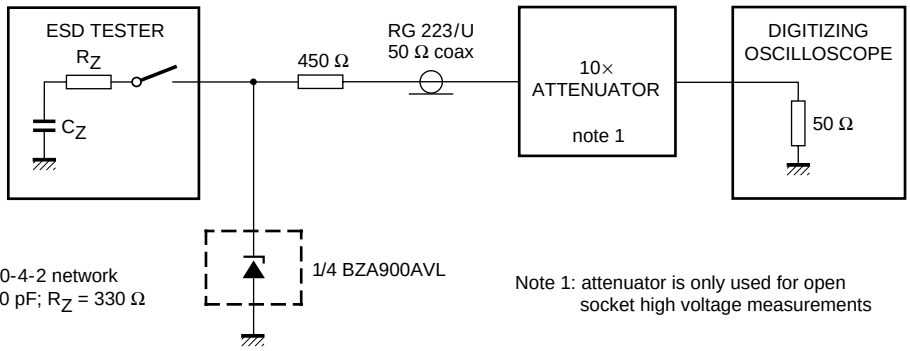
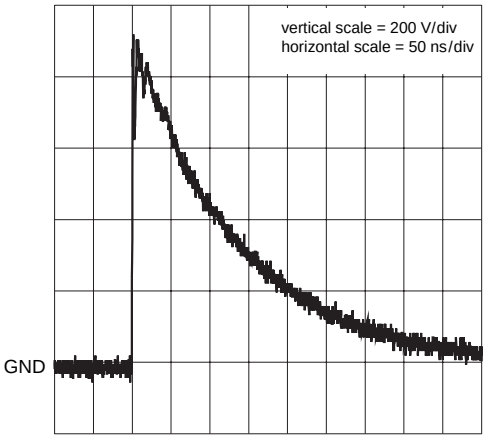
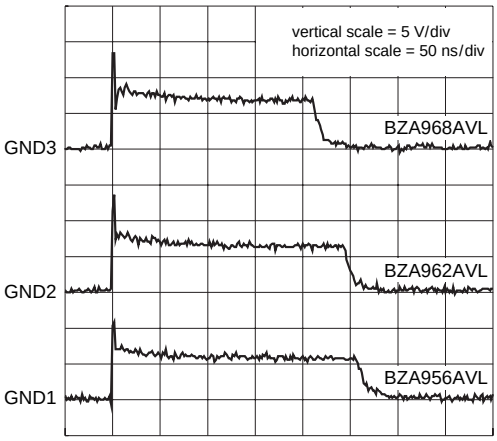


Fig.5 Power derating curve.

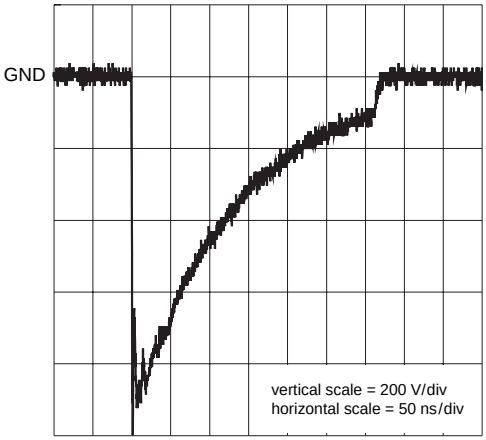




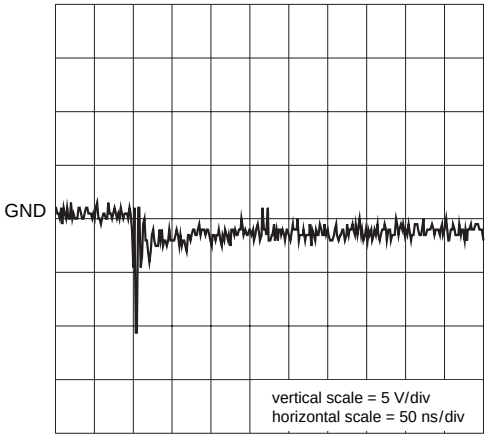
unclamped +1 kV ESD voltage waveform
(IEC 1000-4-2 network)



clamped +1 kV ESD voltage waveform
(IEC 1000-4-2 network)



unclamped −1 kV ESD voltage waveform
(IEC 1000-4-2 network)



clamped −1 kV ESD voltage waveform
(IEC 1000-4-2 network)

MLE005

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

APPLICATION INFORMATION

Typical common anode application

A quadruple transient suppressor in a SOT665 package makes it possible to protect four separate lines using only one package. Two simplified examples are shown in Figs.7 and 8.

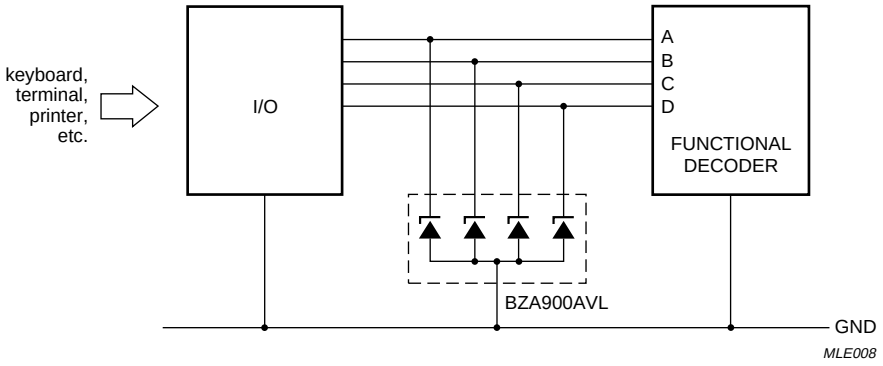


Fig.7 Computer interface protection.

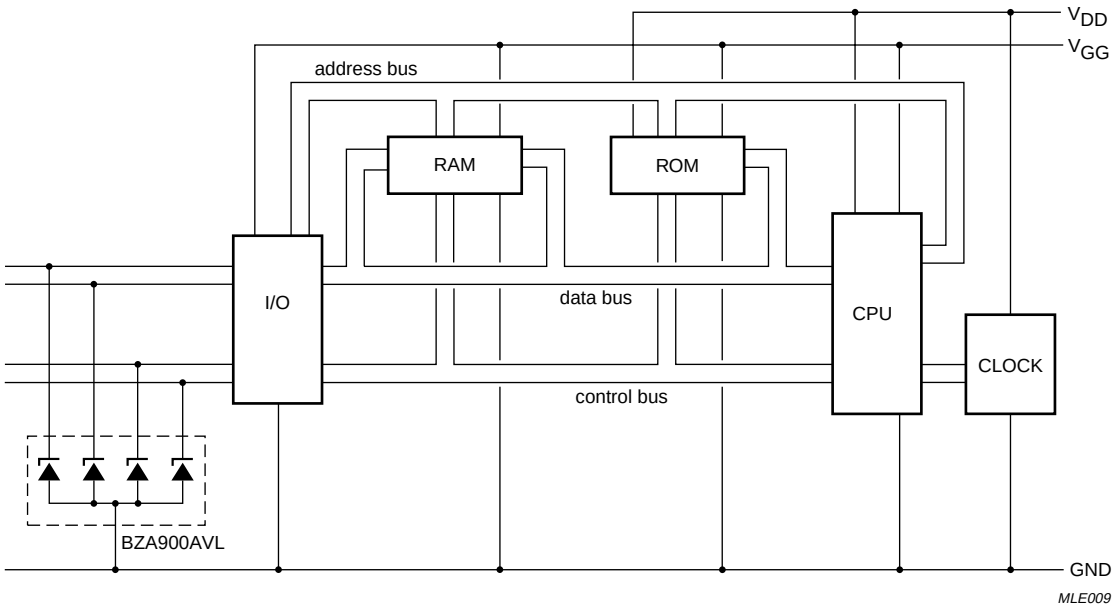


Fig.8 Microprocessor protection.

Device placement and printed-circuit board layout

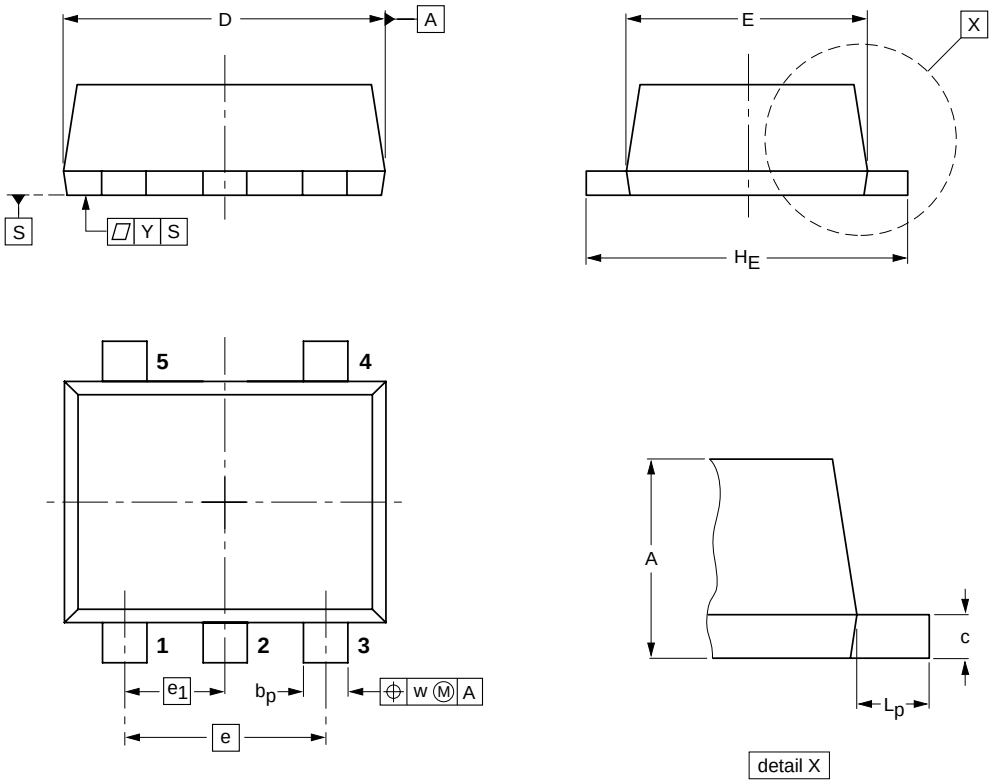
Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA900AVL is determined by the peak transient current and the rate of rise of that current (di/dt). Since parasitic inductances can further add to the clamping voltage (V = L di/dt) the series conductor lengths on the printed-circuit board should be kept to a minimum. This includes the lead length of the suppression element.

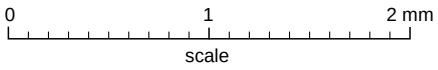
In addition to minimizing conductor length the following printed-circuit board layout guidelines are recommended:

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.

PACKAGE OUTLINE

Plastic surface mounted package; 5 leads **SOT665**





DIMENSIONS (mm are the original dimensions)

UNIT	A	b_p	c	D	E	e	e_1	H_E	L_p	w	y
mm	0.6 0.5	0.27 0.17	0.18 0.08	1.7 1.5	1.3 1.1	1.0	0.5	1.7 1.5	0.3 0.1	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT665						~~01-01-04~~ 01-08-27

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS(1)	PRODUCT STATUS(2)(3)	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.

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**.

Printed in The Netherlands R76/03/pp11 Date of release: 2003 Oct 20 Document order number: 9397 750 11935

Let's make things better.

Philips