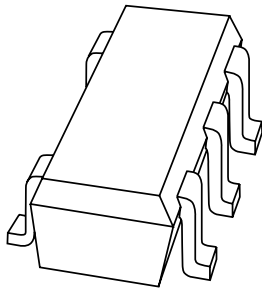


# DATA SHEET



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

Product specification  
Supersedes data of 2003 Apr 01

2003 Oct 20

# 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

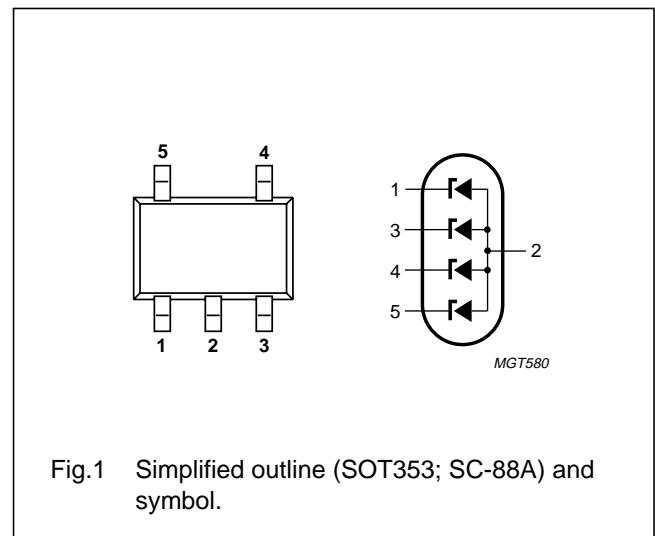
Monolithic transient voltage suppressor diode in a five lead SOT353 (SC-88A) package for 4-bit wide ESD transient suppression.

### 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    |



### ORDERING INFORMATION

| TYPE NUMBER | PACKAGE |  |         |
|-------------|---------|--|---------|
|             | NAME    | DESCRIPTION                              | VERSION |
| BZA856AVL   | –       | plastic surface mounted package; 5 leads | SOT353  |
| BZA862AVL   | –       | plastic surface mounted package; 5 leads | SOT353  |
| BZA868AVL   | –       | plastic surface mounted package; 5 leads | SOT353  |

## 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)            | 15   | –      | 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

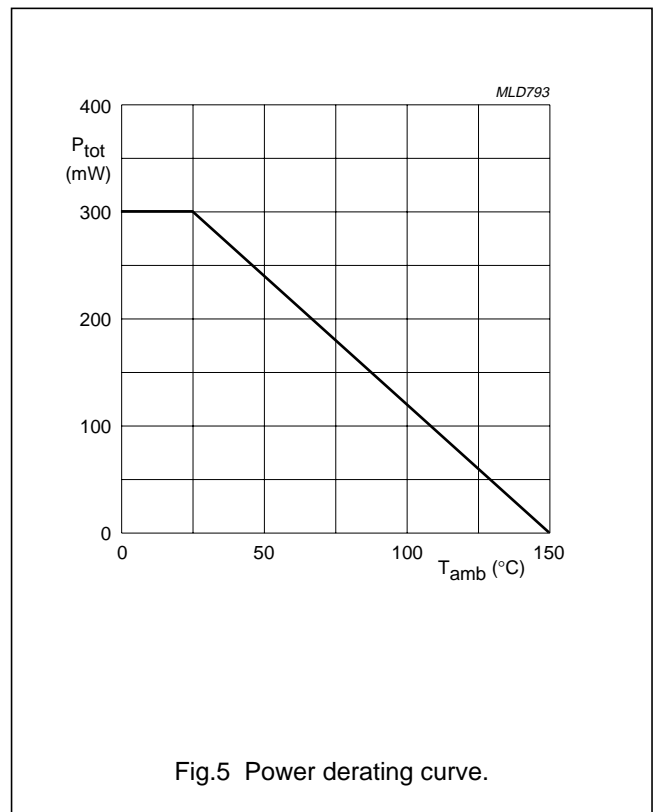
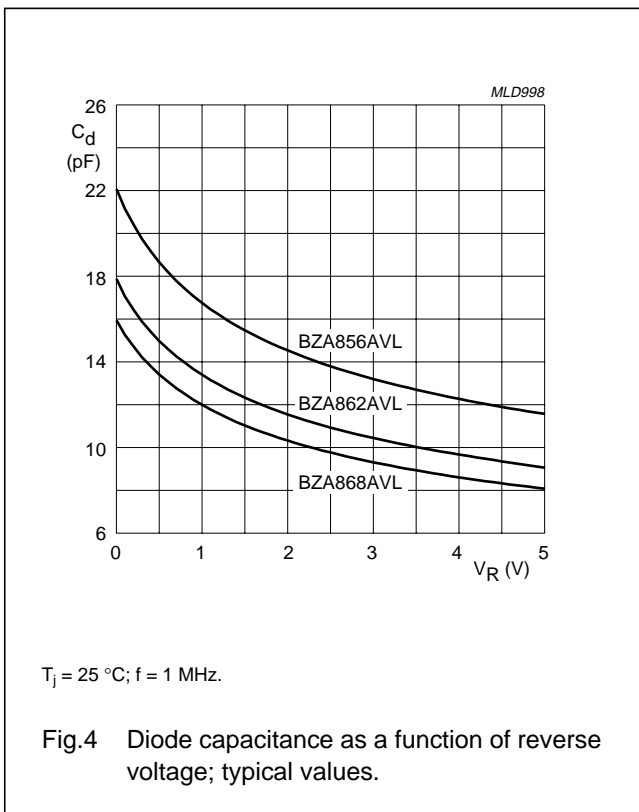
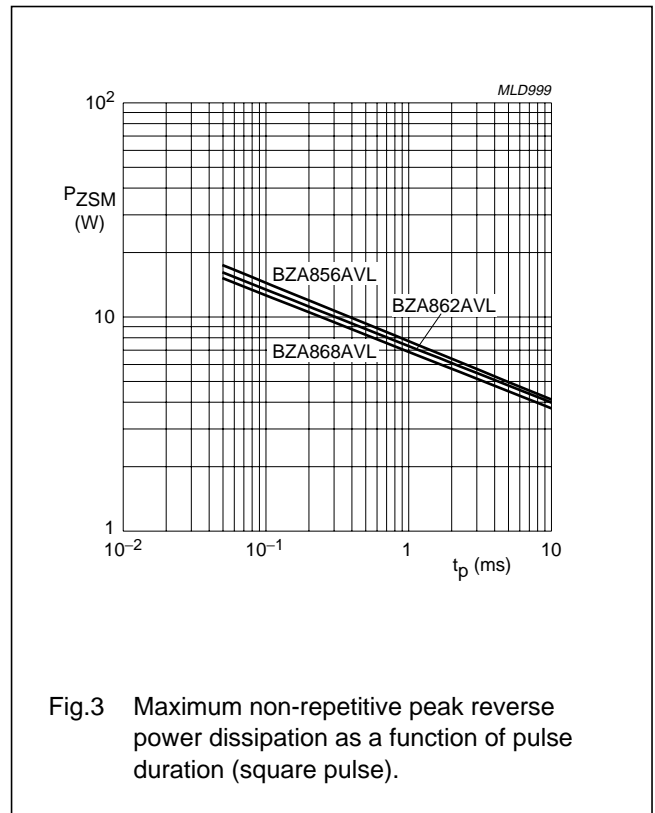
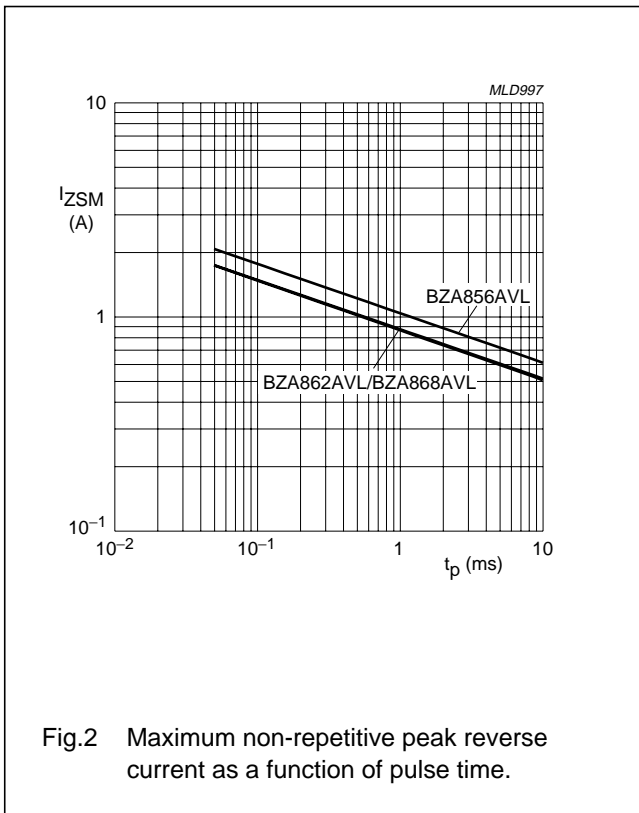
## BZA800AVL series

**ELECTRICAL CHARACTERISTICS**T<sub>j</sub> = 25 °C unless otherwise specified.

| SYMBOL           | PARAMETER                           | CONDITIONS                                      | MIN. | TYP. | MAX. | UNIT |
|------------------|-------------------------------------|---|------|------|------|------|
| V <sub>F</sub>   | forward voltage                     | I <sub>F</sub> = 200 mA                         | –    | –    | 1.2  | V    |
| I <sub>R</sub>   | reverse current                     |   |      |      |      |      |
|                  | BZA856AVL                           | V <sub>R</sub> = 3 V                            | –    | –    | 200  | nA   |
|                  | BZA862AVL                           | V <sub>R</sub> = 4 V                            | –    | –    | 100  | nA   |
|                  | BZA868AVL                           | V <sub>R</sub> = 4.3 V                          | –    | –    | 20   | nA   |
| V <sub>Z</sub>   | working voltage                     | I <sub>Z</sub> = 1 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 <sub>dif</sub> | differential resistance             | I <sub>Z</sub> = 1 mA                           |      |      |      |      |
|                  | BZA856AVL                           |   | –    | –    | 200  | Ω    |
|                  | BZA862AVL                           |   | –    | –    | 150  | Ω    |
|                  | BZA868AVL                           |   | –    | –    | 100  | Ω    |
| S <sub>Z</sub>   | temperature coefficient             | I <sub>Z</sub> = 1 mA                           |      |      |      |      |
|                  | BZA856AVL                           |   | –    | 1.3  | –    | mV/K |
|                  | BZA862AVL                           |   | –    | 2.4  | –    | mV/K |
|                  | BZA868AVL                           |   | –    | 2.9  | –    | mV/K |
| C <sub>d</sub>   | diode capacitance                   | f = 1 MHz; V <sub>R</sub> = 0                   |      |      |      |      |
|                  | BZA856AVL                           |   | –    | 22   | 28   | pF   |
|                  | BZA862AVL                           |   | –    | 18   | 22   | pF   |
|                  | BZA868AVL                           |   | –    | 16   | 19   | pF   |
|                  | diode capacitance                   | f = 1 MHz; V <sub>R</sub> = 5 V                 |      |      |      |      |
|                  | BZA856AVL                           |   | –    | 12   | 17   | pF   |
|                  | BZA862AVL                           |   | –    | 9    | 12   | pF   |
|                  | BZA868AVL                           |   | –    | 8    | 11   | pF   |
| I <sub>ZSM</sub> | non-repetitive peak reverse current | t <sub>p</sub> = 1 ms; T <sub>amb</sub> = 25 °C |      |      |      |      |
|                  | BZA856AVL                           |   | –    | –    | 0.90 | A    |
|                  | BZA862AVL                           |   | –    | –    | 0.85 | A    |
|                  | BZA868AVL                           |   | –    | –    | 0.80 | A    |

Quadruple low capacitance ESD suppressor

BZA800AVL series



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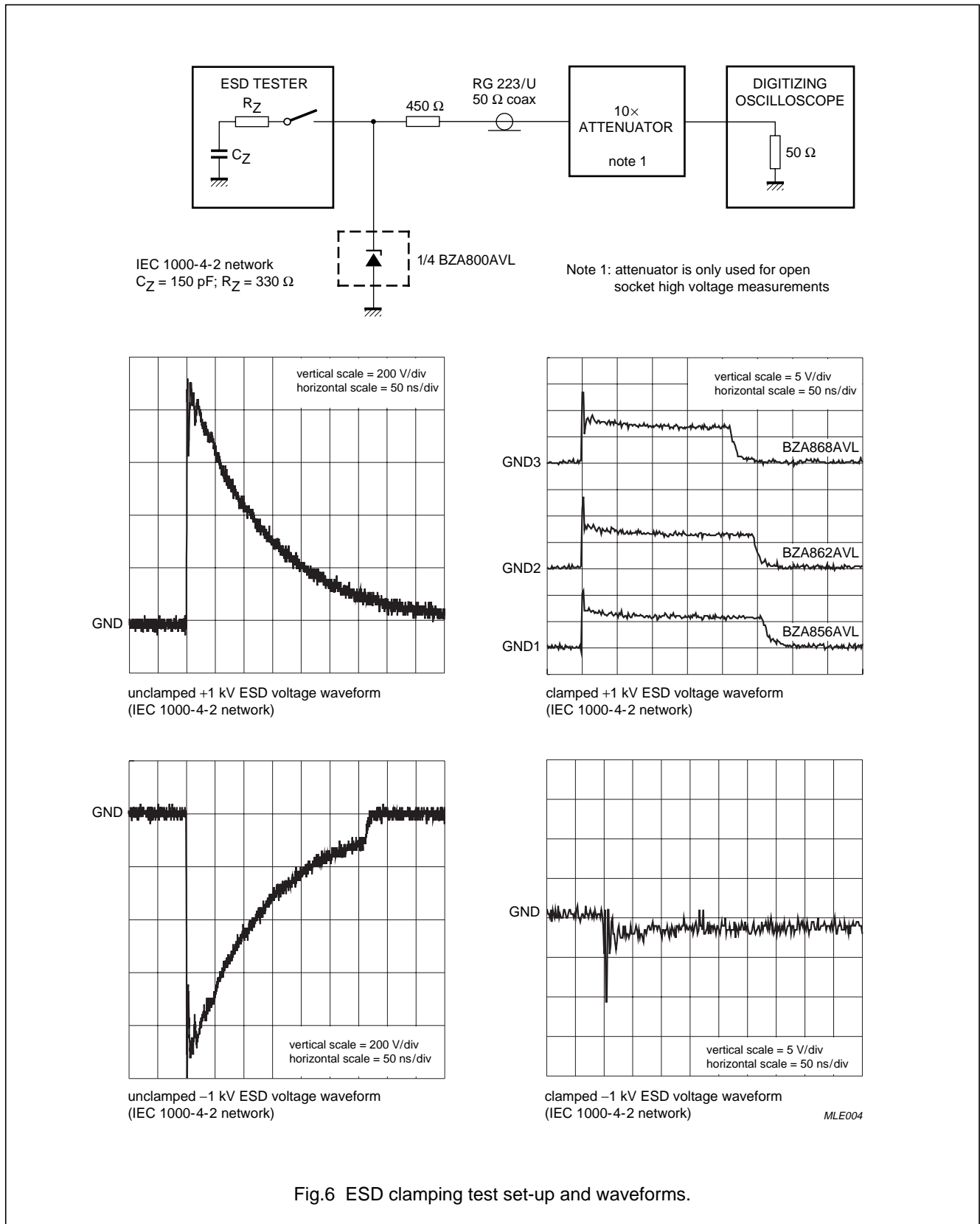


Fig.6 ESD clamping test set-up and waveforms.

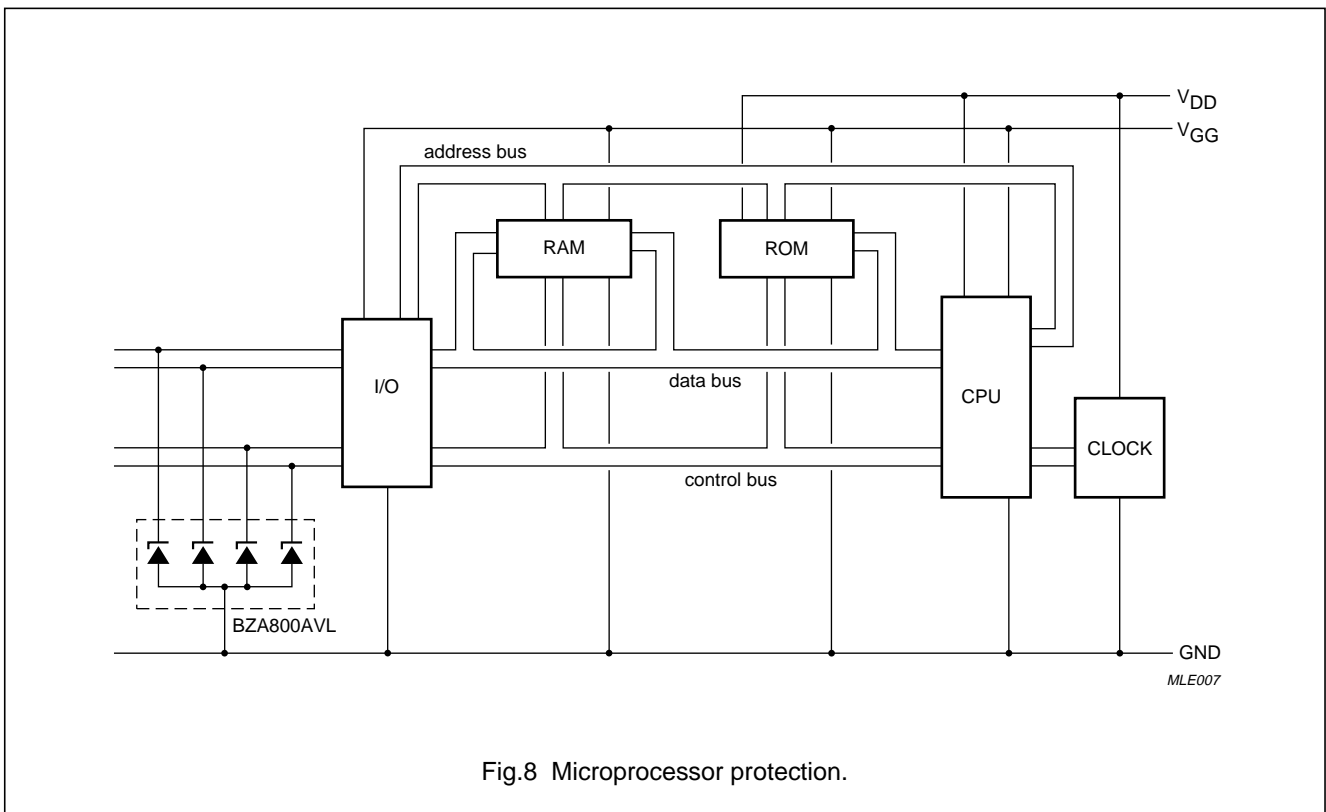
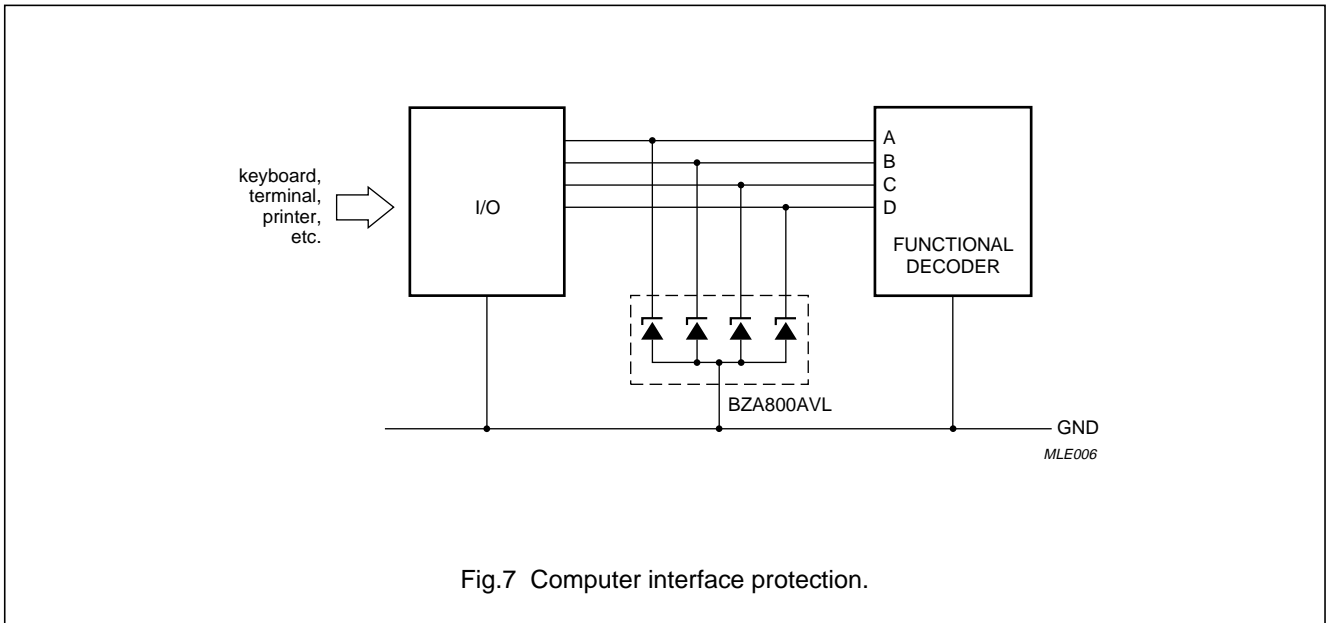
Quadruple low capacitance ESD suppressor

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.



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## Quadruple low capacitance ESD suppressor

## BZA800AVL series

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### 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.



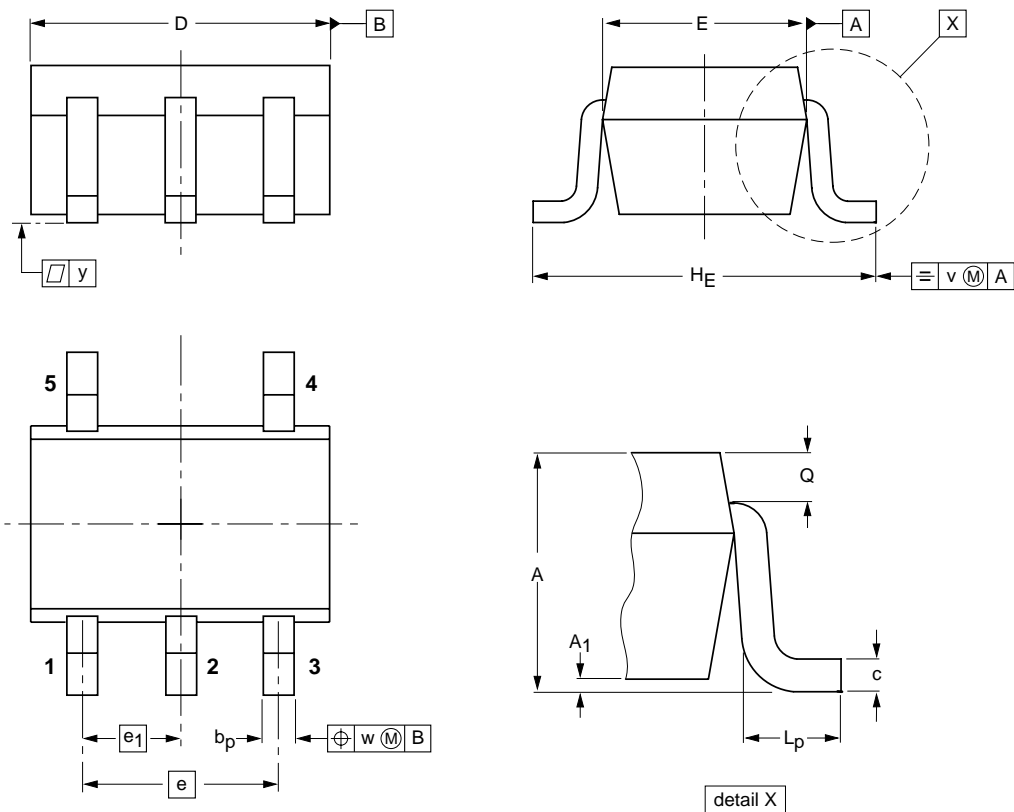
Quadruple low capacitance ESD suppressor

BZA800AVL series

PACKAGE OUTLINE

Plastic surface mounted package; 5 leads

SOT353



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A1<br>max | bp           | c            | D          | E (2)        | e   | e1   | HE         | Lp           | 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   |  |                     |            |
| SOT353          |            |       | SC-88A |  |                     | 97-02-28   |

# Quadruple low capacitance ESD suppressor

# BZA800AVL series

## DATA SHEET STATUS

| LEVEL | DATA SHEET STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)(3)</sup> | DEFINITION   |
|-------|----------------------------------|----------------------------------|--|
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For sales offices addresses send e-mail to: [sales.addresses@www.semiconductors.philips.com](mailto:sales.addresses@www.semiconductors.philips.com).

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