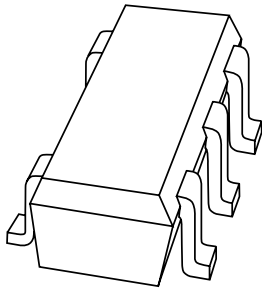


DATA SHEET



BZA800AL series Quadruple ESD transient voltage suppressor

Product data sheet

2002 Jan 11

Quadruple ESD transient voltage suppressor

BZA800AL series

FEATURES

- ESD rating >8 kV contact discharge, according to IEC1000-4-2
- SOT353 (SC-88A) surface mount package
- Common anode configuration.

APPLICATIONS

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

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 |
|-------------|--------------|
| BZA856AL | M1 |
| BZA862AL | M2 |
| BZA868AL | M3 |

PINNING

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

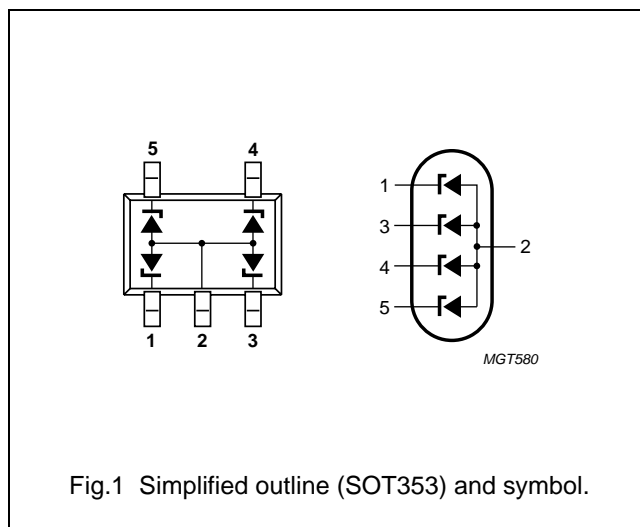


Fig.1 Simplified outline (SOT353) and symbol.

LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|------------------|--|--|------|--------|------------------|
| Per diode | | | | | |
| I_z | working current | $T_{amb} = 25\text{ }^\circ\text{C}$ | – | note 1 | mA |
| I_F | continuous forward current | $T_{amb} = 25\text{ }^\circ\text{C}$ | – | 200 | mA |
| I_{FSM} | non-repetitive peak forward current | $t_p = 1\text{ ms}$; square pulse | – | 4 | A |
| P_{tot} | total power dissipation | $T_{amb} = 25\text{ }^\circ\text{C}$; note 2; see Fig.5 | – | 300 | mW |
| P_{ZSM} | non repetitive peak reverse power dissipation: BZA856AL BZA862AL BZA868AL | square pulse; $t_p = 1\text{ ms}$; see Fig.3 | – | 16 | W |
| | | | – | 15 | W |
| | | | – | 14 | W |
| T_{stg} | storage temperature | | –65 | +150 | $^\circ\text{C}$ |
| T_j | junction temperature | | – | 150 | $^\circ\text{C}$ |

Notes

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

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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).

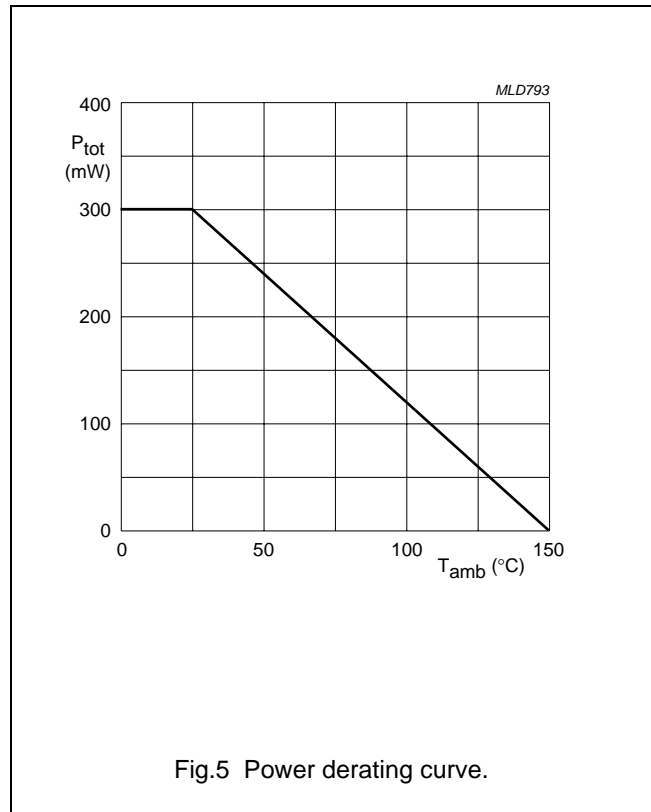
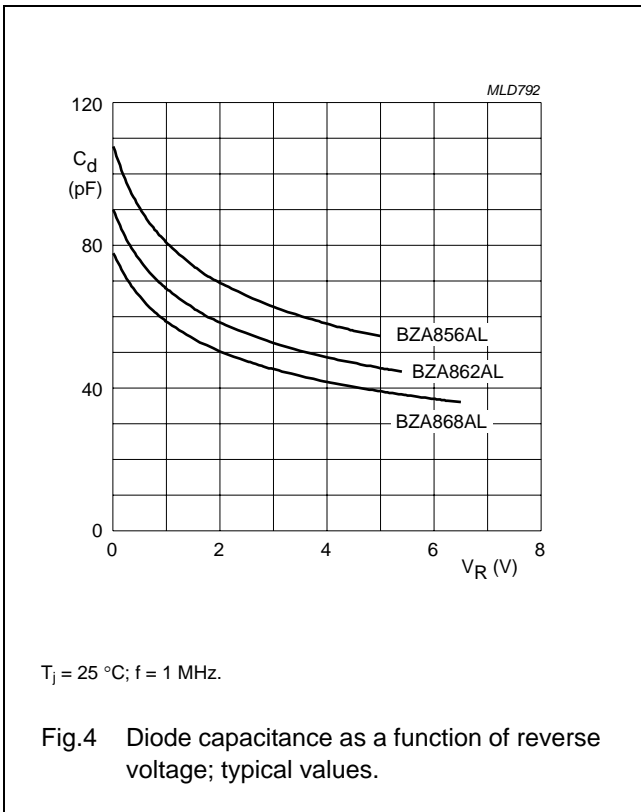
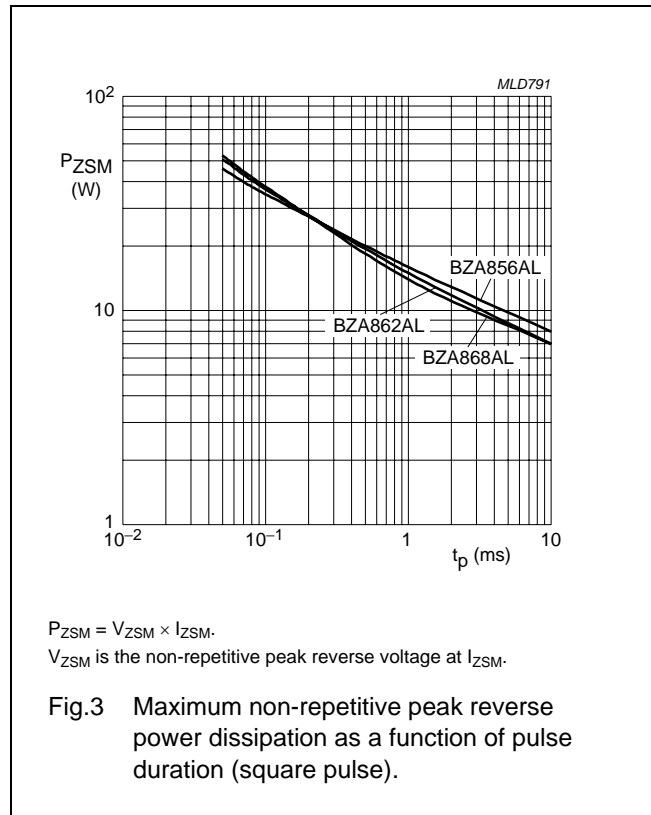
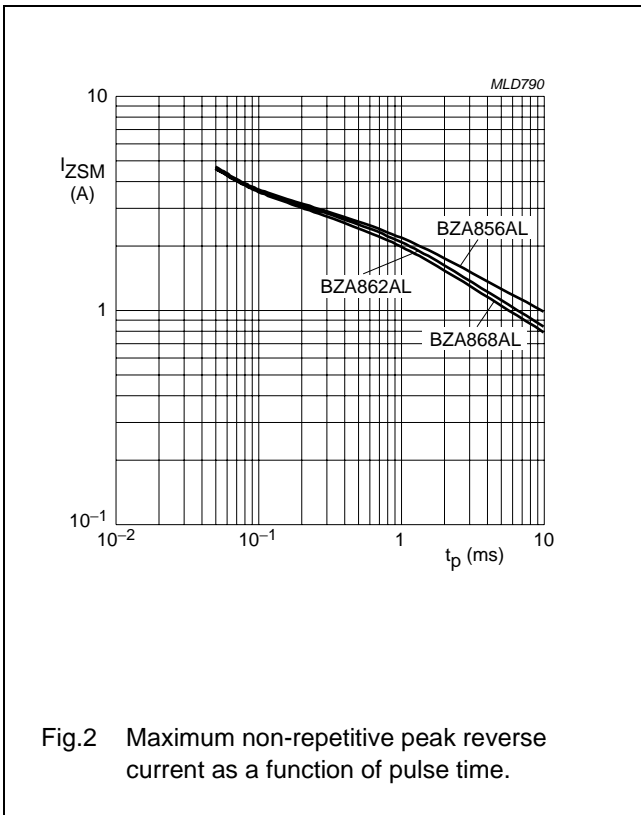
ELECTRICAL CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|-----------|-------------------------------------|---|------|------|-------|----------|
| V_F | forward voltage | $I_F = 200\text{ mA}$ | – | – | 1.3 | V |
| I_R | reverse current | | | | | |
| | BZA856AL | $V_R = 3\text{ V}$ | – | – | 1 000 | nA |
| | BZA862AL | $V_R = 4\text{ V}$ | – | – | 500 | nA |
| | BZA868AL | $V_R = 4.3\text{ V}$ | – | – | 100 | nA |
| V_Z | working voltage | $I_Z = 1\text{ mA}$ | | | | |
| | BZA856AL | | 5.32 | 5.6 | 5.88 | V |
| | BZA862AL | | 5.89 | 6.2 | 6.51 | V |
| | BZA868AL | | 6.46 | 6.8 | 7.14 | V |
| r_{dif} | differential resistance | $I_Z = 1\text{ mA}$ | | | | |
| | BZA856AL | | – | – | 400 | Ω |
| | BZA862AL | | – | – | 300 | Ω |
| | BZA868AL | | – | – | 200 | Ω |
| S_Z | temperature coefficient | $I_Z = 1\text{ mA}$ | | | | |
| | BZA856AL | | – | 0.3 | – | mV/K |
| | BZA862AL | | – | 1.6 | – | mV/K |
| | BZA868AL | | – | 2.2 | – | mV/K |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0$ | | | | |
| | BZA856AL | | – | – | 125 | pF |
| | BZA862AL | | – | – | 105 | pF |
| | BZA868AL | | – | – | 90 | pF |
| I_{ZSM} | non-repetitive peak reverse current | $t_p = 1\text{ ms}; T_{amb} = 25\text{ °C}$ | | | | |
| | BZA856AL | | – | – | 2.2 | A |
| | BZA862AL | | – | – | 2.1 | A |
| | BZA868AL | | – | – | 2 | A |

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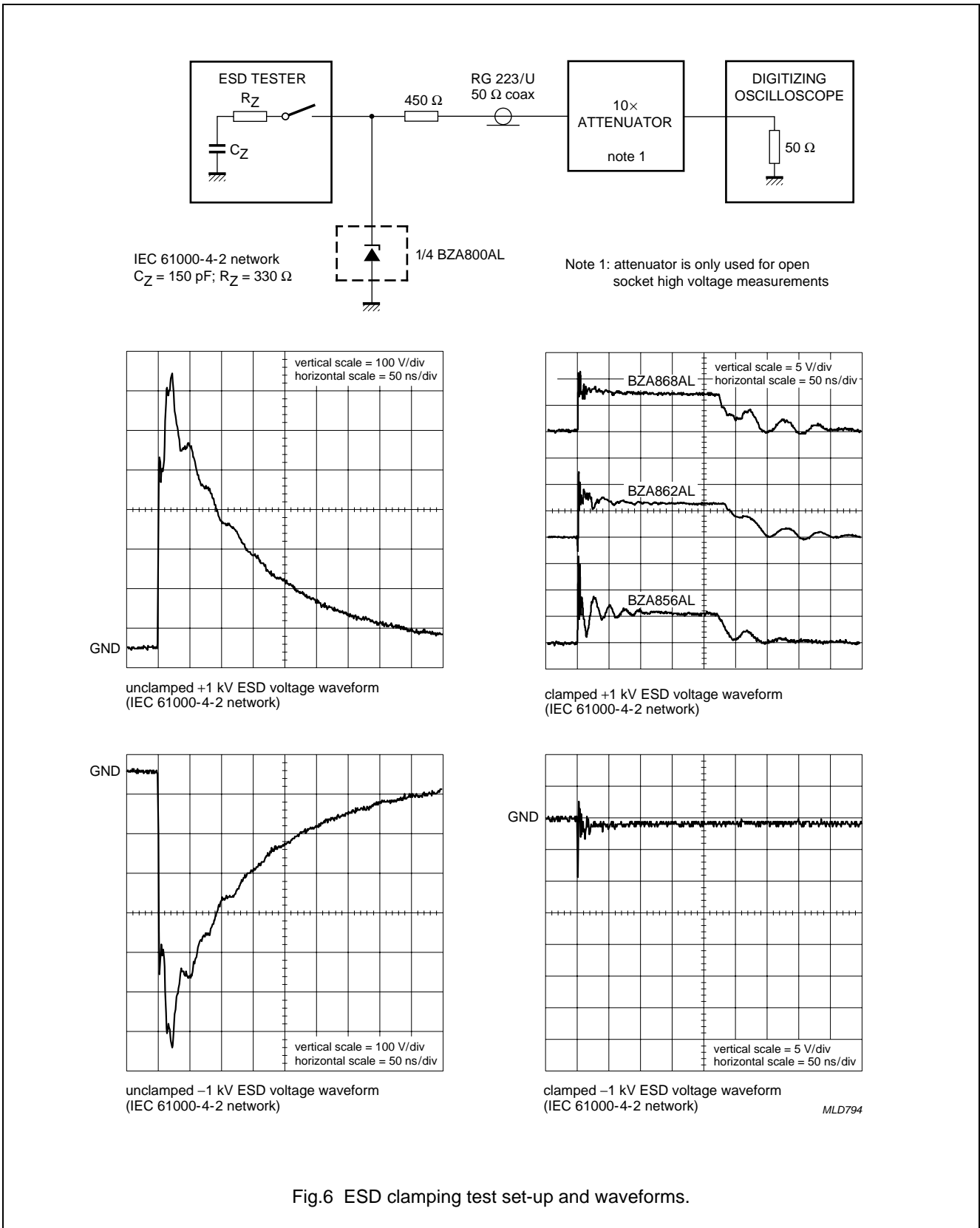


Fig.6 ESD clamping test set-up and waveforms.

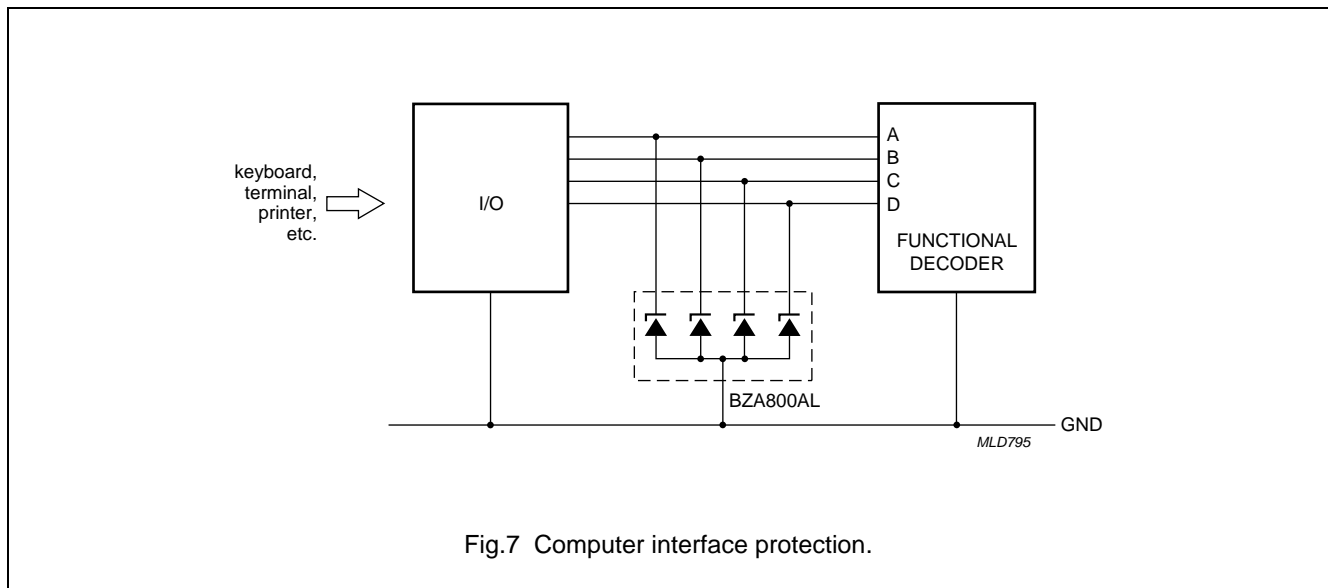
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APPLICATION INFORMATION

Typical common anode application

A quadruple transient suppressor in a SOT353 (SC88A) package makes it possible to protect four separate lines using only one package. A simplified example is shown in Fig 7.



Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA800AL 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.

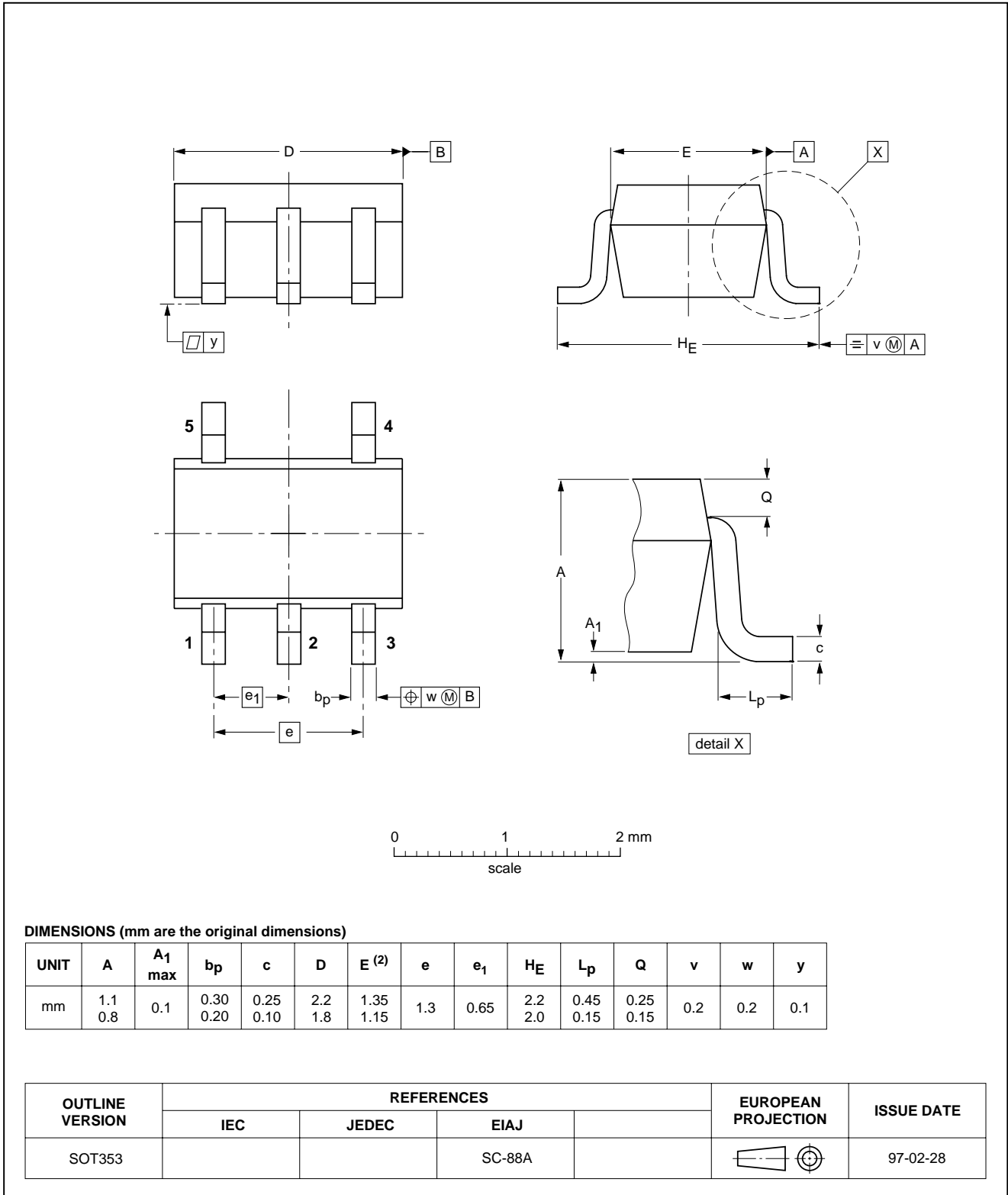
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PACKAGE OUTLINE

Plastic surface mounted package; 5 leads

SOT353



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DATA SHEET STATUS

| DOCUMENT STATUS ⁽¹⁾ | PRODUCT STATUS ⁽²⁾ | DEFINITION |
|--------------------------------|-------------------------------|---|
| Objective data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary data sheet | Qualification | This document contains data from the preliminary specification. |
| Product data sheet | Production | This document contains the product specification. |

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