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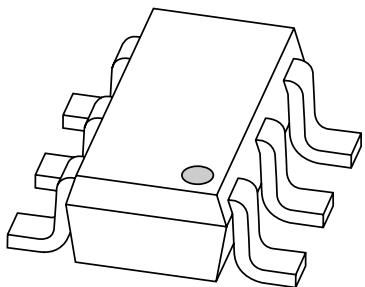
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Kind regards,

Team Nexperia

# DATA SHEET



## **BZA408B**

Quadruple bidirectional ESD  
transient voltage suppressor

Product data sheet  
Supersedes data of 1998 Jun 05

1998 Oct 15

**NXP**  
founded by Philips

## Quadruple bidirectional ESD transient voltage suppressor

BZA408B

### FEATURES

- ESD rating >15 kV, according to IEC1000-4-2
- SOT457 surface mount package
- Non-clamping range: -5 V to +5 V
- Channel separation: >70 dB
- Low reverse current: <100 nA
- Low diode capacitance: <75 pF.

### PINNING

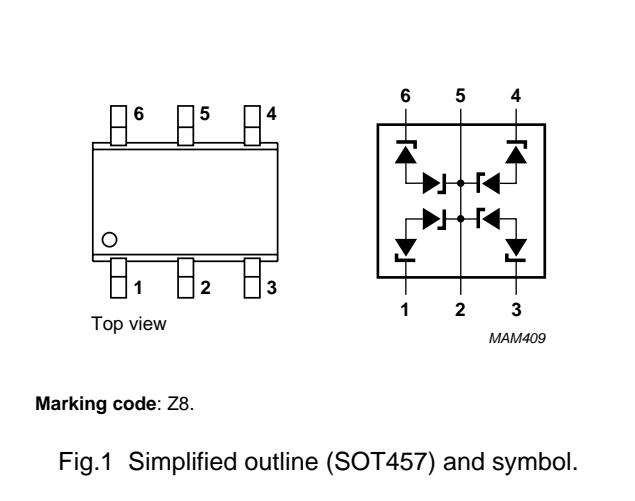
PIN	DESCRIPTION
1	cathode 1
2, 5	ground
3	cathode 2
4	cathode 3
6	cathode 4

### APPLICATIONS

- Protection of equipment, connected to data and transmission lines, against voltage surges caused by electrostatic discharge e.g:
  - Computers and peripherals
  - Audio and video equipment
  - Communication systems
  - Medical equipment
  - Portable electronics.

### DESCRIPTION

4-bit wide monolithic bidirectional ESD transient voltage suppressor in a six lead SOT457 (SC-74) package.



### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Per diode</b> (pin 2 and / or 5 connected to ground)					
$I_{ZSM}$	non-repetitive peak reverse current	$t_p = 1$ ms; square pulse; see Fig.2	–	2	A
$P_{ZSM}$	non-repetitive peak power	$t_p = 1$ ms; square pulse	–	20	W
$T_{stg}$	storage temperature		-65	+150	°C
$T_j$	junction temperature		-65	+150	°C

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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	one or more diodes loaded	340	K/W

## ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Per diode</b> (pin 2 and / or 5 connected to ground)					
$V_{RWM}$	working reverse voltage		–	5	V
$V_R$	reverse voltage	$I_{test} = 5\text{ mA}$	5.5	–	V
$V_{ZSM}$	non-repetitive peak reverse voltage	$t_p = 1\text{ ms}; I_{ZSM} = 2\text{ A}$	–	10	V
$I_R$	reverse current	$V_R = V_{RWM}$	–	100	nA
$C_d$	diode capacitance	see Fig.3			
		$V_R = 0; f = 1\text{ MHz}$	–	75	pF
$V_R = 5\text{ V}; f = 1\text{ MHz}$			–	55	pF
$\alpha_{ch\ (p\ to\ p)}$	pin to pin channel separation	note 1; see Fig.4	70	–	dB

### Note

- $\alpha_{ch\ (p\ to\ p)}$  is measured as follows: a  $-7\text{ dBs}$  sinewave of  $400\text{ Hz}$  is connected to e.g. pin 6 and a  $-7\text{ dBs}$  sinewave of  $1\text{ kHz}$  to pin 1. The  $1\text{ kHz}$  signal of pin 1 is measured on pin 6 by means of a spectrum analyser with an input impedance of  $1\text{ M}\Omega$ . So  $\alpha_{ch\ (p\ to\ p)}$  equals the  $1\text{ kHz}$  level on pin 1 minus the  $1\text{ kHz}$  level on pin 6. For the  $400\text{ Hz}$  signal the same measurement is done in the opposite way.

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### GRAPHICAL DATA

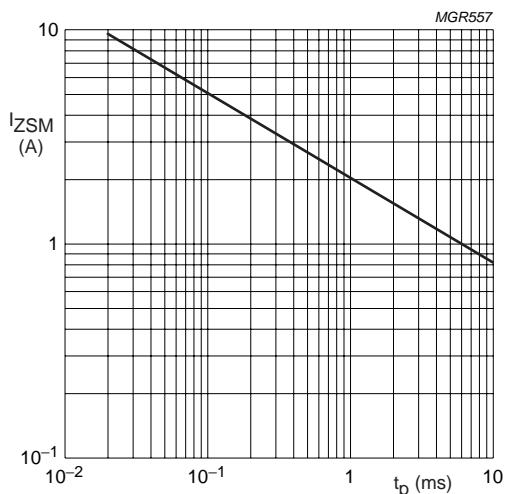
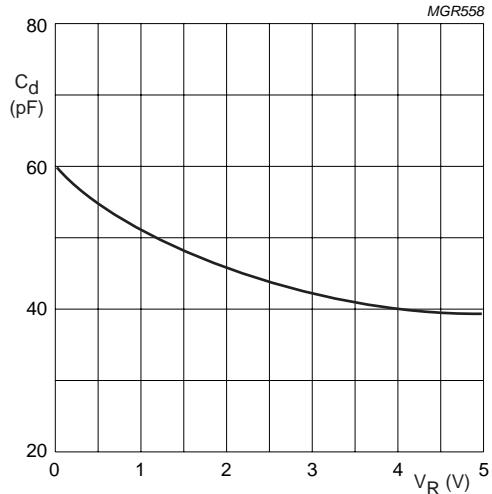


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



$T_J = 25^\circ\text{C}$ ;  $f = 1\text{ MHz}$ .

Fig.3 Diode capacitance as a function of reverse voltage; typical values.

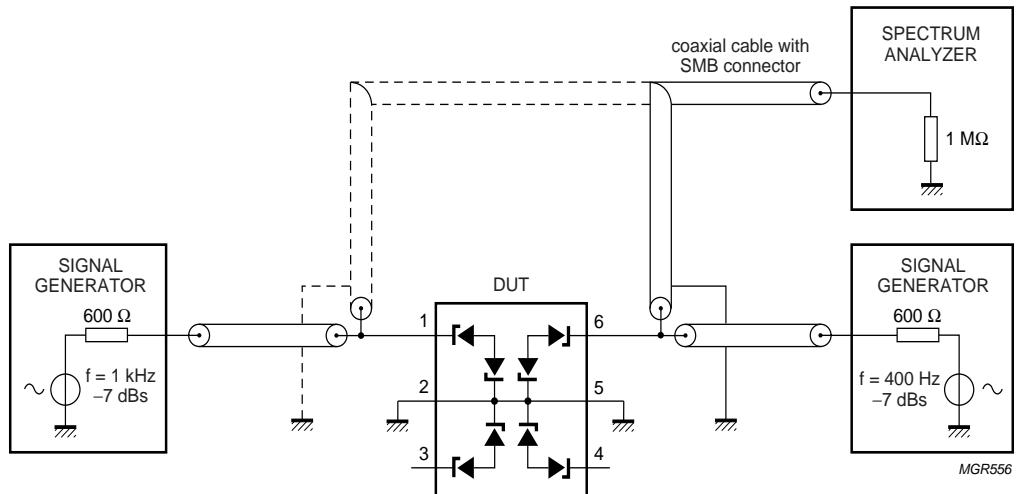


Fig.4 Channel separation measurement setup.

## Quadruple bidirectional ESD transient voltage suppressor

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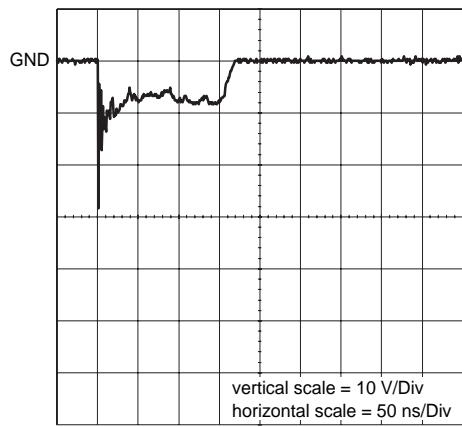
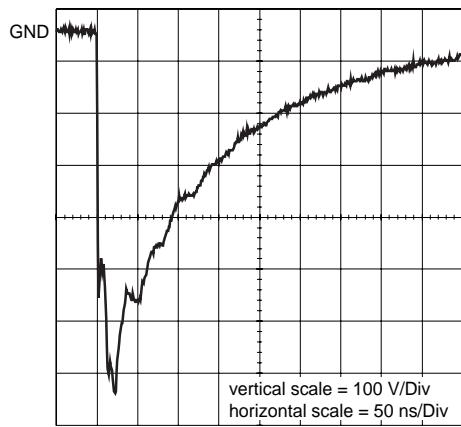
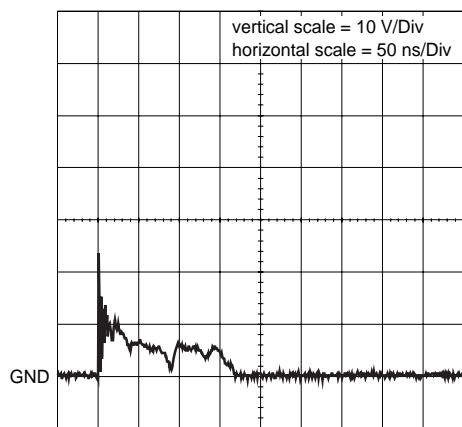
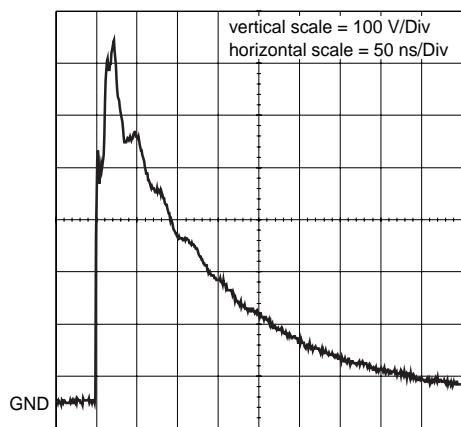
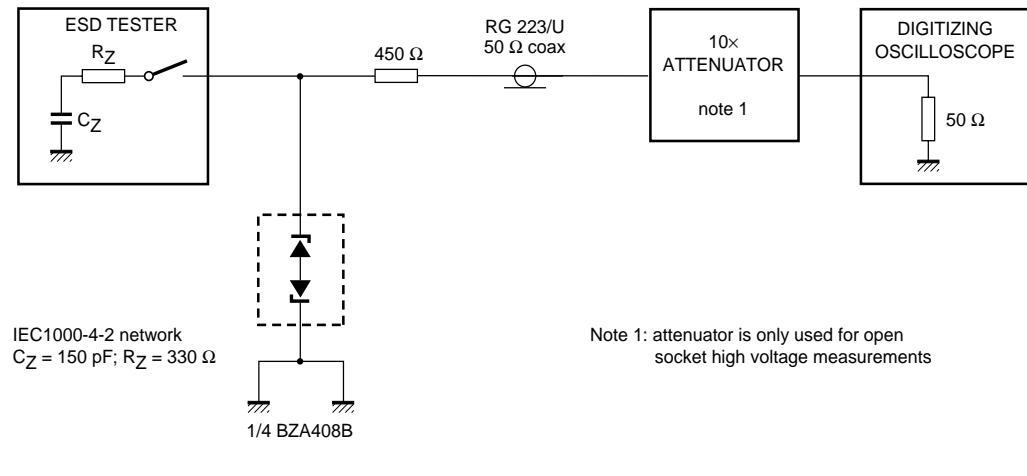


Fig.5 ESD clamping test set-up and waveforms.

## Quadruple bidirectional ESD transient voltage suppressor

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### APPLICATION INFORMATION

#### Typical bidirectional application

A quadruple bidirectional transient suppressor in a SOT457 package makes it possible to protect four separate lines using only one package. One simplified example is shown in Fig.6.

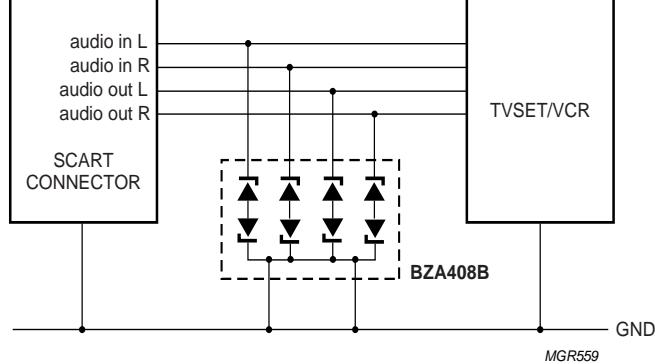


Fig.6 Scart connector protection.

#### Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA408B 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.

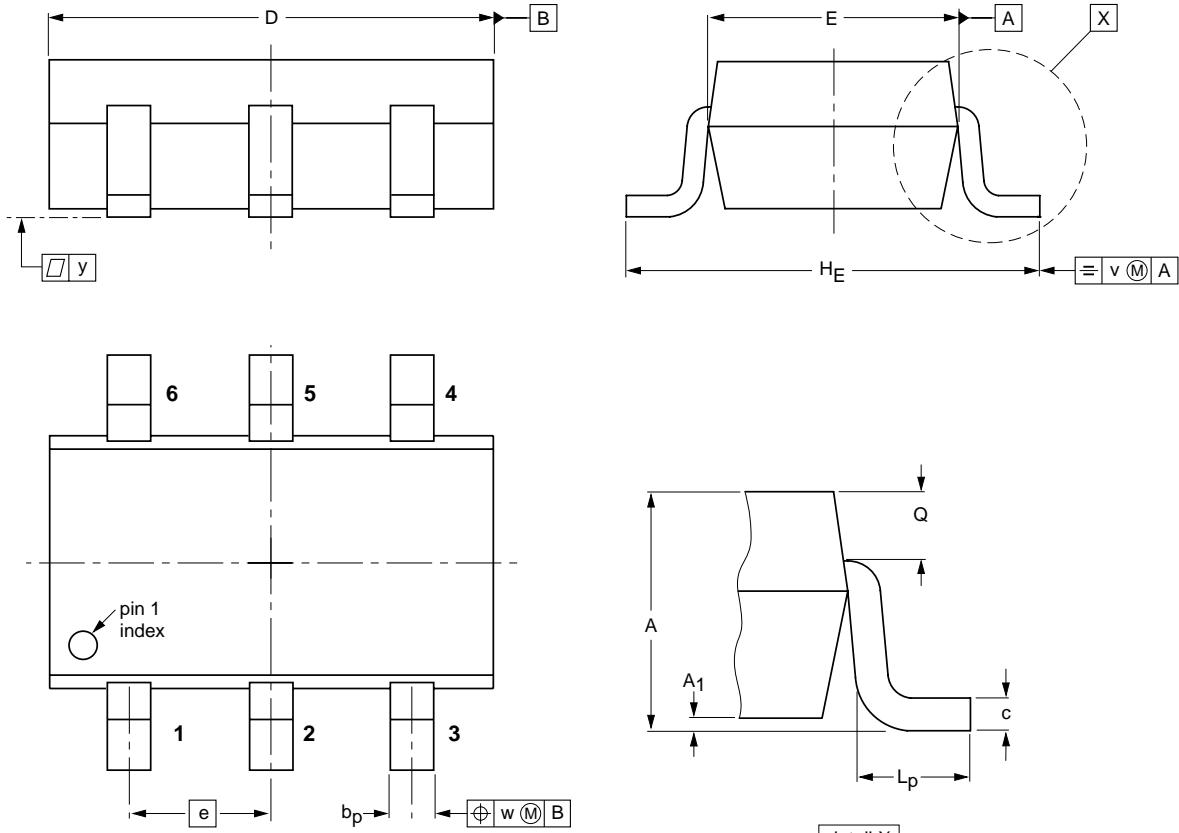
# Quadruple bidirectional ESD transient voltage suppressor

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## PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT457



0 1 2 mm  
scale

## DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub>	b <sub>p</sub>	c	D	E	e	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.1 0.9	0.1 0.013	0.40 0.25	0.26 0.10	3.1 2.7	1.7 1.3	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ	SC-74		
SOT457						-97-02-28- 01-05-04

## Quadruple bidirectional ESD transient voltage suppressor

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### DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	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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## **Customer notification**

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## **Contact information**

For additional information please visit: <http://www.nxp.com>

For sales offices addresses send e-mail to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

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