nexperia

Important notice

Dear Customer,

On 7 February 2017 the former NXP Standard Product business became a new company with the tradename **Nexperia**. Nexperia is an industry leading supplier of Discrete, Logic and PowerMOS semiconductors with its focus on the automotive, industrial, computing, consumer and wearable application markets

In data sheets and application notes which still contain NXP or Philips Semiconductors references, use the references to Nexperia, as shown below.

Instead of http://www.nxp.com, http://www.philips.com/ or http://www.semiconductors.philips.com/, use **http://www.nexperia.com**

Instead of sales.addresses@www.nxp.com or sales.addresses@www.semiconductors.philips.com, use **salesaddresses@nexperia.com** (email)

Replace the copyright notice at the bottom of each page or elsewhere in the document, depending on the version, as shown below:
- © NXP N.V. (year). All rights reserved or © Koninklijke Philips Electronics N.V. (year). All rights reserved
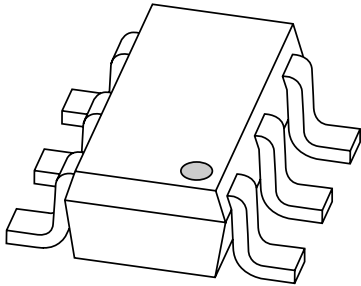Should be replaced with:
- **© Nexperia B.V. (year). All rights reserved**.

If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via **salesaddresses@nexperia.com**). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

DATA SHEET

BZA420A

Quadruple ESD transient voltage suppressor

founded by Philips

Quadruple ESD transient voltage suppressor

BZA420A

FEATURES

- ESD rating >8 kV, according to IEC1000-4-2
- SOT457 surface mount package
- Common anode configuration
- Non-clamping range −0.5 to 20 V
- Maximum reverse peak power dissipation: 19.6 W at t_p = 1 ms
- Maximum clamping voltage at peak pulse current: 28 V at I_{ZSM} = 0.7 A.

APPLICATIONS

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

DESCRIPTION

Monolithic transient voltage suppressor diode in a six lead SOT457 (SC-74) package for 4-bit wide ESD transient suppression at 20 V level.

PINNING

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

Marking code: Z0.

Fig.1 Simplified outline (SOT457) and symbol.
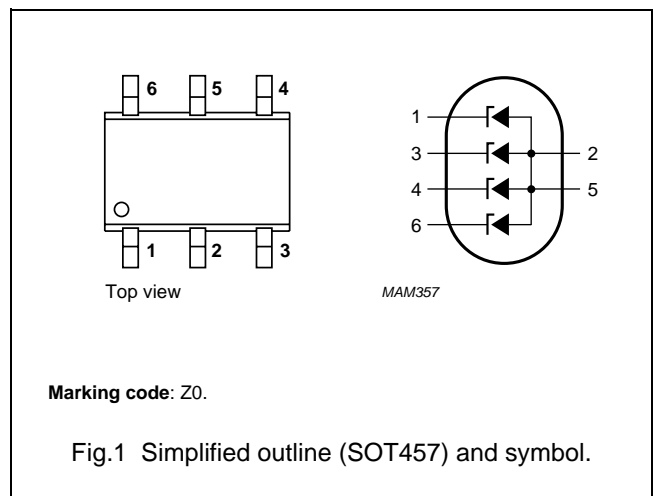
LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_Z	working current	T_s = 60 °C; note 1	–	note 2	mA
I_F	continuous forward current	T_s = 60 °C	–	100	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	3.75	A
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; square pulse; see Fig.2	–	0.7	A
P_{tot}	total power dissipation	T_s = 60 °C; see Fig.3	–	720	mW
P_{ZSM}	non repetitive peak reverse power dissipation	square pulse; t_p = 1 ms; see Fig.4	–	19.6	W
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		−65	+150	°C

Notes

1. T_s is the temperature at the soldering point of the anode pin.

2. DC working current limited by $P_{tot\ max}$.

Quadruple ESD transient voltage
suppressor

BZA420A

THERMAL CHARACTERISTICS

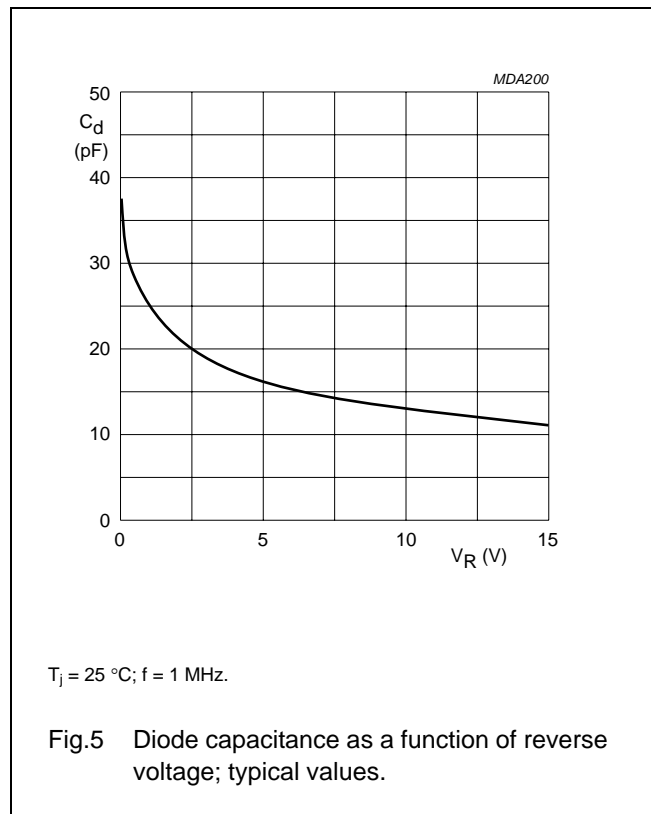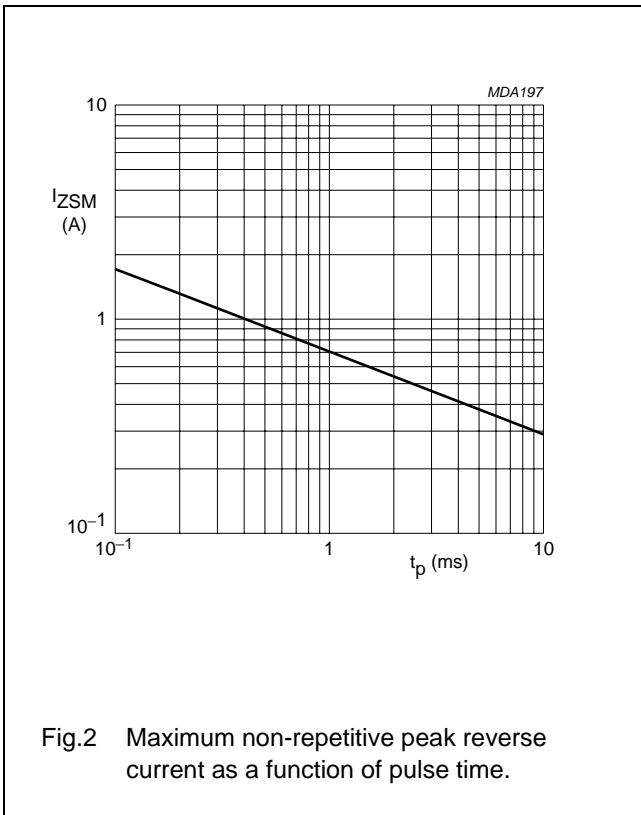| SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}s}$	thermal resistance from junction to soldering point	one or more diodes loaded	125	K/W

ELECTRICAL CHARACTERISTICS

$T_j = 25\ °C$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Per diode						
V_Z	working voltage	$I_Z = 1$ mA	19	20	21	V
V_F	forward voltage	$I_F = 200$ mA	–	–	1.3	V
V_{ZSM}	non-repetitive peak reverse voltage	$I_{ZSM} = 0.7$ A; $t_p = 1$ ms	–	–	28	V
I_R	reverse current	$V_R = 15$ V	–	–	100	nA
r_{dif}	differential resistance	$I_Z = 1$ mA	–	–	125	Ω
S_Z	temperature coefficient of working voltage	$I_Z = 5$ mA	–	16.2	–	mV/K
C_d	diode capacitance	see Fig.5				
		$V_R = 0$; $f = 1$ MHz	–	–	48	pF
		$V_R = 15$ V; $f = 1$ MHz	–	–	14	pF

Quadruple ESD transient voltage suppressor
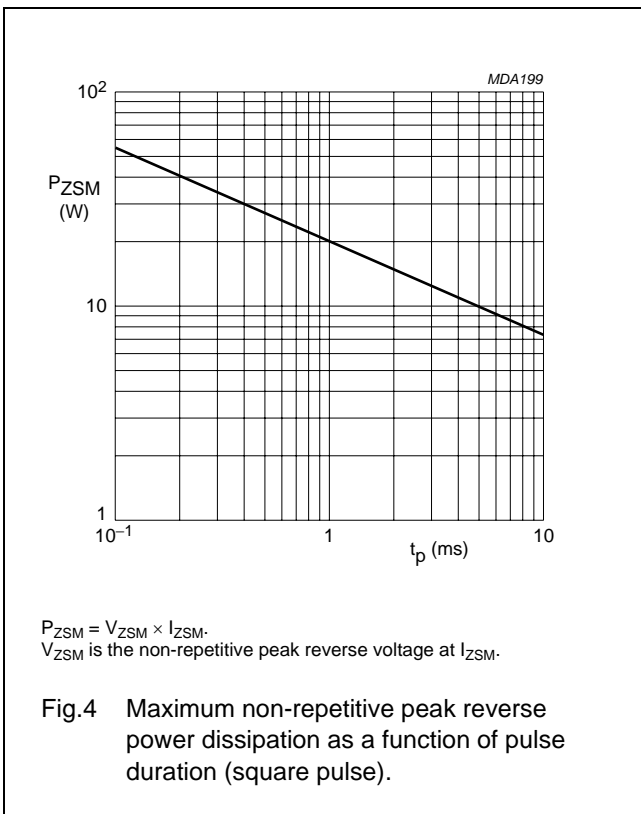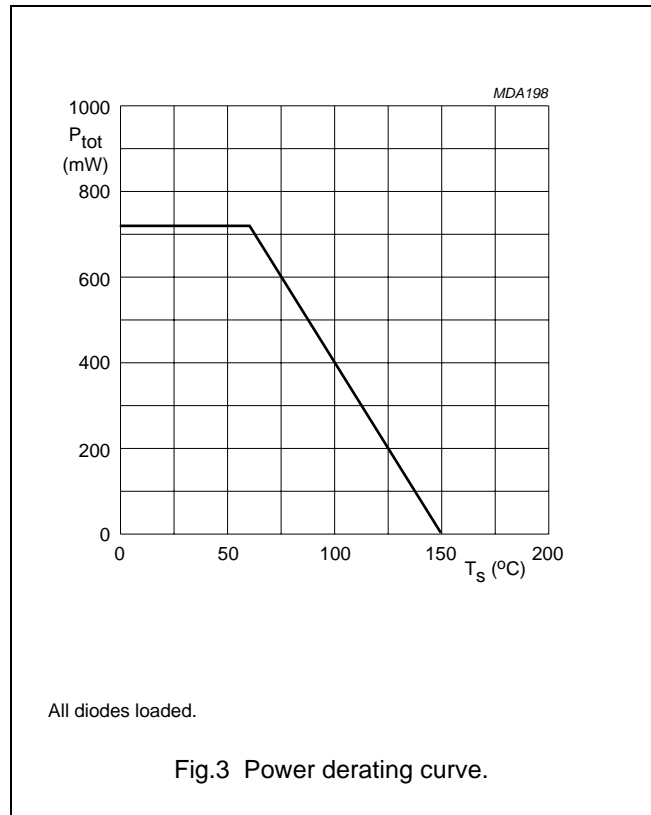
BZA420A

MDA197

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

MDA198

All diodes loaded.

Fig.3 Power derating curve.

MDA199

$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.
V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.4   Maximum non-repetitive peak reverse
power dissipation as a function of pulse
duration (square pulse).

MDA200

$T_j = 25\ °C$; $f = 1$ MHz.

Fig.5   Diode capacitance as a function of reverse
voltage; typical values.

Quadruple ESD transient voltage suppressor

BZA420A
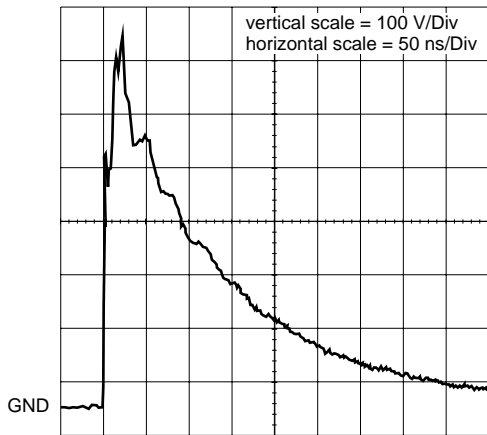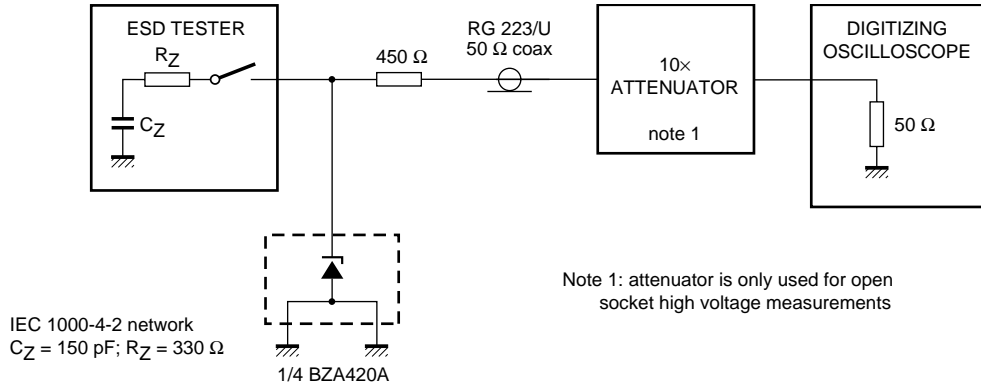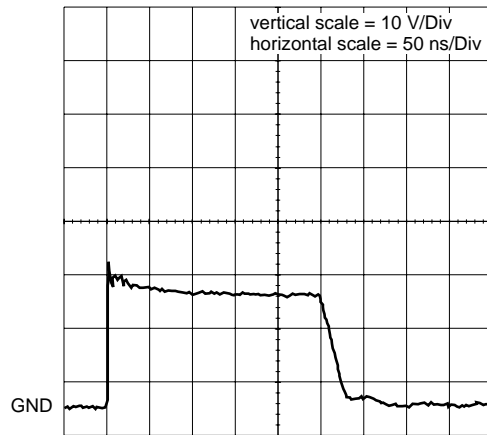
Fig.6 ESD clamping test set-up and waveforms.

Quadruple ESD transient voltage
suppressor   BZA420A

APPLICATION INFORMATION

Typical common anode application

A quadruple transient suppressor in a SOT457 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.
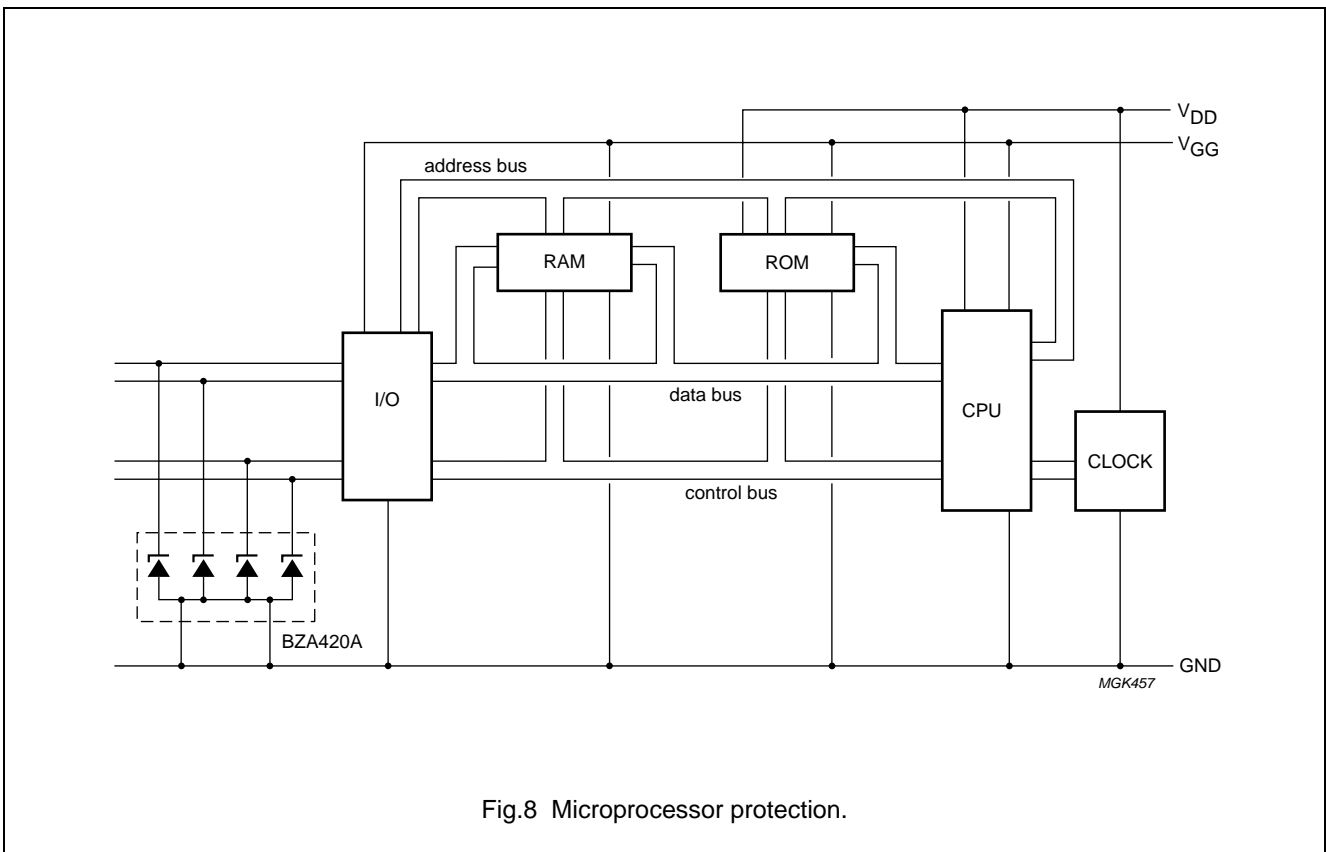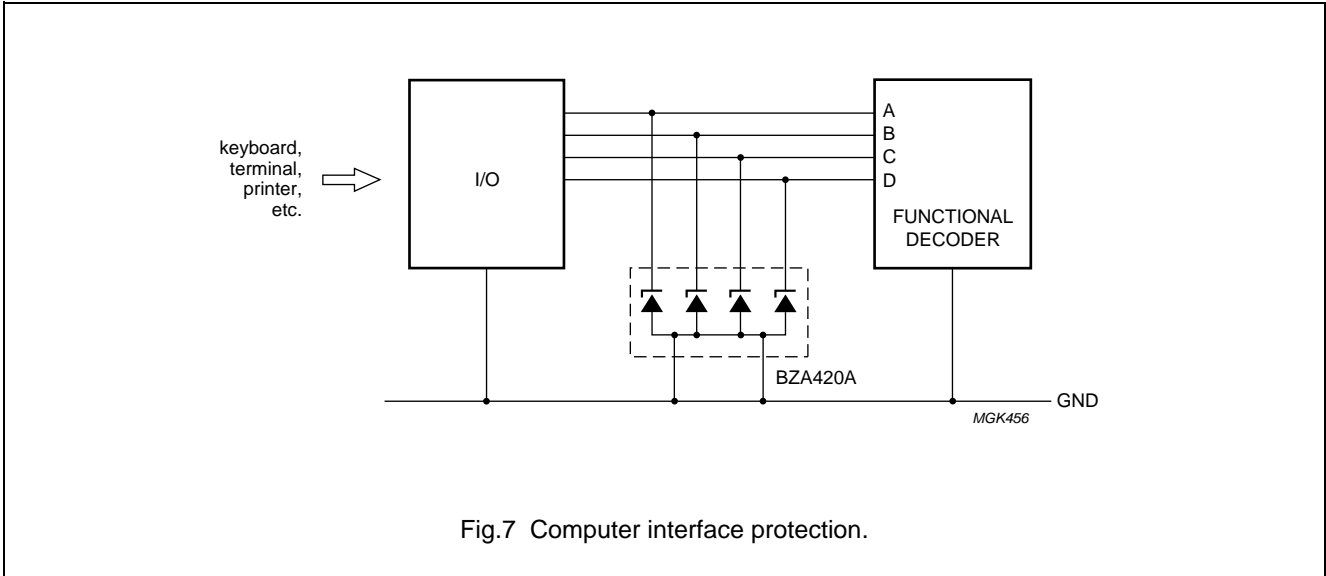
Quadruple ESD transient voltage suppressor

Device placement and printed-circuit board layout

Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA420A 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 ESD transient voltage suppressor

BZA420A

PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT457

pin 1
index

detail X

```
0          1          2 mm
|_____|_____|
        scale
```
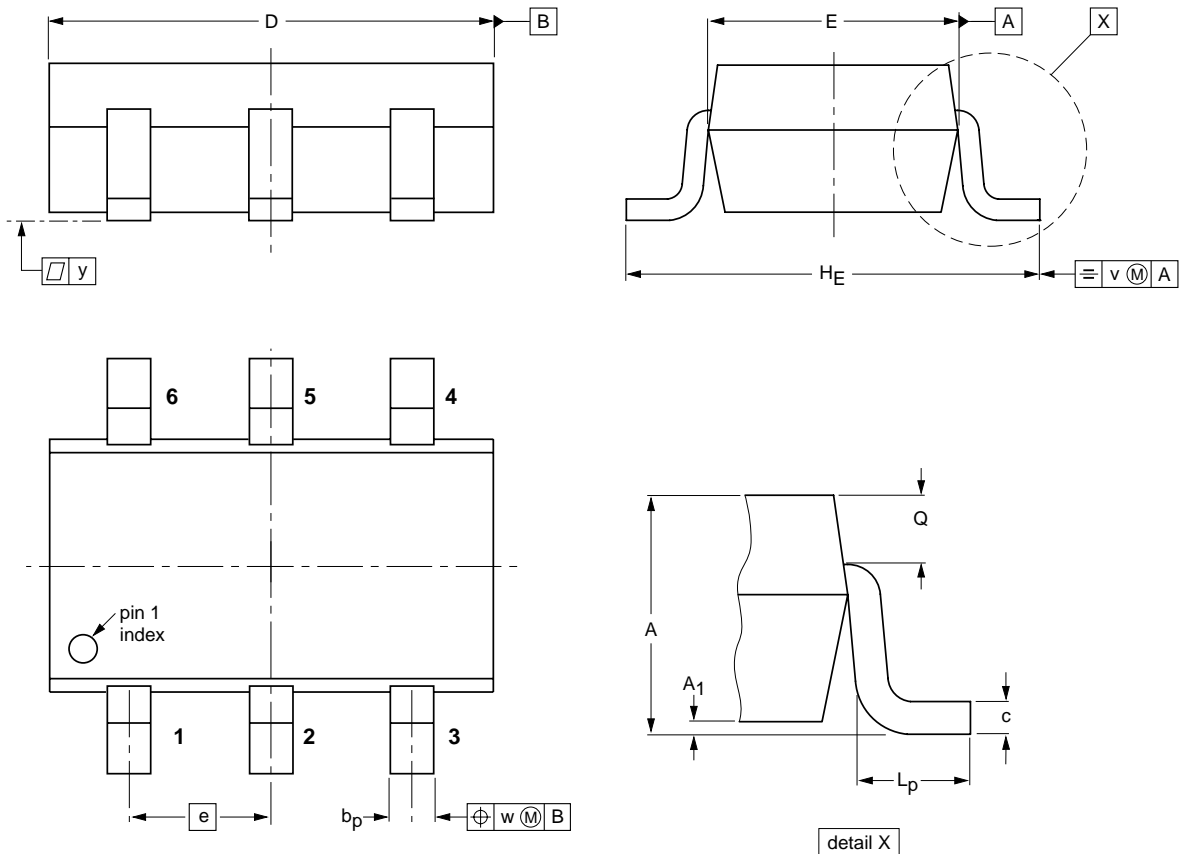
DIMENSIONS (mm are the original dimensions)

UNIT	A	A$_1$	b$_p$	c	D	E	e	H$_E$	L$_p$	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			
SOT457			SC-74			~~97-02-28~~ 01-05-04

Quadruple ESD transient voltage
suppressor   BZA420A

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.

Notes

1. Please consult the most recently issued document before initiating or completing a design.

2. The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

NXP Semiconductors

Customer notification

This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

Contact information

For additional information please visit: **http://www.nxp.com**
For sales offices addresses send e-mail to: **salesaddresses@nxp.com**

founded by

PHILIPS