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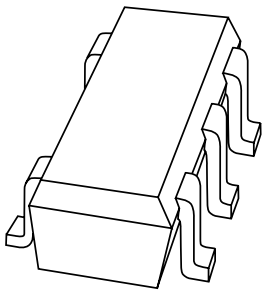
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Team Nexperia

DATA SHEET



BZA800AL series
Quadruple ESD transient voltage suppressor

Product data sheet

2002 Jan 11

NXP founded by Philips

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

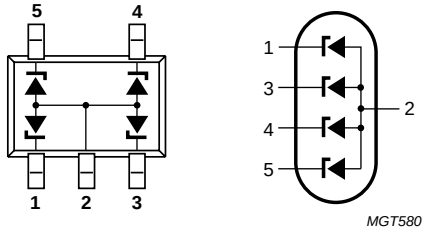


Fig.1 Simplified outline (SOT353) and symbol.

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 °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	–	4	A
P_{tot}	total power dissipation	T_{amb} = 25 °C; note 2; see Fig.5	–	300	mW
P_{ZSM}	non repetitive peak reverse power dissipation:	square pulse; t_p = 1 ms; see Fig.3			
	BZA856AL		–	16	W
	BZA862AL		–	15	W
	BZA868AL		–	14	W
T_{stg}	storage temperature		−65	+150	°C
T_j	junction temperature		–	150	°C

Notes

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	all diodes loaded	410	K/W
$R_{th\ j\text{-}s}$	thermal resistance from junction to solder point; note 1	one diode loaded	200	K/W
		all diodes loaded	185	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	–	–	1.3	V
I_R	reverse current					
	BZA856AL	V_R = 3 V	–	–	1 000	nA
	BZA862AL	V_R = 4 V	–	–	500	nA
	BZA868AL	V_R = 4.3 V	–	–	100	nA
V_Z	working voltage	I_Z = 1 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 mA				
	BZA856AL		–	–	400	Ω
	BZA862AL		–	–	300	Ω
	BZA868AL		–	–	200	Ω
S_Z	temperature coefficient	I_Z = 1 mA				
	BZA856AL		–	0.3	–	mV/K
	BZA862AL		–	1.6	–	mV/K
	BZA868AL		–	2.2	–	mV/K
C_d	diode capacitance	f = 1 MHz; V_R = 0				
	BZA856AL		–	–	125	pF
	BZA862AL		–	–	105	pF
	BZA868AL		–	–	90	pF
I_{ZSM}	non-repetitive peak reverse current	t_p = 1 ms; T_{amb} = 25 °C				
	BZA856AL		–	–	2.2	A
	BZA862AL		–	–	2.1	A
	BZA868AL		–	–	2	A

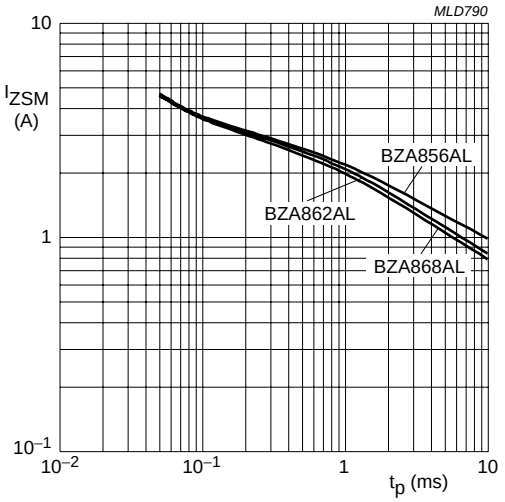
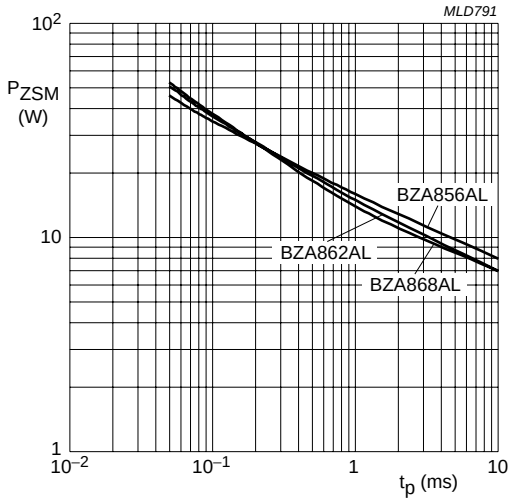
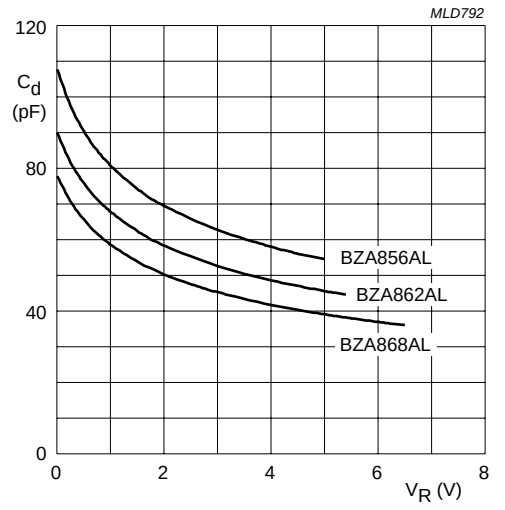


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



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

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.

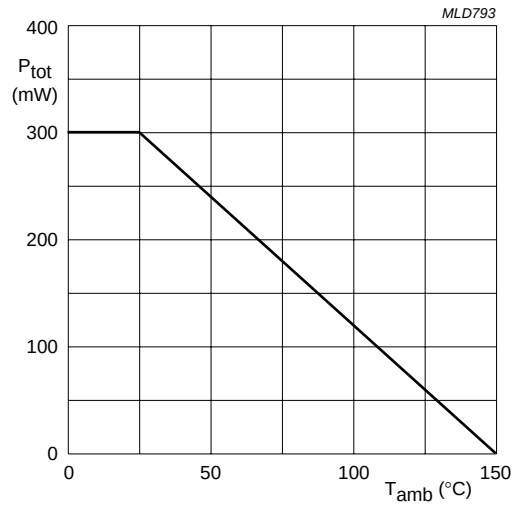
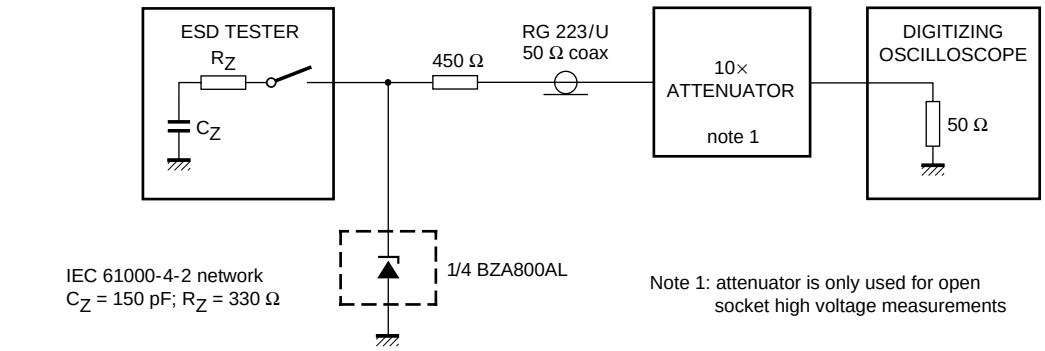
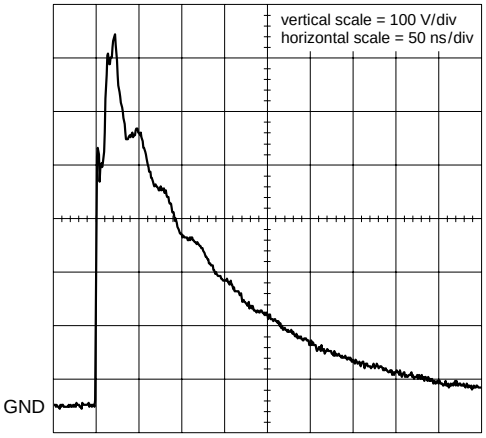
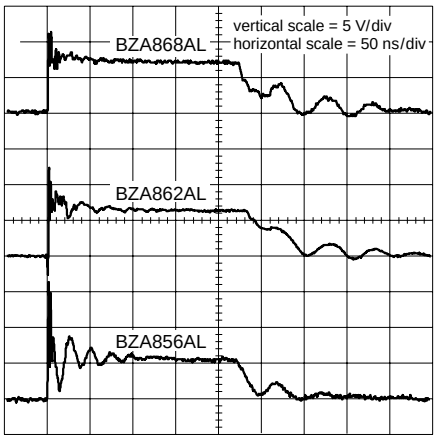


Fig.5 Power derating curve.

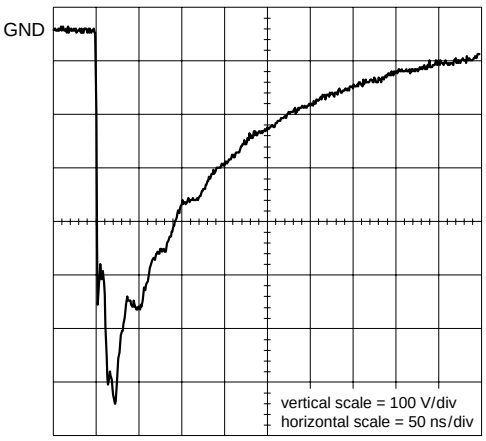




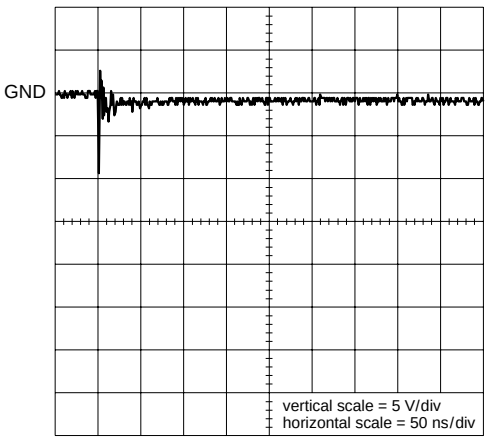
unclamped +1 kV ESD voltage waveform (IEC 61000-4-2 network)



clamped +1 kV ESD voltage waveform (IEC 61000-4-2 network)



unclamped −1 kV ESD voltage waveform (IEC 61000-4-2 network)



clamped −1 kV ESD voltage waveform (IEC 61000-4-2 network)

MLD794

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

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.

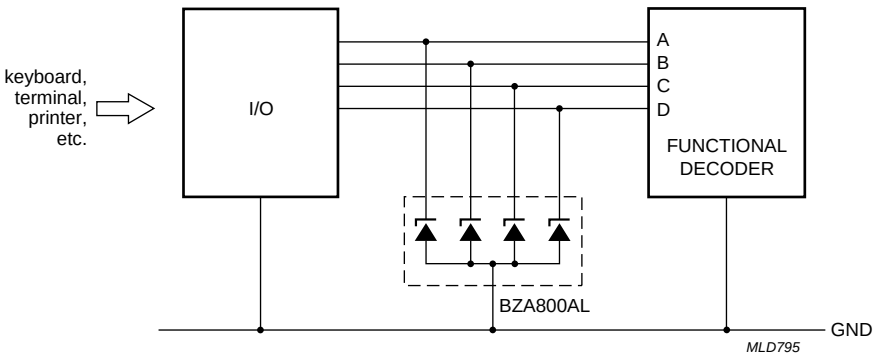


Fig.7 Computer interface protection.

Device placement and printed-circuit board layout

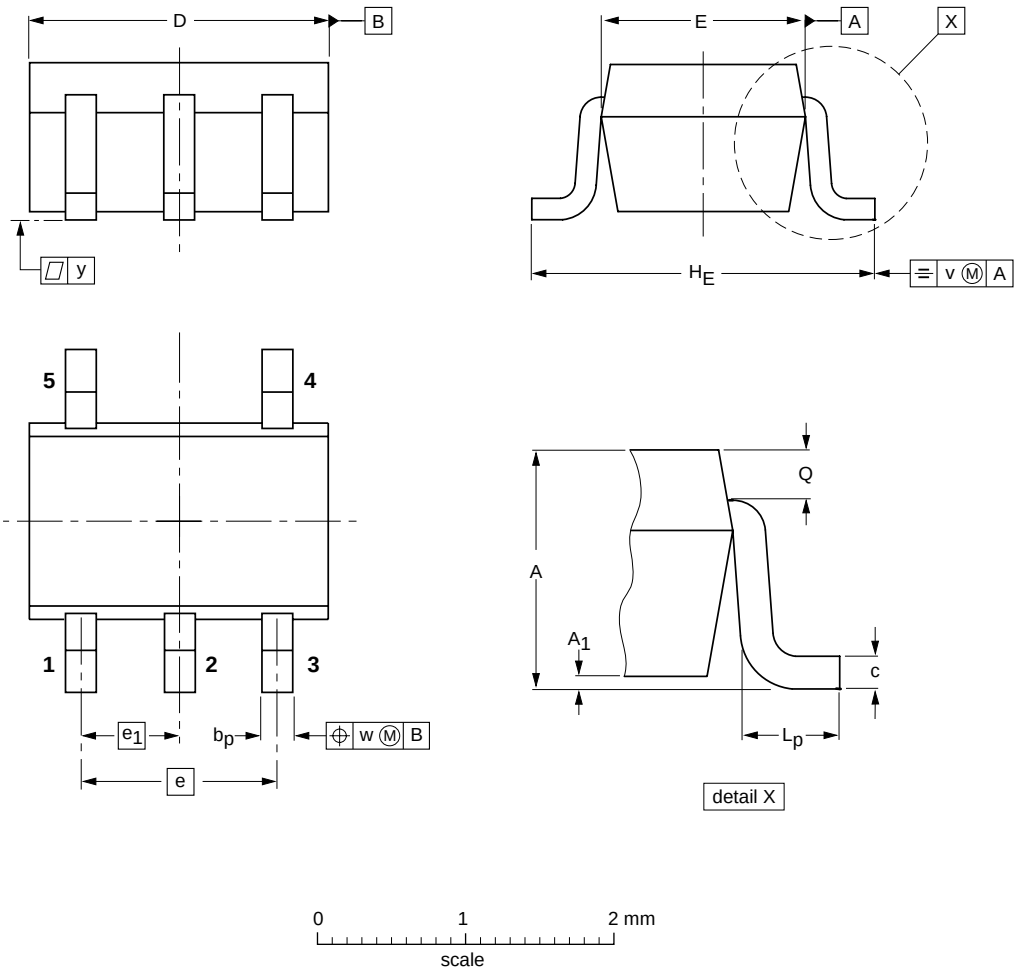
Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA800AL is determined by the peak transient current and the rate of rise of that current (di/dt). Since parasitic inductances can further add to the clamping voltage (V = L di/dt) the series conductor 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.

PACKAGE OUTLINE

Plastic surface mounted package; 5 leads **SOT353**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E (2)	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT353			SC-88A			97-02-28

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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