Features

- ESD/Surge protection for one line with bi-directional
- Provide transient protection for each line to
  IEC 61000-4-2 (ESD) ±24kV / ±20kV (air / contact)
  IEC 61000-4-4 (EFT) ±80A (5/50ns)
  IEC 61000-4-5 (Lightning) 4A (8/20μs)
- Integrate a TVS and a parallel RF decoupling capacitor in a single package
- Suitable for**, 5V and below,** operating voltage applications
- Decoupling capacitor: **33pF**
- **0201 small MCSP package** saves board space
- Protect one I/O line or one power line
- Fast turn-on and low clamping voltage
- Solid-state silicon-avalanche and active circuit triggering technology
- ***Green part***

Applications

- Cellular handsets and accessories
- Audio ports
- Handheld portable applications
- Small panel modules
- Low speed data or control line protection
- Peripherals
- Consumer electronics

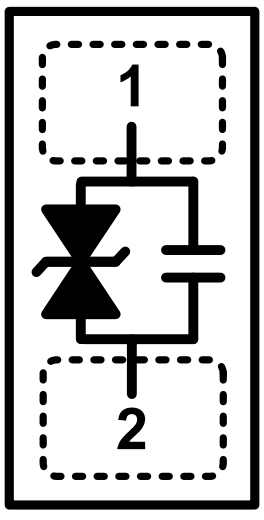
Description

AZ5D25-01M is a design which includes a bi-directional surge rated clamping cell to protect one power line, or one control line, or one low speed data line in an electronic system. The AZ5D25-01M has been specifically designed to protect sensitive components which are connected to power or control lines from over-voltage damage caused by Electrostatic Discharging (ESD), Electrical Fast Transients (EFT), Lightning, and Cable Discharge Event (CDE).

AZ5D25-01M is a unique design which includes proprietary clamping cell in a single package. During transient conditions, the proprietary clamping cell prevents over-voltage on the power line or control/data lines, protecting any downstream components.

AZ5D25-01M may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 (±15kV air, ±8kV contact discharge).

Circuit Diagram / Pin Configuration



MCSP0603P2YS-A (Top View)

Specifications

Absolute Maximum Ratings (T_A= 25°C, unless otherwise specified)			
Parameter	**Symbol**	**Rating**	**Unit**
Peak Pulse Current (t_p =8/20μs)	I_{PP}	4	A
Operating Voltage	V_{DC}	±5.5	V
ESD per IEC 61000-4-2 (Air) ESD per IEC 61000-4-2 (Contact)	V_{ESD-1} V_{ESD-2}	±24 ±20	kV
Lead Soldering Temperature	T_{SOL}	260 (10 sec.)	°C
Operating Temperature	T_{OP}	-55 to +125	°C
Storage Temperature	T_{STO}	-55 to +150	°C

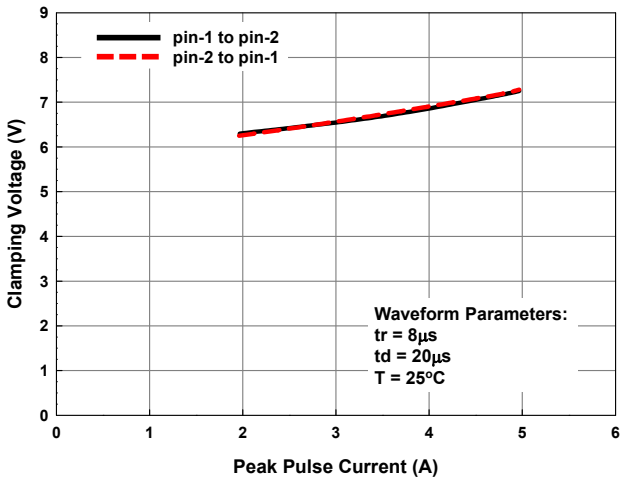
Electrical Characteristics						
Parameter	**Symbol**	**Condition**	**Min**	**Typ**	**Max**	**Unit**
Reverse Stand-Off Voltage	V_{RWM}	T=25 °C.	-5		5	V
Reverse Leakage Current	I_{Leak}	V_{RWM} = ±5V, T=25 °C.			100	nA
Reverse Breakdown Voltage	V_{BV}	I_{BV} = 1mA, T=25 °C.	6.5	8.5	10.5	V
Surge Clamping Voltage	$V_{CL-surge}$	I_{PP} = 4A, t_p = 8/20μs, T=25 °C.		7	9	V
ESD Clamping Voltage (Note 1)	V_{CL-ESD}	IEC 61000-4-2 +8kV (I_{TLP} = 16A), contact mode, T=25 °C.		7.8		V
ESD Dynamic Turn-on Resistance	$R_{dynamic}$	IEC 61000-4-2 0~+8kV, T=25 °C, contact mode.		0.12		Ω
Channel Input Capacitance	C_{IN}	V_R = 0V to 5V, f = 1MHz, T=25 °C.	28		38	pF

Note 1: ESD Clamping Voltage was measured by Transmission Line Pulsing (TLP) System.

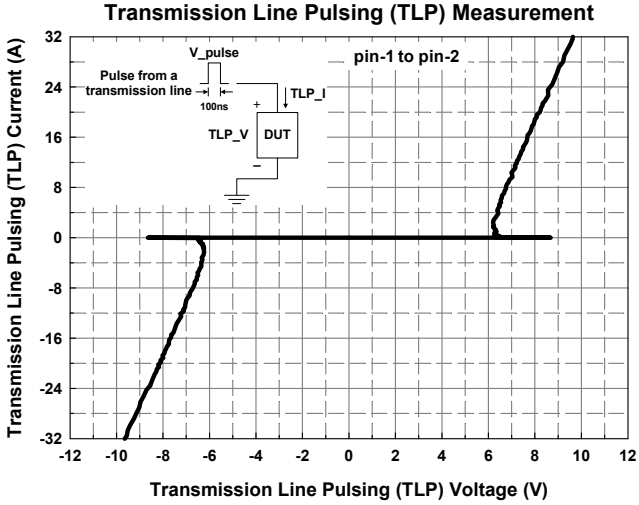
TLP conditions: Z_0= 50Ω, t_p= 100ns, t_r= 1ns.

Typical Characteristics

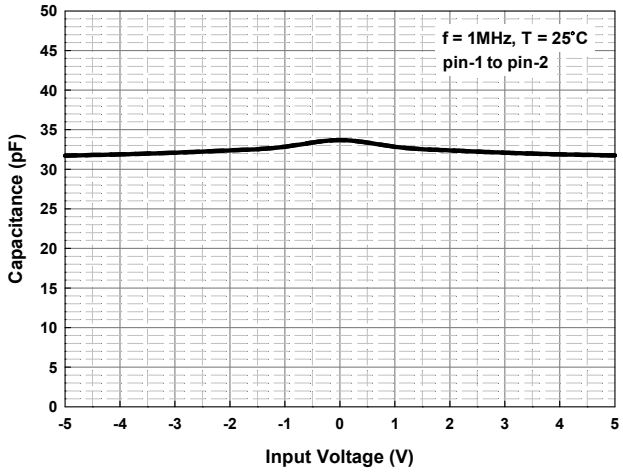
Reverse Clamping Voltage vs. Peak Pulse Current



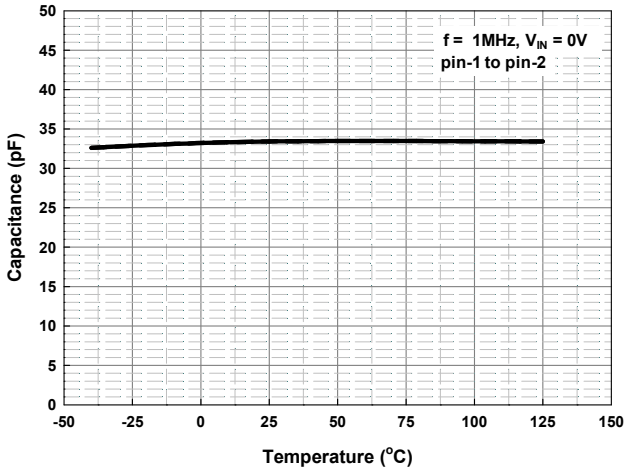
Transmission Line Pulsing (TLP) Measurement



Typical Variation of C_{IN} vs. V_{IN}



Typical Variation of C_{IN} vs. Temperature



Applications Information

The AZ5D25-01M is designed to protect one line against system ESD/EFT/Lightning pulses by clamping it to an acceptable reference.

The usage of the AZ5D25-01M is shown in Fig. 1. Protected line, such as data line, control line, or power line, is connected to pin-1. The pin-2 is connected to a ground plane on the board. In order to minimize parasitic inductance in the board traces, all path lengths connected to the pins of AZ5D25-01M should be kept as short as possible.

In order to obtain enough suppression of ESD induced transient, good circuit board is critical. Thus the following guidelines are recommended:

- Minimize the path length between the protected lines and the AZ5D25-01M.
- Place the AZ5D25-01M near the input terminals or connectors to restrict transient coupling.
- The ESD current return path to ground should be kept as short as possible.
- Use ground planes whenever possible.
- NEVER route critical signals near board edges and near the lines which the ESD transient easily injects to.

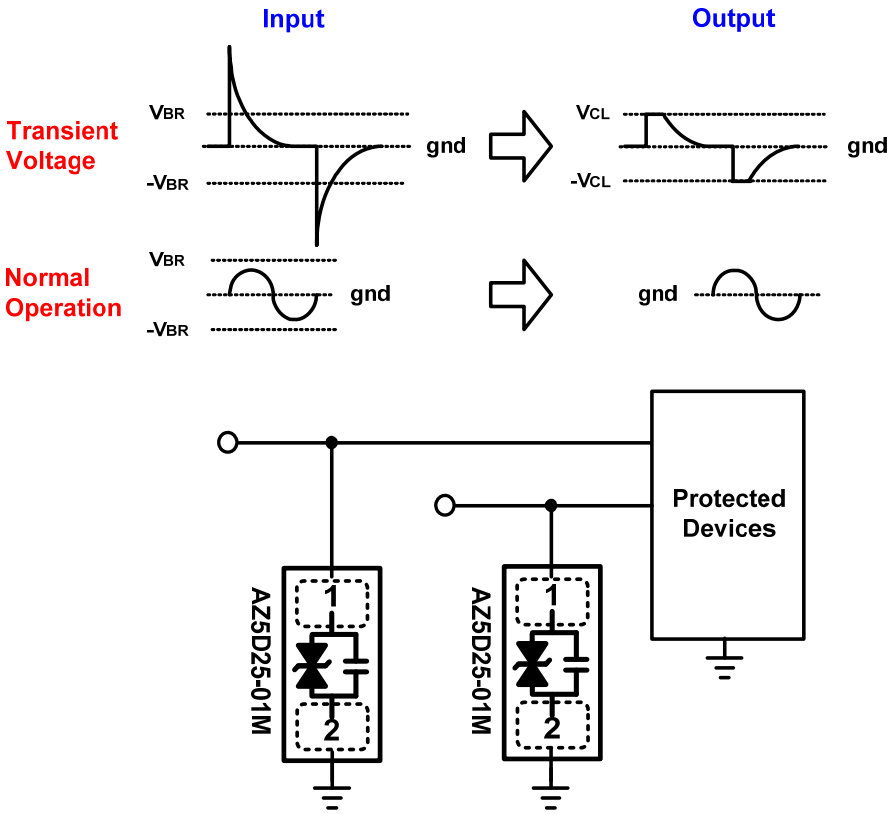


Fig. 1

Fig. 2 shows an example of using AZ5D25-01M for audio port protection. AZ5D25-01M consists of a TVS and a parallel RF decoupling capacitor, which can be used to replace two discrete components. AZ5D25-01M can provide efficient ESD and EMI protection on any low speed lines that are susceptible to ESD damage and RF interference.

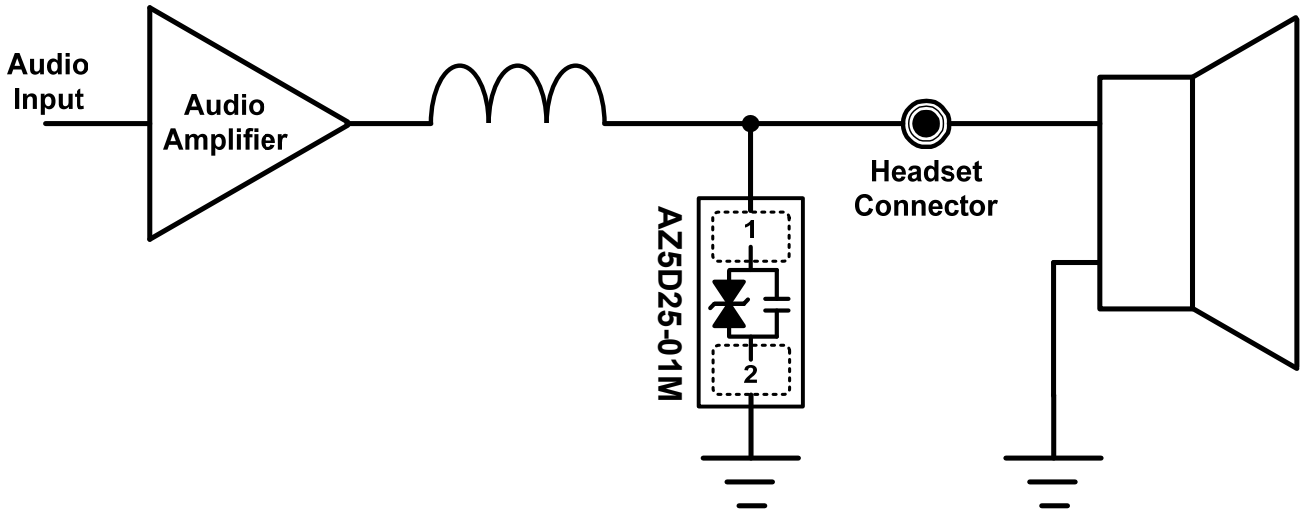
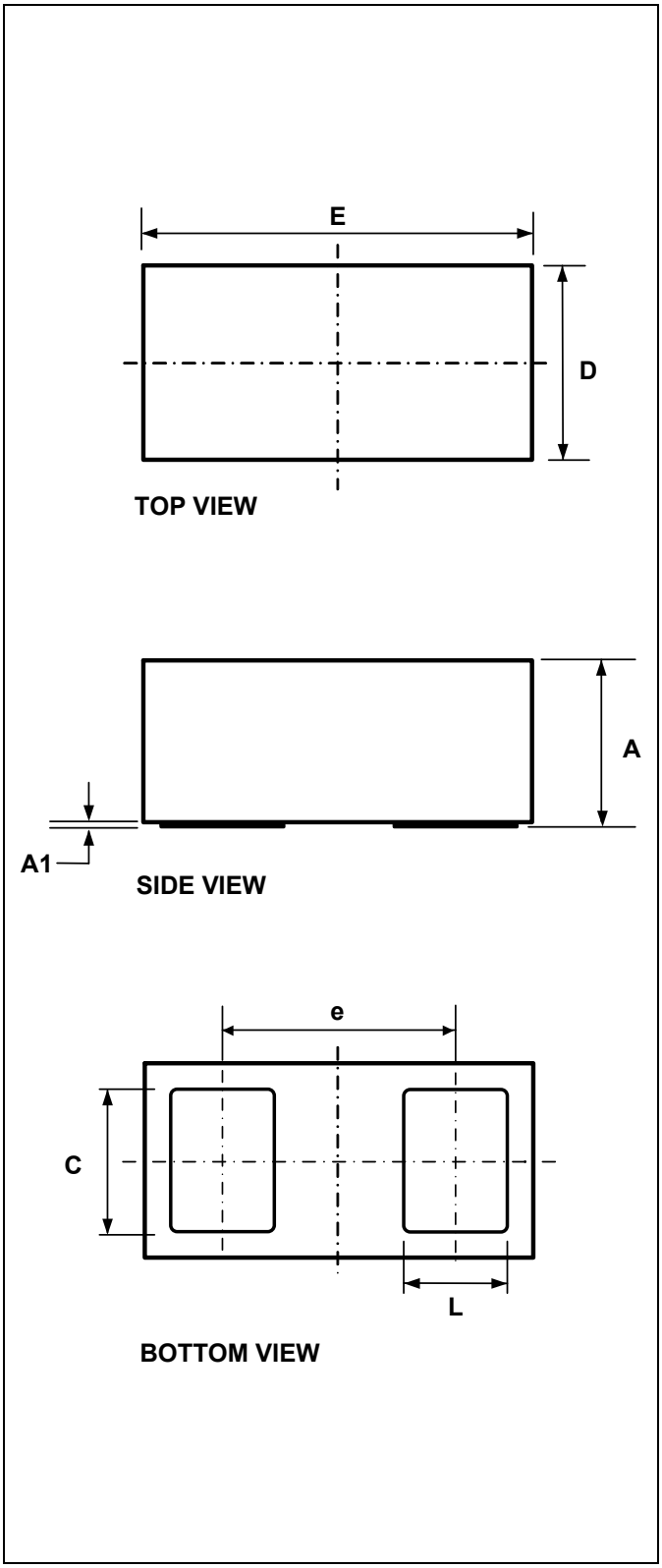


Fig. 2 An example of audio port protection

Mechanical Details

MCSP0603P2YS-A

Package Diagrams

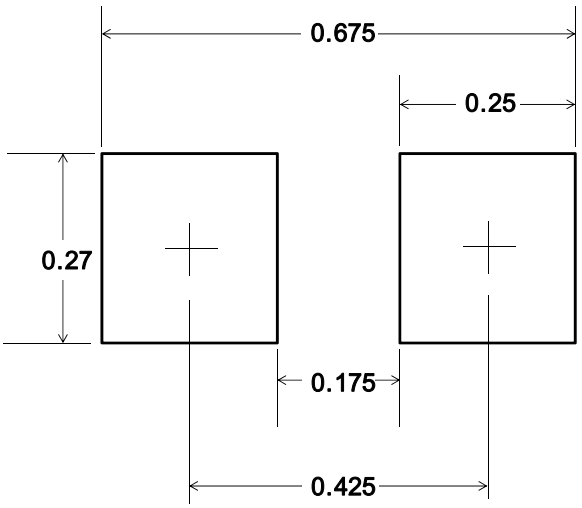


Package Dimensions

SYMBOL	MILLIMETERS		
	MIN.	NOM.	MAX.
E	0.580	0.600	0.620
D	0.280	0.300	0.320
A	0.235	0.250	0.265
A1	0.000	0.010	0.050
L	0.140	0.160	0.180
C	0.200	0.220	0.240
e	0.355 BSC		

Land Layout

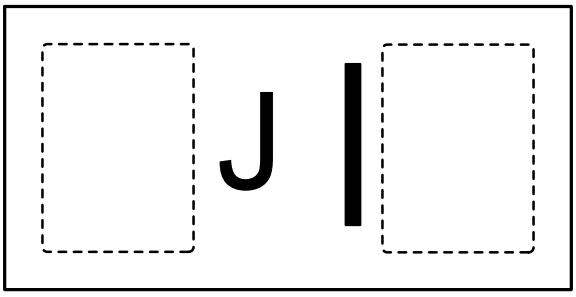
Unit: mm



Notes:

This LAND LAYOUT is for reference purposes only. Please consult your manufacturing partners to ensure your company's PCB design guidelines are met.

Marking Code



J= Device Code

Part Number	Marking Code
AZ5D25-01M.R7G (Green Part)	J

Note : Green means Pb-free, RoHS, and Halogen free compliant.

Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ5D25-01M.R7G	Green	T/R	7 inch	15,000/reel	4 reels = 60,000/box	6 boxes = 360,000/carton

Revision History

Revision	Modification Description
Revision 2024/12/19	Preliminary Release.
Revision 2025/02/26	Formal Release.