

Features

- ESD protection for one line with uni-directional
- Provide transient protection for each line to
IEC 61000-4-2 (ESD) $\pm 18\text{kV}$ (air / contact)
IEC 61000-4-4 (EFT) $\pm 50\text{A}$ (5/50ns)
IEC 61000-4-5 (Lightning) 5A (8/20 μs)
- Suitable for, **24V and below**, operating voltage applications
- **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

- Power supply protection
- USB power delivery
- Small panel modules
- Handheld portable applications
- Low speed data or control line protection
- Peripherals
- Consumer electronics

Description

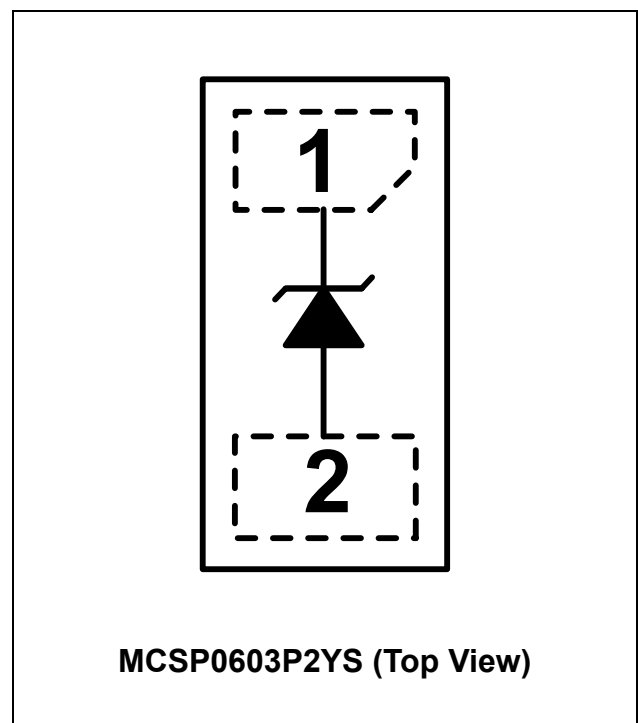
AZ4U24-01M is a design which includes a uni-directional surge rated clamping cell to protect one power line, or one control line, or one low speed data line in an electronic system. The AZ4U24-01M has been specifically designed to protect sensitive components which are connected to power and control lines from

over-voltage damage caused by Electrostatic Discharging (ESD), Electrical Fast Transients (EFT), Lightning, and Cable Discharge Event (CDE).

AZ4U24-01M 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.

AZ4U24-01M may be used to meet the ESD immunity requirements of IEC 61000-4-2, Level 4 ($\pm 15\text{kV}$ air, $\pm 8\text{kV}$ contact discharge).

Circuit Diagram / Pin Configuration



Specifications

Absolute Maximum Ratings (T _A = 25°C, unless otherwise specified)			
Parameter	Symbol	Rating	Unit
Peak Pulse Current (t _p = 8/20μs) (Note 1)	I _{PP}	5	A
Operating Voltage	V _{DC}	26.4	V
ESD per IEC 61000-4-2 (Air)	V _{ESD-1}	±18	kV
ESD per IEC 61000-4-2 (Contact)	V _{ESD-2}	±18	
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}	Pin-1 to pin-2, T=25 °C.			24	V
Reverse Leakage Current	I _{Leak}	V _{RWM} = 24V, T=25 °C, pin-1 to pin-2.			0.1	μA
Reverse Breakdown Voltage	V _{BV}	I _{BV} = 1mA, T=25 °C, pin-1 to pin-2.	26.8		31.3	V
Forward Voltage	V _F	I _F = 15mA, T=25 °C, pin-2 to pin-1.	1		2	V
Surge Clamping Voltage (Note 1)	V _{CL-surge}	I _{PP} = 5A, t _p = 8/20μs, T=25°C.		35		V
ESD Clamping Voltage (Note 2)	V _{CL-ESD}	IEC 61000-4-2 +8kV (I _{TLP} = 16A), contact mode, T=25 °C, pin-1 to pin-2.		36		V
ESD Dynamic Turn-on Resistance	R _{dynamic}	IEC 61000-4-2 0~+8kV, T=25 °C, contact mode, pin-1 to pin-2.		0.45		Ω
Channel Input Capacitance	C _{IN}	V _R = 0V, f = 1MHz, pin-1 to pin-2, T=25 °C.		11	15	pF

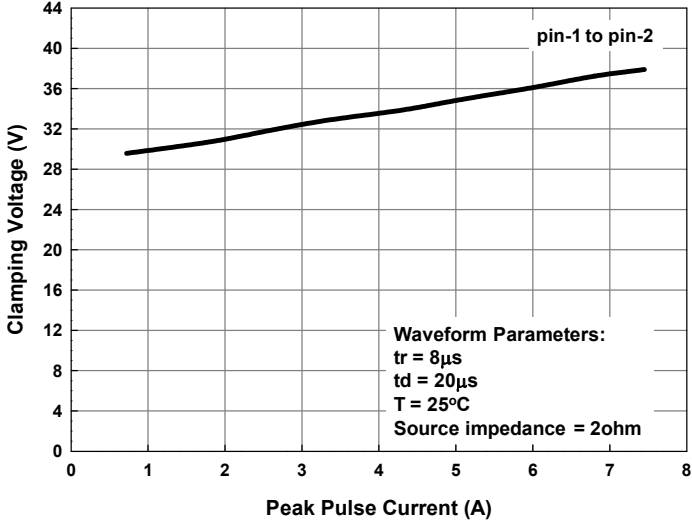
Note 1: The Peak Pulse Current measured conditions: t_p = 8/20μs, 2Ω source impedance.

Note 2: ESD Clamping Voltage was measured by Transmission Line Pulsing (TLP) System.

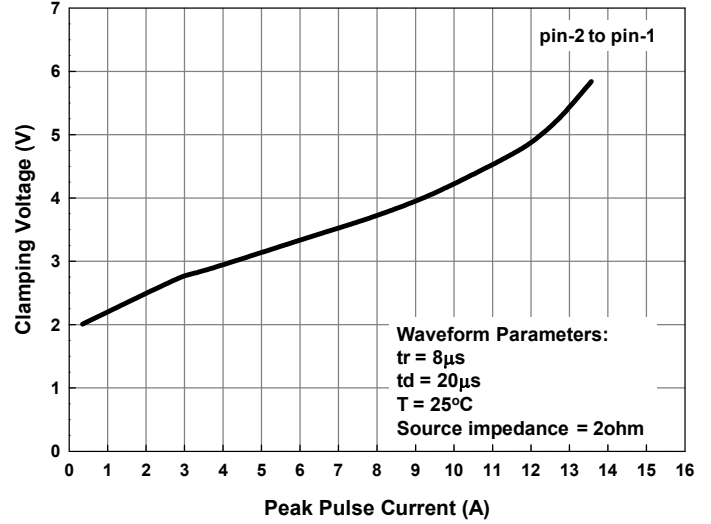
TLP conditions: Z₀ = 50Ω, t_p = 100ns, t_r = 1ns.

Typical Characteristics

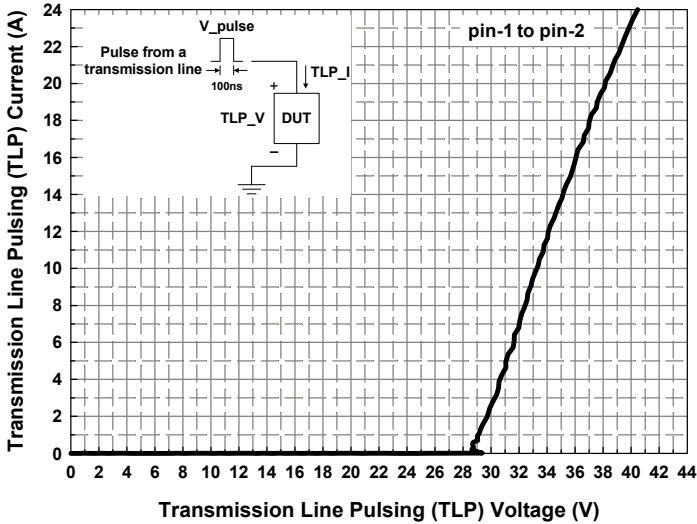
Reverse Clamping Voltage vs. Peak Pulse Current



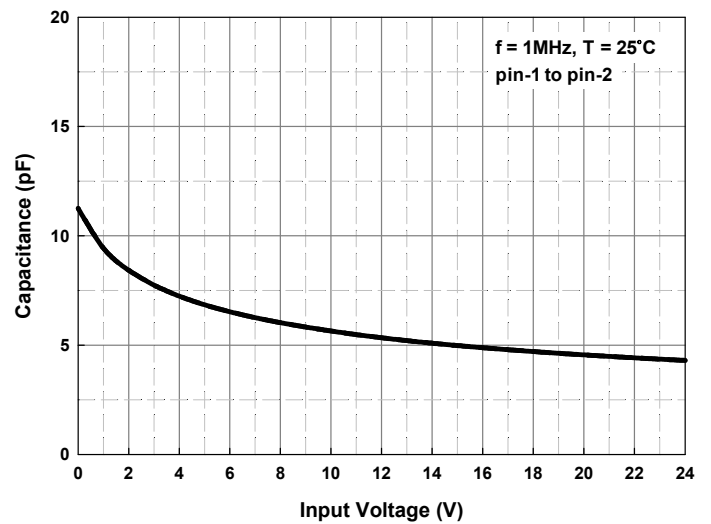
Forward Clamping Voltage vs. Peak Pulse Current



Transmission Line Pulsing (TLP) Measurement



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



Applications Information

The AZ4U24-01M is designed to protect one line against system ESD / EFT / Lightning pulses by clamping it to an acceptable reference.

The usage of the AZ4U24-01M is shown in Fig. 1. Protected lines, such as data lines, control lines, or power lines, are connected to pin 1. The pin 2 should be connected directly to a ground plane on the board. All path lengths connected to the pins of AZ4U24-01M should be kept as short as possible to minimize parasitic inductance in the board traces.

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

- Minimize the path length between the protected lines and the AZ4U24-01M.
- Place the AZ4U24-01M 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.

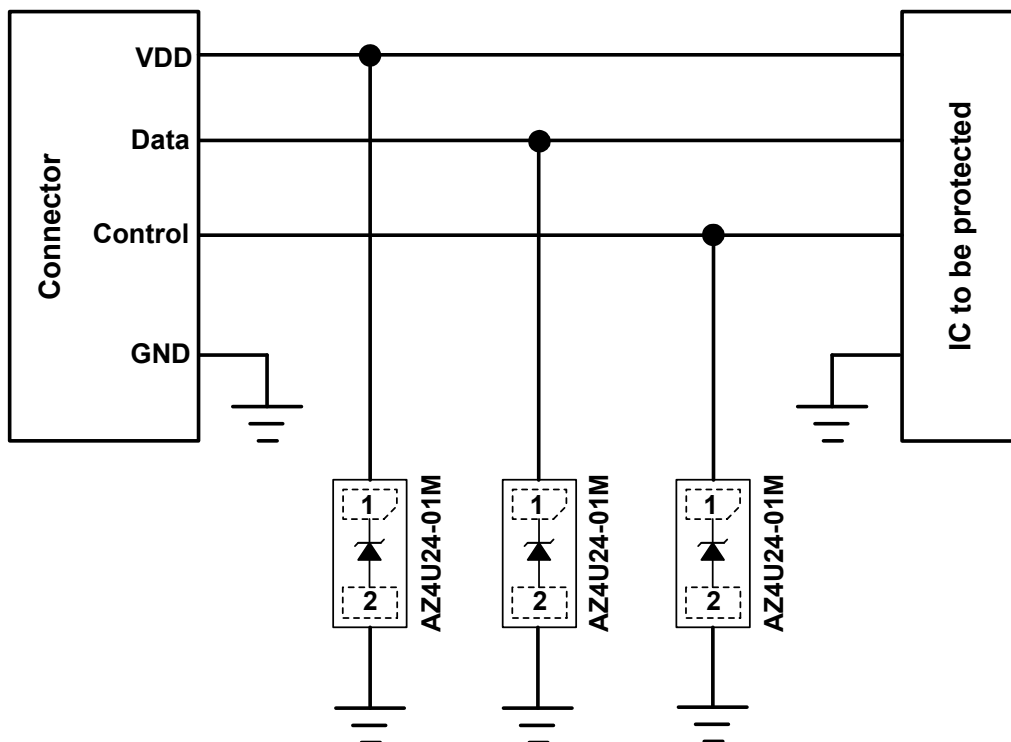
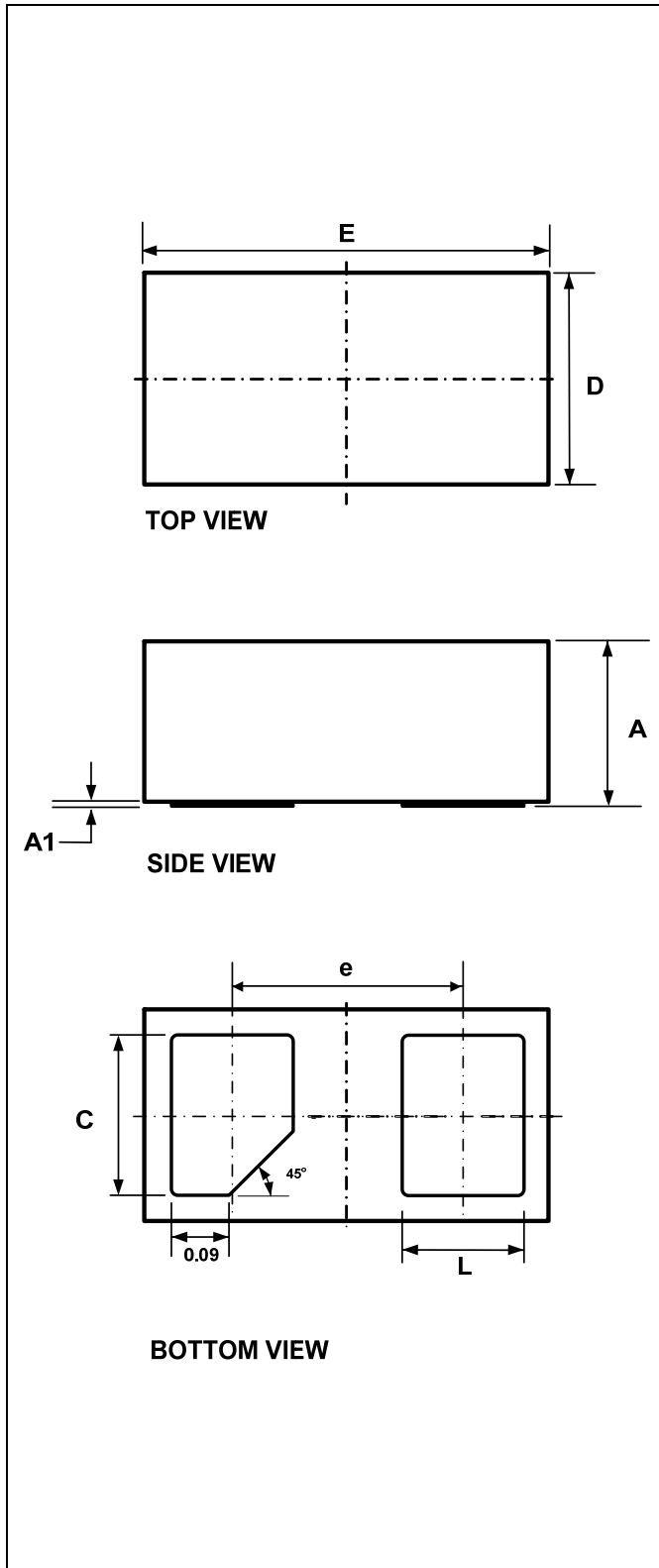


Fig. 1

Mechanical Details

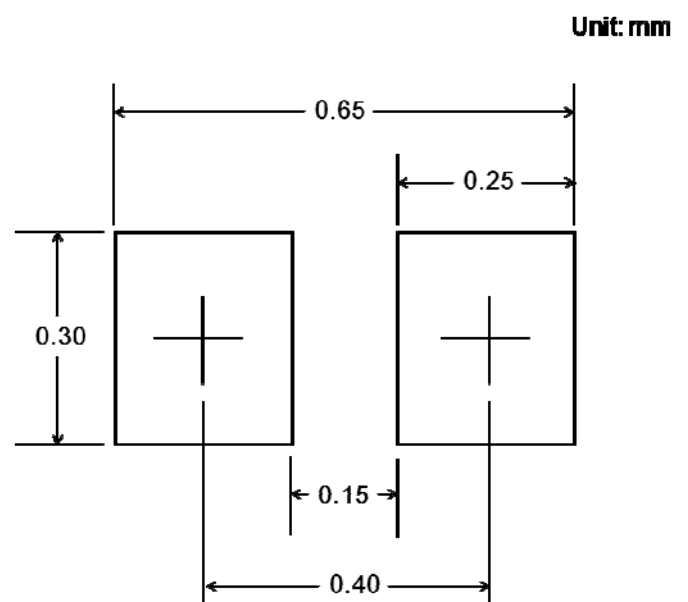
MCSP0603P2YS Package Diagrams



Package Dimensions

SYMBOL	MILLIMETERS		
	MIN.	NOM.	MAX.
E	0.615	0.630	0.645
D	0.315	0.330	0.345
A	0.235	0.250	0.265
A1	0.005	0.015	0.050
L	0.170	0.190	0.210
C	0.230	0.250	0.270
e	0.360 BSC		

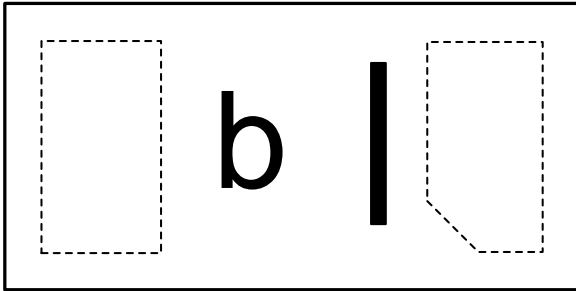
Land Layout



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



Part Number	Marking Code
AZ4U24-01M.R7G (Green Part)	b

b= Device Code

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

Ordering Information

PN#	Material	Type	Reel size	MOQ	MOQ/internal box	MOQ/carton
AZ4U24-01M.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 2023/07/25	Formal Release.