ESD54291Z05

1-Line, Bi-directional, Transient Voltage Suppressors

http//:www.omnivision-group.com

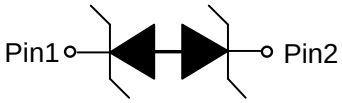
Descriptions

The ESD54291Z05 is a bi-directional TVS (Transient Voltage Suppressor). It is specifically designed to protect sensitive electronic components which are connected to low speed data lines and control lines from over-stress caused by ESD (Electrostatic Discharge), EFT (Electrical Fast Transients) and Lightning.

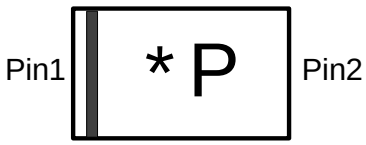
The ESD54291Z05 may be used to provide ESD protection up to ±20kV (contact and air discharge) according to IEC61000-4-2, and withstand peak pulse current up to 3A (8/20μs) according to IEC61000-4-5.

The ESD54291Z05 is available in DFN0603-2L package. Standard products are Pb-free and Halogen-free.

DFN0603-2L (Bottom View)



Circuit diagram



P= Device code
* = Month code (A~Z)

Marking (Top View)

Features

- Reverse stand-off voltage: ±5.0V Max.
- Transient protection for each line according to
  IEC61000-4-2 (ESD): ±20kV (contact and air discharge)
  IEC61000-4-4 (EFT): 40A (5/50ns)
  IEC61000-4-5 (surge): 3A (8/20μs)
- Capacitance: C_J = 3.5pF typ.
- Low leakage current: I_R < 1nA typ.
- Low clamping voltage: V_{CL} = 13V typ. @ I_{PP} = 16A (TLP)
- Solid-state silicon technology

Applications

- Cellular handsets
- Tablets
- Laptops
- Other portable devices
- Network communication devices

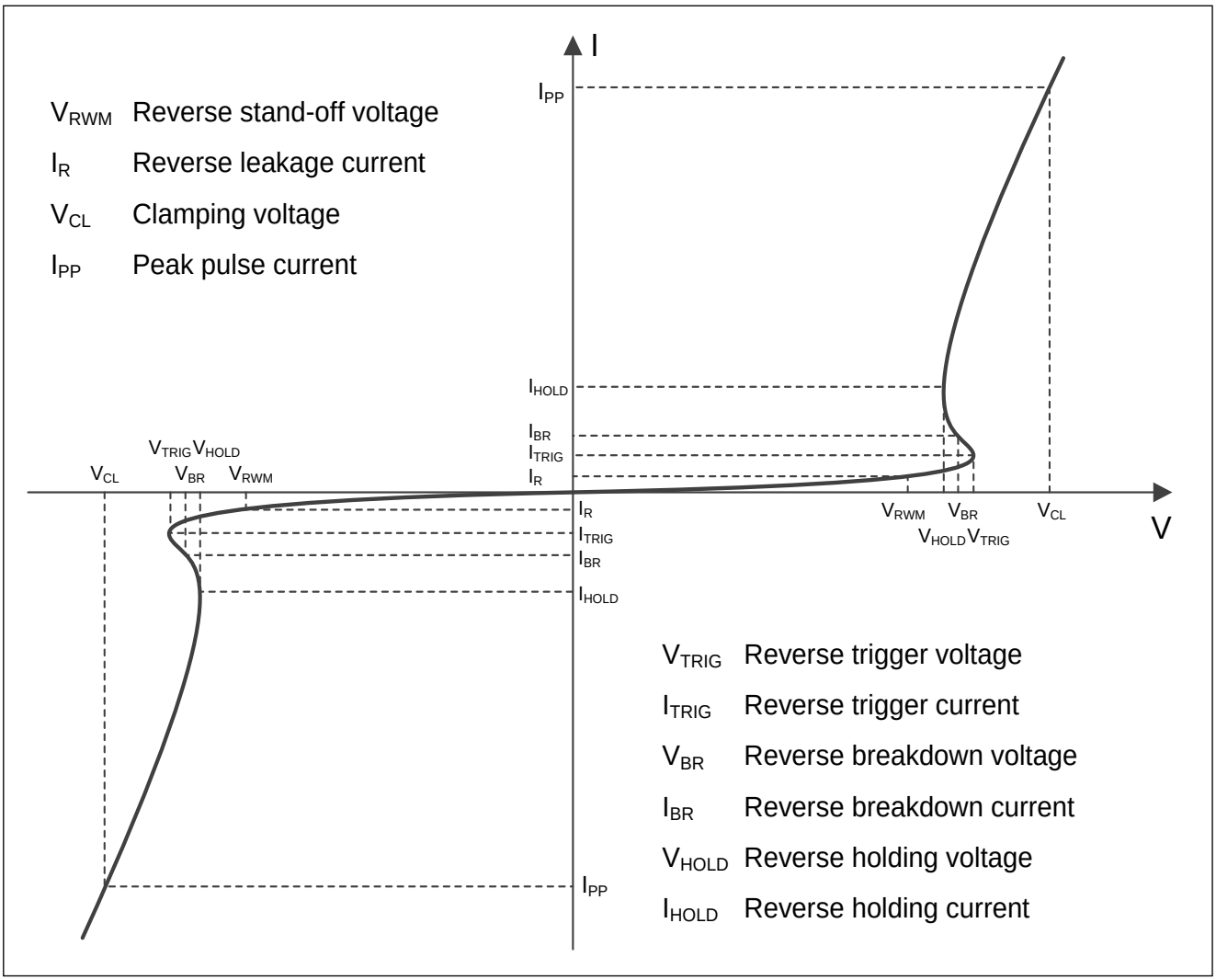
Order information

Device	Package	Shipping
ESD54291Z05-2/TR	DFN0603-2L	10000/Tape&Reel

Absolute maximum ratings

Parameter	Symbol	Rating	Unit
Peak pulse power (t_p = 8/20μs)	P_{pk}	35	W
Peak pulse current (t_p = 8/20μs)	I_{PP}	3	A
ESD according to IEC61000-4-2 air discharge	V_{ESD}	±20	kV
ESD according to IEC61000-4-2 contact discharge		±20	
Junction temperature	T_J	125	°C
Operating temperature	T_{OP}	-40~85	°C
Lead temperature	T_L	260	°C
Storage temperature	T_{STG}	-55~150	°C

Electrical characteristics (T_A=25 °C, unless otherwise noted)



Definitions of electrical characteristics

Electrical characteristics (T_A=25 °C, unless otherwise noted)

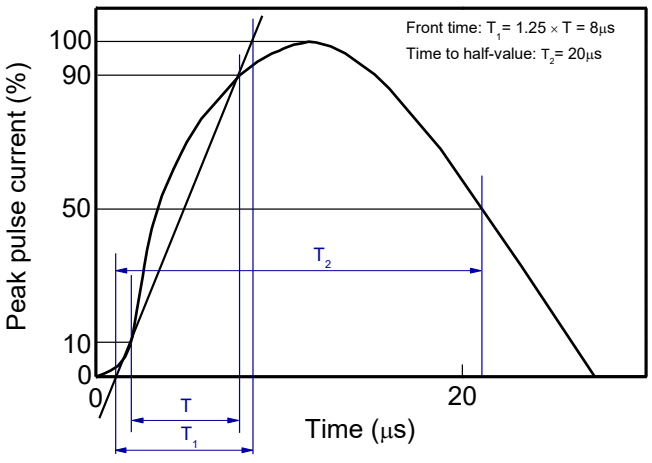
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reverse stand-off voltage	V_{RWM}				±5.0	V
Reverse leakage current	I_R	V_{RWM} = 5.0V		<1	50	nA
Reverse breakdown voltage	V_{BR}	I_{BR} = 1mA	5.5			V
Reverse trigger voltage	V_{TRIG}		5.6			V
Reverse holding voltage	V_{HOLD}	I_{HOLD} = 50mA	5.5			V
Clamping voltage *1)*	V_{CL}	I_{PP} = 16A, t_p = 100ns		13		V
Clamping voltage *2)*	V_{CL}	V_{ESD} = 8kV		13		V
Clamping voltage *3)*	V_{CL}	I_{PP} = 1A, t_p = 8/20μs			8.5	V
		I_{PP} = 3A, t_p = 8/20μs			11.5	V
Dynamic resistance *1)*	R_{DYN}			0.35		Ω
Junction capacitance	C_J	V_R = 0V, f = 1MHz		3.5	4.2	pF
		V_R = 5.0V, f = 1MHz		2.6	2.9	pF

Notes:

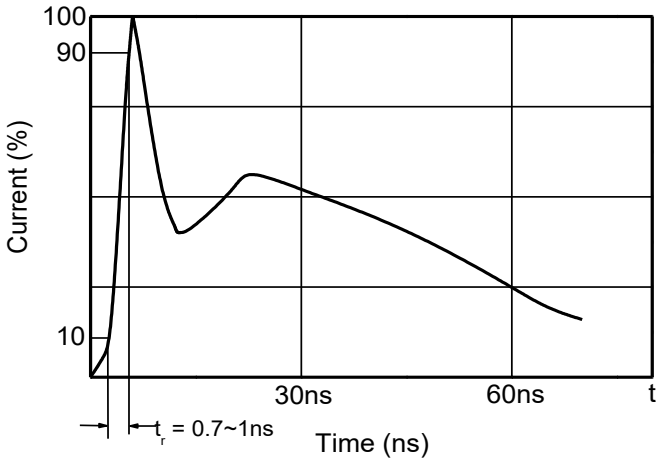
1) TLP parameter: Z_0 = 50Ω, t_p = 100ns, t_r = 2ns, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.

2) Contact discharge mode, according to IEC61000-4-2.

3) Non-repetitive current pulse, according to IEC61000-4-5.

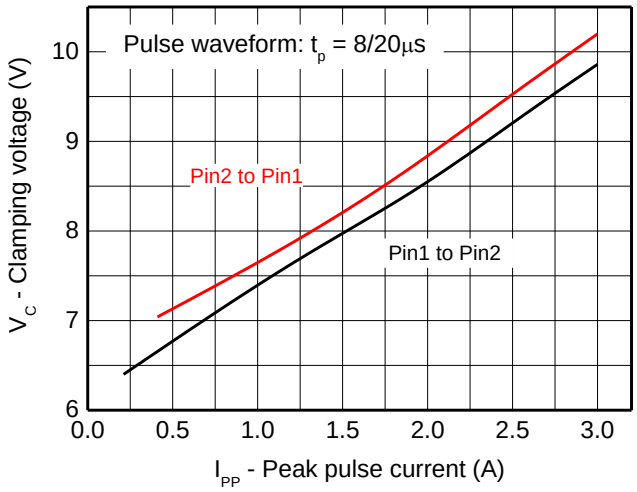


8/20μs waveform per IEC61000-4-5

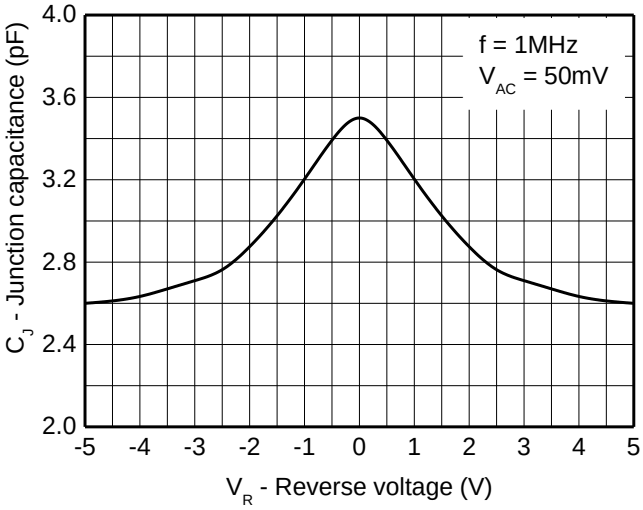


Contact discharge current waveform per IEC61000-4-2

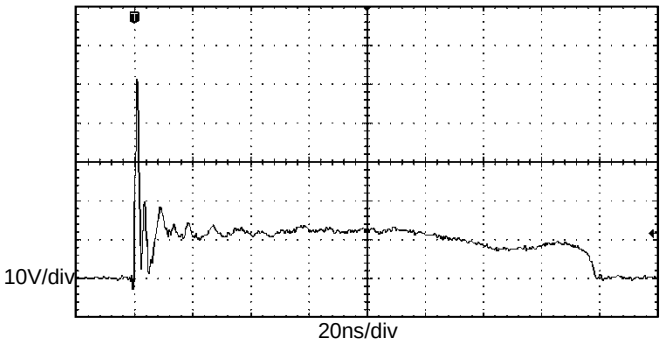
Typical characteristics (T_A=25°C, unless otherwise noted)



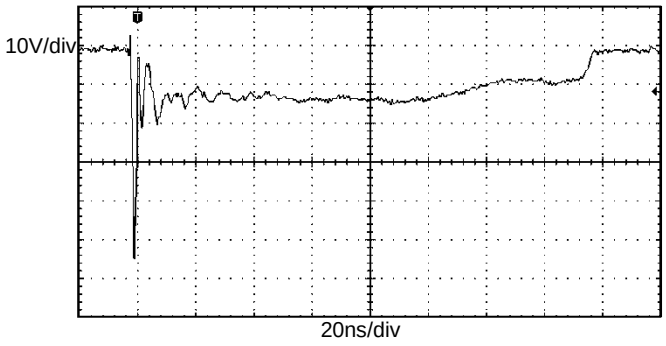
Clamping voltage vs. Peak pulse current



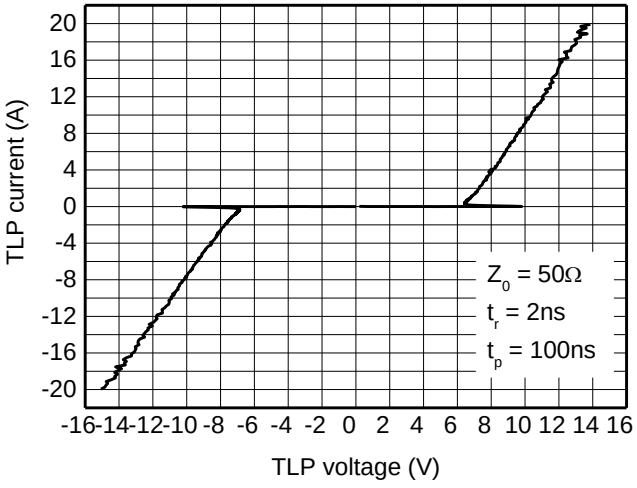
Capacitance vs. Reverse voltage



ESD clamping
(+8kV contact discharge per IEC61000-4-2)



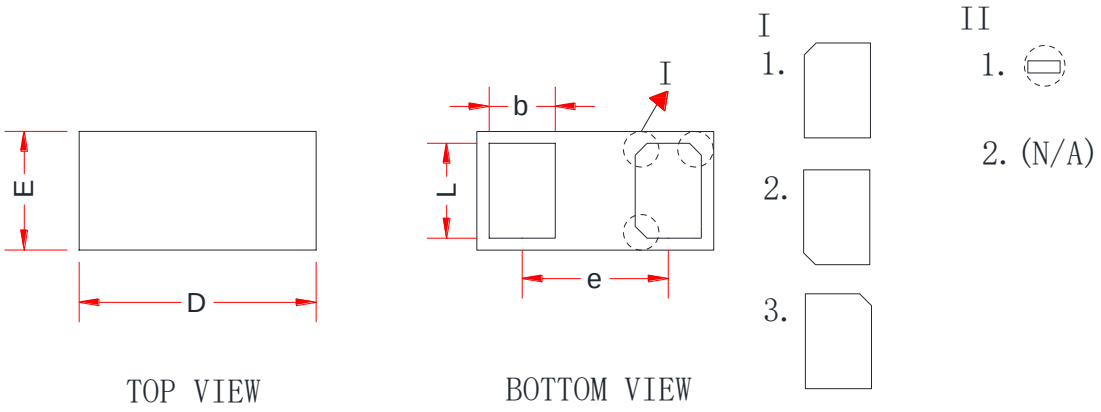
ESD clamping
(-8kV contact discharge per IEC61000-4-2)

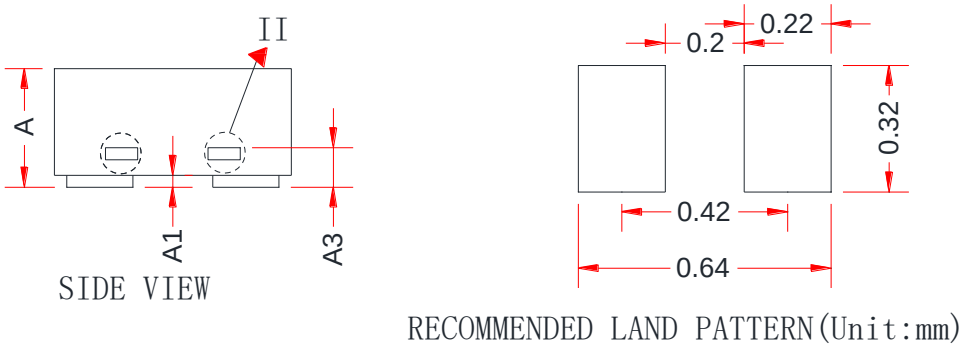


TLP Measurement

PACKAGE OUTLINE DIMENSIONS

DFN0603-2L

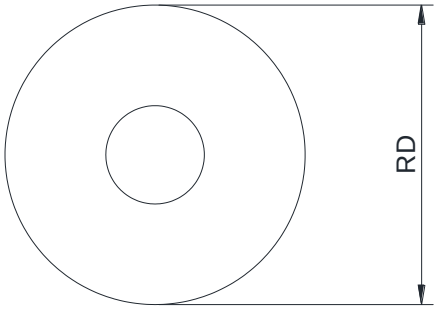




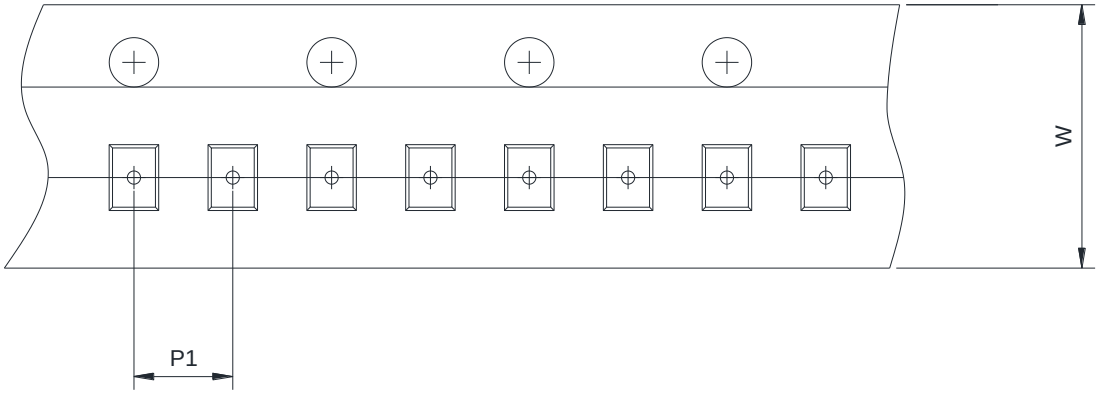
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.23	0.30	0.34
A1	0.00	0.03	0.05
A3	0.10 Ref.		
D	0.55	0.60	0.67
E	0.25	0.30	0.37
b	0.10	0.15	0.22
L	0.20	0.24	0.30
e	0.40 Ref		

TAPE AND REEL INFORMATION

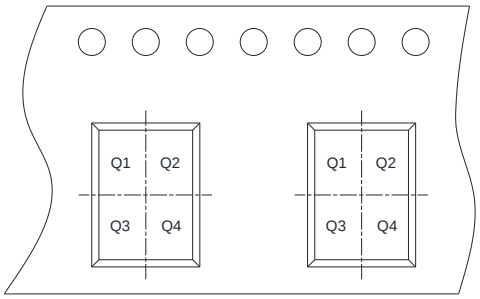
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



User Direction of Feed

RD	Reel Dimension	☑ 7inch	☐ 13inch		
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm	
P1	Pitch between successive cavity centers	☑ 2mm	☐ 4mm	☐ 8mm	
Pin1	Pin1 Quadrant	☑ Q1	☑ Q2	☐ Q3	☐ Q4