

## Descriptions

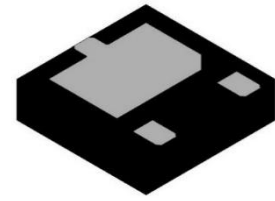
The XESD309D-24V is a transient voltage suppressor designed to protect sensitive electronic components which are connected to power and control lines from over-stress damage caused by Electrostatic Discharging (ESD) and Lighting.

## Features

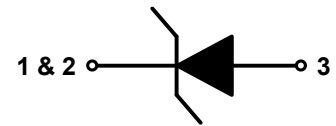
- 1-Line, Uni-directional
- Working voltage: 24V Max.
- ESD withstand voltage according to IEC61000-4-2:  $\pm 30\text{kV}$  (contact & air discharge)
- Lighting withstand according to IEC61000-4-5: 170A (8/20 $\mu\text{s}$ )
- Solid-state silicon technology
- Low leakage current
- Device meets MSL 3 requirements
- Pb-Free, Halogen Free, RoHS Compliant

## Applications

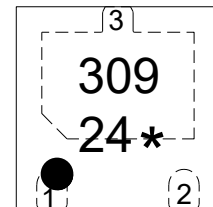
- Power supply protection
- Power management



DFN2x2-3L



Circuit diagram

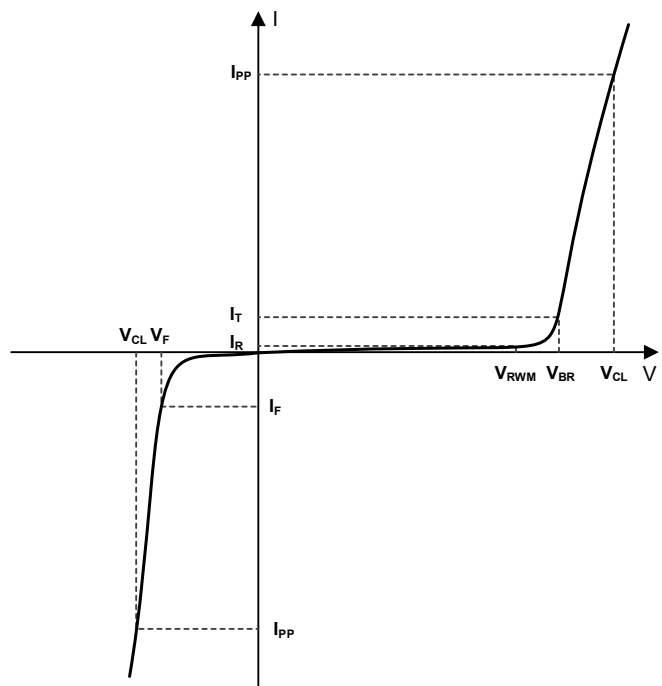


309 = Series code  
 24 = Device code  
 \* = Date code(A~z)  
 Marking

Part Number	Package Type	Marking Code	Shipping
XESD309D-24V	DFN2x2-3L	309 24*	3000/Tape & Reel

## Electrical Characteristics

Symbol	Parameter
$V_F$	Forward Voltage
$I_F$	Forward Current
$V_{RWM}$	Reverse Stand-off Voltage
$I_R$	Reverse Leakage Current
$V_{BR}$	Reverse Breakdown Voltage
$I_T$	Test Current
$I_{PP}$	Peak Pulse Current
$V_{CL}$	Clamping Voltage



**Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)**

Parameter	Symbol	Value	Unit
Peak Pulse Power ( $t_p=8/20\mu\text{s}$ )	$P_{PP}$	4760	W
Peak Pulse Current ( $t_p=8/20\mu\text{s}$ )	$I_{PP}$	170	A
ESD air discharge voltage according to IEC61000-4-2	$V_{ESD}$	$\pm 30$	kV
ESD contact discharge voltage according to IEC61000-4-2		$\pm 30$	
Junction Temperature Range	$T_J$	-55~125	$^\circ\text{C}$
Operating Temperature Range	$T_{OP}$	-55~125	$^\circ\text{C}$
Lead Solder Temperature (10 Seconds)	$T_L$	260	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-55~150	$^\circ\text{C}$

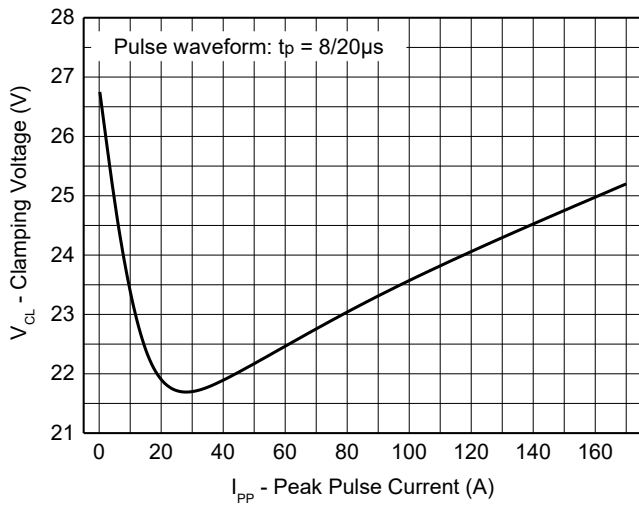
**Electrical Characteristics ( $T_A = 25^\circ\text{C}$ , unless otherwise specified)**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Reverse Stand-Off Voltage	$V_{RWM}$				24	V
Reverse Breakdown Voltage	$V_{BR}$	$I_T = 1\text{mA}$	25			V
Reverse Leakage Current	$I_R$	$V_{RWM} = 24\text{V}$			1	$\mu\text{A}$
Holding Voltage <sup>1)</sup>	$V_H$		21			V
Clamping Voltage <sup>2)</sup>	$V_{CL}$	$I_{PP} = 16\text{A}$ , $t_p = 100\text{ns}$		29		V
Dynamic Resistance <sup>2)</sup>	$R_{DYN}$			0.09		$\Omega$
Clamping Voltage <sup>3)</sup>	$V_{CL}$	$V_{ESD} = +8\text{kV}$		29		V
Clamping Voltage <sup>4)</sup>	$V_{CL}$	$I_{PP} = 30\text{A}$ , $t_p = 8/20\mu\text{s}$		21.5	24	V
		$I_{PP} = 100\text{A}$ , $t_p = 8/20\mu\text{s}$		23.5	26	V
		$I_{PP} = 170\text{A}$ , $t_p = 8/20\mu\text{s}$		25.5	28	V
Junction Capacitance	$C_J$	$V_R = 0\text{V}$ , $f = 1\text{MHz}$		765	1000	pF
		$V_R = 24\text{V}$ , $f = 1\text{MHz}$		200	250	pF

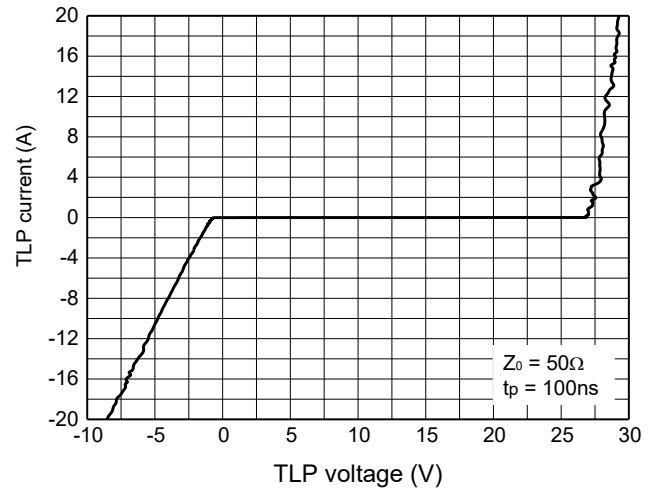
## Notes:

- 1) Power-line voltage needs to be less than  $V_H$  in application,  $V_H$  value is derived from final test data.
- 2) Clamping Voltage was measured by Transmission Line Pulse Test (TLP), TLP conditions:  $Z_0 = 50 \Omega$ ,  $t_r = 0.6\text{ns}$ ,  $t_p = 100\text{ns}$ ,  $I_{TLP}$  and  $V_{TLP}$  averaging window from 70ns to 90ns.  $R_{DYN}$  is calculated from 4A to 16A.
- 3) Contact discharge mode, according to IEC61000-4-2.
- 4) Clamping Voltage was measured by 8/20 $\mu\text{s}$  current waveform,  $R_s = 2 \Omega$ , according to IEC61000-4-5.

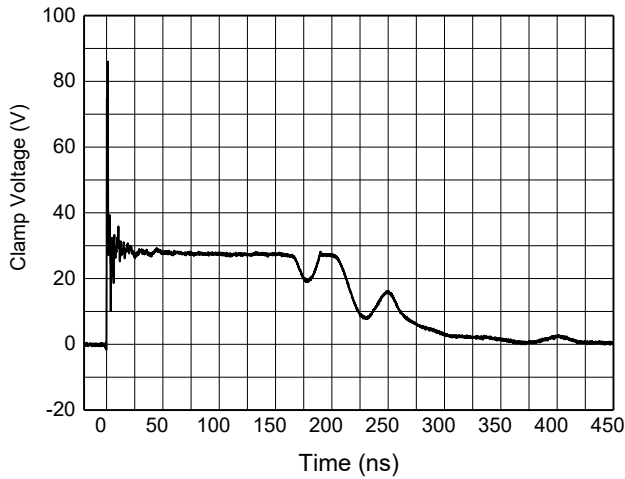
**Typical Characteristics (T<sub>A</sub> = 25 °C, unless otherwise specified)**



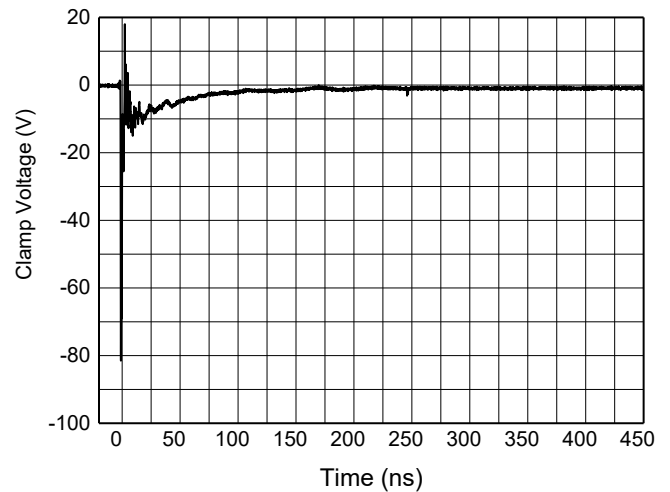
**Clamping Voltage vs. Peak Pulse Current**



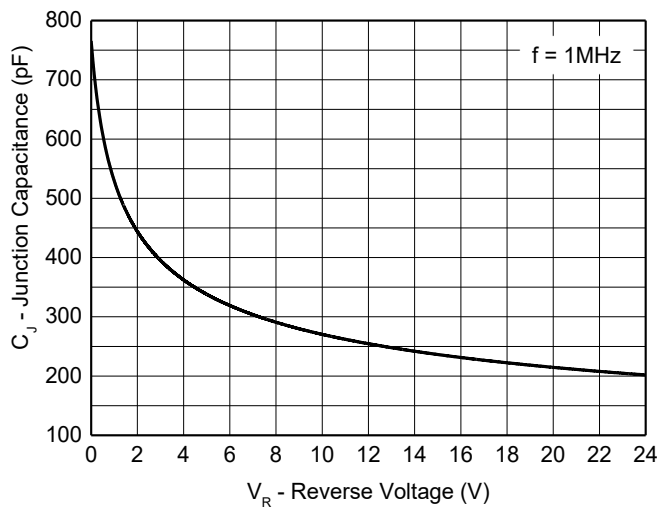
**TLP IV Curve**



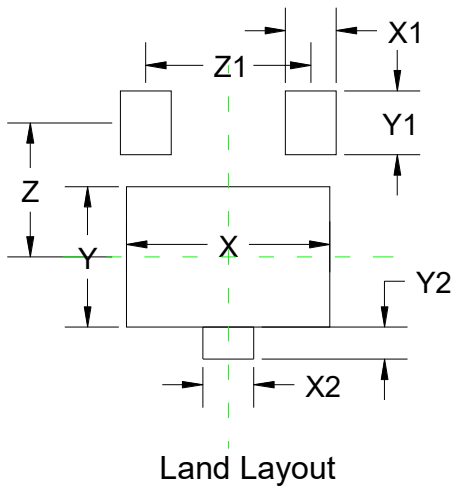
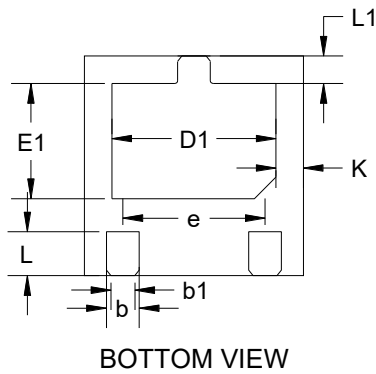
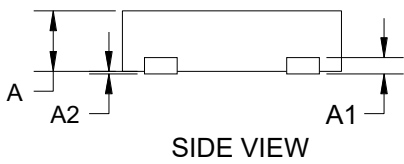
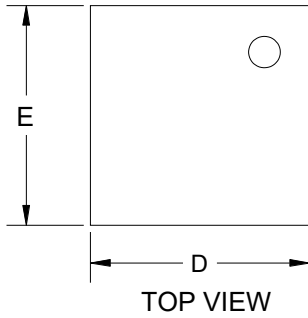
**+8kV contact discharge per IEC61000-4-2**



**-8kV contact discharge per IEC61000-4-2**



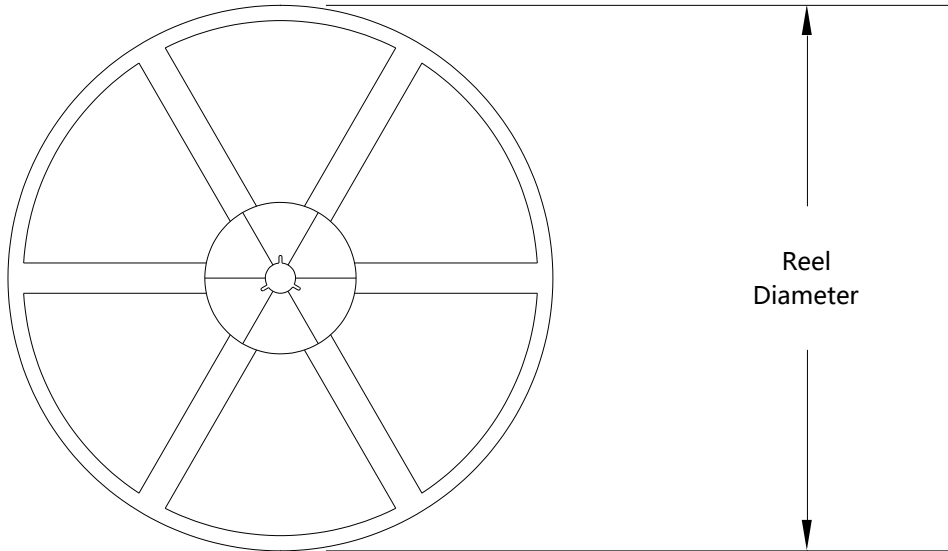
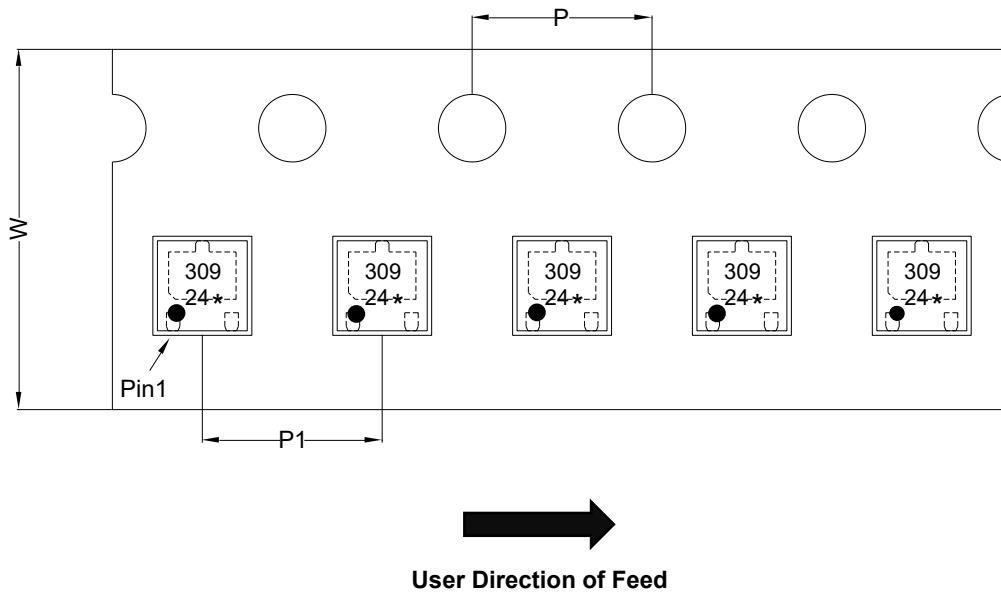
**Capacitance vs. Reverse Voltage**

**PACKAGE OUTLINE & PCB LAYOUT DIMENSIONS**


Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.50	0.55	0.60
A1	0.15REF		
A2	0.00	-	0.05
D	1.95	2.00	2.05
E	1.95	2.00	2.05
D1	1.45	1.50	1.55
E1	1.00	1.05	1.10
L	0.35	0.40	0.45
L1	0.20	0.25	0.30
b	0.25	0.30	0.35
b1	0.22REF		
e	1.30BSC		
K	0.22	0.25	0.28

Symbol	Dimensions in Millimeters
X	1.60
X1	0.40
X2	0.40
Y	1.10
Y1	0.50
Y2	0.25
Z	1.05
Z1	1.30

Notes: This Land Layout is for reference purposes only. Please consult your manufacturing partners to ensure your company's PCB design guidelines are met.

**TAPE AND REEL INFORMATION**
**Reel Dimensions**

**Tape Dimensions**


Package Type	Reel Diameter(inch)	W (mm)	P (mm)	P1 (mm)
DFN2x2-3L	7	8	4	4