Features

- Uni-Directional ESD Protection of One Line
- Low Leakage
- Low Clamping Voltage
- Moisture Sensitivity Level 1
- Halogen Free. “Green” Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

ESD Protection Device

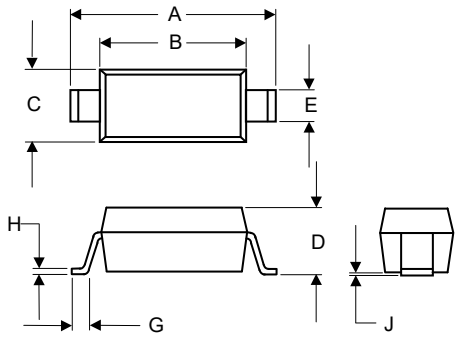
Maximum Ratings

IEC61000-4-2 (ESD)	Air	±30KV
	Contact	±30KV
Peak Pulse Power (8/20μs)(Note2)	P_{PK}	200W
Operating Junction Temperature Range	T_J	-45°C to +125°C
Storage Temperature Range	T_{STG}	-55°C to +150°C

Note :

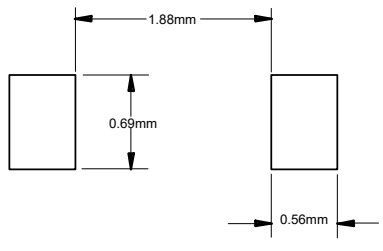
1. Halogen free "Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC61000-4-5.

SOD-323

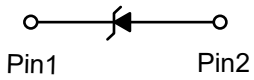


DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.090	0.107	2.30	2.70	
B	0.063	0.071	1.60	1.80	
C	0.045	0.053	1.15	1.35	
D	0.031	0.045	0.80	1.15	
E	0.010	0.016	0.25	0.40	
G	0.004	0.018	0.10	0.45	
H	0.004	0.010	0.10	0.25	
J	-----	0.006	-----	0.15	

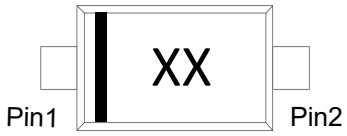
Suggested Solder Pad Layout



Internal Structure



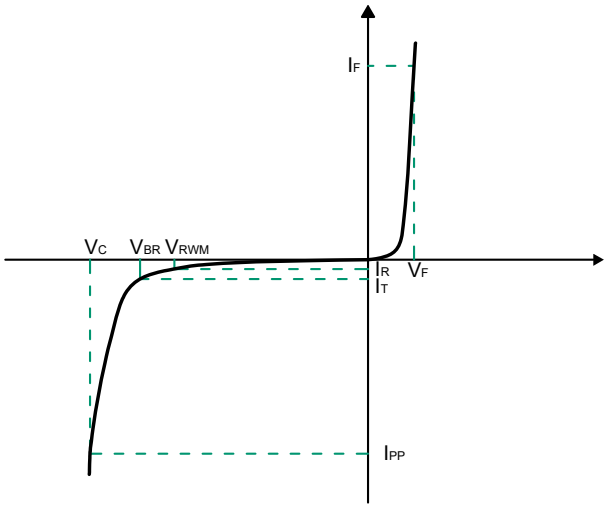
Marking Code



XX:Device code

MCC Part No.	Device Code
ESD3V3D3A	3A.
ESD5V0D3A	05U.
ESD12VD3A	12U.
ESD15VD3A	15U.
ESD18VD3A	18U.
ESD24VD3A	ZS.
ESD36VD3A	36U.

Symbol	Parameter
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ VRWM
V_{BR}	Breakdown Voltage @ IT
IT	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ IPP
P_{PK}	Peak Pulse Power
C_J	Junction Capacitance
I_F	Forward Current
V_F	Forward Voltage @ IF



Electrical Characteristics @ 25°C (Unless Otherwise Specified)

ESD3V3D3A

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Working Voltage	V_{RWM}				3.3	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	4.5			V
Reverse Leakage Current	I_R	V_{RWM}=3.3V			0.5	μA
Forward Voltage	V_F	I_F=10mA			1.2	V
Clamping Voltage Note1	V_C	I_{PP}=1A, t_P=8/20μs			7	V
Clamping Voltage Note1	V_C	I_{PP}=18A, t_P=8/20μs			12	V
Junction Capacitance	C_J	V_R=0V, f=1MHz		185		pF
Dynamic Resistance Note2	R_{DYN}	TLP, t_P=100ns		0.4		Ω

ESD5V0D3A

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Working Voltage	V_{RWM}				5	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	6.2			V
Reverse Leakage Current	I_R	V_{RWM}=5V			0.5	μA
Forward Voltage	V_F	I_F=10mA			1.2	V
Clamping Voltage Note1	V_C	I_{PP}=1A, t_P=8/20μs			8	V
Clamping Voltage Note1	V_C	I_{PP}=15A, t_P=8/20μs			14	V
Junction Capacitance	C_J	V_R=0V, f=1MHz		140		pF
Dynamic Resistance Note2	R_{DYN}	TLP, t_P=100ns		0.1		Ω

ESD12VD3A

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Working Voltage	V_{RWM}				12	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	13.3			V
Reverse Leakage Current	I_R	V_{RWM}=12V			0.5	μA
Forward Voltage	V_F	I_F=10mA			1.2	V
Clamping Voltage Note1	V_C	I_{PP}=1A, t_P=8/20μs			19	V
Clamping Voltage Note1	V_C	I_{PP}=10A, t_P=8/20μs			28	V
Junction Capacitance	C_J	V_R=0V, f=1MHz		55		pF
Dynamic Resistance Note2	R_{DYN}	TLP, t_P=100ns		0.18		Ω

ESD15VD3A

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Working Voltage	V_{RWM}				15	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	16.5			V
Reverse Leakage Current	I_R	V_{RWM}=15V			0.5	μA
Forward Voltage	V_F	I_F=10mA			1.2	V
Clamping Voltage Note1	V_C	I_{PP}=1A, t_P=8/20μs			24	V
Clamping Voltage Note1	V_C	I_{PP}=8A, t_P=8/20μs			35	V
Junction Capacitance	C_J	V_R=0V, f=1MHz		45		pF
Dynamic Resistance Note2	R_{DYN}	TLP, t_P=100ns		0.19		Ω

ESD18VD3A

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Working Voltage	V_{RWM}				18	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	19			V
Reverse Leakage Current	I_R	V_{RWM}=18V			0.5	μA
Forward Voltage	V_F	I_F=10mA			1.2	V
Clamping Voltage Note1	V_C	I_{PP}=1A, t_P=8/20μs			27	V
Clamping Voltage Note1	V_C	I_{PP}=8A, t_P=8/20μs			38	V
Junction Capacitance	C_J	V_R=0V, f=1MHz		39		pF
Dynamic Resistance Note2	R_{DYN}	TLP, t_P=100ns		0.35		Ω

ESD24VD3A

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Working Voltage	V_{RWM}				24	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	25			V
Reverse Leakage Current	I_R	V_{RWM}=24V			0.5	μA
Forward Voltage	V_F	I_F=10mA			1.2	V
Clamping Voltage Note1	V_C	I_{PP}=1A, t_P=8/20μs			32	V
Clamping Voltage Note1	V_C	I_{PP}=7A, t_P=8/20μs			50	V
Junction Capacitance	C_J	V_R=0V, f=1MHz		36		pF
Dynamic Resistance Note2	R_{DYN}	TLP, t_P=100ns		0.36		Ω

ESD36VD3A

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reverse Working Voltage	V_{RWM}				36	V
Reverse Breakdown Voltage	V_{BR}	I_T=1mA	40			V
Reverse Leakage Current	I_R	V_{RWM}=36V			0.5	μA
Forward Voltage	V_F	I_F=10mA			1.2	V
Clamping Voltage Note1	V_C	I_{PP}=1A, t_P=8/20μs			55	V
Clamping Voltage Note1	V_C	I_{PP}=5A, t_P=8/20μs			75	V
Junction Capacitance	C_J	V_R=0V, f=1MHz		24		pF
Dynamic Resistance Note2	R_{DYN}	TLP, t_P=100ns		0.8		Ω

Note :

1.Non-repetitive current pulse 8/20μs exponential decay waveform according to IEC61000-4-5.

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

Curve Characteristics

Fig. 1 - 8 X 20μs Pulse Waveform

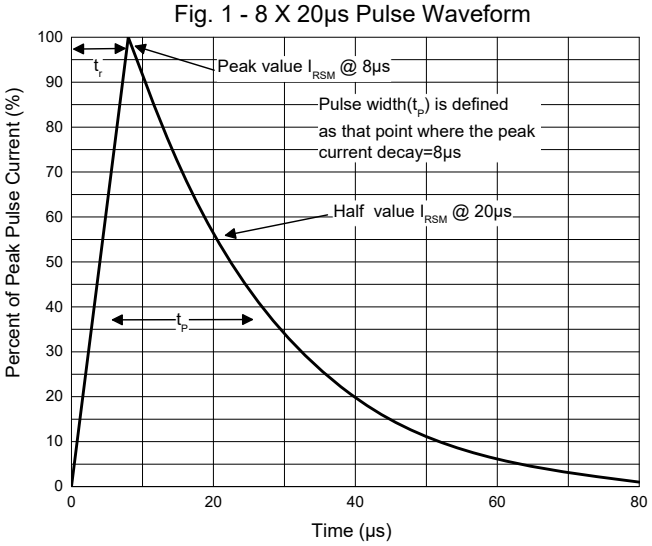


Fig. 2 - Non-Repetitive Peak Pulse Power

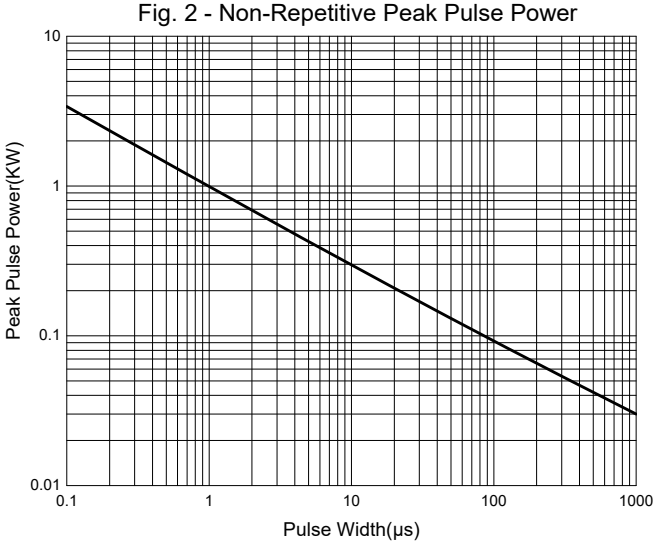


Fig. 3 - Capacitance Characteristics

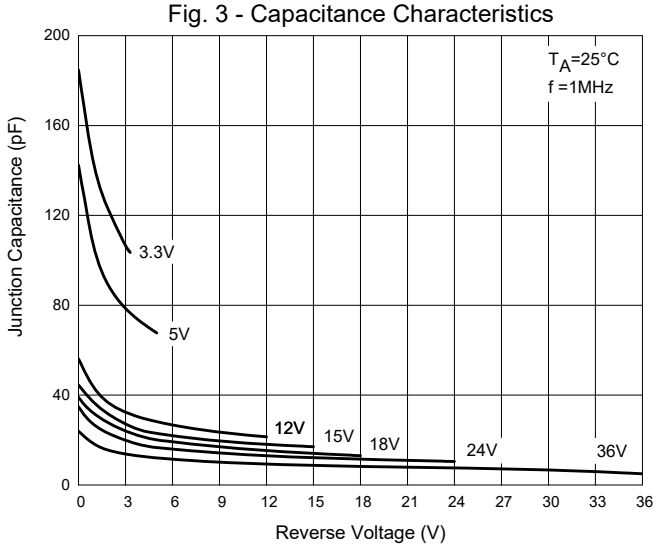


Fig. 4 - Clamping Voltage Characteristics

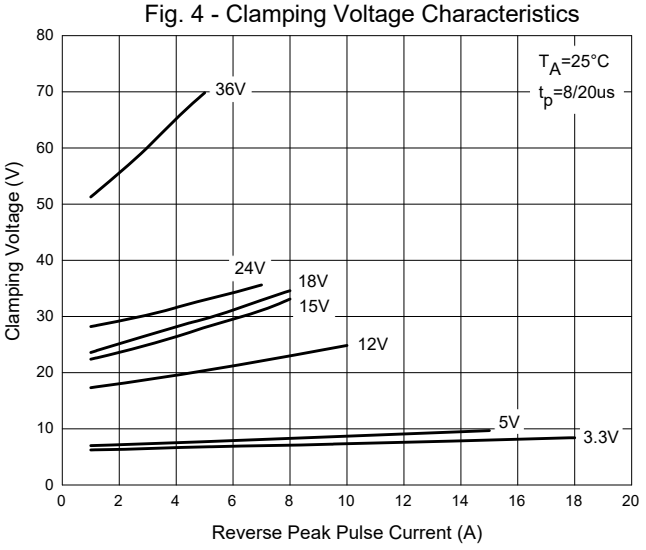


Fig. 5 - TLP Curve

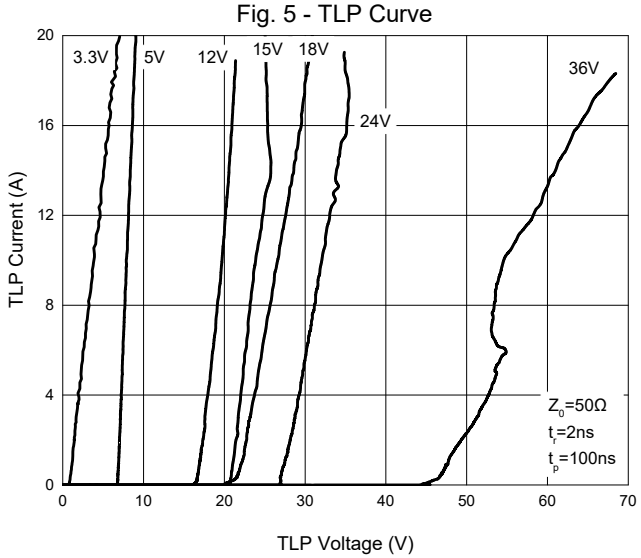
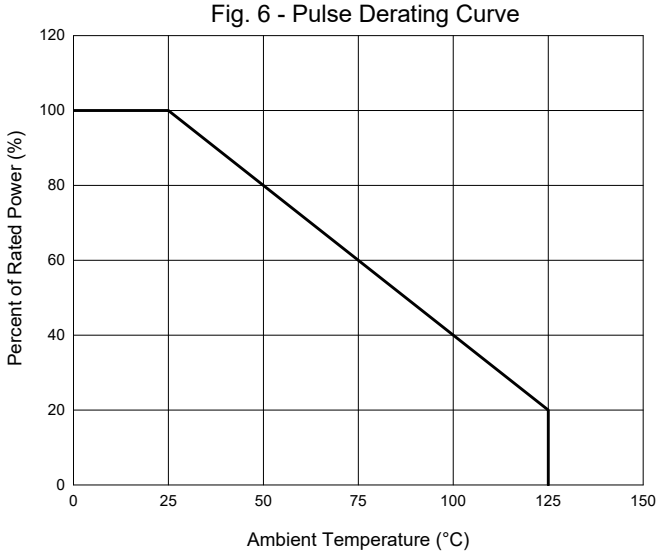


Fig. 6 - Pulse Derating Curve



Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

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