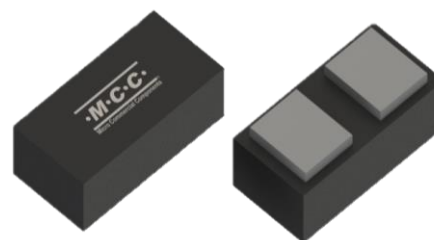


1-Line Uni-directional Ultra Low Capacitance ESD

Features

- Transient protection :
 - IEC 61000-4-2 (ESD) $\pm 30\text{kV}$ (Air), $\pm 30\text{kV}$ (Contact)
 - IEC 61000-4-5 (Lightning) 5A (8/20 μs)
- Uni-directional ESD protection of single line
- Reverse working voltage, V_{RWM} : 3.3V
- Low capacitance: 0.2pF
- Low clamping voltage: 10V (max)
- Low reverse leakage current: 100nA max at $V_R = 3.3\text{V}$
- Solid-state silicon-avalanche



0201-A



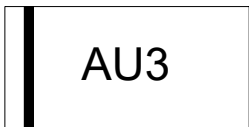
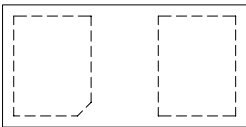

Applications

- USB 2.0 , USB 3.0 , USB 3.1 and USB type-C
- HDMI 1.3, HDMI 1.4 and HDMI 2.0
- Portable Electronics and Notebooks
- Ethernet port: 10/100/1000 Mb/s

Mechanical Data

- Package:0201-A
- Moisture Sensitivity Level 1, per J-STD-020
- Halogen Free. "Green" Device ^(Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Body Marking and Pin Layout

Marking Code	Simplified Outline	Internal Structure
	 Transparent top view	

Ordering Information

Product Name	Packing info
ESDUSBULC3V3AE2-TP	10K pcs/reel

For packaging details, visit our website at <https://www.mccsemi.com/Package/List>

1-Line Uni-directional Ultra Low Capacitance ESD

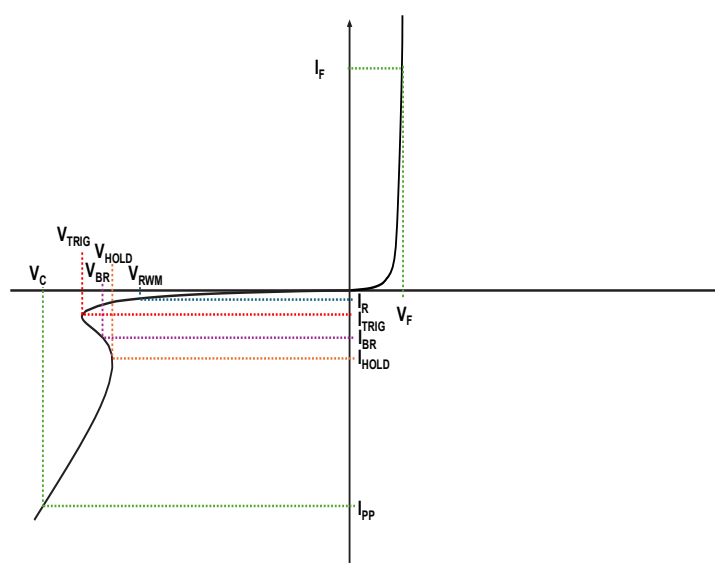
Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Rating	Unit	
IEC61000-4-2(ESD)	Air	V _{ESD}	±30	kV
	Contact	V _{ESD}	±30	kV
Peak Pulse Current (8/20μs) (Note 2)	I _{PP}	5	A	
Peak Pulse Power (8/20μs) (Note 2)	P _{PK}	50	W	
Operating Temperature Range	T _J	-40 to +125	°C	
Storage Temperature Range	T _{STG}	-55 to +150	°C	

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

Parameter Definition

Symbol	Parameter
V _{RWM}	Peak Reverse Working Voltage
I _R	Reverse Leakage Current @ V _{RWM}
V _{BR}	Breakdown Voltage @ I _T
I _T	Test Current
I _{PP}	Maximum Reverse Peak Pulse Current
V _C	Clamping Voltage @ I _{PP}
V _{TRIG}	Reverse Trigger Voltage
I _{TRIG}	Reverse Trigger Current
V _{HOLD}	Reverse Holding Voltage
I _{HOLD}	Reverse Holding Current
C _J	Junction Capacitance
P _{PK}	Peak Pulse Power
I _F	Forward Current
V _F	Forward Voltage @ I _F



Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Reverse Working Voltage	V _{RWM}				3.3	V
Reverse Breakdown Voltage	V _{BR}	I _T = 1mA	5		8.5	V
Reverse Leakage Current	I _R	V _{RWM} = 3.3V			0.1	μA
Forward Voltage	V _F	I _F = 10mA			1.2	V
Clamping Voltage (Note3)	V _C	I _{PP} = 1A, t _p = 8/20μs			6.5	V
		I _{PP} = 5A, t _p = 8/20μs			10	
Clamping Voltage (Note4)	V _C	I _{PP} = 4A(TLP)		5.9		V
		I _{PP} = 16A(TLP)		9		
ESD Trigger Voltage	V _{TRIG}	t _p = 100ns, T _A = 25°C		7.5		V
Reverse Holding Voltage	V _{HOLD}			5		V
Junction Capacitance	C _J	V _R = 0V, f = 1MHz		0.2	0.3	pF
Dynamic Resistance (Note4)	R _{DYN}	TLP, t _p = 100ns		0.3		Ω

- Note:
- Non-repetitive current pulse 8/20μs exponential decay waveform according to IEC61000-4-5.
 - TLP parameter: Z₀ = 50Ω, t_p = 100ns, t_r = 2ns, averaging window from 60ns to 80ns. R_{DYN} is calculated from 4A to 16A.

1-Line Uni-directional Ultra Low Capacitance ESD

Curve Characteristics

Fig. 1 - 8 X 20 μ s Pulse Waveform

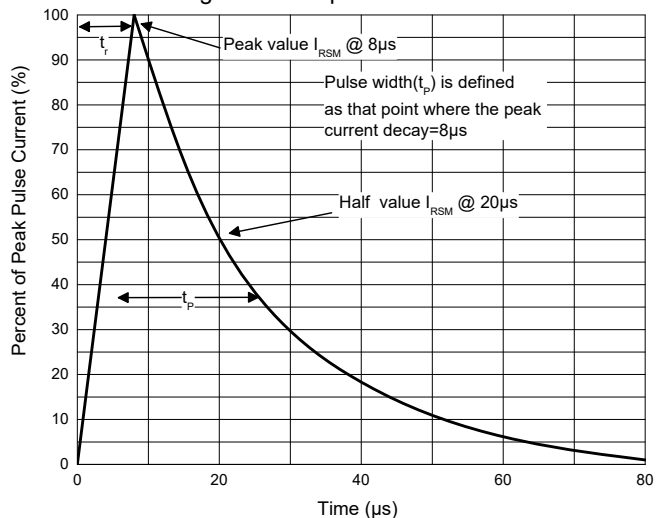


Fig. 2 - Non-Repetitive Peak Pulse Power

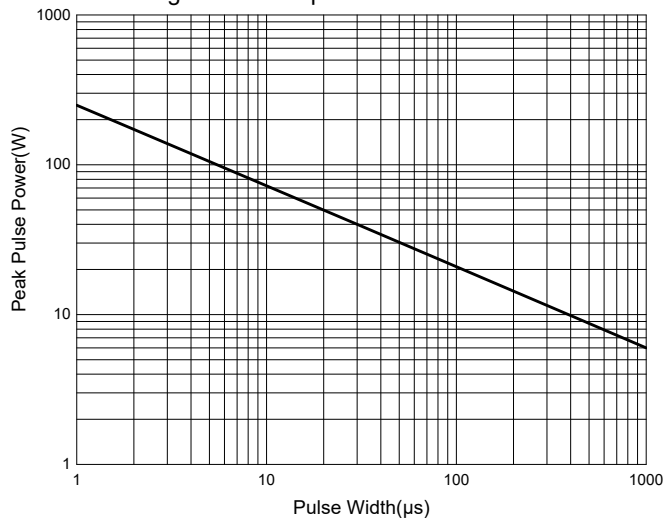


Fig. 3 - Capacitance Characteristics

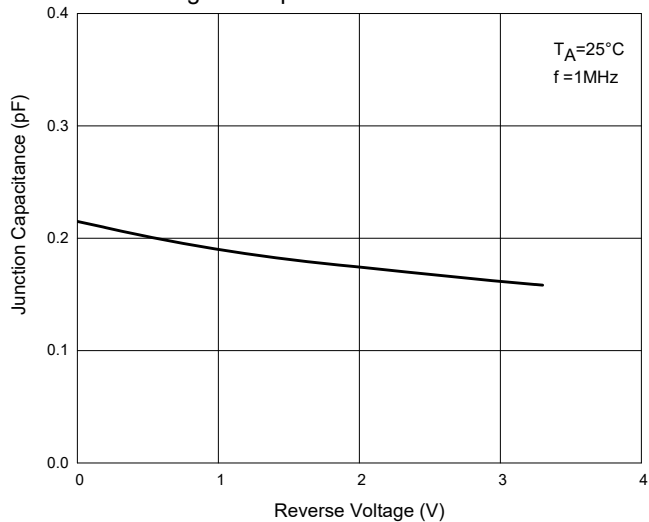


Fig. 4 - Clamping Voltage Characteristics

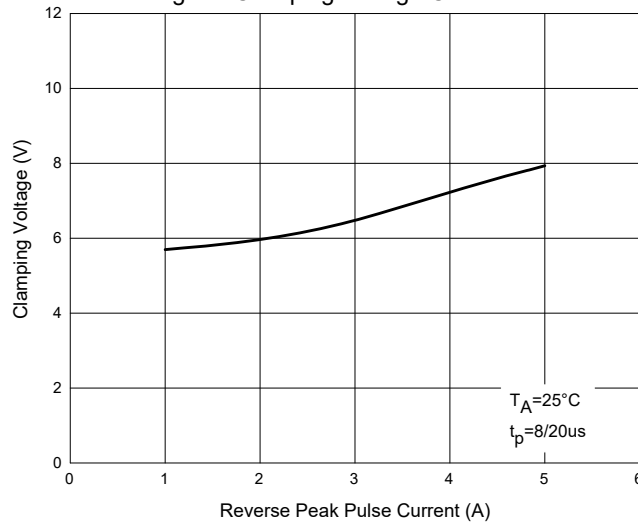


Fig. 5 - TLP Curve

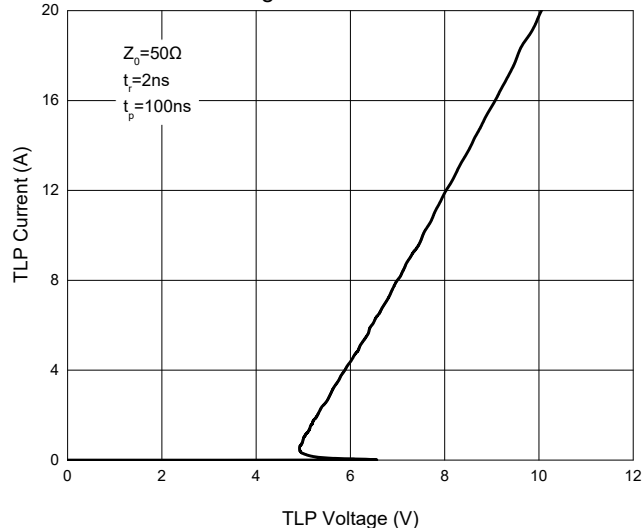
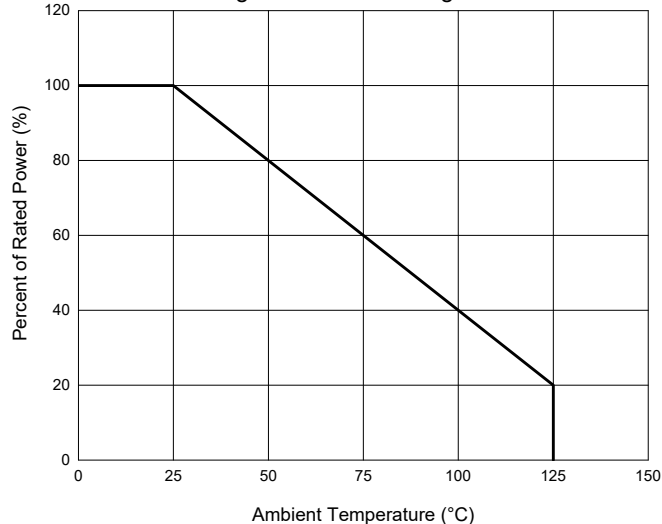
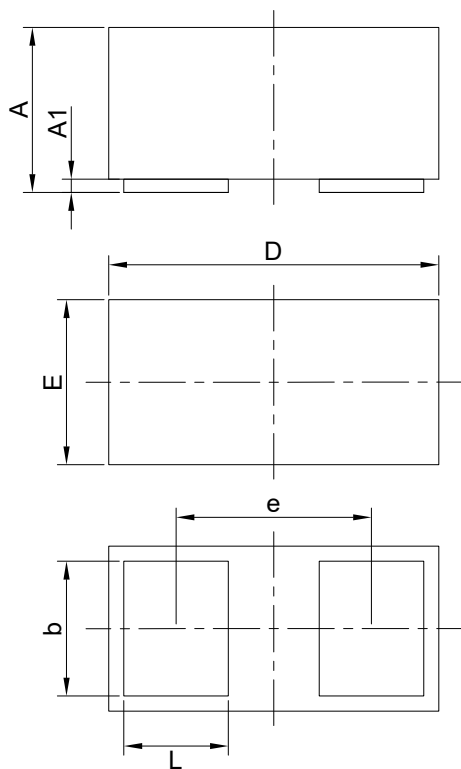


Fig. 6 - Pulse Derating Curve

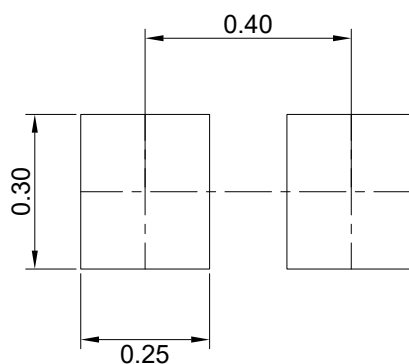


Package Outline



DIM	INCH		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.009	0.014	0.23	0.35	
A1	0.000	0.002	0.00	0.05	
b	0.008	0.011	0.20	0.28	
D	0.022	0.026	0.55	0.65	
E	0.010	0.014	0.25	0.35	
e	0.014		0.355		TYP
L	0.006	0.009	0.16	0.22	

Suggested Pad Layout (Unit:mm)



Notes:

1. The suggested land pattern dimensions have been provided for reference only.
2. For further information, please refer to document IPC-7351A.

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