4 CHANNELS LOW CAPACITANCE TVS DIODE ARRAY

Product Summary

$V_{BR\ Min}$	$I_{pp\ Max}$	$C_{IN\ Typ}$
6V	5A	0.85pF

Features And Benefits

- IEC 61000-4-2 (ESD): Air ±25kV, Contact ±25kV
- 4 Channels of ESD Protection
- Low Channel Input Capacitance of 0.85pF Typical
- Typically Used at High Speed Ports such as USB 2.0, IEEE1394, Serial ATA, DVI™, HDMI™, PCI™
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The D1213A-04VQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Description And Applications

This new generation TVS is designed to protect sensitive electronics from the damage due to ESD. The combination of small size and high ESD surge capability makes it ideal for use in automotive applications.

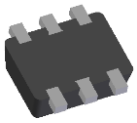
- USB Modules
- HDMI Ports
- LVDS

Mechanical Data

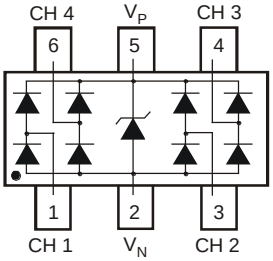
- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish Annealed over Copper Leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.003 grams (Approximate)

SOT563

Top View



Bottom View



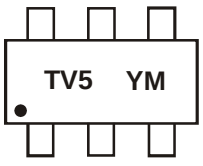
Device Schematic

Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
D1213A-04VQ-7	Automotive	SOT563	3000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
4. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



TV5 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: I = 2021)
M = Month (ex: 9 = September)

Date Code Key

Year	2018	…	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	F	…	I	J	K	L	M	N	O	P	R	S

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	Conditions
Operating Supply Voltage	V_P - V_N	6.0	V	—
DC Voltage at Any Channel Input	—	(V_N – 0.5) to (V_P + 0.5)	V	—
Peak Pulse Current	I_{PP}	5.0	A	8/20μs, Per Figure 3
ESD Protection – Contact Discharge	$V_{ESD\_CONTACT}$	±25	kV	Standard IEC 61000-4-2
ESD Protection – Air Discharge	V_{ESD_AIR}	±25	kV	Standard IEC 61000-4-2

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	380	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	215	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Operating Supply Voltage	V_P	—	3.3	5.5	V	—
Operating Supply Current (Note 6)	I_P	—	—	8.0	μA	(V_P – V_N) = 3.3V
Channel Leakage Current (Note 6)	I_R	—	0.1	1.0	μA	V_P = 5V, V_N = 0V
Reverse Breakdown Voltage	V_{BR}	6.0	—	—	V	I_R = 1mA
Clamping Voltage, Positive Transients	V_{CL1}	—	10.0	—	V	I_{PP} = 1A (Note 7)
Clamping Voltage, Negative Transients	V_{CL2}	—	-1.7	—	V	I_{PP} = -1A (Note 7)
Forward Voltage for Top Diode	V_{FD1}	0.60	0.80	0.95	V	I_F = 8mA, any channel to V_P
Forward Voltage for Bottom Diode	V_{FD2}	0.60	0.80	0.95	V	I_F = 8mA, V_N to any channel
Dynamic Resistance	R_{DYN}	—	0.9	—	Ω	I_{PP} = 1A (Note 7)
Channel Input Capacitance	C_{IN}	—	0.85	1.2	pF	V_{IN} = 1.65V, V_P = 3.3V, V_N = 0V, f = 1MHz

Notes:
5. Device mounted on FR-4 PCB pad layout (2oz copper) as shown on Diodes Incorporated's suggested pad layout, which can be found on our website at http://www.diodes.com/package-outlines.html.
6. Short duration pulse test used to minimize self-heating effect.
7. Clamping voltage value is based on an 8x20μs peak pulse current (I_{pp}) waveform.
8. Measured from any channel to V_N.
9. Measured from V_P to V_N.
10. For information on the impact of Diodes Incorporated's USB 2.0 compatible ESD protectors on signal integrity including eye diagram plots, please refer to AN77 at the following URL: https://www.diodes.com/design/support/application-notes/.

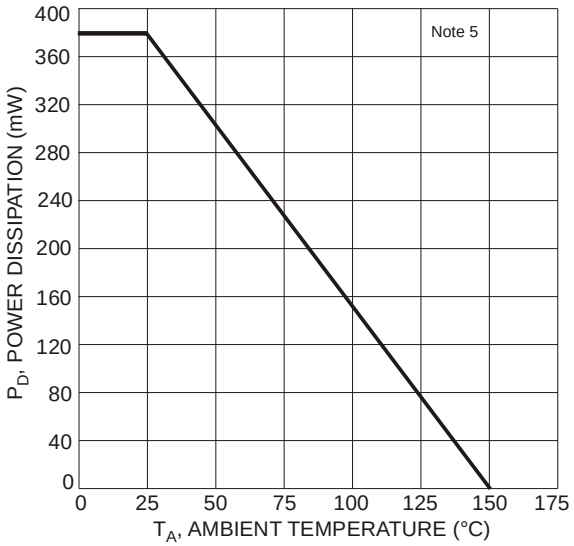


Figure 1 Power Derating Curve

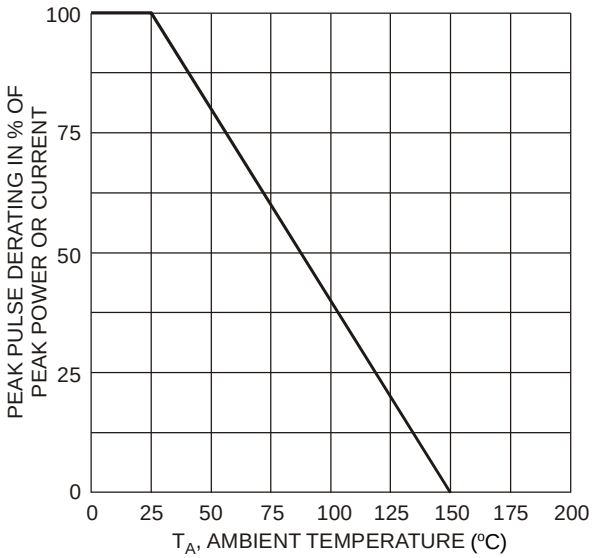


Figure 2 Pulse Derating Curve

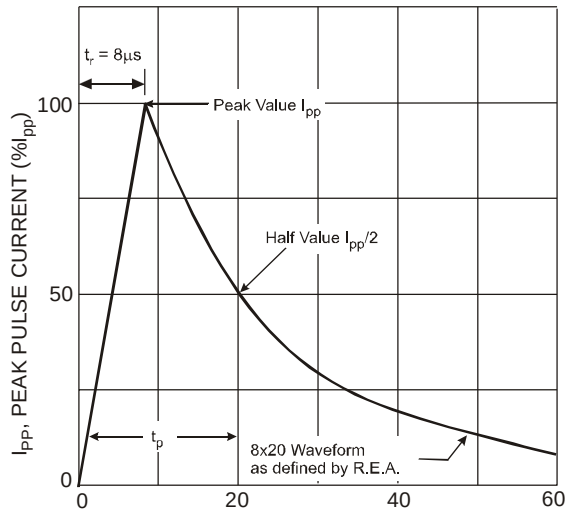


Figure 3 Pulse Waveform

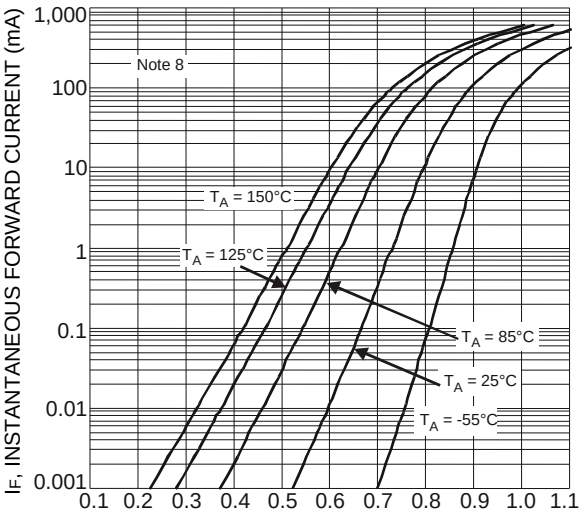


Figure 4 Typical Forward Characteristics

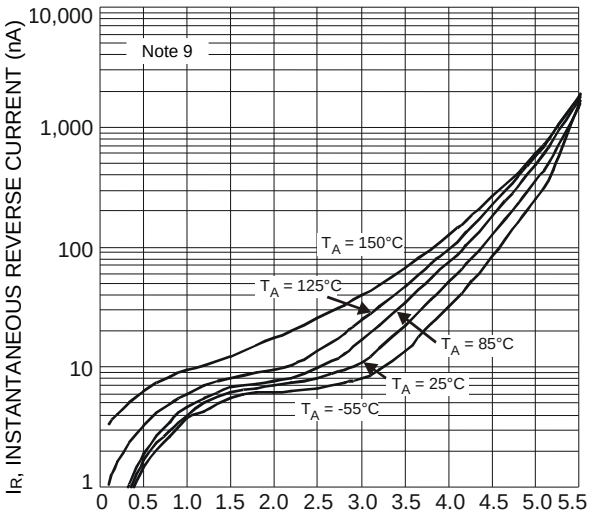


Figure 5 Typical Reverse Characteristics

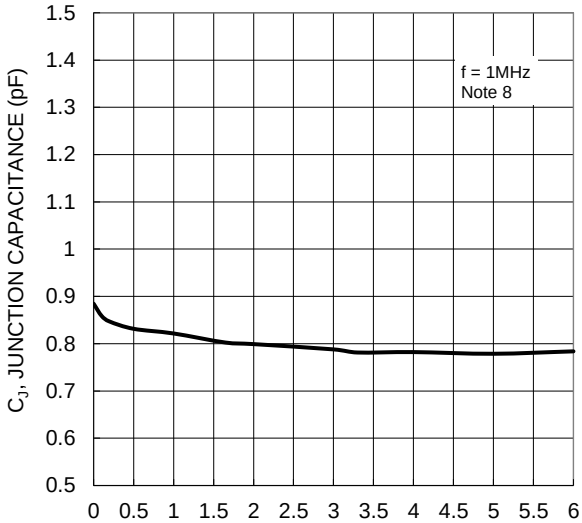


Figure 6 Typical Junction Capacitance

Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

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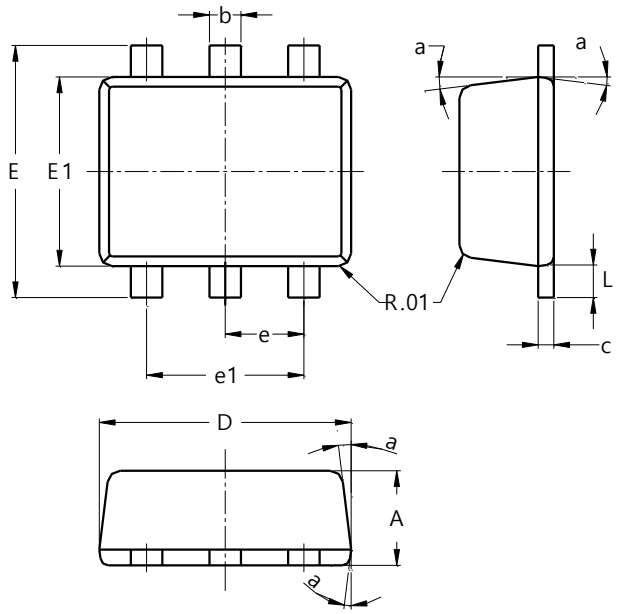

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Dim	**Min**	**Max**	**Typ**
A	0.55	0.60	--
b	0.15	0.30	0.20
c	0.10	0.18	0.11
D	1.50	1.70	1.60
E	1.55	1.70	1.60
E1	1.10	1.25	1.20
e	--	--	0.50
e1	0.90	1.10	1.00
L	0.10	0.30	0.20
a	8°	9°	7°
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

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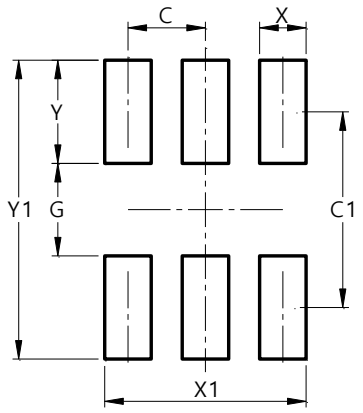

Dimensions	Value (in mm)
C	0.500
C1	1.270
G	0.600
X	0.300
X1	1.300
Y	0.670
Y1	1.940

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