DESD1CANFD24VSOQ

CAN BUS FD ESD PROTECTION DIODE

Product Summary

V_{BR} (Min)	I_{PP} (Max)	C_T (Typ)
25.5V	2.6A	5.2pF

Features

- 110W Peak Power Dissipation per Line (8/20µs Waveform)
- Provides ESD Protection per IEC 61000-4-2 Standard:
  Air ±23kV, Contact ±23kV
- 2 Channels of ESD Protection
- Low Channel Input Capacitance 5.2pF for High Signal Integrity of CANFD Data Raters
- +175°C T_J − Rated for High-Temperature, Mission-Critical Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DESD1CANFD24VSOQ 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

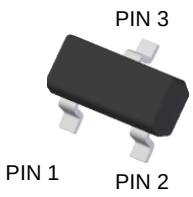
This part is a next-generation ESD and surge protection device packaged in a small footprint surface-mount package. It is qualified to AEC-Q101, supported by a PPAP and is designed to protect two data lines of the controller area network (CAN) in an automotive.

- CAN/CAN-FD
- Low- and high-speed CAN
- Flex rays

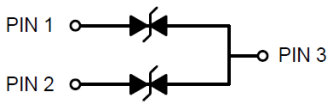
Mechanical Data

- Package: SOT23
- Package 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 Alloy 42 Leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.009 grams (Approximate)

SOT23



Top View



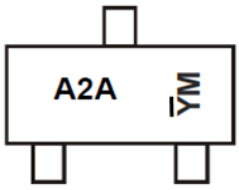
Device Schematic

Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DESD1CANFD24VSOQ-7	SOT23	A2A	7	8	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



A2A = Product Type Marking Code
$\overline{Y}$M = Date Code Marking
Y = Year (ex: K = 2023)
M = Month (ex: N = November)

Date Code Key

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	K	L	M	N	P	R	S	T	U	V	W	X

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
Peak Pulse Power Dissipation	P_{PP}	110	W	8/20µs, per Figure 1
Peak Pulse Current	I_{PP}	2.6	A	8/20µs, per Figure 1
ESD Protection – Contact Discharge	$V_{ESD\_Contact}$	±23	kV	IEC 61000-4-2 Standard
ESD Protection – Air Discharge	V_{ESD_Air}	±23	kV	IEC 61000-4-2 Standard

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Package Power Dissipation (Note 5)	P_D	300	mW
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	417	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
Reverse Standoff Voltage	V_{RWM}	—	—	24	V	—
Channel Leakage Current (Note 6)	I_{RM}	—	1	50	nA	V_{RWM} = 24V
Clamping Voltage, Positive Transients	V_{CL}	—	33	42	V	I_{PP} = 1A, tp = 8/20µs, Figure 1
Breakdown Voltage	V_{BR}	25.5	30	35.5	V	I_R = 10mA
Diode Capacitance Matching	Δ C_T / C_T	—	0.5	—	%	V_R = ±2.5V, f = 1MHz
Channel Input Capacitance	C_T	—	5.2	6	pF	V_R = ±2.5V, f = 1MHz
		—	—	6		V_R = 5V, f = 1MHz
ABS Parasitic Capacitance Matching (Channel 1 – Channel 2)	Δ (CT_Ch1-CT _Ch2)) / CT Max)	—	—	2	%	
	Δ (CT_Ch1-CT _Ch2)	—	—	0.12	pF	

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 https://www.diodes.com/design/support/packaging/diodes-packaging/.
6. Short duration pulse test used to minimize self-heating effect.

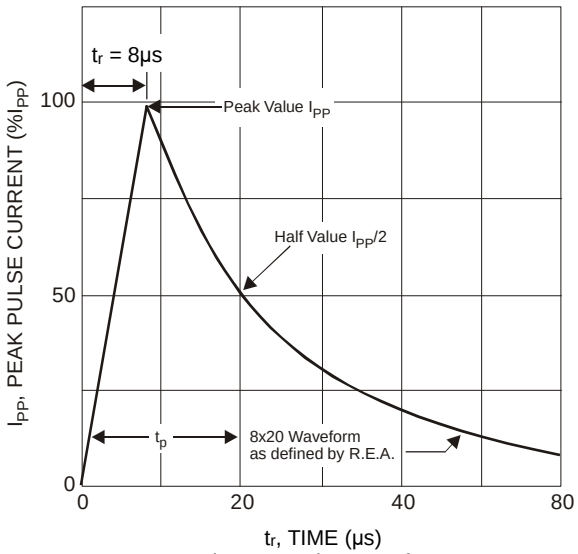


Figure 1. Pulse Waveform

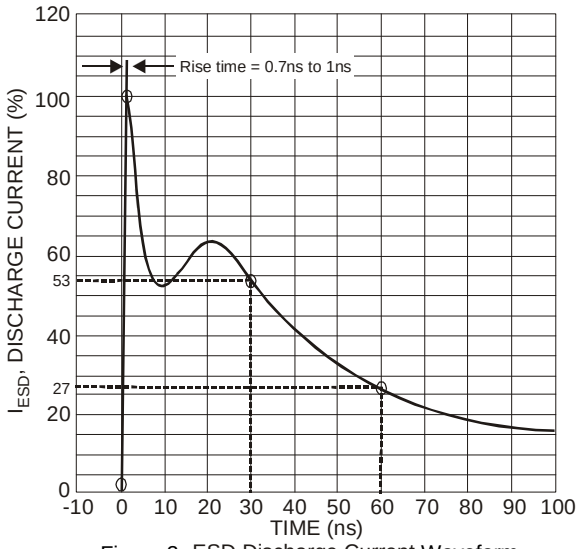


Figure 2. ESD Discharge Current Waveform IEC 61000-4-2 (330Ω/150pF)

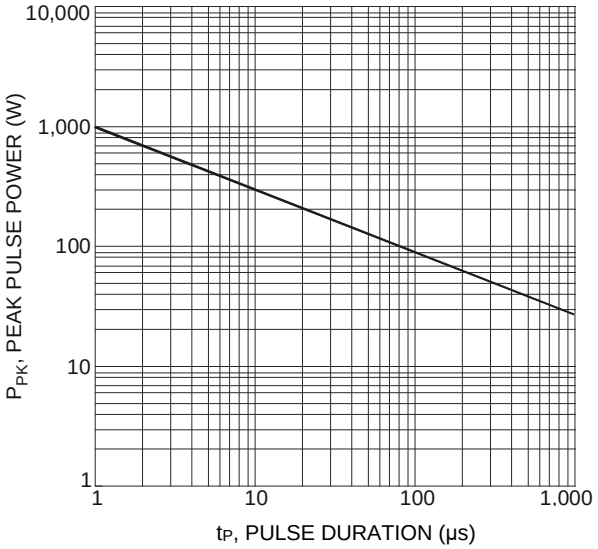


Figure 3. Peak Pulse Power vs. Pulse Duration

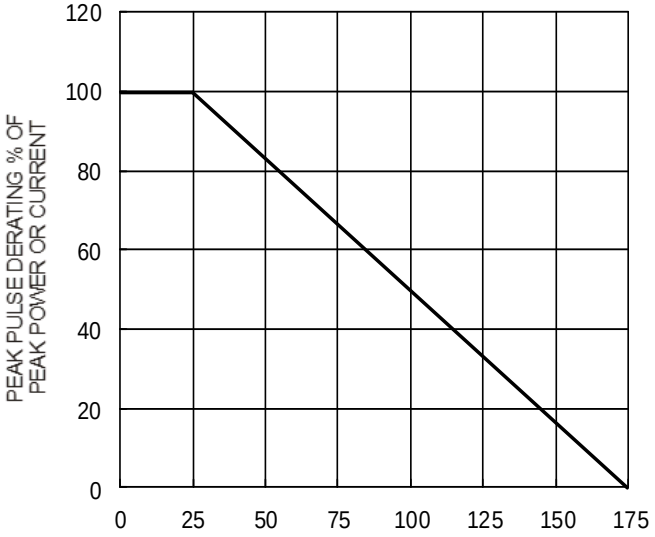


Figure 4. Pulse Derating Curve

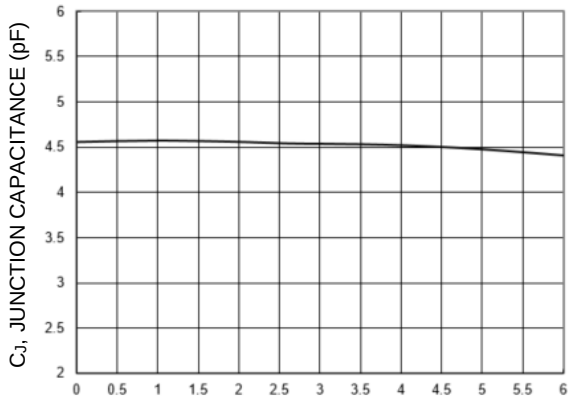


Figure 5. Typical Junction Capacitance

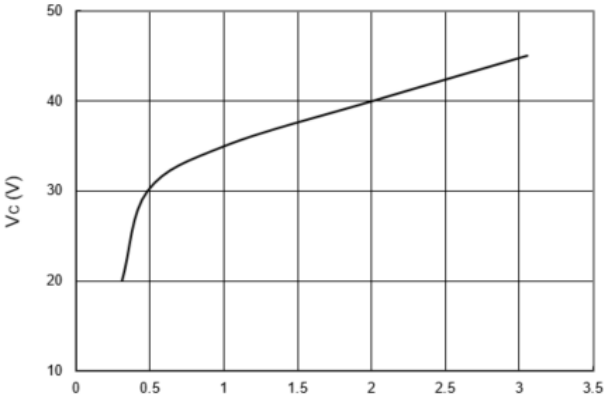


Figure 6. Typical Peak Clamping Voltage V_C vs. Peak Pulse Current I_{PP}

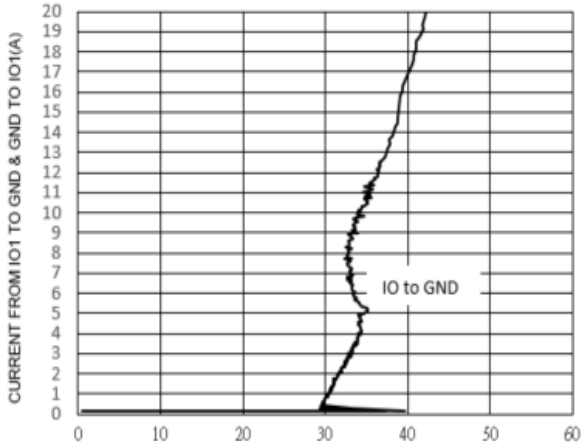
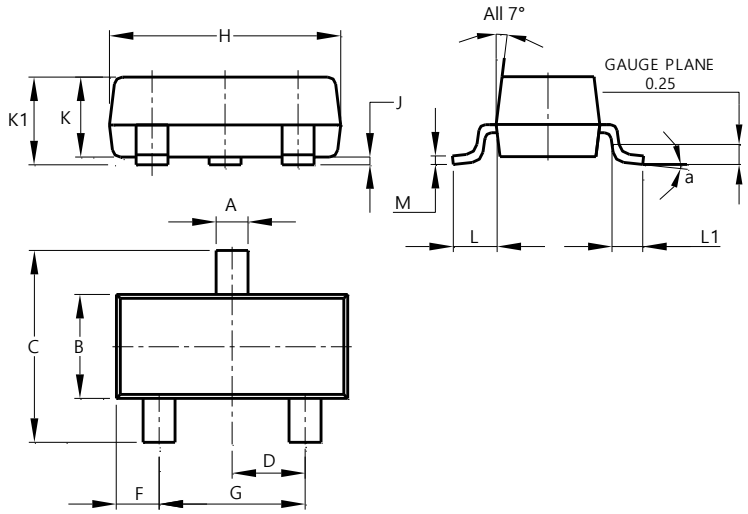


Figure 7. TLP Curve (tp = 100ns)

Package Outline Dimensions

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

SOT23

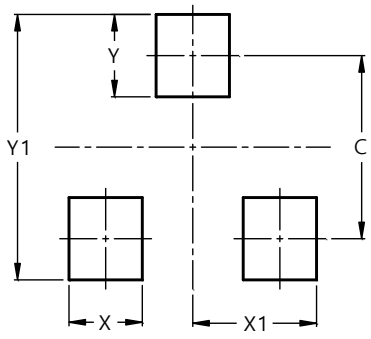


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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