

ESD8472

ESD Protection Diode Ultra-Low Capacitance Micro-Packaged Diodes for ESD Protection

The ESD8472 is designed to protect voltage sensitive components that require ultra-low capacitance from ESD and transient voltage events. Excellent clamping capability, low capacitance, high breakdown voltage, high linearity, low leakage, and fast response time make these parts ideal for ESD protection on designs where board space is at a premium. It has industry leading capacitance linearity over voltage making it ideal for RF applications. This capacitance linearity combined with the extremely small package and low insertion loss makes this part well suited for use in antenna line applications for wireless handsets and terminals.

Features

- Industry Leading Capacitance Linearity Over Voltage
- Ultra-Low Capacitance: 0.2 pF
- Insertion Loss: 0.030 dBm
- 0201DNS Package: 0.60 mm x 0.30 mm
- Stand-off Voltage: 5.3 V
- Low Leakage: < 1 nA
- Low Dynamic Resistance: < 1 Ω
- 1000 ESD IEC61000-4-2 Strikes ± 8 kV Contact / Air Discharged
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant

Typical Applications

- RF Signal ESD Protection
- RF Switching, PA, and Antenna ESD Protection
- Near Field Communications
- USB 2.0, USB 3.0

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
IEC 61000-4-2 Level 4 (Contact) (Note 1) IEC 61000-4-2 Level 4 (Air) (Note 1)	ESD	± 20 ± 20	kV
Maximum Peak Pulse Current IEC 61000-4-5 8/20 μs (Lightning) (Note 2)	I_{PP}	3.0	A
Total Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Thermal Resistance, Junction-to-Ambient	P_D $R_{\theta JA}$	300 400	mW $^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
Lead Solder Temperature - Maximum (10 Second Duration)	T_L	260	$^\circ\text{C}$

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Non-repetitive current pulse at $T_A = 25^\circ\text{C}$, per IEC61000-4-2 waveform.
2. Non-repetitive current pulse at $T_A = 25^\circ\text{C}$, per IEC61000-4-5 waveform.
3. Mounted with recommended minimum pad size, DC board FR-4



ON Semiconductor®

www.onsemi.com



MARKING DIAGRAM



X3DFN2
CASE 152AF

PIN 1

4 M

4 = Specific Device Code
M = Date Code

ORDERING INFORMATION

Device	Package	Shipping†
ESD8472MUT5G	X3DFN2 (Pb-Free)	10000 / Tape & Reel
SZESD8472MUT5G	X3DFN2 (Pb-Free)	15000 / Tape & Reel

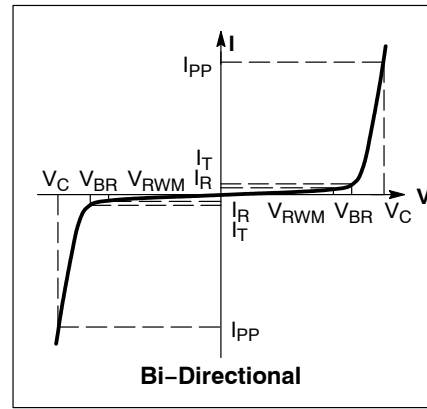
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS

(T_A = 25°C unless otherwise noted)

Symbol	Parameter
I _{PP}	Maximum Reverse Peak Pulse Current
V _C	Clamping Voltage @ I _{PP}
V _{RWM}	Working Peak Reverse Voltage
I _R	Maximum Reverse Leakage Current @ V _{RWM}
V _{BR}	Breakdown Voltage @ I _T
I _T	Test Current

*See Application Note AND8308/D for detailed explanations of datasheet parameters.



ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Reverse Working Voltage	V _{RWM}				5.3	V
Breakdown Voltage	V _{BR}	I _T = 1 mA (Note 4)	7.0		12	V
Reverse Leakage Current	I _R	V _{RWM} = 5.3 V		< 1	50	nA
Clamping Voltage	V _C	I _{PP} = 1 A (Note 5)		11	15	V
Clamping Voltage	V _C	I _{PP} = 3 A (Note 5)		14	20	V
ESD Clamping Voltage	V _C	Per IEC61000-4-2	See Figures 1 and 2			
Junction Capacitance	C _J	V _R = 0 V, f = 1 MHz V _R = 0 V, f = 1 GHz		0.20 0.15	0.30 0.30	pF
Dynamic Resistance	R _{DYN}	TLP Pulse		1		Ω
Insertion Loss		f = 1 MHz f = 8.5 GHz		0.050 0.250		dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

- Breakdown voltage is tested from pin 1 to 2 and pin 2 to 1.
- Non-repetitive current pulse at 25°C, per IEC61000-4-5 waveform (Figure 9).

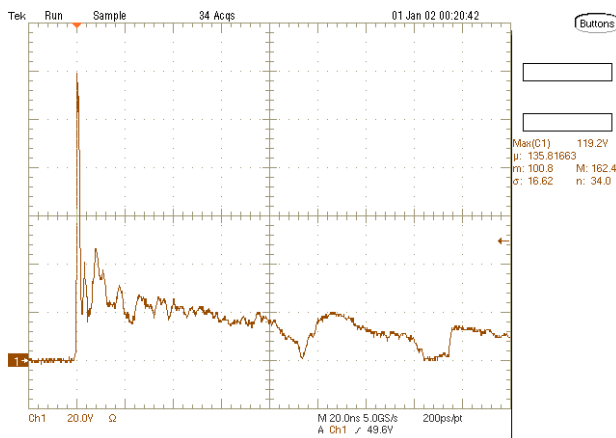


Figure 1. ESD Clamping Voltage Screenshot Positive 8 kV Contact per IEC61000-4-2

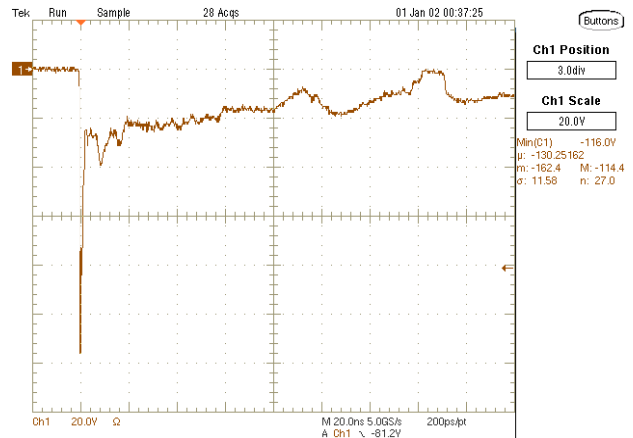


Figure 2. ESD Clamping Voltage Screenshot Negative 8 kV Contact per IEC61000-4-2

ESD8472

TYPICAL CHARACTERISTICS

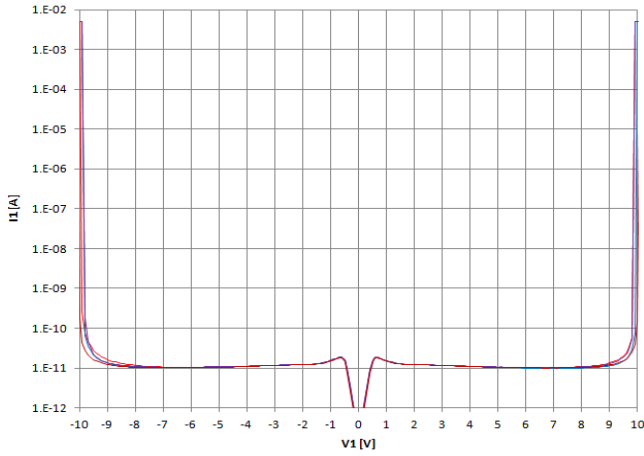


Figure 3. IV Characteristics

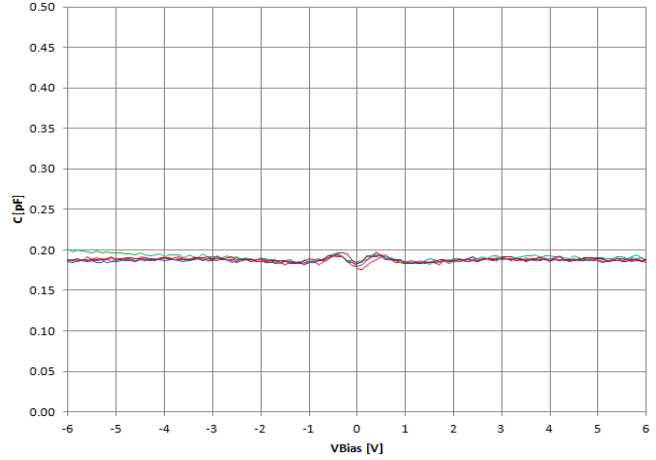


Figure 4. CV Characteristics

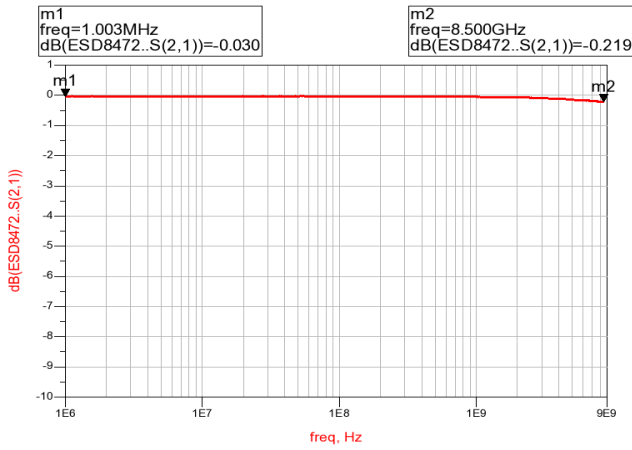


Figure 5. RF Insertion Loss

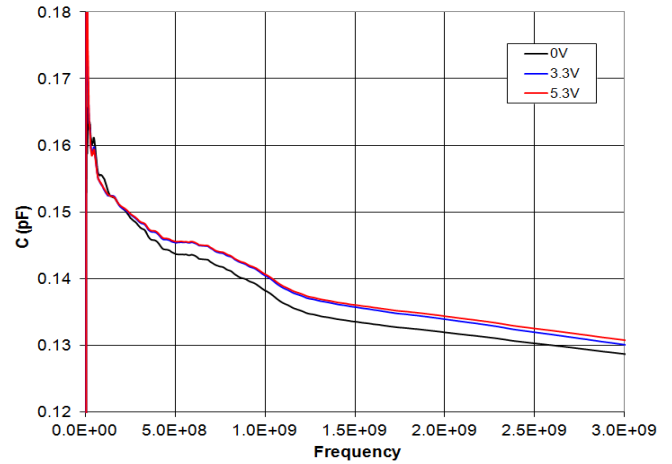


Figure 6. Capacitance over Frequency

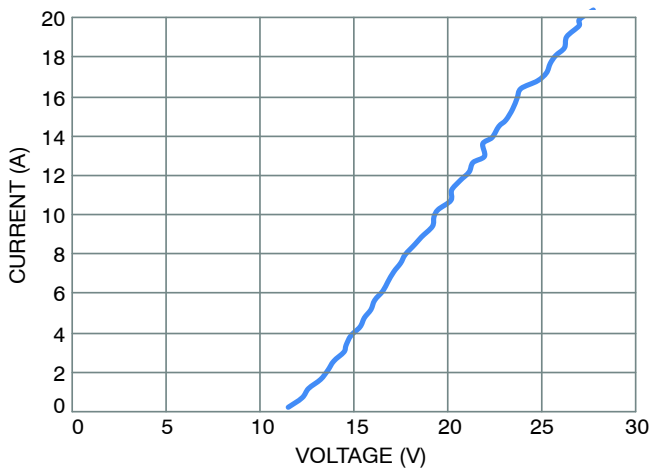


Figure 7. Positive TLP I-V Curve

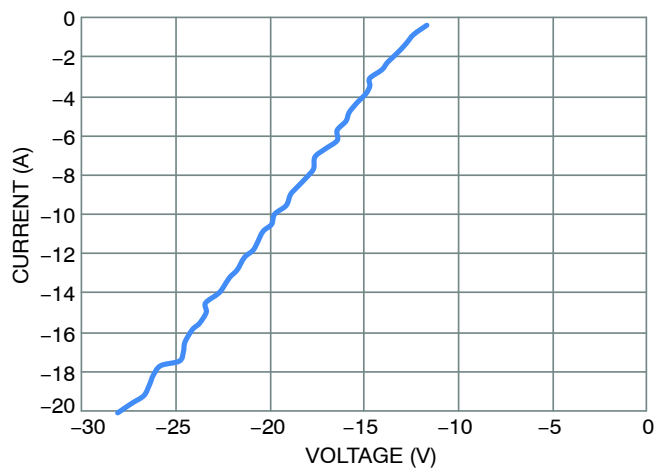


Figure 8. Negative TLP I-V Curve

ESD8472

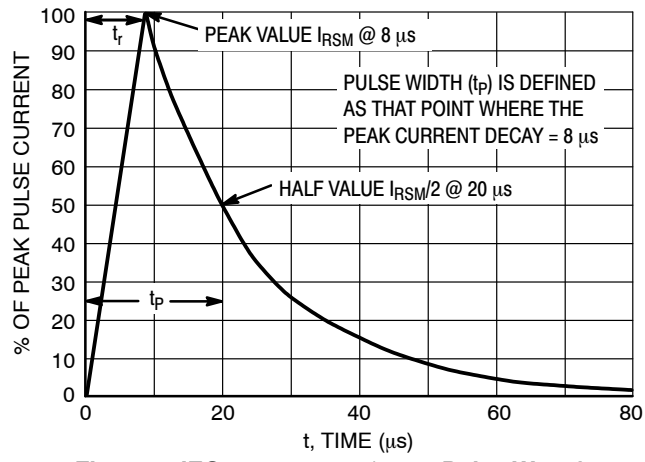
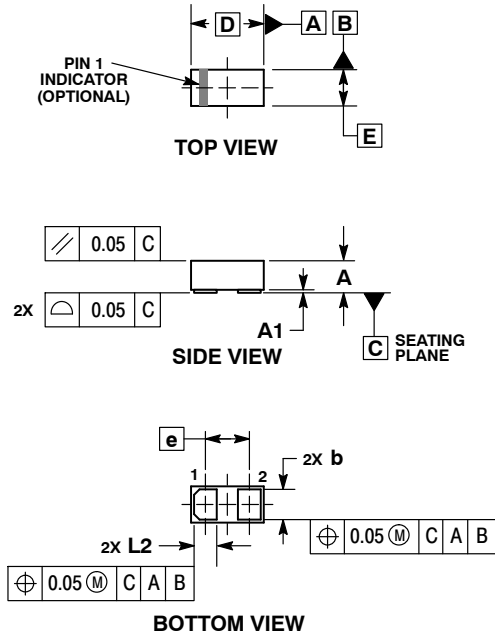


Figure 9. IEC 61000-4-5 8/20 μs Pulse Waveform

ESD8472

PACKAGE DIMENSIONS

X3DFN2, 0.62x0.32, 0.355P, (0201)
CASE 152AF
ISSUE A

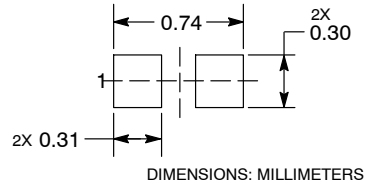


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.

MILLIMETERS		
DIM	MIN	MAX
A	0.25	0.33
A1	---	0.05
b	0.22	0.28
D	0.58	0.66
E	0.28	0.36
e	0.355 BSC	
L2	0.17	0.23

RECOMMENDED MOUNTING FOOTPRINT*



See Application Note AND8398/D for more mounting details
 *For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

ON Semiconductor and are trademarks of Semiconductor Components Industries, LLC dba ON Semiconductor or its subsidiaries in the United States and/or other countries. ON Semiconductor owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of ON Semiconductor's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marketing.pdf. ON Semiconductor reserves the right to make changes without further notice to any products herein. ON Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does ON Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using ON Semiconductor products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by ON Semiconductor. "Typical" parameters which may be provided in ON Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. ON Semiconductor does not convey any license under its patent rights nor the rights of others. ON Semiconductor products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use ON Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold ON Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that ON Semiconductor was negligent regarding the design or manufacture of the part. ON Semiconductor is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
 Literature Distribution Center for ON Semiconductor
 19521 E. 32nd Pkwy, Aurora, Colorado 80011 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
 USA/Canada
Europe, Middle East and Africa Technical Support:
 Phone: 421 33 790 2910
Japan Customer Focus Center
 Phone: 81-3-5817-1050

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
 For additional information, please contact your local Sales Representative

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[ON Semiconductor:](#)

[SZESD8472MUT5G](#) [ESD8472MUT3G](#)