

ESD7471, SZESD7471

Ultra-Low Capacitance ESD Protection

Micro-Packaged Diodes for ESD Protection

The ESD7471 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: 0.35 pF Max
- Stand-off Voltage: 5.3 V
- Low Leakage: < 1 nA
- Low Dynamic Resistance: < 1 Ω
- IEC61000-4-2 Level 4 ESD Protection
- 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/BFR 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 Contact (ESD) (Note 1)	ESD	± 20	KV
IEC 61000-4-2 Air (ESD) (Note 1)	ESD	± 20	kV
IEC 61000-4-5 (ESD) (Note 2)	ESD	2.2	A
Total Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$	P_D	300	mW
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	400	$^\circ\text{C}/\text{W}$
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. At least 10 discharges 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®

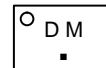
<http://onsemi.com>



MARKING DIAGRAM



XDFN2
CASE 711AM



- D = Specific Device Code
- M = Date Code
- = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping†
ESD7471N2T5G	XDFN2 (Pb-Free)	8000 / Tape & Reel
SZESD7471N2T5G	XDFN2 (Pb-Free)	8000 / 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.

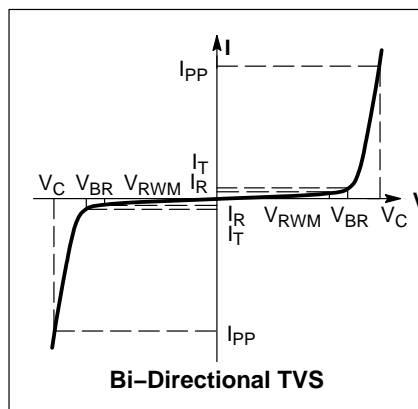
ESD7471, SZESD7471

ELECTRICAL CHARACTERISTICS

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Reverse Working Voltage	V_{RWM}				5.3	V
Breakdown Voltage	V_{BR}	$I_T = 1\text{ mA}$ (Note 4)	7.0			V
Reverse Leakage Current	I_R	$V_{RWM} = 5.3\text{ V}$		< 1	50	nA
Clamping Voltage	V_C	$I_{PP} = 1\text{ A}$ (Note 5)		13	15	V
Junction Capacitance	C_J	$V_R = 0\text{ V}, f = 1\text{ MHz}$ $V_R = 0\text{ V}, f = 1\text{ GHz}$		0.24 0.24	0.35 0.35	pF
Dynamic Resistance	R_{DYN}	TLP Pulse		0.8		Ω

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.

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

ESD7471, SZESD7471

TYPICAL CHARACTERISTICS

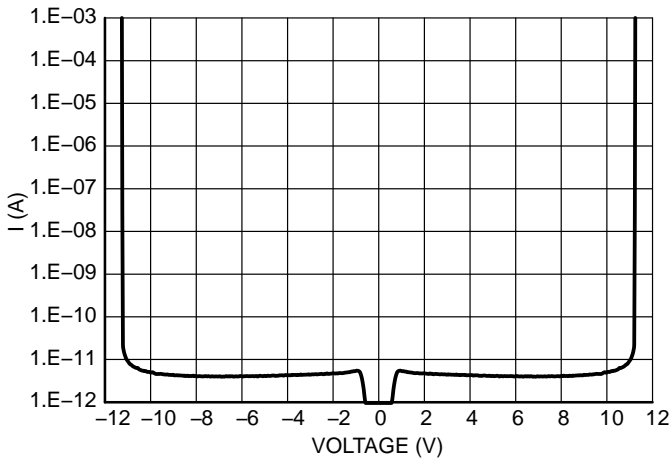


Figure 1. IV Characteristics

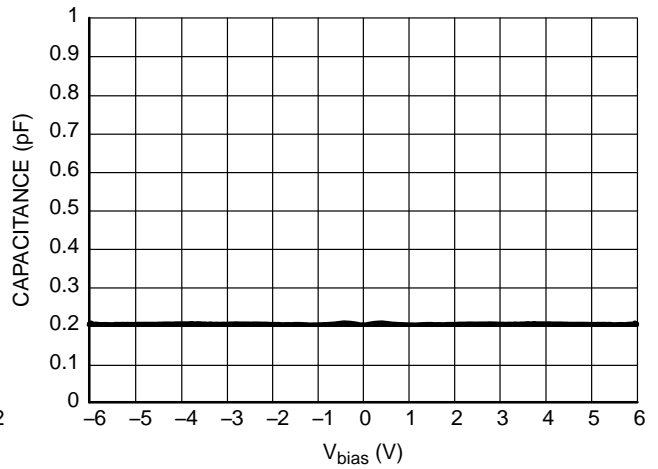


Figure 2. CV Characteristics

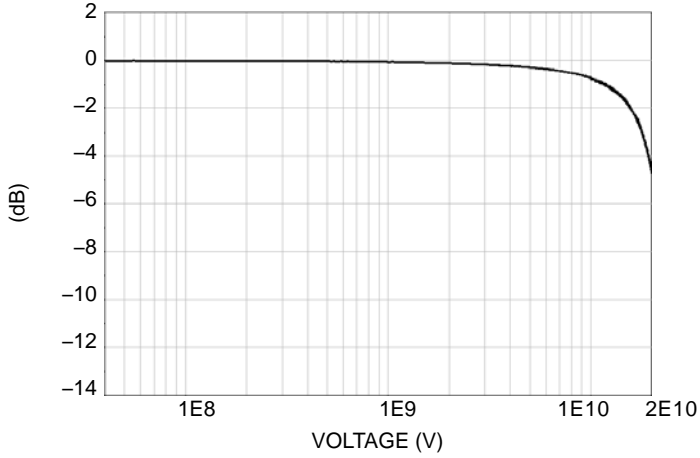


Figure 3. RF Insertion Loss

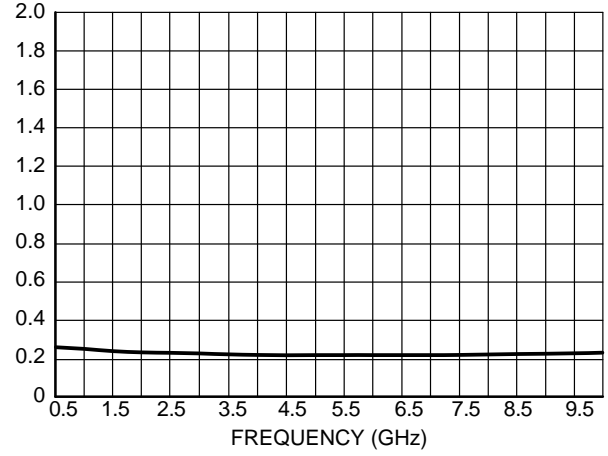


Figure 4. Capacitance over Frequency

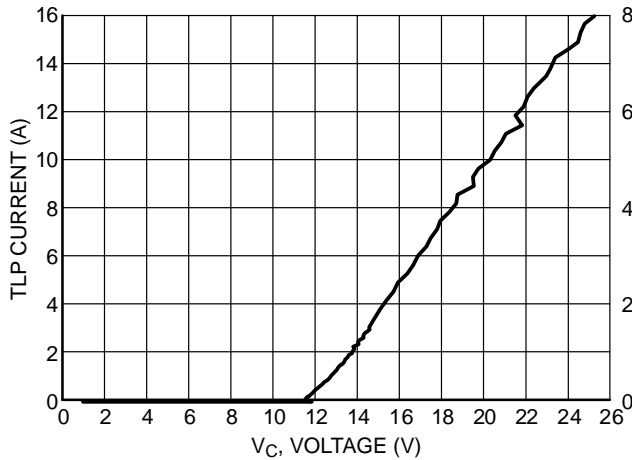


Figure 5. Positive TLP I-V Curve

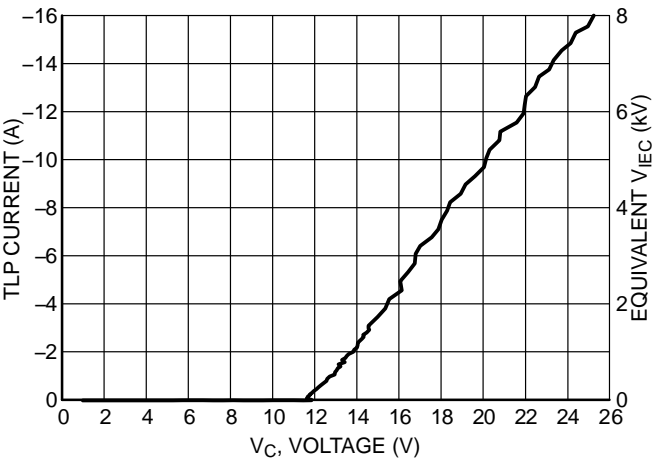
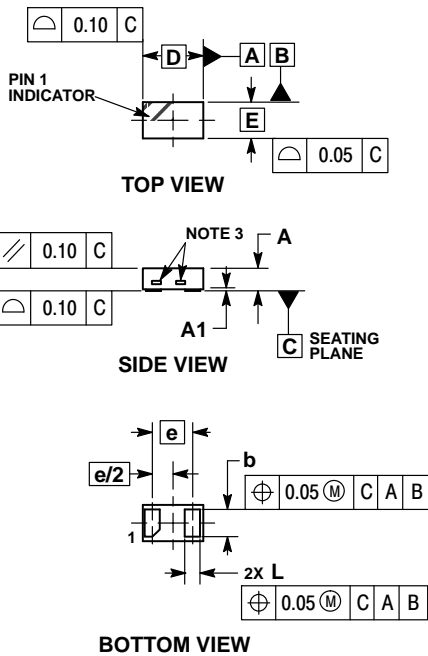


Figure 6. Negative TLP I-V Curve

ESD7471, SZESD7471

PACKAGE DIMENSIONS

XDFN2 1.0x0.6, 0.65P (SOD-882) CASE 711AM ISSUE O

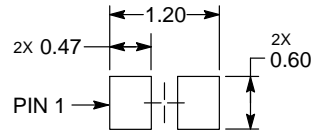


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. EXPOSED COPPER ALLOWED AS SHOWN.

MILLIMETERS		
DIM	MIN	MAX
A	0.34	0.44
A1	---	0.05
b	0.43	0.53
D	1.00 BSC	
E	0.60 BSC	
e	0.65 BSC	
L	0.20	0.30

RECOMMENDED SOLDER FOOTPRINT*



DIMENSIONS: MILLIMETERS

*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 registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent-Marking.pdf. SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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. "Typical" parameters which may be provided in SCILLC 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. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC 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
P.O. Box 5163, Denver, Colorado 80217 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