

NUP8011MU

Transient Voltage Suppressors ESD Protection Diodes with Low Clamping Voltage Array

This integrated transient voltage suppressor device (TVS) is designed for applications requiring transient overvoltage protection. It is intended for use in sensitive equipment such as computers, printers, business machines, communication systems, and other applications. Its integrated design provides very effective and reliable protection for eight separate lines using only one package. These devices are ideal for situations where board space is at a premium.

Features

- Low Clamping Voltage
- UDFN Package, 1.2 x 1.8 mm
- Standoff Voltage: 4.3 V
- Low Leakage Current
- IEC61000-4-2, Level 4 ESD Protection
- Moisture Sensitivity Level 1
- This is a Pb-Free Device

Benefits

- Provides Protection for ESD Industry Standards: IEC 61000, HBM
- Protects the Line Against Transient Voltage Conditions
- Minimize Power Consumption of the System
- Minimize PCB Board Space

Applications

- ESD Protection for Data Lines
- Wireless Phones
- Handheld Products
- Notebook Computers
- LCD Displays

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

Characteristic	Symbol	Value	Unit
Steady State Power – 1 Diode (Note 1)	P_D	380	mW
Thermal Resistance, Junction-to-Ambient Above 25°C , Derate	$R_{\theta JA}$	327 3.05	$^\circ\text{C}/\text{W}$ $\text{mW}/^\circ\text{C}$
Maximum Junction Temperature	T_{Jmax}	150	$^\circ\text{C}$
Operating Temperature Range	T_{OP}	-40 to +85	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$
Lead Solder Temperature (10 seconds duration)	T_L	260	$^\circ\text{C}$
IEC 61000-4-2 (ESD) Contact		± 8.0	kV
Machine Model – Class C	MM	400	V
Human Body Model – Class 3B	HBM	8.0	kV

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

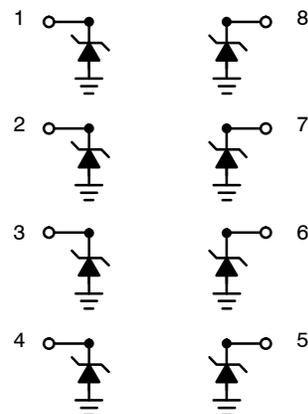
1. Only 1 diode under power. For all 4 diodes under power, P_D will be 25%. Mounted on FR-4 board with min pad.

See Application Note AND8308/D for further description of survivability specs.

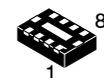


ON Semiconductor®

<http://onsemi.com>

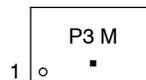


(Top View)



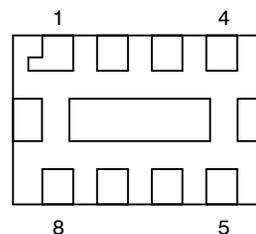
UDFN8
CASE 517AD

MARKING DIAGRAM



- P3 = Specific Device Code
- M = Month Code
- = Pb-Free Package

PIN CONNECTIONS



ORDERING INFORMATION

Device	Package	Shipping
NUP8011MUTAG	UDFN8 (Pb-Free)	3000 / 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.

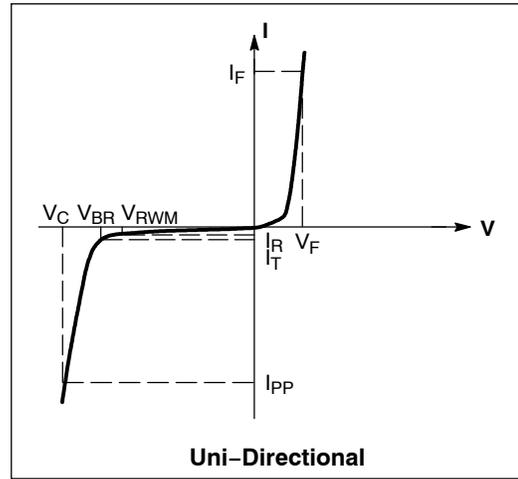
NUP8011MU

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
I_F	Forward Current
V_F	Forward Voltage @ I_F
P_{pk}	Peak Power Dissipation
C	Capacitance @ $V_R = 0$ and $f = 1.0$ MHz

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



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Device	Device Marking	Breakdown Voltage V_{BR} @ 1 mA (V)			Leakage Current I_{RM} @ V_{RM}		Typ Capacitance @ 0 V Bias (pF) (Note 2)		Typ Capacitance @ 3 V Bias (pF) (Note 2)		V_C Per IEC61000-4-2 (Note 3)
		Min	Nom	Max	V_{RWM}	I_{RWM} (μA)	Typ	Max	Typ	Max	
NUP8011MUTAG	P3	6.47	6.8	7.14	4.3	1.0	12	14	6.7	9.5	Figures 1 and 2 (See Below)

- Capacitance of one diode at $f = 1$ MHz, $V_R = 0$ V, $T_A = 25^\circ\text{C}$
- For test procedure see Figures 3 and 4 and Application Note AND8307/D.

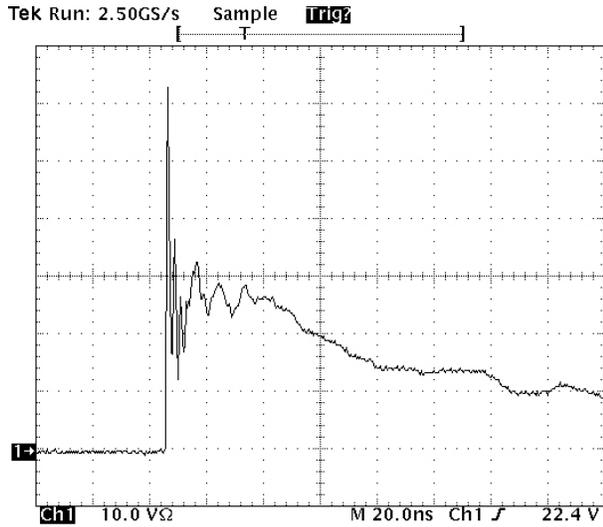


Figure 1. ESD Clamping Voltage Screenshot Positive 8 kV Contact per IEC61000-4-2

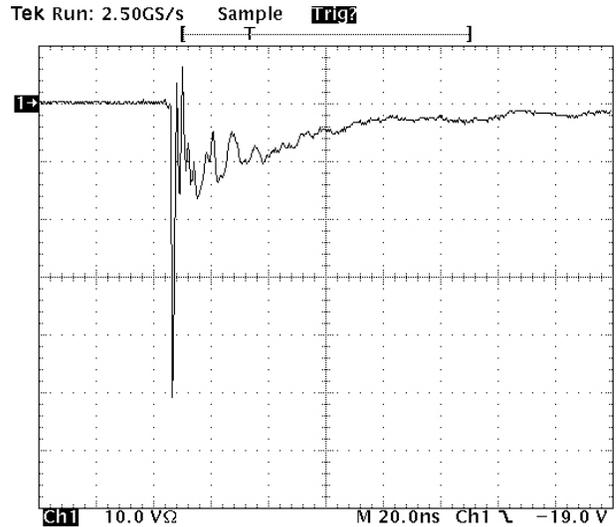


Figure 2. ESD Clamping Voltage Screenshot Negative 8 kV Contact per IEC61000-4-2

IEC 61000-4-2 Spec.

Level	Test Voltage (kV)	First Peak Current (A)	Current at 30 ns (A)	Current at 60 ns (A)
1	2	7.5	4	2
2	4	15	8	4
3	6	22.5	12	6
4	8	30	16	8

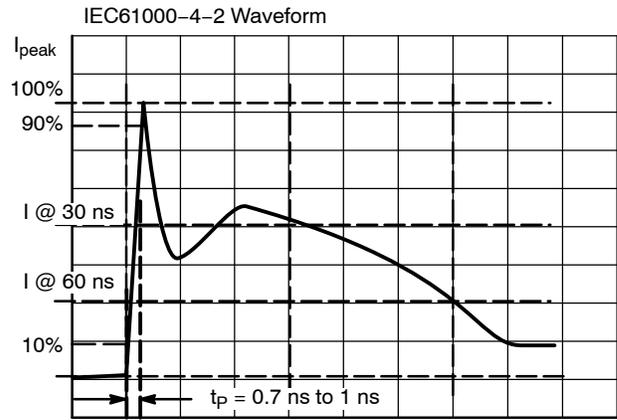


Figure 3. IEC61000-4-2 Spec

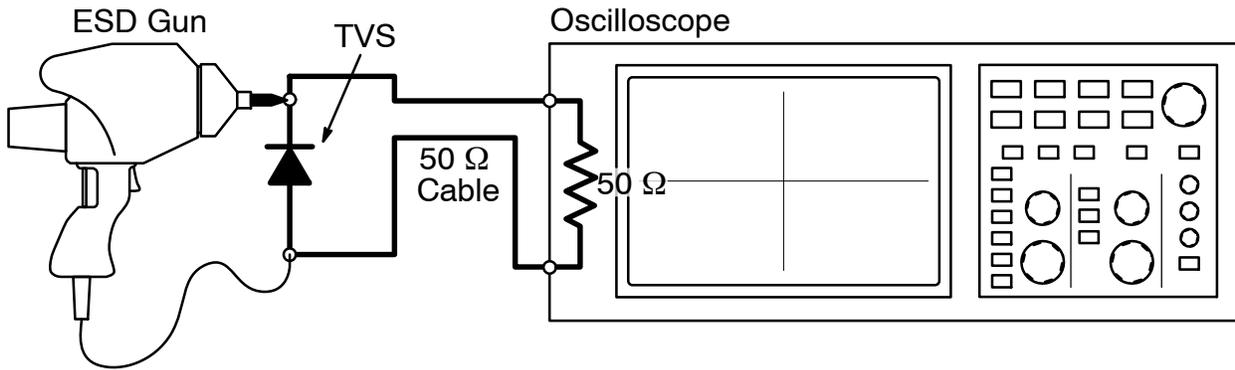


Figure 4. Diagram of ESD Test Setup

The following is taken from Application Note AND8308/D – Interpretation of Datasheet Parameters for ESD Devices.

ESD Voltage Clamping

For sensitive circuit elements it is important to limit the voltage that an IC will be exposed to during an ESD event to as low a voltage as possible. The ESD clamping voltage is the voltage drop across the ESD protection diode during an ESD event per the IEC61000-4-2 waveform. Since the IEC61000-4-2 was written as a pass/fail spec for larger

systems such as cell phones or laptop computers it is not clearly defined in the spec how to specify a clamping voltage at the device level. ON Semiconductor has developed a way to examine the entire voltage waveform across the ESD protection diode over the time domain of an ESD pulse in the form of an oscilloscope screenshot, which can be found on the datasheets for all ESD protection diodes. For more information on how ON Semiconductor creates these screenshots and how to interpret them please refer to AND8307/D.

TYPICAL ELECTRICAL CHARACTERISTICS

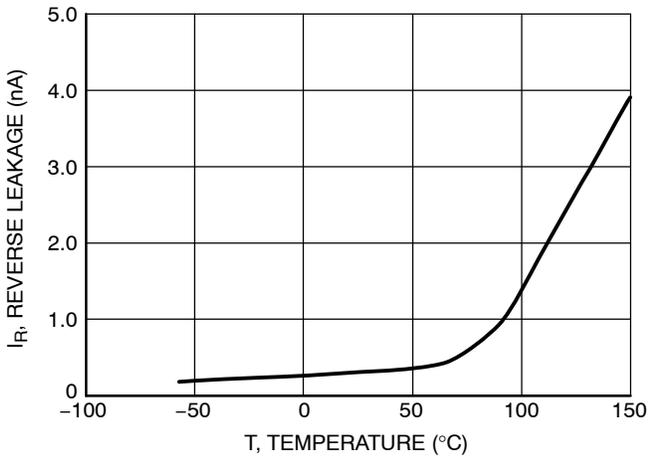


Figure 5. Reverse Leakage versus Temperature

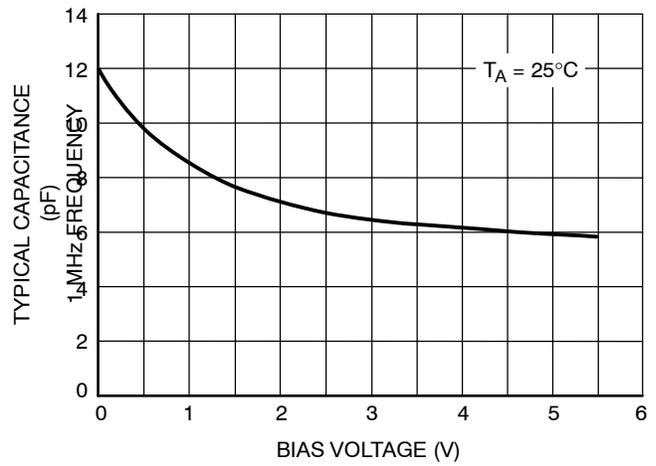


Figure 6. Capacitance

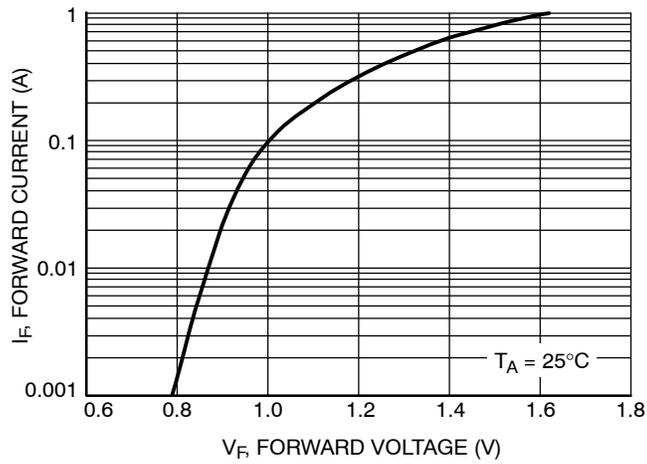
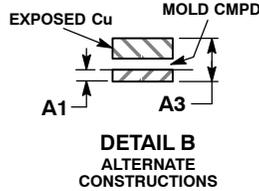
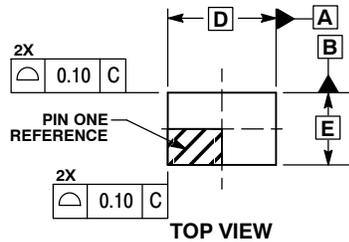


Figure 7. Forward Voltage

NUP8011MU

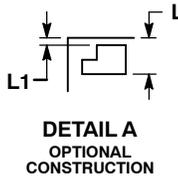
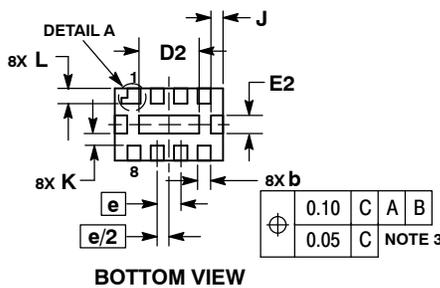
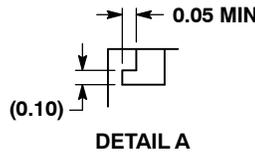
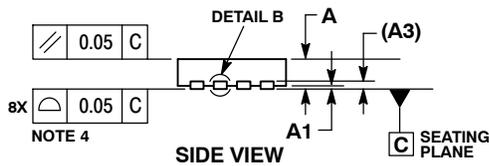
PACKAGE DIMENSIONS

UDFN8, 1.8x1.2, 0.4P
CASE 517AD-01
ISSUE C

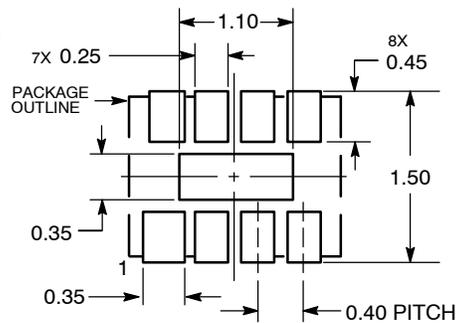


- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
 2. CONTROLLING DIMENSION: MILLIMETERS.
 3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 mm FROM TERMINAL.
 4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

MILLIMETERS		
DIM	MIN	MAX
A	0.45	0.55
A1	0.00	0.05
A3	0.13	REF
b	0.15	0.25
D	1.80	BSC
E	1.20	BSC
e	0.40	BSC
D2	0.90	1.10
E2	0.20	0.30
J	0.19	REF
K	0.20	---
L	0.20	0.30
L1	---	0.10



SOLDERING 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 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: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local Sales Representative

AMEYA360

Components Supply Platform

Authorized Distribution Brand :



Website :

Welcome to visit www.ameya360.com

Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email amall@ameya360.com

QQ 800077892

Skype [ameyasales1](#) [ameyasales2](#)

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com