

# ESD Protection Diode Array

## 5-Pin, Bi-Directional, Quad

### NUP4004M5

This 5-Pin bi-directional transient suppressor array is designed for applications requiring transient overvoltage protection capability. It is intended for use in transient voltage and ESD sensitive equipment such as computers, printers, cell phones, medical equipment, and other applications. Its integrated design provides bi-directional protection for four separate lines using a single TSOP-5 package. This device is ideal for situations where board space is a premium.

#### Features

- Bi-directional Protection for Four Lines in a Single TSOP-5 Package
- Low Leakage Current
- Low Capacitance
- Provides ESD Protection for JEDEC Standards JESD22
  - Machine Model = Class C
  - Human Body Model = Class 3B
- Provides ESD Protection for IEC 61000-4-2, 15 kV (Air), 8 kV (Contact)
- This is a Pb-Free Device

#### Mechanical Characteristics

- Void Free, Transfer-Molded, Thermosetting Plastic Case
- Corrosion Resistant Finish, Easily Solderable
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications

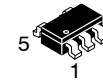
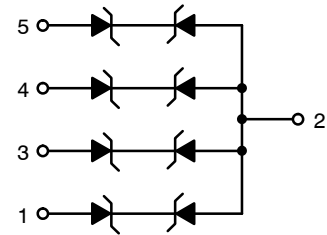
#### Applications

- LCD, Plasma TV Video Lines
- Other Telephone Sets
- Computers / Printers / Set-Top Boxes

#### MAXIMUM RATINGS (T<sub>J</sub> = 25°C, unless otherwise specified)

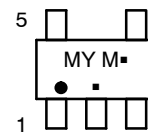
Rating	Symbol	Value	Unit
Operating Junction Temperature Range	T <sub>J</sub>	-40 to 125	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C
Lead Solder Temperature – Maximum (10 sec)	T <sub>L</sub>	260	°C
Human Body Model (HBM)	ESD	16	kV
Machine Model (MM)		0.4	
IEC 61000-4-2 Air (ESD)		30	
IEC 61000-4-2 Contact (ESD)		30	

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.



TSOP-5  
CASE 483

#### MARKING DIAGRAM



MY = Specific Device Code  
M = Date Code  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
NUP4004M5T1G	TSOP-5 (Pb-Free)	3000/Tape & Reel

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

# NUP4004M5

## ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ , unless otherwise specified)

Parameter	Conditions	Symbol	Min	Typ	Max	Unit
Reverse Working Voltage	(Note 1)	$V_{RWM}$	-	-	5.0	V
Breakdown Voltage	$I_T = 1 \text{ mA}$ , (Note 2)	$V_{BR}$	-	7.0	8.0	V
Reverse Leakage Current	$V_{RWM} = 5 \text{ V}$	$I_R$	-	100	1000	nA
Capacitance	$V_R = -3 \text{ V}$ , $f = 1 \text{ MHz}$ (Line to GND)	$C_j$	-	23	-	pF
Capacitance	$V_R = 3 \text{ V}$ , $f = 1 \text{ MHz}$ (Line to GND)	$C_j$	-	32	-	pF

- Surge protection devices are normally selected according to the working peak reverse voltage ( $V_{RWM}$ ), which should be equal or greater than the DC or continuous peak operating voltage level.
- $V_{BR}$  is measured at pulse test current  $I_T$ .

## TYPICAL PERFORMANCE CURVES

( $T_J = 25^\circ\text{C}$  UNLESS OTHERWISE SPECIFIED)

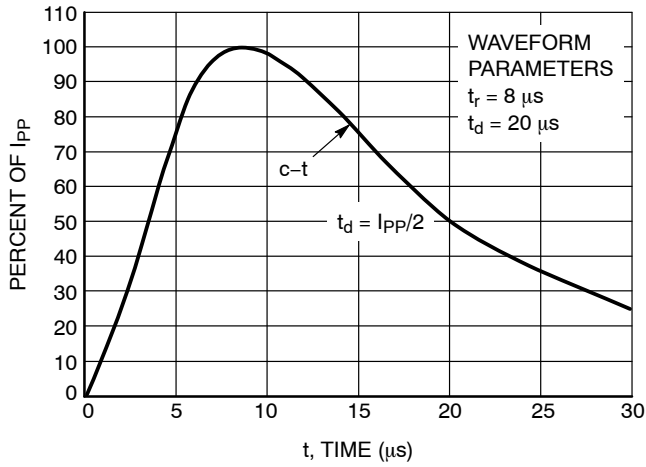


Figure 1. Pulse Waveform

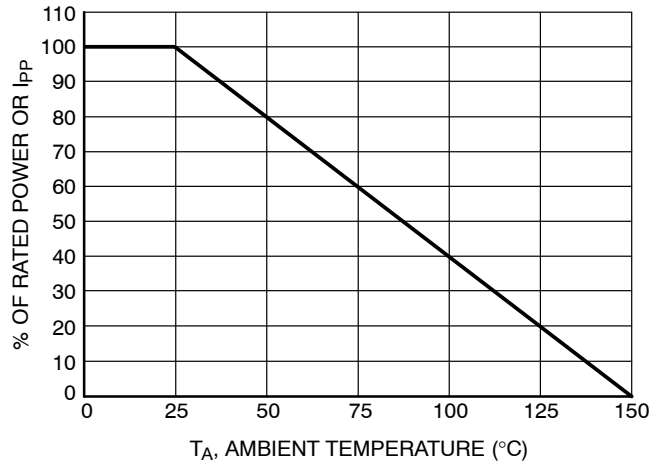
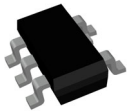
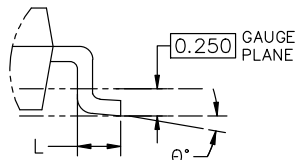
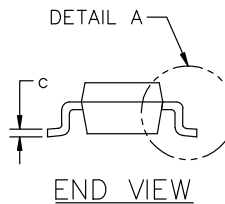
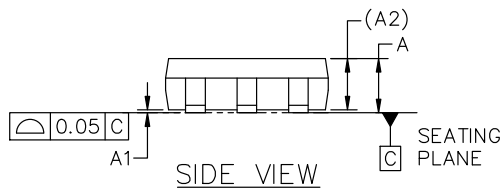
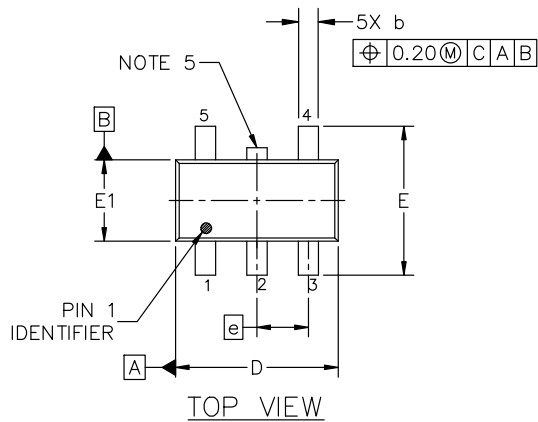


Figure 2. Power Derating Curve



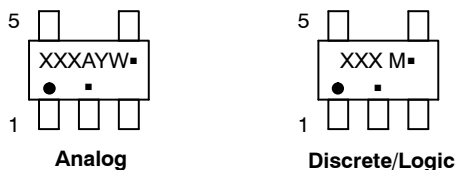
TSOP-5 3.00x1.50x0.95, 0.95P  
CASE 483  
ISSUE P

DATE 01 APR 2024



DETAIL "A"  
SCALE 2:1

GENERIC  
MARKING DIAGRAM\*



- XXX = Specific Device Code
- A = Assembly Location
- Y = Year
- W = Work Week
- = Pb-Free Package
- XXX = Specific Device Code
- M = Date Code
- = Pb-Free Package

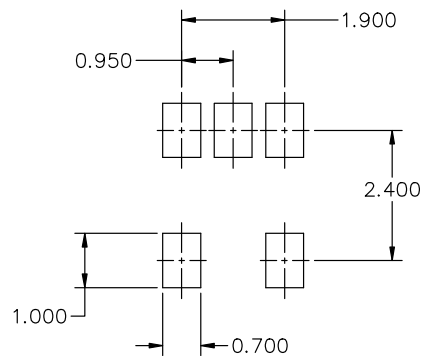
(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS (ANGLES IN DEGREES).
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OF GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.15 PER SIDE. DIMENSION D.
5. OPTIONAL CONSTRUCTION: AN ADDITIONAL TRIMMED LEAD IS ALLOWED IN THIS LOCATION. TRIMMED LEAD NOT TO EXTEND MORE THAN 0.2 FROM BODY.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.900	1.000	1.100
A1	0.010	0.055	0.100
A2	0.950 REF.		
b	0.250	0.375	0.500
c	0.100	0.180	0.260
D	2.850	3.000	3.150
E	2.500	2.750	3.000
E1	1.350	1.500	1.650
e	0.950 BSC		
L	0.200	0.400	0.600
θ	0°	5°	10°



RECOMMENDED MOUNTING FOOTPRINT\*

\* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D.

DOCUMENT NUMBER:	98ARB18753C	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	TSOP-5 3.00x1.50x0.95, 0.95P	PAGE 1 OF 1

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi 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. onsemi does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** 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 **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** 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. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** 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 **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** 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 **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)