

ON Semiconductor

Is Now

onsemi™

To learn more about onsemi™, please visit our website at
www.onsemi.com

onsemi and **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** product/patent coverage may be accessed at 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. Other names and brands may be claimed as the property of others.

NUP4103FC

ESD Protection Diode Array, 4-Channel

This integrated surge protection device is designed for applications requiring transient overvoltage protection. It is intended for use in sensitive portable equipment and other applications. Its integrated design provides very effective and reliable protection for four (4) separate lines using only one package. These devices are ideal for situations where board space is a premium.

Features

- Unidirectional, Quad ESD Protection
- Ultra-small Flip-Chip Packaging (0.95 mm x 1.33 mm)
- Compliance with IEC61000-4-2 (Level 4) Requirements
- Maximum Leakage Current of 100 nA at 3.3 V
- Pb-Free Package is Available*

Benefits

- Protects Four Data Lines from ESD while Reducing Component Count
- Small Package Saves on PCB Real Estate
- Provides Protection for ESD Industry Standards, IEC 61000, HBM and MM
- Low Leakage Capability Minimizes Power Loss in the System

Applications

- ESD Protection for Portable Equipment
- Cell Phones
- MP3 Players
- PDAs

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
ESD Discharge IEC61000-4-2, – Air Discharge – Contact Discharge	V_{PP}	30	kV
Human Body Model		16	
Machine Model		1.6	
Junction Temperature	T_J	150	°C
Operating Ambient Temperature Range	T_A	-40 to +85	°C
Storage Temperature Range	T_{STG}	-55 to +150	°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.

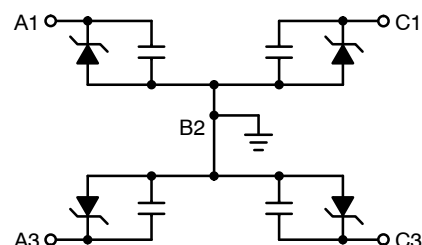
*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



ON Semiconductor®

www.onsemi.com

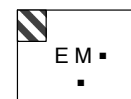
CIRCUIT DESCRIPTION



MARKING DIAGRAM



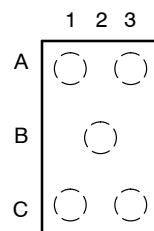
5-PIN FLIP-CHIP CSP
PLASTIC
CASE 766AB



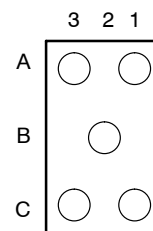
- E = Specific Device Code
- M = Date Code
- = Pb-Free Package

(Note: Microdot may be in either location)

TOP VIEW
(Bumps Down)



BOTTOM VIEW
(Bumps Up)



ORDERING INFORMATION

Device	Package	Shipping†
NUP4103FCT1	Flip-Chip	3000/Tape & Reel
NUP4103FCT1G	Flip-Chip (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.

NUP4103FC

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Stand-Off Voltage	V_{RWM}	$I_{RWM} = 10 \mu\text{A}$ (Note 1)			5.5	V
Breakdown Voltage	V_{BR}	$I_T = 1.0 \text{ mA}$ (Note 2)	6.0	7.0	8.0	V
Leakage Current	I_R	$V_{RM} = 3.3 \text{ V}$ per line			100	nA
Junction Capacitance	C_J	$V_R = 2.5 \text{ V}$, $f = 1 \text{ MHz}$		30		pF

1. 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.
2. V_{BR} is measured at pulse test current I_T .

TYPICAL PERFORMANCE CURVES

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

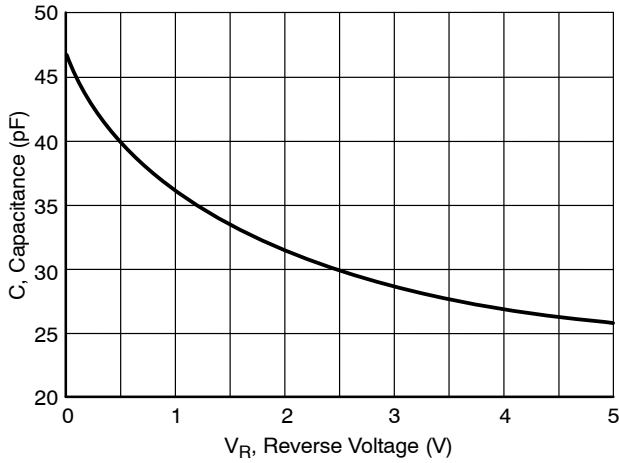


Figure 1. Reverse Voltage vs Junction Capacitance

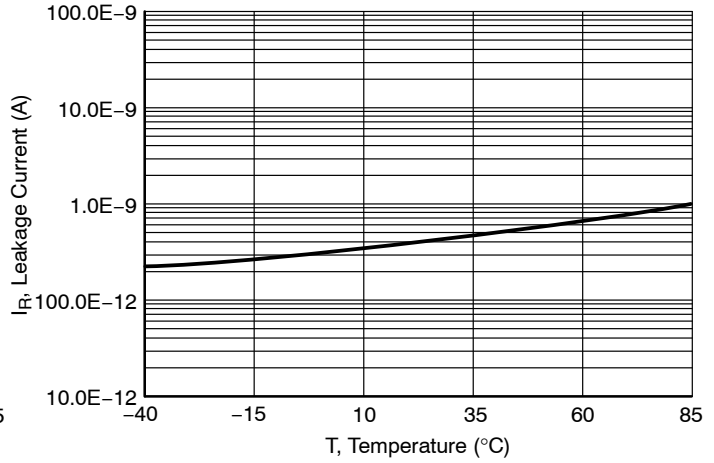


Figure 2. Reverse Leakage Current vs Junction Temperature

NUP4103FC

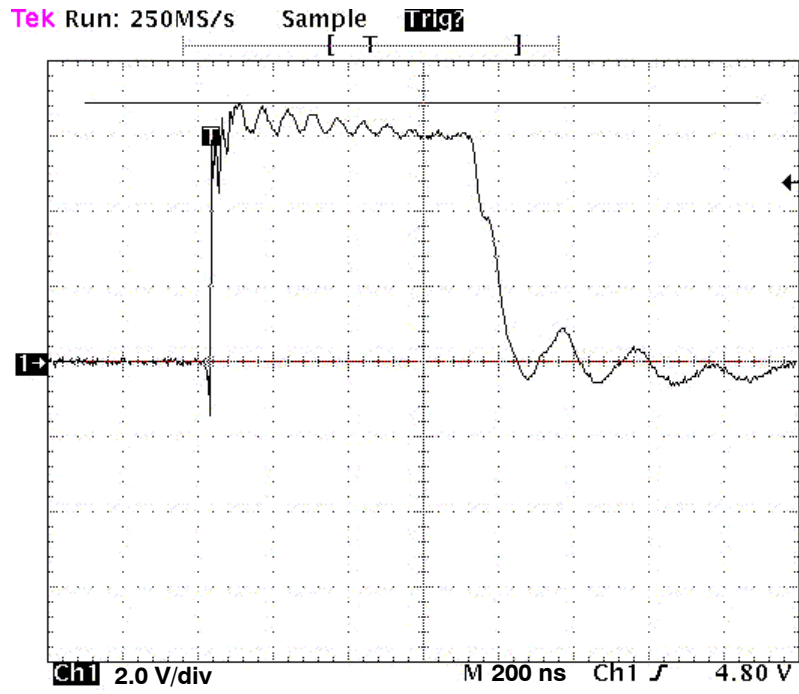


Figure 3. ESD Response for Human Body Model (+8 kV)

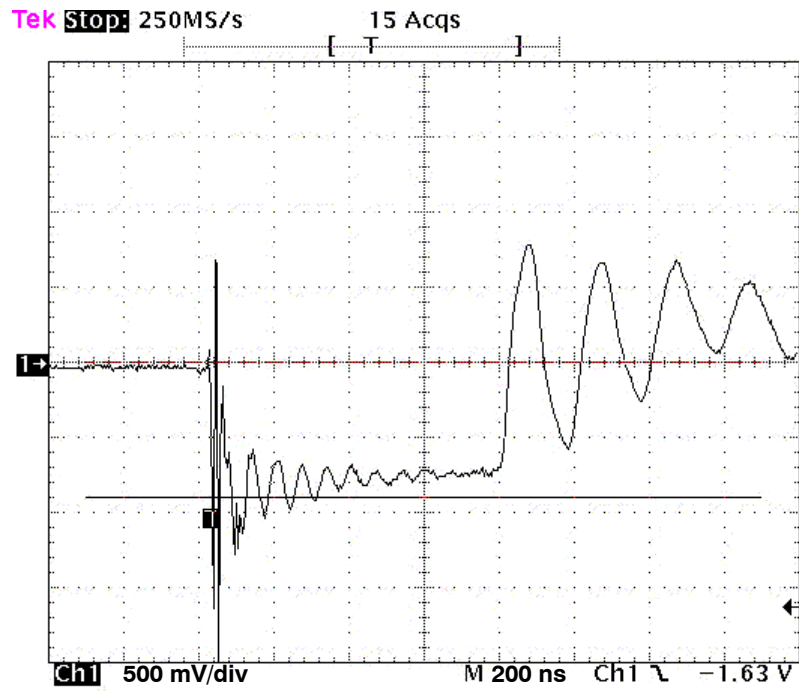


Figure 4. ESD Response for Human Body Model (-8 kV)

NUP4103FC

Printed Circuit Board Recommendations

Parameter	500 μm Pitch 300 μm Solder Ball
PCB Pad Size	250 μm +25 / -0
Pad Shape	Round
Pad Type	NSMD
Solder Mask Opening	350 μm \pm 25
Solder Stencil Thickness	125 μm
Stencil Aperture	250 x 250 μm sq.
Solder Flux Ratio	50/50
Solder Paste Type	No Clean Type 3 or Finer
Trace Finish	OSP Cu
Trace Width	150 μm Max

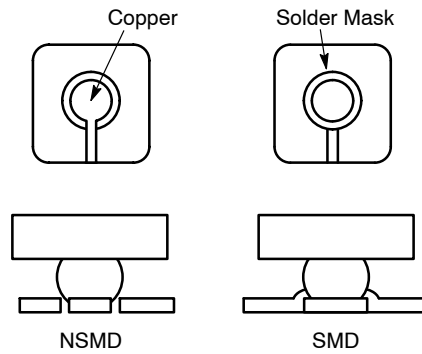


Figure 5. Solder Mask versus Non-Solder Mask Definition

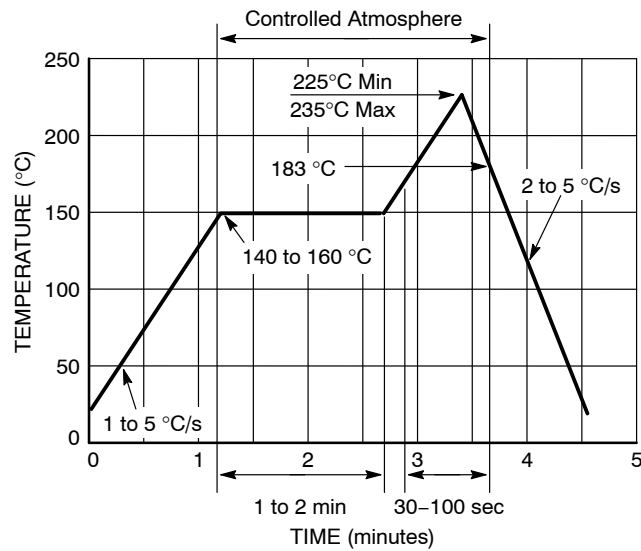


Figure 6. Solder Reflow Profile

MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

ON Semiconductor®

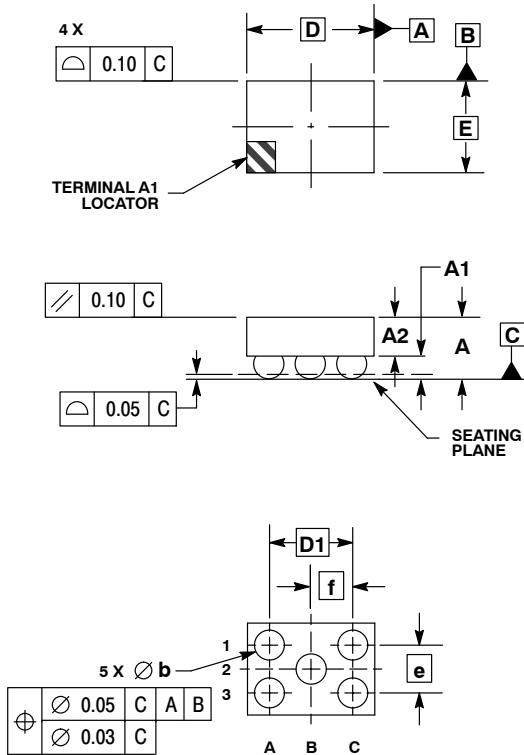


5 PIN FLIP-CHIP CSP CASE 766AB-01 ISSUE O

DATE 04 JUN 2003



SCALE 4:1

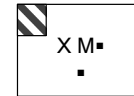


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

DIM	MILLIMETERS	
	MIN	MAX
A	---	0.680
A1	0.210	0.270
A2	0.380	0.430
D	1.330 BSC	
E	0.960 BSC	
b	0.290	0.340
e	0.500 BSC	
f	0.433 BSC	
D1	0.866 BSC	

GENERIC MARKING DIAGRAM



- X = Specific Device Code
 - M = Date Code
 - = Pb-Free Package
- (Note: Microdot may be in either location)

DOCUMENT NUMBER:	98AON12900D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	5 PIN FLIP-CHIP CSP	PAGE 1 OF 1

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 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. ON Semiconductor does not convey any license under its patent rights nor the rights of others.

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-Marking.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:

Email Requests to: orderlit@onsemi.com

ON Semiconductor Website: www.onsemi.com

TECHNICAL SUPPORT

North American Technical Support:
Voice Mail: 1 800-282-9855 Toll Free USA/Canada
Phone: 011 421 33 790 2910

Europe, Middle East and Africa Technical Support:

Phone: 00421 33 790 2910

For additional information, please contact your local Sales Representative

