NMF3000, NMF3010

Dual−Stage, Differential Lines Filter with ESD Protection

The NMF3000 and the NMF3010 are a dual−stage, differential line ESD and filtering protection scheme for input signals into portable devices. The NMF3000 is the first stage and is located at or very near to the interface to the outside world. It provides the high−level ESD protection as well as the initial filtering of incoming audio signals. The NMF3010 is the second stage and provides additional signal filtering. This second stage can be placed some distance away from the first stage to allow for effective filtering across extended distances.

Features

- Dual Filtering Lines for 2−Channels or Differential Transmission
- Separate Power and Analog Grounds for ESD Protection and Filtering Circuitry
- V_{CC} Input Pin on First Stage to Set Microphone DC Bias
- IEC 61000−4−2 Grade ±15 kV Contact ESD Protection on the Inputs, V_{CC}, and Between Power and Analog Grounds
- IEC 61000−4−2 Level 1 ESD protection on All Other Pin−to−Pin Combinations
- These are Pb−Free Devices*

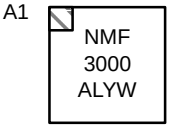
ON Semiconductor®

http://onsemi.com

MARKING DIAGRAMS

A1

9 Bump Flip−Chip
CASE 499AE



A1

6 Bump Flip−Chip
CASE 499AF

A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 8 of this data sheet.

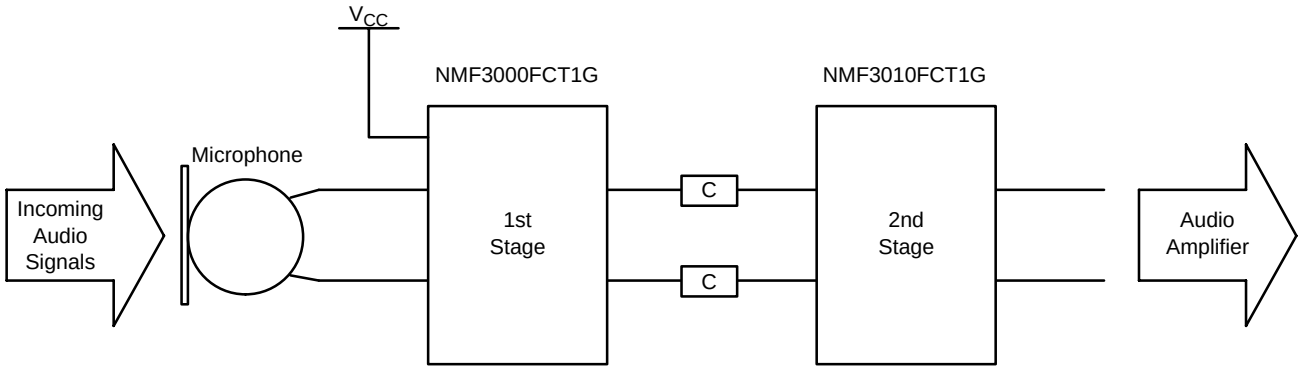


Figure 1. System Diagram

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

FUNCTIONAL BLOCK DIAGRAMS

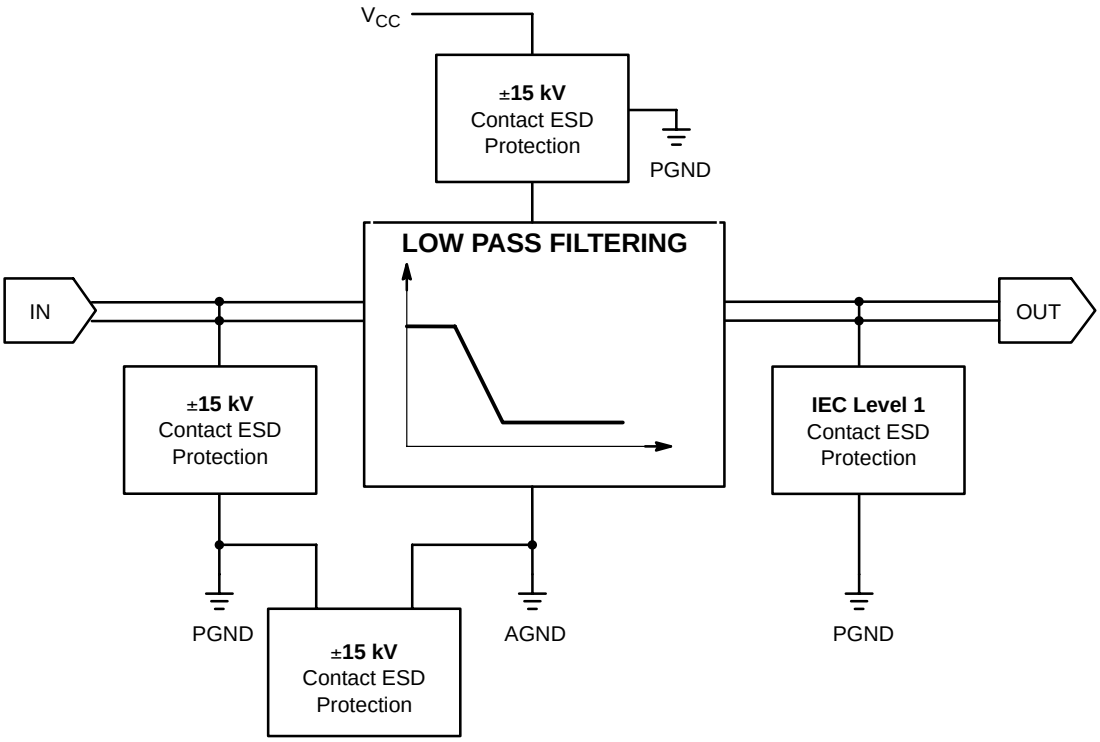


Figure 2. First Stage: NMF3000FCT1G

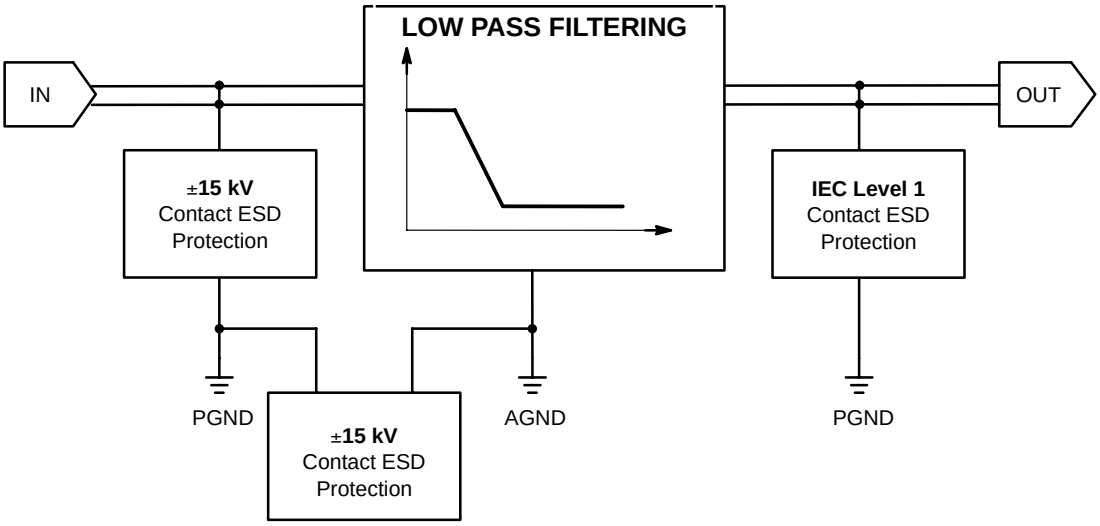


Figure 3. Second Stage: NMF3010FCT1G

PINOUTS AND PIN DESCRIPTIONS

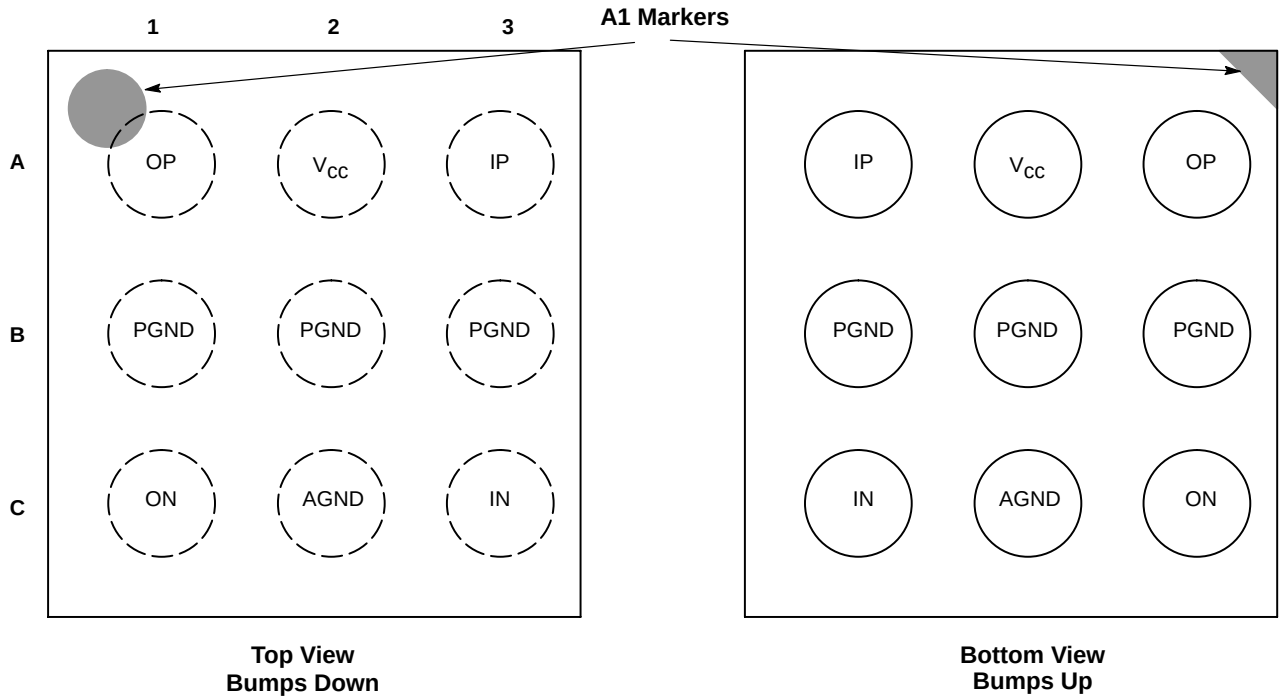


Figure 4. Pinout Diagrams for First Stage: NMF3000FCT1G

PINOUT FUNCTIONS FOR FIRST STAGE

Pin	Type	Description
A1	Output P	Positive Side Signal Output
A2	VCC	DC Power Connection
A3	Input P	Positive Side Signal Input
B1, B2, B3	PGND	Power Ground
C1	Output N	Negative Side Signal Output
C2	AGND	Analog Ground
C3	Input N	Negative Side Signal Input

PINOUTS AND PIN DESCRIPTIONS

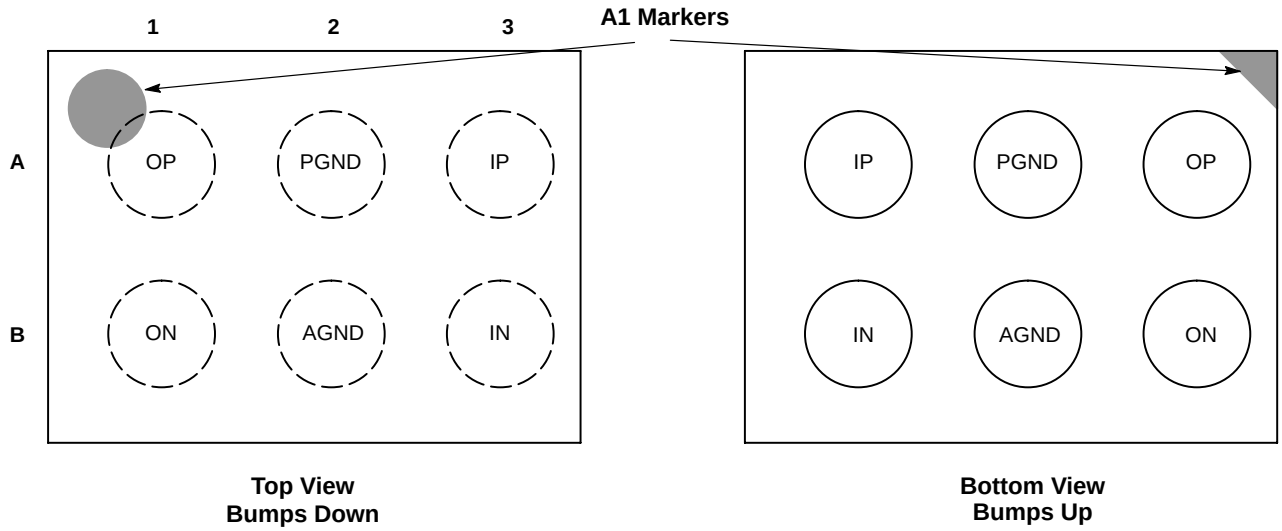


Figure 5. Pinout Diagrams for Second Stage: NMF3010FCT1G

PINOUT FUNCTIONS FOR SECOND STAGE

Pin	Type	Description
A1	Output P	Positive Side Signal Output
A2	PGND	Power Ground
A3	Input P	Positive Side Signal Input
B1	Output N	Negative Side Signal Output
B2	AGND	Analog Ground
B3	Input N	Negative Side Signal Input

MAXIMUM RATINGS

Rating	Symbol	Value	Units
Operating Ambient Temperature Range	T_A	−40 to 85	°C
Moisture Sensitivity	MSL	Level 1	
Storage Temperature Range	T_{stg}	−55 to 150	°C
Supply Voltage	V_{CC}	0 to 11	V

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

ELECTRICAL CHARACTERISTICS (V_{CC} = 0 V to 10 V, T_A = −40°C to 85°C, All Typical Values Measured at 25°C)

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Supply Voltage	First stage only	V_{CC}	0		10	V
Attenuation	@ 800 MHz, 50 Ω Environment		52	95		dB
Attenuation	@ 1.9 GHz, 50 Ω Environment		52	70		dB
B2B Diode Breakdown Voltage	IR = 1.0 mA, Pin to PGND, AGND to PGND	B2B BV	± 12			V
Standoff Voltage		VRM		10		V
Leakage Current	V = VRM, for each stage	IRM			500	nA
Power Dissipation					100	mW
NMF3000FCT1G DC Series Resistance	Input to output on first stage	RI/O	997	1050	1103	Ω
NMF3010FCT1G DC Series Resistance	Input to output on second stage	RI/O	950	1000	1050	Ω
Input Capacitance per Line	f = 1.0 MHz, for each stage when capacitor has 2.0 V across its terminals.	C_{LINE}	900	1000	1100	pF
Bias Resistance per Line	First Stage Only	R_{BIAS1}	950	1000	1050	Ω
Crosstalk	50 Ω Source and Load	CT	−25			dB
Noise	Idle−channel or Self−noise of the Network				6.0	nV/√Hz
Distortion	Anywhere in the Bandwidth 20 Hz to 20 kHz				0.01	%

1. Specifications apply to devices as a pair, as shown in the system diagram, unless otherwise noted as ‘for each stage’.

ESD CHARACTERISTICS

Pin	Level	Type	Min	Units
NMF3000FCT1G: A2, C2, A3, C3 to PGND NMF3010FCT1G: B2, B3, A3 to PGND	4+ IEC 61000−4−2	Contact	15	kV
NMF3000FCT1G: A2, C2, A3, C3 to PGND NMF3010FCT1G: B2, B3, A3 to PGND	4 IEC 61000−4−2	Air	15	kV
NMF3000FCT1G: All Pins Pairwise NMF3010FCT1G: All Pins Pairwise	1 IEC 61000−4−2	Contact	2.0	kV
NMF3000FCT1G: All Pins Pairwise NMF3010FCT1G: All Pins Pairwise	1 IEC 61000−4−2	Air	2.0	kV

COMPONENT MATCHING

Component	Description	Max	Unit
Resistors	Amount of Relative Variation between Symmetrical Resistors / Capacitors on the same Device	2.0	%
Capacitors		2.0	%

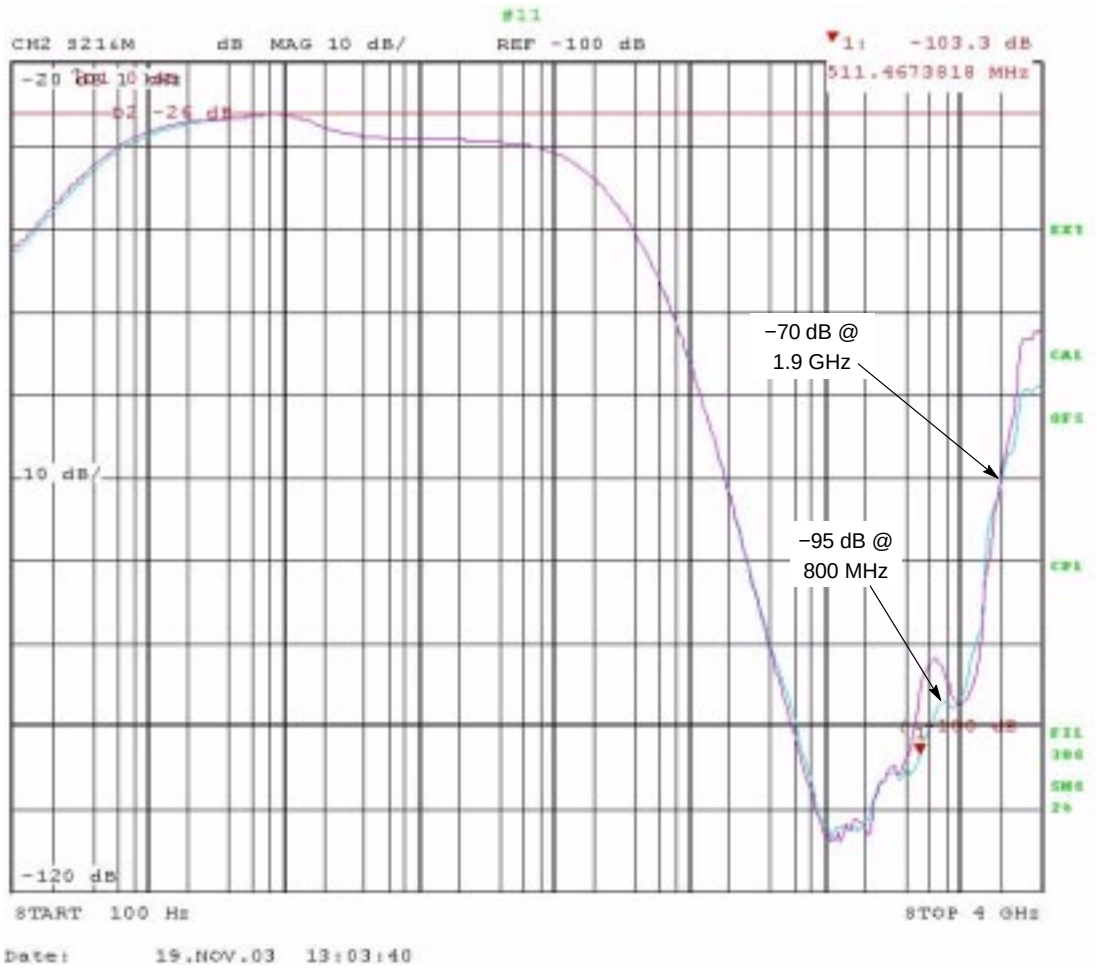
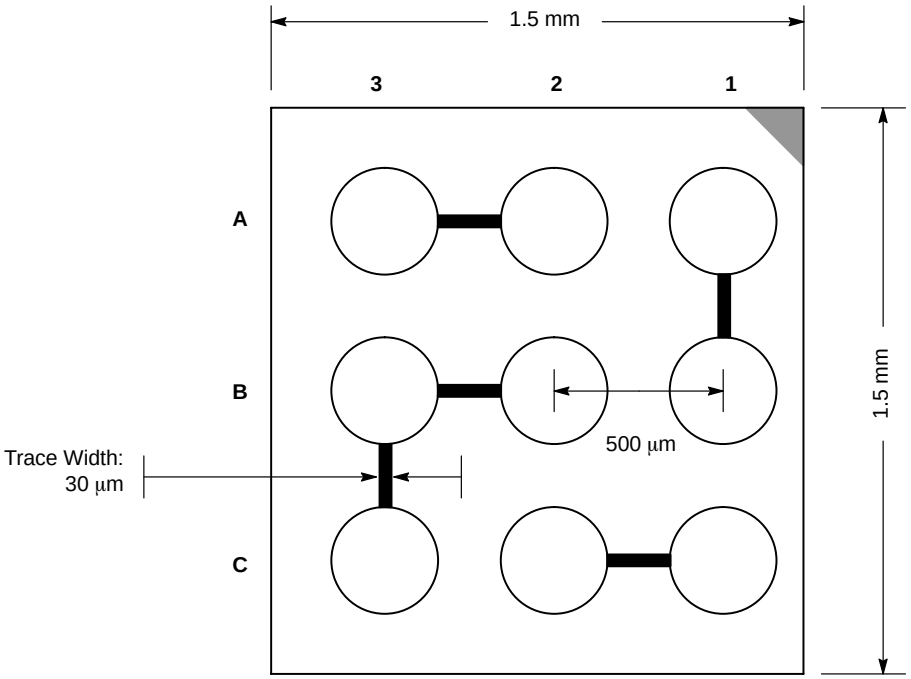


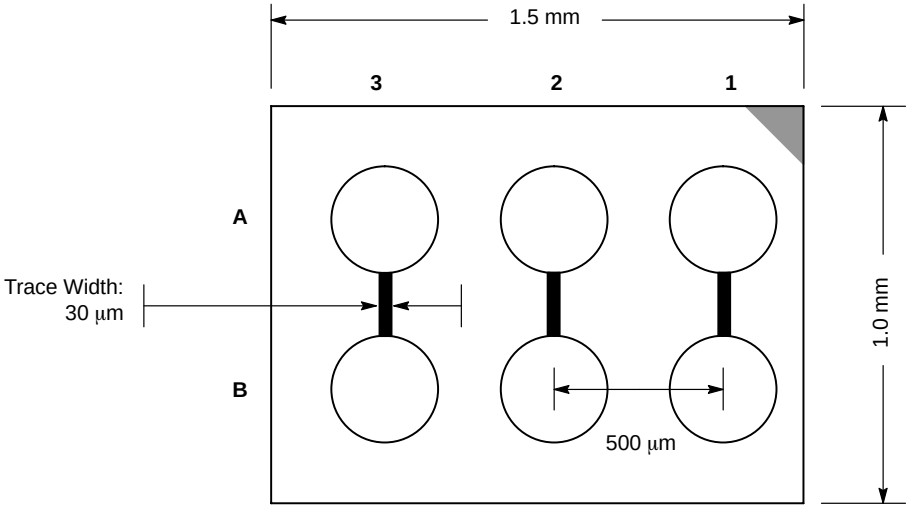
Figure 6. Typical S21 of NMF3000FCT1G & NMF3010FCT1G in a 50 Ω Environment
2 Lines = Positive and Negative Sides

DAISY CHAIN SPECIFICATIONS



Bottom View
Bumps Up

Figure 7. First Stage: NMF3000FCT1G



Bottom View
Bumps Up

Figure 8. Second Stage: NMF3010FCT1G

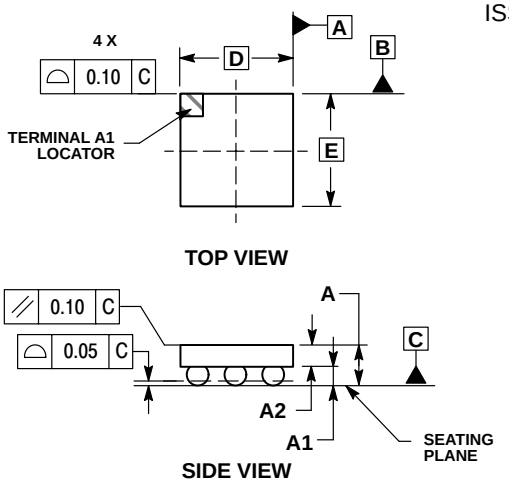
DEVICE ORDERING INFORMATION

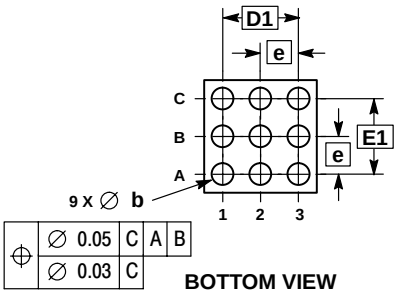
Device Order Number	Package Type	Shipping†
NMF3000FCT1G	9−Bump Flip−Chip	3000 / Tape and Reel
NMF3010FCT1G	6−Bump Flip−Chip	3000 / Tape and Reel
ENGTDDSY3x3FCT1G	9−Bump Flip−Chip	500 / Tape and Reel
ENGTDDSY2x3FCT1G	6−Bump Flip−Chip	500 / Tape and Reel

†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.

PACKAGE DIMENSIONS

FLIP−CHIP−9
CASE 499AE
ISSUE A

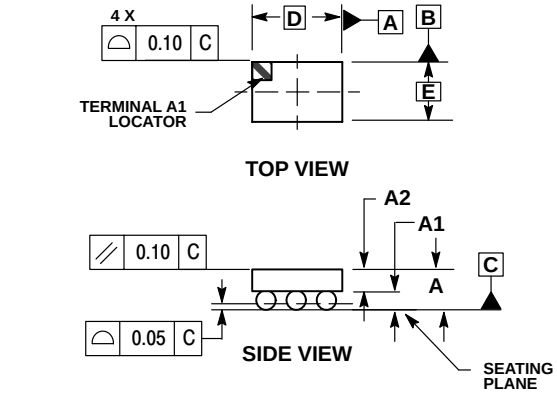


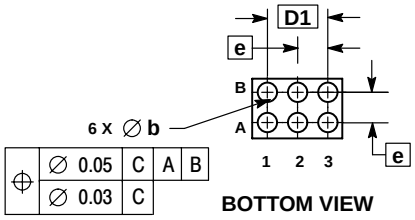


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

	MILLIMETERS	
DIM	MIN	MAX
A	− − −	0.700
A1	0.210	0.270
A2	0.380	0.430
D	1.489 BSC	
E	1.489 BSC	
b	0.290	0.340
e	0.500 BSC	
D1	1.000 BSC	
E1	1.000 BSC	

FLIP−CHIP−6
CASE 499AF
ISSUE A





NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
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	MILLIMETERS	
DIM	MIN	MAX
A	−−−	0.700
A1	0.210	0.270
A2	0.380	0.430
D	1.489 BSC	
E	0.989 BSC	
b	0.290	0.340
e	0.500 BSC	
D1	1.000 BSC	

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

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

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.

NMF3000/D