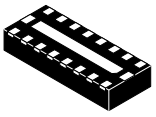
CM1407

4 and 8-Channel EMI Filter Arrays with ESD Protection

ON Semiconductor®

http://onsemi.com

WDFN8
DF/DE SUFFIX
CASE 511BE



WDFN16
DF/DE SUFFIX
CASE 511AU

Product Description

ON Semiconductor CM1407 is an EMI filter array with ESD protection, which integrates either four or eight pi filters (C−R−C). The CM1407 has component values of 7.5 pF − 200 Ω − 7.5 pF (f_C = 210 MHz). The parts include ESD protection diodes on every pin, providing a very high level of protection for sensitive electronic components that may be subjected to electrostatic discharge (ESD). The ESD diodes connected to the filter ports safely dissipate ESD strikes of ±15 kV contact discharge, twice the specification requirement of the IEC 61000−4−2, Level 4 international standard. Using the MIL−STD−883 (Method 3015) specification for Human Body Model (HBM) ESD, the pins are protected for contact discharges at greater than ±30 kV.

This device is particularly well−suited for portable electronics (e.g. mobile handsets, PDAs, notebook computers) because of its small package and easy−to−use pin assignments. In particular, the CM1407 is ideal for EMI filtering and protecting data lines from ESD in wireless handsets.

The CM1407 is available in space−saving, low−profile, 8 and 16−lead WDFN packages. It is fabricated with ON Semiconductor's *Centurion*™ process and available with optional lead−free finishing.

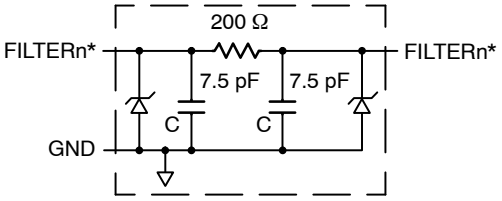
Features

- Four and Eight Channels of EMI Filtering with ESD Protection
- Greater than 25 dB of Attenuation from 800 Mhz to 3 GHz
- ±15 kV ESD Protection (IEC 61000−4−2, Contact Discharge)
- ±30 kV ESD Protection (MIL−STD−883, Method 3015, HBM)
- Fabricated with *Centurion*™ Advanced Low Capacitance Zener Process Technology
- Space Saving, Low Profile 8 and 16−lead 0.5 mm Pitch WDFN Packages
- These Devices are Pb−Free and are RoHS Compliant

Applications

- I/O Port Protection for Mobile Handsets, Notebook Computers, PDAs etc.
- EMI Filtering for Data Ports in Cell Phones, PDAs or Notebook Computers
- EMI Filtering for LCD, Camera and Chip−to−Chip Data Lines

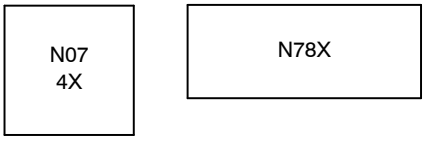
BLOCK DIAGRAM



1 of 4/8 EMI Filtering + ESD Channels

*See Package/Pinout Diagrams for Expanded Pin Information.

MARKING DIAGRAM



N07 4X = Specific Device Code
N78X = Specific Device Code

ORDERING INFORMATION

Device	Package	Shipping†
CM1407−04DF	WDFN8 (Pb−Free)	3000/Tape & Reel
CM1407−08DF	WDFN16 (Pb−Free)	3000/Tape & Reel
CM1407−04DE	WDFN8 (Pb−Free)	3000/Tape & Reel
CM1407−08DE	WDFN16 (Pb−Free)	3000/Tape & Reel

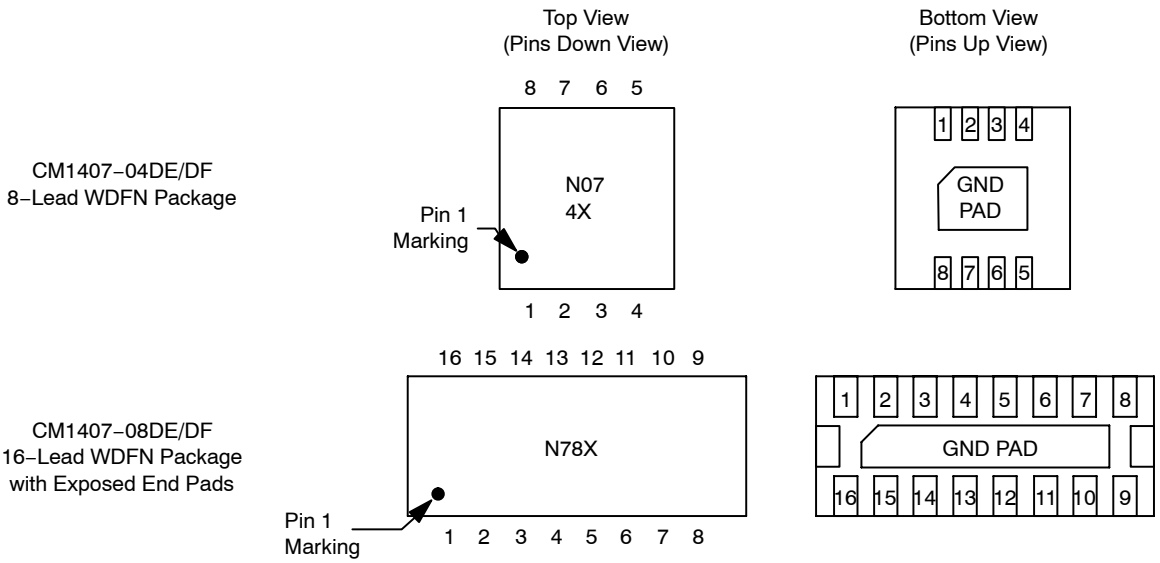
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

© Semiconductor Components Industries, LLC, 2011

March, 2011 − Rev. 3

Publication Order Number:
CM1407/D

PACKAGE / PINOUT DIAGRAMS



Note: See Ordering Information section for device specific marking.

Table 1. PIN DESCRIPTIONS

Pins		Name	Description	Pins		Name	Description
1406−04Dx	1406−08Dx			1406−04Dx	1406−08Dx		
1	1	FILTER1	Filter Channel 1	8	16	FILTER1	Filter Channel 1
2	2	FILTER2	Filter Channel 2	7	15	FILTER2	Filter Channel 2
3	3	FILTER3	Filter Channel 3	6	14	FILTER3	Filter Channel 3
4	4	FILTER4	Filter Channel 4	5	13	FILTER4	Filter Channel 4
	5	FILTER5	Filter Channel 5		12	FILTER5	Filter Channel 5
	6	FILTER6	Filter Channel 6		11	FILTER6	Filter Channel 6
	7	FILTER7	Filter Channel 7		10	FILTER7	Filter Channel 7
	8	FILTER8	Filter Channel 8		9	FILTER8	Filter Channel 8
GND Pad		GND	Device Ground				

SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Storage Temperature Range	−65 to +150	°C
DC Power per Resistor	100	mW
Package DC Power Rating	300	mW

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.

Table 3. STANDARD OPERATING CONDITIONS

Parameter	Rating	Units
Operating Temperature Range	−40 to +85	°C

Table 4. ELECTRICAL OPERATING CHARACTERISTICS (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
R	Resistance		160	200	240	Ω
C	Capacitance	At 2.5 V DC, 1 MHz, 30 mV AC	6	7.5	9	pF
V_{DIODE}	Diode Standoff Voltage	I_{DIODE} = 10 μA		6.0		V
I_{LEAK}	Diode Leakage Current (Reverse Bias)	V_{DIODE} = 3.3 V		0.1	1	μA
V_{SIG}	Signal Voltage Positive Clamp Negative Clamp	 I_{LOAD} = 10 mA I_{LOAD} = −10 mA	 5.6 −1.5	 6.8 −0.8	 9.0 −0.4	V
V_{ESD}	In−system ESD Withstand Voltage a) Human Body Model, MIL−STD−883, Method 3015 b) Contact Discharge per IEC 61000−4−2 Level 4	(Note 2)	 30 15			kV

1. T_A = 25°C unless otherwise specified.
2. ESD applied to input and output pins with respect to GND, one at a time.

PERFORMANCE INFORMATION

Typical Filter Performance (nominal conditions unless specified otherwise, 0 V DC Bias, 50 Ω Environment)

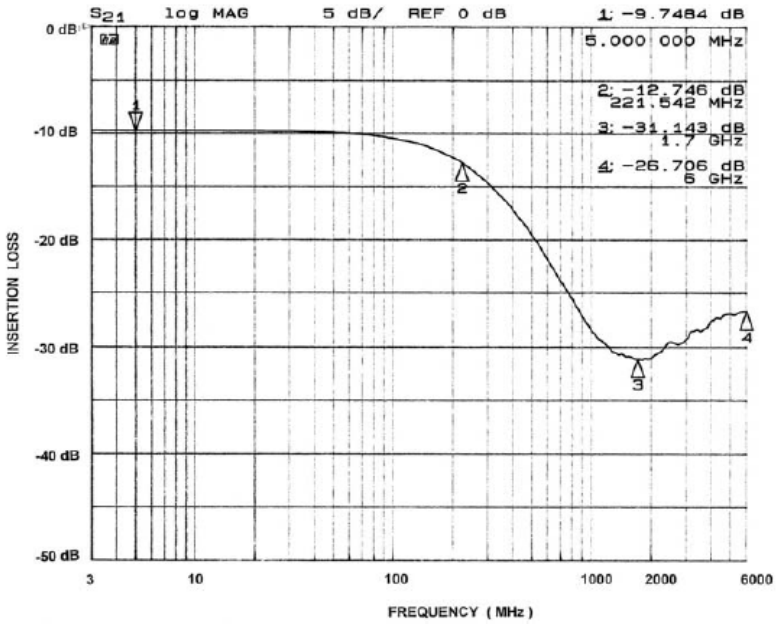


Figure 1. Channel 1 EMI Filter Performance (CM1407−04)

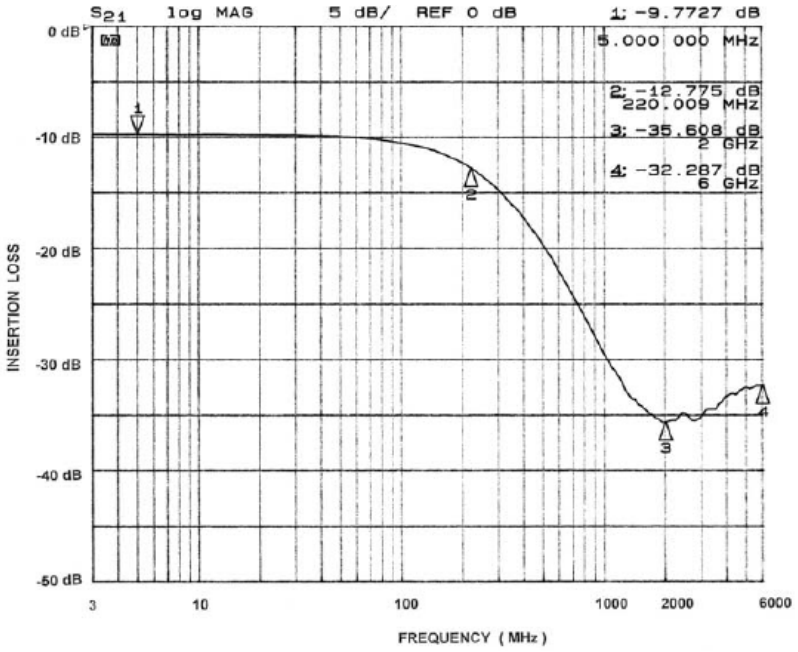


Figure 2. Channel 2 EMI Filter Performance (CM1407−04)

PERFORMANCE INFORMATION (Cont'd)

Typical Filter Performance (nominal conditions unless specified otherwise, 0 V DC Bias, 50 Ω Environment)

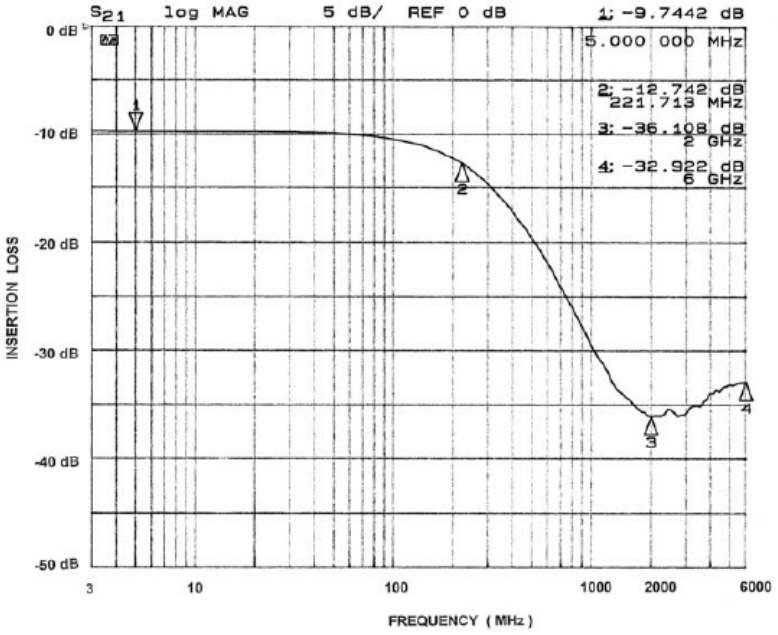


Figure 3. Channel 3 EMI Filter Performance (CM1407−04)

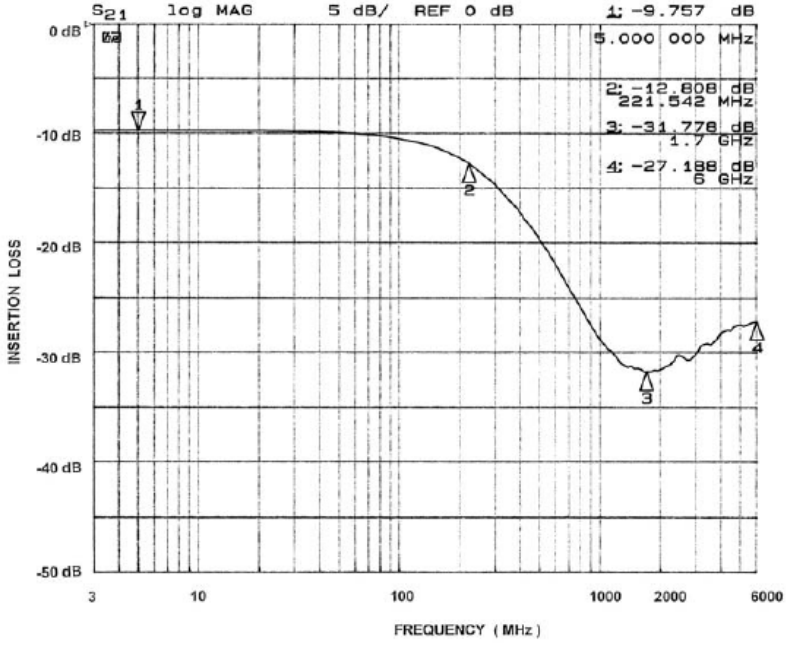


Figure 4. Channel 4 EMI Filter Performance (CM1407−04)

PERFORMANCE INFORMATION (Cont'd)

Typical Filter Performance (nominal conditions unless specified otherwise, 0 V DC Bias, 50 Ω Environment)

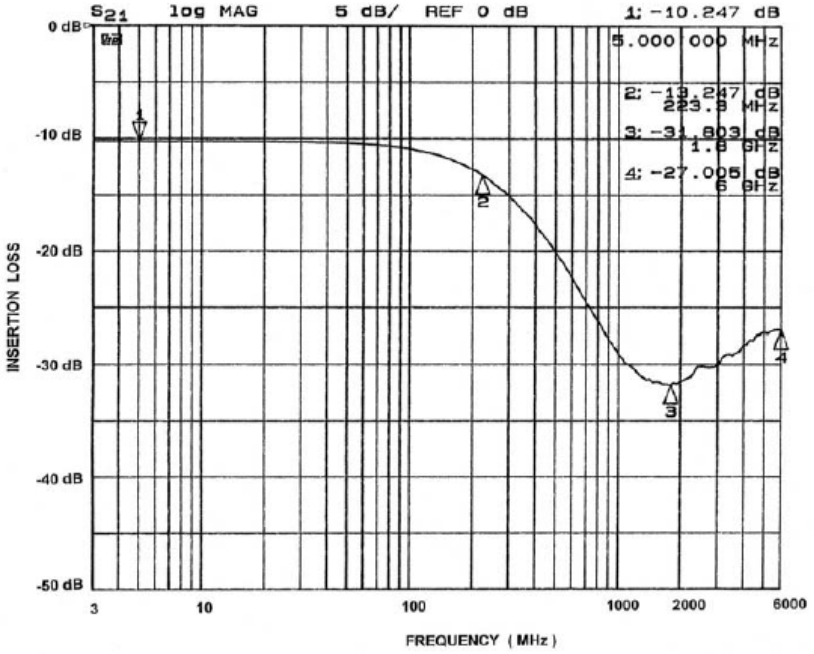


Figure 5. Channel 1 EMI Filter Performance (CM1407−08)

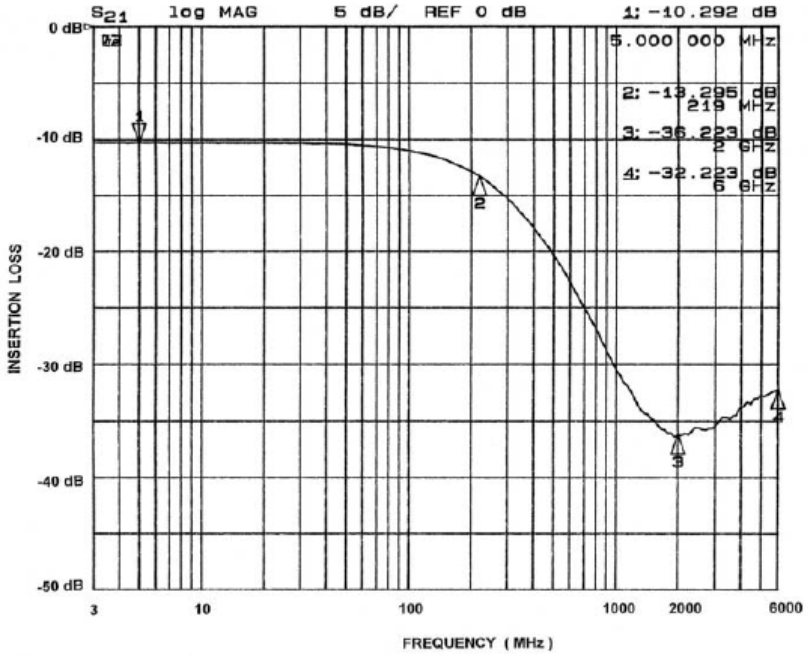


Figure 6. Channel 2 EMI Filter Performance (CM1407−08)

PERFORMANCE INFORMATION (Cont'd)

Typical Filter Performance (nominal conditions unless specified otherwise, 0 V DC Bias, 50 Ω Environment)

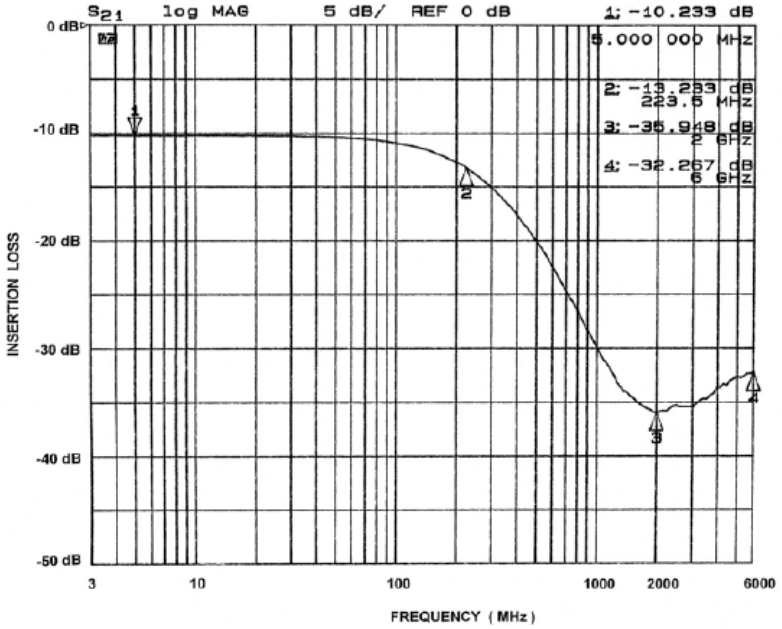


Figure 7. Channel 3 EMI Filter Performance (CM1407−08)

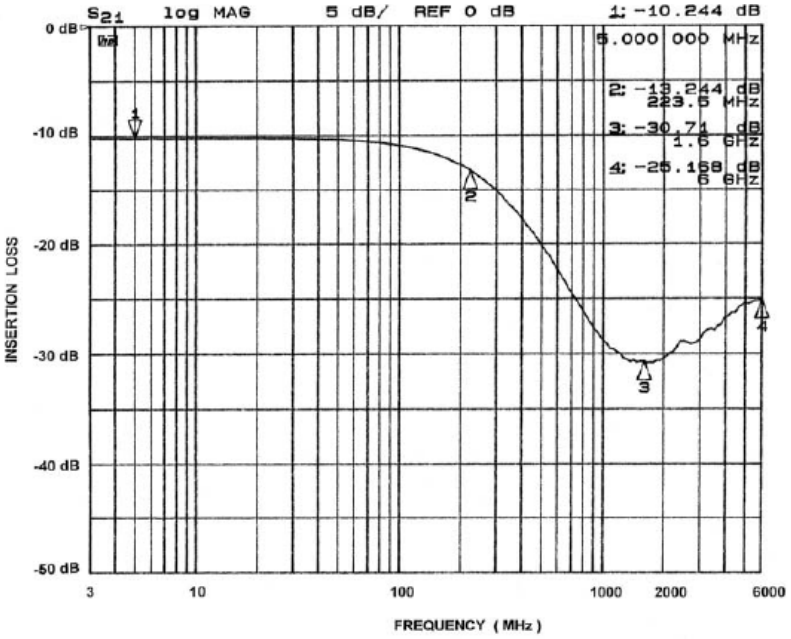


Figure 8. Channel 4 EMI Filter Performance (CM1407−08)

PERFORMANCE INFORMATION (Cont'd)

Typical Filter Performance (nominal conditions unless specified otherwise, 0 V DC Bias, 50 Ω Environment)

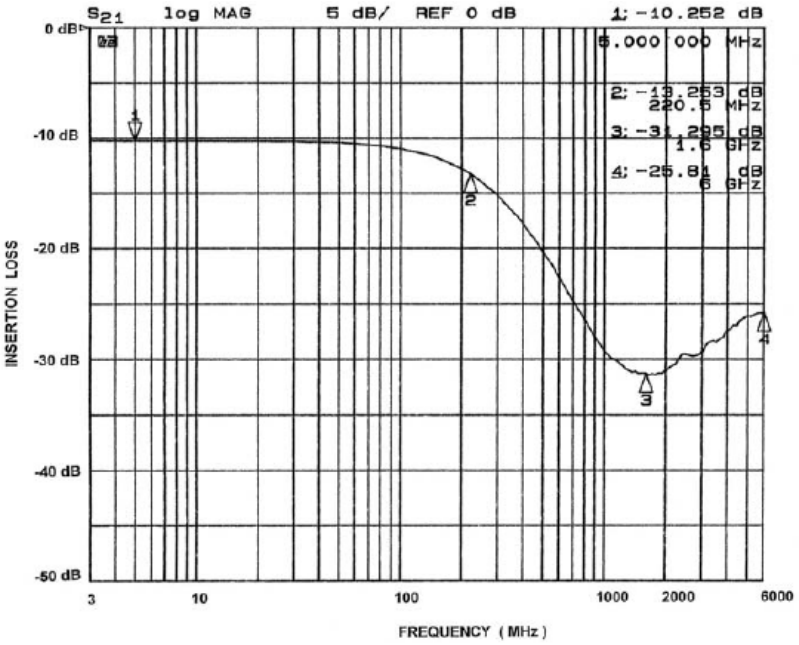


Figure 9. Channel 5 EMI Filter Performance (CM1407−08)

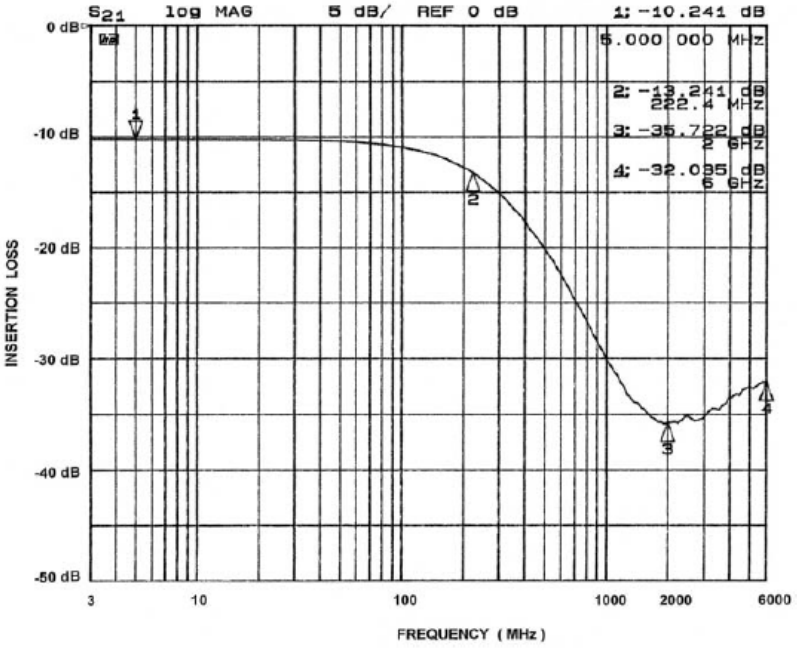


Figure 10. Channel 6 EMI Filter Performance (CM1407−08)

PERFORMANCE INFORMATION (Cont'd)

Typical Filter Performance (nominal conditions unless specified otherwise, 0 V DC Bias, 50 Ω Environment)

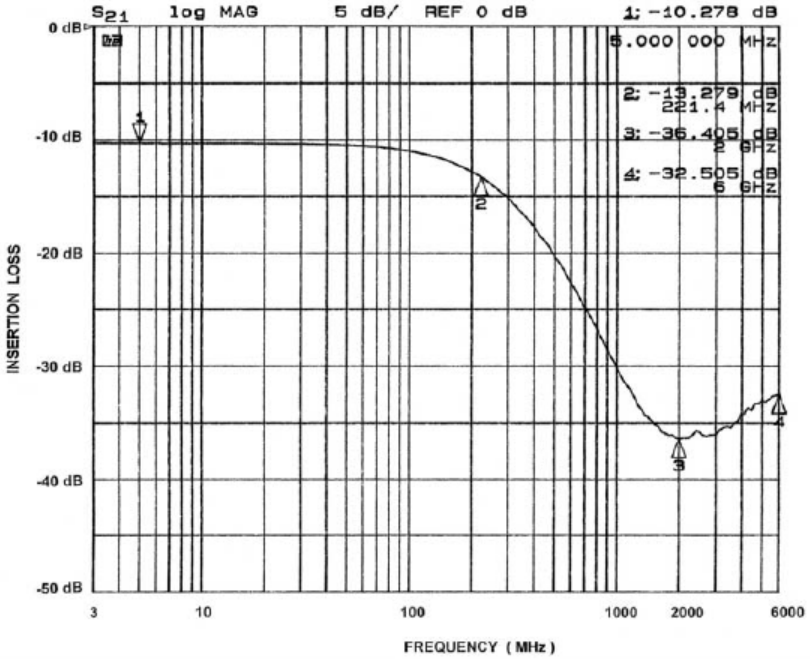


Figure 11. Channel 7 EMI Filter Performance (CM1407−08)

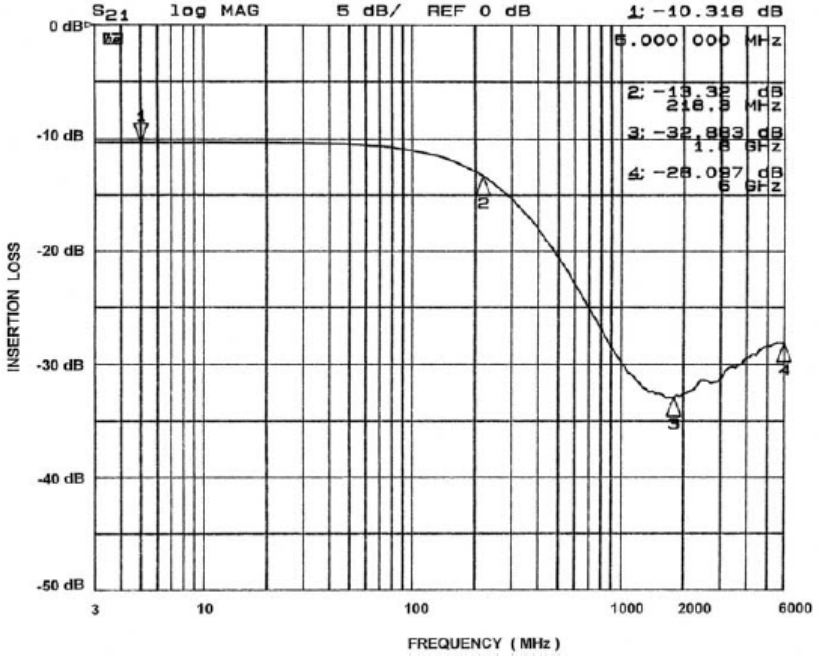


Figure 12. Channel 8 EMI Filter Performance (CM1407−08)

PERFORMANCE INFORMATION (Cont'd)

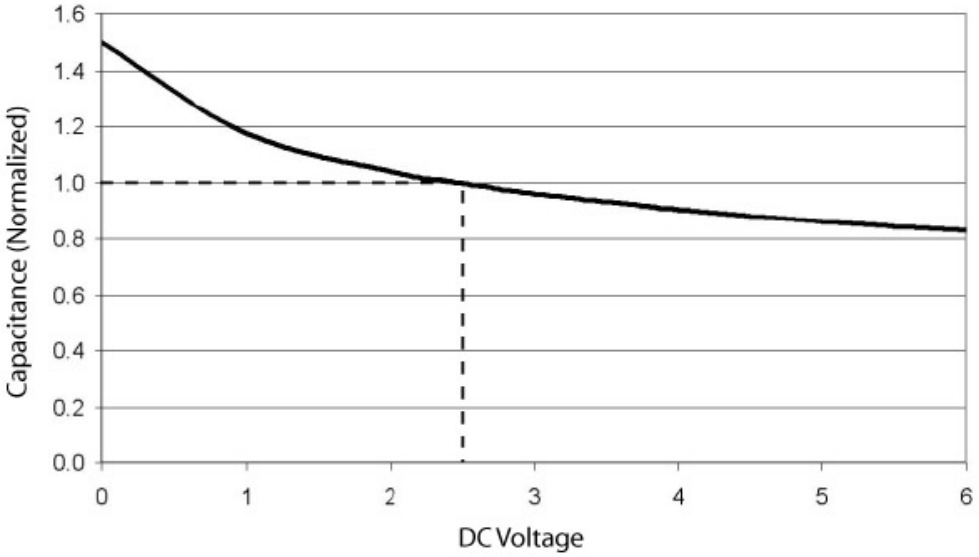
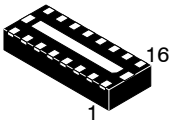


Figure 13. Filter Capacitance vs. Input Voltage over Temperature (normalized to capacitance at 2.5 V DC and 25°C)

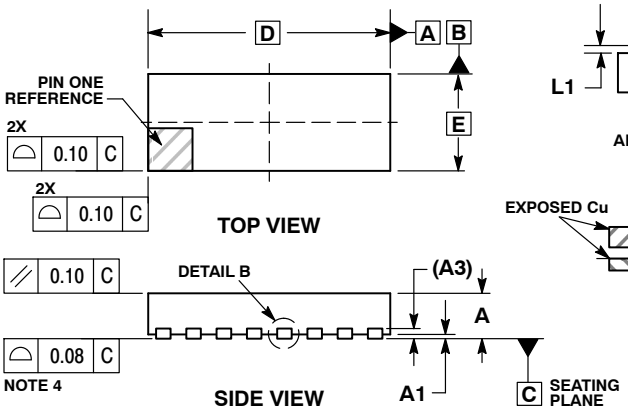
Centurion is a trademark of Semiconductor Components Industries, LLC (SCILLC).

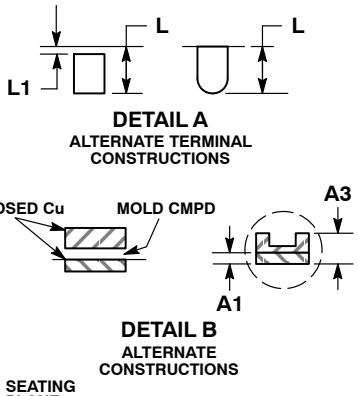
WDFN16, 4x1.6, 0.5P
CASE 511AU
ISSUE O

DATE 06 JUL 2010



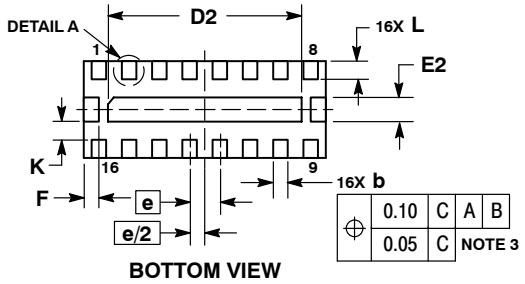
SCALE 4:1



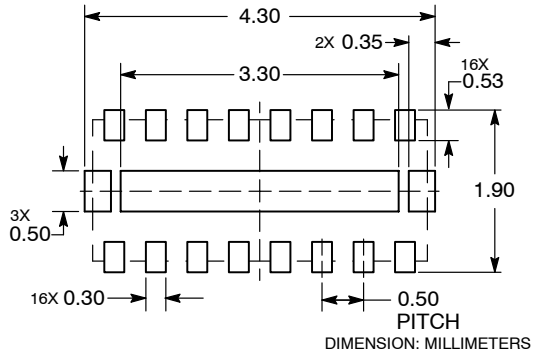


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.70	0.80
A1	0.00	0.05
A3	0.20 REF	
b	0.20	0.30
D	4.00 BSC	
D2	3.10	3.30
E	1.60 BSC	
E2	0.30	0.50
e	0.50 BSC	
F	0.25 REF	
K	0.30 REF	
L	0.20	0.40
L1	---	0.15



RECOMMENDED SOLDERING FOOTPRINT*



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

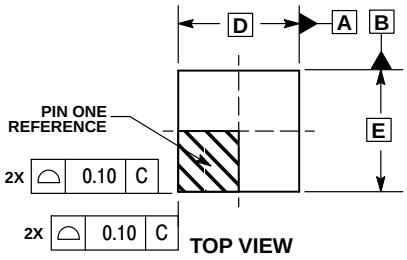
DOCUMENT NUMBER:	98AON48925E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
DESCRIPTION:	WDFN16, 4X1.6, 0.5P	PAGE 1 OF 1

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.

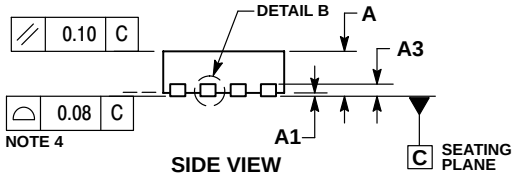
WDFN8 2x2, 0.5P
CASE 511BE
ISSUE A

DATE 27 MAY 2011

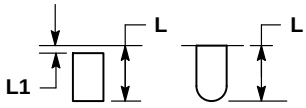
SCALE 2:1



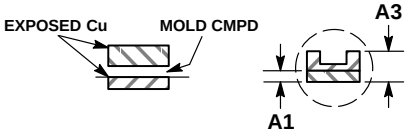
TOP VIEW



SIDE VIEW



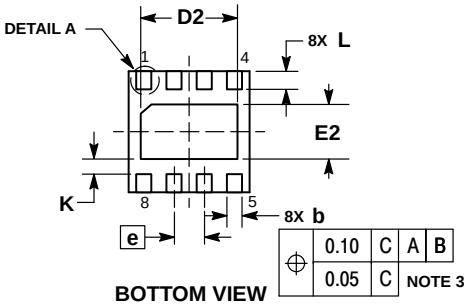
DETAIL A
ALTERNATE CONSTRUCTIONS



DETAIL B
ALTERNATE CONSTRUCTIONS

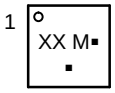
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.70	0.80
A1	0.00	0.05
A3	0.20 REF	
b	0.20	0.30
D	2.00 BSC	
D2	1.50	1.70
E	2.00 BSC	
E2	0.80	1.00
e	0.50 BSC	
K	0.25 REF	
L	0.20	0.40
L1	–––	0.15



BOTTOM VIEW

GENERIC MARKING DIAGRAM*

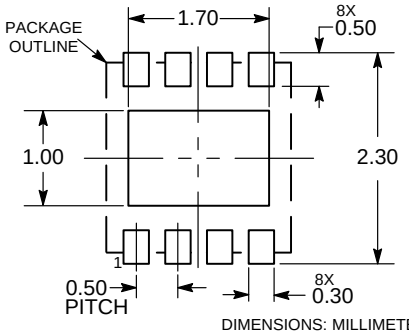


XX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(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.

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

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

DOCUMENT NUMBER:	**98AON48936E**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**WDFN8, 2X2, 0.5P**	**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. **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
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at
www.onsemi.com/support/sales