

# CM1425

## 4-Channel EMI Filter Array with ESD Protection

### Product Description

The CM1425 is an EMI filter array with ESD protection, which integrates 4 pi filters (C-R-C). The CM1425 has component values of 20 pF – 100 Ω – 20 pF. The parts include ESD protection diodes on every pin, which provide 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, well beyond the maximum requirement of the IEC 61000-4-2 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 CM1425 is ideal for EMI filtering and protecting data lines from ESD in wireless handsets.

All CM1425 devices are optionally available with *OptiGuard™* coating which results in improved reliability at assembly. These devices are also available with standard lead-free finishing. The CM1425 is housed in a space-saving, low-profile, chip-scale package and is fabricated with the Centurion™ processes.

### Features

- Four Channels of EMI Filtering with ESD Protection
- Pin Compatible with the CSPRC032A
- Greater than 30 dB Attenuation Over the 800 MHz to 3 GHz Frequency Range
- ±15 kV ESD Protection (IEC 61000-4-2, Contact Discharge)
- ±30 kV ESD Protection (HBM)
- 9-Bump, 2.470 mm x 0.970 mm Footprint Chip Scale Package (CSP)
- Available with *OptiGuard™* Coating for Improved Reliability
- These Devices are Pb-Free and are RoHS Compliant

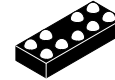
### Applications

- Filtering for Antenna and Keypad Data Lines
- 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 and Chip-to-Chip Data Lines in Mobile Electronic Devices that Use Flexible PCB Interconnections



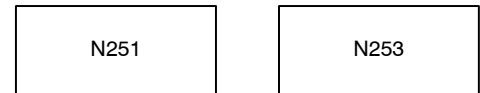
ON Semiconductor®

<http://onsemi.com>



WLCSP9  
CP SUFFIX  
CASE 567BF

### MARKING DIAGRAM



CM1425-01  
9-Bump CSP Package

CM1425-03  
9-Bump CSP Package

N251 = CM1425-01CP  
N253 = CM1425-03CP

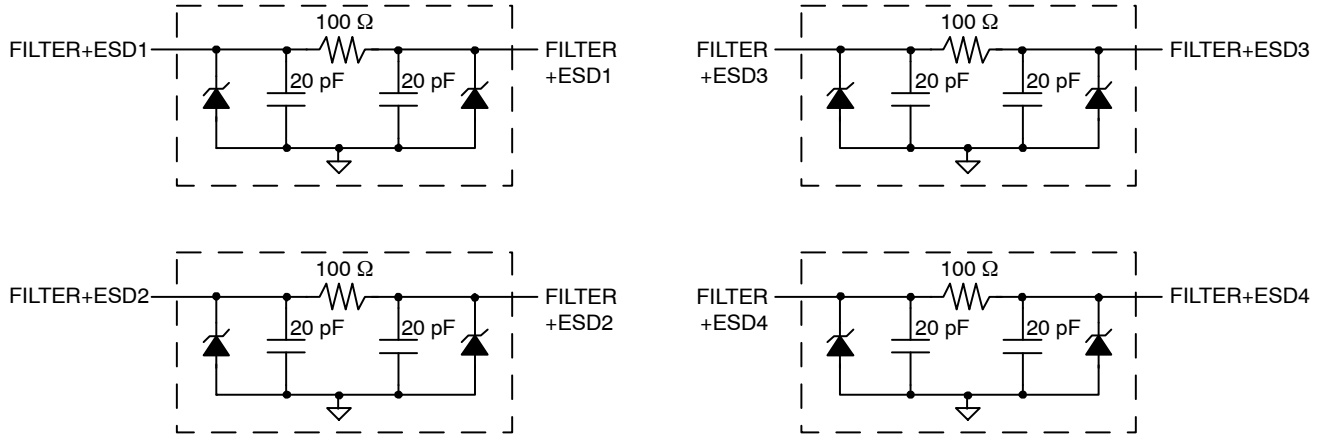
### ORDERING INFORMATION

Device	Package	Shipping†
CM1425-01CP	CSP-9 (Pb-Free)	3500/Tape & Reel
CM1425-03CP	CSP-9 (Pb-Free)	3500/Tape & Reel

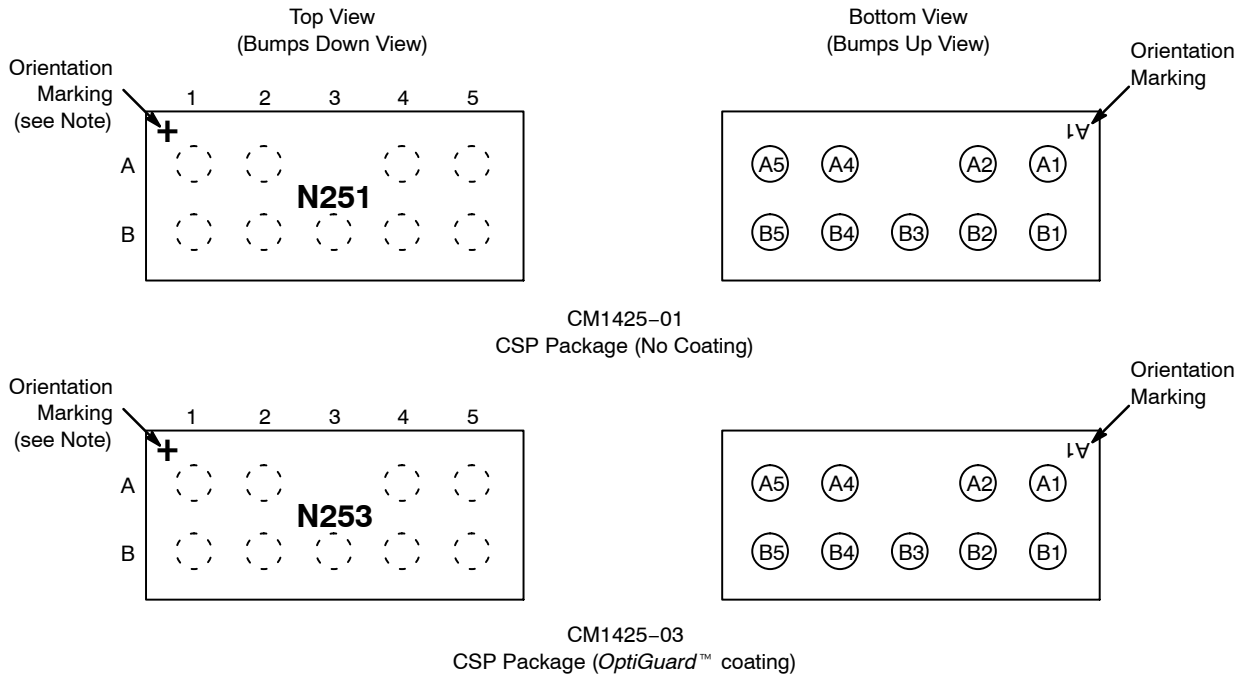
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

# CM1425

## BLOCK DIAGRAM



## PACKAGE / PINOUT DIAGRAMS



Note: Lead-free devices are specified by using a "+" character for the top side orientation mark.

**Table 1. PIN DESCRIPTIONS**

Pins	Name	Description	Pins	Name	Description
A1	FILTER+ESD1	Filter Channel 1	B1	FILTER+ESD1	Filter Channel 1
A2	FILTER+ESD2	Filter Channel 2	B2	FILTER+ESD2	Filter Channel 2
A4	FILTER+ESD3	Filter Channel 3	B4	FILTER+ESD3	Filter Channel 3
A5	FILTER+ESD4	Filter Channel 4	B5	FILTER+ESD4	Filter Channel 4
B3	GND	Device Ground			

# CM1425

## SPECIFICATIONS

**Table 2. ABSOLUTE MAXIMUM RATINGS**

Parameter	Rating	Units
Storage Temperature Range	-65 to +150	°C
DC Power per Resistor	100	mW
DC Package 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		80	100	120	Ω
C	Capacitance	At 2.5 V DC, 1 MHz, 30 mV AC	16	20	24	pF
V <sub>DIODE</sub>	Diode Standoff Voltage	I <sub>DIODE</sub> = 10 μA		6.0		V
I <sub>LEAK</sub>	Diode Leakage Current (reverse bias)	V <sub>DIODE</sub> = +3.3 V		100	300	nA
V <sub>SIG</sub>	Signal Clamp Voltage Positive Clamp Negative Clamp	I <sub>LOAD</sub> = 10 mA I <sub>LOAD</sub> = -10 mA	5.6 -1.5	6.8 -0.8	9.0 -0.4	V
V <sub>ESD</sub>	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
R <sub>DYN</sub>	Dynamic Resistance Positive Negative			1.5 0.9		Ω
f <sub>C</sub>	Cut-off Frequency Z <sub>SOURCE</sub> = 50 Ω, Z <sub>LOAD</sub> = 50 Ω	R = 100 Ω, C = 20 pF		86		MHz

1. T<sub>A</sub> = 25°C unless otherwise specified.
2. ESD applied to input and output pins with respect to GND, one at a time.

# CM1425

## PERFORMANCE INFORMATION

Typical Filter Performance (nominal conditions unless specified otherwise, 50 Ω Environment)

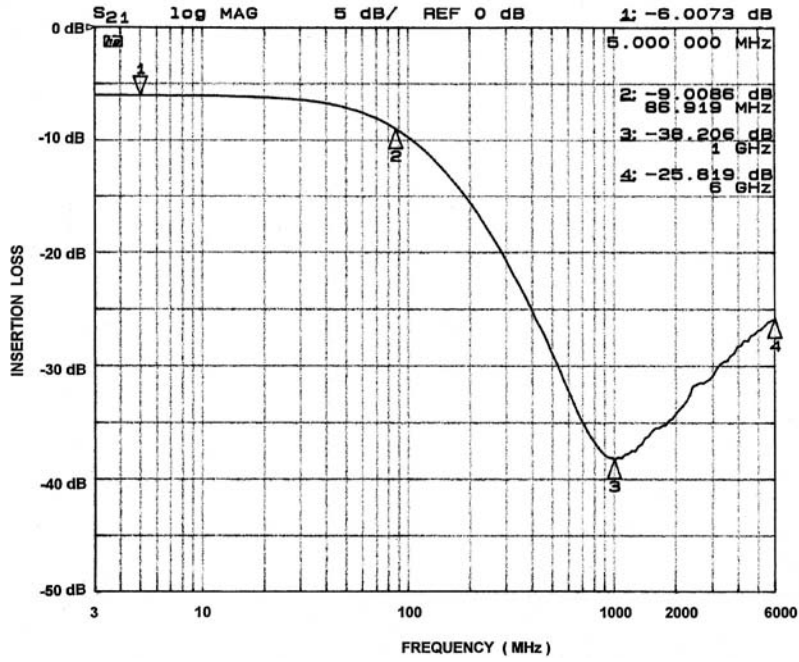


Figure 1. CM1425 Filter Typical Measured Frequency Response

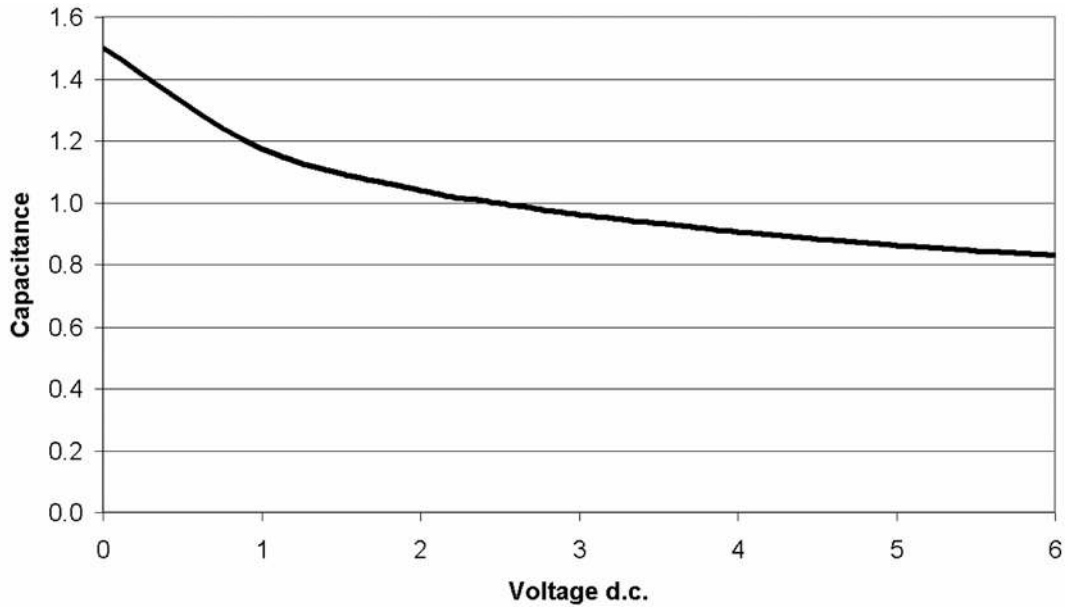


Figure 2. Filter Capacitance vs. Input Voltage over Temperature (normalized to capacitance at 2.5 VDC and 25°C)

APPLICATION INFORMATION

Table 5. PRINTED CIRCUIT BOARD RECOMMENDATIONS

Parameter	Value
Pad Size on PCB	0.240 mm
Pad Shape	Round
Pad Definition	Non-Solder Mask defined pads
Solder Mask Opening	0.290 mm Round
Solder Stencil Thickness	0.125 – 0.150 mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.300 mm Round
Solder Flux Ratio	50/50 by volume
Solder Paste Type	No Clean
Pad Protective Finish	OSP (Entek Cu Plus 106A)
Tolerance – Edge To Corner Ball	±50 μm
Solder Ball Side Coplanarity	±20 μm
Maximum Dwell Time Above Liquidous	60 seconds
Maximum Soldering Temperature for Lead-free Devices using a Lead-free Solder Paste	260°C

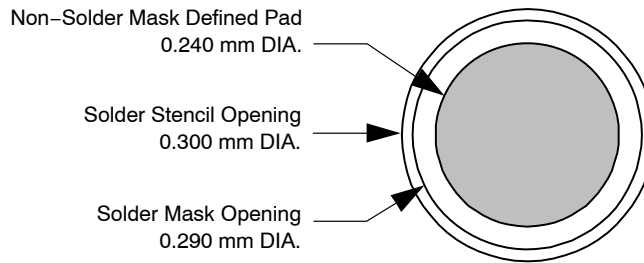


Figure 3. Recommended Non-Solder Mask Defined Pad Illustration

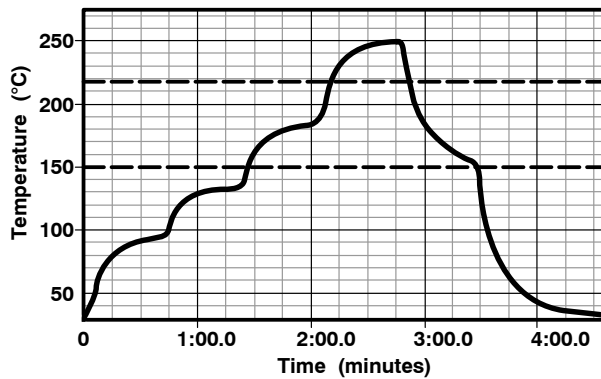


Figure 4. Lead-free (SnAgCu) Solder Ball Reflow Profile

# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

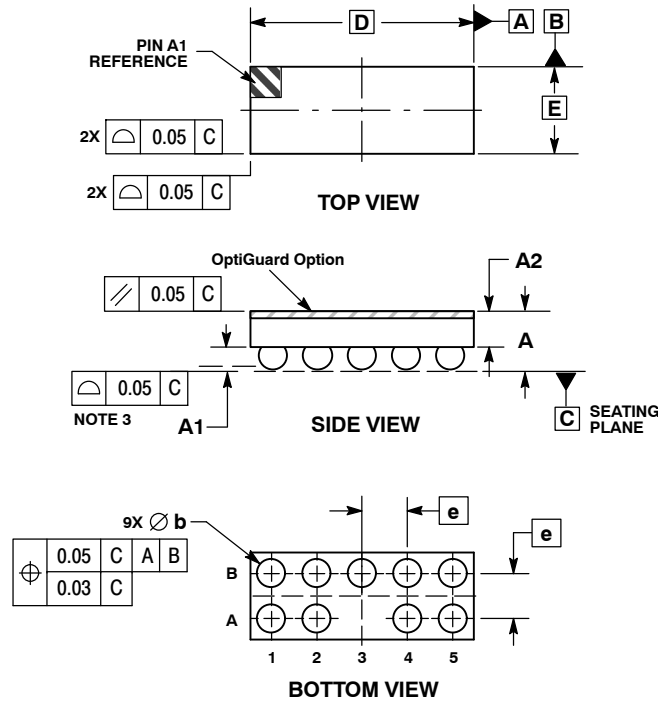
ON Semiconductor®



SCALE 4:1

WLCSP9, 2.47x0.97  
CASE 567BF-01  
ISSUE O

DATE 26 JUL 2010

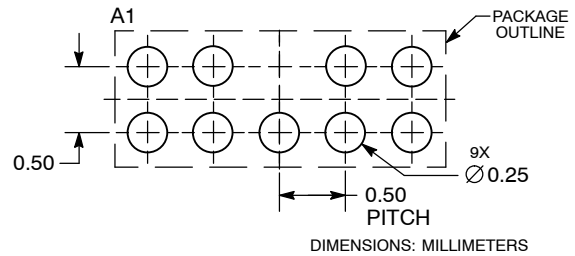


NOTES:

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	0.56	0.72
A1	0.21	0.27
A2	0.42 REF	
b	0.29	0.35
D	2.47 BSC	
E	0.97 BSC	
e	0.50 BSC	

**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.

<b>DOCUMENT NUMBER:</b>	98AON49815E	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>STATUS:</b>	ON SEMICONDUCTOR STANDARD	
<b>NEW STANDARD:</b>		
<b>DESCRIPTION:</b>	WLCSP9, 2.47X0.97	<b>PAGE 1 OF 2</b>



ISSUE	REVISION	DATE
O	RELEASED FOR PRODUCTION. REQ. BY D. TRUHITE.	26 JUL 2010

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.

**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)