CM1425

4-Channel EMI Filter Array with ESD Protection

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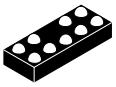
http://onsemi.com



WLCSP9
CP SUFFIX
CASE 567BF

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

MARKING DIAGRAM

N251	N253
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.

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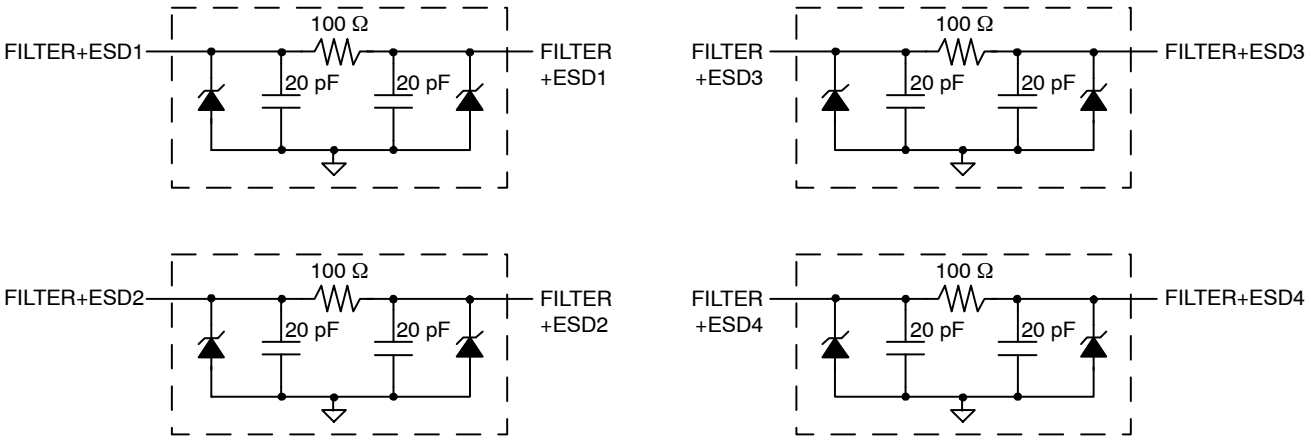
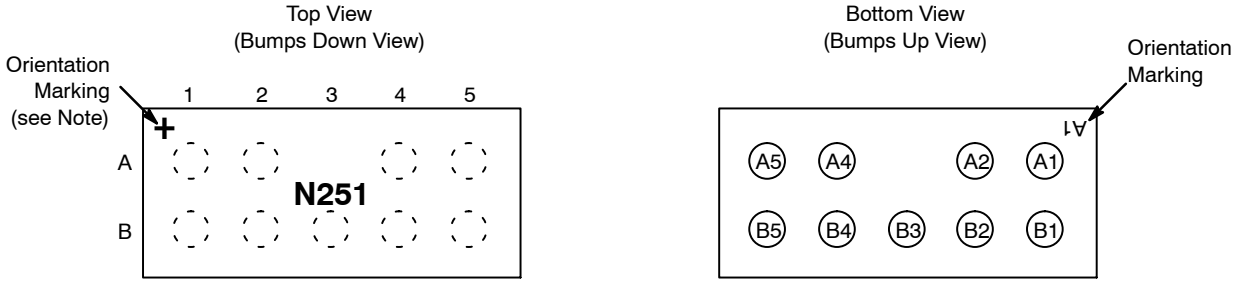
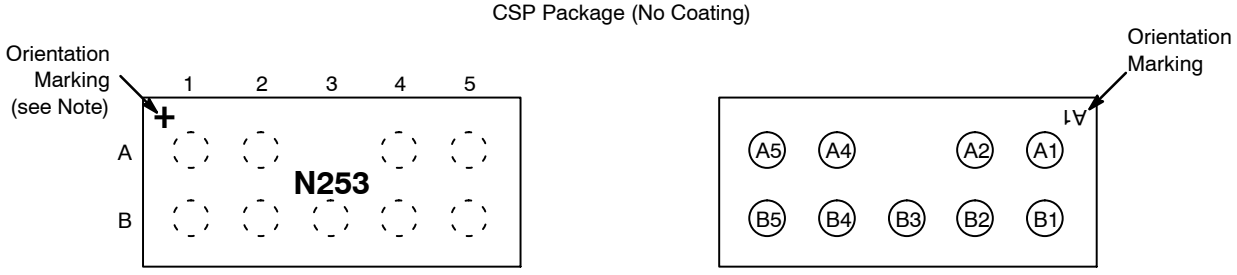
BLOCK DIAGRAM



PACKAGE / PINOUT DIAGRAMS



CM1425−01
CSP Package (No Coating)



CM1425−03
CSP Package (*OptiGuard*™ coating)

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				

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_{DIODE}	Diode Standoff Voltage	I_{DIODE} = 10 μA		6.0		V
I_{LEAK}	Diode Leakage Current (reverse bias)	V_{DIODE} = +3.3 V		100	300	nA
V_{SIG}	Signal Clamp 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
R_{DYN}	Dynamic Resistance Positive Negative			 1.5 0.9		Ω
f_C	Cut−off Frequency Z_{SOURCE} = 50 Ω, Z_{LOAD} = 50 Ω	R = 100 Ω, C = 20 pF		 86		MHz

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, 50 Ω Environment)

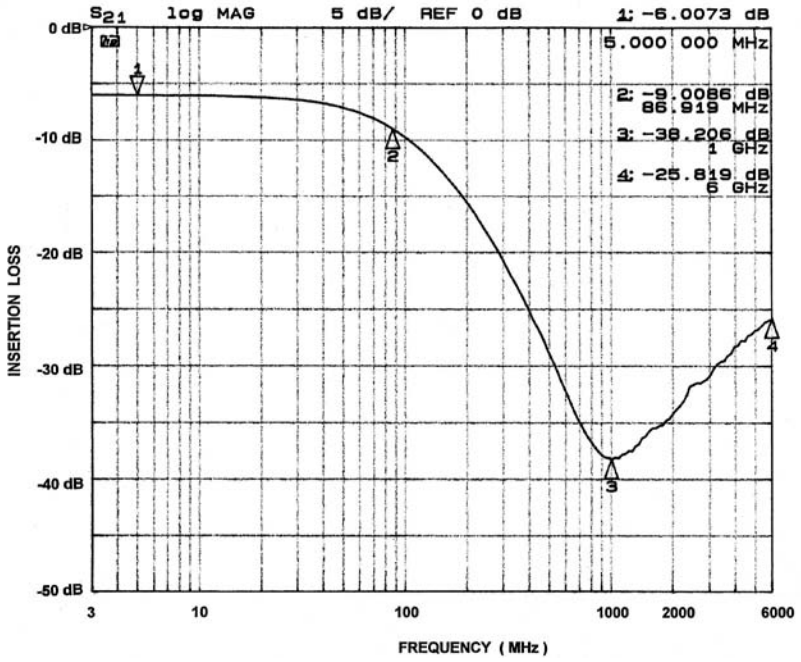


Figure 1. CM1425 Filter Typical Measured Frequency Response

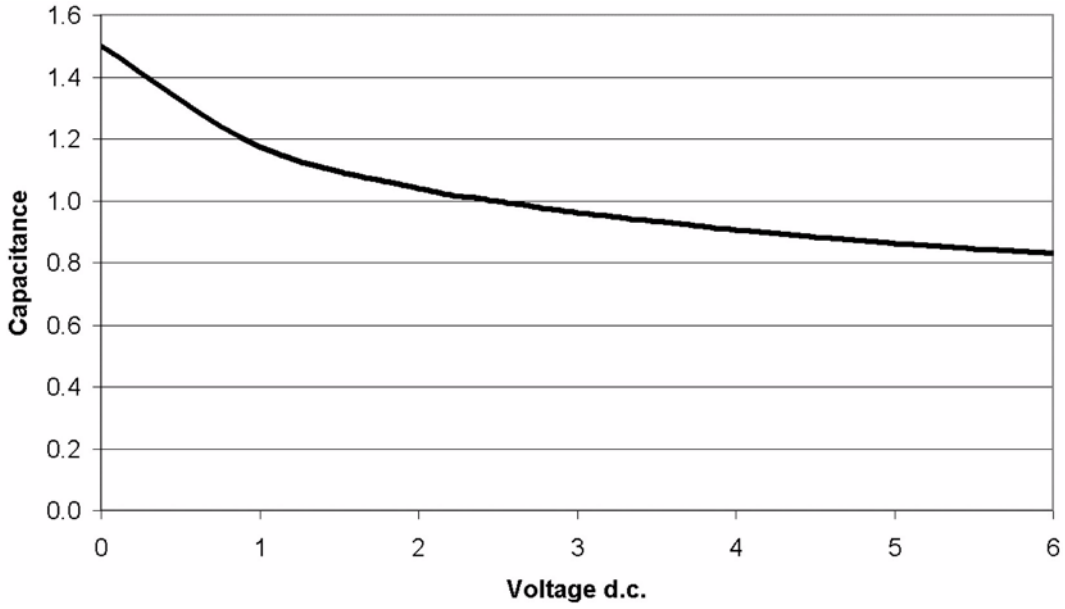


Figure 2. Filter Capacitance vs. Input Voltage over Temperature (normalized to capacitance at 2.5 VDC and 25°C)

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

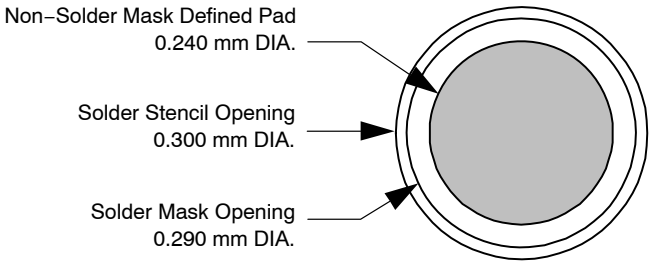


Figure 3. Recommended Non−Solder Mask Defined Pad Illustration

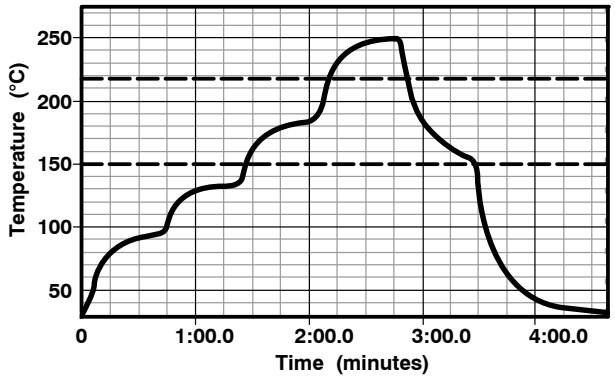


Figure 4. Lead−free (SnAgCu) Solder Ball Reflow Profile

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SCALE 4:1

WLCSP9, 2.47x0.97
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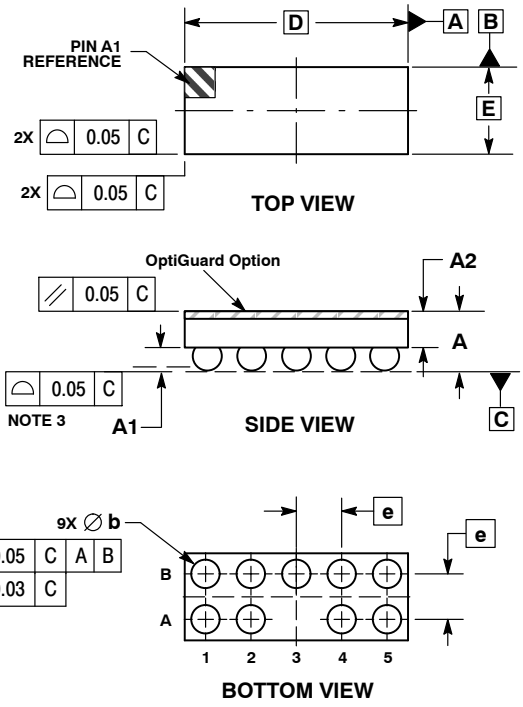
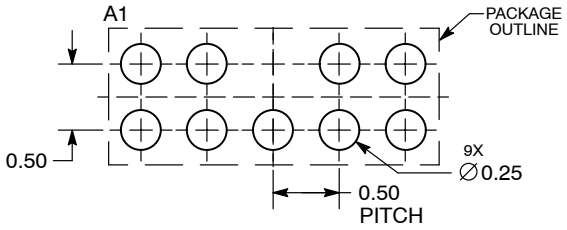


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.56	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*



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.

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