4-Channel ESD/EMI Filter Array Plus 4-Channel ESD Array for USB

Product Description

The CM1401–03 is a multichannel array with four low–pass filter + ESD channels and four ESD–only channels. The CM1401–03 reduces EMI/RFI emissions on a data port and protects against ESD on a USB port. Each EMI/RFI channel integrates a high quality pi–style filter (C–R–C) that provides greater than 30 dB attenuation in the 800–2700 MHz range relative to the pass band attenuation. These pi–style filters are bidirectional, controlling EMI both to and from a data port connector.

The CM1401–03 provides a high–level of ESD protection on all eight channels for sensitive electronic components that may be subjected to electrostatic discharge (ESD). The input pins safely dissipate ESD strikes of ± 15 kV, exceeding 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 device provides protection for contact discharges to greater than ± 30 kV.

The CM1401–03 is particularly well suited for portable electronics (e.g., cellular telephones, PDAs, notebook computers) because of its small package footprint and low weight.

The CM1401–03 incorporates *OptiGuard*[™] coating for improved reliability at assembly and comes in a space–saving, low–profile Chip Scale Package with RoHS–compliant lead–free finishing.

Features

- Functionally and Pin-Compatible with CSPEMI307A Device
- *OptiGuard*[™] Coated for Improved Reliability at Assembly
- Four Channels of Combined EMI/RFI Filtering + ESD Protection
- Four Additional Channels of ESD–Only Protection
- 40 dB Absolute Attenuation (Typical) at 1 GHz
- 35 dB Attenuation (Typical) at 1 GHz Relative to Pass Band
- ±15 kV ESD Protection on All Channels (IEC 61000-4-2 Level 4, Contact Discharge)
- ±30 kV ESD Protection on All Channels (HBM)
- 15–Bump, 2.960 mm X 1.330 mm Footprint
- Chip Scale Package (CSP) Features Extremely Low Lead Inductance for Optimum Filter and ESD Performance
- These Devices are Pb-Free and are RoHS Compliant

Applications

- EMI Filtering and ESD Protection for Both Data and I/O Ports
- Outer Four Channels Provide ESD Protection for USB Lines and Other I/O Port Applications
- Wireless Handsets



WN Semiconductor

http://onsemi.com

WLCSP15 CP SUFFIX CASE 567BS

MARKING DIAGRAM

N013 M=

N013 = CM1401-03CP M = Date Code = Pb-Free Package (Note: Microdot may be in either location)

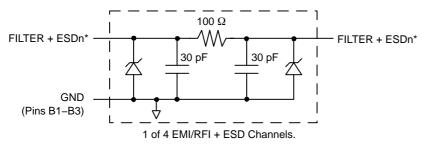
ORDERING INFORMATION

Device	Package	Shipping [†]
CM1401-03CP	CSP-15	3500/Tape & Reel
	(Pb-Free)	

+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.

- Handheld PCs / PDAs
- MP3 Players
- Notebooks
- Desktop PCs

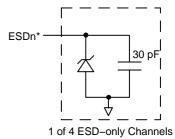
BLOCK DIAGRAM



*See Package/Pinout Diagram for expanded pin information.

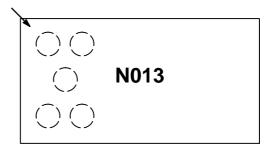
Table 1. PIN DESCRIPTIONS

15-bump CSP Package							
Pin	Name	Description					
A1	ESD_1	ESD Channel 1					
A2	FILTER + ESD_1	Filter + ESD Channel 1					
A3	FILTER + ESD_2	Filter + ESD Channel 2					
A4	FILTER + ESD_3	Filter + ESD Channel 3					
A5	FILTER + ESD_4	Filter + ESD Channel 4					
A6	ESD_2	ESD Channel 2					
B1-B3	GND	Device Ground					
C1	ESD_3	ESD Channel 3					
C2	FILTER + ESD_1	Filter + ESD Channel 1					
C3	FILTER + ESD_2	Filter + ESD Channel 2					
C4	FILTER + ESD_3	Filter + ESD Channel 3					
C5	FILTER + ESD_4	Filter + ESD Channel 4					
C6	ESD_4	ESD Channel 4					



PACKAGE / PINOUT DIAGRAMS

Top View (Bumps Down View)



Bottom View (Bumps Up View)

C1

B2

A1

A1

CM1401–03 CSP Package

Symbol	Parameter	Conditions	Min	Тур	Max	Units
R	Resistance		80	100	120	Ω
С	Capacitance	At 2.5 V DC	24	30	36	pF
TCR	Temperature Coefficient of Resistance			1200		ppm/°C
тсс	Temperature Coefficient of Capacitance	At 2.5 V DC		-300		ppm/°C
V _{DIODE}	Diode Voltage (reverse bias)	I _{DIODE} = 10 kA		6.0		V
I _{LEAK}	Diode Leakage Current (reverse bias)	V _{DIODE} = 3.3 V			100	nA
V _{SIG}	Signal Voltage Positive Clamp Negative Clamp	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
V _{CL}	Clamping Voltage during ESD Discharge MIL–STD–883 (Method 3015), 8 kV Positive Transients Negative Transients	(Notes 2 and 3)		+10 -5		V
f _C	Cut–off Frequency $Z_{SOURCE} = 50 \Omega$, $Z_{LOAD} = 50 \Omega$	R = 100 Ω, C = 30 pF		58		MHz

Table 4. ELECTRICAL OPERATING CHARACTERISTICS (Note 1)

T_A = 25°C unless otherwise specified.
ESD applied to input and output pins with respect to GND, one at a time.
Clamping voltage is measured at the opposite side of the EMI filter to the ESD pin. For example, if ESD is applied to Pin A2, then clamping voltage is measured at Pin C2.

PERFORMANCE INFORMATION

Typical Filter Performance (T_A = 25°C, DC Bias = 0 V, 50 Ω Environment)

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NAME REPORTED IN ANY CALLER CONTRACTORS.

Figure 1. Insertion Loss vs. Frequency (A2–C2 to GND B2)

Figure 2. Insertion Loss vs. Frequency (A3-C3 to GND B2)

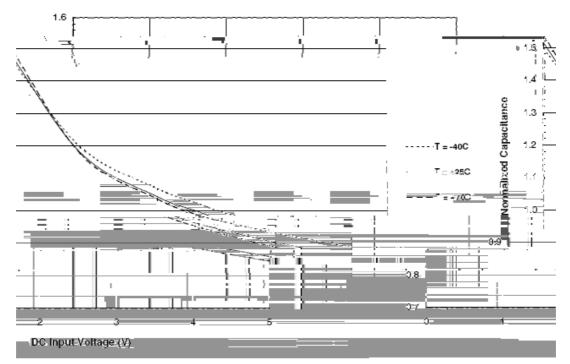
PERFORMANCE INFORMATION (Cont'd)

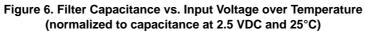
Typical Filter Performance (T_A = 25°C, 50 Ω Environment)

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Figure 5. Comparison of Filter Response Curves for CM1401–03CS with DC Bias

PERFORMANCE INFORMATION (Cont'd)





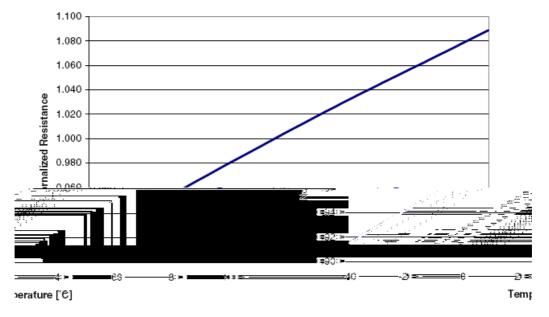


Figure 7. Resistance vs. Temperature (normalized to resistance at 25°C)

APPLICATION INFORMATION

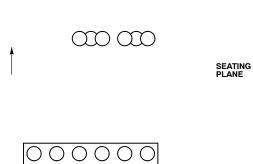
Table 5. PRINTED CIRCUIT BOARD RECOMMENDATIONS

0.240 mm		
Round		
Non-Solder Mask defined pads		
0.290 mm Round		
0.125 – 0.150 mm		
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Solder Stencil Aperture Opening (laser cut, 5% tapered walls)

WLCSP15, 2.96x1.33 CASE 567BS ISSUE O

DATE 26 JUL 2010



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