

# CM1401-03

## 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  $\pm 15$  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  $\pm 30$  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*<sup>™</sup> 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*<sup>™</sup> 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
- $\pm 15$  kV ESD Protection on All Channels (IEC 61000-4-2 Level 4, Contact Discharge)
- $\pm 30$  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

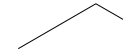
### Applications

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



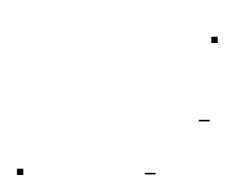
ON Semiconductor

<http://onsemi.com>



WLCSP15  
CP SUFFIX  
CASE 567BS

### MARKING DIAGRAM



### ORDERING INFORMATION

| Device | Package | Shipping |
|--------|---------|----------|
| -      | -       |          |

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## BLOCK DIAGRAM

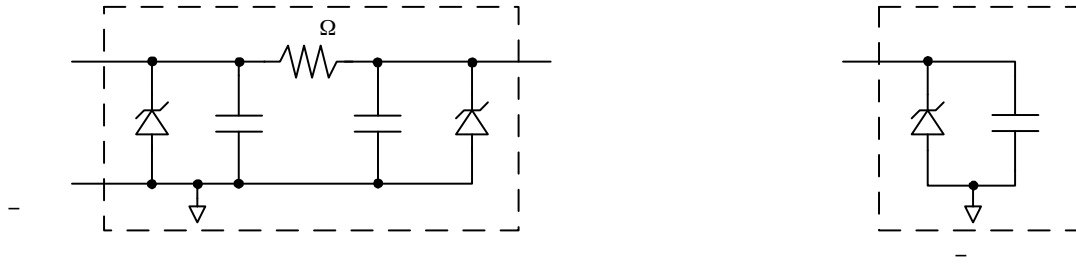
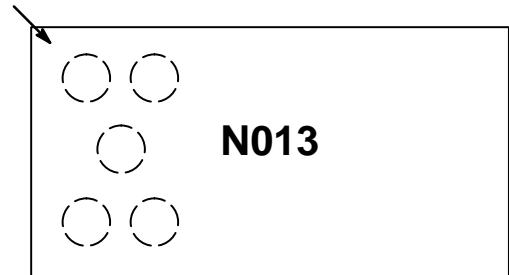


Table 1. PIN DESCRIPTIONS

| 15-bump CSP Package |      |             |
|---------------------|------|-------------|
| Pin                 | Name | Description |
|                     |      |             |
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|                     |      |             |
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|                     |      |             |
|                     |      |             |

## PACKAGE / PINOUT DIAGRAMS



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**Table 4. ELECTRICAL OPERATING CHARACTERISTICS**

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|--------|-----------|------------|-----|-----|-----|-------|
|        |           |            |     |     |     | Ω     |
|        |           |            |     |     |     | °     |
|        |           |            |     | -   |     | °     |
|        |           | μ          |     |     |     |       |
|        |           |            | -   |     | -   |       |
|        | -         | - -        | ±   |     |     |       |
|        | - -       |            | ±   |     |     |       |
|        | -         |            |     |     |     |       |
|        | Ω Ω       | Ω          |     |     |     |       |

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## PERFORMANCE INFORMATION

Typical Filter Performance ( $T_A = 25^\circ\text{C}$ , DC Bias = 0 V, 50  $\Omega$  Environment)



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

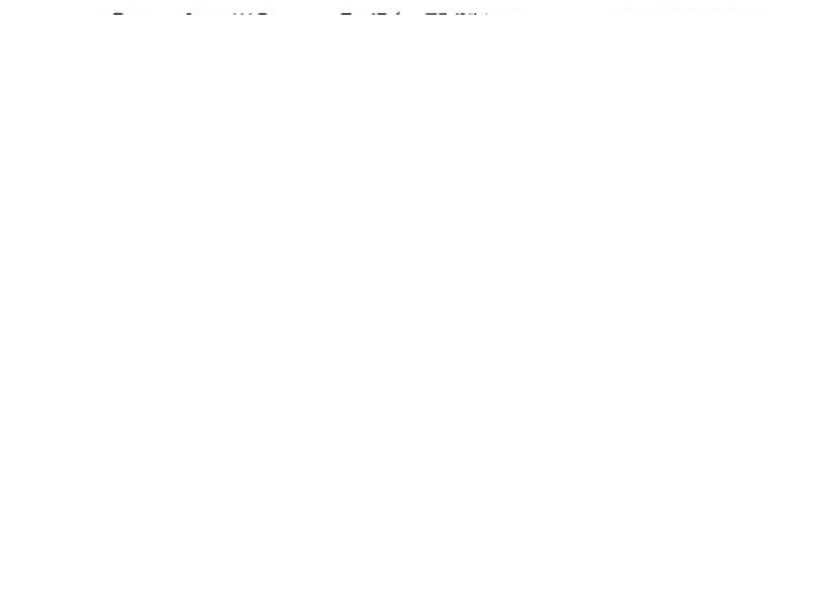


Figure 2. Insertion Loss vs. Frequency (A3-C3 to GND B2)



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## PERFORMANCE INFORMATION (Cont'd)

Typical Filter Performance ( $T_A = 25^\circ\text{C}$ ,  $50\ \Omega$  Environment)

0 100 MHz 200 MHz 300 MHz 400 MHz 500 MHz

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

PERFORMANCE INFORMATION (Cont'd)

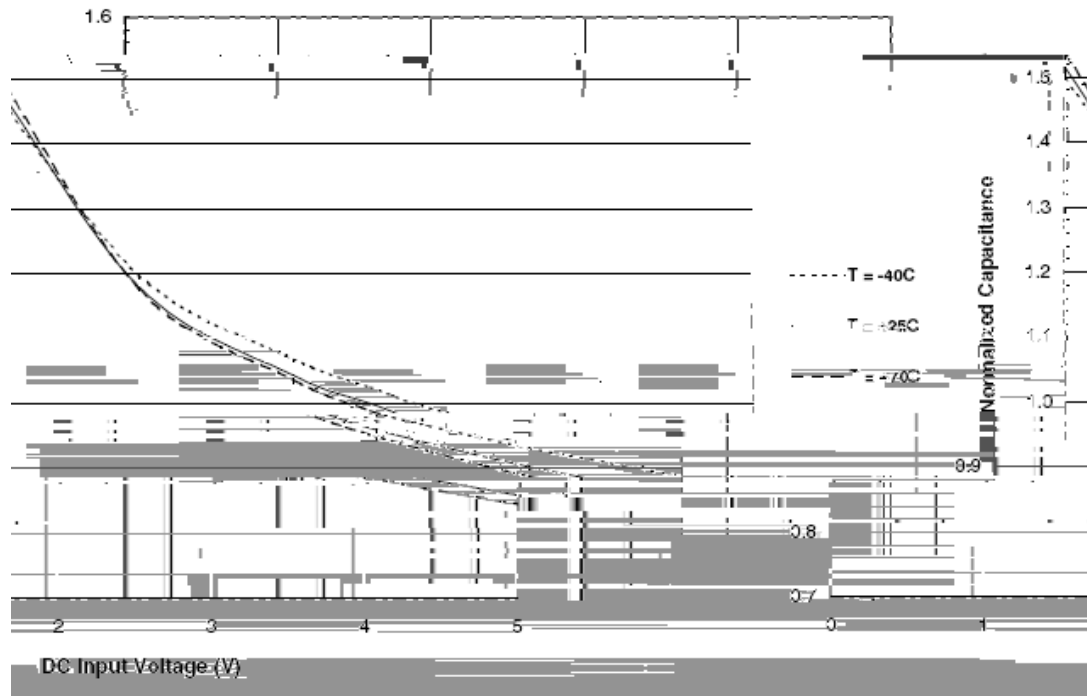


Figure 6. Filter Capacitance vs. Input Voltage over Temperature (normalized to capacitance at 2.5 VDC and 25°C)

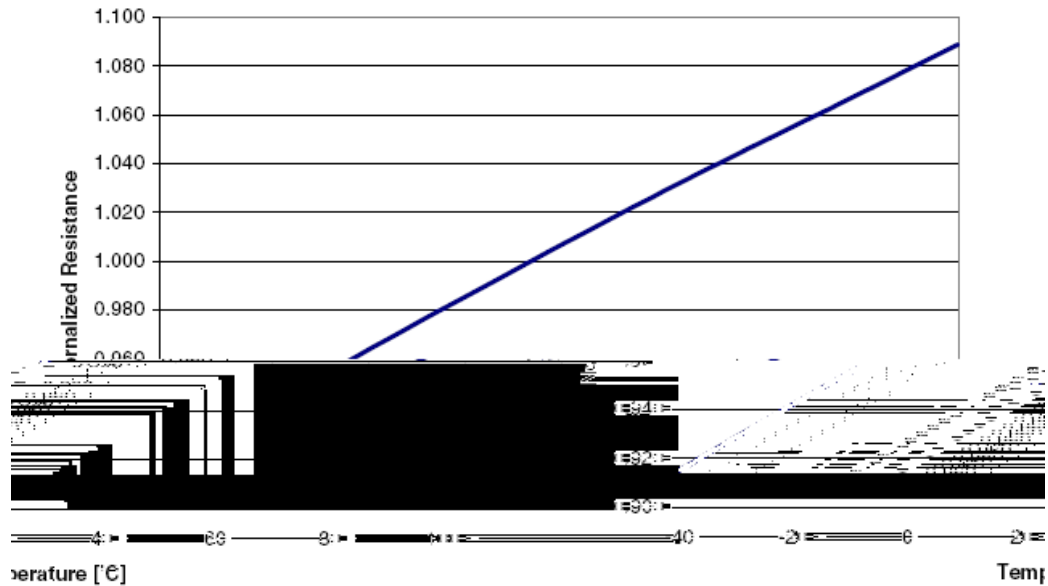


Figure 7. Resistance vs. Temperature (normalized to resistance at 25°C)

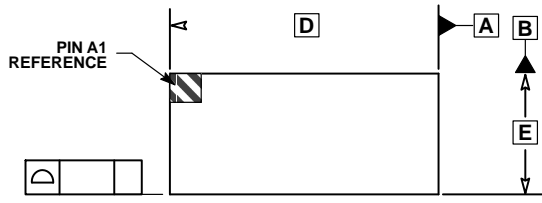
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## APPLICATION INFORMATION

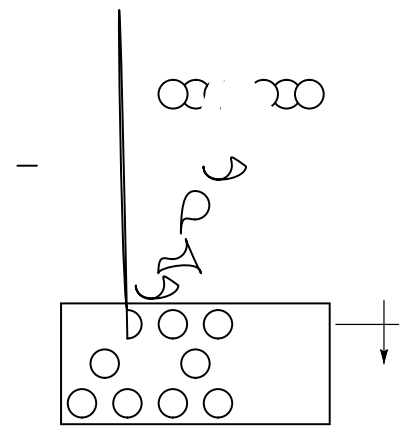
Table 5. PRINTED CIRCUIT BOARD RECOMMENDATIONS

| Parameter | Value |
|-----------|-------|
|           |       |
|           |       |
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|           |       |
|           | -     |
|           |       |





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