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# CM1623

## EMI Filter with ESD Protection for SIM Card Applications

### Features

- 4-Channel EMI Filtering with Integrated ESD Protection
- Pi-Style EMI Filters in a Capacitor-Resistor-Capacitor (C-R-C) Network
- $\pm 15$  kV ESD Protection on Each Channel (IEC 61000-4-2 Level 4, Contact Discharge)
- 8-Lead UDFN Package with 0.40 mm Pitch
- Tiny UDFN Package Size: 1.7 mm x 1.35 mm x 0.5 mm
- Increased Robustness Against Vertical Impacts During Manufacturing Process
- These Devices are Pb-Free and are RoHS Compliant



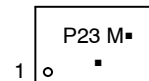
ON Semiconductor®

<http://onsemi.com>



UDFN8  
DE SUFFIX  
CASE 517BC

### MARKING DIAGRAM



P23 = CM1623-04DE

M = Date Code

▪ = Pb-Free Package

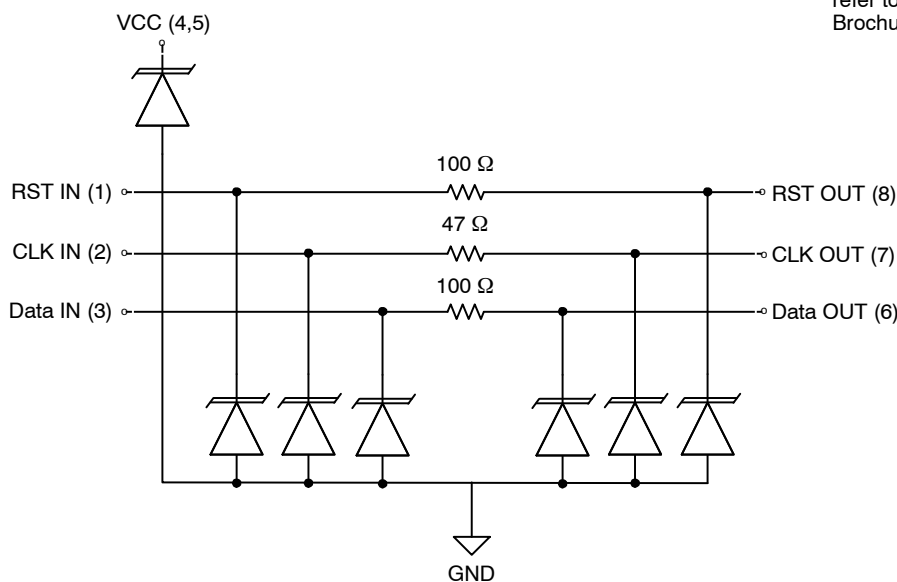
(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device      | Package          | Shipping†        |
|-------------|------------------|------------------|
| CM1623-04DE | UDFN-8 (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.

### ELECTRICAL SCHEMATIC



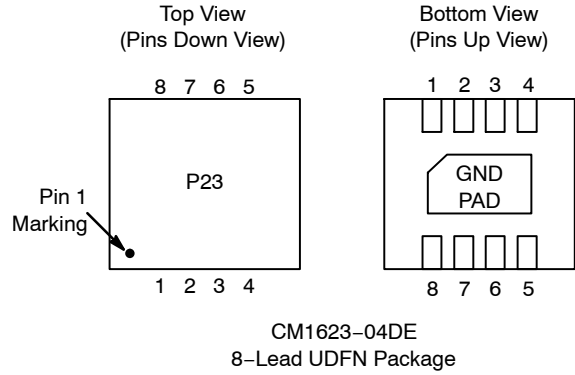
\*See Package/Pinout Diagrams for expanded pin information.

# CM1623

**Table 1. PIN DESCRIPTIONS**

| 8-Lead UDFN Package |      |                        |
|---------------------|------|------------------------|
| Pin                 | Name | Description            |
| 1                   | RST  | Filter + ESD Channel 1 |
| 2                   | CLK  | Filter + ESD Channel 2 |
| 3                   | DATA | Filter + ESD Channel 3 |
| 4                   | VCC  | V External             |
| GND PAD             | GND  | Device Ground          |
| 8                   | RST  | Filter + ESD Channel 1 |
| 7                   | CLK  | Filter + ESD Channel 2 |
| 6                   | DATA | Filter + ESD Channel 3 |
| 5                   | VCC  | V External             |

**PACKAGE / PINOUT DIAGRAMS**



**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   | 500         | 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 |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-------------|-------------|-------------|-------|
| R1                | Reset Channel Resistance                                                                                                                                                              |                                                         | 80          | 100         | 120         | Ω     |
| R2                | Clock Channel Resistance                                                                                                                                                              |                                                         | 37.6        | 47          | 56.4        | Ω     |
| R3                | Data Channel Resistance                                                                                                                                                               |                                                         | 80          | 100         | 120         | Ω     |
| C <sub>1</sub>    | Capacitance on Pins 1, 2, and 3                                                                                                                                                       | At 1 MHz, V <sub>IN</sub> = 0 V                         | 16          | 20          | 24          | pF    |
| C <sub>2</sub>    | Capacitance on Pins 4 and 5                                                                                                                                                           | At 1 MHz, V <sub>IN</sub> = 0 V                         |             | 18          |             | pF    |
| I <sub>LEAK</sub> | Diode Leakage Current (Reverse Bias)                                                                                                                                                  | V <sub>DIODE</sub> = 3.3 V                              |             | 0.1         | 1.0         | μA    |
| V <sub>SIG</sub>  | Signal Clamp Voltage<br>a) Positive Clamp<br>b) Negative Clamp                                                                                                                        | I <sub>LOAD</sub> = 10 mA<br>I <sub>LOAD</sub> = -10 mA | 5.6<br>-1.5 | 6.8<br>-0.8 | 9.0<br>-0.4 | V     |
| V <sub>ESD</sub>  | ESD Peak Discharge Voltage Protection on All Pins<br>In-system ESD Withstand Voltage:<br>a) Contact Discharge per IEC 61000-4-2 Level 4<br>b) Air Discharge per IEC 61000-4-2 Level 4 | T <sub>A</sub> = 25°C<br>(Note 2)                       | ±15<br>±15  | ±15<br>±15  |             | kV    |

- All parameters specified at T<sub>A</sub> = 25°C unless otherwise noted.
- Standard IEC 61000-4-2 with C<sub>Discharge</sub> = 150 pF, R<sub>Discharge</sub> = 330 Ω.

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## PERFORMANCE INFORMATION

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

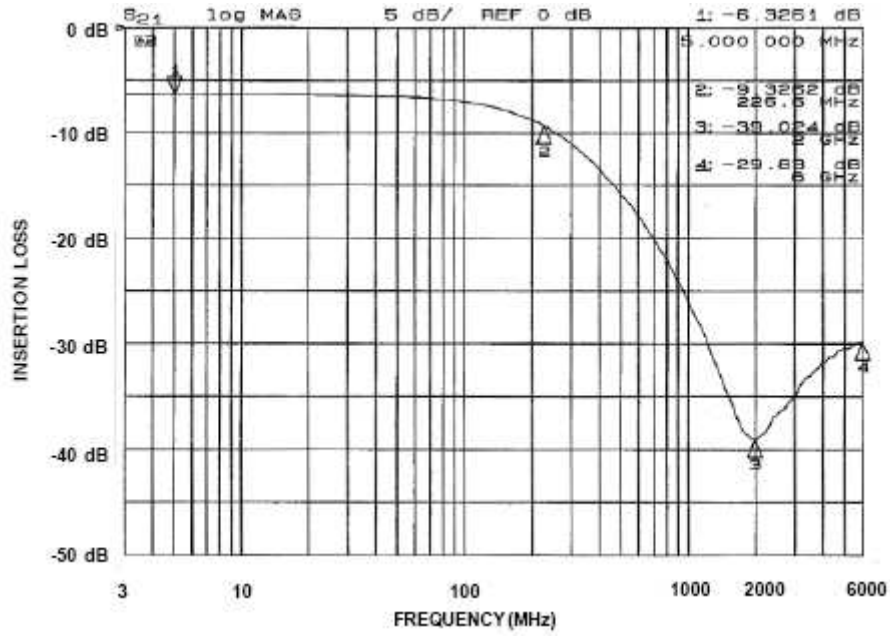


Figure 1. Insertion Loss vs. Frequency, Filter 1 (Pins 1 and 8)

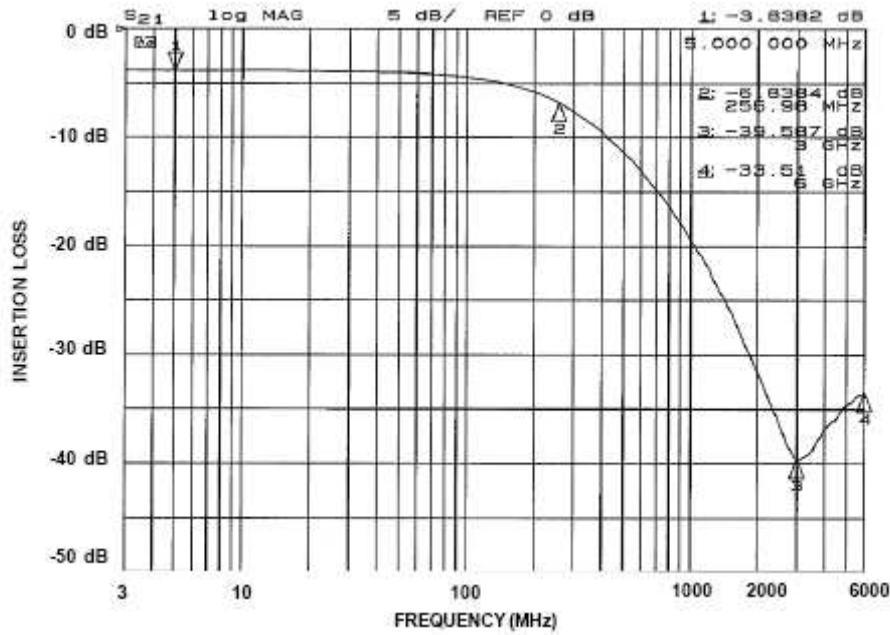


Figure 2. Insertion Loss vs. Frequency, Filter 2 (Pins 2 and 7)

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## PERFORMANCE INFORMATION (Cont'd)

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

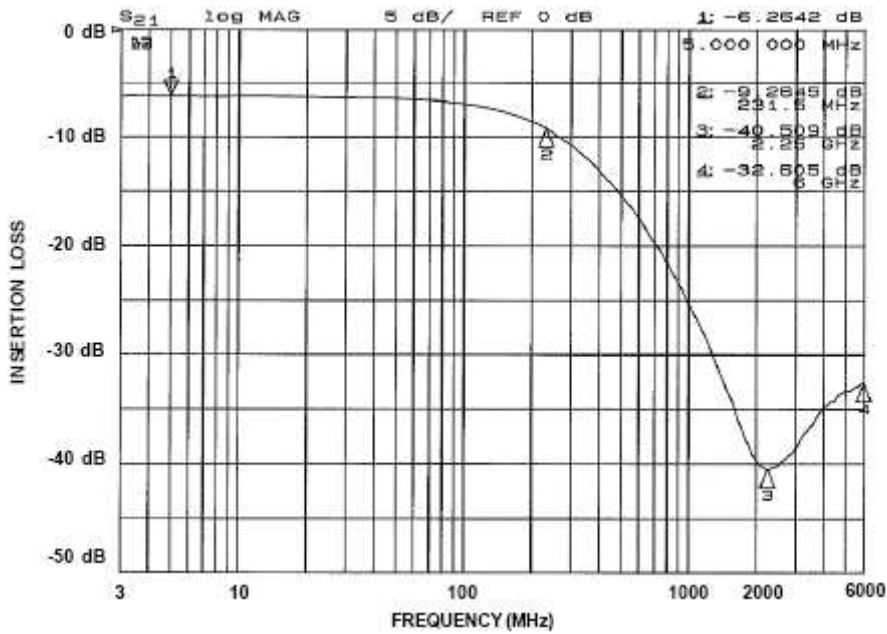


Figure 3. Insertion Loss vs. Frequency, Filter 3 (Pins 3 and 6)

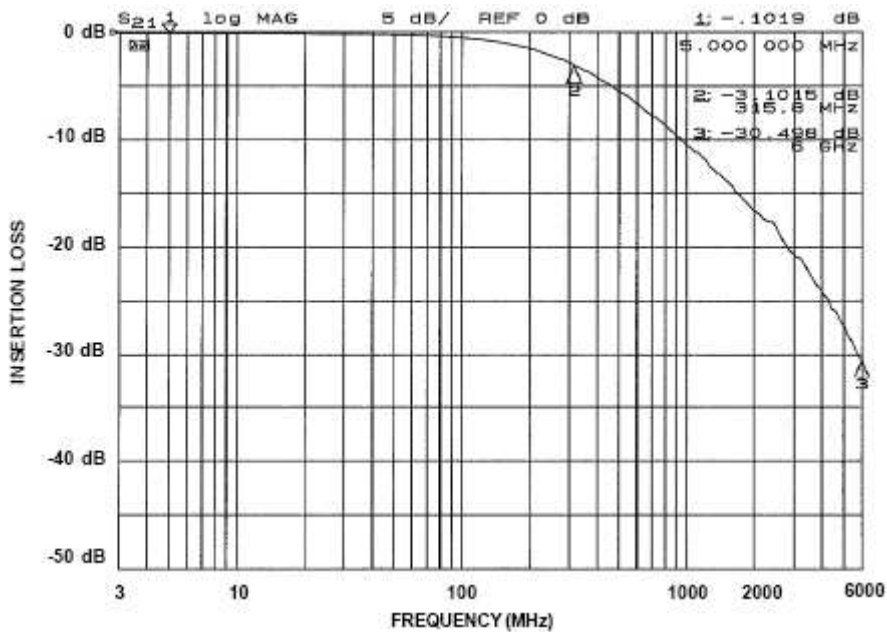
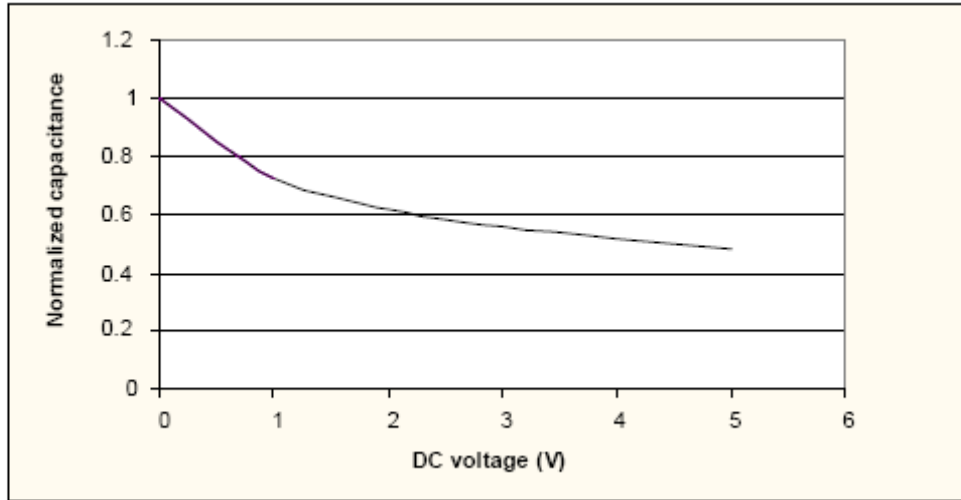


Figure 4. Insertion Loss vs. Frequency, Filter 4 (Pins 4 and 5)

PERFORMANCE INFORMATION (Cont'd)



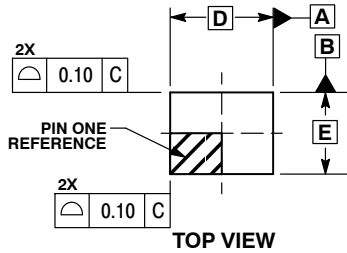
**Figure 5. Diode Capacitance vs. Input Voltage  
(Normalized to Capacitance at 0 VDC and 25°C)**



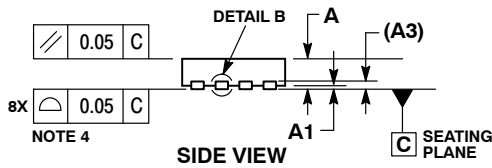
# CM1623

## PACKAGE DIMENSIONS

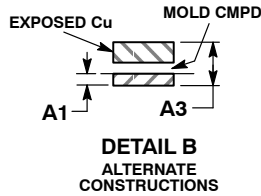
UDFN8, 1.7x1.35, 0.4P  
CASE 517BC-01  
ISSUE O



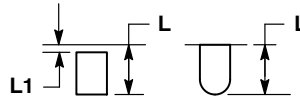
TOP VIEW



SIDE VIEW



DETAIL B  
ALTERNATE  
CONSTRUCTIONS

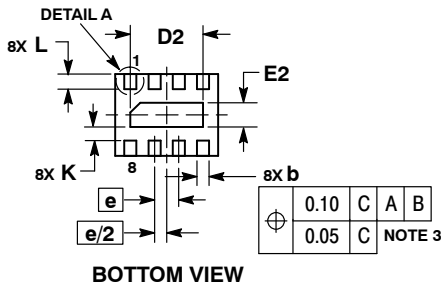


DETAIL A  
ALTERNATE TERMINAL  
CONSTRUCTIONS

NOTES:

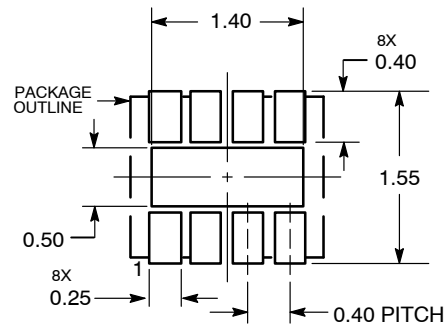
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.25 mm FROM THE TERMINAL TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

| MILLIMETERS |      |      |
|-------------|------|------|
| DIM         | MIN  | MAX  |
| A           | 0.45 | 0.55 |
| A1          | 0.00 | 0.05 |
| A3          | 0.13 | REF  |
| b           | 0.15 | 0.25 |
| D           | 1.70 | BSC  |
| D2          | 1.10 | 1.30 |
| E           | 1.35 | BSC  |
| E2          | 0.30 | 0.50 |
| e           | 0.40 | BSC  |
| K           | 0.15 | ---  |
| L           | 0.20 | 0.30 |
| L1          | ---  | 0.05 |



BOTTOM VIEW

### RECOMMENDED SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

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

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