

# CM6400

## EMI Filter with ESD Protection for Data Line Applications

### Product Description

The CM6400 is a 24-bump EMI filter with ESD protection device for data line application in a 0.4 mm pitch, 5 x 5 CSP form factor. It is fully compliant with IEC 61000-4-2 Level 4. The CM6400 is RoHS II compliant.

### Features

- 24-Bump, 2.06 mm X 2.06 mm Footprint Chip Scale Package
- These Devices are Pb-Free and are RoHS Compliant



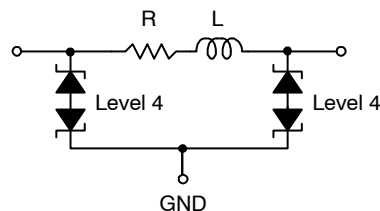
ON Semiconductor®

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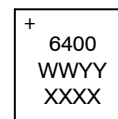
WLCSP24  
CASE 567CH

### ELECTRICAL SCHEMATIC



1 of 10 Filter Channels

### MARKING DIAGRAM



6400 = CM6400  
WWYY = Date Code  
XXXX = Last four digits of lot#

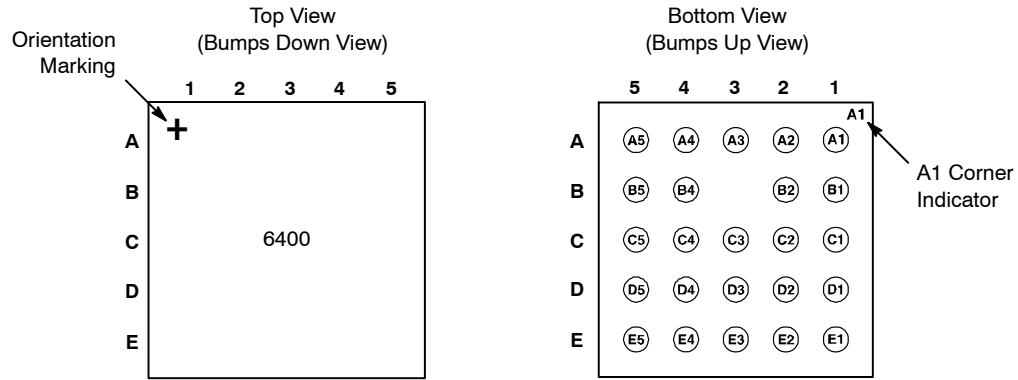
### ORDERING INFORMATION

Device	Package	Shipping†
CM6400	CSP-24 (Pb-Free)	5000/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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## PACKAGE / PINOUT DIAGRAMS



**Table 1. PIN DESCRIPTIONS**

Pin	Description	Pin	Description
A2 – A5	Channel 1	C4 – C1	Channel 6
A4 – A1	Channel 2	D2 – D5	Channel 7
B2 – B5	Channel 3	D4 – D1	Channel 8
B4 – B1	Channel 4	E2 – E5	Channel 9
C2 – C5	Channel 5	E4 – E1	Channel 10
A3, D3, C3, E3	GND		

## ELECTRICAL SPECIFICATIONS AND CONDITIONS

**Table 2. PARAMETERS AND OPERATING CONDITIONS**

Parameter	Rating	Units
Storage Temperature Range	-55 to +150	°C
Operating Temperature Range	-40 to +85	°C

**Table 3. ELECTRICAL OPERATING CHARACTERISTICS** (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
R	Resistance		100	125	150	Ω
L	Inductance	(Note 2)		24		nH
C	Capacitance per channel	At 1 MHz, $V_{IN} = 0\text{ V}$	23.3	29.2	35	pF
		At 1 MHz, $V_{IN} = 2.5\text{ V}$	14.2	17.8	21.4	pF
Att(5)	Passband attenuation at 5 MHz			-7		dB
$F_C$	Cut-off frequency	$Z_{SOURCE} = 50\ \Omega$ , $Z_{LOAD} = 50\ \Omega$		200		MHz
$V_{BR}$	Breakdown voltage	$I_{LOAD} = \pm 10\text{ mA}$	±6	±6.8	±20	V
$I_{LEAK}$	Leakage current per channel	$V_{IN} = +3.0\text{ V}$		0.01	0.10	μA
	Leakage current per chip	$V_{IN} = -3.0\text{ V}$	-2.0	-0.1		μA
$V_{ESD}$	ESD Peak Discharge Voltage Protection at all pins: a) Contact Discharge per IEC 61000-4-2 standard AND b) Air Discharge per IEC 61000-4-2 standard	(Note 2)	±15			kV
			±15			

1. All parameters specified at  $T_A = 25^\circ\text{C}$  unless otherwise noted.
2. Standard IEC 61000-4-2 ( $C_{Discharge} = 150\text{ pF}$ ,  $R_{Discharge} = 330\ \Omega$ ).

# CM6400

## RF CHARACTERISTICS

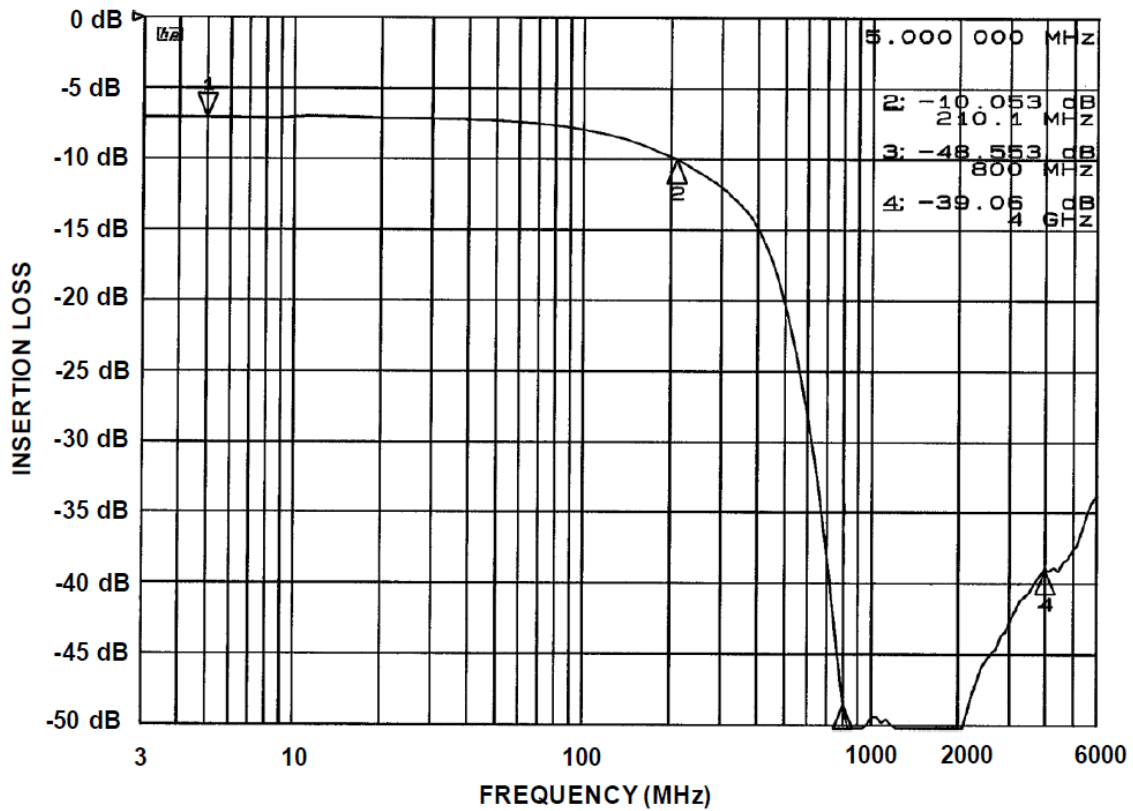


Figure 1. Typical Insertion Loss (Bias = 0 V, T<sub>A</sub> = 25°C, 50 Ω Environment)

## MECHANICAL SPECIFICATION

Table 4. VERTICAL STRUCTURE DIMENSIONS (nominal)

Ref.	Parameter	Material	Dimension
a	Die Thickness	Silicon	389 μm
h	Dielectric Layer 1	Polyimide	7.0 μm
j	Dielectric Layer 2	Polyimide	10 μm
d	UBM-(Ti/Cu)	Plated Cu	5.0 μm
		Sputtered Cu	0.4 μm
		Sputtered Ti	0.1 μm
e	UBM Wetting Area Diameter		240 μm
b	Bump Standoff		194 μm
f	Solder Bump Diameter after Bump Reflow		270 μm
c	Metal Pad Height	AlSiCu	1.5 μm
g	Metal Pad Diameter		60 μm
D2			0.406 mm
D1	Finished Thickness		0.600 mm

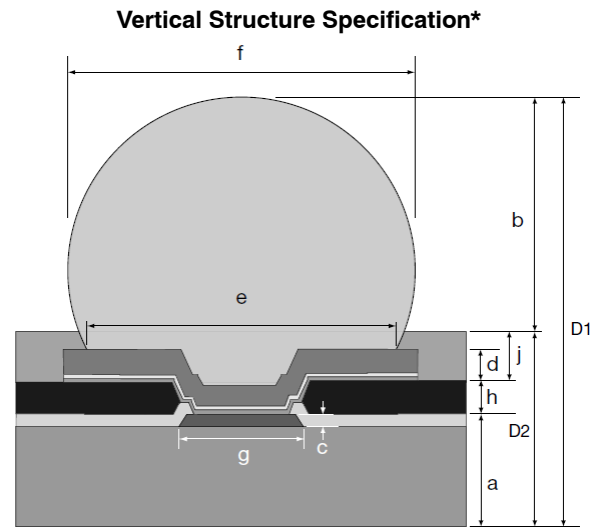


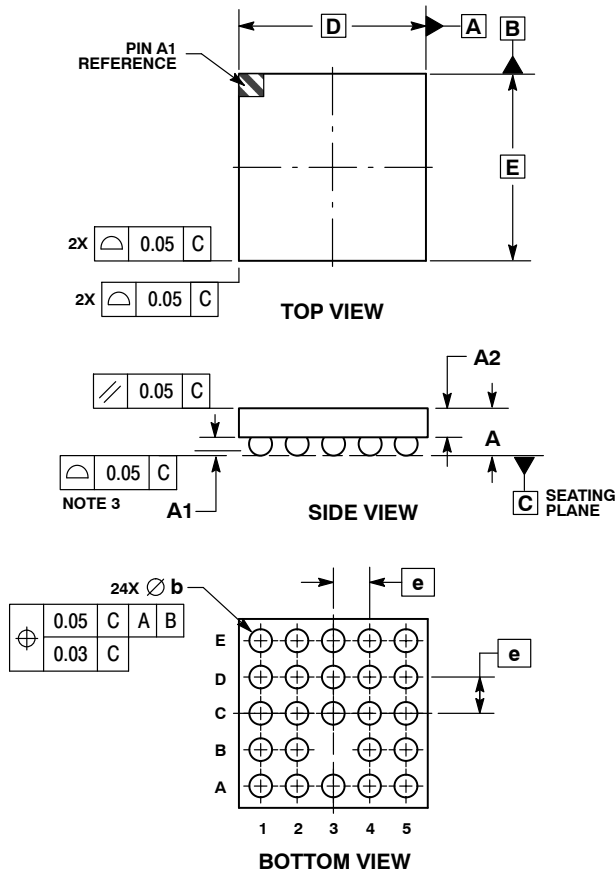
Figure 2. Sectional View

\* Daisy Chain CM6040

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## PACKAGE DIMENSIONS

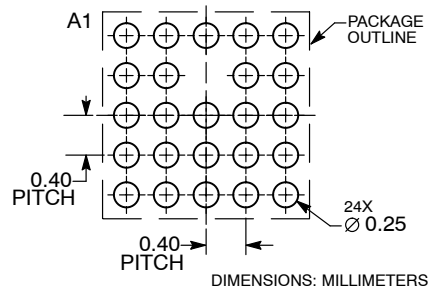
WLCSP24, 2.06x2.06  
CASE 567CH-01  
ISSUE O



- 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	0.57	0.63
A1	0.17	0.24
A2	0.40 REF	
b	0.24	0.29
D	2.06 BSC	
E	2.06 BSC	
e	0.40 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.

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