

4-Channel LCD EMI Filter Array plus 4-Channel ESD Protection Array

Features

- Functionally and pin compatible with CMD's CSPEMI607
- Four channels of combined EMI/RFI filtering plus ESD protection
- Four additional channels of ESD-only protection
- Better than 30dB attenuation (typical) at 1 GHz
- ±15kV ESD protection on all channels (IEC 61000-4-2 Level 4, contact discharge)
- ±30kV ESD protection on all channels (HBM)
- Chip Scale Package features extremely low lead inductance for optimum filter and ESD performance
- 15-bump, 2.960mm X 1.330mm footprint Chip Scale Package (CSP)
- Optiguard[™] coated for improved reliability
- · Lead-free version available

Applications

- LCD data lines in mobile handsets
- EMI filtering and ESD protection for both data and I/O ports
- Mobile Handsets
- Handheld PCs / PDAs
- Notebook Computers

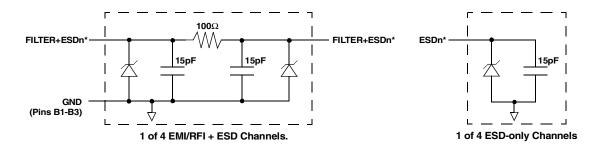
Product Description

The CM1421 is a multichannel array consisting of four low-pass filters with integrated ESD protection and four ESD-only protection channels designed to reduce EMI/ RFI emissions on LCD data lines in mobile handsets. The CM1421 has component values of 15pF-100 Ω -15pF. These devices 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 are designed and characterized to safely dissipate ESD strikes of ±15kV, 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 ±30kV.

This device is particularly well suited for portable electronics (e.g. wireless handsets, PDAs, notebook computers) because of its small package format and easy-to-use pin assignments. In particular, the CM1421 is ideal for EMI filtering and protecting data lines from ESD for the LCD display in clamshell handsets.

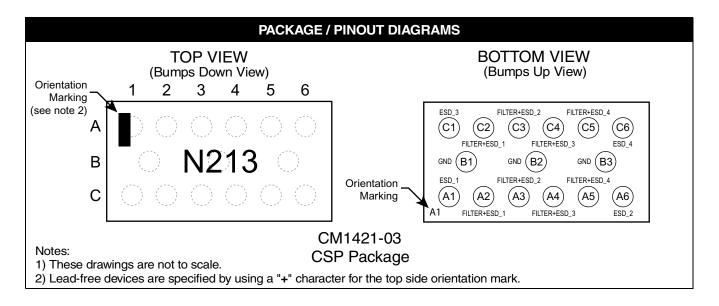
The CM1421 incorporates Optiguard[™] coating which results in improved reliability. The CM1421 is available in space-saving, low-profile chip-scale packages with optional lead-free finishing.

Electrical Schematic



^{*} See Package/Pinout Diagram for expanded pin information





	PIN DESCRIPTIONS				
PIN(s)	NAME	DESCRIPTION			
A1	ESD_1	ESD Channel 1			
A2	FILTER+ESD_1	Filter + ESD Channel 1			
А3	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			
С3	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			

Ordering Information

PART NUMBERING INFORMATION							
		Standa	rd Finish	Lead-free Finish			
		Ordering Part		Ordering Part			
Pins	Package	Number ¹	Part Marking	Number ¹	Part Marking ²		
15	CSP	CM1421-03CS	N213	CM1421-03CP	N213		

Note 1: Parts are shipped in Tape & Reel form unless otherwise specified.

Note 2: Lead-free devices are specified by using a "+" character for the top side orientation mark.



Specifications

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			

STANDARD OPERATING CONDITIONS					
PARAMETER	RATING	UNITS			
Operating Temperature Range	-40 to +85	°C			

	ELECTRICAL OPERATING CHARACTERISTICS (SEE NOTE1)							
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS		
R	Resistance		80	100	120	Ω		
С	Capacitance	At 2.5V DC	12	15	18	pF		
V _{DIODE}	Diode Standoff Voltage	I _{DIODE} =10μA	5.5			V		
I _{LEAK}	Diode Leakage Current (reverse bias)	V _{DIODE} =3.3V		100		nA		
V _{SIG}	Signal Voltage Positive Clamp Negative Clamp	I _{LOAD} = 10mA	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	Notes 2,4 and 5	±30 ±15			kV kV		
V _{CL}	Clamping Voltage during ESD Discharge MIL-STD-883 (Method 3015), 8kV Positive Transients Negative Transients	Notes 2,3,4 and 5		+12 -7		V V		
f _C	Cut-off Frequency Z_{SOURCE} =50 Ω Z_{LOAD} =50 Ω	R=100Ω, C=15pF		120		MHz		

Note 1: $T_A=25^{\circ}C$ unless otherwise specified.

Note 2: ESD applied to input and output pins with respect to GND, one at a time.

Note 3: 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.

Note 4: Unused pins are left open

Note 5: These parameters are guaranteed by design and characterization.



Performance Information

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

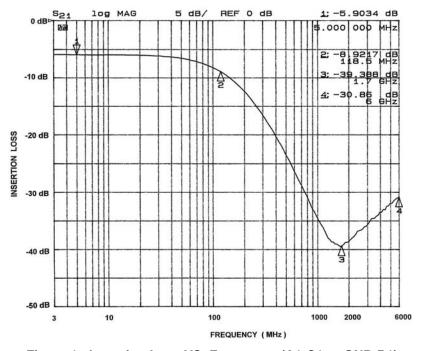


Figure 1. Insertion Loss VS. Frequency (A1-C1 to GND B1)

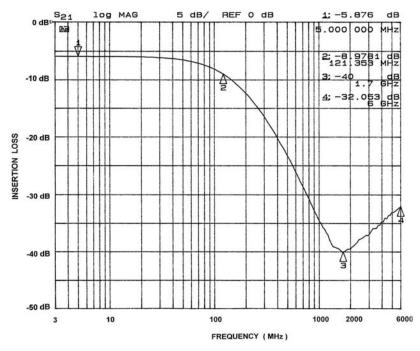


Figure 2. Insertion Loss VS. Frequency (A2-C2 to GND B1)



Performance Information (cont'd)

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

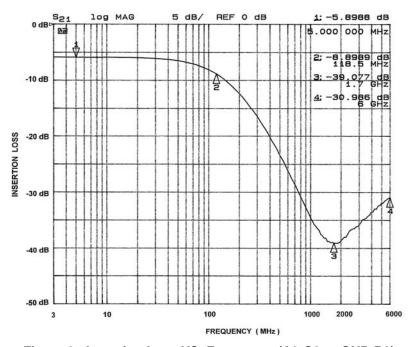


Figure 3. Insertion Loss VS. Frequency (A3-C3 to GND B2)

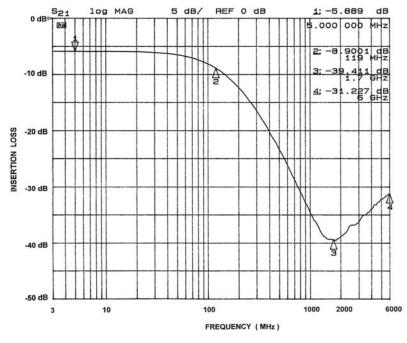


Figure 4. Insertion Loss VS. Frequency (A4-C4 to GND B2)



Performance Information (cont'd)

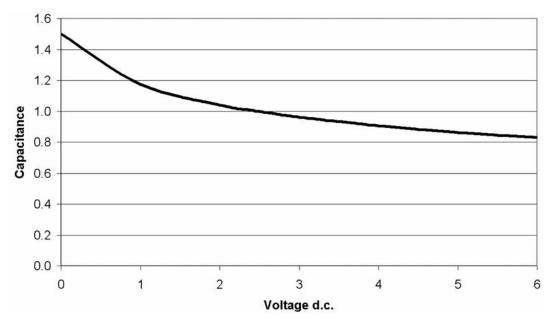


Figure 5. Filter Capacitance vs. Input Voltage over Temperature (normalized to capacitance at 2.5VDC and 25°C)



Application Information

Refer to Application Note AP-217, "The Chip Scale Package", for a detailed description of Chip Scale Packages offered by California Micro Devices.

PRINTED CIRCUIT BOARD RECOMMENDATIONS						
PARAMETER VALUE						
Pad Size on PCB	0.275mm					
Pad Shape	Round					
Pad Definition	Non-Solder Mask defined pads					
Solder Mask Opening	0.325mm Round					
Solder Stencil Thickness	0.125mm - 0.150mm					
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.330mm 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	±50μm					
Solder Ball Side Coplanarity	±20μm					
Maximum Dwell Time Above Liquidous	60 seconds					
Soldering Maximum Temperature	260°C					

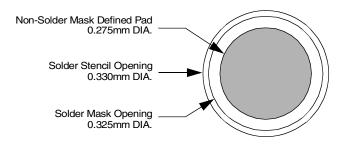


Figure 6. Recommended Non-Solder Mask Defined Pad Illustration

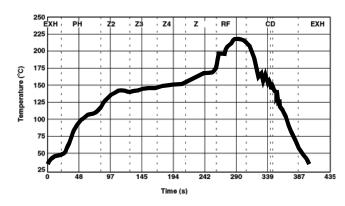


Figure 7. Eutectic (SnPb) Solder Ball Reflow Profile

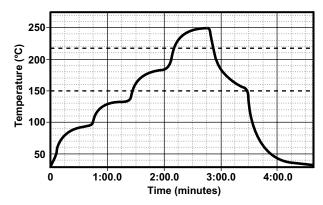


Figure 8. Lead-free (SnAgCu) Solder Ball Reflow Profile

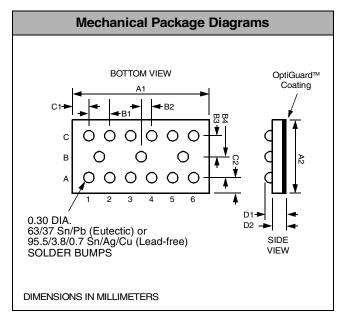


Mechanical Details

CSP Mechanical Specifications

CM1421 devices are packaged in a custom Chip Scale Package (CSP). Dimensions are presented below. For complete information on CSP packaging, see the California Micro Devices CSP Package Information document.

PACKAGE DIMENSIONS							
Pack	age	Custom CSP					
Bumps		15					
Dim	M	lillimeters			Inches		
Diiii	Min	Nom	Max	Min	Nom	Max	
A1	2.915	2.960	3.005	0.1148	0.1165	0.1183	
A2	1.285	1.330 1.375 0.0		0.0506	0.0524	0.0541	
B1	0.495	0.500	0.505	0.0195	0.0197	0.0199	
B2 0.245		0.250	0.255	0.0096	0.0098	0.0100	
В3	0.430	0.435	0.440	0.0169	0.0171	0.0173	
B4	0.430	0.435	0.440	0.0169	0.0171	0.0173	
C1	0.180	0.230	0.280	0.0071 0.0091		0.0110	
C2	0.180	0.230	0.280	0.0071	0.0091	0.0110	
D1	0.600	0.670	0.739	0.0236 0.0264		0.0291	
D2 0.394		0.445	0.495	0.0155	0.0175	0.0195	
# per tap		3500 pieces					
	Controlling dimension: millimeters						



Package Dimensions for CM1421 Chip Scale Package

CSP Tape and Reel Specifications

PART NUMBER	CHIP SIZE (mm)	POCKET SIZE (mm) B ₀ X A ₀ X K ₀	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P ₀	P ₁
CM1421	2.96 X 1.33 X 0.6	3.10 X 1.45 X 0.74	8mm	178mm (7")	3500	4mm	4mm

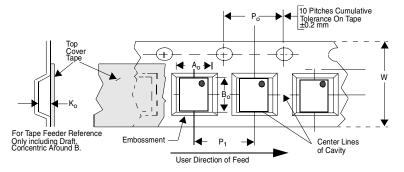


Figure 9. Tape and Reel Mechanical Data