California Micro Devices
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PRELIMINARY

CM1423

Secure Digital Card EMI Filter Array with ESD Protection

Features

- Six channels of EMI filtering with ESD protection
- 4 channels of ESD protection
- ±15kV ESD protection on all I/O pins (IEC 61000-4-2, contact discharge)
- ±30kV ESD protection (HBM)
- Better than 25dB of attenuation at 1GHz for 12pF-100Ω-12pF filter configuration
- Integrates 34 components into small form factor CSP solution

Applications

- Secure Digital (SD) Card data lines in mobile handsets
- SD Card interface protection for other mobile electronics such as MP3 players, PDAs and digital cameras
- I/O port protection for mobile handsets, notebook computers, PDAs etc.
- EMI filtering for data ports in cell phones, PDAs or notebook computers.

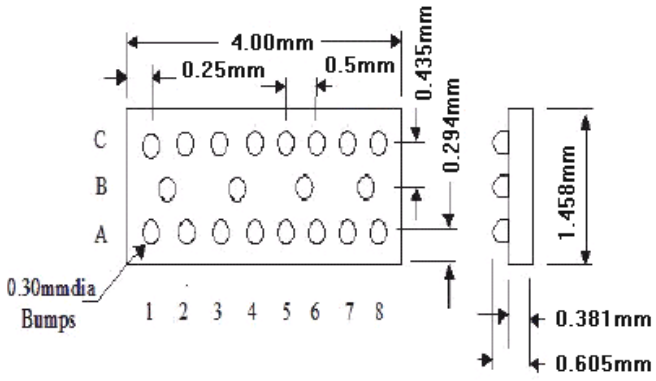
General Description

CAMD's CM1423 is an EMI filter array with ESD protection, which integrates six (6) Pi- filters (C-R-C) and 4 channels of ESD protection. The CM1423 has component values of 12pF-100Ω-12pF. The part includes 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.

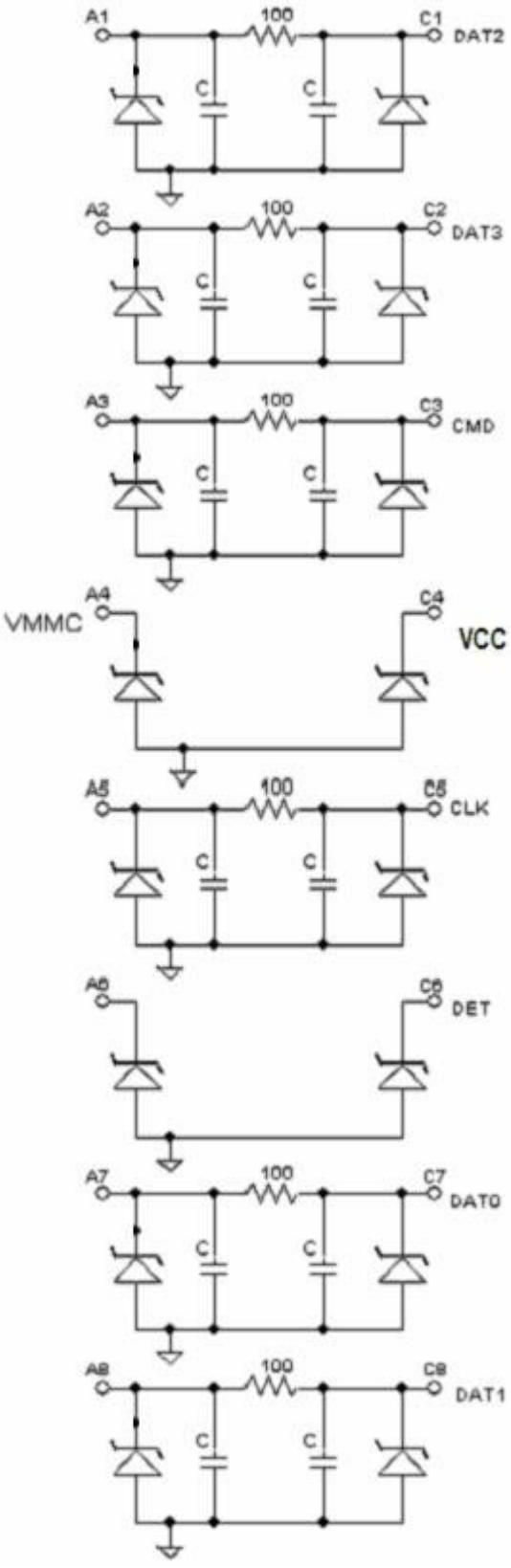
This device is particularly well suited for portable electronics (e.g. mobile handsets, PDAs, notebook computers) because of its small package format and easy-to-use pin assignments. In particular, the CM1423 is ideal for EMI filtering and protecting data lines from ESD for the Secure Digital (SD) Card interface slot in mobile handsets. The CM1423 is an all-inclusive solution for the SD card interface since its EMI filters provide the proper cut-off frequency to attenuate unwanted signals while limiting current with the appropriate pull-up resistor values.

The CM1423 is available in a space-saving, low-profile, chip-scale package, and is fabricated with one of California Micro Devices' semiconductor processes.

Package Diagram



Schematic Diagram



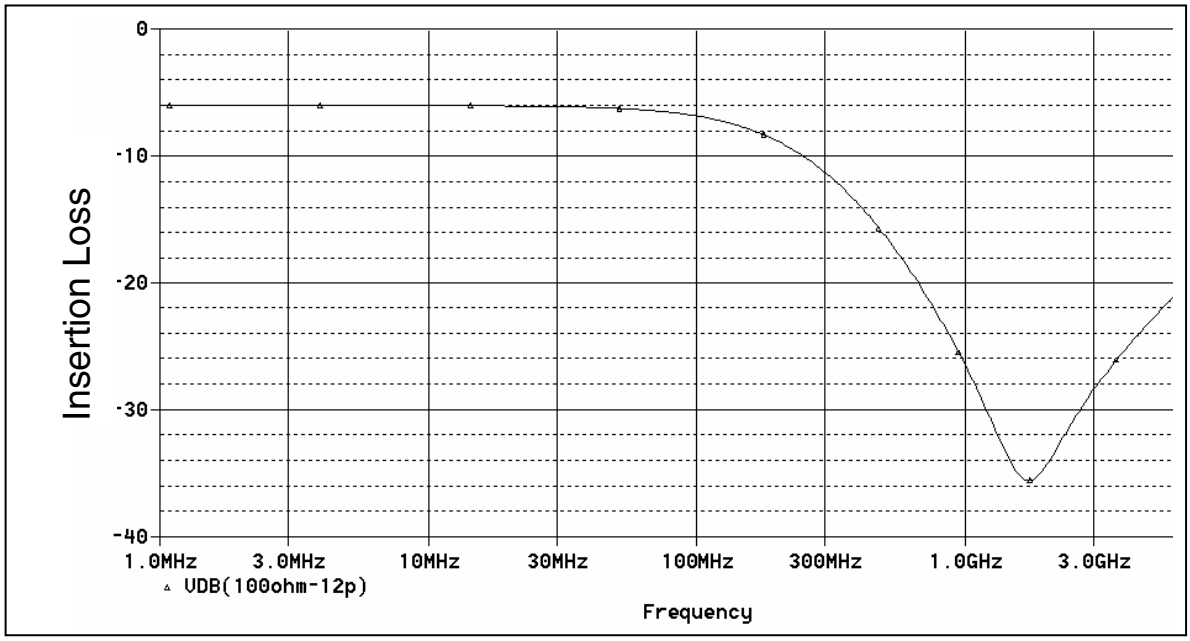
Pin Description

Pin Number	Pin Description
A1	DATA2 EMI Filter with ESD Protection – System Side
A2	DATA3 EMI Filter with ESD Protection – System Side
A3	EMI Filter with ESD Protection for CMD Signal – System Side
A4	ESD Protection for VMMC (VSS2) Supply
A5	EMI Filter with ESD Protection for CLK Signal – System Side
A6	ESD Protection for DET Signal
A7	DATA0 EMI Filter with ESD Protection – System Side
A8	DATA1 EMI Filter with ESD Protection – System Side
B1	Ground
B2	Ground
B3	Ground
B4	Ground
C1	DATA2 EMI Filter with ESD Protection – Secure Digital (SD) Card Side
C2	DATA3 EMI Filter with ESD Protection – SD Card Side
C3	EMI Filter with ESD Protection for CMD Signal – SD Card Side
C4	ESD Protection for VCC (VSS1) Supply
C5	EMI Filter with ESD Protection for CLK Signal – SD Card Side
C6	ESD Protection for DET Signal
C7	DATA0 EMI Filter with ESD Protection – SD Card Side
C8	DATA1 EMI Filter with ESD Protection – SD Card Side

Specifications: (At 25°C unless specified otherwise)	Min.	Typ.	Max.	Unit
Resistance R1	80	100	120	Ω
Capacitance C1 at 2.5V dc; 1MHz, 30mV ac	10	12	15	pF
Stand-off Voltage, I = 10µA	5.5			V
Diode Leakage at 3.3V reverse bias voltage		100		nA
Signal Clamp Voltage: Positive Clamp, 10mA Negative Clamp, -10mA	 5.6 -1.5	 6.8 -0.8	 9.0 -0.4	 V V
In-system ESD withstand voltage*: Human Body Model (MIL-STD-883, method 3015) IEC 61000-4-2, contact discharge method	 ±30 ±15			 kV kV
Clamping voltage during ESD discharge* Positive MIL-STD-883 (Method 3015), 8kV Negative		12 -7		V V
Temperature Range: Operating Storage	 -40 -65		 85 150	 °C
DC Power per Resistor:			0.1	W
DC Package Power Rating:			0.5	W

* ESD applied to input / 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 (i.e. if ESD is applied to pin A1 then clamping voltage is measured at pin C1). Unused pins are left open. These parameters are guaranteed by design.

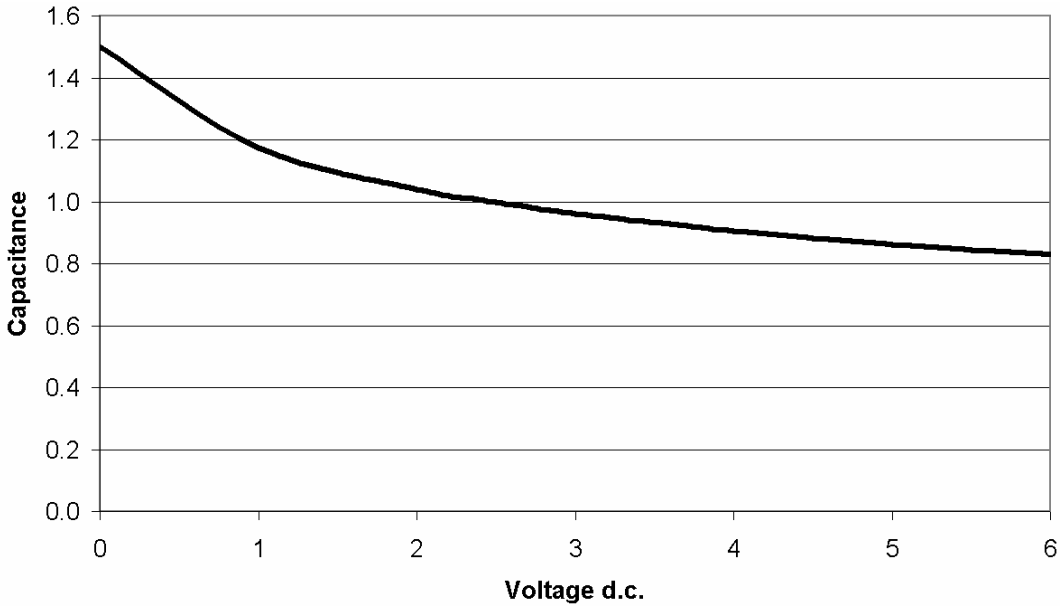
Typical EMI filter performance (2.5V d.c., 50Ω environment)



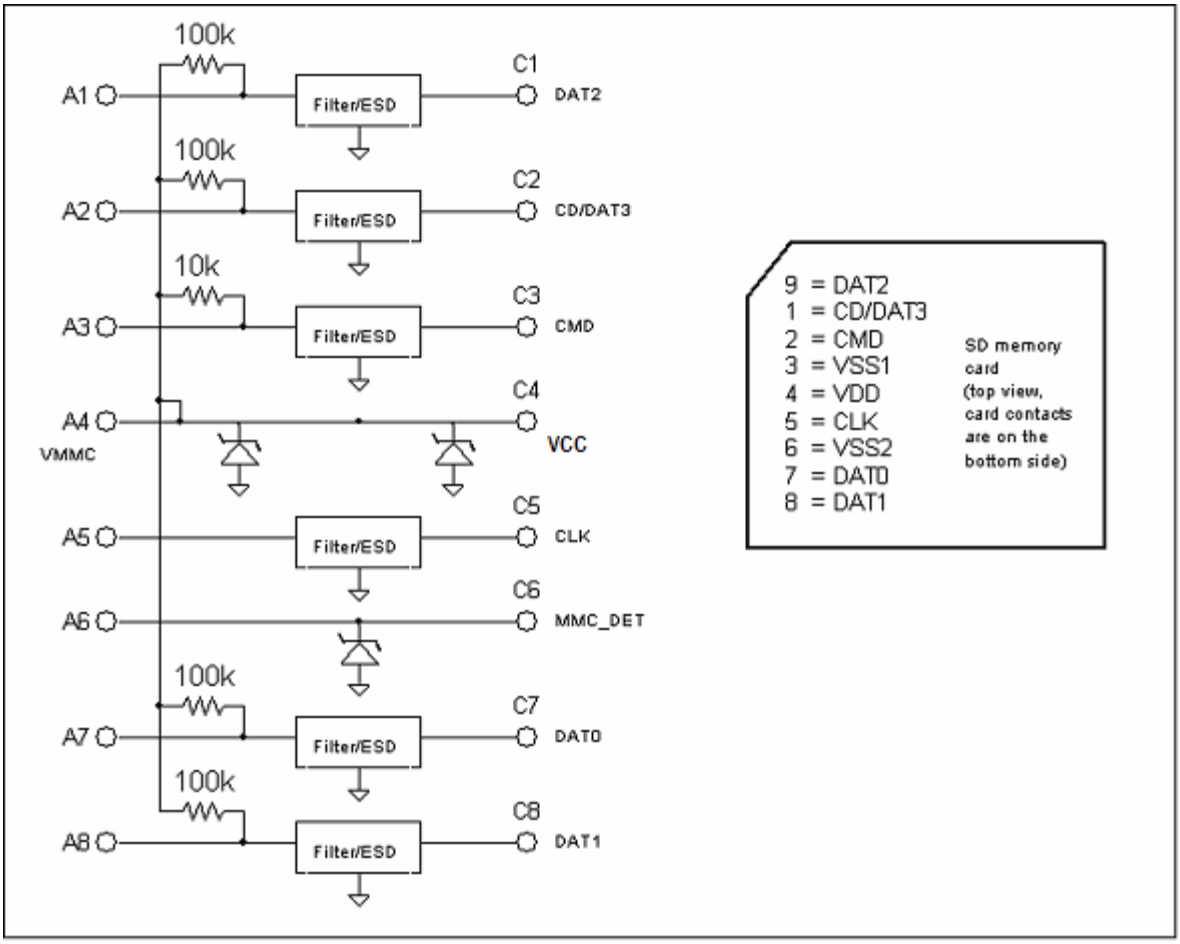
Cut-off Frequency (MHz)	R1 (Ω)	C1 (pF)	20dB Attenuation (MHz)	Over 25dB Range (MHz)
207	100	12	600	800 - 3000

All parameters in the table are typical values.

Typical diode capacitance vs. input voltage (normalized to 2.5V d.c.)

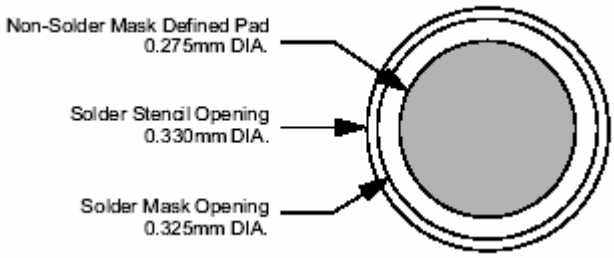


Application Information

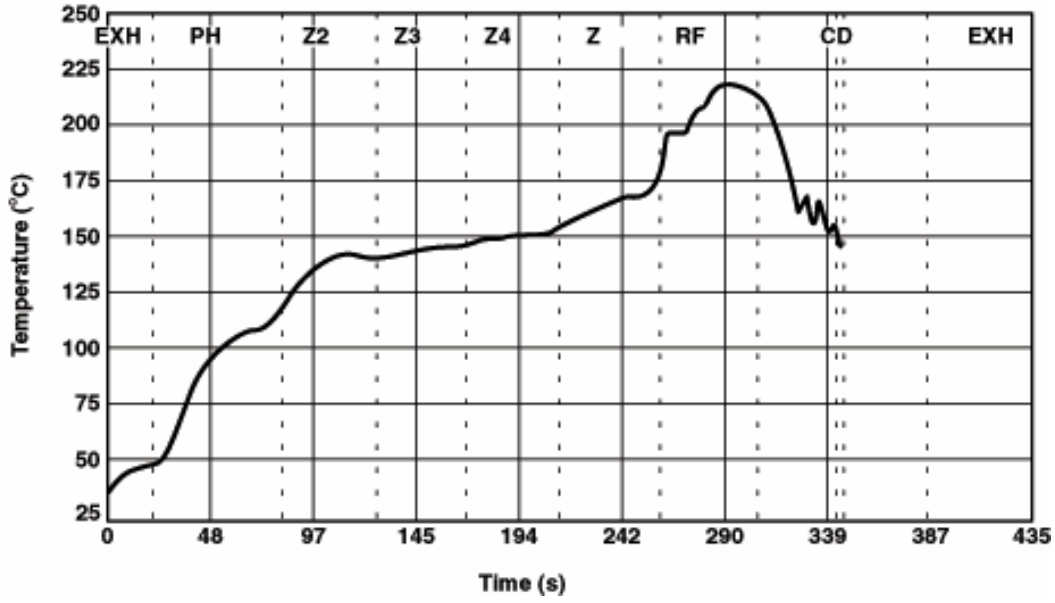


Note: 100kΩ and 10kΩ pull-up resistors are not included in CM1423. Designer will need to determine the appropriate pull-up resistor value for each design.

PRINTED CIRCUIT BOARD RECOMMENDATIONS	
Pad size in PCB	0.275mm
Pad Shape	Round
Pad Definition	Non Solder Mask Defined Pads
Solder Mask Opening	0.325mm Round
Solder Stencil Thickness	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
Bond Trace Finish	OSP (Entek Cu Plus 106A)
Tolerance – Edge to Corner Ball	±50µm
Solder Ball Side Coplanarity	±20µm
Maximum Dwell Time above Liquidous (183°C)	60 seconds
Soldering Maximum Temperature	260°C



Solder Reflow Profile



Tape & Reel Information

CMD PART #	CHIP SIZE (mm)	POCKET SIZE (mm) Bo x Ao x Ko	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
CM1423	4.00 x 1.46 x 0.6	TBD	8mm	178mm (7")	3500	4mm	4mm