

Pi filter array with ESD protection.

PRODUCT DESCRIPTION

UMD1423 is a Pi filter array with TVS diodes for ESD protection. This device has six Pi filters integrated along with four channels of ESD protection.

The Pi filters have values of CRC (12pF, 100Ω, 12pF). The TVS diodes protect every input and output pin of the filter, providing excellent protection for sensitive electronic components against Electro Static Discharge (ESD). These are designed to safely dissipate ESD voltages of ±10kV.

This is more than the requirement specified in IEC61000-4-2, under the human body model. In terms of the contact discharge model, the TVS diodes can dissipate voltages greater than ±25kV.

This device has 20-bumps 4.000mm x 1.458mm footprint and integrates 34 components into small form factor Chip Scale Package (CSP) solution.

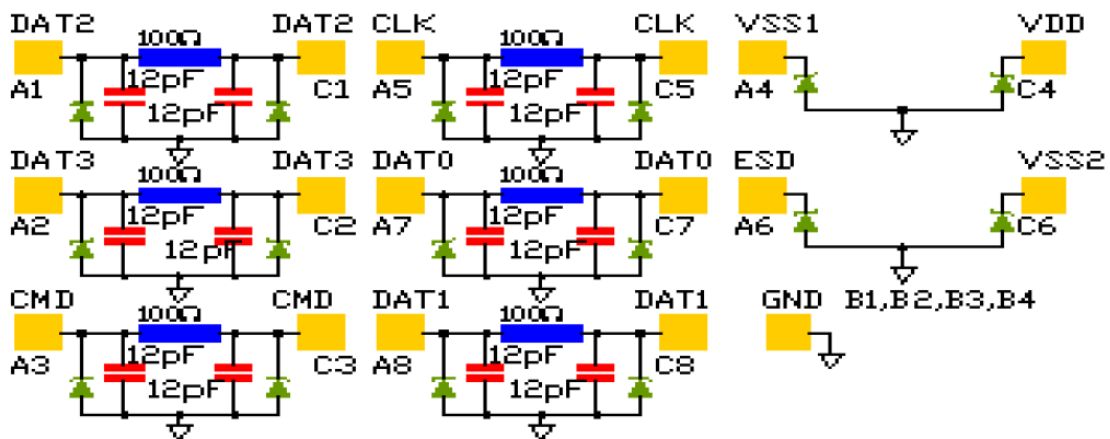
FEATURES

- ※ This device has six channels of EMI/RFI filters and four additional channels for ESD protection.
- ※ This filter has a low insertion loss and very good out of band rejection.
- ※ Offers ESD protection of ±10kV (IEC61000-4-2) on all pins.
- ※ Devices come with lead-free versions.
- ※ Complies with the following standards:
 - IEC 61000-4-2 (ESD) Air-15kv, Contact-8kv
 - IEC 61000-4-4 (EFT) (5/50ns)
 - IEC 61000-4-5 (Surge) (8/20μs)

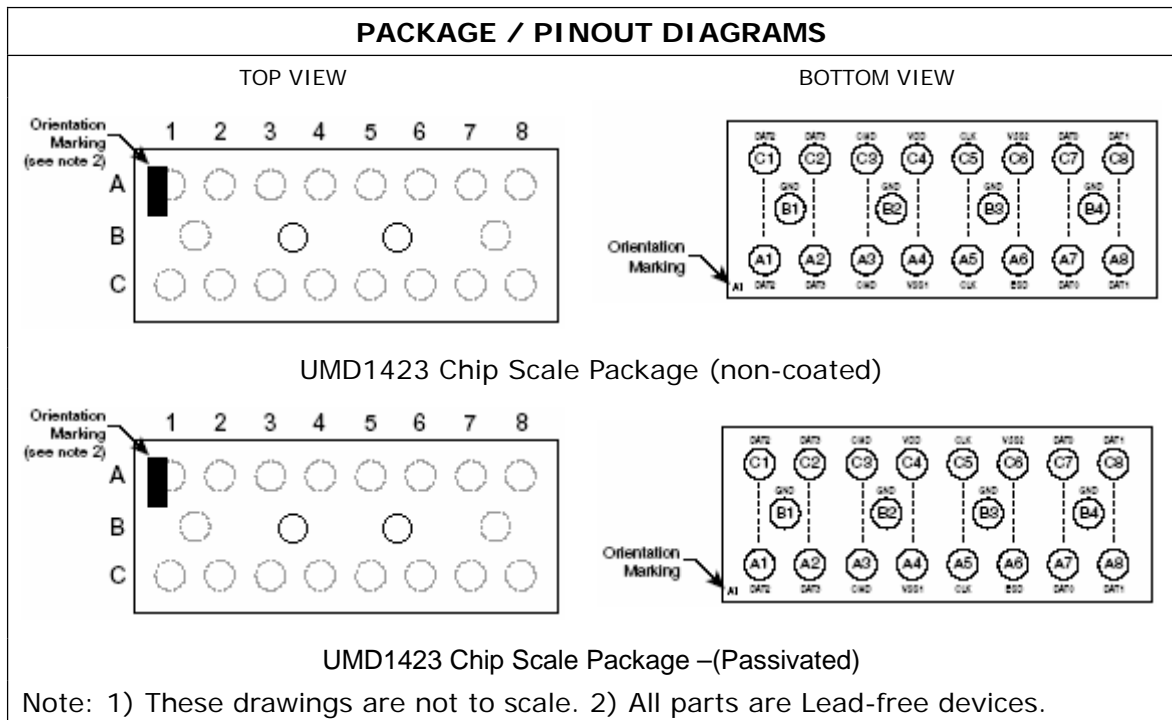
APPLICATIONS

- ※ 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, and PDAs etc.
- ※ EMI filtering for data ports in cell phones, PDAs or notebook computers

ELECTRICAL SCHEMATIC



Pi filter array with ESD protection.



PIN DESCRIPTIONS

PIN(s)	NAME	DESCRIPTION	PIN(s)	NAME	DESCRIPTION
A1	DAT2	Data2 filter+ESD channel, system side	C1	DAT2	Data2 filter+ESD channel, SD card side
A2	DAT3	Data3 filter+ESD channel, system side	C2	DAT3	Data3 filter+ESD channel, SD card side
A3	CMD	CMD signal filter+ESD channel, system side	C3	CMD	CMD signal filter+ESD channel, SD card side
A4	VSS1	ESD-only channel, supply voltage ground	C4	VDD	ESD-only channel, supply voltage
A5	CLK	Clock filter+ ESD channel	C5	CLK	Clock filter+ ESD channel
A6	ESD	ESD-only channel	C6	VSS2	ESD-only channel, supply voltage ground
A7	DAT0	Data0 filter+ESD channel, system side	C7	DAT0	Data0 filter+ESD channel, SD card side
A8	DAT1	Data1 filter+ESD channel, system side	C8	DAT1	Data1 filter+ESD channel, SD card side
B1-B4	GND	Device ground			

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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
C	Capacitance	@2.5vDC, 1Mz, 30mv AC	9	12	15	pF
V _{standoff}	Diode standoff voltage	I _{diode} = 10μA	5.5	6.0		V
I _{leak}	Diode leakage current	V _{diode} = 3.3V		100		nA
V _{sig}	Signal voltage					
	Positive clamp	I _{load} = 10mA	5.6	6.8	9.0	V
	Negative clamp	I _{load} = -10mA	-1.5	-0.8	-0.4	V
V _{esd}	In-system ESD withstand voltage					
	a.) HBM, MIL-STD-883, Method 3015	Notes 2,4 and 5	±25			kV
	b.) Contact discharge per IEC 61000-4-2 Level 4		±10			kV
V _{cl}	Clamping Voltage during					
	Positive transients	Notes 2,3, 4 and 5		+12.0		V
	Negative transients			-7.0		V
F _c	Cut-off frequency	R = 100Ω, C = 12pF (Note5)		145		MHz
	Z _{source} = 50Ω, Z _{load} = 50Ω					

Note 1: T_A = 25°C unless otherwise specified.

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

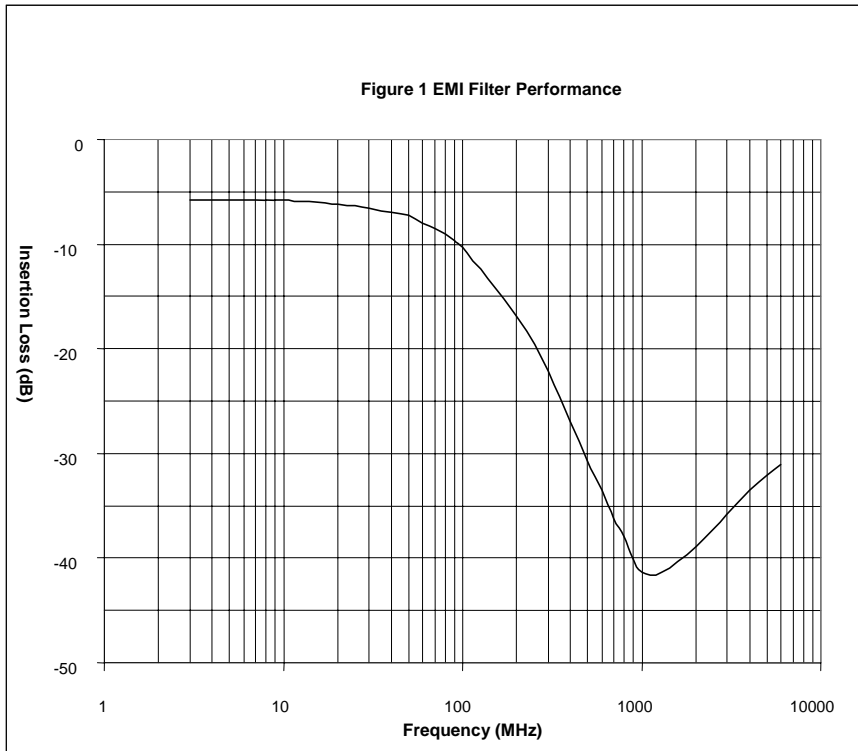
Note 3: Clamping voltage is measured at the opposite side of the EMI filter to the ESD pin.

Note 4: Unused pins are left open

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

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PERFORMANCE CHARACTERISTICS



Typical Filter Performance (nominal conditions, 50 Ohm Environment, unless specified)

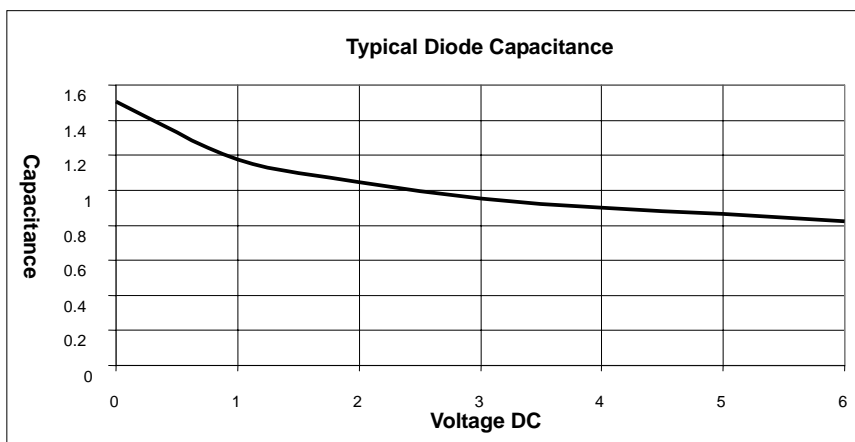
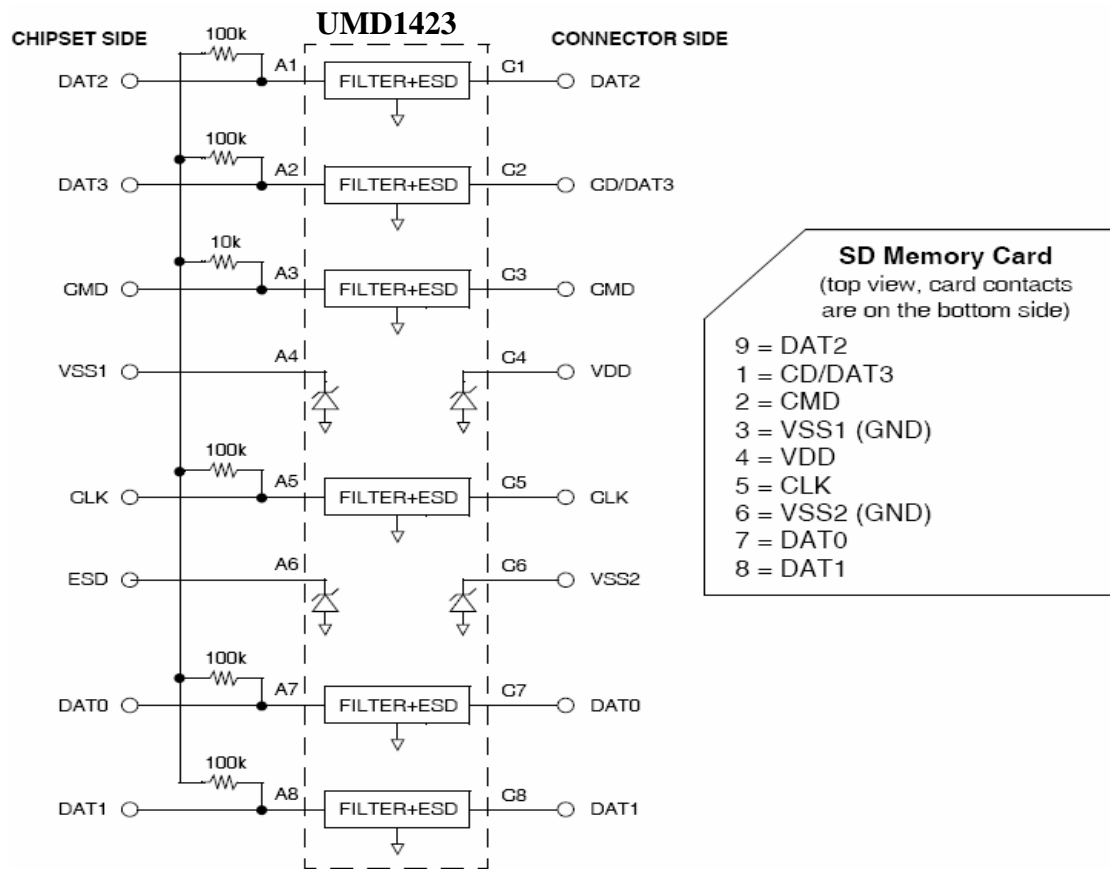


Fig 2: Typical Junction Capacitance vs. Input Voltage normalized to 2.5V

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APPLICATION INFORMATION



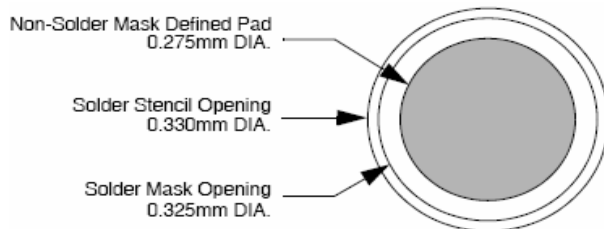
Typical Secure Digital Card application

Note: 100kΩ and 10kΩ pull-up resistors are not included in UMD1423. Designer will need to determine the appropriate pull-up resistor value for each design.

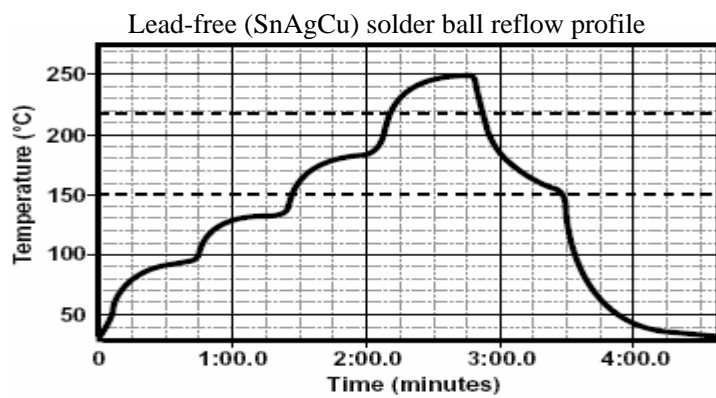
Pi filter array with ESD protection.

APPLICATION INFORMATION

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 opening	0.330mm Round
Solder flux ratio	50/50 by volume
Solder paste type	No clean
Tolerance- edge to corner ball	±50µm
Solder ball side co planarity	±20µm
Max. dwell time above liquidous (183°C)	60 seconds
Max. soldering temp. for lead-free devices	260°C



Recommended Non-Solder Mask Defined Pad Illustration



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MECHANICAL DETAILS

PACKAGE DIMENSIONS FOR UMD1423						
PACKAGE	Custom CSP					
BUMPS	20					
DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A1	3.955	4.000	4.045	0.1557	0.1575	0.1593
A2	1.413	1.458	1.503	0.0556	0.0574	0.0592
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
B3	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	0.200	0.250	0.300	0.0079	0.0098	0.0118
C2	0.244	0.294	0.344	0.0096	0.0116	0.0135
D1	0.561	0.605	0.649	0.0221	0.0238	0.0256
D2	0.355	0.380	0.405	0.0140	0.0150	0.0159
D3	0.600	0.670	0.739	0.0236	0.0264	0.0291
D4	0.394	0.445	0.495	0.0155	0.0175	0.0195

