CM1402

SIM Card EMI Filter Array
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trie o ±10 kV, beyond the maximum requirement of the IEC 61000 4

March, 2011 − Rev. 4
Publication Order Number:
CM1402/D

ELECTRICAL SCHEMATIC

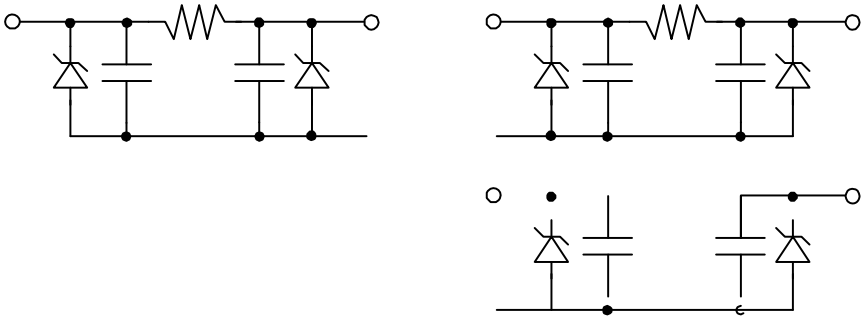


Table 3. STANDARD OPERATING CONDITIONS

Parameter	Rating	Units
Operating Temperature Range	–40 to +85	°C

Table 4. ELECTRICAL OPERATING CHARACTERISTICS (Note 1)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
R_1	Resistance of R_1		80	100	120	Ω
R_2	Resistance of R_2		38	47	56	Ω
C	Capacitance	VIN = 2.5 VDC, 1 MHz, 30 mV ac	16	20	24	pF
$V_{STANDOFF}$	Stand−off Voltage	I = 10 μA		6.0		V
I_{LEAK}	Diode Leakage Current	V_{BIAS} = 3.3 V		0.1	1.0	μA
V_{SIG}	Signal Voltage Positive Clamp Negative Clamp	 I_{LOAD} = 10 mA I_{LOAD} = −10 mA	 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	(Notes 2 and 4)	 ±25 ±10			kV
V_{CL}	Clamping Voltage during ESD Discharge MIL−STD−883 (Method 3015), 8 kV Positive Transients Negative Transients	(Notes 2, 3 and 4)			 +12 −7	V
f_{C1}	Cut−off Frequency Z_{SOURCE} = 50 Ω, Z_{LOAD} = 50 Ω	R = 100 Ω, C = 20 pF		77		MHz
f_{C2}	Cut−off Frequency Z_{SOURCE} = 50 Ω, Z_{LOAD} = 50 Ω	R = 47 Ω, C = 20 pF		85		MHz

1. T_A = 25°C unless otherwise specified.
2. ESD applied to input and output pins with respect to GND, one at a time.
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 A1, then clamping voltage is measured at Pin C1.
4. Unused pins are left open.

PERFORMANCE INFORMATION

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

Figure 1. A1−C1 EMI Filter Performance

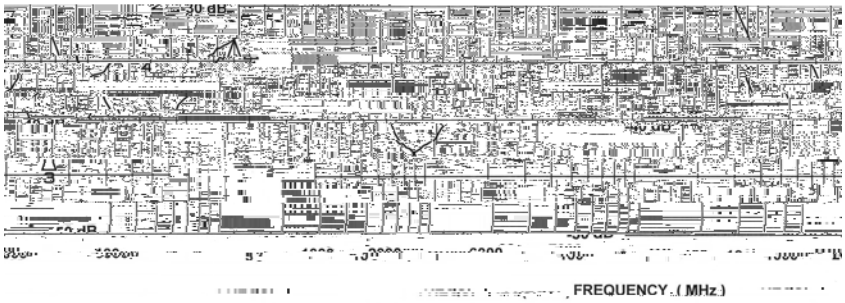


Figure 2. A2−C2 EMI Filter Performance

PERFORMANCE INFORMATION (Cont'd)

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

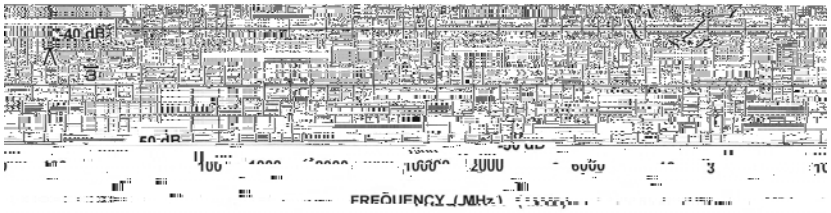


Figure 3. A3−C3 EMI Filter Performance

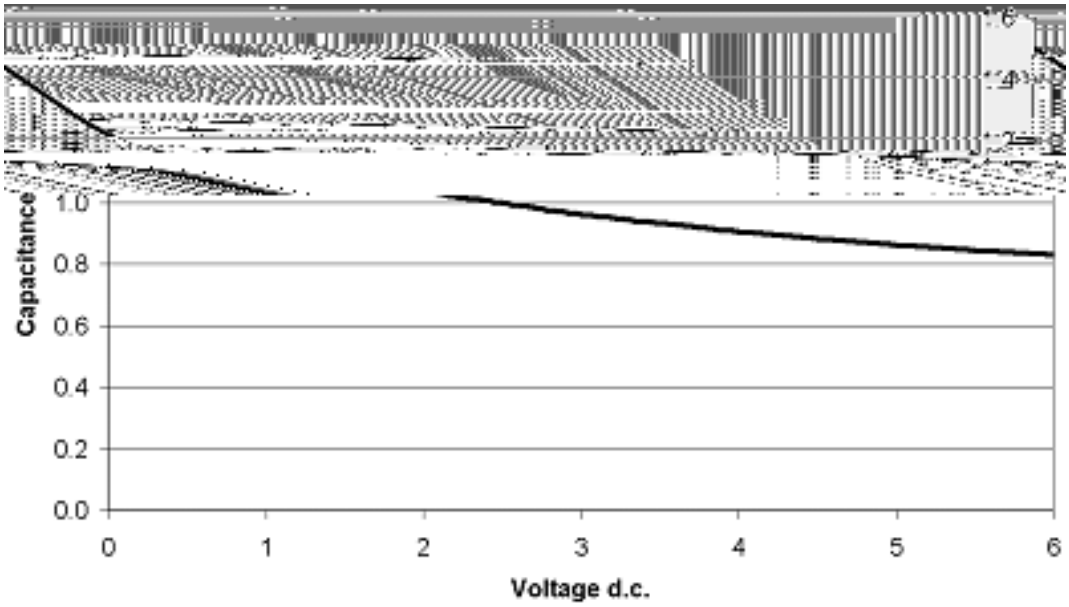
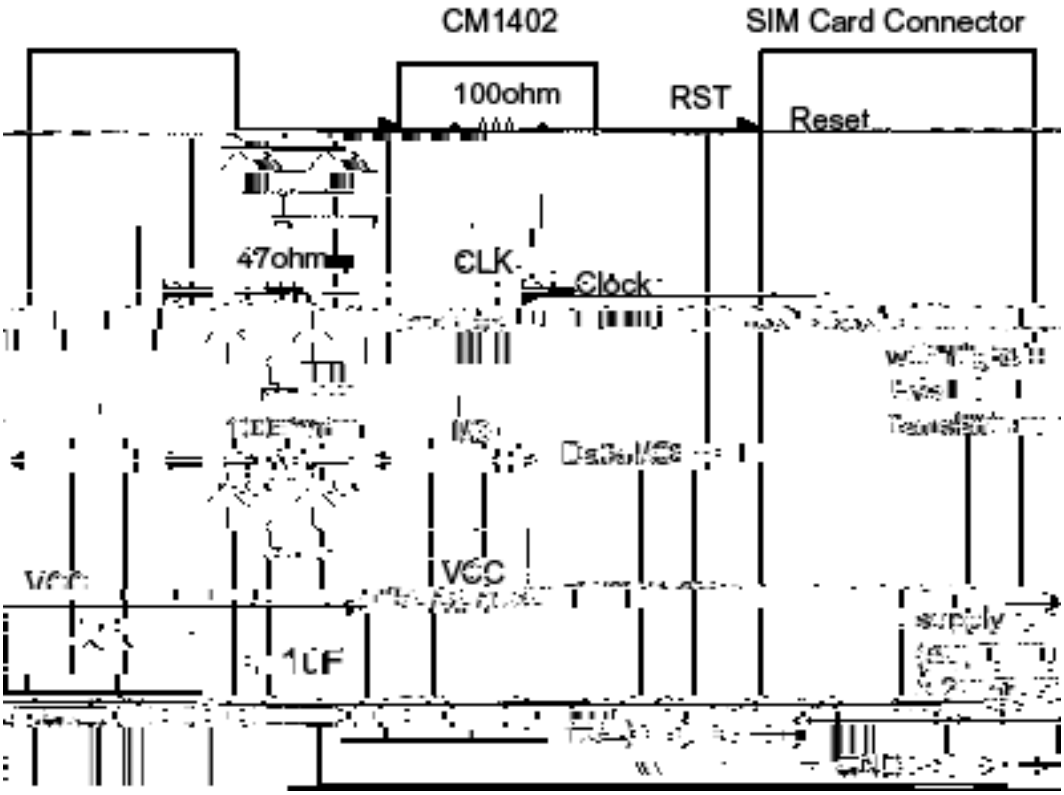


Figure 4. Typical Diode Capacitance vs. Input Voltage (normalized to 2.5 VDC)

APPLICATION INFORMATION

The CM1402 provides a bidirectional filter and protector for all the signals and the power line on the SIM (subscriber identity module) card connector. SIM cards are found in all GSM cellular phones and in some other handheld devices or card readers. The ESD diodes protect the controller against possible ESD strikes that may occur when the connector pins are exposed during direct contact, or during insertion of the SIM card into the card slot. The EMI filter suppresses all high frequency noise, preventing the unwanted EMI signals from both entering and exiting the main board. The signals that interface with the SIM card are the Reset, the Clock and the bidirectional data I/O, as shown in Typical Application Diagram for the SIM Card Interface.



Note: One channel of the CM1402 with a zener diode is not shown on the diagram.

Figure 5. Typical Application Diagram for the SIM Card Interface

For best filter and ESD performance, both GND bumps (B1, B2) of the CM1402 should be directly connected to the Ground plane. A small capacitor of about 1 μF is required next to the V_{CC} pin of the SIM connector in order to improve stability of the SIM card supply rail.

For information on the assembly of the CM1402 to the PCB (printed circuit board), please refer to the Chip Scale Package (CSP) Application Note AP217, or contact factory at 800 282 9855 for technical support.

APPLICATION INFORMATION

Table 5. PRINTED CIRCUIT BOARD RECOMMENDATIONS

Parameter	Value
Pad Size on PCB	0.240 mm
Pad Shape	Round
Pad Definition	Non−Solder Mask defined pads
Solder Mask Opening	0.290 mm Round
Solder Stencil Thickness	0.125 − 0.150 mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.300 mm 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	±50 μm
Solder Ball Side Coplanarity	±20 μm
Maximum Dwell Time Above Liquidous (183