ON Semiconductor®

2 Channel Headset Microphone EMI Filter with ESD Protection

CSPEMI202AG

Features

- Two channels of EMI filtering
- Pi-style EMI filters in a capacitor-resistor-capacitor (C-R-C) network
- Greater than 40dB attenuation at 1GHz
- ±8kV ESD protection on each channel (IEC 61000-4-2 Level 4, contact discharge)
- ±15kV ESD protection on each channel (HBM)
- Supports bipolar signals—ideal for audio applications
- Chip Scale Package features extremely low lead inductance for optimum filter and ESD performance
- 5-bump, 0.930mm X 1.410mm footprint Chip Scale Package (CSP)
- RoHS compliant (lead-free) finishing

Applications

- EMI filtering and ESD protection for headset microphone ports
- Wireless Handsets
- Handheld PCs / PDAs
- MP3 Players
- Digital Camcorders
- Notebooks
- Desktop PCs

Product Description

The CSPEMI202AG is a dual low-pass filter array integrating two pi-style filters (C-R-C) that reduce EMI/RFI emissions while at the same time providing ESD protection. This part is custom-designed to interface with a microphone port on a cellular telephone or similar device. Each high quality filter provides more than 35dB attenuation in the 800-2700 MHz range. These pi-style filters support bidirectional filtering, controlling EMI both to and from a microphone element. They also support bipolar signals, enabling audio signals to pass through without distortion.

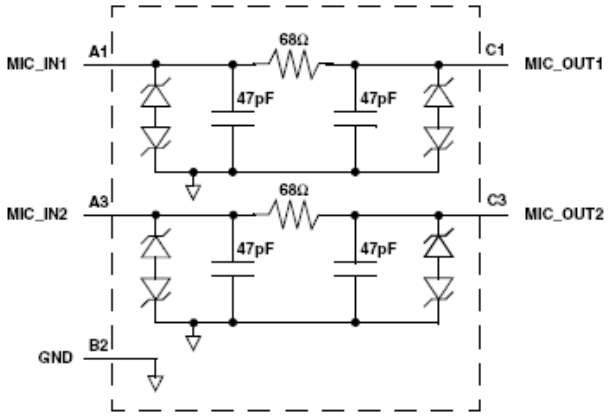
In addition, the CSPEMI202AG provides a very high level of protection for sensitive electronic components that may be subjected to electrostatic discharge (ESD). The diodes safely dissipate ESD strikes of ±8kV, the maximum requirement of the IEC 61000-4-2 international standard. Using the MIL-STD-883 (Method 3015) specification for Human Body Model (HBM) ESD, the device provides protection for contact discharges to greater than ±15kV.

The CSPEMI202AG is particularly well-suited for portable electronics (e.g., cellular telephones, PDAs, notebook computers) because of its small package format and low weight. The CSPEMI202AG is available in a space-saving, low-profile Chip Scale Package with RoHS compliant lead-free finishing.

April 2010 Rev. 3

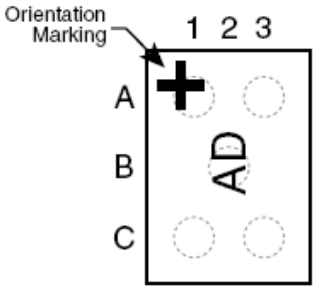
Publication Order Number:
CSPEMI202AG/D

Electrical Schematic

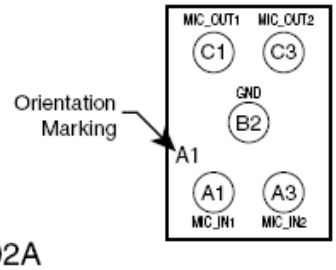


PACKAGE / PINOUT DIAGRAMS

TOP VIEW
(Bumps Down View)



BOTTOM VIEW
(Bumps Up View)



CSPEMI202A
CSP Package

Note:
1) These drawings are not to scale.

PIN DESCRIPTIONS		
PIN	**NAME**	**DESCRIPTION**
A1	MIC_IN1	Microphone Input 1 (from microphone)
A3	MIC_IN2	Microphone Input 2 (from microphone)
B2	GND	Device Ground
C1	MIC_OUT1	Microphone Output 1 (to audio circuitry)
C3	MIC_OUT2	Microphone Output 2 (to audio circuitry)

Ordering Information

PART NUMBERING INFORMATION			
Bumps	**Package**	**Ordering Part Number**[1]	**Part Marking**
5	CSP	CSPEMI202AGG	AD

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

Specifications

ABSOLUTE MAXIMUM RATINGS		
PARAMETER	**RATING**	**UNITS**
Storage Temperature Range	-65 to +150	°C
DC Power per Resistor	100	mW
DC Package Power Rating	200	mW

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

ELECTRICAL OPERATING CHARACTERISTICS[1]

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
R_1	Resistance		61	68	75	Ω
C_1	Capacitance		38	47	56	pF
I_{LEAK}	Diode Leakage Current	V_{IN}=5.0V			1.0	μA
V_{SIG}	Signal Voltage Positive Clamp Negative Clamp	I_{LOAD} = 10mA	 5 -15	 7 -10	 15 -5	 V 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	Note 2	 ±15 ±8			 kV kV
V_{CL}	Clamping Voltage during ESD Discharge MIL-STD-883 (Method 3015), 8kV Positive Transients Negative Transients	Notes 2 and 3		 +15 -19		 V V
f_C	Cut-off frequency Z_{SOURCE} = 50Ω, Z_{LOAD} = 50Ω	R = 68Ω, C = 47pF		60		MHz

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. For example, if ESD is applied to Pin A1, then clamping voltage is measured at Pin C1.

Performance Information

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

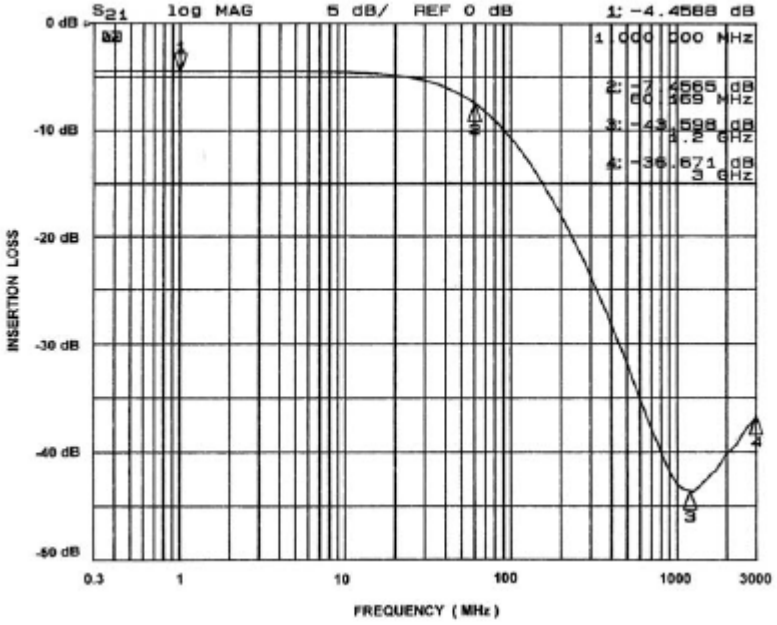


Figure 1. Insertion Loss VS. Frequency (A1-C1 to GND B2)

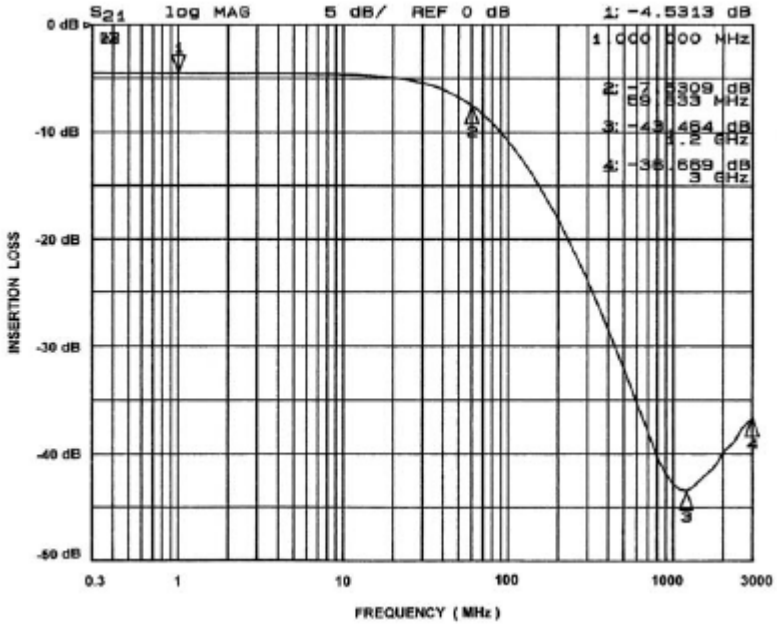


Figure 2. Insertion Loss VS. Frequency (A3-C3 to GND B2)

Application Information

PARAMETER	VALUE
Pad Size on PCB	0.240mm
Pad Shape	Round
Pad Definition	Non-Solder Mask defined pads
Solder Mask Opening	0.290mm Round
Solder Stencil Thickness	0.125mm - 0.150mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.300mm 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
Maximum Soldering Temperature for Lead-free Devices using a Lead-free Solder Paste	260°C

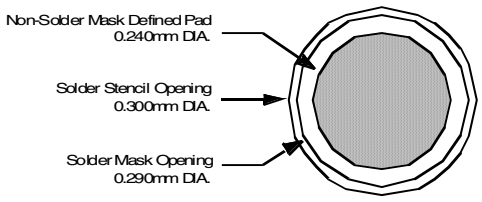


Figure 8. Recommended Non-Solder Mask Defined Pad Illustration

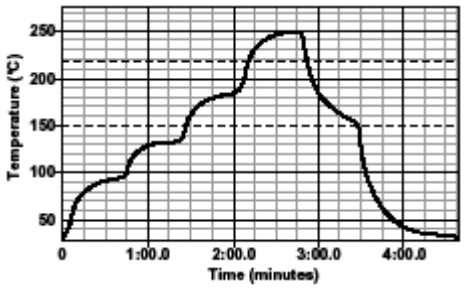


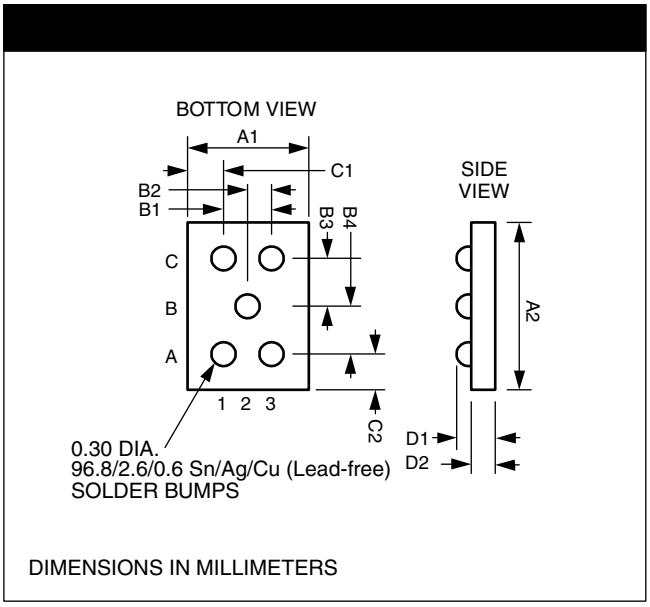
Figure 9. Lead-free (SnAgCu) Solder Ball Reflow Profile

Mechanical Details

CSP Mechanical Specifications

The CSPEMI202AG is available in a custom Chip Scale Package (CSP). Dimensions are presented below. For complete information on CMD's Chip Scale Packaging, see the California Micro Devices CSP Package Information document.

PACKAGE DIMENSIONS						
Package	Custom CSP					
Bumps	5					
Dim	**Millimeters**			**Inches**		
	Min	**Nom**	**Max**	**Min**	**Nom**	**Max**
A1	0.885	0.930	0.975	0.0348	0.0366	0.0384
A2	1.365	1.410	1.455	0.0537	0.0555	0.0573
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	0.165	0.215	0.265	0.0065	0.0085	0.0104
C2	0.220	0.270	0.320	0.0087	0.0106	0.0126
D1	0.562	0.606	0.650	0.0221	0.0239	0.0256
D2	0.356	0.381	0.406	0.0140	0.0150	0.0160
# per tape and reel	3500 pieces					
Controlling dimension: millimeters						



Package Dimensions for CSPEMI202AG 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
CSPEMI202AG	1.41 X 0.93 X 0.606	1.52 X 1.07 X 0.72	8mm	178mm (7")	3500	4mm	4mm

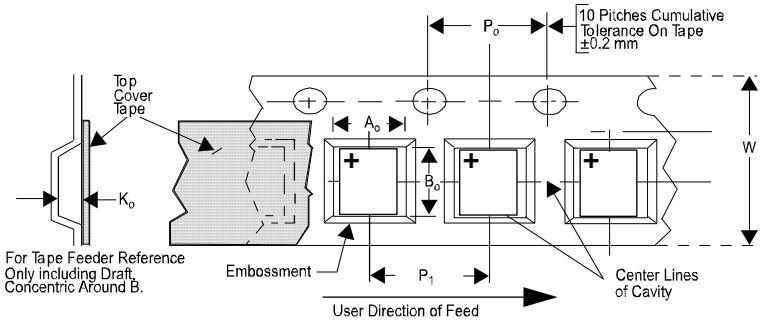


Figure 5. Tape and Reel Mechanical Data

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
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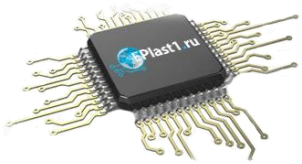

Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.