CSPEMI205G

3-Channel Headset Microphone EMI Filter with ESD Protection

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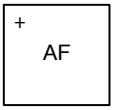
WLCSP8
CASE 567BE

MARKING DIAGRAM



AF = CSPEMI205G

ORDERING INFORMATION

Device	Package	Shipping†
CSPEMI205G	CSP−8 (Pb−Free)	3500/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

Product Description

The CSPEMI205G is a low−pass filter array integrating three 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 the headset port on a cellular telephone, and contains two different filter values. Each high quality filter provides more than 30 dB attenuation in the 800−2700 MHz range. These pi−style filters support bidirectional filtering, controlling EMI both to and from the microphone and speaker elements. They also support bipolar signals, enabling audio signals to pass through without distortion.

In addition, the CSPEMI205G provides a very high level of protection for sensitive electronic components that may be subject to electrostatic discharge (ESD). The input pins safely dissipate ESD strikes of ±8 kV, 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 ±15 kV.

The CSPEMI205G is particularly well−suited for portable electronics (e.g. cellular telephones, PDAs, notebook computers) because of its small package format and low weight. The CSPEMI205G is available in a space−saving, low−profile Chip Scale Package with RoHS compliant lead−free finishing.

Features

- Three Channels of EMI Filtering, Two for Earpiece Speakers and One for a Microphone
- Pi−Style EMI Filters in a Capacitor−Resistor−Capacitor (C−R−C) Network
- Chip Scale Package Features Extremely Low Parasitic Inductance for Optimum Filter Performance
- Greater than 30 dB Relative Attenuation in the 800−2700 MHz Range
- ±8 kV ESD Protection on each Channel (IEC 61000−4−2 Level 4, Contact Discharge)
- ±15 kV ESD Protection on each Channel (HBM)
- 8−Bump, 1.41 x 1.430 mm Footprint Chip Scale Package (CSP)
- These Devices are Pb−Free and are RoHS Compliant

Applications

- EMI Filtering and ESD Protection for Headset Microphone and Speaker
- Cellular / Mobile Phones
- Notebooks and Personal Computers
- Handheld PCs / PDAs / Tablets
- Wireless Handsets
- Digital Camcorders

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ELECTRICAL SCHEMATIC

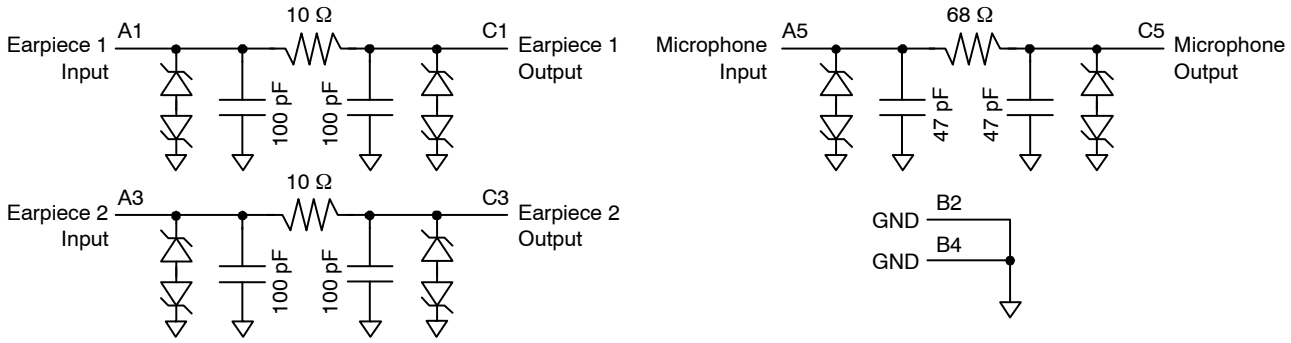
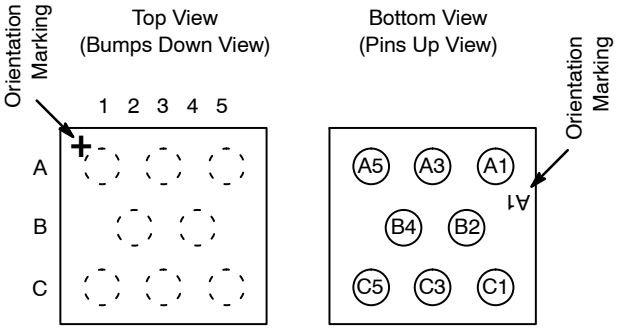


Table 1. PIN DESCRIPTIONS

8−bump CSP Package		
Pin	**Name**	**Description**
A1	EAR1_IN	Earpiece Input 1 (from audio circuitry)
A3	EAR2_IN	Earpiece Input 2 (from audio circuitry)
A5	MIC_IN	Microphone Input (from microphone)
B2	GND	Device Ground
B4	GND	Device Ground
C1	EAR1_OUT	Earpiece Output 1 (to earpiece)
C3	EAR2_OUT	Earpiece Output 2 (to earpiece)
C5	MIC_OUT	Microphone Output (to audio circuitry)

PACKAGE / PINOUT DIAGRAMS



CSPEMI205
CSP Package

SPECIFICATIONS

Table 2. ABSOLUTE MAXIMUM RATINGS

Parameter	Rating	Units
Storage Temperature Range	−65 to +150	°C
DC Power per Resistor	100	mW
DC Package Power Rating	300	mW

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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		9	10	11	Ω
R_2	Resistance		54	68	75	Ω
C_1	Capacitance		80	100	120	pF
C_2	Capacitance		38	47	57	pF
I_{LEAK}	Diode Leakage Current	V_{IN} = 5.0 V			1.0	μA
V_{SIG}	Signal Voltage Positive Clamp Negative Clamp	I_{LOAD} = 10 mA	 5 −15	 7 −10	 15 −5	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 and 4)	 ±15 ±8			kV
V_{CL}	Clamping Voltage during ESD Discharge MIL−STD−883 (Method 3015), 8 kV Positive Transients Negative Transients	(Notes 2, 3 and 4)		 +15 −19		V
f_{C1}	Cut−off frequency 1; (Note 5)	R = 10 Ω, C = 100 pF		34		MHz
f_{C2}	Cut−off frequency 2; (Note 5)	R = 68 Ω, C = 47 pF		63		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.
5. Z_{SOURCE} = 50 Ω, Z_{LOAD} = 50 Ω

PERFORMANCE INFORMATION

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

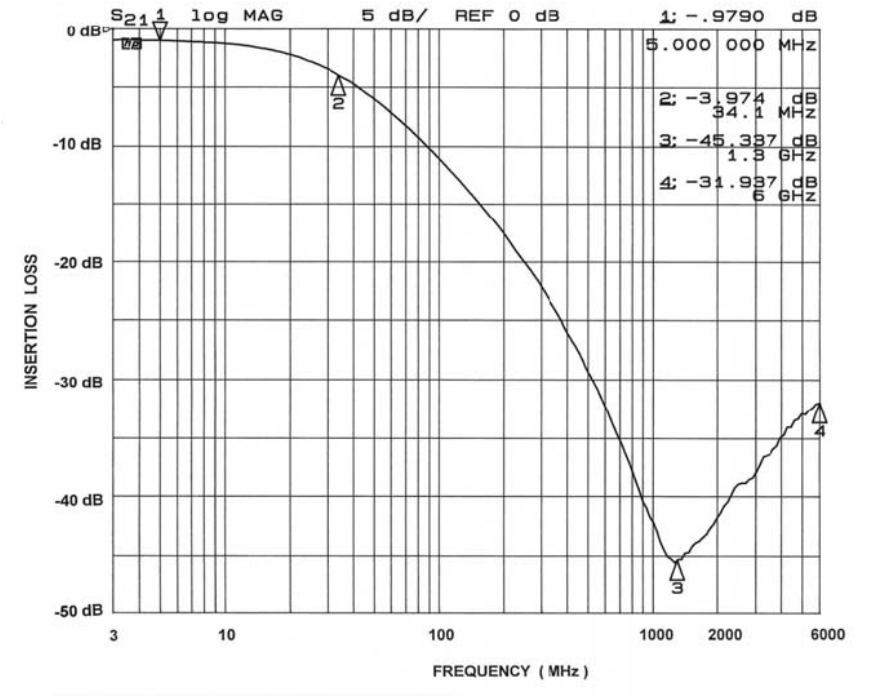


Figure 1. Earpiece Circuit (A1−C1) EMI Filter Performance

PERFORMANCE INFORMATION (Cont'd)

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

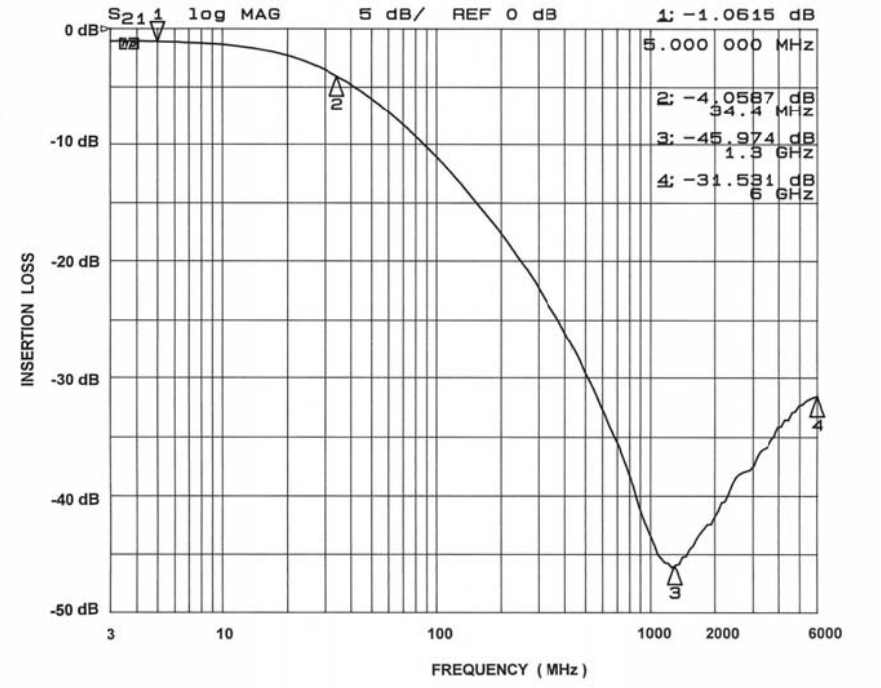


Figure 2. Earpiece Circuit (A3−C3) EMI Filter Performance

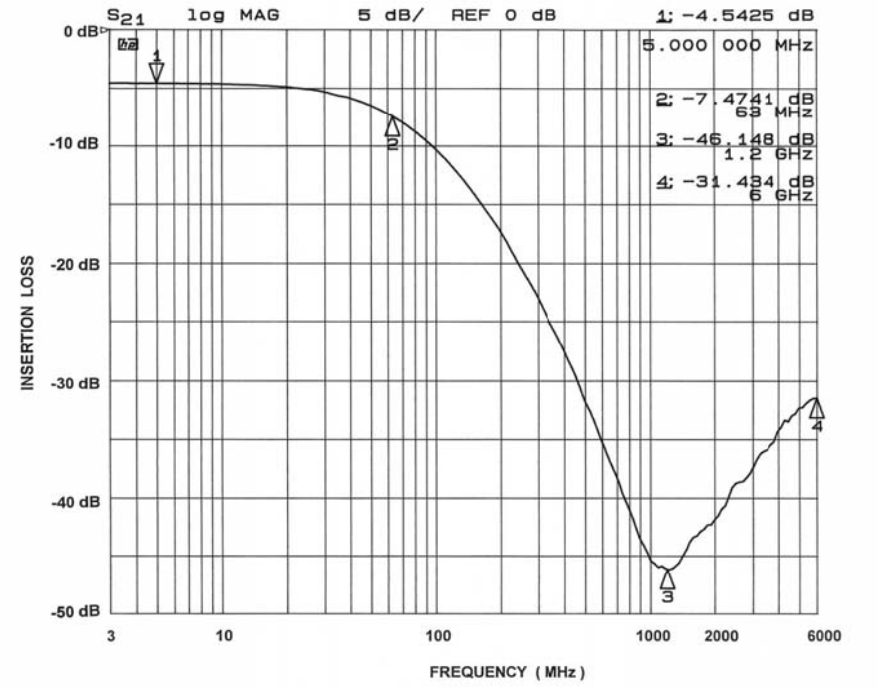


Figure 3. Microphone Circuit (A5−C5) EMI Filter Performance

APPLICATION INFORMATION

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 mm − 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	60 seconds
Maximum Soldering Temperature for Lead−free Devices using a Lead−free Solder Paste	260°C

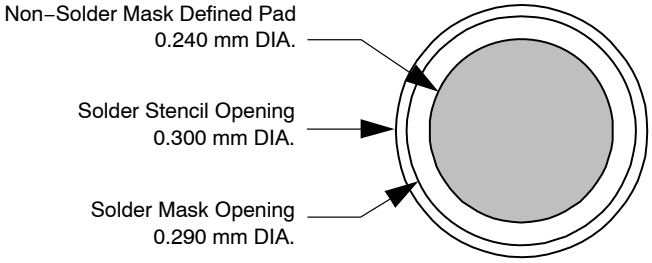


Figure 4. Recommended Non−Solder Mask Defined Pad Illustration

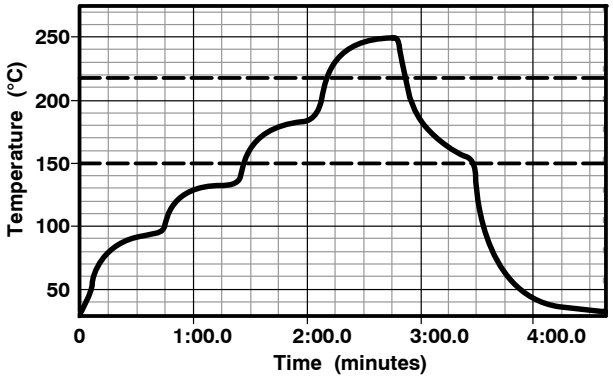
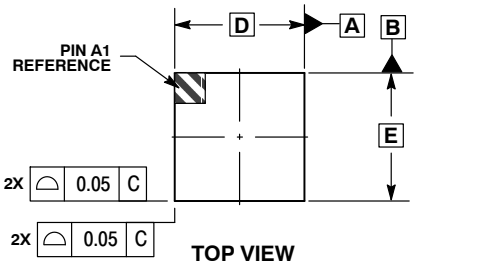


Figure 5. Lead−free (SnAgCu) Solder Ball Reflow Profile

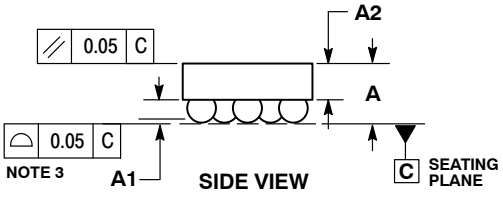
WLCSP8, 1.43x1.41
CASE 567BE
ISSUE O

SCALE 4:1

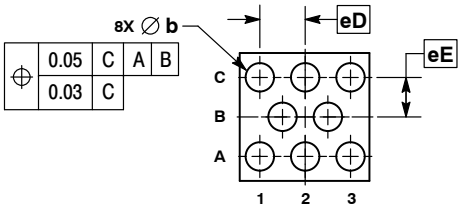
DATE 26 JUL 2010



TOP VIEW



SIDE VIEW

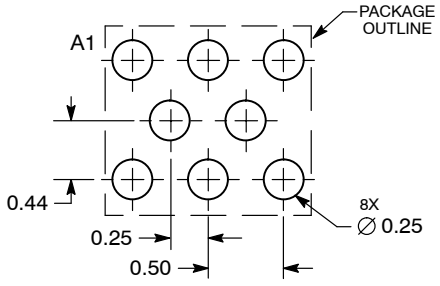


BOTTOM VIEW

NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. COPLANARITY APPLIES TO SPHERICAL CROWNS OF SOLDER BALLS.

	MILLIMETERS	
DIM	MIN	MAX
A	0.56	0.65
A1	0.21	0.27
A2	0.40 REF	
b	0.29	0.35
D	1.43 BSC	
E	1.41 BSC	
eD	0.50 BSC	
eE	0.435 BSC	

RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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