

**Integrated EMI Filter & ESD Protection For  
Earpiece Speaker Ports**
**PRODUCTION DATA SHEET**
**DESCRIPTION**

Proliferation of digital portable electronic equipment has created a noisy environment in which all devices become susceptible to Electromagnetic Interference (EMI). Interference from cell phone frequencies of 800-900 MHz and 1.9GHz as well as the growing wireless LAN frequencies of 2.4-6GHz can couple into the speaker port of a handheld device and adversely affect its performance. FCC Part 15 sets maximum allowable emission and immunity levels for all digital devices.

LX7205 is an integrated low pass filter with ESD protection that filters out the undesired frequencies as well as protecting the port against both positive and negative ESD voltages. The device is a 3x2 array flip chip and measures 1.5 x 1.0 x 0.65 mm. The small size and profile of this device is ideally suited for portable applications. The absence of leadframe and bondwires minimizes inductance and optimizes the high frequency filter performance. LX7205 exceeds the requirements of IEC61000-4-2 (15KV air discharge and 8KV contact discharge).

**IMPORTANT:** For the most current data, consult MICROSEMI's website: <http://www.microsemi.com>

**KEY FEATURES**

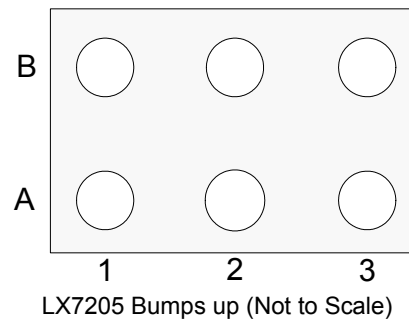
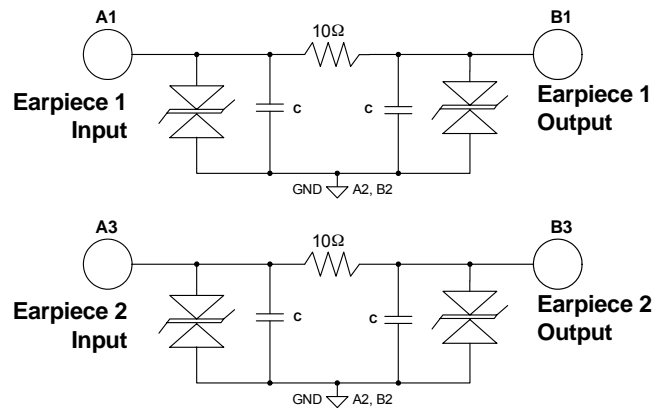
- Flip Chip construction
- Bi-directional EMI/RFI low-pass filter
- ESD protection with integrated line termination resistor
- Bi-directional TVS protects against negative ESD voltages in audio applications
- Low TVS operating voltage (5.0V)
- Low leakage current
- 0.5mm Pitch Chip Scale Package designed for direct assembly on FR4 PCB using conventional assembly techniques

**BENEFITS**

- Filter response characterized up to 6 GHz
- <2dB insertion loss in the pass band
- >20dB attenuation in the 800-900 MHz range
- >12dB attenuation in the WLAN frequencies of 2.4GHz and 5.0-6.0 GHz

**APPLICATIONS**

- Cell phones and Accessories
- Personal Digital Assistants (PDA's)
- Pagers
- MP3 Players
- Desktops and Notebook Computers
- Digital Camcorders

**PRODUCT HIGHLIGHT**
**Device Schematic**

**PACKAGE ORDER INFO**

$T_j$ (°C)	<b>SP</b>	<b>0.5mm Pitch Chip Scale Package (CSP)</b>
-40 to 125		<b>LX7205ISP</b>

Note: Available in Tape & Reel. Append the letters "TR" to the part number. (i.e. LX7205ISP-TR)

**ABSOLUTE MAXIMUM RATINGS**

Peak Pulse Power (tp = 8/20 μs ) IEC61000-4-5 .....	250W
Peak Pulse Current (tp = 8/20 μs ) IEC61000-4-5 .....	26A
ESD Air Discharge per IEC61000-4-2 .....	30KV
ESD Contact Discharge per IEC61000-4-2 .....	30KV
Operating Temperature .....	-40°C to +125°C
Storage Temperature Range.....	-55°C to +150°C

Note: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of specified terminal.

**PACKAGE PIN OUT**


**SP PACKAGE**  
(Bump Up Angle)

**FUNCTIONAL PIN DESCRIPTION**

Name	Description
A1	Line 1 Input
B1	Line 1 Output
A2 & B2	Ground
A3	Line 2 Input
B3	Line 2 Output

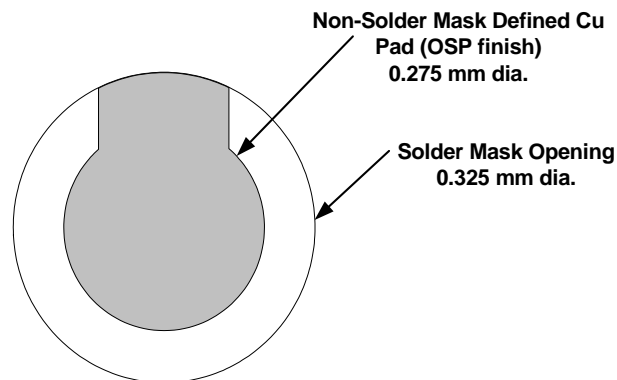
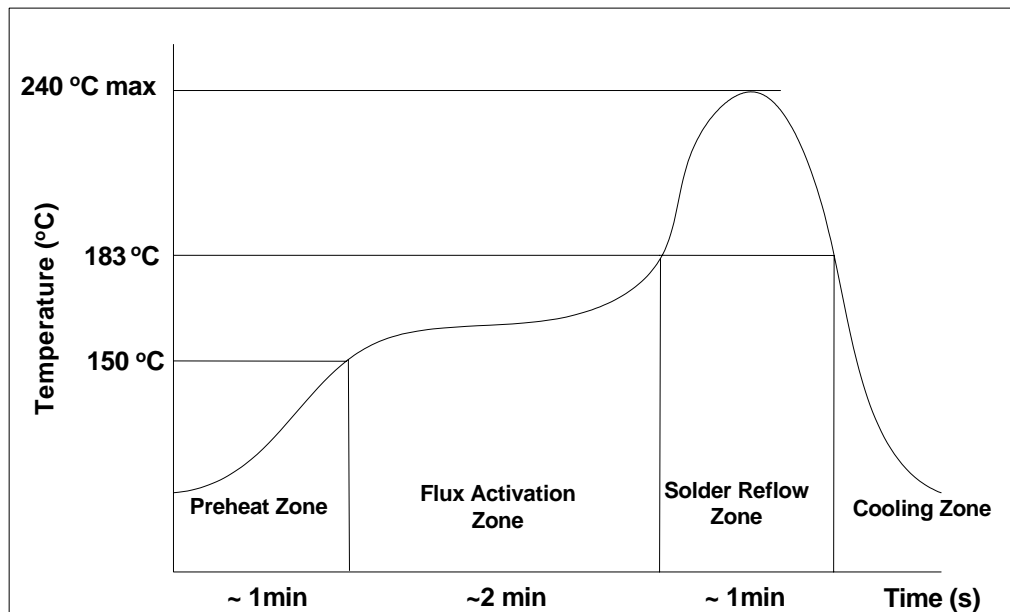
**ELECTRICAL CHARACTERISTICS**

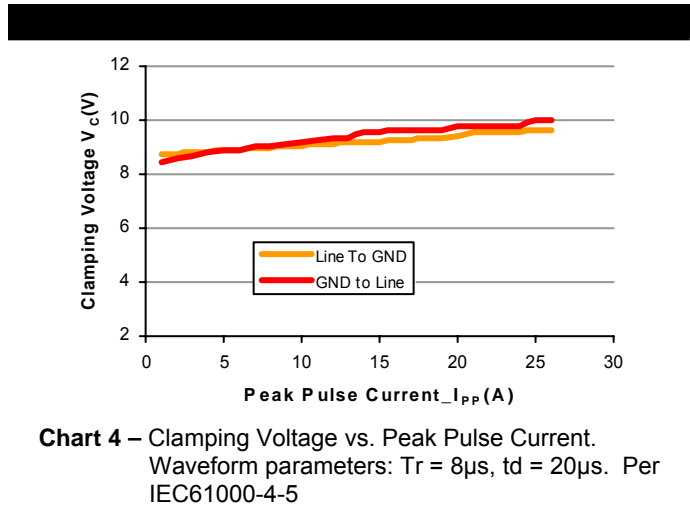
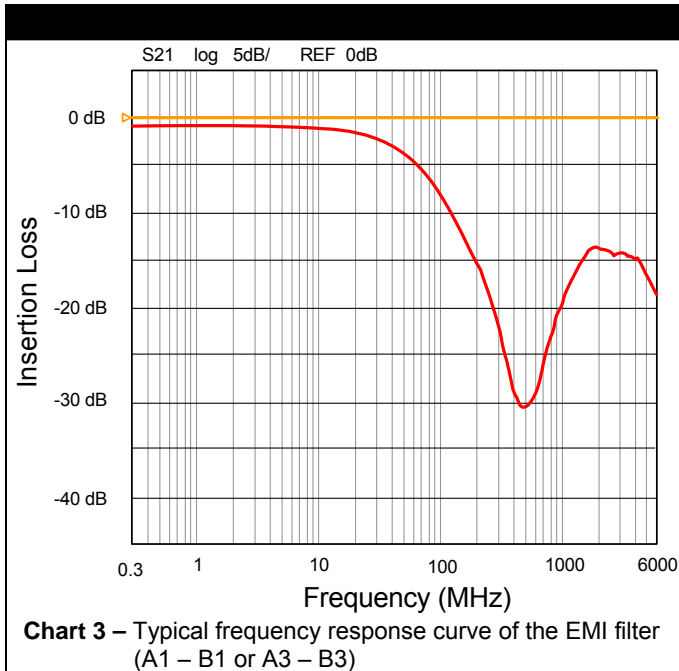
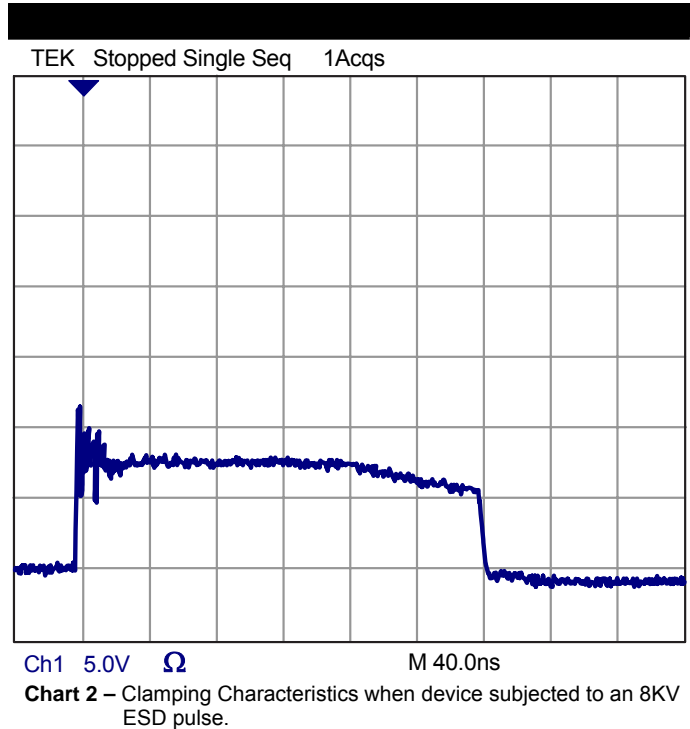
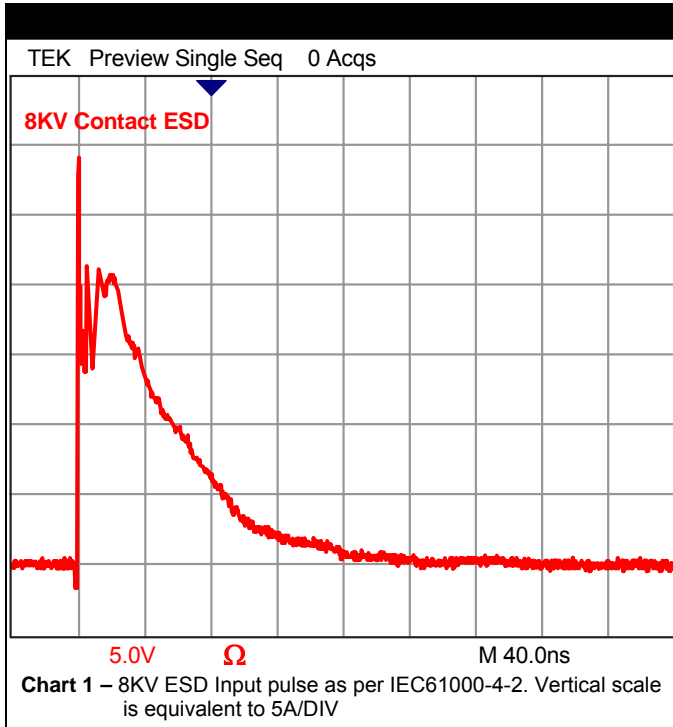
Unless otherwise specified, the following specifications apply over the operating ambient temperature  $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$  except where otherwise noted and the following test conditions:

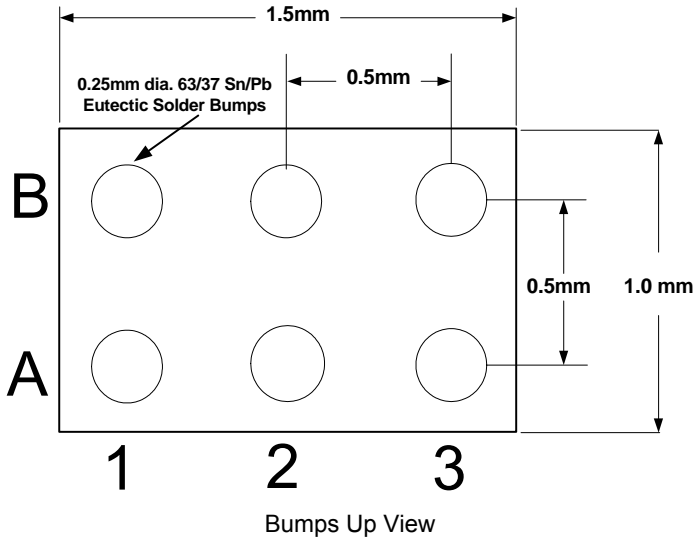
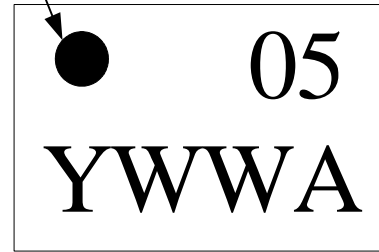
Parameter	Symbol	Test Conditions	LX7205			Units
			Min	Typ	Max	
Stand-Off Voltage	$V_{RWM}$				5.0	V
Breakdown Voltage	$V_{BR}$	$I_R = 1\text{mA}$	6			V
Leakage Current	$I_R$	$VRWM = \pm 5.0\text{V}, T_A = 25^{\circ}\text{C}$	-1		1	μA
Series Resistance, A1 to B1	$R_S$		9	10	11	Ω
Series Resistance, A3 to B3	$R_S$		9	10	11	Ω
Temperature Coefficient of RS	$T_{COEFF}$	Each Line		200		Ppm
Capacitor, A1 or B1 to GND	C	$V_R = 2.5\text{V}, f = 1\text{MHz}$	115	145	175	pF
Capacitor, A3 or B3 to GND	C	$V_R = 2.5\text{V}, f = 1\text{MHz}$	115	145	175	pF

**RECOMMENDED PCB PARAMETERS**

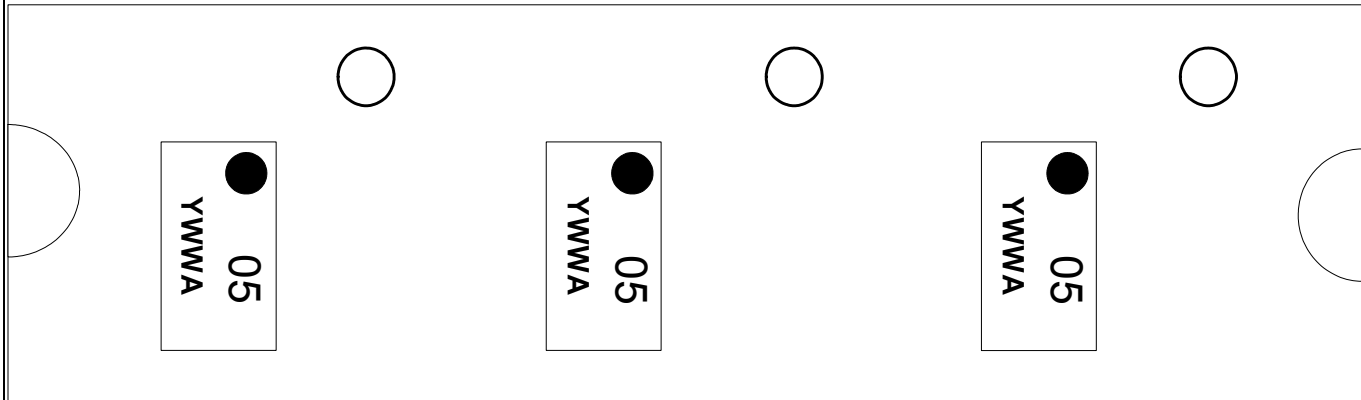
Parameter	Value
Cu pad size	0.275 +0.0/-0.025 mm
Pad Pitch	0.5mm
Pad Definition	Non-Solder Mask Defined
Solder Mask Opening	0.325 ± 0.025 mm
Solder Stencil	0.25 x 0.25 mm square, 0.125 mm thick, laser cut, electro-polished
Pad Protective Finish	OSP (Organic Surface Preservative)


**Figure 1 – Recommended Non-Solder Mask Defined Pad**

**Figure 2 – Solder Reflow Profile. Max Temperature is 240°C and maximum time above liquous (183°C) is 60 seconds**

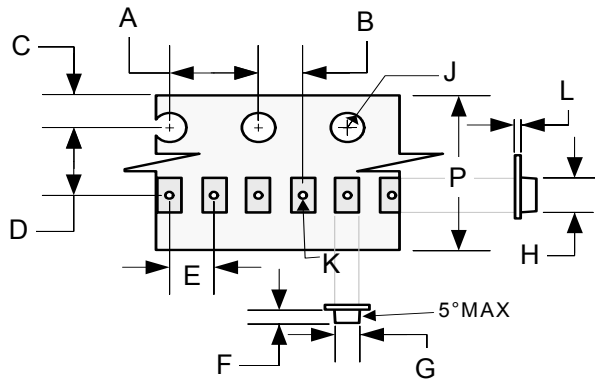


**PACKAGE DIMENSIONS & MARKING**
**SP 0.5mm Chip Scale Package**

**Pin A1 Identification Mark**


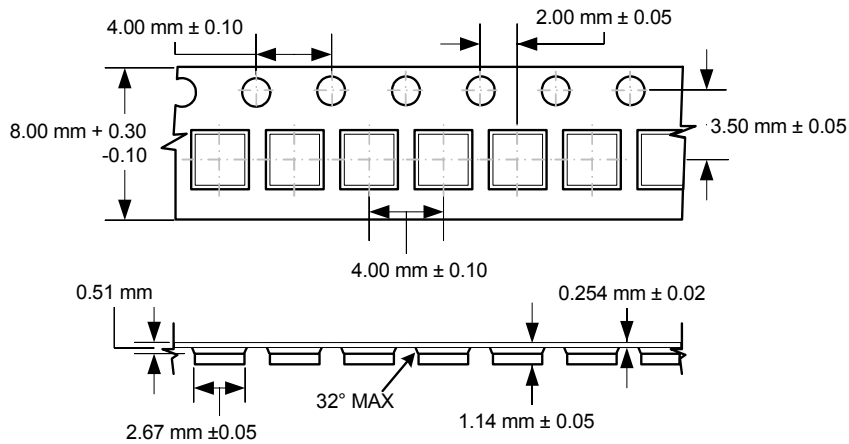
Y = Year | WW = Work Week | A = Lot Code  
SP Package – Bump Side Down



Part Orientation in Tape

**TAPE SPECIFICATIONS**


Dim	MILLIMETERS	
	MIN	MAX
A	3.90	4.10
B	1.95	2.05
C	1.65	1.85
D	3.45	3.55
E	1.90	2.10
F	0.67	0.77
G	1.03	1.13
H	1.75	1.85
J	1.40	1.60
K	0.45	0.55
L	0.252	0.256





**Microsemi**<sup>®</sup>

**LX7205**

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**NOTES**

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