



4 Channel EMI Filter Network

Features

- 4 EMI filter lines per device
- Filters attenuate to -30dB at 3GHz
- CSP package minimizes cross-talk
- 9-bump $2.485\text{mm} \times 0.985\text{mm}$ Chip Scale Package (CSP), 0.5mm pitch
- 0.30mm Eutectic solder bumps
- Ultra small foot print suitable for portable devices
- Silicon substrate

Applications

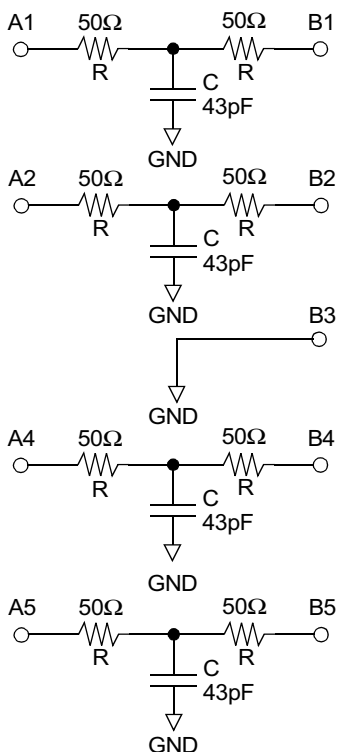
- EMI filtering for RF sections of wireless devices
- Cellular phones
- Cordless phones
- Internet appliances
- PDAs
- Laptop computers

Product Description

The CSPRC032A is a 4-channel low pass EMI filter (R-C-R configuration) in a Chip Scale Package (CSP). Many portable applications require the attenuation of signals in the $800\text{-}3000\text{ MHz}$ band. California Micro Devices' unique thin film technology provides a minimum of -25dB of attenuation over this frequency band.

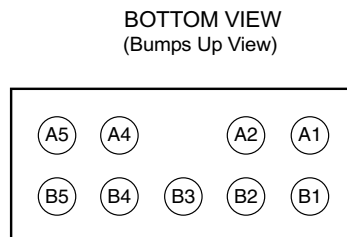
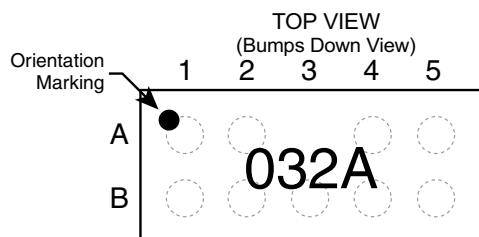
The bump size and pitch of these filters are selected such that the device can be placed directly on a FR4 printed circuit board using conventional assembly techniques. The pin-out for the device features a signal 'flow through' design, allowing optimal signal routing. The solder bump contacts are a $63/37\text{ Sn/Pb}$ alloy and are 0.30 mm in diameter.

Electrical Schematic





PACKAGE / PINOUT DIAGRAMS



CSPRC032A
CSP Package

Note: These drawings are not to scale.

Ordering Information

PART NUMBERING INFORMATION

Bumps	Package	Ordering Part Number ¹	Part Marking
9	CSP	CSPRC032A	032A

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

Specifications

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNITS
Storage Temperature Range	-55 to +150	°C
Power Rating per Resistor	25	mW

STANDARD OPERATING CONDITIONS

PARAMETER	RATING	UNITS
Operating Temperature Range	-40 to +85	°C

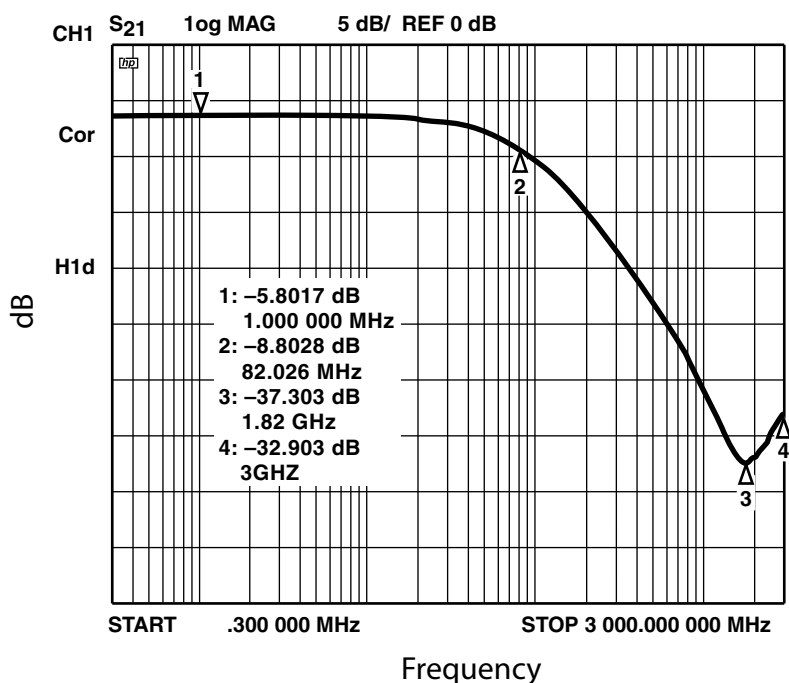
**ELECTRICAL OPERATING CHARACTERISTICS¹**

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
I_{LEAK}	Leakage Current, An or Bn to GND	$V_{IN}=6.0V$			1	μA
TOL_R	Resistor Absolute Tolerance	$R = 50\Omega$			± 10	%
TOL_C	Capacitor Absolute Tolerance	$C=43pF$			± 20	%
TCR	Temperature Coefficient of Resistance				± 150	ppm/ $^{\circ}C$
TCC	Temperature Coefficient of Capacitance				± 500	ppm/ $^{\circ}C$
F_C	Filter Cutoff Frequency $Z_{SOURCE}=0\Omega$, $Z_{LOAD}=\infty$ $Z_{SOURCE}=50\Omega$, $Z_{LOAD}=50\Omega$	$R=50\Omega$, $C=43pF$;		74 74		MHz MHz

Note 1: Electrical Operating Characteristics are guaranteed over the Operating Temperature Range unless otherwise specified.

Filter Performance**CSPRC032 Filter Typical Measured Frequency Response (S21) Measurement**

The measurement is done with 50 Ω -source and 50 Ω -load impedance using a HP8753C Network Analyzer with a HP85047A S-parameter Test Set.



Application Information

Refer to Application Note AP-217, "The Chip Scale Package", for a detailed description of Chip Scale Packages offered by California Micro Devices.

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	0.150mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.330mm 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	$\pm 50\mu\text{m}$
Solder Ball Side Coplanarity	$\pm 20\mu\text{m}$
Maximum Dwell Time Above Liquidous (183°C)	60 seconds
Soldering Maximum Temperature	240°C

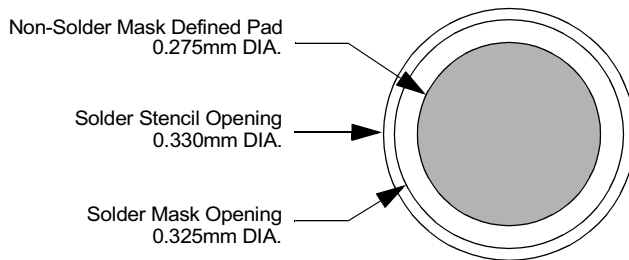


Figure 1. Recommended Non-Solder Mask Defined Pad Illustration

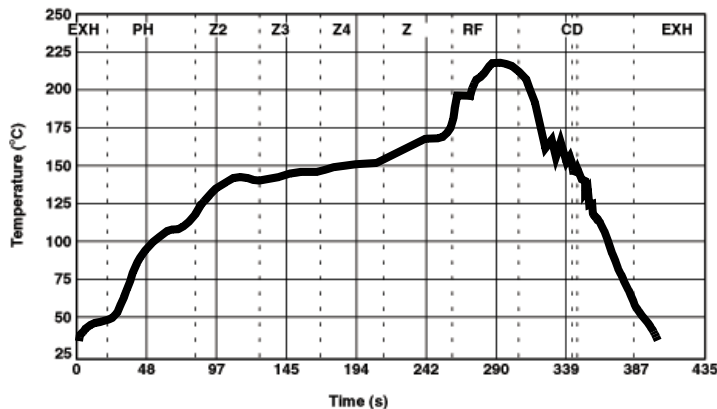


Figure 2. Solder Reflow Profile

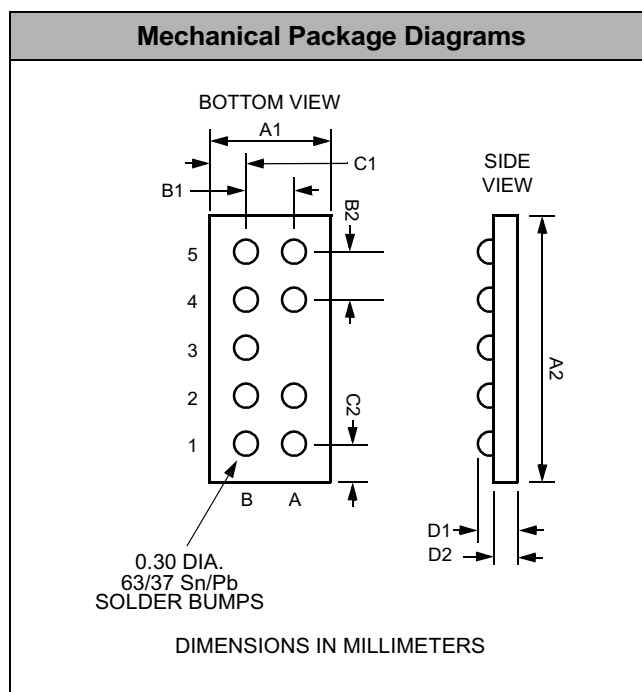
Mechanical Details

The CSPRC032A devices are packaged in custom Chip Scale Packages (CSP).

CSPRC032A 9-bump CSP Mechanical Specifications

The CSPRC032A devices are packaged in a 9-bump custom Chip Scale Package (CSP). Dimensions are presented below.

PACKAGE DIMENSIONS						
Package		Custom CSP				
Bumps		9				
Dim	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A1	0.940	0.985	1.030	0.0370	0.0388	0.0406
A2	2.440	2.485	2.530	0.0961	0.0978	0.0996
B1	0.495	0.500	0.505	0.0195	0.0197	0.0199
B2	0.495	0.500	0.505	0.0195	0.0197	0.0199
C1	0.1925	0.2425	0.2925	0.0076	0.0095	0.0115
C2	0.1925	0.2425	0.2925	0.0076	0.0095	0.0115
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
CSPRC032A 9-bump Chip Scale Package**

CSP Tape and Reel Specifications

PART NUMBER	PKG. SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIA.	QTY PER REEL	P_0	P_1
CSPRC032A	2.485 X 0.985 X 0.606	2.62 X 1.12 X 0.762	8mm	178mm (7")	3500	4mm	4mm

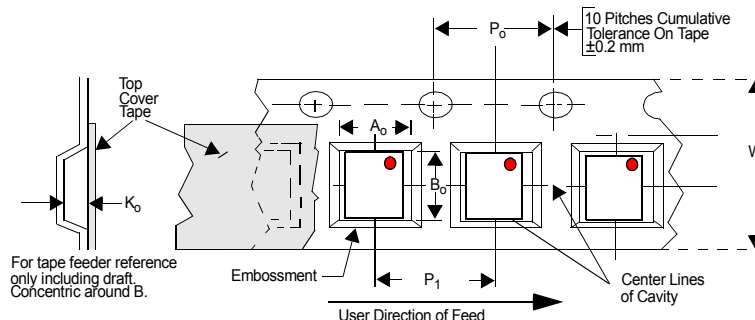


Figure 3. Tape and Reel Mechanical Data