

Chip Scale Package (CSP) Parallel Termination Array

Features

- 8, 16 or 32 high-frequency bussed terminations in a single package
- 10-bump, 20-bump and 40-bump Chip Scale Packages (CSP)
- CSP package minimizes cross-talk
- Ultra small foot print packages suitable for portable devices
- 1% and 5% tolerance components standard
- Extremely low bump inductance (25pH typical)
- Ceramic substrate
- 0.35mm Eutectic solder bumps, 0.65mm pitch

Applications

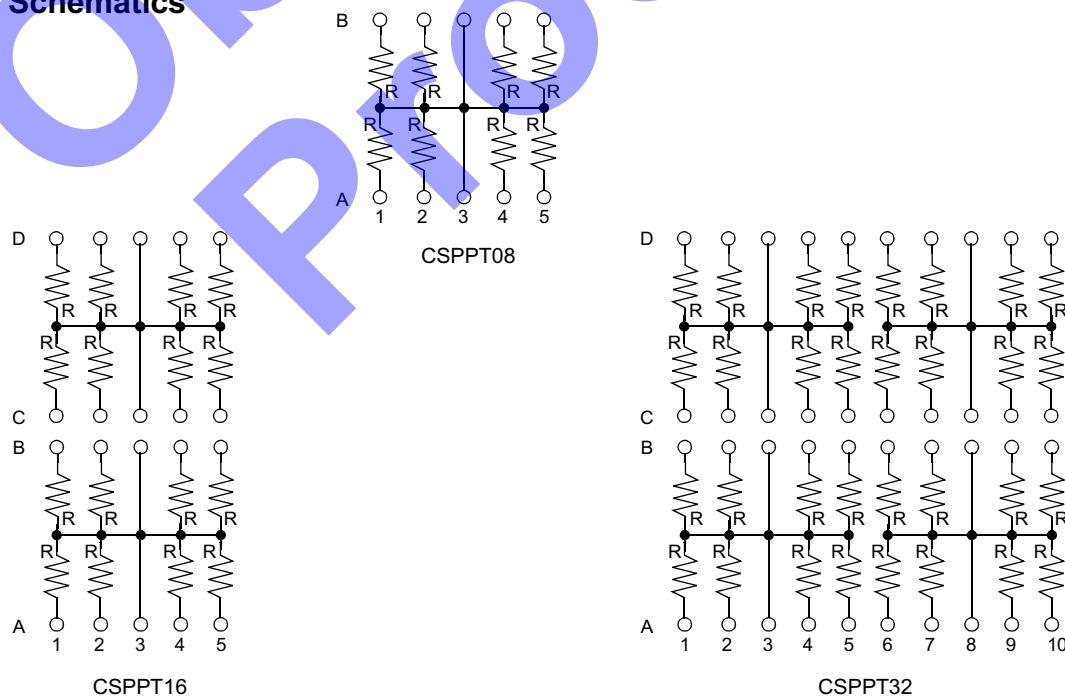
- Parallel resistive bus termination
- Servers
- High speed computing systems
- Notebook PCs
- Handheld devices
- Mobile telephones
- Digital cameras and camcorders

Product Description

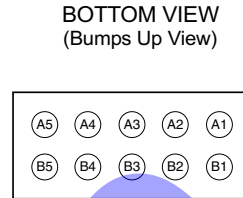
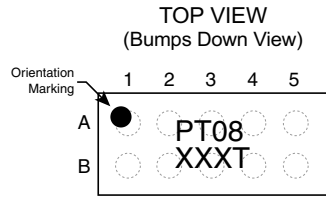
The CSPPT is a high performance Integrated Passive Device (IPD) which provides parallel terminations suitable for use in high speed bus applications. Eight (8), sixteen (16), or thirty-two (32) parallel termination versions are provided. These resistors provide excellent high frequency performance in excess of 3GHz and are manufactured to an absolute tolerance as low as $\pm 1\%$.

The Chip Scale Package provides an ultra small footprint for this device and provides minimal parasitics compared to conventional packaging. Typical bump inductance is less than 25pH. The large solder bumps and ceramic substrate allow for standard attachment to laminate printed circuit boards without the use of underfill.

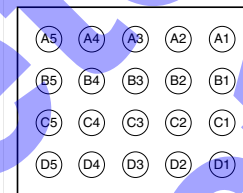
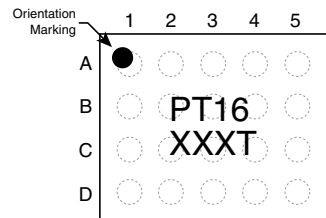
Electrical Schematics



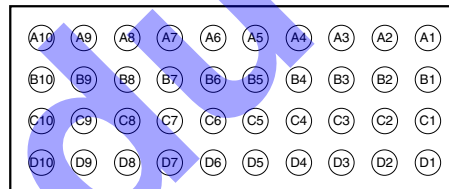
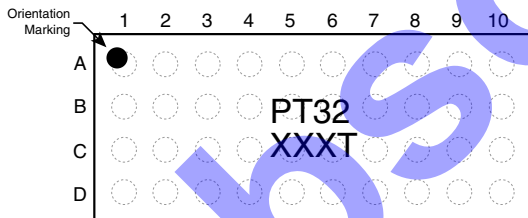
PACKAGE / PINOUT DIAGRAMS



CSPPT08
CSP Package



CSPPT16
CSP Package



CSPPT32
CSP Package

Note: These drawings are not to scale.

Ordering Information

PART NUMBERING INFORMATION				
R Value (Ω)	Package	Terminations	Ordering Part Number¹	Part Marking
47	CSP	8	CSPPT08-470F	PT08 470T
47	CSP	8	CSPPT08-470J	PT08 470T
50	CSP	8	CSPPT08-500F	PT08 500T
50	CSP	8	CSPPT08-500J	PT08 500T
56	CSP	8	CSPPT08-560F	PT08 560T
56	CSP	8	CSPPT08-560J	PT08 560T
68	CSP	8	CSPPT08-680F	PT08 680T
68	CSP	8	CSPPT08-680J	PT08 680T
90	CSP	8	CSPPT08-900F	PT08 900T
90	CSP	8	CSPPT08-900J	PT08 900T
100	CSP	8	CSPPT08-101F	PT08 101T
100	CSP	8	CSPPT08-101J	PT08 101T
47	CSP	16	CSPPT16-470F	PT16 470T
47	CSP	16	CSPPT16-470J	PT16 470T
50	CSP	16	CSPPT16-500F	PT16 500T
50	CSP	16	CSPPT16-500J	PT16 500T
56	CSP	16	CSPPT16-560F	PT16 560T
56	CSP	16	CSPPT16-560J	PT16 560T
68	CSP	16	CSPPT16-680F	PT16 680T
68	CSP	16	CSPPT16-680J	PT16 680T
90	CSP	16	CSPPT16-900F	PT16 900T
90	CSP	16	CSPPT16-900J	PT16 900T
100	CSP	16	CSPPT16-101F	PT16 101T
100	CSP	16	CSPPT16-101J	PT16 101T
47	CSP	32	CSPPT32-470F	PT32 470T
47	CSP	32	CSPPT32-470J	PT32 470T
50	CSP	32	CSPPT32-500F	PT32 500T
50	CSP	32	CSPPT32-500J	PT32 500T
56	CSP	32	CSPPT32-560F	PT32 560T
56	CSP	32	CSPPT32-560J	PT32 560T
68	CSP	32	CSPPT32-680F	PT32 680T
68	CSP	32	CSPPT32-680J	PT32 680T
90	CSP	32	CSPPT32-900F	PT32 900T
90	CSP	32	CSPPT32-900J	PT32 900T
100	CSP	32	CSPPT32-101F	PT32 101T
100	CSP	32	CSPPT32-101J	PT32 101T

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
Power Rating per Resistor	100	mW

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

STANDARD ELECTRICAL OPERATING CHARACTERISTICS ¹						
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
TOL _R	Resistor Absolute Tolerance					
	"F" Tolerance Devices				±1	%
	"J" Tolerance Devices				±5	%
TC _R	Temperature Coefficient of Resistance				±150	ppm/°C

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

Application Information

Refer to Application Note AP-217, "The Chip Scale Package", for a detailed description of the characteristics of Chip Scale Packages offered by California Micro Devices and guidelines for their use in systems.

PRINTED CIRCUIT BOARD RECOMMENDATIONS	
PARAMETER	VALUE
Pad Size on PCB	0.300mm
Pad Shape	Round
Pad Definition	Non-Solder Mask defined pads
Solder Mask Opening	0.350mm
Solder Stencil Thickness	0.152mm
Solder Stencil Aperture Opening	0.360mm square
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 (183°C)	60 seconds
Soldering Maximum Temperature	240°C

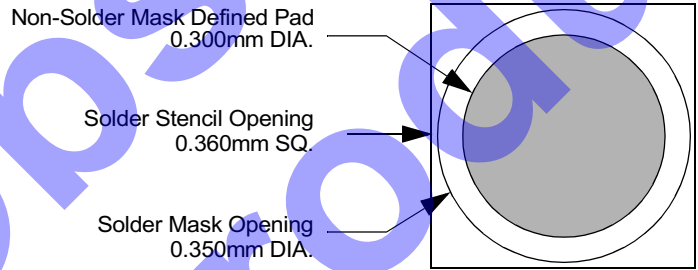


Figure 1. Recommended Non-Solder Mask Defined Pad Illustration

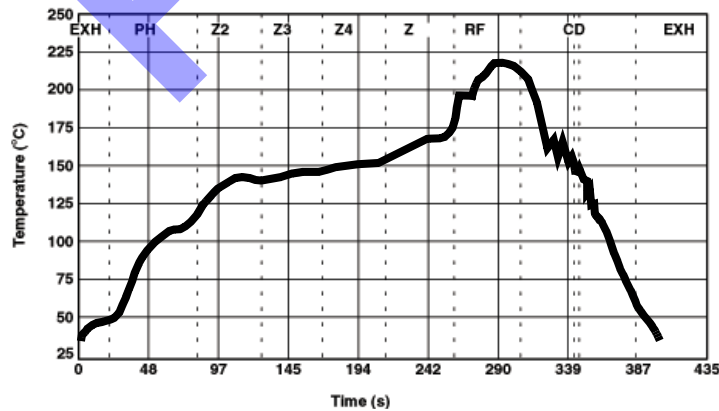


Figure 2. Solder Reflow Profile

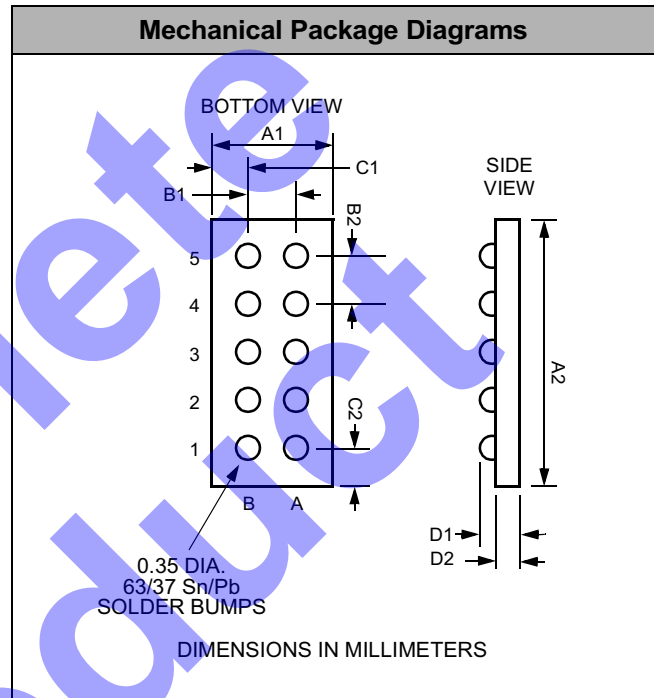
Mechanical Details

The CSPPT devices are packaged in custom 10-bump, 20-bump and 40-bump Chip Scale Packages (CSP).

CSPPT 10-bump CSP Mechanical Specifications

The CSPPT devices are packaged in a 10-bump custom Chip Scale Package (CSP). Dimensions are presented below.

PACKAGE DIMENSIONS						
Package	Custom CSP					
Bumps	10					
Dim	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A1	1.052	1.097	1.142	0.0414	0.0432	0.0450
A2	3.002	3.047	3.092	0.1182	0.1200	0.1217
B1	0.645	0.650	0.655	0.0254	0.0256	0.0258
B2	0.645	0.650	0.655	0.0254	0.0256	0.0258
C1	0.1734	0.2234	0.2734	0.0068	0.0088	0.0108
C2	0.1734	0.2234	0.2734	0.0068	0.0088	0.0108
D1	0.600	0.644	0.687	0.0236	0.0253	0.0271
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 CSPPT 10-bump Chip Scale Package

CSP Tape and Reel Specifications

BASE NUMBER	PKG. SIZE (mm)	POCKET SIZE (mm) $B_0 \times A_0 \times K_0$	TAPE WIDTH W	REEL DIAMETER	QTY PER REEL	P_0	P_1
CSPPT08	3.047 X 1.097 X 0.644	3.28 X 1.32 X 0.813	8mm	178mm (7")	3500	4mm	4mm

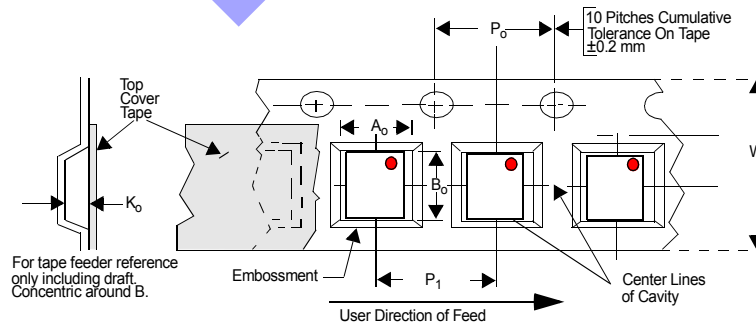


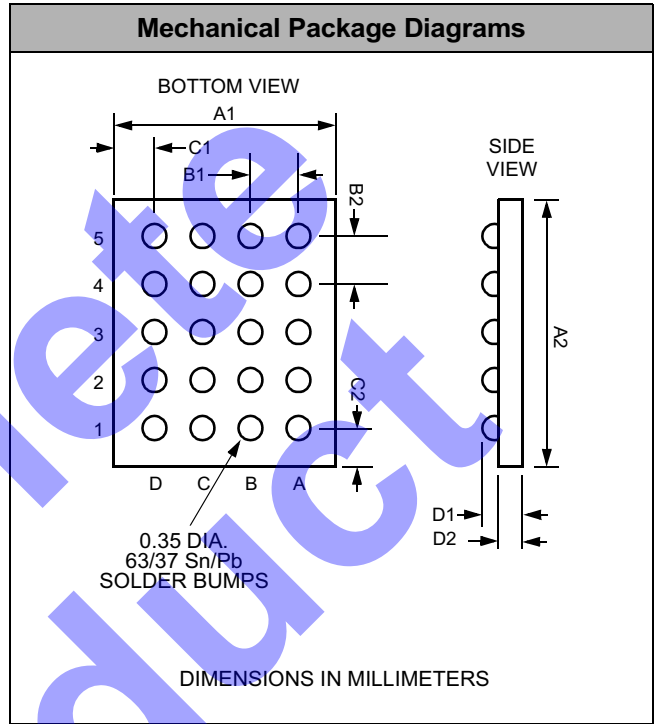
Figure 3. Tape and Reel Mechanical Data

Mechanical Details (cont'd)

CSPPT 20-bump CSP Mechanical Specifications

The CSPPT devices are packaged in a 20-bump custom Chip Scale Package (CSP). Dimensions are presented below.

PACKAGE DIMENSIONS						
Package	Custom CSP					
Bumps	20					
Dim	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A1	2.352	2.397	2.442	0.0926	0.0944	0.0961
A2	3.002	3.047	3.092	0.1182	0.1200	0.1217
B1	0.645	0.650	0.655	0.0254	0.0256	0.0258
B2	0.645	0.650	0.655	0.0254	0.0256	0.0258
C1	0.1734	0.2234	0.2734	0.0068	0.0088	0.0108
C2	0.1734	0.2234	0.2734	0.0068	0.0088	0.0108
D1	0.600	0.644	0.687	0.0236	0.0253	0.0271
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 CSPPT 20-bump Chip Scale Package

CSP Tape and Reel Specifications

BASE NUMBER	PKG. 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
CSPPT16	3.047 X 2.397 X 0.644	3.28 X 2.64 X 0.864	8mm	178mm (7")	3500	4mm	4mm

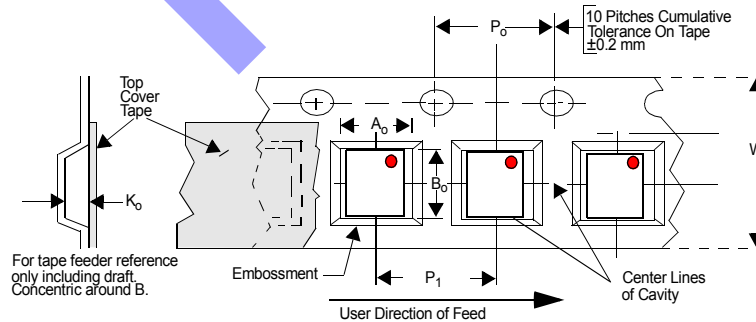


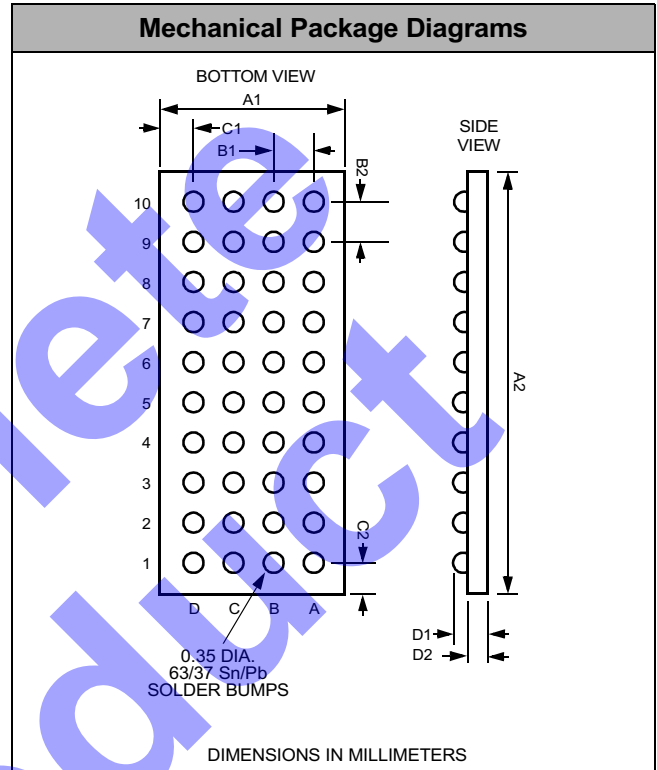
Figure 4. Tape and Reel Mechanical Data

Mechanical Details (cont'd)

CSPPT 40-bump CSP Mechanical Specifications

The CSPPT devices are packaged in a 40-bump custom Chip Scale Package (CSP). Dimensions are presented below.

PACKAGE DIMENSIONS						
Package	Custom CSP					
Bumps	40					
Dim	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A1	2.352	2.397	2.442	0.0926	0.0944	0.0961
A2	6.252	6.297	6.342	0.2461	0.2479	0.2497
B1	0.645	0.650	0.655	0.0254	0.0256	0.0258
B2	0.645	0.650	0.655	0.0254	0.0256	0.0258
C1	0.1734	0.2234	0.2734	0.0068	0.0088	0.0108
C2	0.1734	0.2234	0.2734	0.0068	0.0088	0.0108
D1	0.600	0.644	0.687	0.0236	0.0253	0.0271
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 CSPPT 40-bump Chip Scale Package

CSP Tape and Reel Specifications

BASE NUMBER	PKG. 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
CSPPT32	6.297 X 2.397 X 0.644	6.35 X 2.44 X 0.686	8mm	178mm (7")	3500	4mm	4mm

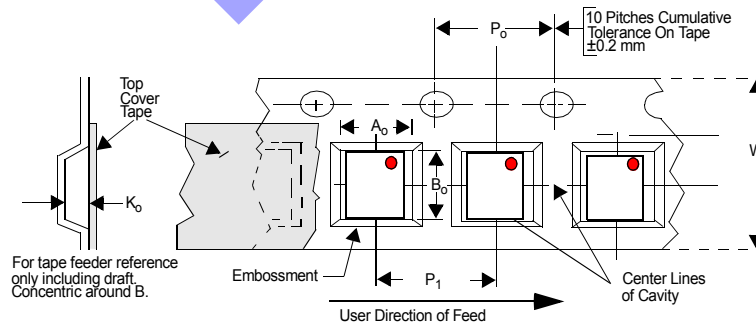


Figure 5. Tape and Reel Mechanical Data