ON Semiconductor®

ESD Protection Arrays in Chip Scale Package

PACDN1404/1408

Features

- Four or eight transient voltage suppressors in a single package
- In-system electrostatic discharge (ESD) protection to ±25kV contact discharge per IEC 61000-4-2 international standard
- Compact Chip Scale Package (CSP) in a 0.65mm pitch format saves board space and eases layout in space critical applications compared to
  discrete solutions and traditional wire bonded packages
- RoHS-compliant (lead-free) 6 and 10-bump CSPs

Applications

- ESD protection for sensitive electronic equipment
- I/O port, keypad and button circuitry protection for portable devices
- Wireless handsets
- Handheld PCs / PDAs
- MP3 Players
- Digital cameras and camcorders
- Notebooks
- Desktop PCs

Product Description

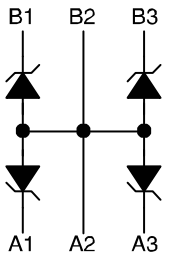
The PACDN1404 and PACDN1408 are 4-and 8-channel transient voltage suppressor arrays that provide a very high level of protection for sensitive electronic components that may be subjected to ESD.
These devices are designed and characterized to safely dissipate ESD strikes at levels well beyond the maximum requirements set forth in the IEC 61000-4-2 international standard (Level 4, +8kV contact discharge). All I/Os are rated at +25kV using the IEC 61000-4-2 contact discharge method. Using the MIL-STD-883D (Method 3015) specification for Human Body Model (HBM) ESD, all pins are protected for contact discharges to greater than +30kV.

The Chip Scale Package format of these devices provide extremely small footprints that are necessary in portable electronics such as cellular phones, PDAs, internet appliances and PCs. The large solder bumps allow for standard attachments to laminate boards without the use of underfill. The PACDN1404 and PACDN1408 are packaged in RoHS-compliant, lead-free finishing.

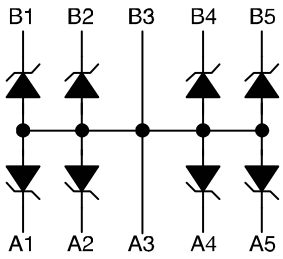
June 2010 – Rev. 3

Publication Order Number:
PACDN1404/1408/D

Electrical Schematic



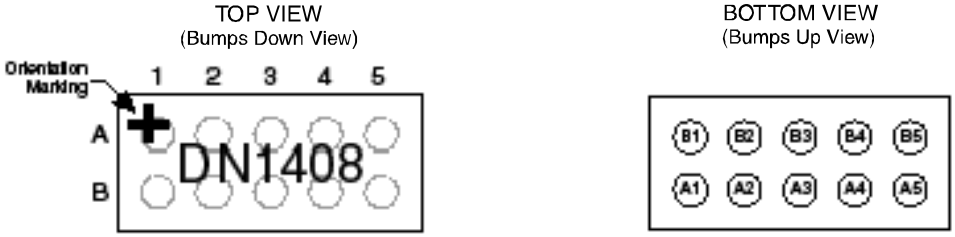
PACDN1404



PACDN1408

PACKAGE / PINOUT DIAGRAMS

PACDN1404
6-Bump CSP Package



PACDN1408
10-Bump CSP Package

Notes:
1) These drawings are not to scale.

Ordering Information

PART NUMBERING INFORMATION

Bumps	Package	Ordering Part Number[1]	Part Marking
6	CSP	PACDN1404CG	D14
10	CSP	PACDN1408CG	DN1408

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

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

ELECTRICAL OPERATING CHARACTERISTICS[1]

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{REV}	Reverse Standoff Voltage	I_{DIODE}=10μA	5.5			V
I_{LEAK}	Leakage Current	V_{IN}=3.3V DC			100	nA
V_{SIG}	Signal Clamp Voltage Positive Clamp Negative Clamp	I_{LOAD} = 10mA	 5.6 -1.2	 6.8 -0.8	 8.0 -0.4	 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	 ±30 ±25			 kV kV
V_{CL}	Clamping Voltage during ESD Discharge MIL-STD-883 (Method 3015), 8kV Positive Transients Negative Transients	Note 2		 +12 -8		 V V
C	Channel Capacitance	At 2.5V DC, *f* = 1MHz		39	47	pF

Note 1: T_A=25°C unless otherwise specified. GND in this document refers to the lower supply voltage.

Note 2: ESD applied to channel pins with respect to GND, one at a time. All other channels are open. All GND pins tied to ground.

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 (183ûC)	60 seconds
Maximum Soldering Temperature for Lead-free Devices using a Lead-free Solder Paste	260°C

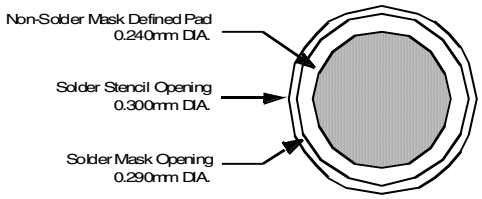


Figure 1. Recommended Non-Solder Mask Defined Pad Illustration

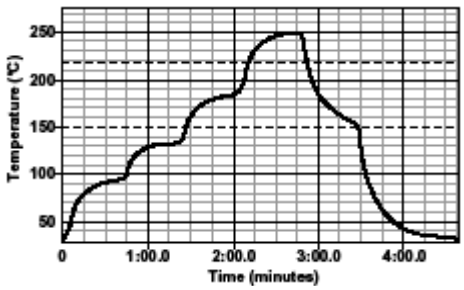


Figure 2. Lead-free (SnAgCu) Solder Ball Reflow Profile

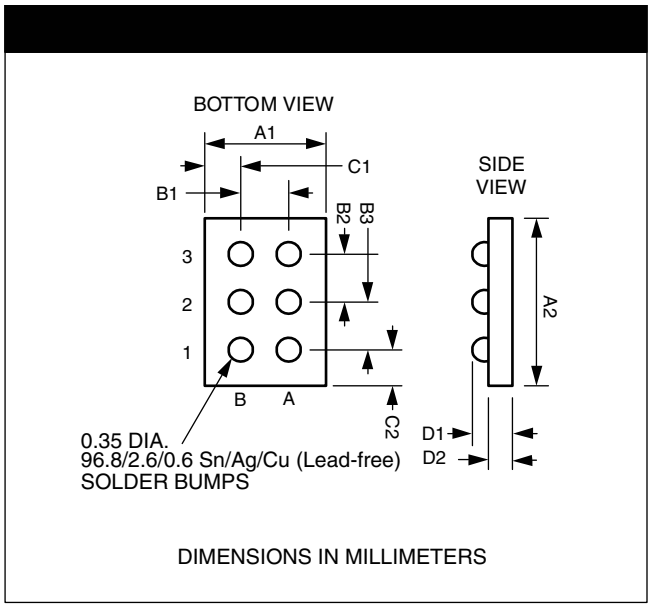
Mechanical Details

The PACDN1404/1408 devices are packaged in custom Chip Scale Packages (CSP).

PACDN1404 6-bump CSP Mechanical Specifications

The PACDN1404 devices are packaged in a 6-bump custom Chip Scale Package (CSP). Dimensions are presented below.

PACKAGE DIMENSIONS						
Package	Custom CSP					
Bumps	6					
Dim	**Millimeters**			**Inches**		
	Min	**Nom**	**Max**	**Min**	**Nom**	**Max**
A1	1.109	1.154	1.199	0.0437	0.0454	0.0472
A2	1.759	1.804	1.849	0.0693	0.0710	0.0728
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
B3	0.645	0.650	0.655	0.0254	0.0256	0.0258
C1	0.202	0.252	0.302	0.0080	0.0099	0.0119
C2	0.202	0.252	0.302	0.0080	0.0099	0.0119
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
PACDN1404 6-bump 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 DIA.	QTY PER REEL	P_0	P_1
PACDN1404	1.804 X 1.154 X 0.644	1.98 X 1.32 X 0.91	8mm	178mm (7")	3500	4mm	4mm

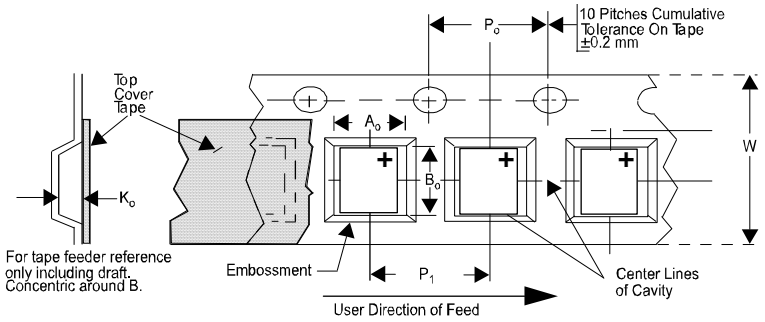


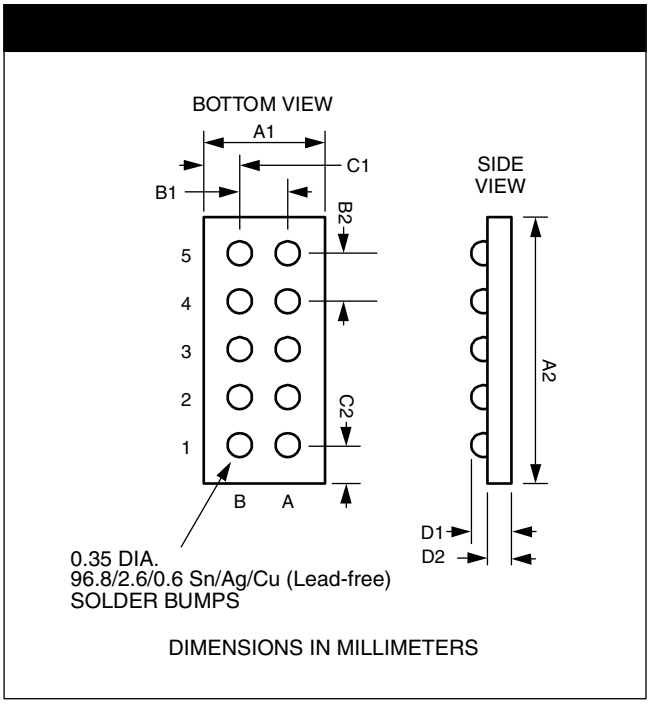
Figure 3. Tape and Reel Mechanical Data

Mechanical Details (cont'd)

PACDN1408 10-bump CSP Mechanical Specifications

The PACDN1408 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	1.109	1.154	1.199	0.0437	0.0454	0.0472
A2	3.059	3.104	3.149	0.1204	0.1222	0.1240
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	0.202	0.252	0.302	0.0080	0.0099	0.0119
C2	0.202	0.252	0.302	0.0080	0.0099	0.0119
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
PACDN1408 10-bump 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
PACDN1408	3.104 X 1.154 X 0.644	3.28 X 1.32 X 0.81	8mm	178mm (7")	3500	4mm	4mm

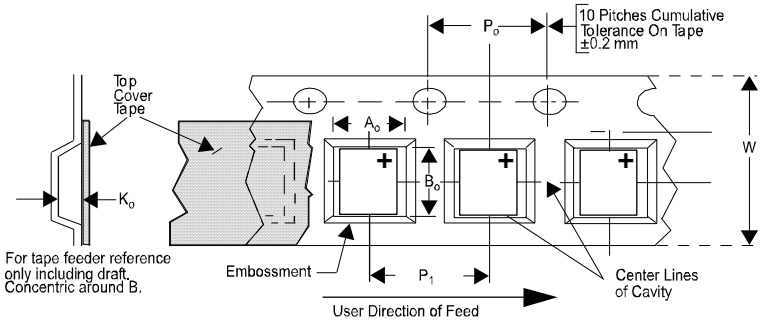


Figure 4. Tape and Reel Mechanical Data

PUBLICATION ORDERING INFORMATION

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