

# Tape and Reel Specification for Integrated Circuits

## Introduction

Many surface mounted devices (SMD) are being packaged for shipment in embossed tape and wound onto reels. The Intersil Tape and Reel specifications are in compliance with Electronics Industries Association Standards for “Embossed Carrier Taping of Surface Mount Components for Automatic Handling”.

- EIA-481 for the .....8, 12, 16, 24, 32, 44 and 56mm Wide Tape

(Except the orientation of square package)

Intersil now supplies many different SMDs in Tape and Reel, as shown in Table 1.

**TABLE 1. PACKAGE AND TAPE SPECIFICATIONS**

PACKAGE TYPE	NO. OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL & HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
xxxxxx-T7A	Note 4	Note 5	250	7&2.4	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5
xxxxxx-T7	Note 4	Note 5	Note 5	7&2.4	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5
SOIC(N) (SOPN)	8	0.155x0.194"	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
SOIC(N) (SOPN)	14	0.155x0.342"	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
SOIC(N) (SOPN)	16	0.155x0.391"	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
SOIC(W) (SOPW)	16	0.296x0.407"	1,000/250	13&4/7&2.4	34	420mm	45	552mm	16mm	12mm
SOIC(W) (SOPW)	18	0.296x0.456"	1,000	13&4	34	420mm	45	552mm	24mm	12mm
SOIC(W) (SOPW)	20	0.296x0.506"	1,000	13&4	34	420mm	45	552mm	24mm	12mm
SOIC(W) (SOPW)	24	0.296x0.606"	1,000	13&4	34	420mm	45	552mm	24mm	12mm
SOIC(W) (SOPW) (or EPSOIC)	28	0.296x0.706"	1,000	13&4	26	416mm	34	544mm	32mm	16mm
EIAJ SOIC	8	0.217x0.217"	2,500	13&4	77	616mm	77	616mm	12mm	8mm
MSOP	8/10	3.0x3.0mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TSSOP	8	4.4x3.0mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TSSOP (or EPTSSOP)	14/16	4.4x5.0mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TSSOP (Custom)	14/16	4.4x5.0mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
TSSOP	20	4.4x6.5mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
TSSOP (or EPTSSOP)	24	4.4x7.8mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
TSSOP (or EPTSSOP)	28/38	4.4x9.7mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm

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TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	NO. OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL & HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
TSSOP	48	12.5x6.1mm	1000	13&4	50	600mm	50	600mm	24mm	12mm
QSOP (SSOP)	16	0.155x0.194"	2500/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
QSOP (SSOP)	20/24	0.155x0.342"	2500/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	16mm	8mm
QSOP (SSOP)	28	0.155x0.391"	2500/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	16mm	8mm
SSOP	16	0.209x0.244"	1,000/250	13&4/7&2.4	24	420mm	45	552mm	16mm	12mm
SSOP	20	0.209x0.284"	1,000/250	13&4/7&2.4	34	420mm	45	552mm	16mm	12mm
SSOP	24	0.209x0.323"	1,000/250	13&4/7&2.4	34	420mm	45	552mm	16mm	12mm
SSOP	28	0.209x0.402"	1,000	13&4	34	420mm	45	552mm	24mm	12mm
PLCC	20	0.350x0.350"	1,000	13&4	53	660mm	64	792mm	16mm	12mm
PLCC	28	0.450x0.450"	750	13&4	15	256mm	25	416mm	24mm	16mm
PLCC	32	0.450x0.550"	750	13&4	15	256mm	25	416mm	24mm	16mm
PLCC	44	0.650x0.650"	500	13&4	15	384mm	25	624mm	32mm	24mm
PLCC	68	0.950x0.950"	250	13&6	25	832mm	25	832mm	44mm	32mm
PLCC	84	1.150x1.150"	200	13&6	25	936mm	25	936mm	44mm	36mm
TQFP	32	5x5x1.0mm	2,000/1000	13&6/13&6	33	400mm	33	400mm	16mm	12mm
TQFP/EPAD TQFP	32/48	7x7x1.0mm	1,000	13&6	34	420mm	45	552mm	16mm	12mm
TQFP/EPAD	64/44	10x10x1.0mm	1,000	13&4	26	420mm	35	552mm	24mm	16mm
TQFP	64/44	10x10x1.0mm	1,000	13&6	25	400mm	30	480mm	24mm	16mm
TQFP	80	14x14x1.0mm	1,000	13&4	10	240mm	20	480mm	24mm	24mm
TQFP (Techwell)	80	12x12x1.0mm	1,000	13&4	25	600mm	25	600mm	24mm	24mm
TQFP	100	12x12x1.0mm	3000	13&4	50	1200mm	50	1200mm	24mm	24mm
LQFP	48	7x7x1.4mm	1,000	13&6	34	420mm	45	552mm	16mm	12mm
LQFP	80	10x10x1.4mm	1,000	13&4	25	400mm	30	480mm	24mm	16mm
LQFP	80	14x14x1.4mm	500	13&4	21	420mm	28	552mm	32mm	24mm
LQFP	128	14x20x1.4mm	1000	13&4	10	160mm	20	390mm	44mm	24mm
LQFP (Techwell)	128	14x20x1.4mm	500	13&4	25	600mm	25	600mm	44mm	24mm
LQFP (or PQLQP)	144	20x20x1.4mm	600	13&6	15	320mm	25	640mm	44mm	32mm
LQFP	160	24x24x1.4mm	500	13&6	20	640mm	20	640mm	44mm	32mm
LQFP	208	28x28x1.4mm	500	13&6	10	360mm	20	720mm	44mm	36mm
MQFP	44	10x10x2.0mm	500	13&6	25	624mm	25	624mm	24mm	24mm
MQFP	80	14x20x2.7mm	500	13&6	10	193mm	20	385mm	44mm	24mm
QFP	128	14x20x2.72mm	500	13&6	25	600mm	25	600mm	44mm	24mm
PBGA (fBGA)	160/196	12x12x1.4mm	1,000	13&6	25	400mm	30	480mm	24mm	16mm
PBGA (fBGA)	192	14x14x1.32mm	1,000	13&6	10	240mm	20	480mm	24mm	24mm
PBGA (fBGA)	196	15x15x1.4mm	750	13&6	10	240mm	20	480mm	24mm	24mm
PBGA (fBGA)	256/316	17x17x1.4mm	500	13&6	10	240mm	20	480mm	24mm	24mm
TFBGA (Techwell)	144	7x7x1.2mm	2500	13&4	50	600mm	50	600mm	16mm	12mm
TFBGA (Techwell)	144	7x7x1.3mm	2500	13&4	50	600mm	50	600mm	16mm	12mm
TDFN	Note 4	1.6x1.6x0.75mm	1000/250	7&2.4/7&2.4	100	400mm	100	400mm	8mm	4mm

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**TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)**

PACKAGE TYPE	NO. OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL & HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
TDFN	Note 4	2.0x2.0x0.75mm	1000/250	7&2.4/7&2.4	100	400mm	100	400mm	8mm	4mm
TDFN (13" Packing)	Note 4	2.0x2.0x0.75mm	6000	13&4	100	400mm	100	400mm	8mm	4mm
TDFN	Note 4	2x3x0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	3x3x0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	4x3x0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	4x4x0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	5x3x0.75mm	4,000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	2x2x0.9mm	6,000/250	13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	2x3x0.9mm	6,000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	3x3x0.9mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	4x3x0.9mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	4x4x0.9mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	4x5.5x1.3mm	4,000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	5x3x0.9mm	4,000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	3x3x0.9/0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
QFN (Zilker Lab)	Note 4	3x3x0.9mm	6000/1000/100	13&4/13&4/7&2.4	20	160mm	50	400mm	12mm	8mm
QFN (Quellan)	Note 4	3x3x0.9mm	1000/100	7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	3x4x0.9/0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	3.5x3.5x0.9/0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	4x4x0.9/0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	4x5x0.9/0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	4x6x0.9/0.75mm	4,000/1000/250	13&4/13&4/7&2.4	34	420mm	45	552mm	16mm	12mm
QFN (Quellan)	Note 4	4x7x0.9mm	1000/100	7&2.4/7&2.4	77	616mm	77	616mm	16mm	8mm
QFN/TQFN	Note 4	5x5x0.9/0.75mm	6000/1000/250	13&4/13&4/7&2.4	77	616mm	77	616mm	12mm	8mm
QFN (Zilker Lab)	Note 4	5x5x0.9mm	6000/1000/100	13&4/13&4/7&2.4	20	160mm	50	400mm	12mm	8mm
QFN/TQFN	Note 4	5x7x0.9/0.75mm	2500/1000/250	13&4/13&4/7&2.4	20	160mm	48	390mm	16mm	8mm
QFN	32	5x6x0.9mm	6000/2500/1000	13&4/13&4/7&2.4	100	800mm	100	800mm	12mm	8mm

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TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	NO. OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL & HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
QFN/TQFN	Note 4	5x10x0.9/ 0.75mm	4,000/1000	13&4/13&4	34	420mm	45	552mm	24mm	12mm
QFN/TQFN	Note 4	6x4x0.9/ 0.75mm	4000/1000/ 250	13&4/13&4/ 7&2.4	34	420mm	45	552mm	16mm	12mm
QFN/TQFN	Note 4	6x6x0.9/ 0.75mm	4000/1000/ 250	13&4/13&4/ 7&2.4	34	420mm	45	552mm	16mm	12mm
QFN (Zilker Lab)	Note 4	6x6x0.9mm	1000/100	13&4/7&2.4	14	160mm	34	400mm	16mm	12mm
QFN/TQFN	Note 4	7x7x0.9/ 0.75mm	4,000/1000/ 250	13&4/13&4/ 7&2.4	34	420mm	45	552mm	16mm	12mm
QFN (Techwell)	Note 4	7x7x0.9mm	3,000	13&4	15	180mm	35	420mm	16mm	12mm
QFN/TQFN	Note 4	8x8x0.9/ 0.75mm	4,000/1000/ 250	13&4/13&4/ 7&2.4	34	420mm	45	552mm	16mm	12mm
QFN/TQFN	Note 4	9x9x0.9/ 0.75mm	4,000/1000/ 250	13&4/13&4/ 7&2.4	34	408mm	45	540mm	16mm	12mm
QFN/TQFN	Note 4	10x10x0.9/ 0.75mm	3,000/1000/ 250	13&4/13&4/ 7&2.4	26	416mm	34	544mm	24mm	16mm
QFN/HDA	Note 4	15x15x3.5/ 2.2mm	500	13&4	20	400mm	20	400mm	24mm	20mm
QFN/HDA	Note 4	15x15x3.6mm	500	13&4	20	400mm	20	400mm	24mm	20mm
QFN/HDA (Punch QFN)	26	17x17x7.5mm	250	13&4	10	240mm	20	480mm	24mm	24mm
X2QFN	28	4x5x0.38mm	6000	13&4	77	616mm	77	616mm	12mm	8mm
aQFN	69	5x5x0.85mm	1000/100	7&2.4/7&2.4	77	616mm	77	616mm	12mm	8mm
HDA	27	17.2x11.45x2.5mm	100	13&4	10	200mm	29	400mm	24mm	20mm
MO-169 (TO-262)	3/7	0.400x0.415"	800	13&4	50	800mm	50	800mm	24mm	16mm
SOT-23	3	0.051x0.115"	3000/1000	7&2.4/7&2.4	40	160mm	100	400mm	8mm	4mm
SOT-23	5/6/8	0.065x0.115"	3000/1000	7&2.4/7&2.4	63	250mm	126	500mm	8mm	4mm
SC70	3	0.049x0.079"	3000/1000	7&2.4/7&2.4	40	160mm	100	400mm	8mm	4mm
SC70	5/6	0.049x0.079"	3000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	4	1.16x0.98mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	6	1.36x0.8mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	6	1.0x1.5mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	9	1.45x1.45mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	9	1.32x1.54mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.48x1.98mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.39x1.69mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.70x1.30mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	20,24	1.60x2.40mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	20	1.72x2.335mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	12mm	4mm
WLCSP	20	2.55x2.05mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	25	2.11x2.13mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	25	2.13x2.11mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	25	2.64x2.64mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	28	2.92x2.185mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	12mm	4mm
WLCSP	36	2.53x2.53mm	3,000/1000	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	72	4.00x4.50mm	3000	13&4	20	160mm	50	400mm	12mm	4mm

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TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	NO. OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL & HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
OCSP	9	2.13x2.13mm	2,500	7&2.4/7&2.4	95	380mm	125	500mm	8mm	4mm
μTDFN	6	1.2x1.0x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
μTDFN	6	1.6x1.6x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
μTDFN	8	2.0x2.0x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	8	1.4x1.2x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	10	1.8x1.4x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	10	2.1x1.6x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	12	2.2x1.4x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	16	2.6x1.8x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	20	3.2x1.8x0.50mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	100	400mm	100	400mm	8mm	4mm
ODFN	4	1.5x1.5x0.70mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	40	160mm	100	400mm	8mm	4mm
ODFN	5/6	2.0x2.1x0.70mm	3,000/1000/250	7&2.4/7&2.4 /7&2.4	40	160mm	100	400mm	8mm	4mm
ODFN	10	2.1x3.5x0.65mm	1,000/250	7&2.4/7&2.4	40	160mm	100	400mm	12mm	4mm
ODFN	8	3.0x3.0x0.70mm	1,000/250	7&2.4/7&2.4	40	160mm	100	400mm	8mm	4mm
ODFN	8	2.36x2.94x1.35mm	1,000/250	7&2.4/7&2.4	40	320mm	100	800mm	12mm	8mm

NOTES:

1. Pocket count and trailer and leader lengths are nominal counts/dimensions.
2. Package size in inches (unless otherwise indicated).
3. Reel & hub size; Example: 13&4 = 13 inch reel with 4 inch hub.
4. Multiple lead counts.
5. Dependent upon the specific package type. Reference specific package type and number of leads in Table 1 for additional information.

## General Information

The Intersil Tape and Reel packing system protects the product from mechanical and electrical damage and is designed for automatic pick-and-place equipment.

The Tape and Reel packing system consists of a Pocket Carrier Tape sealed with a protective Cover Tape to hold the devices in place.

The devices are loaded with leads down, into the carrier pockets.

The tape is wound onto a plastic reel for Labeling and Packing for shipment.

All tape sizes are supplied on 7in and 13in diameter reels.

The conductive Carrier Tape, and antistatic coated Transparent Cover Tape and Reel provide ESD protection.

Information Labels, ESD Labels and Barcode Labels (if required) are placed on each reel.

Transparent Cover Tape allows device verification and brand inspection without having to remove or handle components.

No more than 2 date codes will be combined on any one reel.

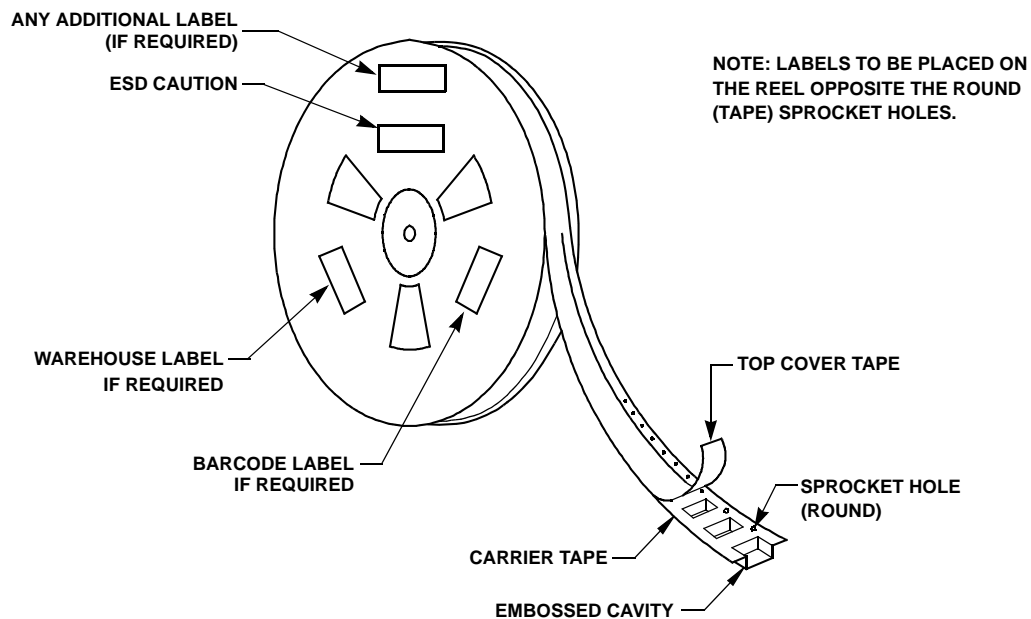


FIGURE 1. TAPE/REEL AND LABEL INFORMATION

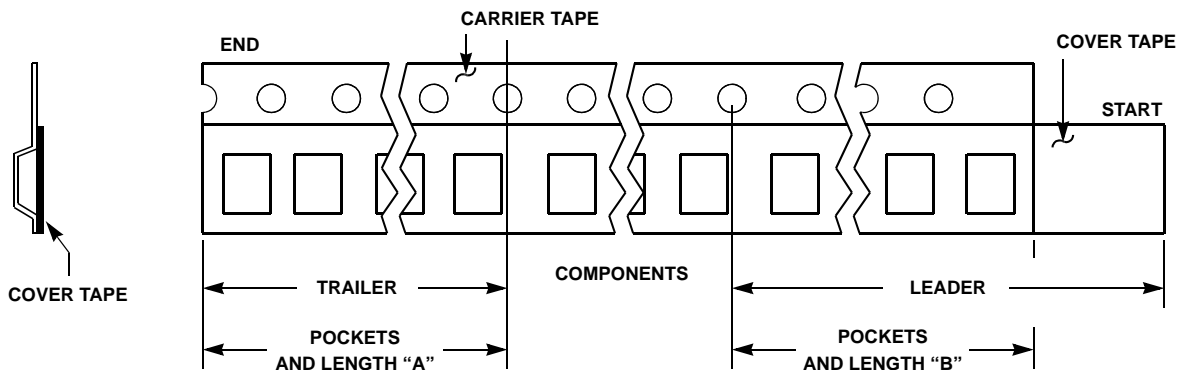


FIGURE 2. TAPE LEADER AND TRAILER

## Materials and Design

### Carrier Tape

The Pocketed Carrier Tape is made of Conductive Polystyrene + Carbon material (or equivalent). The surface resistivity is  $10^6 \Omega/\text{sq.}$  maximum.

Pocket Tapes are designed in such a manner that the components remain in position for automatic handling after the removal of the cover tape.

Each pocket has a hole in the center for automated sensing of whether or not the pocket is occupied, thus facilitating device removal.

Sprocket holes along the edge of the carrier tape enable direct feeding into automated board assembly equipment.

See Figures 3 and 4 for Carrier Tape dimensions.

### Cover Tape

The Cover Tape is made of Antistatic Transparent Polyester Film.

The surface resistivity is less than  $10^{10} \Omega/\text{sq.}$  maximum.

The Cover Tape is heat-sealed or pressure sealed to the edges of the Carrier Tape to encase the devices in the pockets.

The force to peel back the Cover Tape from the Carrier Tape shall be a MEAN value of 30 to 80gm (0.3N to 0.8N).

### Reel

The device loading orientation is in compliance with EIA-481. (See Figure 5).

The loaded Carrier Tape is wound onto a reel that is uniformly sized for all packages. (See Figure 6).

The Reel is made of Antistatic High Impact Polystyrene. The surface resistivity is less than  $10^{10} \Omega/\text{sq.}$  maximum.

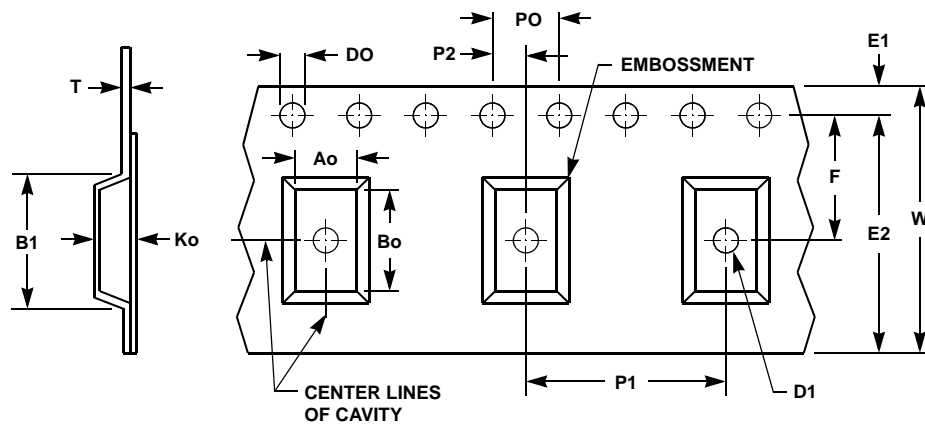


FIGURE 3. CONFIGURATION DRAWING FOR 8, 12, 16, 24mm POCKET TAPE

W (NOMINAL) TAPE WIDTH	B1 (MAXIMUM) (Note 10)	F (NOMINAL)	E2 (MINIMUM)
8mm (0.315)	4.35 (0.171)	3.5 (0.138)	6.25 (0.246)
12mm (0.472)	8.2 (0.323)	5.5 (0.217)	10.25 (0.404)
16mm (0.629)	12.1 (0.476)	7.5 (0.295)	14.25 (0.561)
24mm (0.945)	20.1 (0.791)	11.5 (0.453)	22.25 (0.876)

#### NOTES:

6. Dimensions are in millimeters and are nominal unless otherwise indicated (inches are in brackets for reference only).
7. "T" dimension, nominal 0.30 or 0.35.
8. "P1" cavity pitch is 8.0mm min. and increases in 4.0mm increments depending on package size. (See Table 1).
9. "PO" dimension is 4.0mm.
10. "P2" dimension is 2.0mm.
11. "B1" actual dimension is determined by package size.
12. "D1" diameter is 1.5mm min.
13. "Do" diameter is 1.5mm.
14. "E1" dimension is 1.75mm.
15. "Ao", "Bo", "Ko" dimensions determined by component size.

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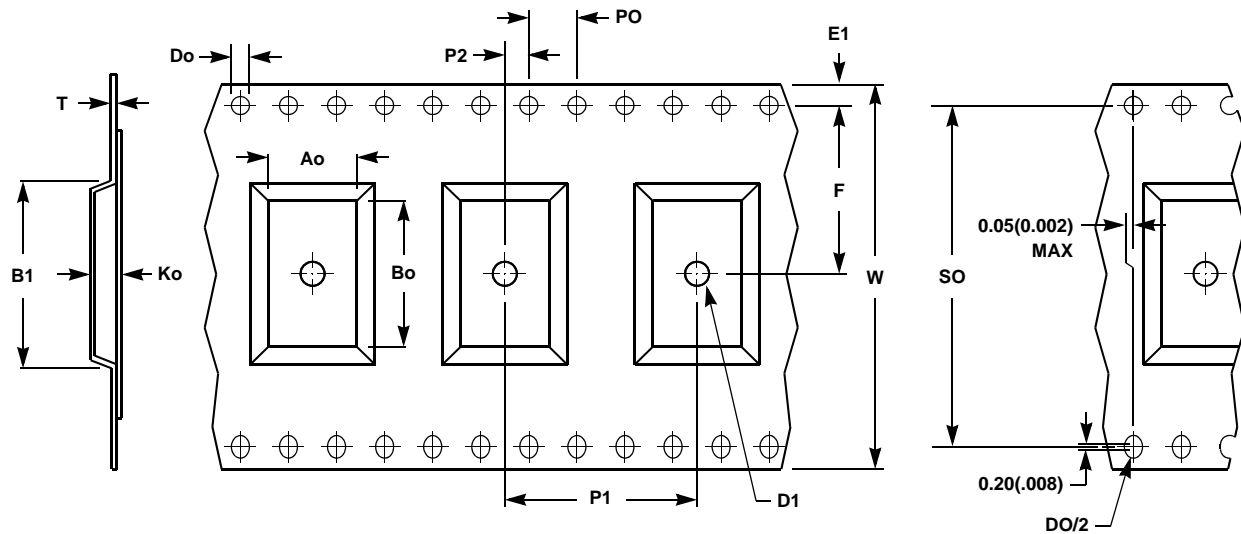


FIGURE 4. CONFIGURATION DRAWING FOR 32mm AND 44mm POCKET TAPE

W (NOMINAL) TAPE WIDTH	B1 (MAXIMUM) (Note 20)	F (NOMINAL)	SO (NOMINAL)
32mm (1.260)	23.0 (0.906)	14.2 (0.559)	28.4 (1.118)
44mm (1.732)	35.0 (1.378)	20.2 (0.795)	40.4 (1.591)

**NOTES:**

16. Dimensions are in millimeters and are nominal unless otherwise indicated (inches are in brackets for reference only).
17. "T" dimension, nominal 0.30 or 0.35.
18. "P1" cavity pitch is 8.0mm min. and increases in 4.0mm increments depending on package size. (See Table 1).
19. "P0" dimension is 4.0mm.
20. "P2" dimension is 2.0mm.
21. "B1" actual dimension is determined by package size.
22. "D1" diameter is 2.0mm min.
23. "Do" diameter is 1.5mm.
24. "E1" dimension is 1.75mm.
25. "Ao", "Bo", "Ko" dimensions determined by component size.



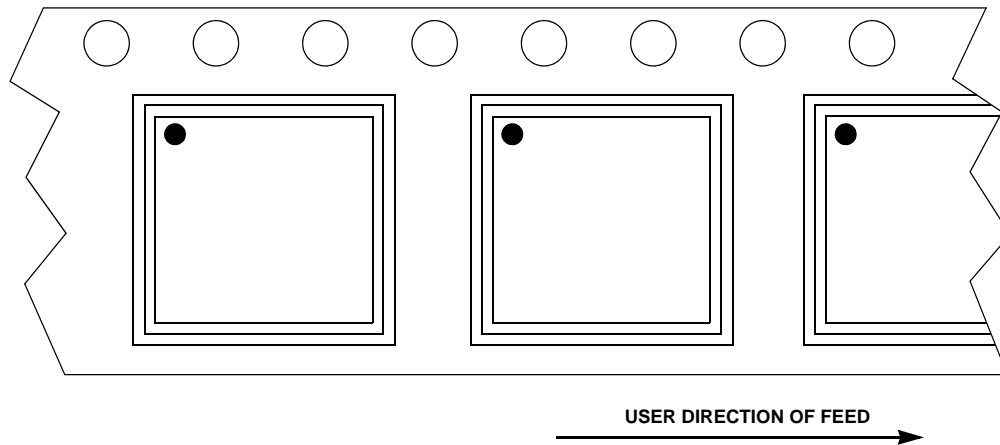


FIGURE 5A. SQUARE - BGA, QFN, DFN AND CSP

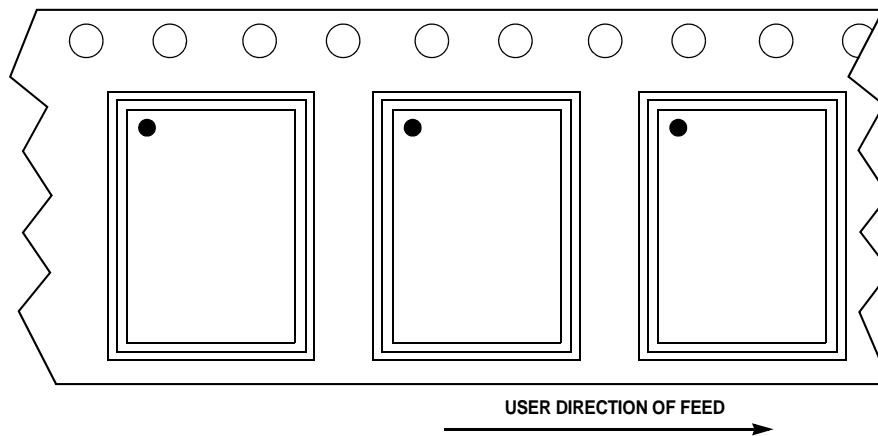


FIGURE 5B. RECTANGULAR - QFN AND DFN

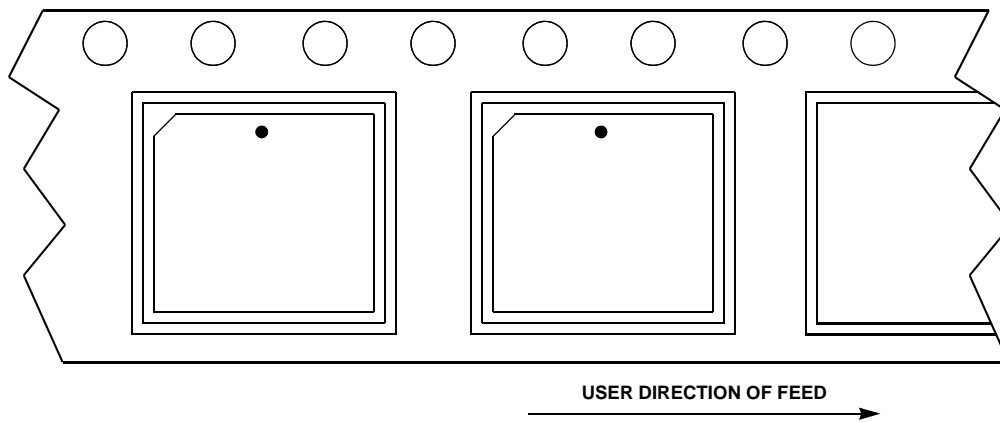


FIGURE 5C. PLCC

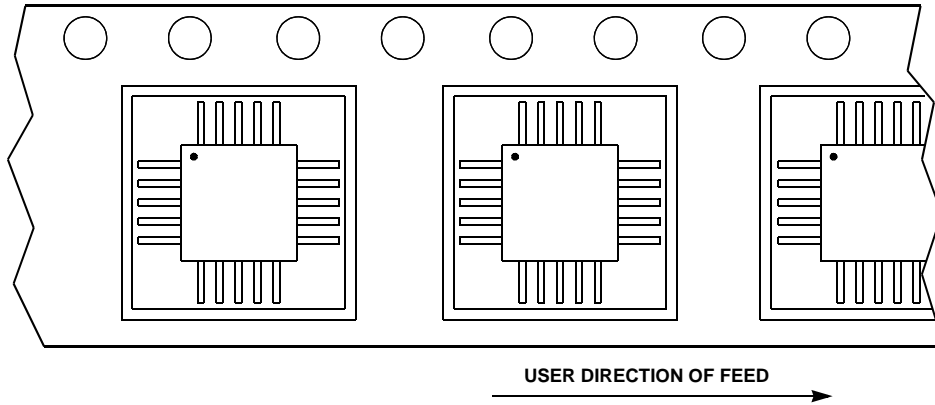


FIGURE 5D. SQUARE - MQFP, TQFP AND LQFP

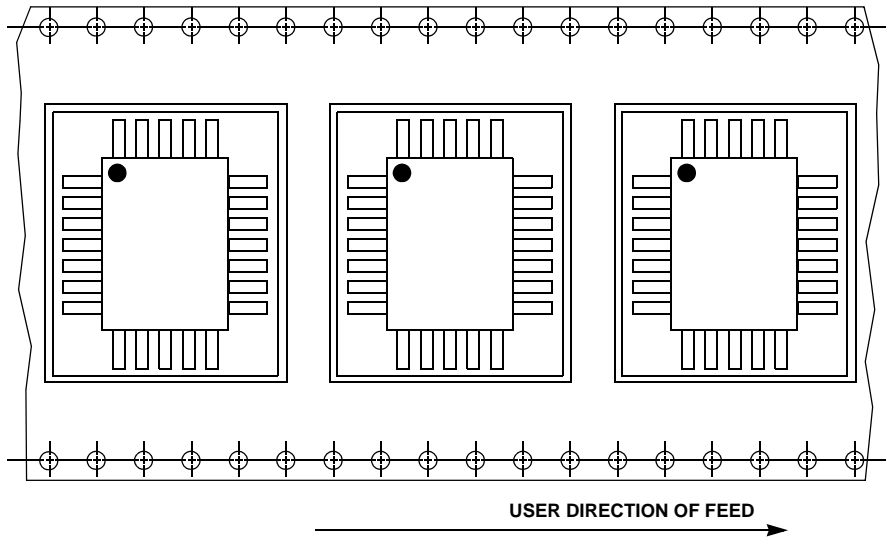


FIGURE 5E. RECTANGULAR - MQFP, TQFP AND LQFP

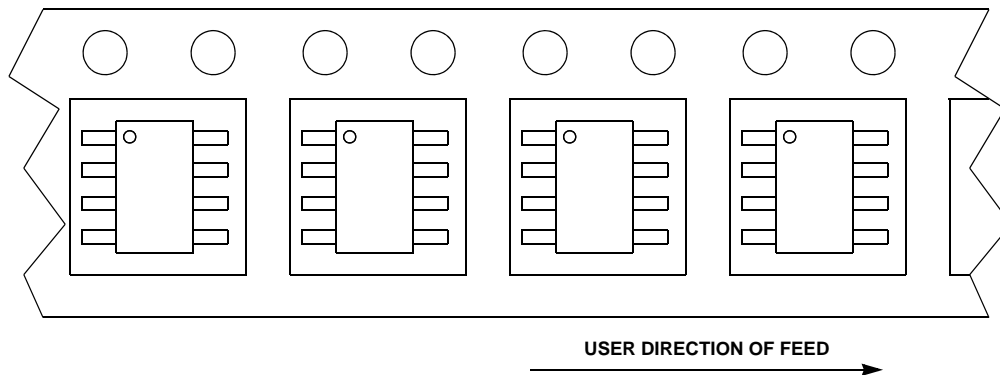


FIGURE 5F. SOIC, MSOP, TSSOP, QSOP AND PSOP

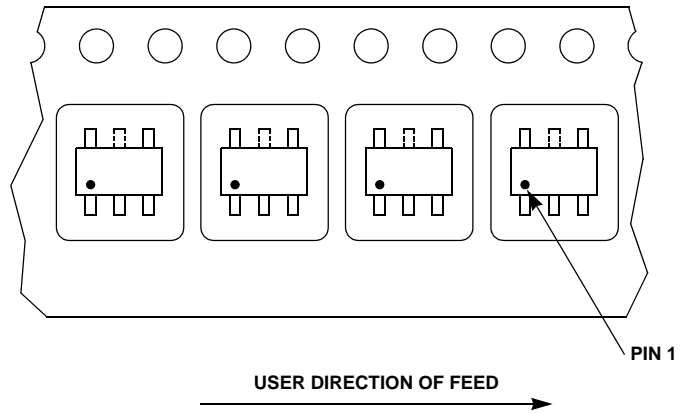


FIGURE 5G. SOT-23 AND SC-70

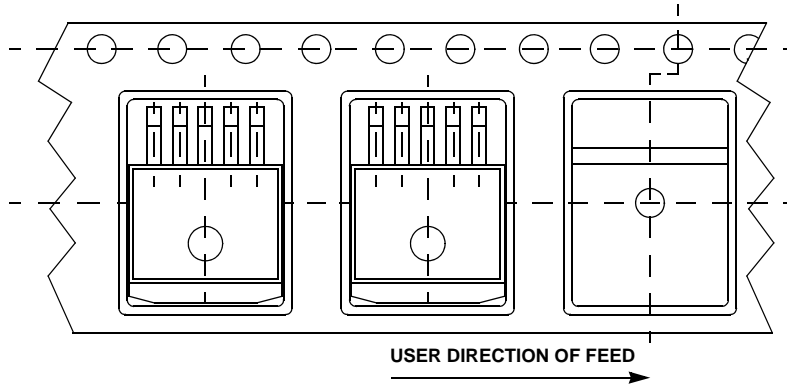


FIGURE 5H. MO-169

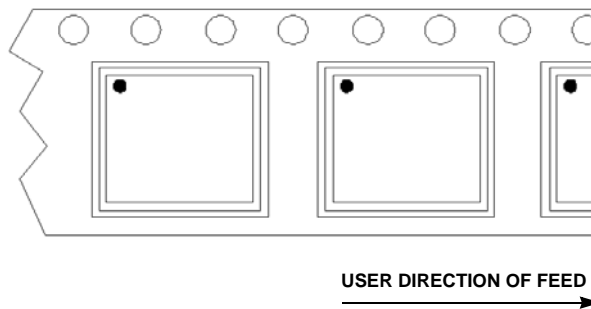
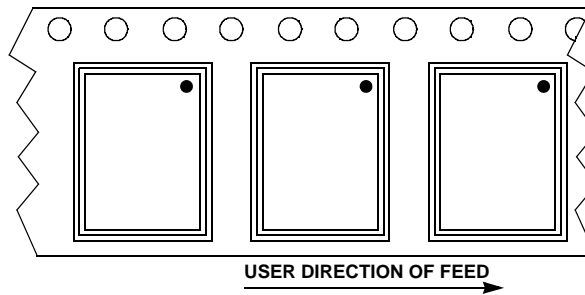


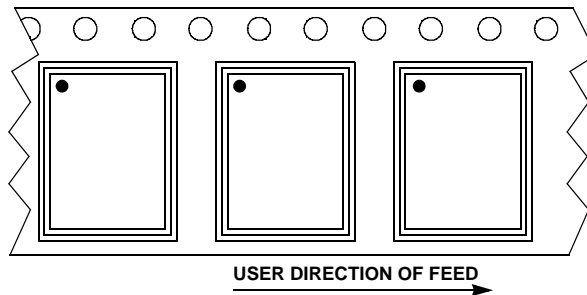
FIGURE 5I. SQUARE CSP

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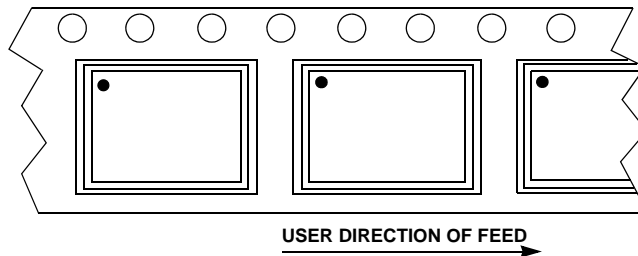
NOTE: THE BUMPS (BALLS) ARE FACING DOWN IN THE POCKET  
MAY BE APPLICABLE ONLY FOR PRODUCTS BEFORE MAY 01, 2008

FIGURE 5J. RECTANGULAR - CSP



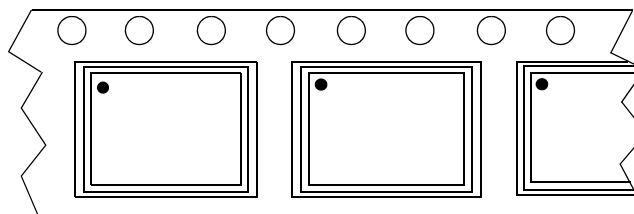
NOTE: ALL NEW PRODUCTS WILL FOLLOW THIS A1 (PIN 1) ORIENTATION  
EFFECTIVE DATE: MAY 01, 2008

FIGURE 5K. RECTANGULAR - CSP



NOTE: SPECIFICALLY FOR 8 BUMP 1.40X1.20MM CSP

FIGURE 5L. RECTANGULAR - CSP



NOTE: ALL NEW PRODUCTS WILL FOLLOW THIS A1 (PIN 1) ORIENTATION  
EFFECTIVE DATE: MAY 01, 2008

FIGURE 5M. RECTANGULAR - HDA

FIGURE 5. MECHANICAL POLARIZATION DIAGRAMS

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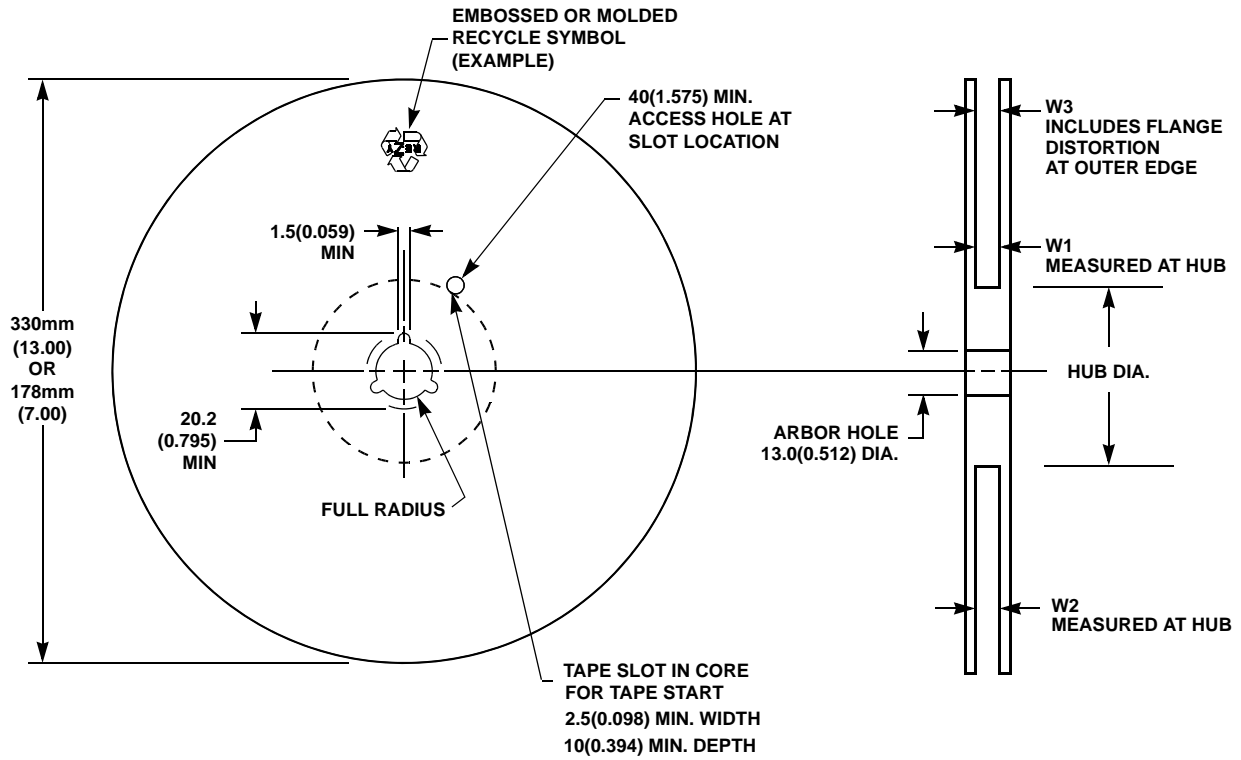


FIGURE 6. REEL DIMENSIONS

TAPE WIDTH	W1 (NOMINAL)	W2 (MAXIMUM)	W3 (MAXIMUM)
8mm (0.315)	8.4 (0.331)	14.4 (0.567)	10.9 (0.429)
12mm (0.472)	12.4 (0.488)	18.4 (0.724)	15.4 (0.606)
16mm (0.629)	16.4 (0.646)	22.4 (0.882)	19.4 (0.764)
24mm (0.945)	24.4 (0.961)	30.4 (1.197)	27.4 (1.079)
32mm (1.260)	32.4 (1.276)	38.4 (1.512)	35.4 (1.394)
44mm (1.732)	44.4 (1.748)	50.4 (1.984)	47.4 (1.866)

**NOTE:**

26. Dimensions are in millimeters (inches are in brackets for reference only).

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