

Packaging

Tape and Reel Specification for Integrated Circuits

Introduction

Many Surface Mounted Devices (SMDs) are packaged for shipment in embossed tape and wound onto reels. The Renesas tape and reel specifications comply with the Electronics Industries Association (EIA) standards for "Embossed Carrier Taping of Surface Mount Components for Automatic Handling".

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

(Except the orientation of square package)

Renesas now supplies many different SMDs in tape and reel, as shown in [Table 1](#).

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND 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
xxxxxx-TK	Note 4	Note 5	1000	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5	Note 5
SOIC(N) (SOPN)	8	0.155×0.194in	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
SOIC(N) (SOPN)	14	0.155×0.342in	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
SOIC(N) (SOPN)	16	0.155×0.391in	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
SOIC(W) (SOPW)	16	0.296×0.407in	1000/250	13&4/7&2.4	34	420mm	45	552mm	16mm	12mm
SOIC(W) (SOPW)	18	0.296×0.456in	1000	13&4	34	420mm	45	552mm	24mm	12mm
SOIC(W) (SOPW)	20	0.296×0.506in	1000	13&4	34	420mm	45	552mm	24mm	12mm
SOIC(W) (SOPW)	24	0.296×0.606in	1000	13&4	34	420mm	45	552mm	24mm	12mm
SOIC(W) (SOPW) (or EPSOIC)	28	0.296×0.706in	1000	13&4	34	420mm	45	552mm	24mm	12mm
EIAJ SOIC	8	0.217×0.217in	2,500	13&4	77	616mm	77	616mm	12mm	8mm
MSOP	8/10	3.0×3.0mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TSSOP	8	4.4×3.0mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TSSOP (or EPTSSOP)	14/16	4.4×5.0mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TSSOP (Custom)	14/16	4.4×5.0mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
TSSOP	20	4.4×6.5mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
TSSOP (or EPTSSOP)	24	4.4×7.8mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
TSSOP (or EPTSSOP)	28/38	4.4×9.7mm	2500/1000/ 250	13&4/13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
TSSOP	48	12.5×6.1mm	1000	13&4	50	600mm	50	600mm	24mm	12mm
QSOP (SSOP)	16	0.155×0.194in	2500/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QSOP (SSOP)	20/24	0.155×0.342in	2500/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
QSOP (SSOP)	28	0.155×0.391in	2500/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
SSOP	16	0.209×0.244in	1000/ 250	13&4/ 7&2.4	24	420mm	45	552mm	16mm	12mm
SSOP	20	0.209×0.284in	1000/ 250	13&4/ 7&2.4	34	420mm	45	552mm	16mm	12mm
SSOP	24	0.209×0.323in	1000/ 250	13&4/ 7&2.4	34	420mm	45	552mm	16mm	12mm
SSOP	28	0.209×0.402in	1000	13&4	34	420mm	45	552mm	24mm	12mm
PLCC	20	0.350×0.350in	1000	13&4	53	660mm	64	792mm	16mm	12mm
PLCC	28	0.450×0.450in	750	13&4	15	256mm	25	416mm	24mm	16mm
PLCC	32	0.450×0.550in	750	13&4	15	256mm	25	416mm	24mm	16mm
PLCC	44	0.650×0.650in	500	13&4	15	384mm	25	624mm	32mm	24mm
PLCC	68	0.950×0.950in	250	13&6	25	832mm	25	832mm	44mm	32mm
PLCC	84	1.150×1.150in	200	13&6	25	936mm	25	936mm	44mm	36mm
TQFP	32	5×5×1.0mm	2000/ 1000	13&6/ 13&6	33	400mm	33	400mm	16mm	12mm
TQFP/EPAD TQFP	32/48	7×7×1.0mm	1000	13&6	34	420mm	45	552mm	16mm	12mm
TQFP/EPAD	64/44	10×10×1.0mm	1000	13&4	26	420mm	35	552mm	24mm	16mm
TQFP	64/44	10×10×1.0mm	1000	13&6	25	400mm	30	480mm	24mm	16mm
TQFP	80	14×14×1.0mm	1000	13&4	10	240mm	20	480mm	24mm	24mm
TQFP (Note 6)	80	12×12×1.0mm	1000	13&4	25	600mm	25	600mm	24mm	24mm
TQFP	100	12×12×1.0mm	1000	13&4	50	1200mm	50	1200mm	24mm	24mm
LQFP	48	7×7×1.4mm	1000	13&6	34	420mm	45	552mm	16mm	12mm
LQFP	80	10×10×1.4mm	1000	13&4	25	400mm	30	480mm	24mm	16mm
LQFP	80/128	14×14×1.4mm	500	13&4	21	420mm	28	552mm	32mm	24mm
LQFP	128	14×20×1.4mm	1000	13&4	10	160mm	20	390mm	44mm	24mm
LQFP (Note 6)	128	14×20×1.4mm	500	13&4	25	600mm	25	600mm	44mm	24mm
LQFP (or PQLQP)	144	20×20×1.4mm	600	13&6	15	320mm	25	640mm	44mm	32mm
LQFP	160	24×24×1.4mm	500	13&6	20	640mm	20	640mm	44mm	32mm
LQFP	208	28×28×1.4mm	500	13&6	10	360mm	20	720mm	44mm	36mm
MQFP	44	10×10×2.0mm	500	13&6	25	624mm	25	624mm	24mm	24mm
MQFP	80	14×20×2.7mm	500	13&6	10	193mm	20	385mm	44mm	24mm
QFP	128	14×20×2.72mm	500	13&6	25	600mm	25	600mm	44mm	24mm
PBGA (fBGA)	160/196	12×12×1.4mm	1000	13&6	25	400mm	30	480mm	24mm	16mm
PBGA (fBGA)	192	14×14×1.32mm	1000	13&6	10	240mm	20	480mm	24mm	24mm
PBGA (fBGA)	196	15×15×1.4mm	750	13&6	10	240mm	20	480mm	24mm	24mm
PBGA (fBGA)	256/316	17×17×1.4mm	500	13&6	10	240mm	20	480mm	24mm	24mm

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
TFBGA	35	4.7×6.3×1.06mm	3000/250	13&4/7&2.4	70	560mm	70	560mm	16mm	8mm
TFBGA (Note 6)	144	7×7×1.2mm	2500	13&4	50	600mm	50	600mm	16mm	12mm
TFBGA (Note 6)	144	7×7×1.3mm	2500	13&4	50	600mm	50	600mm	16mm	12mm
LFBGA	54	5.71×7.66×1.216mm	2500/250	13&4/7X2.4	70	560mm	70	560mm	16mm	12mm
LFBGA	60	5.71×8.46×1.216mm	3000/ 2500/250	13&4/ 13&4/7X2.4	70	560mm	70	560mm	16mm	12mm
LFBGA	66	4.5×7.5×1.2mm	6000	13&4	77	616mm	77	616mm	16mm	8mm
LGA	10	3×3×1.7mm	6000	13&4	77	616mm	77	616mm	12mm	8mm
LGA	10	3×3×1.15mm	6000	13&4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	1.6×1.6×0.75mm	1000/ 250	7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
TDFN	Note 4	2.0×2.0×0.75mm	1000/ 250	7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
TDFN (13" Packing)	Note 4	2.0×2.0×0.75mm	6000	13&4	100	400mm	100	400mm	8mm	4mm
TDFN	22	3.0×6.0×0.75mm	6000/250	13&4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
TDFN	Note 4	2×3×0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	3×3×0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	4×3×0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	4×4×0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
TDFN	Note 4	5×3×0.75mm	4000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	2×2×0.9mm	6000/ 250	13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	10	2.5×2.5×0.85mm	6000	13&4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	2×3×0.9mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	3×3×0.9mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	4×3×0.9mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	4×4×0.9mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
DFN	Note 4	4×5.5×1.3mm	4000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
DFN/TDFN	Note 4	5×3×0.9/ 0.75mm	4000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	3×3×0.9/ 0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QFN (Note 7)	Note 4	3×3×0.9mm	6000/ 1000/ 100	13&4/ 13&4/ 7&2.4	20	160mm	50	400mm	12mm	8mm
QFN (Note 8)	Note 4	3×3×0.9mm	1000/ 100	7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	3×4×0.9/ 0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	20	3.5×4×0.85mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN	Note 4	3.5×3.5×0.9/ 0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN/ FCQFN	Note 4	4×4×0.9/0.75/ 0.85mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN /PQFN	Note 4	4×5×0.9/ 0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/TQFN /PQFN	Note 4	4×6×1.0/0.9/ 0.75	4000/ 3000/ 1000/ 250	13&4/ 13&4/ 13&4/ 7&2.4	34	408mm	45	540mm	16mm	12mm
QFN (Note 8)	Note 4	4×7×0.9mm	1000/ 100	13&4/ 13&4	77	616mm	77	616mm	16mm	8mm
TQFN	Note 4	4.5×6.5×0.75mm	3000/ 2500	7&2.4/ 7&2.4	77	616mm	77	616mm	16mm	8mm
QFN	22	4.5×7.5×1.9mm	3000/ 1000/ 250	13&4/ 13&4/ 7&2.4	50	400mm	50	400mm	16mm	8mm
QFN/TQFN	Note 4	5×5×0.9/0.75mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
QFN/WFQFN (Note 7)	Note 4	5×5×0.9mm	6000/ 1000/ 100	13&4/ 13&4/ 7&2.4	20	160mm	50	400mm	12mm	8mm
QFN	32/39	5×6×0.9/0.75mm	6000/ 2500/ 3000/ 1000	13&4/ 13&4/ 13&4/ 7&2.4	100	800mm	100	800mm	12mm	8mm
QFN/TQFN	Note 4	5×7×0.9/ 0.75mm	2500/ 1000/ 250	13&4/ 13&4/ 7&2.4	20	160mm	48	390mm	16mm	8mm
QFN/TQFN	Note 4	5×10×0.9/ 0.75mm	4000/ 1000	13&4/ 13&4	34	408mm	45	540mm	24mm	12mm

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
QFN/TQFN	Note 4	6×4×0.9/ 0.75mm	4000/ 1000/ 250	13&4/ 13&4/ 7&2.4	34	408mm	45	540mm	16mm	12mm
QFN	23	6.5×9.0×1.95mm	1000/ 250	13&4/ 7&2.4	34	408mm	45	540mm	16mm	12mm
QFN/TQFN	Note 4	6×6×0.9/ 0.75mm	4000/ 1000/ 250	13&4/ 13&4/ 7&2.4	34	408mm	45	540mm	16mm	12mm
QFN (Note 7)	Note 4	6×6×0.9mm	1000/ 100	13&4/ 7&2.4	14	168mm	34	408mm	16mm	12mm
QFN/TQFN	Note 4	7×7×0.9/ 0.75mm	4000/3000 1000/250	13&4/13&4 13&4/7&2.4	34	408mm	45	540mm	16mm	12mm
QFN (Note 6)	Note 4	7×7×0.9mm	3000	13&4	15	180mm	35	420mm	16mm	12mm
QFN/TQFN	Note 4	8×8×0.9/ 0.75mm	4000/ 1000/ 250	13&4/ 13&4/ 7&2.4	34	408mm	45	540mm	16mm	12mm
QFN/TQFN	Note 4	9×9×0.9/ 0.75mm	4000/ 1000/ 250	13&4/ 13&4/ 7&2.4	34	408mm	45	540mm	16mm	12mm
QFN/TQFN	Note 4	10×10×0.9/0.75m m	3000/ 1000/ 250	13&4/ 13&4/ 7&2.4	26	416mm	34	544mm	24mm	16mm
QFN/HDA	Note 4	15×15×3.5/2.2mm	500	13&4	20	400mm	20	400mm	24mm	20mm
QFN/HDA	Note 4	15×15×3.6mm	500	13&4	20	400mm	20	400mm	24mm	20mm
QFN/HDA (Punch QFN)	26	17×17×7.5mm	250	13&4	10	240mm	20	480mm	24mm	24mm
QFN/HDA	27	17.2×11.45×2.5mm	1000	13&4	10	200mm	20	400mm	24mm	20mm
QFN/HDA	22	19.0×13.0×5.3mm	350	13&4	10	240mm	20	480mm	32mm	24mm
QFN/HDA	35	12.0×11.0×5.2mm	500	13&4	26	416mm	34	544mm	24mm	16mm
QFN/HDA	40	17.0×19.0×3.55mm	500	13&4	10	240mm	20	480mm	32mm	24mm
QFN/HDA	42/58	18.0×23.0×7.5mm	100	13&4	10	240mm	20	480mm	44mm	24mm
X2QFN	28	4×5×0.38mm	6000	13&4	77	616mm	77	616mm	12mm	8mm
aQFN	69	5×5×0.85mm	1000/ 100	7&2.4/ 7&2.4	77	616mm	77	616mm	12mm	8mm
WFQFN	40	6.0×6.0×0.85mm	4000/ 1000	13&4/ 13&4	34	420mm	45	552mm	16mm	12mm
MO-169 (TO-262)	3/7	0.400×0.415in	800	13&4	50	800mm	50	800mm	24mm	16mm
SOT-23	3	0.051×0.115in	3000/ 1000	7&2.4/ 7&2.4	40	160mm	100	400mm	8mm	4mm
SOT-23	5/6/8	0.065×0.115in	3000/ 1000	7&2.4/ 7&2.4	63	250mm	126	500mm	8mm	4mm
SOT-89	3	4.5 × 4.1mm	4000/ 1000	13&4.0/ 7&2.4	38	304mm	64	512mm	12mm	8mm
SC70	3	0.049×0.079in	3000/ 1000	7&2.4/ 7&2.4	40	160mm	100	400mm	8mm	4mm
SC70	5/6	0.049×0.079in	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	4	1.16×0.98mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
WLCSP	6	0.84×1.24mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	6	1.36×0.8mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	6	1.36×0.865mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	6	1.0×1.5mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	8	0.76×1.438mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	8	1.0×1.8mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	9	1.28×1.36mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	9	1.45×1.45mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	9	1.32×1.54mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	9	1.41×1.41mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	9	1.425×1.425mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	10	1.02×2.02mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.29×1.69mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.318×1.878mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.48×1.98mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.39×1.69mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.70×1.30mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	12	1.89 x 1.89mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	15	1.51×2.15mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	16	1.655×1.655mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	16	1.74×1.74mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	16	1.78×1.78mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	16	2.16×2.16mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	20	2.55×2.05mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	20	1.595×2.335mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	20	1.72×2.335mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	12mm	4mm

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
WLCSP	20	1.74×2.15mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	12mm	4mm
WLCSP	20	1.82×2.15mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	20	2.07×1.67mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	20	1.64×2.18mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	20/24	1.60×2.40mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	25	2.11×2.13mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	25	2.13×2.11mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	25	2.34×2.38mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	25	2.33×2.07mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	25	2.64×2.64mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	28	1.66×2.86mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	12mm	4mm
WLCSP	28	2.92×2.185mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	12mm	4mm
WLCSP (8mm)	30	2.33×2.61mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	30	2.33×2.61mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	12mm	4mm
WLCSP	35	2.14×2.88mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	35	2.39×3.40mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	35	3.67×2.551mm	3000/1000	7&2.4/ 7&2.4	200	2000mm	150	1200mm	12mm	8mm
WLCSP	36	2.41×2.41mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	36	2.53×2.53mm	3000/1000	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
WLCSP	40	3.26×2.06m	3000	7&2.4	95	380mm	125	500mm	12mm	4mm
WLCSP	40	3.27×2.01mm	3000/1000	7&2.4/ 7&2.4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	42	2.80×3.20mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	42	2.57×2.919mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	46	2.82×3.31mm	3000/ 1000	7&2.4/ 7&2.4	95	380mm	125	500mm	12mm	4mm
WLCSP	48	2.55×3.36mm	3000	13&4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	52	3.14×3.54mm	3000/ 1000	13&4/ 7&2.4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	54	3.67×2.551mm	3000/ 1000	13&4/ 7&2.4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	56	2.86×3.36mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
WLCSP	56	2.86×3.46mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	56	3.11×3.21mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	56	3.22×3.37mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	62	3.69×3.69mm	3000/1000/ 250	13&4/ 7&2.4/ 7&2.4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	64	4.0025×4.0025mm	3000	13&4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	64	4.04×4.04mm	3000/ 1000	13&4/ 7&2.4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	72	3.27×3.67mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	72	3.54×3.94mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	72	3.608×4.009mm	3000/ 1000	13&4/ 7&2.4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	72	4.00×4.50mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	90	3.74×4.14mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	96	4.025×6.105mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	99	4.00×4.80mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	108	4.00×5.20mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	108	3.74×5.02mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
WLCSP	121	5.526×5.540mm	3000	13/4	250	2000mm	150	1200mm	12mm	8mm
OCSP	9	2.13×2.13mm	2,500	7&2.4/ 7&2.4	95	380mm	125	500mm	8mm	4mm
μTDFN	6	1.2×1.0×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
μTDFN	6	1.6×1.6×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
μTDFN	8	2.0×2.0×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	8	1.4×1.2×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	8	2.0×3.0×0.50mm	6000/ 1000/ 250	13&4/ 13&4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	10	1.8×1.4×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	12mm	4mm
μTQFN	10	2.1×1.6×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	12	2.2×1.4×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
μTQFN	16	2.6×1.8×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm

TABLE 1. PACKAGE AND TAPE SPECIFICATIONS (Continued)

PACKAGE TYPE	# OF LEADS	NOMINAL PACKAGE SIZE	UNITS PER REEL	REEL AND HUB SIZE (Note 3)	TRAILER "A"		LEADER "B"		POCKET TAPE	
					POCKETS	LENGTH	POCKETS	LENGTH	WIDTH	PITCH (P1)
μTQFN	20	3.2×1.8×0.50mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	100	400mm	100	400mm	8mm	4mm
PQFN	32	5×5×0.63 mm	6000	13&4	77	616mm	77	616mm	12mm	8mm
PQFN	32	5×5×0.77 mm	6000	13&4	77	616mm	77	616mm	12mm	8mm
PQFN	39	5×6×0.75 mm	6000/ 2500/ 3000/ 1000	13&4/ 13&4/ 13&4/ 7&2.4	100	800mm	100	800mm	12mm	8mm
ODFN	4	1.5×1.5×0.70mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	40	160mm	100	400mm	8mm	4mm
ODFN	4	2.01×1.25×1.0mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	40	160mm	100	400mm	8mm	4mm
ODFN	6	1.5×1.6×0.70mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	40	160mm	100	400mm	8mm	4mm
ODFN	5/6/8	2.0×2.1×0.70mm	3000/ 1000/ 250	7&2.4/ 7&2.4/ 7&2.4	40	160mm	100	400mm	8mm	4mm
ODFN	10	2.1×3.5×0.65mm	1000/ 250	7&2.4/ 7&2.4	40	160mm	100	400mm	12mm	4mm
ODFN	8	3.0×3.0×0.70mm	1000/ 250	7&2.4/ 7&2.4	40	160mm	100	400mm	8mm	4mm
ODFN	8	2.36×2.94×1.35mm	1000/ 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 and 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.
6. Products starting with "TW"
7. Products starting with "ZL"
8. Products starting with "Q"

General Information

The Renesas 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 protective cover tape to hold the devices in place.

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

The tape is wound onto a plastic reel for labeling and then packaged for shipment.

All tape sizes are supplied on 7inch and 13inch 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 two date codes are combined on any one reel.

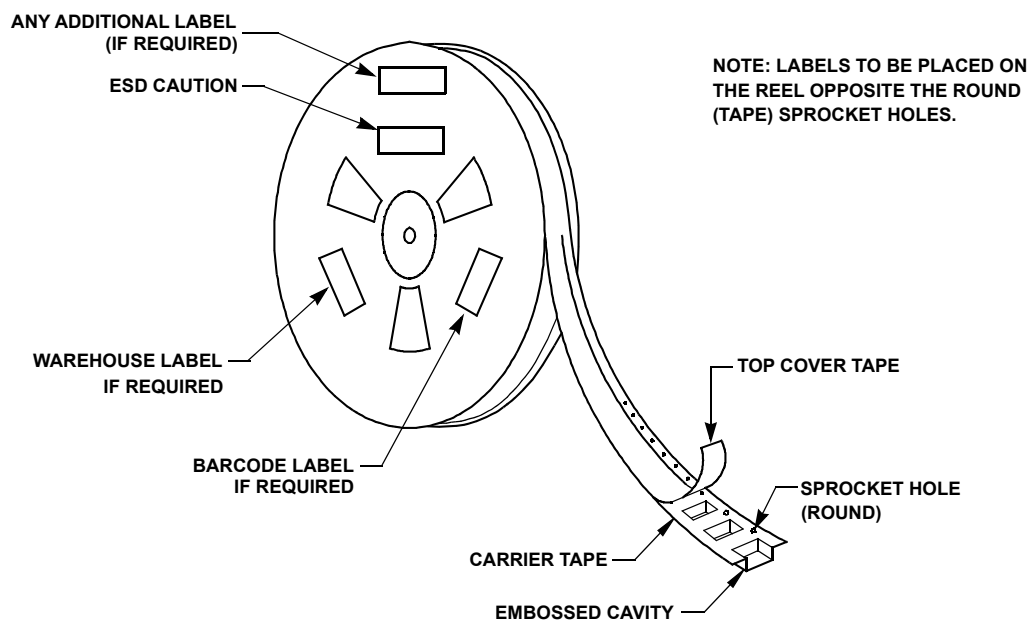


FIGURE 1. TAPE/REEL AND LABEL INFORMATION

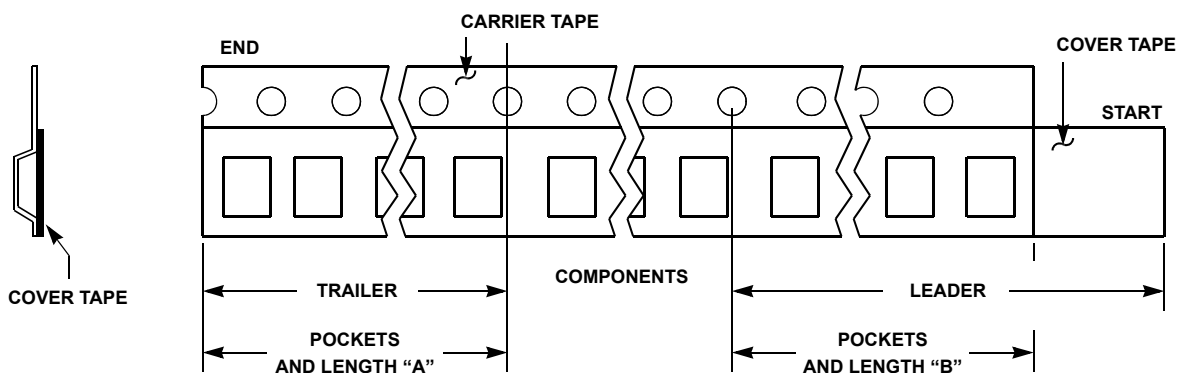


FIGURE 2. TAPE LEADER AND TRAILER

Materials and Design

Carrier Tape

The pocketed carrier tape is made of conductive polystyrene plus carbon material (or equivalent). The surface resistivity is $10^6 \Omega/\text{sq.}$ maximum.

Pocket tapes are designed so that the components remain in position for automatic handling after the cover tape is removed.

Each pocket has a hole in the center for automated sensing of whether 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 30gm 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.

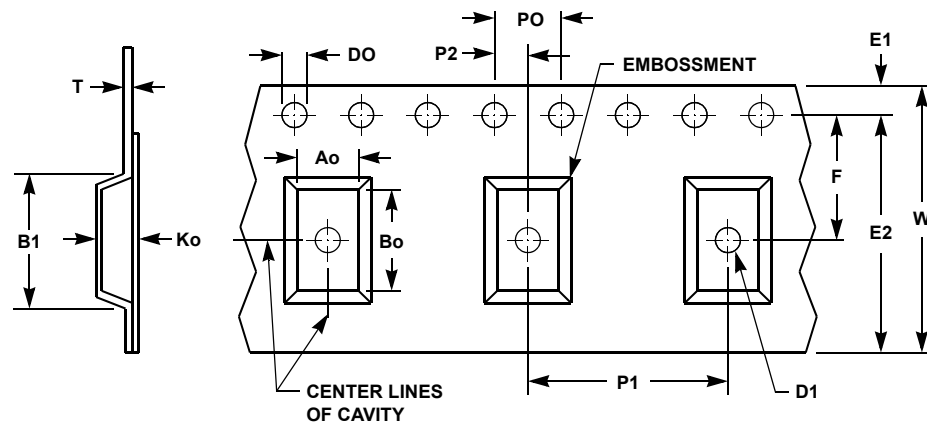


FIGURE 3. CONFIGURATION DRAWING FOR 8, 12, 16, 24MM POCKET TAPE

W (NOMINAL) TAPE WIDTH	B1 (MAXIMUM) (Note 14)	F (NOMINAL)	E2 (MINIMUM)
8mm (0.315in)	4.35 (0.171in)	3.5 (0.138in)	6.25 (0.246in)
12mm (0.472in)	8.2 (0.323in)	5.5 (0.217in)	10.25 (0.404in)
16mm (0.629in)	12.1 (0.476in)	7.5 (0.295in)	14.25 (0.561in)
24mm (0.945in)	20.1 (0.791in)	11.5 (0.453in)	22.25 (0.876in)

NOTES:

9. Dimensions are in millimeters and are nominal unless otherwise indicated (inches are in parentheses for reference only).
10. "T" dimension, nominal 0.30 or 0.35.
11. "P1" cavity pitch is 4.0mm minimum and increases in 4.0mm increments depending on package size, (see [Table 1](#)).
12. "P0" dimension is 4.0mm.
13. "P2" dimension is 2.0mm.
14. "B1" actual dimension is determined by package size.
15. "D1" diameter is 1.5mm minimum.
16. "Do" diameter is 1.5mm.
17. "E1" dimension is 1.75mm.
18. "Ao", "Bo", "Ko" dimensions determined by component size.

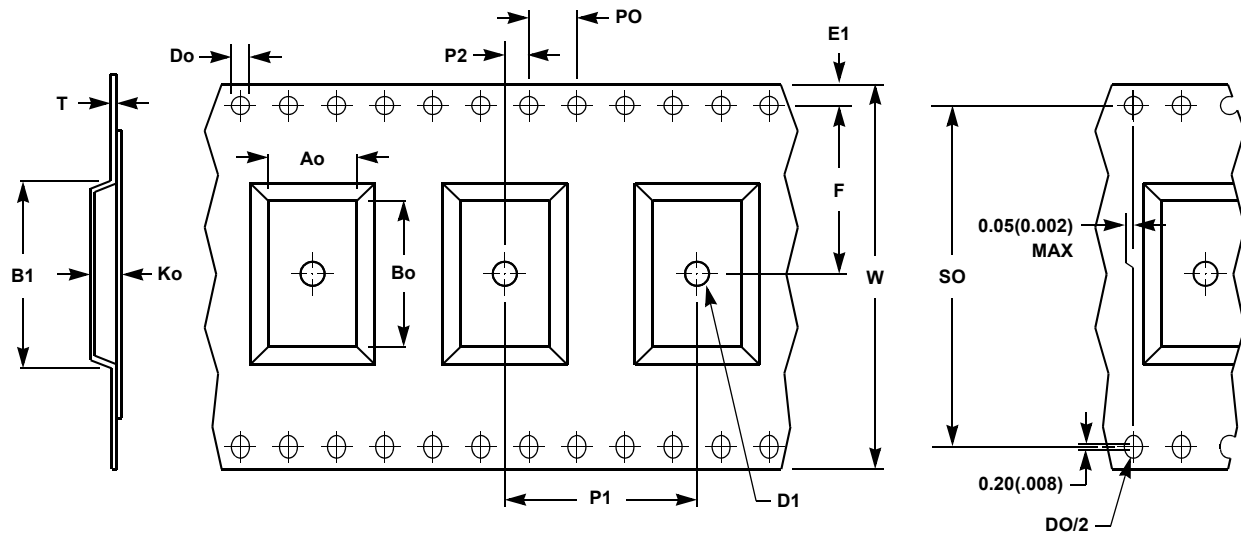


FIGURE 4. CONFIGURATION DRAWING FOR 32MM AND 44MM POCKET TAPE

W (NOMINAL) TAPE WIDTH	B1 (MAXIMUM) (Note 24)	F (NOMINAL)	SO (NOMINAL)
32mm (1.260in)	23.0 (0.906in)	14.2 (0.559in)	28.4 (1.118in)
44mm (1.732in)	35.0 (1.378in)	20.2 (0.795in)	40.4 (1.591in)

NOTES:

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

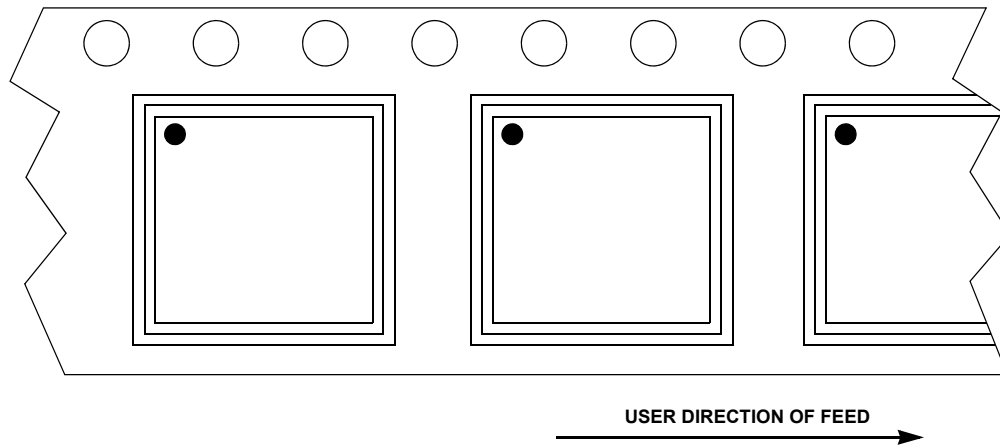


FIGURE 5A. SQUARE - BGA, QFN, DFN, ODFN, AND CSP

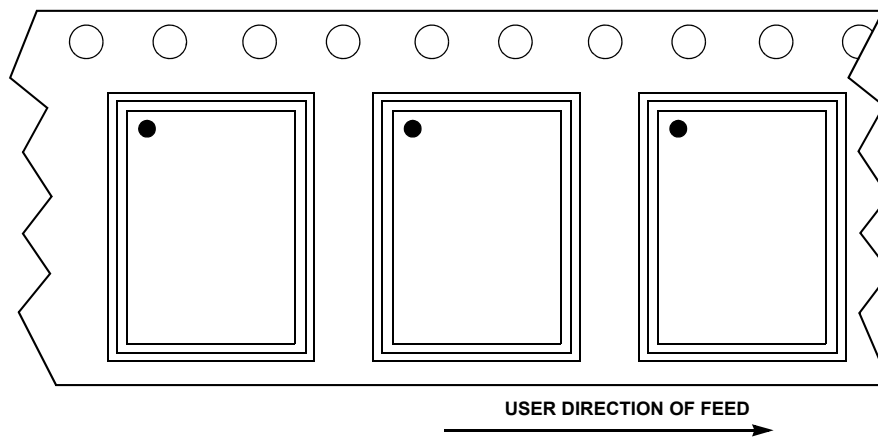


FIGURE 5B. RECTANGULAR - QFN, ODFN, AND DFN

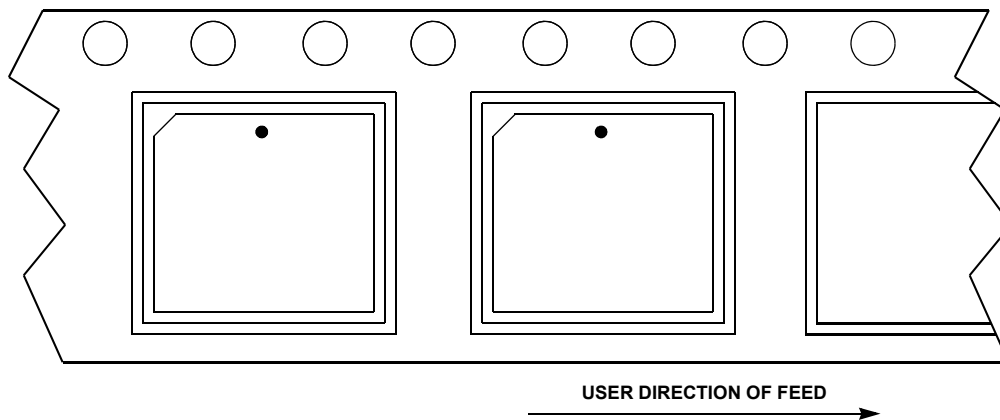


FIGURE 5C. PLCC

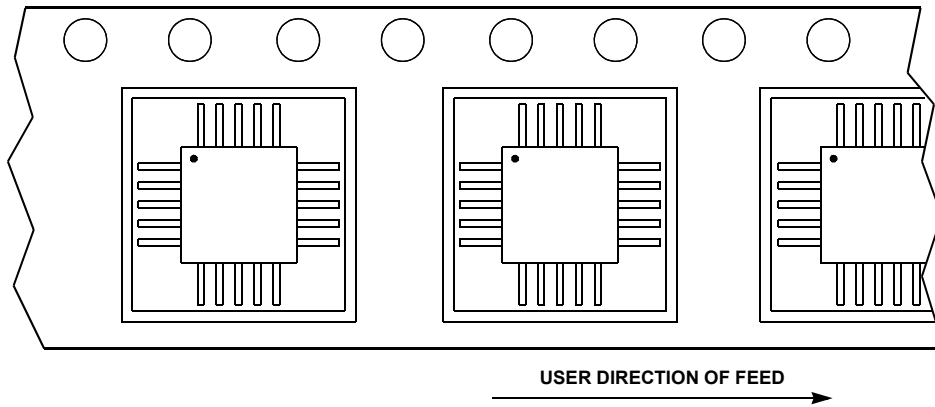


FIGURE 5D. SQUARE - MQFP, TQFP, AND LQFP

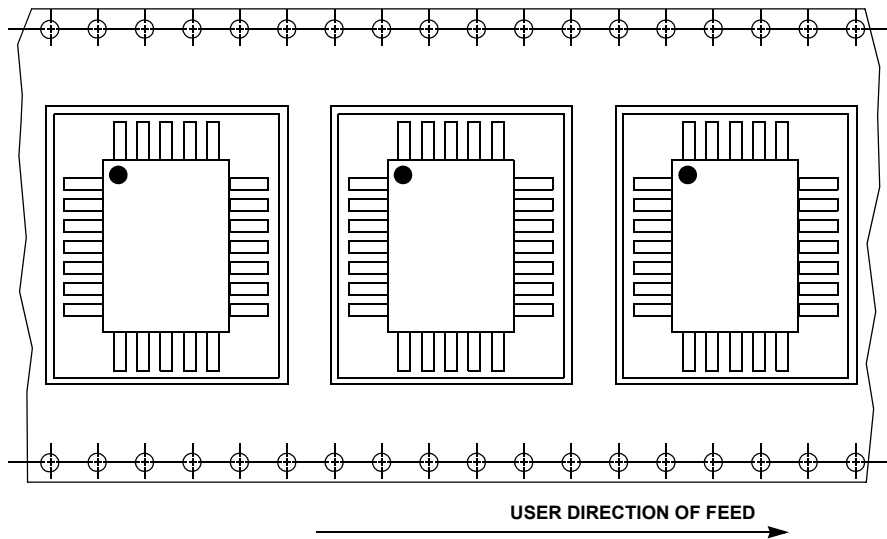


FIGURE 5E. RECTANGULAR - MQFP, TQFP, AND LQFP

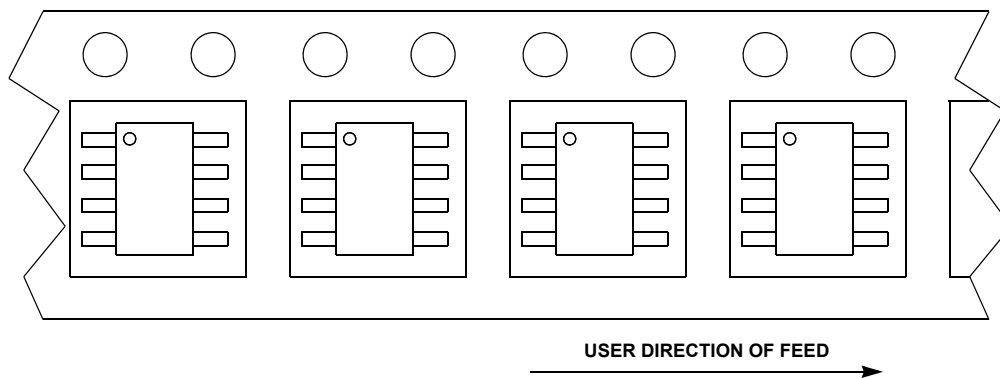


FIGURE 5F. SOIC, MSOP, TSSOP, QSOP, AND PSOP

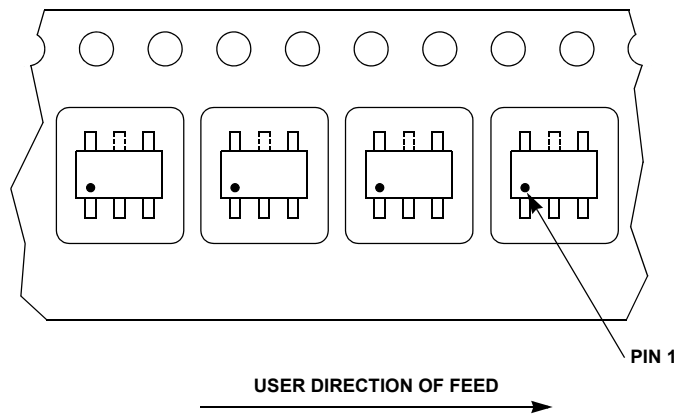


FIGURE 5G. SOT-23 AND SC-70

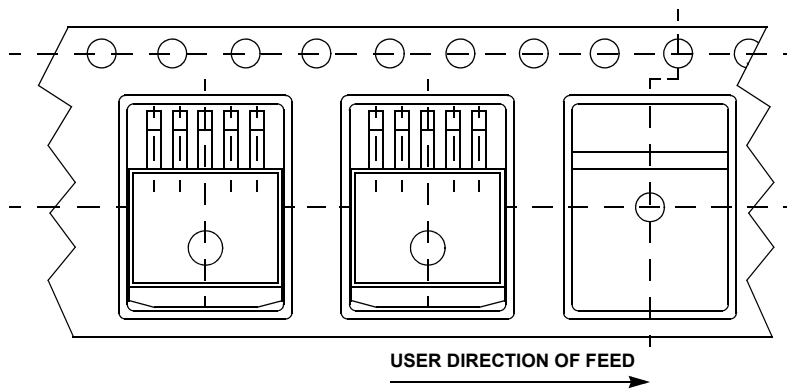
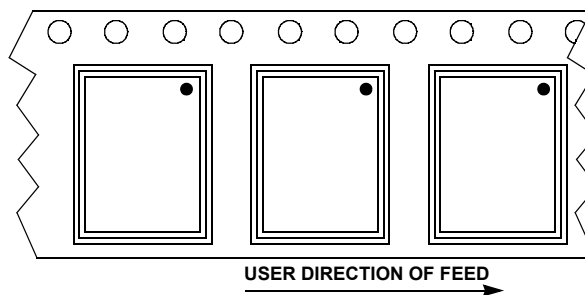
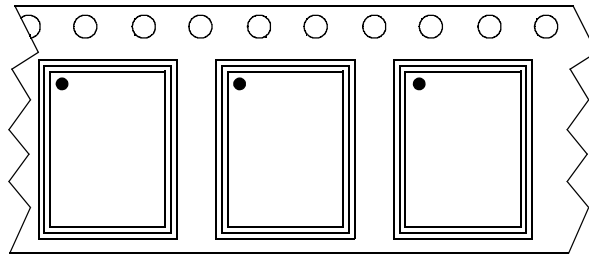


FIGURE 5H. MO-169

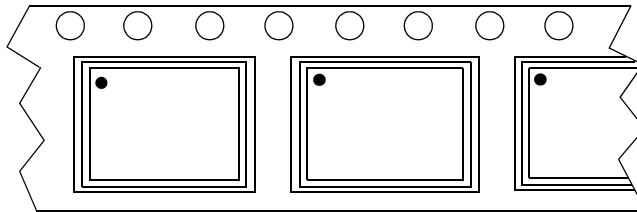


NOTE: THE BUMPS (BALLS) ARE FACING DOWN IN THE POCKET
 MAY BE APPLICABLE ONLY FOR PRODUCTS BEFORE MAY 01, 2008
 FIGURE 5I. RECTANGULAR - CSP



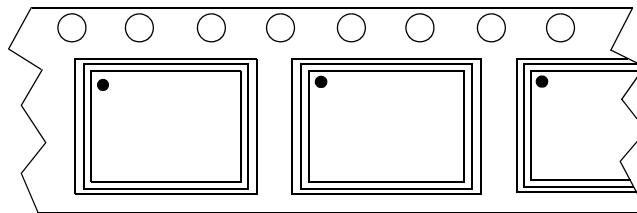
USER DIRECTION OF FEED
NOTE: ALL NEW PRODUCTS FOLLOW THIS A1 (PIN 1) ORIENTATION
EFFECTIVE DATE: MAY 01, 2008

FIGURE 5J. RECTANGULAR - CSP



USER DIRECTION OF FEED
NOTE: SPECIFICALLY FOR 8 BUMP 1.40x1.20mm CSP

FIGURE 5K. RECTANGULAR - CSP



USER DIRECTION OF FEED
NOTE: ALL NEW PRODUCTS FOLLOW THIS A1 (PIN 1) ORIENTATION
EFFECTIVE DATE: MAY 01, 2008

FIGURE 5L. RECTANGULAR - HDA

FIGURE 5. MECHANICAL POLARIZATION DIAGRAMS

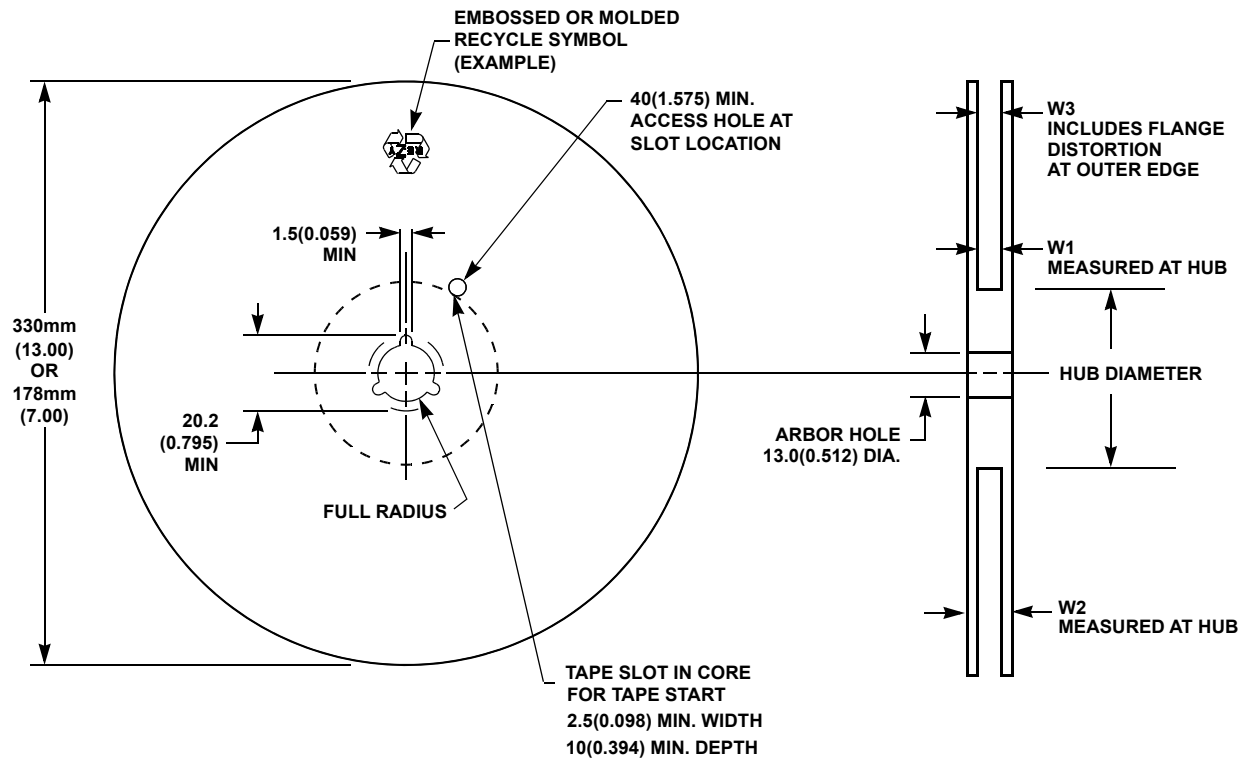


FIGURE 6. REEL DIMENSIONS

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

NOTE:

29. Dimensions are in millimeters (inches are in parentheses for reference only).

Revision History

DATE	REVISION	CHANGE
Apr 15, 2024	38	Added 3000/reel packing for QFN & PQFN 5X6 Added 12 BALL 1.89 X 1.89 WLCSP Spec Added 6 BALL 0.84 X 1.24 WLCSP Spec
Jan 30, 2024	37	Changed WLCSP 8LD from 0.76×0.438mm to 0.76×1.438mm Changed WLCSP 108LD from 3.47×5.20mm to 3.74×5.02mm
Dec 12, 2023	36	Added 3000/reel packing for 4×6 QFN Added 3000/reel packing for LFBGA 5.71×8.46×1.216mm Added packing spec for LGA 3×3×1.15mm Added LFBGA 54LD 5.71×7.66×1.216mm package Added LFBGA 66LD 4.5×7.5×1.2mm package Added packing spec for DFN 2.5×2.5×0.85mm Added packing spec for QFN/TQFN 3.5×4×0.85mm Added PQFN to 4×5 and 4×6 package Added WLCSP 8LD 0.76×0.438mm package Added WLCSP 12LD 1.318×1.878mm package Added WLCSP 35LD 2.39×3.40mm package Added WLCSP 56LD 2.86×3.26mm package Added WLCSP 56LD 2.86×3.46mm package Added WLCSP 108LD 3.47×5.20mm package Added SOT-89 4.5×4.1mm package
Dec 8, 2021	35	Added 5×5×0.9 WFQFN remark Added LFBGA 5.71×8.46×1.216mm Packing spec.
Oct 15, 2021	34	Added 3000/reel into 7×7 QFN packing spec. Added FCQFN 4×4 QFN on the standard 4×4 QFN packing spec Added 1.28×1.36mm WLCSP packing spec. Added 3.74×4.14mm WLCSP packing spec. Added 3×3×1.7mm LGA packing spec.
Jan 13, 2020	33	Removed 32LD uTDFN 5 × 5 × 0.63 mm (Not used) from page 8. Added 32LD PQFN 5 × 5 × 0.63 mm Tape/Reel information on page 8. Added 32LD PQFN 5 × 5 × 0.77 mm Tape/Reel information on page 8. Added 39LD PQFN 5 × 7 × 0.75 mm Tape/Reel information on page 8.
Nov 21, 2019	32	Added TFBGA 35 BALL 4.7×6.3×1.06mm Tape & Reel information Added TDFN 22LD 3.0×6.0×0.75mm Tape & Reel information Added HDA/QFN 35LD 12.0×11.0×5.2mm Tape & Reel information Added WLCSP 10LD 1.02×2.02mm Tape & Reel information Added WLCSP 36LD 2.41×2.41mm Tape & Reel information Added 39LD & 0.75 thickness into 5X6 QFN Tape & Reel information
Jun 11, 2019	31	Added Revision History Removed Figure 5I (Square WLCSP Package): Similar information in Figure 5A. Updated QFN/TQFN 8X8 0.75/0.90 package Leader & Trailer to 408mm & 540mm. Added 8LD 1.0×1.8 WLCSP Tape & Reel information Added 20LD 1.595×2.335 WLCSP Tape & Reel information Added 35LD 3.67×2.551 WLCSP Tape & Reel information Added 42LD 2.57×2.919 WLCSP Tape & Reel information Added 48LD 2.55×3.36 WLCSP Tape & Reel information Added 72LD 3.54×3.94 WLCSP Tape & Reel information

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Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

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