10

Transport Media and Packing

CHAPTER 10
TRANSPORT MEDIA AND PACKING

10.1. TRANSPORT MEDIA

10.1.1. Tubes

Plastic shipping and handling tubes are manufactured from polyvinyl chloride (PVC) with an antistatic surfactant treatment. Standard tubes for most package types are translucent and allow visual inspection of units within the tube. Carbon-impregnated, black conductive tubes are available for all parts, where required by device or use characteristics.

Tube profiles are designed with minimum clearance over the maximum package dimensions to reduce damaging movement of the device within the tube. For some package types, tubes have “riding rails” on which the packages rest while in the tube. The rails protect the fragile leads from touching anything in the tube. Nylon tacks, or rubber plugs are used to retain the units. All tube wall thickness are 0.025 in. to 0.040 in. Table 10-1 through Table 10-8 show tube dimensions, cross-sections and quantity per tube for most Intel package types. Further information on new packages should be requested through Intel Field Sales.

Table 10-1. PLCC Shipping Tube Dimensions (In Inches)

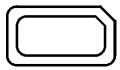
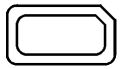
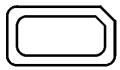
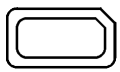
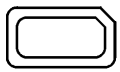
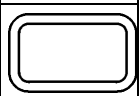
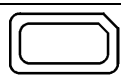
Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
20 L Square		0.030	19.375	0.480	0.263	46
28L Square		0.030	19.375	0.580	0.263	37
44L Square		0.025	19.375	0.780	0.250	26
52L Square		0.030	19.375	0.880	0.263	23
68L Square		0.025	19.375	1.090	0.250	18
28L Rectangular		0.025	19.375	0.480	0.220	30
32L Rectangular		0.025	19.375	0.580	0.220	30
84L Square		0.040	19.375	1.300	0.288	15

Table 10-2. Cerquad Shipping Tube Dimensions (In Inches)

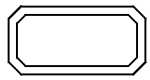
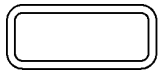
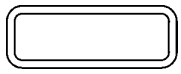
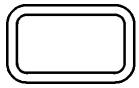
Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
44SQ		0.025	0.200	0.730	11.50	11
52SQ		0.025	0.200	0.820	11.50	11
68SQ		0.030	0.200	1.040	11.50	9
28SQ		0.030	0.200	0.520	11.50	15
32SQ		0.030	0.175	0.530	11.50	12

Table 10-3. PQFP Shipping Tube Dimensions (Inches)

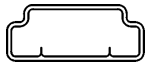
Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
84L PQFP		0.030	9.50	0.999	0.280	10
100L PQFP		0.030	10.50	1.099	0.280	10
132L PQFP		0.030	12.50	1.299	0.280	10

Table 10-4. LCC Shipping Tube Dimensions (In Inches)

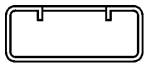
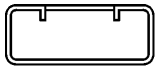
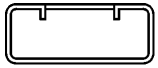
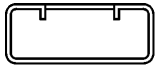
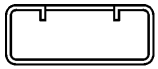
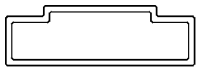
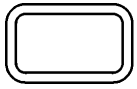
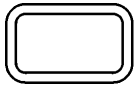
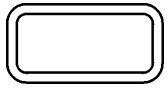
Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
18L		0.025	11.5	0.370	0.165	25
20L		0.025	11.5	0.370	0.165	25
28L		0.025	11.5	0.530	0.165	22
32L		0.025	11.5	0.535	0.207	18
44L		0.025	11.5	0.736	0.180	16
68L Type “A”		0.025	11.5	1.060	0.235	10
68L Type “B”		0.025	11.5	1.060	0.260	10
32L J-Lead Rectangular		0.030	11.5	0.590	0.235	16
32L J-Lead Rectangular EPROM		0.030	11.5	0.600	0.260	16
44L J-Lead Square		0.025	11.5	0.786	0.250	15

Table 10-5. PGA Shipping Tube Dimensions (In Inches)

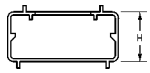
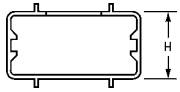
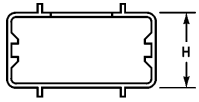
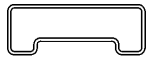
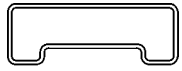
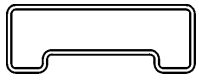
Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
68L		0.040	20	1.255	0.460	15
88L		0.050	20	1.470	0.720	12
132L		0.045	20	1.565	0.720	11

Table 10-6. Flatpack Shipping Tube Dimensions (In Inches)

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Width (W)	Height (H)	
18L* Ceramic		0.020	20	0.810	0.290	18
68L Plastic		0.040	20	2.138	0.628	9
68L Ceramic Quadpack		0.035	20	2.120	0.610	9

NOTE: * Aluminum Tube

Table 10-7. PSOP Shipping Tube Dimensions (In Inches)

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Length (L)	Length (L)	
44L		0.030	20	0.787	0.213	17

Table 10-8. DIP Shipping Tube Dimensions (In Inches)

Lead Type	Cross Section (W x H)	Wall Thickness	Outside Dimensions			Quantity Per Tube
			Length (L)	Length (L)	Length (L)	
16L		0.020	20	0.600	0.510	24 (P) 23 (D) 23 (C)
18L		0.020	20	0.600	0.510	20 (P) 21 (D), (C)
20L		0.020	20	0.600	0.510	18 (P), (D) 17 (C)
24L (300 mil)		0.020	20	0.600	0.510	15
28L (300 mil)		0.020	20	0.600	0.510	14 (P) 13 (D)
22L (400 mil)		0.030	20	0.727	0.535	17
24L (600 mil)		0.022	20	0.890	0.495	15
28L (600 mil)		0.022	20	0.890	0.495	13
32L		0.022	20	0.890	0.495	11
40L		0.022	20	0.890	0.495	9
48L		0.022	20	0.890	0.495	7 (P) 8 (C)

NOTES: (P) = PDIP (C) = Ceramic Sidbrazed (D) = CERDIP

10.1.2. Carriers

Additional protection from lead damage is necessary for the fragile leads of the flatpack packages, which are shipped flat to be trimmed and formed at the customer site. Plastic carriers are used to hold each unit, then the loaded carrier is placed in the tube. Carriers are either coated with antistatic surface treatment or are intrinsically static dissapative. Figure 10-1 through Figure 10-3 show a variety of carrier types.

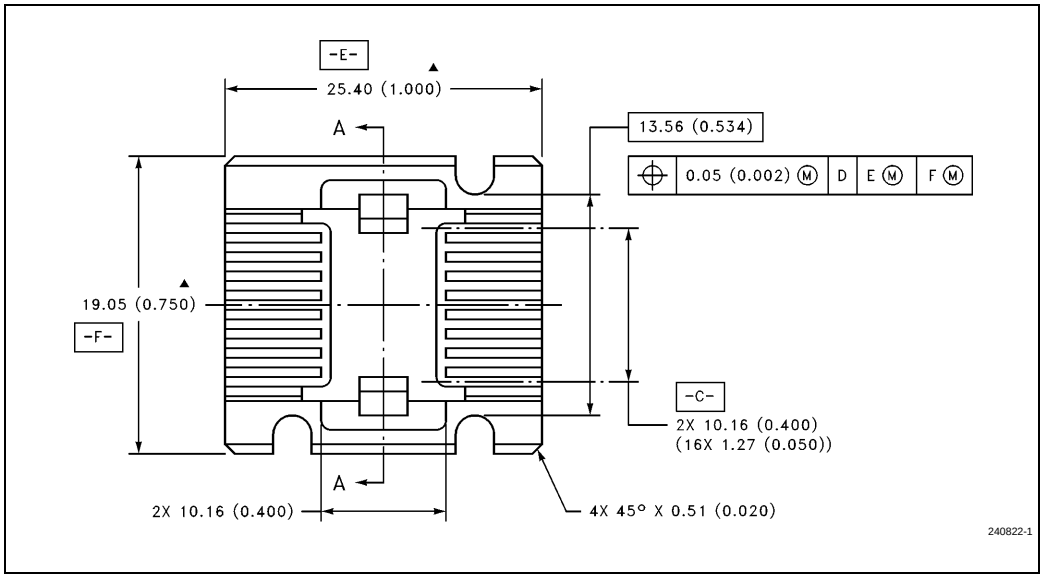


Figure 10-1. 18-Lead Ceramic Flatpack Carrier

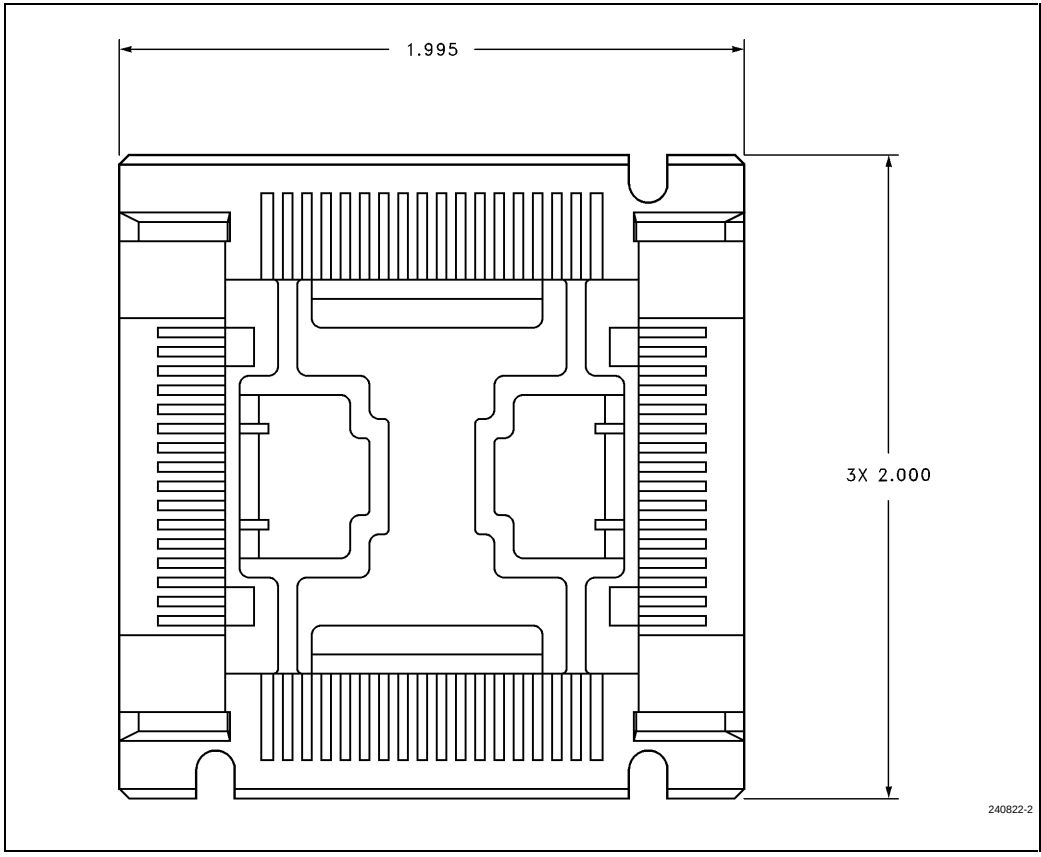


Figure 10-2. 68-Lead Ceramic Flatpack Carrier

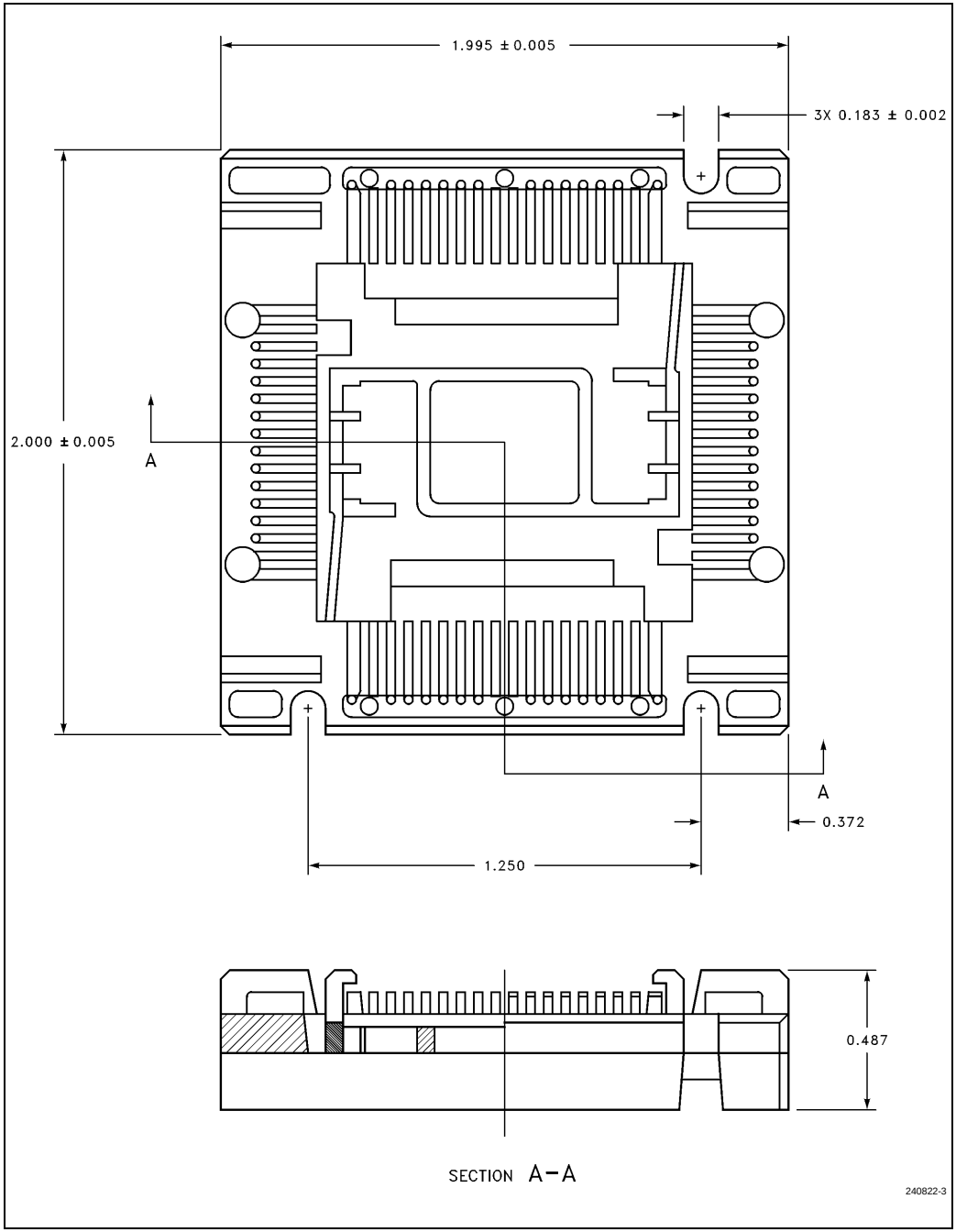


Figure 10-3. 68-Lead Plastic Flatpack Carrier

10.1.3. Trays

Shipping trays are built in compliance with JEDEC thick and thin standard dimensions. Mid-temperature trays can be baked to 140°C while low temperature trays can withstand a maximum sustained temperature of 65°C. Trays are constructed in modified polysulfone (PS) or equivalent for mid-temperature applications and polycarbonate (PC) for low temperature applications because of their high deflection temperature, superior strength, and dimensional stability. All JEDEC trays have the same "X" and "Y" dimensions and are easily stacked for storage and manufacturing.

Intel offers trays for the following:

PQFP	84 LD, 100 LD, 132 LD, 164 LD, 196 LD thick mid-temperature
	84 LD, 100 LD, 132 LD, 196 LD thin mid-temperature
	132 LD, 196 LD single unit thick mid-temperature
PGA	68-84 LD 11 x 11, 88-100 LD 13 x 13, 132-139 LD 14 x 14, 149 LD 15 x 15, 168-208 LD 17 x 17, 240-296 LD 19 x 19, 273 LD 21 x 21, 325 LD 26 x 24 thick low-temperature
PLCC	28 LD square, 28 LD rectangular, 44 LD square, 68 LD square, 84 LD square thick high-temperature
TSOP	32 LD, 40 LD, 48 LD, 56 LD thick mid-temperature
	32 LD, 40 LD, 56 LD thin mid-temperature
SSOP	56 LD thick mid-temperature
CQFP	132 LD formed, 164 LD flat, 196 LD formed, 196 LD flat thick high-temperature
MQFP	44 LD (10 x 10), 64 LD (12 x 12), 80/100 LD (14 x 20) thick and thin mid-temperature.
SQFP	80 LD (12 x 12), 100 LD (14 x 14), 208 LD (28 x 28) thick and thin mid-temperature, 208 LD (28 x 28), single unit thick mid-temperature
TQFP	144 LD (20 x 20), 176 LD (24 x 24) thick and thin mid-temperature
	TCP carrier high-temperature
MSC	19 x 19, 0.880 high spacer low-temperature
	TCP carrier high-temperature
BGA	27 x 27 and 35 x 35 thin mid-temperature
PPGA	296ld thick low temperature

Charts of trays for various packages are shown on the following pages. Intel field sales engineers can obtain detailed drawing and specifications upon request.

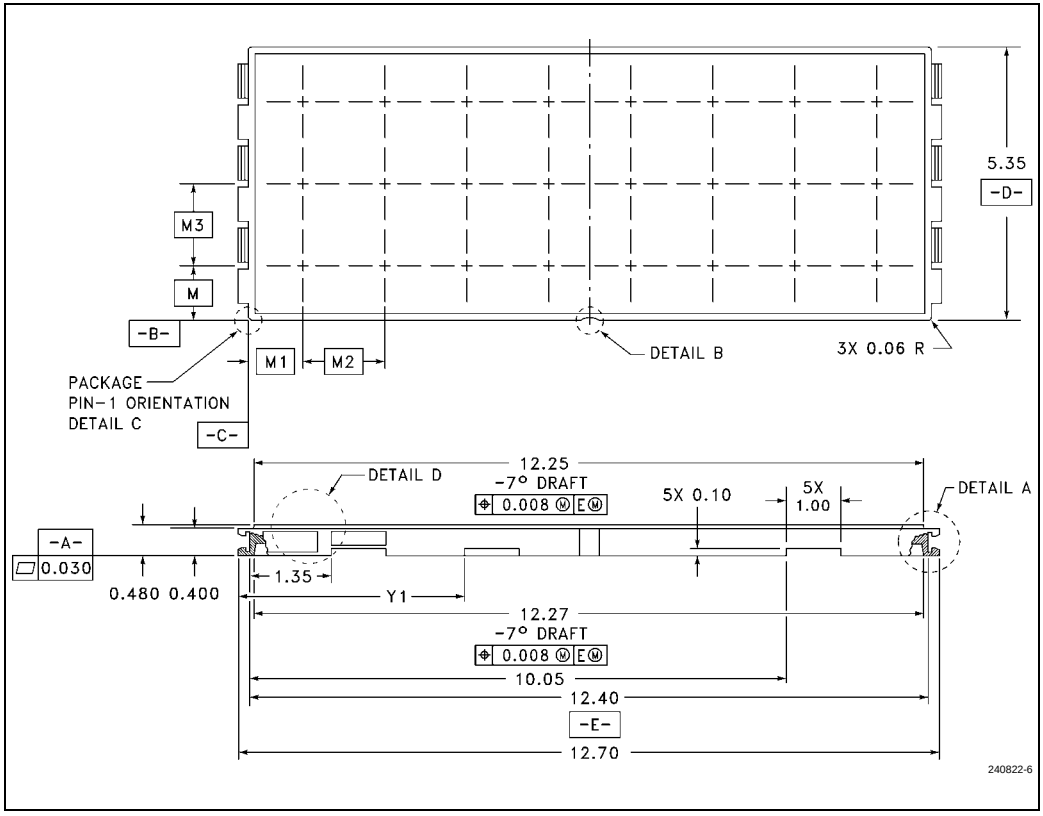


Figure 10-4. Injection Molded Thick JEDEC Tray

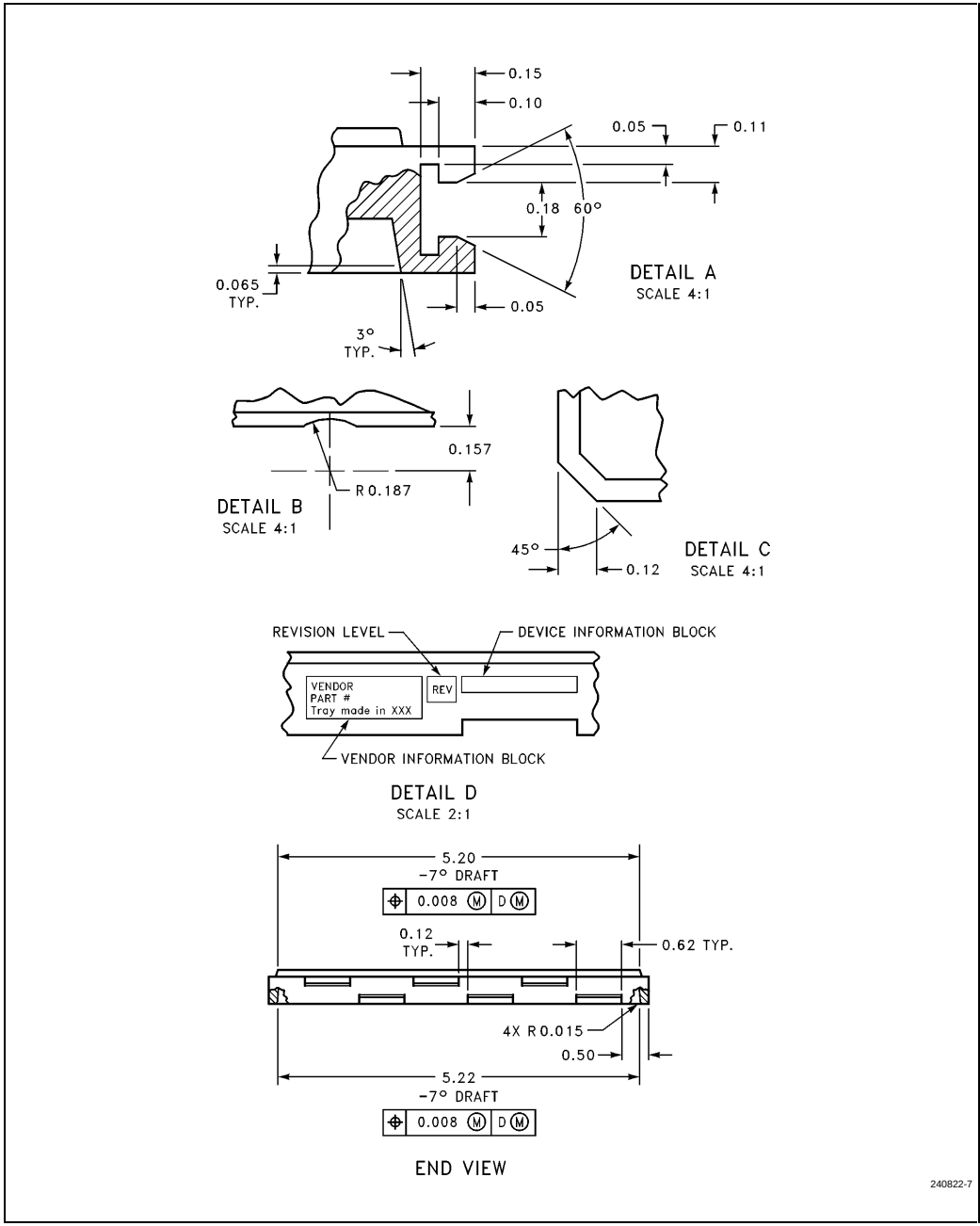


Figure 10-5. Injection Molded Thick JEDEC Tray

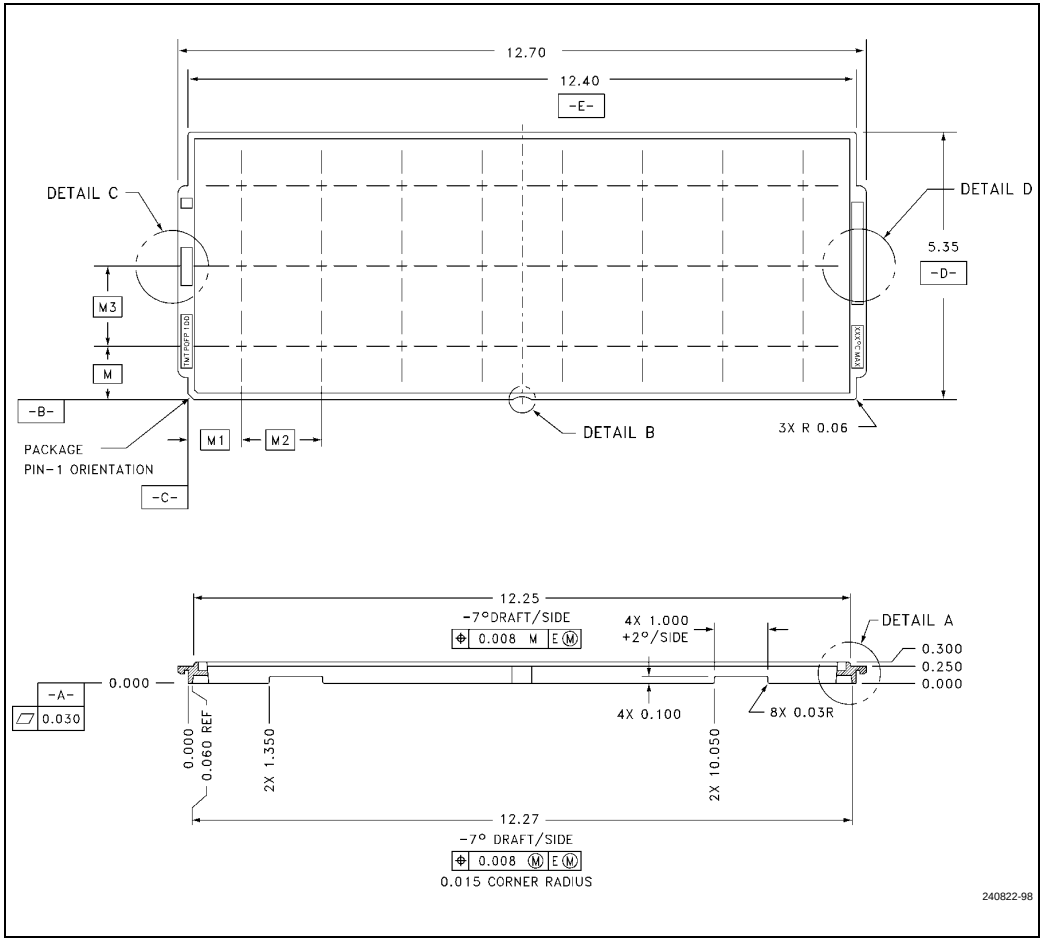


Figure 10-6. Injection Molded Thin JEDEC Tray

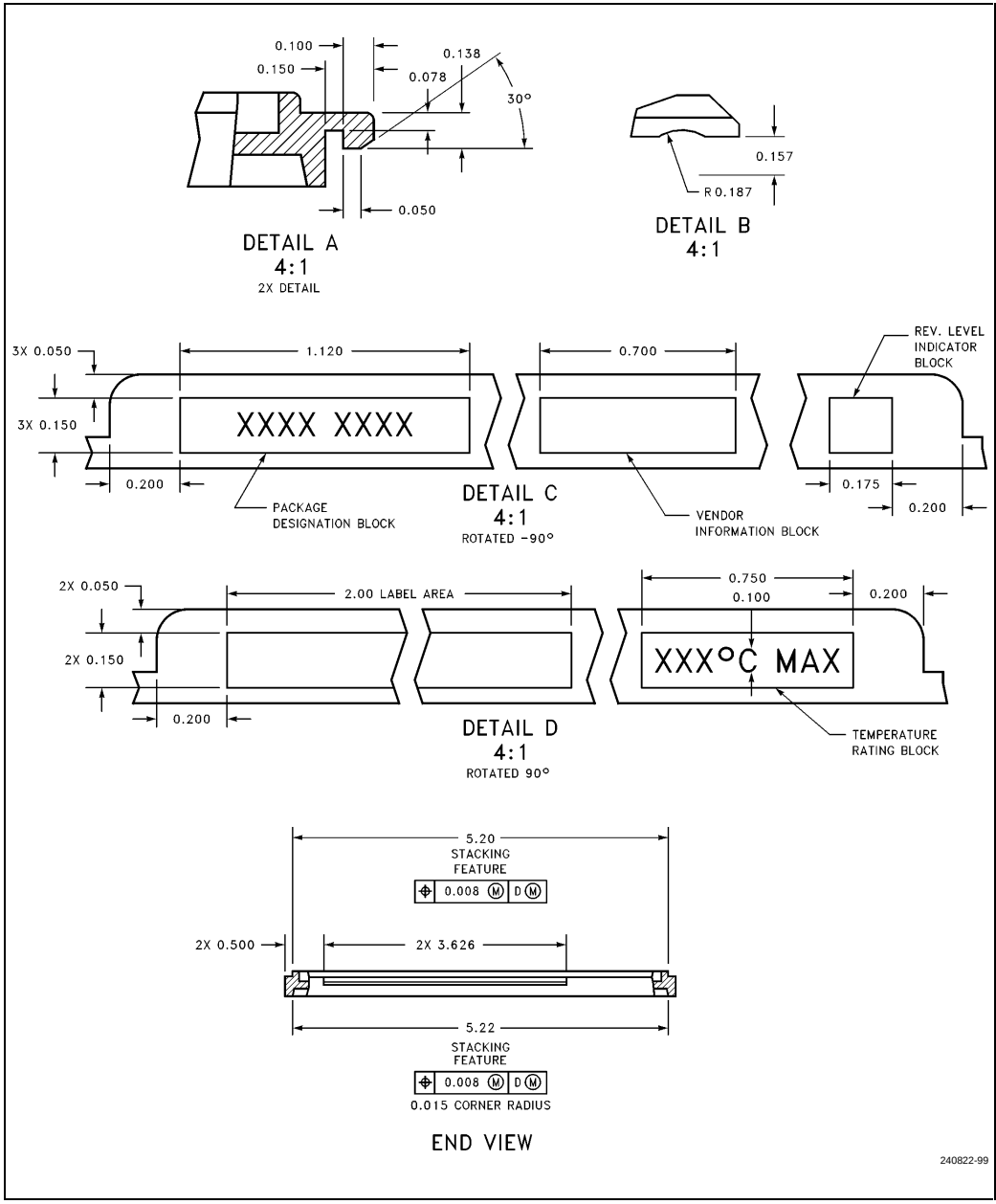


Figure 10-7. Injection Molded Thin JEDEC Tray

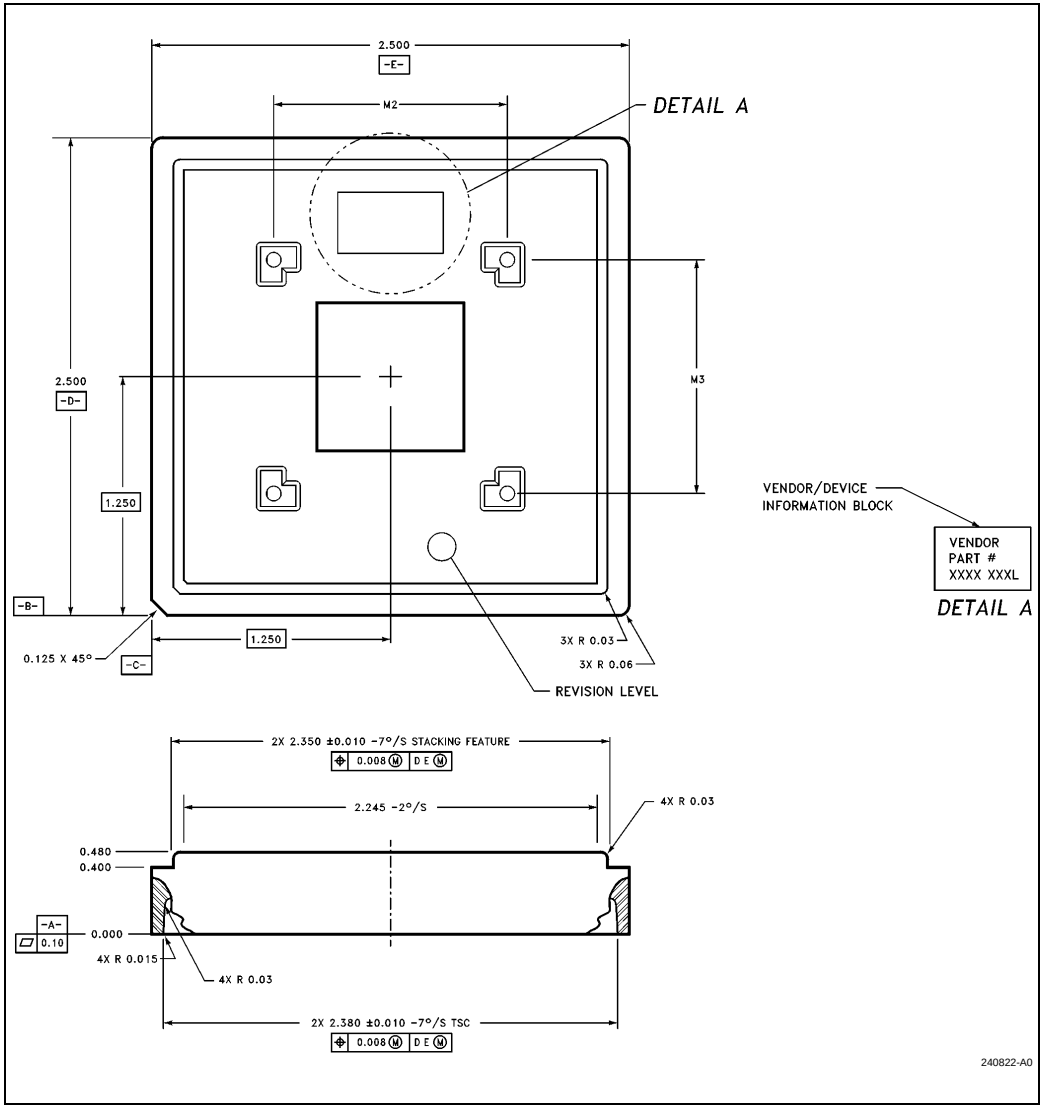


Figure 10-8. Injection Molded Single Unit Tray

Table 10-9. Injection Molded Thick and Thin PQFP JEDEC Tray

PQFP Tray Dimensions						
Pocket Locations	**Symbol**	**84 LD**	**100 LD**	**132 LD**	**164 LD**	**196 LD**
Pocket Cntr Location to Edge Y	M	0.701	0.701	0.824	1.161	1.030
Pocket Cntr Location to Edge X	M1	0.706	0.750	0.944	0.957	1.064
Pocket-Pocket Cntr Distance X	M2	0.999	1.090	1.314	1.498	1.712
Pocket-Pocket Cntr Distance Y	M3	0.987	0.987	1.234	1.514	1.645
# of Rows of Pockets	Rows	5	5	4	3	3
# of Columns of Pockets	Columns	12	11	9	8	7
Total # of Pockets	Pockets	60	55	36	24	21

NOTE: Dimensions are in inches

Table 10-10. Injection Molded Thick PGA JEDEC Tray

PGA Tray Dimensions								
Pocket Locations	**Symbol**	**68 L**	**88 L**	**132 L**	**168L**	**240/296L**	**273 L**	**325/387 L**
Pocket Cntr Location to Edge Y	M	1.072	1.573	1.556	1.506	1.473	1.456	2.675
Pocket Cntr Location to Edge X	M1	1.152	1.077	1.285	1.513	1.446	1.861	1.700
Pocket-Pocket Cntr Distance X	M2	1.683	1.708	1.966	2.344	2.377	2.892	3.000
Pocket-Pocket Cntr Distance Y	M3	1.603	2.204	2.237	2.337	2.404	2.438	N/A
# of Rows of Pockets	Rows	3	2	2	2	2	2	1
# of Columns of Pockets	Columns	7	7	6	5	5	4	4
Total # of Pockets	Pockets	21	14	12	10	10	8	4

NOTE: Dimensions are in inches

Table 10-11. Injection Molded Thick PLCC JEDEC Tray

PLCC Tray Dimensions						
Pocket Locations	**Symbol**	**PLCC 28 LD(R)**	**PLCC 28 LD(S)**	**PLCC 44 LD(S)**	**PLCC 68 LD(S)**	**PLCC 84 LD(S)**
Pocket Cntr Location to Edge Y	M	0.670	0.767	0.899	1.079	1.070
Pocket Cntr Location to Edge X	M1	0.755	0.880	0.890	1.163	1.148
Pocket-Pocket Cntr Distance X	M2	0.990	1.064	1.180	1.679	1.684
Pocket-Pocket Cntr Distance Y	M3	0.802	0.954	1.184	1.596	1.605
# of Rows of Pockets	Rows	6	5	4	3	3
# of Columns of Pockets	Columns	12	11	10	7	7
Total # of Pockets	Pockets	72	55	40	21	21

NOTE: Dimensions are in inches

Table 10-12. SOP Thick Tray Physical Dimensions

Pocket Locations	**Symbol**	**32-Lead TSOP**	**40-Lead TSOP**	**48-Lead TSOP**	**56-Lead TSOP**	**56-Lead SSOP**	**44-Lead TSOP**
Pocket Cntr Location to Edge Y	M	10.24	18.49	17.27	17.27	13.61	20.85
Pocket Cntr Location to Edge X	M1	29.46	29.46	29.46	29.46	29.46	31.78
Pocket-Pocket Cntr Distance X	M2	32.00	32.00	32.00	32.00	32.00	35.92
Pocket-Pocket Cntr Distance Y	M3	16.48	16.48	16.89	16.89	18.11	23.55
# of Rows	Rows	8	7	7	7	7	5
# of Columns	Columns	9	9	9	9	9	8
Total # of Pockets	Pockets	72	63	63	63	63	40

NOTE: Dimensions are in millimeters

Table 10-13. Thin High Density SOP Tray Dimensions

Pocket Locations	Symbol	32-Lead TSOP	40-Lead TSOP	48-Lead TSOP	56-Lead TSOP
Pocket Cntr Location to Edge Y	M	8.53	14.40	15.80	13.00
Pocket Cntr Location to Edge X	M1	17.25	17.25	17.25	17.24
Pocket-Pocket Cntr Distance X	M2	25.50	25.50	25.50	25.50
Pocket-Pocket Cntr Distance Y	M3	9.90	11.89	14.90	15.69
# of Rows of Pockets	Rows	12	12	12	12
# of Columns of Pockets	Columns	13	10	8	8
Total # of Pockets	Pockets	156	120	96	96

NOTE: Dimensions are in millimeters

Table 10-14. Injection Molded Thick Formed CQFP JEDEC Tray

CQFP Tray Dimensions			
Pocket Locations	**Symbol**	**132 LEAD**	**196 LEAD**
Pocket Cntr Location to Edge Y	M	0.824	1.030
Pocket Cntr Location to Edge X	M1	0.944	1.064
Pocket-Pocket Cntr Distance X	M2	1.314	1.712
Pocket-Pocket Cntr Distance Y	M3	1.234	1.645
# of Rows of Pockets	Rows	4	3
# of Columns of Pockets	Columns	9	7
Total # of Pockets	Pockets	36	21

NOTE: Dimensions are in inches

Table 10-15. Injection Molded Thick Formed CQFP JEDEC Tray

CQFP Flat Leads Tray Dimensions			
Pocket Locations	**Symbol**	**164 LEAD**	**132/196 LEAD**
Pocket Cntr Location to Edge Y	M	2.675	2.675
Pocket Cntr Location to Edge X	M1	1.700	1.700
Pocket-Pocket Cntr Distance X	M2	3.000	3.000
Pocket-Pocket Cntr Distance Y	M3	—	—
# of Rows of Pockets	Rows	1	1
# of Columns of Pockets	Columns	4	4
Total # of Pockets	Pockets	4	4

NOTE: Dimensions are in inches

Table 10-16. Injection Molded Thick and Thin MQFP JEDEC Tray

MQFP Thick and Thin Tray Dimensions					
Pocket Locations	**Symbol**	**44 LD (10x 10)**	**64 LD (12 x 12)**	**80/100 (14 x 20) Thick**	**80/100 (14 x 20) Thin**
Pocket Cntr Location to Edge Y	M	0.720	0.608	0.843	0.608
Pocket Cntr Location to Edge X	M1	0.680	0.701	1.034	0.886
Pocket-Pocket Cntr Distance X	M2	0.736	0.846	1.148	1.063
Pocket-Pocket Cntr Distance Y	M3	0.782	0.827	0.916	0.827
# of Rows of Pockets	Rows	6	6	5	6
# of Columns of Pockets	Columns	16	14	10	11
Total # of Pockets	Pockets	96	84	50	68

NOTE: Dimensions are in inches

Table 10-17. Injection Molded Thick and Thin SQFP JEDEC Tray

SQFP Thick and Thin Tray Dimensions				
Pocket Locations	**Symbol**	**80 LD (12 x12)**	**100 LD (14 x 14)**	**208 LD (28 x 28)**
Pocket Cntr Location to Edge Y	M	0.608	0.608	1.218
Pocket Cntr Location to Edge X	M1	0.701	0.701	1.100
Pocket-Pocket Cntr Distance X	M2	0.846	0.846	1.457
Pocket-Pocket Cntr Distance Y	M3	0.827	0.827	1.457
# of Rows of Pockets	Rows	6	6	3
# of Columns of Pockets	Columns	14	14	8
Total # of Pockets	Pockets	84	84	24

NOTE: Dimensions are in inches

Table 10-18. Injection Molded Thick Formed TQFP JEDEC Tray

TQFP Thick and Thin Tray Dimensions			
Pocket Locations	**Symbol**	**144 LD (20 x 20)**	**176 LD(24 x 24)**
Pocket Cntr Location to Edge Y	M	0.691	0.815
Pocket Cntr Location to Edge X	M1	0.701	0.815
Pocket-Pocket Cntr Distance X	M2	1.000	1.197
Pocket-Pocket Cntr Distance Y	M3	0.992	1.240
# of Rows of Pockets	Rows	5	4
# of Columns of Pockets	Columns	12	10
Total # of Pockets	Pockets	60	40

NOTE: Dimensions are in inches

Table 10-19. Injection Molded MSC JEDEC Tray

Pocket Locations	Symbol	19 x 19 - 0.880	TCP Carrier
Pocket Cntr Location to Edge Y	M	1.473	1.415
Pocket Cntr Location to Edge X	M1	1.446	1.667
Pocket-Pocket Cntr Distance X	M2	2.377	3.022
Pocket-Pocket Cntr Distance Y	M3	2.404	2.521
# of Rows of Pockets	Rows	2	2
# of Columns of Pockets	Columns	5	4
Total # of Pockets	Pockets	10	8
Tray Height	Height	0.880	0.480

NOTE: Dimensions are in inches

Table 10-20. Injection Molded Thin BGA JEDEC Tray

BGA Thin Tray Dimensions			
Pocket Locations	**Symbol**	**27 x 27**	**35 x 35**
Pocket Cntr Location to Edge Y	M	24.15	29.29
Pocket Cntr Location to Edge X	M1	26.10	24.50
Pocket-Pocket Cntr Distance X	M2	29.20	38.00
Pocket-Pocket Cntr Distance Y	M3	29.20	38.00
# of Rows of Pockets	Rows	4	3
# of Columns of Pockets	Columns	10	8
Total # of Pockets	Pockets	40	24

NOTE: Dimensions are in millimeters

Table 10-21. Injection Molded Thick PPGA JEDEC Tray

PPGA Thick Tray Dimensions		
Pocket Locations	**Symbol**	**296 Lead**
Pocket Cntr Location to Edge Y	M	1.473
Pocket Cntr Location to Edge X	M1	1.448
Pocket-Pocket Cntr Distance X	M2	2.377
Pocket-Pocket Cntr Distance Y	M3	2.404
# of Rows of Pockets	Rows	2
# of Columns of Pockets	Columns	5
Total # of Pockets	Pockets	10

NOTE: Dimensions are in millimeters

10.2. ENVIRONMENTAL PROGRAMS OVERVIEW

Intel continues to evaluate current packaging methodologies to ensure we meet or exceed global regulatory compliance with regards to environmental concerns. Our philosophy focuses on eliminating redundant or mixed materials as appropriate, implementation of reuse applications and increasing the recyclability of our component packaging material. For the latest information regarding reuse or recycling programs please contact 1-800-628-8686.

10.2.1. Reuse Programs

1. JEDEC Tray Reuse Program:

   Intel has been very successful in establishing a program for reuse of our low/high temperature JEDEC Trays. Not only does the program offer a nominal cash reimbursement but it lowers the cost of plastic shipping trays, employs several handicapped agencies and reduces environmental waste. JEDEC trays can now be returned for reuse at Intel through a variety of methods dependent upon your location. To ensure trays are returned in a usable condition, trays should be placed in corrugated containers and palletized if volumes warrant. All containers should be labeled with the customers return address.

   All trays will be subjected to a variety of inspections to ensure they meet Intel's specifications prior to reuse by an Intel factory. Any tray that fails Intel's quality requirements or non-Intel trays are sent to plastic reclamation vendors for utilization in other plastic applications. No trays are sent to landfills.

Table 10-22. Tray Reclaim Vendor Addresses

North and South America's Micro Plastics 3420 West Whitton Ave. Phoenix, AZ 85017 Phone: (602) 278-4545 Fax: (602) 278-4477	In North and South America, contact Micro Plastics for specific shipping instructions. Bill Shipping Costs to: Intel Corp. C/O NWTA PO Box 4567 Federal Way, WA 98063
Asia Pacific Region Mr. Danny Tong Peak Plastic /SemiCycle Hong Kong LTD Unit 7, 37/F., Warf Cable Tower 9 Hoi Shing Road Tsuen Wan, NT, Hong Kong Phone: (852) 2402 5100 Fax: (852) 2498 5382	Peak Plastic will provide all shipping arrangements at no charge to the customer.
Japan Cygnus, Inc. 5-25-16, Naritahigashi Suginami-Ku, Tokyo, 166 Japan Phone: [81]333-920370 Fax: [81]333-920850	Contact Cygnus for shipping instructions
Europe Peak Plastic/Semicycle P.O. Box 129 1211 Geneva 20 Switzerland Phone: 00[41]22 733 6282 Fax: 00[41]22 734 1479	Peak Plastic will provide all shipping arrangements at no charge to the customer.

2. Gel Pak Reuse Program

   Intel utilizes Gel Pak as a method for transporting bare die. The reuse program for Gel Pak packages will be centralized at Micro Plastics, Phoenix, Arizona. Micro Plastics is Intel's designated recycler, unless future volumes warrant additional locations. Micro Plastics provides cleaning and inspection as per Intel specified guidelines for reuse of Gel Pak at Intel factories.

Table 10-23. Gel Pak Recycling Vendor Address

Ship to: Micro Plastics 3420 West Whitton Ave. Phoenix, AZ 85017 Phone: (602) 278-4545 Fax: (602) 278-4477	Contact Micro Plastics for specific Intel shipping instructions for your area. Bill Shipping Costs to: Intel Corp. C/O NWTA PO Box 4567 Federal Way, WA 98063

3. Reel Reuse Program

   Intel has established a Reel Reuse Program and customers are encouraged to return reels using the recyclers listed below.

Table 10-24. Reel Recycling Vendor Address

North America Micro Plastics 3420 West Whitton Ave. Phoenix, AZ 85017 Phone: (602) 278-4545 Fax: (602) 278-4477	Contact Micro Plastics for specific shipping instructions for your area. Bill Shipping Costs to: Intel Corp. C/O NWTA PO Box 4567 Federal Way, WA 98063
Asia Pacific Region Mr. Danny Tong Peak Plastic /SemiCycle Hong Kong LTD Unit 7, 37/F., Warf Cable Tower 9 Hoi Shing Road Tsuen Wan, NT, Hong Kong Phone: (852) 2402 5100 Fax: (852) 2498 5382	Peak Plastic will provide all shipping arrangements at no charge to the customer.

10.2.2. Recycle Programs

In order to reduce the amount of material being sent into landfills, Intel is in the process of identifying regional recycler's for items such as PVC tubes and wafer boats for use in other types of plastic applications. If you require additional information please contact 1-800-628-8686.

Additional information can also be obtained by contacting your Intel Field Sales Engineer or Regional Customer Service Representative.

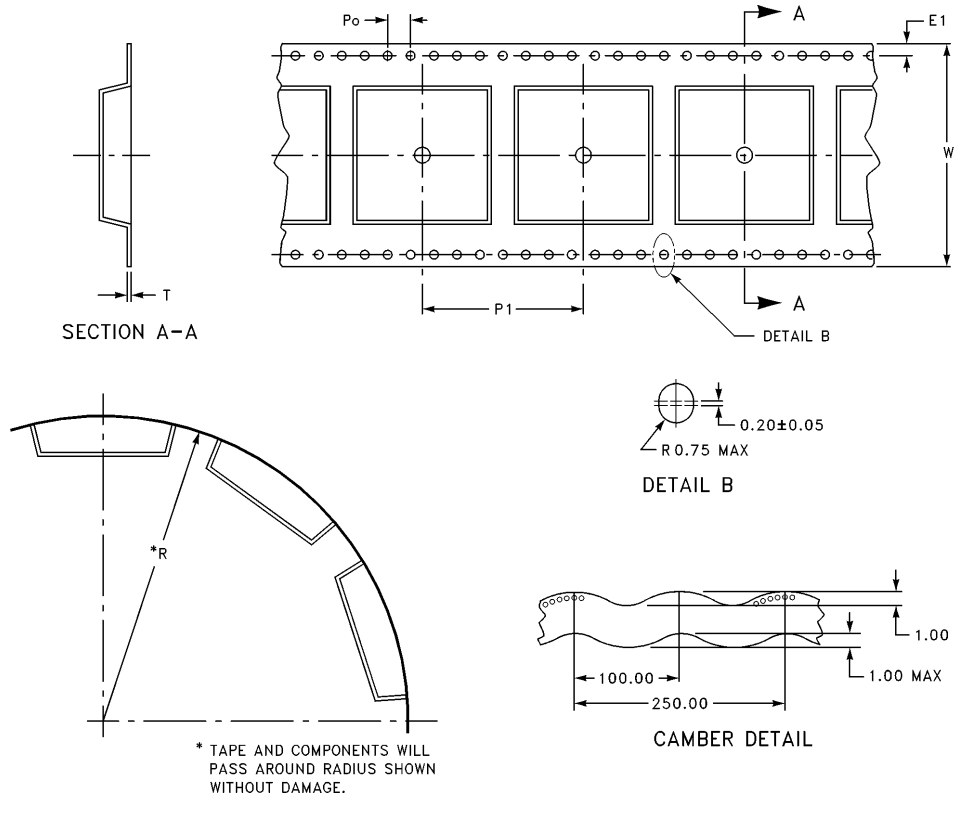
10.3. TAPE AND REEL

The tape and reel packing system places surface mount devices (SMDs) in a tape embossed with individual carrier pockets. The devices are then sealed with a cover tape to retain and protect them. The loaded tapes are then wound onto a reel similar to a movie reel. Tape and reel packing is growing in popularity, especially for PLCCs, because it preserves lead integrity and lends itself to easy automation at board level usage. TSOPs and PQFPs may also be available in tape and reel.

The number of devices per reel will vary depending on the lead count of the devices involved.

The Electronics Industry Association (EIA) has set tape and reel standards for tapes measuring from 8 mm to 56 mm per spec, EIA 481-1, 481-2, and 481-3. Intel's tape and reel materials are

designed in compliance with these EIA standards and range from 16 mm through 56 mm. (For specific products offered in tape and reel, see **Table 10-25**).



NOTE: All dimensions are in millimeters.

Figure 10-9. Carrier Tape

Table 10-25. Carrier Tape Dimensions by Package

		Tape Size	E1	Single/ Double Sprocket	PO	P1	R	T	W	Units/ Reel
PLCC	20 LD	16 mm	1.65-1.85	Single	3.9-4.1	11.9-12.1	30 MIN	.25-3.5	15.7-16.3	1000
	28 LD (REC)	24 mm	1.65-1.85	Single	3.9-4.1	11.9-12.1	30 MIN	.25-3.5	23.7-24.3	750
	28 LD (SQ)	24 mm	1.65-1.85	Single	3.9-4.1	15.9-16.1	30 MIN	.25-3.5	23.7-24.3	750
	32 LD (REC)	24 mm	1.65-1.85	Single	3.9-4.1	15.9-16.1	30 MIN	.25-3.5	23.7-24.3	750
	44 LD	32 mm	1.65-1.85	Double	3.9-4.1	23.9-24.1	50 MIN	.25-3.5	31.7-32.3	500
	52 LD	32 mm	1.65-1.85	Double	3.9-4.1	23.9-24.1	50 MIN	.25-3.5	31.7-32.3	500
	68 LD	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	50 MIN	.25-3.5	43.7-44.3	350
	84 LD	44 mm	1.65-1.85	Double	3.9-4.1	35.9-36.1	50 MIN	.25-3.5	43.7-44.3	250
PQFP	84 LD	32 mm	1.65-1.85	Double	3.9-4.1	27.9-28.1	50 MIN	.25-3.5	31.7-32.3	500
	100 LD	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	50 MIN	.25-3.5	43.7-44.3	300
	132 LD	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	50 MIN	.25-3.5	43.7-44.3	250
TSOP	32 LD	32 mm	1.65-1.85	Double	3.9-4.1	15.9-16.1	50 MIN	.25-3.5	31.7-32.3	2000
	40 LD	32 mm	1.65-1.85	Double	3.9-4.1	15.9-16.1	50 MIN	.25-3.5	31.7-32.3	2000
	48 LD	32 mm	1.65-1.85	Double	3.9-4.1	15.9-16.1	50 MIN	.25-3.5	31.7-32.3	2000
	56 LD	32 mm	1.65-1.85	Double	3.9-4.1	19.9-20.1	50 MIN	.25-3.5	31.7-32.3	1600
PSOP	44 LD	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	89 MIN	.25-3.5	43.7-44.3	450
SSOP	56 LD	44 mm	1.65-1.85	Double	3.9-4.1	23.9-24.1	89 MIN	.25-3.5	43.7-44.3	550
BGA	27 x 27	44 mm	1.65-1.85	Double	3.9-4.1	31.9-32.1	89 MIN	.25-.35	43.7-44.3	TBD
	35 x 35	56 mm	1.65-1.85	Double	3.9-4.1	39.9-40.1	89 MIN	.25-.35	55.7-56.3	TBD

NOTE: Dimensions are in millimeters

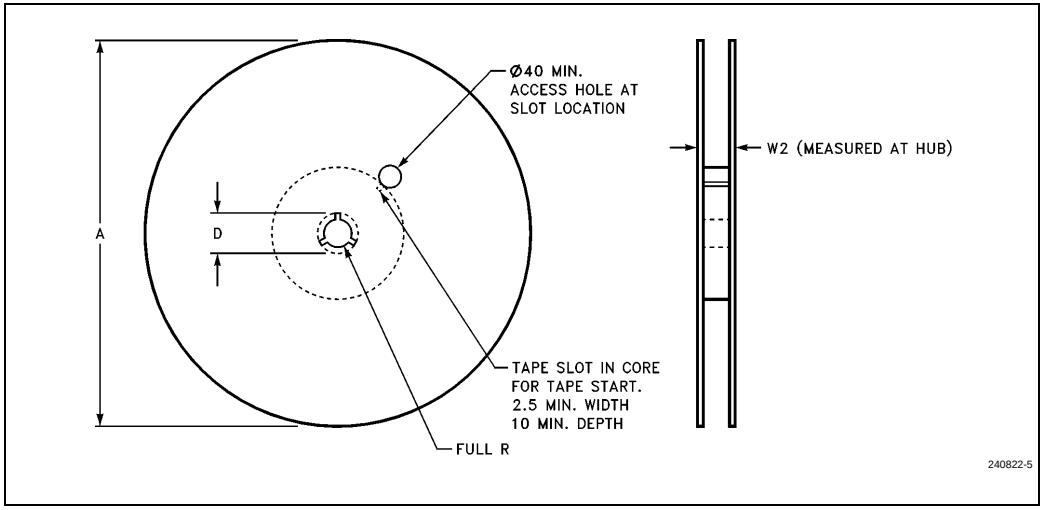


Figure 10-10. Carrier Tape Reel

Table 10-26. Carrier Tape Reel Dimensions

Millimeters	16 mm	24 mm	32 mm	44 mm	56 mm
A Max.	330	330	330	330	609
D Min	20.2	20.2	20.2	20.2	20.2
W2 Max.	22.4	30.4	38.4	50.4	62.4

NOTE: Dimensions are in millimeters

10.4. PROTECTIVE BANDS

To provide additional protection for product shipped in carrier tape, protective bands will be wrapped inside the edges of the carrier tape reels. These bands consist of 1mm-thick strips of carbon-loaded polystyrene.

The protective bands conform to the following dimensions depending on the size of the carrier tape being used:

Table 10-27. Protective Band Dimensions

Carrier Tape Size	Protective Band Dimensions
24mm	24.2mm wide X 1.09 meters long
32mm	32.2mm wide X 1.09 meters long
44mm	44.2mm wide X 1.09 meters long

10.5. SHIPPING FORMATS

10.5.1. Desiccant Pack Materials

All PSMCs are shipped in desiccant pack. For a thorough discussion of the packing process (bake and bag) and handling considerations unique to PSMCs, please consult Chapter 7, which addresses moisture sensitivity of PSMCs.

Intel used the following materials in desiccant pack:

- **Moisture Barrier Bag (MBB)**. Inside the shipping box is a moisture barrier bag containing components. The opaque MMB is constructed of three layers: a conductive polyethylene inner layer for sealing, an aluminum film mid-layer, and a tyvek outer layer. The bag meets MIL-STD-81705 TYPE I for electrostatic discharge (ESD) and mechanical stability. The measured water vapor transmission rate (WVTR) of the bag is better than the MIL-STD requirements for moisture protection. A "warning" label on the bag outlines precautions that should be taken with desiccant-packed units. A desiccant barcade label is also affixed to the bag.
- **Desiccant**. Each MBB contains one or more pouches of desiccant to absorb moisture that may be present in the bag. The desiccant is supplied in one-unit pouches. The number of pouches required is a function of the bag surface area.
- **Humidity Indicator Card (HIC)**. Along with the desiccant pouches, each MBB contains a humidity indicator card. This card is a military-standard moisture indicator and is included to show the user the approximate relative humidity (RH) level within the bag. The HIC is reversible and can be reused.
- **Labels**. The desiccant barcode label (shown in Figure 10-11), mentioned above in the section on MBBs, contains the date that the bag was sealed (MM/DD/YY). The remaining storage life of the units in the bag is determined from this date. The "warning" label attached to the outside of the MBB outlines precautions that must be taken when handling desiccant-packed units if they are to be kept dry.
- **Shipping Box**. The barcode label on the shipping box will indicate that desiccant-packed material is included. This label will indicate the seal date of the enclosed MBB, and thus, the remaining shelf life.

10.5.2. Shipping Boxes and Cartons

Intel products are placed in tubes or trays, or on reels, then packed for shipment in a box made of corrugated fiberboard with an inner coating of conductive carbon that prevents electrostatic damage. Various materials, such as bubble wrap or antistatic foam end pads, are used for cushioning inside the box. Outer boxes are used for increased protection during shipping. All packing materials are either conductive, static dissipative, or antistatic, and meet the electrostatic discharge (ESD) requirements of EIA standard 541.

10.5.3. Labeling Information

- **Tube and Reel Labels**. Tube labels with information on lot traceability, part and spec numbers, quantity of parts, and ROM and PROM codes are available by special order. Reel labels are standard and provide the same information. Customer part number references can be included on either type of label, also by special order.
- **Box Labels**. Bar-coded labels for each box are standard on Intel product shipments. Box labels provide all the information on the tube labels, show order packing and shipping information, and allow more space to define special requirements.

10.6. REVISION SUMMARY

The main differences between the revision 6 and 7 is:

- Updated Tray information