



5 Shipping, Transport Media and Moisture Sensitivity Level

Intel® Manufacturing Enabling Guide

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5.1 Product Transport Media

All semiconductor products must be shipped in some type of handling media. The type used is specific to the type of package, die, or wafer that is to be shipped. The following sections outline the different types of shipping and handling media that Intel uses and outlines how they can be recycled. This is not inclusive of all the many different types of media available, but is meant to show the main types used.

5.1.1 Trays

Shipping trays are built in compliance with JEDEC thick and thin standard perimeter dimensions though the footprint of different media may differ. Mid-temperature trays can be baked to 140°C while low temperature trays can withstand a maximum sustained temperature of 50°C. Trays are manufactured in modified Polyphenylene Oxide (mPPO) or equivalent for mid-temperature applications because of their high deflection temperature, superior strength, and dimensional stability as well as Acrylonitrile Butadiene Styrene (ABS) and Polyethylene Terephthalate (PET) for low temperature applications. All JEDEC trays have the same "X" and "Y" dimensions and are easily stacked (with matching tray types) for storage and manufacturing. Intel offers trays for the following package types:

FCBGA, FCLGA, FCMB, FCPGA, PBGA, PQFP, QFN, and TSOP

Illustrations of tray outlines for various packages are shown on the following pages. Intel field sales engineers can provide detailed drawings and specifications upon request.

Figure 5-1 Injection Molded Thick JEDEC Tray

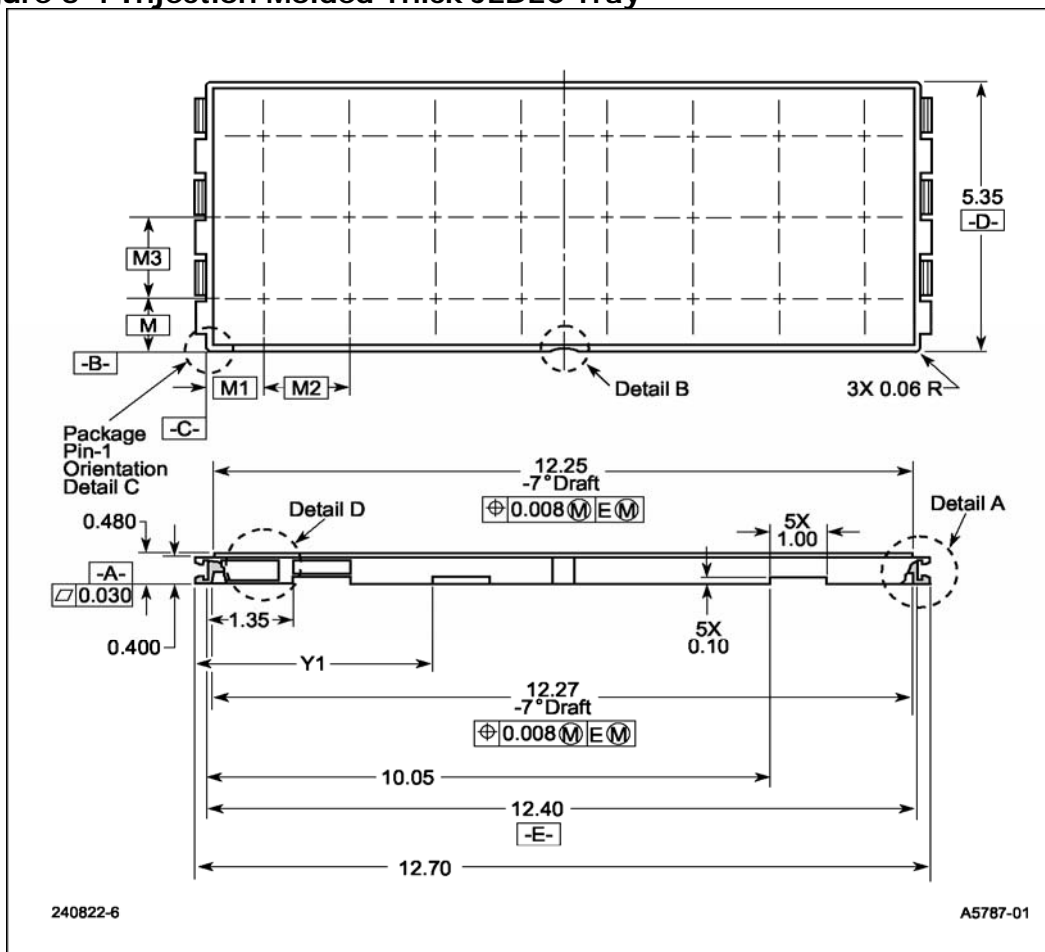
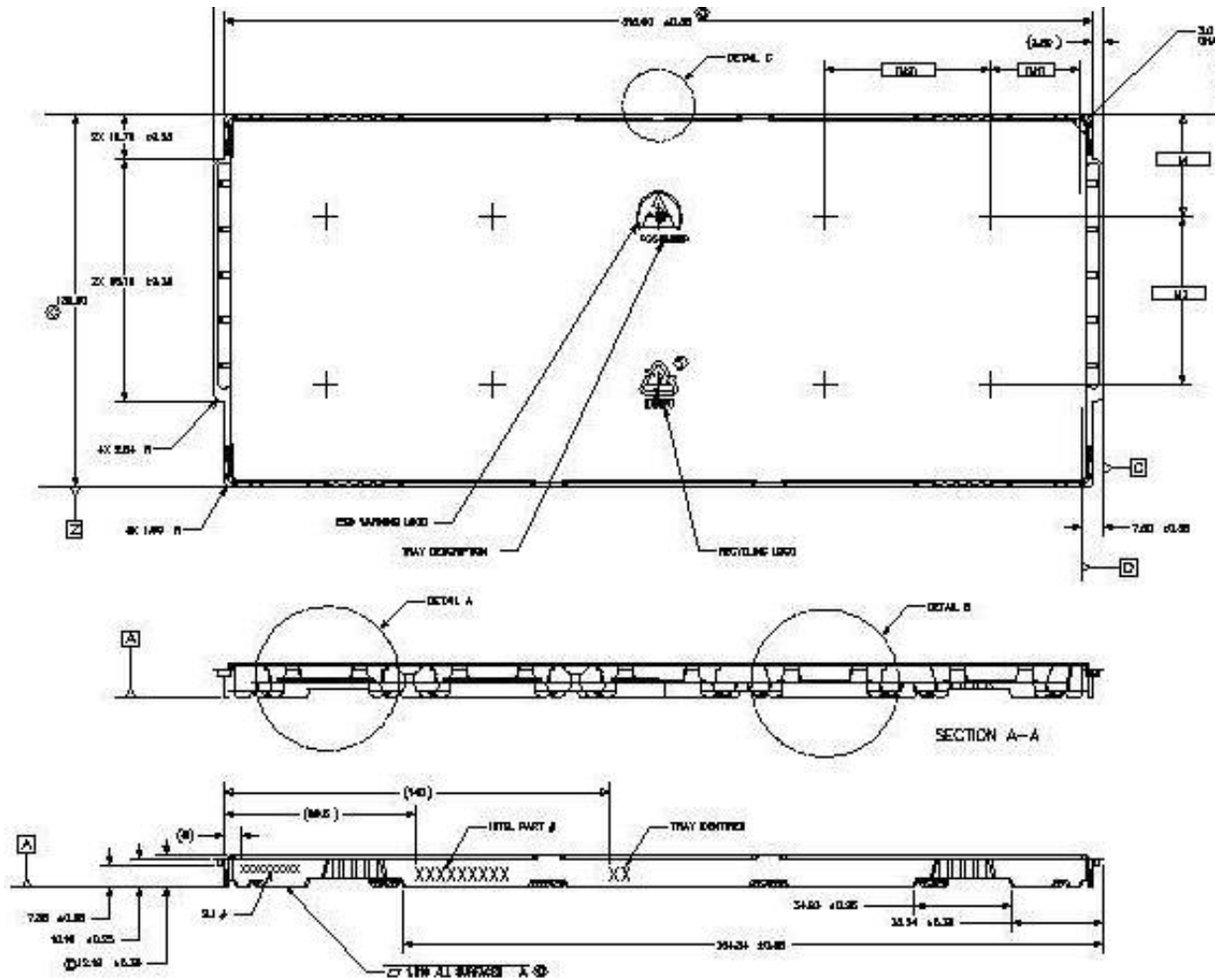


Figure 5-3 Thermoform Tray





5.1.2 Carrier Tape and Reel

Tape and Reel is utilized for shipping various products where requested by the customer. Tape is manufactured in varying widths (listed in Table 5-1 below) using polystyrene (PS) material.

Generic illustrations are shown below for the tape and reel.

Figure 5-4 Carrier Tape and Reel

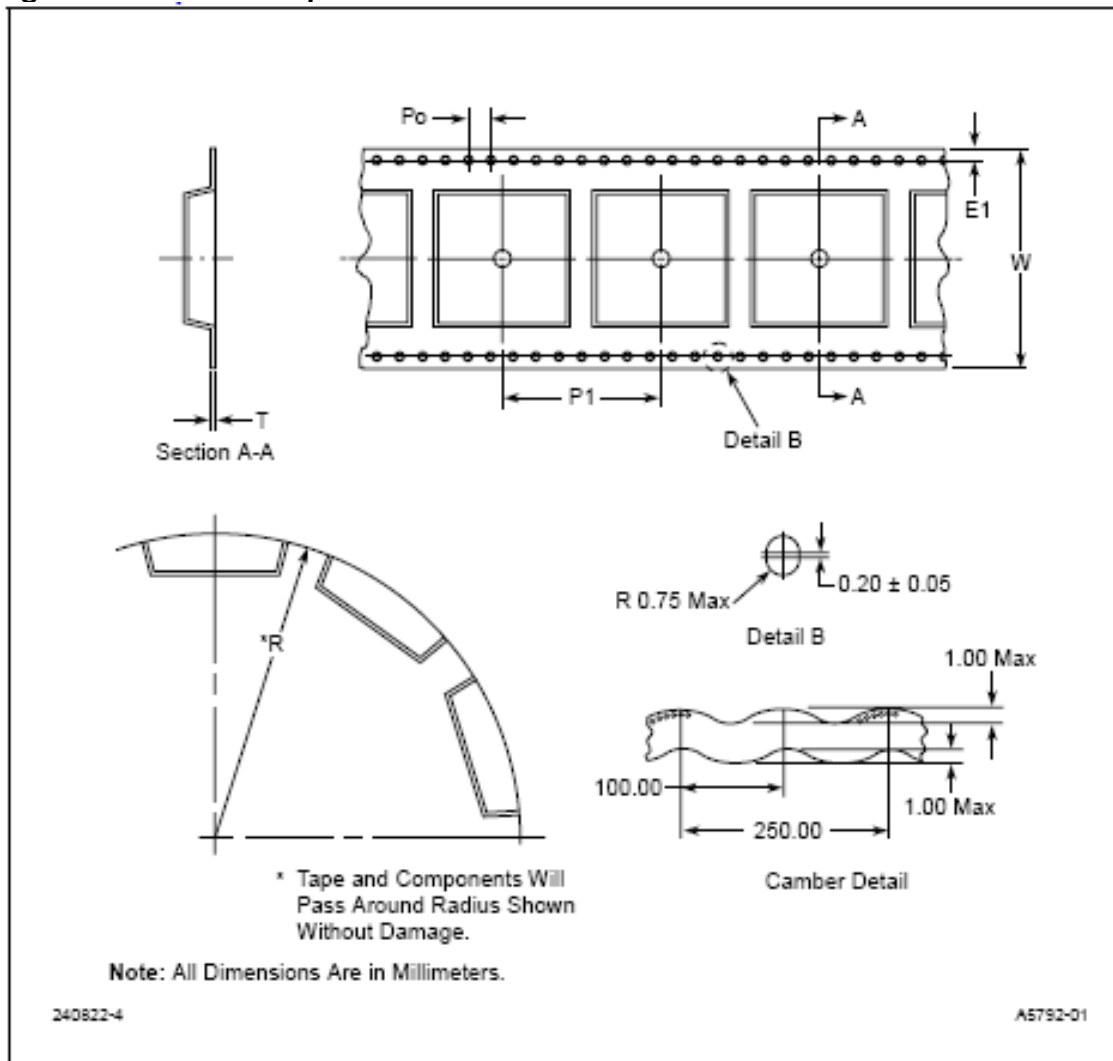


Figure 5-5 Carrier Tape Reel

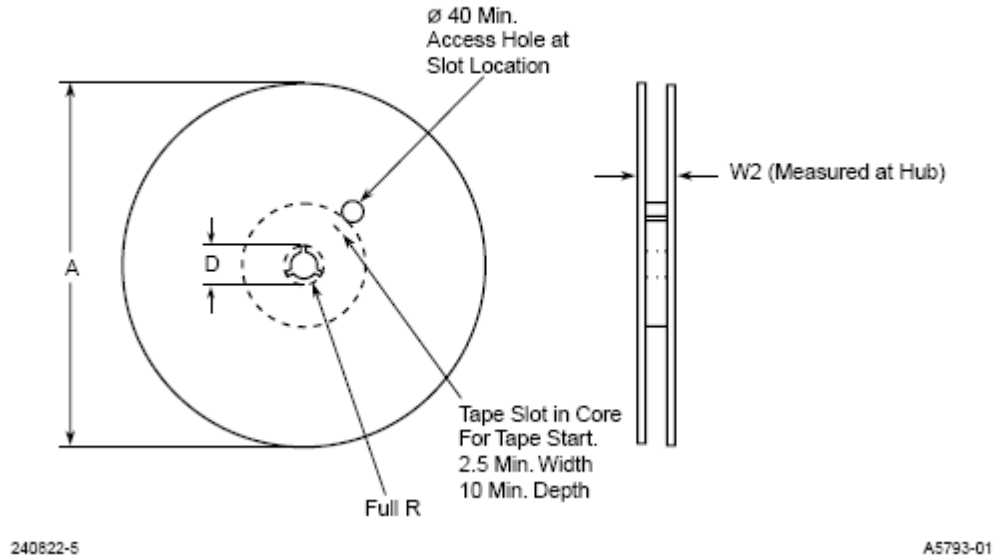


Table 5-1 Carrier Tape and Reel Dimensions

	12	16	24	32	44	56
A Max.	330	330	330	330	330	609
D Min	20.2	20.2	20.2	20.2	20.2	20.2
W2 Max.	16	22.4	30.4	38.4	50.4	62.4

NOTE:
1. Dimensions are in millimeters.

5.1.2.1 Protective Bands

To provide additional protection for product shipped in carrier tape, protective bands are wrapped inside the edges of the carrier tape reels. These bands are made of carbon-loaded polystyrene.

Table 5-2 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



5.2 Environmental Programs Overview

Intel continues to evaluate current packaging methodologies to ensure that we meet or exceed global regulatory compliance with regards to environmental concerns. Our philosophy focuses on eliminating redundant or mixed materials as appropriate, implementing reuse applications and increasing the recyclability of our component packaging material. This chapter also contains information for recycling of the transport media materials at the end of each section.

5.2.1 Intel's Shipping Media Reuse Programs

5.2.1.1 JEDEC Tray Reuse Program

Intel has been successful in establishing a program for recycle of our Trays. Trays are subjected to a variety of inspections to ensure they meet Intel's specifications prior to use by an Intel factory. Trays that fail to meet Intel's quality requirements are sent to plastic reclamation vendors for utilization in other plastic applications. As a general rule trays are not sent to landfills.

5.2.1.2 Intel's Die Sales & Gel-Pak Reuse Program

Intel utilizes Gel-Paks as a method for transporting bare die from Intel to the end customer. The Gel-Paks are placed in Moisture Barrier bags with a desiccant card to minimize moisture and sealed. Gel-Paks can be reclaimed and reused.



5.3 Shipping Formats

5.3.1 Desiccant Pack Materials

All Intel Moisture Sensitive Products are shipped in desiccant pack. Intel certifies, manufactures, classifies, labels and ships moisture sensitive materials according to industry standards (JEDEC, IPC, EIA). As industry standards evolve, Intel will continue to modify its procedures accordingly. For a thorough discussion of the packing process and handling considerations unique to Moisture Sensitive Products, please refer to the Moisture Sensitivity/ Desiccant Packaging/Handling of Moisture Sensitive Products References listed below.

Intel uses 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 meets 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 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. Gel-Paks, where used, utilize a 3"x4" desiccant card.
- **Humidity Indicator Card (HIC).** Each MBB contains a humidity indicator card. This card is a 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 bar code label mentioned above in the section on MBB 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.

- **Inner Box.** The bar code label on the inner box indicates that desiccant-packed material is included. This label indicates the seal date of the enclosed MBB, and thus, the remaining shelf life. The product's specific moisture sensitivity level (MSL) and maximum reflow temperature is also indicated as illustrated in Figure 5-6.

Applicable Moisture Sensitivity/Desiccant

Packaging/Handling of PSMCs JEDEC References. The references listed below can be located and downloaded free of charge at www.jedec.org. Search by document number as noted below in the list of references.

1. "Joint Industry Standard Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface Mount Devices", IPC/JEDEC (J-STD-020D)
2. "JEDEC Standard Preconditioning of Nonhermetic Surface Mount Devices Prior to Reliability Testing", JEDEC/EIA, (JESD22A113)
3. "Joint Industry Standard Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices" IPC/JEDEC (J-STD-033B)
4. "EIA/JEDEC Engineering Publication Symbol and Labels for Moisture Sensitive Devices", EIA/JEDEC (JEP113-B)



5.3.2 Shipping Boxes and Cartons

Intel products are placed in trays or on reels and then packed for shipment in a box made of corrugated fiberboard. Various materials, such as bubble wrap or foam end pads, are used for cushioning. Outer boxes are used for increased protection during shipping. If details about the packing materials are needed in your specific area, please contact your local Intel Field Sales Representative.

5.3.2.1 Reel Labels

Reel labels contain information on lot traceability, part and spec numbers, and quantity of parts. Customer part number references also can be included by special order.

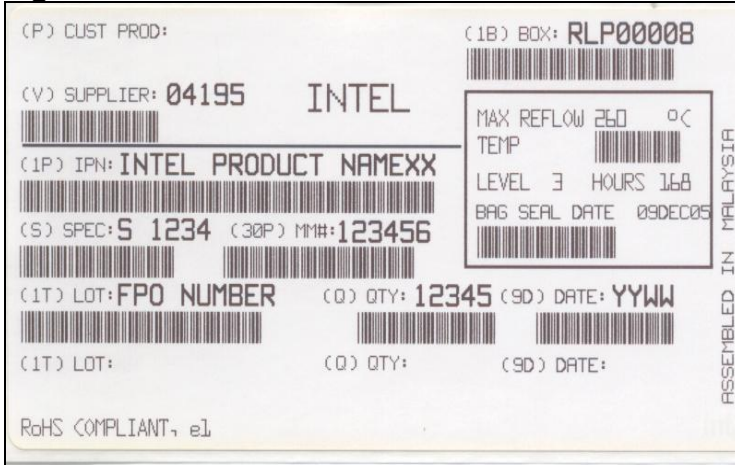
5.3.2.2 Inner Box Labels

Bar code labels for each box are standard on Intel product shipments. Box labels provide lot traceability, part and spec numbers, and quantity of parts.

The standard inner box and bag labels identify the parts as RoHS Compliant (or with a 2nd Level interconnect which meets the requirements to be RoHS compliant) if applicable. The peak reflow temperature and moisture sensitivity level of the component, the quantity of parts in the box, the lot number, and the pack date are included on the labels.



Figure 5-6 Box Label



5.4 Revision Summary

Original publication