

# LMSSC PACKAGING STANDARD

---

## PACKAGING OF ELECTRONIC SURFACE MOUNT COMPONENTS FOR AUTOMATIC PLACEMENT

---

### **1.0 SCOPE**

This standard provides methods of packaging for shipping Electrostatic Sensitive Devices (ESD) and Non-ESD which can be installed using automated equipment.

### **2.0 REFERENCES**

#### **2.1 LMSSC DOCUMENTS**

2.1.1 LMSSC MPI-441008 "Protection of Electrostatic Discharge Sensitive Devices"

#### **2.2 GOVERNMENT/MILITARY DOCUMENTS** (latest revisions)

2.2.1 MIL-STD-2073-1 Standard Practice for Military Packaging

2.2.2 MIL-DTL-39032, "Resistors, Preparation for Delivery of"

2.2.3 MIL-DTL-19491, "Semiconductor Devices, Packaging of"

2.2.4 Code of Federal Regulations (CFR) Title 49

2.2.5 DOD-STD-1686, "Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)"

2.2.6 DOD-HNBK-263, "Electrostatic Discharge Control Handbook for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)."

#### **2.3 INDUSTRIAL DOCUMENTS**

2.3.1 EIA-481, "Taping of Surface Mount Components for Automatic Placement"

2.3.2 Universal GS-297C, "Automatic Matrix Tray Changer"

2.3.3 JEDEC MO-094, "TapePak Molded Carrier Ring Family"

2.3.4 JEDEC 95 CO, Recommended Matrix Tray Tolerancing and Indexing

2.3.5 AA, "Barcode Symbology Standard for Code 39"

### **3.0 REQUIREMENTS**

#### **3.1 GENERAL**

3.1.1 The requirement of EIA-481 shall be met in addition to provisions of this Packaging Standard.

3.1.2 All components in a unit package shall be from the same lot date code (LDC).

3.1.3 The quantity per unit package is variable, depending upon the type of unit packaging and the order quantity.

3.1.4 The "/suffix letter" following the P-125- (P-125) callout identifies the required packaging per Table 1.

<b>Table 1</b>	
P-125/R	Barcoded ESD Tape and Reel, Formed (if required) and Tinned Components
P-125/SR	Barcoded ESD Tape and Reel, Formed (if required) and Tinned Components. The minimum lot size is one ( 1 ) full reel for each Purchase Order line item quantity, and orders are required to be in increments of the single reel quantity.
P-125/N	Barcoded Non-ESD Tape and Reel, Formed (if required) and Tinned Components
P-125/T	Barcoded ESD Rail/Tube, Formed (if required) and Tinned Components
P-125/X	Barcoded ESD Matrix Tray, Formed (if required) and Tinned Components
P-125/P	Barcoded ESD TapePak, Tinned Leads
P-125/W	ESD Waffle Tray for Unformed/Untinned Flatpacks and Quad Flatpacks
P-125/U	ESD Individually Unit Packaged Unformed/Untinned Components
P-125/F	Barcoded ESD Individually Unit Packaged Formed/Tinned Components
P-125/S	Non-ESD Individually Unit Packaged Unformed/Untrimmed Components
P-125/O	Barcoded Non-ESD Individually Unit Packaged Formed/Tinned Components

If no "/suffix letter" is specified, the vendor shall select the most appropriate method.

3.1.5 Usage of Bar Coding will be per Code 39 symbology.

3.1.6 Contact the responsible buyer or subcontract administrator if packaging for a specific component is unobtainable, differs from package configurations in this specification or if the packaging specified is not compatible with the devices.

### 3.2 UNIT PACKAGING

#### 3.2.1 Tape and Reel Packaging

- 3.2.1.1 Components shall be prevented from falling out of the component window of the tape. This is normally done by cover tapes on one or both surfaces of the carrier tape.
- 3.2.1.2 The cover tape shall extend past the edge of the carrier tapes provided that the maximum dimensions of the carrier package is not exceeded. In no case shall the cover tape cover any part of the sprocket holes.
- 3.2.1.3 Tapes in adjacent layers shall not stick together when wound on the carrier reel.
- 3.2.1.4 Packaging materials shall perform their duties without adversely affecting component performance.
- 3.2.1.5 In no case shall there be 2 consecutive components missing between the first and last part of any reel.

- 3.2.1.6 The top cover tape for each carrier tape shall have peel strength of 0.4 to 0.7 newtons measured at 175°F to 180°F with respect to the component carrier along the longitudinal axis of the carrier tape. The peel-off rate shall be 120 to 125 mm/min.
- 3.2.1.7 The following orientation shall be considered as standard: chip resistors shall be packaged with the resist material facing the top cover tape. Components with bottom-only terminations shall be packaged with the terminations facing the bottom cover tape or embossed carrier.
- 3.2.1.8 Regardless of tape size, component size, or pitch size used, the centerline of the component cavity, or position, shall be located midway between a pair of sprocket holes in the lengthwise direction of the tape.
- 3.2.1.9 Reels shall be disposable metal or plastic. The reel shall be rigid to protect components and shall allow the free unreeling of taped components.
- 3.2.1.10 The component cannot rotate more than 20° within the tape cavity.
- 3.2.1.11 A minimum 12" leader shall be provided at each end of the reel.

### 3.2.2 Rail/Tube Package

- 3.2.2.1 Electronic components shall be packaged in tubes or rails following current industrial standard, and marked per this specification.
- 3.2.2.2 All components must be oriented in the same direction -- all pins 1 located in same spot with respect to tube or rail.
- 3.2.2.3 Tube or rail should be engineered to permit component free fall without binding or buckling within the tube or rail.
- 3.2.2.4 Tube or rail lead trough must be at least 0.020" greater than dip lead length.
- 3.2.2.5 The maximum space in the tube or rail is component height + 0.050".
- 3.2.2.6 Quantity per tube or rail shall not be forced into tube so that they buckle or overlap.
- 3.2.2.7 The required tube or rail length is min. 12" to max 24".
- 3.2.2.8 Material for tube or rail shall be transparent. Tubes or rails for ESD parts must be made of an approved static protective material and marked ESD.
- 3.2.2.9 Do not place spacers between parts.
- 3.2.2.10 Cut ends of tubes or rails shall be free of any deformation or burrs.
- 3.2.2.11 Stoppers or pins shall be placed in the ends of tubes and rails. Stoppers are the preferred method. Foam or any other stuffing material in partially filled tubes or rails is prohibited.

### 3.2.3 Matrix Tray Packaging

- 3.2.3.1 Matrix trays are to be fabricated to and packaged per the specifications and requirements of JEDEC 95 CO. This includes tray dimensions, tolerances, and orientation/registration.
- 3.2.3.2 Tray lids shall hold components securely within individual cavities. Tray lids shall be secured with inert non-gassing, adhesive tape.
- 3.2.3.3 The following orientation shall be considered standard: Chip resistors shall be packaged with the resist material facing the lid. Components with bottom-only terminations shall be packaged with the terminations facing the cavities.

### 3.2.4 TapePak Packaging

3.2.4.1 Package per JEDEC MO-094, "TapePak Molded Carrier Ring Family."

### 3.3 INTERMEDIATE PACKAGING

3.3.1 Consolidate tubes or rails of identical part number, manufacturer and lot number into a bundle, place bundle into a (static protective if needed) bag, and seal the bag. Place bagged tubes into an intermediate corrugated fiberboard container -- heed container size and weight specification limitations. Fill any voids with suitable non-particulate generating dunnage to prevent damage during handling and/or transporting.

3.3.2 Place individual reel, TapePak, or stack of matrix trays into a (static protective if needed) bag and seal. Place bags in corrugated fiberboard container -- heed container size and weight specification limitations. Fill any voids with suitable non-particulate generating dunnage to prevent damage during handling and/or transporting.

### 3.4 PACKING

3.4.1 Pack appropriate number of intermediate containers uniformly into each shipping container.

3.4.2 Shipping containers shall protect the item from damage during ordinary handling/shipping and shall meet the minimum requirements of common carriers for safe transportation (see contracting documents).

3.4.3 Intermediate containers which meet the requirements of 3.4.2 may be used as shipping containers.

3.4.4 Suppliers shall preserve and pack ESD hardware in accordance with requirements established in the Purchase Order, Statement of Work (SOW), Product Specification or Engineering Drawing.

3.4.5 LMSSC facilities shall preserve and pack ESD hardware in accordance with MPI-441008 and applicable Engineering Drawing Notes. Should there be a conflict between the requirements of this packaging standard and contractual requirements, the Contract shall take precedence.

### 3.5 MARKING (Unless otherwise specified in the contract or P.O. use the following criteria)

3.5.1 All marking shall be legible, uniform, durable and properly placed on containers to avoid loss of identity when package is opened and shall not be detrimental to dispensing for automated assembly of parts. Labels shall not be applied within 2" of either end of a tube or rail. Marking should be limited to that required by the PO or part specification.

3.5.2 Minimum marking on unit package shall include:

3.5.2.1 Nomenclature

3.5.2.2 Quantity per unit package

3.5.2.3 Suppliers/Manufacturer Identity (may be abbreviated but logo only is not acceptable.)

3.5.2.4 Lot date code (LDC), if applicable.

3.5.2.5 Part number per contracting document

3.5.2.6 Marking should be limited to that required by the PO or part specification.

### 3.5.3 Intermediate packing marking

- 3.5.3.1 If consolidation bag is transparent and unit container marking is readable through the material, the intermediate container marking requirement is unnecessary.
- 3.5.3.2 If unit container marking cannot be read through the bag, marking shall be per 3.5.2.1 through 3.5.2.6.
- 3.5.3.3 Marking should be limited to that required by the PO or part specification.

### 3.5.4 Shipping container marking for all devices shall consist of:

- 3.5.4.1 Part number per contracting document
- 3.5.4.2 Supplier and Name
- 3.5.4.3 Total number and destination
- 3.5.4.4 Special, precautionary, and handling markings for ESD devices.
- 3.5.4.5 Attach or enclose a copy of the packing slip.
- 3.5.4.6 Special marking as specified/appropriate (Serial/Lot numbers, ESD CAUTION label, barcode, etc.)
- 3.5.4.7 Special and precautionary handling labels shall meet ASTM D5445, Pictorial Marking for Handling of Goods.
- 3.5.4.8 Marking should be limited to that required by the PO or part specification.



Figure 1. Electrostatic CAUTION Label

## 4.0 QUALITY ASSURANCE

Packaging shall be accomplished in such a manner as to prevent physical damage to, or degradation of, the packaged items during delivery to the using activity. It shall be the prerogative of LMSSC to return damaged items, at supplier's expense, when such damage is attributable to improper or inadequate protection.

**5.0 NOTES**

**Commodity**

Barrier Material, Electrostatic Protection

Label Electrostatic CAUTION (Pressure Sensitive)

Box Fiberboard

Tubes, Static Protective Plastic

Bag, Polyolefin

**Material/Commercial Specifications**

MIL-PRF-81705, Type 1, Class 1

Commercially Available

ASTM D5118, Type CF, Class Domestic,  
SW, Style RSC, Grade 44 ECT or 200  
Mullen

Commercially Available (Suggestion:  
Thielex, Plastic Corp)

A-A-3174, Type 1, Class 1, Grade B