

# Analog and Power Management Tape and Reel Specification

## 1 Introduction

The purpose of this application note is to define the standard configuration and documentation requirement for packing semiconductor product in embossed tape.

This document applies to all analog and power management semiconductor devices assembled or tested by Freescale Semiconductor as well devices assembled or tested by subcontractor to Freescale Semiconductor.

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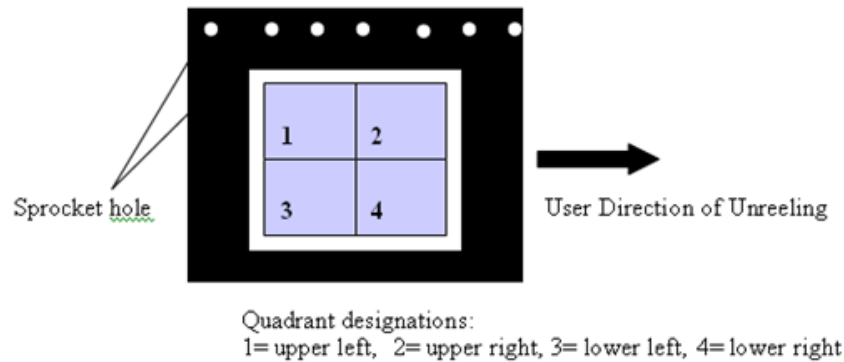
## 2 Overview

### 2.1 Device Orientation

The following device orientations (in an embossed tape) conform to EIA 481-D Standards.

#### 2.1.1 General specification

1. Marking on the top surface of the device faces the cover tape.
2. Rectangular shaped devices are oriented with the longest axis perpendicular to direction of feed.
3. The edge of the package containing termination (PIN) 1 or (Ball/Pad) A1 faces the round sprocket holes.
4. For devices where the above cannot be met, then termination (PIN) 1, or (Ball/Pad) A1 shall be in the first quadrant.
5. Each package family has a unique feature, which identifies the location of pin ONE.
6. For devices where termination (PIN) 1 or (Ball/Pad) A1 is not distinguishable or it is located in the exact center of the device, then an alternative will be chosen for orientation. A known exception for this includes SOT (Small Outline Transistor) package device.

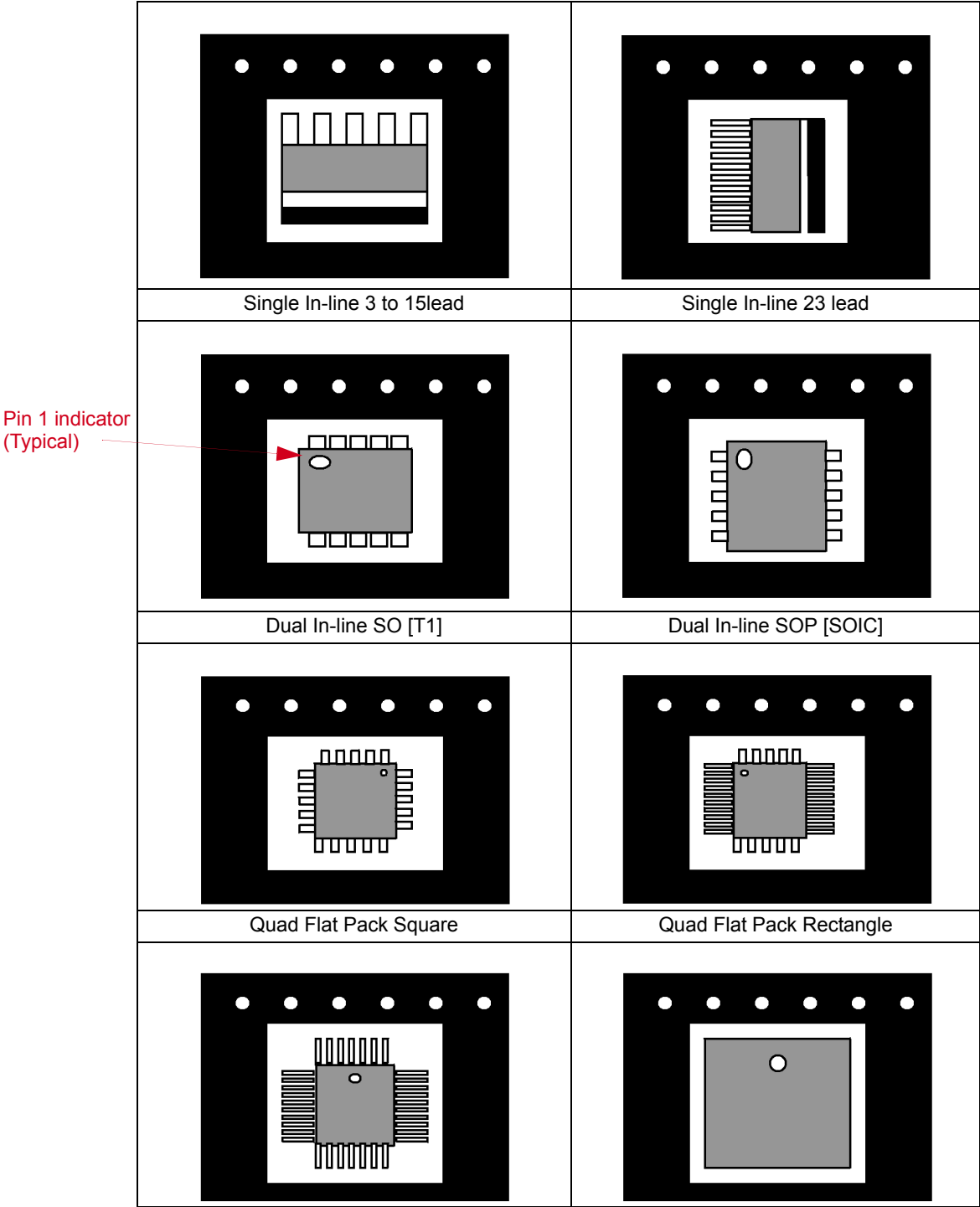


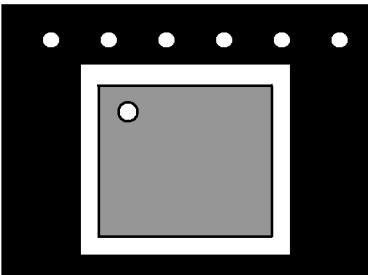
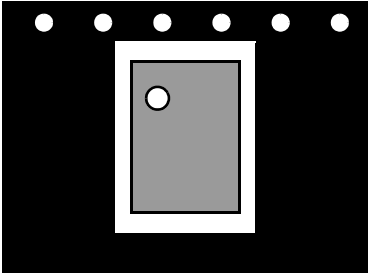
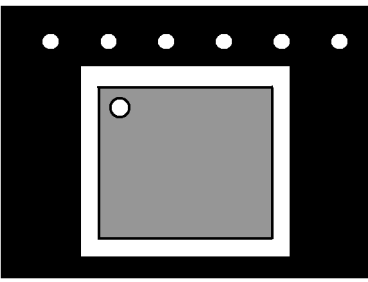
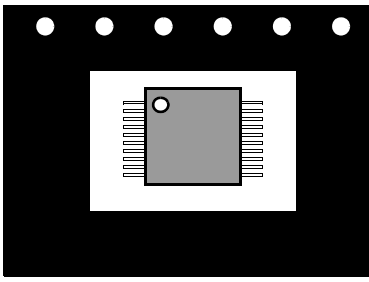
**Figure 1. Quadrant Designations**

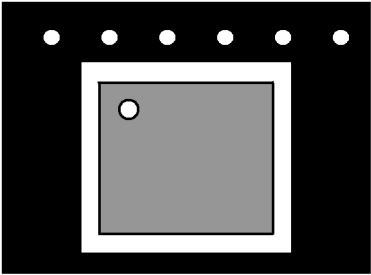
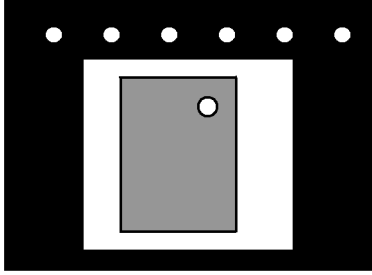
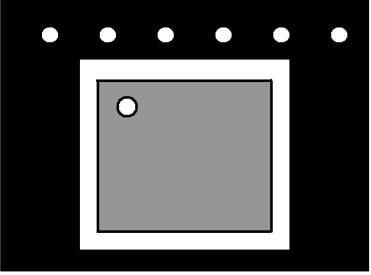
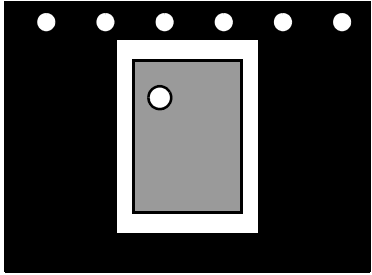
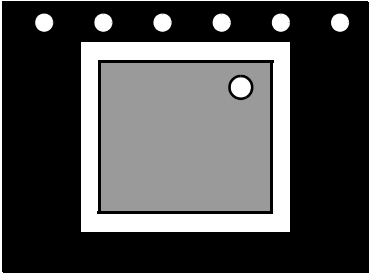
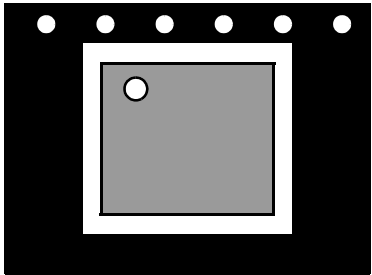
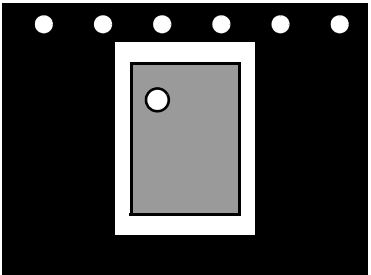
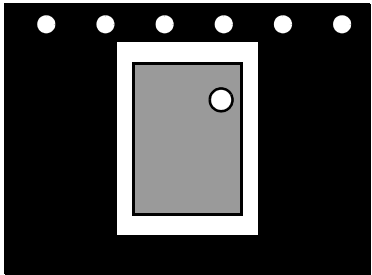
## 2.2 Specific device package orientation

The following illustrations indicate the standard orientation of devices in embossed tape.

### 2.2.1 Illustrations Of Product Orientation In Embossed Tape



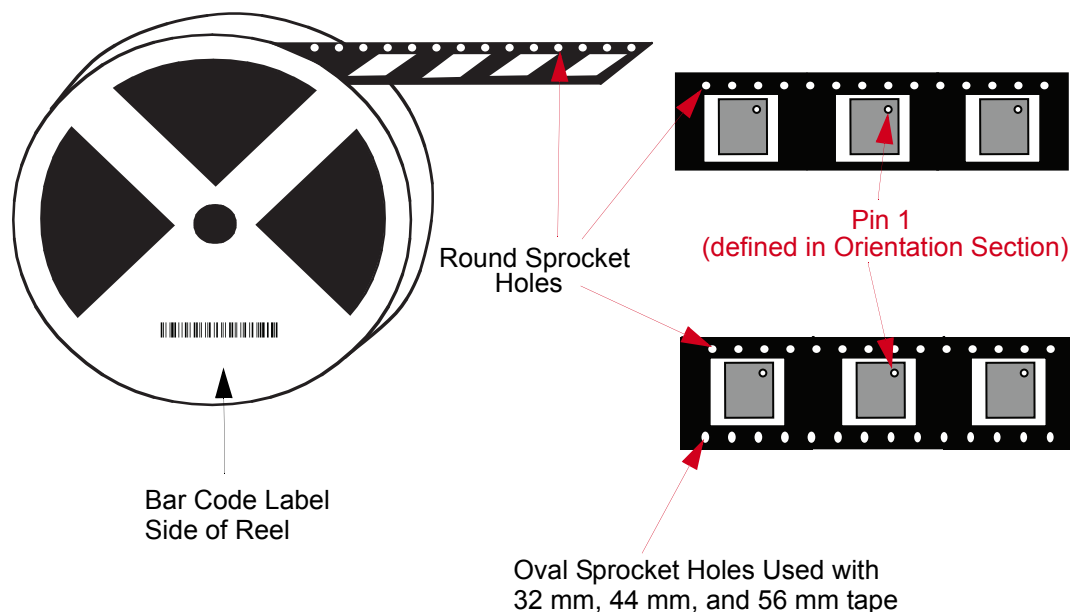
	
<p>Lead-less Chip Carrier (Ceramic/Plastic)</p>	<p>LGA Modules (Non-square)</p>
	
<p>LGA Modules (Square)</p>	<p>Heat Sink Small Outline Package (HSOP)</p>

Quad Chip Carrier Leaded	Quad Chip Carrier No Lead
	
Array Ball Grid Square (includes WLCSP)	Array Ball Grid Rectangle
	
Bump Chip Carrier Square	Bump Chip Carrier Rectangle
OR	
	
QFN/uDFN/PQFN (Square)	QFN/uDFN (Square) Exceptions - 2x2mm
	
QFN/uDFN/PQFN (Non-square)	QFN/uDFN/PQFN (Non-square)

## 2.3 Reel Size

1. Reel size selection depends on the part number suffix codes as listed in [Appendix A](#).
2. Reels are available in one piece, two piece and three pieces configurations. Unless specified, selection of configuration is based on local availability

### 2.3.1 Reel Labeling



***Freescale, with few exceptions, follows EIA-481-D standard for taping orientation.***

**Figure 2. Bar Code Label Placement**

### 2.3.2 Tape Retention on Reel

1. Completed reels of products are taped at the end using a non-charging ESD adhesive tape.
2. A retaining band is placed around the circumference of the reel and taped using a strip of non-charging ESD adhesive tape.
3. The completed taped and reeled product is placed in a sealed moisture barrier bag with accompanying humidity indicators and desiccants, if applicable.
4. The sealed barrier bag is placed inside a pizza box and may contain appropriate foam or dunnage to prevent lead and package damage during handling and shipping.

### 3 Part Number Suffix Codes

**Table 1. Appendix A**

Suffix	Reel Diameter	Notes	Exception
R1 <sup>(1),(2)</sup>	7" reel	N/A	N/A
R2 <sup>(1)</sup>	13" reel	N/A	N/A
R3	13" reel	Special for some divisions	N/A
R4	13" reel	D2 PAK	N/A
Rk	13" reel	D PAK	N/A
T1	13" reel	N/A	Pegasus (Pat numbers may end in T1 suffix, but using 7" reel)
T2	13" reel	Pegasus	N/A
R	13" reel	N/A	Viper part number (SGMPPC6230F7MVR) ends with R, but shipped in bulk

**Notes**

1. These tape and reel suffixes are the only ones used by Analog and Power Management.
2. Analog and Radar

## 4 Terms and Definitions

Definitions and Terms	Description
Cover tape	Thin piece of translucent plastic sheet to cover the embossed tape by heat sealing process
Embossed carrier tape	Thin piece of plastic that has been formed to accommodate placement of integrated circuit
Hub	Core of the reel
Leader	Specific length of empty embossed carrier tape furthest away from the hub
Peel Back Force Test	A test performed to quantify the strength of the sealing between cover and carrier tapes
Reel	Circular item for tape to be rolled into
Trailer	Specific length of empty embossed carrier tape nearest to the hub



## 5 Reference Documents

Document Number	Document Title
EIA 481-1	8.0 mm and 12 mm Embossed Carrier Taping of Surface mount Components for automatic handling
EIA 481-2	16 mm and 24 mm Embossed Carrier Taping of Surface Mount Components for Automatic Handling
EIA 481-3	32 mm, 44 mm, and 56 mm Embossed Carrier Taping of Surface Mount Components for Automatic Handling

## 6 Revision History

Revision	Date	Description of Changes
3.0	5/2013	Converted to application note format



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