MEMS Motion Handling and Assembly Guide

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1 PURPOSE AND SCOPE

This document provides general information and reference guidelines for handling and assembling TDK InvenSense Micro Electro-Mechanical Systems (MEMS) motion sensors. Design rules and soldering recommendations included in this document represent the best practices to achieve a high level of performance in terms of accuracy and stability.

2 DOCUMENT OBSOLESCENCE NOTICE

Starting from the date of the present revision (4.4), this document is deprecated and superseded by:

“AN-000393: IMU PCB Design and MEMS Assembly Guidelines for ICM/IAM/IIM-4xxxx, 2xxxx and MPU-6xxx Products”.

3 REVISION HISTORY

Revision Date	Revision	Description
10/16/2013	1.0	Initial Release
01/13/2014	2.0	Revised sections 3.1.5, 3.3, 3.7, 3.8, 3.9, and 3.11.
02/11/14	2.1	Modified document format and updated shipping label.
05/29/14	2.2	Added tape and reel handling guidelines, updated 3x3mm tape and reel spec, updated packaging section for reels
07/07/14	2.3	Revised 3x3mm tape and reel spec to add tolerances
11/06/14	2.4	Added section on PCB Mounting Optical Inspection section
11/17/2014	2.5	Updated Storage Specifications
12/04/2014	2.6	Updated carrier pocket (Ao, Bo) tolerances to +/-0.05mm.
02/19/2015	2.7	Added storage specification back in. Added tape and reel spec 3x3x1.25mm.
03/01/2016	2.8	Added pizza box 2D label example picture.
05/03/2016	2.9	Added 2 type 3x3 top marking example. Updated the front/end empty pocket quantity from 550ea to 50ea for all package types.
05/26/2016	3.0	Change the front/end empty pocket quantity from 50ea back to 550ea
11/08/2016	3.1	Added the 2.5x3 tape and reel specifications.
11/09/2016	3.2	Formatting update
01/06/2017	3.3	Added the new tape and reel specifications for 2.5x3 Tape Dimensions TYPE II
07/27/2017	3.4	Updated the tape and reel specification 2.5x3 Tape Dimensions TYPE I
04/17/2018	3.5	Updated the manufacturing recommendations section
11/06/2018	3.6	1.Adjust PACKAGE MARKING SPECIFICATION of 3x3 to TYPE I~III (Figure 5~7) 2.Add PACKAGE MARKING SPECIFICATION of 2.5x 3 (Figure 9) 3. Remove special marking requirement of special code table 3~4. 4. Combine and revise 3x3 Tape Dimensions for package height 0.9 and 1.0. (Figure 11) 5. Revise Improved Packing (Figure 21.) 6. Add MSL1 label (Figure22)
11/13/2018	3.7	1.Tabel 3. Add 2.5x3 information 2.Remove product name from this document as general guide
12/19/2018	3.8	Remove Component Placement Pressure and Pick-and-Place Velocity/Mounter Force
06/14/2019	3.9	Added package 4.5 x 4.5 x 1.1. Updated mounting recommendations. Added MSL handling conditions
10/14/2019	4.0	1. Added the MSL details 2. Added MSL 5 label Updated PCB design section: no solder musk below the component, die pad must be left unconnected. Updated soldering recommendation: TDK InvenSense strongly recommend not to place solder mask below the MEMS component. Updated Figure 4
03/31/2020	4.1	Updated ESD Considerations Updated PCB Design and Solder Paste Printing to guarantee proper QFN 4.5 x 4.5 mm2 flanks wettability Updated description of shock tolerance
12/01/2020	4.2	Updated Figure 24 &32 label logo
03/11/2021	4.3	Updated pick and place details and MEMS handling instructions section.
01/24/2024	4.4	Document Superseding

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