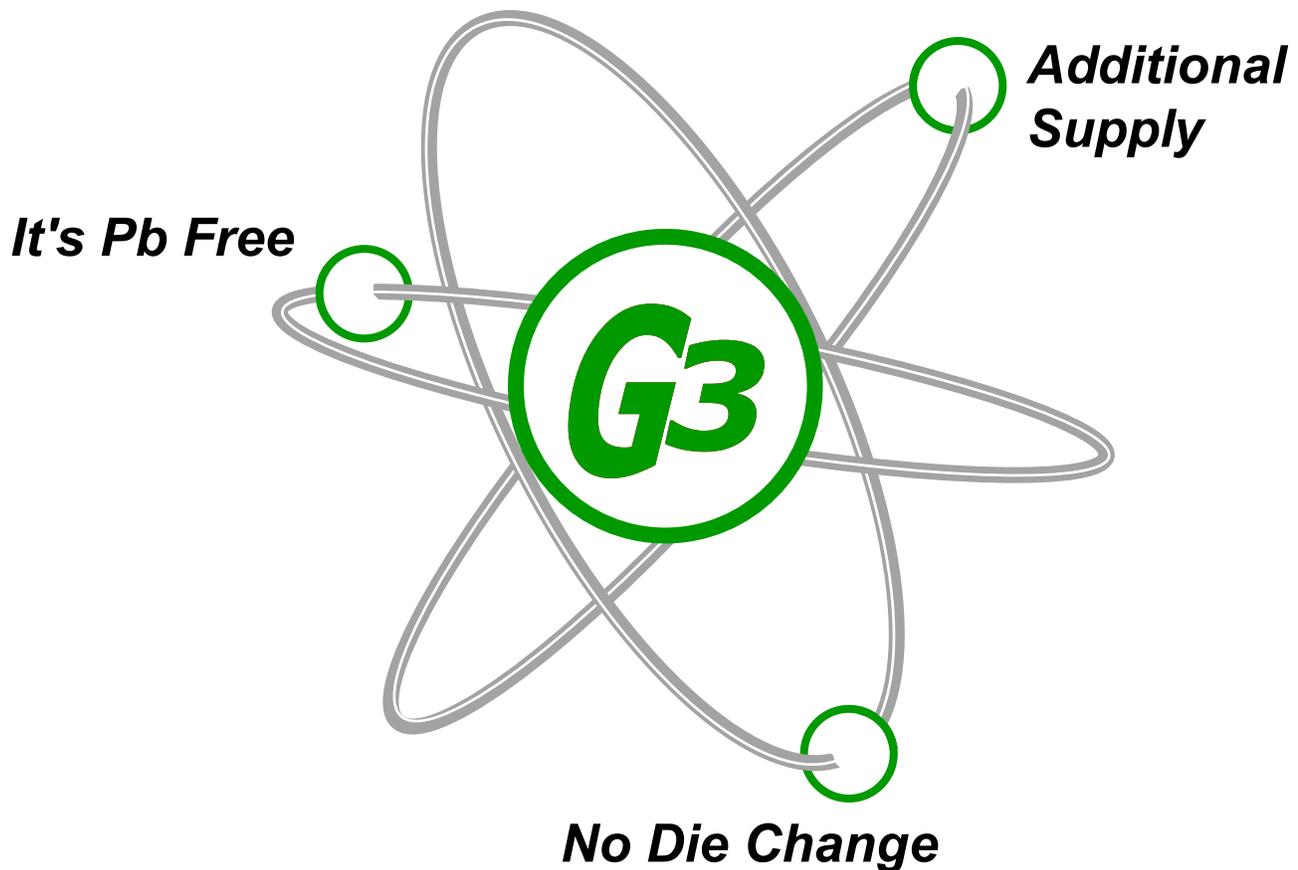


Standard Linear and Logic (SLL)

Introduces our **NEW G3** Products



Included:

- FAQ documents, Stocks available, Qualification Data*
- New Product Release Roadmap/Plans*
- Questions or Needs: g3_sll@list.ti.com*

NOW AVAILABLE



Standard Linear & Logic (SLL)

Matte tin (Sn)/Pb Free Lead Finish FAQ

SOIC & TSSOP Packages

Contents

1. Introduction
2. Frequently Asked Questions (FAQ).
3. Appendix A: Pb Free marking/ labeling.
4. Appendix B: TI matte tin qualification data.

Introduction

Standard Linear and Logic (SLL) Business Unit of Texas Instruments is please to announce the release of matte tin Pb Free lead finish options for selected products in the SOIC and TSSOP packages. This move allows customers to have the flexibility to use alternate Pb Free options in addition to the NiPdAu solutions offered for the same devices.

The matte tin devices will have a unique device name with G3 designation. This document outlines answers to some basic questions regarding the matte tin offering.

Frequently Asked Questions (FAQ)

- Q1. What is matte tin material?
A1. Matte Sn plating is a term that refers to a pure tin layer electrodeposited onto a Cu alloy base metal (leadframe). Matte Sn is a descriptive term to indicate a non-shiny, non-reflective, “dull” tin deposit.
- Q2. What is the current lead frame finish material for the current device?
A2. The current lead frame finish is NiPdAu
- Q3. Why the changes in lead frame material?
A3. We are not changing the leadframe base metal but offering a matte tin lead finish as an option to support customers who need quick/short lead time delivery support in this environment where many of the suppliers are on allocation.
- Q4. How do we identify the matte tin lead frame finish type material?
A4. It is identified by a part number ending in G3 for green packages and E3 for non-green packages. For example LM358DRG3. For more information see **Appendix A.**
- Q5. Is the matte tin material Pb Free and ROHS compliant?
A5. Yes.
- Q6. Are there any changes in other materials such as die, wire, etc. in the G3 devices?
A6. The mold compound and die attach materials are optimized for use with matte tin finished leads. Au wire is still being used at this time for die to lead frame interconnects. There is no change in the die.
- Q7. What is the difference between G3 and G4?
A7. G = Green mold compound
G3 = Green with matte tin finish
G4 = Green with pre-plated finish (NiPd, NiPdAu, or NiPdAuAg)
- Note: This nomenclature follows JEDEC industry standards
- Q8. What about E3?
A8. E3 is only offered in PDIP as we do not offer green material for PDIP.
- Q9. Are competitors offering green in PDIP?
A9. Not that we know off.

- Q10. Are competitors offering matte tin lead frame materials for SOIC and TSSOP?
- A10. Yes, matte tin finish has been in production in the industry on PDIP, SOIC, and TSSOP packages for many years.
- Q11. What is the lead time for G3 material?
- A11. G3 material lead times average <4 weeks, subject to availability.
- Q12. What G3 material is available?
- A12. Please Refer to the attached excel sheet for device availability.
- Q13. Is matte tin compatible with leaded solder processes?
- A13. Matte tin is backward compatible with leaded solder processing.
- Q14. What is the main difference between matte tin and NiPdAu lead finish?
- A14. Both matte tin and NiPdAu leadframe finishes are RoHS compliant. Both finishes are compatible with the Pb-free board mount operations resulting in no required process change for the user.
- Q15. Are there any concerns for the shelf-life of matte tin finish products?
- A15. Based on TI's method for matte tin, we have successfully completed a shelf-life study for products with matte tin finish. Samples for the evaluation ranged from **3 months to 8 years** in age successfully passed the study.
- Q16. Where can customer obtain product content or package profile data for matte tin products?
- A16. Customer can find this information at www.ti.com or contact TI at support@ti.com.
- Q17. Where can customer obtain qualification data for matte tin products?
- A17. TI has qualified matte tin products per JEDEC requirements. Qualification data is listed in **Appendix B** of this document.

Appendix A

The ***J-STD-609 industry standard*** includes Pb-Free finish categories with an option to identify the component finish on the packing label and in the device marking.

Pb-free Finish Code

Finish Code	
e1	SnAgCu(shall not be included in category e2)
e2	Sn alloys with no Bi or Zn excluding SnAgCu
e3	Sn
e4	Precious metal (e.g. Ag, Au, NiPd, NiPdAu (no Sn))
e5	SnZn SnZnx (no Bi)
e6	contains Bi
e7	low temperature solder (δ 150C) containing Indium (no Bi)

Green Finish Code

Finish Code	
G1	SnAgCu(shall not be included in category e2)
G2	Sn alloys with no Bi or Zn excluding SnAgCu
G3	Sn
G4	Precious metal (e.g. Ag, Au, NiPd, NiPdAu (no Sn))
G5	SnZn SnZnx (no Bi)
G6	contains Bi
G7	low temperature solder (δ 150C) containing Indium (no Bi)

Appendix B

TSSOP Matte Tin Qualification Data

Test Type	Prec	Condition/Duration	LM358APW (8 pin TSSOP)		
			Lot 1	Lot 2	Lot 3
Steady-State Life Test, 150C	1	300 hrs	77/0	77/0	77/0
Biased HAST, 130C/85%RH	1	96 hrs	77/0	77/0	77/0
Unbiased HAST 130C/85%RH	1	96 hrs	77/0	77/0	77/0
Autoclave 121C	1	96 hrs			
Temperature Cycle, -65/150C	1	500 cycles	77/0	77/0	77/0
Thermal Shock -65/150C	1	1000 cycles	77/0	77/0	77/0
High Temp Storage Bake 150C	1	1000 hrs			
High Temp Storage Bake 170C	1	420 hrs	77/0	77/0	77/0
Solderability		8 Hrs/Stm Age	10/0	10/0	10/0
Lead Finish Adhesion		-	15/0	15/0	15/0
Lead Pull		-	22/0	22/0	22/0
Lead Fatigue		-	22/0	22/0	22/0
Flammability (UL 94V-0)		-	5/0	5/0	5/0
Flammability (UL-1694)		-	5/0	5/0	5/0
Flammability (IEC 695-2-2)		-	5/0	5/0	5/0
X-RAY		Topside Only	5/0	5/0	5/0
Physical Dimensions		(per mechanical drawing)	5/0	5/0	5/0
Bond Strength		76 ball bonds, min. 3 units	76/0	76/0	76/0
Die Shear		-	15/0	15/0	15/0
Salt Atmosphere		-	22/0	22/0	22/0
Visual / Mechanical		Approved by A-T Site	Pass	Pass	Pass
Moisture Sensitivity, L1		MSL 1 / 260C	12/0	12/0	12/0
Manufacturability		Approved by A-T Site	Pass	Pass	Pass

GD75232PWR (20 Pin TSSOP)			Assembly Lot #'s					
Test Type	Prec	Condition/Duration	1269	1270	1271	TIS021N0N1	TIS021N0N2	TIS021N0N3
Bond Strength		76 ball bonds, min. 3 units				80/0	80/0	80/0
Die Shear		-				15/0	15/0	15/0
Lead Pull		0 Hr	22/0	22/0	22/0			
Flammability (IEC 695-2-2)		IEC 695-2-2	5/0	5/0	5/0			
Unbiased HAST 130C/85%RH	1	96 hrs	77/0	77/0	77/0			
X-RAY		Topside Only	5/0	5/0	5/0			
Lead Fatigue		-	22/0	22/0	22/0			
High Temp Storage Bake 170C	1	420 hrs	77/0	77/0	77/0			
Moisture Sensitivity, L1		MSL 1/ 260C	12/0	12/0	12/0			
Steady-State Life Test, 150C	1	300 hrs	77/0	77/0	77/0			
Temperature Cycle, -65/150C	1	500 cycles	77/0	77/0	77/0			
Solderability		post 8 Hrs/Strm Age	22/0	22/0	22/0			
Salt Atmosphere		-	22/0	22/0	22/0			
Manufacturability		(Approved by A-T Site)				Pass	Pass	Pass
Physical Dimensions		Per Pkg Dwg	5/0	5/0	5/0			
Visual / Mechanical		(Approved by A-T Site)				Pass	Pass	Pass
Lead Finish Adhesion		-	15/0	15/0	15/0			
Flammability (UL-1694)		UL-1694	5/0	5/0	5/0			
Thermal Shock -65/150C	1	500 cycles	77/0	77/0	77/0			
Biased HAST, 130C/85%RH	1	96 hrs	77/0	77/0	77/0			
Flammability (UL 94V-0)		UL 94V-0	5/0	5/0	5/0			

ULN2003APWR (16 Pin TSSOP)			Assembly Lot #'s					
Test Type	Prec	Condition/Duration	1275	1276	1277	TIS019N0D6	TIS019N0D7	TIS019N0D8
Bond Strength		76 ball bonds, min. 3 units				80/0	80/0	80/0
Die Shear		-				15/0	15/0	15/0
X-RAY		Topside Only	5/0	5/0	5/0			
Manufacturability		(Approved by A-T Site)				Pass	Pass	Pass
Physical Dimensions		Per Pkg Dwg	5/0	5/0	5/0			
Visual / Mechanical		(Approved by A-T Site)				Pass	Pass	Pass

LM324APWR (14 Pin TSSOP)			Assembly Lot #'s					
Test Type	Prec	Condition/Duration	1281	1282	1283	TIS019N0E2	TIS019N0E3	TIS019N0E4
Bond Strength		76 ball bonds, min. 3 units				80/0	80/0	80/0
Die Shear		-				15/0	15/0	15/0
X-RAY		Topside Only	5/0	5/0	5/0			
Manufacturability		(Approved by A-T Site)				Pass	Pass	Pass
Physical Dimensions		Per Pkg Dwg	5/0	5/0	5/0			
Visual / Mechanical		(Approved by A-T Site)				Pass	Pass	Pass

SOIC Matte Tin Qualification Data

TEST TYPE	HRCY	ULN2003AD Group A 16 pin SOIC	ULN2003AD Group B 16 pin SOIC	ULN2003AD Grp_C 16 pin SOIC
SSLT 150C	168	77/0	77/0	77/0
SSLT 150C	300	77/0	77/0	77/0
HAST 130/85	96	77/0	77/0	77/0
Autoclave 121C	96	77/0	77/0	77/0
Temp Cycle -65/150	500	77/0	77/0	77/0
Temp Cycle -65/150	1000	77/0	77/0	77/0
Thermal Shock -65/150	500	77/0	77/0	77/0
Thermal Shock -65/150	1000	77/0	77/0	77/0
Bake 150C	500	77/0	77/0	77/0
Bake 150C	1000	77/0	77/0	77/0
Solderability	8 Hrs	22/0	22/0	22/0
Lead Fin Adh	N/A	15/0	15/0	15/0
Lead Pull	0 Hr	22/0	22/0	22/0
Lead Fatigue	N/A	22/0	22/0	22/0
Flamm (UL 94V-0)	N/A	5/0	5/0	5/0
Flammability (UL-1694)	0 Hr	5/0	5/0	5/0
Flamm (IEC 695-2-2)	N/A	5/0	5/0	5/0
X-RAY	N/A	5/0	5/0	5/0
Salt Atmos	N/A	22/0	22/0	22/0
Manufacturability		Pass	Pass	Pass
Visual Mechanical		Pass	Pass	Pass
Moist Sens. L1 260 C	Test-1	Pass	Pass	Pass

TEST TYPE	HRCY	LM358ADR x3Lots 8pin SOIC	SN74HC04DR x3 Lots 14 pin SOIC	ULN2003AD x3Lots 16 pin SOIC
SSLT 150C	168			77/0
SSLT 150C	300			77/0
HAST 130/85	96			77/0
Autoclave 121C	96			77/0
Temp Cycle -65/150	500		77/0	77/0
Temp Cycle -65/150	1000		77/0	77/0
Thermal Shock -65/150	500			77/0
Thermal Shock -65/150	1000			77/0
Bake 150C	500		77/0	77/0
Bake 150C	1000		77/0	77/0
Solderability	8 Hrs			22/0
Lead Fin Adh	N/A			15/0
Lead Pull	0 Hr			22/0
Lead Fatigue	N/A			22/0
Flamm (UL 94V-0)	N/A			5/0
Flammability (UL-1694)	0 Hr			5/0
Flamm (IEC 695-2-2)	N/A			5/0
X-RAY	N/A	5/0	5/0	5/0
Salt Atmos	N/A			22/0
Manufacturability		Pass	Pass	Pass
Visual Mechanical		Pass	Pass	Pass
Moist Sens. L1 260 C	Test-1	QBS	QBS	Pass