



PRODUCT INFORMATION LETTER

PIL CRP/13/8135
Dated 04 Oct 2013

D2PAK Leads (Pins) Modification

Sales Type/product family label	See attached
Type of change	Product design change
Reason for change	The purpose of this change is to eradicate tin burr risks.
Description	This change concerns a modification of lead design of D2PAK packages at ST Shenzhen Back-End plant.
Forecasted date of implementation	31-Oct-2013
Forecasted date of samples for customer	27-Sep-2013
Forecasted date for STMicroelectronics change Qualification Plan results availability	27-Sep-2013
Involved ST facilities	ST Shenzhen Back-End plant

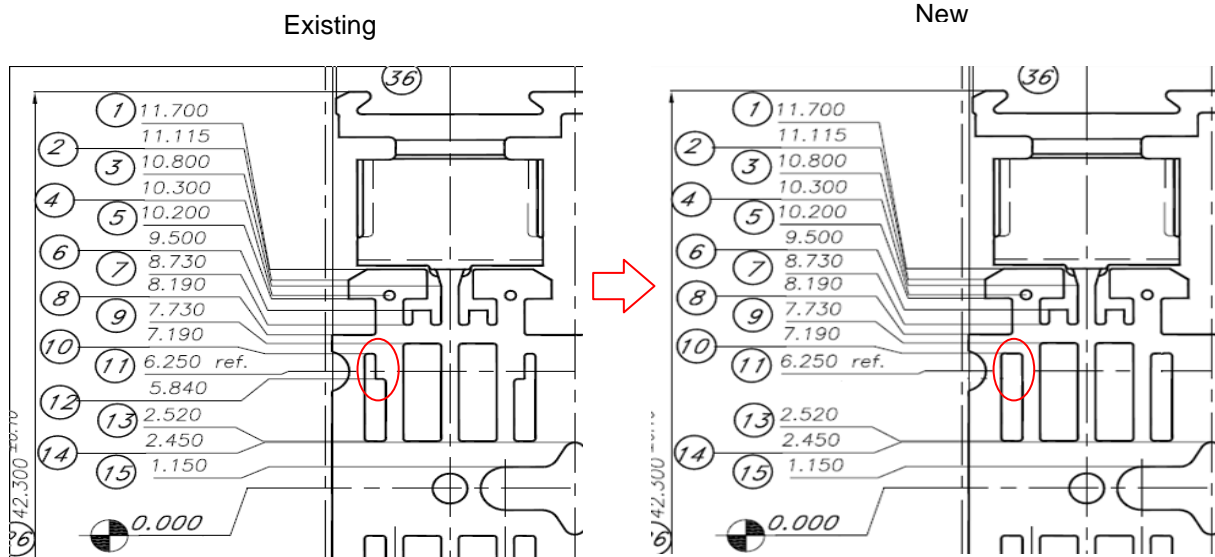
DOCUMENT APPROVAL

Name	Function
Livache, Veronique	Corporate Quality Manager
Low, Patrick	Process Owner

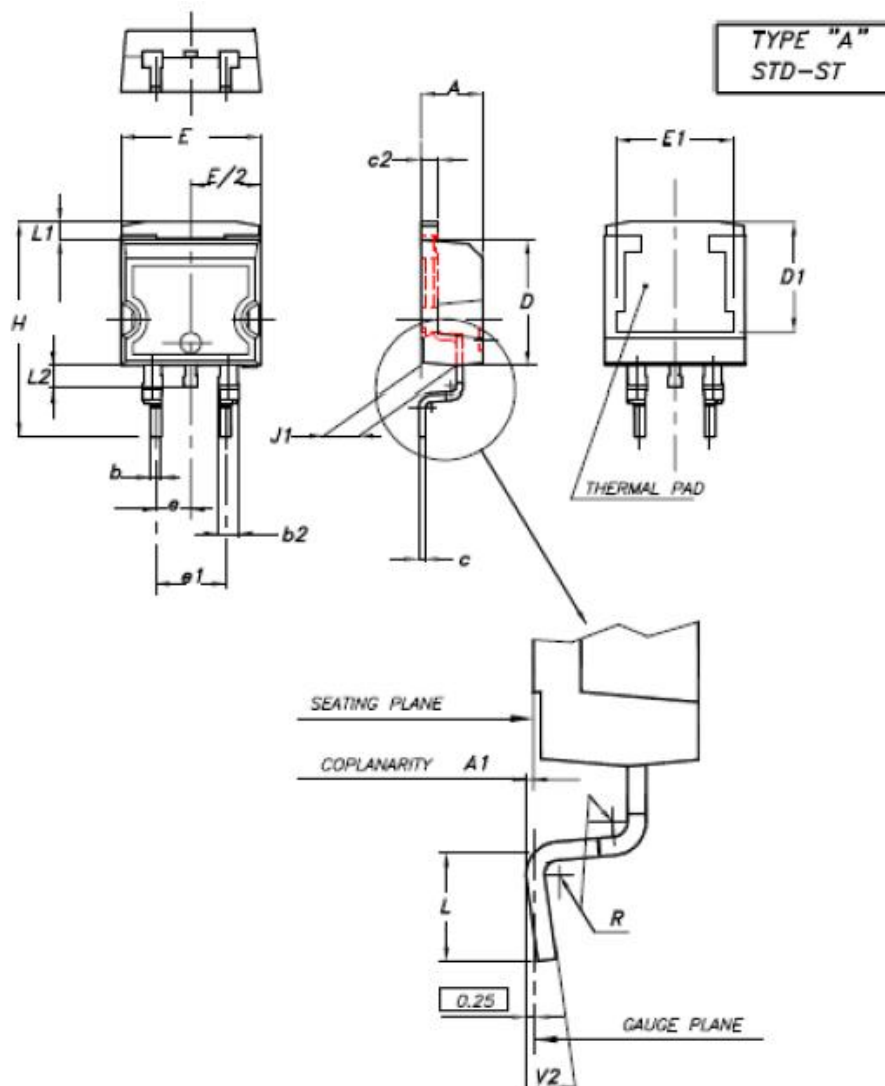
SHENZHEN –D2PAK Lead (Pins) Modification

WHAT:

This change concerns a modification of lead design of D2PAK packages at ST Shenzhen Back-End plant, without changing materials, people, method, facilities, process flow, and controls. Below is the comparison between new frame design and existing one.

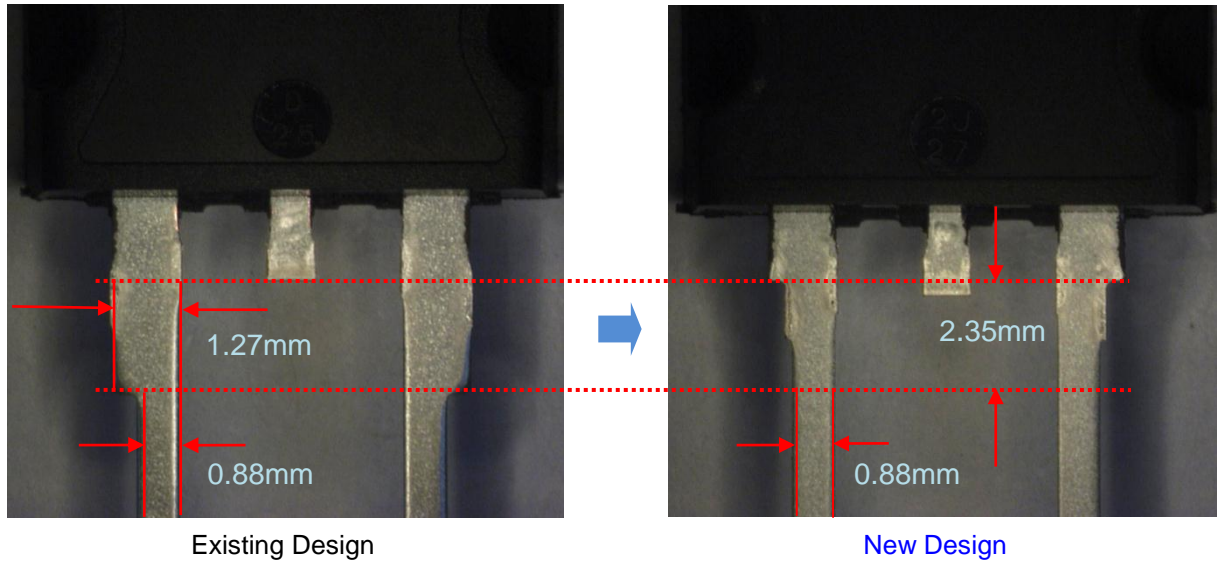


POA is not affected. Dimensions concerned by the proposed change are not specified in the POA

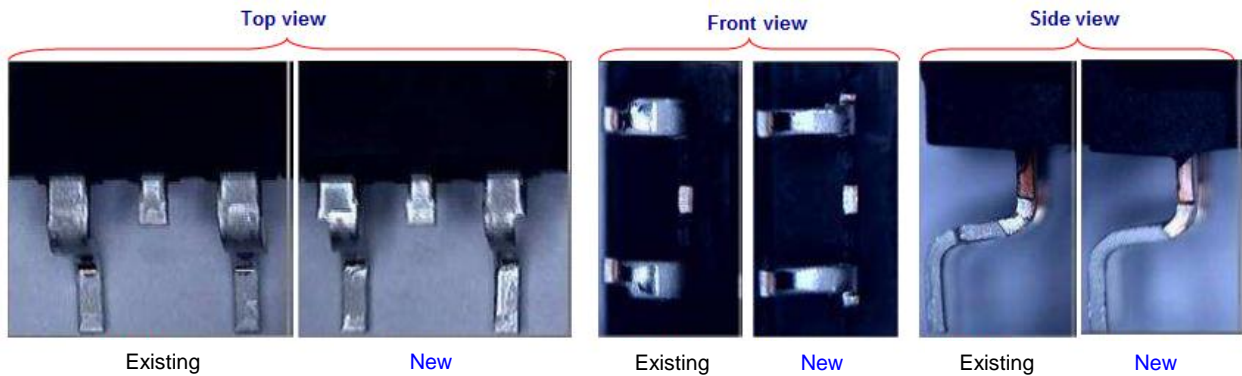


Visual aids to illustrate the change:

Units after dam bar cutting, before forming



Units after forming

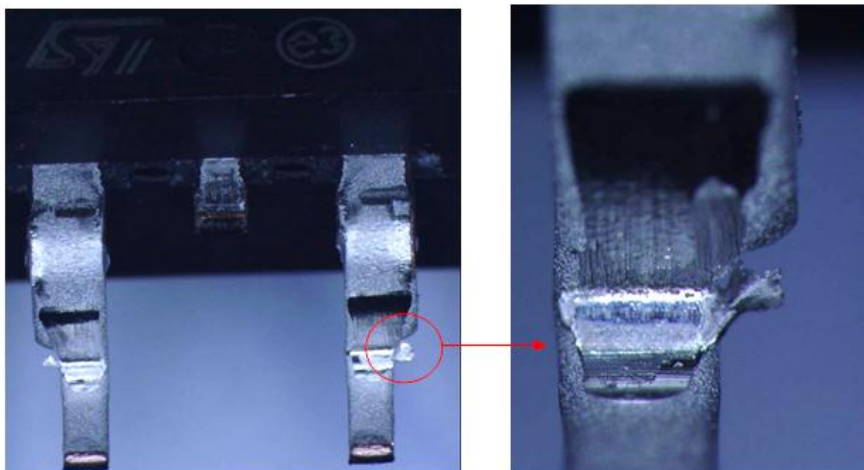


WHY:

The purpose of this change is to eradicate tin burr risks.

Few tin burrs were observed on pin1 and pin3 on 3 units occasionally, due to actual lead frame design (see below pictures).

New lead frame design will prevent this risk. It is already implemented on the devices STB85NF55T4\$Z & STB85NF55T4\$Z1 since 2011, so far burrs problems are removed.



WHEN:

Proposed plan:

- | | |
|---|--|
| • Phase 1 – Preparation, Risk assessment | Done (see Appendix 1) |
| • Phase 2 – Workability and Qualification | Done (see Appendix 2) |
| • Phase 3 – Lead frame Conversion | Schedule depend on Customer feedback & Supplier Existing Stock |

HOW:

This Lead (Pins) modification is following a **working plan**, divided in 3 major phases detailed below.

Phase 1 – Preparation and risk assessment

- Risk assessment (See appendix 1)

Phase 2 – Qualification Execute

- Qualification & Workability validation (see Qualification result in appendix 2)

Phase 3 – Lead Frame Conversion

- To start production with new lead frame design, under following conditions:
 - Ramp up with re-enforced control plan linked to identified risk
(See Appendix 1 - risk assessment)

IMPACT OF THE CHANGE:

No impacts on **Fit, Function** of the parts with new lead frame design.

Appendix 1: Risk Assessment

#	Risks identified	Potential risk resulting from	Class	Considered Action
Process & Quality	Lead pitch too big	Forming force is not balanced	Medium	To modify the punching tool to shorten the lead protrusion. Specific control to put in place during ramp up phase
	Burr/metal filter/ flash on lead	Cutting tool worn-out and frame residue damage leads or stick on leads.	Low	
	Chip package	Jam between Turntable and track	Low	
	Delamination	Punch dimension is out of spec	Low	
	Incomplete cropping	Cutting tool worn-out	Low	
	Scratch on slug	Resin residue or broken lead in track	Low	
	Shift cutting	Mis-pitch in track	Low	
	Mechanical failures	At forming neck, mechanical stress can degrade the rigidity and performances of the leads	Low	Only cosmetic changes, no impact on product, which has already been verified by experience on other device
Supply Chain	Tin burr issue re-occurrence	Part numbers forgotten during the change and still assembled with same old design lead frame	Medium	Reviewed all D2PAK frame part numbers
	Delivery issue, parts delinquency, customer line down	Not enough lead frame in stock to satisfy the delivery plans	Low	As per division plans, order sufficient lead frames in advance to prepare the WIP

Workability validation: all results are within spec.

1. Burr visual result of 1st batch 6k sample

Group name	Sample size	Lead burr	Failure rate
Dummy group1 (New design)	3000	0	0%
Dummy group2 (New design)	3000	0	0%

* From the result, zero burr was found on the 6k new designed lead frame

2. POA measurement result of these 2 group new design samples in Smart scope

			Lead standoff	Lead width	Lead pitch
Dummy1 (New design)	Sample size	Average	0.15	0.83	5.14
	30pcs	3S	0.015	0.014	0.014
		CPK	5.69	7.1	9.79
Dummy2 (New design)	Sample size	Average	0.14	0.84	5.14
	30pcs	3S	0.015	0.023	0.03
		CPK	5.6	4.06	4.54

3. Burr visual result of 2nd batch 15k samples

Group name	Sample size	Lead burr	Failure rate
Dummy group1 (New design)	5000	0	0%
Dummy group2 (New design)	5000	0	0%
Dummy group3 (New design)	5000	0	0%

4. POA measurement result of these 3 group samples in Smart scope

			Lead standoff	Lead width	Lead pitch
Dummy1 (New design)	sample size	AVG	0.14	0.81	5.15
	30 pcs	3S	0.015	0.017	0.015
		CPK	6.28	6.74	8.81
Dummy2 (New design)	sample size	AVG	0.14	0.81	5.15
	30 pcs	3S	0.015	0.016	0.017
		CPK	5.87	6.98	7.58
Dummy3 (New design)	sample size	AVG	0.13	0.81	5.15
	30 pcs	3S	0.015	0.017	0.014
		CPK	6.55	6.27	9.26

15K dummy units were performed inspection on vision machine focused on ST,WI,PI, zero defect was found.

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