



PRODUCT CHANGE NOTIFICATION

PCN-000931

Date: OCT-20-2023

Change Details							
Part Number(s) Affected: LCDA12C-1.TCT LCDA24C-1.TCT LCDA15C-1.TCT SR2.8.TCT SR3.3.TCT SLVE2.8.TCT SLVG2.8.TCT		Customer Part Number(s) Affected: <input checked="" type="checkbox"/> N/A					
Description, Purpose and Effect of Change: Alternative lead frame qualification for SOT143 in Cirtek. This change is necessary for continued supply of the above listed Semtech Part Numbers currently built at Cirtek. Detail: Semtech has qualified Ning-Bo from China as a new SOT143 lead frame supplier. POR lead frame supplier is PSMC from Korea has discontinued supply. There is no change on package form, fit, function, reliability or MSL 1 rating.. <table border="1" data-bbox="300 1360 1349 1444"><thead><tr><th>POR Lead Frame</th><th>New Lead Frame</th></tr></thead><tbody><tr><td>PSMC, Alloy42 lead frame</td><td>Ning-Bo, C194 CU lead frame</td></tr></tbody></table> The equipment models, process flow, and BOM remain unchanged. There was no change in test locations.				POR Lead Frame	New Lead Frame	PSMC, Alloy42 lead frame	Ning-Bo, C194 CU lead frame
POR Lead Frame	New Lead Frame						
PSMC, Alloy42 lead frame	Ning-Bo, C194 CU lead frame						
Change Classification	<input checked="" type="checkbox"/> Major <input type="checkbox"/> Minor	Impact to Form, Fit, Function	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Impact to Data Sheet	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	New Revision or Date	<input checked="" type="checkbox"/> N/A				
Impact to Performance, Characteristics or Reliability: <ul style="list-style-type: none">There is no impact to form, fit, function, performance, characteristics, or reliability of package.There is no change in process and process equipment for the package.							



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Implementation Date	JAN-20-2024	Work Week	TBA
Last Time Ship (LTS) <small>Of unchanged product</small>	N/A	Affecting Lot No. / Serial No. (SN)	N/A
Sample Availability	Available upon request	Qualification Report Availability	May-30-2023
Supporting Documents for Change Validation/Attachments: <ul style="list-style-type: none">• PCN-000931 From To Analysis – Qualify Ning-Bo Lead frame in Cirtek as PSMC is End of Life (EOL).			



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To Qualify SOT143 Ning-Bo Lead frame (China) due to current source PSMC (Korea) has end of life its lead frame in Cirtek.

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Introduction



- ❑ Cirtek received the notification from their Current SOT143 lead frame supplier PSMC (Korea) that they have stop their business on manufacturing. As such, Cirtek have to qualify alternative source of SOT143 lead frame from Ning-Bo (China) which is been qualified by Cirtek.
- ❑ There is no change in Form, Fit and functions and package outlines.
- ❑ The change affect applicable to products:
 - a.) Lead frame part # ST04NG2106 – LCDA12C-1.TCT, LCDA24C-1.TCT, LCDA15C-1.TCT
 - b.) Lead frame part # ST04NG2104 – SR2.8.TCT, SR3.3.TCT, SLVE2.8.TCT and SLVG2.8.TCT
- ❑ Qualification Vehicles :
REL Job under PRODDOC029425 – Passed with MSL 1 on 30th May 2023.
- ❑ Schedule for Implementation
12th Dec 2023

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Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) with Assembly BOM – LDF #1 & #2



BOM	Material Comparison		Remarks
	PSMC (OLD - LDF#1) ST04IG2103	Ning-Bo (New - LDF#1) ST04NG2106	
Lead frame	Alloy42	A194 AgCu	Difference
Epoxy	84-1 LMIS R4	84-1 LMIS R4	Same
Wire	Au Wire 1.3mils	Au Wire 1.3mils	Same
Mold Compound	EME-G600	EME-G600	Same
Plating	100% Matte Tin Plating	100% Matte Tin Plating	Same

BOM	Material Comparison		Remarks
	PSMC (OLD - LDF#2) ST04NH2102	Ning-Bo (New - LDF#2) ST04NG2104	
Lead frame	Alloy42	A194 AgCu	Difference
Epoxy	84-1 LMIS R4	84-1 LMIS R4	Same
Wire	Au Wire 1.3mils	Au Wire 1.3mils	Same
Mold Compound	EME-G600	EME-G600	Same
Plating	100% Matte Tin Plating	100% Matte Tin Plating	Same


- There is no change in assembly BOM material except lead frame.
- New Lead frame material A194 AgCu is proven mass production material in Cirtek which is more than 10 years. Thus, it is low risk to use this material.

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Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) with MSDS and RoHs Report – LDF #1



	ST04IG2103 PSMC (Old)	ST04NG2106 Ning-Bo (New)	Remarks
Material	Alloy42	<u>AgCu</u>	Different
Lead frame Outlook			Same
MSDS	 MSDS for leadframe PSMC A4	 MSDS Ning Bo C194	
ICP Test Report	 ICP report for PSMC Alloy42	 SGS report for NingBo LDF	

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Date: OCT-20-2023

Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) with MSDS and RoHs Report - LDF#2



	ST04NH2102 PSMC (Old)	ST04NG2104 Ning-Bo (New)	Remarks
Material	Alloy42	<u>AgCu</u>	Different
Lead frame Outlook			Same
MSDS	 MSDS for sadframe PSMC A4	 MSDS Ning Bo C194	
ICP Test Report	 ICP report for PSMC Alloy42	 SGS report for NingBo LDF	

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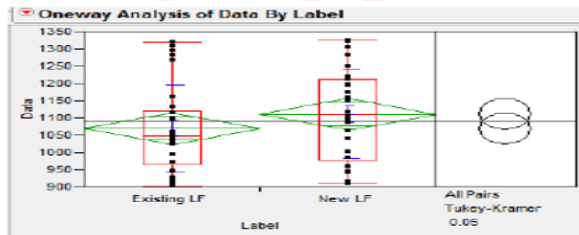
Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) in Die shear strength - LDF#1



Die attach photo on old LF



Die attach photo on new LF



Results:

- Both PSMC (Old) and Ning-Bo (New) Lead frame are meeting die shear minimum spec requirement of 320g.
- No significant difference in term of die shear strength for both PSMC (Old) and Ning-Bo (New).

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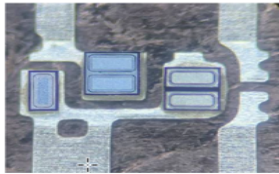
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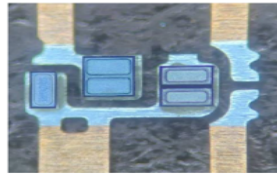
PCN-000931

Date: OCT-20-2023

Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) in Die shear strength – LDF #2

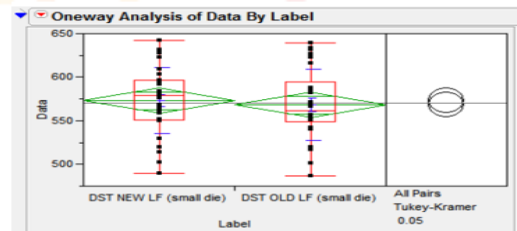


Die attach photo on old leadframe

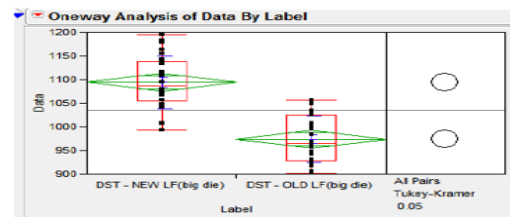


Die attach photo on new leadframe

Die Shear test for Small die



Die Shear test for Big die



Results:

- Both PSMC (Old) and Ning-Bo (New) Lead frame are meeting die shear minimum spec requirement of 320g.
- No significant difference for smaller die in term of die shear strength.
- Ning-Bo (New) is having higher die shear force comparing to PSMC (old) lead frame.

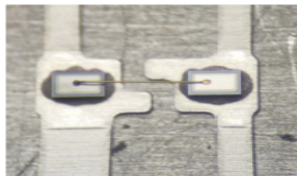
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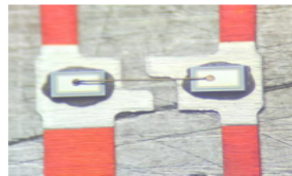
Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) in Wire Pull Strength – LDF #1



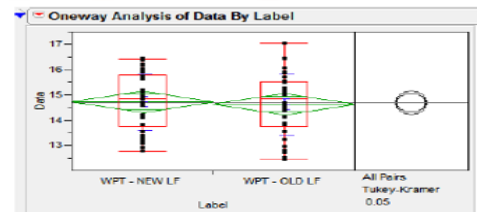
Wire Pull test



WB photo on old leadframe



WB photo on new leadframe



Results:

- Both PSMC (Old) and Ning-Bo (New) Lead frame are passing wire pull test.
- No significant difference for wire pull test for both PSMC (Old) and Ning-Bo (New)

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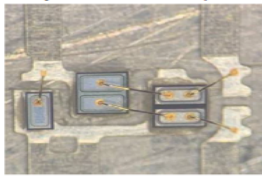
PCN-000931

Date: OCT-20-2023

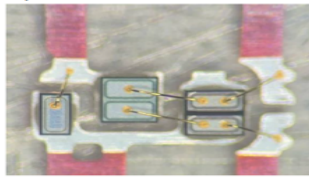
Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) in Wire Pull Strength – LDF #2



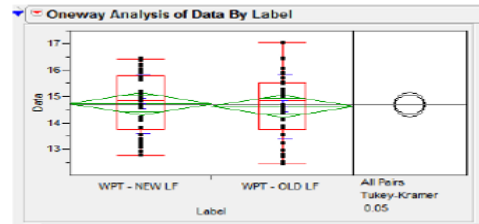
Wire Pull test



WB photo on old leadframe



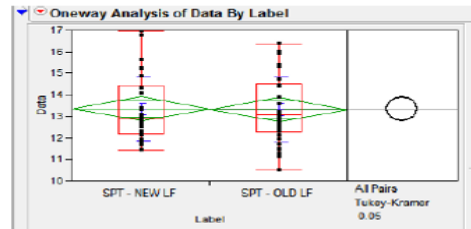
WB photo on new leadframe



Results:

- Both PSMC (Old) and Ning-Bo (New) Lead frame are passing wire pull test.
- No significant difference for wire pull test for both PSMC (Old) and Ning-Bo (New)

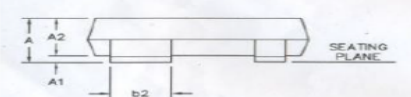
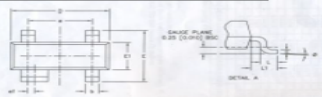
Stitch Pull test



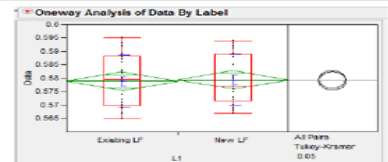
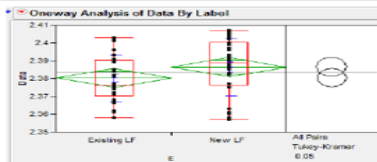
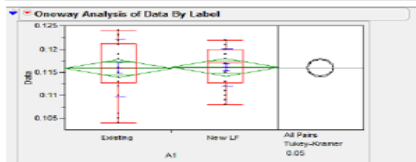
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Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) on POD – LDF #1



	POD (in mm)												
	A	A1	A2	b	b2	c	D	E1	E	L	L1		
PSMC, (Old) Existing SOT-43, Alloy LF SS: 30 readings	Min	1.059	0.104	0.945	0.404	0.797	0.110	2.842	1.240	2.358	0.420	0.565	
	Max	1.077	0.124	0.966	0.419	0.808	0.117	2.854	1.257	2.403	0.428	0.595	
	Average	1.068	0.116	0.956	0.410	0.802	0.113	2.848	1.248	2.380	0.424	0.579	
	Stdev	0.0055	0.0062	0.0066	0.0046	0.0034	0.0025	0.0036	0.0052	0.0131	0.0026	0.0097	
	Specs	0.97 –	0.05 –	0.89 –	0.36 –	0.76 –	0.08 –	2.79 –	1.22 –	2.11 –	0.41 –	0.53 –	
		1.12	0.15	0.99	0.46	0.84	0.20	3.87	1.32	2.64	0.48	0.64	
	Cpk	3.1722	1.6276	1.7400	3.6439	3.6933	4.5076	0.652	1.8090	6.5042	1.7682	1.6678	
Remarks	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed		
Ning-Bo, (New) New SOT-43, C194-H, LF SS: 30 readings	Min	1.056	0.108	0.944	0.402	0.798	0.110	2.844	1.240	2.357	0.420	0.567	
	Max	1.076	0.123	0.965	0.418	0.805	0.117	2.851	1.255	2.407	0.428	0.594	
	Average	1.067	0.116	0.956	0.409	0.802	0.113	2.847	1.249	2.387	0.424	0.579	
	Stdev	0.0056	0.0041	0.0054	0.0048	0.0022	0.0023	0.0021	0.0037	0.0161	0.0026	0.0095	
	Specs	0.97 –	0.05 –	0.89 –	0.36 –	0.76 –	0.08 –	2.79 –	1.22 –	2.11 –	0.41 –	0.53 –	
		1.12	0.15	0.99	0.46	0.84	0.20	3.87	1.32	2.64	0.48	0.64	
	Cpk	3.1724	2.7634	2.1086	3.3697	5.929	4.8428	3.6982	2.5760	5.2511	1.8229	1.7398	
Remarks	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed		



No Difference on dimensions between PSMC (Old) and Ning-Bo (New)

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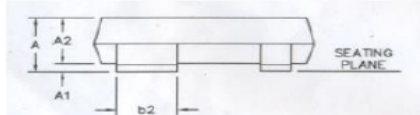
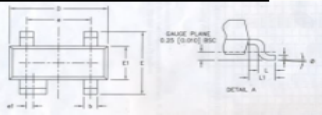
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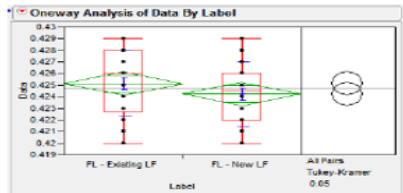
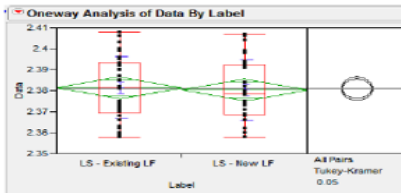
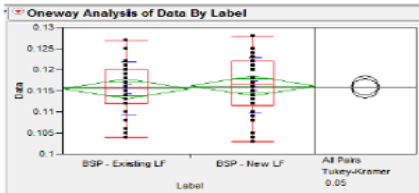
Date: OCT-20-2023

Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) on POD – LDF #2



Existing SOT-143, Alloy42, LF SS: 30 readings	POD (in mm)	A	A1	A2	b	b2	c	D	E1	E	L	L1
Min	1.058	0.104	0.946	0.402	0.795	0.109	2.846	1.238	2.358	0.420	0.562	
Max	1.079	0.127	0.964	0.419	0.808	0.118	2.852	1.256	2.408	0.429	0.596	
Average	1.0691	0.1155	0.9536	0.4111	0.8010	0.1132	2.8491	1.2482	2.3814	0.4251	0.5809	
Stdev	0.0057	0.0063	0.0047	0.0057	0.0036	0.0030	0.0022	0.0054	0.0149	0.0028	0.0098	
Specs	0.97 –	0.05 –	0.89 –	0.36 –	0.76 –	0.08 –	2.79 –	1.22 –	2.11 –	0.41 –	0.53 –	
	1.12	0.15	0.99	0.46	0.84	0.20	2.87	1.32	2.64	0.48	0.64	
Cpk	2.976	1.835	2.563	2.865	3.620	3.733	3.141	1.753	5.782	1.786	1.727	
Remarks	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	

New SOT-143, C194-H, LF SS: 30 readings	POD (in mm)	A	A1	A2	b	b2	c	D	E1	E	L	L1
Min	1.056	0.103	0.958	0.4	0.792	0.106	2.846	1.24	2.358	0.420	0.564	
Max	1.077	0.128	0.984	0.419	0.806	0.118	2.852	1.257	2.407	0.429	0.596	
Average	1.0689	0.1162	0.9527	0.4092	0.8002	0.1135	2.8497	1.2466	2.3804	0.4242	0.5813	
Stdev	0.0059	0.0066	0.0073	0.0063	0.0049	0.0029	0.0020	0.0050	0.0143	0.0028	0.0097	
Specs	0.97 –	0.05 –	0.89 –	0.36 –	0.76 –	0.08 –	2.79 –	1.22 –	2.11 –	0.41 –	0.53 –	
	1.12	0.15	0.99	0.46	0.84	0.20	2.87	1.32	2.64	0.48	0.64	
Cpk	2.872	1.709	1.714	2.607	2.719	3.788	3.351	1.759	6.053	1.702	1.767	
Remarks	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	Passed	



No Difference on dimensions between PSMC (Old) and Ning-Bo (New)

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Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) on Solderability Test – LDF #1



Solderability Test	Existing SOT-143, Alloy42, LF		New SOT-143, C-194-H, LF	
	Top	Bottom	Top	Bottom
0 hour SS: 7 units				
After 8 hours steam aging SS: 7 units				
Remarks	PASSED	PASSED	PASSED	PASSED

**Solderability Test is passed for both Lead frame supplier – PSMC and Ning-Bo.
No Difference on Solderability test between PSMC (Old) and Ning-Bo (New)**

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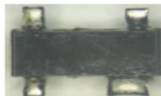


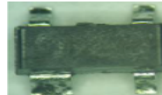
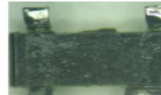


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PCN-000931

Date: OCT-20-2023

Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) on Solderability Test – LDF #2



Solderability Test	Existing SOT-143, Alloy42, LF		New SOT-143, C-194-H, LF	
	Top	Bottom	Top	Bottom
0 hour SS: 7 units				
After 8 hours steam aging SS: 7 units				
Remarks	PASSED	PASSED	PASSED	PASSED

**Solderability Test is passed for both Lead frame supplier – PSMC and Ning-Bo.
No Difference on Solderability test between PSMC (Old) and Ning-Bo (New)**

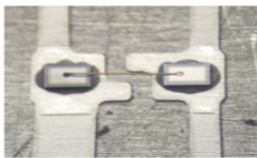
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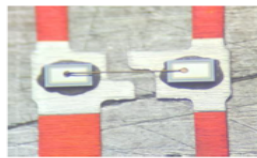
Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) on Process outlook – LDF #1



1. Wire Bond Outlook - PSMC (Old) Vs Ning-Bo (New)

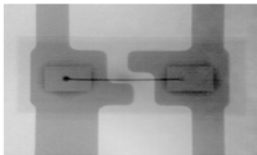


WB photo on old leadframe

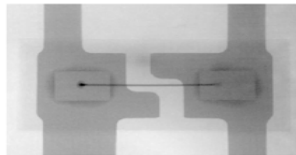


WB photo on new leadframe

2. X-Ray Outlook - PSMC (Old) Vs Ning-Bo (New)



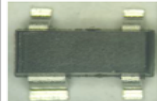
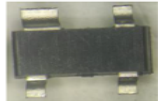


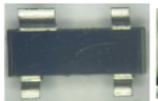
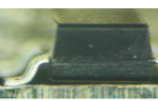
X-ray inspection of old LF



X-ray inspection of new LF

No Difference on Outlook between PSMC (Old) and Ning-Bo (New)

3. Top, Bottom and Side View Outlook - PSMC (Old) Vs Ning-Bo (New)

Existing SOT-143, Alloy42, LF (bottom & top)			New SOT-143, C194-H, LF (top & bottom)		
					

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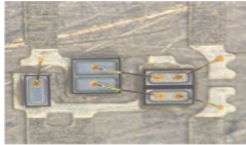
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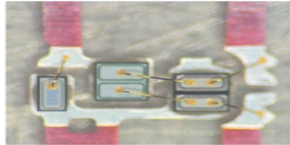
Lead frame Comparison PSMC (Old) Vs Ning-Bo (New) on Process outlook – LDF #2



1. Wire Bond Outlook - PSMC (Old) Vs Ning-Bo (New)

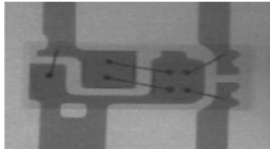


WB photo on old leadframe

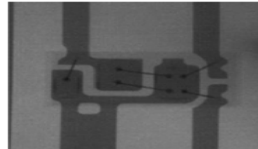


WB photo on new leadframe

2. X-Ray Outlook - PSMC (Old) Vs Ning-Bo (New)



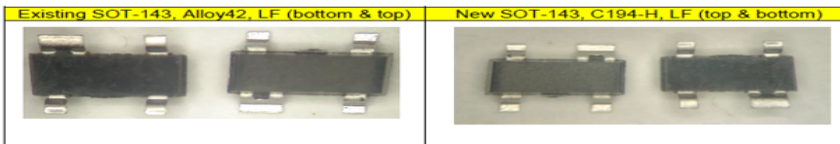
X-ray inspection of old leadframe samples



X-ray inspection of new leadframe samples

No Difference on Outlook between PSMC (Old) and Ning-Bo (New)

3. Top and Bottom View Outlook - PSMC (Old) Vs Ning-Bo (New)



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Lead frame REL for PSMC (Old) Vs Ning-Bo (New) for both Lead frame part # 1 & 2



Lead frame Part #	REL Item	Conditions	Results	
PSMC (OLD - LDF#1) ST04IG2103	Post Assembly CSAM		Passed	
	Post Pre-Conditioning MSL1 CSAM	85DegC/ 85RH, 168 hours, 3X IR @260 DegC	Passed	
	AutoClave / PCT	121 DegC, 15psig, 100%RH, 96 hours	Passed	
	Temperature Cycles	-65DegC / +150DegC, 500 cycles	Passed	
Ning-Bo (New - LDF#1) ST04NG2106	Post Assembly CSAM		Passed	
	Post Pre-Conditioning MSL1 CSAM	85DegC/ 85RH, 168 hours, 3X IR @260 DegC	Passed	
	AutoClave / PCT	121 DegC, 15psig, 100%RH, 96 hours	Passed	
	Temperature Cycles	-65DegC / +150DegC, 500 cycles	Passed	
Lead frame Part #	REL Item	Conditions	Results	
	PSMC (OLD - LDF#2) ST04NH2102	Post Assembly CSAM		Passed
		Post Pre-Conditioning MSL1 CSAM	85DegC/ 85RH, 168 hours, 3X IR @260 DegC	Passed
		AutoClave / PCT	121 DegC, 15psig, 100%RH, 96 hours	Passed
Temperature Cycles		-65DegC / +150DegC, 500 cycles	Passed	
Ning-Bo (New - LDF#2) ST04NG2104	Post Assembly CSAM		Passed	
	Post Pre-Conditioning MSL1 CSAM	85DegC/ 85RH, 168 hours, 3X IR @260 DegC	Passed	
	AutoClave / PCT	121 DegC, 15psig, 100%RH, 96 hours	Passed	
	Temperature Cycles	-65DegC / +150DegC, 500 cycles	Passed	

All the reliability assessment on the new Ning-Bo material were passed without failures.

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PRODUCT CHANGE NOTIFICATION

PCN-000931

Date: OCT-20-2023

Quality Assurance	
Semtech Business Unit	APS Business Unit
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FOR FURTHER INFORMATION & WORLDWIDE SALES COVERAGE: http://www.semtech.com/contact/index.html#support	