Taiwan Semiconductor Co. Ltd.
11Fl., No. 205, Sec. 3, Beishin Rd.
Xindian Dist., New Taipei City 231
Taiwan, R.O.C.
Tel.:+886 2 8913 1588
Fax: +886 2 8913 1788
www.taiwansemi.com

Process Change Notification

This is to inform you that a design and/or process change will be implemented to the affected product(s) and this notification is for your information and concurrence. This change is planned to take effect in 90 calendar days from the date of this notification.

Please work with your local Taiwan Semiconductor Sales Representative to manage your inventory of unchanged product if your evaluation of this change will require more than 90 calendar days.

Please contact your local Taiwan Semiconductor Field Quality Service or Customer Quality Engineer within 45 days of receipt of this notification if you require any additional data or samples.

PCN No: PCN23004 rev0
Title: SOD-123 Package Alternate LF Material (Cu Leadframe)
Issue Date: 2023/3/22

If you have any questions concerning this change, please contact:

PCN Coordinator
Name : Delia Chang
E-Mail : delia.chang@mail.ts.com.tw
Phone : +886-3-928-5117 Ext. 315

PCN Originator
Name : Melinda Luo
E-Mail: Melinda_luo@mail.tew.com.cn
Phone: 0086-22-59816699 Ext : 2032

Reliability Engineer
Name : Aiping Zhang
E-Mail: aiping@mail.tew.com.cn
Phone: 0086-22-59816699 Ext : 2034

PCN Type:
Alternate LF Material (Cu Leadframe)

Effectivity:
Expected 1st device shipment date: 2023/6/20

Product Category (Description):
Affected parts assembled in SOD-123 package supplied by Taiwan Semiconductor Co. Ltd.

Description of Change:
Taiwan Semiconductor Company supplier (Vendor code: 3876, N) qualified Cu Alloy Leadframe as an alternate LF material to ensure the production supply and delivery requirement. In addition, it would also enhance the assembly manufacturability and product sustainability.

Item	Current	Alternative
Lead frame material	Fe-Ni alloy	Cu alloy

Qualification and Reliability Result:

1. Electrical test comparison

PN: BAT42W (SKY)	ITEM	VR	IR	VF1	VF2	VF3
	TEST Condition	IR=10uA	VR=25V	IF=10mA	IF=50mA	IF=200mA
	SPEC.	＞30 V	＜0.5uA	＜0.4V	＜0.65V	＜1V
Current	MIN	48.72	0.23	0.32	0.40	0.56
	MAX	50.84	0.39	0.32	0.41	0.59
	AVG.	50.58	0.32	0.32	0.41	0.58
	CPK	20.76	1.41	46.63	50.04	22.52
Additional	MIN	47.41	0.23	0.33	0.40	0.56
	MAX	57.89	0.27	0.33	0.41	0.60
	AVG.	54.67	0.24	0.33	0.41	0.59
	CPK	4.15	10.42	30.32	34.80	16.63

PN: BZT52B30-G (ZENER)	ITEM	VZ	IR	VF	ZZT	ZZK
	TEST Condition	IZT=2mA	VR=21V	IF=10mA	IZT=2mA	IZK=0.5mA
	SPEC.	29.4~30.6V	＜100nA	＜0.9V	＜80Ω	＜300Ω
Current	MIN	29.739	0.100	3.750	1.000	0.797
	MAX	30.060	7.900	64.750	74.000	0.802
	AVG.	29.866	0.862	5.815	9.420	0.801
	CPK	2.430	29.370	2.933	9.888	46.485
Additional	MIN	29.720	0.100	3.250	1.000	0.800
	MAX	30.050	11.200	5.500	35.000	0.801
	AVG.	29.865	1.238	4.455	9.480	0.801
	CPK	2.151	16.568	52.032	19.106	115.461

PN: 1N4148W-G(SWCH)	ITEM	VR	IR1	IR2	VF1	VF2	VF3	VF4
	TEST Condition	IR=100uA	VR=75V	VR=20V	IF=1mA	IF=10mA	IF=50mA	IF=150mA
	SPEC.	＞100V	＜2500nA	＜25nA	＜0.715V	＜0.885V	＜1V	＜1.25V
Current	MIN	149.89	21.00	13.45	0.581	0.713	0.837	0.998
	MAX	166.78	23.20	16.48	0.583	0.718	0.844	1.012
	AVG.	157.56	21.88	14.48	0.582	0.715	0.840	1.006
	CPK	3.47	1532.56	6.21	65.54	56.011	41.011	31.635
Additional	MIN	146.39	20.30	13.35	0.581	0.712	0.837	0.996
	MAX	166.11	22.60	15.76	0.584	0.717	0.844	1.013
	AVG.	155.98	21.66	14.45	0.582	0.715	0.840	1.006
	CPK	3.251	1994.81	6.66	64.11	51.076	37.894	31.271

Conclusion: The additional lead frame did not affect the electrical performance of the product.

2. Device/Package Qualification

NO.	Test	Test Conditions	No. of Lots	Sample Size	Result
1	Pre-conditioning	J-STD-020 MSL-1 (3x reflow at 260°C)	3	3*308	Passed
2	Temperature Cycling	JESD22-A104 -55(-10/+0)°C/15min to 150(+15/-0) °C/15min, 1000cycles	3	3*77	Passed
3	Highly Accelerated Stress Test	JESD22-A110 130°C/85% RH; V=80% VR; 42V max, 96hrs	3	3*77	Passed
4	Intermittent Operating Life	MIL-STD-750 Ta=25°C; ΔTj=100°C; 2.0 min on/off,7500cycles	3	3*77	Passed
5	Unbiased Highly Accelerated Stress Test	JESD22-A118 Ta=130°C, 85%RH, 96hrs	3	3*77	Passed
6	Resistance to solder heat	JESD22-A111 SMD (Pb free): 260°C; 10 sec	3	3*10	Passed
7	Destructive Physical Analysis	AEC-Q101-004 Post-TC, Post-HAST	3	3*4	Passed
8	Solderability	J-STD-002 245 °C ± 5 °C (Pb-free), 5sec	1	1*10	Passed
9	Thermal Resistance	JESD24 per product datasheet	1	1*5	Passed
10	Die Shear	MIL-STD-750 per assembly spec	1	1*5	Passed
11	Wire Bond Pull	MIL-STD-750 per assembly spec CPK≥1.33	3	3*30	Passed
12	Wire Bond Shear	AEC Q101-003 per assembly spec	3	3*30	Passed

Conclusion: Affected parts using Cu LF can satisfy the product reliability requirement.

Effect of Change:
There is no impact in product electrical specification, functionality, quality and reliability. This change will guarantee Taiwan Semiconductor commitment on customer service and satisfaction through continuous improvement.

Identification and Traceability:

Item	Identification
Traceability	Product date code

List of Affected Devices:

Package	Part Number	Package	Part Number	Package	Part Number
SOD-123	BAT42W	SOD-123	BZT52B16-G	SOD-123	BZT52C10-G
SOD-123	BAT43W	SOD-123	BZT52B18-G	SOD-123	BZT52C11-G
SOD-123	SD103AW	SOD-123	BZT52B20-G	SOD-123	BZT52C12-G
SOD-123	SD103BW	SOD-123	BZT52B22-G	SOD-123	BZT52C13-G
SOD-123	SD103CW	SOD-123	BZT52B24-G	SOD-123	BZT52C15-G
SOD-123	1N4148W-G	SOD-123	BZT52B27-G	SOD-123	BZT52C16-G
SOD-123	BAV19W-G	SOD-123	BZT52B30-G	SOD-123	BZT52C18-G
SOD-123	BAV19W-G-N0	SOD-123	BZT52B33-G	SOD-123	BZT52C20-G
SOD-123	BAV20W-G	SOD-123	BZT52B36-G	SOD-123	BZT52C22-G
SOD-123	BAV20W-G-N0	SOD-123	BZT52B39-G	SOD-123	BZT52C24-G
SOD-123	BAV21W-G	SOD-123	BZT52B43-G	SOD-123	BZT52C27-G
SOD-123	BAV21W-G-N0	SOD-123	BZT52B47-G	SOD-123	BZT52C30-G
SOD-123	BZT52B2V4-G	SOD-123	BZT52B51-G	SOD-123	BZT52C33-G
SOD-123	BZT52B2V7-G	SOD-123	BZT52B56-G	SOD-123	BZT52C36-G
SOD-123	BZT52B3V0-G	SOD-123	BZT52B62-G	SOD-123	BZT52C39-G
SOD-123	BZT52B3V3-G	SOD-123	BZT52B68-G	SOD-123	BZT52C43-G
SOD-123	BZT52B3V6-G	SOD-123	BZT52B75-G	SOD-123	BZT52C47-G
SOD-123	BZT52B3V9-G	SOD-123	BZT52C2V4-G	SOD-123	BZT52C51-G
SOD-123	BZT52B4V3-G	SOD-123	BZT52C2V7-G	SOD-123	BZT52C56-G
SOD-123	BZT52B4V7-G	SOD-123	BZT52C3V0-G	SOD-123	BZT52C62-G
SOD-123	BZT52B5V1-G	SOD-123	BZT52C3V3-G	SOD-123	BZT52C68-G
SOD-123	BZT52B5V6-G	SOD-123	BZT52C3V6-G	SOD-123	BZT52C75-G
SOD-123	BZT52B6V2-G	SOD-123	BZT52C3V9-G		
SOD-123	BZT52B6V8-G	SOD-123	BZT52C4V3-G		
SOD-123	BZT52B7V5-G	SOD-123	BZT52C4V7-G		
SOD-123	BZT52B8V2-G	SOD-123	BZT52C5V1-G		
SOD-123	BZT52B9V1-G	SOD-123	BZT52C5V6-G		
SOD-123	BZT52B10-G	SOD-123	BZT52C6V2-G		
SOD-123	BZT52B11-G	SOD-123	BZT52C6V8-G		
SOD-123	BZT52B12-G	SOD-123	BZT52C7V5-G		
SOD-123	BZT52B13-G	SOD-123	BZT52C8V2-G		
SOD-123	BZT52B15-G	SOD-123	BZT52C9V1-G		