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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: PCN22003
Title: SOD123F Change of EMC, die size and bonding wire

Issue Date: 2022/2/22

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

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PCN Type: Change of EMC, die size and bonding wire

Effectivity:
Expected 1st device shipment date: 2022/5/23
Last order date: 2022/8/21
Last delivery date: 2023/8/21

Product Category (Description):
Devices of SOD-123F package supplied by Taiwan Semiconductor Co., Ltd and manufactured by its qualified supplier.
The full lists of products affected are listed in the "List of Affected Devices" section.

Description of Change:

This PCN is to inform customers regarding the initiated changes by TSC supplier (Vendor code 4999)for devices manufactured in SOD-123F to ensure the continuity of supply and guarantee commitment on customer service and satisfaction.

Reliability test performance on the representative part numbers are to ensure no change on the device functionality or electrical specifications in the datasheet. Refer to reliability test report below:

BOM Comparison

1. Die size change

Item	From	To	Remarks
Die Size (BZT52Series)	0.26*0.26mm	0.33*0.33mm	Different
Die Size (MMSZ5221BSeries)	0.26*0.26mm	0.32*0.32mm/0.33*0.33mm	Different

2. EMC and bonding wire change

Item	From	To	Remarks
Wire	Au	Cu	Different
Molding Compound	SG-8300CS	KHG600	Different

Qualification and Reliability Result:

1. Electrical test comparison

P/N: BZT52B5V1	ITEM	VZ(V)	ZZT (Ω)	ZZK (Ω)	IR(nA)	VF (V)	Result
	TEST Condition	IZ=5mA	Izt=5mA	Izk=1mA	VR=2V	IF=10mA	
	SPEC.	5V<VZ<5.2V	ZZT<60Ω	ZZK<451Ω	IR<1800nA	VF<1V	
Before	MIN	5.11	4.94	36.80	1.92	0.82	Both can meet specification
	MAX	5.12	6.02	39.90	7.21	0.83	
	AVG.	5.12	5.33	38.64	4.06	0.82	
	CPK	10.51	89.01	223.47	412.15	35.75	
After	MIN	5.09	24.94	268.80	48.72	0.79	
	MAX	5.11	26.12	274.30	53.09	0.80	
	AVG.	5.10	25.47	271.39	51.06	0.79	
	CPK	7.82	36.16	41.09	482.22	80.77	

P/N: MMSZ5252B	ITEM	VZ(V)	ZZT (Ω)	ZZK (Ω)	IR(nA)	VF (V)	Result
	TEST Condition	IZ=5.2mA	Izt=5.2mA	Izk=0.25mA	VR=18V	IF=10mA	
	SPEC.	22.8V<VZ<25.2V	ZZT<33Ω	ZZK<600Ω	IR<100nA	VF<0.9V	
Before	MIN	23.76	13.69	49.60	0.01	0.78	Both can meet specification
	MAX	23.93	14.26	95.60	2.58	0.79	
	AVG.	23.87	13.99	65.90	1.43	0.79	
	CPK	10.03	38.84	13.16	39.37	30.53	
After	MIN	23.63	9.13	80.40	0.11	0.775	
	MAX	23.87	9.92	235.60	0.54	0.784	
	AVG.	23.74	9.44	143.51	0.40	0.780	
	CPK	4.61	36.10	3.23	474.94	16.19	

Conclusion: The change of die size, molding compound and bonding wire will not affect the product electrical performance and product reliability.

2. Qualification and Reliability Result:

Qualification Vehicle:

BZT52B75, BZT52C75, MMSZ5262B, 1N4448W, BAV21W, B0520LWF, B0540WF
Package: SOD-123F

NO.	Test	Test Conditions/ Standard	No. of Lots	Sample Size	Result
1	Pre-conditioning	JESD22-A113, J-STD-020 Temp. Cycle: -40 °C ~ +60 °C, 5 cycles Bake: 125 °C for 24 hrs. Soak: > MSL1: 85 °C RH: 85 %, 168 Hrs IR Reflow Temperature: 260 (+5/-0)°C @ 3x cycles	7	308	PASS
2	Steady state operational	MIL-STD-750-1 M1038 Condition B(Zeners) rated IZ max,Tj=150°C, 1000hrs	3	77	PASS
3	High Temperature Reverse Bias	JESD22-A108, MIL-STD-750 M1038 Tj=Tjmax, at least 80% rated Vr, 1000hrs	4	77	PASS
4	Temperature Cycling	JESD22-A104 '-55(-10/+0)°C/15min to 150(+15/-0)°C/15min, 1000 cycles	7	77	PASS
5	High Temperature Storage Test	JESD22-A103, 150°C, 1000hrs	7	77	PASS
6	UHAST	JESD22-A118, Ta=130°C, 85%RH, 96hrs	7	77	PASS
7	HAST	JESD22-A110 Ta=130°C/85%RH 80% rated Vr up to 42Vmax, 96hrs	7	77	PASS
8	Intermittent Operational Life	Ta=25°C, ΔTj >= 100 °C, 2 mins ON + 2 mins OFF , 6000 cycle	7	77	PASS
9	Destructive Physical Analysis (DPA)	JESD22-A104,JESD22-B116 TC passed choose 2pcs of the 1 lot HAST or H3TRB passed choose 2 pcs of the 1 lot: Visual inspection, SAM, X-ray, decapsulation than Visual inspection	7	4	PASS

10	Resistance to Solder Heat	JESD22-A111 SMD, B-106 PTH Pb free: 260(+5/-0)°C , 10 sec (+2/-0)	7	10	PASS
11	ESD Characterization	HBM JS-001 10pcs for each ESD level, (C=100pf R=1500Ω)	3	30	Cap.:8K V
		CDM JS-002 10pcs for each ESD level allowed.	3	30	Cap.:2K V
12	Solderability	J-STD-002 245 °C ± 5 °C (Pb-free) 5 sec	7	10	PASS
13	C-SAM	J-STD-035, AEC-Q006, T0, Post-PC & Post-TC; T0, Post-PC & Post-HAST rej=0	5	22	PASS
14	Wire Bond Pull	MIL-STD-750 per assembly spec CPK≥ 1.33	5	30	PASS
15	Wire Bond Shear	MIL-STD-750 per assembly spec CPK≥ 1.33	5	30	PASS
16	Die shear	MIL-STD-750 per assembly spec	3	10	PASS
17	Thermal Resistance	JESD24, per product datasheet	3	5	PASS

Conclusion: The combination of new die size, molding compound and wire can ensure the quality and reliability of final product.

Effect of Change:

There is no impact on the form, fit, function, reliability or processability. This change will guarantee Taiwan Semiconductor commitment on customer service and satisfaction through continuous improvement.

List of Affected Devices:

Package	Part Number	Package	Part Number	Package	Part Number
SOD-123F	BZT52B2V4	SOD-123F	BZT52B10	SOD-123F	BZT52B43
SOD-123F	BZT52B2V7	SOD-123F	BZT52B11	SOD-123F	BZT52B47
SOD-123F	BZT52B3V0	SOD-123F	BZT52B12	SOD-123F	BZT52B51
SOD-123F	BZT52B3V3	SOD-123F	BZT52B13	SOD-123F	BZT52B56
SOD-123F	BZT52B3V6	SOD-123F	BZT52B15	SOD-123F	BZT52B62
SOD-123F	BZT52B3V9	SOD-123F	BZT52B16	SOD-123F	BZT52B68
SOD-123F	BZT52B4V3	SOD-123F	BZT52B18	SOD-123F	BZT52B75
SOD-123F	BZT52B4V7	SOD-123F	BZT52B20	SOD-123F	BZT52C2V4
SOD-123F	BZT52B5V1	SOD-123F	BZT52B22	SOD-123F	BZT52C2V7
SOD-123F	BZT52B5V6	SOD-123F	BZT52B24	SOD-123F	BZT52C3V0
SOD-123F	BZT52B6V2	SOD-123F	BZT52B27	SOD-123F	BZT52C3V3
SOD-123F	BZT52B6V8	SOD-123F	BZT52B30	SOD-123F	BZT52C3V6
SOD-123F	BZT52B7V5	SOD-123F	BZT52B33	SOD-123F	BZT52C3V9
SOD-123F	BZT52B8V2	SOD-123F	BZT52B36	SOD-123F	BZT52C4V3
SOD-123F	BZT52B9V1	SOD-123F	BZT52B39	SOD-123F	BZT52C4V7
SOD-123F	BZT52C5V1	SOD-123F	MMSZ5221B	SOD-123F	MMSZ5259B
SOD-123F	BZT52C5V6	SOD-123F	MMSZ5225B	SOD-123F	MMSZ5260B
SOD-123F	BZT52C6V2	SOD-123F	MMSZ5226B	SOD-123F	MMSZ5261B
SOD-123F	BZT52C6V8	SOD-123F	MMSZ5227B	SOD-123F	MMSZ5262B
SOD-123F	BZT52C7V5	SOD-123F	MMSZ5228B	SOD-123F	1N4148W
SOD-123F	BZT52C8V2	SOD-123F	MMSZ5229B	SOD-123F	1N4448W
SOD-123F	BZT52C9V1	SOD-123F	MMSZ5230B	SOD-123F	1N914BW

Package	Part Number	Package	Part Number	Package	Part Number
SOD-123F	BZT52C10	SOD-123F	MMSZ5231B	SOD-123F	BAV19W
SOD-123F	BZT52C11	SOD-123F	MMSZ5232B	SOD-123F	BAV20W
SOD-123F	BZT52C12	SOD-123F	MMSZ5234B	SOD-123F	BAV21W
SOD-123F	BZT52C13	SOD-123F	MMSZ5235B	SOD-123F	B0520LWF
SOD-123F	BZT52C15	SOD-123F	MMSZ5236B	SOD-123F	B0530WF
SOD-123F	BZT52C16	SOD-123F	MMSZ5237B	SOD-123F	B0540WF
SOD-123F	BZT52C18	SOD-123F	MMSZ5239B		
SOD-123F	BZT52C20	SOD-123F	MMSZ5240B		
SOD-123F	BZT52C22	SOD-123F	MMSZ5241B		
SOD-123F	BZT52C24	SOD-123F	MMSZ5242B		
SOD-123F	BZT52C27	SOD-123F	MMSZ5243B		
SOD-123F	BZT52C30	SOD-123F	MMSZ5244B		
SOD-123F	BZT52C33	SOD-123F	MMSZ5245B		
SOD-123F	BZT52C36	SOD-123F	MMSZ5246B		
SOD-123F	BZT52C39	SOD-123F	MMSZ5248B		
SOD-123F	BZT52C43	SOD-123F	MMSZ5250B		
SOD-123F	BZT52C47	SOD-123F	MMSZ5251B		
SOD-123F	BZT52C51	SOD-123F	MMSZ5252B		
SOD-123F	BZT52C56	SOD-123F	MMSZ5254B		
SOD-123F	BZT52C62	SOD-123F	MMSZ5256B		
SOD-123F	BZT52C68	SOD-123F	MMSZ5257B		
SOD-123F	BZT52C75	SOD-123F	MMSZ5258B		