

Process Change Notification

This is to inform you that a design and/or process change will be implemented to the affected product(s) listed below. This notification requires your concurrence within 45 days upon receipt of this notification.

The plan change/s will take effect 90 calendar days from the date of this notification.

Please work with your local Taiwan Semiconductor Sales Representative to manage your inventory of unchanged/ existing 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.

Change No: PCN23013 rev0

Title: TO-277A (SMPC) to TO-277A (SMPC4.6U) Package Transfer

Issue Date : 2023/11/30

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

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Change Type: Package Consolidation

Effectivity:

Expected 1st device shipment date: 2024/2/28

Last Order Date: 2024/5/28

Last Delivery Date: 2025/5/28

Product Category (Description):

TO-277A (SMPC) GPP devices that are currently assembled and tested in Taiwan Semiconductor Company ILAN Facility.

Description of Change:

Taiwan Semiconductor Company will convert its TO-277A (SMPC) to TO-277A (SMPC4.6U) for:

1. Package consolidation and process automation
2. Wettable flank to enable the AOI at customer PCB assembly process
3. Productivity improvement

In addition to the package outline change the mold compound will be change from ELER-8-500C to G700LA and Clip type will be changed from round dimple to flat dimple design (qualified clip type for SMPC4.6u devices).

No change in product Part Number but datasheet will be revised for the package and outline alignment.

Other than the above changes there is no fit and function change.

Full electrical characterization and high reliability testing has been completed on representative part number. There is no change to device functionality or electrical specifications in the datasheet.

TO-277A (SMPC4.6U) is TSC ILAN's AECQ-101 qualified package running in mass production.

1. Product Datasheet Revision

No change in product part number only change in Package and Package outline.

Item	From	To
Package	TO-277A (SMPC)	TO-277A (SMPC4.6U)

2. Bill of Materials Comparison

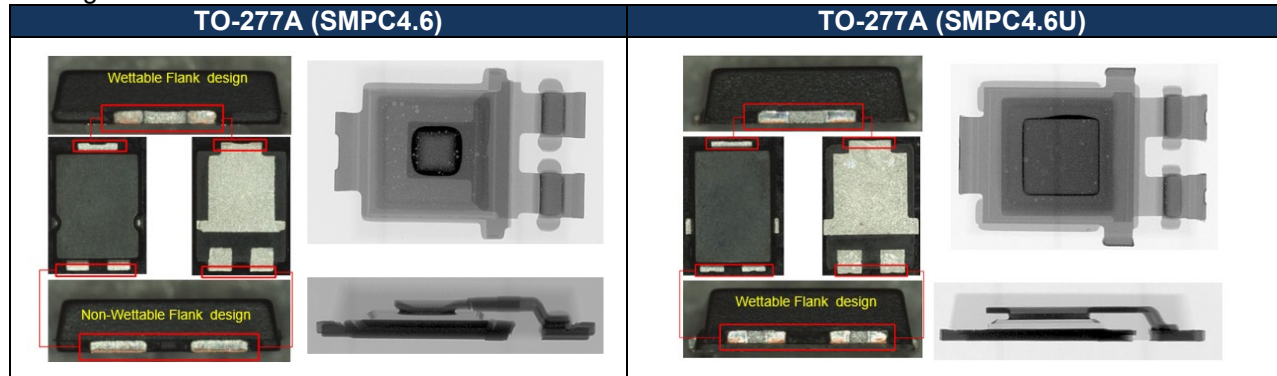
Item	From	To	Remarks
Molding Compound	ELER-8-500C	G700LA	Both Green/ Halogen Free
Clip Type	Round Dimple Type	Flat Dimple Type	Qualified Clip type for SMPC4.6U devices

3. Package Outline Comparison

Wettable flank to enable the AOI at customer PCB assembly process.

DIM (mm)	TO-277A (SMPC)		TO-277A (SMPC4.6U)		Remarks
	Min	Max	Min	Max	
Package Thickness	1.00	1.20	1.00	1.20	Same
Package Width	4.55	4.65	4.45	4.75	Minor gap
Package Length	6.35	6.65	6.35	6.65	Same
Pins Width	1.043	1.343	0.94	1.24	Minor gap
Pins Length	1.00	1.30	1.05	1.35	Minor gap
Heatsink Length	4.235	4.535	4.40	4.80	Minor gap

Package View and Datasheet POD



Qualification and Reliability Result:

A. Electrical Test Result: TPMR10J

Item	Spec LSL	Spec USL	Units	Test Results					Results
				Max.	Avg.	Min.	sigma	Cpk	
VF	--	1.80	V	1.509	1.356	1.295	0.030	4.95	PASS
VR	600	--	V	753	740.78	710	6.28	7.473	PASS
IR	--	10	uA	0.681	0.030	0.10	0.034	96.451	PASS
TRR	--	40	ns	24.00	22.80	20.00	0.499	11.481	PASS

B. Qualification Grade: Automotive (AEC-Q101)

Stress Test	Abbrev	Test Methods	Test Conditions	Final Readpoint	Requirements		Results	
					SS	# Lots	Rej/SS	Remarks
Environmental and Lifetime Stress Tests								
Pre- and Post-Stress Electrical Test	TEST	Product Datasheet	Test at room temp	-	All	3	0 Fails	Passed
External Visual	EV	JESD22-B101	per reference standard	-	All	3	0 Fails	Passed
Preconditioning	PC	J-STD-020	MSL-1 (3x reflow at 260°C)	-	308	3	0/308	Passed
Temperature Cycle	TC	JESD22-A104	-55°C to +150°C; 15 mins dwell	1000 cycs	77	3	0/231	Passed
Unbiased HAST	UHAST	JESD22-A118	130°C/85% RH; unbiased	96 hrs	77	3	0/231	Passed
Highly Accelerated Stress Test	HAST	JESD22-A110	130°C/85% RH; Vr = 42V	264 hrs	77	3	0/231	Passed
Resistance to Solder Heat	RSH	JESD22-A111	SMD (Pb free): 260°C; 10 sec	10 secs	30	3	0/90	Passed
High Temp Reverse Bias	HTRB	MIL-STD-750-1	175°C; 100% Rated VR	1000 hrs	77	3	0/231	Passed
Intermittent Operating Life	IOL	MIL-STD-750	On/2min,off/2min,ΔTj≥100°C	15000 cycs	77	3	0/231	Passed
Package Assembly Integrity Tests								
Solderability	SD	J-STD-002	245°C	results	10	3	0/30	Passed
Physical Dimension	PD	JESD22-B100	per assembly spec	results	30	3	0/90	Passed
Die Shear	DS	MIL-STD-750-2	per assembly spec	results	30	3	0/90	Passed
Electrical Verification Tests								
ESD - Human Body Model	ESD - HBM	AEC-Q101-001	per product spec	results	10	3	0/30	Passed ±8KV
ESD - Charged Device Model	ESD - CDM	AEC-Q101-005	per product spec	results	10	3	0/30	Passed ±1KV

Conclusion:

Successfully passed Automotive-grade qualification per AEC-Q101 Rev. E.

Effect of Change:

There is no impact in product Fit and Function. There is change in form of the package but no impact in datasheet parameters and product performance.

Identification and Traceability:

Item	Identification
Traceability	Product date code

List of Affected Devices:

Family	Package	Ordering Code	New Package
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR6G	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR6J	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR6GH	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR6JH	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR10D	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR10G	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR10J	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR10DH	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR10GH	TO-277A (SMPC4.6U)
Super-Fast Recovery Rectifier	TO-277A (SMPC)	TPMR10JH	TO-277A (SMPC4.6U)
Ultra-Fast Recovery Rectifier	TO-277A (SMPC)	TPUH6D	TO-277A (SMPC4.6U)
Ultra-Fast Recovery Rectifier	TO-277A (SMPC)	TPUH6J	TO-277A (SMPC4.6U)
Ultra-Fast Recovery Rectifier	TO-277A (SMPC)	TPUH6DH	TO-277A (SMPC4.6U)
Ultra-Fast Recovery Rectifier	TO-277A (SMPC)	TPUH6JH	TO-277A (SMPC4.6U)