



# PRODUCT/PROCESS CHANGE NOTIFICATION

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PCN IPD-IPC/12/7348  
Dated 31 Jul 2012

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**SO 08/14/16 Narrow : Back-End plant optimization in ST  
Shenzhen, with implementation of SHD frame, ECOPACK 2  
and Cu wire capability.**

**Table 1. Change Implementation Schedule**

Forecasted implementation date for change	01-Oct-2012
Forecasted availability date of samples for customer	01-Sep-2012
Forecasted date for <b>STMicroelectronics</b> change Qualification Plan results availability	03-Sep-2012
Estimated date of changed product first shipment	30-Oct-2012

**Table 2. Change Identification**

Product Identification (Product Family/Commercial Product)	See attached list
Type of change	Multiple locations change
Reason for change	To optimize ST's assets utilization
Description of the change	Transfer of product lines housed in SO 08, SO 14 and SO 16 Narrow package from ST Muar, ST Bouskoura, ASE and Amkor to ST Shenzhen. Implementation of Super High Density frame (SHD), Ecopack 2 and copper wire bonding (where compatible).
Change Product Identification	Assembly plant area on marking as per attached description and finished goods code
Manufacturing Location(s)	Please Refer To The Description Of The Change

**Table 3. List of Attachments**

Customer Part numbers list	
Qualification Plan results	



Customer Acknowledgement of Receipt		PCN IPD-IPC/12/7348
Please sign and return to STMicroelectronics Sales Office		Dated 31 Jul 2012
<input type="checkbox"/> Qualification Plan Denied <input type="checkbox"/> Qualification Plan Approved  <input type="checkbox"/> Change Denied <input type="checkbox"/> Change Approved	Name:	
	Title:	
	Company:	
	Date:	
	Signature:	
Remark ..... ..... ..... ..... ..... ..... ..... ..... .....		

## DOCUMENT APPROVAL

<b>Name</b>	<b>Function</b>
Arrigo, Domenico Massimo	Marketing Manager
Borghi, Maria Rosa	Marketing Manager
Pioppo, Sergio Franco	Marketing Manager
Riviera, Antonio	Marketing Manager
Arrigo, Domenico Massimo	Product Manager
Borghi, Maria Rosa	Product Manager
Naso, Lorenzo	Product Manager
Pioppo, Sergio Franco	Product Manager
Motta, Antonino	Q.A. Manager



**WHAT:**

Following the Company guidelines on the assets optimization, we are going to move our products housed in SO 08, SO 14 and SO 16 Narrow package, from the plants ST Muar (Malaysia), ST Bouskoura (Morocco), ASE (China) and Amkor (Philippines) to the plant ST Shenzhen (China).

In ST Shenzhen we will also implement a Super High Density frame (SHD), the ECOPACK 2 (so called halogen-free) and, where compatible, the copper wire bonding. See attached product list for each specific change.

**WHY:**

To optimize ST's assets utilization in compliance with the Company Roadmap.

**HOW:**

This change deals with the usage of a new assembly line (SHD) transferring from ST Muar the testing equipment and tools. No transfer of equipment from the other involved plants.

These changes will not affect the electrical, dimensional and thermal parameters of the products, keeping unchanged all the information reported on the relevant datasheets. There will be as well no change in the packing process and in the standard delivery quantities.

**Qualification program and results**

The qualification program consists mainly of comparative electrical yield and reliability tests.

Preliminary results on testing yield for trial lots assembled and tested in Shenzhen show a yield well aligned to the actual yield in Muar and the other plants as well.

Qualification and Reliability Plan with Preliminary Results are enclosed herewith.

**Marking and traceability**

The plant in Shenzhen can be identified internally by a new Finished Goods code, also shown on ST standard labels, and by the letter "K" marked on the package surface.

**WHEN:**

The production in ST Shenzhen of the parts described in this PCN will start as follows :

<b>Package</b>	<b>Schedule</b>
SO 08 Narrow	week 40, 2012
Lines VNA4 and VNB7	week 49, 2012
SO 14 and SO 16 Narrow	week 45, 2012

Samples can be delivered upon request in 8 weeks A.R.O.

**List of products housed in SO 08 package**

<b>pnl</b>	<b>line</b>	<b>pk</b>	<b>pkdescr</b>	<b>cp</b>	<b>old B/E plant</b>	<b>new B/E plant</b>	<b>old BOM</b>	<b>new BOM</b>
32	LW3301	07	SO 08 .15 JEDEC	04835669AA	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
91	U36603	07	SO 08 .15 JEDEC	9397930TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	KF2501	07	SO 08 .15 JEDEC	KF25BD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	KF3301	07	SO 08 .15 JEDEC	KF33BD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	KF0501	07	SO 08 .15 JEDEC	KF50BD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LWA201	07	SO 08 .15 JEDEC	L4931ABD120TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LW3301	07	SO 08 .15 JEDEC	L4931ABD33-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LW3501	07	SO 08 .15 JEDEC	L4931ABD35-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LW0501	07	SO 08 .15 JEDEC	L4931ABD50-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LWA201	07	SO 08 .15 JEDEC	L4931CD120-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LW2701	07	SO 08 .15 JEDEC	L4931CD27-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LW3301	07	SO 08 .15 JEDEC	L4931CD33-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LW3501	07	SO 08 .15 JEDEC	L4931CD35-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LW0501	07	SO 08 .15 JEDEC	L4931CD50-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LW0801	07	SO 08 .15 JEDEC	L4931CD80-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
J2	UT2003	07	SO 08 .15 JEDEC	L5970AD	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UT2003	07	SO 08 .15 JEDEC	L5970ADTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UD0903	07	SO 08 .15 JEDEC	L5970D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UD0903	07	SO 08 .15 JEDEC	L5970D013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UD7203	07	SO 08 .15 JEDEC	L5972D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UD7203	07	SO 08 .15 JEDEC	L5972D013TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
91	U56603	07	SO 08 .15 JEDEC	L6375S	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U56603	07	SO 08 .15 JEDEC	L6375STR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36403	07	SO 08 .15 JEDEC	L6384ED	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36403	07	SO 08 .15 JEDEC	L6384ED013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36403	07	SO 08 .15 JEDEC	L6384EDR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36603	07	SO 08 .15 JEDEC	L6385ED	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36603	07	SO 08 .15 JEDEC	L6385ED013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36603	07	SO 08 .15 JEDEC	L6385EDR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36603	07	SO 08 .15 JEDEC	L6385PTD	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36603	07	SO 08 .15 JEDEC	L6385PTD013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36603	07	SO 08 .15 JEDEC	L6385PTDR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U32403	07	SO 08 .15 JEDEC	L6387ED	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U32403	07	SO 08 .15 JEDEC	L6387ED013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U32403	07	SO 08 .15 JEDEC	L6387EDR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U37103	07	SO 08 .15 JEDEC	L6388ED	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame





pnl	line	pk	pkdescr	cp	old B/E plant	new B/E plant	old BOM	new BOM
32	LA1201	07	SO 08 .15 JEDEC	L78L12CD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA1501	07	SO 08 .15 JEDEC	L78L15ACD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA1501	07	SO 08 .15 JEDEC	L78L15CD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA1801	07	SO 08 .15 JEDEC	L78L18CD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA2401	07	SO 08 .15 JEDEC	L78L24CD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA3301	07	SO 08 .15 JEDEC	L78L33ABD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA3301	07	SO 08 .15 JEDEC	L78L33ACD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA3301	07	SO 08 .15 JEDEC	L78L33CD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LB0501	07	SO 08 .15 JEDEC	L79L05ABD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LB0501	07	SO 08 .15 JEDEC	L79L05ACD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LB0801	07	SO 08 .15 JEDEC	L79L08ACD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LB1201	07	SO 08 .15 JEDEC	L79L12ACD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LB1501	07	SO 08 .15 JEDEC	L79L15ABD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LB1501	07	SO 08 .15 JEDEC	L79L15ACD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	KS3301	07	SO 08 .15 JEDEC	LD1117D33CTR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	KS3301	07	SO 08 .15 JEDEC	LD1117D33TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LE0301	07	SO 08 .15 JEDEC	LE30CD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LE3301	07	SO 08 .15 JEDEC	LE33CD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LE4501	07	SO 08 .15 JEDEC	LE45CD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LE0501	07	SO 08 .15 JEDEC	LE50ABD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LE0501	07	SO 08 .15 JEDEC	LE50CD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LE0801	07	SO 08 .15 JEDEC	LE80CD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
J2	UA6101	07	SO 08 .15 JEDEC	LED2000DR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
32	LK3301	07	SO 08 .15 JEDEC	LK115D33-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LK0501	07	SO 08 .15 JEDEC	LK115D50-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA1701	07	SO 08 .15 JEDEC	LM217LD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	KA3301	07	SO 08 .15 JEDEC	LM2931AD33R	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	KA0501	07	SO 08 .15 JEDEC	LM2931AD50R	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	KA1701	07	SO 08 .15 JEDEC	LM2931D-R	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	LA1701	07	SO 08 .15 JEDEC	LM317LD13TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
I3	LL0201	07	SO 08 .15 JEDEC	MC34063ABD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, HD frame	Ecopack 2, Cu wire, SHD frame
I3	LL0401	07	SO 08 .15 JEDEC	MC34063EBD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, HD frame	Ecopack 2, Cu wire, SHD frame
I3	LL0401	07	SO 08 .15 JEDEC	MC34063ECD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, HD frame	Ecopack 2, Cu wire, SHD frame
J2	UA6101	07	SO 08 .15 JEDEC	ST1CC40DR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UA1701	07	SO 08 .15 JEDEC	ST1S31D-R	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UA2701	07	SO 08 .15 JEDEC	ST1S40IDR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
I3	U79701	07	SO 08 .15 JEDEC	ST619LBDR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, HD frame	Ecopack 2, Cu wire, SHD frame
I3	U79701	07	SO 08 .15 JEDEC	ST619LBDR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, HD frame	Ecopack 2, Cu wire, SHD frame

pnl	line	pk	pkdescr	cp	old B/E plant	new B/E plant	old BOM	new BOM
13	U79201	07	SO 08 .15 JEDEC	ST662ABD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, HD frame	Ecopack 2, Cu wire, SHD frame
13	U79201	07	SO 08 .15 JEDEC	ST662ACD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, HD frame	Ecopack 2, Cu wire, SHD frame
13	U79501	07	SO 08 .15 JEDEC	ST763ACDTR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, HD frame	Ecopack 2, Cu wire, SHD frame
13	UM6401	07	SO 08 .15 JEDEC	STCS05ADR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
13	UM6401	07	SO 08 .15 JEDEC	STCS05DR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
92	UF5801	07	SO 08 .15 JEDEC	STSR2PCD	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UF5801	07	SO 08 .15 JEDEC	STSR2PCD-TR	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UF5801	07	SO 08 .15 JEDEC	STSR2PMCD	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UF5801	07	SO 08 .15 JEDEC	STSR2PMCD-TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UW3501	07	SO 08 .15 JEDEC	STSR30D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UW3501	07	SO 08 .15 JEDEC	STSR30D-TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	170703	07	SO 08 .15 JEDEC	TDE1707BFP	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	170703	07	SO 08 .15 JEDEC	TDE1707BFPT	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	143171	07	SO 08 .15 JEDEC	TL1431ACDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	143171	07	SO 08 .15 JEDEC	TL1431AIDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	143171	07	SO 08 .15 JEDEC	TL1431CDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	143171	07	SO 08 .15 JEDEC	TL1431IDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	43101	07	SO 08 .15 JEDEC	TL431ACDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	43101	07	SO 08 .15 JEDEC	TL431AIDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	43101	07	SO 08 .15 JEDEC	TL431CDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	43101	07	SO 08 .15 JEDEC	TL431CDT/VI	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
32	43101	07	SO 08 .15 JEDEC	TL431IDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
92	30301	07	SO 08 .15 JEDEC	TSM103WAID	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
92	30301	07	SO 08 .15 JEDEC	TSM103WAIDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
92	30301	07	SO 08 .15 JEDEC	TSM103WID	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
92	30301	07	SO 08 .15 JEDEC	TSM103WIDT	SHENZHEN B/E	SHENZHEN B/E	Ecopack 2, Cu wire, HD frame	Ecopack 2, Cu wire, SHD frame
92	10971	07	SO 08 .15 JEDEC	TSM109AID	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	10971	07	SO 08 .15 JEDEC	TSM109AIDT	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	10971	07	SO 08 .15 JEDEC	TSM109ID	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	10971	07	SO 08 .15 JEDEC	TSM109IDT	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	VNA401	07	SO 08 .15 JEDEC	VIMIT10-E	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
92	VNA401	07	SO 08 .15 JEDEC	VIMIT10TR-E	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
92	VNA401	07	SO 08 .15 JEDEC	VIPER12AS-E	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
92	VNA401	07	SO 08 .15 JEDEC	VIPER12ASTR-E	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
92	VNB701	07	SO 08 .15 JEDEC	VIPER22AS-E	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
92	VNB701	07	SO 08 .15 JEDEC	VIPER22ASTR-E	SHENZHEN B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
91	VNM201	07	SO 08 .15 JEDEC	VN751S	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
91	VNM201	07	SO 08 .15 JEDEC	VN751STR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame

**List of products housed in SO 14 and SO 16 Narrow package**

<b>pnl</b>	<b>line</b>	<b>pk</b>	<b>pkdescr</b>	<b>cp</b>	<b>old B/E plant</b>	<b>new B/E plant</b>	<b>old BOM</b>	<b>new BOM</b>
J2	U36303	Q7	SO 16 .15 TO JEDEC MS-	90874	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
J2	U36303	Q7	SO 16 .15 TO JEDEC MS-	90874D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U76203	Q7	SO 16 .15 TO JEDEC MS-	L5991AD	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U76203	Q7	SO 16 .15 TO JEDEC MS-	L5991AD13TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U74803	Q7	SO 16 .15 TO JEDEC MS-	L5991D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U74803	Q7	SO 16 .15 TO JEDEC MS-	L5991D013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U33301	K7	SO 14 .15 TO JEDEC MS-	L6386AD	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U33301	K7	SO 14 .15 TO JEDEC MS-	L6386ADTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36703	K7	SO 14 .15 TO JEDEC MS-	L6386ED	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36703	K7	SO 14 .15 TO JEDEC MS-	L6386ED013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U36703	K7	SO 14 .15 TO JEDEC MS-	L6386EDR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U33201	Q7	SO 16 .15 TO JEDEC MS-	L6390D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U33201	Q7	SO 16 .15 TO JEDEC MS-	L6390DTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U34201	K7	SO 14 .15 TO JEDEC MS-	L6391D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U34201	K7	SO 14 .15 TO JEDEC MS-	L6391DTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U33601	K7	SO 14 .15 TO JEDEC MS-	L6392D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U33601	K7	SO 14 .15 TO JEDEC MS-	L6392DTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U33401	K7	SO 14 .15 TO JEDEC MS-	L6393D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	U33401	K7	SO 14 .15 TO JEDEC MS-	L6393DTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UE2903	K7	SO 14 .15 TO JEDEC MS-	L6563	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UE3501	K7	SO 14 .15 TO JEDEC MS-	L6563A	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UE3501	K7	SO 14 .15 TO JEDEC MS-	L6563ATR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UE3901	K7	SO 14 .15 TO JEDEC MS-	L6563S	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UE3901	K7	SO 14 .15 TO JEDEC MS-	L6563STR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UE2903	K7	SO 14 .15 TO JEDEC MS-	L6563TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
J2	U36203	K7	SO 14 .15 TO JEDEC MS-	L6572	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
J2	U36203	K7	SO 14 .15 TO JEDEC MS-	L6572D013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
J2	U36303	Q7	SO 16 .15 TO JEDEC MS-	L6574D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
J2	U36303	Q7	SO 16 .15 TO JEDEC MS-	L6574D013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
J2	U36303	Q7	SO 16 .15 TO JEDEC MS-	L6574D-NM	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame

pnf	line	pk	pkdescr	cp	old B/E plant	new B/E plant	old BOM	new BOM
J2	U36303	Q7	SO 16 .15 TO JEDEC MS-	L6574DTR-NM	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
J2	U36303	Q7	SO 16 .15 TO JEDEC MS-	L6574DTR-PL	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U37003	Q7	SO 16 .15 TO JEDEC MS-	L6598BDTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U37003	Q7	SO 16 .15 TO JEDEC MS-	L6598D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U37003	Q7	SO 16 .15 TO JEDEC MS-	L6598D013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U33801	Q7	SO 16 .15 TO JEDEC MS-	L6599AD	AMKOR	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U33801	Q7	SO 16 .15 TO JEDEC MS-	L6599ADTR	AMKOR	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U33801	Q7	SO 16 .15 TO JEDEC MS-	L6599ATD	AMKOR	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U33801	Q7	SO 16 .15 TO JEDEC MS-	L6599ATDTR	AMKOR	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U32903	Q7	SO 16 .15 TO JEDEC MS-	L6599D	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U32903	Q7	SO 16 .15 TO JEDEC MS-	L6599DTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U33801	Q7	SO 16 .15 TO JEDEC MS-	L6599ED	AMKOR	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U33801	Q7	SO 16 .15 TO JEDEC MS-	L6599EDTR	AMKOR	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
J2	UT5403	Q7	SO 16 .15 TO JEDEC MS-	L6725	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UN2101	Q7	SO 16 .15 TO JEDEC MS-	L6725A	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UN2101	Q7	SO 16 .15 TO JEDEC MS-	L6725ATR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UT5403	Q7	SO 16 .15 TO JEDEC MS-	L6725TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UD3903	Q7	SO 16 .15 TO JEDEC MS-	L6910	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UN0401	Q7	SO 16 .15 TO JEDEC MS-	L6910G	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UN0401	Q7	SO 16 .15 TO JEDEC MS-	L6910GTR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
J2	UD3903	Q7	SO 16 .15 TO JEDEC MS-	L6910TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Au wire, SHD frame
92	L75203	Q7	SO 16 .15 TO JEDEC MS-	SG2525AP	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	L75203	Q7	SO 16 .15 TO JEDEC MS-	SG2525AP013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	L75003	Q7	SO 16 .15 TO JEDEC MS-	SG3524P	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	L75003	Q7	SO 16 .15 TO JEDEC MS-	SG3524P013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	L75203	Q7	SO 16 .15 TO JEDEC MS-	SG3525AP	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	L75203	Q7	SO 16 .15 TO JEDEC MS-	SG3525AP013TR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	D31001	Q7	SO 16 .15 TO JEDEC MS-	TD310ID	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	D31001	Q7	SO 16 .15 TO JEDEC MS-	TD310IDT	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	D35001	K7	SO 14 .15 TO JEDEC MS-	TD350E	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	D35001	K7	SO 14 .15 TO JEDEC MS-	TD350ETR	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	174703	K7	SO 14 .15 TO JEDEC MS-	TDE1747FP	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame

pnl	line	pk	pkdescr	cp	old B/E plant	new B/E plant	old BOM	new BOM
91	174703	K7	SO 14 .15 TO JEDEC MS-	TDE1747FPT	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	174703	K7	SO 14 .15 TO JEDEC MS-	TDE3247FP	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	174703	K7	SO 14 .15 TO JEDEC MS-	TDE3247FPT	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U78601	Q7	SO 16 .15 TO JEDEC MS-	TSM1002DSD	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	U78601	Q7	SO 16 .15 TO JEDEC MS-	TSM1002DSDT	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UF6801	K7	SO 14 .15 TO JEDEC MS-	TSM108ID	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UF6801	K7	SO 14 .15 TO JEDEC MS-	TSM108IDH	AMKOR	SHENZHEN B/E	Ecopack 2, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UF6801	K7	SO 14 .15 TO JEDEC MS-	TSM108IDT	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
92	UF6801	K7	SO 14 .15 TO JEDEC MS-	TSM108IDTH	AMKOR	SHENZHEN B/E	Ecopack 2, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	WF4305	K7	SO 14 .15 TO JEDEC MS-	WFK143CB14	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
91	WF4305	K7	SO 14 .15 TO JEDEC MS-	WFK143CB14T	MUAR B/E	SHENZHEN B/E	Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame

**List of products housed in SO 16 Narrow package**

<b>pnl</b>	<b>line</b>	<b>pk</b>	<b>pkdescr</b>	<b>cp</b>	<b>old B/E plant</b>	<b>new B/E plant</b>	<b>old FG: old BOM</b>	<b>new BOM</b>
32	L20103	Q7	SO 16 .15 TO JEDEC MS-	ULN2001D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2001D1R\$1K: Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20103	Q7	SO 16 .15 TO JEDEC MS-	ULN2001D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2001D1R\$2K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20203	Q7	SO 16 .15 TO JEDEC MS-	ULN2002D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2002D1R\$1K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20203	Q7	SO 16 .15 TO JEDEC MS-	ULN2002D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2002D1R\$2K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20203	Q7	SO 16 .15 TO JEDEC MS-	ULN2002D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2002D1R\$K2: Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20303	Q7	SO 16 .15 TO JEDEC MS-	ULN2003D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2003D1R\$2K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20303	Q7	SO 16 .15 TO JEDEC MS-	ULN2003D1013TR	ASE	SHENZHEN B/E	ULN2003D1R\$2S: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20303	Q7	SO 16 .15 TO JEDEC MS-	ULN2003D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2003D1R\$3K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20303	Q7	SO 16 .15 TO JEDEC MS-	ULN2003D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2003D1R\$K3: Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20403	Q7	SO 16 .15 TO JEDEC MS-	ULN2004/1BR	BOUSKOURA	SHENZHEN B/E	ULN2004/1BR\$2K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20403	Q7	SO 16 .15 TO JEDEC MS-	ULN2004D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2004D1R\$2K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20403	Q7	SO 16 .15 TO JEDEC MS-	ULN2004D1013TR	BOUSKOURA	SHENZHEN B/E	ULN2004D1R\$K2: Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20303	Q7	SO 16 .15 TO JEDEC MS-	ULQ2003D1013TR	ASE	SHENZHEN B/E	ULQ2003D1R\$2S: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20303	Q7	SO 16 .15 TO JEDEC MS-	ULQ2003D1013TR	BOUSKOURA	SHENZHEN B/E	ULQ2003D1R\$3K: Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20303	Q7	SO 16 .15 TO JEDEC MS-	ULQ2003D1013TR	BOUSKOURA	SHENZHEN B/E	ULQ2003D1R\$5K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20303	Q7	SO 16 .15 TO JEDEC MS-	ULQ2003D1013TR	BOUSKOURA	SHENZHEN B/E	ULQ2003D1R\$6K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20403	Q7	SO 16 .15 TO JEDEC MS-	ULQ2004D1013TR	BOUSKOURA	SHENZHEN B/E	ULQ2004D1R\$2K: Ecopack 2, Cu wire, standard frame	Ecopack 2, Cu wire, SHD frame
32	L20403	Q7	SO 16 .15 TO JEDEC MS-	ULQ2004D1013TR	BOUSKOURA	SHENZHEN B/E	ULQ2004D1R\$K2: Ecopack 1, Au wire, standard frame	Ecopack 2, Cu wire, SHD frame



**PRELIMINARY RELIABILITY EVALUATION**  
**QUALIFICATION OF SOIC 8/14/16L**  
**SHDLF(SUPER HIGH DENSITY LEAD FRAME)**  
**Gold & Cu wire with HALOGEN FREE vers.**  
**ST-SHENZHEN(CHINA)**

**DOCUMENT INFORMATION**

Version	Date	Pages	Prepared by	Approved by	Comment
1.1	28-Jun-2012	16	F.VENTURA I&PC QA&R / B/E	A.MOTTA I&PC QA&R DIR.	Final report

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.  
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IMS  
Industrial & Multisegment Sector  
APM  
Analog, Power, MEMs  
I&PC  
Industrial & Power Conversion  
Quality & Reliability B-END

Report ID [RR000112CT6004](#)

General Information	
Product Line	CAO7*U324AE6
P/N	L6387ED-CHF/L6387ED13TR-CHF/L6387EDR-CHF/
Product Group	APM
Product division	Industrial & Power Conversion
Package	SOIC 8L
Silicon Process technology	A5 BCD OFF LINE
Maturity level step	21

Locations	
Wafer fab	AMK5 (ANG MO KIO S'PORE)
Assembly plant	ST-SHENZHEN- CHINA
Preliminary Reliability Assessment	PASSED
Reliability Lab	ST-ITALY

General Information	
Product Line	CCO7*UF58FC3
P/N	STSR2PCD-CHF/STSR2PCD-TR-CHF
Product Group	APM
Product division	Industrial & Power Conversion
Package	SOIC 8L
Silicon Process technology	A8 BCD3 S
Maturity level step	21

Locations	
Wafer fab	AMK5 (ANG MO KIO S'PORE)
Assembly plant	ST-SHENZHEN- CHINA
Preliminary Reliability Assessment	PASSED
Reliability Lab	ST-ITALY

General Information	
Product Line	CCO7*UD72EC6
P/N	L5972D-CHF/L5972DTR-CHF/
Product Group	APM
Product division	Industrial & Power Conversion
Package	SOIC 8L
Silicon Process technology	A1 BCD5S
Maturity level step	21

Locations	
Wafer fab	AMK5 (ANG MO KIO S'PORE)
Assembly plant	ST-SHENZHEN- CHINA
Preliminary Reliability Assessment	PASSED
Reliability Lab	ST-SHENZHEN





<b>1</b>	<b>APPLICABLE AND REFERENCE DOCUMENTS</b>	<b>3</b>
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Document reference	Short description
AEC-Q100	Stress test qualification for automotive grade integrated circuits
JESD47	Stress-Test-Driven Qualification of Integrated Circuits

## **1 GLOSSARY**

DUT	Device Under Test
SS	Sample Size



## 2 RELIABILITY EVALUATION OVERVIEW

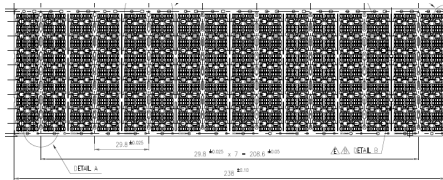
### 2.1 Objectives

SDHLF QUALIFICATION WITH NEW ECOPAK 2 HALOGEN FREE MATERIALS ST-SHENZHEN

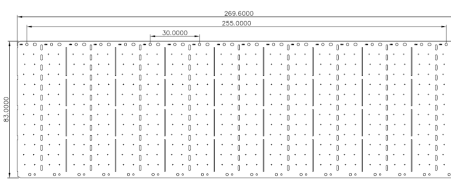
### 2.2 Conclusion

Qualification Plan requirements (WORKABILITY/ TESTING / CONSTRUCTION ANALISYS) have been fulfilled without exception. It is stressed that **PRELIMINARY** reliability tests have shown that the devices behave correctly against environmental tests (no failure). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the ruggedness of the products and safe operation, which is consequently expected during their lifetime.

#### SUPER HIGH DENSITY LEAD FRAME SCENARIO:



**STS SO8 Current HD frame**  
8\*4\*8=256units/strip;  
70mm\*238.1mm



**STS SO8 Super HD frame – IDF**  
12Rows  
12\*4\*9=432units/strip;  
83mm\*269.6mm



**STS SO14/16I Super HD frame – IDF**  
12Rows \*\*  
12\*4\*5=240units/strip;



## 2.3 Construction note

P/N: L6387ED-CHF/L6387ED13TR-CHF/L6387EDR-CHF/	
<b>Wafer/Die fab. information</b>	
Wafer fab manufacturing location	AMK5
Technology	ANG MO KIO S'PORE
Process family	BCD5S
Die finishing back side	A1 BCD5S
Die size	CHROMIUM NICKEL
Bond pad metallization layers	2370 x 1700 mm
Passivation type	Al/Si/Cu
	SIN
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	AMK5
<b>Assembly information</b>	
Assembly site	ST-SHENZHEN (CHINA)
Package description	SOIC8L NARROW .15
Molding compound	ECOPAK 2 COMPLIANCE
Frame material	SHDLF 8L Ni/Thin/Pd/Ag/Au OPT.C
Die attach process	EPOXY
Die attach material	EPOXY GLUE
Die pad size	98 X 150 mil
Wire bonding process	THERMOSONIC
Wires bonding materials/diameters	1mils Cu
Lead finishing process	Pre- plated
Package code	O7
<b>Final testing information</b>	
Testing location	ST-SHENZHEN (CHINA)



## Construction note

P/N: STSR2PCD-CHF/STSR2PCD-TR-CHF	
<b>Wafer/Die fab. information</b>	AMK5
Wafer fab manufacturing location	ANG MO KIO S'PORE
Technology	BCD3s
Process family	A8 BCD3s
Die finishing back side	CHROMIUM/NICKEL/GOLD
Die size	1940 x 2740 mm
Bond pad metallization layers	Ti/TiN/Ti/Al/Si/Cu
Passivation type	USG-PSG-SiON-PIX
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	AMK5
<b>Assembly information</b>	
Assembly site	ST-SHENZHEN (CHINA)
Package description	SOIC8L NARROW .15
Molding compound	ECOPAK 2 COMPLIANCE
Frame material	SHDLF 8L Ni/Thin/Pd/Ag/Au OPT.C
Die attach process	EPOXY
Die attach material	EPOXY GLUE
Die pad size	98 X 150 mil
Wire bonding process	THERMOSONIC
Wires bonding materials/diameters	1.3mils Cu
Lead finishing process	Pre- plated
Package code	O7
<b>Final testing information</b>	
Testing location	ST-SHENZHEN (CHINA)



## Construction note

<i>P/N:L5972D-CHF/L5972DTR-CHF/</i>	
<b>Wafer/Die fab. information</b>	
	AMK5
Wafer fab manufacturing location	ANG MO KIO S'PORE
Technology	BCD5S
Process family	A1BCD5S
Die finishing back side	CHROMIUM/NICKEL
Die size	2770 x 1980 mm
Bond pad metallization layers	Ti/TiN/Ti/AI/Si/Cu
Passivation type	USG-PSG-SION-PIX
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	AMK5
<b>Assembly information</b>	
Assembly site	ST-SHENZHEN (CHINA)
Package description	SOIC8L NARROW .15
Molding compound	ECOPAK 2 COMPLIANCE
Frame material	SHDLF 8L Ni/Thin/Pd/Ag/Au OPT.B
Die attach process	EPOXY
Die attach material	EPOXY GLUE
Die pad size	94 X 125 mil
Wire bonding process	THERMOSONIC
Wires bonding materials/diameters	1.3mils Au
Lead finishing process	Pre- plated
Package code	O7
<b>Final testing information</b>	
Testing location	ST-SHENZHEN (CHINA)



### 3 TESTS RESULTS SUMMARY

#### 3.1 Test vehicle \*U324

Lot #	Diffusion Lot	Assy Lot	Trace Code	Process/Package	Product Line	Comments
1	V61380X8	GK21214D01	GK21214D	SOIC 8L NARROW	CA07*U324AE6	

Detailed results in below chapter will refer to P/N and Lot #.

#### 3.2 Test plan and results summary

P/N L6387ED-CHF/L6387ED13TR-CHF/L6387EDR-CHF/

Test	PC	Std ref.	Conditions	Steps	Note
PC	Y	JESD22 A020-D	MSL_3 (192H 30°C/60%H.R)	0/300	NO DELAMINATION TOP/BOTTOM
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C	96 H 168 H	0/77 0/77
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	500 cy 1000cy	0/77 0/77
HTSL	N	JESD22 A-103	Ta = 150°C	500 H 1000 H	0/77 0/77

#### 3.3 Test vehicle \*UF58

Lot #	Diffusion Lot	Assy Lot	Trace Code	Process/Package	Product Line	Comments
1	V6127L05	GK21214F01	GK21214F	SOIC 8L NARROW	CC07*UF58FC3	

Detailed results in below chapter will refer to P/N and Lot #.



### 3.4 Test plan and results summary

Test	PC	Std ref.	Conditions	Steps	Note
PC	Y	JESD22 A020-D	MSL_3 (192H 30°C/60%H.R)	0/300	
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C	96 H	0/77
				168 H	*
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	100 cy	0/77
				500cy	*
				1000cy	*
HTSL	N	JESD22 A-103	Ta = 150°C	168 H	0/77
				500 H	*
				1000 H	*

**\*ON GOING**

In case of Automotive customer insert here the family data.

In case of rejects include a short description of the failure analysis and corrective actions.

**Forecast of end evaluation WK31-2012**

### TESTS RESULTS SUMMARY

#### Test vehicle \* UD72

Lot #	Diffusion Lot	Assy Lot	Trace Code	Process/ Package	Product Line	Comments
1	V6152F2H	GK2160LL01	GK2160L	SOIC 8L NARROW	CC07*UD72EC6	

Detailed results in below chapter will refer to P/N and Lot #.



## Test plan and results summary

Test	PC	Std ref.	Conditions	Steps	Note
PC	Y	JESD22 A020-D	MSL_3 (192H 30°C/60%H.R)	0/300	
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C	96 H	*
				168 H	*
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	100 cy	*
				500cy	*
				1000cy	*
HTSL	N	JESD22 A-103	Ta = 150°C	168 H	*
				500 H	*
				1000 H	*

**\*ON GOING**

In case of Automotive customer insert here the family data.

In case of rejects include a short description of the failure analysis and corrective actions.

**Forecast of end evaluation WK33-2012**

### 3.4.1 ANNEXES

See below attached docs.

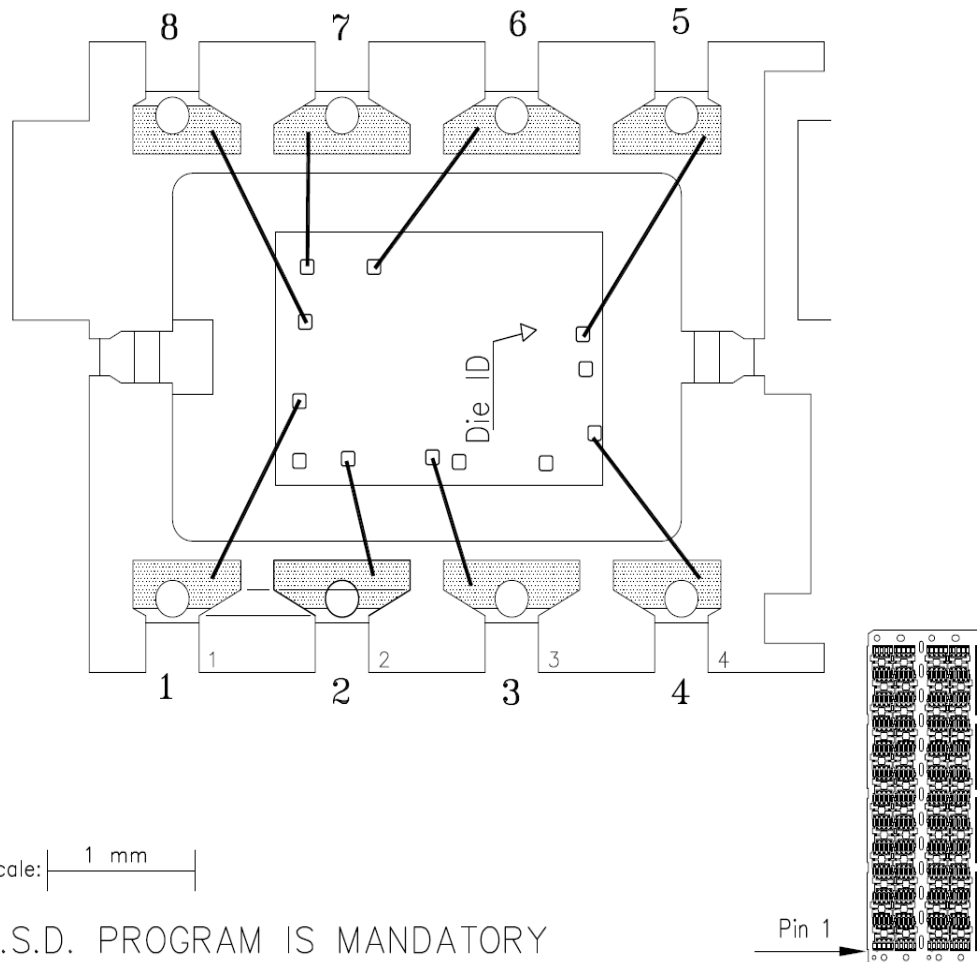
BONDING DIAGRAM/POA





# MBD for U324 prod line (S08)

FRAME PAD :  $\frac{98 \times 150 \text{ mls}}{2,489 \times 3,810 \text{ mm}}$



Scale: | 1 mm |

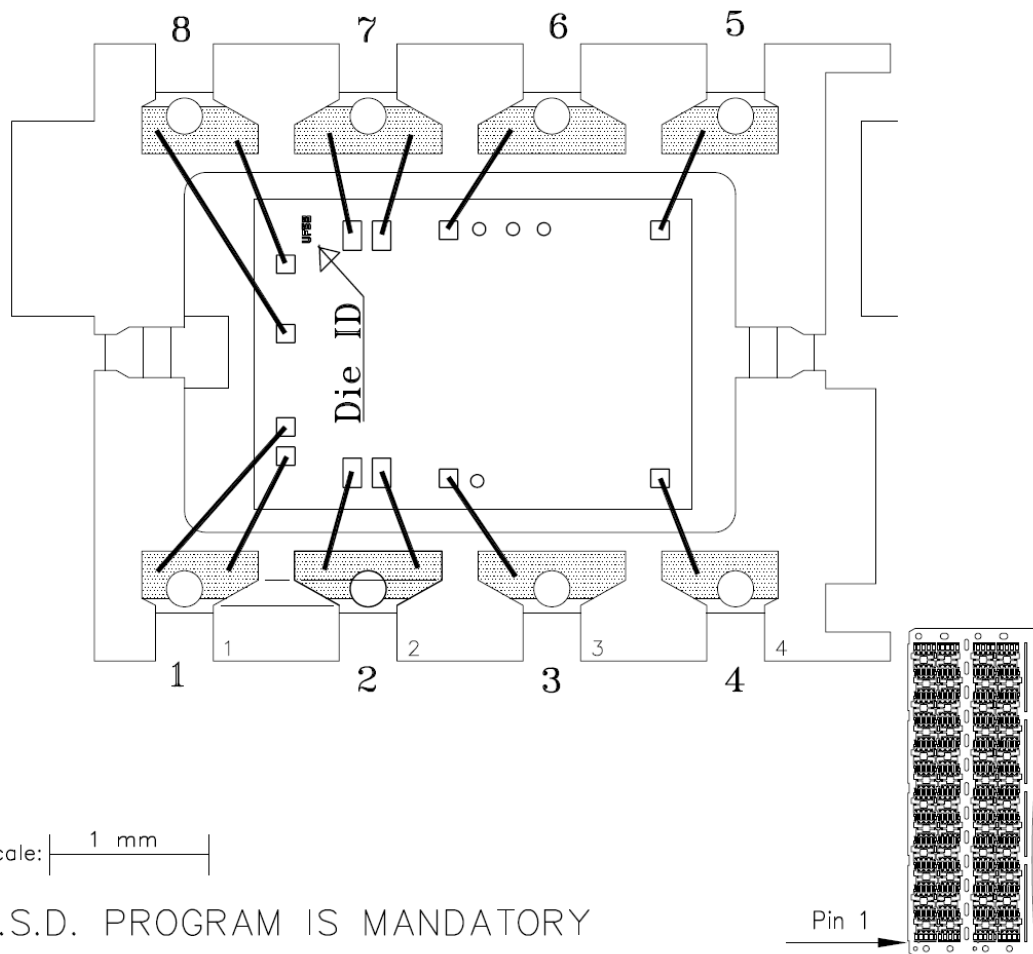
E.S.D. PROGRAM IS MANDATORY

Pin 1



# MBD for UF58 prod line (S08)

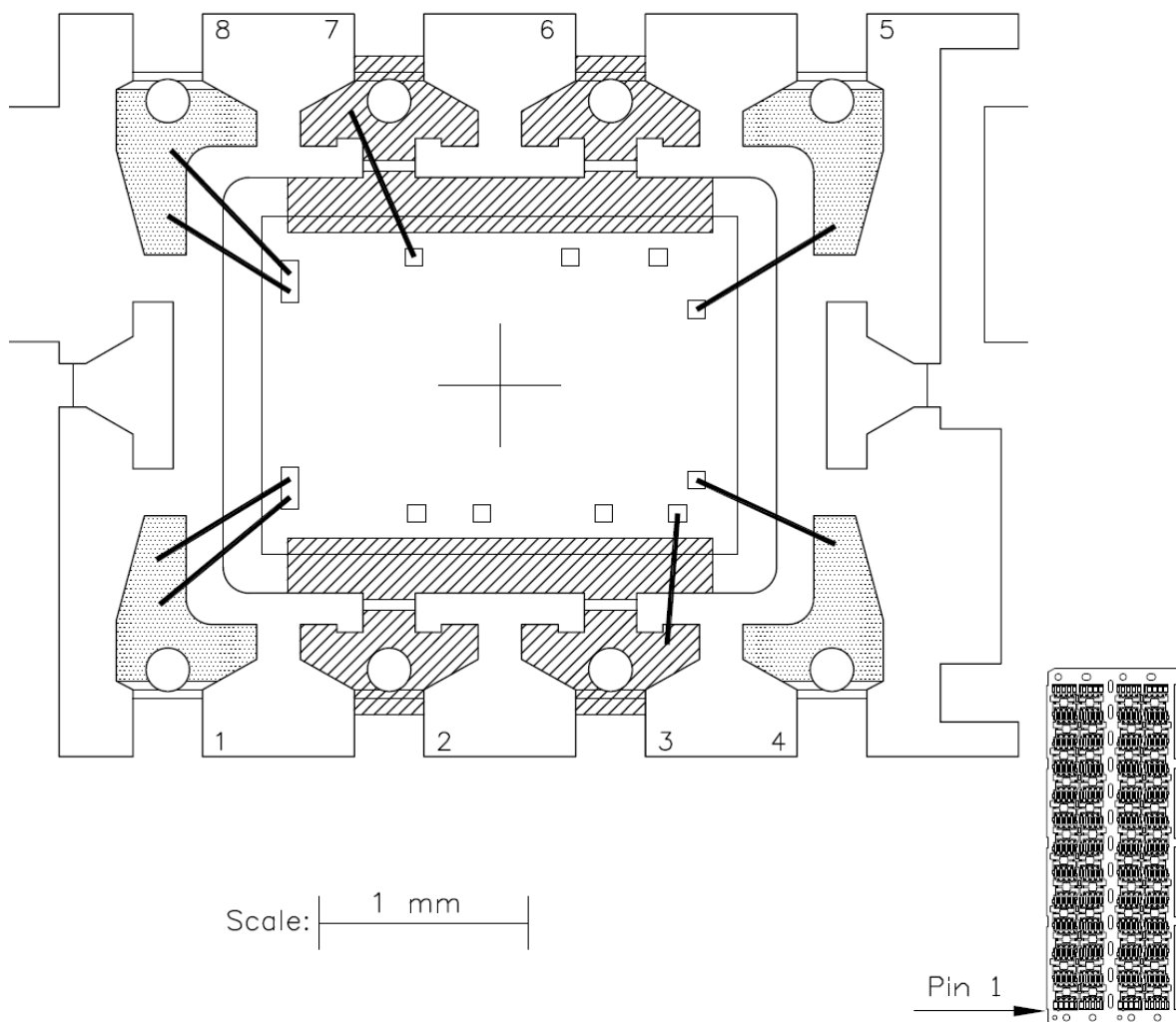
FRAME PAD :  $\frac{98 \times 150 \text{ mls}}{2,489 \times 3,810 \text{ mm}}$





## MBD FOR UD72 PROD LINE (SO8 - SHD 1/f)

FRAME PAD :  $\frac{094 \times 125 \text{ mils } (4+2+2)}{2,387 \times 3,171 \text{ mm}}$



E.S.D. PROGRAM IS MANDATORY



### 3.4.1 Package outline/Mechanical data

#### PACKAGE OUTLINE ASSEMBLY

**TITLE: PLASTIC SMALL OUTLINE PACKAGE 8L**

**PACKAGE CODE: O7 (O like OSCAR)**

**PACKAGE WEIGHT: 0,0765 g/unit typ**

**JEDEC/EIAJ REFERENCE NUMBER: JEDEC MS-012-AA**

DIMENSIONS							
REF.	DATABOOK (mm)			DRAWING (mm)			NOTES
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
A			1.75			1.74	
A1	0.10		0.25	0.12	0.15	0.18	
A2	1.25			1.48	1.52	1.56	
b	0.28		0.48	0.375	0.40	0.425	
c	0.17		0.23	0.192	0.20	0.225	
D	4.80	4.90	5.00	4.87	4.90	4.93	(1)
E	5.80	6.00	6.20	5.90	6.00	6.10	
E1	3.80	3.90	4.00	3.87	3.90	3.93	(2)
e		1.27			1.27		
h	0.25		0.50	0.425		0.50	
L	0.40		1.27	SEE LEADFRAME OPTIONS			
L1		1.04			1.05		
k	0		8	2	4	8	DEGREES
ccc			0.10			0.04	

LEADFRAME OPTIONS							
REF.	PREPLATED			POSTPLATED			NOTES
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
L	0.567	0.617	0.667	0.585	0.635	0.685	

**NOTES:**

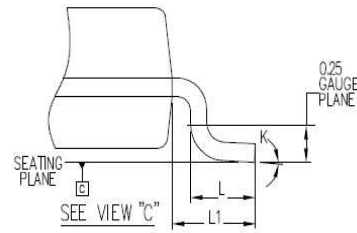
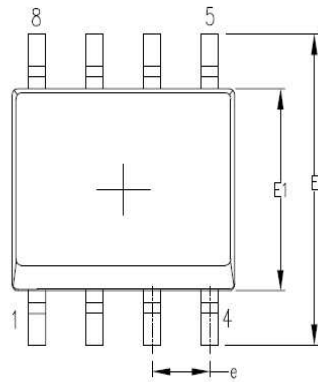
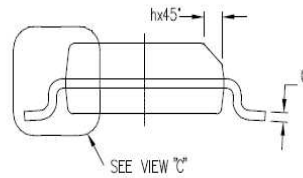
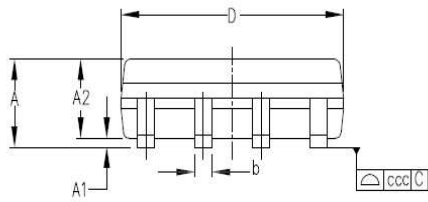
- (1) – Dimension "D" does not include mold flash, protrusions or gate burrs.  
Mold flash, protrusions or gate burrs shall not exceed 0.15mm in total (both side).
- (2) – Dimension "E1" does not include interlead flash or protrusions.  
Interlead flash or protrusions shall not exceed 0.25mm per side.



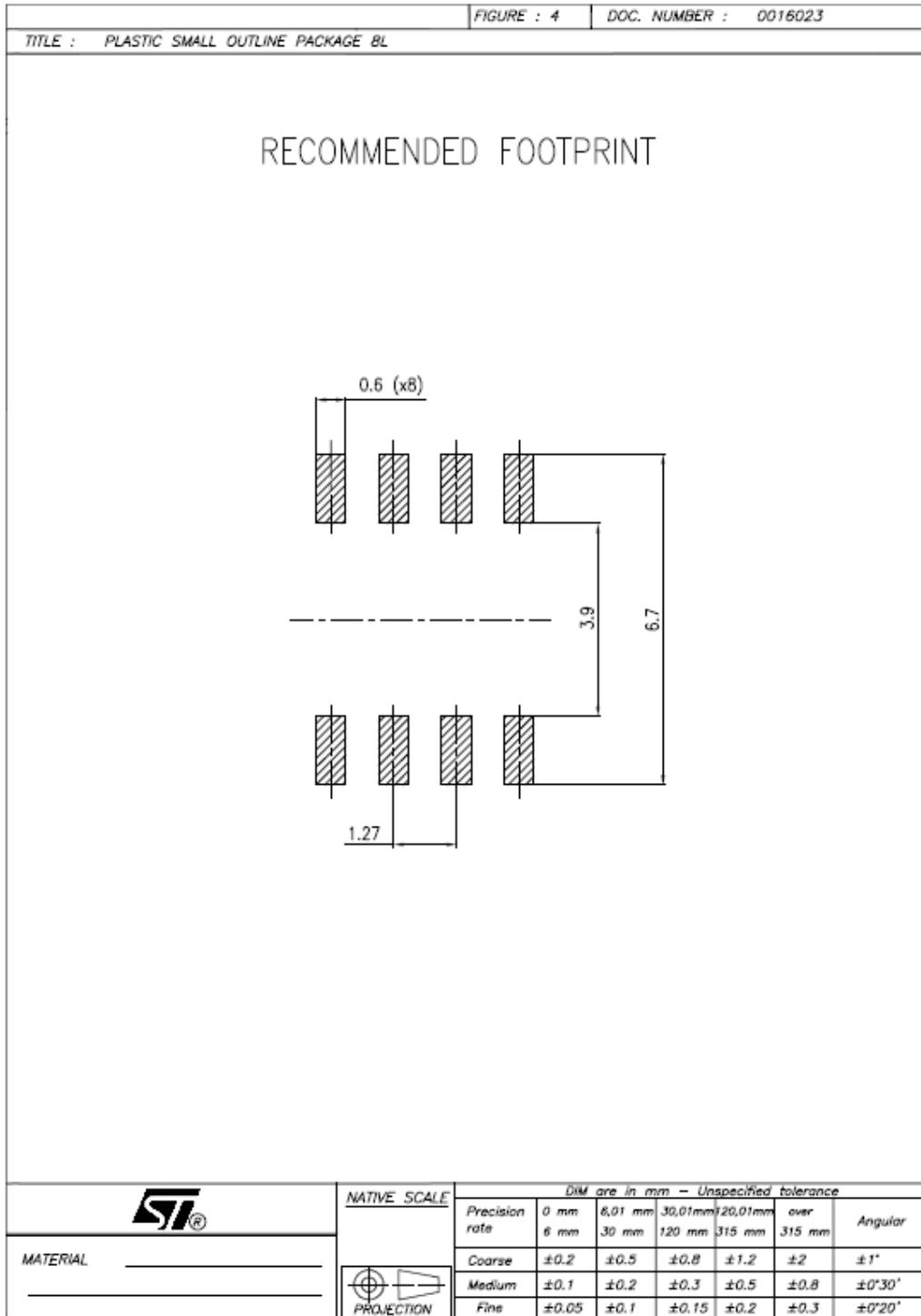
IMS  
 Industrial & Multisegment Sector  
 APM  
 Analog, Power, MEMs  
 I&PC  
 Industrial & Power Conversion  
 Quality & Reliability B-END

Report ID RR000112CT6004

FIGURE : 2 DOC. NUMBER : 0016023  
 TITLE : POA PLASTIC SMALL OUTLINE PACKAGE 8L (ASE SUBCON.)



	NATIVE SCALE	DIM are in mm - Unspecified tolerance						
		Precision rate	0 mm 6 mm	6,01 mm 30 mm	30,01mm 120 mm	120,01mm 315 mm	over 315 mm	Angular
MATERIAL _____		Coarse	±0.2	±0.5	±0.8	±1.2	±2	±1°
		Medium	±0.1	±0.2	±0.3	±0.5	±0.8	±0°30'
©Copyright STMicroelectronics	COMPANY INTERNAL	Fine	±0.05	±0.1	±0.15	±0.25	±0.5	±0°30'





## Tests Description

Test name	Description	Purpose
<b>Package Oriented</b>		
<b>PC</b> Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "pop corn" effect and delamination.
<b>AC</b> Auto Clave (Pressure Pot)	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
<b>TC</b> Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
<b>HTSL</b> High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.



# Internal Reliability Evaluation Report

***SO8 Super High Density Frame  
Assembly Plant Shenzhen***

***T.V: ST890BDR***

General Information	
Product Line	UD91
Product Description	Programmable current limit up to 1.2 A
P/N	ST890BDR
Product Group	AMS
Product division	ANALOG Standard Products & HiRel
Package	SO8 Super High Density Frame
Silicon Process technology	BCD5

Locations	
Wafer fab	SINGAPORE Ang Mo Kio
Assembly plant	SHENZHEN
Reliability Lab	CATANIA
Reliability assessment	Pass

## DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	25 JUNE 2012	10	Angelo Basile	Giovanni Presti	Final Report

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.

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## 1 APPLICABLE AND REFERENCE DOCUMENTS

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits

## 2 GLOSSARY

DUT	Device Under Test
SS	Sample Size



---

### **3 REIABILITY EVALUATION OVERVIEW**

#### **3.1 Objectives**

SO8 Super High Density Lead Frame in Shenzhen.

The ST890BDR is one of the Test Vehicles chosen for the *SOIC 8/14/16L SHDLF*.

#### **3.2 Conclusion**

Qualification Plan requirements have been fulfilled without exception. It is stressed that reliability tests have shown that the devices behave correctly against environmental tests (no failure).



## 4 DEVICE CHARACTERISTICS

### 4.1 Device description

#### **Description**

The ST890 is a low voltage, P-channel MOSFET power switch intended for high side load switching applications. The switch operates with inputs from 2.7 V to 5.5 V, making it ideal for both 3 V and 5 V systems. The internal current limiting circuitry protects the input supply against overload. The thermal overload protection limits power dissipation and junction temperatures. The maximum current limit is 1.2 A. The current limit through the switch is programmed with a resistor from SET to ground. The device is available in SO-8 and DFN8L (3 x 3 mm)

### 4.2 Construction note

<b>P/N</b>	
<b>TLVH431BIL3T</b>	
<b>Wafer/Die fab. information</b>	
<b>SO8</b>	
Wafer fab manufacturing location	Ang Mo Kio - Singapore
Technology	BCD5
Die finishing back side	RAW SILICON
Die size	2140, 1830 micron
Passivation type	USG-PSG-SION-PIX
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	Ang Mo Kio
Tester	ASL1000
Test program	UD91UA00A11
<b>Assembly information</b>	
Assembly site	SHENZHEN
Package description	SO 08 .15 JEDEC
Molding compound	Epoxy Ecopack2
Frame material	<b>FRAME SO 8L 94x125 HD IDF OpB</b>
Die attach material	EPOXY GLUE
Wire bonding process	THERMOSONIC
Wires bonding materials/diameters	WIRE Cu D1.3
Lead finishing process	NiPdAgAu (4 layers)
Lead finishing/bump solder material	PPF (Preplated I/f)
<b>Final testing information</b>	
Testing location	SHENZHEN
Tester	ASL1K
Test program	UD91UA00A11



## 5 TESTS RESULTS SUMMARY

### 5.1 Test vehicle

Lot #	Assy Lot	Process/ Package	Product Line	Comments
1	GK2101FX01	SO8	UD91	Super high density frame

### 5.2 Test plan and results summary

P/N ST890BDR

Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS	Note
<b>Die Oriented Tests</b>							
HTOL	N	JESD22 A-108	Tj = 125°C, BIAS= 6V	77	168 H	0/77	
					500 H	0/77	
					1000 H	0/77	
HTSL	N	JESD22 A-103	Ta = 150°C	45	168 H	0/45	
					500 H	0/45	
					1000 H	0/45	
<b>Package Oriented Tests</b>							
PC		JESD22 A-113	Drying 24 H @ 125°C Store 168 H @ Ta=85°C Rh=85% Oven Reflow @ Tpeak=260°C 3 times	231	Final	Pass	go no go
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C	77	168h	0/77	
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	77	100 cy	0/77	
					200 cy	0/77	
					500 cy	0/77	
THB	Y	JESD22 A-101	Ta = 85°C, RH=85%, BIAS= 4.5V	77	168 H	0/77	
					500 H	0/77	
					1000 H	0/77	



## 6 ANNEXES

### 6.1 Device details

#### 6.1.1 Pin connections

Figure 1. SO-8 pin connection (top view)

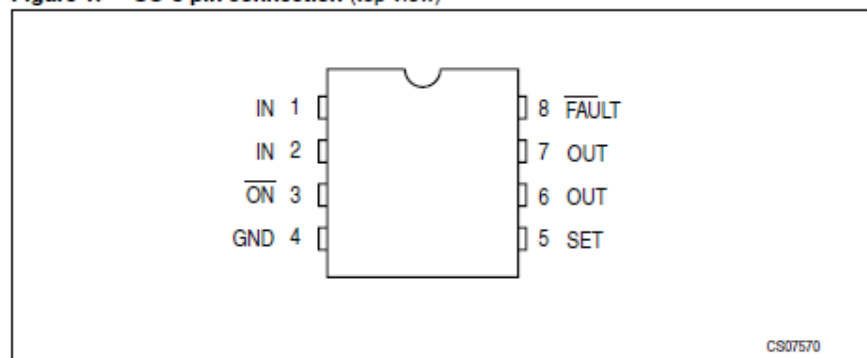


Table 2. SO-8 pin description

Pin N.	Symbol	Name and function
1, 2	IN	Input P-channel MOSFET source. Bypass IN with a 1 $\mu\text{F}$ capacitor to ground
3	$\overline{\text{ON}}$	Active low switch ON input. A logic low turns the switch ON
4	GND	Ground
5	SET	Set current limit input. A resistor from SET to GND sets the current limit for the switch. $R_{\text{SET}} = 1.24 \times 1110 / I_{\text{LIM}}$ , where $I_{\text{LIM}}$ is the desired current limit in Amperes
6,7	OUT	Switch output. P-channel MOSFET drain. Bypass OUT with a 0.1 $\mu\text{F}$ capacitor to ground
8	$\overline{\text{FAULT}}$	Fault indicator output. This open drain output goes low when in current limit or when the die temperature exceeds 135°C

### 6.1.2 Block diagram

Figure 3. Schematic diagram

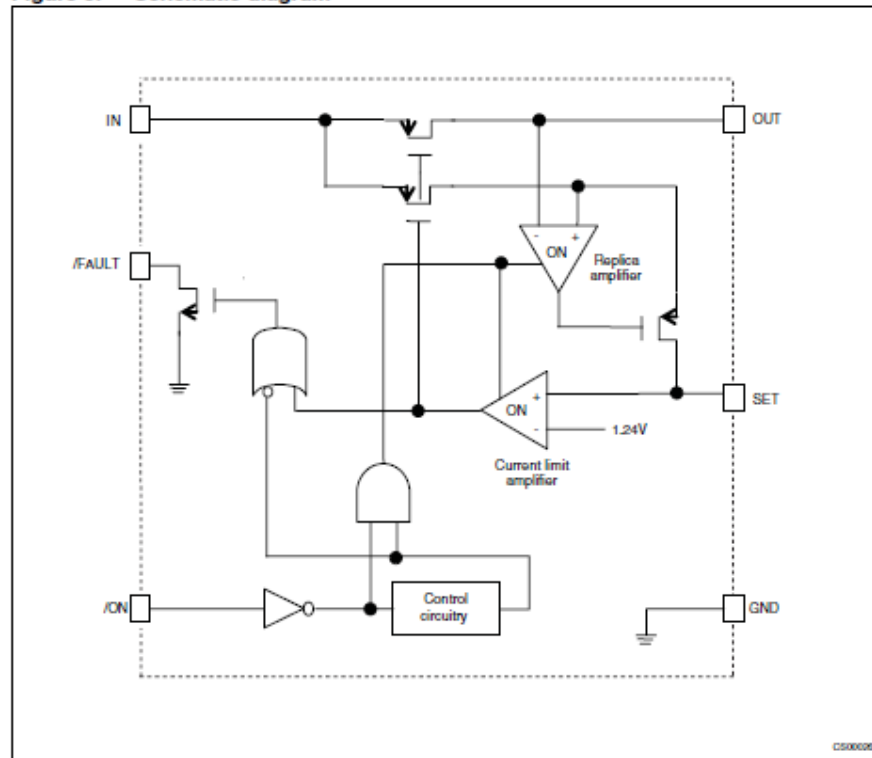


Table 4. Truth table for  $\overline{\text{ON}}$ /OFF switch

$\overline{\text{ON}}$ /OFF	OUT
L	ON
H	OFF

Table 5. Truth table for FAULT

FAULT	FLAG
H	Normal operation
L	Fault condition

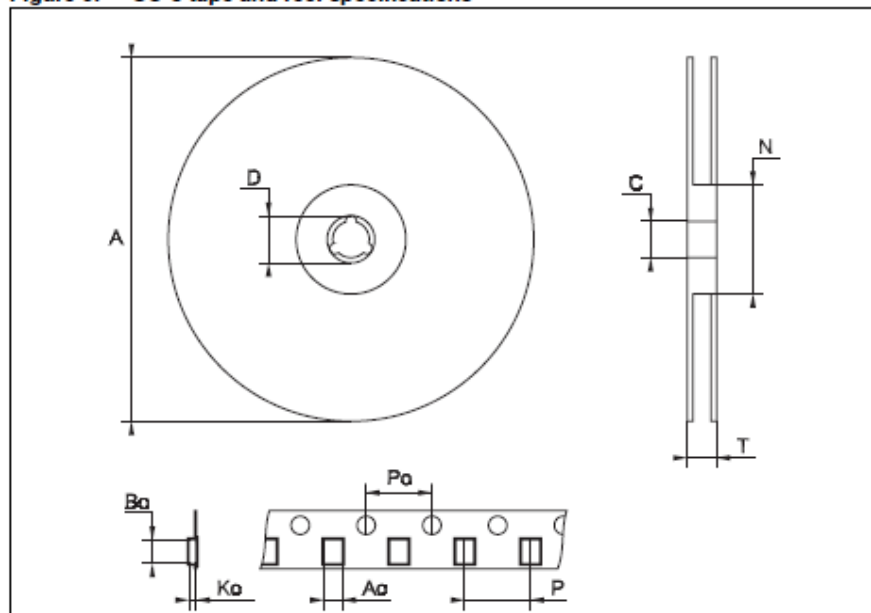


### 6.1.3 Package outline/Mechanical data

Package mechanical data

ST890

Figure 9. SO-8 tape and reel specifications



1. Drawing not to scale.

Table 11. SO-8 tape and reel mechanical data

Symbol	millimeters			inches		
	Min	Typ	Max	Min	Typ	Max
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	8.1		8.5	0.319		0.335
Bo	5.5		5.9	0.216		0.232
Ko	2.1		2.3	0.082		0.090





## 6.2 Tests Description

Test name	Description	Purpose
<b>Die Oriented</b>		
<b>HTOL</b> High Temperature Operative Life	The device is stressed in static or dynamic configuration, approaching the operative max. absolute ratings in terms of junction temperature and bias condition.	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices' operating condition in an accelerated way. The typical failure modes are related to, silicon degradation, wire-bonds degradation, oxide faults.
<b>HTSL</b> High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.
<b>Package Oriented</b>		
<b>PC</b> Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "pop corn" effect and delamination.
<b>AC</b> Auto Clave (Pressure Pot)	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
<b>TC</b> Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
<b>THB</b> Temperature Humidity Bias	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.



## Internal Reliability Evaluation Report

**S08 Super High Density Frame  
Assembly Plant Shenzhen**

***T.V.:TL431ICDT***

General Information	
<b>Product Line</b>	1431AD6
<b>Product Description</b>	Programmable voltage reference
<b>P/N</b>	TL1431CDT
<b>Product Group</b>	IMS-IPD IPC
<b>Product division</b>	Linear Voltage Regulators & Vref
<b>Packages</b>	S08
<b>Silicon Process technology</b>	BIP 111 Bipolar

Locations	
<b>Wafer fab</b>	ANG MO KIO
<b>Assembly plant</b>	SHENZHEN
<b>Reliability Lab</b>	CATANIA
<b>Reliability assessment</b>	Pass

### DOCUMENT INFORMATION

Version	Date	Pages	Prepared by	Approved by	Comment
1.0	22-JUNE 2012	8	Angelo Basile	Giovanni Presti	Final Report

Note: This report is a summary of the reliability trials performed in good faith by STMicroelectronics in order to evaluate the potential reliability risks during the product life using a set of defined test methods.

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Linear Voltage Regulators & Vref  
Quality and Reliability

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## **1 APPLICABLE AND REFERENCE DOCUMENTS**

Document reference	Short description
JESD47	Stress-Test-Driven Qualification of Integrated Circuits

## **2 GLOSSARY**

DUT	Device Under Test
SS	Sample Size

## **3 RELIABILITY EVALUATION OVERVIEW**

### **3.1 Objectives**

SO8 Super High Density Frame in Shenzhen.

The TL1431CDT is one of the Test Vehicles chosen for the *SOIC 8/14/16L SHDLF(Super High D LEAD FRAME) qualification.*

### **3.2 Conclusion**

Qualification Plan requirements have been fulfilled without exception. It is stressed that reliability tests have shown that the devices behave correctly against environmental tests (no failure in the available steps). Moreover, the stability of electrical parameters during the accelerated tests demonstrates the ruggedness of the products and safe operation, which is consequently expected during their lifetime.


 Linear Voltage Regulators & Vref  
 Quality and Reliability

## 4 DEVICE CHARACTERISTICS

### 4.1 Device description

The TL1431 is a programmable shunt voltage reference with guaranteed temperature stability over the entire operating temperature range. The device's temperature range is extended for the automotive version from -40°C up to +125°C. The output voltage can be set to any value between 2.5 and 36 V with two external resistors. The TL1431 operates with a wide current range from 1 to 100 mA with a typical dynamic impedance of 0.2Ω.

### 4.2 Construction note

	P/N
	TL1431CDTt
<b>Wafer/Die fab. information</b>	<b>SO8</b>
Wafer fab manufacturing location	SINGAPORE Ang Mo Kio
Technology	BIP111 BIPOLAR
Die finishing back side	RAW Silicon
Die size	1820x1120um
Passivation type	SiN
<b>Wafer Testing (EWS) information</b>	
Electrical testing manufacturing location	Ang Mo Kio EWS
Tester	ASL1000
Test program	T0431AW1
<b>Assembly information</b>	
Assembly site	SHENZHEN
Package description	SO8
Molding compound	Epoxy Ecopack 2
Frame material	SO 8L 94x125 HD IDF OpB NiThPd
Die attach process	GLUE
Die attach material	Epoxy Glu
Wire bonding process	Cu wire bonding
Wires bonding materials/diameters	1.0mil Cu wire
Lead finishing process	NA, PPF lead frame
<b>Final testing information</b>	
Testing location	Shenzhen
Tester	ASL1000
Test program	T0431AW1



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**5 TESTS RESULTS SUMMARY**

**5.1 Test vehicle**

Lot #	Assy Lot	Process/ Package	Product Line	Comments
1	GK21114001	SO8	1431AD6	Super High Density Frame SO8

**5.2 Test plan and results summary**

P/N TL1431CDT

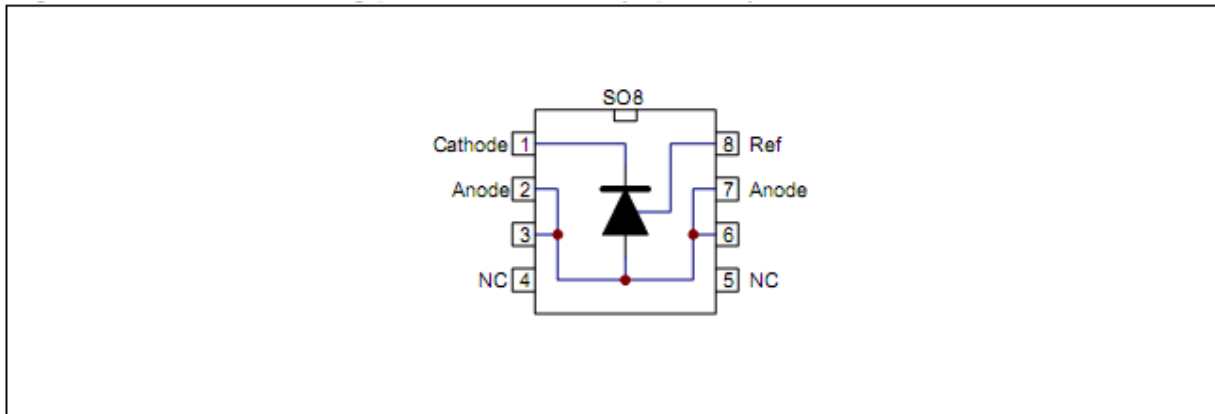
Test	PC	Std ref.	Conditions	SS	Steps	Failure/SS	Note
						SO8	
<b>Die Oriented Tests</b>							
HTOL	N	JESD22 A-108	Ta = 125°C, BIAS= 5V	77	168 H	0/77	
					500 H	0/77	
					1000 H	0/77	
HTSL	N	JESD22 A-103	Ta = 150°C	45	168 H	0/45	
					500 H	0/45	
					1000 H	0/45	
<b>Package Oriented Tests</b>							
PC		JESD22 A-113	Drying 24 H @ 125°C Store 168 H @ Ta=85°C Rh=85% Oven Reflow @ Tpeak=260°C 3 times	231	Final	Pass	Go no go
AC	Y	JESD22 A-102	Pa=2Atm / Ta=121°C	77	96 H		
					168 H	0/77	
TC	Y	JESD22 A-104	Ta = -65°C to 150°C	77	100 cy	0/77	
					200 cy	0/77	
					500 cy	0/77	
THB	Y	JESD22 A-101	Ta = 85°C, RH=85%, BIAS= 3V	77	168 H	0/77	
					500 H	0/77	
					1000 H	0/77	



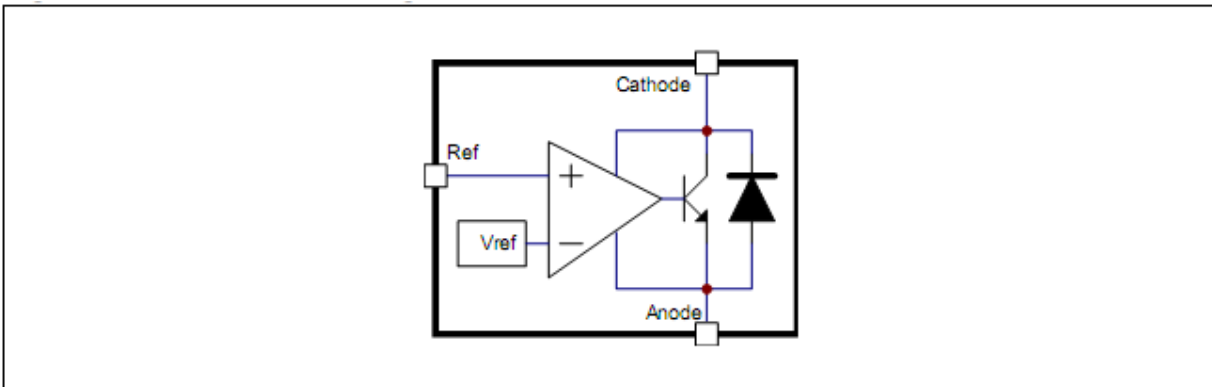
## 6 ANNEXES

### 6.1 Device details

#### 6.1.1 Pin connection



#### 6.1.2 Block diagram

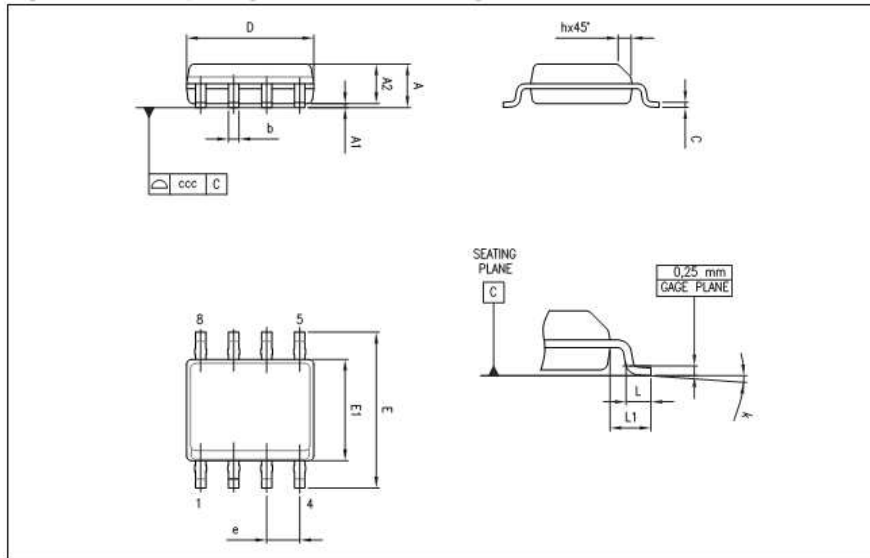




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6.1.3 Package out line/Mechanical data

SO8 package information



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
A1	0.10		0.25	0.004		0.010
A2	1.25			0.049		
b	0.28		0.48	0.011		0.019
c	0.17		0.23	0.007		0.010
D	4.80	4.90	5.00	0.189	0.193	0.197
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e		1.27			0.050	
h	0.25		0.50	0.010		0.020
L	0.40		1.27	0.016		0.050
L1		1.04			0.040	
k	1°		8°	1°		8°
ccc			0.10			0.004





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## 6.2 Tests Description

Test name	Description	Purpose
<b>Die Oriented</b>		
<b>HTOL</b> High Temperature Operative Life	The device is stressed in static or dynamic configuration, approaching the operative max. absolute ratings in terms of junction temperature and bias condition.	To determine the effects of bias conditions and temperature on solid state devices over time. It simulates the devices' operating condition in an accelerated way. The typical failure modes are related to, silicon degradation, wire-bonds degradation, oxide faults.
<b>HTSL</b> High Temperature Storage Life	The device is stored in unbiased condition at the max. temperature allowed by the package materials, sometimes higher than the max. operative temperature.	To investigate the failure mechanisms activated by high temperature, typically wire-bonds solder joint ageing, data retention faults, metal stress-voiding.
<b>Package Oriented</b>		
<b>PC</b> Preconditioning	The device is submitted to a typical temperature profile used for surface mounting devices, after a controlled moisture absorption.	As stand-alone test: to investigate the moisture sensitivity level. As preconditioning before other reliability tests: to verify that the surface mounting stress does not impact on the subsequent reliability performance. The typical failure modes are "pop corn" effect and delamination.
<b>AC</b> Auto Clave (Pressure Pot)	The device is stored in saturated steam, at fixed and controlled conditions of pressure and temperature.	To investigate corrosion phenomena affecting die or package materials, related to chemical contamination and package hermeticity.
<b>TC</b> Temperature Cycling	The device is submitted to cycled temperature excursions, between a hot and a cold chamber in air atmosphere.	To investigate failure modes related to the thermo-mechanical stress induced by the different thermal expansion of the materials interacting in the die-package system. Typical failure modes are linked to metal displacement, dielectric cracking, molding compound delamination, wire-bonds failure, die-attach layer degradation.
<b>THB</b> Temperature Humidity Bias	The device is biased in static configuration minimizing its internal power dissipation, and stored at controlled conditions of ambient temperature and relative humidity.	To evaluate the package moisture resistance with electrical field applied, both electrolytic and galvanic corrosion are put in evidence.

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