Initial Product/Process Change Notification

Document #:IPCN25001Z
Issue Date:29 Sep 2022

Title of Change:	Transfer front end manufacturing of AS0149 to TSMC Fab 14 and transition to Rev 1.1
Proposed Changed Material First Ship Date:	01 Jul 2023 or earlier if approved by customer
Current Material Last Order Date:	09 Jan 2023 *Orders received after the Current Material Last Order Date expiration are to be considered as orders for new changed material as described in this PCN. Orders for current (unchanged) material after this date will be per mutual agreement and current material inventory availability*.
Current Material Last Delivery Date:	30 Jun 2023 *The Current Material Last Delivery Date may be subject to change based on build and depletion of the current (unchanged) material inventory*
Product Category:	Active components – Integrated circuits
Contact information:	Contact your local onsemi Sales Office or Mike.Webster@onsemi.com
PCN Samples Contact:	Contact your local onsemi Sales Office to place sample order. Sample requests are to be submitted no later than 45 days after publication of this change notification. Samples delivery timing will be subject to request date, sample quantity and special customer packing/label requirements.
Additional Reliability Data:	Contact your local onsemi Sales Office or Mike.Webster@onsemi.com
Type of Notification:	This is an Initial Product/Process Change Notification (IPCN) sent to customers. An IPCN is an advance notification about an upcoming change and contains general information regarding the change details and devices affected. It also contains the preliminary reliability qualification plan.The completed qualification and characterization data will be included in the Final Product/Process Change Notification (FPCN). This IPCN notification will be followed by a Final Product/Process Change Notification (FPCN) at least 6 months prior to implementation of the change. In case of questions, contact <PCN.Support@onsemi.com>.

Change Category

Category	**Type of Change**
Process - Wafer Production	Move of all or part of wafer fab to a different location/site/subcontractor

Description and Purpose:

onsemi currently manufactures the Rev 1.0 AS0149 front-end CMOS process at the TSMC Fab 12 facility; once product completes this process in Fab 12, it is then delivered to TSMC Fab 14 for the backside Imager process. Both Fab 12 and Fab 14 are located in Taiwan, but at separate locations.

As part of the overall capacity improvement strategy at TSMC, we are moving all manufacturing out of FAB 12 and into FAB 14. We are qualifying AS0149 Rev 1.1 products front-end CMOS processing at the TSMC Fab 14 facility to allow us to transfer manufacturing to the FAB 14 facility. The new TSMC Fab 14 facility is fully automotive certified and is currently running the same generation of product/process for *onsemi*. These facilities use the same equipment and manufacturing processes. There are no product material changes as a result of this change. Wafer probe, final test and AEC-Q100 reliability testing is currently being performed on AS0149 REV 1.1 to show equivalence between these facilities.

The AS0149 Revision 1.1 has been released to production at TSMC Fab 12 as a direct replacement for previous AS0149 revisions. The Rev 1.1 has the same functionality as the previous Revision 1.0, but contains a metal layer design change to address:
1) High startup current. Some registers, used for diagnostic purposes only, were in an unknown state at startup. These registers persisted in their unknown state until the part would enter streaming, at which time all register values are reset to their intended values
The Rev1.1 fix was to tie these diagnostic registers to ground. With these registers tied off, there is no path to ground. Validation tests done on Rev1.1 show that the fix has worked. These diagnostic registers are for test purposes only and are not for customer usage. Thus, there are no settings changes required for the customer.

2) DNSU shutter jump. The Rev1.0 design was missing the logic that tied shutter to TX pulsing. The Rev1.1 fix was to insert the missing logic that ties shutter to TX pulsing. This was a metal-only design fix.

There is no change to Form, Fit or Function for this revision. Revision 1.1 is fully backward compatible to Rev 1.0 devices and has been fully qualified at TSMC Fab 12.
The AS0149ATSC00XUEA0-DPBR product discontinuance notice has been distributed and a PDN will be distribued for AS0149ATSC00XUEA0-TRBR next.
This PCN will couple the FAB transfer and the Revision update in a single change.

	From	To
Fab Site of Front End Processing	TSMC FAB 12	TSMC FAB 14
Product Revision	Revision 1.0	Revision 1.1

	From	To
Product marking change	HBDLR	HBDMP

Reason / Motivation for Change:	Capacity improvement
Anticipated impact on fit, form, function, reliability, product safety or manufacturability:	The device will be qualified and validated based on the same Product Specification. No anticipated impacts.

Sites Affected:

onsemi Sites	**External Foundry/Subcon Sites**
None	TSMC Semiconductor, Taiwan

Marking of Parts/ Traceability of Change:	New OPN associated with the revision change

Reliability Data Summary:

QV DEVICE NAME : AS0149ATSC00XUEA0-DPBR
PACKAGE : 8mmx9mm iBGA

Test	Specification	Condition	Interval
HTOL	JESD22-A108	Ta= 125 °C Tj, 100 % max rated Vcc	1008 hrs
ELFR	AEC Q100-008	Ta= 125 °C	24 hrs
PC	J-STD-020 JESD-A113	MSL 3 @ 260 °C	
HTSL	JESD22-A103	Ta= 150 °C	1008 hrs
TC	JESD22-A104	Ta= -55 °C to +125 °C	1000 cyc
HAST	JESD22-A110	110°C, 85% RH, with bias	264 hrs
uHAST	JESD22-A118	110°C, 85% RH, unbiased	264 hrs
WBS	AEC Q100-001 AEC Q003	CPK >1.67	
WBP	MIL-STD883 Method 2011 AEC Q003	CPK >1.67, 0 Fails after TC (test #A4)	
HBM	AEC Q100-002	0 Fails; 2KV HBM	
CDM	AEC Q100-011	0 Fails: 750V for corner pins, 500V all other pins	
LU	AEC Q100-004	0 Fails	
ED	AEC Q100-009 AEC Q003	Elect. Distribution: (Test @ C/ R/ H)	

To view attachments:
1. Download pdf copy of the PCN to your computer
2. Open the downloaded pdf copy of the PCN
3. Click on the paper clip icon available on the menu provided in the left/bottom portion of the screen to reveal the Attachment field
4. Then click on the attached file.

Electrical Characteristics Summary:

Electrical characteristics are not impacted. Full electrical performance will be supplied upon FPCN.

List of Affected Parts:

Note: *Only the standard (off the shelf) part numbers are listed in the parts list. Any custom parts affected by this PCN are shown in the customer specific PCN addendum in the PCN email notification, or on the* ***PCN Customized Portal****.*

Current Part Number	New Part Number	Qualification Vehicle
AS0149ATSC00XUEA0-DPBR	AS0149ATSC00XUEA1-DPBR	AS0149ATSC00XUEA0-DPBR
AS0149ATSC00XUEA0-TRBR	AS0149ATSC00XUEA1-TRBR	AS0149ATSC00XUEA0-TRBR