ON Semiconductor®

Final Product/Process Change Notification

Document # : FPCN22337X
Issue Date: 13 July 2018

Title of Change:	Qualification of Aizu Fujitsu Semiconductor Manufacturing (AFSM) as additional wafer fabrication facility, and qualification of palladium coated copper (PdCu) wire bill of material at ON Semiconductor, Tarlac City, Philippines (ON Semiconductor – Tarlac) for NCP153MX330180TCG.
Proposed first ship date:	20 October 2018 *or earlier with customer approval.*
Contact information:	Contact your local ON Semiconductor Sales Office or <Leos.Kneisl@onsemi.com>
Samples:	Contact your local ON Semiconductor Sales Office or <PCN.samples@onsemi.com> Sample requests are to be submitted no later than 30 days from the date of first notification, Initial PCN or Final PCN, for this change.
Additional Reliability Data:	Contact your local ON Semiconductor Sales Office or <Tomas.Vajter@onsemi.com>.
Type of notification:	This is a Final Product/Process Change Notification (FPCN) sent to customers. FPCNs are issued 90 days prior to implementation of the change. ON Semiconductor will consider this change accepted, unless an inquiry is made in writing within 30 days of delivery of this notice. To do so, contact <PCN.Support@onsemi.com>.
Change Part Identification:	Shipments made after work week 39, 2018 (or earlier with customer approval), may contain die fabricated in either AFSM or ON Semiconductor. The product date code will indicate the work week of manufacturing and the product labels will contain the wafer source indicator. Shipments made after work 39, 2018 (or earlier with customer approval) which have been assembled in ON Semiconductor, Tarlac City, Philippines, will be assembled with PdCu wire. There will be a hard cut-over between wire bond material and date code traceability of the conversion will be maintained by ON Semiconductor.
Change Category:	☑ Wafer Fab Change ☑ Assembly Change ☐ Test Change ☐ Other _____

Change Sub-Category(s):

☑ Manufacturing Site Addition	☑ Material Change	☐ Datasheet/Product Doc change
☐ Manufacturing Site Transfer	☐ Product specific change	☐ Shipping/Packaging/Marking
☐ Manufacturing Process Change		☐ Other: _____

Sites Affected:	ON Semiconductor Sites: ON Tarlac City, Philippines	External Foundry/Subcon Sites: Aizu Fujitsu, Japan

Description and Purpose:

The AFSM (Aizu Fujitsu Semiconductor Manufacturing) wafer fab, located in Aizuwakamatsu, Japan has been qualified as additional capacity supply for the ONC25 CMOS wafer process. AFSM utilizes the same process technology as is currently running in the ON Semiconductor wafer fab located in Gresham, Oregon, USA. Tool sets are different, but the exact same masking layers and processing steps are used in both fabs. This is a capacity expansion to supplement the existing ON Semiconductor wafer fab. The parts qualified are dual sourced and may be processed at either wafer fab in the future, depending on capacity requirements.

Additionally, this change is also announcing the conversion from 0.8mil gold (Au) to 0.8mil palladium coated copper (PdCu) wire bond material for product assembled by ON Semiconductor, Tarlac City, Philippines (ON Semiconductor-Tarlac). Upon effectively of this PCN, product manufactured by ON Semiconductor-Tarlac will convert to PdCu wire.

The bill of material for product assembled in alternate qualified manufacturing locations will not change.

	Before Change Description	After Change Description
Wafer source	ON Semiconductor; Gresham, Oregon, USA	ON Semiconductor; Gresham, Oregon, USA, or Aizu Fujitsu Semiconductor Manufacturing; Aizu, Japan
Wire bond diameter and material	0.8 mil Au	0.8 mil PdCu

Reliability Data Summary:

QV DEVICE NAME: NCP153MX330180TCG (Gresham die + Tarlac PdCu BOM)

Test	Name	Test Conditions	Interval	Results
HTSL	High Temp Storage	TA = 150°C for 1008 hours	1008 Hrs & 2016 Hrs	0/256
HTOL	High Temp Operating Life	TA = 125°C for 1008 hours	1008 Hrs	0/254
PC	MSL1 Preconditioning	3 IR @ 260 deg C	Results	0/390
TC	Temp Cycle (precond)	Ta= -65 °C to 150 °C , air to air	500 cyc	0/375
HAST	Highly Accelerated Stress Test (precond)	Temp= +130°C, RH=85% , p = 18.8 psig, bias	96 Hrs	0/357
uHAST	un-bias Highly Accelerated Stress Test (precond)	Temp= +130°C, RH=85% , p = 18.8 psig, un-bias	96 Hrs & 192 Hrs	0/254
RSH	Resistance to Solder Heat	260 C Immersion	Results	0/90
SAT	Scanning Acoustic Tomography	Compare for Delamination before and after PC	Results	0/66
WBP	Wire Bond Pull	MIL-STD-883 Method 2011	30 bonds 5 parts	0/5
WBP	Wire Bond Pull (post Precond)	MIL-STD-883 Method 2011	30 bonds 5 parts	0/36
WBP	Wire Bond Pull (post TC500)	MIL-STD-883 Method 2011	30 bonds 5 parts	0/18
WBP	Wire Bond Pull (post HAST96)	MIL-STD-883 Method 2011	30 bonds 5 parts	0/18
BS	Bond Shear	AEC-Q100-001	30 bonds 5 parts	0/5
BS	Bond Shear (post Precond)	AEC-Q100-001	30 bonds 5 parts	0/18
BS	Bond Shear (post TC500)	AEC-Q100-001	30 bonds 5 parts	0/9
BS	Bond Shear (post HAST96)	AEC-Q100-001	30 bonds 5 parts	0/9
PMD	Pad Metal Displacement	12MON49370E	-	Pass
UPD	Under Pad Damage	12MON49370E	-	Pass

Due to the performance and reliability similarities between Gresham and AFSM die (same process technology, same bond pad structure) there are no identified risks with the AFSM + Tarlac PdCu wire combination, however additional reliability data will be collected using the AFSM + PdCu wire from Tarlac combination in order to augment the reliability database.

AFSM qualification details are provided below for reference. This data has been previously published in FPCN21520X, FPCN21520XA, and FPCN21520XB, and is repeated again here for customer convenience.

QV DEVICE NAME : NCP170A/BXVxxxT2G (AFSM die + existing qualified assembly locations, per FPCN21520XB)

Test	Specification	Condition	Interval	Results
HTOL	JESD22-A108	Ta=125°C, 100 % max rated Vcc	1008 hrs	0/160
ELFR	JA108	Ta=125°C, 100 % max rated Vcc	48 hrs	0/2400
HTSL	JA103	Ta=150°C	1008 hrs	0/240
TC	JESD22-A104	Ta= -65°C to +150°C	500 cyc	0/270
HAST	JESD22-A110	130°C, 85% RH, 18.8psig, bias	264 hrs	0/270
UHAST	JESD22-A118	130°C, 85% RH, 18.8psig, unbiased	96 hrs	0/240
PC	J-STD-020 JESD-A113	MSL 1 @ 260 °C		PASS
RSH	JESD22- B106	Ta = 265C, 10 sec		0/90
ED	Electrical Distribution	Critical parameters		CPK>1.67, Pass
BPS	MILSTD883 Method 2011	Cond C.		CPK>1.67, Pass
SAT	J-STD-020 JESD-A113			Pass
ESD	CDM JS002		1kV	Pass
ESD	HBM JS001		2kV	Pass
LU	JESD78	Class II	+/-100ma	Pass

QV DEVICE NAME: NCP160/1BFCSxxxT2G, NCP160/1BFCTxxxT2G, NCP160/1A/BMXxxxTBG (AFSM + qualified assembly locations, per FCPN21520X, FPCN21520XA)

Test	Specification	Condition	Interval	Results
HTOL	JESD22-A108	Ta=125°C, 100 % max rated Vcc	1008 hrs	0/336
HTSL	JA103	Ta=150°C	1008 hrs	0/251
TC	JESD22-A104	Ta= -40°C to +150°C	1000 cyc	0/334
HAST	JESD22-A110	130°C, 85% RH, 18.8psig, bias	96 hrs	0/336
UHAST	JESD22-A118	130°C, 85% RH, 18.8psig, unbiased	96 hrs	0/336
PC	J-STD-020 JESD-A113	MSL 1 @ 260 °C		Pass
ED	Electrical Distribution	Critical parameters		CPK>1.67, Pass
ESD	HBM JS001		2kV	Pass
LU	JESD78		+/-100mA	Pass

Electrical Characteristic Summary:

Electrical characteristics are not impacted. Data available upon request.

List of Affected Part:

Part Number	Qualification Vehicle
NCP153MX330180TCG	NCP153MX330180TCG