



Final Product/Process Change Notification

Document #:FPCN24366X

Issue Date:11 Jan 2022

| | |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Title of Change: | Addition of HuaTian as second source for AR0144 image sensor based CSP products. |
| Proposed First Ship date: | 18 Apr 2022 or earlier if approved by customer |
| Contact Information: | Contact your local onsemi Sales Office or Geethakrishnan.Narasimhan@onsemi.com |
| PCN Samples Contact: | Contact your local onsemi Sales Office. 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. 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 Amy.Wu@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. onsemi 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 |
| Marking of Parts/ Traceability of Change: | Date Code Mar 2022 |
| Change Category: | Assembly Change |
| Change Sub-Category(s): | Manufacturing Site Addition |

Sites Affected:

| onsemi Sites | External Foundry/Subcon Sites |
|--------------|-------------------------------|
| None | Huatian Technology, China |
| | Xintec (ISBU) |

Description and Purpose:

In order to increase capacity to meet additional demand, Huatian Technology Kuro San (HTKS) is being qualified and added as an additional site for CSP (Chip Scale Package) assembly of AR0144 image sensor products. KYEC will continue to support final test for the products assembled in HTKS. There is no change to test program or limits with this proposed change. The key changes and manufacturing routes for CSP assembly and test are summarized below.

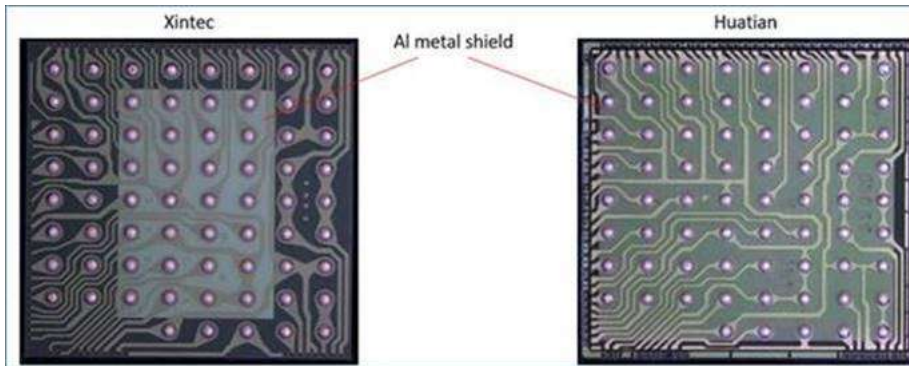
| | Before Change Description (Xintec) | After Change Description (Xintec, HTKS) |
|-------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Passivation | CVD Oxide 1-2um | Xintec: CVD Oxide 1-2um HTKS: Passivation 1: JSR5100 (10um) Passivation2: JSR5100 (9um) |
| Redistribution Layer (RDL) | PVD -- Al/Cu (5um+/-15%) ECD – N/A E'less Material—Ni (2.5+/-0.5um); Au (0.03-0.18um) | Xintec – (see previous column) HTKS: PVD --Ti (0.15um)/ Cu (1um) ECD—Cu (3.8+/-0.5um) E'less Material—Ni(3+/-1um); Au (0.03-0.12um) |
| BBAR Glass Supplier | Hermosa | Xintec: Hermosa HTKS: Crystal Optic |
| Dam Material | LSF60 | Xintec: LSF60 HTKS: 5635 |
| CSP Assembly Site | Xintec | Xintec HuaTian (HTKS) |

| | | |
|-----------------|------|------|
| Final Test Site | KYEC | KYEC |
|-----------------|------|------|

There are no product material changes as a result of this change.

There is no product marking change as a result of this change.

There are no changes in physical dimensions. The difference in the appearance of the backside of the parts is shown below. The Al metal shield covers most of the backside in the CSP package assembled in Huatian.



Reliability Data Summary:

QV DEVICE NAME: AR0144CSSM20SUKA0
 PACKAGE TYPE: CSP

| Test | Specification | Condition | Interval | Results |
|------|------------------|-----------------------------------------------|-------------|---------|
| HTOL | JESD22-A108 | Ta= 105°C, 100 % max rated Vcc | 504 hrs | 0/240 |
| PC | J-STD-020 | 30°C/60%RH for 96hrs + 3X IR Reflow @ 245C | - | 0/462 |
| TC | JESD22-A104 | -55°C - 125°C | 1000 cycles | 0/231 |
| HAST | JESD22-A110 | 110°C/85% RH with max rated Vcc | 264 hrs | 0/231 |
| HTSL | JESD22-A103 | Ta= 150°C | 1008 hrs | 0/90 |
| SD | J-STD-002 | Solderability | - | 0/30 |
| SBS | AEC-Q100-010 | Solder Ball Shear | - | 0/30 |
| PD | JESD22 B100,B108 | Physical Dimension: Critical Cpk>1.33 | - | 0/30 |
| HBM | JESD22-A114 | Electrostatic Discharge, Human Body Model | HBM 2KV | Pass |
| CDM | JESD22-C101 | Electrostatic Discharge, Charge Device Model: | CDM 500V | Pass |
| LU | JESD78 | Latch-up | - | Pass |

Electrical Characteristics Summary:

There is no change in the electrical characteristics. Below is the summary of the comparison of key electrical parameters measured on CSP parts assembled in current site i.e. Xintec and the proposed site i.e. Huatian.

| AR0144 test data at Ta=room temp | | Units | Upper Specification | Xintec | | | Huatian | | | Accuracy% | CPU Diff | Temp Condition of specification |
|----------------------------------|-------------------------------------|-------|---------------------|--------|---------|-------|---------|---------|-------|-----------|----------|---------------------------------|
| Quantity | Mode | | | Stdev | Mean | CPU | Stdev | Mean | CPU | | | |
| IDD | Parallel, Streaming, Full Res 60fps | mA | 51 | 0.83 | 24.73 | 10.54 | 0.84 | 24.85 | 10.34 | 0.49 | 0.20 | Tj=60 |
| IDD IO | Parallel, Streaming, Full Res 60fps | mA | NA | 0.72 | 38.23 | 13.53 | 0.57 | 38.19 | 15.62 | 0.10 | 2.09 | Tj=60 |
| IAA | Parallel, Streaming, Full Res 60fps | mA | 37 | 0.77 | 28.25 | 3.81 | 0.80 | 28.20 | 3.70 | 0.18 | 0.12 | Tj=60 |
| IAA PIX | Parallel, Streaming, Full Res 60fps | mA | 3.5 | 0.05 | 2.61 | 5.96 | 0.05 | 2.60 | 6.00 | 0.26 | 0.04 | Tj=60 |
| IDD | MIPI, Streaming, Full Res 60fps | mA | 82 | 1.35 | 43.56 | 9.55 | 1.34 | 43.75 | 9.54 | 0.44 | 0.01 | Tj=60 |
| IDD IO | MIPI, Streaming, Full Res 60fps | mA | 0.35 | 0.01 | 0.13 | 7.33 | 0.01 | 0.13 | 7.33 | 0.00 | 0.00 | Tj=60 |
| IAA | MIPI, Streaming, Full Res 60fps | mA | 63 | 0.76 | 28.47 | 15.24 | 0.79 | 28.42 | 14.68 | 0.15 | 0.56 | Tj=60 |
| IAA PIX | MIPI, Streaming, Full Res 60fps | mA | 3.5 | 0.05 | 2.61 | 5.96 | 0.05 | 2.60 | 6.00 | 0.26 | 0.04 | Tj=60 |
| Analog (VAA + VAA PIX + VDD IO) | Soft Standby, ClkOn | uA | 240 | 1.48 | 65.58 | 35.31 | 3.53 | 65.68 | 20.73 | 0.15 | 14.58 | Tj=60 |
| Digital (VDD + VDD PHY) | Soft Standby, ClkOn | uA | 5400 | 29.99 | 2236.05 | 42.72 | 25.73 | 2241.25 | 41.07 | 0.23 | 1.65 | Tj=60 |
| Analog (VAA + VAA PIX + VDD IO) | Soft Standby, ClkOff | uA | 200 | 2.37 | 17.91 | 26.31 | 3.94 | 18.17 | 17.61 | 1.45 | 8.70 | Tj=60 |
| Digital (VDD + VDD PHY) | Soft Standby, ClkOff | uA | 1500 | 25.30 | 47.34 | 29.28 | 22.05 | 45.23 | 22.05 | 4.45 | 7.23 | Tj=60 |
| Analog (VAA + VAA PIX + VDD IO) | Hard Standby, ClkOn | uA | 200 | 1.22 | 11.47 | 44.68 | 3.45 | 11.73 | 23.37 | 2.27 | 21.31 | Tj=60 |
| Digital (VDD + VDD PHY) | Hard Standby, ClkOn | uA | 1500 | 25.17 | 45.83 | 29.40 | 21.98 | 43.72 | 22.14 | 4.60 | 7.26 | Tj=60 |
| Analog (VAA + VAA PIX + VDD IO) | Hard Standby, ClkOff | uA | 200 | 2.35 | 18.03 | 26.55 | 4.04 | 18.27 | 17.36 | 1.37 | 9.19 | Tj=60 |
| Digital (VDD + VDD PHY) | Hard Standby, ClkOff | uA | 1500 | 25.31 | 47.26 | 29.25 | 22.07 | 45.15 | 22.04 | 4.46 | 7.22 | Tj=60 |



Final Product/Process Change Notification

Document #:FPCN24366X

Issue Date:11 Jan 2022

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**.

| Part Number | Qualification Vehicle |
|---------------------------|------------------------|
| AR0144CSSM28SUKA0-CPBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM20SUKA0-HQ-CRBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM20SUKA0-HQ-CPBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM20SUKA0-CRBR1 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM20SUKA0-CRBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM20SUKA0-CPBR1 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM20SUKA0-CPBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM00SUKA0-CRBR1 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM00SUKA0-CRBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM00SUKA0-CPBR2 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM00SUKA0-CPBR1 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSSM00SUKA0-CPBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC20SUKA0-CRBR1 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC20SUKA0-CRBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC20SUKA0-CPBR1 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC20SUKA0-CPBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC00SUKA0-CRBR1 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC00SUKA0-CRBR | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC00SUKA0-CPBR2 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC00SUKA0-CPBR1 | AR0144CSSM20SUKA0-CPBR |
| AR0144CSC00SUKA0-CPBR | AR0144CSSM20SUKA0-CPBR |

Appendix A: Changed Products

PCN#: FPCN24366X
Issue Date: Jan 11, 2022

| Product | Customer Part Number | Qualification Vehicle | New Part Number | Replacement Supplier |
|-------------------------|----------------------|------------------------|-----------------|----------------------|
| AR0144CSSM20SUKA0-CPBR1 | | AR0144CSSM20SUKA0-CPBR | NA | |
| AR0144CSSC00SUKA0-CPBR2 | | AR0144CSSM20SUKA0-CPBR | NA | |
| AR0144CSSC00SUKA0-CPBR1 | | AR0144CSSM20SUKA0-CPBR | NA | |
| AR0144CSSM00SUKA0-CPBR2 | | AR0144CSSM20SUKA0-CPBR | NA | |