

<b>PCN Number:</b>	20180326001A	<b>PCN Date:</b>	May 14, 2018
<b>Title:</b>	Qualify TI Chengdu (CDAT) as an additional Assembly & Test site for select devices		
<b>Customer Contact:</b>	<a href="#">PCN Manager</a>	<b>Dept:</b>	Quality Services
<b>Proposed 1<sup>st</sup> Ship Date:</b>	Aug 14, 2018	<b>Estimated Sample Availability:</b>	Provided upon Request
<b>Change Type:</b>			
<input checked="" type="checkbox"/>	Assembly Site	<input type="checkbox"/>	Design
<input type="checkbox"/>	Assembly Process	<input type="checkbox"/>	Data Sheet
<input checked="" type="checkbox"/>	Assembly Materials	<input type="checkbox"/>	Part number change
<input type="checkbox"/>	Mechanical Specification	<input checked="" type="checkbox"/>	Test Site
<input checked="" type="checkbox"/>	Packing/Shipping/Labeling	<input type="checkbox"/>	Test Process
		<input type="checkbox"/>	Wafer Bump Site
		<input type="checkbox"/>	Wafer Bump Material
		<input type="checkbox"/>	Wafer Bump Process
		<input type="checkbox"/>	Wafer Fab Site
		<input type="checkbox"/>	Wafer Fab Materials
		<input type="checkbox"/>	Wafer Fab Process

### PCN Details

#### Description of Change:

Revision A is to announce the addition of new devices that were not included on the original PCN notification. These new devices are in **Group 2 & 3** in the device list below. The expected first shipment date for these new devices will be 90 days from this notice for these newly added devices only.

Texas Instruments is pleased to announce the qualification of TI Chengdu (CDAT) as an additional Assembly & Test site for the list of devices shown below. Material differences between sites are as follows.

Assembly Site	Assembly Site Origin	Assembly Country Code	Assembly City
TI Clark	QAB	PHL	Angeles City
TI Malaysia	MLA	MYS	Kuala Lumpur
Hana Semiconductor	HNT	THA	Ayutthaya
<b>TI Chengdu</b>	<b>CDA</b>	<b>CHN</b>	<b>Chengdu</b>

#### Material Differences:

##### Group 1:

	TI Clark	TI Malaysia	TI Chengdu
Mount Compound	4207768	4205846	4207123
Mold Compound	4208625	4208625	4222198
Lead Finish	NiPdAu	NiPdAu	NiPdAu

Devices highlighted under **Group 1** of the Product affected section below may use the same material set for other TI assembly sites as TI Chengdu when the PCN expires.

##### Group 2:

	TI Clark	TI Chengdu
Mold Compound	4208625	4222198

##### Group 3:

	Hana Semiconductor	TI Chengdu
Mount Compound	400195	4207123
Mold Compound	450235	4222198

Wire Type	1.0mil Au	1.0mil Cu
-----------	-----------	-----------

Test coverage, insertions, conditions will remain consistent with current testing and verified with test MQ.

**Reason for Change:**

Continuity of Supply

**Anticipated impact on Fit, Form, Function, Quality or Reliability (positive / negative):**

None

**Anticipated impact on Material Declaration**

<input type="checkbox"/>	No Impact to the Material Declaration	<input checked="" type="checkbox"/>	Material Declarations or Product Content reports are driven from production data and will be available following the production release. Upon production release the revised reports can be obtained from the <a href="#">TI Eco-Info website</a> . There is no impact to the material meeting current regulatory compliance requirements with this PCN change.
--------------------------	---------------------------------------	-------------------------------------	---

**Changes to product identification resulting from this PCN:**

Assembly Site		
TI Clark Philippines	Assembly Site Origin (22L)	ASO: QAB
TI Malaysia	Assembly Site Origin (22L)	ASO: MLA
Hana Semiconductor	Assembly Site Origin (22L)	ASO: HNT
TI Chengdu	Assembly Site Origin (22L)	ASO: CDA

Sample product shipping label (not actual product label)

**Product Affected: Group 1**

MSP430F2101IRGER	MSP430F2350IRHAT	MSP430F2234TRHAT	MSP430G2444IRHA40T
MSP430F2101IRGET	MSP430F2350TRHAR	MSP430F2252IRHAR	MSP430G2544IRHA40R
MSP430F2101TRGER	MSP430F2350TRHAT	MSP430F2252IRHAT	MSP430G2544IRHA40T
MSP430F2111IRGER	MSP430F2370IRHAR	MSP430F2252TRHAR	MSP430G2744IRHA40R
MSP430F2111IRGET	MSP430F2370IRHAT	MSP430F2252TRHAT	MSP430G2744IRHA40T
MSP430F2111TRGER	MSP430F2370TRHAR	MSP430F2254IRHAR	MSP430G2755IRHA40R
MSP430F2111TRGET	MSP430F2370TRHAT	MSP430F2254IRHAT	MSP430G2755IRHA40T
MSP430F2121IRGER	MSP430FR2110IRLLR	MSP430F2254TRHAR	MSP430G2855IRHA40R
MSP430F2121IRGET	MSP430FR2110IRLLT	MSP430F2254TRHAT	MSP430G2855IRHA40T
MSP430F2121TRGER	MSP430FR2111IRLLR	MSP430F2272IRHAR	MSP430G2955IRHA40R
MSP430F2121TRGET	MSP430FR2111IRLLT	MSP430F2272IRHAT	MSP430G2955IRHA40T
MSP430F2131IRGER	MSP430FR2433IRGER	MSP430F2272TRHAR	MSP430V203IRGER

<b>MSP430F2131IRGET</b>	MSP430FR2433IRGET	<b>MSP430F2272TRHAT</b>	MSP430V205IRHAR
<b>MSP430F2131TRGER</b>	MSP430FR2532IRGER	<b>MSP430F2274IRHAR</b>	MSP430V303IRHAR
<b>MSP430F2131TRGET</b>	MSP430FR2532IRGET	<b>MSP430F2274IRHAT</b>	<b>MSP430V325IRHAR</b>
<b>MSP430F2232IRHAR</b>	<b>MSP430FR2533IRHBR</b>	<b>MSP430F2274TRHAR</b>	MSP430V347IRHAR
<b>MSP430F2232IRHAT</b>	<b>MSP430FR2533IRHBT</b>	<b>MSP430F2274TRHAT</b>	<b>MSP430V372IRHA40R</b>
<b>MSP430F2232TRHAR</b>	MSP430FR2632IRGER	MSP430F2330IRHAR	<b>MSP430V593IRHAR</b>
<b>MSP430F2232TRHAT</b>	MSP430FR2632IRGET	MSP430F2330IRHAT	TPS65235-1RUKR
<b>MSP430F2234IRHAR</b>	<b>MSP430FR2633IRHBR</b>	MSP430F2330TRHAR	TPS65235-1RUKT
MSP430F2330TRHAT	<b>MSP430F2234IRHAT</b>	<b>MSP430FR2633IRHBT</b>	
MSP430F2350IRHAR	<b>MSP430F2234TRHAR</b>	<b>MSP430G2444IRHA40R</b>	

**Product Affected: Group 2**

MSP430F2001IRSAR	MSP430F2013TRSAR	MSP430G220IRSA16R	MSP430G2402IRSA16R
MSP430F2001IRSAT	MSP430F2013TRSAT	MSP430G220IRSA16T	MSP430G2402IRSA16T
MSP430F2001TRSAR	MSP430G2001IRSA16R	MSP430G2211IRSA16R	MSP430G2412IRSA16R
MSP430F2001TRSAT	MSP430G2001IRSA16T	MSP430G2211IRSA16T	MSP430G2412IRSA16T
MSP430F2002IRSAR	MSP430G2101IRSA16R	MSP430G2212IRSA16R	MSP430G2432IRSA16R
MSP430F2002IRSAT	MSP430G2101IRSA16T	MSP430G2212IRSA16T	MSP430G2432IRSA16T
MSP430F2002TRSAR	MSP430G2102IRSA16R	MSP430G2221IRSA16R	MSP430G2452IRSA16R
MSP430F2002TRSAT	MSP430G2102IRSA16T	MSP430G2221IRSA16T	MSP430G2452IRSA16T
MSP430F2003IRSAR	MSP430G2111IRSA16R	MSP430G2231IRSA16R	MSP430V229IRSAR
MSP430F2003IRSAT	MSP430G2111IRSA16T	MSP430G2231IRSA16T	MSP430V277IRSAR
MSP430F2003TRSAR	MSP430G2112IRSA16R	MSP430G2232IRSA16R	MSP430V388IRSA16R
MSP430F2003TRSAT	MSP430G2112IRSA16T	MSP430G2232IRSA16T	TPS25725RSMR
MSP430F2011IRSAR	MSP430G2121IRSA16R	MSP430G2252IRSA16R	TPS25725RSMR
MSP430F2011IRSAT	MSP430G2121IRSA16T	MSP430G2252IRSA16T	TPS25740ARGER
MSP430F2011TRSAR	MSP430G2131IRSA16R	MSP430G2302IRSA16R	TPS25740ARGET
MSP430F2011TRSAT	MSP430G2131IRSA16T	MSP430G2302IRSA16T	TPS25740RGER
MSP430F2012IRSAR	MSP430G2132IRSA16R	MSP430G2312IRSA16R	TPS25740RGET
MSP430F2012IRSAT	MSP430G2132IRSA16T	MSP430G2312IRSA16T	TPS25741ARSMR
MSP430F2012TRSAR	MSP430G2152IRSA16R	MSP430G2332IRSA16R	TPS25741ARSMT
MSP430F2012TRSAT	MSP430G2152IRSA16T	MSP430G2332IRSA16T	TPS25741RSMR
MSP430F2013IRSAR	MSP430G2201IRSA16R	MSP430G2352IRSA16R	TPS25741RSMT
MSP430F2013IRSAT	MSP430G2201IRSA16T	MSP430G2352IRSA16T	

**Product Affected: Group 3**

HD3SS3212IRKSR	HD3SS3212IRKST	HD3SS3212RKSR	HD3SS3212RKST
----------------	----------------	---------------	---------------

# Group 1: Qualification Report

## Qualification of TI Chengdu A/T as Second Source Assembly Site for Select MSP430 QFN Devices

Approval Date: 03/07/2018

### Product Attributes

Attributes	Qual Device: <u>MSP430G2755IRHA40R</u>	QBS Package Reference: <u>MSP430FR2633IRHB</u>	QBS Package Reference: <u>MSP430G2553IRHB</u>
Assembly Site	CDAT	CDAT	CDAT
Package Family	VQFN	VQFN	VQFN
Flammability Rating	UL 94 V-0	UL 94 V-0	UL 94 V-0
Wafer Fab Supplier	TSMC-F10	DMOS6	TSMC-F10

- QBS: Qual By Similarity

- Qual Devices qualified at LEVEL2-260C: MSP430G2755IRHA40R

### Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: <u>MSP430G2755IRHA40R</u>	QBS Package Reference: <u>MSP430FR2633IRHB</u>	QBS Package Reference: <u>MSP430G2553IRHB</u>
AC	Autoclave 121C	96 Hours	3/231/0	-	-
HAST	Biased HAST, 110C/85%RH	264 Hours	-	3/231/0	3/77/0
HTSL	High Temp. Storage Bake, 150C	1000 Hours	-	3/231/0	-
HTSL	High Temp. Storage Bake, 170C	420 Hours	-	-	3/231/0
TC	Temperature Cycle, -65/150C	500 Cycles	3/231/0	-	-

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable

- The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours

- The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours

- The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

#### Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

# Qualification Report

## TPS65235-1RUK Qualification

Approve Date 03/13/2018

### Product Attributes

Attributes	Qual Device: <u>TPS65235-1RUK</u>	QBS Product Reference: <u>TPS65235-2RUK</u>	QBS Process Reference: <u>TPS51217DSC</u>	QBS Package Reference: <u>TPS51285BRUKR</u>	QBS Package Reference: <u>TPS53641RSBR</u>
Assembly Site	CDAT	CDAT	CLARK-AT	CDAT	CDAT
Package Family	QFN/SON	QFN/SON	QFN/SON	QFN/SON	QFN/SON
Flammability Rating	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB	RFAB
Wafer Process	LBC7	LBC7	LBC7	LBC7X	LBC7X

- QBS: Qual By Similarity

- Qual Device TPS65235-1RUK is qualified at LEVEL2-260C

## Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: <u>TPS65235-1RUK</u>	QBS Product Reference: <u>TPS65235-2RUK</u>	QBS Process Reference: <u>TPS51217DSC</u>	QBS Package Reference: <u>TPS51285BRUKR</u>	QBS Package Reference: <u>TPS53641RSBR</u>
ED	Electrical Characterization	Per Datasheet Parameters	Pass	Pass	Pass	-	-
HBM	ESD - HBM	4000 V	1/3/0	-	-	-	-
CDM	ESD - CDM	1500 V	1/3/0	-	3/9/0	-	-
LU	Latch-up	(per JESD78)	1/6/0	-	3/18/0	-	-
HTOL	Life Test, 135C	635 Hours	-	-	3/231/0	-	-
HTSL	High Temp. Storage Bake, 170C	420 Hours	-	1/77/0	3/231/0	-	3/231/0
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	3/231/0	-	-
AC	Autoclave, 121C	96 Hours	-	-	3/231/0	3/231/0	3/231/0
TC	Temperature Cycle, -65/150C	500 Cycles	-	1/77/0	3/231/0	3/231/0	3/231/0
WBP	Bond Pull	Wires	-	-	-	3/228/0	3/228/0
WBS	Ball Bond Shear	Wires	-	-	-	3/228/0	3/228/0

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable
  - The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours
  - The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours
  - The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles
- Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

**Green/Pb-free Status:**

Qualified Pb-Free(SMT) and Green

## Qualification Report

### Qualification of CDAT Second Source QFN Assembly Site for MSP430FR2633 and MSP430FR2111 Device Families

Approved – 03/22/2018

#### Product Attributes

Attributes	Qual Device: <u>MSP430FR2100IRLLR</u>	Qual Device: <u>MSP430FR2633IRHB</u>	QBS Package Reference: <u>TPS65262RHBR</u>
Assembly Site	CDAT	CDAT	CDAT
Package Family	VQFN	VQFN	VQFN
Flammability Rating	UL 94 V-0	UL 94 V-0	UL 94 V-0
Wafer Fab Supplier	DMOS6	DMOS6	RFAB
Wafer Process	HPE035	HPE035	LBC7

- QBS: Qual By Similarity
- Qual Device MSP430FR2633IRHB is qualified at LEVEL2-260C.
- Qual Device MSP430FR2100IRLLR is qualified at LEVEL2-260C.

## Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: <u>MSP430FR2100IRLLR</u>	Qual Device: <u>MSP430FR2633IRHB</u>	QBS Package Reference: <u>TPS65262RHBR</u>
AC	Autoclave 121C	96 Hours	-	3/231/0	-
HAST	Biased HAST, 110C/85%RH	264 Hours	-	3/231/0	-
HTSL	High Temp. Storage Bake, 150C	1000 Hours	-	3/231/0	-
SD	Solderability	Pb Free	-	-	3/66/0
TC	Temperature Cycle, - 65/150C	500 Cycles	3/231/0	3/231/0	-
WBP	Bond Pull	Wires	-	3/228/0	-
WBS	Ball Bond Shear	Wires	-	3/228/0	-

- Preconditioning was performed for Autoclave, Biased HAST, Temperature Cycle, and HTSL.

- The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles

Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

### Green/Pb-free Status:

Qualified Pb-Free(SMT) and Green

THIS INFORMATION RELATING TO QUALITY AND RELIABILITY IS PROVIDED "AS IS." Product information detailed in this report may not accurately reflect TI's current product materials, processes and testing used in the construction of the TI products. Customers are solely responsible to conduct sufficient engineering and additional qualification testing to determine whether a device is suitable for use in their applications. Using TI products outside limits stated in TI's datasheet may void TI's warranty. See TI's Terms of Sale at "<http://www.ti.com/lscds/ti/legal/termsofsale.page>"

## Group 2: Qualification Report

### CDAT QFN Second Source Assembly Qualification for Select MSP430 Devices

Approved – 05/09/2018

#### Product Attributes

Attributes	Qual Device: <u>MSP430G2452IRSA16</u>	QBS Package Reference: <u>MSP430FR2633IRHB</u>	QBS Package Reference: <u>MSP430G2553IRHB</u>
<b>Assembly Site</b>	TI-CHENGDU A/T	TI-CHENGDU A/T	TI-CHENGDU A/T
<b>Package Family</b>	VQFN	VQFN	VQFN
<b>Flammability Rating</b>	UL 94 V-0	UL 94 V-0	UL 94 V-0
<b>Wafer Fab Supplier</b>	TSMC-F10	DMOS6	TSMC-F10
<b>Wafer Fab Process</b>	0.35UM-TSMC	HPE035	0.35UM-TSMC

- QBS: Qual By Similarity

- Qual Devices qualified at LEVEL2-260C: MSP430G2452IRSA16

## Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: <u>MSP430G2452IRSA16</u>	QBS Package Reference: <u>MSP430FR2633IRHB</u>	QBS Package Reference: <u>MSP430G2553IRHB</u>
AC	Autoclave 121C	96 Hours	-	3/231/0	3/231/0
HAST	Biased HAST, 110C/85%RH	264 Hours	-	3/231/0	3/77/0
HTSL	High Temp. Storage Bake, 150C	1000 Hours	-	3/231/0	-
HTSL	High Temp. Storage Bake, 170C	420 Hours	-	-	3/231/0

Type	Test Name / Condition	Duration	Qual Device: <u>MSP430G2452IRSA16</u>	QBS Package Reference: <u>MSP430FR2633IRHB</u>	QBS Package Reference: <u>MSP430G2553IRHB</u>
TC	Temperature Cycle, -65/150C	500 Cycles	3/231/0	-	-
WBP	Bond Pull	Wires	3/228/0	-	-
WBS	Ball Bond Shear	Wires	3/228/0	-	-

- Preconditioning was performed for Autoclave, Biased HAST, Temperature Cycle, and HTSL.

- The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours  
Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

**Green/Pb-free Status:**

Qualified Pb-Free(SMT) and Green

**Qualification of TI Chengdu A/T as Second Source Assembly Site  
for TPS25725RSM, TPS25740RGE, TPS25740ARGE TPS25741RSM, and TPS25741ARSM  
Devices**

Approval Date: 04/23/2018

**Product Attributes**

Attributes	Qual Device: <u>TPS25725RSM</u>	Qual Device: <u>TPS25740ARGE</u>	Qual Device: <u>TPS25740RGE</u>	Qual Device: <u>TPS25741RSM</u>
Assembly Site	CDAT	CDAT	CDAT	CDAT
Package Family	QFN, 4 x 4 MM	QFN, 4 x 4 MM	QFN, 4 x 4 MM	QFN, 4 x 4 MM
Flammability Rating	UL 94 V-0	-	-	UL 94 V-0
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB
Wafer Process	LBC8LV	LBC8LV	LBC8LV	LBC8LV

Attributes	QBS Product Reference: <u>TPS25725</u>	QBS Product Reference: <u>TPS25740BRGE</u>	QBS Product Reference: <u>TPS25741RSM</u>	QBS Process Reference: <u>LM3631YFFR</u>
Assembly Site	CLARK AT	CDAT	CLARK-AT	TI-CLARK
Package Family	VQFN	QFN	VQFN	YFF
Flammability Rating	UL 94 V-0	UL 94 V-0	UL 94 V-0	UL 94 V-0
Wafer Fab Supplier	RFAB	RFAB	RFAB	RFAB
Wafer Process	LBC8LV	LBC8LV	LBC8LV	LBC8LV

- QBS: Qual By Similarity

- Qual Devices qualified at LEVEL2-260CG: TPS25740RGE, TPS25741RSM, TPS25725RSM, TPS25740ARGE, TPS25741ARSM

**Qualification Results**

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: <u>TPS25725RSM</u>	Qual Device: <u>TPS25740ARGE</u>	Qual Device: <u>TPS25740RGE</u>	Qual Device: <u>TPS25741RSM</u>
AC	Autoclave 121C	96 Hours	-	-	-	-
ED	Electrical Characterization	Per Datasheet Parameters	-	-	Pass	Pass
ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	-	-
HAST	Biased HAST, 130C/85%RH	96 Hours	-	-	-	-
HBM	ESD - HBM	4000 V	-	1/3/0	-	-
CDM	ESD - CDM	1500 V	1/3/0	1/3/0	-	-
HTOL	Life Test, 125C	1000 Hours	-	-	-	-
HTOL	Life Test, 150C	300 Hours	-	-	-	-

HTSL	High Temp Storage Bake 150C	500 Hours	-	-	-	-
HTSL	High Temp Storage Bake 170C	420 Hours	-	-	-	-
LU	Latch-up	(per JESD78)	-	1/6/0	-	1/6/0
TC	Temperature Cycle -65/150C	500 Cycles	-	-	-	-
UHAST	Unbiased HAST, 130C/85%RH	96 Hours	-	-	-	-
YLD	FTY and Bin Summary	--	Pass	Pass	Pass	-

Type	Test Name / Condition	Duration	QBS Product Reference: <u>TPS25725</u>	QBS Product Reference: <u>TPS25740BRGE</u>	QBS Product Reference: <u>TPS25741RSM</u>	QBS Process Reference: <u>LM3631YFFR</u>
AC	Autoclave 121C	96 Hours	-	-	-	-
ED	Electrical Characterization	Per Datasheet Parameters	Pass	Pass	Pass	-
ELFR	Early Life Failure Rate, 125C	48 Hours	-	-	-	2/320/0
HAST	Biased HAST, 130C/85%RH	96 Hours	-	3/231/0	-	-
HBM	ESD - HBM	4000 V	-	1/3/0	-	-
CDM	ESD - CDM	1500 V	-	1/3/0	-	-
HTOL	Life Test, 125C	1000 Hours	-	1/77/0	-	3/231/0
HTOL	Life Test, 150C	300 Hours	-	-	1/77/0	-
HTSL	High Temp Storage Bake 150C	500 Hours	-	-	-	1/77/0
HTSL	High Temp Storage Bake 170C	420 Hours	-	3/231/0	1/77/0	-
LU	Latch-up	(per JESD78)	-	1/6/0	1/6/0	3/18/0
TC	Temperature Cycle - 65/150C	500 Cycles	-	3/231/0	1/77/0	-
UHAST	Unbiased HAST, 130C/85%RH	96 Hours	-	3/231/0	-	-
YLD	FTY and Bin Summary	--	Pass	-	-	-

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable
  - The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours
  - The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours
  - The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles
- Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

**Green/Pb-free Status:**

Qualified Pb-Free(SMT) and Green

THIS INFORMATION RELATING TO QUALITY AND RELIABILITY IS PROVIDED "AS IS." Product information detailed in this report may not accurately reflect TI's current product materials, processes and testing used in the construction of the TI products. Customers are solely responsible to conduct sufficient engineering and additional qualification testing to determine whether a device is suitable for use in their applications. Using TI products outside limits stated in TI's datasheet may void TI's warranty. See TI's Terms of Sale at "<http://www.ti.com/lscds/ti/legal/termsofsale.page>"



## Group 3: Qualification Report

### HD3SS3212RKSR/T and HD3SS3212IRKSR/T HNA to CDAT Offload

Approval Date: 05/04/2018

#### Product Attributes

Attributes	Qual Device: <u>HD3SS3212IRKS</u>	Process QBS References: HD3SS3411TRWAQ1
Wafer Fab Supplier	FFAB	FFAB
Wafer Process	1833BICOM3ZL	1833BICOM3ZL
Assembly Site	CDAT	CLARK
Package Family	VQFN	QFN
Package Designator	RKS	RWA
Pin Count	20	18
Flammability Rating	UL 94 V-0	UL 94 V-0

- QBS: Qual By Similarity
- Qual Device HD3SS3212IRKS is qualified at LEVEL2-260C
- Qual Device HD3SS3212RKS is qualified at LEVEL2-260C

#### Qualification Results

Data Displayed as: Number of lots / Total sample size / Total failed

Type	Test Name / Condition	Duration	Qual Device: <u>HD3SS3212IRKS</u>	Process QBS References: HD3SS3411TRWAQ1
HTOL	Life Test, 140C	480 Hours		3/231/0
ELFR	Early Life Failure Rate, 140C	24 Hours		3/2400/0
SD	Solderability (Pb-Free)	>95% Lead Coverage , precondition w.155 Dry Bake(4 hrs+/- 15 minutes)	1/30/0	-
SD	Solderability (Pb-Free)	>95% Lead Coverage 8 Hr Steam Age	1/30/0	1/30/0
TPI	Thermal Path Integrity (Cu Wire)	MSL2	1/12/0	-
AC	**Autoclave 121C	121C, 2 atm (96 Hours)	3/231/0	3/231/0
HAST	**Biased HAST	130C/85%RH (96 Hours)	3/231/0	3/231/0
HTSL	**High Temp. Storage Bake	150C (500, 1000 Hours)	3/231/0	1/45/0
MISC	Bond Pad Cratering Check	Post 500 Temp Cycle	1/5/0	-
MQ	Manufacturability (Assembly)	(per mfg. Site specification)	3/3/0	-
PD	Physical Dimensions	(per mechanical drawing)	1/5/0	3/30/0
TC	**T/C -65C/150C	-65C/+150C (500 Cycles)	3/231/0	3/231/0
TC-SAM	Post Temp Cycle SAM	CSAM and TSAM analysis after 500 cycles Temp cycle	1/10/0	-
TC-WBP	Post T/C bond-pull strength (for Info Only)	Test 2 bonds per corner and 1 bond at the middle of the die.	1/30/0	-
VM	Visual Quality Reliability Inspection	Post Temp Cycle	1/2/0	-
WBP	Bond Pull	76 Wires, 3 units min	3/30/0	1/3/0
WBS	Ball Bond Shear	76 balls, 3 units min	3/30/0	1/30/0
XRAY	X-ray	(top side only)	3/5/0	-

- Preconditioning was performed for Autoclave, Unbiased HAST, THB/Biased HAST, Temperature Cycle, Thermal Shock, and HTSL, as applicable
  - The following are equivalent HTOL options based on an activation energy of 0.7eV : 125C/1k Hours, 140C/480 Hours, 150C/300 Hours, and 155C/240 Hours
  - The following are equivalent HTSL options based on an activation energy of 0.7eV : 150C/1k Hours, and 170C/420 Hours
  - The following are equivalent Temp Cycle options per JESD47 : -55C/125C/700 Cycles and -65C/150C/500 Cycles
- Quality and Environmental data is available at TI's external Web site: <http://www.ti.com/>

**Green/Pb-free Status:**

Qualified Pb-Free(SMT) and Green

THIS INFORMATION RELATING TO QUALITY AND RELIABILITY IS PROVIDED "AS IS." Product information detailed in this report may not accurately reflect TI's current product materials, processes and testing used in the construction of the TI products. Customers are solely responsible to conduct sufficient engineering and additional qualification testing to determine whether a device is suitable for use in their applications. Using TI products outside limits stated in TI's datasheet may void TI's warranty. See TI's Terms of Sale at "<http://www.ti.com/lscs/ti/legal/termsofsale.page>"

For questions regarding this notice, e-mails can be sent to the regional contacts shown below or your local Field Sales Representative.

<b>Location</b>	<b>E-Mail</b>
USA	<a href="mailto:PCNAmericasContact@list.ti.com">PCNAmericasContact@list.ti.com</a>
Europe	<a href="mailto:PCNEuropeContact@list.ti.com">PCNEuropeContact@list.ti.com</a>
Asia Pacific	<a href="mailto:PCNAsiaContact@list.ti.com">PCNAsiaContact@list.ti.com</a>
Japan	<a href="mailto:PCNJapanContact@list.ti.com">PCNJapanContact@list.ti.com</a>