



Cypress Semiconductor Corporation, 198 Champion Court, San Jose, CA 95134. Tel: (408) 943-2600

PRODUCT CHANGE NOTIFICATION

PCN: PCN200902

Date: March 03, 2020

Subject: Qualification of PTI-SG as an Additional Bumping, Wafer Sort, Backend and Finish Site for Select WLCSP Products

To: FUTURE ELECTRONICS
 FUTURE ELE
 pcn.system2@future.ca

Change Type: Major

Description of Change:

Cypress announces the qualification of Powertech Technology Inc. (PTI-SG – 12 Ang Mo Kio Street 65, Singapore 569060) as an additional bumping, wafer sort, backend and finish site for select WLCSP products.

PTI-SG is the only 300mm wafer bumping facility in Singapore. This qualification will allow Cypress to leverage PTI-SG's manufacturing expertise and quality focus. PTI-SG is certified on several international quality standards: IATF16949, ISO9001, ISO14001 and OHSAS18001. PTI-SG quality certifications can be downloaded in this link: <http://www.pti-sg.com/PTISGweb/A1034.aspx>.

The Ball Drop bump WLCSP products are bumped at PTI-SG using the following Bill of Materials:

Material	PTI-SG Bill of Materials	TSMC/ASE-KH/SPIL/Amkor Bill of Materials
Polyimide	HD-8820	HD-8820
RDL/UBM Seed Layer	Titanium (Ti)	Titanium (Ti)
RDL/UBM Seed Layer	Copper (Cu)	Copper (Cu)
RDL/UBM	Copper (Cu)	Copper (Cu)
Solder Ball	SACX(0.3%Ag-0.7%Cu) or SACQ(4.0%Ag-0.5%Cu-2%Bi)	SACX(0.3%Ag-0.7%Cu) or SACQ(4.0%Ag-0.5%Cu-2%Bi)

The plated bump WLCSP products are bumped at PTI-SG using the following Bill of Materials:

Material	PTI-SG Bill of Materials	PTI-Taiwan Bill of Materials
Polyimide	HD-4104E	HD-4104E
UBM Seed Layer	Titanium (Ti)	Titanium (Ti)
UBM Seed Layer	Copper (Cu)	Copper (Cu)
UBM	Nickel (Ni)	Nickel (Ni)
Solder Bump	Tin-Silver1.8%	Tin-Silver1.8%

Cypress also announces the qualification of an alternate source for carrier tape and cover tape for the select WLCSP products.

- No changes in carrier tape dimensions and materials for all the affected packages except a minor improvement on Ao. Bo & Ko for WLCSP151 4.91x5.85x0.55 mm. Refer to attachment for drawing 151-Ball WLCSP (4.91x5.85x0.55 mm).
- Cover tape type changed from pressure seal to heat seal.

The alternate source carrier tape and cover tape have the following details in below.
Carrier Tape and Cover Tape details:

Items	194-Ball WLCSP		109-Ball WLCSP		128-Ball WLCSP		192-ball WLCSP	
	4.97x7.50x0.55 mm		4.08x4.48x0.55 mm		4.51x5.43x0.60 mm		4.87x7.67x0.55 mm	
	Existing Carrier Tape	Alternate Carrier Tape	Existing Carrier Tape	Alternate Carrier Tape	Existing Carrier Tape	Alternate Carrier Tape	Existing Carrier Tape	Alternate Carrier Tape
Carrier Tape Supplier	3M	Advantek	3M	Advantek	3M	Advantek	3M	Advantek
Carrier Tape Material Type	Poly carbonate	Poly carbonate	Poly carbonate	Poly carbonate	Poly carbonate	Poly carbonate	Poly carbonate	Poly carbonate
Carrier Tape Unit Orientation	Quadrant 1	Quadrant 1	Quadrant 1	Quadrant 1	Quadrant 1	Quadrant 1	Quadrant 1	Quadrant 1
W: Tape Width (mm)	16.00+0.30 /-0.10	16.00+0.30 /-0.10	12.00+0.30 /-0.10	12.00+0.30 /-0.10	12.00+0.30 /-0.10	12.00+0.30 /-0.10	16.00+0.30 /-0.10	16.00+0.30 /-0.10
P1: Pocket Pitch (mm)	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10
Ao: Pocket Length (mm)	5.16 ± 0.05	5.16 ± 0.05	4.28 ± 0.05	4.28 ± 0.05	4.69 ± 0.05	4.69 ± 0.05	5.01 ± 0.05	5.01 ± 0.05
Bo: Pocket Width (mm)	7.68 ± 0.05	7.68 ± 0.05	4.68 ± 0.05	4.68 ± 0.05	5.63 ± 0.05	5.63 ± 0.05	7.81 ± 0.05	7.81 ± 0.05
Ko: Pocket Height (mm)	0.67 ± 0.05	0.67 ± 0.05	0.68 ± 0.05	0.68 ± 0.05	0.88 ± 0.05	0.88 ± 0.05	0.65 ± 0.05	0.65 ± 0.05
Cover Tape Supplier	3M	Advantek	3M	Advantek	3M	Advantek	3M	Advantek
Cover Tape Material Type	Polyester Film	Polyester Film	Polyester Film	Polyester Film	Polyester Film	Polyester Film	Polyester Film	Polyester Film
Cover Type	Pressure	Heat	Pressure	Heat	Pressure	Heat	Pressure	Heat
Cover Tape Width (mm)	13.3	13.3	9.3	9.2	9.3	9.2	13.3	13.3
Cover Tape Color	Clear	Clear	Clear	Clear	Clear	Clear	Clear	Clear

Items	151-Ball WLCSP		145-Ball WLCSP		69-Ball WLCSP	
	4.91x5.85x0.55 mm		4.87x5.413x0.55 mm		4.53x2.93x0.55 mm	
	Existing Carrier Tape	Alternate Carrier Tape (*)	Existing Carrier Tape	Alternate Carrier Tape	Existing Carrier Tape	Alternate Carrier Tape
Carrier Tape Supplier	Avantek	Avantek	3M	Avantek	3M	Avantek
Carrier Tape Material Type	Polycarbonate	Poly carbonate	Polycarbonate	Polycarbonate	Polycarbonate	Polycarbonate
Carrier Tape Unit Orientation	Quadrant 1	Quadrant 1	Quadrant 1	Quadrant 1	Quadrant 1	Quadrant 1
W: Tape Width (mm)	16.00+0.30 /-0.10	16.00+0.30 /-0.10	12.00+0.30 /-0.10	12.00+0.30 /-0.10	12.00+0.30 /-0.10	12.00+0.30 /-0.10
P1: Pocket Pitch (mm)	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10	8.00 ± 0.10
Ao: Pocket Length (mm)	5.02 ± 0.05	*5.05 ± 0.05	5.06 ± 0.05	5.06 ± 0.05	3.05 ± 0.05	3.05 ± 0.05
Bo: Pocket Width (mm)	6.17 ± 0.05	*5.99 ± 0.05	5.73 ± 0.05	5.73 ± 0.05	4.65 ± 0.05	4.65 ± 0.05
Ko: Pocket Height (mm)	0.7	*0.65 ± 0.05	0.65 ± 0.05	0.65 ± 0.05	0.65 ± 0.05	0.65 ± 0.05
Cover Tape Supplier	Avantek	Avantek	3M	Avantek	3M	Avantek
Cover Tape Material Type	Polyester Film	Polyester Film	Polyester Film	Polyester Film	Polyester Film	Polyester Film
Cover Type	Heat	Heat	Pressure	Heat	Pressure	Heat
Cover Tape Width (mm)	13.3	13.3	9.3	9.2	9.3	9.2
Cover Tape Color	Clear	Clear	Clear	Clear	Clear	Clear

(Note *: A minor improvement on Ao, Bo & Ko)

Benefit of Change:

Qualification of alternate manufacturing sites is part of the ongoing flexible manufacturing initiative announced by Cypress. The goal of the flexible manufacturing initiative is to provide the means for Cypress to continue to meet delivery commitments through dynamic, changing market conditions.

Part Numbers Affected: 28

See the attached 'Affected Parts List' file for a list of all part numbers affected by this change. Note that any new parts that are introduced after the publication of this PCN will include all changes outlined in this PCN.

Qualification Status:

This change has been qualified through a series of tests documented in the Qualification Test Plan (QTP) reports in the table below. These qualification reports can be found as attachments to this PCN or by visiting www.cypress.com and typing the QTP number in the keyword search window.

Product Scope: The UMC Fab Ball Drop bump WLCSP products (Commercial)

QTP	Qualification	Process Coverage
192010	Qualification PTI Singapore as an additional WLCSP Site for UMC-SG Ball drop and Backend Products	Bumping, Backend, Finish
184401	Qualification of PTI Singapore (PTI-SG) as an Additional Class Testing for Select Ball Drop Bump WLCSP Products	Wafer Sort
191601	Qualification of Advantek Carrier Tape for 151 ball WLCSP 4.91x5.85x0.55 mm at PTI Singapore	Finish
184703	Qualification of Advantek Carrier Tape, Cover Tape & Reel for 192 ball WLCSP 4.87x7.67x0.55 mm at PTI Singapore	Finish
191110	Advantek Tape and Reel Materials Qualification (WLCSP Packages) at PTI Singapore	Finish

Product Scope: The TSMC Fab Ball Drop bump WLCSP products (Automotive and Commercial)

QTP	Qualification	Process Coverage
192808	Qualification PTI Singapore as an additional WLCSP Site for TSMC Ball Drop Bump and Backend Products	Bumping, Backend, Finish
192607	IOT 89335 / 43353 SORT Class TEST qualification at Powertech Technology (Singapore) Test location	Wafer Sort
191110	Advantek Tape and Reel Materials Qualification (WLCSP Packages) at PTI Singapore	Finish

Product Scope: The SMIC Fab Plated bump WLCSP products (Commercial)

QTP	Qualification	Process Coverage
194902	Qualify PTI-Singapore as alternative Assembly site for PTI-Taiwan WLCSP plated bump process	Bumping

Sample Status:

Qualification samples may not be built ahead of time for all part numbers affected by this change. Please review the attached 'Affected Parts List' file for a list of affected part numbers with their associated PTI-SG sample ordering part numbers. Samples are available now unless there is an indication that the sample ordering part numbers are subject to lead times. If you require qualification samples, please contact your local Cypress sales representative as soon as possible, preferably within 30 days of the date of this PCN, to place any sample orders.

Approximate Implementation Date:

Effective 90 days from the date of this notification or upon customer approval, whichever comes first, all shipments of Commercial, Industrial and Automotive non-PPAP part numbers in the attached file will be assembled at PTI-SG or other approved assembly sites. For Automotive PPAP part numbers this change will be effective upon customer approval.

Anticipated Impact:

Products assembly at the new site are completely compatible with existing products from form, fit, functional, parametric and quality performance perspectives. Also, there is no anticipated impact on the use of the new cover tape and carrier tape on the affected devices.

Cypress also recommends that customers take this opportunity to review these changes against current application notes, system design considerations and customer environment conditions to assess impact (if any) to their application.

Method of Identification:

Cypress maintains traceability of product to wafer level, including wafer fabrication location, through the lot number marked on the package.

Response Required:








No response is required.








For additional information regarding this change, contact your local sales representative or contact the PCN Administrator at pcn_adm@cypress.com.

Sincerely,

Cypress PCN Administration

BUMPING

Process	Material	SDS	Expiry Date
Passivation Layer	HD4104	 HD4104_SG_20180316_130000030675.pdf	2023-03-16
PBO Dielectric Layer	HD8820	 SDS-005.01 HD8820.pdf	2020-08-24
Sputter	Cu Metal	 MSDSCu_E(00-02-04)_Rev. 12.pdf	2023-04-02
	Ti Metal	 SDS-087.00 JX Nippon Ti Target.pdf	2019-11-17
Plated Nickel	Ni-100	 I:\DCC\DCC Secured Folder\PTI Documents\	2024-09-05
Plated LF Bump	Sula TS-140 Base	 TASS-17D154 SDS SULA LIQUID-TS-140BASE.pdf	2022-05-08
Solder Ball	Cyclomax (SAC_Q)	 Accurus SDS for Cyclomax (SAC_Q) by 20180903.pdf	2023-09-03

ICP (RoHS)	Expiry Date
 C:\Users\lenovo\pp\Cypress\ePPC	2020-12-03
 C:\Users\lenovo\pp\Cypress\ePPC	2021-01-16
 2019_Analysis Data_Cu_E.pdf	2020-05-31
 2019_Analysis Data_4N5 Ti_E.pdf	2020-05-31
 Mixture of Microfab Ni 100 ROHS.PDF	2020-11-06
 A8D5DFAA.zip	2020-05-10
 C:\Users\lenovo\pp\Cypress\ePPC	2021-01-10

Cypress Semiconductor Reliability Qualification Report

QTP# 192010 Version **

**CYW89493 / 89702 / 43493 / 43502 / 43909 / 4373 /
4334 / 20702**

**Qualification Of PTI Singapore As An Additional WLCSP Site For UMC-
SG Ball Drop And Backend Process**

FOR ANY QUESTIONS ON THIS REPORT, PLEASE CONTACT
reliability@cypress.com or via a CYLINK CRM CASE

Prepared By:
Bak Lee Chan
Reliability Engineer

Reviewed By:
Yusaku Ohta
Reliability Manager

Approved By:
David Hoffman
Reliability Director

I. Product and Package Information

Product Description: CYW89359CUBGT **Cypress Division:** IoT Division
Single-Chip 5G WiFi IEEE 802.11ac 2x2 MAC/Baseband/ Radio with
RSDB and Bluetooth 4.2 for Automotive Applications

Package: WLCSP	QTP: 192010	
Description: (4.97 x 7.5 x 0.55mm) 194 Ball, Wafer Level Chip Scale Package (WLCSP)		Flammability: O2 Index:
Assembly: PTI Singapore	Molding Compound: N/A	UL-V0 >28
Electrical Test: N/A		
Substrate/Leadframe: N/A	Die Attachment: N/A	
Lead Finish: SAC-Q (SAC405 + 2% Bi + Ge/P), CY		
Comments:		

Est. Field Temperature: 55 °C	Life Test Temperature: 125 °C
Est. DC Field Current: 20 mA	Life Test Dynamic Current: 5 mA
Est. Field Voltage: 1.2 V	Life Test Voltage: 1.38 V
Est. Field Power Dissipation: 24 mWatts	Est. Stress Power Dissipation: 6.9 mWatts

Die: 89493QVB1DA	Die Size: 7.46 x 4.93 mm
Process: 40NM LP	Fab: UMC-12I
Type:	Density: N/A

II. 40nm GLL/LP/RF Life Test Failure Rate Calculation

HTOL Stress Temperature - 125 °C

Failure Mechanism	Read Points / Test Results				Modeling Parameters @ 55°C					Avg. Failure Rate FITS @ 55°C, 60% Conf.	
	24 hrs	168 hrs	500 hrs	1000 hrs	Ea eV	TAF	VAF	OAF	MTTF (yrs)	PPM	FIT
PLASTIC											
Sample Size	2716	2519	1559	1559							
Zero fails, Process ave. Ea	0 *	0	0	0	0.66	71	1	71			
Totals	0	0	0	0					14269	0	8

* - Contributes to early life FITS

III. Summary of Stress Test Results

Stress Test	Stress Condition	Package Type	Sample Size	Num. of Lots	Num. of Fails	Failure Rate %	Comments
Data From Qualification 192010:							
High Temp Bake	(150°C)	WLCSP ¹	45	1	0	0.00	1000 hours
ESD CDM	N/A	WLCSP ¹	3	1	Passed 1.0kV		
Preconditioning	(PC5/260°C, +0°C/-5°C)	WLCSP ¹	693	3	Passed Jedec L1		
Precon+Temp Cycle	(PC5/260°C, -65°C/150°C)	WLCSP ¹	231	3	0	0.00	500 cycles
Precon+uHAST	(PC5/260°C, Unbiased, 130°C/85% RH)	WLCSP ¹	231	3	0	0.00	96 hours
Generic Reference Data:							
Precon+HAST	(PC2/260°C, Biased, 130°C/85% RH)	FCBGA ²	231	3	0	0.00	96 hours

Notes / Justification: 1) Results from Qual 192010, CYW89359CUBGT, 40NM LP in 194 Ball WLCSP (4.97 x 7.5 x 0.55mm)
2) Results from Qual 191701, CYW43242KFFB4G in 252 Ball FCBGA (10 x 10 x 1.05mm)

Preconditioning Flows: PC5 (JEDEC L1): Bake 125°C, 24hr => Soak @ 85°C/85%RH, 168hr => 3x Reflow

Reliability Tests Performed per Specification Requirements

Stress	Condition	Specification Reference
ESD CDM	N/A	JS002 / AEC-Q100-011
High Temp Bake	(150°C)	JESD22-A103
Precon+HAST	(PC2/260°C, Biased, 130°C/85% RH)	JESD22-A110
Precon+Temp Cycle	(PC5/260°C, -65°C/150°C)	JESD22-A104
Precon+uHAST	(PC5/260°C, Unbiased, 130°C/85% RH)	JESD22-A118
Preconditioning	(PC5/260°C, +0°C/-5°C)	J-STD-020

IV. Revision History

Document Number: 002-29518**Document Title:** Qualification Of PTI Singapore As An Additional WLCSP Site For UMC-SG Ball Drop And Backend Process

Rev.	Issue Date	ECN#	Originator	Description
**	1/20/2020	6780959	BAKC	Initial Release.

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Item	Marketing Part Number	Sample Order Part Number	Package	Sample Availability
1	2ICT00167A	2ICT00167A	145-Ball WLCSP	Subject to leadtime
2	71.28933.00UAG	71.28933.00UAG	145-Ball WLCSP	Subject to leadtime
3	BCM20713A1KUBXGT	BCM20713A1KUBX GT	42-Ball WLCSP	WW2009
4	BCM43353LIUBGT	BCM43353LIUB GT	145-Ball WLCSP	Subject to leadtime
5	BCM88335L2CUBGT	BCM88335L2CUB GT	145-Ball WLCSP	Subject to leadtime
6	BCM88359CUBGT	BCM88359CUB GT	194-Ball WLCSP	WW2009
7	BCM89335L2CUBGT	BCM89335L2CUB GT	145-Ball WLCSP	Subject to leadtime
8	BCM89335LCUBGT	BCM89335LCUB GT	145-Ball WLCSP	WW2010
9	CG8674BAT	CG8674 AT	192-Ball WLCSP	WW2009
10	CG8705AFT	CG8705AFT	109-Ball WLCSP	WW2010
11	CG8732AFT	CG8732AFT	109-Ball WLCSP	WW2010
12	CG8883AMT	CG8883 MT	133-Ball WLCSP	WW2009
13	CG8921AMT	CG8921 MT	192-Ball WLCSP	WW2009
14	CYW20713A1KUBXGT	CYW20713A1KUBX GT	42-Ball WLCSP	WW2009
15	CYW4334WKUBGT	CYW4334WKUB GT	109-Ball WLCSP	WW2010
16	CYW43353LIUBGT	CYW43353LIUB GT	145-Ball WLCSP	Subject to leadtime
17	CYW43362KUBGT	CYW43362KUB GT	69-Ball WLCSP	WW2010
18	CYW43362SKUBGT	CYW43362SKUB GT	69-Ball WLCSP	WW2010
19	CYW4339XKUBGT	CYW4339XKUB GT	145-Ball WLCSP	Subject to leadtime
20	CYW4343WKWBGT	CYW4343WKW GT	133-Ball WLCSP	WW2009
21	CYW4354XKUBGT	CYW4354XKUB GT	192-Ball WLCSP	WW2010
22	CYW4356XKUBGT	CYW4356XKUB GT	192-Ball WLCSP	WW2009
23	CYW4373IUBGT	CYW4373IUB GT	128-Ball WLCSP	WW2010
24	CYW43903KUBGT	CYW43903KUB GT	151-Ball WLCSP	WW2010
25	CYW88335L2CUBGT	CYW88335L2CUB GT	145-Ball WLCSP	Subject to leadtime
26	CYW88359CUBGT	CYW88359CUB GT	194-Ball WLCSP	WW2009
27	CYW89335L2CUBGT	CYW89335L2CUB GT	145-Ball WLCSP	Subject to leadtime
28	CYW89335LCUBGT	CYW89335LCUB GT	145-Ball WLCSP	WW2010