

**To:** \_\_\_\_\_

# Notification about Substitutes for UQFN10 Products to be Discontinued (Urgent request)

## **TOSHIBA**

Issue No. H440-1G-002P-E

Date of issue: July 12, 2021

Quality And Reliability Engineering Group

Quality Assurance Department

Himeji Operations - Semiconductor

**Toshiba Electronic Devices & Storage Corporation**

# State of production of UQFN10 products

Products of package UQFN10 are currently manufactured at two sites. Overseas subcontractor Company Y, however, has unilaterally informed us that it will discontinue the package products. In addition, domestic subcontractor Company Z has informed us that a frame manufacturer will stop producing the frames for UQFN10B products.

For continued production, we are preparing substitute products for those products to be discontinued as follows. We would appreciate it if you would promptly look into whether you can accept them.

Production site	Package	No.	Product name	State of production	Request to our customers
Overseas subcontractor: Company Y ※1	UQFN10	#1	TC7USB40MU,LF(S	- The subcontractor has unilaterally informed that it will discontinue these products. - We are notifying our customers that the products will be discontinued and asking our customers to inform us of necessary quantity of these products.	It is difficult to continue supplying these products. <b>Please change to the substitute products #3.</b>
			TC7USB42MU,LF(S		
Domestic subcontractor: Company Z	UQFN10B	#2	TC7USB40MU,LF(S2	The frame manufacturer has informed that it will discontinue the frames for these products.	These products, which will be discontinued, are limited in supply. <b>Please change to the substitute products #3.</b>
			TC7USB42MU,LF(S2		
		#3	TC7USB40MU,LF(S2E	We are preparing to start mass-producing these products with new frames in September 2021.	<b>Please approve these products.</b>
			TC7USB42MU,LF(S2E		

※1 Our person in charge of foundry business is discussing the issue of discontinued production with the overseas subcontractor. However, no major progress has been made so far. We apologize for the short notice, but we would like to supply substitutes and ask for your approval.

The following pages show the details of the changes.

# 1. Schedule for supplying products

Products with #3 are scheduled to be mass-produced from Oct 2021.

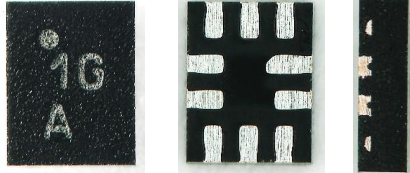
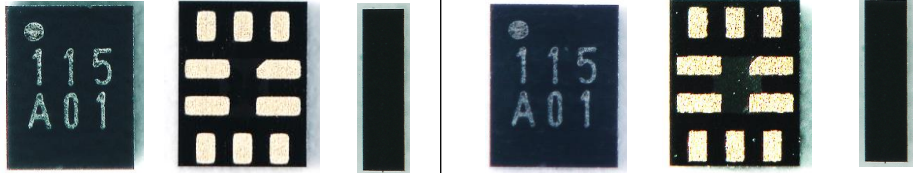
The domestic subcontractor has produced similar packages including DFN5B for around 10 years.

Please contact our sales representatives to ask for samples of the substitutes (products # 3). Your cooperation would be appreciated.

Item		2021									2022				2023
		Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Apr.	Jul.	Oct.	Jan.
#1	TC7USB40MU,LF(S)			Out of production											
	TC7USB42MU,LF(S)														
#2	TC7USB40MU,LF(S2)	In production → Gather information about quantity of products customers need									Products with old frames: Out of production				
	TC7USB42MU,LF(S2)														
#3	TC7USB40MU,LF(S2E)			Start up production							production Start				
	TC7USB42MU,LF(S2E)														

# 2. Summary of changes

We have basically adopted the subcontractor's standard designs for materials, etc. The chips, which are supplied from a Japan factory, are not to change.

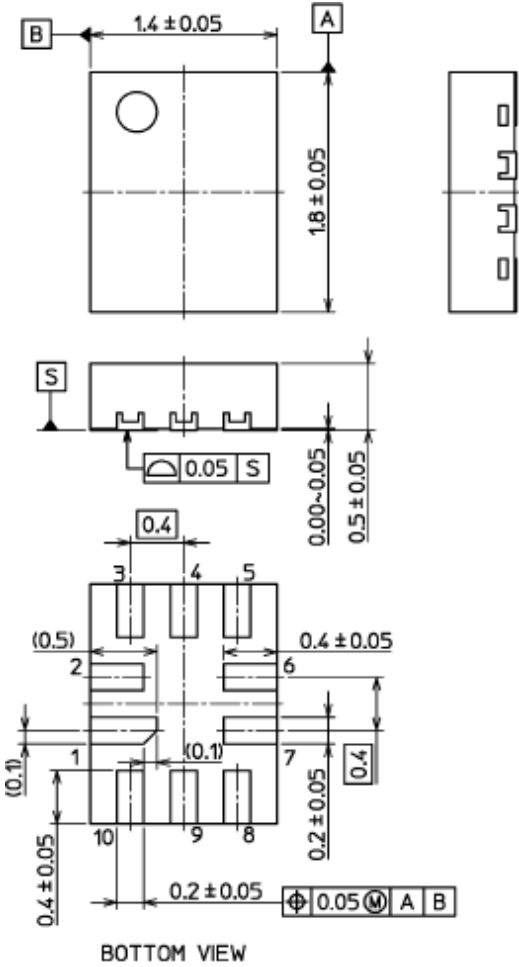
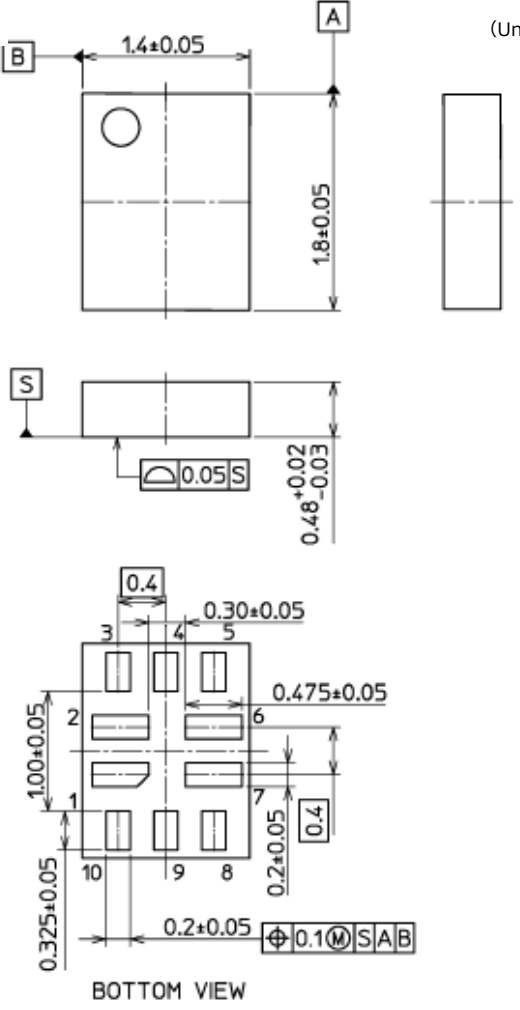
Item		Overseas subcontractor	Domestic subcontractor		
Package name		UQFN10	UQFN10B		
Number		# 1	# 2	# 3	
Product name (Change in additional code "ADDC")		TC7USB40MU,LF(S)	TC7USB40MU,LF(S <del>2</del> )	TC7USB40MU,LF(S <del>2</del> E)	
		TC7USB42MU,LF(S)	TC7USB42MU,LF(S <del>2</del> )	TC7USB42MU,LF(S <del>2</del> E)	
Drawing in TD (Technical data)		Only the drawings change. No change in product size and characteristics.			
Product appearance		Land pattern: Large	Land pattern: Small		
					
		The photos above are TC7SB40MU. The electrodes are exposed on the sides.	The photos above are TC7SB40MU. No electrode is exposed on the sides.		
Mark	ID code	No change in product ID code: TC7SB40MU = A TC7SB42MU = B			
	Trace code	Year code, week code	Year code, week code, internal control number		
Manufacturing	QCS	Subcontractor's standard QCS	Subcontractor's standard QCS		
	Chip	No change: Supplied from Japan (Japan Semiconductor Corporation)			
	Frame structure (plating)	Cu alloy (Ni/Pd/Au)	Ni electroforming (Ag/Pd/Ni/Au)	Ni electroforming (Ag/Ni/Au)	
	Product' back side	Au			
	Bonding	Au	Pd-Cu		
	Resin	No change: Halogen-free			
Packing	Labelling	Assembled in Thailand	Assembled in Japan		
	Device quantity per reel	No change: 3000 pcs/reel			
	Reel	Blue: Subcontractor's standard reel	Black: Subcontractor's standard reel		
	Inner carton	Subcontractor's standard carton 1 reel/carton	Subcontractor's standard carton Max 10 reels/carton		

# 3. Change points (Summary of this document)

Item		Content	Item number
Package name		Summary of changes	2
Number			
Product name (Change in additional code "ADDC")			
Drawing in TD (Technical data)		Comparison in drawing	4.4-1
		Land pattern	4.4-2
Product appearance	Appearance		4.4-3
	Mark	ID code	Explanation about marking
		Trace code	
Manufacturing	QCS		4.4-5
	Chip		-
	Frame structure (Plating)		Comparison in structural drawing (#1 vs #3)
	External part		
	Bonding		
	Resin		
Packing	Labelling		4.4-7
	Tape dimensions		Descriptions in packing specifications
	Reel		
	Inner carton		
Product function	Electrical characteristics		5
	Reliability		6
	Mounting evaluation		7
Finished product	Evaluation on finished product	Comparison in external dimensions	8

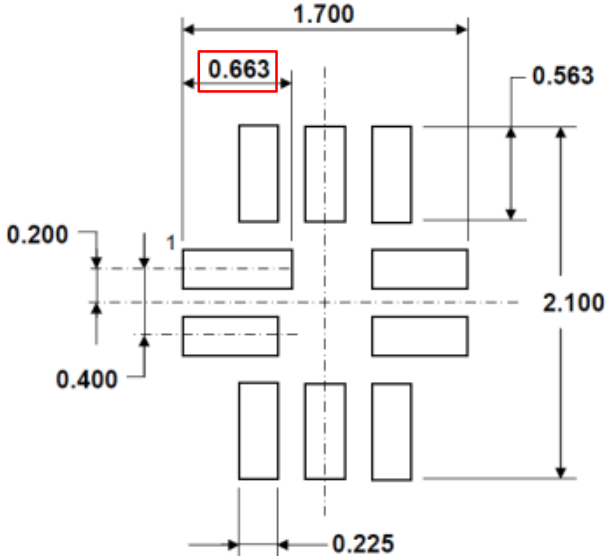
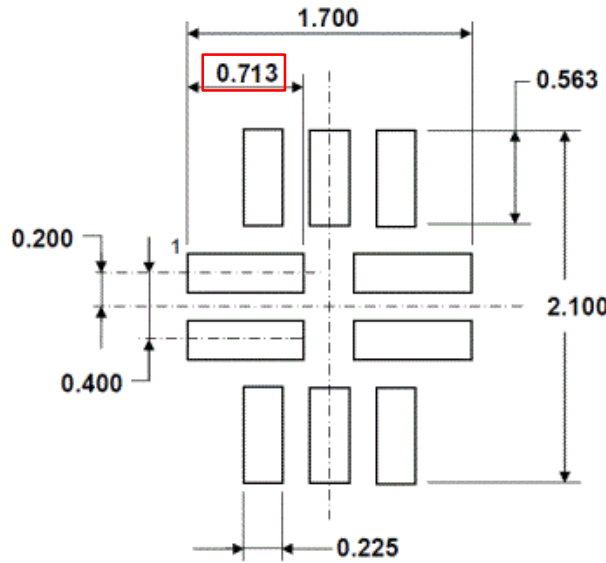
# 4. Change point: Technical data (TD)-External drawing

4-1) There are changes mainly in shape of the product's back.

Product before change #1 (Overseas subcontractor)	Product after change #2 & #3 (Domestic subcontractor)
<p>UQFN10 (Unit mm)</p>  <p>Front view: Width <math>1.4 \pm 0.05</math>, Height <math>1.8 \pm 0.05</math>. Section lines A-A and B-B.</p> <p>Side view: Thickness <math>0.5 \pm 0.05</math>. Lead height <math>0.00 \sim 0.05</math>. Lead width <math>0.05</math>. Section line S-S.</p> <p>Bottom view: Pin 1 width <math>0.4 \pm 0.05</math>, Pin 2 width <math>0.2 \pm 0.05</math>, Pin 3 width <math>0.4 \pm 0.05</math>, Pin 4 width <math>0.2 \pm 0.05</math>, Pin 5 width <math>0.4 \pm 0.05</math>, Pin 6 width <math>0.2 \pm 0.05</math>, Pin 7 width <math>0.4 \pm 0.05</math>, Pin 8 width <math>0.2 \pm 0.05</math>, Pin 9 width <math>0.4 \pm 0.05</math>, Pin 10 width <math>0.2 \pm 0.05</math>. Pin pitch <math>0.2 \pm 0.05</math>. Section lines A-A, B-B, and M.</p>	<p>UQFN10B (Unit mm)</p>  <p>Front view: Width <math>1.4 \pm 0.05</math>, Height <math>1.8 \pm 0.05</math>. Section lines A-A and B-B.</p> <p>Side view: Thickness <math>0.48^{+0.02}_{-0.03}</math>. Section line S-S.</p> <p>Bottom view: Pin 1 width <math>0.4</math>, Pin 2 width <math>0.30 \pm 0.05</math>, Pin 3 width <math>0.475 \pm 0.05</math>, Pin 4 width <math>0.2 \pm 0.05</math>, Pin 5 width <math>0.4</math>, Pin 6 width <math>0.2 \pm 0.05</math>, Pin 7 width <math>0.4</math>, Pin 8 width <math>0.2 \pm 0.05</math>, Pin 9 width <math>0.325 \pm 0.05</math>, Pin 10 width <math>0.2 \pm 0.05</math>. Pin pitch <math>0.2 \pm 0.05</math>. Section lines S, A, B, and M.</p>

# 4. Change point: Technical data (TD)- Land pattern

4-2) The following shows a difference in land pattern.

Product before change (Overseas subcontractor)	Product after change (Domestic subcontractor)
<p>UQFN10 (Unit mm)</p> 	<p>UQFN10B (Unit mm)</p> 








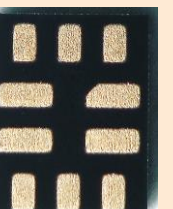
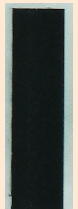
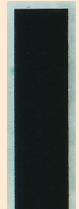



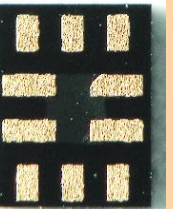




Recommended land size for mounting:

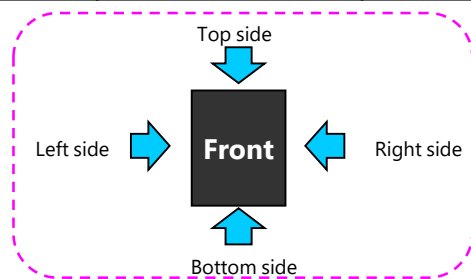
We have confirmed that the land size of the overseas subcontractor's products can be used to mount the substitute products. However, we recommend that your company apply the land size according to the change in terminal dimensions when fabricating a new board.

# 4. Change point: Comparison in product appearance

## 4-3) Photos of six sides

Representative product: TC7USB40MU

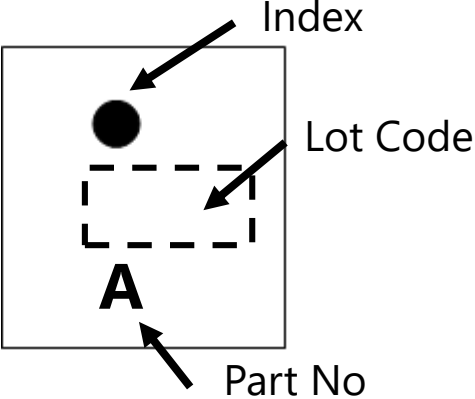
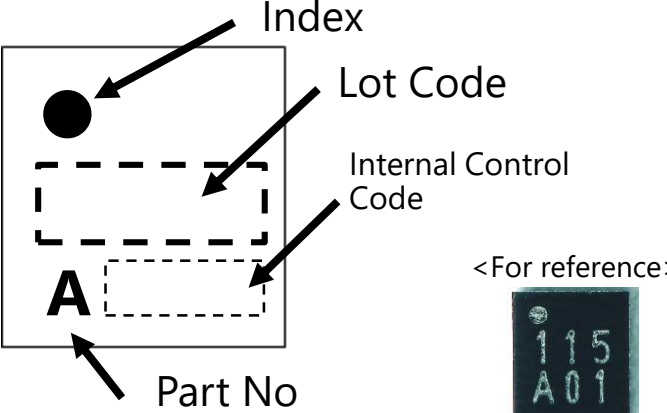
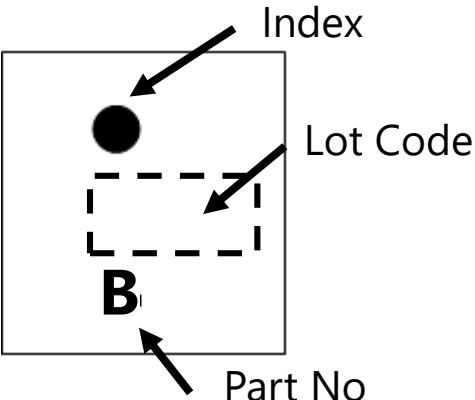
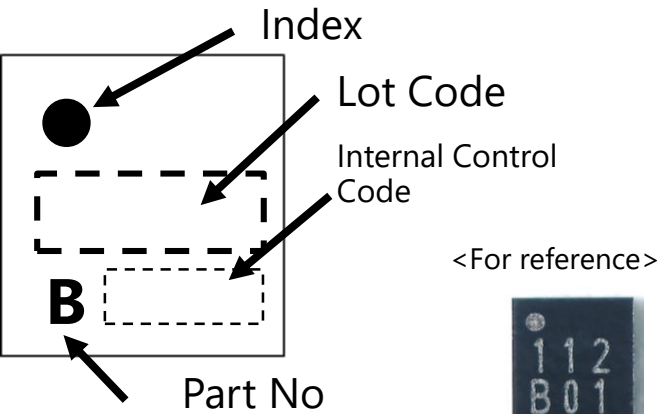
	Front	Back	Left side	Right side	Top side	Bottom side
Product before change #1 (Overseas subcontractor)						
Product after change #2 (Domestic subcontractor)						
Product after change #3 (Domestic subcontractor)						





# 4. Change point: Mark (ID code, trace code)

4-4) Explanation about marking is shown below.

Product name	Product before change (Overseas subcontractor)	Product after change (Domestic subcontractor)
TC7USB40MU	 <p>Diagram showing marking on TC7USB40MU before change. The marking includes an Index (black dot), Lot Code (dashed box), and Part No (A). A reference image shows the marking: 1G A.</p>	 <p>Diagram showing marking on TC7USB40MU after change. The marking includes an Index (black dot), Lot Code (dashed box), Internal Control Code (dashed box), and Part No (A). A reference image shows the marking: 115 A01.</p>
TC7USB42MU	 <p>Diagram showing marking on TC7USB42MU before change. The marking includes an Index (black dot), Lot Code (dashed box), and Part No (B). A reference image shows the marking: 112 B01.</p>	 <p>Diagram showing marking on TC7USB42MU after change. The marking includes an Index (black dot), Lot Code (dashed box), Internal Control Code (dashed box), and Part No (B). A reference image shows the marking: 112 B01.</p>

※ Please see Appendix (ID code, trace code) for the details of Lot Code and Internal Control Code.

# 4. Change point: QCS

## 4-5) Control plan (QC process flow)

### Product before change (Overseas subcontractor)

Manufacture Production		Items Controlled/Inspected	Check Frequency
Flow Chart	Process		
	(Chip) (Frame) Die Bonding	Temperature	Once / Week
	Appearance Inspection	Bonding Status	Once / Lot Change
	Curing		
	(Bonding Wire) Wire Bonding	Bonding Strength	Once / Shift
	Appearance Inspection	Bonding Status	Once / Shift
	(Molding Resin) Molding	Temperature	Once / Day
	Marking		
	Appearance Inspection	Marking Status	Once / Lot
	Sheet Sticking		
	Dicing		
	Appearance Inspection	Dicing Status	Once / Lot
	Testing	Electrical Characteristics	
	(Taping Material) Taping		
	(Packing Material) Packing		
	Quality Monitoring Shipping	Electrical Characteristics Reliability test	

Symbol    ▽: Storage    ○: Operation    □: 100% Test    ◻: Sampling inspection  
 ◻Δ: Special check    ○—□: Check

The above process may be changed or rationalized based on the result in our process.

### Product after change (Domestic subcontractor)

Manufacturing Process		Items Controlled/Inspected	Check Frequency
Flow Chart	Process		
	(Wafer)		
	Backgrinding (Die mount material (DAF)) Dicing	Wafer thickness	Once/Day
	(Substrate + Electrode) (Epoxy resin) Die bonding	Appearance	Once/Lot
	(Bonding wire) Wire bonding	Bonding strength	Once/Week
	Appearance inspection	Bonding condition	Once/Lot
	(Molding resin) Molding	Temperature	Once/Day
	Substrate removing Marking	Appearance	Once/Lot
	Sheet attaching Dicing	Appearance	Once/Lot
	Testing Appearance inspection	Electrical characteristics	
	(Taping material) Taping		
	(Packing material) Packing		
	Quality monitoring Shipping	Electrical characteristics Reliability testing	

Symbol    ▽: Storage    ○: Operation    □: 100% Test    ◻: Sampling inspection  
 ◻Δ: Special check    ○—□: Check

The above flow is subject to change or streamlining based on the track record of our process.

# 4. Change point: Structural drawing

4-6) The structural drawings are shown below.

**TC7USB40MU / TC7USB42MU**

Product before change (Overseas subcontractor)	Product after change (Domestic subcontractor)																																																				
<p>UQFN10</p> <p>The drawing shows a side view of the UQFN10 package with callout 5 pointing to the top surface and callout 4 pointing to the bottom surface. The top view shows a square die (1) mounted on a square read frame (3) within a circular mold cavity (2). Bonding wires (2) connect the die to the frame. Callout 1 points to the die, callout 2 to the mold cavity, callout 3 to the read frame, and callout 4 to the bottom surface.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>Name</th> <th>Material</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Chip</td> <td>Si</td> <td></td> </tr> <tr> <td>2</td> <td>Bonding Wire</td> <td>Au</td> <td></td> </tr> <tr> <td>3</td> <td>Read Frame</td> <td>Cu</td> <td></td> </tr> <tr> <td>4</td> <td>Electrode</td> <td>Cu, Ni/ Pd /Au Plating</td> <td>Cu+Ni(100%)/Pd(100%)/Au(100%)</td> </tr> <tr> <td>5</td> <td>Molding Resin</td> <td>Epoxy Resin</td> <td></td> </tr> <tr> <td>6</td> <td>Die mount material</td> <td>Epoxy Resin</td> <td></td> </tr> </tbody> </table>	NO.	Name	Material	Comment	1	Chip	Si		2	Bonding Wire	Au		3	Read Frame	Cu		4	Electrode	Cu, Ni/ Pd /Au Plating	Cu+Ni(100%)/Pd(100%)/Au(100%)	5	Molding Resin	Epoxy Resin		6	Die mount material	Epoxy Resin		<p>UQFN10B</p> <p>The drawing shows a side view of the UQFN10B package with callout 4 pointing to the bottom surface. The top view shows a square die (1) mounted on a square read frame (3) within a circular mold cavity (2). Bonding wires (2) connect the die to the frame. Callout 1 points to the die, callout 2 to the mold cavity, callout 3 to the read frame, and callout 4 to the bottom surface.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>Name</th> <th>Material</th> <th>Comment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Chip</td> <td>Si</td> <td></td> </tr> <tr> <td>2</td> <td>Bonding Wire</td> <td>Cu</td> <td></td> </tr> <tr> <td>3</td> <td>Electrode</td> <td>Ag (Top) / Ni/ Pd /Au (Bottom) Plating</td> <td>Plating composition :Ag(100%)/Ni(100%)/Pd(100%)/Au(100%) Plating thickness :80μm(Target value)</td> </tr> <tr> <td>4</td> <td>Molding Resin</td> <td>Epoxy Resin</td> <td></td> </tr> <tr> <td>5</td> <td>Die Attach Material</td> <td>Epoxy Resin</td> <td></td> </tr> </tbody> </table>	NO.	Name	Material	Comment	1	Chip	Si		2	Bonding Wire	Cu		3	Electrode	Ag (Top) / Ni/ Pd /Au (Bottom) Plating	Plating composition :Ag(100%)/Ni(100%)/Pd(100%)/Au(100%) Plating thickness :80μm(Target value)	4	Molding Resin	Epoxy Resin		5	Die Attach Material	Epoxy Resin	
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5	Die Attach Material	Epoxy Resin																																																			

# 4. Change point: Labelling

4-7) Descriptions on the label are shown below.

## Product before change #1 (Overseas subcontractor)

P/N:

TYPE	TC7USB40MU,LF		
ADD.C	(S)	Q'TY	3000pcs

BAR  
CODE

LOT

[[G]]/RoHS COMPATIBLE

DIFFUSED IN JAPAN  
ASSEMBLED IN THAILAND

BAR CODE

## Product after change #2 (Domestic subcontractor)

P/N:

TYPE	TC7USB40MU,LF		
ADD.C	(S2)	Q'TY	3000pcs

BAR  
CODE

LOT

[[G]]/RoHS COMPATIBLE

DIFFUSED IN JAPAN  
ASSEMBLED IN JAPAN

BAR CODE

## Product after change #3 (Domestic subcontractor)

P/N:

TYPE	TC7USB40MU,LF		
ADD.C	(S2E)	Q'TY	3000pcs

BAR  
CODE

LOT

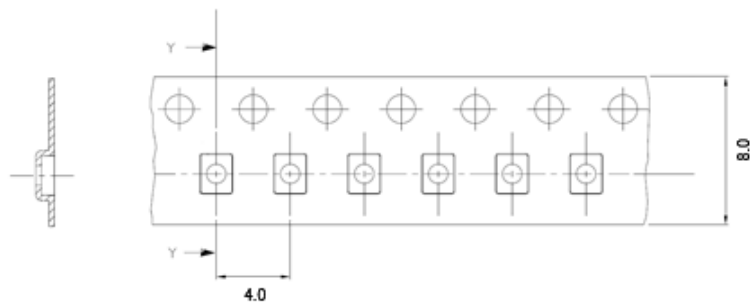
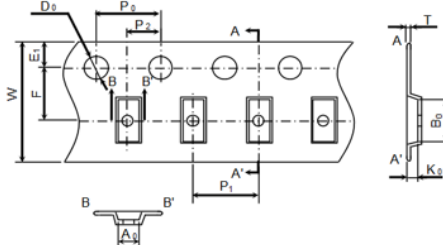
[[G]]/RoHS COMPATIBLE

DIFFUSED IN JAPAN  
ASSEMBLED IN JAPAN

BAR CODE

# 4. Change point: Packing specifications

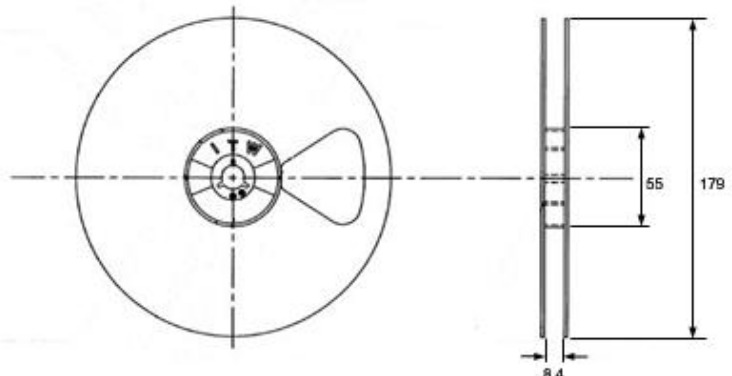
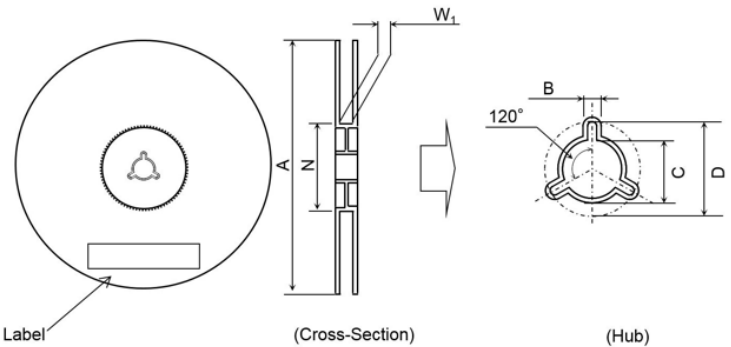
## 4-8) Change in tape dimensions

Product before change (Overseas subcontractor)	Product after change (Domestic subcontractor)																																				
<p>UQFN10</p> <p><b>2. Tape and Reel Dimensions</b></p> <p>2-1) Carrier Tape Form and Dimensions</p> <p style="text-align: right;">Unit: mm</p>  <p>SECTION Y-Y</p>	<p>UQFN10B</p> <p><b>Tape Dimensions</b></p>  <p style="text-align: center;"><b>Figure 3 Tape Dimensions</b></p> <p>(Figure 3 is an example and may differ from the actual tape. Refer to table 1 and 2 for dimensions.)</p> <p style="text-align: center;"><b>Table 1 Tape Dimensions -1</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="5" style="text-align: right;">Unit: mm</th> </tr> <tr> <th>D<sub>0</sub></th> <th>E<sub>1</sub></th> <th>P<sub>0</sub></th> <th>T</th> <th>P<sub>0</sub> Cumulative Tolerance</th> </tr> </thead> <tbody> <tr> <td>1.5±0.1/0</td> <td>1.75±0.1</td> <td>4.0±0.1</td> <td>0.6max.</td> <td></td> </tr> </tbody> </table> <p style="text-align: center;"><b>Table 2 Tape Dimensions -2</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="7" style="text-align: right;">Unit: mm</th> </tr> <tr> <th>F</th> <th>P<sub>1</sub></th> <th>P<sub>2</sub></th> <th>W</th> <th>A<sub>0</sub></th> <th>B<sub>0</sub></th> <th>K<sub>0</sub></th> </tr> </thead> <tbody> <tr> <td>3.5±0.05</td> <td>4.0±0.1</td> <td>2.0±0.05</td> <td>8.0</td> <td>1.6</td> <td>2.0</td> <td>0.65</td> </tr> </tbody> </table>	Unit: mm					D <sub>0</sub>	E <sub>1</sub>	P <sub>0</sub>	T	P <sub>0</sub> Cumulative Tolerance	1.5±0.1/0	1.75±0.1	4.0±0.1	0.6max.		Unit: mm							F	P <sub>1</sub>	P <sub>2</sub>	W	A <sub>0</sub>	B <sub>0</sub>	K <sub>0</sub>	3.5±0.05	4.0±0.1	2.0±0.05	8.0	1.6	2.0	0.65
Unit: mm																																					
D <sub>0</sub>	E <sub>1</sub>	P <sub>0</sub>	T	P <sub>0</sub> Cumulative Tolerance																																	
1.5±0.1/0	1.75±0.1	4.0±0.1	0.6max.																																		
Unit: mm																																					
F	P <sub>1</sub>	P <sub>2</sub>	W	A <sub>0</sub>	B <sub>0</sub>	K <sub>0</sub>																															
3.5±0.05	4.0±0.1	2.0±0.05	8.0	1.6	2.0	0.65																															

There is no change in tape pitch between the overseas and domestic products.  
(Adoption of each outsourced standard product)

# 4. Change point: Packing specifications

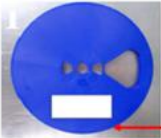
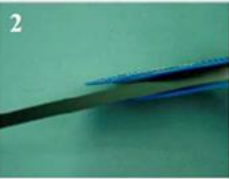

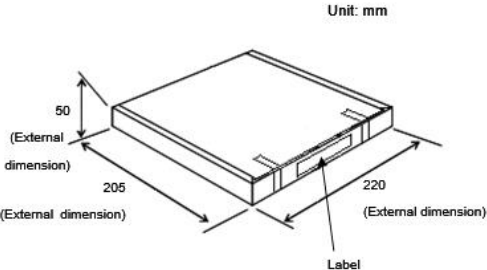
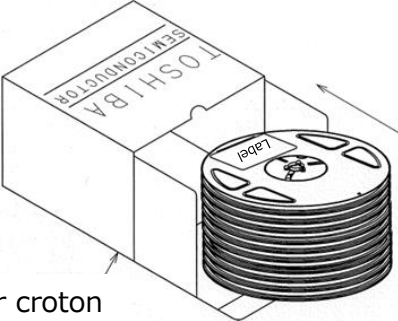
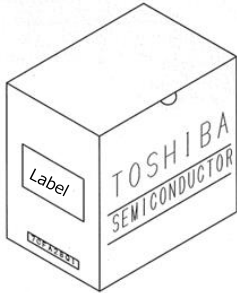
## 4-8) Change in reel dimensions

Product before change (Overseas subcontractor)	Product after change (Domestic subcontractor)																		
<p>UQFN10</p> <p>3. Reel Form and Dimensions</p> <p style="text-align: right;">Unit: mm</p> 	<p>UQFN10B</p> <p>Reel Dimensions</p>  <p style="text-align: center;">Figure Reel</p> <p style="text-align: center;">Table Reel Dimensions</p> <table border="1" data-bbox="1110 849 1758 921"> <thead> <tr> <th colspan="6" style="text-align: right;">Unit: mm</th> </tr> <tr> <th>A</th> <th>N</th> <th>W<sub>1</sub></th> <th>C</th> <th>D</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>180</td> <td>60</td> <td>9.0</td> <td>13.0±0.2</td> <td>21.0±0.8</td> <td>2.0±0.5</td> </tr> </tbody> </table>	Unit: mm						A	N	W <sub>1</sub>	C	D	B	180	60	9.0	13.0±0.2	21.0±0.8	2.0±0.5
Unit: mm																			
A	N	W <sub>1</sub>	C	D	B														
180	60	9.0	13.0±0.2	21.0±0.8	2.0±0.5														

There is no change in reel dimensions (180φ) between the overseas and domestic products.  
(Adoption of each outsourced standard product)

# 4. Change point: Packing specifications

## 4-9) Change in inner carton dimensions

Product before change (Overseas subcontractor)	Product after change (Domestic subcontractor)
<p>UQFN10</p> <p>(1 reel/Inner carton)</p> <p>8. Packing</p>  <p>Label</p>  <p>Secure leader of carrier tape with Guard band</p>  <p>3</p> <p>Wrap reel with bubble sheet and then put it into Box</p>  <p>Unit: mm</p> <p>(External dimension) 50</p> <p>(External dimension) 205</p> <p>(External dimension) 220</p> <p>Label</p>	<p>UQFN10B</p> <p>(Max 10 reels/Inner carton)</p>  <p>10Reel for inner croton.</p> <p>Inner croton</p> 

(Adoption of each outsourced standard product)

# 5. Product function check

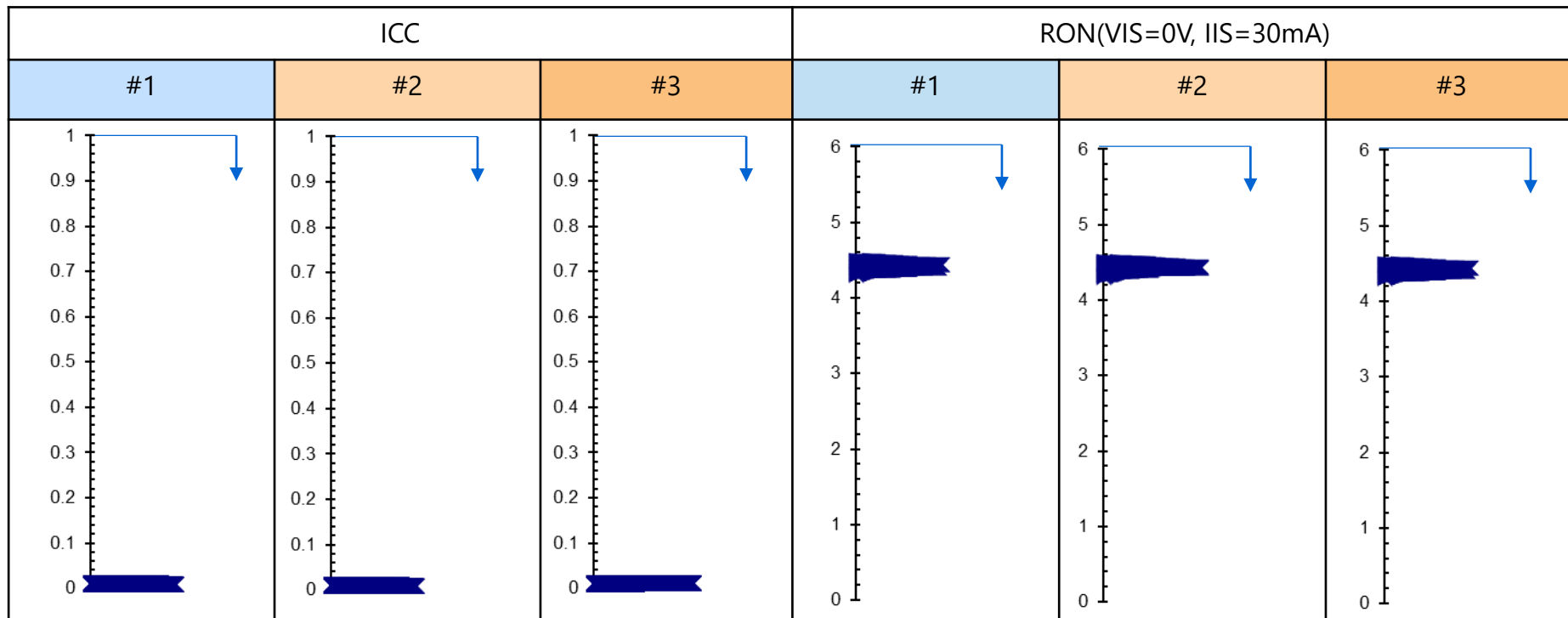
## Comparison in initial characteristics

Initial characteristics (electrical characteristics) were measured. The measurements fell within the specifications. No differences were found in the results and no problems were found.

### Representative product: TC7USB42MU

n= 1 Lot Ta=25°C

Item	Symbol	Measurement condition	Specification (TD)				#1		#2		#3	
			Min	Typ	Max	Unit	Average	Cpk	Average	Cpk	Average	Cpk
Quiescent supply current	ICC	VIN=VCC or GND, IOU=0A	-	-	1	uA	0.009	557	0.009	587	0.009	543
ON-resistance	RON	VIS=0V, IIS=30mA	-	4.5	6	Ω	4.42	15.7	4.43	15.5	4.42	16.1





# 6. Reliability data

The following shows data on evaluations for the change.

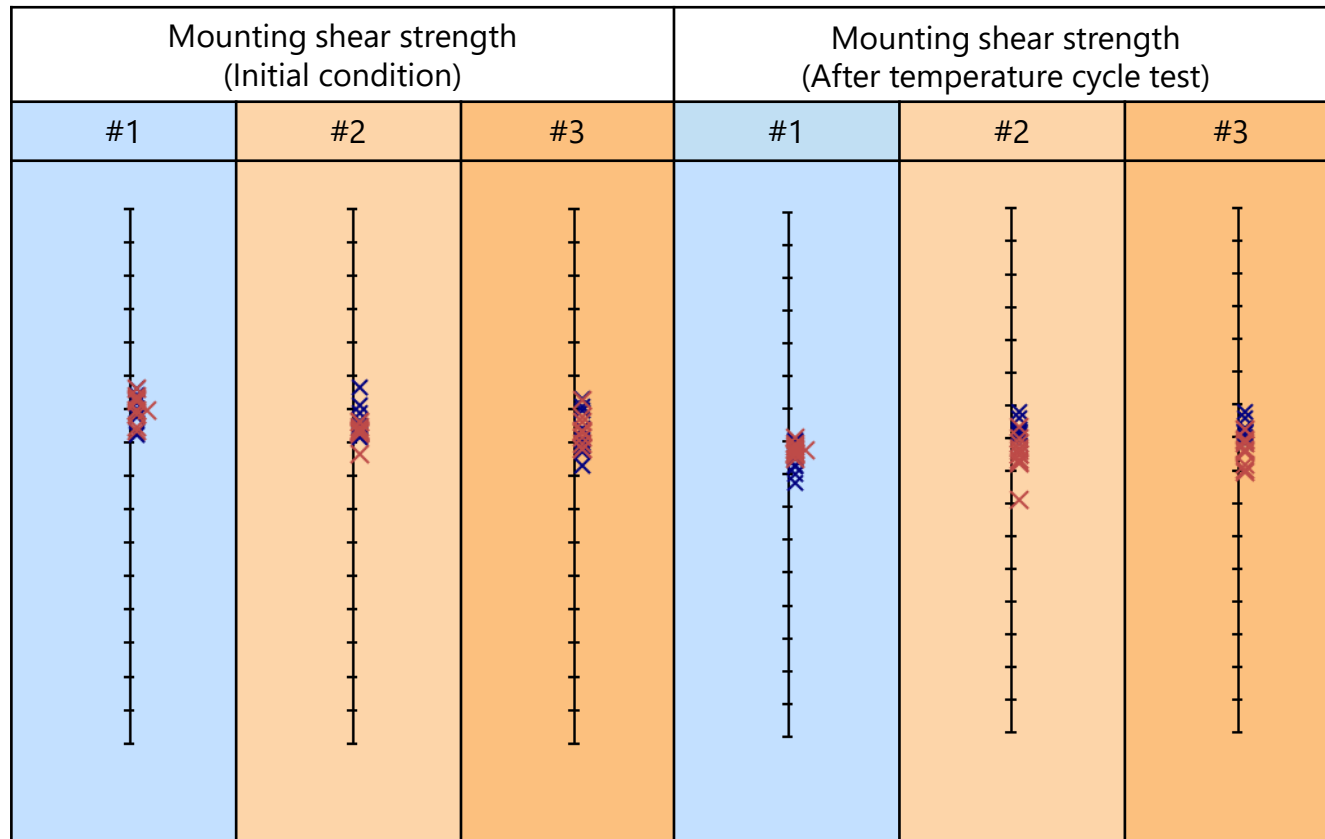
Evaluation	Item	Conditions	Result (Sample size = n)	Judgment	Data attached
Product function check	Solderability test	240°C/3s	10p	OK	-
	Static load test	20N, 40N, 50N	12p	OK	-
Reliability check	Temperature cycle test (Pretreatment = Moisture absorption + Reflow)	-65°C(30 min) to 150°C(30 min), 100 cyc	30p	OK	-
	Pressure cooker test (Pretreatment = Moisture absorption + Reflow)	127°C/100% 96h	30p	OK	-
	Salt atmosphere test (Use of results of evaluating antecedently developed package, DFN5B)	35°C/5% NaCl/48h	11p	OK	-
Mounting check	Mounting shear strength	Directions X, Y (Initial)	11p	OK	Attached
	Shear test after mounting temperature cycle test	Directions X, Y (100 cyc)	11p	OK	Attached

# 7. Device mounting check (Mounting shear strength, mounting temperature cycle test)

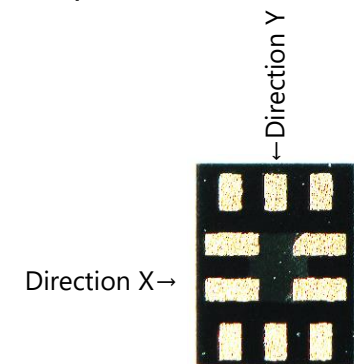
Mounting shear strength and mounting temperature cycle tests were conducted. The results showed that both before and after the temperature cycle test, the shear strength of products after the change (#2, #3) was equivalent to that of products before the change (#1). No problems were found.

**Representative product: TC7USB42MU**

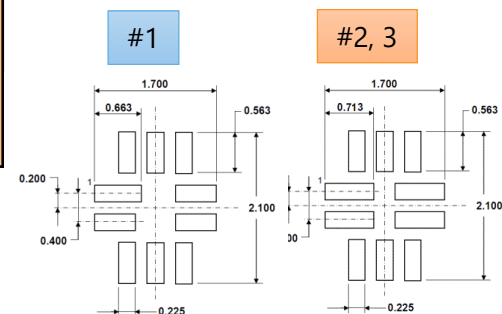
Direction Y: X  
 Direction X: X (n=11 pcs each)



• Shear direction (Representative: #3)



• Mount pad size



• Mounting conditions

Reflow condition	Toshiba standard
Peak temp	Peak 260°C
Reflow zone	230°C or more / 30 - 50 sec
Preheat	180 - 190°C / 60 - 120 sec

Board

- Metal mask thickness: 100 μm
- Metal mask aperture ratio: 100%
- Mount pad size (Figure on the right)

# 8. Finished product check

## Comparison in external dimensions

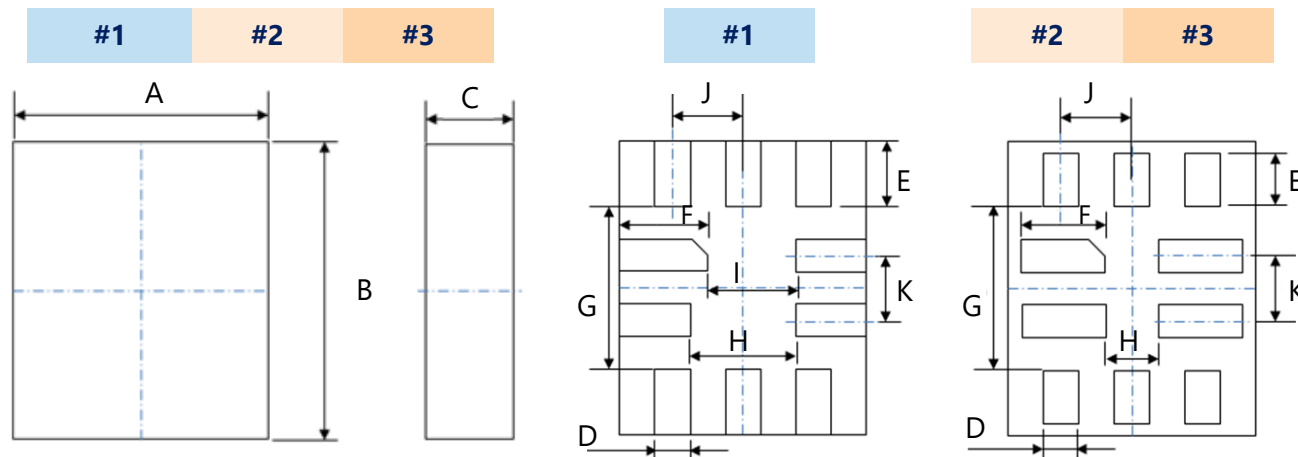
Product dimensions were measured. The measurements fell within the specifications. No differences were found in the results and no problems were found.

### Representative product: TC7USB42MU

(n=10p×3 lots)

Num ber	Item	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)	J (mm)	K (mm)
#1	Avg	1.385	1.795	0.526	0.205	0.417	0.494	0.961	0.593	0.484	0.395	0.394
	Cp	5.92	6.53	11.87	5.56	4.98	7.83	-	-	-	-	-
	Cpk	4.09	5.85	5.60	5.01	3.33	6.96	-	-	-	-	-
Spec for #1		1.35~1.45	1.75~1.85	0.45~0.55	0.15~0.25	0.35~0.45	0.45~0.55	1.0typ	0.6typ	0.5typ	0.4typ	0.4typ
Judgment		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Num ber	Item	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	I (mm)	J (mm)	K (mm)
#2	Avg	1.394	1.795	0.476	0.215	0.326	0.489	0.998	0.297	-	0.396	0.395
	Cp	6.62	4.94	2.19	6.91	8.40	3.75	3.87	5.54	-	-	-
	Cpk	5.86	4.45	2.12	4.81	8.18	2.69	3.73	5.22	-	-	-
#3	Avg	1.394	1.802	0.485	0.205	0.320	0.469	1.000	0.296	-	0.400	0.405
	Cp	5.43	5.73	2.72	5.40	4.97	4.71	4.95	5.22	-	-	-
	Cpk	4.82	5.48	1.69	4.89	4.46	4.17	4.91	4.80	-	-	-
Spec for #2, 3		1.35~1.45	1.75~1.85	0.45~0.5	0.15~0.25	0.275~0.375	0.425~0.525	0.95~1.05	0.25~0.35	-	0.4typ	0.4typ
Judgment		OK	OK	OK	OK	OK	OK	OK	OK	-	OK	OK



\* Specification with upper and lower limits: Cpk, Cp, Average  
\* Typ. value: Average

# TOSHIBA

Our Semiconductor and Storage products  
will always be a driving force to change the world

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Toshiba Electronic Devices and Storage, together with our customers, will accelerate our future journey.

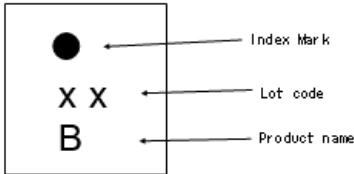
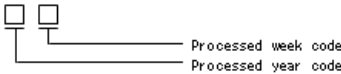
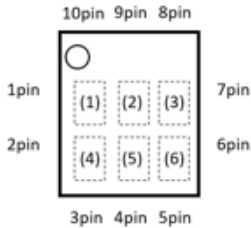
We aim to be a company that will be chosen for our pioneering technology and spirit embedded in our products.

**「Do the right thing / 誠実であり続ける」**

# Appendix

# For reference: Specifications (ID code, trace code)

Lot traceability in the specifications is as follows.

Product before change (Overseas subcontractor)	Product after change (Domestic subcontractor)																																																																																																																																																																											
<p>UQFN10</p> <p>Marking</p>  <p>Explanation for Lot code</p>  <p>Processed year code</p> <table border="1" data-bbox="137 739 909 796"> <thead> <tr> <th>Year</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>2012</th> <th>2013</th> <th>2014</th> <th>2015</th> <th>2016</th> <th>2017</th> <th>2018</th> <th>...</th> </tr> </thead> <tbody> <tr> <td>Mark</td> <td>9</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>...</td> </tr> </tbody> </table> <p>Processed week code</p> <table border="1" data-bbox="137 853 668 1210"> <thead> <tr> <th>Week</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> </tr> </thead> <tbody> <tr> <td>mark</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>0</td> </tr> <tr> <th>Week</th> <th>11</th> <th>12</th> <th>13</th> <th>14</th> <th>15</th> <th>16</th> <th>17</th> <th>18</th> <th>19</th> <th>20</th> </tr> <tr> <td>mark</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> <td>F</td> <td>G</td> <td>H</td> <td>J</td> <td>K</td> </tr> <tr> <th>Week</th> <th>21</th> <th>22</th> <th>23</th> <th>24</th> <th>25</th> <th>26</th> <th>27</th> <th>28</th> <th>29</th> <th>30</th> </tr> <tr> <td>mark</td> <td>L</td> <td>M</td> <td>N</td> <td>P</td> <td>Q</td> <td>R</td> <td>T</td> <td>U</td> <td>V</td> <td>W</td> </tr> <tr> <th>Week</th> <th>31</th> <th>32</th> <th>33</th> <th>34</th> <th>35</th> <th>36</th> <th>37</th> <th>38</th> <th>39</th> <th>40</th> </tr> <tr> <td>mark</td> <td>X</td> <td>Y</td> <td>Z</td> <td>a</td> <td>c</td> <td>d</td> <td>f</td> <td>h</td> <td>i</td> <td>j</td> </tr> <tr> <th>Week</th> <th>41</th> <th>42</th> <th>43</th> <th>44</th> <th>45</th> <th>46</th> <th>47</th> <th>48</th> <th>49</th> <th>50</th> </tr> <tr> <td>mark</td> <td>k</td> <td>m</td> <td>n</td> <td>o</td> <td>r</td> <td>s</td> <td>t</td> <td>u</td> <td>v</td> <td>w</td> </tr> <tr> <th>Week</th> <th>51</th> <th>52</th> <th>53</th> <td colspan="7"></td> </tr> <tr> <td>mark</td> <td>x</td> <td>y</td> <td>z</td> <td colspan="7"></td> </tr> </tbody> </table>	Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	...	Mark	9	0	1	2	3	4	5	6	7	8	...	Week	1	2	3	4	5	6	7	8	9	10	mark	1	2	3	4	5	6	7	8	9	0	Week	11	12	13	14	15	16	17	18	19	20	mark	A	B	C	D	E	F	G	H	J	K	Week	21	22	23	24	25	26	27	28	29	30	mark	L	M	N	P	Q	R	T	U	V	W	Week	31	32	33	34	35	36	37	38	39	40	mark	X	Y	Z	a	c	d	f	h	i	j	Week	41	42	43	44	45	46	47	48	49	50	mark	k	m	n	o	r	s	t	u	v	w	Week	51	52	53								mark	x	y	z								<p>UQFN10B</p> <p>1. Lot No. Designation</p> <p>Lot No. is designated by year and month of manufacture as a combination of numbers and alphabet.</p>  <p>2. Designation List</p> <table border="1" data-bbox="991 811 1850 1039"> <thead> <tr> <th>Item</th> <th>Mark Position</th> <th>Contents</th> </tr> </thead> <tbody> <tr> <td>Year code</td> <td>(1)</td> <td>Year of manufacture: Last digit of Christian year.</td> </tr> <tr> <td>Weekly code</td> <td>(2)(3)</td> <td>Week of manufacture: 1st week to 53rd week are denoted by 2 digit numbers respectively.</td> </tr> <tr> <td>Product abbreviation</td> <td>(4)</td> <td>A:TC7USB40MU, B:TC7USB42MU</td> </tr> <tr> <td>Internal management code.</td> <td>(5)(6)</td> <td>Denoted by letters A to Z or 0 to 9 respectively.</td> </tr> </tbody> </table>	Item	Mark Position	Contents	Year code	(1)	Year of manufacture: Last digit of Christian year.	Weekly code	(2)(3)	Week of manufacture: 1st week to 53rd week are denoted by 2 digit numbers respectively.	Product abbreviation	(4)	A:TC7USB40MU, B:TC7USB42MU	Internal management code.	(5)(6)	Denoted by letters A to Z or 0 to 9 respectively.
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