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To: ____________________

Notification about Change of Frame of DFN (Dual Flat No Lead) Products

TOSHIBA

Issue No. H440-1E-008P-E
Date of issue: May 27, 2021

Quality And Reliability Engineering Group
Quality Assurance Department
Himeji Operations - Semiconductor
Toshiba Electronic Devices & Storage Corporation

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1. Outline of the change

1) Background of the change

One of our frame manufacturers, Company A, has informed us that it will stop producing the frames of the following packages. We will change the manufacturer to Company B which has already mass-produced the frames for package DFN5B. Please confirm the details of the change shown on the following pages.

Item	①	②	③	④ Company B has production record.
	SDFN4	DFN4	DFN4C	DFN 5 B
Frame manufacturer (Before change)	Company A			Company B
Frame manufacturer (After change)	Company B			

We have used Company B's frames for package DFN5B. The manufacturer has a solid track record of production. More than 100 million DFN5B products with the frames have been manufactured.

2) Products subjected to the change

Please see the list of the products subjected to the change. Those products are identified by the name in order for us to smoothly manufacture them after the change. Therefore, the product names for order are to be changed. We are sorry for the inconvenience, but your understanding would be sincerely appreciated.

3) Schedule of the change

The change is scheduled to start from the production of January 2022.
We apologize for the short notice, but your understanding would be highly appreciated for our continuous supply.

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2. Schedule for supplying products after the change

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Products with their frames changed are scheduled to be mass-produced from January 2022.

Please contact our sales representatives to ask for samples after the change and/or inform of necessary quantity of products before the change.

Your cooperation would be appreciated.

Item (Subject)	**2021**									**2022**		
	4月	5月	6月	7月	8月	9月	10月	11月	12月	1月	2月	3月
	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Internal evaluation on representative products	Done											
Change notification to customer, customer's approval			Period of customer's approval									
Start of mass-production with the frame changed.										Production start		

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3. Description of the change (5M1E)

Changes in **5M1E** resulting from the frame change are shown below.

5M1E	Change point
Man	No change
Machine	No change
Measurement	No change
Method	No change
Material	To be changed (Frame manufacturer from Company A to Company B)
Environment	No change

The change will not affect the products’ electrical characteristics, reliability, etc.

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4. Description of the change (QC process flow)

Control plan (QC process flow) (Package: SDFN4/DFN4/DFN4C common to all)

There are no differences before and after the change.

Manufacture Production		Items Controlled/Inspected	Check Frequency
Flow Chart	Process		
▽	(Wafer)		
○─□	Back Grinding	Wafer Thickness	Once / Day
○	Dicing	Appearance	
▽	(Substrate)		
▽	(Epoxy Resin)		
○─□	Die Bonding	Appearance	Once / Lot
▽	(Bonding Wire)		
○─□	Wire Bonding	Bonding Strength	Once / Week
◪	Appearance Inspection	Bonding Status	Once / Lot
▽	(Molding Resin)		
○─□	Molding	Temperature	Once / Day
○	Marking		
□	Appearance Inspection		
○	Sheet Sticking		
○─□	Dicing	Appearance	
□	Testing	Electrical Characteristics	
▽	(Taping Material)		
○	Taping		
▽	(Packing Material)		
○	Packing		
◪△	Quality Monitoring	Electrical Characteristics Reliability test	
▽	Shipping		
Symbol	▽:Storage ◪△:Special check	○:Operation ○─□ :Check	□ :100%Test ◪ : Sampling inspection

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

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5. Summary of the change (Detailed)

Changes resulting from the frame change are shown below.

The new frame entails changes in appearance of the products' electrode. While part of the specifications (dimensional drawing) changes, the products have no change in size.

Also, there is no change in land pattern (for reference).

Item	Description	① SDFN4	② DFN4	③ DFN4C
Package/ product name	Package name	SDFN4E	DFN4E	DFN4F
	Product identification by adding "E" to additional code (ADDC) *1	Example of product name: TCR2LNxx,LF(SE TCR2LNxx,LSF(SE TCR2ENxx,LF(SE	Example of product name: TCR3DMxx,RF(SE TCR3DMxx,LF(SE TCR3UMxx,LF(SE	Example of product name: TCR3RMxxA,LF(SE
Document	TD (Technical data)	Part of TD descriptions is to be changed.	Part of TD descriptions is to be changed.	Part of TD descriptions is to be changed.
Material	Frame shape	Products' electrode, etc. are to be changed.		
	Frame (Composition, thickness)	Frame composition and thickness are to be changed.		

＊1: The additional code means the (xx part) after the parentheses.

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6. Change points and evaluations (DRBFM)

1) DRBFM regarding the frame change is shown below.

DRBFM: Changes & Evaluation Sheet

Issue date：March 28,2021
Frame manufacture change： (before change) Company A
(After change) Company B
Team department: [development dept]、[Technical dept]、[Application engineering dept]、[Quality Assureance dept]

No. +C8:O 2C8:P2 4	Part & product/Change and its purpose — Ban against change without purpose: Part, product	Change	Function — Required performance	Concern from change (Failure mode) — Loss of function, lack of merchantability, and side effect caused by change	Case where a concern arises — Cause, factor	Effects on customer	Item reflected (Removal of concerns) — (Current process control/design)	Action (based on result of DRBFM): What action was taken? — Item to be reflected on design drawing	Item to be reflected on evaluation (New evaluation method) — Item	Test result (Defectives /quantity tested)	Judgment	Item to be reflected on manufacturing (Action)
1	Frame	Change in frame appearance: Mounting surface (back side), shape Uneven edge → Straight edge	Electrical connection with board	Deterioration of solderability	Change in the state of mounting surface	Failure in mounting	Based on QCS	None	1) Solderability test 2) Salt atmosphere test (Use of results of evaluating antecedently developed package)	1)0／10p 2)0／11p	OK	- Check by IQC - Appearance inspection after molding
2		Change in frame appearance: On the side of package where the electrodes are exposed, the shape of cutting surface of the electrode (support pin) changes. Straight → Mushroom-shaped	Part that connects frame with device part during manufacturing ("Support pin")	Abnormality in appearance due to electrode burr	Improper conditions of package dicing	Abnormality in appearance/shape (Deterioration of quality)	Based on design values	None	Appearance check on the conditions of the dicing concerned	0／30p	OK	None
3		Change in frame structure (Electroforming) Au/Ni/Pd/Ag → Au/Ni/Ag (Au: Mounting side, Ag: Internal junction area)	Electrical connection between frame and wire	Deterioration of bonding between frame and wire	Improper conditions of bonding due to frame change	Deterioration of reliability	Based on QCS	None	1) Wire pull strength 2) Bonding shear strength 3) Ball thickness 4) Ball diameter 5) Temperature cycle test: 100cyc	1)0／30p 2)0／30p 3)0／30p 4)0／30p 5)0／30p	OK	- Check by IQC - Regular monitoring on reliability of representative products
4			Mechanical connection with chip	Decrease in die shear strength	Improper conditions of electroforming	Deterioration of reliability	Based on QCS	None	Die shear strength	0／30p	OK	Check by IQC
5		Frame (Change in internal shape) Uneven edge → Mushroom-shaped	Securing of adhesion to molding resin	Decrease in mounting strength	Insufficient adhesion between frame and molding resin (Decrease in device adhesion)	- Failure in mounting - Deterioration of device reliability after mounting	Based on design values	None	1) Mounting shear strength: Directions X and Y 2) Mounting temperature cycle test: 1000cyc, Directions X and Y	1)0 ／11p 2)0 ／11p	OK	None
6				Decrease in package strength	Insufficient adhesion between frame and molding resin (Decrease in device adhesion)	- Deterioration of reliability - Failure in mounting	Based on design values	None	1) Temperature cycle test: 100cyc 2) Static load test	1)0／30p 2)0／11p	OK	None
7				Moisture intrusion due to poor adhesion to molding resin	Insufficient adhesion between frame and molding resin (Decrease in device adhesion)	- Failure in operation - Deterioration of reliability	Based on design values	None	1) Initial characteristics 2) Pressure cooker test: 127℃／100%／96h 3) Temperature humidity operation test: 85℃／85%／Vdd／1000h	1)0／1 lot 2)0／30p 3)0／30p	OK	None
8			Proper device appearance in the process after molding resin filling	Edge of frame exposed on the side of package (where electrodes are not cut)	Increase in electrode size due to package dicing which is significantly misaligned	Abnormality in appearance/shape (Deterioration of quality)	Based on QCS	None	1) Appearance inspection: Stereomicroscope (20x) 2) Measurement of amount of dicing misalignment: 15 positions on a frame	0／30p 0／15p	OK	Check by IQC
9				- Resin around the edge of package becomes thinner. - Resin chips off and falls during dicing.	Due to package dicing which is significantly misaligned, resin around the edge of package becomes thinner, the edge of frame is exposed, etc. Resin chips off and falls during dicing.	Abnormality in appearance/shape (Deterioration of quality)	Based on design values	None	1) Temperature cycle test 100cyc 2) Mounting temperature cycle test, 100cyc 3) Static load test Product appearance check after each test	1)0 ／30p 2)0 ／11p 3)0 ／11p	OK	None
10			Electrical/mechanical connection with board	Abnormality in electrode shape	Improper mask dimensions of frame (for electroforming)	Unusable	Based on design values	None	Frame incoming inspection: Electrode dimensions measurement	0／30p	OK	Incoming inspection data
11		Frame (Change in thickness) 0.035mm→0.070mm	Electrical/mechanical connection with board	Decrease in package strength	Decrease in package strength due to decrease in resin's cubic volume	- Deterioration of reliability - Failure in mounting	Based on design values	None	1) Temperature cycle test: 100cyc 2) Static load test	1)0／30p 2)0／12p	OK	None
12				Exposure of wire	Decrease in clearance between chip surface and package surface due to thickened frame (Securing of design margin)	Abnormality in appearance/shape (Deterioration of quality)	Based on design values	None	1) Appearance inspection: Stereomicroscope (20x) 2) X-ray check	1) 0／30p 2) 0／10P	OK	None
13			Electrical connection between frame and wire	Deterioration of bonding between frame and wire	Improper conditions of bonding due to change in frame thickness	Deterioration of reliability	Based on QCS	None	1) Wire pull 2) Bonding shear strength 3) Ball thickness 4) Ball diameter 5) Temperature cycle test: 100cyc	1)0／30p 2)0／30p 3)0／30p 4)0／30p 5)0／30p	OK	Check by IQC (Check on strength)
14			Securing of electrical characteristics	Change in electrical characteristics	Change in electrical characteristics due to change in frame thickness	Abnormality in characteristics	100% inspection (Guarantee of design values)	None	1) Initial characteristics 2) Thermal resistance curve	1)0／30p 2)0／1p	OK	100% check in the test process (Guarantee of design values)

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7. Evaluation Summary

Results of evaluations which were conducted based on the DRBFM are shown below.
No problems were found.

Evaluation	Item		Condition	Result (Sample size = n)	Judgment	Document attached
Selection of representative product	Concept of how to select representative product		-	-	—	★
Material check	Frame incoming inspection		Based on the internal control rules	30p	OK	—
Evaluation after each process	Die bonding evaluation	Die shear strength	Based on the internal control rules	30p	OK	★
	Wire bonding evaluation	Wire pull strength	Based on the internal control rules	30p	OK	★
		Bonding shear strength	Based on the internal control rules	30p	OK	★
		Ball thickness	Based on the internal control rules	30p	OK	★
		Ball diameter	Based on the internal control rules	30p	OK	★
	Appearance inspection after dicing		Based on the internal control rules	30p	OK	★ each package
	Measurement of amount of dicing misalignment		Based on the internal control rules	15p	OK	—
	X-ray check		Based on the internal control rules	10p	OK	★ each package
	Product yield		Based on the internal control rules	1 lot	OK	—
Product function check	Initial characteristics		Based on the TD	Representative product (1 lot)	OK	★ each package
	Thermal resistance		Based on the TD	Representative product(1pc)	OK	★ each package
	Solderability test		240℃/3s	10p	OK	—
	Static load test		20N, 40N, 50N	12p	OK	—
Reliability check	Temperature cycle test (Pretreatment = Moisture absorption + Reflow)		-65℃(30 min)-150℃(30 min), 100 cyc	30p	OK	—
	Pressure cooker test (Pretreatment = Moisture absorption + Reflow)		127℃/100% 96h	30p	OK	—
	Temperature humidity operation test (Pretreatment = Moisture absorption + Reflow)		85℃ / 85% Vdd=6V 1000h	30p	OK	—
	Salt atmosphere test (Use of results of evaluating antecedently developed package)		35℃/5% NaCl/48h	11p	OK	—
Mounting check	Mounting shear strength		Directions X, Y (Initial)	11p	OK	★
	Mounting temperature cycle test		Directions X, Y (100 cycles)	11p	OK	★
Finished product	Appearance check after reliability testing	After temperature cycle test	There shall be no defect in appearance.	30p	OK	—
		After mounting temperature cycle test	There shall be no defect in appearance.	11p	OK	—
		After static load test	There shall be no defect in appearance.	12p	OK	—

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8. Selection of representative product

For the evaluations for the change, package SDFN4 was picked out as a representative. Among the three packages, this package is the smallest and has the smallest electrode, which affects most mounting strength, package strength, and adhesion between resin and frame. TCR2EN18, which is a main product, was evaluated as a representative.

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9. Description of the change (Detailed)

9-1) Details of the change (Package: SDFN4)

<table>
<tr><th colspan="2">Item</th><th>Product before change (Company A)</th><th>Product after change (Company B)</th></tr>
<tr><td colspan="2">Package name</td><td>SDFN4</td><td>SDFN4E</td></tr>
<tr><td colspan="2" rowspan="3">Product name (Only additional code, ADDC, changes.)</td><td>TCR2LNxx,LF(S</td><td>TCR2LNxx,LF(SE</td></tr>
<tr><td>TCR2LNxx,LSF(S</td><td>TCR2LNxx,LSF(SE</td></tr>
<tr><td>TCR2ENxx,LF(S</td><td>TCR2ENxx,LF(SE</td></tr>
<tr><td rowspan="2">Material</td><td>Frame structure (Electroforming)</td><td>Ni/Au/Pd/Ag</td><td>Ni/Au/Ag</td></tr>
<tr><td>Frame thickness</td><td>0.035mm</td><td>0.07mm</td></tr>
<tr><td colspan="2" rowspan="2">Appearance photos</td><td>Backside electrode: Uneven edge</td><td>Backside electrode: Straight edge</td></tr>
<tr><td>Ex)TCR2EN18</td><td>Ex)TCR2EN18</td></tr>
<tr><td colspan="2">Drawing in TD (Technical data)</td><td colspan="2">Part of TD descriptions changes. See the following page.</td></tr>
<tr><td colspan="2">Electrical characteristics, reliability, mark specifications</td><td colspan="2">No change</td></tr>
</table>

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9. Description of the change (Detailed)

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9-1) Details of the change (Package: DFN4)

<table>
<tr><th colspan="2">Item</th><th>Product before change (Company A)</th><th>Product after change (Company B)</th></tr>
<tr><td colspan="2">Package name</td><td>DFN4</td><td>DFN4E</td></tr>
<tr><td colspan="2" rowspan="3">Product name (Only additional code, ADDC, changes.)</td><td>TCR3DMxx,RF(S</td><td>TCR3DMxx,RF(SE</td></tr>
<tr><td>TCR3DMxx,LF(S</td><td>TCR3DMxx,LF(SE</td></tr>
<tr><td>TCR3UMxx,LF(S</td><td>TCR3UMxx,LF(SE</td></tr>
<tr><td rowspan="2">Material</td><td>Frame structure (Electroforming)</td><td>Ni/Au/Pd/Ag</td><td>Ni/Au/Ag</td></tr>
<tr><td>Frame thickness</td><td>0.035mm</td><td>0.07mm</td></tr>
<tr><td colspan="2" rowspan="2">Appearance photo</td><td>Backside electrode: Uneven edge</td><td>Backside electrode: Straight edge</td></tr>
<tr><td>Ex)TCR3DM18</td><td>Ex)TCR3DM18</td></tr>
<tr><td colspan="2">Drawing in TD (Technical data)</td><td colspan="2">Part of TD descriptions changes. See the following page.</td></tr>
<tr><td colspan="2">Electrical characteristics, reliability, mark specifications</td><td colspan="2">No change</td></tr>
</table>

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9. Description of the change (Detailed)

9-1) Details of the change (Package: DFN4C)

Item		Product before change (Company A)	Product after change (Company B)
Package name		DFN4C	DFN4F
Product name (Only additional code, ADDC, changes.)		TCR3RMxxA,LF(S	TCR3RMxxA,LF(SE
Material	Frame structure (Electroforming)	Ni/Au/Pd/Ag	Ni/Au/Ag
	Frame thickness	0.035mm	0.07mm
Appearance photo		Backside electrode: Uneven edge	Backside electrode: Straight edge
		Ex)TCR3RM18A	Ex)TCR3RM18A
Drawing in TD (Technical data)		Part of TD descriptions changes. See the following page.	
Electrical characteristics, reliability, mark specifications		No change	

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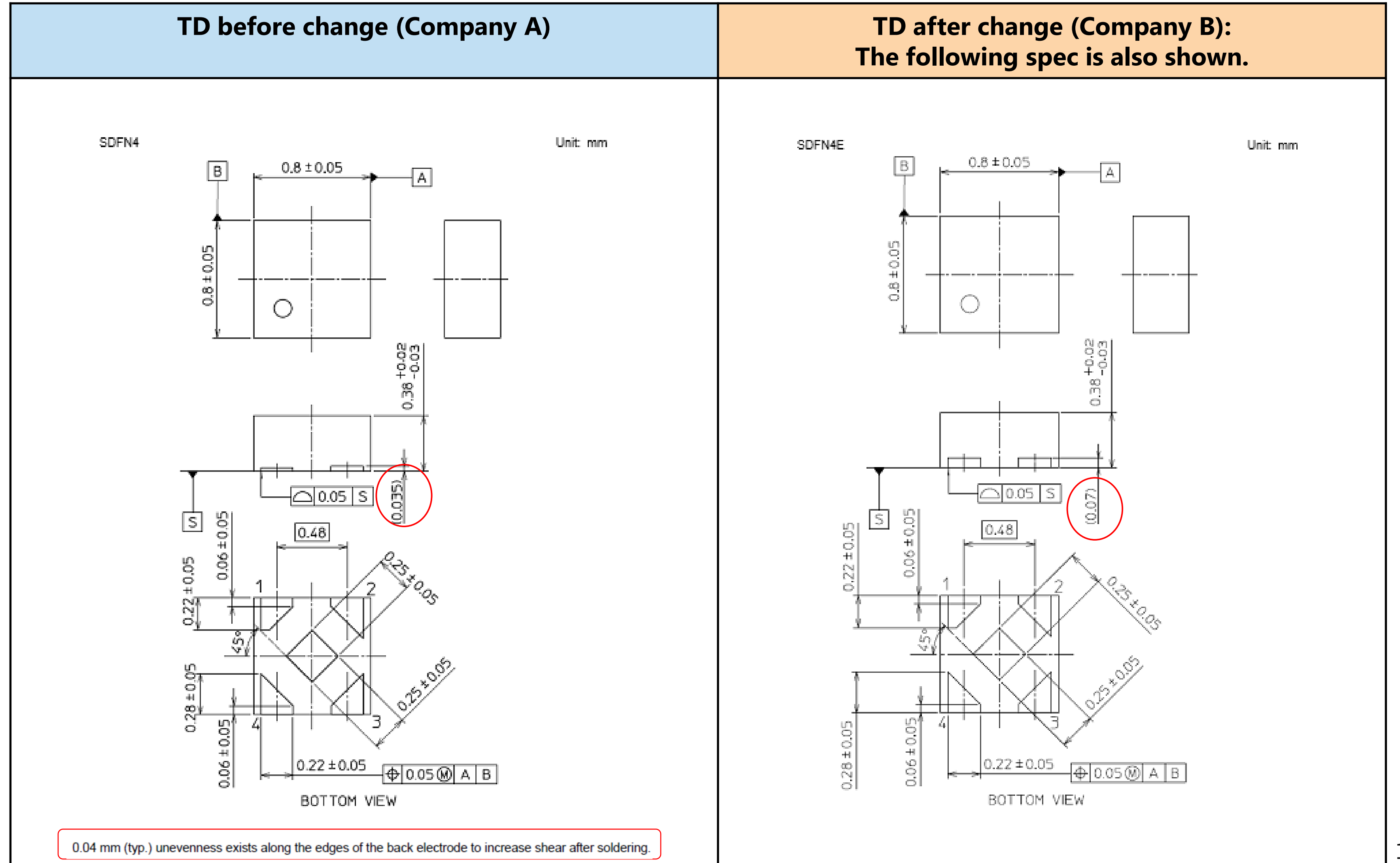
9-2) Technical data (Change in dimensional drawing) (Package: SDFN4)

The new frame entails the following changes in the technical data as marked in red.
Both specifications before and after the change are shown in the TD because the period of manufacturing products with old and new frames overlaps. (※ The latest format is applied to describe the drawings in the TD after the change in terms of our regular review on specifications.)

TD before change (Company A)	TD after change (Company B): The following spec is also shown.



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9-2) Technical data (Change in dimensional drawing) (Package: DFN4)

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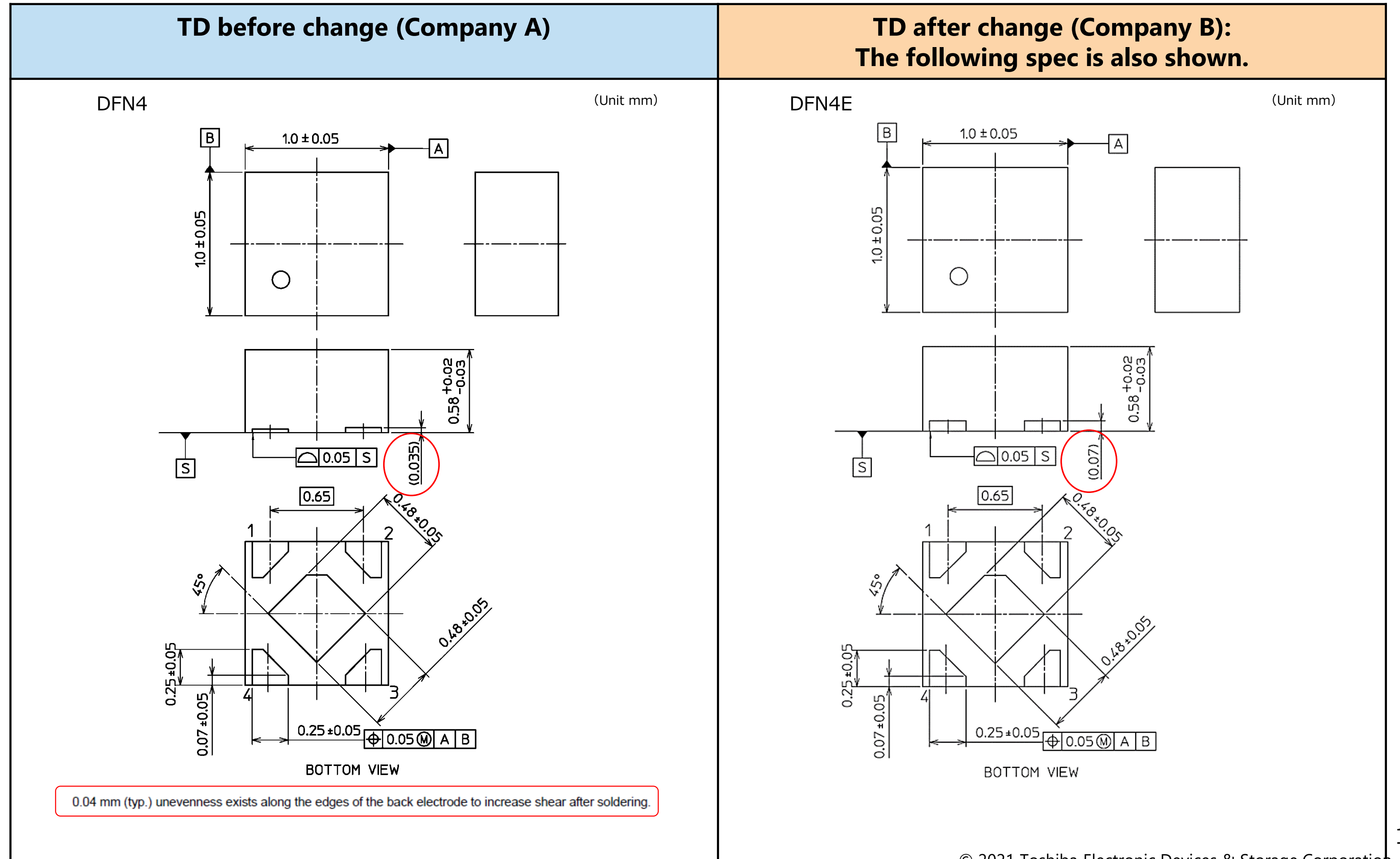
Both specifications before and after the change are shown in the TD because the period of manufacturing products with old and new frames overlaps. (※ The latest format is applied to describe drawings in TD after the change in terms of our regular review on specifications.)



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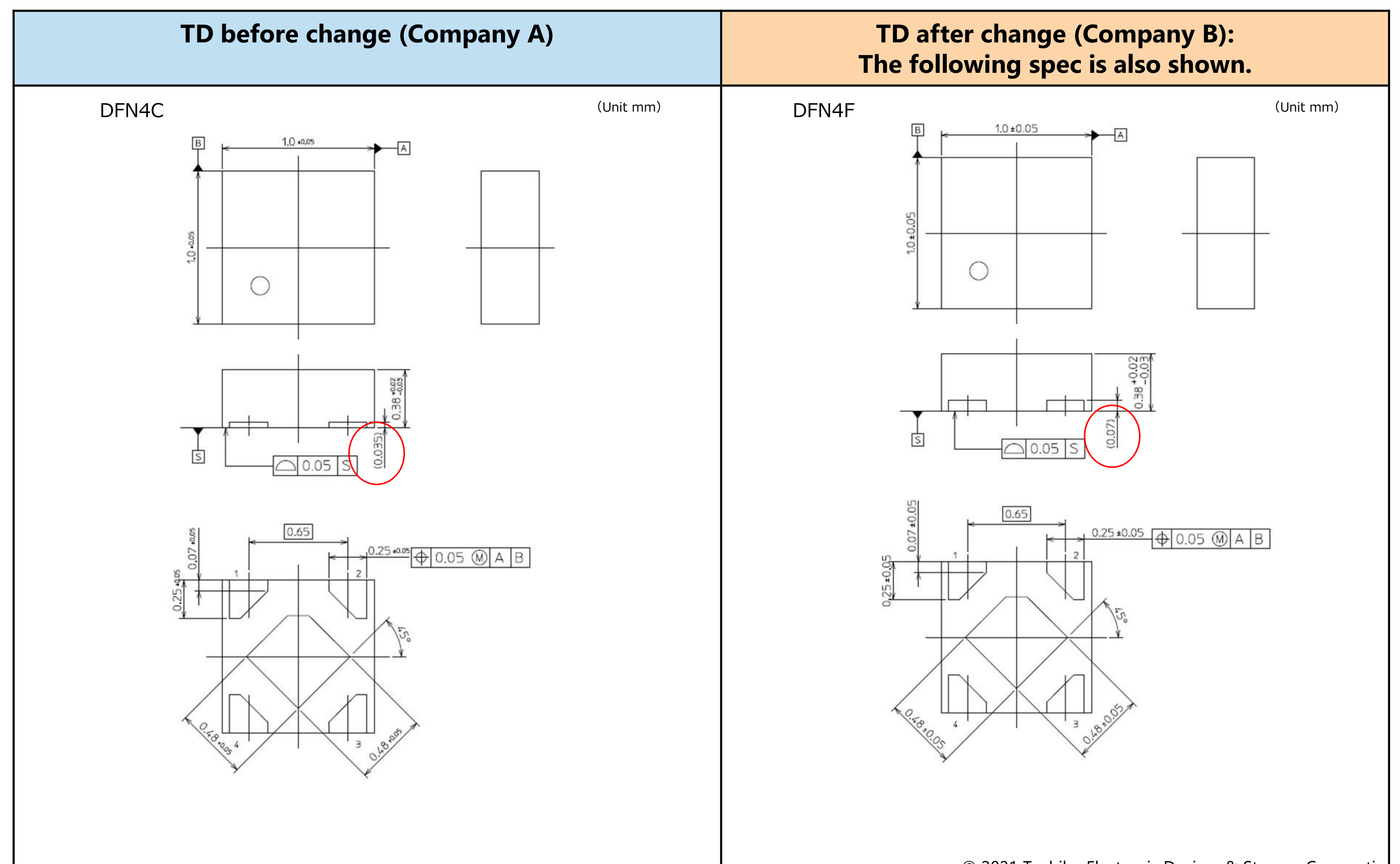
9. Description of the change (Technical data)

9-2) Technical data (Change in dimensional drawing) (Package: DFN4C)

The new frame entails the following changes in the technical data as marked in red.
Both specifications before and after the change are shown in the TD because the period of manufacturing products with old and new frames overlaps. (※ The latest format is applied to describe drawings in TD after the change in terms of our regular review on specifications.)



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9. Results of evaluations for the change (Bonding)

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9-3) Bonding evaluation results (Die/ Wire)

The following items were checked. There were no problems with the process capability of die bonding and wire bonding.

Check items	Frame	Process capability (Cpk)	Specification	Quantity	Judgement
Die shear strength	Before change	3.07	Based on internal specifications	30p	OK
	After change	3.05		30p	OK
Wire pull strength	Before change	2.40	Based on internal specifications	30p	OK
	After change	3.46		30p	OK
Wire bonding shear strength	Before change	2.13	Based on internal specifications	30p	OK
	After change	3.10		30p	OK
Ball thickness	Before change	2.09	Based on internal specifications	30p	OK
	After change	2.08		30p	OK
Ball Diameter	Before change	3.10	Based on internal specifications	30p	OK
	After change	3.20		30p	OK

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9. Results of evaluations for the change (X-ray)

9-4) X-ray check result (Package: SDFN4 / Representative product: TCR2EN18)

Products were x-rayed. No wire was exposed from the resin package. No problems were found.

	Before change (Company A)	After change (Company B)
Top view (Mark side)		
Side view (Lead)		

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9. Results of evaluations for the change (X-ray)

9-4) X-ray check result (Package: DFN4 / Representative product: TCR3DM11)

Products were x-rayed. No wire was exposed from the resin package. No problems were found.

	Before change (Company A)	After change (Company B)
Top view (Mark side)		
Side view (Lead)		

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9. Results of evaluations for the change (X-ray)

9-4) X-ray check result (Package: DFN4C / Representative product: TCR3RM18A)

Products were x-rayed. No wire was exposed from the resin package. No problems were found.

	Before change (Company A)	After change (Company B)
Top view (Mark side)		
Side view (Lead)		

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10. Product function check

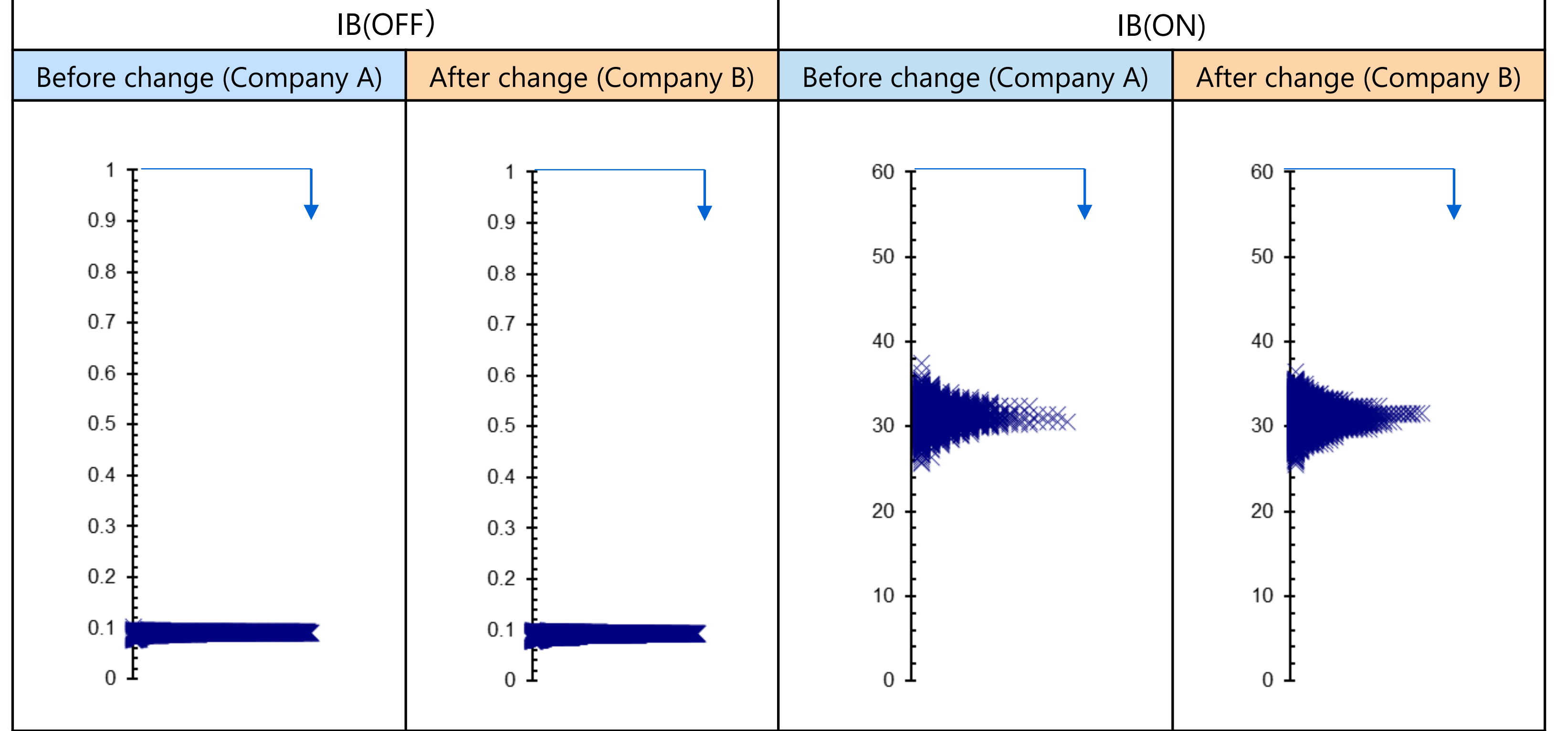
10-1) Comparison in initial characteristics

(Package: SDFN4 / Representative product: TCR2EN18)

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

n= 1 Lot Ta=25℃

Item	Symbol	Measurement condition	Specification (TD)				Before change (Company A)		After change (Company B)	
			Min	Typ	Max	Unit	Average	Cpk	Average	Cpk
Stand-by current	IB(OFF)	VCT=0V	-	0.1	1	uA	0.09	10.9	0.09	9.20
Quiescent current	IB(ON)	IOUT=0mA	-	35	60	uA	31	6.06	31	6.14



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10. Product function check

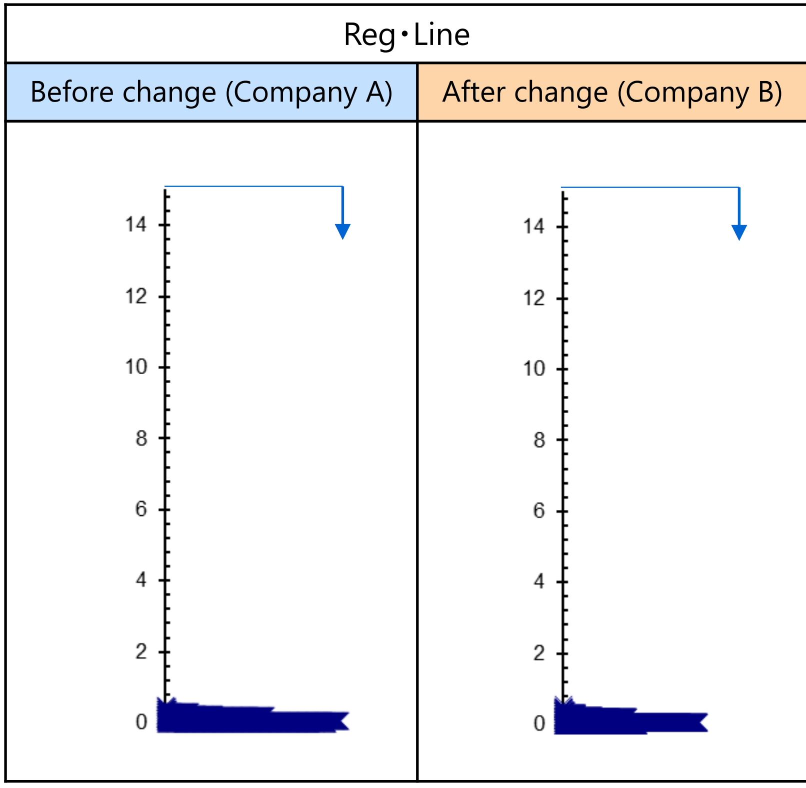
10-1) Comparison in initial characteristics

(Package: SDFN4 / Representative product: TCR2EN18)

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

n= 1 Lot Ta=25℃

Item	Symbol	Measurement condition	Specification (TD)				Before change (Company A)		After change (Company B)	
			Min	Typ	Max	Unit	Average	Cpk	Average	Cpk
Line regulation	Reg・Line	VOUT+0.5≦VIN ≦5.5V, IOUT=1mA	-	1	15	mV	0.11	58.7	0.11	57.7



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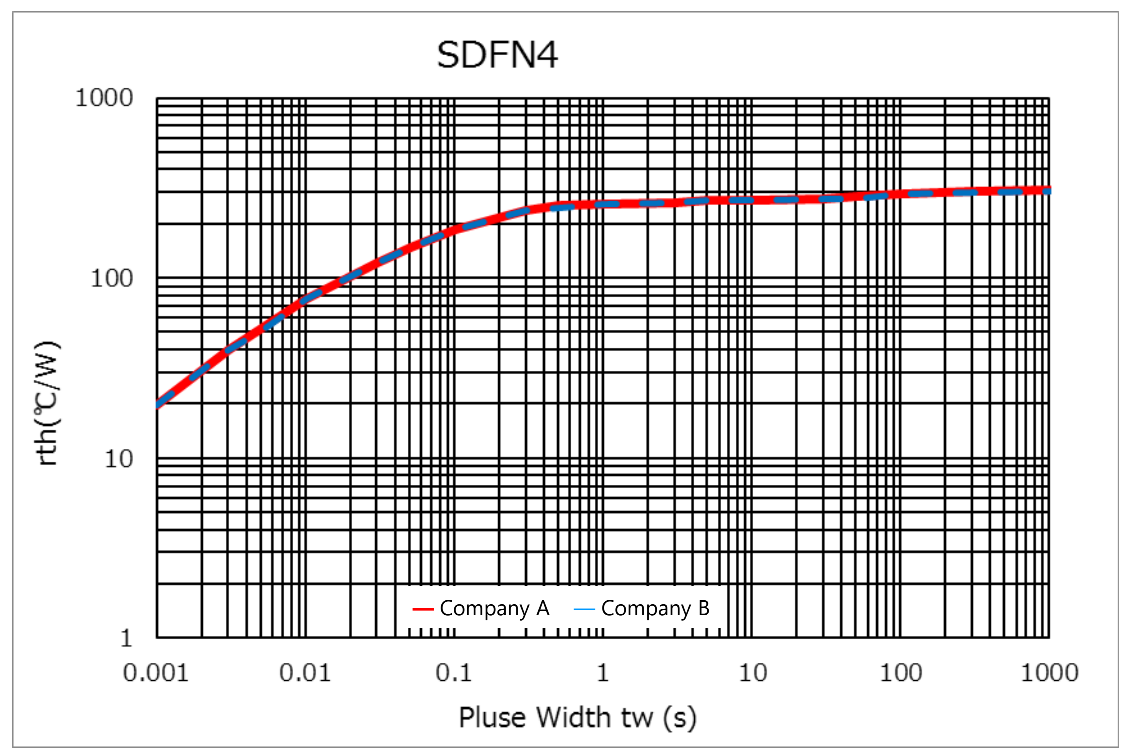
10-2) Comparison in thermal resistance

(Package: SDFN4 / Representative product: TCR2EN18)

Thermal resistance was compared between Company A and B.
The results showed that both were equivalent and no problem was found.



Using Board
Glass epoxy (FR4)
Board area: 40 mm x 40 mm (Double-sided board), t=1.6 mm
Wiring rate: Front side = About 50%, Back side = About 50%
Through-hole: Diameter 0.5 mm x 24

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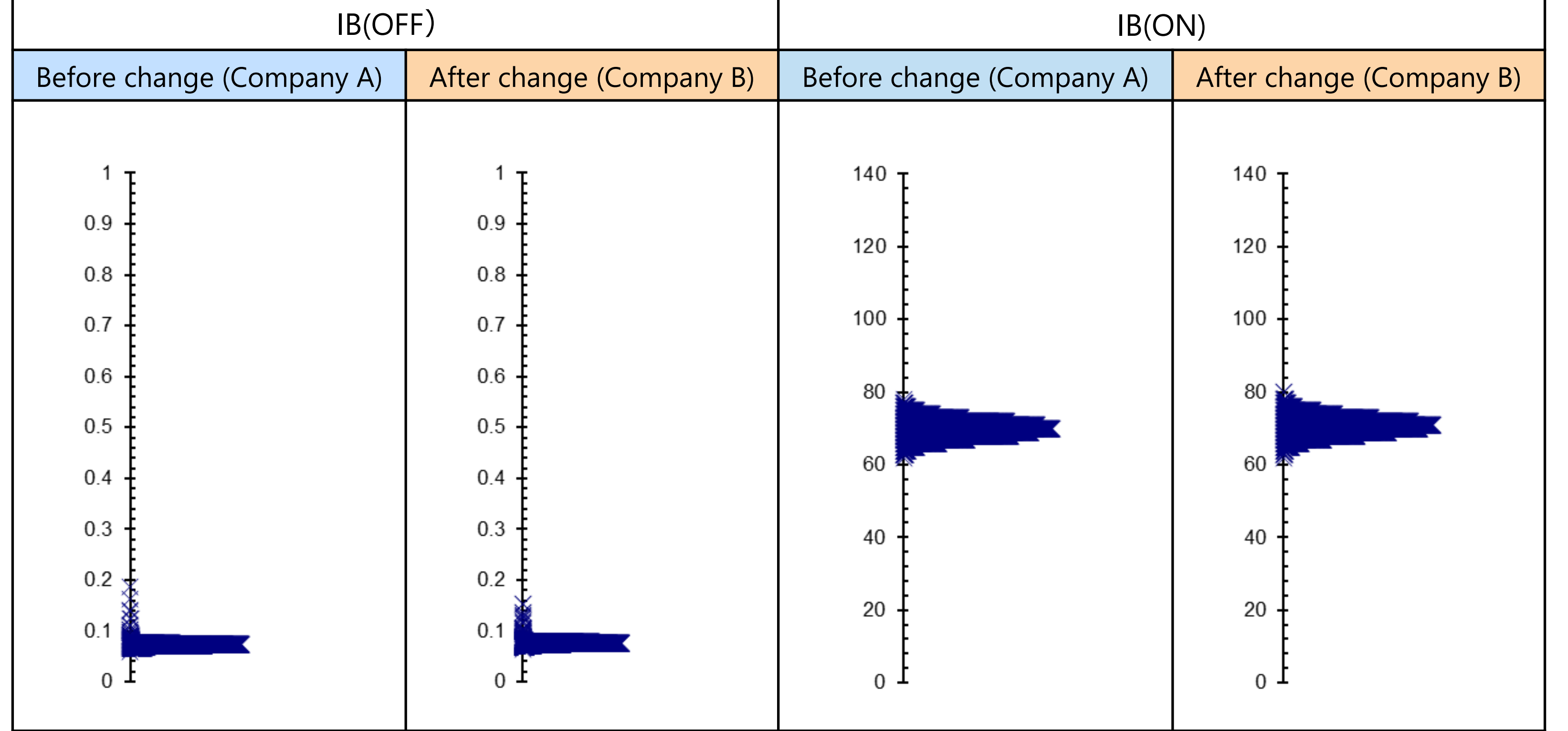
10-3) Comparison in initial characteristics

(Package: DFN4 / Representative product: TCR3DM11)

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

n= 1 Lot Ta=25℃

Item	Symbol	Measurement condition	Specification (TD)				Before change (Company A)		After change (Company B)	
			Min	Typ	Max	Unit	Average	Cpk	Average	Cpk
Stand-by current	IB(OFF)	VCT=0V	-	0.1	1	uA	0.07	6.18	0.08	6.49
Quiescent current	IB(ON)	IOUT=0mA	-	65	-	uA	69.9	-	70.7	-



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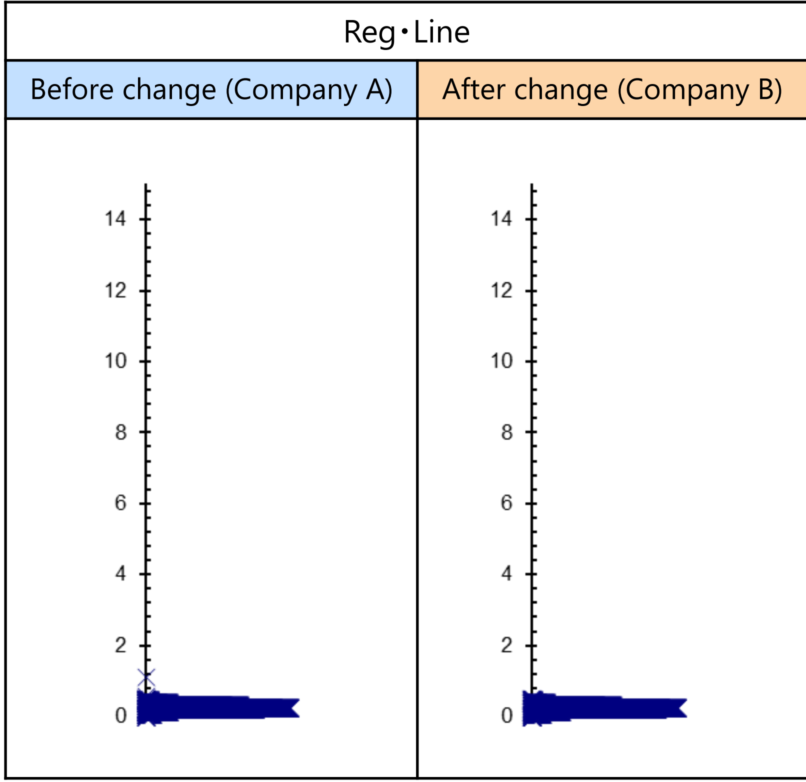
10-3) Comparison in initial characteristics

(Package: DFN4 / Representative product: TCR3DM11)

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

n= 1 Lot Ta=25℃

Item	Symbol	Measurement condition	Specification (TD)				Before change (Company A)		After change (Company B)	
			Min	Typ	Max	Unit	Average	Cpk	Average	Cpk
Line regulation	Reg･Line	VOUT+0.5≦VIN≦5.5V,IOUT=1 mA	-	1	15	mV	0.24	64	0.23	68



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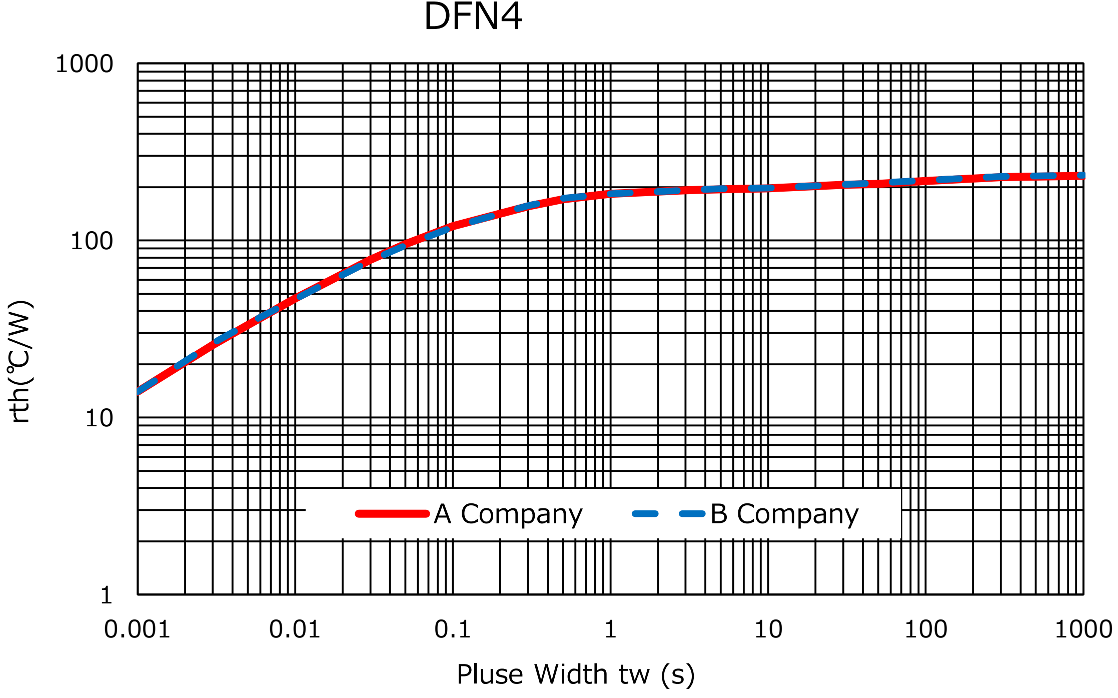
10-4) Comparison in thermal resistance

(Package: DFN4 / Representative product: TCR3DM11)

Thermal resistance was compared between Company A and B. The results showed that both were equivalent and no problem was found.



Using Board
Glass epoxy (FR4)
Board area: 40 mm x 40 mm (Double-sided board), t=1.6 mm
Wiring rate: Front side = About 50%, Back side = About 50%
Through-hole: Diameter 0.5 mm x 24

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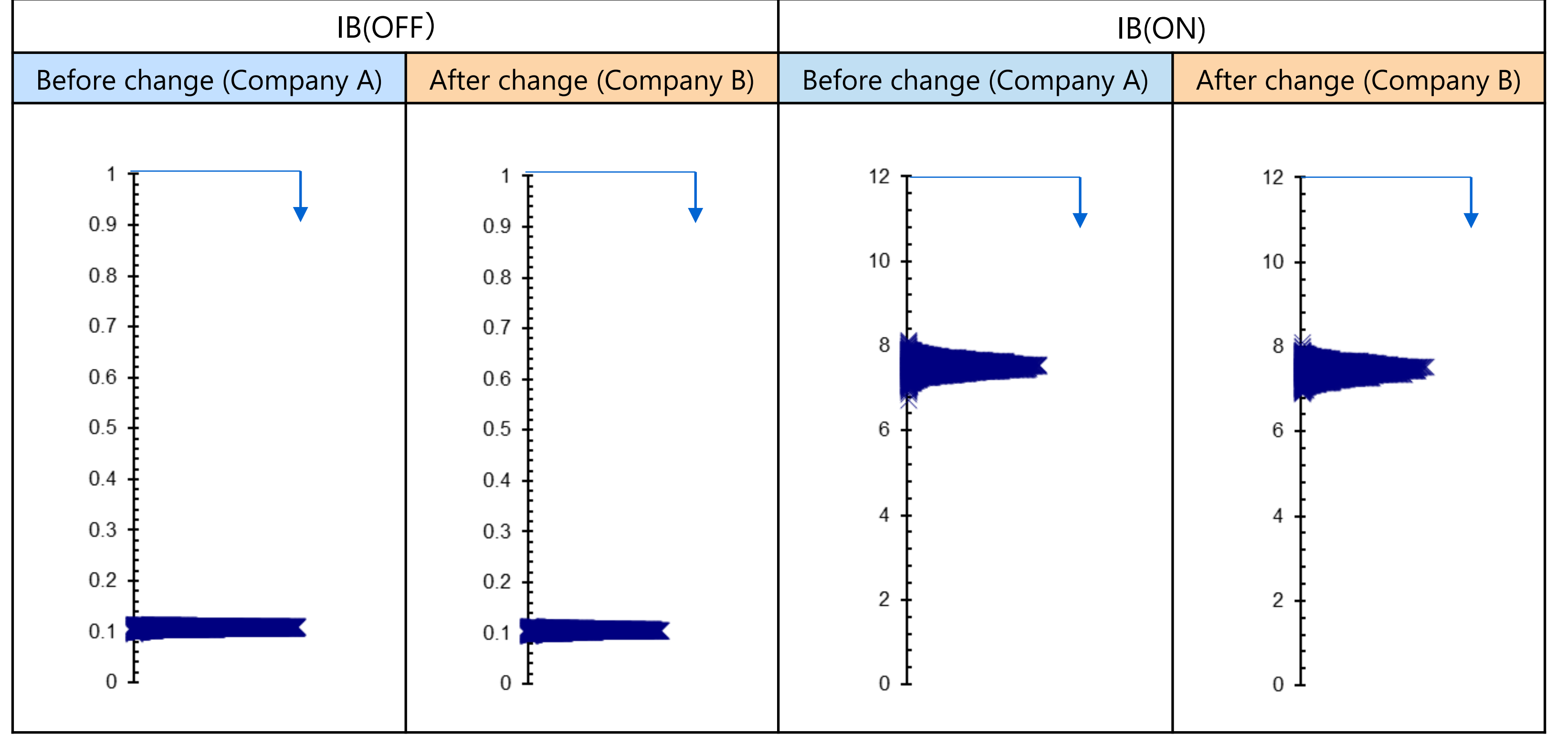
10-5) Comparison in initial characteristics

(Package: DFN4C / Representative product: TCR3RM18A)

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

n= 1 Lot Ta=25℃

Item	Symbol	Measurement condition	Specification (TD)				Before change (Company A)		After change (Company B)	
			Min	Typ	Max	Unit	Average	Cpk	Average	Cpk
Stand-by current	IB(OFF)	VCT=0V	-	0.1	1	uA	0.10	15.5	0.11	12.8
Quiescent current	IB(ON)	IOUT=0mA	-	7	12	uA	7.5	10.0	7.5	9.46



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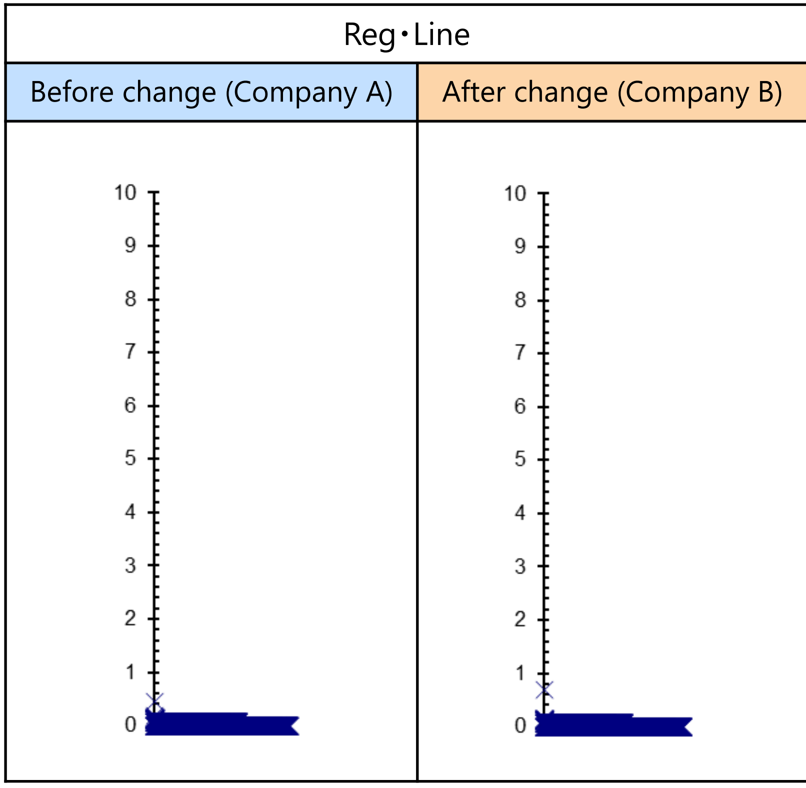
10-5) Comparison in initial characteristics

(Package: DFN4C / Representative product: TCR3RM18A）

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

n= 1 Lot Ta=25℃

Item	Symbol	Measurement condition	Specification (TD)				Before change (Company A)		After change (Company B)	
			Min	Typ	Max	Unit	Average	Cpk	Average	Cpk
Line regulation	Reg･Line	VOUT + 1 V ≦ VIN ≦ 5.5 V IOUT = 1 mA	-	0.025	-	%/V	0.0004	-	0.0004	-



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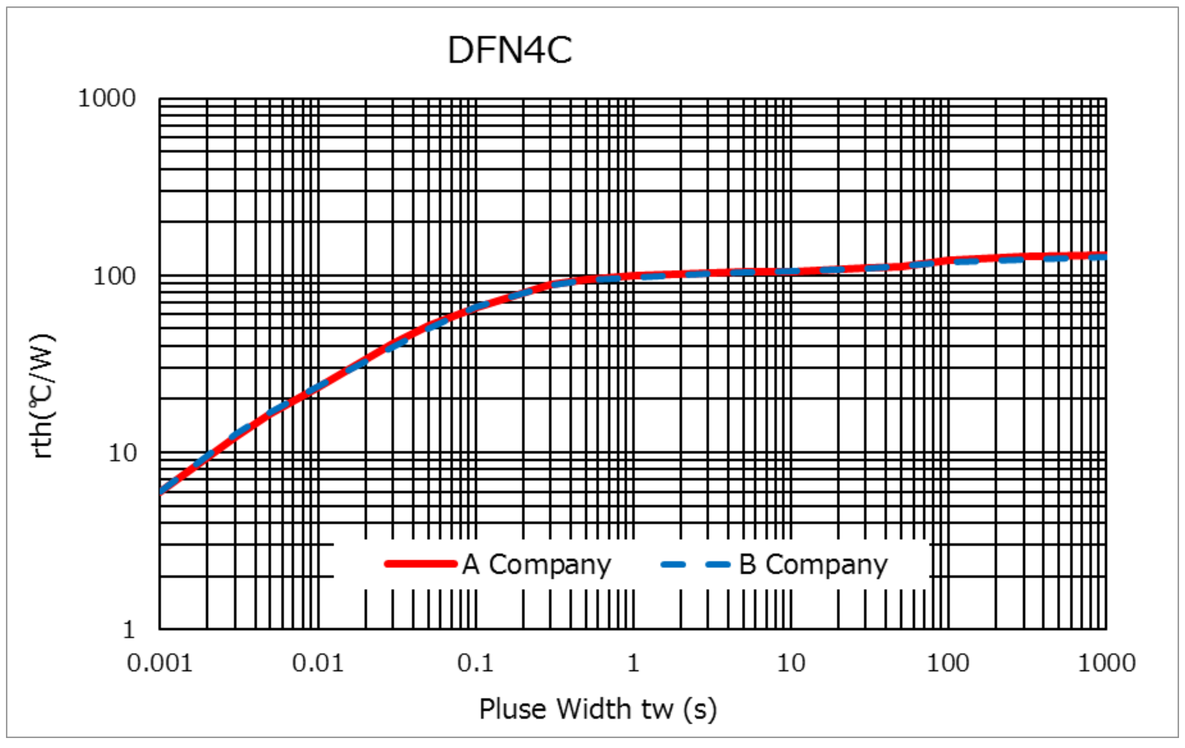
10-6) Comparison in thermal resistance

(Package: DFN4C / Representative product: TCR3RM18A)

Thermal resistance was compared between Company A and B. The results showed that both were equivalent and no problem was found.



Using Board
Glass epoxy (FR4)
Board area: 40 mm x 40 mm (Double-sided board), t=1.6 mm
Wiring rate: Front side = About 50%, Back side = About 50%
Through-hole: Diameter 0.5 mm x 24

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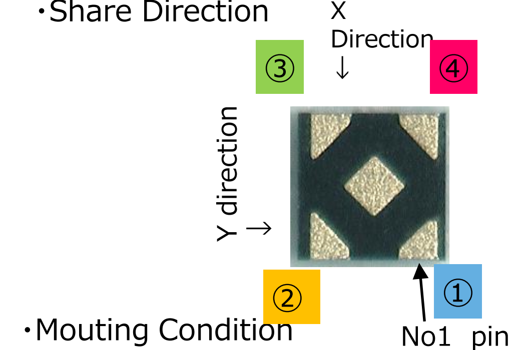
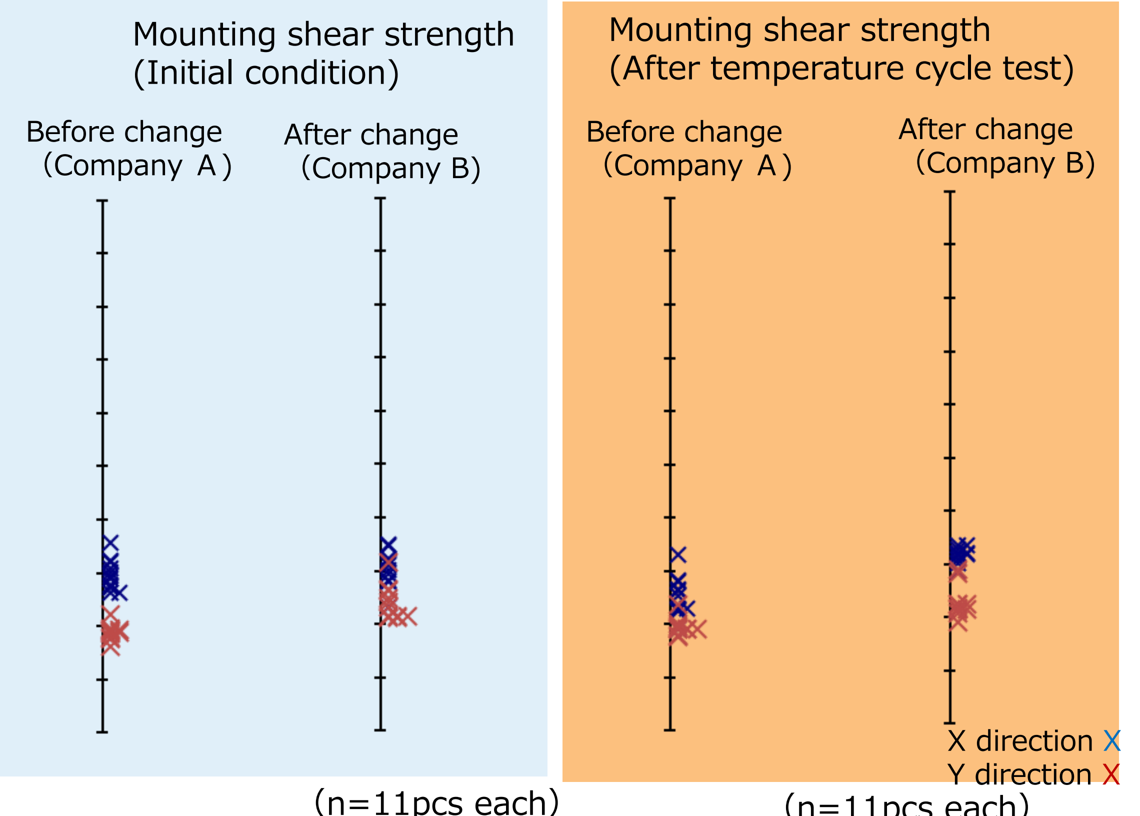
11. Device mounting confirmation
(Mounting shear strength, mounting temperature cycle test)

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 (Company B) was equivalent to that of products before the change (Company A).
No problems were found.



・Mouting Condition

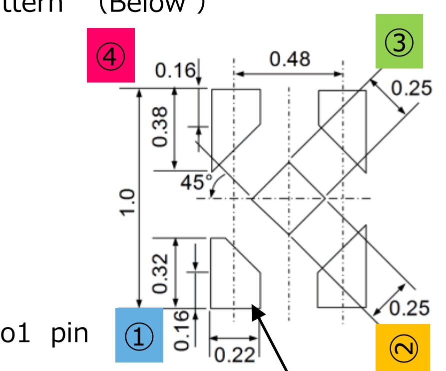
Reflow condition	TOSHIBA standard
Peak temp	Peak : 260℃
Reflow zoon	230℃ 30-50s
Preheat	180-190℃、60-120s



(n=11pcs each)

(n=11pcs each)

Board subject
Metal mask Thickness 100μm
Metal mask aperture ratio 100%
Land pattern (Below)



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

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」

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