



# MK2 S5E BiCS5 512Gb iTLC - 1/2/4/8D Micro Package PQ Report

*October 18, 2021*



**MK2 S5E BiCS5 512Gb iTLC - 1D**  
**9x13.3x0.87mm**  
**Shielded - 315 LGA**

# Dimension X-Y-Z, Warpage

## 1D (shielded)

Item	X(Width)	L(Length)	Package T w/o Bump	Pre-bump Height	Body T w/o Bump	Warpage @ RT
<b>Spec</b>	<b>9.0+/-0.05mm</b>	<b>13.3+/-0.05mm</b>	<b>Max. 0.87mm</b>	<b>50 +/-20um</b>	<b>0.770+/- 0.025mm</b>	<b>[-30 um,75um]</b>
<b>Max</b>	9.012	13.305	0.810	59.1	0.781	28.30
<b>Min</b>	8.968	13.265	0.792	40.3	0.768	9.30
<b>Mean</b>	8.994	13.290	0.800	49.7	0.776	20.27
<b>Std Dev</b>	0.007	0.007	0.005	2.40	0.002	1.8

- Data taken from 60 units from 3 PQ lots (20 units/lot) and all dimensions within spec.

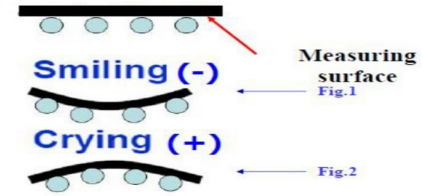
# Wire Bond Data (1D)

	<b>Lot 1</b>		<b>Lot 2</b>		<b>Lot 3</b>	
	<b>Wire Pull</b>	<b>Ball Shear</b>	<b>Wire Pull</b>	<b>Ball Shear</b>	<b>Wire Pull</b>	<b>Ball Shear</b>
<b>Spec (gf) – Min.</b>	<b>1.8</b>	<b>10</b>	<b>1.8</b>	<b>10</b>	<b>1.8</b>	<b>10</b>
<b>Max (gf)</b>	6.69	23.75	6.51	26.00	6.23	23.92
<b>Min (gf)</b>	5.03	19.05	4.72	19.07	5.01	20.37
<b>Avg (gf)</b>	5.76	21.20	5.57	22.60	5.57	22.13
<b>Std Dev (gf)</b>	0.36	1.12	0.41	2.00	0.61	1.78

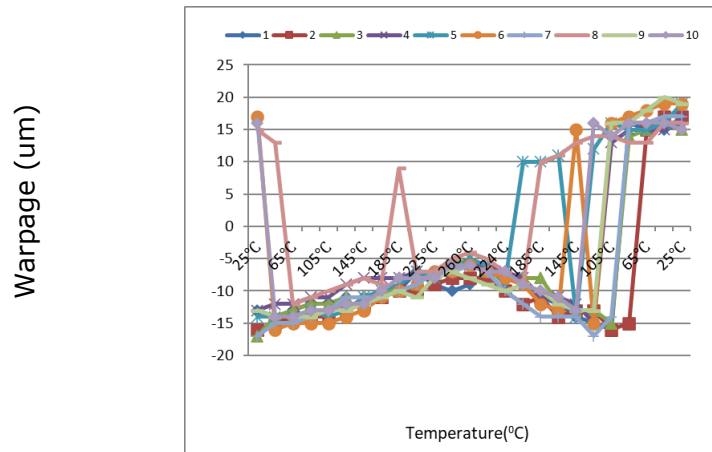
- Data taken from 36 wires (5 units/lot) from 3 PQ lots and passed wire pull and bond shear.

# Shadow Moiré (1D)

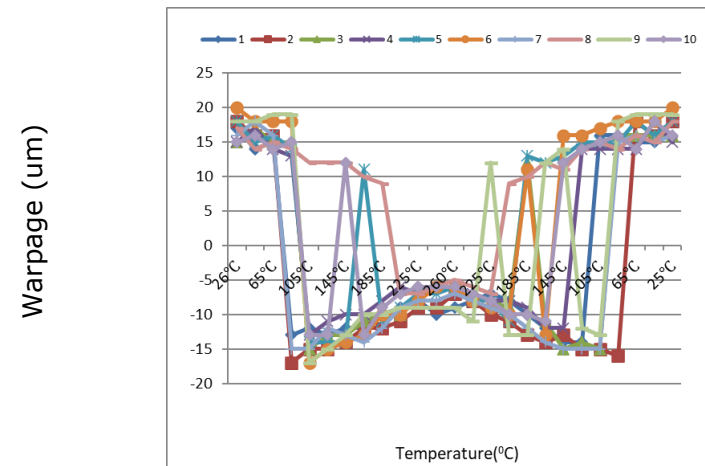
**Dry condition samples** - meets Apple spec at all specified temp.



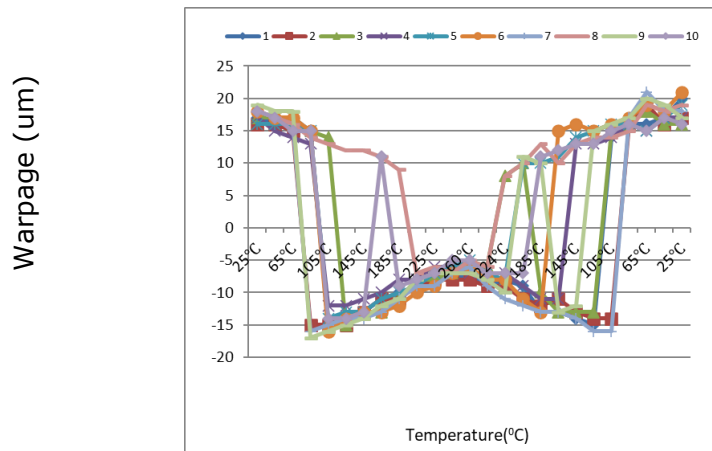
1<sup>st</sup> reflow



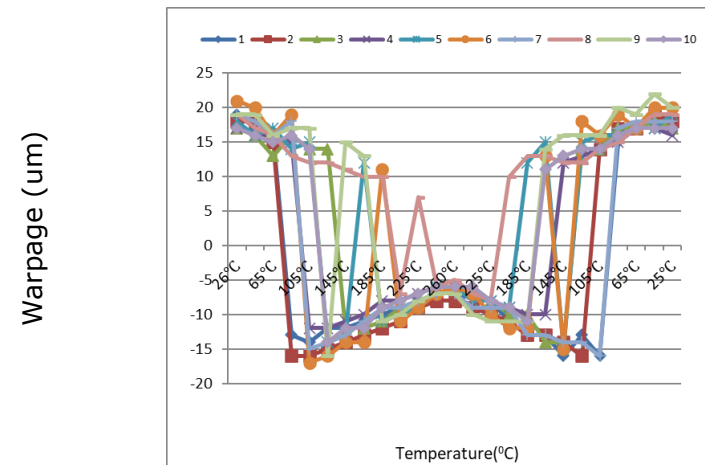
2<sup>nd</sup> reflow



3<sup>rd</sup> reflow

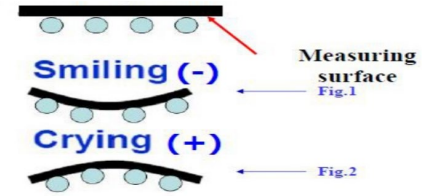


4<sup>th</sup> reflow

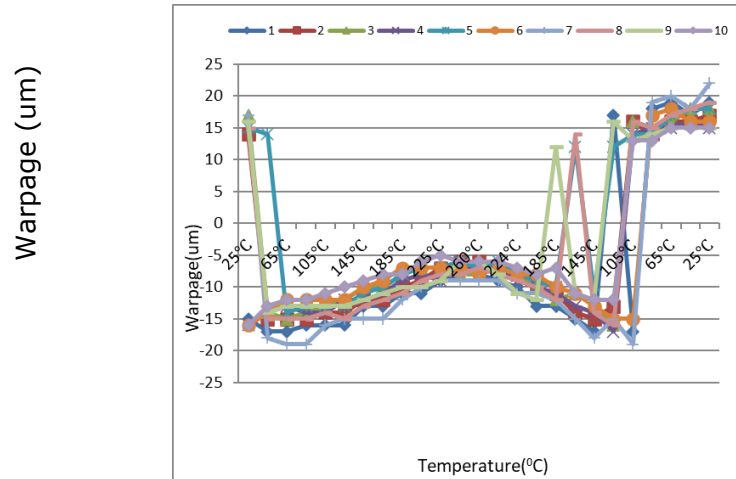


# Shadow Moiré (1D)

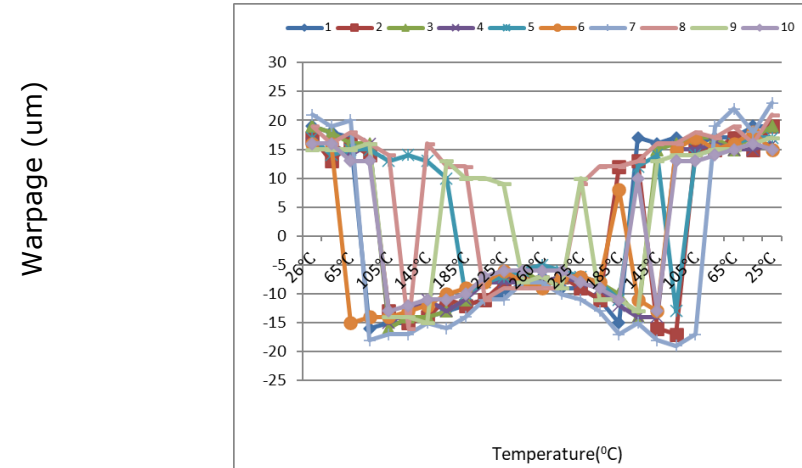
**Wet condition samples** - meets Apple spec at all specified temp.



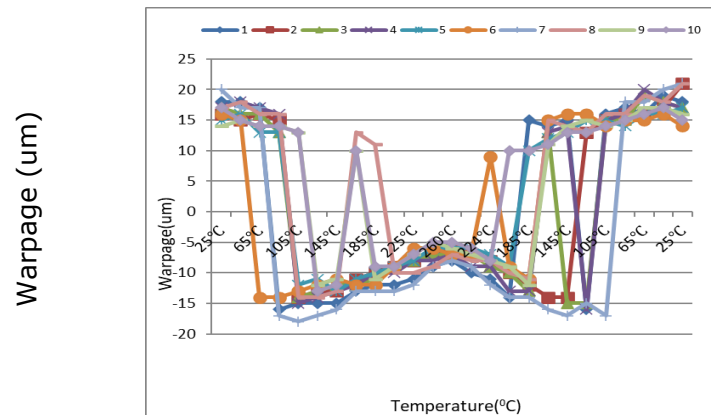
1<sup>st</sup> reflow



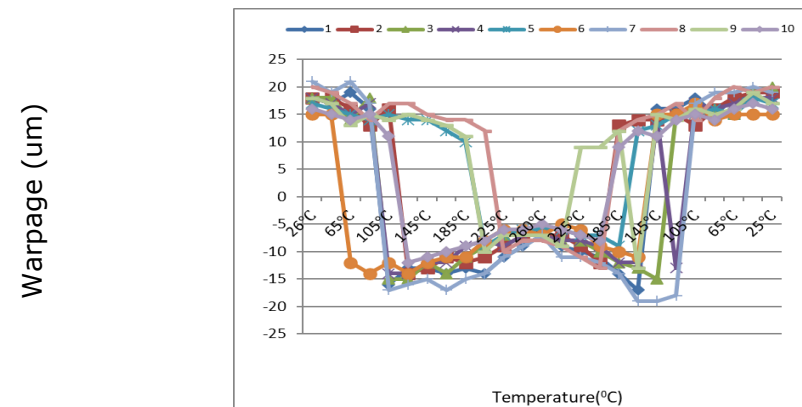
2<sup>nd</sup> reflow



3<sup>rd</sup> reflow



4<sup>th</sup> reflow



# Tape Adhesion Test (1D)

20 units from each of 3 PQ lots

AI No.	Qty	Comment
Lot 1	20	Peeling test pass spec
Lot 2	20	Peeling test pass spec
Lot 3	20	Peeling test pass spec

Tape adhesion test done as per ASTM D-3359 at  $T_a = 25^\circ\text{C}$  and it meets peeling criterion

# Contact Resistance and Delam check (1D)

Test	Pkg Type	Spec	Test result	Sample size	Remarks
Delamination check by CSAM	Shield	JED22-A113	0 fail / 60ea	60units	Require pre-conditioning with MSL level 3A and measure it after 260C 4x IR reflow
Contact Resistance check	Shield	<0.6Ω	0 fail / 60ea	60 units	

- Data taken from 60 units from 3 PQ lots (20 units/lot).

# Package Reliability Data (1D) – Mini Qual

## Package Qual Lot #1 (Substrate Vendor X, EMI-Linco)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

# Package Reliability Data (1D) – Mini Qual

## Package Qual Lot #2 (Substrate Vendor X, EMI- Tango)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

# Package Reliability Data (1D) – Mini Qual

## Package Qual Lot #3 (Substrate Vendor Y, EMI-Linco)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

**MK2 S5E BiCS5 512Gb iTLC - 2D**  
**9x13.3x0.87mm**  
**Shielded - 315 BGA**

# Dimension X-Y-Z, Warpage

## 2D (shielded)

Item	X(Width)	L(Length)	Package T w/o Bump	Pre-bump Height	Body T w/o Bump	Warpage @ RT
<b>Spec</b>	<b>9.0+/-0.05mm</b>	<b>13.3+/-0.05mm</b>	<b>Max. 0.87mm</b>	<b>50 +/-20um</b>	<b>0.770+/-0.025mm</b>	<b>[-30 um,75um]</b>
<b>Max</b>	9.009	13.310	0.802	59.8	0.780	25.6
<b>Min</b>	8.968	13.276	0.779	40.5	0.765	9.0
<b>Mean</b>	8.992	13.292	0.787	50.3	0.772	17.0
<b>Std Dev</b>	0.007	0.006	0.004	2.69	0.002	2.82

- Data taken from 60 units from 3 PQ lots (20 units/lot) and all dimensions within spec.

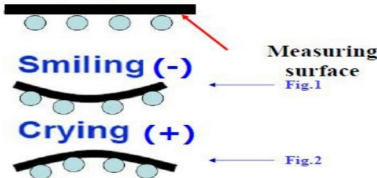
# NAND Wire Bond Data (2D)

	<b>Lot 1</b>		<b>Lot 2</b>		<b>Lot 3</b>	
	<b>Wire Pull</b>	<b>Ball Shear</b>	<b>Wire Pull</b>	<b>Ball Shear</b>	<b>Wire Pull</b>	<b>Ball Shear</b>
<b>Spec (gf) – Min.</b>	<b>1.8</b>	<b>10</b>	<b>1.8</b>	<b>10</b>	<b>1.8</b>	<b>10</b>
<b>Max (gf)</b>	8.32	25.30	8.13	23.99	7.71	23.74
<b>Min (gf)</b>	6.66	19.19	6.23	19.42	6.63	20.01
<b>Avg (gf)</b>	7.43	21.75	7.29	21.74	7.15	21.68
<b>Std Dev (gf)</b>	0.36	0.98	0.38	1.02	0.43	1.32

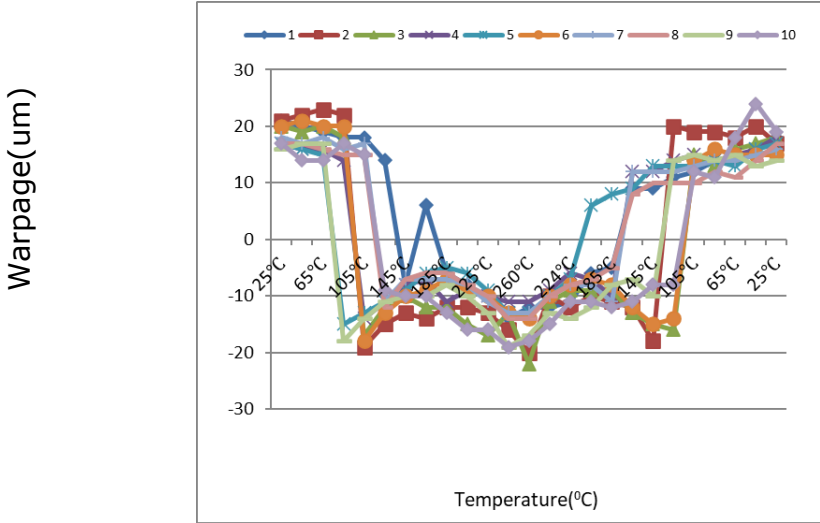
- Data taken from 36 wires (5 units/lot) from 3 PQ lots and passed wire pull and bond shear.

# Shadow Moiré (2D)

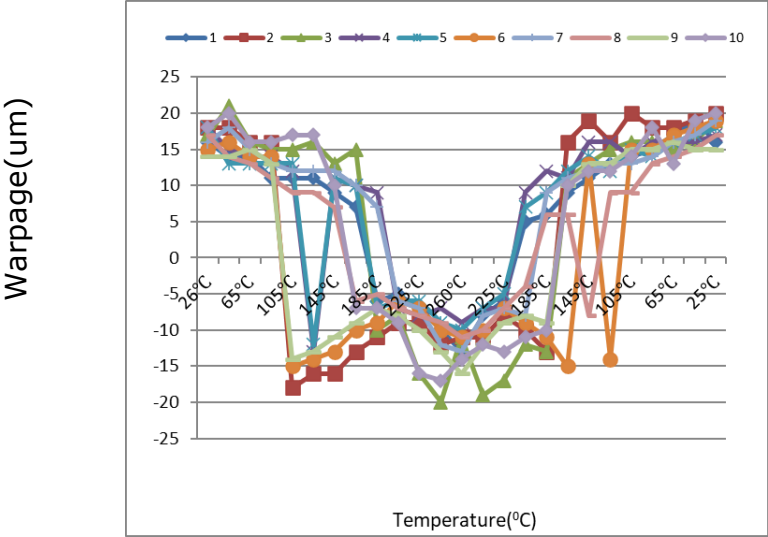
Dry condition samples - meets Apple spec for all temperature range specified



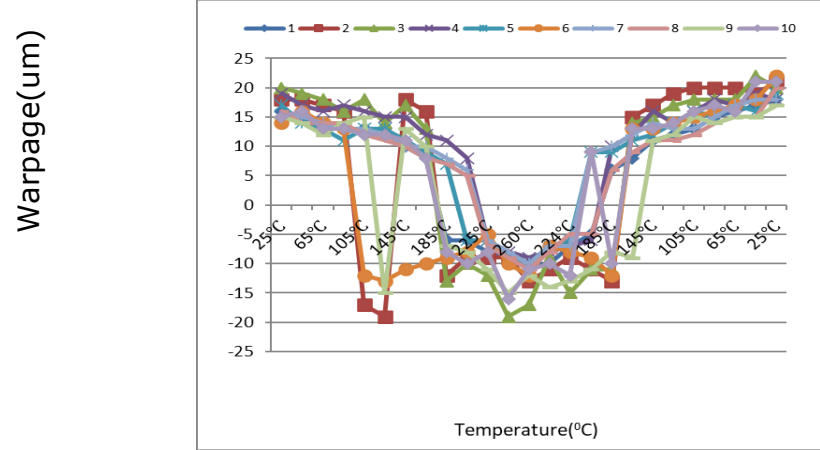
1<sup>st</sup> reflow



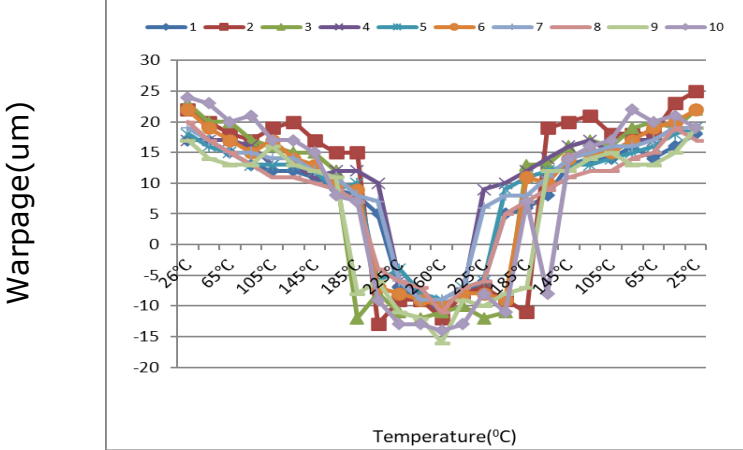
2<sup>nd</sup> reflow



3<sup>rd</sup> reflow

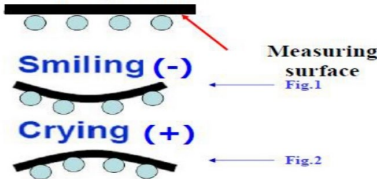


4<sup>th</sup> reflow

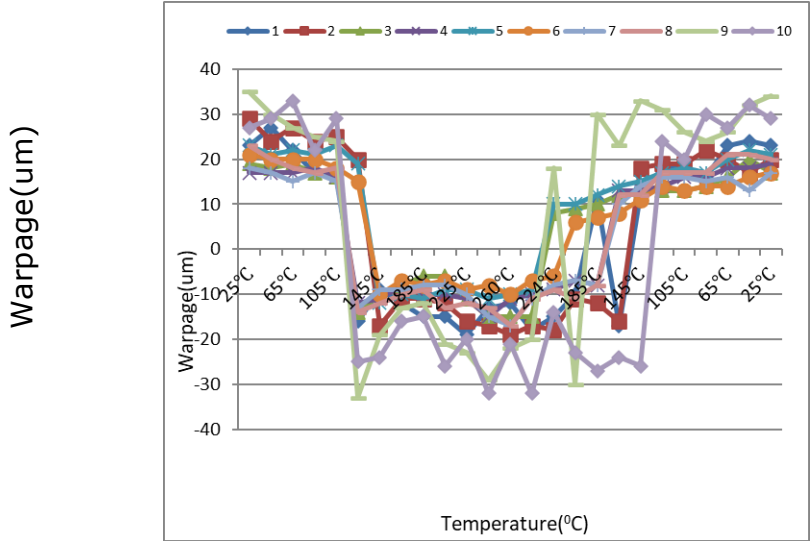


# Shadow Moiré (2D)

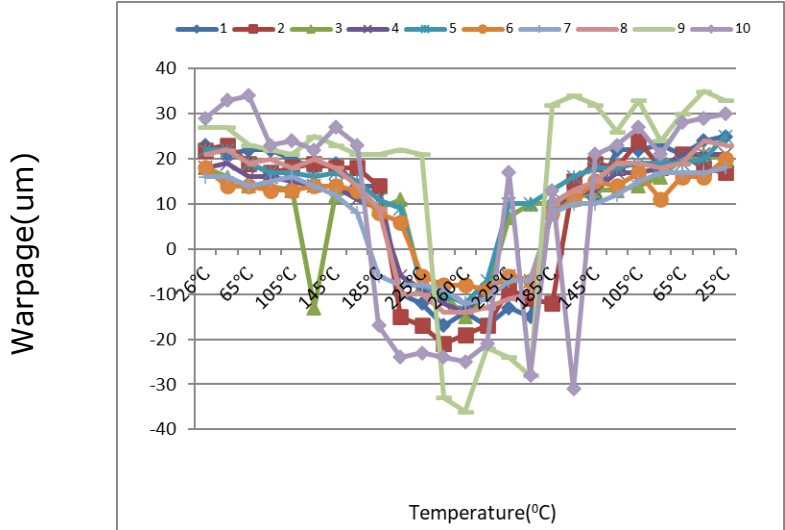
Wet condition samples - meets Apple spec for all temperature range specified



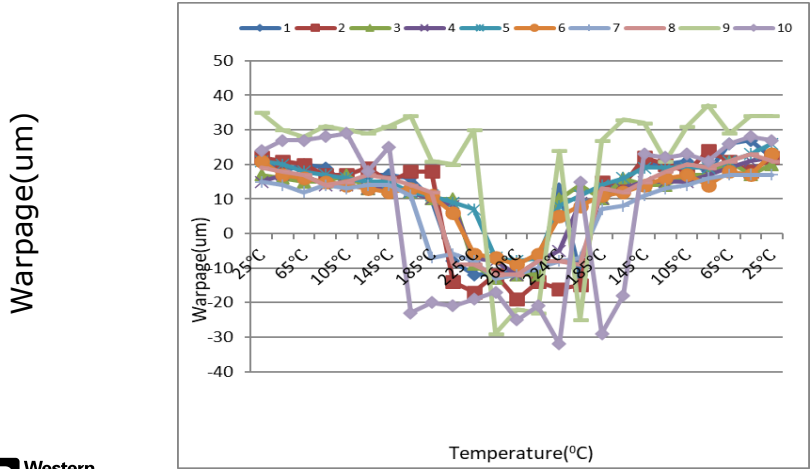
1<sup>st</sup> reflow



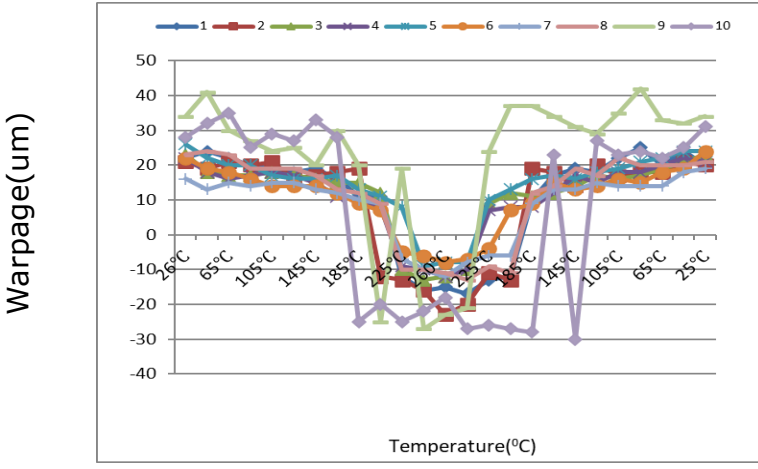
2<sup>nd</sup> reflow



3<sup>rd</sup> reflow



4<sup>th</sup> reflow



# Tape Adhesion test (2D)

20 units from each of 3 PQ lots

AI No.	Qty	Comment
Lot1	20	Peeling test pass spec
Lot2	20	Peeling test pass spec
Lot3	20	Peeling test pass pec

Tape adhesion test done as per ASTM D-3359 at  $T_a = 25^\circ\text{C}$  and it meets peeling criterion

# Contact Resistance and Delam check (2D)

Test	Pkg Type	Spec	Test result	Sample size	Remarks
Delamination check by CSAM	Shield	JED22-A113	0 fail / 60ea	60units	Require pre-conditioning with MSL level 3A and measure it after 260C 4x IR reflow
Contact Resistance check	Shield	<0.6Ω	0 fail / 60ea	60 units	

- Data taken from 60 units from 3 PQ lots (20 units/lot)

# Package Reliability Data (2D) – Mini Qual

## Package Qual Lot #1 (Substrate Vendor Y, EMI-Linco)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

# Package Reliability Data (2D) – Mini Qual

## Package Qual Lot #2 (Substrate Vendor X, EMI-Tango)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

# Package Reliability Data (2D) – Mini Qual

## Package Qual Lot #3 (Substrate Vendor Y, EMI-Tango)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

**MK2 S5E BiCS5 512Gb iTLC - 4D**  
**9x13.3x0.87mm**  
**Shielded - 315 BGA**

# Dimension X-Y-Z, Warpage

## 4D (shielded)

Item	X(Width)	L(Length)	Package T w/o Bump	Pre-bump Height	Body T w/o Bump	Warpage @ RT
<b>Spec</b>	<b>9.0+/-0.05mm</b>	<b>13.3+/-0.05mm</b>	<b>Max. 0.87mm</b>	<b>50 +/-20um</b>	<b>0.770+/-0.025mm</b>	<b>[-30 um,75um]</b>
<b>Max</b>	9.007	13.310	0.833	62.9	0.781	52.7
<b>Min</b>	8.971	13.258	0.797	44.5	0.765	28.6
<b>Mean</b>	8.991	13.28	0.816	52.8	0.772	42.2
<b>Std Dev</b>	0.007	0.007	0.007	2.54	2.67	4.06

- Data taken from 60 units from 3 PQ lots (20 units/lot) and all dimensions within spec.

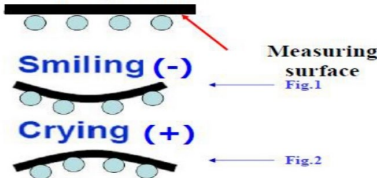
# NAND Wire Bond Data (4D)

	Lot 1		Lot 2		Lot 3	
	Wire Pull	Ball Shear	Wire Pull	Ball Shear	Wire Pull	Ball Shear
<b>Spec (gf) – Min.</b>	<b>1.8</b>	<b>10</b>	<b>1.8</b>	<b>10</b>	<b>1.8</b>	<b>10</b>
<b>Max (gf)</b>	6.01	24.77	6.16	23.83	6.85	23.96
<b>Min (gf)</b>	4.04	19.89	5.59	20.86	4.00	19.28
<b>Avg (gf)</b>	4.98	21.95	5.74	22.80	4.92	21.39
<b>Std Dev (gf)</b>	0.53	1.15	0.25	0.76	0.66	0.91

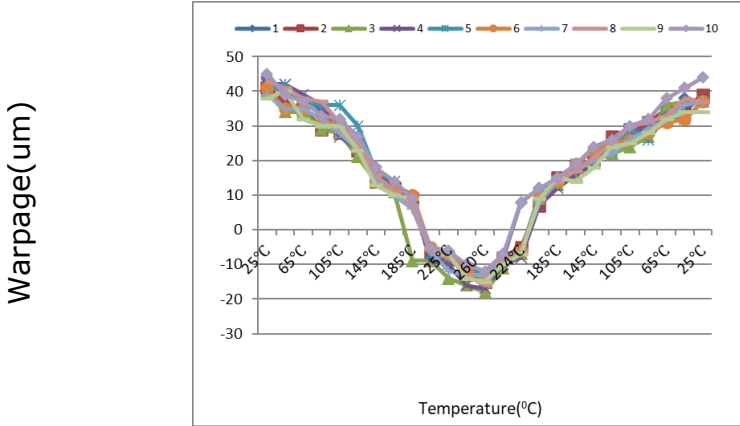
- Data taken from 36 wires (5 units/lot) from 3 PQ lots and passed wire pull and bond shear.

# Shadow Moiré (4D)

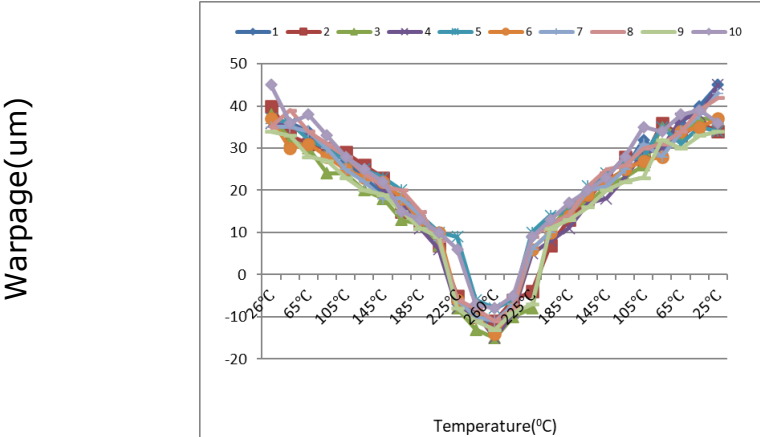
Dry condition samples - meets Apple spec for all temperature range specified



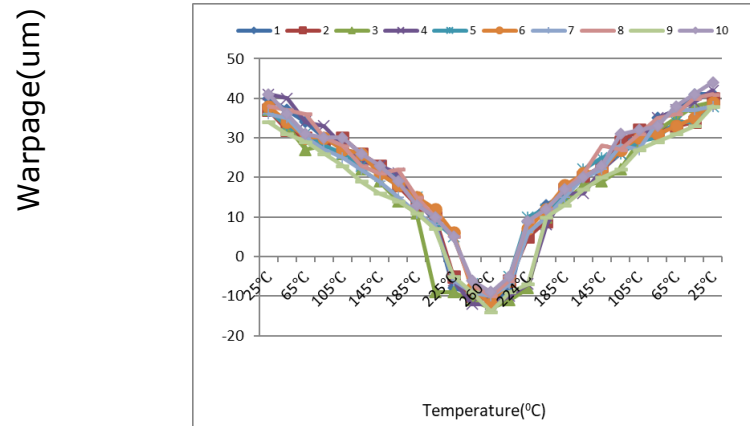
1<sup>st</sup> reflow



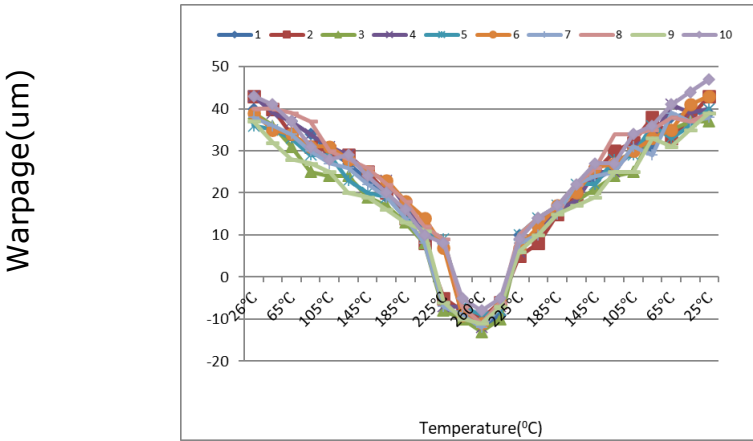
2<sup>nd</sup> reflow



3<sup>rd</sup> reflow

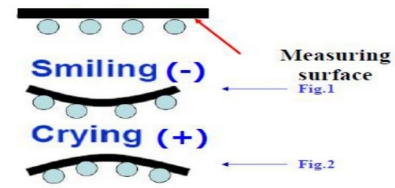


4<sup>th</sup> reflow

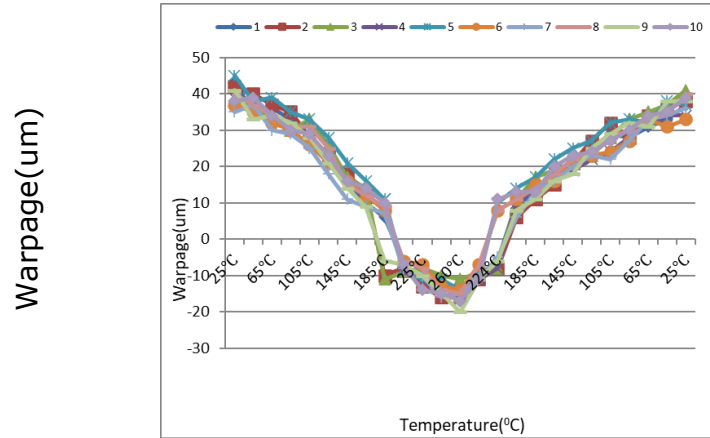


# Shadow Moiré (4D)

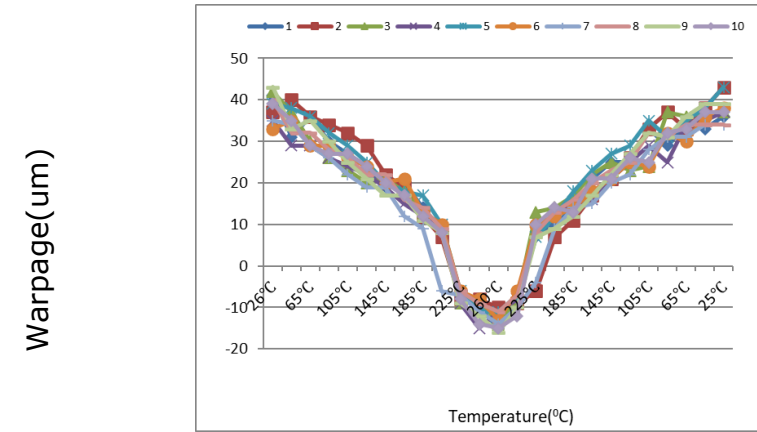
**Wet condition samples** - meets Apple spec for all temperature range specified



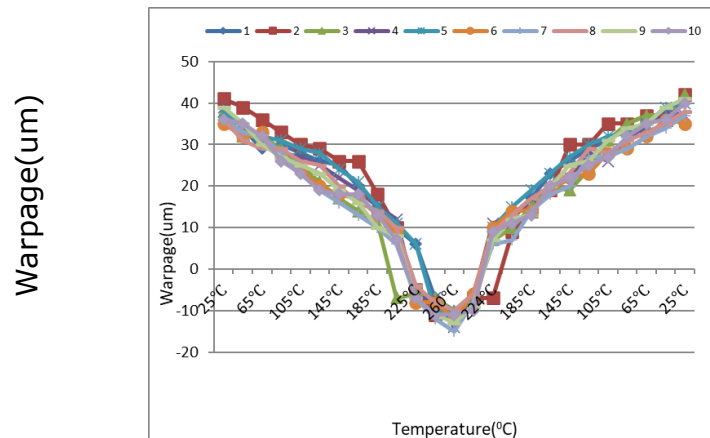
### 1<sup>st</sup> reflow



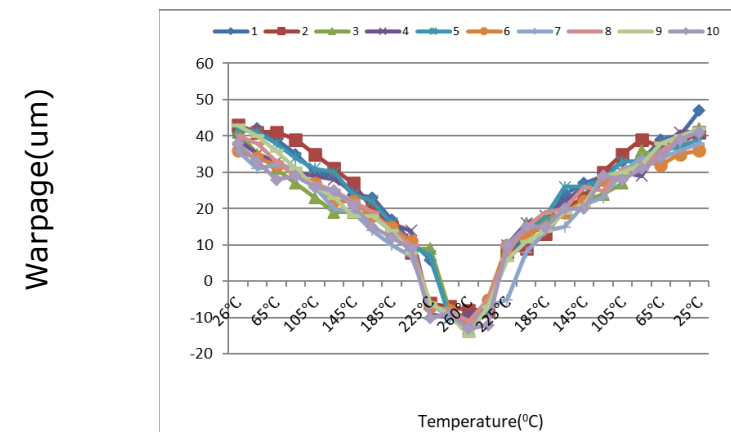
### 2<sup>nd</sup> reflow



### 3<sup>rd</sup> reflow



### 4<sup>th</sup> reflow



# Tape Adhesion test (4D)

20 units from each of 3 PQ lots

AI No.	Qty	Comment
Lot1	20	Peeling test pass spec
Lot2	20	Peeling test pass spec
Lot3	20	Peeling test pass pec

Tape adhesion test done as per ASTM D-3359 at  $T_a = 25^\circ\text{C}$  and it meets peeling criterion

# Contact Resistance and Delam check (4D)

Test	Pkg Type	Spec	Test result	Sample size	Remarks
Delamination check by CSAM	Shield	JED22-A113	0 fail / 60ea	60units	Require pre-conditioning with MSL level 3A and measure it after 260C 4x IR reflow
Contact Resistance check	Shield	<0.6Ω	0 fail / 60ea	60 units	

- Data taken from 60 units from 3 PQ lots (20 units/lot)

# Package Reliability Data (4D) – Mini Qual

## Package Qual Lot #1 (Substrate Vendor Y, EMI-Linco)

Test ItemsC	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

# Package Reliability Data (4D) – Mini Qual

## Package Qual Lot #2 (Substrate Vendor X, EMI-Tango)

Test ItemsC	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

# Package Reliability Data (4D) – Mini Qual

## Package Qual Lot #3 (Substrate Vendor X, EMI-Linco)

Test ItemsC	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	50	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/50
				Test result	0/50
TMCL for embedded components after pre-con (Temperature Cycling Test)	25	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/25
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	25	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/25

**MK2 S5E BiCS5 512Gb iTLC - 8D**  
**9x13.3x0.9mm**  
**Shielded - 315 BGA**

# Dimension X-Y-Z, Warpage

## 8D (shielded)

Item	X(Width)	L(Length)	Package T w/o Bump	Pre-bump Height	Body T w/o Bump	Warpage @ RT
<b>Spec</b>	<b>9.0+/-0.05mm</b>	<b>13.3+/-0.05mm</b>	<b>Max. 0.90mm</b>	<b>50 +/-20um</b>	<b>0.800+/-0.025mm</b>	<b>[-30 um,75um]</b>
<b>Max</b>	9.024	13.330	0.847	57.7	0.804	45.9
<b>Min</b>	8.978	13.275	0.820	41.6	0.790	20.5
<b>Mean</b>	9.001	13.304	0.836	49.7	0.799	36.2
<b>Std Dev</b>	0.010	0.013	0.005	2.26	0.005	4.75

- Data taken from 60 units from 3 PQ lots (20 units/lot) and all dimensions within spec.

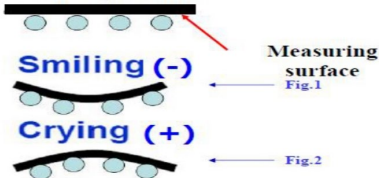
# NAND Wire Bond Data (8D)

	Lot 1		Lot 2		Lot 3	
	Wire Pull	Ball Shear	Wire Pull	Ball Shear	Wire Pull	Ball Shear
<b>Spec (gf) – Min.</b>	<b>1.8</b>	<b>10</b>	<b>1.8</b>	<b>10</b>	<b>1.8</b>	<b>10</b>
<b>Max (gf)</b>	6.36	23.88	6.55	25.27	5.70	23.83
<b>Min (gf)</b>	4.33	21.59	4.02	20.26	4.29	20.86
<b>Avg (gf)</b>	5.59	23.02	4.92	23.22	5.40	22.80
<b>Std Dev (gf)</b>	0.54	0.59	0.56	0.77	0.46	0.76

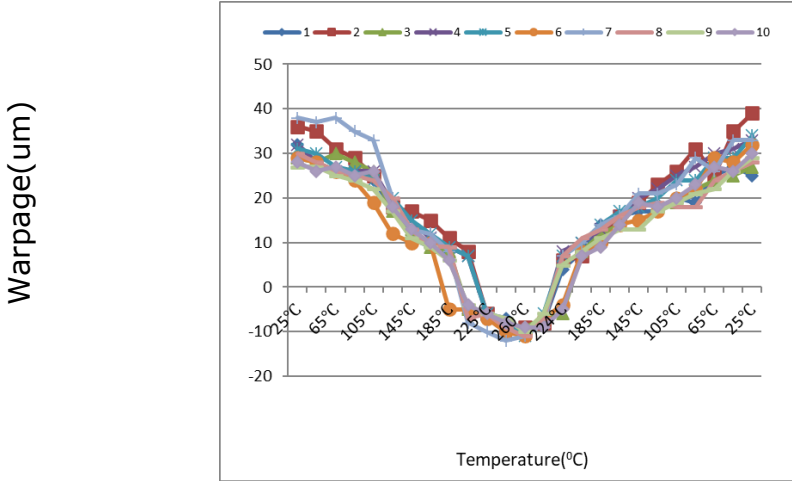
- Data taken from 36 wires (5 units/lot) from 3 PQ lots and passed wire pull and bond shear.

# Shadow Moiré (8D)

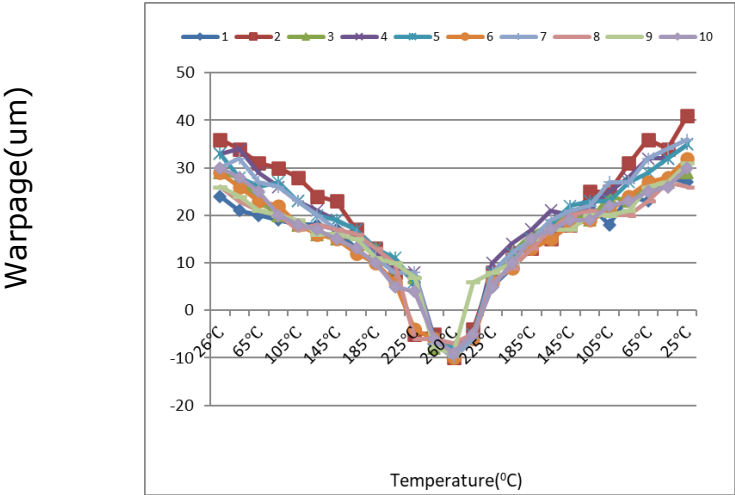
Dry condition samples - meets Apple spec for all temperature range specified



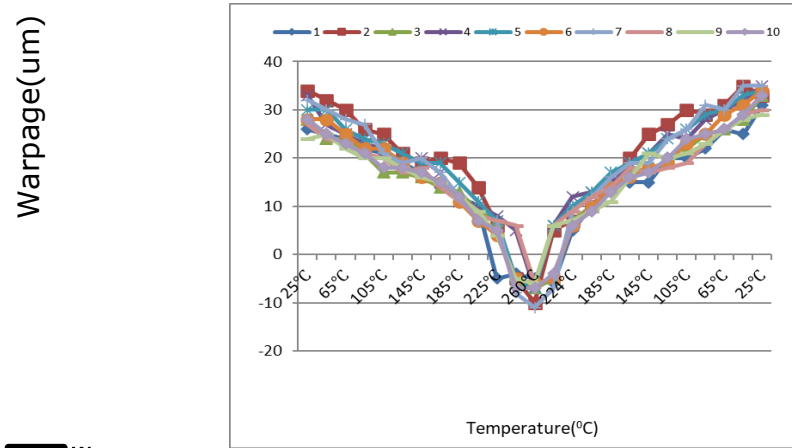
1<sup>st</sup> reflow



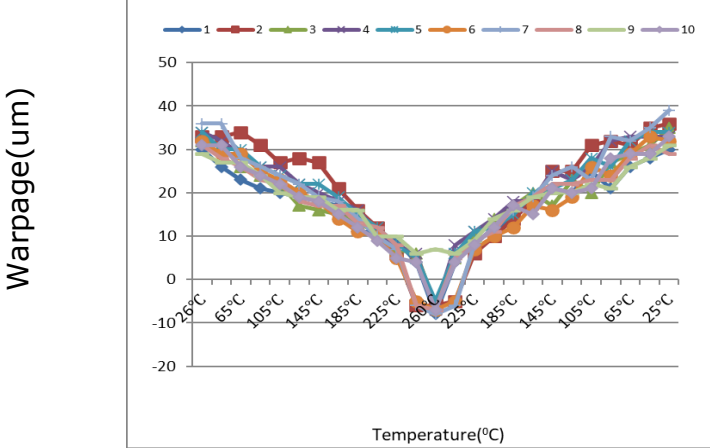
2<sup>nd</sup> reflow



3<sup>rd</sup> reflow

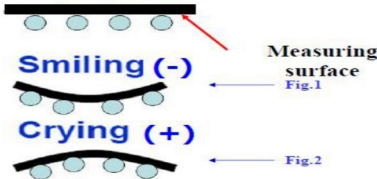


4<sup>th</sup> reflow

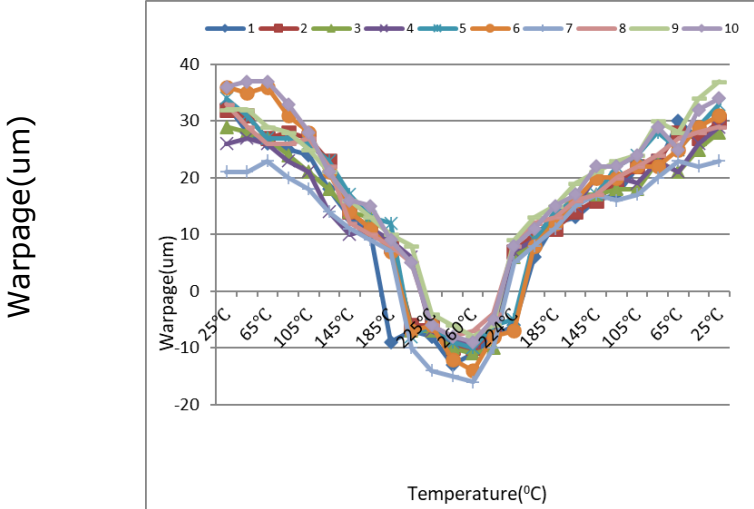


# Shadow Moiré (8D)

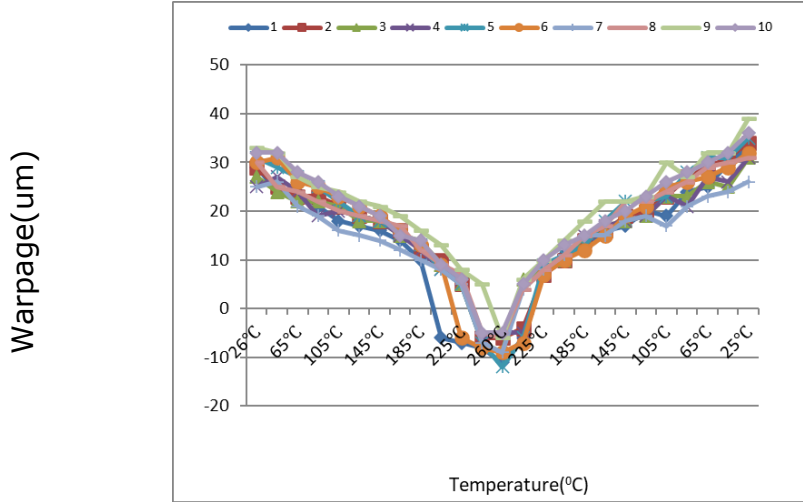
Wet condition samples - meets Apple spec for all temperature range specified



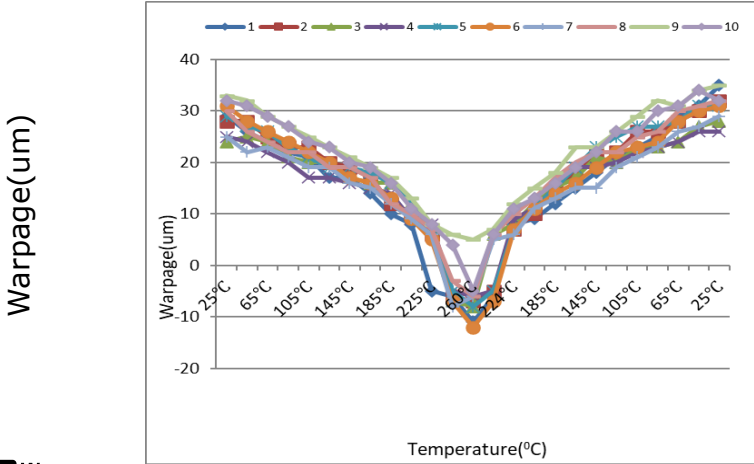
1<sup>st</sup> reflow



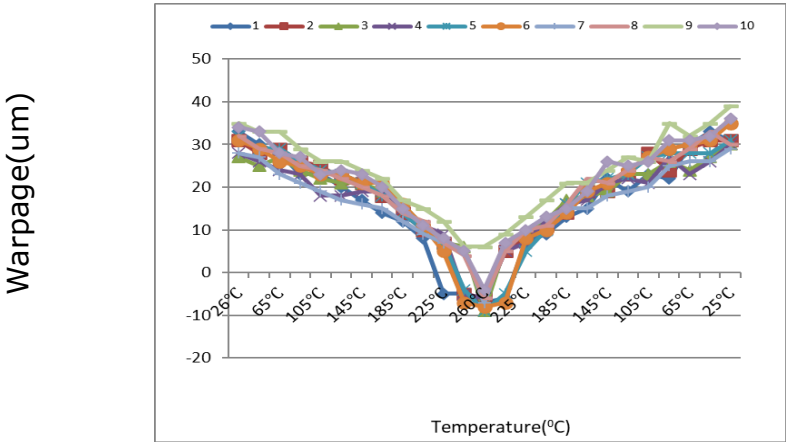
2<sup>nd</sup> reflow



3<sup>rd</sup> reflow



4<sup>th</sup> reflow



# Tape Adhesion test (8D)

20 units from each of 3 PQ lots

AI No.	Qty	Comment
Lot1	20	Peeling test pass spec
Lot2	20	Peeling test pass spec
Lot3	20	Peeling test pass pec

Tape adhesion test done as per ASTM D-3359 at  $T_a = 25^\circ\text{C}$  and it meets peeling criterion

# Contact Resistance and Delam check (8D)

Test	Pkg Type	Spec	Test result	Sample size	Remarks
Delamination check by CSAM	Shield	JED22-A113	0 fail / 60ea	60units	Require pre-conditioning with MSL level 3A and measure it after 260C 4x IR reflow
Contact Resistance check	Shield	<0.6Ω	0 fail / 60ea	60 units	

- Data taken from 60 units from 3 PQ lots (20 units/lot)

# Package Reliability Data (8D) – Full Qual

## Package Qual Lot #1 (Substrate Vendor X, EMI-Linco)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	280	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/280
				Test result	0/280
TMCL for embedded components after pre-con (Temperature Cycling Test)	77	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/77
		-55°C to 125°C; 500cycles	No Failure	After 500cys	0/77
		-55°C to 125°C; 700cycles	No Failure	After 700cys	0/77
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	77	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/77
		110°C, 85% RH; 3.6V/1.95V/0.99V for 264hours.	No Failure	After 264hrs	0/77
Un-Biased-HAST after pre-con (Un-Biased Highly Accelerated Stress Test)	77	110°C, 85%RH; 96hours.	No Failure	After 96hrs	0/77
		110°C, 85% RH; 264hours.	No Failure	After 264hrs	0/77
HTST after pre-con (High Temperature Storage Test)	45	150°C; 300hours	No Failure	After 300hrs	0/45
		150°C; 500hours	No Failure	After 500hrs	0/45

# Package Reliability Data (8D) – Full Qual

## Package Qual Lot #2 (Substrate Vendor X, EMI-Tango)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	280	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/280
				Test result	0/280
TMCL for embedded components after pre-con (Temperature Cycling Test)	77	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/77
		-55°C to 125°C; 500cycles	No Failure	After 500cys	0/77
		-55°C to 125°C; 700cycles	No Failure	After 700cys	0/77
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	77	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/77
		110°C, 85% RH; 3.6V/1.95V/0.99V for 264hours.	No Failure	After 264hrs	0/77
Un-Biased-HAST after pre-con (Un-Biased Highly Accelerated Stress Test)	77	110°C, 85%RH; 96hours.	No Failure	After 96hrs	0/77
		110°C, 85% RH; 264hours.	No Failure	After 264hrs	0/77
HTST after pre-con (High Temperature Storage Test)	45	150°C; 300hours	No Failure	After 300hrs	0/45
		150°C; 500hours	No Failure	After 500hrs	0/45

# Package Reliability Data (8D) – Full Qual

## Package Qual Lot #3 (Substrate Vendor Y, EMI-Tango)

Test Items	Sample Size (ea)	Test Condition	Criteria	Intermediate read-point	Result
Pre-condition: MSL3A +4xIR	280	60° C; 60% RH; 40hours 4xIR.	No Failure	SAT result	0/280
				Test result	0/280
TMCL for embedded components after pre-con (Temperature Cycling Test)	77	-55°C to 125°C; 300cycles	No Failure	After 300cys	0/77
		-55°C to 125°C; 500cycles	No Failure	After 500cys	0/77
		-55°C to 125°C; 700cycles	No Failure	After 700cys	0/77
Biased-HAST after pre-con (Biased Highly Accelerated Stress Test)	77	110°C, 85%RH; 3.6V/1.95V/0.99V for 96hours.	No Failure	After 96hrs	0/77
		110°C, 85% RH; 3.6V/1.95V/0.99V for 264hours.	No Failure	After 264hrs	0/77
Un-Biased-HAST after pre-con (Un-Biased Highly Accelerated Stress Test)	77	110°C, 85%RH; 96hours.	No Failure	After 96hrs	0/77
		110°C, 85% RH; 264hours.	No Failure	After 264hrs	0/77
HTST after pre-con (High Temperature Storage Test)	45	150°C; 300hours	No Failure	After 300hrs	0/45
		150°C; 500hours	No Failure	After 500hrs	0/45

# MCP ESD CDM (500V, 400V, 250V) Results

<b>BiCS5 512Gb iTLC S5E – 1D (Micro)</b>	<b>Sample size (ea)</b>	<b>Results</b>
500V CDM	10	0F/10T
400V CDM	10	0F/10T
250V CDM	10	0F/10T
<b>BiCS5 512Gb iTLC S5E – 2D (Micro)</b>	<b>Sample size (ea)</b>	<b>Results</b>
500V CDM	10	0F/10T
400V CDM	10	0F/10T
250V CDM	10	0F/10T
<b>BiCS5 512Gb iTLC S5E – 4D (Micro)</b>	<b>Sample size (ea)</b>	<b>Results</b>
500V CDM	10	0F/10T
400V CDM	10	0F/10T
250V CDM	10	0F/10T
<b>BiCS5 512Gb iTLC S5E – 8D (Micro)</b>	<b>Sample size (ea)</b>	<b>Results</b>
500V CDM	10	0F/10T
400V CDM	10	0F/10T
250V CDM	10	0F/10T

- All die stacks passed ESD min. spec  $\geq$  250V.

The image features the Western Digital logo in a bold, white, sans-serif font, centered horizontally. The background is a dark, abstract composition of overlapping, semi-transparent brushstrokes in shades of orange, red, and teal, creating a sense of motion and depth. The logo is the primary focus, standing out against the complex, colorful background.

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