Li98 Reliability Testing Report

1. RA test

Procedure

Tested for thermal resistance using a ASTM D5470 at different condition (room temperature, aging 80 ℃, HAST and thermal shock).

1.1 Room temperature @ 25°C

1.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

During testing and aging, the samples were maintained between two round aluminum disks of one square inch in surface area.

During Aging, clamps were used to hold a constant pressure on the sample.

Results

Code/(Unit : □-in²/W)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	0.630	-	-	-	-
Thermal Aging	0.630	0.632	0.636	0.639	0.642
Thermal HAST	0.630	0.628	0.624	0.620	0.617

Code/(Unit :℃-in²/W)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	0.631	0.634	0.633	0.630	0.636

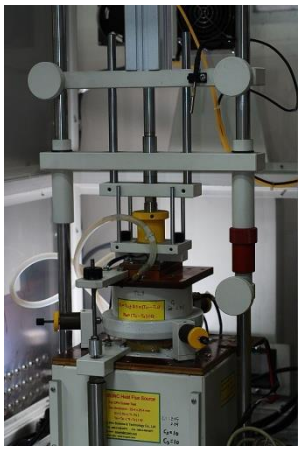
Test method : ASTM D5470

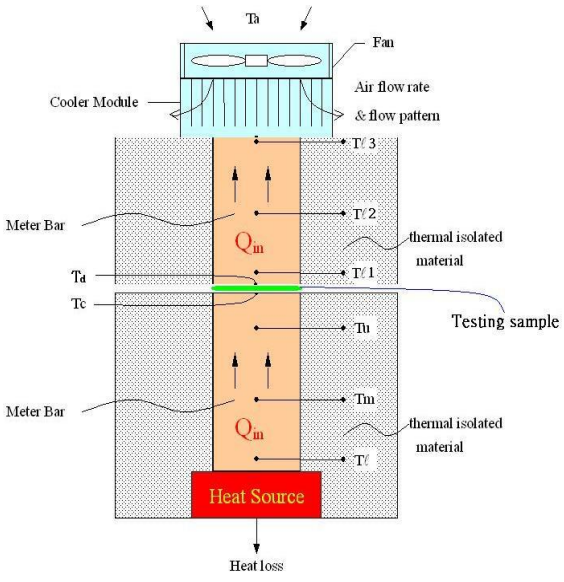
Heat power : 30W

Specimen Area: 1 inch²

Specimen thickness: 0.15 mm, n=5

Specimen area: 1 inch²





Li98 Reliability Testing Report

2. Peel Adhesion Test

Procedure

Adhere the specimen to the testing aluminum plate. (under 2kg roll)

Wait for 72 hrs at room temperature.

2.1 Room temperature @ 25°C

2.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

Secure the end of the plate furthest away from the tab to the moving grip.

Begin peeling the tape at a 90 degree by moving the plate at the specified rate.

Record the average force required for peeling.

Results

Code/(Unit : N/inch)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	15.5	-	-	-	-
Thermal Aging	15.5	15.8	16.7	17.4	17.8
Thermal HAST	15.5	16.4	16.9	17.5	18.2

Code/(Unit : N/inch)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	15.9	16.6	17.1	17.8	18.4

Li98 Reliability Testing Report

3. Static Shear Test

Procedure:

PSTC-7 for adhesively bonded test

Results

Code	Room temperature @ Holding 1000 g	80℃ @ Holding 1000 g
0.15 mm	**>10000 min**	**>10000 min**

Note:

The data for design engineer guidance only.

Engineers are reminded to test the material in varies application.

Li98 Reliability Testing Report

1. RA test

Procedure

Tested for thermal resistance using a ASTM D5470 at different condition (room temperature, aging 80 ℃, HAST and thermal shock).

1.1 Room temperature @ 25°C

1.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

During testing and aging, the samples were maintained between two round aluminum disks of one square inch in surface area.

During Aging, clamps were used to hold a constant pressure on the sample.

Results

Code/(Unit : □-in²/W)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	1.095	-	-	-	-
Thermal Aging	1.095	1.098	1.104	1.108	1.112
Thermal HAST	1.095	1.092	1.088	1.085	1.081

Code/(Unit :℃-in²/W)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	1.096	1.103	1.109	1.114	1.111

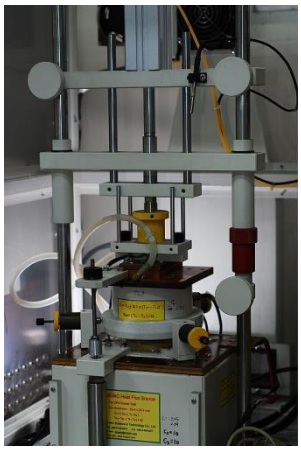
Test method : ASTM D5470

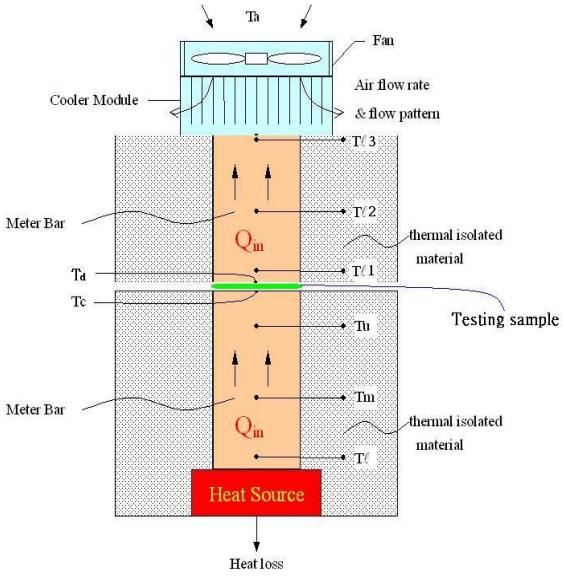
Heat power : 30W

Specimen Area: 1 inch²

Specimen thickness: 0.25 mm, n=5

Specimen area: 1 inch²





Li98 Reliability Testing Report

2. Peel Adhesion Test

Procedure

Adhere the specimen to the testing aluminum plate. (under 2kg roll)

Wait for 72 hrs at room temperature.

2.1 Room temperature @ 25°C

2.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

Secure the end of the plate furthest away from the tab to the moving grip.

Begin peeling the tape at a 90 degree by moving the plate at the specified rate.

Record the average force required for peeling.

Results

Code/(Unit : N/inch)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	17.4	-	-	-	-
Thermal Aging	17.4	17.6	18.2	18.6	19.1
Thermal HAST	17.4	17.9	18.1	18.9	19.4

Code/(Unit : N/inch)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	18.1	18.6	19.2	19.6	19.8

Li98 Reliability Testing Report

3. Static Shear Test

Procedure:

PSTC-7 for adhesively bonded test

Results

Code	Room temperature @ Holding 1000 g	80℃ @ Holding 1000 g
0.25 mm	**>10000 min**	**>10000 min**

Note:

The data for design engineer guidance only.

Engineers are reminded to test the material in varies application.

Li98C Reliability Testing Report

1. RA test

Procedure

Tested for thermal resistance using a ASTM D5470 at different condition (room temperature, aging 80 ℃, HAST and thermal shock).

1.1 Room temperature @ 25°C

1.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

During testing and aging, the samples were maintained between two round aluminum disks of one square inch in surface area.

During Aging, clamps were used to hold a constant pressure on the sample.

Results

Code/(Unit : □-in²/W)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	0.554	-	-	-	-
Thermal Aging	0.554	0.556	0.558	0.561	0.564
Thermal HAST	0.554	0.550	0.547	0.544	0.542

Code/(Unit :℃-in²/W)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	0.555	0.557	0.560	0.564	0.566

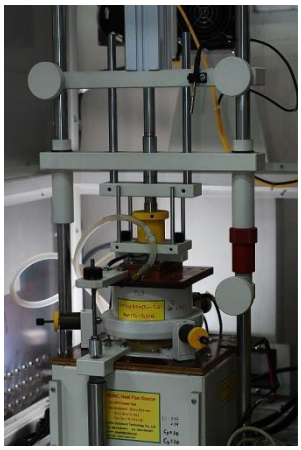
Test method : ASTM D5470

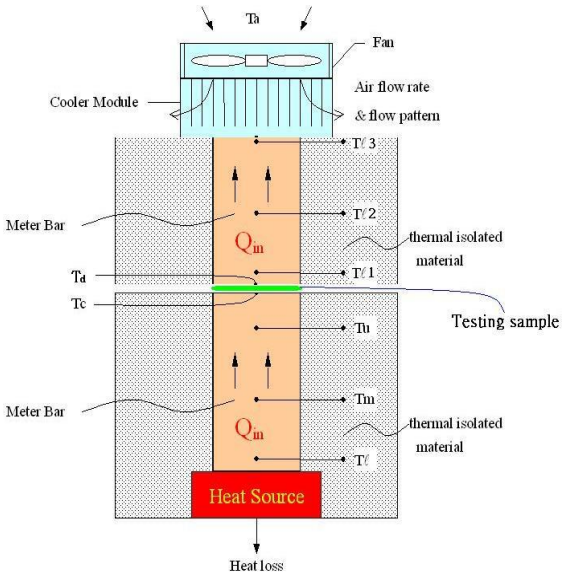
Heat power : 30W

Specimen Area: 1 inch²

Specimen thickness: 0.15 mm, n=5

Specimen area: 1 inch²





Li98C Reliability Testing Report

2. Peel Adhesion Test

Procedure

Adhere the specimen to the testing aluminum plate. (under 2kg roll)

Wait for 72 hrs at room temperature.

2.1 Room temperature @ 25°C

2.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

Secure the end of the plate furthest away from the tab to the moving grip.

Begin peeling the tape at a 90 degree by moving the plate at the specified rate.

Record the average force required for peeling.

Results

Code/(Unit : N/inch)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	7.4	-	-	-	-
Thermal Aging	7.4	7.9	8.6	8.9	9.4
Thermal HAST	7.4	8.1	8.6	9.4	10.2

Code/(Unit : N/inch)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	7.6	8.2	8.7	9.4	9.8

Li98C Reliability Testing Report

3. Static Shear Test

Procedure:

PSTC-7 for adhesively bonded test

Results

Code	Room temperature @ Holding 1000 g	80℃ @ Holding 1000 g
0.15 mm	**>10000 min**	**>10000 min**

Note:

The data for design engineer guidance only.

Engineers are reminded to test the material in varies application.

Li98C Reliability Testing Report

1. RA test

Procedure

Tested for thermal resistance using a ASTM D5470 at different condition (room temperature, aging 80 ℃, HAST and thermal shock).

1.1 Room temperature @ 25°C

1.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

During testing and aging, the samples were maintained between two round aluminum disks of one square inch in surface area.

During Aging, clamps were used to hold a constant pressure on the sample.

Results

Code/(Unit : □-in²/W)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	0.924	-	-	-	-
Thermal Aging	0.924	0.926	0.931	0.934	0.936
Thermal HAST	0.924	0.921	0.918	0.915	0.912

Code/(Unit :℃-in²/W)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	0.925	0.927	0.932	0.928	0.929

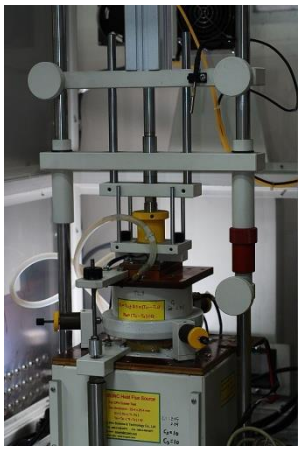
Test method : ASTM D5470

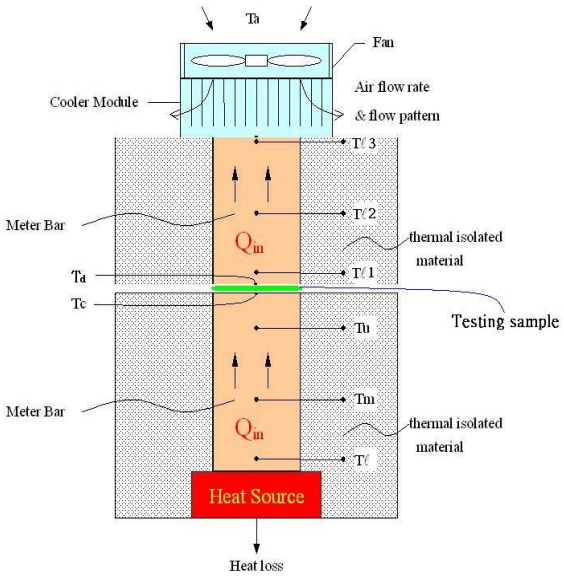
Heat power : 30W

Specimen Area: 1 inch²

Specimen thickness: 0.25 mm, n=5

Specimen area: 1 inch²





Li98C Reliability Testing Report

2. Peel Adhesion Test

Procedure

Adhere the specimen to the testing aluminum plate. (under 2kg roll)

Wait for 72 hrs at room temperature.

2.1 Room temperature @ 25°C

2.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

Secure the end of the plate furthest away from the tab to the moving grip.

Begin peeling the tape at a 90 degree by moving the plate at the specified rate.

Record the average force required for peeling.

Results

Code/(Unit : N/inch)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	9.4	-	-	-	-
Thermal Aging	9.4	9.9	10.5	10.8	11.2
Thermal HAST	9.4	10.1	10.8	11.2	11.7

Code/(Unit : N/inch)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	9.6	10.4	10.8	11.3	11.6

Li98C Reliability Testing Report

3. Static Shear Test

Procedure:

PSTC-7 for adhesively bonded test

Results

Code	Room temperature @ Holding 1000 g	80℃ @ Holding 1000 g
0.25 mm	**>10000 min**	**>10000 min**

Note:

The data for design engineer guidance only.

Engineers are reminded to test the material in varies application.

Li98CN Reliability Testing Report

1. RA test

Procedure

Tested for thermal resistance using a ASTM D5470 at different condition (room temperature, aging 80 ℃, HAST and thermal shock).

1.1 Room temperature @ 25°C

1.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

1.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

During testing and aging, the samples were maintained between two round aluminum disks of one square inch in surface area.

During Aging, clamps were used to hold a constant pressure on the sample.

Results

Code/(Unit : □-in²/W)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	0.681	-	-	-	-
Thermal Aging	0.681	0.684	0.686	0.689	0.691
Thermal HAST	0.681	0.680	0.673	0.675	0.671

Code/(Unit :℃-in²/W)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	0.683	0.685	0.689	0.691	0.694

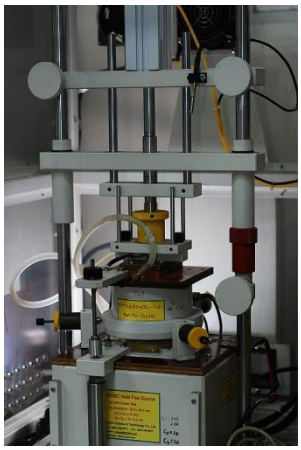
Test method : ASTM D5470

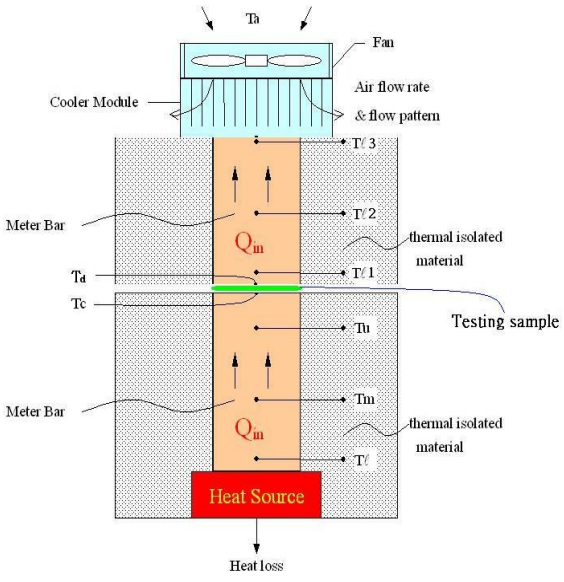
Heat power : 30W

Specimen Area: 1 inch²

Specimen thickness: 0.18 mm, n=5

Specimen area: 1 inch²





Li98CN Reliability Testing Report

2. Peel Adhesion Test

Procedure

Adhere the specimen to the testing aluminum plate. (under 2kg roll)

Wait for 72 hrs at room temperature.

2.1 Room temperature @ 25°C

2.2 Thermal Aging @ 80°C (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.3 Thermal HAST @ 85°C/85%RH (200 hrs, 400 hrs, 700 hrs, 1000 hrs)

2.4 Thermal Cycling @ -40°C to 120°C for 500 cycles (100 cycles, 200 cycles, 300 cycles, 400 cycles, 500 cycles)

Secure the end of the plate furthest away from the tab to the moving grip.

Begin peeling the tape at a 90 degree by moving the plate at the specified rate.

Record the average force required for peeling.

Results

Code/(Unit : N/inch)	0 hr	200 hrs	400 hrs	700 hrs	1000 hrs
Room temperature	9.6	-	-	-	-
Thermal Aging	9.6	9.9	10.3	10.6	11.1
Thermal HAST	9.6	9.9	10.4	11.6	12.3

Code/(Unit : N/inch)	100 cycles	200 cycles	300 cycles	400 cycles	500 cycles
Thermal Cycling	10.2	10.6	11.4	11.8	12.4

Li98CN Reliability Testing Report

3. Static Shear Test

Procedure:

PSTC-7 for adhesively bonded test

Results

Code	Room temperature @ Holding 1000 g	80℃ @ Holding 1000 g
0.18 mm	**>10000 min**	**>10000 min**

Note:

The data for design engineer guidance only.

Engineers are reminded to test the material in varies application.