## Reliability Test Report

**M/A-Com Part Number:** MABA-009600-CF48A0  
**Part Type:** Transformer  
**Platform:** Soldered SOT Carrier  
**Test Laboratory:** SGS-CSTC Standards Technical Services Co. LTD. Shenzhen China.

**M/A-Com Part Numbers Qualified by Similarity:** All Soldered SOT Carriers

### RELIABILITY TEST SUMMARY:

<table>
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<tr>
<th>TEST GROUP</th>
<th>DESCRIPTION</th>
<th>TEST METHOD</th>
<th>TEST PARAMETERS / COMMENTS</th>
<th>MIL-S-39169 REF #</th>
<th>SAMPLE SIZE</th>
<th>RESULT</th>
<th>REPORT SECTION REFERENCE</th>
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<tbody>
<tr>
<td><strong>TEST GROUP 1</strong></td>
<td>Visual &amp; Dimensions</td>
<td>ML-STD-883 Method 2009.9</td>
<td>Per visual spec</td>
<td>2.0.1</td>
<td>30</td>
<td>PASS</td>
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<td></td>
<td>Solvent Resistance</td>
<td>ML-STD-883 Method 2015.13</td>
<td>Perform at room temp</td>
<td>2.0.1</td>
<td>30</td>
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<td></td>
<td>Terminal Fatigue</td>
<td>ML-STD-883 Method 2004.5</td>
<td>Test Condition D</td>
<td>2.0.1</td>
<td>30</td>
<td>PASS</td>
<td>Section 1.3</td>
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<td><strong>TEST GROUP 2</strong></td>
<td>Steam Age (10 Units)</td>
<td>N/A</td>
<td>35°C, 95%RH, 168Hrs</td>
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<td>20</td>
<td>PASS</td>
<td>Section 2.1</td>
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<td>Bake (10 Units)</td>
<td>N/A</td>
<td>150°C, 100Hrs</td>
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<td>Section 2.2</td>
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<td></td>
<td>Solderability</td>
<td>ML-STD-883 Method 2003.8</td>
<td>Dip &amp; Look</td>
<td>PASS</td>
<td>Section 2.3</td>
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<td>Solderability Visual</td>
<td>ML-STD-883 Method 2003.8</td>
<td>Photos</td>
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<td>Section 2.3</td>
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<td><strong>TEST GROUP 3</strong></td>
<td>Electrical Test</td>
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<td>MABA-009600-CF48A0 Test File</td>
<td>2.0.3</td>
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<td>Section 3.1</td>
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<td></td>
<td>HI Temp Life</td>
<td>ML-STD-883 1008.2 COND.A</td>
<td>100°C, 500Hrs</td>
<td>2.0.3</td>
<td>76</td>
<td>PASS</td>
<td>Section 3.2</td>
</tr>
<tr>
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<td>Thermal Shock</td>
<td>ML-STD-883 1011.9 COND.A</td>
<td>0°C to 100°C, 100 cycles</td>
<td>2.0.3</td>
<td>76</td>
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<td>Section 3.3</td>
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<td><strong>TEST GROUP 4</strong></td>
<td>Electrical Test</td>
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<td>MABA-009600-CF48A0 Test File</td>
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<td>10</td>
<td>PASS</td>
<td>Section 3.4</td>
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<td>Solder Temp/ Shock</td>
<td>ML-STD-750D Method 2031.2</td>
<td>260°C for 10 Seconds</td>
<td>2.0.4</td>
<td>10</td>
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<td>Section 4.1</td>
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<td>IR/CONVECTION OVEN Profile</td>
<td>N/A</td>
<td>230°C for 30 Seconds</td>
<td>2.0.4</td>
<td>10</td>
<td>PASS</td>
<td>Section 4.2</td>
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<td><strong>TEST GROUP 5</strong></td>
<td>Electrical Test</td>
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<td>MABA-009600-CF48A0 Test File</td>
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<td>PASS</td>
<td>Section 5.1</td>
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<td></td>
<td>Salt Atmosphere</td>
<td>ML-STD-883 1009.8 COND.A</td>
<td>24Hrs</td>
<td>2.0.5</td>
<td>5</td>
<td>PASS</td>
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<td></td>
<td>Visual</td>
<td>ML-STD-883 1009.8 COND.A</td>
<td>Failure Criteria</td>
<td>PASS</td>
<td>Section 5.3</td>
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<td><strong>TEST GROUP 6</strong></td>
<td>Electrical Test</td>
<td>N/A</td>
<td>MABA-009600-CF48A0 Test File</td>
<td>2.0.6</td>
<td>38</td>
<td>PASS</td>
<td>Section 6.1</td>
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<td></td>
<td>Pressure Cooker</td>
<td>JESD22-A-102-C</td>
<td>121°C, 15psi, 96Hrs</td>
<td>2.0.6</td>
<td>38</td>
<td>PASS</td>
<td>Section 6.2</td>
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<td>Temp./Humidity</td>
<td>JESD22-A-101-B</td>
<td>85°C, 85%RH, 500Hrs</td>
<td>2.0.6</td>
<td>38</td>
<td>PASS</td>
<td>Section 6.3</td>
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<tr>
<td><strong>TEST GROUP 7</strong></td>
<td>Electrical Test</td>
<td>N/A</td>
<td>MABA-009600-CF48A0 Test File</td>
<td>2.0.7</td>
<td>1</td>
<td>PASS</td>
<td>Section 7.1</td>
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<tr>
<td></td>
<td>Lead Material &amp; Plating</td>
<td>Cross Section &amp; XRF</td>
<td>Substrate Part Drawing</td>
<td>PASS</td>
<td>Section 8.1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Glass Transition Temp (TG)</td>
<td>ASTM D7028</td>
<td>TG TEST</td>
<td>PASS</td>
<td>Section 8.2</td>
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<tr>
<td><strong>TEST GROUP 8 &amp; 9</strong></td>
<td>Electrical Test</td>
<td>N/A</td>
<td>MABA-009600-CF48A0 Test File</td>
<td>2.0.8 &amp; 2.0.9</td>
<td>50</td>
<td>PASS</td>
<td>Section 8.3</td>
</tr>
<tr>
<td></td>
<td>Vibration</td>
<td>ML-STD-202 Method 201 Condition A</td>
<td>Freq: 10Hz to 55Hz, Displacement 1.524mm Swept, Sweep: 1min/cycle, Orientation X,Y,Z axes, Duration 24Hrs</td>
<td>2.0.8 &amp; 2.0.9</td>
<td>50</td>
<td>PASS</td>
<td>Section 8.4</td>
</tr>
<tr>
<td></td>
<td>Mechanical Shock</td>
<td>ML-STD-202 Method 2136 Condition A</td>
<td>Shock Wave Shape: Half Sine Acceleration: 50g Pulse duration: 11ms Shock Times: 3 times</td>
<td>PASS</td>
<td>Section 8.5</td>
<td></td>
<td></td>
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<tr>
<td><strong>TEST GROUP 10</strong></td>
<td>Electrical Test</td>
<td>N/A</td>
<td>MABA-009600-CF48A0 Test File</td>
<td>PASS</td>
<td>Section 8.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Reliability flow Chart:

SELECT AT RANDOM 100 PRODUCTION PARTS

- Electrical Test
  - Vibration MIL-STD-202 Method 201 Condition A
  - Pressure Cooker MIL-STD-202 1290C, 2 Hours
  - Reflow MIL-STD-202 1400C, 10 Hours

- Temp/Humidity MIL-STD-883 2010C, 508 Hrs
- Terminal Fatigue Testing (Band Angle @ 45)
- Electrical Test

- Visual & Dimensional Inspection MIL-STD-883 Method 206.03
- Solvent Resistance (See Notes 1 below) MIL-STD-883 Method 206.03
- Solvability Visual Inspection (Photo)
- Visual Inspection MIL-STD-883 Method 206.03

- Solvability Visual Inspection (Photo)
- Glass Transition Temp (TG) Test

- Salt Atmosphere 24 Hrs MIL-STD-883 Method 206.03
- Bake 1500C, 10 Hrs MIL-STD-883 Method 206.03

- Steam Age 30% 15% 9% 10 Hrs MIL-STD-883 Method 206.03

- Visual Inspection MIL-STD-883 Method 206.03
  - Visual Inspection (Lead Material & Plating)

- Test Group 1: Visual & Dimensional Inspection Sample Size: 30 Items
- Test Group 2: Solvability of Terminations Sample Size: 30 Items
- Test Group 3: Corrosion Test Salt Atmosphere Sample Size: 30 Items
- Test Group 4: Reflow: Resistance to High Temp Sample Size: 30 Items
- Test Group 5: Pressure Cooker Testing Sample Size: 30 Items
- Test Group 6: PCT, Pressure Cooker Testing Sample Size: 30 Items
- Test Group 7: Hi Temp Life Stabilization Bake Sample Size: 30 Items
- Test Group 8: Vibration MIL-STD-202 Method 201 Condition A Sample Size: 30 Items
- Test Group 9: Vibration & Mechanical Shock Sample Size: 30 Items
- Test Group 10: Mechanical Shock Sample Size: 30 Items

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Test Group 1

1.1 Dimensional Analysis:

1.1.1 Test Purpose:
These measurements are to verify that the units meet the dimensional specifications outlined in the data sheet.

1.1.2 Test Method/Specification:
Refer to dimensional section of MABA 009600-CF48A0 data sheet

See Figure 1.1A

![Figure 1.1A - MABA 009600-CF48A0 specification.](image)

1.1.3 Measurement Results:
Sample(s) Description: MABA 009600-CF48A0

Quantity: 30 PCS

All 30 samples measured meet the data sheet dimensional specifications. The measurement result for 5 sample units can be seen in Figure 1.1B.

<table>
<thead>
<tr>
<th>Nominal</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.25</td>
<td>5.45</td>
<td>1.48</td>
<td>3.49</td>
<td>3.79</td>
<td>Pass</td>
</tr>
<tr>
<td>2</td>
<td>4.25</td>
<td>5.53</td>
<td>1.48</td>
<td>3.52</td>
<td>3.75</td>
<td>Pass</td>
</tr>
<tr>
<td>3</td>
<td>4.24</td>
<td>5.54</td>
<td>1.48</td>
<td>3.49</td>
<td>3.64</td>
<td>Pass</td>
</tr>
<tr>
<td>4</td>
<td>4.24</td>
<td>5.43</td>
<td>1.48</td>
<td>3.49</td>
<td>3.62</td>
<td>Pass</td>
</tr>
<tr>
<td>5</td>
<td>4.25</td>
<td>5.49</td>
<td>1.48</td>
<td>3.50</td>
<td>3.65</td>
<td>Pass</td>
</tr>
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</table>

![Figure 1.1B – Dimensional results](image)
1.2 Solvent Resistance Test:


1.2.1 Test Purpose:
The purpose of this test is to verify that the markings will not become illegible on the component parts when subjected to solvents.

1.2.2 Test Method/Specification:

1.2.3 Appearance Inspection:
Appearance inspection performed before and after test.

1.2.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 2 PCS (11#, 12#)
Appearance Inspection: No visual damage was found on samples before test.
See Photo 1.2A.

1.2.5 Test Procedure:
Lab Environmental Conditions: Ambient temperature: 25±3ºC, Relative humidity: 55±20%RH.

1.2.6 Test Result(s):
Standard’s failure criteria:
After subjection to the test, evidence of damage to the device and any specified markings which are missing in whole or in part, faded, smeared, blurred, or shifted (dislodged) to the extent that they cannot be readily identified from a distance of at least 15.0 cm (6 inches) with normal room lighting and without the aid of magnification or with a viewer having a magnification no greater than 3X shall constitute a failure.

Appearance Inspection: No visual damage was found on samples after test.
See Photo 1.2B.

<table>
<thead>
<tr>
<th>Sample Item</th>
<th>Sample No.</th>
<th>Appearance after test</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>MABA 009600-CF48A0</td>
<td>11#</td>
<td>No visible damage</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>12#</td>
<td>No visible damage</td>
<td>Pass</td>
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</table>
1.3 Terminal Fatigue Testing:


1.3.1 Test Purpose:
This test is designed to check the capabilities of the device solder pads to withstand a
delamination (peel) stress of specified tension and time.

1.3.2 Test Method/Specification:
Refer to Mil-STD-883G Method 2004.5 condition D.
Test Condition:
- A tension of 0.227 kg (8 ounces), unless otherwise specified, shall be applied,
  without shock, to each lead to be tested in a direction parallel to the
  axis of the lead and maintained for 30 seconds minimum.

1.3.3 Appearance Inspection:
Appearance inspection performed before and after test.

1.3.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 5 PCS (160#~164#)
Appearance Inspection: No visual damage was found on samples before test.
See Photo 1.3B.

1.3.5 Test Procedure:

Test Equipment:

Name: Joint Strength Tester
Brand: DAGE
Model: 4000 Series TPXY

Photo 1.3A: Samples under Test

Lab Environmental Conditions: Ambient temperature: 25±3°C, Relative humidity: 55±20%RH.

1.3.6 Test Result(s):
Standard’s failure criteria:
When examined using 10X magnification after removal of the stress, any evidence of breakage,
loosening, or relative motion between the lead (terminal) and the device body shall be considered a
failure. When a seal test in accordance with method 1014 is conducted as a post test measurement
following the lead integrity test(s), meniscus cracks shall not be cause for rejection of devices which
pass the seal test.
<table>
<thead>
<tr>
<th>Sample Item</th>
<th>Sample No.</th>
<th>Appearance after test</th>
<th>Conclusion</th>
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<tbody>
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<td>160#</td>
<td>No visible damage</td>
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<td>161#</td>
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<td>162#</td>
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<td></td>
<td>163#</td>
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</tr>
<tr>
<td></td>
<td>164#</td>
<td>No visible damage</td>
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</table>

Photo 1.3B: Samples Before Test

Photo 1.3C: Sample After Test
Test Group 2

2.1 Steam Age Test:


2.1.1 Test Purpose:
The test aim is to verify the samples' ability to resist the environment conditions.

2.1.2 Test Method/Specification:
Refer to client’s requirements.
  - Test Temperature: 35°C
  - Test Humidity: 95%RH
  - Test Duration: 168hours

2.1.3 Appearance Inspection:
Appearance inspection performed before and after test.

2.1.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 10 PCS (28# - 37#)
Appearance Inspection: No visual damage was found on samples before test. See Photo 2.1B.

2.1.5 Test Procedure:

Test Equipment:

*Name:* Temp & Humidity Chamber

*Model:* ETH-B0-100

*Equipment No.:* POLY-I-242

Lab Environmental Conditions: Ambient temperature: 25±3°C, Relative humidity: 55±20%RH

2.1.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test. See Photo 2.1C.
2.2 Bake Test:


2.2.1 Test Purpose:
The test aim is to verify the samples’ ability to resist the environment conditions.

2.2.2 Test Method/Specification:
Refer to client’s requirements.
- Test Temperature: 150ºC
- Test Duration: 100 hours

2.2.3 Appearance Inspection:
Appearance inspection performed before and after test.

2.2.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 10 PCS (18# - 27#)
Appearance Inspection: No visual damage was found on samples before test. See Photo 2.2B.

2.2.5 Test Procedure:
Test Equipment:

Name: Thermal Shock Chamber
Model: TS300
Equipment No.: SZREL-010

Lab Environmental Conditions: Ambient temperature: 25±3ºc, Relative humidity: 55±20%RH

2.2.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test. See Photo 2.2C

Photo 2.2B Samples Before Test
Photo 2.2C Samples After Test
2.3 Solderability Test:

2.3.1 Test Purpose:
The purpose of this test is to verify the solderability of the samples subjected to the steam age and bake testing outlined in sections 2.1 & 2.2.

2.3.2 Test Method/Specification:
- Dip and Look solderability Test.
- Solder Temperature 245ºC ± 5 ºC
- Solder: SN60
- Immersion rate: 1” per second ± 0.25” per second
- Dwell Time: 5 seconds ± 0.5 second.

2.3.3 Appearance Inspection:
Appearance inspection performed before and after test.

2.3.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity:
10 PCS after Steam age test.
10PCS after Bake test.

Appearance Inspection: No visual damage was found on samples before test. See Photo 2.3A.

2.3.5 Test Result(s):
Appearance Check: Samples checked using magnification of 10-15x.
All samples meet the criteria for acceptable solderability.
The solder coverage is >95%
See Photo 2.3B
Test Group 3:

3.1: High Temperature Life Stabilization Bake Test:


3.1.1 Test Purpose:
The purpose of this test is to determine the effect on microelectronic devices of storage at elevated temperatures without electrical stress applied.

3.1.2 Test Method/Specification:
Refer to Mil-STD-883G Method 1008.2 condition A.
- Test Temperature: 100°C
- Test Duration: 500 hours

3.1.3 Appearance Inspection:
Appearance inspection performed before and after test.

3.1.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 76 PCS
Appearance Inspection: No visual damage was found on samples before test. See Photo 3.1B.

3.1.5 Test Procedure:

Test Equipment:

Name: Ramp Temperature Cycling Chamber
Model: WK-800/70/25
Equipment No.: SZREL-009

Lab Environmental Conditions: Ambient temperature: 25±3°C, Relative humidity: 55±20%RH

3.1.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test. See Photo 3.1C.

3.2: Thermal Shock Test:

3.2.1 Test Purpose:
The purpose of this test is to determine the resistance of the part to sudden exposure to extreme changes in temperature and the effect of alternate exposures to these extremes.

3.2.2 Test Method/Specification:
Refer to Mil-STD-883G Method 1011.9 condition A.

- Low Temperature: 0°C.
- High Temperature: 100 °C.
- Dwell Time: 10 minutes.
- Test Cycles: 100.
- Total duration: about 34 hours.

3.2.3 Appearance Inspection:
Appearance inspection performed before and after test.

3.2.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 76 PCS (after Hi temp Life Stabilization Bake Test).
Appearance Inspection: No visual damage was found on samples before test. See Photo 3.2C.

3.2.5 Test Procedure:
Test Equipment:

- Name: Thermal Shock Chamber
- Model: TS300
- Equipment No.: SZREL-010

Lab Environmental Conditions: Ambient temperature: 25±3°C, Relative humidity: 55±20%RH

3.2.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test. See Photo 3.2D.
3.3: Functional Test:

3.3.1 Initial Functional Test Results
The 76 units were functionally tested for Insertion loss before being subjected to High Temperature Life Stabilization Bake and Thermal Shock outlined in sections 3.1 & 3.2. All 76 units passed to specification. The initial test results are plotted in Figure 3.3A below.

![Figure 3.3A – Test Plots before Temperature Testing.](image)

3.3.2 Functional Test Results After Temperature testing
The 76 units were functionally re-tested after High Temperature Life Stabilization Bake and Thermal Shock. All 76 units continue to pass specification. The test results after Temperature testing are plotted in Figure 3.3B below.

![Figure 3.3B – Test Plots after Temperature Testing.](image)
Test Group 4:

4.1 Convection Oven Profile:

4.1.1 Test Purpose:
The purpose of this test is to determine the resistance of the part to high temperature experienced during Convection Oven reflow.

4.1.2 Test Method/Specification:
Refer to client’s reflow requirements.
- Test Temperature: 230ºC
- Test Duration: 30 seconds.
See Figure 4.1A

Figure 4.1A-Reflow Profile

4.1.3 Appearance Inspection:
Appearance inspection performed before and after test.

4.1.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 10 PCS
Appearance Inspection:
No visual damage was found on samples before test.
See Photo 4.1B.

4.1.5 Test Procedure:
Test Equipment:
7 Zone Convection Reflow Oven.
4.1.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test. See Photo 4.1C.

![Photo 4.1B Samples Before Test](image1) ![Photo 4.1C Samples After Test](image2)

4.2: Functional Test After Reflow:

4.2.1 Functional Test Results after Convection Reflow
The 10 finished good units were functionally tested for Insertion Loss after the Convection oven reflow outlined in section 4.1.

All 10 units pass functional specification after reflow. The test results after Convection oven reflow are plotted in Figure 4.2A below.

![Figure 4.2A – Test Plots after Reflow.](image3)
Test Group 5:

5.1 Salt Atmosphere Test:

5.1.1 Test Purpose:
This test provides a controlled corrosive environment which has been utilized to produce relative corrosion resistance information for specimens of metals and coated metals exposed in a given test chamber.

5.1.2 Test Method/Specification:
Refer to Mil-STD-883G Method 1009.8 condition A.
- Concentration of salt solution: 0.5%~3.0% NaCl (m/m)
- Chamber temperature: 35ºC
- PH of salt solution at (35±2) ºC: 6.5~7.2
- Exposure period: 24h

5.1.3 Appearance Inspection:
Appearance inspection performed before and after test.

5.1.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 5 PCS
Appearance Inspection: No visual damage was found on samples before test. See Photo 5.1A.

5.1.5 Test Procedure:
Test Equipment:
Name: Salt Spray Chamber
Model: CEEC-YW-150
Equipment No.: 070042

Lab Environmental Conditions: Ambient temperature: 25±3ºC, Relative humidity: 55±20%RH

5.1.6 Test Result(s):
Standard’s failure criteria:
  a) Corrosion defects over more than 5 percent of the area of the finish or base metal of any package element other than leads such as lid, cap, or case.
  b) Leads missing, broken, or partially separated.
  c) Specified markings, which are missing in whole or in part, faded, smeared, blurred, shifted, or dislodged to the extent that they are not legible.
Appearance Inspection: No visual damage was found on samples before test. See 5.1B

<table>
<thead>
<tr>
<th>Sample Item</th>
<th>Sample No.</th>
<th>Appearance after test</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>MABA 009600-CF48A0</td>
<td>114#</td>
<td>No visible damage</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>115#</td>
<td>No visible damage</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>116#</td>
<td>No visible damage</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>117#</td>
<td>No visible damage</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>118#</td>
<td>No visible damage</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Photo 5.1A Sample Before Test.  Photo 5.1B Sample After Test.
Test Group 6:

6.1 Pressure Cooker Test:


6.1.1 Test Purpose:
This test is performed to evaluate the moisture resistance integrity of non-hermetic packaged solid state devices using moisture condensing or moisture saturated steam environments.

6.1.2 Test Method/Specification:
Refer to JESD22-A-102-C and client’s requirements.
- Vapor pressure: 15 PSI
- Test Temperature: 121ºC
- Test Duration: 96hours

6.1.3 Appearance Inspection:
Appearance inspection performed before and after test.

6.1.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 38 PCS
Appearance Inspection: No visual damage was found on samples before test.

6.1.5 Test Procedure:

Test Equipment:

Name: Pressure Cooker Tester
Brand: KSON
Model: PCT-S/S022

Lab Environmental Conditions: Ambient temperature: 25±3ºC, Relative humidity: 55±20%RH.

6.1.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test.
See Photo 6.1B.
6.2 Temp/Humidity Test:


6.2.1 Test Purpose:
This test is performed for the purpose of evaluating the reliability of non-hermetic packaged solid-state devices in humid environments.

6.2.2 Test Method/Specification:
Refer to JESD22-A-101-B and client’s requirements.
- Test Temperature: 85°C
- Test Humidity: 85%RH
- Test Duration: 500 hours

6.2.3 Appearance Inspection:
Appearance inspection performed before and after test.

6.2.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA-009600-CF48A0
Quantity: 38 PCS (after Pressure Cooker Test)
Appearance Inspection: No visual damage was found on samples before test. See Photo 6.2B.

6.2.5 Test Procedure:

Test Equipment:

Name: Triple Temp & Humidity Chamber
Brand: GIANT FORCE
Model: GTH-162TR-SP/MAA0605-012

Lab Environmental Conditions: Ambient temperature: 25±3°C, Relative humidity: 55±20%RH.

6.2.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test. See Photo 6.2C.
6.3: Functional Test:

6.3.1 Initial Functional Test Results:
The 38 units were functionally tested for Insertion loss before being subjected to Pressure Cooker and Temp/Humidity testing outlined in sections 6.1 & 6.2. All 38 units passed to specification. The initial test results are plotted in Figure 6.3A below.

![Figure 6.3A – Test Plots before Pressure Cooker and Temp/Humidity testing.](image)

6.3.2 Functional Test Results After Pressure & Humidity testing:
The 38 units were functionally re-tested after Pressure Cooker and Temp/Humidity testing. All 38 units continue to pass specification. The test results after Temperature testing are plotted in Figure 6.3B below.

![Figure 6.3B – Test Plots after Pressure Cooker and Temp/Humidity testing.](image)

Test Group 7:
7.1 Lead Material & plating:

7.1.1 Test Purpose:
Measurements performed to verify that the lead plating thickness and composition meet specification.

7.1.2 Test Method/Specification:
Refer to SOT carrier material drawing 1000025621-CTR000 for plating specification.

- Plating Composition:
  - Ni: 30 ±2%
  - Sn: 70±2%

7.1.3 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 3 PCS
Appearance Inspection: No visual damage was found on samples before test.

7.1.4 Test Procedure: XRF analysis.

7.1.5 Test Results:
Lead plating on all samples meet the required composition specifications. See Figure 7.1A

![Material Declaration Form](Photo 7.1A- Material Declaration form - Pin plating composition.)

**Test Group 8 & 9:**
8.1 Vibration:

*TTS Report Reference: WDZ0709—Section 1.*

8.1.1 Test Purpose:
This test is performed to evaluate the resistance of the part to vibration.

8.1.2 Test Method/Specification:
Refer to MIL-STD-202, Method 201, Condition A.
- Freq: 10Hz to 55Hz
- Displacement 1.524mm
- Swept Speed: 1min/cycle
- Orientation X,Y,Z axes
- Duration 2H/axis

8.1.3 Appearance Inspection:
Appearance inspection performed before and after test.

8.1.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 50 PCS
Appearance Inspection: No visual damage was found on samples before test.
See Photo 8.1C.

8.1.5 Test Procedure:

Test Equipment:

**Name:** Vibration System

**Model:** V850-440

*Photo: 8.1A – Units under vibration*
Lab Environmental Conditions: Ambient temperature: 25±3°C, Relative humidity: 55±20%RH.

8.1.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test. See Photo 8.1D.
8.2 Mechanical Shock:

*TTS Report Reference: WDZ0709 – Section 2.*

8.2.1 Test Purpose:
This test is performed to evaluate the resistance of the part to mechanical shock.

8.2.2 Test Method/Specification:
Refer to MIL-STD-202, Method 213B, Condition A
- Shock Wave Shape: Half Sine
- Acceleration: 50g
- Pulse duration: 11ms
- Shock Times: 3 on each ±X, ±Y, ±Z,

8.2.3 Appearance Inspection:
Appearance inspection performed before and after test.

8.2.4 Sample(s) Inspection before Test:
Sample(s) Description: MABA 009600-CF48A0
Quantity: 50 PCS (after Vibration Test)
Appearance Inspection: No visual damage was found on samples before test.

8.2.5 Test Procedure:

Test Equipment:
- **Name:** Mechanical Shock Tester
- **Model:** DP-1200-60
- **Equipment No:** TTS-YQ-094

*Photo: 8.2A – Units under mechanical shock*
Lab Environmental Conditions: Ambient temperature: 25±3°C, Relative humidity: 55±20%RH.

8.2.6 Test Result(s):
Appearance Check: No visual damage was found on samples after test. See Photo 8.2C.
8.3: Functional Test:

8.3.1 Initial Functional Test Results:
The 50 units were functionally tested for Insertion loss before being subjected to Vibration & Mechanical Shock testing outlined in sections 8.1 & 8.2. All 50 units passed to specification.

The initial test results are plotted in Figure 8.3A below.

![Figure 8.3A – Test Plots before Vibration & Mechanical Shock](image)

8.3.2 Functional Test Results After Vibration & Mechanical Shock:
The 50 units were functionally re-tested after Vibration & Mechanical Shock testing. All 50 units continue to pass specification. The test results after Vibration & Mechanical Shock are plotted in Figure 8.3B below.

![Figure 8.3B – Test Plots after Vibration & Mechanical Shock testing](image)