# QUALIFICATION TEST REPROT

501-60015 Rev. 0

Product Specification : 108-60036 Rev. O
Reference Test Report No. : TR-94062
Date : 20 SEP 2004
Classification : UNRESTRICTED



| LTR | REVISION RECORD | DR | DATE |
|---|---|---|---|
| O | Released FB00-0268-04 | C.W | 20SEP 04 |

DIST

Prepared by PE: C.WANG
Reviewed by PE Manager: I.ENOMOTO
Approved by QA Manager: JAMES .LU

tyco Electronics
Tyco Electronics AMP Shanghai Ltd

NO: 501-60015 | REV: O | LOC: ES

PAGE 1 of 7

TITLE: AMP Connector, Amplimite*.050 Series I BTB Connector Lead Free

## 1. Introduction

1.1 Testing was performed on the AMPLIMAITE .050 Series (I) Board-to-Board Connector to determine if it meets the requirements of AMP Specification, 108-60036, Rev. O.

### 1.2 Scope

This report covers the electrical, mechanical and environmental performance requirements of the AMP LIMAITE .050 Series (I) Board-to-Board Connector.

### 1.3 Conclusion

The AMPLIMITE .050 Series (I) Board-to-Board Connector meets the electrical, mechanical and environmental performance requirements of Product Specification, 108-60036. Rev. O.

### 1.4 Product Description

These AMPLIMAITE* .050 Series I Connectors have been developed to meat ever-growing requirements for miniaturization, high density packing and cost reduction of electric equipment, Their compact design with contacts on an extremely close 1.27 mm centreline certainly satisfies industry needs. Both board-mounted plug and cap assemblies or available in two configurations, horizontal mounting and vertical mounting. By combining these four style assemblies, a variety of interconnection between printed Circuit boards are possible, such as horizontal connection, parallel connection and right angle connection as Applications require.

### 1.5 Test Samples

Samples were taken randomly from current production. The following samples were used:

| Part Number | Description |
|---|---|
| 2-5173277-5 | 34 Pos. Horizontal Plug Ass'y |
| 2-5173277-6 | 48 Pos. Horizontal Plug Ass'y |
| 2-5173277-8 | 96 Pos. Horizontal Plug Ass'y |
| 2-5173280-5 | 34 Pos. Vertical Cap Ass'y |
| 2-5173280-6 | 48 Pos. Vertical Cap Ass'y |
| 2-5173280-8 | 96 Pos. Vertical Cap Ass'y |

Fig. 1

## 2. Test Contents

| No. | Test Items | Requirements | Judgement |
|---|---|---|---|
| 2.1 | Confirmation of Product | Inspect visually per applicable Quality Inspection Plan (QIP) | Accept-able |
| | | Electrical Requirements | |
| 2.2 | Termination Resistance (Low Level) | Initial; 25 mΩ Max. (Horizontal-to-Horizontal and Horizontal-to-Vertical)<br>15 mΩ Max. (Vertical-to-Vertical)<br>Final; 50 mΩ Max. (Horizontal-to-Horizontal and Horizontal-to-Vertical)<br>30 mΩ Max. (Vertical-to-Vertical) | Accept-able |
| 2.3 | Dielectric withstanding Voltage | Initial/Final 500 kV AC, (50 Hz), 1 minute<br>No abnormality such as insulation break-down or flashover shall take place during the test. | Accept-able |
| 2.4 | Insulation Resistance | Initial; 1000 MΩ Min.<br>Final; 500 MΩ Min. | Accept-able |
| 2.5 | Temperature Rising | 30˚C Max.<br>Test Current 1 A | Accept-able |

Fig. 2 (to be continued)

| No. | Test Items | Requirements | Judge ment |
|---|---|---|---|
| Mechanical Requirements | | | |
| 2.6 | Vibration<br>(High Frequency) | 10-500-10 Hz/15 minutes, (10G),<br>Amplitude: 1.52 mm, X, Y& Z Axes: 3 hours.<br>No electrical discontinuity greater than 1 µsec. shall occur. | Accep table |
| 2.7 | Physical Shock | No electrical discontinuity greater than 1 µsec. allowed.<br>(50G). Halfsine Wave XYZ 3 drops | Accep table |
| 2.8 | Connector Mating Force | (80 gf) Max. per contact<br>Head Operation Speed: 100 mm/minute | Accep table |
| 2.9 | Connector Unmating Force | (20 gf) Min. per contact<br>Head Operation Speed: 100mm/minute | Accep table |
| Environmental Requirements | | | |
| 2.10 | Durability<br>(Repeated Mating/Unmating ) | Repeated mating/unmating for 100 cycles at a rate of 100 mm/min. | Accep table |
| 2.11 | Resistance to Soldering Heat | Solder Temperature 260±5°C, to solder bath for 3 seconds. No abnormalities were found. | Accep table |
| 2.12 | Thermal Shock | -55°C~85°C, 5 cycles<br>Termination Resistance; To meet 2.2. | Accep table |
| 2.13 | Temperature-Humidity Cycling | 25°C~65°C, 90~95% RH, 10 Cycle<br>To meet 2.2, 2.3,2.4. | Accep table |
| 2.14 | Industrical SO2 Gas | 10±3 ppm, Room Temperature 90% RH 48 Hrs.<br>Termination Resistance; To meet 2.2. | Accep table |
| 2.15 | Temperature Life | 85±2°C, 250 Hrs.<br>Termination Resistance; To meet 2.2. | Accep table |

Fig. 2 (End)

2. Product Qualification Test Sequence

| Test Items | Test Group | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | Test Sequence (a) | | | | | | | | |
| Confirmation of Product | 1,7 | 1,5 | 1,5 | 1,5 | 1,5 | 1,6 | 1,7 | 1,3 | 1,3 |
| Termination Resistance (Low Level) | 4,6 | 2,4 | 2,4 | 2,4 | 2,4 | 2,5 | | | |
| Dielectric withstanding Voltage | | | | | | | 3,6 | | |
| Insulation Resistance | | | | | | | 2,5 | | |
| Temperature Rising | | | | | | | | 2 | |
| Vibration (High Frequency) | | | | | | 3 | | | |
| Physical Shock | | | | | | 4 | | | |
| Connector Mating Force | 2 | | | | | | | | |
| Connector Unmating Force | 3 | | | | | | | | |
| Durability (Repeated Mating/Unmating) | 5 | | | | | | | | |
| Resistance to Soldering Heat | | | | | | | | | 2 |
| Thermal Shock | | | 3 | | | | | | |
| Temperature-Humidity Cycling | | 3 | | | | | 4 | | |
| Industrical SO2 Gas | | | | | 3 | | | | |
| Temperature Life (Heat Aging) | | | | 3 | | | | | |

(a) Numbers indicate the sequence in which the tests are performed.

## 3. Test Result

| Test Group | Test Items | | Timing | Unit | Result | | | | | | Spec. | Judge-ment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Set | N | Max. | Min. | Ave. | S | | |
| 1 | Mating/ Unmating Force | 34P | Mating | Kg | 5 | 5 | 2.0 | 1.9 | 1.97 | 0.045 | 80g Max. /1P | Accept |
| | | | Unmat-ing | Kg | 5 | 5 | 1.7 | 1.5 | 1.55 | 0.062 | 20g Max. /1P | |
| | | 48P | Mating | Kg | 5 | 5 | 3.4 | 2.5 | 2.98 | 0.320 | 80g Max. /1P | |
| | | | Unmat-ing | Kg | 5 | 5 | 2.8 | 2.2 | 2.42 | 0.239 | 20g Max. /1P | |
| | | 96P | Mating | Kg | 5 | 5 | 6.8 | 5.2 | 6.30 | 0.700 | 80g Max. /1P | |
| | | | Unmat-ing | Kg | 5 | 5 | 5.5 | 4.2 | 5.10 | 0.590 | 20g Max. /1P | |
| 2 | Durability (Repeated Mating/Unmating) | | INT | MΩ | 5 | 96 | 11.02 | 7.60 | 9.09 | 0.269 | 25 Max. | |
| | | | FIN | MΩ | 5 | 96 | 10.78 | 7.58 | 9.05 | 0.241 | 50 Max. | |
| 3 | Temperature-Humidity Cyling | | INT | MΩ | 3 | 96 | 10.21 | 7.49 | 8.78 | 0.204 | 25 Max. | |
| | | | FIN | MΩ | 3 | 96 | 10.21 | 7.39 | 8.69 | 0.192 | 50 Max. | |
| 4 | Thermal Shock | | INT | MΩ | 3 | 96 | 10.28 | 7.72 | 9.04 | 0.183 | 25 Max. | |
| | | | FIN | MΩ | 3 | 96 | 10.46 | 7.56 | 9.03 | 0.204 | 50 Max. | |
| 5 | Temperature Life | | INT | MΩ | 3 | 96 | 9.73 | 7.39 | 8.61 | 0.179 | 25 Max. | |
| | | | FIN | MΩ | 3 | 96 | 10.45 | 7.51 | 8.81 | 0.264 | 50 Max. | |
| 6 | Industrical Gas Exposure | | INT | MΩ | 3 | 96 | 11.34 | 7.75 | 9.34 | 0.242 | 25 Max. | |
| | | | FIN | MΩ | 3 | 96 | 12.55 | 7.75 | 9.44 | 0.440 | 50 Max. | |
| 7 | Vibration, Physical Shock | | | MΩ | 3 | 96 | 10.27 | 7.70 | 9.09 | 0.290 | 25 Max. | |
| | | | | MΩ | 3 | 96 | 10.25 | 7.37 | 8.79 | 0.244 | 50 Max. | |
| | | | Vibration | | 3 | No electrical discontinuity greater than 1 microsecond took place suring the test. | | | | | 1μ Max. | |
| | | | Physical Shock | | 3 | No electrical discontinuity greater than 1 microsecond took place suring the test. | | | | | 1μ Max. | Accept |

(1/2)

| Test Group | Test Items | Timing | Unit | Result | | | | | | Spec. | Judgment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Set | N | Max. | Min. | Ave. | S | | Acceptable |
| 8 | Insulation Resistance | INT | MΩ | 3 | 96 | $1X10^7$ | $8.96X10^6$ | | | $1X10^3$ | |
| | | FIN | MΩ | 3 | 96 | $1X10^7$ | $3.22X10^7$ | | | | |
| | Dielectric Strength | INT | | 3 | No abnormalities were evident. | | | | | No electrical abnormalities such as short circuit and flashover shall be evident. | |
| | | FIN | | 3 | | | | | | | |
| 9 | Temperature Rising | | °C | 1 | 6 | 20.9 | 16.9 | 19.56 | 2.07 | 30Max. | |
| 10 | Resistance to Soldering Heat | | | 3 | No abnormalities were evident. | | | | | No abnormalities shall be evident | Acceptable |

(2/2)