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|---|--|---|-------------------|
| NUMBER GS-12 -1298 | CATEGORY PRODUCT SPECIFICATION | Amphenol ICC | |
| TITLE 0.5mm Board to board® Product Specification | | PAGE 1 of 7 | REVISION C |
| | | GUARDIAN (VERIFIED BY) Yuan-Yuan Bao | DATE 12/4/2019 |
| | | APPROVED BY Tim Yao | |
| | | CLASSIFICATION : UNRESTRICTED | |

1.0 OBJECTIVE

This specification defines the performance, test, quality and reliability requirements of 0.5mm pitch Board to board® product.

2.0 SCOPE

This specification is applicable to the termination characteristics of 0.5mm pitch Board to board® family of products, which provides electrical connections between parallel mounted boards.

3.0 GENERAL

This document is composed of the following sections:

| PARAGRAPH | TITLE |
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| 3.0 | GENERAL |
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4.0 APPLICABLE DOCUMENTS

4.1 Standards and Specifications

EIA 364: Electronic connector/socket test procedures including environmental classifications.

5.0 REQUIREMENTS

5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

5.2 Material

5.2.1 Housing: All housing materials shall be high temperature plastic, rated flame retardant 94V-0 in accordance with UL-94.

5.2.2 Receptacle Terminal: Copper alloy.

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5.2.3 Plug Terminal: Copper alloy.

5.2.4 Hold Down: Copper alloy.

5.3 Finish

The finish for applicable components shall be specified in product drawings with plating area, plating material and plating thickness.

5.4 The thickness of the PCB solder paste

Below data is FCI recommended dimension, For some customer's process are different (such as, PCB thickness, solder temperature, solder paste type, etc.), customer can according to the actual application environment adjust the solder paste thickness. using solder paste thickness 0.15mm Min.

5.5 Design and Construction

The connector shall be a multi-piece assembly having two rows of contacts with surface mount solder-tail terminations for installation on printed wiring board.

5.6 Rating

| | |
|--------------------|---------------|
| Voltage Rating | 100V AC |
| Current Rating | 0.5A Max. |
| Temperature Rating | -40°C ~ 125°C |

6.0 PERFORMANCE

Unless otherwise specified, the performance of connectors given in the attached list shall satisfy the values specified in Table 6.1. The performance test shall follow the test method and the test sequence given in Table 6.2 & 6.3 under the environmental conditions listed below. All connectors to be tested shall be free of defects such as burr, flaw, void, blister etc. which will affect the life and application of connectors.

- Temperature ----- 15°C ~ 35°C
- Humidity ----- 25% ~ 85%
- Pressure ----- 86 ~ 106KP

6.1 Performance

TABLE 6.1

| | Test Item | Requirements |
|-------|--------------------|---|
| 6.1.1 | Visual Examination | Product shall meet the requirements of product drawings. Visual Examination performed under 10X |

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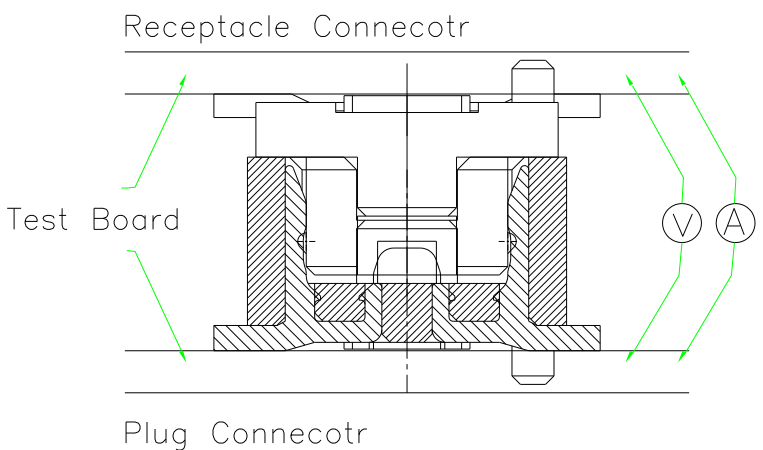
| | | |
|-----------------------------------|--------------------------------------|---|
| | | magnification. Parts should be free from blistering, discoloration, cracks, etc |
| Electric Requirements | | |
| 6.1.2 | Low Level Contact Resistance(LLCR) | Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum |
| 6.1.3 | Dielectric Withstanding Voltage | 150 VAC,1 Minutes ,No evidence of arc-cover, insulation breakdown or leakage current in excess of 0.5 mA. |
| 6.1.4 | Insulation Resistance | 500 MΩ Minimum |
| 6.1.5 | Current Rating | Temperature rise above ambient shall not exceed 30°C with all contacts powered at 0.5A |
| Mechanical Requirements | | |
| 6.1.6 | Vibration | No discontinuity greater than 1 microsecond |
| 6.1.7 | Mating Force | 110132797/10132798: 1.47N Maximum per 10144851/10144852: 0.8N Maximum per contact 10156000/10156001: 0.8N Maximum per contact |
| 6.1.8 | Un-mating Force | 10132797/10132798: 0.15N Minimum per contact. 10144851/10144852:0.3N Max. 0.15N Min. per contact 10156000/10156001:0.3N Max. 0.15N Min. per contact |
| 6.1.9 | Normal Force | 0.25N Min. Per mated Pair |
| 6.1.10 | Durability | Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum |
| 6.1.11 | Solder-ability | Solder coverage ----- 95% Minimum |
| 6.1.12 | Resistance to Solder Heat | No evidence of physical or mechanical damage. |
| 6.1.13 | Contact Retention Force | 0.98N Minimum per contact. |
| Environmental Requirements | | |
| 6.1.14 | Thermal Shock | Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum |
| 6.1.15 | Temperature Life | Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum |
| 6.1.16 | Cyclical Humidity & Temperature | Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum |
| 6.1.17 | Salt Spray | Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum |
| 6.1.18 | MFG Test (10144851/10144852 ONLY) | Initial ----- 30 mΩ Maximum After test ----- 50 mΩ Maximum |

6.2 Test Methods

TABLE 6.2

| | Test Item | Test Methods |
|-------|--------------------|---|
| 6.2.1 | Visual Examination | Visually and functionally inspected. Under 10X magnification. |

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|-------|------------------------------------|---|
| 6.2.2 | Low Level Contact Resistance(LLCR) |  <p style="text-align: center;">Figure 1</p> <p>EIA-364-23 Test method of connection as Figure 1. Test current ----- 100 mA Maximum Open circuit ----- 20 mV Maximum Number of readings ----- 100 separable contact interface minimum or 3 connectors whichever is greater</p> |
| 6.2.3 | Dielectric Withstanding Voltage | <p>EIA-364-20 Test voltage ----- 150 Vrms AC Duration ----- 1 minute Current----- 0.5 mA Max Measure between adjacent terminals of mated connectors. Number of readings ----- 30 (10 readings per connector set)</p> |
| 6.2.4 | Insulation Resistance | <p>MIL-STD-202 Method 302 Test voltage ----- 100 V DC Measure between adjacent terminals of mated connectors. Number of readings ----- 30 (10 readings per connector set)</p> |
| 6.2.5 | Current Rating | <p>EIA-364-70 25°C Ambient still -----air All contact powered -----0.5A</p> |
| 6.2.6 | Vibration | <p>EIA-364-28 Frequency ----- 10-55-10 Hz Amplitude-----1.5mm Current----- 10 mA Max Duration ----- 2 hours in each of three mutually perpendicular axes (6 hours total).</p> |
| 6.2.7 | Mating Force | <p>EIA-364-13 Operating speed ----- 25 mm/minute No lubrication and utilize free-floating fixture. Number of connectors ----- 5 mated pair</p> |
| 6.2.8 | Un-mating Force | <p>EIA-364-13 Operating speed ----- 25 mm/minute No lubrication and utilize free-floating fixture. Number of connectors ----- 5 mated pair</p> |
| 6.2.9 | Norma Force | <p>EIA-364-04A Method A</p> |

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|--------|---|---|
| | | Speed: 1mm/Min. Displacement: 0.075mm |
| 6.2.10 | Durability | EIA-364-09 Operating speed ----- 25 mm/minute Number of cycles ----- 50 |
| 6.2.11 | Solder-ability | EIA-364-52 For Non- leaded: Solder temperature ----- 230 ± 5°C. Dip duration =3 sec Criteria: 95% coverage min |
| 6.2.12 | Resistance to Solder Heat | EIA-364-56 For Non- leaded: Peak temperature ----- 260 ± 5°C. Duration ----- 60 seconds No damage |
| 6.2.13 | Contact Retention Force | Operating speed ----- 25 mm/minute |
| 6.2.14 | Thermal Shock | EIA-364-32 Method A Temperature range ----- -40 +0/-5°C to 125 +5/-0°C Time at temperature extremes ----- 30 minutes Test Duration (A-4) ----- 10 cycles Transfer Time ----- 5 minutes maximum |
| 6.2.15 | Temperature Life | EIA-364-17 Subject product to 85±2°C for 96 hours |
| 6.2.16 | Cyclical Humidity & Temperature | <p>EIA-364-31, Method III (omit step 7b) Temperature and humidity are listed figure 2. Duration ----- 10 cycles.</p> |
| 6.2.17 | Salt Spray | EIA-364-26 5±1% salt concentration 48±4 hours 35±2°C |
| 6.2.18 | Mixed Flowing Gas (MFG) (10144851/10144852 ONLY) | EIA-364-65B Class IIIa (Mated 10Days) |

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| Table 1 - Environmental classes | | | | | | |
|---------------------------------|-----------------------------------|-----------------|--------------------|-----------------|------------------|-----------------|
| Class | Relative humidity, % | Temperature, °C | Concentration, ppb | | | |
| | | | Cl ₂ | NO ₂ | H ₂ S | SO ₂ |
| I | Discontinued as a test procedure. | | | | | |
| II | Superseded by class IIA | | | | | |
| IIA | 70 ± 2 | 30 ± 1 | 10 ± 3 | 200 ± 50 | 10 ± 5 | 100 ± 20 |
| III | Superseded by class IIIA | | | | | |
| IIIA | 70 ± 2 | 30 ± 1 | 20 ± 5 | 200 ± 50 | 100 ± 20 | 200 ± 50 |
| IV | 75 ± 2 | 40 ± 2 | 30 ± 5 | 200 ± 50 | 200 ± 20 | N/A |

7.0 QUALIFICATION TEST MATRIX

| TEST ITEM | TEST GROUP | | | | | | | | | | | |
|-------------------------------------|------------|-----|-----|-----|-----|-----|-------|-----|-------|-----|-----|-----|
| | Section | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9a | 9b | 10 |
| Visual Examination | 6.2.1 | 1,9 | 1,5 | 1,3 | 1,3 | 1,3 | 1,7 | 1,5 | 1,10 | 1,5 | 1,5 | 1,3 |
| Low Level Contact Resistance (LLCR) | 6.2.2 | 2,8 | 2,4 | | | | 2,4,6 | 2,4 | | 2,4 | 2,4 | |
| Dielectric Withstanding Voltage | 6.2.3 | | | | | | | | 3,6,9 | | | |
| Insulation Resistance | 6.2.4 | | | | | | | | 2,5,8 | | | |
| Current Rating | 6.2.5 | | | | | | | | | | | 2 |
| Vibration | 6.2.6 | | 3 | | | | | | | | | |
| Mating Force | 6.2.7 | 3,6 | | | | | | | | | | |
| Un-mating Force | 6.2.8 | 4,7 | | | | | | | | | | |
| Normal Force | 6.2.9 | | | | | | | | | | | |
| Durability | 6.2.10 | 5 | | | | | | | | | | |
| Solder-ability | 6.2.11 | | | 2 | | | | | | | | |
| Resistance To Solder Heat | 6.2.12 | | | | 2 | | | | | | | |
| Contact Retention Force | 6.2.13 | | | | | 2 | | | | | | |
| Thermal Shock | 6.2.14 | | | | | | 3 | | 4 | | | |
| Temperature Life | 6.2.15 | | | | | | | 3 | | | | |
| Cyclical Humidity & Temperature | 6.2.16 | | | | | | 5 | | 7 | | | |
| Salty Spray | 6.2.17 | | | | | | | | | 3 | | |
| Mixed Flowing Gas | 6.2.18 | | | | | | | | | | 3 | |
| Number of Samples | | 5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 5 | 5 | 3 |

8.0 RECORD RETENTION

| REV | PAGES | DESCRIPTION | EC # | DATE |
|-----|-------|-------------|------|------|
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|---|-----|---|---------------|-----------|
| A | ALL | NEW RELEAS | - | 19 Mar 15 |
| B | ALL | MAJOR RELEASES | ELX-N-20800 | 30 Apr 15 |
| C | ALL | ADD CURRENT RATING / MFG CHANGE THE TEST SPECIFICATION FROM MIL TO EIA | ELX-N-35539-1 | 04 Dec 19 |