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| NUMBER GS-12-625 | TYPE Product Specification |  | |
| TITLE Terminal block- Plug and Socket, Fixed Plug | | PAGE 1 of 8 | REVISION D |
| | | AUTHORIZED BY Jason Hsu | DATE Nov. 11 th , 2009 |
| | | CLASSIFICATION Unrestricted | |

1.0 SCOPE

This specification covers performance, test, and quality requirement for terminal block pluggable plug, socket and fixed plug. Centerline spacing are 3.50, 3.81, 5.00, 5.08, and 7.62mm.

2.0 APPLICABLE DOCUMENTS

2.1 Drawing


| Pitch | Type | FCI series name | Drawing number | FCI part number | Poles |
|--------|--------|-----------------|----------------|--------------------|--------|
| 3.50mm | Plug | 01-350 | 20020004 | 20020004-CxxxxxxLF | 02~24p |
| | | 01-350 | 20020000 | 20020000-CxxxxxxLF | 02~24p |
| | | 02-350 | 20020009 | 20020009-CxxxxxxLF | 02~24p |
| | | 02-350 | 20020008 | 20020008-CxxxxxxLF | 02~24p |
| | Socket | 06-350 | 20020107 | 20020107-CxxxxxxLF | 02~24p |
| | | 06-350 | 20020108 | 20020108-CxxxxxxLF | 02~24p |
| | | 06-350 | 20020111 | 20020111-CxxxxxxLF | 02~24p |
| 3.81mm | Plug | 01-381 | 20020004 | 20020004-DxxxxxxLF | 02~24p |
| | | 01-381 | 20020000 | 20020000-DxxxxxxLF | 02~24p |
| | | 02-381 | 20020009 | 20020009-DxxxxxxLF | 02~24p |
| | | 02-381 | 20020008 | 20020008-DxxxxxxLF | 02~24p |
| | Socket | 06-381 | 20020107 | 20020107-DxxxxxxLF | 02~24p |
| | | 06-381 | 20020108 | 20020108-DxxxxxxLF | 02~24p |
| | | 06-381 | 20020111 | 20020111-DxxxxxxLF | 02~24p |
| 5.00mm | Plug | 01-500 | 20020006 | 20020006-GxxxxxxLF | 02~24p |
| | | 01-500 | 20020003 | 20020003-GxxxxxxLF | 02~24p |
| | | 02-500 | 20020009 | 20020009-GxxxxxxLF | 02~24p |
| | | 02-500 | 20020008 | 20020008-GxxxxxxLF | 02~24p |
| | Socket | 06-500 | 20020107 | 20020107-GxxxxxxLF | 02~24p |
| | | 06-500 | 20020108 | 20020108-GxxxxxxLF | 02~24p |
| | | 06-500 | 20020111 | 20020111-GxxxxxxLF | 02~24p |
| 5.08mm | Plug | 01-508 | 20020003 | 20020003-HxxxxxxLF | 02~24p |
| | | 01-508 | 20020006 | 20020006-HxxxxxxLF | 02~24p |
| | | 02-508 | 20020009 | 20020009-HxxxxxxLF | 02~24p |
| | | 06-508 | 20020108 | 20020108-HxxxxxxLF | 02~24p |
| | | 06-508 | 20020111 | 20020111-HxxxxxxLF | 02~24p |

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3.0 REQUIREMENTS

3.1 Design and Construction

Connectors shall be of the design, construction and physical dimensions specified on the applicable product drawings and shall consider the requirements mentioned on IEC 998-2-1 paragraph 10, relevant to clamping units.

3.2 Materials, Dimensions, Plating and Markings

All of these items are described on the individual drawings.

3.3 Ratings

Voltage rating, current rating, operation temperature and rated screw torque are described on the individual drawings.

3.4 Performance and Test Description

Product is designed to meet the electrical, mechanical and environment performance requirement list in section 3.5.

Unless otherwise specified, all tests shall be performed at ambient environmental conditions per IEC 160.

3.5 Test Requirements and Procedures Summary


| 3.5.1 ELECTRICAL REQUIREMENTS | | |
|--|--|---|
| DESCRIPTION | TEST CONDITION | REQUIREMENT |
| 3.5.1.1 Product Examination | Visual, dimensional and functional | Meet requirements of product drawing. |
| 3.5.1.2 Low Level Contact Resistance | Mated connectors, apply a maximum voltage of 0.2 V between wire pole and terminated terminal. | 20 milliohms maximum. |
| 3.5.1.3 Insulation resistance | IEC 60998-1, paragraph 13e 13.3. Initial 1000Volts DC, or 500Volts DC after environment test applied between two adjacent contact with measurements made 1 minute after the application of the voltage. | 1) 5000 MΩ Min. initial. 2) 5 MΩ minimum after environment test. |
| 3.5.1.4 Dielectric Withstanding Voltage | IEC 60998-1, paragraph 13e 13.4. Apply 1.6K VAC, Test between adjacent contacts of connector assemblies. | No breakdown; Current leakage < 5 mA |

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| 3.5.1.5 Temperature rise VS current | UL 1059 Measurements are made when the specimen had reached thermal equilibrium at the rated current specified on individual drawing. | +30 °C Maximum |
|---|--|----------------|

| 3.5.2 MECHANICAL REQUIREMENTS | | | |
|--|---|--|----------------------|
| DESCRIPTION | TEST CONDITION | REQUIREMENT | Applicable |
| 3.5.2.1 Mating force | Mate connector and measure the force required. | 5.5N Maximum. (Per mating pole.) | Plug/socket |
| 3.5.2.2 Unmating force | Unmate connector and measure the force required. | 1.0N Minimum. (Per unmating pole.) | Plug/socket |
| 3.5.2.3 Durability (mate/unmate) | After durability cycles, low level contact resistance shall be less than 20millionohm. | 200 Cycles | Plug/socket |
| 3.5.2.4 Wire Pull Strength | IEC 60998-2-1 paragraph 10.105, Subject connector to a pull force for 1 minute in the axis of tapping connector. Connector shall not slip out of the connecting device. | 10AWG: Min 80N 12AWG: Min 60N 16AWG: Min 30N 24AWG: Min 13N | Plug/Fixed plug |
| 3.5.2.5 Torque | UL1059 Apply the rated torque (refer to drawings) for wire attachment. | No visible crack | Plug/Fixed Plug |
| 3.5.2.6 Pin Retention | Force required to unload pin from the housing in the direction of plug entry. | Min 20N. | Socket |
| 3.5.2.7 Solder ability | Soldering time 5 second. (flux is applied) Soldering temperature: 250±10°C | 95% min of solder area and the plastics have not been melted | Fixed plug/Socket |

| 3.5.3 ENVIRONMENT REQUIREMENTS | | |
|---|--|--|
| DESCRIPTION | TEST CONDITION | REQUIREMENT |
| 3.5.3.1 Heat Resistance | IEC 60998-2-1, paragraph 12.1 Subject specimens to 115±2°C for 168 hours and shall be left alone for 1 to 2 hours in a room ambient for next examination/testing. | No cracks visible. No material becomes sticky. No material becomes greasy. Specimen shall not undergo any change impairing their further use. |
| 3.5.3.2 Cold resistance | IEC 60998-2-1, paragraph 12.1 Subject specimens to -40±2°C for 168 hours and shall be left alone for 1 to 2 hours in a room ambient for next examination/testing.. | |
| 3.5.3.3 Humidity | IEC 60998-1, paragraph 12.2. Subject specimens to 30±2°C, relative humidity 91%~95% for 48 hours and shall be left alone for 1 to 2 hours in a room ambient for next examination/testing... | |
| 3.5.3.4 Salt Spray | EIA-364-26B, condition A Salt concentration: 5%, temperature 32±2°C, 48hours. | |

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TABLE 1: QUALIFICATION TESTING SEQUENCE for Pluggable Plug

| TEST | PARA | Test Group | | | | | | | |
|-----------------------------------|--------------------|---------------|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H |
| | | Test Sequence | | | | | | | |
| Product examination | 3.5.1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| LLCR | 3.5.1.2 | 2 | | | | | | 3 | |
| Insulation Resistance | 3.5.1.3 | 3 | | | 3 | 3 | 3 | 4 | |
| Dielectric withstanding voltage | 3.5.1.4 | 4 | | 4 | 4 | 4 | 4 | | |
| Mating/Un-mating force | 3.5.2.1 3.5.2.2 | | 2 | | | | | | |
| Torque | 3.5.2.5 | | 3 | | | | | | |
| Wire Pull Strength | 3.5.2.4 | | | 2 | | | | | |
| Temperature rise | 3.5.1.5 | | | 3 | | | | | |
| humidity test | 3.5.3.3 | | | | 2 | | | | |
| Heat resistance | 3.5.3.1 | | | | | 2 | | | |
| Cold resistance | 3.5.3.2 | | | | | | 2 | | |
| Salt Spray | 3.5.3.4 | | | | | | | 2 | |
| Fire Test (Glow wire test) | 3.5.3.5 | | | | | | | | 2 |
| Qualification connector per group | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

TABLE 2: QUALIFICATION TESTING SEQUENCE-Pluggable Socket

| TEST | PARA | Test Group | | | | | | | |
|---------------------------------|---------|---------------|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H |
| | | Test Sequence | | | | | | | |
| Product examination | 3.5.1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Insulation Resistance | 3.5.1.3 | 2 | | 3 | 3 | 3 | | | |
| Dielectric withstanding voltage | 3.5.1.4 | 3 | | 4 | 4 | 4 | | | |
| Pin Retention (Pull force) | 3.5.2.6 | | 2 | | | | | | |
| Humidity | 3.5.3.3 | | | 2 | | | | | |
| Heat resistance | 3.5.3.1 | | | | 2 | | | | |
| Cold resistance | 3.5.3.2 | | | | | 2 | | | |
| Salt Spray | 3.5.3.4 | | | | | | 2 | | |
| Fire Test (Glow wire test) | 3.5.3.5 | | | | | | | 2 | |
| Solder ability | 3.5.2.7 | | | | | | | | 2 |

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|-----------------------------------|---|---|---|---|---|---|---|---|---|
| Qualification connector per group | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
|-----------------------------------|---|---|---|---|---|---|---|---|---|

TABLE 3: QUALIFICATION TESTING SEQUENCE-Fixed Plug

| TEST | PARA | Test Group | | | | | | | | | |
|-----------------------------------|---------|---------------|---|---|---|---|---|---|---|---|--|
| | | A | B | C | D | E | F | G | H | J | |
| | | Test Sequence | | | | | | | | | |
| Product examination | 3.5.1.1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| LLCR | 3.5.1.2 | 2 | | | | | | 3 | | | |
| Insulation Resistance | 3.5.1.3 | 3 | | | 3 | 3 | 3 | 4 | | | |
| Dielectric withstanding voltage | 3.5.1.4 | 4 | | 4 | 4 | 4 | 4 | | | | |
| Torque | 3.5.2.5 | | 2 | | | | | | | | |
| Wire Pull Strength | 3.5.2.4 | | | 2 | | | | | | | |
| Temperature rise | 3.5.1.5 | | | 3 | | | | | | | |
| humidity test | 3.5.3.3 | | | | 2 | | | | | | |
| Heat resistance | 3.5.3.1 | | | | | 2 | | | | | |
| Cold resistance | 3.5.3.2 | | | | | | 2 | | | | |
| Salt Spray | 3.5.3.4 | | | | | | | 2 | | | |
| Solder ability | 3.5.2.7 | | | | | | | | 2 | | |
| Fire Test (Glow wire test) | 3.5.3.5 | | | | | | | | | 2 | |
| Qualification connector per group | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | |

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REVISION RECORD

| REV | PAGE | DESCRIPTION | ECR# | DATE |
|-----|------|---|-----------|-----------------------------|
| A | All | Initial Release | DG09-0204 | Nov 11 th , 2009 |
| B | 3 | 3.5.2.7 solderability test, Temperature change form 260 +/- 5 °C to 250 +/- 10°C | T09-1162 | Dec 17 th , 2009 |
| C | All | Add phase-2 product series | T10-0079 | Jun 15 th , 2010 |
| D | 2 | Add p/n 20020336 | | Jan 31 th , 2010 |

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