

CABLINE®-CA IIF

Part No. Plug: 20856-040T-01

Receptacle: 20682-040E-0# (CABLINE-CA II RECEPTACLE)

Product Specification

Qualification Test Report No. TR-17079

| | | | | | |
|------|--------|-------------------|-------------|------------|-------------|
| 3 | S20660 | December 17, 2020 | M.Muro | - | Y.Shimada |
| 2 | S18682 | November 19, 2018 | Y.Sasa | T.Masunaga | H.Ikari |
| 1 | S17896 | December 8, 2017 | Y.Sasa | T.Masunaga | H.Ikari |
| 0 | S17736 | October 3, 2017 | Y.Sasa | T.Masunaga | H.Ikari |
| Rev. | ECN | Date | Prepared by | Checked by | Approved by |

1. Scope

This Product Specification defines the test conditions and the performances of the CABLINE-CA IIF Connector , a shield FPC-to-board connector of 0.4mm contact pitch.

2. Product Name and Parts No.

2.1 Product Name

CABLINE-CA IIF

2.2 Parts No

Plug: 20856-040T-01

2.3 Applicable RECE Connector

CABLINE-CA II RECEPTACLE : 20682-040E-0#

2.4 Applicable FPC

Shielded FPC Conductor pitch / size of thickness ... 0.4mm /0.25^{+0.02/-0.03}mm

Thermosetting adhesive. Refer to the product drawing (DWG No.20856) for a detail dimension and structure.

3. Rating

3.1 Operating Conditions

Amperage: 0.3A AC/DC (per contact)

Voltage: 100V AC (per contact)

Operating temperature: 233~358K(-40°C~85°C)

(Containing temperature rise by current)

Operating humidity: 85% max

3.2 Storage Conditions

Storage temperature: 248~333K(-25°C~60°C)

Storage humidity: 85% max. (Non-condensing)

4. Test and Performance

Test Condition

This initial test is equal to it's at shipping condition and unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202 G.

Temperature ... 288K~308K (15°C~35°C)

Pressure ... 866hPa~1066hPa (650mmHg~800mmHg)

Relative humidity ... 45~75%R.H.

4.1 Electrical Performance

| | |
|---|---|
| 1. Contact resistance | |
| Reference standard: | MIL-STD-202G, Method 307 |
| Test conditions: | Solder the receptacle connector to the test board and mate the plug connector together, then measure the contact resistance as shown in Fig.1 by the four terminal methods. Apply the low level condition of 20mV MAX. DC for the open circuit voltage and 10mA MAX. DC for the closed circuit current. |
| | |
| $\text{Contact Resistance} = R_{AB} - (\text{FPC Conductor Resistance}) - (\text{Test Board Conductor Resistance})$ | |
| Fig.1 | |
| Pass criteria: | Contact ... Initial: 60 mΩ MAX. After testing: ΔR 40 mΩ MAX. Ground contact ... Initial: 60 mΩ MAX. After testing: ΔR 40 mΩ MAX. |

| | |
|--------------------------|--|
| 2. Insulation resistance | |
| Reference standard: | MIL-STD-202 G, Method 302 |
| Test conditions: | Mate the plug and receptacle connector together, and then apply DC 250 V between the inner contact and the ground contact. |
| Pass criteria: | Initial: 1000 MΩ MIN. After testing: 500 MΩ MIN. |

| | |
|------------------------------------|---|
| 3. Dielectric withstanding voltage | |
| Reference standard: | MIL-STD-202 G, Method 301 |
| Test conditions: | Mate the receptacle and plug connector together, then apply AC 250V(rms) between the neighboring contacts for a minute. |
| Pass criteria: | No creeping discharge, flashover, no insulator breakdown shall occur. |

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| 4. Temperature rising | |
| Reference standard: | - |
| Test conditions: | Mate the plug and receptacle connector together and then apply rating current per contact. |
| Pass criteria: | Over ambient ΔT 30 °C MAX. |

4.2 Mechanical Performance

1. Mating force and Un-mating force

Reference standard: -

Test conditions: Solder the receptacle connector to the test board, then place the board and plug on push-on/pull-off machine, measure of initial and mating/unmating 30 cycles at a speed 25±3mm/min. along the mating axis.

Pass criteria: Mating force
40 P : 18.0 N MAX.
50 P : 22.5 N MAX.

Unmating force
40 P : 1.92 N MIN.
50 P : 2.40 N MIN.

2. Durability

Reference standard: -

Test conditions: Solder the receptacle connector to the test board, then place the board and plug on the push-on/pull-off machine, and repeat mating and unmating 30cycles at a speed 25±3mm/min. along the mating axis.

Pass criteria: Contact resistance: Shall meet 4.1.1

3. Conn. Lock

Reference standard: -

Test conditions: Mate, and place them on the push-on/pull-off machine, then apply 10N (1.02gf) force on the cable along the mating axis.

Pass criteria: The lock does not damage and cancel.

4. Vibration

Reference standard: MIL-STD-202 G, Method 201

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and place them on the vibrator. Then apply the following vibration. During the testing, run 100mA DC to check electrical discontinuity.

Frequency: 10Hz→55Hz→10Hz/approx. 1min.

Directions: 3 mutually perpendicular direction.

Total Amplitude: 1.52mm

Sweep duration: 2 hours for each direction, a total of 6 hours.

Pass criteria: Contact resistance: Shall meet 4.1.1.

Electrical discontinuity: No electrical discontinuity greater than 1μs shall occur.

Appearance: No abnormality

5. Shock

Reference standard: MIL-STD-202 G, Method 213, Condition A.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and place them on the shock machine. Then apply the following shock.

MAX.G: 50G

Directions: 6 mutually perpendicular direction

Duration: 11msec

Cycle: 3 cycles about each direction

Wave Form: Half Sinusoidal

Pass criteria: Contact resistance: Shall meet 4.1.1.

Electrical discontinuity: No electrical discontinuity greater than 1μs shall occur.

Appearance: No abnormality

4.3 Environmental Performance

1. Thermal shock

Reference standard: MIL-STD-202 G, Method 107, Condition A.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.

Temperature: 218K(-55°C),30min.→358K(85°C),30min.

Transition time: 5min. MAX.

No. of cycles: 5 cycles

Pass criteria: Contact resistance: Shall meet 4.1.1.

Insulation resistance: Shall meet 4.1.2.

Dielectric withstanding voltage: Shall meet 4.1.3.

Appearance: No abnormality

2. High temperature life

Reference standard: MIL-STD-202 G, Method 108, Condition B.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.

Temperature: 358±2K (85±2°C)

Duration: 250 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.

Contact retention force: Shall meet 4.2.3.

Appearance: No abnormality

3. Humidity (Steady state)

Reference standard: MIL-STD-202 G, Method 103, Condition A.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.

Temperature: 313±2K (40±2°C)

Humidity: 90~95%RH

Duration: 240 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.

Insulation resistance: Shall meet 4.1.2.

Dielectric withstanding voltage: Shall meet 4.1.3.

Appearance: No abnormality

4. Humidity (Cycling)

Reference standard: MIL-STD-202 G, Method 106.

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.

Temperature: 298[263]~338K (25[-10]~65°C)

Humidity: 90~98%RH

Duration: 10cycles (240hours)

Pass criteria: Contact resistance: Shall meet 4.1.1.

Insulation resistance: Shall meet 4.1.2.

Dielectric withstanding voltage: Shall meet 4.1.3.

Appearance: No abnormality

4.3 Environmental Performance

5. Salt water spray

Reference standard: -

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.
 Temperature: $308 \pm 2\text{K}$ ($35 \pm 2^\circ\text{C}$)
 Salt water density: $5 \pm 1\%$ [by weight]
 Duration: 48 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Appearance: No abnormality

6. H₂S gas

Reference standard: -

Test conditions: Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment.
 Temperature: $313 \pm 2\text{K}$ ($40 \pm 2^\circ\text{C}$)
 Relative humidity: $80 \pm 5\%RH$
 Gas: H₂S $3 \pm 1\text{ppm}$
 Duration: 48 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Appearance: No abnormality adversely affecting the performance shall occur.

4.4 Test Sequence and Specimen Quantity

Table 1 Test Sequence and Sample Quantity

| Test Item | Group | | | | | | | | | |
|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | A | B | C | D | E | F | G | H | J | K |
| Contact Resistance | | 2,6 | | 1,3,5 | 1,3 | 1,3 | 1,5 | 1,5 | 1,3 | 1,3 |
| Insulation Resistance | | | | | | | 2,6 | 2,6 | | |
| D. W. Voltage | | | | | | | 3,7 | 3,7 | | |
| Temperature rising | 1 | | | | | | | | | |
| Mating Force | | 1,5 | | | | | | | | |
| Un-mating Force | | 3,7 | | | | | | | | |
| Durability | | 4 | | | | | | | | |
| Conn. Lock | | | 1 | | | | | | | |
| Vibration | | | | 2 | | | | | | |
| Shock | | | | 4 | | | | | | |
| Thermal Shock | | | | | 2 | | | | | |
| High Temperature Life | | | | | | 2 | | | | |
| Humidity (Steady State) | | | | | | | 4 | | | |
| Humidity (Cycling) | | | | | | | | 4 | | |
| Salt Water Spray | | | | | | | | | 2 | |
| H2S Gas | | | | | | | | | | 2 |
| Specimen Quantity. | 5 pcs. | 5 pos. | 5 pos. | 5 pcs. | 5 pcs. | 5 pcs. | 5 pcs. | 5 pcs. | 5 pcs. | 5 pcs. |

※Numbers indicate sequence in which tests are performed.

5. Precautions for Handling Cable Connectors

Refer to instruction manual : HIM-17029 for the handling of CABLINE-CA IIF.