

CABLINE®-CAP Connector

Part No. Plug:81863-100B-** Receptacle:20525-050E-02

Product Specification

Qualification Test Report No. TR-23020

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1. Scope

This product specification defines the test conditions and the performances of the CABLINE-CAP Connector(with PADDLE CARD), a wire-to-board connector of 0.4mm contact pitch.

2. Product Name and Parts No.

2.1 Product Name

CABLINE-CAP

2.2 Parts No.

Plug: 81863-100B-**

Receptacle: 20525-050E-02 (Connector to be mated)

3. Rating

3.1 Applicable Cable

Micro-Coaxial Cable AWG#【38】,Characteristic Impedance 45Ω

3.2 Operating Conditions

Amperage: 0.4A AC/DC [AWG#38] (per contact)

Voltage: 100V AC (per contact)

Operating temperature: 233 to 358K (-40°C to +85°C) (Containing temperature rise by current)

Operating humidity: 85% max

3.3 Storage Conditions

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

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

4. Test and Performance

Test Condition

Unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202.

Temperature: 288K to 308K (15°C to 35°C)

Pressure: 866hPa to 1066hPa (650mmHg to 800mmHg)

Relative humidity: 45 to 75% R.H.

4.1. Electrical Performance

1. Contact resistance	
Reference standard:	MIL-STD-202-307
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, then apply 20mV MAX. DC open circuit voltage and 10mA MAX. DC closed circuit current. Measure the contact resistance of signal and GROUND at the section shown in Fig.1 by the four terminal methods.
<p>Fig.1</p>	
Pass criteria:	<p>Signal Contact Initial: 270 mΩMAX.(AWG#38) After testing: ΔR 40 mΩ MAX. Initial value contains the following conductor resistance of a cable 100 mm. 210 mΩMAX. (AWG#38)</p> <p>GROUND SHELL Initial: 50 mΩ MAX. After testing: ΔR 40 mΩ MAX.</p>

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

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

4. Temperature rising	
Reference standard:	-
Test conditions:	Mate the plug and receptacle connector together, and apply rating current per contact. Measure delta T over ambient.
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, Repeat mating/unmating 30 cycles at a speed 25 ± 3 mm/min. along the mating axis. Measure the mating and unmating force at the initial and after 30cycles.
Pass criteria:	Mating force Initial / 30cycles: 18.90 N MAX. Unmating force Initial / 30cycles: 2.50 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 un-mating 30cycles at a speed 25 ± 3 mm/min. along the mating axis.
Pass criteria:	Contact resistance: Shall meet 4.1.1

3. Cable retention force

Reference standard:	-
Test conditions:	Place the plug connector on the push-on/pull-off machine and pull the cable along the cable axis at a speed 25 ± 3 mm/min. Measure the force when the discontinuity occurs.
Pass criteria:	24.5N MIN.

4. Vibration

Reference standard:	MIL-STD-202-201
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. 1 min. Directions: 3 mutually perpendicular directions. Total Amplitude: 1.52 mm 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 adversely affecting the performance shall occur.

5. Shock	
Reference standard:	MIL-STD-202-213, Test 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 Duration: 11 msec Wave Form: Half Sinusoidal Directions: 6 mutually perpendicular direction Cycle: 3 cycles each direction
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than 1 μ s shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

4.3. Environmental Performance

1. Thermal shock	
Reference standard:	MIL-STD-202-107, Test 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 $^{\circ}$ C),30min.→358K(85 $^{\circ}$ C),30 min. Transition time: 5 min. MAX. Cycle: 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 adversely affecting the performance shall occur.

2. High temperature life	
Reference standard:	MIL-STD-202-108, Test condition A
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 358 \pm 2K (85 \pm 2 $^{\circ}$ C) Duration: 500 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

3. Humidity (Steady state)	
Reference standard:	MIL-STD-202-103, Test condition B.
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 313 \pm 2K (40 \pm 2 $^{\circ}$ C) Humidity: 90 to 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 adversely affecting the performance shall occur.

4. Humidity (Cycling)	
Reference standard:	MIL-STD-202-106.
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 298[263] to 338K (25[-10]~65°C) Humidity: 90[80] to 100%RH Duration: 10 cycles (240 hours)
	<p>The graph shows a temperature profile over 25 hours. The y-axis is Temperature [deg.] from -20 to 80. The x-axis is Time [hr] from 0 to 25. The profile starts at 25°C at 0h, rises to 65°C at 2h, stays at 65°C until 6h (Phase A), drops to 25°C at 7h, stays at 25°C until 8h (Phase B), rises to 65°C at 9h, stays at 65°C until 13h (Phase A), drops to 25°C at 14h, stays at 25°C until 17h, drops to -10°C at 18h, stays at -10°C until 21h (Phase B), rises to 25°C at 22h, stays at 25°C until 24h, and finally rises to 65°C at 25h. A legend indicates: A: 90-100%RH, B: 80-100%RH.</p>
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 adversely affecting the performance shall occur.

5. Saltwater spray	
Reference standard:	MIL-STD-202-101, Test condition B.
Test conditions:	Solder the receptacle connector to the test board, then mate plug connector, and expose them to the following environment. Temperature: 308±2K (35±2°C) Saltwater density: 5±1% [by weight] Duration: 48 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Appearance: No abnormality adversely affecting the performance shall occur.

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±2K (40±2°C) Relative humidity: 80±5%RH Gas: H ₂ S 3±1ppm Duration: 96 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
Contact resistance	2,6	1,3,5	1,3	1,3	1,5	1,5,7	1,3	1,3	
Insulation resistance					2,6	2,8			
Dielectric withstanding voltage					3,7	3,9			
Temperature rising									1
Mating force	1,5								
Unmating force	3,7								
Durability	4					4 (10cyc.)			
Cable retention force	8								
Vibration		2							
Shock		4							
Thermal shock			2						
High temperature life				2					
Humidity (Steady State)					4				
Humidity (Cycling)						6			
Saltwater spray							2		
H ₂ S gas								2	
Specimen quantity.	5	5	5	5	5	5	5	5	5

※Numbers indicate test sequences.

5. Recommended Metal Mask

Refer to drawing (Receptacle: 20525-0*0E-##) for the recommended metal mask thickness and opening dimension.

6. Precautions for Handling Cable Connectors

Refer to instruction manual: HIM-23013 for the handling of CABLINE-CAP Paddle Card Harness.