

## **CABLINE®-CAF**

Part No. Plug: 3437-0\*\*1 (SHELL Only), 20858-0\*\*T-01 (SHELL ASS'Y)

Receptacle : 20525-※\*\*E-※ ※

# **Product Specification**

Qualification Test Report No. TR-18016

5	S23234	July 26, 2023	T.Onishi	M.Muro	H.Ikari
4	S21661	December 2, 2021	M.Muro	-	H.Ikari
3	S21308	July 21, 2021	R.Fukuda	M.Muro	H.Ikari
2	S19167	March 5, 2019	Y.Sasa	T.Masunaga	Y.Shimada
Rev.	ECN	Date	Prepared by	Checked by	Approved by
Confidential C			I-PEX Inc.		QKE-DFFDE06-08 REV.9

#### 1. Scope

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

#### 2. Product Name and Parts No.

#### 2.1 Product Name

CABI INF-CAF

#### 2.2 Parts No

PLUG SHELL Only: 3437-0\*\*1 PLUG SHELL ASS'Y: 20858-0\*\*T-01

#### 2.3 Applicable RECE. Connector

CABLINE-CA RECE : 20525-X\*\*E-XXX

#### 2.4 Applicable FPC

Shielded FPC Conductor pitch / size of thickness · · · 0.4mm / 0.26±0.02mm Thermosetting adhesive. Refer to the product drawing (DWG No. 20858) for a detail dimension and structure.

#### 3. Rating

#### 3.1 Operating Conditions

Amperage: 0.5A AC/DC (per contact pin) \*Available up to 14 Pin Amperage: 0.3A AC/DC (per contact pin) \*Available for all Pin

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:  $248 \sim 333 \text{K}(-25 \,^{\circ}\text{C} \sim +60 \,^{\circ}\text{C})$ 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  $\cdots$  288K $\sim$ 308K (15 $^{\circ}$ C $\sim$ 35 $^{\circ}$ C)

Pressure  $\cdots$  866hPa $\sim$ 1066hPa (650mmHg $\sim$ 800mmHg)

Relative humidity  $\cdots$  45 $\sim$ 75%R.H.

### **4.1 Electrical Performance**

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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, and then apply 20mV MAX. DC open circuit voltage and 1mA 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.
	A
	B PLUG RECEPTACLE
	TEST BOARD
Contact	t Resistance=R <sub>AB</sub> -(FPC 40mm Conductor Resistance)-(Test Board Conductor Resistance)
	Fig.1
Pass criteria:	Contact ••• Initial: 60 m $\Omega$ MAX. After testing: $\triangle$ R40 m $\Omega$ MAX. Ground contact ••• Initial: 60 m $\Omega$ MAX. After testing: $\triangle$ R 40 m $\Omega$ MAX.

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

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

4. Temperature rising	
Reference standard:	-
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, and then apply rating current to each contact and measure temperature rise around the connector.
Pass criteria:	Over ambient ⊿T 30 ℃ 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 : 11.07 N MAX 60 P : 16.61 N MAX
	Unmating force 40 P : 1.44 N MIN. 60 P : 2.16 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 meet4.1.1

3. Vibration	
Reference standard:	MIL-STD-202G, Method 201
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, 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 adversely affecting the performance shall occur.

4. Shock	
Reference standard:	MIL-STD-202G, Method 213, Condition A.
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, 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 adversely affecting the performance shall occur.

### **4.3 Environmental Performance**

1. Thermal shock	
Reference standard:	MIL-STD-202G, Method 107, Condition A.
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, 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.

2. High temperature life	
Reference standard:	MIL-STD-202G, Method 108, Condition B.
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.  Temperature: 358±2K (85±2℃)  Duration: 250 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1.

3. Humidity (Steady state	te)
Reference standard:	MIL-STD-202G, Method 103, Condition A.
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.  Temperature: 313±2K (40±2℃)  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.

4. Humidity (Cycling)	
Reference standard:	MIL-STD-202G, Method 106.
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment. Temperature: $298[263]\sim338K$ ( $25[-10]\sim65^{\circ}C$ ) Humidity: $90\sim98\%RH$ Duration: $10$ cycles ( $240$ 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.

### 4.3 Environmental Performance

5. Salt water spray	
Reference standard:	MIL-STD-202G, Method 101, Condition B.
Test conditions:	Solder the receptacle connector to the test board and mate the plug connector together, and expose them to the following environment.  Temperature: 308±2K (35±2°C)  Salt water 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 and mate the plug connector together, and expose them to the following environment.  Temperature: 313±2K (40±2°C)  Relative humidity: 80±5%RH  Gas: H₂S 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									
rest item	А	В	С	D	Е	F	G	Н	J	
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			
Dielectric withstanding voltage						3,7	3,7			
Temperature rising	1									
Mating force		1,5								
Un-mating force		3,7								
Durability		4								
Vibration			2							
Shock			4							
Thermal shock				2						
High temperature life					2					
Humidity (Steady State)						4				
Humidity (Cycling)							4			
Saltwater spray								2		
H <sub>2</sub> S gas									2	
Specimen Quantity.	5 pcs.	5 pos.	5 pos.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	

XNumbers indicate test sequence.

**5. Precautions for Handling Cable Connectors**Refer to instruction manual: HIM-18016 for the handling of CABLINE-CAF.