

NUMBER <b>GS-12-340</b>	TYPE <b>GENERAL PRODUCT SPECIFICATION</b>	<b>Amphenol FCI</b>	
TITLE <b>0.5mm PITCH SMT type CONNECTOR for FPC/FFC 10051922 (VLL) series</b>		PAGE <b>1 of 11</b>	REVISION <b>G</b>
		AUTHORIZED BY <b>S.Watanabe</b>	DATE <b>12/11/'24</b>
		CLASSIFICATION <b>UNRESTRICTED</b>	

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## 1. Scope

This specification is intended to cover the performance and evaluation conditions for “10051922 (VLL)series”. In addition, this connector must perform the following evaluation using the recommendation application conductor (FPC/FFC)

## 2. Application product

TITLE	P/N
0.5mm pitch SMT type connector for FPC ” 10051922(VLL) Series”	10051922 -**10E(H)LF

## 3. Shape, Materials and Finish

Part name	Material	Finish	Note
Housing	Glass filled LCP	—	UL94V-0, Color : Natural
Actuator (Non-Halogen free)	Glass filled 9TPA	—	UL94V-0, Color : Black
Actuator (Halogen free)	Glass filled LCP	—	UL94V-0, Color : Natural
Contact	Copper alloy	Gold 0.05µm MIN. (Nickel underplate overall)	—
Fitting nail	Copper alloy	Tin 1.5µm MIN. (Nickel underplate overall)	—
Emboss tape	Polystyrene	—	JIS C 0806 Conformity
Cover tape	Polyester / Polyethylene	—	JIS C 0806 Conformity
Reel (for packaging)	Polystyrene	—	JIS C 0806 Conformity

## 4. Recommendation PCB pattern and Application conductor (FPC/FFC)

Refer to each product drawing.

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## 5. Operation requirements

5.1 Rating voltage : AC/DC 50V

5.2 Rating current : AC/DC 0.5A

5.3 Operation temperature range : -55 ~ 150°C (Including temperature rise caused by application of current)

### 5.4 Performance of various

Unless otherwise specified, when tested the ambient conditions in accordance with IEC 60068 as described below and evaluated with the sequence listed in Table 1, the connector shall meet the requirements.

Temperature : 15~35 °C  
Relative humidity : 25~85%Rh.  
Atmospheric pressure: 86~106Kpa

Table 1. Performance of various

	Para.	Requirements	Condition
Electrical Requirements	Contact resistance	Initial : 30 mΩ Max. Final : Δ20 mΩ Max.	6.1.
	Insuration resistance	Initial : 100MΩ Final : 100MΩ	6.2.
	Dielectric Withstanding Voltage	No evidence of arc-over or insulation breakdown. (Current leakage : 2mA Max.)	6.3.
Environmental Requirements	Humidity (steady state)	No evidence of cracking, swelling or other damage. Contact resistance : Final : Δ20 mΩ Max., Insulation resistance Final : 100MΩ	6.4.
	High temperature	No evidence of cracking, swelling or other damage. Contact resistance : Final : Δ20 mΩ Max.	6.5.
	Thermal Shock		6.6.
	Salt splay		6.7.
Mechanical Requirements	Vibration (Low Frequency)	No evidence of physical or mechanical damage, or disassociation of parts, and no electrical discontinuity greater than 1μsec. shall occur. Contact resistance : Final : Δ20 mΩ Max.	6.8.
	Physical Shock		6.9.
	Durability	There shall be no defect which spoils a function. The contact resistance shall not exceed Δ20 mΩ	6.10.
	Solder heat resistance (IR Reflow)	There shall be no defect which spoils a function.	6.11.
	Solderability	Solder wetting area shall be 95% minimum.	6.12.
	Conductor retention force (Reference Spec)	0.35N/contact min.	6.13.

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## 6. Test method

### 6.1. Contact resistance

The contact resistance shall not be exceeded 30 mΩ before test or Δ20 mΩ after test when measured under the following conditions. (IEC 512-2, Test 2a conformity)

- (a) Method of connection : See Fig 1.
- (b) Test current : Less than 100 mA DC
- (c) Open circuit voltage : Less than 20 mV DC

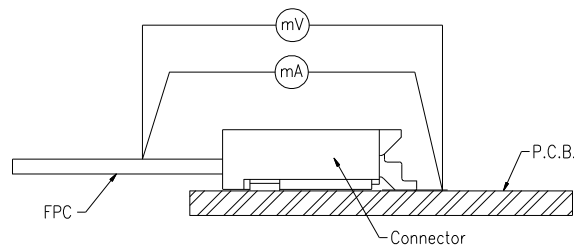


Fig 1. Test method of contact resistance

### 6.2. Insulation resistance

The insulation resistance of the unmated connector shall be not less than 100 MΩ before test when measured accordance with IEC 512-2, Test 3a.

The following details shall apply.

- (a) Test Voltage : DC 500 V for 1 minute
- (b) Special Preparation : The connector shall not be mounted on PCB.
- (c) Points of Measurement : Between adjacent terminals

### 6.3. Dielectric Withstanding Voltage

There shall be no evidence of arc-over or insulation breakdown when the unmated connector is tested in accordance with IEC 512-2, Test 4a.

The following details shall apply.

- (a) Test Voltage : AC 200V for 1 minute
- (b) Special Preparation : The connector shall not be mounted on PCB.
- (c) Points of Measurement : Between adjacent terminals


### 6.4. Humidity

There shall be no evidence of cracking, swelling or other damage which would be detrimental to the function of the connector after the mated connector is exposed to a high humidity ambience in accordance with IEC 60068-2-3.

The contact resistance shall not exceed Δ20 mΩ, and insulation resistance shall be not less than 100 MΩ.

The following details shall apply.

- (a) Ambient Temperature : 40 ± 2 °C
- (b) Relative Humidity : 90 to 95 %
- (c) Duration : 48 hours

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#### 6.5. High temperature

There shall be no evidence of cracking, swelling or other damage which would be detrimental to the function of the connector. The contact resistance shall not exceed  $\Delta 20$  m $\Omega$  after the mated connector is exposed to a high temperature environment in accordance with IEC 60068-2-2.

The following details shall apply.

- (a) Ambient Temperature :  $150 \pm 2$  °C
- (b) Duration : 240 hours

#### 6.6. Thermal Shock

There shall be no evidence of cracking, swelling or other damage which would be detrimental to the function of the connector after the mated connector is exposed to alternate cycles of extreme high and low temperature in accordance with IEC 60068-2-14. The contact resistance shall not exceed  $\Delta 20$  m $\Omega$ .

The following details shall apply.

- (a) Temperature range :  $-55 \pm 3$  °C for 30 minutes followed by  $150 \pm 3$  °C for 30 minutes.
- (b) Number of cycles : 240 cycles

#### 6.7. Salt splay

There shall be no evidence of cracking, swelling or oxidation which would be detrimental to the function of the connector. The contact resistance shall not exceed  $\Delta 20$  m $\Omega$  after the mated connector is exposed to a salt fog ambience in accordance with IEC 60068-2-11.

The following details shall apply.

- (a) Salt Solution :  $5 \pm 1\%$  by weight
- (b) Ambient Temperature :  $35 \pm 2$  °C
- (c) Duration : 48 hours
- (d) Special Treatment : The measurement shall be conducted after the mated connector is mildly rinsed in running water to remove deposition of salt, followed by natural drying by placing it for 24 hours at room temperature.

#### 6.8. Vibration

There shall be no evidence of physical or mechanical damage, or disassociation of parts, and no evidence of discontinuity greater than 1 microsecond when the mated connector is subjected to mechanical vibration. The contact resistance shall not exceed  $\Delta 20$  m $\Omega$  after the test. The test shall be in accordance with IEC 60068-2-6.

The following details shall apply.

- (a) Frequency : 10 to 55Hz, sweep vibration
- (b) Amplitude : 1.5 mm MAX.
- (c) Test Current : 0.1 A
- (d) Duration : 2 hours in each direction along 3 orthogonal axes (6 hours total)

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6.9. Physical Shock

There shall be no evidence of physical or mechanical damage, or disassociation of parts, and no evidence of discontinuity greater than 1 microsecond when the mated connector is subjected to mechanical shock. The contact resistance shall not exceed  $\Delta 20$  m $\Omega$  after the test. The test shall be in accordance with IEC 60068-2-27.

The following details shall apply.

- (a) Test condition : 490m/s<sup>2</sup> (50 G), 11 ms, half sin wave
- (b) Number of Shock : 6 shocks along each of 3 orthogonal axes (18 total)
- (c) Test Current : 0.1 A

6.10. Durability

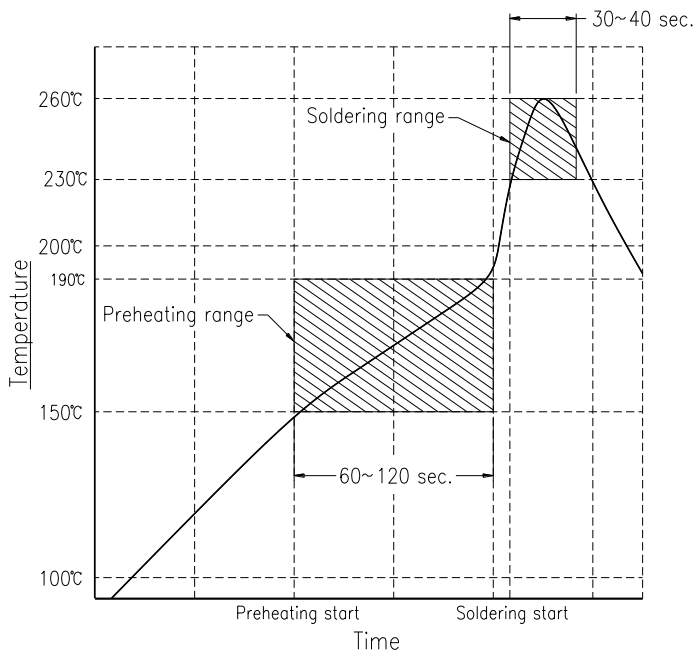
After 20 mating cycles, contact resistance shall not exceed  $\Delta 20$  m $\Omega$ .

6.11. Solder Heat Resistance (IR Reflow)

There shall be no defect which spoils a function under the following conditions. (Refer to Fig.2) The test shall be in accordance with IEC 60068-2-58.

The following details shall apply.

- (a) Pre-Heat Temperature : 150 ~ 190 °C
- (b) Pre-Heat Duration : 60 ~ 120 seconds
- (c) Soldering Temperature : 230 °C min.
- (d) Soldering Duration : 30 ~ 40 seconds.
- (e) Peak temperature : 260 °C max.



**Fig.2 Recommendation reflow temperature profile**



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#### 6.12. Solderability

After soldering contact by being immersed in the weak activity rosin system flux, solder wetting area shall be 95% minimum. The test shall be in accordance with IEC 60068-2-20.

The following details shall apply.

- (a) Solder temperature : 235±5 °C
- (b) Immersing time : 2±0.5 seconds.

#### 6.13. Conductor retention force (Reference Spec)

Measure initial conductor retention force after inserted and locked by using accommodated conductor. The conductor retention force should be more than 0.35N/contact.

### 7. Test sequence

Test sequence is shown in Table 2.

Table2. Test sequence

No.	Test item	Test group											Test method	
		1	2	3	4	5	6	7	8	9	10	11		
1	L.L.C.R		1 3	1 3	1 3	1 3	1 3	1 3	1 3					6.1.
2	Insulation resistance	1 4												6.2.
3	Dielectric withstanding voltage	2 5												6.3.
4	Humidity	3	2											6.4.
5	High temperature			2										6.5.
6	Thermal shock				2									6.6.
7	Salt spray					2								6.7.
8	Vibration						2							6.8.
9	Shock							2						6.9.
10	Durability								2					6.10.
11	Solder Heat Resistance									1				6.11.
12	Solderability										1			6.12.
13	Conductor retention force											1		6.13.

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## **8. Notice**

- 8.1. Please be sure to look through application specification in the case of use of this product.
- 8.2. Retention force for accommodated conductor specified in clause 6.13 differs due to different thickness, structure and surface treatment of conductor. Therefore, the value of retention force specified in the clause for performance is reference value.

## **9. Indication and packaging**

### 9.1. Indication

- 1) Catalog number and lot number are not indicated on the connector.
- 2) Catalog number and quantity shall be indicated on the surface of the package box.

### 9.2. Packaging

- 1) The connector individuals are packed by tapes with specified quantity in accordance with [JIS C 0806 "Packaging of Electronic Components on Continuous Tapes (Surface Mount components)" ] and put into package box in accordance with FCI packaging specification.

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## 10. Revision record

REV.	PAGE	DESCRIPTION	ECR #	DATE
A	All	New release	J05-0392	06/30/'05
B	All 1	Logo change Change actuator material	J06-0172	04/24/'06
C	2	Changed rating current to 0.5A from 0.4A	J06-0336	08/23/'06
D	7	Changed test condition of solder heat resistance item 6.11.	J09-0016	01/14/'09
E	All 1	Added halogen free catalog number Changed material sheet to add halogen free actuator	J10-0171	06/23/'10
F	All 1,2 3 4,8 5~8 9	Changed format and Removed Japanese Added Table of Contents Changed material for Emboss tape and Cover tape on item 3 to match with current status due to PCN19016 Add Conductor retention force (Reference spec) on item 6.13 Updated the IEC number to match with the latest Added item 8.2 and item 9	ELX-J-50421	01/17/'24
G	4 6	Change operating temperature from -55~85°C to -55~150°C. Change test condition of item 6.5 High temperature from 85°C, 48h to 150°C, 240h Change test condition of item 6.6 Thermal shock from -55°C/85°C (30min each), 5cycles to -55°C/150°C (30min each), 240cycles	ELX-J-53854	12/11/'24