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## GENERAL AMPMODU CONNECTORS

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### 1. SCOPE

#### 1.1 Contents

This specification covers performance, tests and quality requirements for **GENERAL AMPMODU CONNECTORS**.

#### 1.2 Qualification

When required tests are performed on the subject products, procedures specified in TE 109 series specifications shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

### 2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

#### 2.1 TE Connectivity Document:

- A. 109-1: General Requirements for Test Specifications
- B. 109 series: Test Specification as indicated in figure 2 (Comply with MIL-STD-202)
- C. Corporate Bulletin 401-76:  
Cross-reference between TE test specifications and Military or Commercial Documents.
- D. 501-: Test Report

#### 2.2 International Standards

EIA-364: Electrical Connector/Socket Test Procedures Including Environment Classification

### 3. REQUIREMENTS

#### 3.1 Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawings.

#### 3.2 Materials

- A. Housing: Thermoplastic or high temp. Thermoplastic, UL94V-0 rated, Black or other color specified.
- B. Contact: Copper Alloy,
- C. Finish Plating:
  - C.a. Specified thickness gold plating on mating area or covers the whole pin/contact  
Specified thickness tin plating on mating area or covers the whole pin/contact
  - C.b. 3.81~6.35um, or specified thickness, tin plating on soldering area or covers whole pin/contact

**\*Note: Lead-free tin plating is mandatory in accordance with RoHS2.0,  
Or other specified tin standard in accordance with customized requirement.**

  - C.c. 1.27um nickel under-plating covers whole pin/contact
- D. Pick Pad: Thermoplastic or high temp. Thermoplastic, UL94V-0 rated, Black or other color specified.

E. Adhesive Film Cover: Mylar, or Kapton Polyimide

**3.3 Ratings**

- A. Voltage Rating: 250V AC
- B. Current Rating: For 1.27 pitch, 1.0AMP.  
For 2.00 pitch, 2.0AMP.  
For 2.54 pitch, 3.0AMP.
- C. Temperature Rating: -40°C to +85°C

**3.4 Performance Requirements and Test Descriptions**

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 3. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per AMP Specification 109-1.

**3.5 Test Requirements and Procedures Summary (Fig. 1)**

NO.	TEST ITEMS	REQUIREMENTS	PROCEDURES
3.5.1	Examination of Product	Meets requirements of product drawing. No physical damage.	Visually, dimensionally and functionally inspected per applicable inspection plan.
<b>ELECTRICAL REQUIREMENTS</b>			
3.5.2.1	Contact Resistance	Initial	Subject mated contacts assembled in housing to closed circuit current of 50mA max at open circuit voltage of 50mV max. Fig.4 EIA-364-23A
		Final	
3.5.2.2	Insulation Resistance	1000M ohms min. (Initial) 1000M ohms min (Final)	Measured by applying test potential between adjacent contacts, and between the contacts and ground in the mated connector assembly. EIA-364-21B
3.5.2.3	Dielectric Strength	For 2.54pitch Connector must withstand test potential of 1000VAC for 1 min. For 1.27/2.00pitch, Connector must withstand test potential of 500VAC for 1 min. Current leakage is limited to 0.5mA MAX.	Measured by applying test potential between adjacent contacts, and between the contacts and ground in the mated connector assembly. EIA-364-20
<b>MECHANICAL REQUIREMENTS</b>			
3.5.3.1	Connector Mating force	2N(200gf) Max per contact(gold plating) 4N(400gf) Max per contact(Tin plating)	Subject terminated contact and pins to mate, to measure the force required to insert and extract by operating at a rate of 100mm/minute. TE Spec. 109-5206
3.5.3.2	Connector Unmating force	0.1N(10gf) min per contact(gold plating) 0.2N(20gf) min per contact(Tin plating)	Subject terminated contact and pins to un-mate, to measure the force required to insert and extract by operating at a rate of 100mm/minute. TE Spec. 109-5206
3.5.3.3	Durability	Contact resistance R≤20mohms final	250 cycles for 0.76um gold plating at mating area; 100 cycles for 0.381um to 0.76um gold plating at mating area; 50 cycles for 0.254um to 0.381um gold

			plating at mating area; 25 cycles for lower than 0.076um gold plating at mating area, and non-gold plating finish. 30 cycles for Tin plating at mating area EIA-364-09B
3.5.3.4	Solderability	The inspected area of each lead must have 95% solder coverage MIN.	Temperature: 245±5 ° C, 3±0.5sec. EIA-364-52, Class I. Category 1.
3.5.3.5	Vibration (Random)	No electrical discontinuity greater than 1 microsecond.	Subject mated connectors to 10-55-10Hz traversed in 1 minutes 2 Hours each of 3 mutually perpendicular planes. EIA-364-28F Test, condition I
3.5.3.6	Physical shock	No electrical discontinuity greater than 0.1 micro-sec shall occur	Subject mated connectors should be tested according to the condition listed below : Wave form : Half-sine Peak acceleration : 30 G's Duration : 11 ms Times: 3 shocks in each direction applied along three mutually perpendicular planes, total 18 shocks. EIA 364-27 Condition H
<b>ENVIRONMENTAL REQUIREMENTS</b>			
3.5.4.1	Temperature Life (Heat Aging)	Resistance (low level) shall be met. Resistance 20m ohms Max.	Subject mated connector assemblies to temperature life at 85°C±2°C for 96 hours. EIA 364-17 Type III, condition A
3.5.4.2	Humidity, Steady State	Insulation Resistance (Final) 500M ohms min. Resistance (low level) shall be met.	Subject mated connectors to steady state humidity at 40°C±2°C and 90-95% R.H for 96hrs. EIA-364-31A, Method II (No pre-condition)
3.5.4.3	Thermal Shock	Resistance (low level) shall be met.	Subject mated connector assemblies on 5 cycle -40 °C and +105°C for 30 minutes each duration at temperature extremes. EIA 364-32B, condition VII
3.5.4.4	Salt Spray (Gold plating item only)	No physical damage shall occur 20mΩ Max. (Final)	Subject mated connectors should be tested according to the condition as below: Temperature: 35 ± 2°C Humidity: 95~98% (R.H) PH value: 6.5~7.2 Duration: 48 hours Density of salt water: 5 ± 1% EIA-364-26 Test condition B
3.4.5.5	Resistance to Wave Soldering Heat	No physical damage shall occur.	Solder Temp. : 240±5°C, 10±0.5sec. TE spec. 109-202, Condition A
	Resistance to Reflow Soldering Heat	No physical damage shall occur.	Pre-soak condition, 85°C/85 % RH for 168 hours. Pre Heat: 150~180°C, 90±30sec. Heat: 230°C Min., 30±10sec.

			Peak Temp. : 260±5°C, 10~20sec. Duration: 3 cycles TE spec. 109-201, Condition B (Reflow soldering as shown in Figure 5). EIA-364-56C
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**Fig. 1 (End)**

**\* Notes**

- A) Product must be without rust, corrosion transformation, crack and discoloration.
- B) Product must meet visual requirements, shows no physical damage, and must meet requirements of additional tests as specified in the Product Qualification and Requalification.

**3.6 Product Qualification Test Sequence (Fig.2)**

Examination	Test Group						
	1	2	3	4	5	6	7
	Test sequence						
Examination of product	1,9	1,10	1,6	1,5	1,5	1,3	1,3
Contact Resistance	2,8	2,7	2,5	2,4	2,4		
Insulation Resistance		3,8					
Dielectric Withstanding Voltage		4,9					
Connector mating force	3,6						
Connector un-mating force	4,7						
Durability	5						
Solder ability						2	
Vibration			3				
Physical shock			4				
Temperature Life (Heat Aging)					3		
Humidity, Steady State		5					
Thermal Shock		6					
Resistance to Soldering Heat							2
Salt Spray				3			

**\* Notes:**

Numbers indicate the sequence in which the tests are performed.

**4. Quality Assurance Provisions:**

**4.1 Test Conditions :**

Unless otherwise specified, all the tests shall be performed in the combination of the following test conditions.

Temperature :	15~35°C
Relative Humidity :	45~75%
Atmospheric Pressure :	86.6~106.6Kpa

**Fig. 3**

**4.2 Tests**

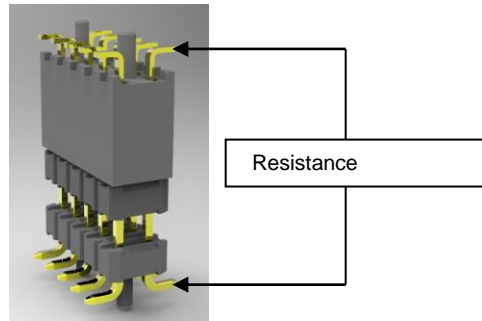
**4.2.1 Test Specimens**

The test specimens to be employed for the tests shall be conforming to the requirements specified in the applicable product drawings.

**4.2.2 Test Sequence**

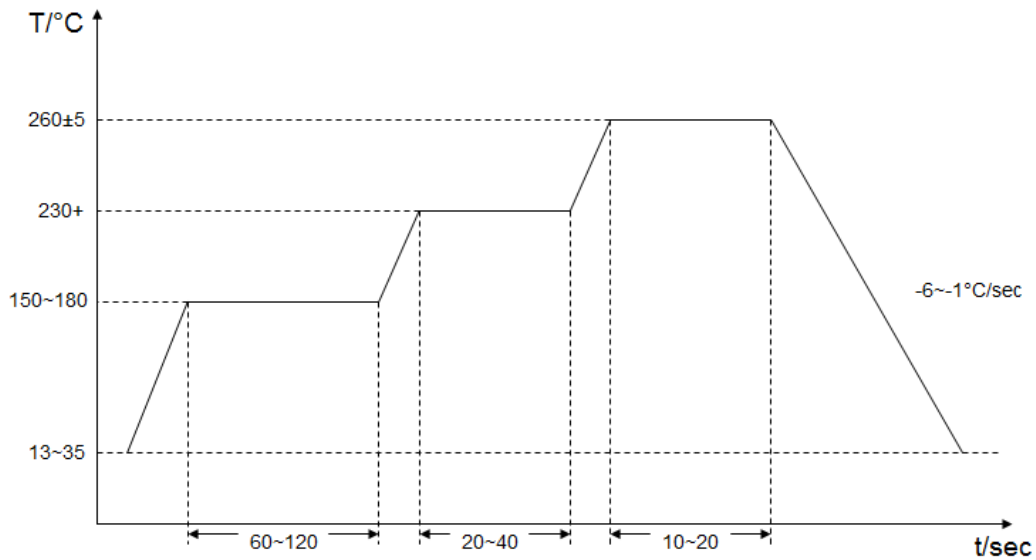
Qualification inspection shall be verified by testing specimens as specified in fig.2

**4.2.3 Terminal Resistance Diagram**



**Fig. 4**

\* **Notes:** When the resistance test is performed, plating of the post contacts shall be corresponding to that of receptacle contact to be used for testing.



**Fig.5 Recommended Reflow T/t Profile**