

**AMP 2.5mm Pitch HPI  
High Performance Interconnect (Low Cost)  
Wire-To-Board System**

**1. SCOPE**

**1.1. CONTENTS**

This specification covers the requirements for product performance, test methods and quality assurance provisions of AMP High Performance Interconnect (HPI), 2.5mm Pitch, Crimp Type.

The applicable product descriptions and part number are as shown below, Table 1:

Product Part No.	Descriptions
X- 440133 -X	Receptacle CRIMP Housing, 2-15 Circuit Position
X- 440134 -X	Receptacle CRIMP Contact, Applicable wire: AWG#22-28
X- 440052 -X	Post Header Vertical Type, 2-15 Circuit Position
X- 440053 -X	Post Header Right-angle Type, 2-15 Circuit Position

Table 1

**1.2 QUALIFICATION**

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

**2. APPLICABLE DOCUMENTS AND SPECIFICATIONS**

The following documents form a part of this specification to the extent specified herein. 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.

- 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 AMP test Specifications and Military or Commercial Documents.
- D. 114-57004: Application Specification.
- E. 501-57057: Test Report.

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### 3. REQUIREMENTS

#### 3.1. DESIGN AND CONSTRUCTION

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

#### 3.2. MATERIALS

##### A. Housing

Receptacle CRIMP Housing: Thermoplastic (UL94V-0).

Post Header Housing: Thermoplastic (UL94V-0).

##### B. Contact

CRIMP Receptacle Contact:

Phosphor Bronze T=0.2mm, Tin Plated.

Post Headers Contact:

Brass, Tin plated over Copper Plated.

#### 3.3. RATING

- A. Voltage: 3A, 250 VAC / DC
- B. Operating Temperature: -25 to +85°C
- C. Current: AWG #22 — 3A  
AWG #24 — 3A  
AWG #26 — 3A  
AWG #28 — 2A

##### 3.3.1 Applicable wires

A. Wire Size: AWG #28 -- #22 (0.08mm<sup>2</sup> - 0.30mm<sup>2</sup>)

B. Insulation Diameter: 1.0mm - 1.9mm

Note: The compatibility of wires for termination must be evaluated accordingly; by the category from each manufacturer, brand, trade names and product catalog numbers

##### 3.3.2 Applicable Printed Circuit Board

A. Board Thickness: 0.8mm - 1.6mm

B. Hole Diameter: 0.9mm – 0.95mm

### 3.4. PERFORMANCE AND TEST DESCRIPTION

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Table 2. All tests are performed at ambient environmental conditions per AMP Specification 109-1 unless otherwise specified.

### 3.5. TEST REQUIREMENTS AND PROCEDURES SUMMARY

Table 2

NO.	TEST ITEMS	REQUIREMENTS		PROCEDURES		
3.5.1	Conformity of Product physical requirements	Product shall conform to the requirements of applicable Product Drawing and Application Specification		Visually, inspected per applicable quality inspection plan.		
<b>ELECTRICAL PERFORMANCE REQUIREMENTS</b>						
3.5.2.1	Termination Resistance	Initial	10m ohms max.	Subject mated contacts assembled in housing to closed circuit current of 10mA max at open circuit voltage of 20mV max.		
		Final	20m ohms max.			
3.5.2.2	Insulation Resistance	1000M ohms min. (Initial) 500M ohms min (Final)		Measure by applying test potential between adjacent contacts, and between the contacts and ground in the mated connector assembly.  MIL-STD-202, Method 302, Condition B		
3.5.2.3	Dielectric Strength	Connector must withstand test potential of 1.0 kVAC for 1 min. Current leakage limit to 5.0mA max.		Measure by applying test potential between adjacent contacts, and between the contacts and ground in the mated connector assembly.  MIL-STD-202, Method 301		
<b>MECHANICAL PERFORMANCE REQUIREMENTS</b>						
3.5.3.1	Connector Mating/ Unmating Force	Initial And 50 <sup>th</sup> Cycle			Subject terminated connector and header to mate and unmate to measure the force required to engage and disengage by operating at a rate of 25mm a minute.	
		Circuit Pos	Insertion (kgf max)	Extraction (kgf min)		
				Initial		Final
		2	2.0	0.4		0.2
		3	2.5	0.5		0.3
		4	3.0	0.6		0.4
		5	3.5	0.7		0.5
		6	4.0	0.8		0.6
		7	4.5	0.9		0.7
		8	5.0	1.0		0.8
		9	5.5	1.1		0.9
		10	6.0	1.2		1.0
		11	6.5	1.3		1.1
		12	7.0	1.4		1.2
		13	7.5	1.5		1.3
		14	8.0	1.6		1.4
15	8.5	1.7	1.5			

3.5.3.2	Individual Pin Insertion/ Extraction Force	Insertion Force	Extraction Force	Subject terminated contact and pin to mate and unmate to measure the force required to insert and extract by operating at a rate of 25mm a minute.
		0.7kgf max	0.10kgf min (Initial) 0.08kgf min (Final)	
3.5.3.3	Tensile Strength of Wire Termination	AWG #22—5.0kgf min. AWG #24—3.0kgf min. AWG #26—2.0kgf min. AWG #28—1.0kgf min.		Apply an axial pull-off load to terminated wire of contact. At a rate of 100mm a minute. The load is applied in the axial directions
3.5.3.4	Contact Retention Force	1.5 kgf min. per contact		Apply axial load to terminated contact at a rate of 100mm a minute.
3.5.3.5	Post Retention Force	1.0 kgf min. per contact		Apply axial pull-off load to post contact mounted on housing and measure the force required to dislodge post from housing.
<b>ENVIRONMENTAL PERFORMANCE REQUIREMENTS</b>				
3.5.4.1	Vibration Sinusoidal Low Frequency	No electrical discontinuities greater than 1 microsecond.  Termination resistance (low level) shall be met.		Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 hours in each of 3 mutually perpendicular planes.  MIL-STD-202, Method 201, Condition A
3.5.4.2	Temperature Life (Heat Aging)	Termination resistance (low level) shall be met.		Subject mated connector assemblies to temperature life at 85°C±2°C for 240hours.
3.5.4.3	Humidity, Steady State	Insulation Resistance (Final): 500 Mohms min.  Termination resistance (low level) shall be met.  Dielectric Strength shall be met.		Subject mated connectors to steady state humidity at 40°C and 90-95% R.H for 240hrs  MIL-STD-202, Method 103, Condition B.
3.5.4.4	Thermal Shock	Termination resistance (low level) shall be met.  Must meet electrical requirements.		Subject mated connector assemblies on 25 cycle -55 °C and +85°C for 30 minutes each duration at temperature extremes.  MIL-STD-202, Method 107, Condition A
3.5.4.5	Salt Spray	Termination resistance (low level) shall be met.		Subject mated/ unmated connectors to 5% salt concentration for 48 hours.  MIL-STD-202, Method 101, Condition B
3.5.4.6	Industrial Gas / Sulfurous Acid Gas (SO <sub>2</sub> )	Termination resistance (low level) shall be met.		Subject mated connector to sulfurous acid gas (SO <sub>2</sub> ) atmosphere of 3±1 ppm concentration at 40±2°C for 96 hours
3.5.4.7	Solderability	The contact solder tails should be covered by a continuous new solder coating for 95% Minimum of affected area.		Subject contacts to solderability testing, as specified and solder transfer at 245±5°C for 3±0.5sec  MIL-STD-202, Method 208

3.5.4.8	Resistance to Soldering Heat	No physical damage shall occur.	Subject product mounted on printed circuit board to solder bath at $245\pm 5^{\circ}\text{C}$ for $3\pm 1$ seconds MIL-STD-202, Method 210 except as indicated above when testing by manual soldering iron, apply it as $350\pm 10^{\circ}\text{C}$ for 1-2 seconds without forcing pressure to affect the time of contact. Wave solder curve for *-440052-* as Fig 1
3.5.4.9	Durability (Repeated Mate /Unmating)	Termination resistance (low level) shall be met.	Subject connector assembly to 50 cycles of repeated mating /unmating at a rate of 10 cycles a minute.
3.5.4.10	Ammonia	Termination resistance (low level) shall be met.	After 72 hours exposure in ammonia chamber with 25cc of 3% ammonia solution for every liter of chamber capacity

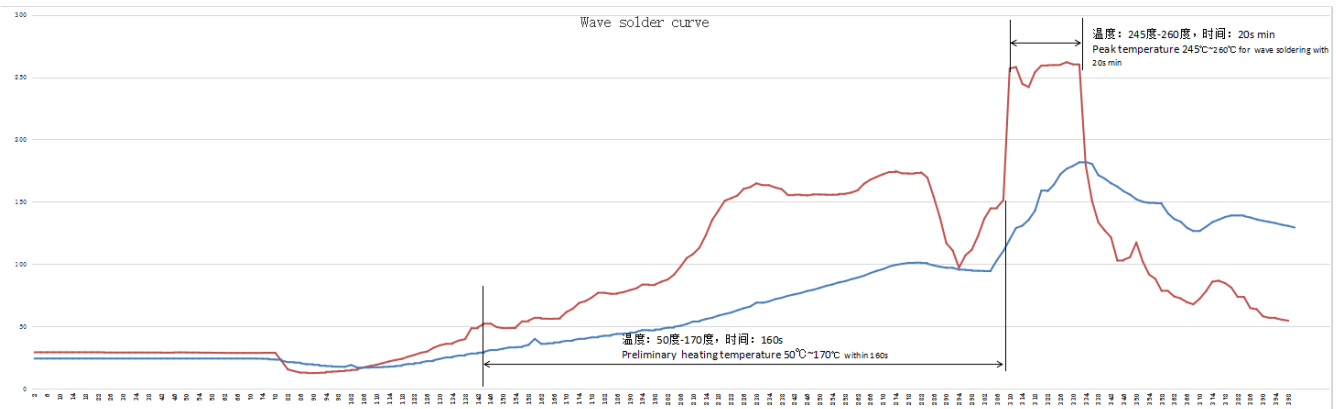


Fig 1 Wave solder curve  
Suggest PCB thickness 1.5mm

## **4. QUALITY ASSURANCE PROVISIONS**

### **4.1 QUALIFICATION TESTING**

#### **A. Test Specimens**

The test specimens to be used for the performance evaluation testing, shall be prepared in accordance with AMP Application Specification, 114-57004, Termination AMP 2.5mm HPI CRIMP Connector, by using samples selected from the current production at random, and conforming to the requirements of the applicable product drawings.

#### **B. Test Condition**

Unless otherwise specified, all tests shall be performed under any combination of the following test conditions:

Temperature: 15 – 30°C

Relative Humidity: 45 – 75%

Atmospheric Pressure: 650 – 800 mmHg

### **4.2 RE-QUALIFICATION TESTING**

If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate re-qualification testing, consisting of all or part of original testing sequence as determined by development/product, quality and reliability engineering.

### **4.3 ACCEPTANCE**

Acceptance is based on verification that product meets requirements Spelled in Table 2. Data attributed to equipment; test setup or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmit.

### **4.4 QUALITY CONFORMANCE INSPECTION**

Applicable AMP quality inspection plan will specify sampling acceptable quality level to be used. Dimension and functional requirements shall be in accordance with applicable product drawing and this specification.