108-5204
NUMBER
Customer Release
AMP SECURITY CLASSIFICATION

108-5204

PRODUCT SPECIFICATION

AMP Low Profile ULTREX 2.0mm Pitch Series Interconnection System (Crimp Type and Mass-termination (M/T) Type)

1. Scope

This specifiaction applies to the crimp type and the M/T type of wire-to-PCB type products of AMP low profile ULTREX 2.0mm pitch series.

Type	Product Name	Product No.	Remarks
Crimp type	Receptacle contact	173653-☐	AWG #30 ∿ #26
	Receptacle contact	173654-☐	AWG #26 ∿ #22
	Receptacle housing	☐-173292-☐	2 ∿ 12 poles
	Header assembly	☐-173611-☐	2 ∿ 12 poles, vertical type
M/T type	Receptacle contact assembly	☐-173610-☐	AWG #28, #26 2 ∿ 12 poles
	Header assembly	☐-173611-☐	2 ∿ 12 poles, vertical type

LTR	REVISION RECORD	DR	CHK	DATE
F	Revise RFA-1108		T.S	4/16 '97
E	Revised RFA-1097			
D	Revised RFA-1082	T.S		11/5 '94
C	Revised RFA-1013		T.S	6/11 '86
B	Revised RFA-967	T.S	T.S	1/20 '86
A	Revised RFA-911		T.S	9/27 '85
	Released RFA-874		Y.S.	4/18 '85

DR		AMP	AMP (Japan), Ltd. TOKYO, JAPAN	
CHK	6/13 '85			
APP	6/13 '85	LOC J	A	NO 108-5204	REV F
SHEET 1 OF 11	NAME AMP Low Profile ULTREX 2.0 Series Interconnection System			

2. Material and Finish

Item No.	Part Name	Material and Finish
2.1	Receptacle contact	Pre-tinned (0.8μ or over in thickness) phosphor bronze
2.2	Receptacle housing	Glass-filled PBT (UL94V-0)
2.3	Post contact	Pre-tinned (0.8μ or over in thickness) phosphor bronze
2.4	Header housing	Glass-filled PBT (UL94V-0)

3. Rating

Item No.	Part Name	Rating
3.1	Rated voltage	250V AC/DC
3.2	Rated current	Shall be as shown below in accordance with sizes of wire to be connected. AWG #30 .... 2.0A AWG #24 .... 3.0A AWG #28 .... 2.0A AWG #22 .... 4.0A AWG #26 .... 2.5A
3.3	Range of temperature	-30° ∿ +105°C The upper limit of temperature shall include the rise due to the load current.
3.4	Applicable wire sizes	Crimp type: 0.05 ∿ 0.14mm² (AWG #30 ∿ #26) 0.14 ∿ 0.37mm² (AWG #26 ∿ #22) M/T type : 0.08 ∿ 0.15mm² (AWG #28, #26) Only pre-tinned, 7-strand wires, tin-coated wires and pre-tinned single-strand wires can be used.
3.5		Crimp type: 0.7 ∿ 1.1mm (AWG #30 ∿ #26) 0.9 ∿ 1.6mm (AWG #26 ∿ #22) M/T type : 0.88 - 1.10mm
3.6	Applicable printed circuit board	Thickness of the board: 0.8 ∿ 1.6mm Hole diameter of the board: 0.8 ∿ 0.9ømm (Thru hole type PCB: 0.850 - 0.910

4. Conditions for Quality Assurance

4.1 Testing Environment

Unless otherwise specified, the product performance evaluation testing shall be conducted under the following environmental conditions.

Temperature : 15 ∿ 30°C
Relative humidity : 45 ∿ 75%
Atmospheric pressure : 650 ∿ 800mm Hg

4.2 Test Samples

4.2.1 Test samples for use in the product performance evaluation testing shall conform to the requirements specified on the appropriate drawings.

4.2.2 Connection wires specified in Item 3.4 and Item 3.5 shall be used and connected using applicable tools.

4.2.3 Unless otherwise specified, no test samples shall be re-used.

5. Product Performance

Item No.	Test Item	Specified Value	Testing Condition and Method
5.1	Appearance	To be free from flaws, cracks, deformation blister, stain, burrs, etc. which are detrimental to functions and commercial value of product.	Visual check

Item No.	Test Item	Specified Value	Testing Condition and Method
5.2	Low-level termination resistance	Initial value: 10mΩ max.	To be measured with break voltage DC 50mV max. and make current of 50mA max. applied by the measuring circuit shown in Figure 1.
5.3	Insulation resistance	500MΩ min.	To be measured across adjacent contacts of the connector, which is completely connected, according to the testing method specified in Test Condition B (500V ±10%), Testing Method 302 of MIL-STD-202. In this measurement, the header assembly shall be not mounted on the printed circuit board.
5.4	Dielectric strength	To be free from abnormalities such as insulation break-down and flashover etc.	AC 750V (actual) to be applied for one minute across adjacent contacts of the connector, which is completely connected, according to the testing method specified in Testing Method 301 of MIL-STD-202. In this measurement, the header assembly shall be not mounted on the printed circuit board.
5.5	Temperature rise	30°C max.	The header assembly and the receptacle assembly, which are mounted on the printed circuit board, to be connected so that all poles form a serires circuit while the connector is completely connected, and the test to be conducted by applying the rated current. After temperature rising becomes stabilized, measure by using thermocouple. A value obtained by subtracting the room temperature from the measured temperature value shall be the value of temperature rise.

<table>
<tr><th>Item No.</th><th>Test Item</th><th>Specified Value</th><th>Testing Condition and Method</th></tr>
<tr><td>5.6</td><td>Tensile strength of the crimped part (applied to only the crimp type)</td><td>
<table>
<tr><th colspan="2">Wire Size</th><th rowspan="2">Strength kg(min)</th></tr>
<tr><th>mm²</th><th>AWG</th></tr>
<tr><td>0.05</td><td>#30</td><td>0.8</td></tr>
<tr><td>0.08</td><td>#28</td><td>1.3</td></tr>
<tr><td>0.13</td><td>#26</td><td>2.0</td></tr>
<tr><td>0.2</td><td>#24</td><td>3.0</td></tr>
<tr><td>0.3</td><td>#22</td><td>5.0</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
</td><td>To be measured by pulling the contact crimped to an applicable wire of approx. 100mm at the rate of 100mm/min in the axial direction. The tensile strength is represented by a value measured when the wire is broken or comes off from the crimped part.
For this test, insulation support shall be not crimped.</td></tr>
<tr><td>5.7</td><td>Contact retaining force (applied to the crimp type only)</td><td>2.0kg min</td><td>To be measured by fitting the contact which is crimped to the applicable wire having a tensile strength larger than the specified value to the housing and pulling it at the rate of 100mm/min in the axial direction.
The contact retaining force is represented by a value measured when the contact is dislodged from the housing.</td></tr>
<tr><td>5.8</td><td>Post retaining force</td><td>0.8kg min./pole</td><td>A load to be measured when the post comes off from the housing as the post is straightly pushed at the rate of approx. 100mm/min in the axial direction from the soldering tine side of the header assembly as shown in Figure 2.</td></tr>
<tr><td>5.9</td><td>Wire retaining force (applied to only the M/T type)</td><td>
<table>
<tr><th rowspan="2">AWG (mm²)</th><th colspan="2">Retaining force kg(min)</th></tr>
<tr><th>Straight</th><th>Orthogonal</th></tr>
<tr><td>#28 (0.08)</td><td>1.5</td><td>1.0</td></tr>
<tr><td>#26 (0.13)</td><td>2.5</td><td>1.5</td></tr>
</table>
</td><td>To be measured by pulling the applicable wire of approx. 100mm, which is mass-terminated to the receptacle assembly, in straight or orthogonal direction. The wire retaining force is represented by a value measured when the wire is broken or drawn out or the contact</td></tr>
</table>

Item No.	Test Item	Specified Value			Testing Condition and Method
5.9	(Continued)	AWG (mm^2)	Retaining force kg(min)		is drawn out. The straight direction is referred to the wire drawing out direction and the orthogonal direction is referred to a direction at right angles to the wire drawing out direction (where the wire comes off from the M/T slot).
			Straight	Orthogonal	
5.10	Connection inserting/ drawing force	Pole No.	Inserting force kg max.	Drawing force kg min.	Initial inserting force and drawing force to be measured by operating the receptacle assembly with the pole number corresponding to the header assembly at the rate of 100mm/min.
		2	4.5	1.0	
		3	4.5	1.0	
		4	4.5	1.0	
		5	5.0	1.5	
		6	6.0	1.5	
		7	6.0	2.0	
		8	6.5	2.0	
		9	7.0	2.0	
		10	7.0	2.5	
		11	8.0	2.5	
		12	8.5	2.5	
5.11	Durability (Repeated insertion and drawing of connector)	To be free from external abnormality. Low-level termination resistance: 20mΩ max.			Inserting and drawing operations of the receptacle assembly having the pole number corresponding to the header assembly shall be repeated 25 times at the rate not

Item No.	Test Item	Specified Value	Testing Condition and Method
			exceeding 10 operations/min under an ordinary operating condition.
5.12	Low-frequency vibration	To be free from electrical discontinuity exceeding 1μ sec. during vibration. Low-level termination resistance: 20mΩ max. To be free from external abnormality.	The receptacle assembly having the pole number corresponding to the header assembly mounted on the printed circuit board shall be completely inserted into the header assembly so that the poles are connected to form a series circuit and the test shall be conducted with 0.1A test current supplied according to Testing Method 201 of MIL-STD-202. Maximum amplitude: 1.5mm Vibration frequency: 10-55-10Hz/min Direction and time : 2 hours each in X, Y and Z directions (6 hours in total)
5.13	Humidity resistance (normal condition)	Insulation resistance: 100MΩ min. Dielectric strength: Shall satisfy Item 5.4. Low-level termination resistance: 20mΩ max.	To be tested for 96 hours according to the following testing conditions based on Testing Method 103 of MIL-STD-202 under the condition that the receptacle assembly having the pole number corresponding to the header assembly mounted on the printed circuit board is completely inserted into the header assembly. Temperature: 40 ±2°C Humidity : 90∿95% After the tests, measurement shall be carried out with test samples which have been left at room temperature for one hour.

<table>
<tr><th>Item No.</th><th>Test Item</th><th>Specified Value</th><th>Testing Condition and Method</th></tr>
<tr><td>5.14</td><td>Thermal shock</td><td>Low-level termination resistance:
20mΩ max.</td><td>To be consecutively tested in 25 cycles according to the following testing conditions based on Testing Method 107 of MIL-STD-202 under the condition that the receptacle assembly having the pole number corresponding to the header assembly mounted on the printed circuit board is completely inserted into the header assembly.
<table>
<tr><th>Step</th><th>Temperature (°C)</th><th>Time (min)</th></tr>
<tr><td>1</td><td>-55^{+0}_{-3}</td><td>30</td></tr>
<tr><td>2</td><td>25^{+10}_{-5}</td><td>5 max.</td></tr>
<tr><td>3</td><td>85^{+3}_{-0}</td><td>30</td></tr>
<tr><td>4</td><td>25^{+10}_{-5}</td><td>5 max.</td></tr>
</table></td></tr>
<tr><td>5.15</td><td>Salt spray</td><td>Low-level termination resistance:
20mΩ max.</td><td>To be tested for 48 hours according to Testing Condition B, Testing Method 101 of MIL-STD-202 under the condition that the receptacle assembly having the pole number corresponding to the header assembly mounted on the printed circuit board is completely inserted into the header assembly.
Salt concentration: 5%
Temperature: 35°C
After the test conditioning, linse the sample in the tap water, and having it dried in the room temperature for one hour, measure low level termination resistance.</td></tr>
</table>

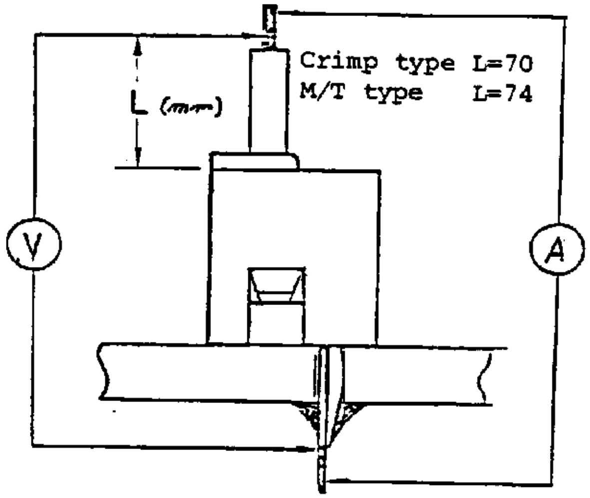
Item No.	Test Item	Specified Value	Testing Condition and Method
5.16	Sulfurous acid gas	Low-level termination resistance: 20mΩ max.	To be tested for 96 hours according to the testing conditions given below under the condition that the receptacle assembly having the pole number corresponding to the header assembly mounted on the printed circuit board is completely inserted into the header assembly. Sulfurous acid gas concentration: 10 ±3 ppm Humidity: 90% min. Temperature: Room temperature After the tests, measurement shall be carried out with test samples which heve been left at room temperature for one hour.
5.17	Post solder-ability	Soldered area: 95% min. (except the sheared surfaces of contact)	To be tested by submerging the soldered parts of the posts of the header assembly in flux (Alpha 100, GX-5 or GX7) for 3 to 5 seconds and further in the soldering bath (tin 60% and lead 40%) having temperature of 230 ±5°C for 3 ±0.5 seconds.
5.18	Resistance to soldering heat	To be free from physical abnormalities such as play of the posts, cracks and deformation of the housing, etc.	To be tested by submerging the soldering tine parts in the soldering bath having temperature of 260 ±5°C for 5 ±2 seconds according to Testing Condition C, Testing Method 210 of MIL-STD-202 under the condition that the header assembly is completely mounted on the printed circuit board.

6. Test Items and Sequence

The product performance evaluation testing shall be conducted for the divided groups in the sequence specified by encircled numbers shown in Table 1.

Test Item	Item No.	Test Group															
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Appearance	4.1	①	①					①	①	①	①	①	①		①		
Low-level termination resistance	4.2							②	②	②	②	②	②				
Insulation resistance	4.3	②															
Dielectric strength	4.4	③															
Temperature rise	4.5		②														
Tensile strength of crimped part	4.6			①													
Contact retaining force	4.7				①												
Post retaining force	4.8					①											
Wire retaining force	4.9						①										
Connector insertion/extraction force	4.10							③									
Durability	4.11							④									
Low-frequency vibration	4.12								③								
Humidity (Steady state)	4.13	④								③							
Thermal shock	4.14										③						
Salt spray	4.15											③					
Sulfurous acid gas	4.16												③				
Post solderability	4.17													①			
Soldering heat resistivity	4.18														②		
Insulation resistance	4.3	⑤															
Dielectric strength	4.4	⑥															
Low-level termination resistance	4.2							⑤	④	④	④	④	④				
Appearance	4.1	⑦	③					⑥	⑤	⑤	⑤	⑤	⑤		③		

Table 1



Note: The resistance value of 75 mm wire shall be subtracted from the measured value.

Figure 1 Measuring Method for Low-level Termination Resistance

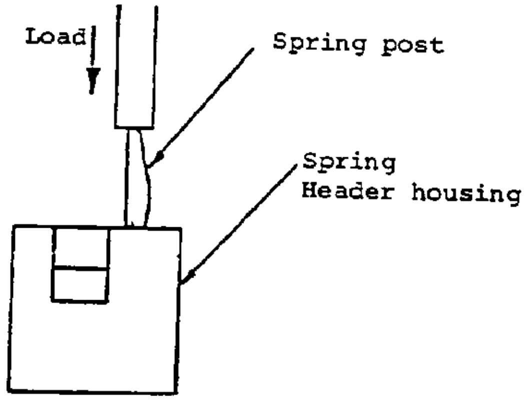


Figure 2 Testing Method for Post Retaining Force

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LOC J A	NO 108-5204		REV. F
NAME AMP Low Profile ULTREX 2.0 Series Interconnection System			