



朝貴電子股份有限公司

CKM ELECTRONICS CO., LTD.

PRODUCT SPECIFICATION

CKM PN: 2501 Series

2.50mm PITCH CONNECTOR

REVISION HISTORY:

REV	REVISION DESCRIPTION	DATE	CREATED/REVISED
A	NEW RELEASE	2006.04.03	
B	UPGRADE THE FORM	2013.10.20	Qinggang yang
C	UPGRADE THE FORM	2014.09.09	Guobao Lee
D	UPDATE THE MAXIMUM OPERATING TEMPERATURE	2015.10.28	Zisen Wei
E	UPDATE TEST REQUIREMENTS AND PROCEDURES	2015.11.23	Zisen Wei
F	UPDATE THE FORM	2015.12.08	Zisen Wei
G	Update Data	2019.04.11	Odyssey

<b>REVISION:</b> <b>G</b>	<b>ECR/ECN INFORMATION:</b> EC No.: DATE: 2019/04/11	<b>TITLE:</b> 2.50mm PITCH CONNECTOR	<b>SHEET No.</b> 1 of 9	
<b>DOCUMENT NUMBER:</b> <b>PS-2501-001</b>		<b>CREATED/REVISED</b> Odyssey	<b>CHECKED BY</b> Sun Lee	<b>APPROVED BY</b> Angus Chen



**1.0. SCOPE**

This product specification covers performance, tests and quality requirements for **2501 Connector Series** When tests are performed on subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable product drawing.

**2.0. 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 the 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. APPLICABLE DOCUMENTS AND SPECIFICATIONS**

- EIA-364
- UL-94 Flammability
- JIS C5402
- JIS C0020,C0021
- MIL-STD-202

**3.0.REQUIREMENTS**

**3.1 Design and Construction**

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

**3.2 MATERIAL**

Materials used in the construction of this product shall be as specified on the applicable product drawing

**3.3 Ratings**

- 1. Rated Voltage: 250 V AC DC
- 2. Rated Current: 2.5A(#22 AWG)  
2A (#24 AWG)  
1.5A (#26 AWG)  
1.25A(#28 AWG)

3. Current: See Figure 4 for applicable current carrying capability. Maximum rated current that can be carried by this product is limited by maximum operating temperature of the housings (85°C) and temperature rise of the housings (30°C). Variables to be considered for each application are: wire size, connector size, contact material, ambient temperature, and printed circuit board design.

- 4. Ambient Temperature Range: -25 to 85°C

**3.4 Performance and Test Description.**

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

**3.5 Test Requirements and Procedures Summary**

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Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
<b>ELECTRICAL</b>		
Low Level Contact Resistance (LLCR).	10 mΩ maximum initial. 40 mΩ maximum final.	EIA-364-23. Subject specimens to 100 mA maximum and 20 mV maximum open circuit voltage. See Figure 3.
Insulation resistance.	1000 MΩ minimum	EIA-364-21. 500 V DC, 1 minute hold. Test between adjacent contacts.
Withstanding voltage.	One minute hold with no breakdown or flashover. 5mA maximum leakage current.	EIA-364-20, Condition I. 500 V AC at sea level. Test between adjacent contacts.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C. See Figure 4.
<b>MECHANICAL</b>		
Durability.	See Note.	EIA-364-9. Manually mate and un mate specimens with companion headers for 30 cycles at a maximum rate of 25±3 mm per minute

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Mating force.	See figure1	EIA-364-13.Measure force necessary to mate specimens with companion headers a distance of 5.08 mm from point of initial contact at a maximum rate of 25±3 mm per minute.
Un mating force.	See figure1	EIA-364-13.Measure force necessary to un mate specimens from companion headers at a maximum rate of 25±3 mm per minute
Terminal / Housing Retention Force (For Plug)	1.0kgf Min.	Retention speed 25±3 mm per minute from housing
Contact retention. (for Header)	1.0kgf minimum	Push pin from insulator base at speed 25± 3 mm per minute
Vibration	Appearance: No damage; Contact resistance: 40mΩ Max; Discontinuity: 1 micro second max.	Amplitude: 0.75mm Sweep Time: 10-55-10 Hz/minute Duration: 2 Hours in each X,Y,Z axils (Based upon MIL-STD-202 Method 201)
Mechanical Shock	No physical damage & No electric discontinuity greater than 1 μ sec. shall occur & Contact resistance: 40 m Ω Max After test	Subject mated connectors to 50 G's (peak value) half-sine shock pulses of 11 ms duration. Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test specimen (18 shocks). The electrical load condition shall be 100mA maximum for all contacts.

**ENVIRONMENTAL**

Heat Resistance	No Physical damage & Contact resistance: 40 m Ω Max After test	Subject mated connectors to temperature life at 85± 2°C for 96 hours. Measure Signal.
Cold Resistance	No physical damage & Contact resistance: 40 mΩ Max After test	Mate connectors: Duration: 96 hours; Temperature: -25 ± 2°C
Humidity	No physical damage Contact resistance: 40 mΩ Max. after test Insulation resistance: 10 MΩ Min. Dielectric withstanding voltage: No breakdown	Subject mated plug and connector, soldered to P.C. Board, to relative humidity 90~95%RH and a temperature of 60°C ± 2°C relative humidity for 96 hour. It shall be subjected to standard atmospheric condition for 1 hour after which measurements shall be made.

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Temperature cycling	Appearance: No damage Contact resistance: 40 mΩ Max.	Mated connector shall be set to temperature cycling for 5 cycles of which 1 cycle consists of: a) +25°C ~ 3 minutes b) -25°C ~ 30 minutes c) +25°C ~ 3 minutes d) +85°C ~ 30 minutes (Based upon JIS C5402 7.2)
Salt spray	Appearance: No damage	Mated connector shall be placed on a salt spray chamber on the following conditions. (Based upon JIS C5402 7.1 / MIL-STD-202 Method 101 Condition B) Salt Solution Density : 5±1% Temperature : 35±2°C, Duration : 12Hours
Solder ability	Solder coverage: 95% Min.	Subject the test area of contacts into the flux for 5-10 sec. And then into solder bath, Temperature at 245 ±5°C for 3±0.5sec.
Resistance to Soldering Heat (for Header)	No damage	for wave soldering :MIL-STD-202F, Method 210A, Test Condition B. Pre-heat : 80°C, 60 Seconds Temperature : 260±5 °C Immersion duration : 10 ± 1 sec. See figure 5
Soldering iron method	No damage	Apply solder iron in solder tail Temperature: 350°C Max, 3 sec.

Figure 1

**4.Mating and Un-mating Force(Retain Latch):**

PIN No.	At Initial		At 30th
	Mating (kgf Max.)	Un-mating (kgf Min.)	Un-mating (kgf Min.)
2	3.5	0.8	0.6
3	4.0	1.0	0.8
4	4.5	1.2	0.9
5	5.0	1.2	0.9
6	5.5	1.4	1.0
7	6.0	1.4	1.0
8	6.5	1.6	1.2
9	7.0	1.6	1.2
10	7.5	1.8	1.4

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11	8.0	1.8	1.4
12	8.5	2.0	1.6
13	9.0	2.0	1.6
14	9.5	2.2	1.8
15	10.0	2.4	2.0

**5. Crimping Specification:**

Fix the crimped terminal, apply axial pull out force on the wire at a constant speed of 25±3mm/min (Based upon JIS C5402 6.22)

2501T0X-XX					
Wire Size(AWG)		#22	#24	#26	#28
1. CONDUCTOR (mm)	CRIMP WIDTH	1.50±0.1			
	CRIMP HEIGHT	0.74~0.85	0.69~0.78	0.63~0.72	0.59~0.68
2. INSULATION (mm)	CRIMP WIDTH	1.80			
	CRIMP HEIGHT	1.92	1.85	1.81	1.75
CRIMP STRENGTH		4.0Kgf (MIN)	3.0Kgf (MIN)	2.0Kgf (MIN)	1.5Kgf (MIN)

**NOTE**

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure2.

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Test or Examination	Test Group											
	A	B	C	D	E	F	G	H	I	J	K	L
	Test Sequence (a)											
Examination of Product	1,5	1,7	1	1	1,5	1,3	1,5	1,6	1,3	1,3	1,3	1,5
Contact Resistance	2,6	2,8			2,4		2,4	2,5				2,4
Insulation Resistance		3,9										
Dielectric withstanding Voltage		4,10										
Temperature Rise						2						
Durability	4											
Mating & Un-mating force	3											
Terminal/Housing Insertion Force (For Plug)				2								
Contact retention. (for Header)			2									
Vibration					3							
Mechanical Shock												3
Heat Resistance								3				
Cold Resistance								4				
Humidity		6										
Temperature cycling		5										
Salt spray									2			
Solder ability										2		
Resistance to Reflow heat							3					
Soldering iron method											2	
Sample Size	5	5	5	5	5	5	5	5	5	5	5	

Figure2

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**NOTE:**

- (a) See paragraph 6.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Precondition specimens with 30 durability cycles.

**6. QUALITY ASSURANCE PROVISIONS**

6.1 Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1, 2, 3 and 5 shall each consist of a minimum of 5 specimens with a minimum of 30 data points. Test group 4 shall consist of a minimum of 5 specimens with a minimum of 30 header posts

B. Test Sequence

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

6.2 Requalification Testing

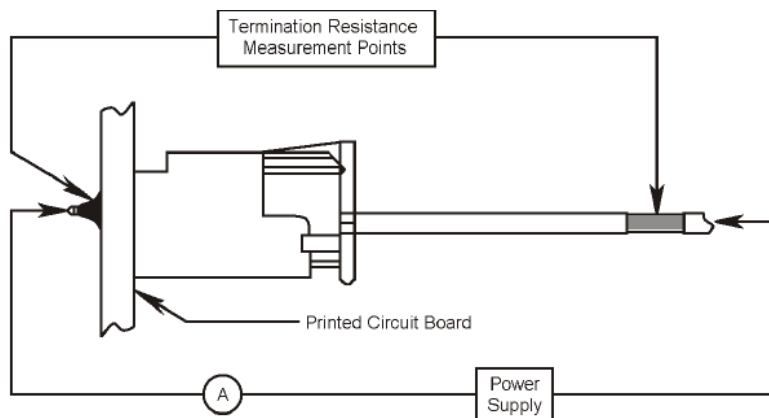
If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

6.3 Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

6.4 Quality Conformance Inspection

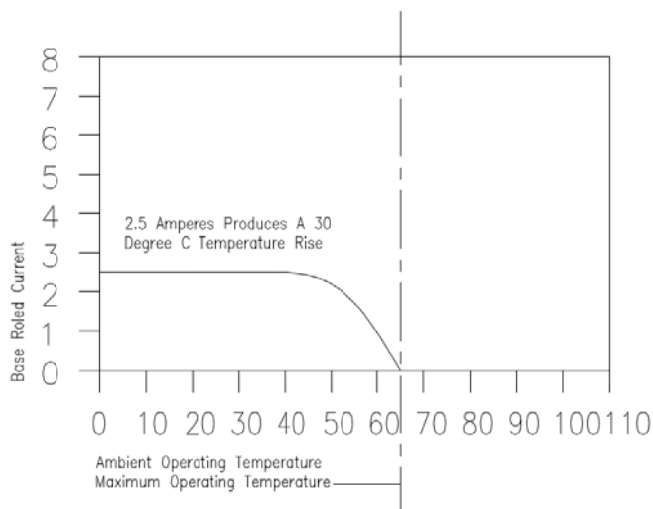
The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification



**Figure 3**  
**LLCR Measurement Points**

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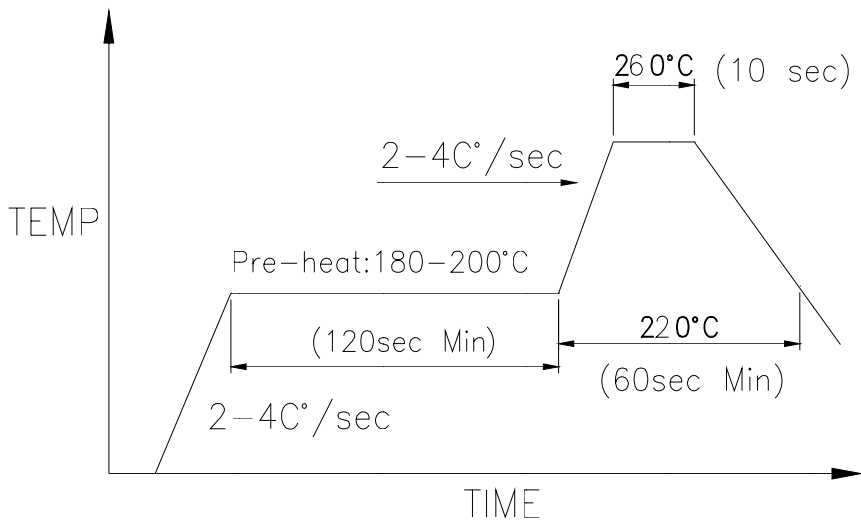


**Figure 4**  
**Current Rating**

**NOTE:**

To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use the Multiplication Factor (F) from the above chart and multiply it times the Base rated Current for a single circuit at the maximum ambient operating temperature shown in Figure 4.

**Figure5**



The connector shall be mounted on the PCB ,the temperature of the solder shall be  $260\pm 5^{\circ}\text{C}$ , and immersion duration: $10\pm 1$ seconds.

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