

M.2(NGFF) MINI CARD 0.5 PITCH 67 Positions

1. SCOPE

1.1. CONTENTS

This specification covers the performance, tests and quality requirements for the M.2(NGFF) mini card connector for high end application.

1.2. QUALIFICATION

When tests are performed on the subject product line, the procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENT

The following TE 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 SPECIFICATIONS

- A. 109-1: General Requirements for Test Specifications
- B. 109-197: TE Specification vs EIA and IEC Test Methods
- C. 114-115006: Application specification
- D. 501-115043: Test Report for 2.25H
501-115039: Test Report for 3.2H
501-115044: Test Report for 4.2H
501-115047: Test Report for Mid-plane

2.2. INDUSTRY STANDARDS

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.

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

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

3.3. RATINGS

- A. Rated Voltage: 50 VAC (per pin).
- B. Rated Current: 0.5 A (per pin)
- C. Service Temperature: -40°C ~ +85°C PERFORMANCE REQUIREMENT AND TEST DESCRIPTION

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. All tests shall be performed at ambient environmental conditions per AMP Specification 109-1 TEST REQUIREMENTS AND PROCEDURES SUMMARY.

3.4. TEST REQUIREMENTS AND PROCEDURES SUMMARY

Test Item		Requirement	Procedure
1	Examination of Product	Meets requirements of product drawing. No physical damage.	Visual inspection.
ELECTRICAL REQUIREMENT			
2	Low Level Contact Resistance	55 m Ohm Max.(Initial) 20 m Ohm Max change allowed(Final)	Subject mated contacts assembled in housing to 20mV Max open circuit at 100mA Max. EIA-364-23B.
3	Dielectric withstanding Voltage	No creeping discharge or flashover shall occur. Current leakage: 1 mA Max.	300VAC for 1minute Test between adjacent circuits of unmated connector. EIA-364-20C.
4	Insulation Resistance	500 M Ohm Min.(Initial) 500 M Ohm Min.(Final)	Impressed voltage 500 VDC. Test between adjacent circuits of unmated connector. EIA-364-21C.
5	Current Rating	30°C Max change allowed at rated current.	Mate connector: measure the temperature rise at rated current after 0.5A/Power contact. The temperature rise above ambient shall not exceed 30°C the ambient condition is still air at 25°C. Please refer 3.8 fig. 4. EIA-364-70 Method 2.
MECHANICAL REQUIREMENT			
6	Mating / Unmating Force	Mating: 20 N Max. Unmating: 25 N Max	Card mating/unmating sequence: a) Insert the card at the angle specified by the manufacturer b) Rotate the card into position c) Reverse the installation sequence to unmated Operation Speed: 25.4mm per minute. Measure the force required to mating/unmating connector EIA-364-13, Method A.
7	Durability	60 cycles No evidence of physical damage	The sample should be mounted in the tester and fully mated and unmated the numbers of cycles specified at the rate of 25.4mm per minute. EIA-364-09.
8	Durability (Preconditioning)	5 cycles No evidence of physical damage	The sample should be mounted in the tester and fully mated and unmated the numbers of cycles specified at the rate of 25.4mm per minute. EIA-364-09.

9	Vibration	No electrical discontinuity greater than 1u sec shall occur. No evidence of physical damage	2 hours in each of 3 mutually perpendicular directions. Both mating halves should be rigidly fixed so as not to contribute to the relative motion of one contact against another. The method of fixture should be detailed in the test report. Random curve, Test condition VII, condition D. EIA-364-28.
10	Mechanical Shock	No electrical discontinuity greater than 1u sec shall occur. No evidence of physical damage	Option 1: 50 G, 11ms Option 2: 285 G, 2ms, Non-operating environment. Half sine No. of Drops: 3 drops each to normal and reversed directions of X, Y and Z axes, totally 18 drops. EIA-364-27B.
ENVIRONMENTAL REQUIREMENT			
11	Humidity-Temperature Cycle	20 m Ohm Max change allowed(Final)	Mated Connector Initial measurement, cold shock and vibration. Except cycle the connector between 25°C +/-3°C at 80%+/-3%RH and 65°C +/-3°C at 50%+/-3%RH. Ramp times should be 0.5 hour and dwell times should be 1.0 hour. Dwell times start when the temperature and humidity have stabilized within the specified levels. Perform 24 such cycles. EIA-364-31, method III.
12	Thermal Shock	20 m Ohm Max change allowed(Final)	Mated Connector EIA-364-32, Test condition I, 10 cycles
13	Temperature Life	20 m Ohm Max change allowed(Final)	Mated Connector 105°C, 120 hours, EIA-364-17, Method A..
14	Temperature Life (Preconditioning)	20 m Ohm Max change allowed(Final)	Mated Connector 105°C, 72 hours, EIA-364-17, Method A.
15	Reseating	20 m Ohm Max change allowed(Final)	Manually unplug/plug the connector. Perform 3 such cycles.
16	Mix Flowing Gas	20 m Ohm Max change allowed(Final)	EIA-364-65, Class II A, 120 hours to simulate 3 years field life. Option 4.
17	Thermal Disturbance	20 m Ohm Max change allowed(Final)	Cycle the connector between 15°C +/-3°C and 85°C +/-3°C, as measured on the part. Ramps should be a minimum of 2°C per Minute, and dwell times should insure that the contacts reach the temperature Extremes (a minimum of 5 minutes) Humidity is not controlled. Perform 10 such cycles.
18	Resistance to Reflow Soldering Heat	No evidence of physical damage	Pre-soak condition, 85°C/85%RH for 168 hours. Pre Heat: 150~180°C, 60~90 sec. Heat: 230°C Min., 40 sec Min. Peak Temp.: 245°C Max., 10 sec Max. TE spec. 109-201, Condition A.

Figure 1

3.6. PRODUCT QUALIFICATION AND REQUALIFICATION TEST

Test Examination	Test Group									
	1	2	3	4	5	6	7	8	9	10
	Test Sequence									
Examination of Product	1, 8	1, 10	1, 8	1	1, 7	1, 7	1, 7	1, 7	1, 3	1, 3
Low Level Contact Resistance	2,5,7	2,5,7,9	2,5,7	2,5,7,9,11		2, 6	2, 4, 6	2, 4, 6		
Dielectric withstanding Voltage					2,5					
Insulation Resistance					3,6					
Mating/Un-mating Force						3(b), 5 (b)				
Durability						4(b)				
Durability (Preconditioning)	3(a)	3(a)	3(a)	3(a)			3(a)	3(a)		
Vibration			6							
Temperature Rise									2	
Reseating	6	8		10						
Mix Flowing Gas				6						
Thermal Disturbance				8						
Mechanical Shock (50G, 11ms)							5			
Mechanical Shock (285G, 2ms)								5		
Thermal Shock		4								
Resistance to Soldering Heat										2
Humidity Temperature Cycling		6			4					
Temperature Life	4									
Temperature Life (Preconditioning)			4	4						
Sample Quantity	5	5	5	5	5	5	5	5	5	5

Note:

(a) Durability preconditioning: 5 cycles.

(b) Measure mating/unmating force and LLCR at initial, 25th cycle, and 60th cycle.

Figure 2

3.7 Table. 1 Reflow profile table for soldering heat resistance Test

Reflow profile for soldering heat resistance Testing:		
Item	Time	Specification
Pre Heating		$\cong 3^{\circ}\text{C}/\text{Sec}$
Flux Wetting	T_{soak}	2~3Min
Time Over 217°C	t_1	60~150 Sec
Peak Temp	t_3	$245^{\circ}\text{C} (+0/-5^{\circ}\text{C})$
Peak Time	T_{peak}	$\cong 15$ Sec
Speed of Cooling		$\cong 6^{\circ}\text{C}/\text{Sec}$
25°C to Peak Temp		$\cong 8$ Min

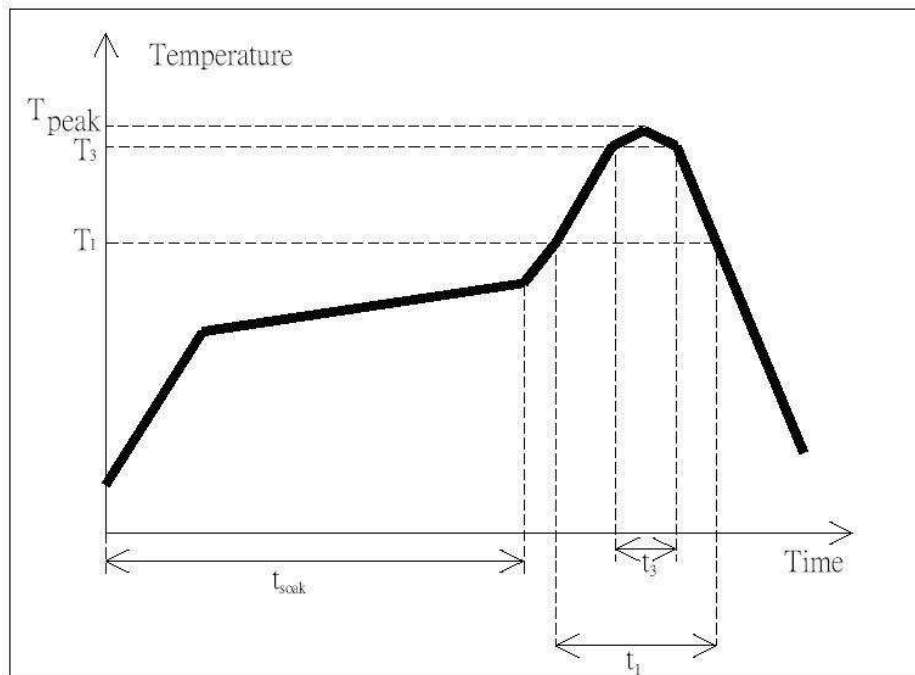


Figure 3

3.8 T-rise test circuit

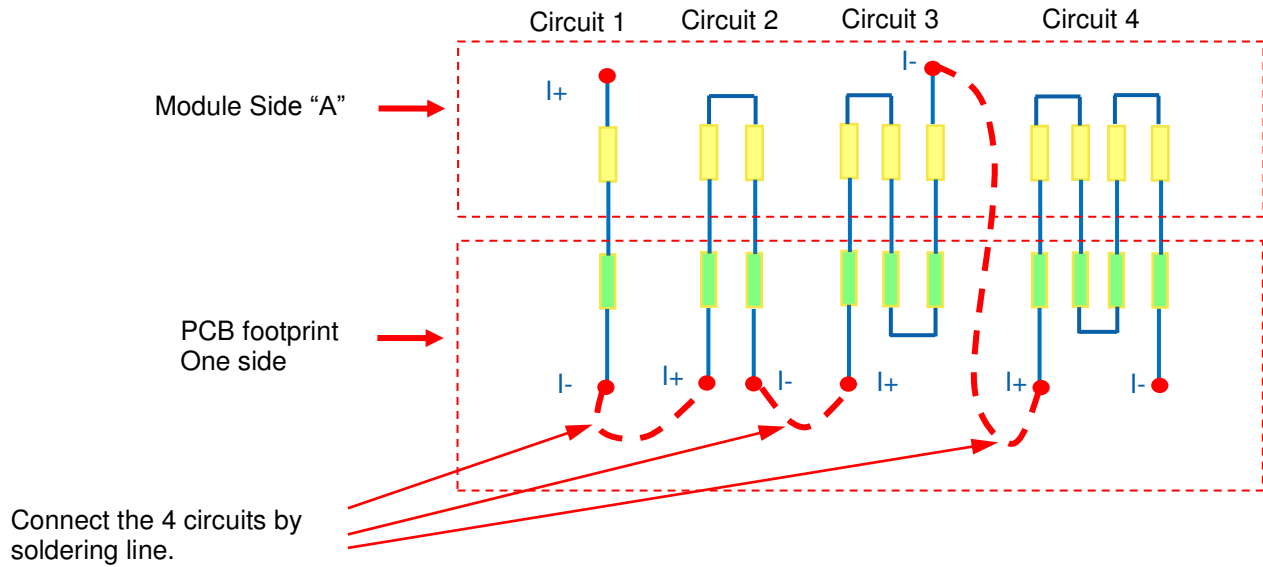


Figure 4