



MINIPAK* HDE Board Mount Power Header Connector

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE connectivity MINIPAK* HDE Board Mount Power Header Connector. This two row connector is a hard metric connector designed to be compatible with 2 mm equipment practices per IEC 61076-4-101 and two Universal Power Module receptacles. The product is offered in 6 through 24 position connectors with 3 levels of sequencing and utilizes eye of needle (EON) press-fit leads for assembly onto printed circuit boards.

1.2. Qualification

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

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 09Aug2010. The Qualification Test Report number for this testing is 501-128044. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute a part of this specification to the extent specified herein. Unless otherwise indicated, 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 Documents

- 109 Series: Test Specifications as indicated in Figure 2.
- 108-1651: Product Specification for Universal Power Module
- 114-13269: Application Specification
- 501-128044: Qualification Test Report (MINIPAK* HDE Board Mount Power Header Connector)

2.2. Industry Documents

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

2.3. Reference Document

- 109-197 Test Specification (TE Test Specification vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

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

3.3. Ratings

- Voltage: 250 volts AC & DC
- Current:
 - 18 amperes per contact (2x4 position connector, 30°C temperature rise at 23°C ambient, fully energized, terminated to PCB). See Figure 1 for other positions.
 - UL Current Interruption Rating: See 108-1651 for Universal Power Modules.
- Temperature: -40 to 105°C

Number of Contacts Energized	1(Lower row)	2x3	2x4	2x6	2x8	2x10	2x12
Current (amperes)	26	20	18	16	14	13	12

Figure 1
Current per Contact at 30°C Temperature Rise

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 2. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Initial examination of product	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing. Document gold plating thickness at contact interfaces.
Final examination of product	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Low Level Contact Resistance (LLCR).	3 milliohms maximum. 3 milliohms maximum change.	EIA-364-23. Subject specimens to 100 milliamperes Maximum and 20 millivolts Maximum open circuit voltage.
Contact resistance at rated current.	2 milliohms maximum, end of life.	EIA-364-6. Measure millivolt drop at specified currents. For 1 lower row contact energized, 26 amperes and TBD amperes at 30°C temperature rise end of life. For 2 x 6 contacts energized, 16amperes and TBD amperes at 30°C temperature rise end of life. For 2 x 12 contacts energized, 12 amperes and TBD amperes

		at 30°C temperature rise end of life.
Insulation resistance.	10000 megaohms minimum.	EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of mated specimens.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 2120 volts DC at sea level. Test between adjacent contacts of mated specimens.
Temperature rise vs current.	30°C maximum temperature rise. See Figure 1 for maximum current at 30°C temperature rise.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C. Test with single lower row energized contact and with 2x3, 2x4, 2x6, 2x8, 2x10 and 2x12 power contacts energized. Record data over a range of 20 to 50°C temperature rise. Document 30°C temperature rise current.

MECHANICAL

Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VII, Condition E. Subject mated specimens to 4.90G's rms between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens for 250 cycles at a maximum rate of 325 cycles per hour.
Mating force.	1.0 N maximum per contact.	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 25.4 mm per minute.
Unmating force.	0.5 N minimum per contact.	EIA-364-13. Measure force necessary to unmate specimens at a

		maximum rate of 25.4 mm per minute.
Compliant pin insertion.	70 N maximum average per pin.	TE Spec 109-41. Measure force necessary to seat pins into a printed circuit board at a maximum rate of 25.4 mm per minute.
Compliant pin retention.	4.4 N minimum average per pin.	TE Spec 109-30. Measure force necessary to unseat pins from a printed circuit board at a maximum rate of 25.4 mm per minute.
Contact retention.	Axial displacement shall not exceed 0.2 mm with force applied or 0.1 mm after force has been removed.	TE 109-30. Apply axial force of 10 N to pin contacts in the unmating direction at a maximum rate of 2.54 mm per minute and hold for 5 seconds. Apply axial force of 5 N to pin contacts in the mating direction at a maximum rate of 2.54 mm per minute and hold for 5 seconds.

ENVIRONMENTAL

Thermal shock.	See Note.	EIA-364-32. Subject mated specimens to 5 cycles between -40 and 105 / C with 30 minute dwells at temperature extremes.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method III. Subject specimens to 10 cycles (10 days) between 25 and 65 / C at 80 to 100% RH.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 3, Test Time Condition C. Subject mated specimens to 85°C for 500 hours.
Mixed flowing gas.	See Note.	EIA-364-65, Class IIA (4 gas). Subject specimens to environmental Class IIA for 20 days (10 days unmated, 10 days mated).


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 Figure 3.

Figure 2

3.6. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)				
	1	2	3	4	5
	TEST SEQUENCE (b)				
Initial examination of product	1	1	1	1	1
Low level contact resistance		3,7			2,5,7,9
Contact resistance at rated current			2,6		11
Insulation resistance			3,7		
Withstanding voltage					
Temperature rise vs. Current					3(c),10
Random Vibration		5			8
Mechanical shock		6			10
Durability		4			
Mating force		2			
Un-mating force		8			
Compliant pin insertion	2				
Compliant pin retention	3				
Contact retention				2	
Thermal shock			4		
Humidity/temperature cycling			5		
Temperature life					6
Mixed flowing gas					4(d)
Final examination of product	4	9	8	3	12



NOTE

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Precondition specimens with 10 durability cycles.
- (d) Measure LLCR after 10 days unmated.

Figure 3

4. QUALITY ASSURANCE PROVISIONS

4.1. 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 4 shall consist of 5 mated pairs of UPM receptacles and right angle MINIPAK HDE plugs. Test group 5 shall consist of 3 mated pairs of UPM receptacles and right angle MINIPAK HDE plugs.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 3.

4.2. 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.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 2. 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 resubmittal.

4.4. 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.