

NOVASTACK® 35-HDP WITH CAP 2-IN-1

Part No. Plug&Receptacle:21001-042E-01

Product Specification

Qualification Test Report No. TR-21035

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Rev.	ECN	Date	Prepared by	Checked by	Approved by

1. Scope

This product specification defines the test conditions and the performances of the double-row mounting type NOVASTACK 35-HDP, a board-to-board connector with a contact pitch of 0.35 mm

2. Product Name and Parts No.

2.1 Product Name

NOVASTACK 35-HDP WITH CAP 2-IN-1

2.2 Parts No.

Plug & Receptacle: 21001-042E-01

3. Rating

3.1 Operating Conditions

Amperage: Signal contact ··· 0.3A AC/DC [per contact pin]
12.0A AC/DC [per connector]
Power contact ··· 2.2A AC/DC [per contact pin]
8.8A AC/DC [per connector]

Voltage: 60V AC (per contact pin)

Operating temperature: 233 to 358K(-40°C to +85°C) (Containing temperature rise by current)

Operating humidity: 85% max

3.2 Storage Conditions

Storage temperature: 248 to 333K(-25°C to 60°C)

Storage humidity: 85% max. (Non-condensing)

4. Test and Performance

Test Condition

Unless otherwise specified, all tests and measurements shall be performed under the following conditions in accordance with MIL-STD-202.

Temperature: 288K to 308K(15°C to 35°C)

Pressure: 866hPa to 1066hPa (650mmHg to 800mmHg)

Relative humidity: 45 to 75% R.H.

4.1. Electrical Performance

1. Contact resistance

Reference standard: MIL-STD-202-307

Test conditions: Solder the connectors to the test board and mate the another pair of the connectors, then apply 20mV MAX. DC open circuit voltage and 10mA MAX. DC closed circuit current. Measure the contact resistance of signal and power, GROUND at the section shown in Fig.1 by the four terminal methods.

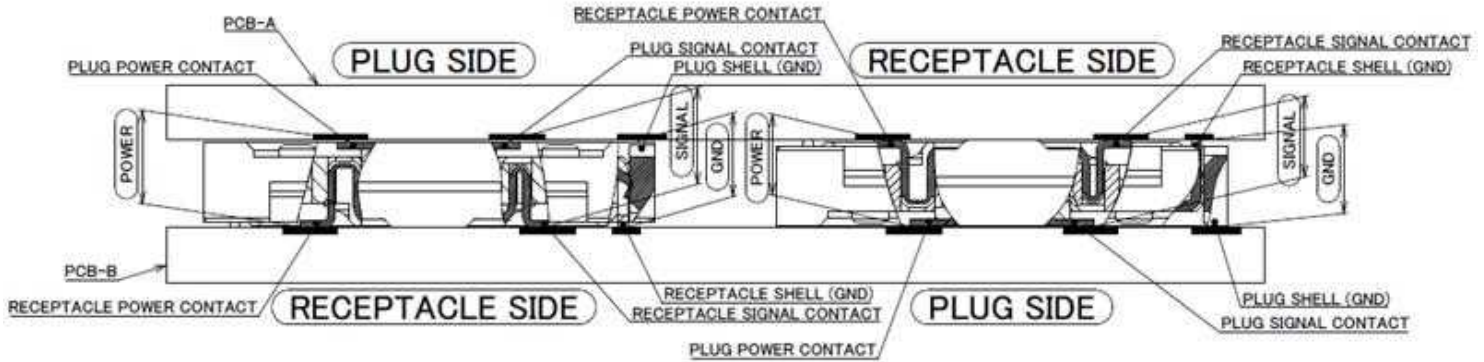


Fig.1

Pass criteria:

- Signal Contact
 - Initial: 40mΩ MAX
 - After testing: ΔR 40mΩ MAX
- Power Contact
 - Initial: 20mΩ MAX
 - After testing: ΔR 20mΩ MAX
- Shell (Ground)
 - Initial: 20mΩ MAX
 - After testing: ΔR 20mΩ MAX

2. Insulation resistance

Reference standard: MIL-STD-202-302

Test conditions: Solder the connectors to the test board and mate the another pair of the connectors, and then apply DC 250 V between adjacent terminals and terminal shells, and then proceed with the measurement.

Pass criteria: Initial: 1000 MΩ MIN. After testing: 500 MΩ MIN.

3. Dielectric withstanding voltage

Reference standard: MIL-STD-202-301

Test conditions: Solder the connectors to the test board and mate the another pair of the connectors, then apply AC 250V(rms) between adjacent terminals and terminal shells for a minute.

Pass criteria: No abnormalities such as creeping discharge, flashover, insulator breakdown occur.

4. Temperature rising

Reference standard: -

Test conditions: Solder the connectors to the test board and mate the another pair of the connectors, and apply rating current per contact. Measure delta T over ambient.

Pass criteria: Over ambient ΔT 30 °C MAX.

4.2. Mechanical Performance

1. Mating force and Un-mating force	
Reference standard:	-
Test conditions:	Solder connectors to the test board, then place the board on push-on/pull-off machine. Repeat mating/unmating 20 cycles at a speed $25\pm 3\text{mm/min}$. along the mating axis. Measure the mating and unmating force at the initial and after 20 cycles.
Pass criteria:	Mating Force 150.0N MAX Un Mating Force 9.2N MIN.

2. Durability	
Reference standard:	-
Test conditions:	Solder the connectors to the test board, then place the board on the push-on/pull-off machine, and repeat mating and unmating 20 cycles at a speed $25\pm 3\text{mm/min}$. along the mating axis.
Pass criteria:	Contact resistance: Shall meet 4.1.1

3. Contact retention force	
Reference standard:	-
Test conditions:	Place the connector on the push-on/pull-off machine, then apply force to the contact from opposite direction of the contact insertion at a speed of $25\pm 3\text{mm/min}$. Measure the force when the contact dislodges from the connector.
Pass criteria:	Receptacle contact retention force: 0.1N MIN.

4. Vibration	
Reference standard:	MIL-STD-202-201
Test conditions:	Solder the connectors to the test board and mate the another pair of the connectors, and place them on the vibrator. Then apply the following vibration. During the testing, run 100mA DC to check electrical discontinuity. Frequency: 10Hz→55Hz→10Hz/approx. 1min. Directions: 3 mutually perpendicular directions. Total Amplitude: 1.52 mm Sweep duration: 2 hours for each direction, a total of 6 hours.
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than $1\mu\text{s}$ shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

5. Shock	
Reference standard:	MIL-STD-202-213, Test condition A.
Test conditions:	Solder the connectors to the test board and mate the another pair of the connectors, and place it on the shock machine. Then apply the following shock. Apply 100mA DC current to confirm electrical interruption. MAX.G: 50G Duration: 11msec Wave Form: Half Sinusoidal Directions: 6 mutually perpendicular direction Cycle: 3 cycles each direction
Pass criteria:	Contact resistance: Shall meet 4.1.1. Electrical discontinuity: No electrical discontinuity greater than $1\mu\text{s}$ shall occur. Appearance: No abnormality adversely affecting the performance shall occur.

4.3. Environmental Performance

1. Thermal shock	
Reference standard:	MIL-STD-202-107, Test condition A.
Test conditions:	Solder the connectors to the test board and mate the another pair of the connectors, and expose them to the following environment. Temperature: 218K(-55°C),30 min.→358K(85°C),30 min. Transition time: 5 min. MAX. Cycle: 5 cycles
Pass criteria:	Contact resistance: Shall meet 4.1.1. Insulation resistance: Shall meet 4.1.2. Dielectric withstanding voltage: Shall meet 4.1.3. Appearance: No abnormality adversely affecting the performance shall occur.

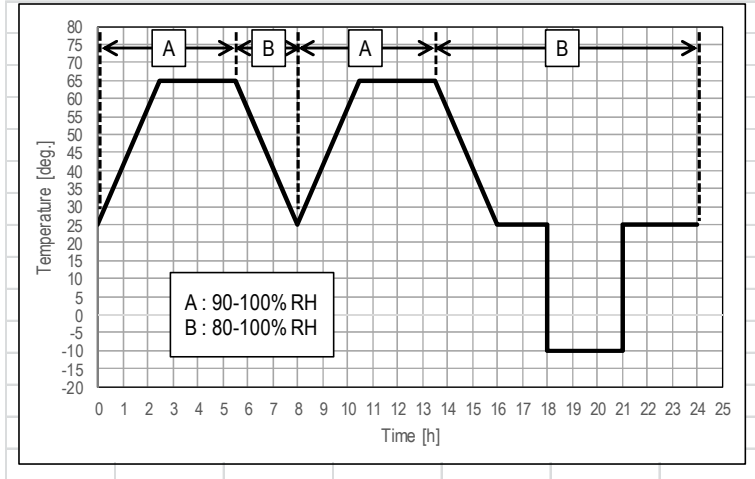
2. High temperature life	
Reference standard:	MIL-STD-202-108, Test condition A.
Test conditions:	Solder the connectors to the test board and mate the another pair of the connectors, and expose them to the following environment. Temperature: 358±2K (85±2°C) Duration: 96 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Contact retention force: Shall meet 4.2.3. Appearance: No abnormality adversely affecting the performance shall occur.

3. Humidity (Steady state)	
Reference standard:	MIL-STD-202-103, Test condition B.
Test conditions:	Solder the connectors to the test board and mate the another pair of the connectors, and expose them to the following environment. Temperature: 313±2K (40±2°C) Humidity: 90 to 95%RH Duration: 96 hours
Pass criteria:	Contact resistance: Shall meet 4.1.1. Insulation resistance: Shall meet 4.1.2. Dielectric withstanding voltage: Shall meet 4.1.3. Appearance: No abnormality adversely affecting the performance shall occur.

4. Humidity (Cycling)

Reference standard: MIL-STD-202-106.

Test conditions: Solder the connectors to the test board and mate the another pair of the connectors, and expose them to the following environment.
 Temperature: 298[263]~338K (25[-10] to 65°C)
 Humidity: 90[80] to 100%RH
 Duration: 10 cycles (240 hours)



Pass criteria: Contact resistance: Shall meet 4.1.1.
 Insulation resistance: Shall meet 4.1.2.
 Dielectric withstanding voltage: Shall meet 4.1.3.
 Appearance: No abnormality adversely affecting the performance shall occur.

5. Saltwater spray

Reference standard: MIL-STD-202-101, Test condition B.

Test conditions: Solder the connectors to the test board and mate the another pair of the connectors, and expose them to the following environment.
 Temperature: 308±2K (35±2°C)
 Saltwater density: 5±1% [by weight]
 Duration: 48 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Appearance: No abnormality adversely affecting the performance shall occur.

6. H₂S gas

Reference standard: -

Test conditions: Solder the connectors to the test board and mate the another pair of the connectors, and expose them to the following environment.
 Temperature: 313±2K (40±2°C)
 Relative humidity: 80±5%RH
 Gas: H₂S 3±1ppm
 Duration: 48 hours

Pass criteria: Contact resistance: Shall meet 4.1.1.
 Appearance: No abnormality adversely affecting the performance shall occur.

4.4. Others

1. Solderability	
Reference standard:	-
Test conditions:	Immerse the contact soldering part to flux of RMA or R type for 5 to 10 seconds, then dip the part into the solder bath of $518 \pm 5K$ ($245 \pm 5^{\circ}C$) for 5 ± 0.5 seconds.
Pass criteria:	More than 95% of the dipped surface shall be evenly wet.

2. Resistance to soldering heat

Reference standard:	-
Test conditions:	Reflow temperature: See Fig.2. Reflow Cycle: Maximum 2 cycles.

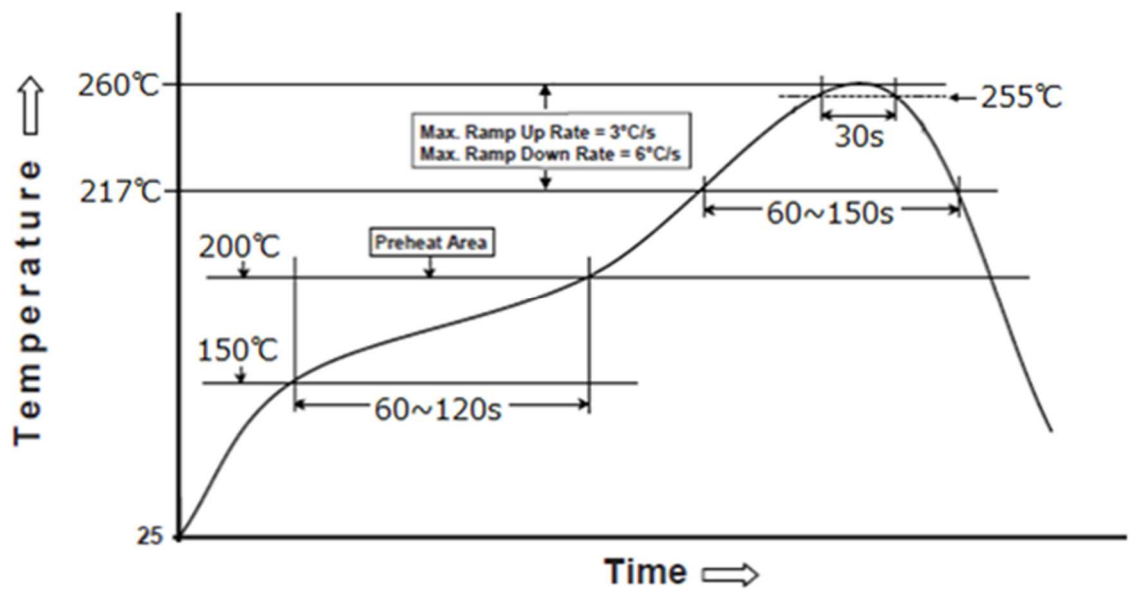


Fig.2

Pass criteria:	No deformation nor defect adversely affecting the performance occur.
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4.5 Test Sequence and Specimen Quantity

Table.1 Test Sequence and Sample Quantity

Test Item	Group											
	A	B	C	D	E	F	G	H	J	K	L	M
Contact resistance	2,6		1,3,5	1,5	1,3	1,5	1,5,7	1,3	1,3			
Insulation resistance				2,6		2,6	2,8					
Dielectric withstanding voltage				3,7		3,7	3,9					
Temperature rising												1
Mating force	1,5											
Unmating force	3,7											
Durability	4						4					
Contact retention force		1,3										
Vibration			2									
Shock			4									
Thermal shock				4								
High temperature life		2			2							
Humidity (Steady State)						4						
Humidity (Cycling)							6					
Saltwater spray								2				
H ₂ S gas									2			
Solder ability										1		
Soldering heat resistance											1	
Specimen quantity.	5 pcs.	20 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	5 pcs.	10 pcs.	10 pcs.	5 pcs.

※Numbers indicate test sequences.

5. Recommended Metal Mask

Refer to drawing (DWG No.21001) for the recommended metal mask thickness and opening dimension.

6. Precautions for Handling Cable Connectors

Refer to HIM-21007.