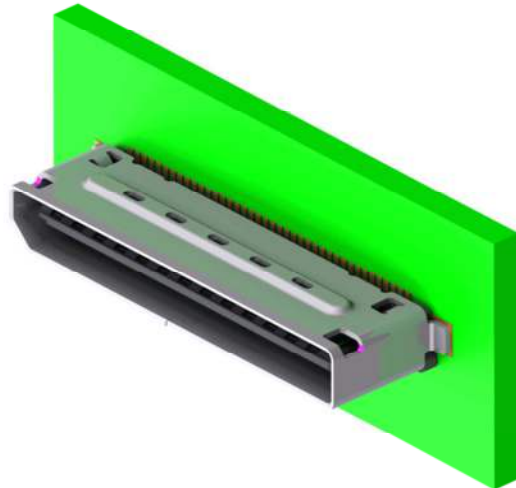
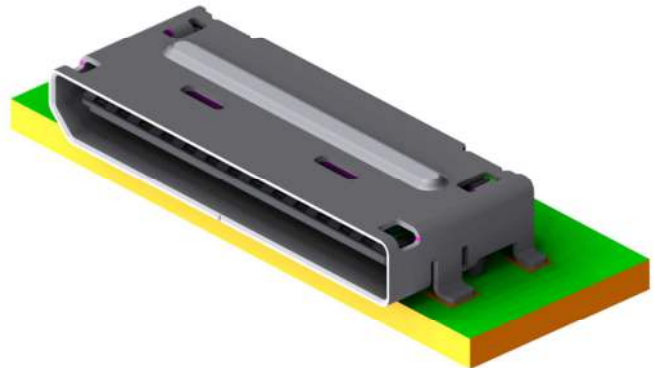
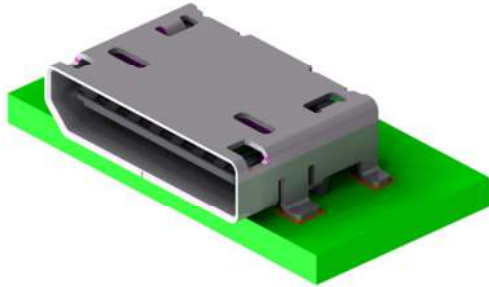




PRODUCT SPECIFICATION

NANOPITCH I/O PLUGGABLE CONNECTOR SYSTEM



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PRODUCT SPECIFICATION

1.0 SCOPE

This specification covers the 0.50 mm (.020 inch) centerline Small Form-factor Pluggable (NanoPitch I/O) Pluggable connectors

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER(S)

Product Name: NanoPitch I/O Connector
Connector Series: 173162, 171982, 171983
Plug & Cable Series: 100436

2.2 DIMENSION, MATERIALS, PLATING AND MARKINGS

See the appropriate Sales Drawing for information on dimensions, materials, plating, marking, and footprint patterns.

2.3 SAFETY AGENCY APPROVALS

UL file: TBD
CSA file: TBD

2.4 PIN ASSIGNMENTS

Pin assignment may vary depending on the cable assembly configuration. Different configurations will have different part numbers within the series. Reference the appropriate cable sales drawing of the specific part number for the correct pin assignment.

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3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

3.1 MOLEX DOCUMENTS

TS-171982-0001	Test Summary
TS-173162-0001	Test Summary (RESULTS PENDING)
AS-173162-0001	Application Specification NanoPitch
AS-173162-0002	Application Specification Routing Guide
PK-173982-9000	Packaging Specification
PK-173307-0001	Packaging Specification
PS-45499-002	Cosmetic Specification

3.2 INDUSTRY DOCUMENTS

EIA 364 Series	Electrical Connector Test Procedures Including Environmental Classifications with Test Procedures
EIA 364-1000	Environmental Test Methodology for Assessing the Performance of Connectors and Sockets Used in Business Office Applications

4.0 QUALIFICATION

Laboratory condition and sample selection are in accordance with EIA 364

5.0 RATINGS

5.1 VOLTAGE

30 Volts AC (RMS)/DC Max.

5.2 CURRENT

0.5 Amps Max.

5.3 TEMPERATURE

Operating:	-40°C to +80°C
Non-operating:	-55°C to +80°C

5.4 DURABILITY

Contact Interface: 0.76 µm Au – 250 cycles

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6.0 PERFORMANCE (MECHANICAL & ENVIRONMENTAL)

6.1 TEST GROUP 1 – TEMPERATURE LIFE

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Low Level Contact Resistance	EIA 364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	Base line
2	Durability (precondition)	EIA-364-09; perform plug & unplug cycles: 50.		No evidence of physical damage
3	Temperature Life	EIA-364-17 Method A, Test Condition 3, 72 hours at 105°±2°C	Mated	None
4	Low Level Contact Resistance	EIA 364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max
5	Reseating	Manually unplug & plug the connector, 3 cycles		No evidence of physical damage
6	Low Level Contact Resistance	EIA 364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max

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6.2 TEST GROUP 2 – CYCLIC TEMPERATURE & HUMIDITY

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Low Level Contact Resistance	EIA 364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	Base line
2	Durability (precondition)	EIA-364-09; perform plug & unplug cycles: 50.		No evidence of physical damage
3	Thermal Shock	EIA 364-32, Method A, test condition I (10 cycles)	Mated	None
4	Low Level Contact Resistance	EIA 364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max
5	Cyclic Temperature & Humidity	EIA-364-31 Cycle connectors between 25° ± 3°C at 80% RH and 65 °± 3 °C at 50% RH 24 cycles. Ramp times should be 0.5 hour and dwell should be 1.0 hour.	Mated	None
6	Low Level Contact Resistance	EIA 364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max
7	Reseating	Manually unplug & plug the connector, 3 cycles		No evidence of physical damage
8	Low Level Contact Resistance	EIA 364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max

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6.3 TEST GROUP 3 – MECHANICAL VIBRATION

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	Base line
2	Durability (precondition)	EIA-364-09; perform plug & unplug cycles: 50.		No evidence of physical damage
3	Temperature Life (precondition)	EIA-364-17, Method A, Test Condition 3 240 hours at 90°±2°C (60°C for 5 years)	Mated	None
4	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max
5	Mechanical Vibration	EIA-364-28 test condition VII test condition letter D 15 minutes in each of 3 mutually perpendicular directions. Both mating halves rigidly fixed to not contribute to relative motion of one contact against another.	Mated	Discontinuity < 1 μsec No evidence of physical damage
6	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max

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6.4 TEST GROUP 4 – MIXED FLOWING GAS

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	Base line
2	Durability (precondition)	EIA-364-09; perform plug & unplug: 50 cycles		No evidence of physical damage
3	Temperature Life (precondition)	EIA-364-17; Method A, 120 hours at 90°±2°C (60°C for 5 years)	Mated	None (Conditioning Exposure)
4	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max See note 3
5	Mixed Flowing Gas	EIA-364-65; Class IIA, 14 days	See note 1	None (Conditioning Exposure)
6	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max See note 3
7	Thermal Disturbance	Cycle connectors 10 times between 15° ± 3°C and 85 °± 3 °C. Ramps should be a minimum of 2°C per minute and dwell times should insure that the contacts reach the temperature extremes for a minimum of 5 minutes.	Mated	None (Conditioning Exposure)
8	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max See note 3
9	Reseating	Manually unplug & plug the connector, 3 cycles		No evidence of physical damage
10	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max

Note:

- Expose receptacles unmated for 7 days (168 hours) of the test duration. Mate the receptacle to the same plug used during preconditioning temperature life. Expose mated plug and receptacle for the remainder of the test duration 7 days (168 hours).
- Characterize porosity & plating thickness before test sequence.
- Sample size = 100 data points minimum, intermediate test values must meet 10 mΩ max. delta at 99% and 1% of samples shall not exceed 15 mΩ delta.

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6.5 TEST GROUP 5 – DURABILITY

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Dielectric Withstanding Voltage	EIA-364-20; apply a maximum voltage of 660V and a current of 100 mA between adjacent contacts for 1 minute	Mated	No breakdown or flashover
2	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA .	Mated	Base line
3	Durability	EIA-364-09; perform plug & unplug cycles: 50		No evidence of physical damage
4	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA .	Mated	<20 mΩ Δ max
5	Dielectric Withstanding Voltage	EIA-364-20; apply a maximum voltage of 660V and a current of 100 mA between adjacent contacts for 1 minute	Mated	No breakdown or flashover

6.6 TEST GROUP 6 – SOLDERABILITY

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	General Examination	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA .	Unmated	No evidence of physical damage
2	Solderability	EIA-364-52 Category 1, no steam RMA class 1 flux Immerse in molten solder at 245°C at a rate of 25.4mm per second. Solder Duration: 5 ± 0.5 seconds	Unmated	Solderable area shall have a minimum of 95% solder coverage when testing 30 random loose contacts.
3	General Examination	EIA-364-17, Method A, Test Condition 3 240 hours at 90°±2°C (60°C for 5 years)	Unmated	No evidence of physical damage

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6.7 TEST GROUP 7 – DIELECTRIC WITHSTANDING VOLTAGE

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Dielectric Withstanding Voltage	EIA-364-20; apply a voltage of 300 VDC for 1 minute between adjacent terminals and between adjacent terminals and ground.	Mated	No disruptive discharge No leakage current in excess of 5mA
2	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	Base line
3	Durability	EIA-364-09; perform plug & unplug cycles: 250		No evidence of physical damage
4	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max
5	Dielectric Withstanding Voltage	EIA-364-20; apply a voltage of 300 VDC for 1 minute between adjacent terminals and between adjacent terminals and ground.	Mated	No disruptive discharge No leakage current in excess of 5mA

Note:

1. Separate sets of test specimens will be used to access dielectric withstanding voltage and the change in low level contact resistance.
2. Dielectric withstanding voltage testing will use different contacts than those used for low level contact resistance testing.

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7.0 PERFORMANCE (MECHANICAL)

7.1 TEST GROUP 1

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Temperature Rise Verses Current	EIA-364-70; Method B, Test Condition 3	Mated	Temperature Rise: +30°C maximum

7.2 TEST GROUP 2

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Connector Mate Forces (42 circuit)	Mate connector at a rate of 25 mm per min.	Mate	40 N MAX
2	Connector Un-mate Forces (42 circuit)	Un-mate connector at a rate of 25 mm per min.	Un-mate	25 N MAX
1	Connector Mate Forces (80 circuit)	Mate connector at a rate of 25 mm per min.	Mate	TBD N MAX
2	Connector Un-mate Forces (80 circuit)	Un-mate connector at a rate of 25 mm per min.	Un-mate	TBD N MAX

7.3 TEST GROUP 3

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Normal Force	Apply a perpendicular force.		0.29 N, (30 grams) MINIMUM normal force

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7.4 TEST GROUP 4

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	X Axis Load (Side)	Mate plug to connector and apply load on plug until open circuit.	Mated	Force (N) and Displacement (mm) at open circuit detection or probe failure
2	Y Axis Load (Toward Latch)	Mate plug to connector and apply load on plug until open circuit.	Mated	Force (N) and Displacement (mm) at open circuit detection or probe failure
3	Plug Pullout Force (Axial)	Mate plug to connector and apply an axial pullout force on the wire at a rate of 25 mm per min.	Mated	30 N minimum Force to overcome latch
4	Plug Pullout Force (Right Angle)	Mate plug to connector and apply a right angle pullout force on the wire at a rate of 25 mm per min.	Mated	30 N minimum

7.5 TEST GROUP 5

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	Base line
2	Wire Flex	EIA 364-21 test condition II with Tension = 26 N. Flex cables 180° for 20 cycles..	Mated	No physical damage
3	Low Level Contact Resistance	EIA-364-23; apply a maximum voltage of 20 mV and a current of 100 mA.	Mated	<20 mΩ Δ max

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7.6 TEST GROUP 6

ITEM	TEST	TEST PROCEDURE	CONDITION	REQUIREMENT
1	Cable Pullout Force (Axial Load)	Apply an axial load to cable at a rate of 25 ± 6 mm/min	Un-Mated	TBD N

8.0 PACKAGING

8.1 CONNECTOR AND SHELL

- 8.1.1 Product shall be packaged in tape and reel per the packaging specification as called out on the applicable assembly print.
- 8.1.2 Packaging shall meet the requirements of and be tested per the packaging specification as called out on the applicable assembly print.

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9.0 GAGES AND FIXTURES

Fixture setup for mated plug X & Y axis load testing. Probe to be approximately 6mm diameter with a full radius nose. Position the probe 20mm from the face of the PCB and locate at the centerline of the plug. Apply load to plug at a rate of 25mm per minute.

Y Axis Load

X Axis Load

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10.0 OTHER INFORMATION

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