



TEST SUMMARY

SEARAY™ CONNECTOR SERIES

1.0 SCOPE

This test summary covers the 1.27 mm (0.50") centerline (pitch) printed circuit board (PCB) connector series with select gold (over nickel) plated contacts, and select tin (over nickel) plated solder surfaces with tin or tin/lead solder charges. Contact integrity is the primary scope of the testing.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND PART NUMBER(S)

SEARAY™ Plug Connector	45970-****
SEARAY™ Receptacle Connector	45971-****
SEARAY™ Slim Plug Connector	46556-****
SEARAY™ Slim Receptacle Connector	46557-****

2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

Refer to the appropriate sales drawings for information on dimensions, materials, platings and markings.

2.3 PRODUCT SPECIFICATION TITLE AND DOCUMENT NUMBER

Title: Product Specification SEARAY™ Interconnect System
Document No.: PS-45970-001

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

3.1 TESTING SEQUENCES AND PROCEDURES

Reference Appendix 1

3.2 OTHER DOCUMENTS AND SPECIFICATIONS

SD-45970-001
SD-45971-001
SD-46556-001
SD-46557-001
AS-45970-001
PS-45970-001

4.0 QUALIFICATION

Laboratory conditions and sample selection are in accordance with EIA-364.

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5.0 PERFORMANCE

5.1 ELECTRICAL/ENVIRONMENTAL PERFORMANCE RESULTS

(Note that measured LLCR values are for one mated interface)

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
G R O U P 1	Contact Resistance (Low Level)	Initial	9.0 mΩ Nominal no limit set	8.43 mΩ	7.65 mΩ	9.41 mΩ
		After Initial Durability (100 cycles)	10 mΩ MAXIMUM*	-0.16 mΩ	-1.30 mΩ	1.43 mΩ
		After Dust	10 mΩ MAXIMUM*	-0.25 mΩ	-1.45 mΩ	1.03 mΩ
		After Vibration X-axis (Mechanical)	10 mΩ MAXIMUM*	-0.21 mΩ	-1.12 mΩ	0.94 mΩ
			No Discontinuity	PASS		
		After Vibration Y-axis (Mechanical)	10 mΩ MAXIMUM*	-0.17 mΩ	-1.26 mΩ	1.68 mΩ
			No Discontinuity	PASS		
		After Vibration Z-axis (Mechanical)	10 mΩ MAXIMUM*	-0.15 mΩ	-1.34 mΩ	2.58 mΩ
			No Discontinuity	PASS		
		After Shock X-axis (Mechanical)	10 mΩ MAXIMUM*	-0.14 mΩ	-1.28 mΩ	1.89 mΩ
			No Discontinuity	PASS		
		After Shock Y-axis (Mechanical)	10 mΩ MAXIMUM*	-0.11 mΩ	-1.10 mΩ	2.38 mΩ
			No Discontinuity	PASS		
		After Shock Z-axis (Mechanical)	10 mΩ MAXIMUM*	-0.15 mΩ	-1.14 mΩ	1.91 mΩ
			No Discontinuity	PASS		
		After Final Durability (100 cycles)	10 mΩ MAXIMUM*	-0.13 mΩ	-1.03 mΩ	1.25 mΩ
			No Damage	Pass		

* change from initial

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5.1 ELECTRICAL/ENVIRONMENTAL PERFORMANCE RESULTS (cont)

(Note that measured LLCR values are for one mated interface)

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
G R O U P 2	Contact Resistance (Low Level)	Initial	9.0 mΩ Nominal no limit set	8.65 mΩ	7.58 mΩ	9.96 mΩ
		After Initial Durability (100 cycles)	10 mΩ MAXIMUM*	-0.09 mΩ	-1.42 mΩ	2.05 mΩ
		After Thermal Shock	10 mΩ MAXIMUM*	0.29 mΩ	-1.25 mΩ	1.99 mΩ
		After Dust	10 mΩ MAXIMUM*	-0.10 mΩ	-1.40 mΩ	2.23 mΩ
		After Humidity	10 mΩ MAXIMUM*	0.06 mΩ	-1.41 mΩ	2.25 mΩ
		After Final Durability (100 cycles)	10 mΩ MAXIMUM*	0.00 mΩ	-1.61 mΩ	2.15 mΩ

* change from initial

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
G R O U P 3	Contact Resistance (Low Level)	Initial	9.0 mΩ Nominal no limit set	8.64 mΩ	7.71 mΩ	9.97 mΩ
		After Temp Life	10 mΩ MAXIMUM*	0.36 mΩ	-0.87mΩ	2.25 mΩ

* change from initial

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5.1 ELECTRICAL/ENVIRONMENTAL PERFORMANCE RESULTS (cont)

(Note that measured LLCR values are for one mated interface)

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
G R O U P 4	Contact Resistance (Low Level)	Initial	9.0 mΩ Nominal 55.0 mΩ Max	9.79	8.36	12.74
		After Durability (25 cycles)	10 mΩ MAXIMUM*	-0.48	-2.95	0.84
		After Temp. Life (300 hrs. @ 105 C)	10 mΩ MAXIMUM*	-0.06	-2.53	2.06
		After 5 days unmated MFG Testing	10 mΩ MAXIMUM*	-0.10	-3.21	2.33
		After 10 days (5 unmated) MFG Testing	10 mΩ MAXIMUM*	0.24	-3.29	5.50
		After 15 days (5 mated) MFG Testing	10 mΩ MAXIMUM*	0.00	-3.69	2.47
		After 20 days (5 mated) MFG Testing	10 mΩ MAXIMUM*	0.10	-2.77	4.10
		After Thermal Disturbance	10 mΩ MAXIMUM*	-0.12	-3.37	3.30
		After Durability (25 cycles)	10 mΩ MAXIMUM*	-0.15	-3.37	5.80
		Visual	No damage	Pass		

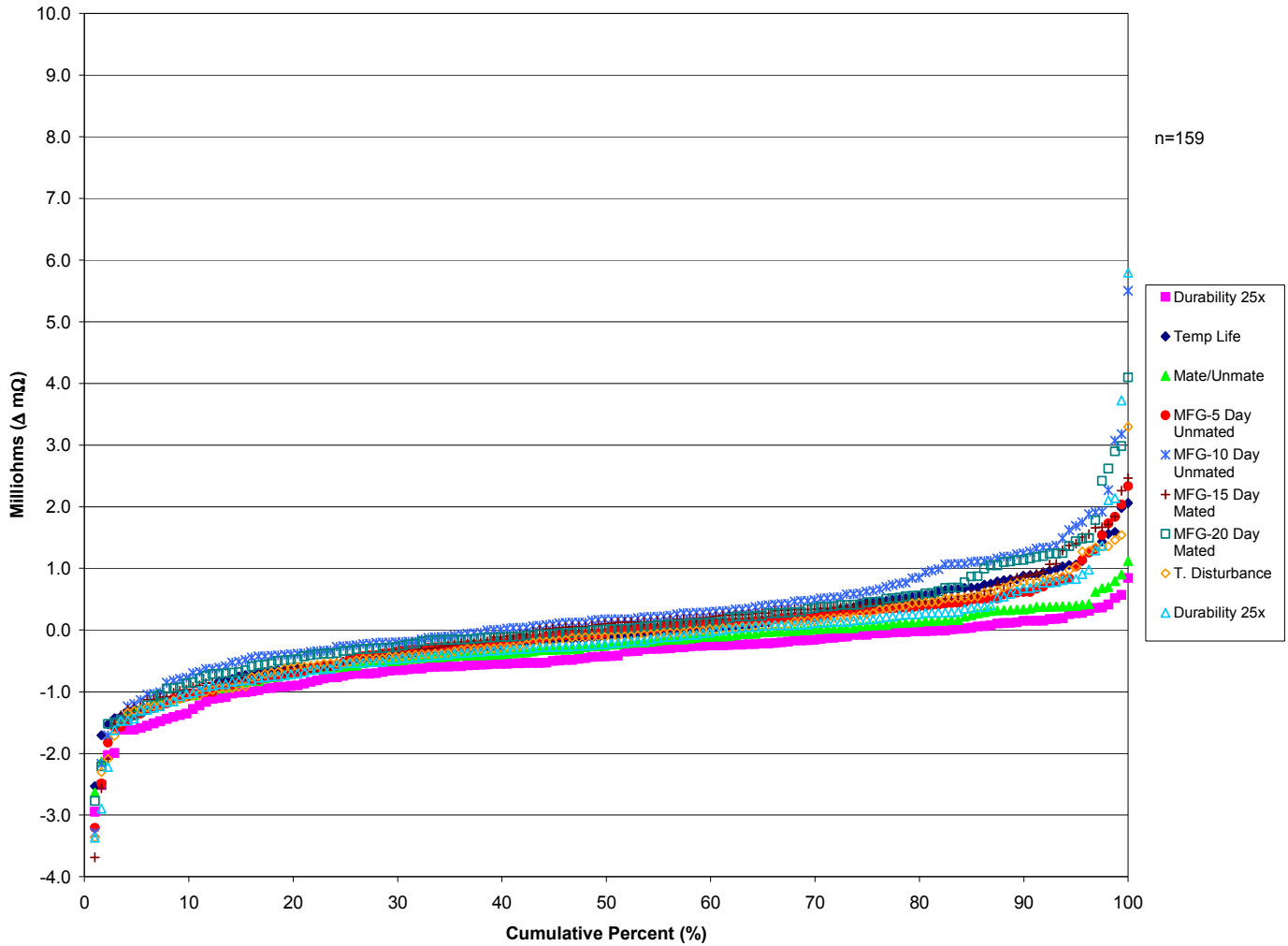
* change from initial

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Sequence 4 - MFG



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5.1 ELECTRICAL PERFORMANCE RESULTS (cont)

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	RESULTS
G R O U P 6	Insulation Resistance (adjacent contacts across rows)	500 VDC	5,000 MΩ MINIMUM	PASS
	Dielectric Withstanding Voltage (adjacent contacts across rows)	900 VAC	No breakdown or flashover	PASS
	Insulation Resistance (Adjacent contacts in the same row)	500 VDC	5,000 MΩ MINIMUM	PASS
	Dielectric Withstanding Voltage (adjacent contacts in the same row)	900 VAC	No breakdown or flashover	PASS

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	RESULTS
G R O U P 7	Current Carrying Capacity	Current applied across 6 adjacent circuits in series in outside row	Withstand 1 amp current for 60 minutes without exceeding 30° temperature rise	PASS

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5.2 MECHANICAL PERFORMANCE RESULTS

ITEM	DESCRIPTION	TREATMENT	REQUIREMENT	MEAN	MINIMUM	MAXIMUM
GROUP 1	Connector Mate and Unmate Forces	Initial Mating	0.50 N per contact maximum	0.39 N	0.35 N	0.43 N
		Final Mating	0.50 N per contact maximum	0.32 N	0.29 N	0.33 N
		Initial Unmating	0.13 N per contact minimum	0.17 N	0.14 N	0.19 N
		Final Unmating	0.13 N per contact minimum	0.24 N	0.23 N	0.26 N
GROUP 2	Connector Mate and Unmate Forces	Initial Mating	0.50 N per contact maximum	0.39 N	0.37 N	0.44 N
		Final Mating	0.50 N per contact maximum	0.27 N	0.25 N	0.29 N
		Initial Unmating	0.13 N per contact minimum	0.15 N	0.14 N	0.17 N
		Final Unmating	0.13 N per contact minimum	0.22 N	0.18 N	0.24 N
GROUP 3	Connector Mate and Unmate Forces	Initial Mating	0.50 N per contact maximum	0.41 N	0.39 N	0.45 N
		Final Mating	0.50 N per contact maximum	0.18 N	0.17 N	0.19 N
		Initial Unmating	0.13 N per contact minimum	0.17 N	0.15 N	0.19 N
		Final Unmating	0.13 N per contact minimum	0.14 N	0.13 N	0.14 N
GROUP 5	Normal Force	Cycle 1	50 g per contact minimum	70.45 g	68.11 g	72.66 g
		Cycle 2	50 g per contact minimum	66.16 g	64.12 g	67.97 g

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6.0 FIXTURES AND TEST EQUIPMENT

459709720, 458309856 used for Mate/Unmate force testing
458309860, 459709711 used for Vibration and Shock testing

7.0 OTHER INFORMATION

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8.0 APPENDIX 1

8.1 TEST SEQUENCES

<u>GROUP 1</u>	<u>GROUP 2</u>	<u>GROUP 3</u>	<u>GROUP 4</u>	<u>GROUP 5</u>	<u>GROUP 6</u>	<u>GROUP 7</u>
Visual Exam	Visual Exam	Visual Exam	Visual Exam	Visual Exam	Insulation Resistance	Current Carrying Capacity (CCC)
Mate/Unmate Forces	Mate/Unmate Forces	Mate/Unmate Forces	LLCR	Normal Force	Dielectric Withstanding Voltage (DWV)	
LLCR	LLCR	LLCR	Durability (25 cycles)			
Durability	Durability	Thermal Aging (Temp Life)	LLCR			
LLCR	LLCR	LLCR	Thermal Aging (Temp Life) (300hrs. @ 105°C)			
Dust	Thermal Shock	Mate/Unmate Forces	Mate/Unmate Forces			
LLCR	LLCR	Visual Exam	LLCR			
Vibration	Dust		MFG (10 days Unmated)			
LLCR (in each axis)	LLCR		LLCR (After 5th & 10th days)			
Mechanical Shock	Cyclic Humidity		MFG (10 days Mated)			
LLCR (in each axis)	LLCR		LLCR (After 5th & 10th day)			
Durability	Durability		Thermal Disturbance			
LLCR	Mate/Unmate Forces		LLCR			
Mate/Unmate Forces	LLCR		Durability (25 cycles)			
Visual Exam			LLCR			
			Visual Exam			

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8.2 TEST PROCEDURES

<u>ITEM</u>	<u>TEST CONDITION</u>
LOW LEVEL CONTACT RESISTANCE (LLCR)	per EIA-364-TP-23
INITIAL MATING FORCE	per EIA-364-TP-13
INITIAL UN-MATING FORCE	per EIA-364-TP-13
DURABILITY	per EIA-364-TP-09 (100 Cycles)
RANDOM VIBRATION	per EIA-364-TP-28 Test Cond. V, letter "B"; Frequency: 50 to 2000 Hz Duration: 2 hrs/axis (3 axis total); g's: 7.56 g rms
MECHANICAL SHOCK	per EIA-364-TP-27 Peak Value: 100 G; Duration: 6 mSec.; Waveform: Half Sine; # Shocks Direction: 3 shocks/3 axes (18 total)
NORMAL FORCE	per EIA-364-04
THERMAL AGING (Temp life)	per EIA-364-TP-17 Test Cond. 4 @ 105°C Test Time Cond. B for 250 hrs.
THERMAL SHOCK	per EIA-364-TP-32 # of Thermal Cycles: 100 Hot Temp: +85°C +3°/-0°C Cold Temp: -55°C +3°/-0°C Dwell/Config: 30 min./extreme Hot/Cold Transition: Immediate

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8.2 TEST PROCEDURES (cont)

CYCLIC HUMIDITY	per EIA-364-TP-31 Test Temp: +25°C to +65°C Relative Humidity: 90 to 95%; Test Duration: 10 days
DUST	per EIA-364-TP-91 Benign Dust Composition Unmated
MIXED FLOWING GAS (MFG)	per EIA-364-TP-65 Temperature: 30°C Relative Humidity: 70%; Chlorine: 10 ppb Nitrogen Oxide: 200 ppb Hydrogen Sulfide: 10 ppb; Sulfur Dioxide: 100 ppb Exposure Time: 20 days (Unmated: day 1-10) (Mated: day 11-20)
Dielectric Withstanding Voltage (DWV)	per EIA-364-TP-20 Method B
Insulation Resistance	per EIA-364-TP-21
Current Carrying Capacity (CCC)	per EIA-364-TP-70 Method 2

9.0 REVISION HISTORY

Revision Level:	Created / Revised By:	Revision Description:	Date of Revision
2	T. Gregori	Initial Release	10/25/07
3	T. Gregori	Added shock and vibration discontinuity - PASS	01/28/08
4	T. Gregori	Added MFG data	01/29/09
5	T. Gregori	Correction; Added Cum% graph	02/02/09

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