SGI1.50 Dual Row Connector Product Specification

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) Signal Grace Inertial (SGI) 1.50 Dual Row Connector System. The SGI1.50 dual row product is a wire-to-board and mass terminated using crimp termination technology on 1.50mm centerlines and mate with 0.3 mm square posts providing a reliable interconnection between wires and posts mounted on printed circuit boards.

The SGI1.50 Dual Row Connector System is available in 4 through 18 positions for 1.50mm centerlines dual row. It is designed to be terminated to 24 AWG to 28 AWG wire. For the header assembly, it provides vertical type with SMT mounted.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 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. The Qualification Test Report number for this testing is 501-161257.

1.4. Revision Summary

- Initial release.

2. APPLICABLE DOCUMENTS AND FORMS

The following 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 Connectivity Specifications

114-106497	Application Specification – Crimp version
501-161257	Qualification Test Report for SGI1.5 dual row

2.2. Commercial Standards and Specifications

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

2.3. Reference Documents

102-950	Qualification of Separable Interface Connectors
109-1	General Requirements for Testing
109-197	Test Specifications 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. Ratings

A. Voltage Rating: 100V AC/DC

B. Current Rating: See Figure 1 for applicable current carrying capability. Maximum rated current that can be carried by this product is limited by maximum operating temperature of the housings (105°C) and temperature rise of the housings (30°C). Variables to be considered for each application are: wire size, connector size, contact material, ambient temperature, and printed circuit board design. See appendix for current capacity of respective position.

Current Capacity / A	
Pitch / Wire Size	SGI 1.50 connector Dual Row
24AWG	2.8 Max.
26AWG	2.4 Max.
28AWG	2.3 Max.

Figure 1

C. Temperature Rating: –40°C to +105°C (The upper limit of the temperature includes the temperature rising by energized current.)

3.3. Performance Requirements and Test Description

The product should meet the electrical, mechanical and environmental performance requirements specified in Figure 2. All tests shall be performed at ambient environmental conditions otherwise specified.

3.4. Test Requirements and Procedure Summary

Test Description	Requirement	Procedure
Initial Examination of Product	Meets requirements of product drawing and Application Specification 114-106497.	EIA-364-18. Visual and dimensional inspection per product drawing.
Final Examination of Product	Meets visual requirements.	EIA-364-18. Visual examination.
Electrical		
Low Level Contact Resistance (LLCR)	20 milliohms maximum initial. 40 milliohms maximum final.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 4.
Insulation Resistance	500 megaohm minimum initial. 100 megaohm minimum final.	EIA-364-21 500 volts DC for one minute hold. Test between adjacent contacts.
Withstanding Voltage	One minute hold with no breakdown or flashover. 5.0 milliamperes maximum leakage current.	EIA-364-20, Condition I. 500 volts AC at sea level. Test between adjacent contacts..
Temperature Rise vs. Current	30°C maximum temperature rise.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minutes intervals are within 1°C.

Test Description	Requirement	Procedure
	Mechanical	
Sinusoidal Vibration	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition I. Subject mated specimens to 10 to 55 to 10Hz traversed in 1 minute with 1.5 mm maximum total excursion. Two hours in each of 3 mutually perpendicular planes.
Mechanical Shock	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Test Condition H. Subject mated specimens to 30 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 30 cycles at a maximum rate of 500 cycles per hour.
Durability Preconditioning	See Note.	EIA-364-9. Mate and unmate specimens for 5 cycles at a maximum rate of 500 cycles per hour.
Connector Mating Force	4P 21N Max. 6P 24N Max. 8P 27N Max. 10P 30N Max. 12P 33N Max. 14P 36N Max. 16P 39N Max. 18P 42N Max.	EIA-364-13, Method A. Measure force necessary to mate specimens fully from point of initial contact at a maximum rate of 12.7 mm per minute with latch disengaged.
Connector Unmating Force	4P 0.5N Min. 6P 1.0N Min. 8P 1.5N Min. 10P 2.0N Min. 12P 2.5N Min. 14P 3.0N Min. 16P 3.5N Min. 18P 4N Min.	EIA-364-13, Method A. Measure force necessary to unmate specimens at a maximum rate of 12.7 mm per minute with latch disengaged.
Resistance to Soldering Heat	See Note.	Follow TE Spec 109-201, method B, condition B Peak Temperature: 260 +0/-5°C
Connector Locking Strength	4P 15 N minimum 6P-18P 30 N minimum	EIA-364-98. Measure connector locking strength at a maximum rate of 12.7mm per minute without receptacle terminals.
Post Retention Force	15 N minimum	EIA-364-29, Method C Measure post retention at a maximum rate of 25.4 mm per minute.
Contact Insertion Force	7.84 N (maximum) per Contact	EIA-364-5 Operation Speed: 25.4 mm/min.
Contact Retention Force	10 N (minimum)	EIA-364-29, Method C Operation Speed: 25.4 mm/min.

Test Description	Requirement		Procedure
Crimp Tensile Strength	**Wire Size (AWG)**	**Crimp Tensile (minimum) (N)**	EIA-364-8 Operation Speed: 25.4 mm/min Apply an axial pull force to the crimped wire while the contact is secured.
	24	30	
	26	20	
	28	11	
Solderability	Wet Solder Coverage 95% Min.		TEC-109-11 Method B Solder Temperature: 245±5°C Immersion duration: 3±0.5s Flux: Non-activated rosin base.
Environmental			
Thermal Shock	See Note.		EIA-364-32, Method A Test Condition VII. Subject mated specimens to 10 cycles between -55 and 105°C with 30 minutes dwells at temperature extremes and 5 minutes transition between temperatures.
Humidity/temperature Cycling	See Note.		EIA-364-31, Method IV. Subject specimens to 10 cycles (10 days) between 25 and 65°C at 90 to 95% RH.
Temperature Life	See Note.		EIA-364-17, Method A, Test Condition 4, Test Time Condition A. Subject mated specimens to 105°C for 96 hours.
Salt Spray	See Note.		EIA-364-26. Subject mated specimens to 5% salt concentration for 48 hours.
Hydrogen Sulfide	See Note.		Subject mated specimens to 3 ± 1 ppm H_2S gas concentration maintained at 40 ± 2°C for 96 hours.
Ammonia	See Note.		Subject mated specimens in atmosphere that rated 25 mL/L of 3% NH3 for 7 hours.
Resistance to Cold	See Note.		IEC 60068-2-1 Mated connectors, -40±2°C, 96 hours

Figure 2 (end)

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.

3.5. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	TEST SEQUENCE (b)														
Initial examination of product	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LLCR	3,7	2,4	2,5									2,4	2,4	2,4	2,4
Withstanding Voltage					3,7										
Insulation Resistance					2,6										
Temperature Rise vs. Current				2											
Sinusoidal Vibration	5														
Mechanical Shock	6														
Durability	4														
Durability Preconditioning			3												
Connector Mating Force	2														
Connector Unmating Force	8														
Crimp Tensile Strength						2									
Contact Insertion Force								2							
Contact Retention Force								3							
Resistance to Soldering Heat							2								
Connector Locking Strength									2						
Post Retention Force										2					
Solderability											2				
Thermal Shock					4										
Humidity/Temperature Cycling			4		5										
Temperature Life		3													
Salt Spray												3			
Hydrogen Sulfide													3		
Ammonia														3	
Resistance to Cold															3
Final Examination of Product	9	5	6	3	8	3	3	4	3	3	3	5	5	5	5

Figure 3

NOTE
(a) See paragraph 4.2.
(b) Numbers indicate sequence in which tests are performed.

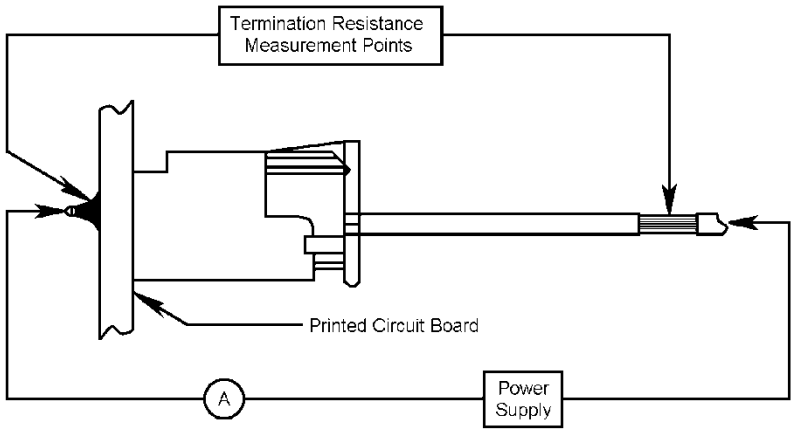

Figure 4: LLCR Measurement Points (Subtract Wire Bulk)

4. QUALITY ASSURANCE PROVISIONS

4.1. Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions shown in Figure 5.

Temperature	15°C – 35°C
Relative Humidity	45% – 75%
Atmospheric Pressure	86.6 – 106.6 kPa

Figure 5

4.2. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production.

B. Test Sequence

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

4.3. 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.

4.4. Acceptance

Acceptance is based on verification that the product meets the requirements in 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.

4.5. 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.

5. RECOMMENDED SOLDERING PROFILE

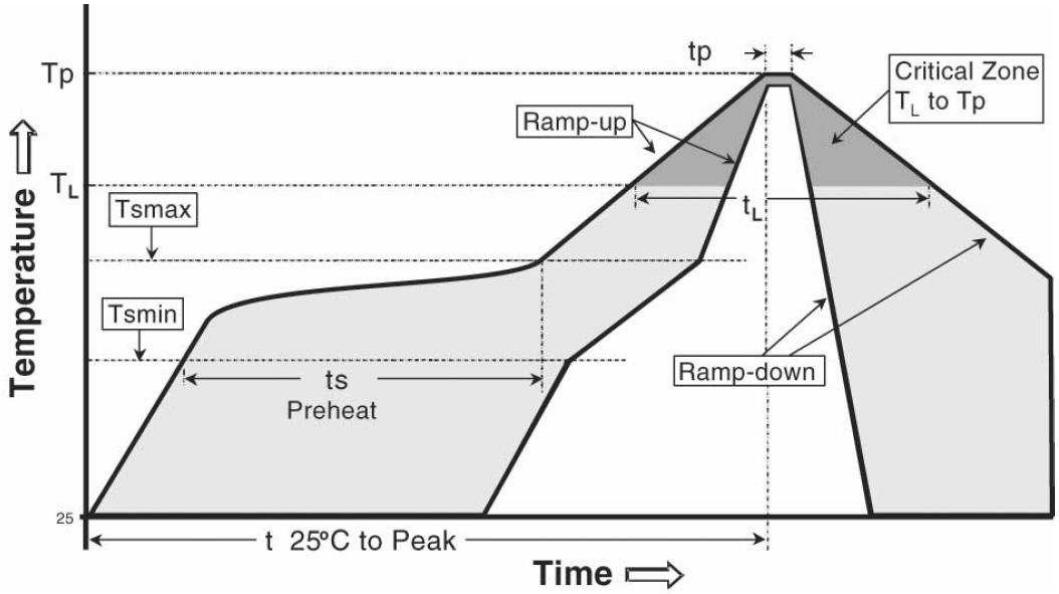

Figure 8

- Average ramp rate: 3°C per second maximum
- Preheat temperature T_{smin} (minimum): 150°C
- Preheat temperature T_{smax} (maximum): 200°C
- Preheat time t_s: 60 to 180 seconds
- Ramp to peak: 3°C per second maximum
- Time over liquidus T_L(217°C): 60 to 150 seconds
- Peak temperature T_p: 260 +0/-5°C
- Time within 5°C of peak t_p: 20 to 40 seconds
- Ramp - cool down: 6°C per second maximum
- Time 25°C to peak: 8 minutes maximum

Note: All temperatures refer to topside of the package, measured on the package body surface.

Appendix

Current Capacity / A

Number of Circuits	SGI 1.50 dual row		
	24 AWG	26 AWG	28 AWG
4	2.8	2.4	2.3
6			
8	2.4	2.0	1.8
10			
12	2.0	1.8	1.7
14			
16			
18 (a)			

*Note:

(a) 2.5A can apply to any 4 pins out of 18 position header assembly and the rest pins apply 1A, the temperature rise of the housing < 30°C.