TB-2304

GENERAL PRODUCT SPECIFICATION
CHAMELEON MEZZANINE CONNECTORS

Revision C

Specification Revision Status

Revision	SCR No.	Description	Initial	Date
A	S4994	Initial Release	D. Smith	09/29/2016
B	S9926	Update current ratings in table 5.3 based on UL testing results.	J. Proulx	06/22/2022
C	S10154	updated table on page 5 Other clerical updates	D Smith	10-11-2022

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1.0 SCOPE

1.1 Content

1.1.1 This specification covers performance, test and quality requirements for the Chameleon Mezzanine connectors. These connectors are two piece devices, a plug and socket that connect two parallel printed circuit boards. Both connectors are SMT, ball grid array devices. The Chameleon Mezzanine connector may consist of differential pair, single ended and/or power contacts. Both plug and socket may be configured with any combination containing 4, 6, 8, 10 or 12 differential pair, single ended, and power segments. The maximum total number of segments is 22.

1.2 Qualification

1.2.1 When tests are performed on subject product line, procedures specified in EIA-364 shall be used per the test sequences outlined in Amphenol-TCS Technical Bulletin TB-2023. All inspections shall be performed using applicable inspection plan and product drawings.

1.2.2 If changes affecting form, fit, or function are made to the product or to the manufacturing process, product engineering shall coordinate requalification testing, consisting of all or part of the original sequence.

1.2.3 Acceptance is based on verification that the product meets the requirements outlined in the General Qualification Plan in TB-2023. Failures attributed to equipment, test set-up, or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Verification of corrective action is required before resubmittal.

1.3 Quality Conformance Inspection

1.3.1 The applicable FPIR and Plating Quality Inspection Plan shall specify the acceptable stamping and molding quality levels to be applied. Dimensional and functional requirements shall be in accordance with the applicable product drawings and this product specification.

2.0 REFERENCE DOCUMENTS

2.1 The following documents form a part of this specification to the extent specified herein.

2.1.1 Amphenol Documents

TB-2023 – Amphenol Commercial Connector Qualification Plan

TB-2305 – Chameleon DFM and Application Design Guide

TB-2317 – Chameleon Routing Guidelines

2.2 Commercial Standards

2.2.1 EIA-364 Electrical Connector Test Procedure Including Environmental Classifications

2.2.2 GR-1217-CORE - Generic Requirements for Separable Electrical Connectors used in Telecommunications Hardware

2.2.3 IEC-512 - Electromechanical Components for Electronic Equipment - Basic testing procedures and measuring methods.

3.0 MATERIALS AND FINISHES

3.1 Contacts

3.1.1 All differential, single ended and power contacts shall be 0.15 mm thick, high performance copper alloy.
753 Finish Option – Mating area shall be 0.00076mm thick gold minimum, per MIL-G-45204, Type II, Grade C, over 0.00127mm thick nickel minimum all over per QQ-N-290. Tail area shall be 0.0000508 to 0.000305 thick gold flash over 0.00127 min thick nickel to meet solder ability requirements per ASTM B579.

3.2 Insulators

3.2.1 Glass reinforced polyester (Liquid Crystal Polymer). UL 94V-0 rating

4.0 SIGNAL BULK RESISTANCE RATINGS

Connector Mated Height (Line Length mm)	Bulk Resistance(1,2,3) Differential Pair, mΩ	Bulk Resistance(1,2,3) Ground, mΩ	Bulk Resistance(1,2,3) Single Ended, mΩ	Bulk Resistance(1,2,3) Power, mΩ
6.0 mm	8.2	4.0	8.1	4.2
7.0 mm	TBD			
9.0 mm	TBD			
10.0 mm	TBD			

NOTES:

1. The values reported include the contributions of PWB pads and solder joints.
2. The values reported are obtained by a process of laboratory measurements of actual connector samples.
3. Mated bulk resistance values are typical values

5.0 ELECTRICAL RATINGS

5.1 Resistance

Description	Target Values
Dielectric Withstanding Voltage	750 Volts RMS
Insulation Resistance	1000 MΩ
Separable Interface Contact Resistance	Delete
SMT Lead to SMT pad Resistance	Delete

5.2 Voltage

Description	Agency	Working	DWV
All Contacts	UL 48 VAC (RMS)	250 VAC (RMS)	750 VAC (RMS)

5.3 Current

Current ratings based on UL listing and test conditions: no Cu planes in the PCB and power applied to all contacts in series.

Description	Value
Diff. Signal, Diff. Small Ground, Single Ended, Small Power Contacts	1.0 Amp per contact
Diff. Large Ground, Large Power Contacts	2.5 Amp per contact

6.0 TEMPERATURE RATINGS, MATED

Description	Value
Maximum Operating Temperature Rating	105 degrees C
Minimum Operating Temperature Rating	-55 degrees C

7.0 HIGH FREQUENCY SIGNAL INTEGRITY RATINGS

Description	Value
Impedance Control Tolerance	100 ohms +/- 10%
Insertion Loss Maximum	< -1.25 dB @ 10 Ghz (AFR fixture removal)
NEXT Maximum	< -30dB @ 10 Ghz (single aggressor)
FEXT Maximum	< -40dB @ 10 Ghz (single aggressor)
In-Pair Skew	0 psec (not measurable)
Impedance	Min. = 95, Max. = 110 ohms

8.0 Mechanical Ratings

	Value, per contact	
Description	**Grams (lbs.)**	**Newtons**
Signal, Ground and Power Contact Normal Force	30 End Of Life (EOL)	0.31
Signal, Ground and Power Contact Engagement Force, Individual, Maximum	45	0.46
Signal, Ground and Power Contact Separation Force, Individual, Minimum	10	0.10
Signal, Shield, and Power Contact Durability	250 Mating Cycles	
Contact Mechanical Wipe Nominal (Worst Case Minimum) Values	1.5mm nominal	

9.0 SMT LEAD INTERFACE

Description	Value per Pin, Newtons (lbs)
Signal and Shield SMT ball pull strength	2 lbs minimum

10.0 SPECIFICATION SUMMARY

10.1 Material

Parameters	Specification Value	Chameleon Value	Reference Document
Plating Integrity	Acceptable Porosity	Meets requirement	EIA-364-53A
Contact Metallization	30µin Gold min 50µin Nickel min	Meets requirement	GR-1217-CORE Per paragraph 9.1.1.2 EIA-364-TP09
Durability	200 Cycles	250 cycles	GR-1217-CORE
Flammability Rating	94V-0	Resin meets requirement	UL94

10.2 Mechanical

Parameters	Specification Value	Chameleon Value	Reference Document
Contact Normal Force	30 gms EOL	Meets requirement	
Engagement Force	See section 8.0	Meets requirement	
Signal Contact Wipe Distance	0.51 mm (0.020") min	1.5 mm nominal	
Polarization Force			
Contact Geometry	Minimum one curved surface in mating area.	Minimum one curved surface in mating area.	N/A
Hertz Stress	N/A		N/A

10.3 Electrical

Parameters	Specification Value	Chameleon Value	Reference Document
Contact Resistance Stability (LLCR)	Less than 10mΩ change from initial reading	Meets requirement	GR-1217-CORE EIA-364-TP23
SMT Solder Ball to SMT Pad Resistance	1mΩ maximum Test Current 100mA and 20 mV open circuit	1mΩ maximum	GR-1217-CORE EIA-364-TP23
Mated Bulk Resistance	N/A	See section 4.0	N/A
Signal Continuity	Less than 10 nanosecond interrupt	Meets requirement	GR-1217-CORE
Current Rating	Less than 30° C Temperature Rise	See section 5.3	GR-1217-CORE
Insulation Resistance	1,000 Megaohms	1,000 Megaohms	GR-1217-CORE
Dielectric Withstanding Voltage	1000 VAC (RMS)	750 VAC (RMS) De-rated value	GR-1217-CORE

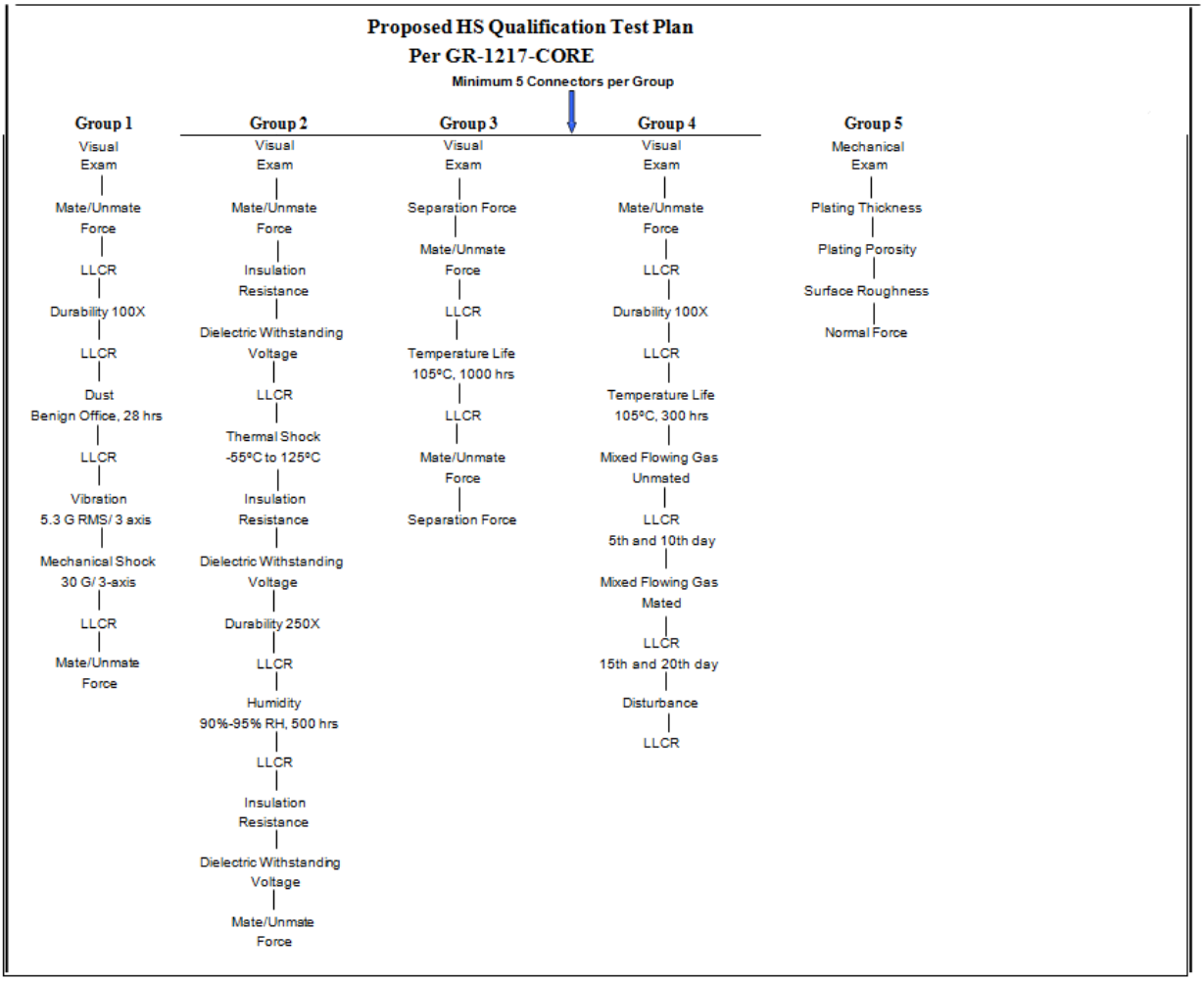
10.4 Environmental

Parameters	Specification Value	Chameleon Value	Reference Document
Temperature Life	No Change in LLCR greater than 10mΩ. 500 hours at 105ºC	Meets requirement 1000 hours at 105ºC	GR-1217-CORE EIA-364-TP17
Thermal Shock	No Change in LLCR greater than 10mΩ. 5 Cycles -55ºC - 85ºC	Meets requirement 25 Cycles -55ºC - 85ºC	GR-1217-CORE EIA-364-TP32
Moisture Resistance	No Change in LLCR greater than 10mΩ. RH 90% - 98% for 500 hours.	Meets requirement	GR-1217-CORE EIA-364-TP31
Dust	No Change in LLCR greater than 10mΩ.	Meets requirement	GR-1217-CORE EIA-364-TP91
Vibration	No Change in LLCR greater than 10mΩ. Random Vibration 5.3 G RMS	Meets requirement	GR-1217-CORE EIA-364-TP28
Mechanical Shock	No Change in LLCR greater than 10mΩ. 30 G, 11 millisecond, half sine, 3 axis	Meets requirement	GR-1217-CORE EIA-364-TP27
Mixed Flowing Gas	No Change in LLCR greater than 10mΩ.	TBD(Complete Q4 2016)	GR-1217-CORE EIA-364-TP65

11.0 TELCORDIA QUALIFICATION TEST GROUP SUMMARY

11.1 Test Groups

Group 1: Vibration and mechanical shock with dust and durability
Group 2: Thermal shock and humidity with dust and durability
Group 3: Temperature life, 500 hrs @ 105°C
Group 4: Mixed flowing gas, 4 gases with durability- thermal pre-conditioning
Group 6: Porosity and plating thickness



11.2 Each test group will have at a minimum of 4 connectors and 200 LLCR-CPIR measurements.

11.3 Definitions

11.3.1 LLCR- Low Level Contact Resistance

11.3.2 CPIR- Compliant Pin Interface Resistance

11.3.3 DWV- Dielectric Withstanding Voltage

11.3.4 IR- Insulation Resistance