



AMPSEAL16 180 DEG HEADER SPECIFICATION

AMPSEAL16 180 DEG HEADER 产品规范

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1. SCOPE 适用范围

1.1 Content 内容

This specification covers the performance, test and quality requirements for 2439715 (hereinafter referred to as 2439715).

This specification applies to the product 2439715-*, but not limited to it.

本规范适用于 2439715(以下简称 2439715) 的性能, 测试和质量要求。

本规范适用但不仅限于以下零件号: 2439715-1, 2439715-2, 2439715-3, 2439715-4, 2439715-5

1.2 Qualification 限制

When tests are performed, the following specifications and standards shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

本测试规范依照下面的规范及标准执行。所有的检验应依照合适的检验计划及产品图纸执行。

2. APPLICABLE DOCUMENTS 适用文件

2.1 Usable document 使用文件

In the event of conflict between the requirements of this specification and the drawing, the drawing shall take precedent.

In the event of conflict between the requirement of this specification and the referenced documents, this specification shall take precedent.

在本规范的要求与图纸发生冲突时, 以产品图纸为准。在本规范的要求与参考文件发生冲突时, 以本规范为准。

2.2 TE specifications 泰科电子规范

109-1: General requirements for Test Specifications / 测试通用规范

2.3 Other specifications 其他规范

SAE/USCAR-2 (Rev 7): Performance Specification for Automotive Electrical Connector Systems.
汽车电气连接器系统性能规范

- ISO 20653: Tests and measurements- Road vehicles - Degrees of protection (IP-Code) - Protection of electrical equipment against foreign objects, water and access.
测试和测量— 道路车辆-防护程度
(IP-Code) —保护电气设备不受外来物体、水和接触的影响。
- USCAR17: Performance Specification for Automotive RF Connector System.
汽车射频连接器系统性能规范
- IEC 60512-25-7: Tests and measurements – Impedance, reflection coefficient, and voltage standing wave ratio (VSWR)
测试和测量—阻抗、反射系数和电压驻波比(VSWR)
- IEC 60512-25-2: Tests and measurements – Attenuation (insertion loss)
测试和测量—衰减(插入损耗)
- IEC 60512-25-5: Tests and measurements – Return loss
测试和测量—回程损耗
- IEC 60512-25-1: Tests and measurements – Crosstalk ratio
测试和测量—串扰
- EIA-364-02: Air Leakage Test Procedure for Electrical Connectors
电连接器漏气试验程序

- ☐ SAE J1455: Recommended Environmental Practices for Electronic Equipment
电子设备环境建议规范
- ☐ GMSL2 Hardware Design Guide (Rev. 14.0)
硬件设计指南
- ☐ LV214: Motor Vehicle Connectors Test Specification
机动车辆连接器测试规范

3. REQUIREMENT 要求

3.1 Design and Construction 设计和结构

Products must meet the design, construction and physical dimensions specified in the applicable product drawings.

产品必须满足产品图纸上的设计，结构和尺寸要求。

3.2 Material 材料

Description of the material sees the related product drawings.

材料描述见相关产品图纸。

Component List	Raw material	Surface Treatment
Plastic Housing	PA10T 30% GF	NA
OUTER CONTACT	JIS CuSn6	3μm MIN. Sn OVER Ni
CENTER PIN	UNS C51100	SOLOED SIDE: 3μm MIN. Sn OVER Ni INTERFACE SIDE: 2μm MIN. Ag OVER N
OVERMOLD HOUSING	LCP-GF32	NA

3.3 Test parameters and tolerances 测试参数与公差

Table 1: Test parameters and tolerances

Requirement 要求	Tolerance 公差
Ambient temperature 环境温度	23°C ± 5°C
Relative humidity 相对湿度	45% to 75%
Atmospheric pressure 大气压力	96kPa ± 10kPa

3.4 Ratings 等级

- A. Operating Temperature / 工作温度: -40~105°C
- B. Storage Temperature / 储存温度: -40~105°C
- C. Rated voltage / 额定工作电压: 60V DC
- D. Application / 产品应用: Under hood 发动机舱

3.5 General Performance and Test description 通用性能和试验描述

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Para.3.6. All testes must be performed at the test condition of the TE test specification 109-1 unless otherwise specified.

产品应能满足段落 3.6 中的电气，机械和环境等性能要求。所有试验均需按照 TE 规范 109-1 中的测试条件进行，除非另有说明。

3.6 Tests requirement and method summary 测试要求及方法

Para.	Test Item	Requirements	Method
3.6.1	Visual inspection	No visual defects, torn seals, cracked plastic, or discoloration observed.	USCAR2 Visual inspection of product before (and after) un-mating connectors for conditions such as torn seals, cracked plastic, evidence of fluid or dust ingress in sealed connector systems, arcing, charring, melting, or anything that affects the performance or serviceability of the product as deemed by qualified Engineer.
Mechanical Requirement			
3.6.2	Connector-connector mating force	135N Max.	TE-501-94038 2.2
3.6.3	Connector-connector un-mating force.	135N Max.	TE-501-94038 2.3

3.6.4	Connector disengagement force with lock enabled	120 N min.	SAE/USCAR-2 5.4.2.4
3.6.5	Polarization feature effectiveness.	130 N maximum with no center contact continuity.	USCAR 2, 5.1.7
3.6.6	Connector cycling.	SAE/USCAR-2 5.1.7.4 No defects	SAE/USCAR-2 5.1.7.4
3.6.7	Vibration Mechanical shock	No defects or loss of continuity.	SAE/USCAR-2, 5.4.6.3-V2
3.6.8	Connector-Connector Audible Clic	SAE/USCAR-2, 5.4.7.3	SAE/USCAR-2, 5.4.7.4
3.6.9	Header Terminal Solderability	95% coverage of center contact and shield solder tines	TEC-109-11-10; Method B
3.6.10	Reflow Solder	no defects	TEC-109-201 Rev E 3.3.C. 2.b
ELECTRICAL			
3.6.11	Insulation resistance	Insulation Resistance > 100 M Ω	TE 109-18341 5.3.1
3.6.12	Low Signal Termination Resistance/Contact resistance	Outer Contacts mated connection: Initial: max 7.5 m Ω After test: max 40m Ω Inner Contacts mated connection: Initial: max 15 m Ω After test: max 40m Ω	USCAR17, 4.3.1.2
SIGNAL PROPAGATION			
3.6.13	Impedance	50 Ω $\pm$ 10 Ω (trise = 35 ps)	TE 109-18341 5.3.2
3.6.14	Crosstalk	≥ 60 dB 0,01 GHz < f $\leq$ 4 GHz ≥ 50 dB 4 GHz < f $\leq$ 6 GHz	TE 109-18341 5.3.5
3.6.15	Insertion Loss	≤ 0.30 dB 0.03GHz < f $\leq$ 1GHz ≤ 0.50 dB 1GHz < f $\leq$ 2.5GHz ≤ 0.60 dB 2.5GHz < f $\leq$ 4GHz ≤ 0.70 dB 4GHz < f $\leq$ 5.5GHz ≤ 0.80 dB 5.5GHz < f $\leq$ 6GHz RF performance requirements of Inline Connections.	TE 109-18341 5.3.3

3.6.16	Return Loss	$\leq -23 \text{ dB}$ $0,01 \text{ GHz} \leq f \leq 1 \text{ GHz}$ $\leq -23 \text{ dB} + 3 \text{ dB / GHz} * (f - 1 \text{ GHz})$ $1 \text{ GHz} < f \leq 3 \text{ GHz}$ $\leq -17 \text{ dB}$ $3 \text{ GHz} < f \leq 5,5 \text{ GHz}$ $\leq -17 \text{ dB} + 5 \text{ dB / GHz} * (f - 5,5 \text{ GHz})$ $5,5 \text{ GHz} < f \leq 6 \text{ GHz}$	TE 109-18341 5.3.4
ENVIRONMENTAL			
3.6.17	Water Immersion IPX7	Water shall not penetrate in a quantity causing harmful effects or impair performance if the enclosure is immersed in water temporarily under specified pressure and time conditions	ISO 20653 Immersion depth: 1.0 m Duration 30 min
3.6.18	Dust Test IP6KX	Dust shall not penetrate in a quantity causing harmful effects or impair performance if the enclosure is exposed to dust per the standard.	ISO 20653
3.6.19	Thermal shock	USCAR 2 5.6.1 Rev 7	USCAR 2 5.6.1
3.6.20	Temp. / Humidity Cycling	SAE/USCAR-17, 4.5.2.2	SAE/USCAR-17, 4.5.2.4, 100°C
3.6.21	High Temperature Exposure	USCAR 2 5.6.3	USCAR 2 5.6.3

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 1

3.7 Test sequence 试验顺序

Test or Examination	Test Group (a)									
	A	B	C	D	E	F	G	H	I	J
	Test Sequence (b)									
3.6.1 Visual inspection	1,5	1,3	1,3	1,16	1,16	1,16	1,16	1,3	1,3	1,7
3.6.11 Contact Resistance				2,10	2,10	2,10	2,10			
3.6.10 Insulation resistance				3,11	3,11	3,11	3,11			2,4,6
3.6.8 Solderability, dip test								2		
3.6.9 Reflow Solder									2	
3.6.2 engagement force	2									
3.6.3 Connector disengagement force with lock disabled	4									
3.6.4 Connector disengagement force with lock enabled	3									
3.6.5 Polarization feature effectiveness		2								
3.6.6 Connector cycling				8	8	8	8			
3.6.8 Connector-Connector Audible Click			2							
3.6.7 Mechanical shock / Vibration				9						
3.6.19 Thermal shock					9					
3.6.20 Temperature-humidity cycling						9				
3.6.21 High temperature exposure							9			
3.6.13 Impedance				4,12	4,12	4,12	4,12			
3.6.15 Insertion Loss				5,13	5,13	5,13	5,13			
3.6.16 Return Loss				6,14	6,14	6,14	6,14			
3.6.14 Cross Talk				7,15	7,15	7,15	7,15			
3.6.17 Water Immersion ISO 20653 IPX7										3
3.6.18 Dust Test ISO 20653 IP6KX										5

Note:

(a) See Paragraph 4.1

(b) Numbers indicate sequence in which tests were performed.

Figure 1. Test Sequences

4. QUALITY 质量

4.1 Qualification test 鉴定

Samples must be in accordance with drawings and be taken in a random way in the production in progress.

样件必须与产品图纸一致，并且是生产过程中随机选取的。

4.2 Requalification test 重新鉴定

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

如果产品或者制造过程中有显著影响外观，装配和功能的设变，质保需要协调按照原先工程部定义的测试顺序，重新验证全部或者部分测试项目。

4.3 Acceptance 验收

Acceptance is based on verification that the product meets the requirements of section 3.6. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmitted.

归咎于测试设备，样件安装或者操作员的失误的失效不应判定产品不合格。当产品失效发生时，需要有纠正措施以及重新提交样件进行验证。在重新验证前，需确认已有纠正措施。

4.4 Quality conformance inspection 质量合格检验

The applicable TE Connectivity quality inspection plan will 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

TE Connectivity 的质量检验计划将指定适用的质量标准。尺寸和功能要求，应按照适用的产品图纸和本规范。