



Sealed MATE-AX 4P Header Conn Specification

防水同轴板端高速产品规范

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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 TE 4P Sealed MATE-AX Headed Conn. (hereinafter referred to as MATE-AX Conn.).

Application product description and part numbers are shown in Fig 3, but not limited to it.

本规范适用于防水同轴板端高速产品(以下简称高速连接器)的性能, 测试和质量要求。

本规范适用零件料号如图 Fig 3, 但不仅限于这些料号零件号。

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	Performance Standard for Automotive Electrical Connector Systems 汽车电气连接器系统性能标准
SAE/USCAR-17	Performance Specification for Automotive RF Connector Systems 汽车射频连接器系统性能规范
LV214	Motor Vehicle Connectors Test Specification
ISO 20653	Tests and measurements- Road vehicles - Degrees of protection (IP-Code) - Protection of electrical equipment against foreign objects, water and access.

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。

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. Voltage /电压: 60V

C. Characteristic Impedance/ 特性阻抗: 50 ohms

D. Frequency Range / 频率范围: 0 to 6.0 GHz

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

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per SAE/USCAR-2.

产品设计符合图 1 中规定的电气、机械和环境性能要求。除非另有规定，所有测试都应在 SAE/USCAR-2 规定的环境条件下进行。

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

Para.	Test Item	Requirements	Method
3.6.1	Visual inspection	SAE/USCAR-2, 5.1.8.4. No defects	SAE/USCAR-2, 5.1.8.3.
ELECTRICAL			
3.6.2	Contact resistance.	Before exposure Max. 15 mOhm for signal Max. 7.5 mOhm for outer contact After exposure Max. 40 mOhm for signal and ground contacts.	DIN EN 60512-2-1
3.6.3	Isolation resistance.	SAE/USCAR-17, 4.4.1.3. 100 M Min	SAE/USCAR-17, 4.4.1.2.
3.6.4	Current Capability	1.0 A RG174 Cable 3.0 A RTK 031 Cable	DIN EN 60512-5-1
3.6.5	Dielectric withstanding voltage.	800 volts AC	SAE/USCAR-17,4.3.2
MECHANICAL			
3.6.6	Solderability, dip test.	Solderable area shall have a minimum of 95% solder coverage.	AMP Spec 109-11-5 Test Method B Subject contacts to solderability.
3.6.7	Reflow Solder	no defects	TEC-109-201 Rev E 3.3.C.2.b
3.6.8	Connector engagement force.	75 N max.	USCAR-2 Rev.6_2013 5.4.2
3.6.9	Connector disengagement force with lock disabled.	60 N max. 5N min.	DIN EN 60512-13-2
3.6.10	Connector disengagement force with lock enabled	110 N min.	DIN EN 60512-13-1
3.6.11	Polarization effectiveness.	80 N maximum with no center contact continuity.	SAE/USCAR-2, 5.4.4
3.6.12	Connector cycling.	SAE/USCAR-2, 5.1.7.5. No defects	SAE/USCAR-2, 5.1.7

3.6.13	Mechanical shock / Vibration	No defects or loss of continuity.	VW75174 V2 October 2018 6.18
3.6.14	Header pin retention.	SAE/USCAR-2, 5.7.1.4. 15 N min.	SAE/USCAR-2, 5.7.1.3.
3.6.15	Connector Installation Abuse - Side Force	110 N Min	GMW3191 2019 9.3.8
ENVIRONMENTAL			
3.6.16	Thermal shock.	SAE/USCAR-2, 5.6.1.4.	SAE/USCAR-2 5.6.2
3.6.17	Temperature-humidity cycling.	SAE/USCAR-2, 5.6.2.4.	SAE/USCAR-17 4.5.2
3.6.18	High temperature exposure.	SAE/USCAR-2, 5.6.3.4.	SAE/USCAR-2, 5.6.3
3.6.19	Salt Spray Test	VW75174 PG18 A	IEC 60068-2-52 Severity 3
3.6.20	High Pressure Spray (IPX9K)	SAE/USCAR-2, 5.6.7.4.	SAE/USCAR-2, 5.6.7.3
3.6.21	Submersion (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
3.6.22	Dust-proof	TEC60529-2013 13.4	TEC60529-2013 13.4
3.6.23	Mixed Flowing Gas	LV 214 March 2010 B 19.4	LV 214 March 2010 B 19.4
3.6.24	Humidity heat, constant	The test parts showed no crack and no deformation	USCAR-2 Rev.6_2013 5.7.3
RF-PARAMETER			
3.6.25	Impedance	50±10 Ohm	DIN EN 60512-25-7

3.6.26	Insertion Loss	$\leq 0,30 \text{ dB}$ $0.03\text{GHz} < f \leq 1 \text{ GHz}$ $\leq 0,50 \text{ dB}$ $1 \text{ GHz} < f \leq 2.5 \text{ GHz}$ $\leq 0,60 \text{ dB}$ $2.5 \text{ GHz} < f \leq 4 \text{ GHz}$ $\leq 0,70 \text{ dB}$ $4 \text{ GHz} < f \leq 5.5 \text{ GHz}$ $\leq 0,80 \text{ dB}$ $5.5 \text{ GHz} < f \leq \mathbf{6 \text{ GHz}}$	DIN EN 60512-25-2
3.6.27	Return Loss	$\leq -23 \text{ dB}$ $0.08\text{GHz} < f \leq 1 \text{ GHz}$ $\leq -23 \text{ dB} + 3 \text{ dB} / \text{GHz} * (f - 1,0 \text{ GHz})$ $\leq -17 \text{ dB}$ $1 \text{ GHz} < f \leq 3 \text{ GHz}$ $\leq -17 \text{ dB}$ $3 \text{ GHz} < f \leq 5.5 \text{ GHz}$ $\leq -17 \text{ dB} + 5 \text{ dB} / \text{GHz} * (f - 5,5 \text{ GHz})$ $5.5 \text{ GHz} < f \leq \mathbf{6\text{GHz}}$	DIN EN 60512-25-5
3.6.28	Cross Talk	$\geq 60 \text{ dB}$ $0,08 \text{ GHz} < f \leq 4 \text{ GHz}$ $\geq 50 \text{ dB}$ $4 \text{ GHz} < f \leq \mathbf{6 \text{ GHz}}$	DIN EN 60512-25-1
3.6.29	RF Attenuation	$\leq -45 \text{ dB}$ $0,08 \text{ GHz} < f \leq 4 \text{ GHz}$ $\leq -40 \text{ dB}$ $4 \text{ GHz} < f \leq \mathbf{6 \text{ GHz}}$	USCAR-17 Rev 5, 4.4.3

(Figure 1)

3.7 Test sequence 试验顺序

Test or Examination	Test Group(i)																	
	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S
	Test Sequence(ii)																	
3.6.1 Visual inspection	1,5	1,6	1,3	1,4	1,3	1,3	1,7	1,9	1,9	1,9	1,9	1,6	1,8	1,8	1,6	1,3	1,3	1,6
3.6.2 Contact Resistance								3,6	3,6	3,6	3,6	3,5			3,5			3,5
3.6.3 Isolation resistance.								4,7	4,7	4,7	4,7		3,6	3,6				
3.6.4 Current Capability																		
3.6.5 Dielectric withstanding voltage.								8	8	8	8		4,7	4,7				
3.6.6 Solderability, dip test.																2		
3.6.7 Reflow Solder																	2	
3.6.8 Connector engagement force.	2	3																
3.6.9 Connector disengagement force with lock disabled.	4	5																
3.6.10 Connector disengagement force with lock enabled	3	4																
3.6.11 Polarization effectiveness					2													
3.6.12 Connector cycling.								2	2	2	2	2	2	2	2			2
3.6.13 Mechanical shock / Vibration								5										
3.6.14 Header pin retention.			2	3														
3.6.15 Connector Installation Abuse - Side Force						2												
3.6.16 Thermal shock.										5								
3.6.17 Temperature-humidity cycling.									5									
3.6.18 High temperature exposure.											5							
3.6.19 Salt Spray Test												4						
3.6.20 High Pressure Spray														5				
3.6.21 Submersion													5					
3.6.22 Dust-proof															4			
3.6.23 Mixed Flowing Gas																		4
3.6.24 Humidity heat, constant		2		2														
3.6.25 Impedance							2											
3.6.26 Insertion Loss							3											
3.6.27 Return Loss							4											
3.6.28 Cross Talk							5											
3.6.29 RF Attenuation							6											

(Figure 2)

Notes:

(i) See paragraph 4.1.A.

(ii) Numbers indicate sequence in which tests are performed.

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。

5. APPLICATION PRODUCT DESCRIPTION AND PART NUMBERS 应用产品描述和零件编号

PART NUMBER	DESCRIPTION
2404815-*	4pos MATE-AX Header 90°
-2354439-	4pos MATE-AX plug 180° housing assembly

(Figure 3)

For cable application, please contact TE Connectivity