
Mini Dynamic Connector

1 SCOPE

1.1 Content

*This specification describes the design, the characteristics, the tests and the quality requirements of the **Mini Dynamic Connector**.*

*Header (12 Pos to 44 Pos): *-2834465-*, *-2834499-**

*Receptacle (12 Pos to 44 Pos): *-2834461-*, *-2834497-**

*Terminal: 2834464-**

1.2 Qualification

When testing the named products the following the specified specifications and standards shall be used. All tests have to be done using the applicable inspection plan and drawings.

2 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the case of a conflict between this specification and the specified documents, this specification has priority.

For the listed documents is valid the specification at the date of the first release of this specification.

2.1 Standards

- A. DIN/IEC 60512 *Electromechanical components for electronic equipments, basic testing procedures and measuring methods*
- B. DIN EN 60068 *Environmental tests*
- C. DIN IEC 68 *Electrical Engineering, basic environmental testing procedures*
- D. LV214 *Car Plug connectors – Test procedure*
- E. USCAR *Performance Specification for Automotive Electrical Connector System*
- F. EIA-364 *Electrical Connector / Socket Test Procedures Including Environmental Classifications*

2.2 DESCRIPTION

All design and construction data, such as dimensions, materials, wire sizes, etc., are shown in the product drawings.

3 PROPERTIES

3.1 General Requirements

The product must correspond with the drawing, concerning the design and the physical dimensions.

3.2 Technical Data - Ratings

Current carrying capacity	3A(22AWG), 2A(24AWG), 1A(26AWG)
Maximum mating cycles	30 cycles for tin-plated contacts
Temperature range	-40°C to +125°C for tin-plated contacts (including temperature rise)

3.3 Materials

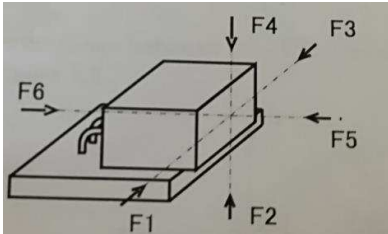
- A. Contact:
 - Material: Copper Alloy
 - Finish: Tin plating over Nickel Plating
 - Contact Point: Tin plating
 - Soldering Point: Tin plating
- B. Housing:
 - Material: PBT or HTN
 - Color: Black,
- C. Retention Leg:
 - Material: Copper Alloy
 - Finish: Tin plating over Nickel Plating

3.4 Performance

The product performs the electrical, mechanical and climatic requirements of Chapter 3.5

3.5 Electrical, Mechanical and Climatic requirements

Para.	Test items	Requirements	Procedures
MECHANICAL TEST			
3.5.1	Visual Inspection	No damage	Acc. DIN EN 60512-1-1
3.5.2	Header Pin retention force	≥Minimum displacement force 15N, within 0.2mm displacement.	Acc. USCARD-2:5.7.1
3.5.3	Connector-to-Connector mating Force	75N Max	Operation Speed: 25mm/min. Measure the force required to mate connector. It should be measured without Housing Lock. EIA 364-13
3.5.4	Connector-to-Connector Un-mating Force	75N Max	Operation Speed: 25mm/min. Measure the force required to unmate connector. It should be measured without Housing Lock. EIA 364-13
3.5.5	Polarizing/Keying	For 12/16/20 Pos: Keying/Polarizing efficiency > 3 times the insertion force (equipped housing), but at least 80N For 24 to 44 Pos: Keying/Polarizing efficiency > 80N	Acc. LV214 2010-03 E7.1 DIN EN 60512-13-5
3.5.6	Retention force of the housing latch/lock	The retention force must > 60N	Acc. LV214 2018-10 TG7 DIN EN 60512-15-6
3.5.7	Contact Insertion force and Retention force	Contact Insertion Force $F \leq 5N$ Contact Retention Force Primary Locking $F_{PRIM} \geq 30N$ Primary Locking + Secondary Locking $F_{SEK} + F_{PRIM} \geq 50N$	DIN ITEC 60512-8, Test 15B Testing speed: 25mm/Min
3.5.8	Conductor Pull-out Strength	26 AWG: 19.6 N MIN 24AWG: 29.4 N MIN 22 AWG: 49.0 N MIN	Apply an axial pull-off load to crimped wire of contact secured on the tester. Subjects take insulation barrel away. Operation Speed: 100 mm/min. EIA 364-08

Para.	Test items	Requirements	Procedures
MECHANICAL TEST			
3.5.9	Connector Mounting Feature Mechanical Strength	F1 TO F5 DIRECTION: 50N MIN F6 DIRECTION: 110N MIN 	USCAR-2: 5.4.11
3.5.10	Terminal bend resistance	FBend = 3N The TUT must not tear when subjected to the applied force. If the TUT was bent from its original position during the test, it must not tear or crack when straightened to its original position	SAE/USCAR-2 5.2.2

Para.	Test items	Requirements	Procedures
ELECTRICAL TEST			
3.5.11	Contact resistance	Dry Circuit Resistance Initial: 10mΩ max Final: 30mΩ max	Acc. LV214 2018-10 Appendix D Table D.1 Acc. DIN EN 60512-2-1 10 mV AC max. 0.1mA
3.5.12	Insulation resistance	1000 MΩ Min. (Initial) 100 MΩ Min. (Final)	Impressed voltage 500 V DC. Test between adjacent circuits of mated connectors. EIA 364-21
3.5.13	Dielectric withstanding Voltage	Neither creeping discharge nor flashover shall occur. Current leakage: 0.5 mA Max.	650V AC for 1 minute. Test between adjacent circuits of mated connectors. EIA 364-20

Para.	Test items	Requirements	Procedures																																																														
ENVIROMENTAL TEST																																																																	
3.5.14	Vibration (High Frequency)	<p>No function-relevant damage must occur. Circuit interruption monitoring takes place during the test. Permissible circuit interruption <1000ns. The circuit considered interrupted when the contact resistance exceeds 7Ω. Interruptions are not permissible.</p> <p>30 mΩ Max. (Final)</p>	<p>Acc. LV214 PG 17 E14.0 DIN EN 60068-2-6 Measurement frequency: 1 measured value per min Severity: see below table</p> <table border="1"> <tr> <td rowspan="2">2) "Body" sealed</td> <td>0 min/20 °C</td> <td>20 h per axis</td> <td rowspan="2">No sine wave</td> <td rowspan="2">A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000</td> </tr> <tr> <td>60 min/-40 °C</td> <td>RMS value of acceleration</td> </tr> <tr> <td></td> <td>150 min/-40 °C</td> <td>27.8 m/s²</td> <td></td> <td></td> </tr> <tr> <td></td> <td>300 min/120 °C</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>420 min/120 °C</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>480 min/20 °C</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Hz</td> <td>(m/s²)/Hz</td> <td></td> </tr> <tr> <td></td> <td></td> <td>10</td> <td>20</td> <td></td> </tr> <tr> <td></td> <td></td> <td>55</td> <td>6,5</td> <td></td> </tr> <tr> <td></td> <td></td> <td>180</td> <td>0,25</td> <td></td> </tr> <tr> <td></td> <td></td> <td>300</td> <td>0,25</td> <td></td> </tr> <tr> <td></td> <td></td> <td>360</td> <td>0,14</td> <td></td> </tr> <tr> <td></td> <td></td> <td>1 000</td> <td>0,14</td> <td></td> </tr> </table> <p>Sweep speed: 1 oct./min</p>	2) "Body" sealed	0 min/20 °C	20 h per axis	No sine wave	A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000	60 min/-40 °C	RMS value of acceleration		150 min/-40 °C	27.8 m/s²				300 min/120 °C					420 min/120 °C					480 min/20 °C						Hz	(m/s²)/Hz				10	20				55	6,5				180	0,25				300	0,25				360	0,14				1 000	0,14	
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3.5.15	Physical Shock	<p>No function-relevant damage must occur Circuit interruption monitoring takes place during the test. Permissible circuit interruption <1000ns. The circuit considered interrupted when the contact resistance exceeds 7Ω. Interruptions are not permissible.</p> <p>30 mΩ Max. (Final)</p>	<p>Acc. LV214 PG 17 E14.0 DIN EN 60068-2-27 Severity: see below table</p> <table border="1"> <tr> <td rowspan="2">2) "Body" sealed</td> <td>0 min/20 °C</td> <td>20 h per axis</td> <td rowspan="2">No sine wave</td> <td rowspan="2">A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000</td> </tr> <tr> <td>60 min/-40 °C</td> <td>RMS value of acceleration</td> </tr> <tr> <td></td> <td>150 min/-40 °C</td> <td>27.8 m/s²</td> <td></td> <td></td> </tr> <tr> <td></td> <td>300 min/120 °C</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>420 min/120 °C</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>480 min/20 °C</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Hz</td> <td>(m/s²)/Hz</td> <td></td> </tr> <tr> <td></td> <td></td> <td>10</td> <td>20</td> <td></td> </tr> <tr> <td></td> <td></td> <td>55</td> <td>6,5</td> <td></td> </tr> <tr> <td></td> <td></td> <td>180</td> <td>0,25</td> <td></td> </tr> <tr> <td></td> <td></td> <td>300</td> <td>0,25</td> <td></td> </tr> <tr> <td></td> <td></td> <td>360</td> <td>0,14</td> <td></td> </tr> <tr> <td></td> <td></td> <td>1 000</td> <td>0,14</td> <td></td> </tr> </table>	2) "Body" sealed	0 min/20 °C	20 h per axis	No sine wave	A = 30 g T = 6 ms sinusoidal half-wave No. of shocks: 6 000	60 min/-40 °C	RMS value of acceleration		150 min/-40 °C	27.8 m/s²				300 min/120 °C					420 min/120 °C					480 min/20 °C						Hz	(m/s²)/Hz				10	20				55	6,5				180	0,25				300	0,25				360	0,14				1 000	0,14	
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3.5.16	Temperature Rise	30°C Max. under loaded specified current or rating current.	<p>Install Contact in the housing, energize, and measure the rise in heat by energizing. The measurement is measured on the condition of not receiving the influence of the convection of air. The thermo-couple is measured attaching to Crimp of the wire barrel of Contact. EIA 364-7</p>																																																														
3.5.17	Aging in dry heat (120h,130°C)	<p>No function-relevant damage must occur Circuit interruption monitoring takes place during the test. Permissible circuit interruption <1000ns.</p>	<p>Acc. DIN EN 60068-2-2 Test B Duration: 120h Temperature: 130°C</p>																																																														
3.5.18	Humid heat, constant	<p>Relative humidity: 95% constant Duration: 10 cycles of 24 h each Temperatures: Tu = 25 °C, To = 55 °C Tu = lower cycle temperature To = upper cycle temperature</p>	<p>Acc. DIN EN 60068-2-30 Variant 2 Relative humidity: 95% constant Duration: 10 cycles of 24 h each Temperatures: Tu = 25 °C, To = 55 °C Tu = lower cycle temperature To = upper cycle temperature</p>																																																														
3.5.19	Low temperature aging	<p>Duration: 48h Temperature: -40°C</p>	<p>Acc. DIN EN 60068-2-1 Duration: 48h Temperature: -40°C</p>																																																														

Para.	Test items	Requirements	Procedures
ENVIROMENTAL TEST			
3.5.20	Removal and insertion at -20°C	It must be possible to open and re-close the connector even at -20°C Any latch elements present must not break off or crack upon actuation	Acc. LV214 2010-03 PG20 B 20.4
3.5.21	Long-term aging in dry heat	Duration: 1000h Temperature: 130°C Subsequent aging: 48h at RT 30 mΩ Max. (Final)	Acc. DIN EN 60068-2-2 Test B Duration: 1000h Temperature: 130°C Subsequent aging: 48h at RT
3.5.22	Aging in dry heat (48h,80°C)	Duration: 48h Temperature: 80°C	LV214 2010-03 PG20 B20.5 DIN EN 60068-2-2 Test B Duration: 48h Temperature: 80°C
3.5.23	Salt Spray	30 mΩ Max. (Final) No corrosion influence performance.	Subject mated/unmated connectors to 5±1% salt concentration for 48 hours. The measurement is held after remove the salt and dry up at indoor. EIA 364-26 Condition
3.5.24	Solderability	No deformation for plastic part Plating surface no crack/bubble/color change, Immersion surface coverage ratio of Tin at least 95%	IEC 60068-2-58 Td1 Method 2
3.5.25	Resistance to reflow soldering heat	No Functional issue for plastic part, additional warpage fulfills drawing spec. Plating surface no crack/bubble/color change,	Pb-free Solder – Surface mount process simulation test for more details Requirements: 95% minimum wetting Test Method: IPC/ECA J-STD-002 Test S1
3.5.26	Industrial Gas (SO ₂)	30 mΩ Max. (Final) No corrosion influence performance	Mated/unmated connector SO ₂ Gas:10 ppm, 95% R.H. 25°C、 96 hours
3.5.27	Temperature cycle	30 mΩ Max. (Final)	TEMPERATURE- 40 →ROOM TEMP →120 °C→ ROOM TEMP TIME 30 → 5 → 30 → 5 min UNDER 1000 Cycles. Acc: EIA-364-32

Para.	Test items	Requirements	Procedures
ENVIROMENTAL TEST			
3.5.28	Humidity-Temperature Cycling	Termination resistance: 30 mΩ Max. (Final) Insulation resistance: 100 MΩ Min. (Final) Dielectric withstanding Voltage: Neither creeping discharge nor flashover shall occur. Current leakage: 0.5 mA Max. 650V AC for 1 minute	Mated and unmated connector, 25~65°C, 80~95% R.H. Cold shock – 10°C(not)performed 10 cycles 1cycle=24hours. The measurement is held after being left indoor for 3 hours. MIL-STD-202 Method 106
3.5.29	Latch Functional test	No Functional issue, Latch no crack/disfunction	Connection of the connector housings until complete latching, Opening of the lock and complete disconnection of the connector housings Number of cycles: 5 LV214 2010-03: E21.1

3.6 Product Qualification Test and Sequences

Test or examination	SAMPLE QUANTITIES									
	TEST GROUP									
	1	2	3 (PG0)	4 (TG7)	5 (PG8)	6 (PG10)	7 (PG11)	8	9	10 (USCARD-2)
	Test Sequence									
3.5.1 Visual Inspection	1,3	1,4	1,5	1,4	1,3	1,3	1,5	1,4	1,8	1,3
3.5.2 Header Pin retention force	4									
3.5.3 Connector-to-Connector Mating force							3			
3.5.4 Connector-to-Connector Un-mating Force							4			
3.5.5 Polarizing/Key-ing				2						
3.5.6 Retention force of the housing latch/lock				3						
3.5.7 Contact Insertion force and Retention force					2					
3.5.8 Conductor Pull-out Strength						2				
3.5.9 Connector Mounting Feature Mechanical Strength		3								
3.5.10 Terminal bend resistance										2
3.5.11 Contact resistance			3						3,5	
3.5.12 Insulation resistance			4						6	
3.5.13 Dielectric withstanding Voltage									7	
3.5.14 Vibration (High										

Frequency) Humid heat, constant										
3.5.15 Physical Shock										
3.5.16 Temperature Rise								3		
3.5.17 Aging in dry heat (120h,130°C)										
3.5.18 Humid heat, constant										
3.5.19 Low temperature aging										
3.5.20 Removal and insertion at -20°C										
3.5.21 Long-term aging in dry heat										
3.5.22 Aging in dry heat (48h,80°C)										
3.5.23 Salt Spray										
3.5.24 Solderability										
3.5.25 Resistance to reflow soldering heat	2	2	2				2	2	2	
3.5.26 Industrial Gas (SO ₂)										
3.5.27 Temperature cycle										
3.5.28 Humidity-Temperature Cycling									4	
3.5.29 Latch Functional test										
Sample size	5	5	5	5	5	5	5	5	5	5

Test or examination	SAMPLE QUANTITIES										
	TEST GROUP										
	11	12 (PG17)	13 (PG18A)	14 (PG20)	15 (PG21)	16	17				
	Test Sequence										
3.5.1 Visual Inspection	1,3	1,6	1,6	1,7,10,12	1,8	1,6	1,6				
3.5.2 Header Pin retention force											
3.5.3 Connector-to-Connector Mating force											
3.5.4 Connector-to-Connector Un-mating Force											
3.5.5 Polarizing/Key-ing											
3.5.6 Retention force of the housing latch/lock											
3.5.7 Contact Insertion force and Retention force											
3.5.8 Conductor Pull-out Strength					7						

3.5.9 Connector Mounting Feature Mechanical Strength											
3.5.10 Terminal bend resistance											
3.5.11 Contact resistance		3,7	3,5		3,5	3,5	3,5				
3.5.12 Insulation resistance				3,6							
3.5.13 Dielectric withstanding Voltage											
3.5.14 Vibration (High Frequency) Humid heat, constant		4									
3.5.15 Physical Shock		5									
3.5.16 Temperature Rise											
3.5.17 Aging in dry heat (120h,130°C)				4							
3.5.18 Humid heat, constant				5							
3.5.19 Low temperature aging				8							
3.5.20 Removal and insertion at -20°C				9							
3.5.21 Long-term aging in dry heat					4						
3.5.22 Aging in dry heat (48h,80°C)				11							
3.5.23 Salt Spray			4								
3.5.24 Solderability	2										
3.5.25 Resistance to reflow soldering heat		2	2	2	2	2	2				
3.5.26 Industrial Gas (SO ₂)							4				
3.5.27 Temperature cycle						4					
3.5.28 Humidity-Temperature Cycling											
3.5.29 Latch Functional test					6						
Sample Size	5	5	5	5	5	5	5				