



SPECIFICATION

宏致電子股份有限公司

桃園縣中壢市東園路13號

No.13, Dongyuan Rd., Jhongli City,

Taoyuan County 320, Taiwan (R.O.C.)

TEL: +886-3-463-2808

FAX: +886-3-463-1800

SPEC. NO.: PS-56910-XXXXX-XX1 REVISION: C

PRODUCT NAME: BOXING POWER DC CONN. (400W)

PRODUCT NO: 56910-XXXXX-XX1 / 56911-XXXXX-XX1
56912-XXXXX-XX1 / 56915-XXXXX-X11

PREPARED: KO, MENG HSUN DATE: 23/03/15	CHECKED: CHANG, CHUN TE DATE: 23/03/15	APPROVED: KUO, RONG HSUN DATE: 23/03/15
---	---	--



Aces P/N: **5691X-XXXXX-XX1 series**

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **2** OF **10**

1. REVISION HISTORY	3
2. SCOPE	4
3. APPLICABLE DOCUMENTS.....	4
4. REQUIREMENTS	4
5. PERFORMANCE	5
6. SOLDERING CONDITION.....	9
7. PRODUCT QUALIFICATION AND TEST SEQUENCE.....	10



Aces P/N: **5691X-XXXXX-XX1 series**

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **3** OF **10**

1 Revision History

Rev.	ECN #	Revision Description	Prepared	Date
A	ECN-1901320	NEW SPEC	KODA	19'01/19
B	ECN-004245	ADD NEW PRODUCT MODIFY MATING & UNMATING FORCE	KODA	21'05/26
C	ECN-011701	ADD NEW PRODUCT MODIFY MATING & UNMATING FORCE TEST METHOD	KODA	23'03/15

TITLE: **BOXING POWER DC CONN. (400W)**

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **4** OF **10**

2 SCOPE

This specification covers the requirements for product performance, test methods and quality assurance provisions of **DC Power Connector**.

3 APPLICABLE DOCUMENTS

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.

EIAJ RC 5320A

EIA-364 : The Test Sequence and Test Procedures for Electrical Connectors and Sockets.

4 REQUIREMENTS

4.1 Design and Construction

Product shall be of the design, construction and physical dimensions specified in the applicable product drawing

4.2 Materials and Finish

4.2.1 Jack & Plug Housing : Thermoplastic or Thermoplastic High Temp., UL94V-0

4.2.2 Jack & Plug Contact Pin : Copper Alloy

Finish: Refer to the drawing.

4.2.3 Jack & Plug Shell: Stainless Steel

Finish: Refer to the drawing.

4.2.4 Jack Detect Pin : Stainless Steel

Finish: Refer to the drawing.

4.3 Ratings

4.3.1 Rated Voltage : 20 V

4.3.2 Current : 20 A

4.3.3 Temperature : -40°C to +85°C

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **5** OF **10**

5 Performance

5.1. Test Requirements and Procedures Summary

Item	Requirement	Standard
Examination of Product	Visual and dimensional inspection per product drawing	Meet requirement of product drawing
ELECTRICAL		
Item	Requirement	Standard
Low Level Contact Resistance	Power Pin (+) (-) Initial: 10mΩ MAX. After test: 15mΩ MAX.	The object of this test procedure is to detail a standard method to measure the electrical resistance across a pair of mated contacts such that the insulating films, if present, will not be broken or asperity melting will not occur. Subject mated contacts assembled in housing to closed circuit current of 100 mA maximum at open circuit at 20 mV maximum. (EIA 364- 23)
Insulation Resistance	(1) Initial: 100MΩ Min. (2) After test: 50MΩ Min.	The object of this test procedure is to detail a standard method to assess the insulation resistance of connectors. This test procedure is used to determine the resistance offered by the insulation materials and the various seals of a connector to a DC potential tending to produce a leakage of current through or on the surface of these members. Measure by applying test potential between the adjacent contacts, and between the contacts and ground in the mated connector assemblies. Test Voltage : 500V DC.(EIA 364- 21)
Dielectric Withstanding Voltage	1. No flashover, No sparkover, No excess leakage, No breakdown. 2. Current leakage : < 0.5 mA	The object of this test procedure is to detail a test method to prove that a connector can operate safely at its rated voltage and withstand momentary over potentials due to switching, surges and/or other similar phenomena. Measure by applying test potential between the adjacent contacts, and between the contacts and ground in the mated connector assemblies. Test Potential : 500 V AC at sea level Test Duration : 60 seconds (EIA-364-20)

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **6** OF **10**

Temperature Rise vs Current Rating	<p>The Temp rise shall not exceed +30°C at any point in the connector under test.</p>	<p>The object of this procedure is to detail a standard method to assess the current carrying capacity of mated connector contacts.</p> <p>Measure temperature rise vs current at 20A when measured at an ambient temperature of 23±3°C. (EIA 364- 70 Method B)</p>
MECHANICAL		
Mating and Unmating force	<p>1.Initial: 0.8~3.5kgf.</p> <p>The initial data refers to the data for the first mating and unmating force of the connector.</p> <p>2.Final: 0.6~3.5kgf.</p> <p>The final data refers to the data for the final mating and unmating force of the connector after durability test</p> <p>Before test the final data, we have to blow and remove inside dust of the connector's jack and plug .</p> <p>3. During the durability test, no mating and unmating force test and reading of data will be performed.</p>	<p>The object of this test is to detail a standard method for determining the mechanical forces required for inserting connector.</p> <p>Subject connector to mate and unmate to measure the mechanical forces required to engage and disengage at a rate of 25.4mm per (EIA-364-13)</p>
Physical Shock	<p>1. No discontinuities of 1µs or longer duration.</p> <p>2. No evidence of damage.</p> <p>3. The electrical performances should meet the spec. specified.</p>	<p>The object of this test procedure is to detail a standard method to assess the ability of a connector to withstand specified severity of mechanical shock.</p> <p>Subject mated connectors should be tested according to the condition listed below :</p> <p>Wave form : Half-sine</p> <p>Peak acceleration : 30 G's</p> <p>Duration : 11 ms</p> <p>Times : 3 shocks in each direction applied along three mutually perpendicular planes, total 18 shocks (EIA-364-27 Condition H).</p>
Durability	<p>1. 8000 insertion /extraction cycles at a maximum rate of 20-30 cycles per minutes.</p> <p>2. No evidence of damage.</p>	<p>The object of this test procedure is to detail a uniform test method for determining the effects caused by subjecting a connector to the</p>

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **7** OF **10**

	3. The electrical performances should meet the spec. specified.	conditioning action of insertion and extraction simulating the expected life of the connectors. Durability cycling with a gauge is intended only to produce mechanical stress. Durability performed with mating components is intended to produce both mechanical and wear stress. (EIA-364-09)
--	---	--

ENVIRONMENTAL

Item	Requirement	Standard
Humidity (Temperature Cycling)	1. No evidence of damage. 2. The electrical performances should meet the spec. specified.	The object of this test procedure is to detail a standard test method for the evaluation of the properties of materials used in connectors as they are influenced by the effects of high humidity and heat. Subject mated and unmated connectors should be tested according to the condition listed below : Temperature :38~42℃ Humidity : 90 ~ 95% (R.H) Duration : 96 hours (EIA 364-31 Method III Test Condition A)
Vibration (Random)	1. No discontinuities of 1μs or longer duration. 2. No evidence of damage. 3. The electrical performances should meet the spec. specified.	This test procedure is applicable to connectors that may, in service, be subjected to conditions involving vibration. Whether a connector has to function during vibration or merely to survive conditions of vibration should be clearly stated by the detailed product specification. In either case, the relevant specification should always prescribe the acceptable performance tolerances. Subject mated connectors should be tested according to the condition listed below : Test condition : Random Frequency : 50 ~ 2000 Hz PSD value : 5.35 Grms minimum Duration : 15 minutes/axis Times : Each of three mutually perpendicular planes. (EIA 364-28)

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **8** OF **10**

		Condition V Test letter A)
Temperature Life	1. No discontinuities of 1μs or longer duration. 2. No evidence of damage. 3. The electrical performances should meet the spec. specified.	The object of this test is to detail a standard test method to assess the ability of a connector to withstand elevated temperatures with or without electrical loading. Subject mated connectors should be tested according to the condition listed below : Temperature :85±2℃ Duration : 96 hours (EIA 364-17)
Thermal Shock	1. No evidence of damage. 2. The electrical performances should meet the spec. specified.	The object of this test is to determine the resistance of a connector to exposure at extremes of high and low temperatures and to the shock of alternate exposures to these extremes, simulating the worst case conditions for storage, transportation and application. Subject mated and unmated connectors should be tested according to the condition listed below : Temperature : -40 ~ 85℃ Cycles : 5 cycles Exposure time at temp. extremes : 30 minutes (EIA-364-32)
Salt Spray	1. No evidence of Physical damage. 2. The electrical performances should meet the spec. specified.	The object of this test procedure is to detail a standard test method to assess the effects of a controlled salt laden atmosphere on connector components, finishes and mechanisms. Subject mated and unmated connectors should be tested according to the condition listed below : Temperature : 35±1.1℃

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **9** OF **10**

		Humidity : 95 ~ 98% (R.H.) Connectors to 5% salt-solution Duration : 48 hours (EIA 364-26 Test Condition A)
Cold test	1. No evidence of damage. 2. The electrical performances should meet the spec specified.	Temperature : -40℃ Duration :96hours (EIA-364-59)
Solder ability	Continuous solder coating with a min. 95% coverage	<p>The object of this test procedure is to detail a uniform test method for determining connector solder ability.</p> <p>The surfaces to be tested shall be immersed in flux for a minimum of 5 seconds to 10 seconds.</p> <p>Unless otherwise specified in the referencing document, the temperature of the solder bath shall be maintained as measured below the surface oh the solder at 245℃±5℃</p> <p>Examination</p> <p>The test specimens shall be examined at 10X magnification. Referee magnification shall be at 30X magnification and shall only be used when examining specimens rejected.</p> <p>(EIA 364-52 Category 2)</p>
Resistance to Soldering Heat (Only Jack)	1. No evidence of damage. 2. The electrical performances should meet the spec. specified. 3. The mechanical performances should meet the spec. specified.	<p>Procedure 3 Test Condition C</p> <p>The test is performed for the purpose of determining whether connectors can withstand the effects of the heating and/or environment to which they will be subjected during the soldering of their terminations by solder dip, soldering iron, solder wave, or reflow soldering techniques. The heat and/or environment of soldering may affect the electrical characteristics of the connector and may cause damage to the materials making up the connector. It may also result in loosening of terminations, softening or distortion of insulation materials, opening of solder seals,</p>

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

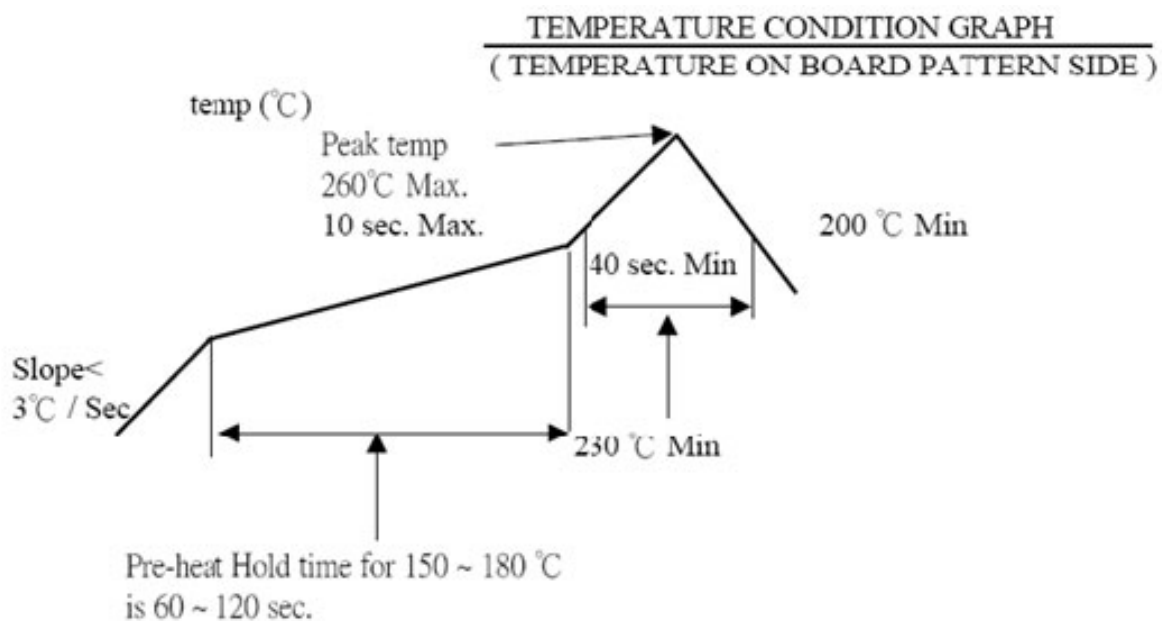
REVISION: C

ECN No: 011701

PAGE: **10** OF **10**

		weakening of mechanical joints, etc. Subject unmated connectors should be tested according to the condition listed below : Temperature : $260\pm5^{\circ}\text{C}$ (EIA 364-56)
--	--	---

6 INFRARED REFLOW CONDITION



7 SOLDERING CONDITION :

AUTOMATIC OR HAND SOLDERING:

THE TERMINAL OF PLUG TESTED SHALL BE HEATED TO 1.5 MILLIMETERS FROM A TIP OF THE TERMINAL BY A SOLDERING IRON TO HAVE A CAPACITY OF 60 WATTS CONSUMPTION AT A TEMPERATURE CONTROLLED OF $350^{\circ}\text{C}\pm 10^{\circ}\text{C}$ FOR A PERIOD OF 0.5 SECONDS.

TITLE: BOXING POWER DC CONN. (400W)

RELEASE DATE: 2023-03-15

REVISION: C

ECN No: 011701

PAGE: **11** OF **10**

8 PRODUCT QUALIFICATION AND TEST SEQUENCE

Test or Examination	Test Group										
	1	2	3	4	5	6	7	8	9		
	Test Sequence										
Appearance	1,3	1,7	1,10	1,10	1,9	1,9	1,9	1,3	1,3		
Low Level Contact Resistance		2,6	2,9	2,7	2,6	2,6	2,6				
Insulation Resistance			3,7	3,8	3,7	3,7	3,7				
Dielectric Withstanding Voltage			4,8	4,9	4,8	4,8	4,8				
Temperature Rise vs Current Rating	2										
Mating and Unmating force		3,5									
Physical Shock			6								
Durability		4									
Humidity (Temperature Cycling)				5							
Vibration (Random)			5								
Temperature Life					5						
Thermal Shock				6							
Salt Spray						5					
Cold test							5				
Solder ability								2			
Resistance to Soldering Heat									2		
Sample Size	2	5	5	5	5	5	5	5	5		