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Reliability Test Report

for BFX-UA300 (K18X001.01)

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Revision Change History

Revision	Description of Change	Date
1.0	Initial Release	05/03/2022

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Purpose:

1. Provide a formal functional demonstration of the product design reliability.
2. Identify any design discrepancies.
3. Reliability assurance of trial samples which are designed and fabricated in accordance with the customer's product specifications.
4. Conduct robustness testing on early production samples in accordance to customer's product environmental testing specification.

Scope:

This document describes the performance requirements, validation criteria, and the validation tests which focus on BFX-UA300 (K18X001.01) product.

The DUT H/W version is V005 and S/W revision is 4.9.178.

Second Source:

	1st Source		2nd Source	
1	002.02152.005	IC PER 1.5/1.8/2.5/3.3.V SMD QFN40 GP	JSYT8531C	YT8531C
2	036.00079.005	IC DRIVER 2.7~5.5V SMD VQFN32 GP LP5024RSMR TI	JSAW21024QNR 036.00110.005	AW21024QNR
3	036.00084.005	IC DRIVER 2.7~5.5V SMD VQFN46 GP LP5036RJVR	JSAW21036QNR 036.00111.005	AW21036QNR
4	029.00909.005	IC DC-DC 6V SMD TSOT23-8 GP SY8824CAIC	JSHL7593WL02-> JSHL7593WL08	HL7593WL08
5	029.00944.005	IC DC-DC 4.5~28V SMD SOT583 GP	620.05188.005	TMI3343B
6	029.00604.005	IC DC-DC 2.3~5.5V SMD SOT563 GP/HF	029.00923.005	G2262TR1U
7	027.01230.005	IC DC-DC 2.3~5.5V SMD SOT563 GP/HF	029.01026.005	G2986K21U
8	074.00117.005	IC GATE 1.2~3.6V SMD TSSOP14 GP	075.00490.005	74LVC125AT14-13

The summary of test items:

NO.	Item	Test Condition	Q'ty	Period	Pass Criteria	Test result
1	Cold Start Test	Power off, Storage, Ta = - 20°C Storage 48 hours then ramp the temperature to 0°C, power on operation test Power on/off 15 times	2	3 days	1. No functional failures both before and after the test. 2. No performance degradation during the functional test. 3. No visual damage to the products during inspection, such as warpage, peeling, missing pixels, discoloration, etc.	PASS
2	Hot Start Test	Power off, Storage, Ta = 70°C Storage 48 hours then ramp the temperature to 50°C power on operation test Power on/off 15 times	2	3 days	1. No functional failures both before and after the test. 2. No performance degradation during the functional test. 3. No visual damage to the products during inspection, such as warpage, peeling, missing pixels, discoloration, etc.	PASS
3	High Temperature & High humidity Test (storage)	1. Temperature 70°C 2. Humidity 90% R.H. 3. Test period 72 hours	2	4 days	1. No functional failures both before and after the test. 2. No performance degradation during the functional test. 3. No visual damage to the products during inspection, such as warpage, peeling, missing pixels, discoloration, etc.	PASS
4	High Temperature & High Humidity Test (OP)	Power on, Operation Ta = 50°C, Humi. = 95% R.H. for 72 hours	2	4 days	1. No functional failures both before and after the test. 2. No performance degradation during the functional test. 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	PASS
5	Operational Temperature Cycle Test	1. Power on, Operation 2. 25°C & R.H. 65% for 1 hour 3. 25°C & R.H. 65% to - 5°C for 2 hours 4. - 5°C for 13 hours 5. - 5°C to 25°C & R.H. 65% for 2 hours. 6. 25°C to R.H. 65% for 1 hour 7. 25°C & R.H. 65% to 50°C & RH 95% for 2 hours 8. 50°C & R.H. 95% for 13 hours 9. 50°C & R.H. 95% to 25°C & RH 65% for 2 hours 10. Repeat 1~9 for 2 cycles 11. 25°C & R.H. 65% for 48 hours Total for 120 hours	2	5 days	1. No functional failures both during and after the test. 2. No performance degradation during the functional test. 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	PASS
6	Thermal Shock Test (PCB only)	Power off , non-operation Ta= - 20°C (30min) ~ 70°C (30min) 60 cycles Transfer time: 5 min	2	3 days	1. No functional failures both before and after the test. 2. No performance degradation during the functional test. 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	PASS
7	Power On/Off Test with Temperature	1. Power on: 50 sec 2. Power off: 10 sec 3. Temperature: - 5°C and 50°C 4. Cycle: 2,500 cycles per test condition 5. Total 5,000 cycles	2	5 days	1. No functional failures both before and after the test. 2. No performance degradation after the functional test. 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	PASS

8	Abnormal power on/off	1. Power on: 50 sec 2. Power off: 2 sec 3. Temperature: 25°C 4. Cycle: 100 cycles	20	2 days	1. No functional failures both before and after the test. 2. No performance degradation after the functional test. 3. No visual damage to the products after inspection, such as peeling, discoloration, etc.	PASS
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Panel Drawing:

Front



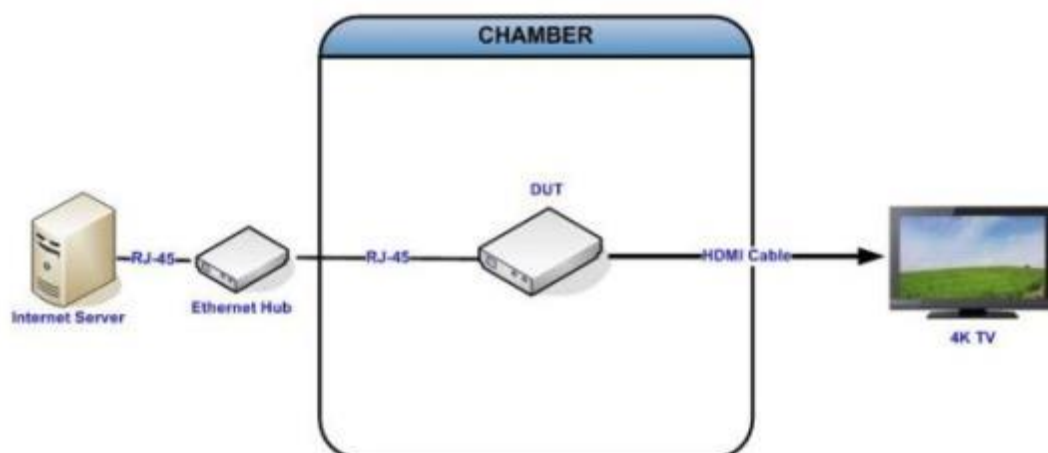
Rear



Adapter



Test setup and function test:



HDMI connects to 4K TV for playing local 4K video.
Ethernet hub is for iperf 50Mbps.

1. Cold Start Test

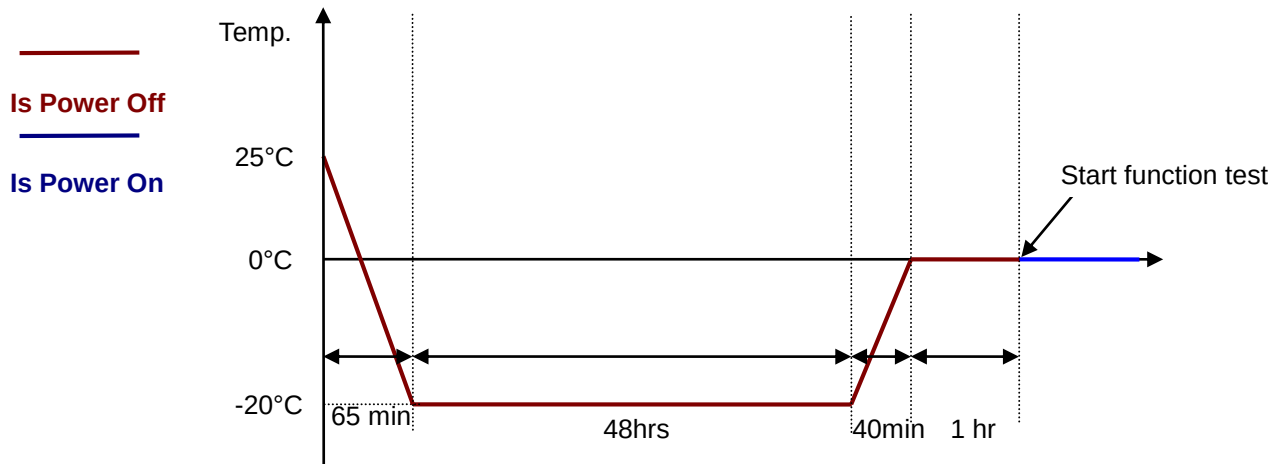
Purpose:

To demonstrate that the product can be stored at low temperature environment.

Quantity: 2 units

Test Objective: Power off, and store at - 20°C. After 48 hours, ramp to 0°C and function test.

Test Profile:



Test Procedure:

1. Power off.
2. Start test at 25°C.
3. Ramp the temperature to - 20°C and hold for 48 hours.
4. Ramp the temperature to 0°C and hold for 1 hour.
5. Rate: 1°C/minute.
6. Repeat 3 times to power on and activated in full function and operation.

Pass Criteria:

1. No functional failures both before and after the test.
2. No performance degradation after the functional test.
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: IEC 60068-2-01.

Test Result: **PASS**



2. Hot Start Test

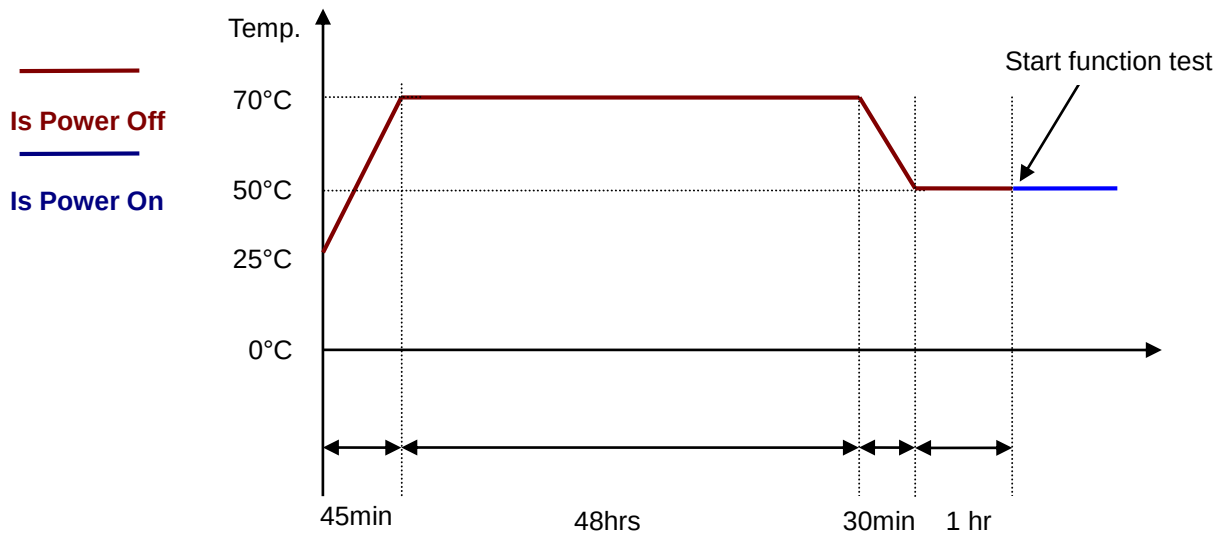
Purpose:

To demonstrate that the product can be stored at high temperature environment.

Quantity: 2 units

Test Objective: Power off, and store at 70°C. After 48 hours, ramp to 50°C and function test.

Test Profile:



Test Procedure:

1. Power off.
2. Start test at 25°C.
3. Ramp the temperature to 70°C and hold for 48 hours.
4. Ramp the temperature to 50°C and hold for 1 hour.
5. Rate: 1°C/minute.
6. Repeat 3 times to power on and activated in full function and operation.

Pass Criteria:

1. No functional failures both before and after the test.
2. No performance degradation after the functional test.
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: IEC 60068-2-02.

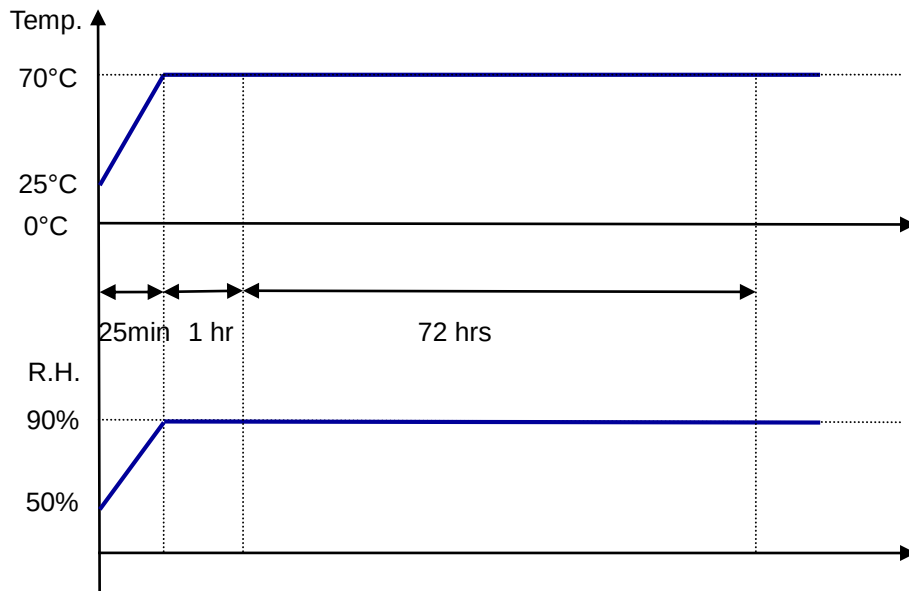
Test Result: **PASS**



3. High Temperature and High humidity Test (Storage)

Purpose:

To demonstrate that products can withstand the high limit temperature and the high limit humidity of an operating environment.

Quantity: 2 units**Test Objective:** Storage in High Temperature and High Humidity: Temp. + 70°C and R.H. 90%,
Duration: 3 days**Test Profile:****Test Procedure:**

1. Power off storage.
2. Start test at 25°C and RH 50%.
3. Ramp the temperature to 70°C and R.H. 90% in 25 minutes, then hold for 1 hour.
4. Hold 70°C, RH 90% for 72 hours.

Pass Criteria:

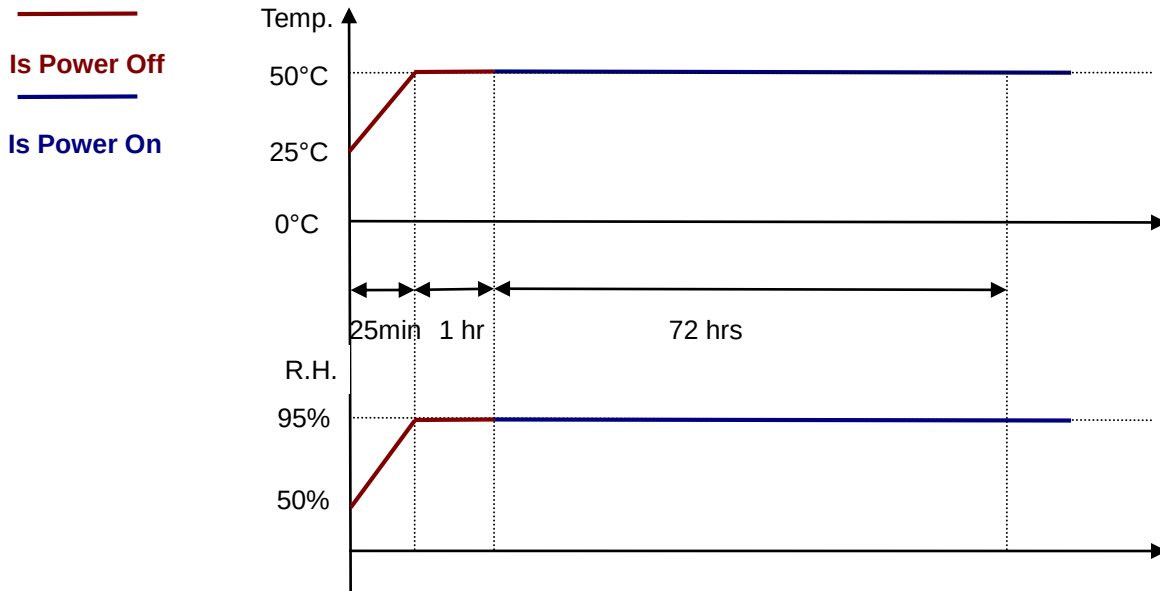
1. No functional failures both during and after the test.
2. No performance degradation during the functional test.
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: IEC 60068-2-30**Test Result:** **PASS**

4. High Temperature and High humidity Test (OP)

Purpose:

To demonstrate that products can withstand the high limit temperature and the high limit humidity of an operating environment.

Quantity: 2 units**Test Objective:** Operating Temperature and Humidity: Temp. + 50°C and R.H. 95%, Duration: 3 days**Test Profile:****Test Procedure:**

1. Power off.
2. Start test at 25°C and RH 50%.
3. Ramp the temperature to 50°C and R.H. 95% in 25 minutes, then hold for 1 hour.
4. Power on the test units.
5. Hold 50°C, RH 95% for 72 hours.

Pass Criteria:

1. No functional failures both during and after the test.
2. No performance degradation during the functional test.
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: IEC 60068-2-30**Test Result:** **PASS**

5. Operational Temperature Cycle Test

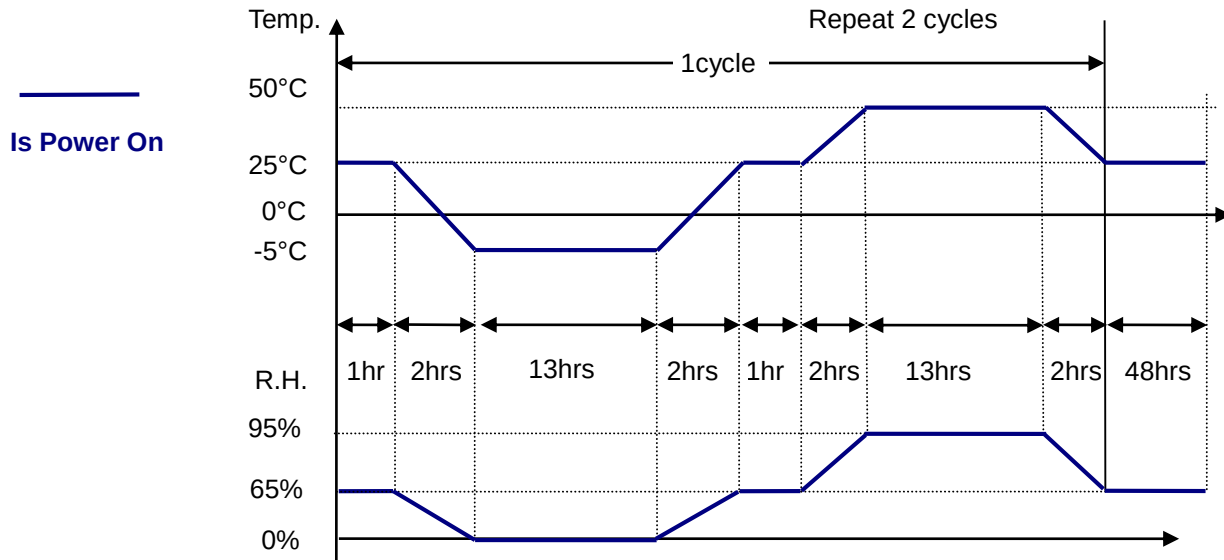
Purpose:

To demonstrate that products can operate in the high/low temperature and high humidity environment.

Quantity: 2 units

Test Objective: Operating in high/low Temperature and Humidity.

Test Profile:



Test Procedure:

1. Power on, then activated in full function and operation.
 2. 25°C & R.H. 65% for 1 hour
 3. 25°C & R.H. 65% to - 5°C for 2 hours
 4. - 5°C for 13 hours
 5. - 5°C to 25°C & R.H. 65% for 2 hours.
 6. 25°C to R.H. 65% for 1 hour
 7. 25°C & R.H. 65% to 50°C & R.H. 95% for 2 hours
 8. 50°C & R.H. 95% for 13 hours
 9. 50°C & R.H. 95% to 25°C & R.H. 65% for 2 hours
 10. Repeat 1~9 for 2 cycles
 11. 25°C & R.H. 65% for 48 hours
- Total for 120 hours

Pass Criteria:

1. No functional failures both during and after the test.
2. No performance degradation during the functional test.
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: IEC 60068-2-30.

Test Result: **PASS**



6. Thermal Shock Test (PCB only)

Purpose:

To demonstrate that the product can be operated after high & low temperature shock environment.

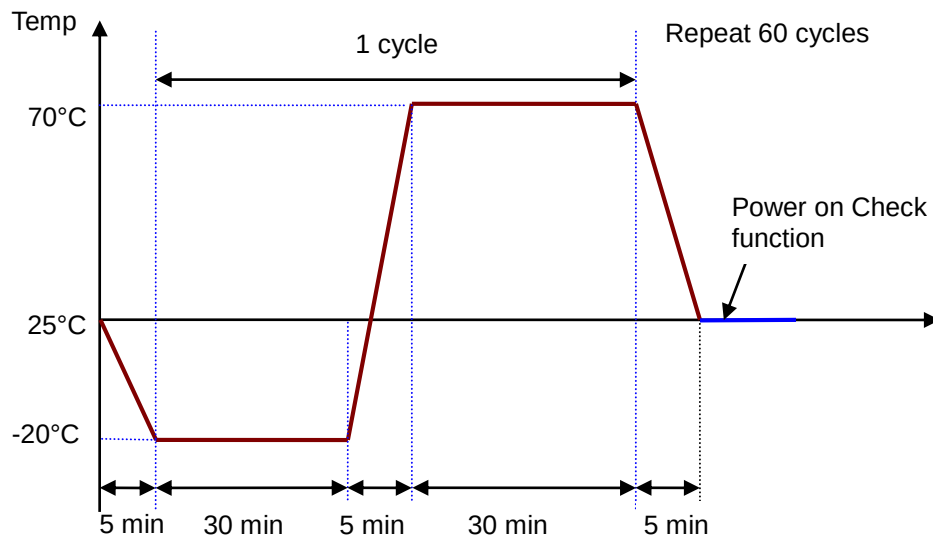
Quantity: 2 units

Test Objective: $T_a = -20^{\circ}\text{C}$ (30minues) ~ 70°C (30minutes), Cycle: 60 cycles,
Transfer time: 5 minutes.

Test Profile:

Is Power Off

Is Power On



Test Procedure:

1. Power off.
2. Start test at 25°C .
3. Ramp the temperature to -20°C and hold for 30 minutes.
4. Ramp the temperature to 70°C and hold for 30 minutes.
5. Transfer time: 5 minutes
6. After repeat 60 cycles. Power on, then activated in full function and operation.

Pass Criteria:

1. No functional failures both before and after the test.
2. No performance degradation after the functional test.
3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Basis for Profile: MIL -STD-810F Method 503.4 Procedure I

Test Result: **PASS**



7. Power On/Off Test with Temperature

Purpose:

The purpose of this specification is to define the power on / off test. This test is to assure the product will meet customer's specification.

Quantity: 2 units

Test Objective: 1. Power on: 50 sec.

2. Power off: 10 sec.

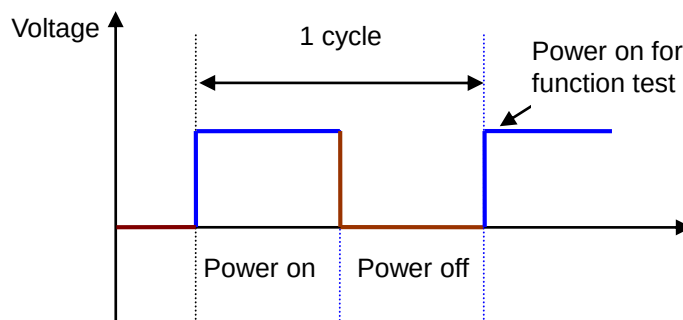
3. Temperature: - 5°C and 50°C .

4. AC Source Voltage: 220V, Frequent: 60Hz.

5. Cycle: 2,500 cycles per test condition.

6. Total 5,000 cycles.

Test Profile:



Test Procedure:

1. Temperature: - 5°C and 50°C .

2. Control the power on/off and input voltage as below.

Power on/off frequency: Power on: 50 seconds / Power off: 10 seconds.

AC Source Voltage: 220V, Frequent: 60Hz.

3. Cycle: 2,500 cycles per test condition.

4. Total: 5,000 cycles.

Pass Criteria:

1. No functional failures both during and after the test.

2. No performance degradation during the functional test.

3. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Test Result: **PASS**



8. Abnormal power on/off test

Purpose:

The purpose of this specification is to define the power on / off test. This test is to assure the product will meet customer's specification.

Quantity: 20 units

Test Objective: 1. Base on test setup and function test to check DUT function.

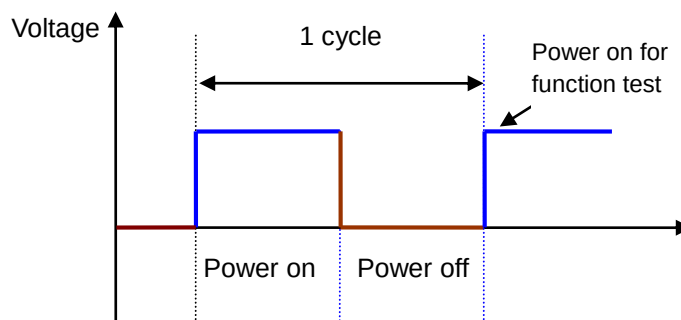
2. Power on: 50 sec.

3. Power off: 2 sec.

4. Temperature: 25°C

5. Cycle: 100 cycles test condition.

Test Profile:



Test Procedure:

1. Base on test setup and function test to check DUT function.
2. Temperature: 25°C.
3. Control the power on/off frequency, temperature and input voltage as below.
Power on/off frequency: Power on: 50 seconds/ Power off: 2 seconds.
4. Total: 100 cycles.

Pass Criteria:

1. No functional failures both during and after the test.
2. No ping failures both during the test and after the test.
3. No performance degradation during the functional test
4. No visual damage to the products after inspection, such as peeling, discoloration, etc.

Test Result: **PASS**

