

# Product Specification

108-115008-3

Spring Finger

Restricted to Sony Ericsson Mobile Communications

## 1. SCOPE

### 1.1. Content

This specification covers the requirements for product performance test methods and quality assurance provisions of Spring Finger. Applicable product descriptions and part numbers are as shown in Table 3.

### 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Table 2 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

## 2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. 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.

### 2.1. TE Connectivity Documents

501-115009-\*: Qualification Test Report

### 2.2. Commercial Standard and Specifications:

A: Test Methods for Electronic Component Parts: MIL-STD-202.


## 3. REQUIREMENTS:

### 3.1. Design and Construction:

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

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	A1	New Release	T.Q	22Jul y14	PAGE 1 of 13	TITLE Spring Finger Restricted to Sony Ericsson Mobile Communications				
A	Release	T.Z	22June11							
LTR	REVISION RECORD	DR	DATE							

### 3.2. Materials:

Stainless Steel

Under plating: Ni 1.3  $\mu$  m MIN

Contact area: Au 0.5  $\mu$  m MIN

Soldering area: Au Flash 0.05 ~ 0.3  $\mu$  m

### 3.3. Ratings

A. Rated current / voltage: 0.5A @ 12 V

B. Operating mode: 100mA @ 4V

C. Temperature: -40 °C to 85 °C

D: Moisture Sensitivity Level: Level 2(IPC/JEDC J-STD-20, Table 5-1)

### 3.4. Performance and Test Description


Product is designed to meet the electrical, mechanical and environmental performance

Requirements specified in 3.5. All tests shall be performed at ambient environmental conditions.

### 3.5. Test Requirements and Procedures Summary (Table. 1)


Para.	Test Items	Requirements	Procedures
3.5.1	Initial examination of Product	Meets requirements of product drawing No physical damage	Visual inspection Pursuant to EIA-364-18
3.5.2	Final examination of Product	No physical damage	Visual inspection Pursuant to EIA-364-18
Electrical Requirements			
3.5.3	Contact Resistance measurement	Initial: 80 m $\Omega$ Max. Final : $\triangle$ 25 m $\Omega$ Max.	Subject mated contacts assembled in housing to 20 mV Max open circuit at 100mA DC. See Fig. 2 Pursuant to IEC 60512-2-1
3.5.4	Rated Voltage/ Current	Temperature limit on the terminal shall not exceed 30°C	All the contact are loaded under: Current: 0.7 A through each terminal Voltage: 5V d.c Time: 1 min
Mechanical Requirements			

**Table. 1 continued**

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Para.	Test Items	Requirements	Procedures
3.5.5	Durability Test	Contact resistance should be kept Test Item 3.5.3. Contact force should be kept Test Item 3.5.6. No cracks or permanent damage is allowed.	Operation cycles: 10 cycles Stroke the spring top to the nominal working height
3.5.6	Contact Force Measurement	Normal Force at nominal height: $0.60 \pm 0.2N$ .	Stroke the spring top to the minimum working height and check the force at the nominal height
3.5.7	Shock, Operational	No electrical discontinuity greater than $1 \mu$ sec shall occur. No mechanical damages are allowed. Contact resistance should be kept Test Item 3.5.3.	Subject mated specimens at nominal working height. Subject test frame to $30G \pm 15\%$ half sine shock pluses 6msec duration. 18shocks in both directions of 3 mutual perpendicular axis. See Fig. 3. Apply a 0.1A d.c. current to the set. Pursuant to IEC 60068-2-27, test Ea
3.5.8	Peeling off strength	2N minimum in vertical to PCB direction. 15N minimum in Long pad direction. 10N minimum in Short pad direction..	Subject soldered specimens to the test condition as Fig. 4 ( Vertical to PCB direction) Fig. 5 (Long pad direction) Fig. 6 (Short pad direction)
Environment Requirement			
3.5.9	Sulfuration for gold surface	Contact resistance should be kept Test Item 3.5.3. No permanent damages are allowed. No trace of corrosion is allowed	Subject mated specimens at nominal working height. Gas concentration: $H_2S$ : 3ppm. Temperature: $40 \pm 2^\circ C$ Humidity: $75 \pm 3\%$ RH Duration: 24h
3.5.10	Cold test, Non Operational	Contact resistance should be kept Test Item 3.5.3. No permanent damages are allowed.	Subject mated specimen at nominal working height to $-40 \pm 3^\circ C$ , 16h See Fig. 7.

**Table. 1 continued**

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Para.	Test Items	Requirements	Procedures
3.5.11	Cold test, Operational	<p>Applied voltage to mated specimen and there should be no abnormal Change during the cold test.</p> <p>Contact resistance should be kept Test Item 3.5.3.</p> <p>No permanent damages are allowed.</p>	<p>Subject mated specimen at nominal working height.</p> <p>Apply current 0.2A, 4V d.c. to the Samples during the test.</p> <p>Decrease the temperature to <math>-20\pm 3^{\circ}\text{C}</math> during a 1-hour ramp. Hold the temperature 2-hours. Then, lower the temperature to <math>-30\pm 3^{\circ}\text{C}</math> during a 30 min ramp. Hold the temperature 1-hour. After that, increase the temperature to ambient conditions during 1-hour ramp.</p> <p>Test procedure follow the Fig 8 Pursuant to: IEC 60068-2-1 and FCC part 24.</p>
3.5.12	Heat test Non Operational	<p>Contact resistance should be kept Test Item 3.5.3.</p> <p>No permanent damages are allowed.</p>	<p>Subject mated specimen at nominal working height to <math>-85\pm 3^{\circ}\text{C}</math>, <math>50\pm 5\%\text{RH}</math>, 16h. See Fig. 9</p>
3.5.13	Heat test Operational	<p>Applied voltage to mated specimen and there should be no abnormal Change during the heat test.</p> <p>Contact resistance should be kept Test Item 3.5.3.</p> <p>No permanent damages are allowed.</p>	<p>Subject mated specimen at nominal working height.</p> <p>Apply current 0.2A, 4V d.c. to the Samples during the test.</p> <p>Increase the temperature to <math>+60\pm 3^{\circ}\text{C}</math> (<math>50\pm 10\%</math> relative humidity) during a 1-hour ramp. Hold the temperature 2-hours. Then, increase the temperature to <math>+70\pm 3^{\circ}\text{C}</math> (<math>50\pm 10\%</math> relative humidity) during a 30 min ramp. Hold the temperature 1-hour. After that, decrease the temperature to ambient conditions during 1-hour ramp.</p> <p>Test procedure follow the Fig. 10 Pursuant to: IEC 60068-2-2</p>

Table. 1 continued

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Para.	Test Items	Requirements	Procedures
3.5.14	Thermal shock test	Contact resistance should be kept Test Item 3.5.3. No permanent damages are allowed.	Subject mated specimen at nominal working height. Temperature range from $-40\pm 3^{\circ}\text{C}$ to $85\pm 3^{\circ}\text{C}$ . See the Fig. 11. Making this a cycle, repeat 256 cycles.
3.5.15	Condensation test Operational	Contact resistance should be kept Test Item 3.5.3 after durability test 3.5.5. No permanent damages are allowed.	Subject mated specimen at nominal working height. Apply current 0.2A, 4V d.c. to the samples during the test. Increase the temperature and humidity to $+55\pm 3^{\circ}\text{C}$ and $95\pm 5\%$ RH during a 10-minutes ramp. Hold the temperature and humidity 1-hour. Then, decrease the temperature to $+25\pm 3^{\circ}\text{C}$ (Keep $95\pm 10\%$ RH) during a 10-minutes ramp. Repeat this cycle 44 times. (totally 45 cycles) Test procedure follow the Fig. 12 Pursuant to: IEC 60068-2-30
3.5.16	Vibration, Random	No electrical discontinuity greater than $1\ \mu\text{sec}$ shall occur. No mechanical damages are allowed. Contact resistance should be kept Test Item 3.5.3.	Subject mated specimen at nominal working height. and apply 0.1A d.c. current to the assembly. Ambient conditions. 2 hours for each axis (X, Y, Z). Spectral density; 5 Hz $\rightarrow 0.10\text{m}^2/\text{s}^3$ 12 Hz $\rightarrow 2.20\text{m}^2/\text{s}^3$ 20 Hz $\rightarrow 2.20\text{m}^2/\text{s}^3$ 200 Hz $\rightarrow 0.04\text{m}^2/\text{s}^3$ 500 Hz $\rightarrow 0.04\text{m}^2/\text{s}^3$

**Table. 1 continued**

Para.	Test Items	Requirements	Procedures
3.5.17	Vibration, Sinusoidal	<p>No electrical discontinuity greater than 1 <math>\mu</math> sec shall occur.</p> <p>No mechanical damages are allowed.</p> <p>Contact resistance should be kept Test Item 3.5.3.</p>	<p>Subject mated specimens at nominal working height</p> <p>Frequency range: 10-60Hz with constant displacement equal to <math>\pm 0.35</math>mm, 60-500 Hz with constant accelerate equal to 5g. Sweep rate: 1 octave/minute 5sweep cycles per axis (X, Y, Z). Pursuant to IEC 60068-2-6</p>
Soldering Requirement			
3.5.18	Soldering Verification	<p>No physical damage is allowed.</p> <p>At least 95% of immersed area should be adequately Wetted on all samples.</p> <p>Moisture sensitivity should meet at least level 2.</p> <p>No Flux or solder ingression into contact area.</p>	<p>Stencil thickness: 0.1mm.</p> <p>Soldering Reflow profile; See Fig.1 And Table.4.</p> <p>Reflow cycles: 3 times.</p> <p>Test according to JESD22-B102E, IPC/JEDC J-STD-20, Table 5-1 IPC/JEDEC J-STD-020D</p>
3.5.19	Solderability	<p>Solder wetting time shall be no more than 3 seconds. A new uniform coating of solder shall cover a minimum of 95% of the surface being immersed.</p>	<p>Refer to JESD22-B102E.</p> <p>Lead free soldering.</p>

**Table. 1 finished**

#### 4. Product Qualification Test Sequence (Table. 2)

Test Items	Test group											
	1	2	3	4	5	6	7	8	9	10	11	12
	Test sequence(a)											
Initial Examination of Product	1	1	1	1	1	1	1	1	1	1	1	1
Contact resistance Measurement		3,6	3,5		3,5,7	3,5	3,5		3,5,7	3,5		3,5
Rated Voltage/Current								2				
Durability Test	5	4										
Contact Force Measurement	4,6											
Shock Operational										4		
Peel Off Strength											3	
Sulfuration for gold surface							4					
Cold Test non operational					6							
Heat Test non operational					4							
Cold Test – operational									6			
Heat Test – operational									4			
Thermal Shock Test						4						
Condensation Test – operational		5										
Vibration, Random			4									
Vibration, Sinusoidal												4
Soldering Verification	2	2	2		2	2	2		2	2	2	2
Solderability				2								
Final Examination of Product	3,7	7	6	3	8	6	6	3	8	6		6

(a) Number indicates sequence in which the tests are performed.

The applicable product descriptions and part numbers are as shown (Table. 3)

Part Number	Description
1551572-4	Spring Finger 1.8 (Adhesive sealing)
1551573-4	Spring Finger 2.15 (Adhesive sealing)
1551574-4	Spring Finger 2.6 (Adhesive sealing)
1551575-4	Spring Finger 3.0 (Adhesive sealing)
1551576-4	Spring Finger 3.4 (Adhesive sealing)
1551572-6	Spring Finger 1.8 (Heat sealing)
1551573-6	Spring Finger 2.15 (Heat sealing)
1551574-6	Spring Finger 2.6 (Heat sealing)
1551575-6	Spring Finger 3.0 (Heat sealing)
1551576-6	Spring Finger 3.4 (Heat sealing)



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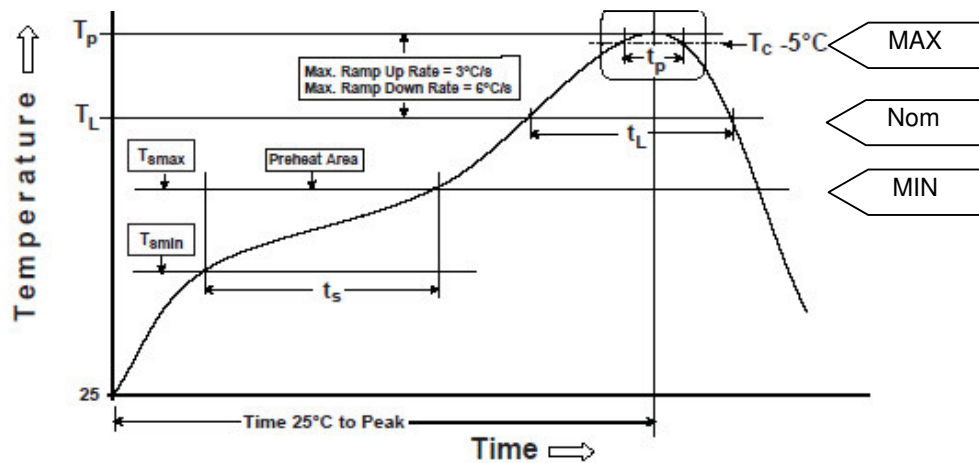
REV  
A1

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## Appendix 1

**Table. 4: Reflow Condition. Refer to IPC/JEDEC J-STD-020D.1**

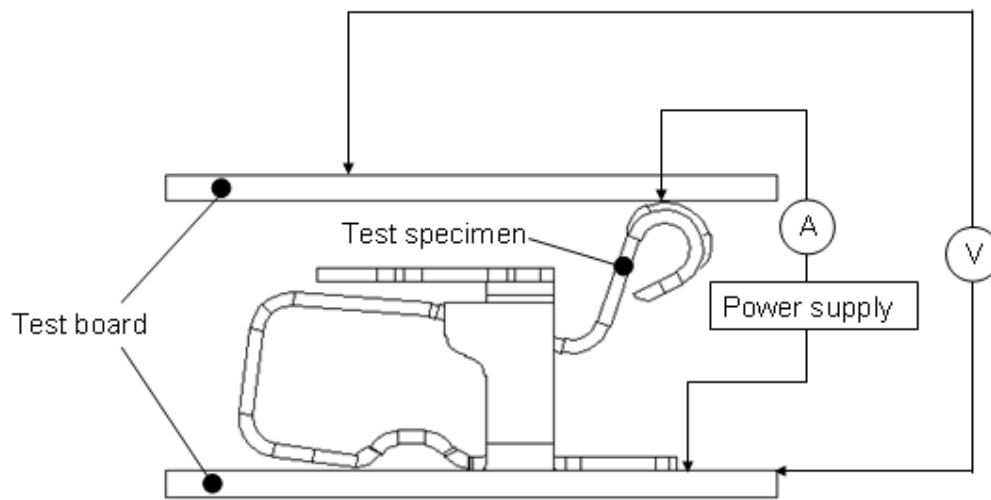
Profile Feature	Pb-Free Soldering
Temperature MIN ( $T_{smin}$ )	150 °C
Temperature MAX ( $T_{smax}$ )	200 °C
Time ( $T_s$ ) from ( $T_{smin}$ to $T_{smax}$ )	60 to 120 seconds
Ramp-up rate ( $T_L$ to $T_P$ )	3°C / second MAX
Liquidous temperature ( $T_L$ )	217°C
Time ( $T_L$ ) ,maintained above $T_L$	60 to 150 seconds
Peak temperature ( $T_P$ )	260°C
Time within 5°C of the actual Peak temperature ( $t_p$ ),	20 to 40 seconds
Ramp-down rate ( $T_P$ to $T_L$ )	6°C / second MAX
Time 25°C to Peak Temperature	8 minutes MAX



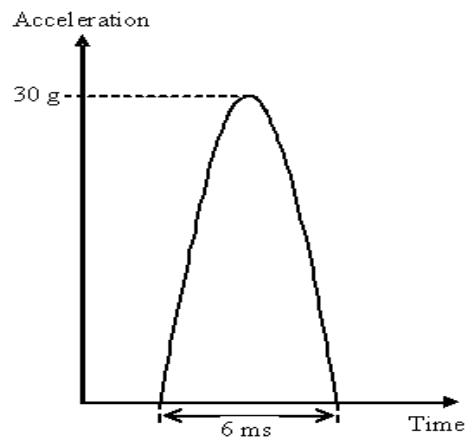
**Fig. 1: Reflow Profile**



## Appendix 2



**Fig. 2: Contact resistance measurement point**



**Fig. 3: Test wave for Shock operational**

## Appendix 3

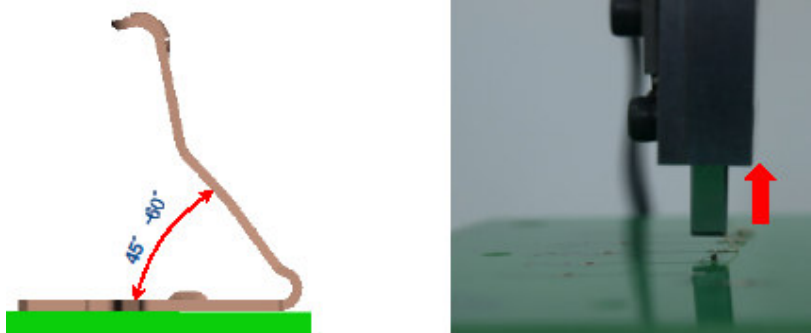


Fig. 4: Test Condition for Peel off strength (Vertical to PCB direction)



Fig. 5: Test Condition for Peel off strength (Long pad direction)



Fig. 6: Test Condition for Peel off strength (Short pad direction)

## Appendix 4

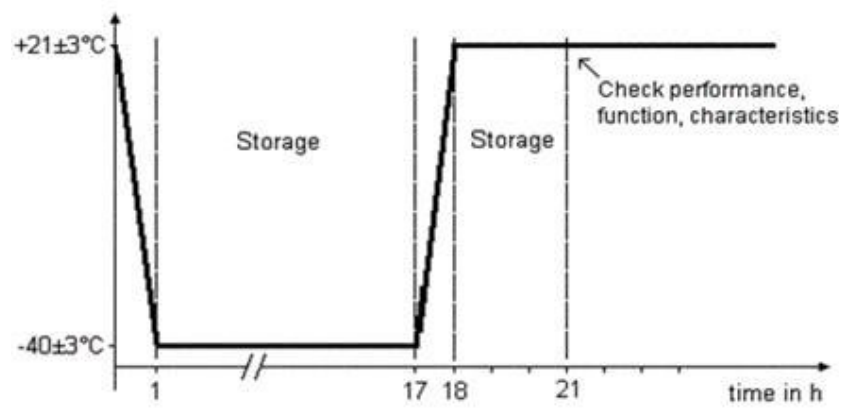


Fig. 7: Cold test cycle (non operational)

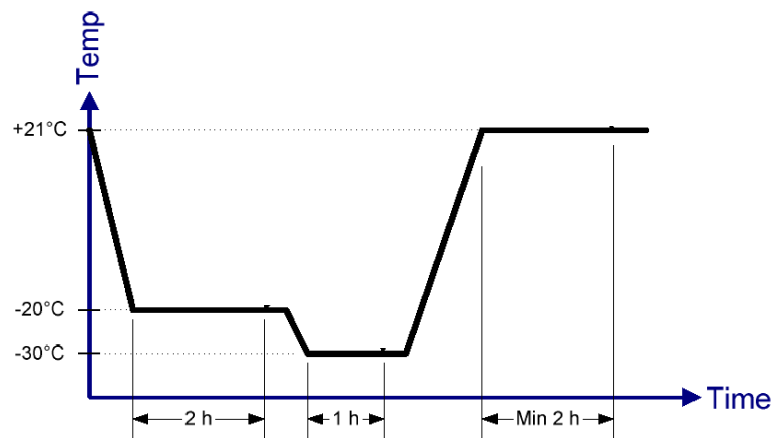


Fig. 8: Cold test cycle (operational)

## Appendix 5

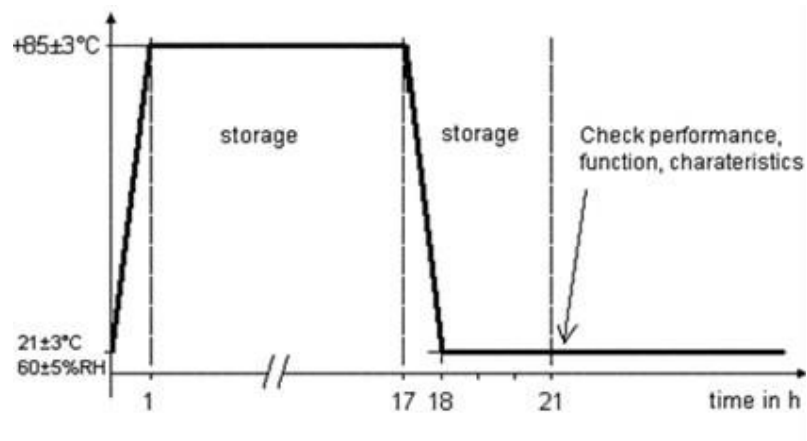


Fig. 9: Heat test cycle (non operational)

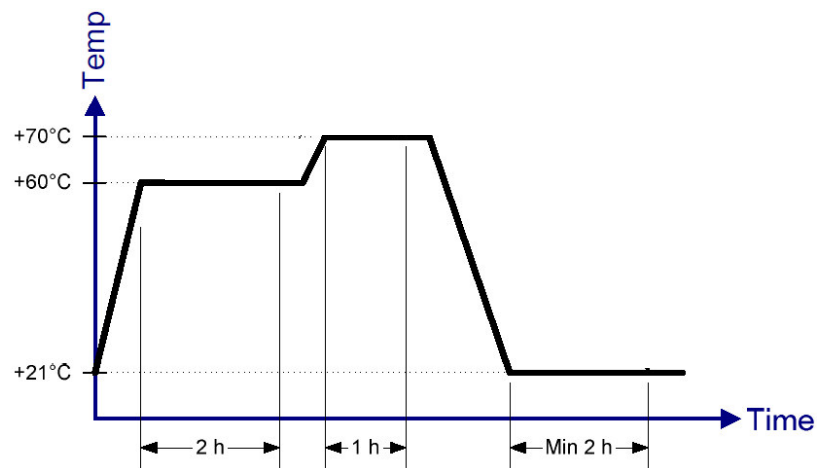
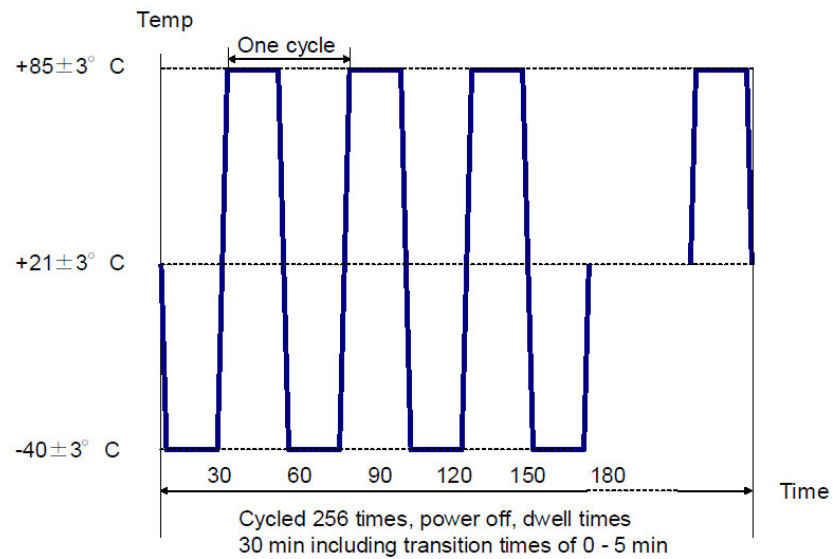
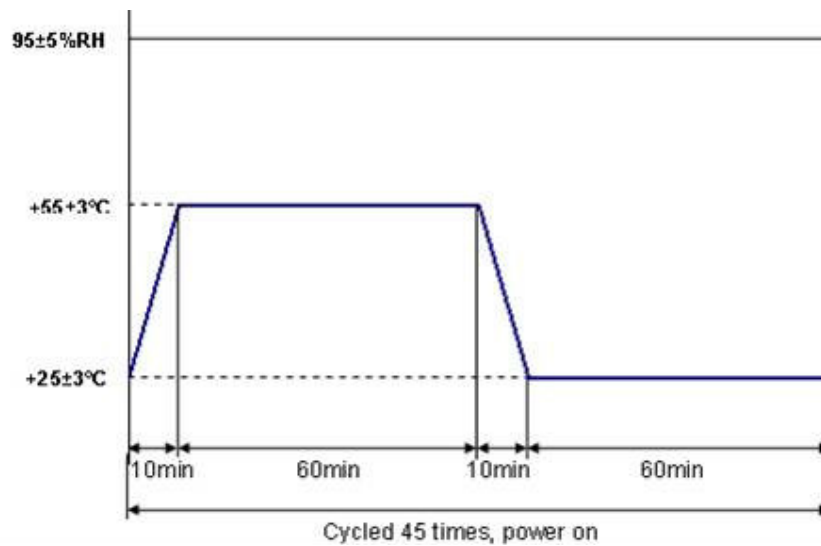


Fig. 10: Heat test cycle (operational)

## Appendix 6



**Fig. 11: Thermal shock test cycle**



**Fig. 12: Condensation test cycle**