NEWHAVEN DISPLAY INTERNATIONAL

Product Specification

NHD-7.0-800480AF-LSXP

IPS TFT Liquid Crystal Display

NHD-	Newhaven Display
7.0-	7.0" Diagonal
800480-	800x480 Pixels
AF-	Model
L-	LVDS Interface
S-	High Brightness, White LED Backlight
X-	TFT
P-	IPS, Wide Temperature

Newhaven Display International, Inc.
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REACH Compliant

RoHS Compliant

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Table of Contents

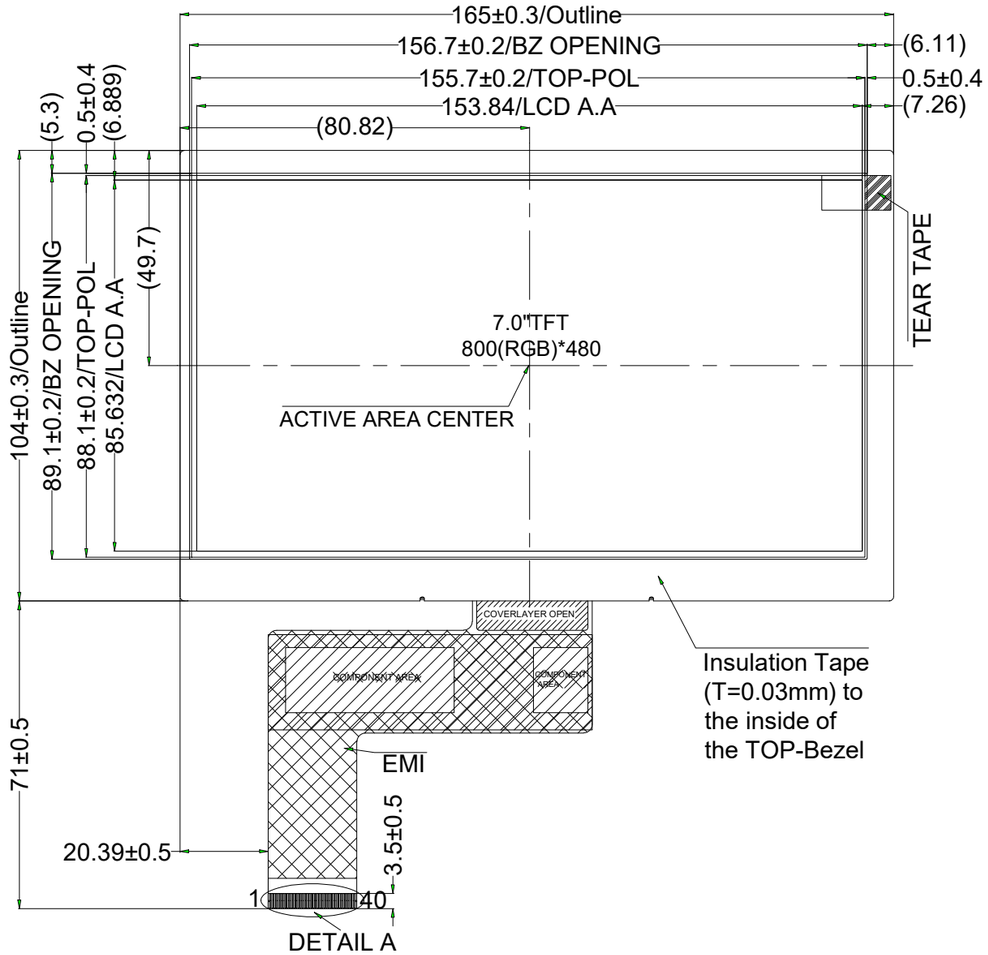
Additional Resources

- **Support Forum:** https://support.newhavendisplay.com/hc/en-us/community/topics
- **GitHub:** https://github.com/newhavendisplay
- **Example Code:** https://support.newhavendisplay.com/hc/en-us/categories/4409527834135-Example-Code/
- **Knowledge Center:** https://www.newhavendisplay.com/knowledge_center.html
- **Quality Center:** https://www.newhavendisplay.com/quality_center.html
- **Precautions for using LCDs/LCMs:** https://www.newhavendisplay.com/specs/precautions.pdf
- **Warranty / Terms & Conditions:** https://www.newhavendisplay.com/terms.html

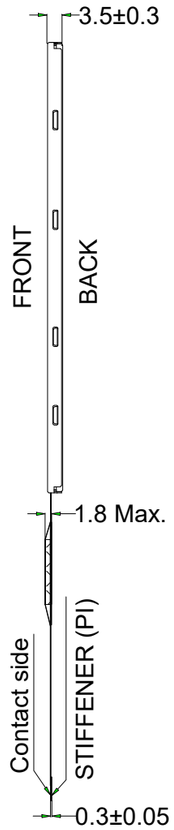
Document Revision History

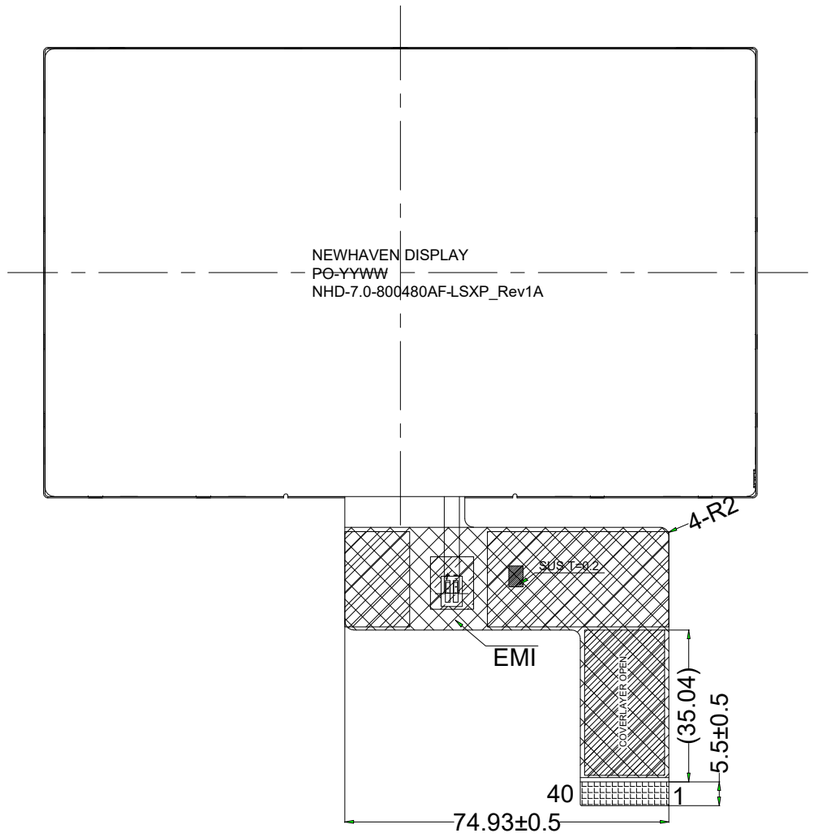
Revision	Date	Description	Changed By
-	10/08/2024	Initial Release	KL

Mechanical Drawing

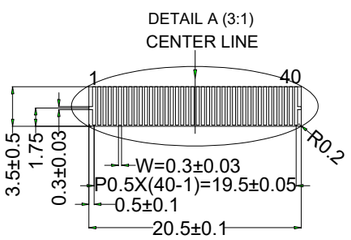


Insulation Tape
(T=0.03mm) to
the inside of
the TOP-Bezel



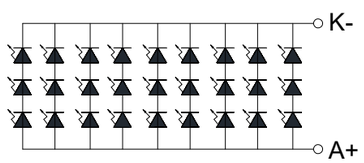


PIN	SYMBOL
1	NC
2	VDD
3	VDD
4	NC
5	GRB
6	DISP
7	GND
8	RX0N
9	RX0P
10	GND
11	RX1N
12	RX1P
13	GND
14	RX2N
15	RX2P
16	GND
17	DCLKN
18	DCLKP
19	GND
20	RX3N
21	RX3P
22	GND
23	NC
24	NC
25	GND
26	NC
27	BIST_EN
28	LVDS_SEL
29	NC
30	GND
31	NC
32	NC
33	HDIR
34	VDIR
35	NC
36	LED-K
37	LED-K
38	NC
39	LED-A
40	LED-A



Product Description: 7.0” 800x480 IPS TFT

1. Driver IC: ST7277
2. Interface: LVDS
3. Power Requirement: 3.3V TFT, 9.3V/180mA Backlight
4. Optical Features: Normally Black, Transmissive, 1000cd/m²
5. Recommended FFC Connector: 40pin 0.5mm pitch; Ex. Molex 54104-4031
6. EMI shielded FPC



LED CIRCUIT

Standard Tolerance:
(Unless otherwise specified)
Linear: ±0.3mm

NEWHAVEN DISPLAY INTERNATIONAL

Drawing/Part Number:	Revision:
NHD-7.0-800480-LSXP	1A

Unless otherwise specified:
• Dimensions are in Millimeters
• Third Angle Projection

Drawn By:	Approved By:
K. Lewis	K. Lewis
Drawn Date: 10/08/2024	Approved Date: 10/08/2024

Pin Description

Pin No.	Symbol	Connection	Function Description
1	NC	-	No connection
2-3	V_{DD}	Power Supply	Supply voltage for LCD (+3.3V)
4	NC	-	No connection
5	GRB	MPU	Active LOW Reset signal (normally pull high)
6	DISP	MPU	Active LOW Standby signal (normally pull high)
7	GND	Power Supply	Power Ground
8	RX1N	MPU	-LVDS differential data input CH0
9	RX0P	MPU	+LVDS differential data input CH0
10	GND	Power Supply	Ground
11	RX1N	MPU	-LVDS differential data input CH1
12	RX1P	MPU	+LVDS differential data input CH1
13	GND	Power Supply	Ground
14	RX2N	MPU	-LVDS differential data input CH2
15	RX2P	MPU	+LVDS differential data input CH2
16	GND	Power Supply	Ground
17	DCLKN	MPU	-LVDS differential Clock
18	DCLKP	MPU	+LVDS differential Clock
19	GND	Power Supply	Ground
20	RX3N	MPU	-LVDS differential data input CH3
21	RX3P	MPU	+LVDS differential data input CH3
22	GND	Power Supply	Ground
23 - 24	NC	-	No connection
25	GND	Power Supply	Ground
26	NC	-	No connection
27	BIST_EN	MPU	Built in Self-Test BIST = H: Self-Test Enabled BIST = L: Normal Operation (Default)
28	LVDS_SEL	MPU	Data Input Format: LVDS = L: 3 Lane (6-bit) Input LVDS = H: 4 Lane (8-bit) Input (Default)
29	NC	-	No connection
30	GND	Power Supply	Power Ground
31-32	NC	-	No connection
33	HDIR	MPU	Horizontal Scan Direction: HDIR = H: Normal Scan (Default) HDIR = L: Reverse Scan
34	VDIR	MPU	Vertical Scan Direction: VDIR = H: Normal Scan (Default) VDIR = L: Reverse Scan
35	NC	-	No connection
36-37	LED-K	Power Supply	Backlight Cathode (Ground)
38	NC	-	No connection
39-40	LED-A	Power Supply	Backlight Anode (180mA @ 9.3V)

Recommended LCD connector: 40pin 0.5mm pitch FFC. Molex p/n: 54104-4031 (top contact)

Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Operating Temperature Range	T_{OP}	Absolute Max	-20	-	+70	°C
Storage Temperature Range	T_{ST}	Absolute Max	-30	-	+80	°C
Supply Voltage for LCD	V_{DD}	-	3.1	3.3	3.6	V
Supply Current for LCD	I_{DD}	V_{DD} = 3.3V	45	90	135	mA
LVDS Differential input high Threshold voltage	R_XVTH	R_XVCM = 1.2V	-	-	100	mV
LVDS Differential input low Threshold voltage	R_XVTL		-100	-	-	mV
LVDS Differential input common mode voltage	R_XVCM	-	|VID|/2	-	2.4-|VID|/2	V
LVDS Differential voltage	|VID|	-	200	-	600	mV
Backlight Supply Current	I_{LED}	-	-	180	-	mA
Backlight Supply Voltage	V_{LED}	I_{LED} = 180 mA	8.3	9.3	10.2	V
Backlight Lifetime*	-	T_{OP} = 25° C	30,000	-	-	Hrs.

*Backlight lifetime is rated as Hours until **half-brightness**, under normal operating conditions. The LED of the backlight is driven by current drain; drive voltage is for reference only. Drive voltage must be selected to ensure backlight current drain is below MAX level stated

Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Optimal Viewing Angles	Top	φY+	-	-	85	-	o
	Bottom	φY-		-	85	-	o
	Left	θX-		-	85	-	o
	Right	θX+		-	85	-	o
Contrast Ratio		CR	-	800	1000	-	-
Luminance		L_V	I_{LED} = 180 mA	800	1000	-	cd/m^2
Response Time (Rise + Fall)		$T_R + T_F$	T_{OP} = 25°C	-	25	-	ms
Chromaticity	Red	X_R	-	0.556	0.606	0.656	-
		Y_R	-	0.297	0.347	0.397	-
	Green	X_G	-	0.274	0.324	0.374	-
		Y_G	-	0.547	0.597	0.647	-
	Blue	X_B	-	0.076	0.126	0.176	-
		Y_B	-	0.084	0.134	0.184	-
	White	X_W	-	0.241	0.291	0.341	-
		Y_W	-	0.295	0.345	0.36	-

Driver Information

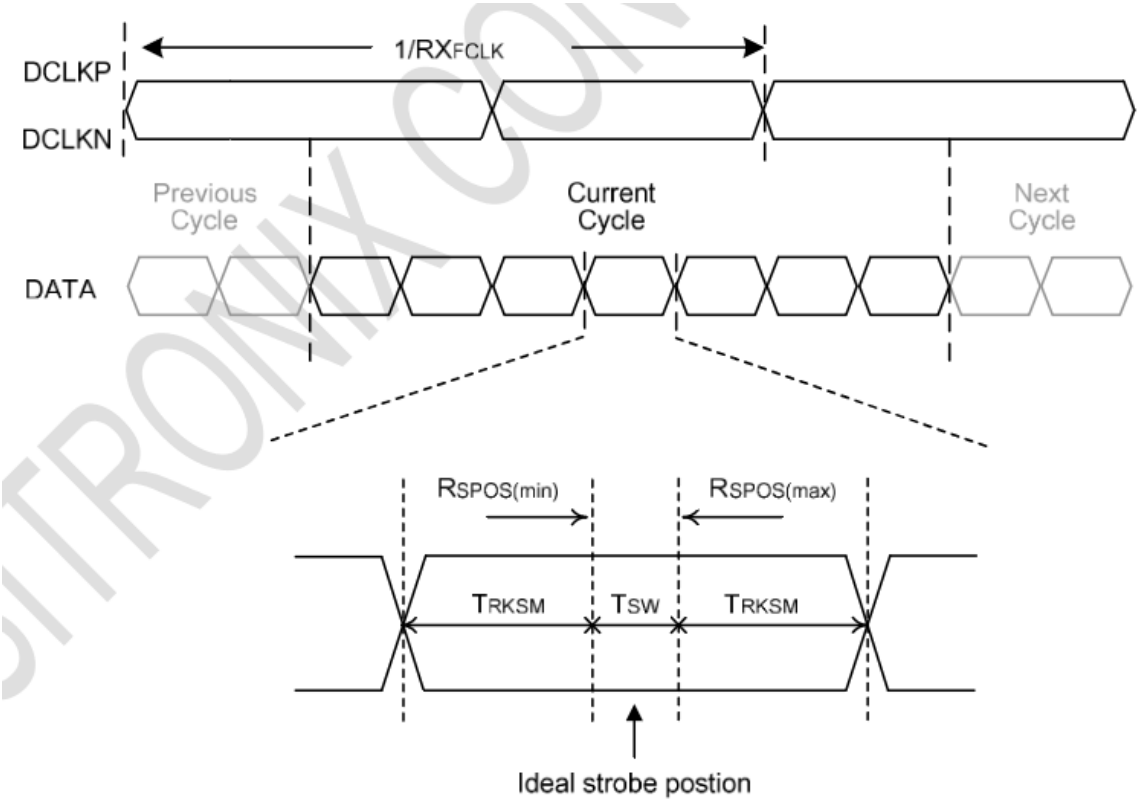
Built-in ST7277 Source Driver: https://support.newhavendisplay.com/hc/en-us/articles/22014397027991-ST7277

Timing Characteristics

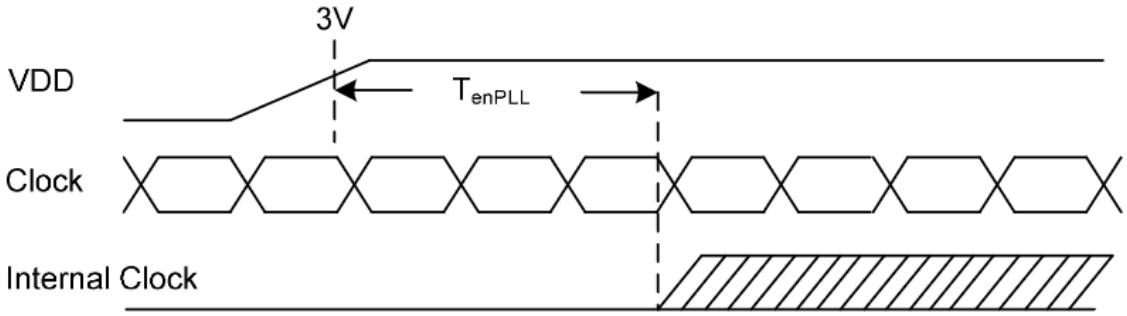
Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{XFCLK}	23	25	27	MHz	-
Input data skew margin	T_{RSKM}	400	-	-	pS	-
Clock high time	T_{LVCH}	-	4/(7 * R_{XFCLK})	-	nS	-
Clock low time	T_{LVCL}	-	3/(7 * R_{XFCLK})	-	nS	-
PLL wake-up time	T_{emPLL}	-	-	150	µS	-

Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Modulation Frequency	SSC_{MF}	-	-	100	KHz	-
Modulation Rate	SSC_{MR}	-	-	±3	%	-

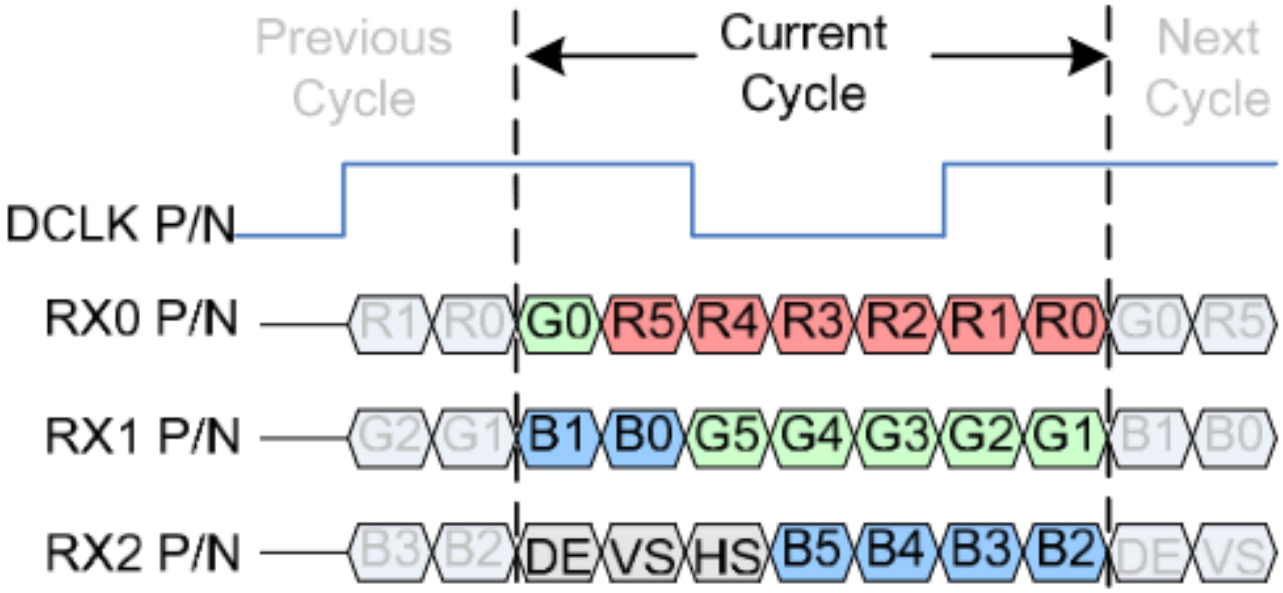
LVDS input Timing



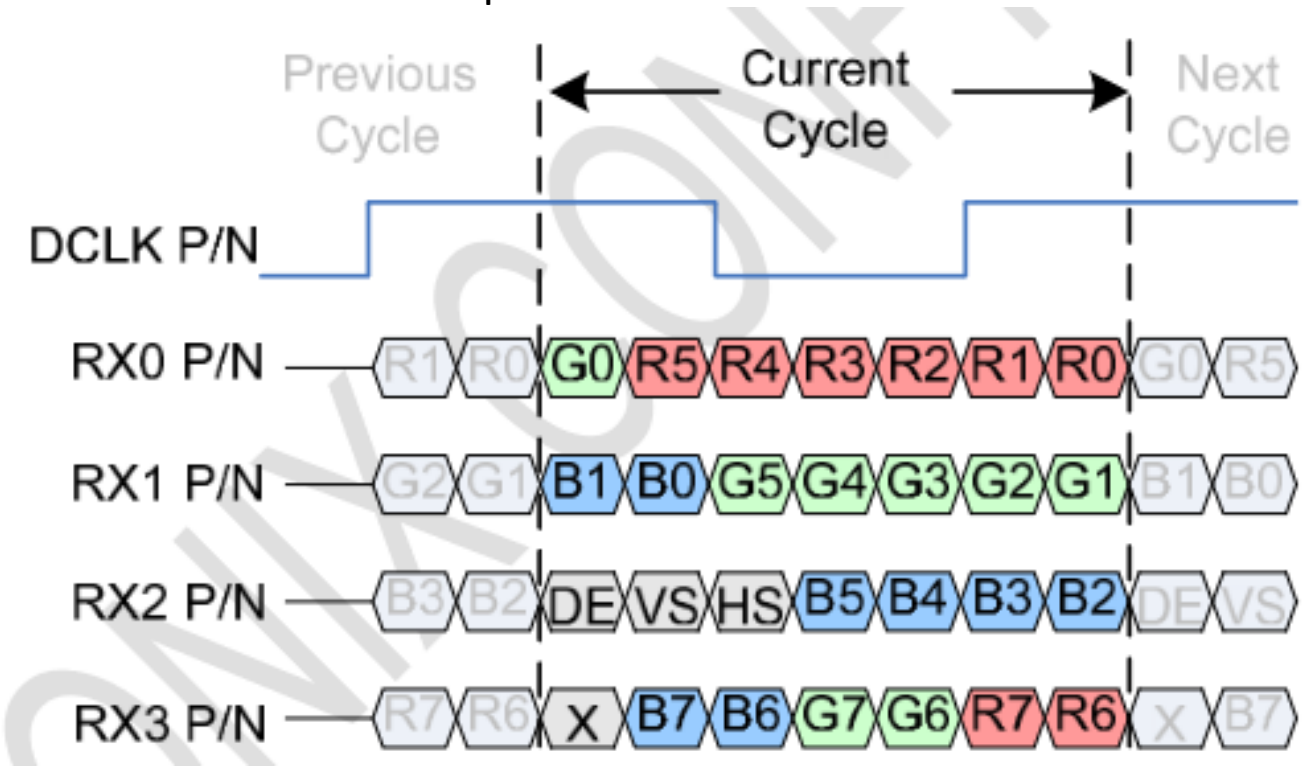
R_{RKSM} : Receiver strobe margin
R_{SPOS} : Receiver strobe position
T_{SW} : Strobe width (internal DATA sampling window)



3 Lane VESA Mode Color Bit Map



4 Lane VESA Data Format Color Bit Map



Quality Information

Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	+80°C , 96hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C , 96hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+70°C 96hrs	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	-20°C , 96hrs	1,2
High Temperature / Humidity Storage	Endurance test applying the electric stress (voltage & current) and the high thermal with high humidity stress for a long time.	+50°C , 90% RH , 96hrs	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	-20°C,60min -> 70°C,60 min =20 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	Frequency range:10Hz~50Hz Acceleration of gravity:5G X, Y, Z 30 min for each direction	3
Static electricity test	Endurance test applying electric static discharge.	Air: ±8kV ; Contact: ±4kV For 5 times each.	

Note 1: No condensation to be observed.

Note 2: Conducted after 4 hours of storage at 25°C, 0%RH.

Note 3: Test performed on product itself, not inside a container.