NEWHAVEN DISPLAY INTERNATIONAL

Product Specification

NHD-10.1-1024600BF-LSXP

TFT Liquid Crystal Display

NHD-	Newhaven Display
10.1-	10.1" Diagonal
1024600-	1024xRGBx600 Pixels
BF-	Model
L-	LVDS Interface
S-	High Brightness, White LED Backlight
X -	TFT
P-	IPS, Wide Temperature

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REACH Compliant

RoHS Compliant

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Table of Contents

Additional Resources

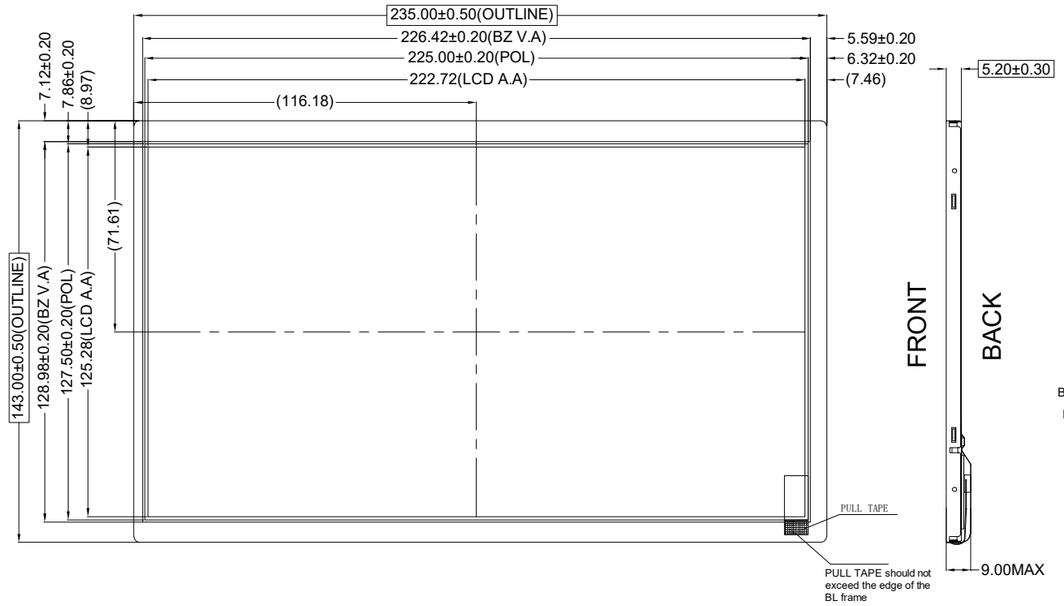
- **Support Forum:** https://support.newhavendisplay.com/hc/en-us/community/topics
- **GitHub:** https://github.com/newhavendisplay
- **Example Code:** https://support.newhavendisplay.com/hc/en-us/categories/4409527834135-Example-Code/
- **Knowledge Center:** https://www.newhavendisplay.com/knowledge_center.html
- **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

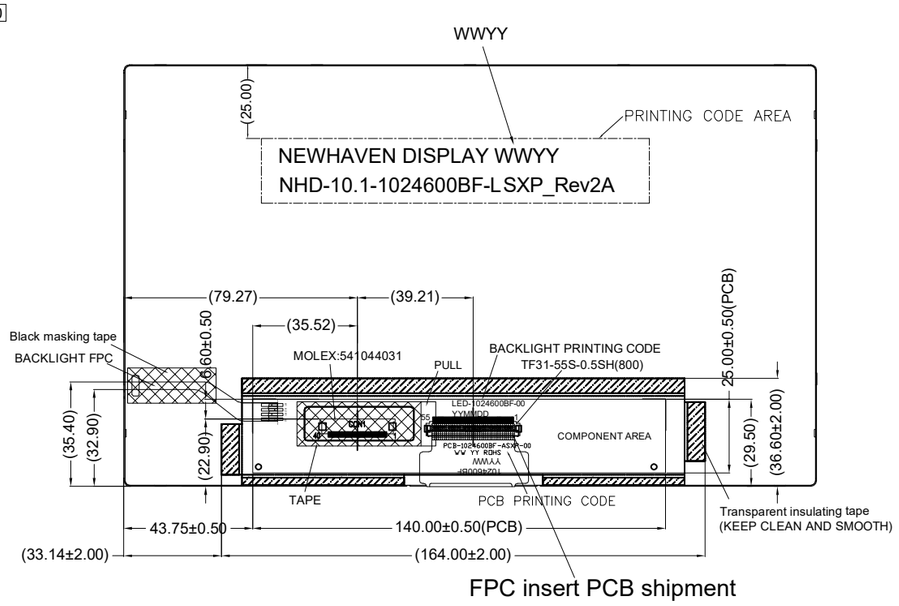
Document Revision History

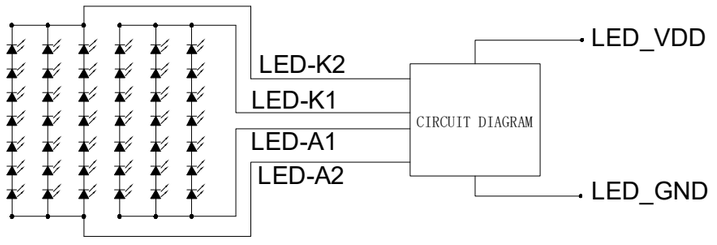
Revision	Date	Description	Changed By
0	03/01/2022	Initial Release	ZP
1	04/13/2022	Included Backlight Driver IC	JT
2	08/04/2022	Updated LCD Supply Current, Backlight Enable Voltage and Chromaticity values.	JT
3	08/16/2022	Updated Operating and Storage Temperature Range, and Differential Input Common Voltage	JT
4	09/08/2022	Updated the Backlight PWM Frequency Range	JT
5	10/28/2022	Mechanical Drawing Page Updated	JT

Mechanical Drawing

SYMBOL	REVISION	DATE







PIN	Symbol	PIN	Symbol
1	GND	21	Rin3+
2	VDD	22	GND
3	VDD	23	INSEL
4	V_EDID	24	GND
5	GND	25	GND
6	SCL	26	UPDN
7	SDA	27	SHLR
8	Rin0-	28	GND
9	Rin0+	29	RESET
10	GND	30	STBYB
11	Rin1-	31	LED-GND
12	Rin1+	32	LED-GND
13	GND	33	LED-GND
14	Rin2-	34	GND
15	Rin2+	35	LED_PWM
16	GND	36	LED_EN
17	CLKIN-	37	BIST
18	CLKIN+	38	LED_VDD
19	GND	39	LED_VDD
20	Rin3-	40	LED_VDD

Product Description: 10.1” IPS TFT

1. TFT Driver IC: HX8282-A11; Backlight Driver IC: MP3398EGF
2. TFT Interface: LVDS
3. TFT Power Requirement: 3.3V, Backlight: 360mA/12.0V
4. Optical Features: Full View, Transmissive, Normally Black, 800 cd/m²

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

NEWHAVEN DISPLAY INTERNATIONAL

Drawing/Part Number: NHD-10.1-1024600BF-LSXP			Revision: 2A
Unless otherwise specified:	Drawn By: J.Thomas	Approved By: J.Thomas	Size: A3
• Dimensions are in Millimeters • Third Angle Projection	Drawn Date: 10/28/2022	Approved Date: 10/28//2022	Scale: NS
	Do Not Scale Drawing		Sheet 1 of 1

Pin Description

TFT:

Pin No.	Symbol	Connection	Function Description
1	GND	Power Supply	Ground
2-3	V_{DD}	Power Supply	Supply voltage for LCD (+3.3V)
4	$V_{\_EDID}$	Power Supply	Supply voltage for EDID (+3.3V)
5	GND	Power Supply	Ground
6	SCL	MPU	Serial Clock for EDID
7	SDA	MPU	Serial Data for EDID
8	Rin0-	MPU	-LVDS differential data input CH0
9	Rin0+	MPU	+LVDS differential data input CH0
10	GND	Power Supply	Ground
11	Rin1-	MPU	-LVDS differential data input CH1
12	Rin1+	MPU	+LVDS differential data input CH1
13	GND	Power Supply	Ground
14	Rin2-	MPU	-LVDS differential data input CH2
15	Rin2+	MPU	+LVDS differential data input CH2
16	GND	Power Supply	Ground
17	CLKIN-	MPU	-LVDS differential Clock
18	CLKIN+	MPU	+LVDS differential Clock
19	GND	Power Supply	Ground
20	Rin3-	MPU	-LVDS differential data input CH3
21	Rin3+	MPU	+LVDS differential data input CH3
22	GND	Power Supply	Ground
23	INSEL (HSD)	MPU	Data Input Format: INSEL = L 8-Bit LVDS Input (Default) INSEL = H 6-Bit LVDS Input
24-25	GND	Power Supply	Ground
26	UPDN	MPU	Gate Driver Up/Down Scan Setting: UPDN = H: Reverse Scan UPDN = L: Normal Scan (Default)
27	SHLR	MPU	Gate Driver Left/Right Scan Setting: SHLR = H: Normal Scan (Default) SHLR = L: Reverse Scan
28	GND	Power Supply	Ground
29	RESET	MPU	Active Low Reset Signal
30	STBYB	MPU	Active Low Standby Signal
31-33	LED_GND	Power Supply	Ground for Backlight Driver
34	GND	Power Supply	Ground
35	LED_PWM	MPU	Backlight PWM Signal Input (See Table Below)
36	LED_EN	MPU	Backlight Enable H: Backlight On; L: Backlight Off
37	BIST	MPU	Built in Self-Test BIST = H: Self-Test Enabled BIST = L: Normal Operation (Default)
38-40	LED_V_{DD}	Power Supply	Supply Voltage for Backlight Driver

Recommended LCD connector: 0.5mm pitch 40-Conductor FFC.
Recommended Cable: 40 POS FFC **Molex P/N**: 15020-0435

Driver Information

TFT:

Source Driver HX8282-A11: https://support.newhavendisplay.com/hc/en-us/articles/4414530594583-HX8282-A11
Gate Driver HX8696-A01: https://support.newhavendisplay.com/hc/en-us/articles/4414548297367-HX8696-A
Backlight Driver IC: MP3398EGF

Electrical Characteristics

TFT:

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}	-	3.0	3.3	3.6	V
Supply Voltage for EDID	$V_{\_EDID}$	-	3.0	3.3	3.6	V
Supply Current for LCD	I_{DD}	V_{DD} = 3.3V	84.5	169	210	mA
LVDS Differential input HIGH Voltage	RxVTH	-	-	-	+100	mV
LVDS Differential input LOW Voltage	RxVTL	-	-100	-	-	mV
LVDS Differential input Common Voltage	RxVCM	-	|VID|/2	-	VDD-1.2	V
LVDS Differential Voltage	|VID|	-	200	-	600	mV
Supply Voltage for Backlight Driver	LED_V_{LED}	-	5.0	12.0	22.4	V
Supply Current for Backlight Driver[1]	LED_I_{LED}		160	360	1200	mA
Backlight Lifetime[2]	-	T_{OP} = 25°C	30,000	-	-	Hrs.
Backlight Enable Voltage	LED_EN	-	1.5	3.3	5.5	V
Backlight PWM Voltage	LED_PWM	-	1.5	3.3	5.5	V
Backlight PWM Frequency	-	LED_PWM = 3.3V	200	-	2000	Hz

[1]Minimum supply current occurs when supply voltage is at max; maximum supply current when supply voltage is at minimum.
[2]Backlight lifetime is rated as Hours until **half-brightness**, under normal operating conditions.

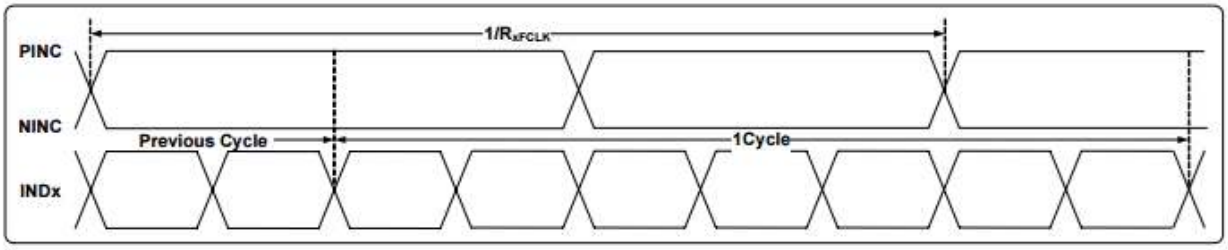
Optical Characteristics

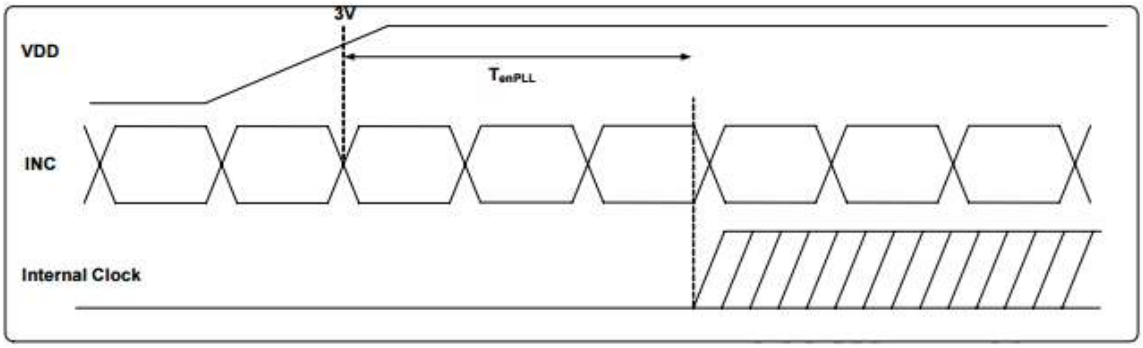
Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Optimal Viewing Angles	Top	φY+	CR ≥ 10	-	80	-	°
	Bottom	φY-		-	80	-	°
	Left	θX-		-	80	-	°
	Right	θX+		-	80	-	°
Contrast Ratio		CR	-	600	800	-	-
Luminance		L_V	-	600	800	1000	cd/m²
Response Time (Rise + Fall)		$T_R + T_F$	T_{OP} = 25°C	-	25	35	ms
Chromaticity	Red	X_R	-	0.57	0.60	0.63	-
		Y_R	-	0.33	0.36	0.39	-
	Green	X_G	-	0.30	0.33	0.36	-
		Y_G	-	0.51	0.54	0.57	-
	Blue	X_B	-	0.10	0.13	0.16	-
		Y_B	-	0.05	0.08	0.11	-
	White	X_W	-	0.28	0.31	0.34	-
		Y_W	-	0.30	0.33	0.36	-

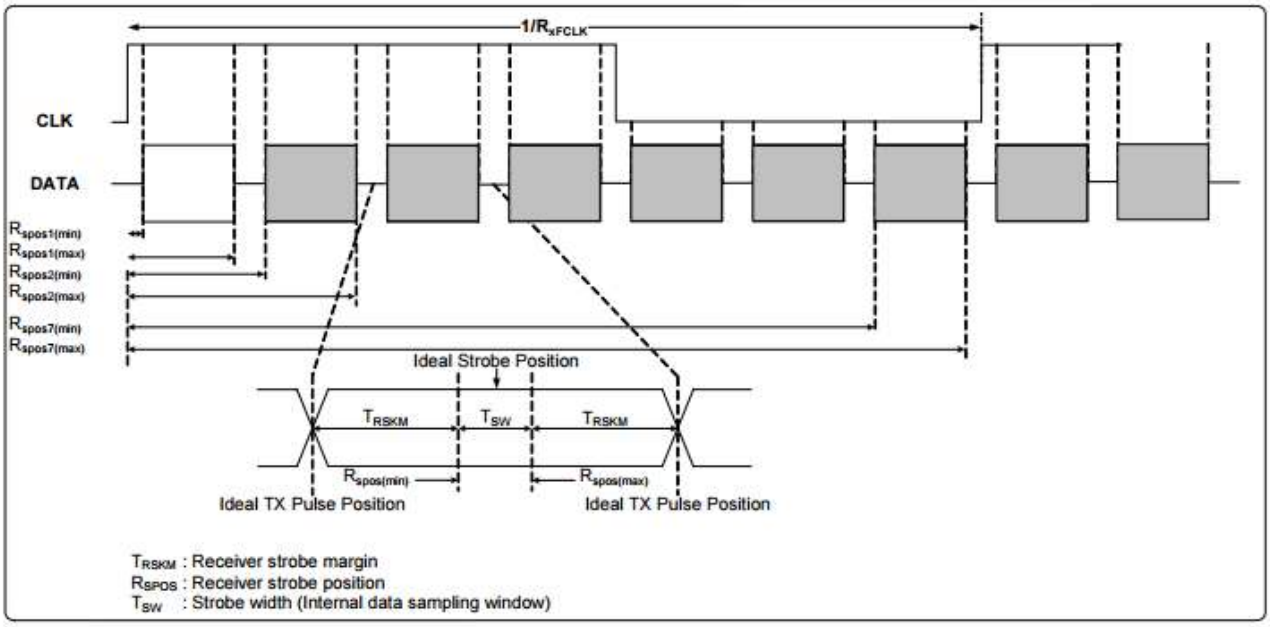
Timing Characteristics – TFT Display

Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{XFCLK}	20	-	71	MHz	-
Input data skew margin	T_{RSKM}	500	-	-	pS	| VID | = 400mV R_{XVCM} = 1.2V R_{XFCLK} = 71MHz
Clock high time	T_{LVCH}	-	4/(7 * RXFCLK)	-	nS	-
Clock low time	T_{LVCL}	-	3/(7 * RXFCLK)	-	nS	-
PLL wake-up time	T_{emPLL}	-	-	150	µS	-

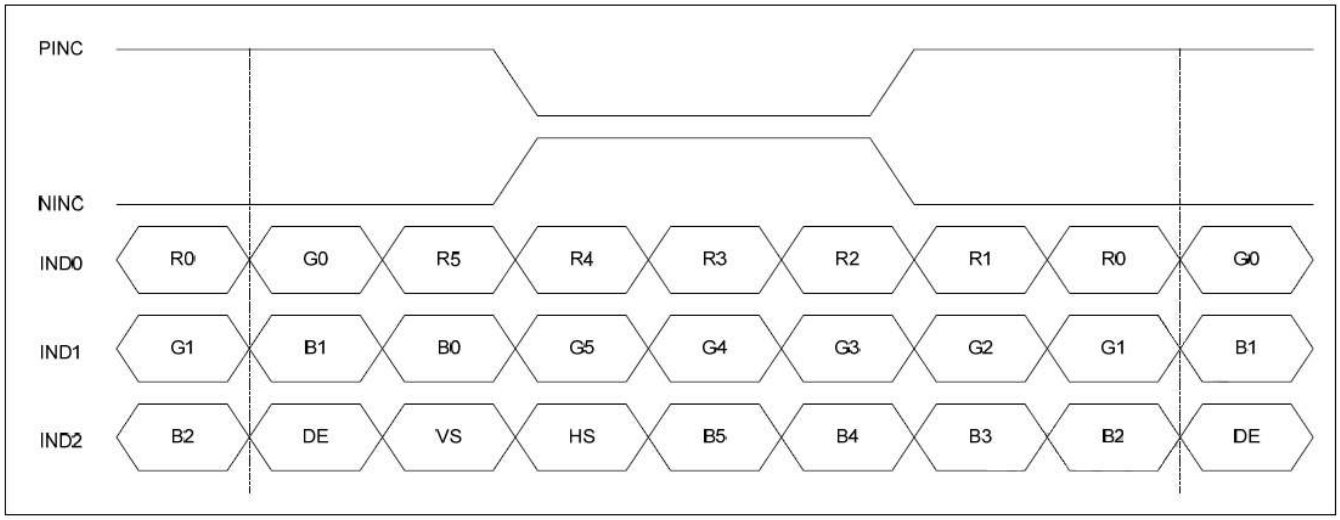
Parameter	Symbol	Spec			Unit	Condition
		Min.	Typ.	Max.		
Modulation Frequency	SSC_{MF}	23	-	93	KHz	-
Modulation Rate	SSC_{MR}	-	-	±3	%	LVDS Clock = 71 MHz



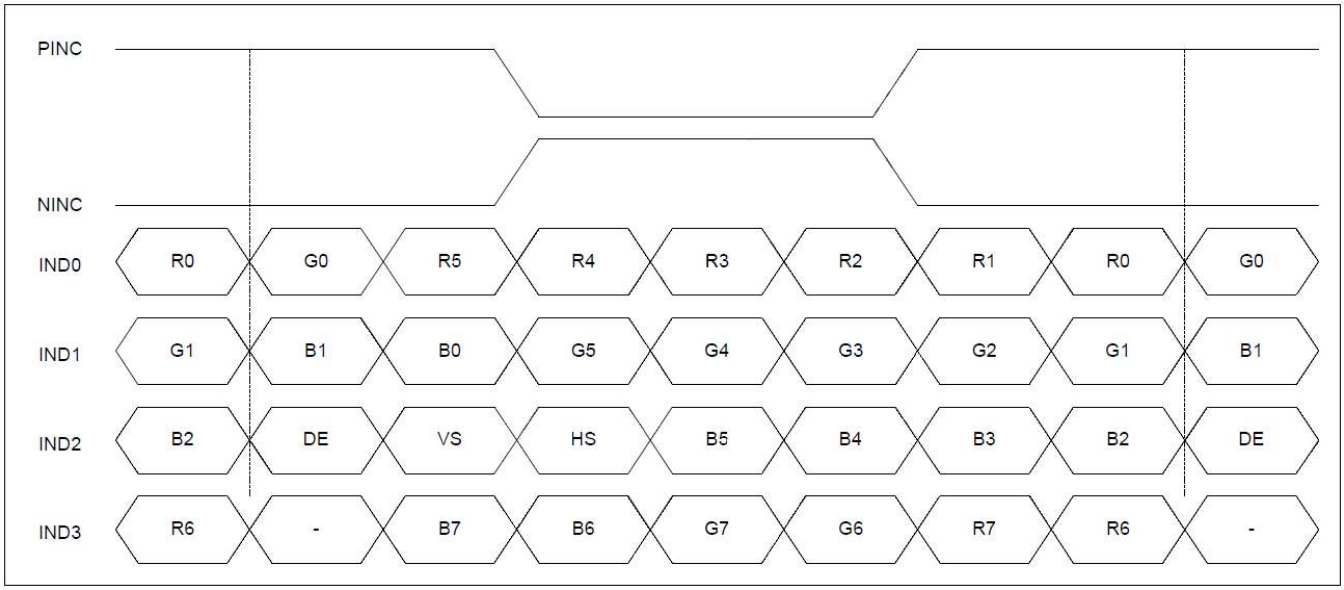




6-bit LVDS data input format:



8-Bit LVDS Data Input Format:



Horizontal & Vertical Timing (1024x600)

Item		Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DCLK Frequency		F_{CLK}	44.9	51.2	63	MHz
HSYNC	Horizontal Display Area	T_{HD}		1024		DCLK
	HSD Period	T_H	1200	1344	1400	DCLK
	HSD Pulse Width	T_{HPW}	1	-	140	DCLK
	HSD Back Porch	T_{HBP}		160		DCLK
	HSD Front Porch	T_{HFP}	16	160	216	DCLK
VSYNC	Vertical Display Area	T_{VD}		600		T_H
	VSD Period	T_V	624	635	750	T_H
	VSD Pulse Width	T_{VPW}	1	-	20	T_H
	VSD Back Porch	T_{VBP}		23		T_H
	VSD Front Porch	T_{VFP}	1	12	127	T_H

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, 240 hrs.	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C, 240 hrs.	1,2
High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the high thermal stress for a long time.	+70°C, 120 hrs.	2
Low Temperature Operation	Endurance test applying the electric stress (voltage & current) and the low thermal stress for a long time.	-20°C, 120 hrs.	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, 120 hrs.	1,2
Thermal Shock resistance	Endurance test applying the electric stress (voltage & current) during a cycle of low and high thermal stress.	-30°C, 30min->25°C, 10min -> 80°C, 30min 10 cycles	
Vibration test	Endurance test applying vibration to simulate transportation and use.	Frequency: 250r/min Amplitude: 1 inch Time: 45 min	3
Static electricity test	Endurance test applying electric static discharge.	Air: V_S=8KV, Contact: V_S=4KV 10 Times	

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.