New Vision Display

PRODUCT SPECIFICATION

7” CTP & 800RGBX480 TFT

RFQ NUMBER: EM-36670-B

MODEL P/N: 1P.BIBI-TM2306DA070L-01

Rev: 01

CUSTOMER P/N: TBD

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DATE	2020/06/29	2020/06/29	

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CUSTOMER APPROVAL		

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Revision History

Revision	Date	Originator	Detail	Remarks
01	2020/06/29	Qijian Luo	First release	

Note: All parameters and dimensions in this specification are subject to change and will be confirmed once the program is awarded and kicked-off at New Vision Display.

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1. General Description

This display module consists of a 7.0 inch 800 RGB x 480, TFT a-Si Active Matrix Color LCD that is electronically and mechanically integrated. The TFT display is capable of displaying 16.7M colors. Each pixel is divided into Red, Green and Blue sub-pixels or dots which are arranged in vertical stripes.

The product consists with a full x-y mutual capacitance touch panel with associated controller, true multi-touch function is supported. The touch panel is DITO glass structure with an optical bonded hardened glass lens. The complete LCM and touch sensor assembly shall be RoHS compliant.

2. General Parameters

2.1. Module Parameter

Features	Details	Unit
Display Size(Diagonal)	7”	Inch
LCD type	α-Si TFT	
Display Mode	TN/Transmissive /Normally white	
Resolution	800 RGB x 480	landscape
View Direction	6 O’clock	
Grayscale Inversion Direction	12 O’clock	
Module Outline	170.08(H)x 103.92(V)x5.53(T)(Note1)	mm
Active Area	154.08(H) x 85.92(V)	mm
Pixel Size	0.1926(H) x 0.1790(V)	mm
Pixel Arrangement	RGB Vertical stripe	
Source Driver IC	HX8264-E or EQU	
Gate Driver IC	HX8664-B or EQU	
Polarizer Surface Treatment	Normal	
Display Colors	16.7M	
Interface	24-bit RGB	
Weight	TBD	G

Note1:Excluding hooks, posts, FPC /FPC tall etc.

2.2. Touch Panel Parameter

Features	Details	Notes
Operation Technology	Projected capacitive	--
Input Method	Bare or gloved finger or thick conductive stylus	--
Number of simultaneous touches	5	--
Min. spacing between 2 touches	18	mm
Positional Accuracy	± 2.5mm at 4 edges and 2.0mm at center	mm
Minimum Touch Area	30	mm2
Minimum Touch Pressure	0	N
Number of touches	>10 million over lifetime	With correct input method
Connection Type	ZIF Connector	--
Anti-glare surface	No	Available on request
Optical Transmittance	≥88%	Measured by LCD5100
FG Weight	TBD	g
Non-Linearity	≦3.0%	--
RoHS Compliance	Yes	SJ/T 11363-2006 (China)
Power Consumption	TBD	Idle mode
Interface to Host	I2C	400kbps
Response Time/Speed	<15ms	Measured by Oscillograph
I2C Address	0X38	
Touch controller	FT5426DQ8	FocalTech product
Touch Panel Vendor ID	Address: 0xA8 Data:0x01	--
Firmware version number	Address: 0xA6 Data:0x05	--
ESD Capability	15KV Air discharge (TP with lens) 8KV contact discharge(TP with lens)	150pF / 330 ohm
Operating Voltage	3.3V	±5%

3. Absolute Maximum Ratings

3.1. TFT IC parameter

GND=0V, Ta=25ºC

Item		Symbol	Min.	Max.	Unit
Supply Voltage	Analog	AVDD	-0.5	+13.5	V
	Digital	DVDD	-0.3	+5.0	V
Gate On Voltage		VDDG	-0.3	+42	V
Gate Off Voltage		*VEEG*	-20	+0.3	V
Gate On-Gate Off Voltage		VDDG-VEEG	12	40	V
Storage temperature		T_{STG}	-30	+80	ºC
Operating temperature		T_{OP}	-20	+70	ºC

Note

1. If Ta below 50ºC, the maximum humidity is 90%RH, if Ta over 50ºC, maximum humidity should be less than 60%RH.
2. If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

3.2. Touch panel controller FT5426DQ8 Parameter

Item	Symbol	Rating	Unit
Power Supply Voltage	VDD	2.7 to +3.6	V
Operating temp	Topr	-40 to +85	ºC
Storage temp	Tstg	-55 to +150	ºC

Notes

1. If used beyond the absolute maximum ratings. FT5426 may be permanently damaged. It is strongly recommended that the device be used within the electrical characteristics in normal operations. If exposed to the condition not within the electrical characteristics, it may affect the reliability of the device.

4. Electrical Characteristics

4.1. TFT display DC characteristics

Ta=25 ºC

Item	Symbol	Min.	Typ.	Max.	Unit
Digital Supply Voltage	DVDD	3	3.3	3.6	V
Analog Supply Voltage	AVDD	10.2	10.4	10.6	
Gate On Voltage	VDDG	-	15	-	
Gate Off Voltage	VEEG	-	-10	-	
Common Voltage	VCOM	-	4.04	-	
Logic Input Voltage	VIH	0.7DVDD	-	DVDD	
	VIL	GND	-	0.3DVDD	
Logic Input Voltage	VOH	VDD-0.4	-	-	
	VOL	-	-	GND+0.4	
Current Consumption(Note 2)	I_{DVDD}	-	TBD	TBD	mA
Frame Frequency	f_{FR}	-	60	-	Hz

Note

1. Please adjust VCOM to make the flicker level be minimum.
2. The backlight current is not included. Value would be updated after samples build.

4.2. CAP TP control IC FT5426DQ8 characteristics

Parameter	Description	Min.	Typ.	Max.	Units	Notes
VDD	Operating limits	3.135	3.3	3.465	V	±5%
IDD	Active mode		12.76		mA	24MHZ,1 Touch
	Idle mode		0.042		mA	24MHZ, No Touch
Vil	Low input logic level	-0.3		0.3IOvdd	V	
Vih	High input logic level	0.7IOvdd		IOvdd	V	
Vol	Low output logic level	-	-	0.3IOvdd	V	IoH=0.1mA
Voh	High output logic level	0.7IOvdd	-	-	V	IoH=-0.1mA
Ili	input leakage current	-1	-	1	uA	Vin=0~VDD

Note : VDD= 3.3V±5%.This consumption data is intended for design guidance only. Actual current will depend on the particular sensor design and firmware options.

4.3. Backlight Characteristic

Item	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	V_f	Ta=25 ºC, IF=160mA	8.1	9.3	10.5	V
Forward Current	I_f	Ta=25 ºC	-	160	--	mA
Reverse Voltage	V_R	-	-	-	5	V
Reverse current	I_R	-	-	-	50	μA
Power dissipation	P_d	Ta=25 ºC,IF=160mA	-	1488	-	mW
Drive method	Constant current 160mA					
LED Configuration	24 White LED ,3 in series ,8 in Parallel					

Note: 1. Test condition Ta=25ºC.

5. Optical Characteristics

5.1. Optical Characteristics

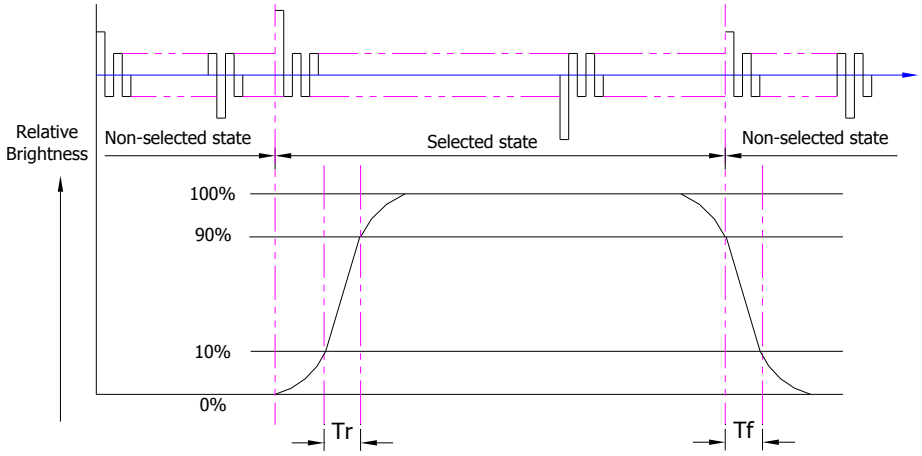
Ta=25ºC, VDD=3.3V, TN LC+ Polarizer

	Item		Symbol	Condition	Specification			Unit
					Min.	Typ.	Max.	
Backlight On (Transmissive Mode)	Surface Luminance (On TP Lens Surface, I_f =160mA) (See 5.6)		*Lv*	θ= 0° Normal viewing angle	320	400	-	cd/m²
	Uniformity(CTP surface) (see 5.6)		*Avg*		75	80		%
	Contrast ratio(See 5.3)		*CR*		500	800	-	
	Response time (See 5.2)		$T_{R+}T_F$		-	25	50	ms
	Chromaticity Transmissive (See 5.5)	Red	X_R		TBD	TBD	TBD	
			Y_R		TBD	TBD	TBD	
		Green	X_G		TBD	TBD	TBD	
			Y_G		TBD	TBD	TBD	
		Blue	X_B		TBD	TBD	TBD	
			Y_B		TBD	TBD	TBD	
		White	X_W		TBD	TBD	TBD	
			Y_W		TBD	TBD	TBD	
	Viewing Angle (See 5.4)	Horizontal	θ_{X+}	Center CR≥10	60	70	-	Deg.
			θ_{X-}		60	70	-	
		Vertical	θ_{Y+}		50	60	-	
			θ_{Y-}		60	70	-	
	NTSC Ratio(Gamut)				41	51	-	%

Note: The module value should be provided after the first sample building

5.2. Definition of Response Time

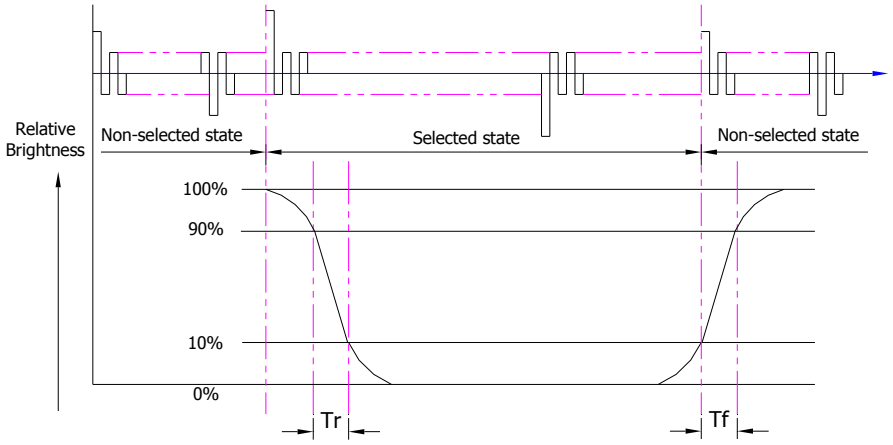
5.2.1. Normally Black Type (Negative)



Tr is the time it takes to change from non-selected state with relative luminance 10% to selected state with relative luminance 90%;
Tf is the time it takes to change from selected state with relative luminance 90% to non-selected state with relative luminance 10%.

Note : Measuring machine: LCD-5100 or EQU

5.2.2. Normally White Type (Positive)



Tr is the time it takes to change from non-selected state with relative luminance 90% to selected state with relative luminance 10%;
Tf is the time it takes to change from selected state with relative luminance 10% to non-selected state with relative luminance 90%;

Note : Measuring machine: LCD-5100 or EQU

5.3. Definition of Contrast Ratio

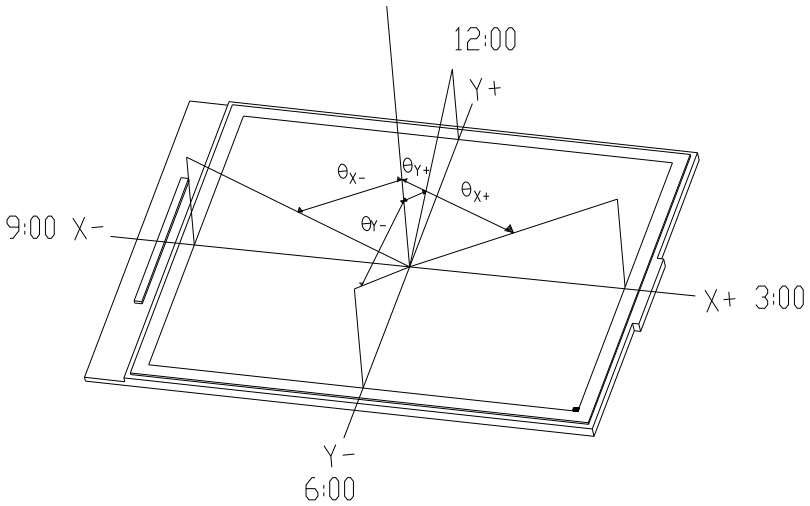
Contrast is measured perpendicular to display surface in transmissive mode.

The measurement condition is:

Measuring Equipment	BM-7 or EQU
Measuring Point Diameter	3mm//1mm
Measuring Point Location	Active Area centre point
Test pattern	A: All Pixels white
	B: All Pixel black
Contrast setting	Maximum

Definitions: CR (Contrast) = Luminance of White Pixel / Luminance of Black Pixel

5.4. Definition of Viewing Angles



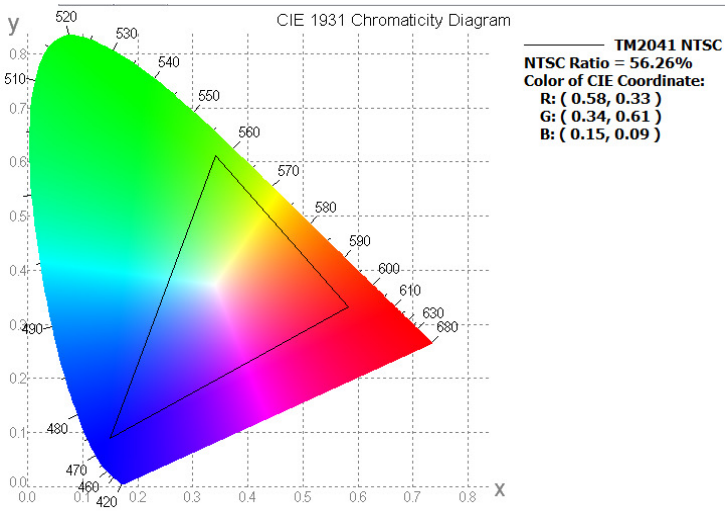
Measuring machine: LCD-5100 or EQUI

5.5. Definition of Color Appearance

R,G,B and W are defined by (x, y) on the IE chromaticity diagram

NTSC=area of RGB triangle/area of NTSC triangleX100%

Measuring picture: Red, Green, Blue and White (Measuring machine: BM-7 OR EQU)



5.6. Definition of Surface Luminance, Uniformity and Transmittance

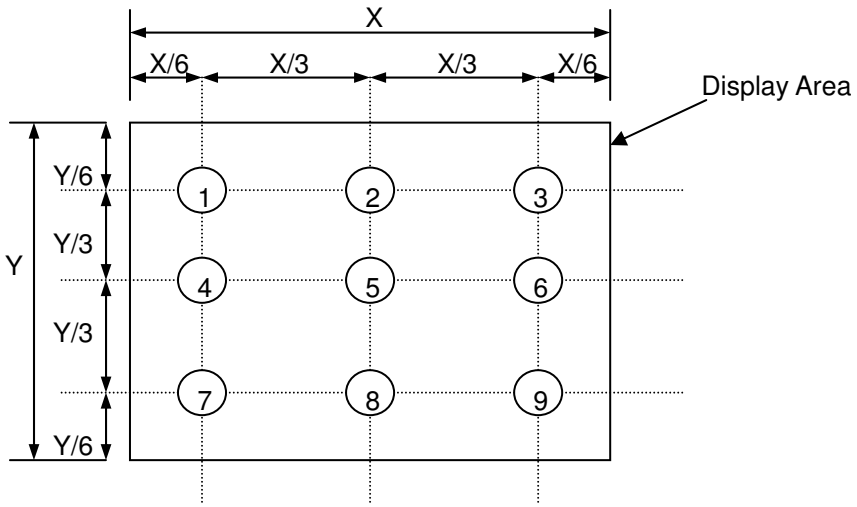
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

5.6.1. Surface Luminance: L_V = average (L_{P1}:L_{P9})

5.6.2. Uniformity = Minimal (L_{P1}:L_{P9}) / Maximal (L_{P1}:L_{P9}) * 100%

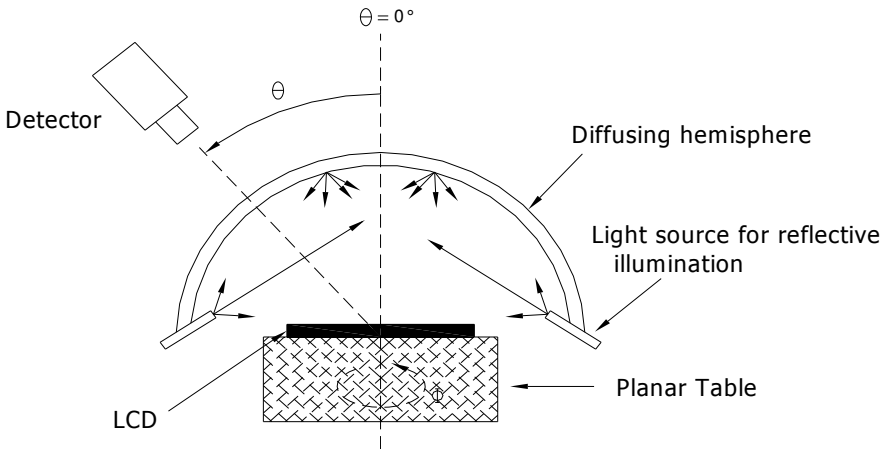
5.6.3. Transmittance = L_V on LCD / L_V on Backlight * 100%

Note : Measuring machine: BM-7 or EQU



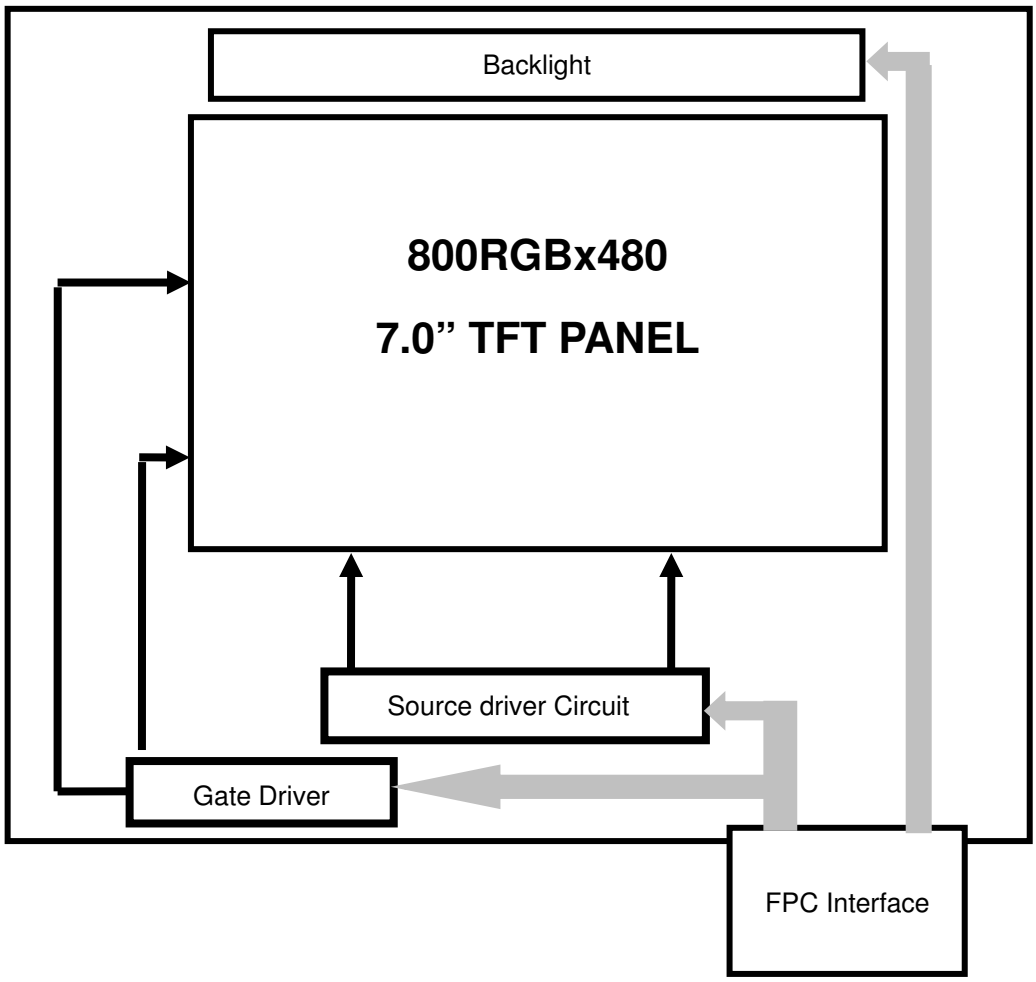
5.7. Definition of Reflectivity

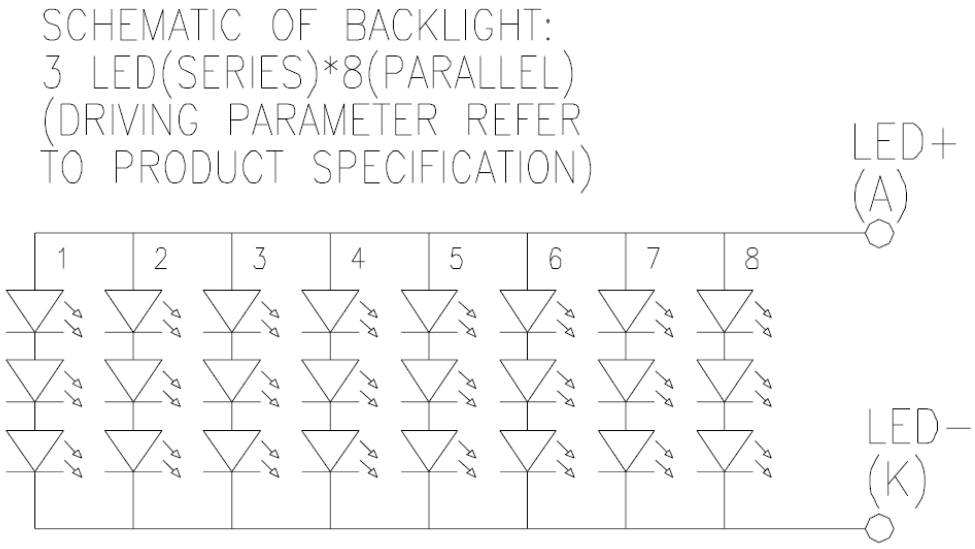
To measure the reflectivity, the detector should be aligned to the normal direction of the LCD surface corresponding azimuthally angle θ=0°



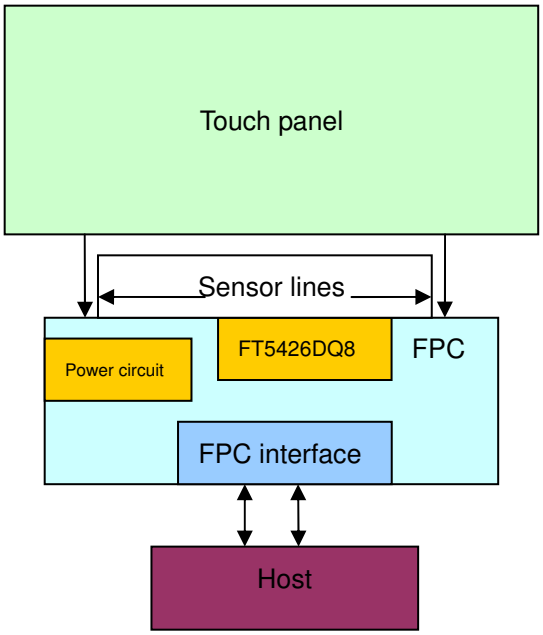
6. Block Diagram and Power Supply

6.1. Block Diagram and Power Supply for Module





6.2. Block Diagram and Power Supply for TP



7. Interface Pins Definition

7.1. TFT Interface Pins Definition

No.	Symbol	I/O	Function
1	LED+ / A	P	LED backlight (anode)
2	LED+ / A	P	LED backlight (anode)
3	LED- / K	P	LED backlight (cathode)
4	LED- / K	P	LED backlight (cathode)
5	GND	P	Power Ground
6	VCOM	P	Common Voltage for TFT
7	DVDD	P	Digital Supply Voltage
8	MODE	I	DE/SYNC mode select. Normally pull high H: DE mode. L: HSD/VSD mode
9	DE	I	Display Enable signal
10	VSYNC	I	Vertical sync input. Negative polarity
11	HSYNC	I	Horizontal sync input. Negative polarity
12-19	B7-B0	I	Blue data input
20-27	G7-G0	I	Green data input
28-35	R7-R0	I	Red data input
36	GND	P	Power Ground
37	PCLK	I	Dot data clock
38	GND	P	Power Ground
39	SHLR	I	Left or Right Display Control SHLR=”H” left to right scan direction SHLR=”L” right to left scan direction
40	UPDN	I	Up or Down Display Control UPDN=”H” bottom to top scan direction UPDN=”L” top to bottom scan direction
41	VDDG	P	Positive Power for TFT
42	VEEG	P	Negative Power for TFT
43	AVDD	P	Analog Supply Voltage
44	RSTB	I	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ，C=1μF)
45	NC	--	No Connection
46	VCOM	P	Common Voltage for TFT
47	DITH	I	Dithering setting DITH=”H” 6bit resolution(last 2 bit of input data truncated) DITH=”L” 8bit resolution(default setting)
48	GND	P	Power Ground
49~50	NC	--	No Connection

Note: I – Input ; O – Output ; P – Power/ground, I/O: Input/Output pin

7.2. TP Interface PINS Definition (FPC PITCH=0.5mm)

Pin No.	Name	Type	Function Description
1	VDD	P	**Power Supply**
2	I2C_SCL	OD	**Serial Interface clock** None pull-up resistor on CTP FPC, an external pull-up resistor is required, typical 4.7K to VDD.
3	I2C_SDA	OD	**Serial Interface Data** None pull-up resistor on CTP FPC, an external pull-up resistor is required, typical 4.7K to VDD.
4	INT	OD	**State change interrupt** None pull-up resistor on CTP FPC, an external pull-up resistor is required, typical 4.7K to VDD.
5	RESET	I	**Reset low** Has internal 20K ohm to 60K ohm pull-high resistor in chip. Should connect to the hot system
6	GND	P	**Ground connection**

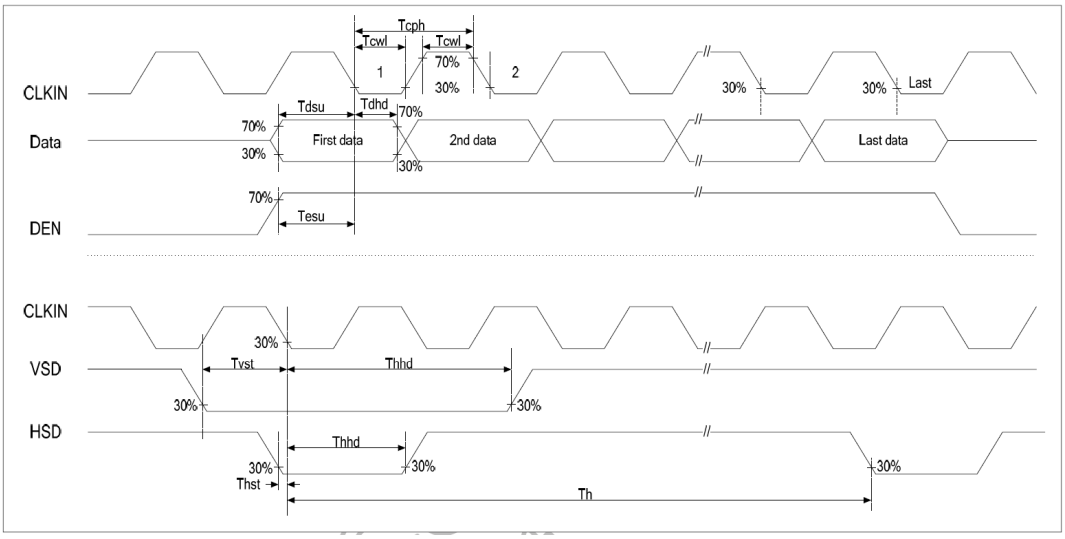
P: Ground or Power OD :open drain I :Input only

8. AC Characteristics

8.1. Display Interface Timing

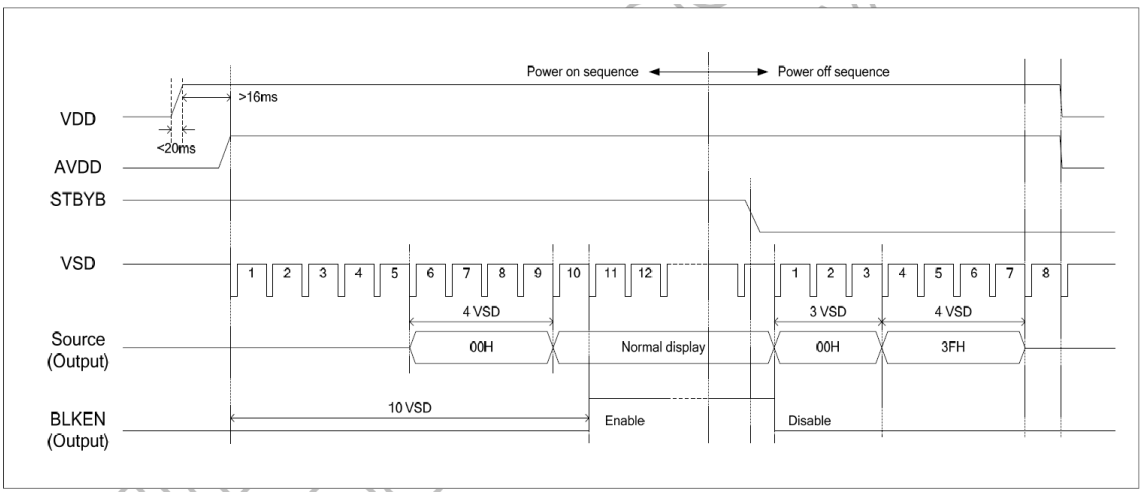
8.1.1. Input clock and data timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	Thst	8	-	-	ns
HS hold time	Thhd	8	-	-	ns
VS setup time	Tvst	8	-	-	ns
VS hold time	Tvhd	8	-	-	ns
Data setup time	Tdsu	8	-	-	ns
Data hold time	Tdhd	8	-	-	ns
DE setup time	Tesu	8	-	-	ns
DE hold time	Tehd	8	-	-	ns
VDD Power On Slew rate	TPOR	-	-	20	ms
RSTB pulse width	TRst	10	-	-	µs
CLKIN cycle time	Tcph	20	-	-	ns
CLKIN pulse duty	Tcwh	40	50	60	%
Output stable time	Tsst	-	-	6	µs

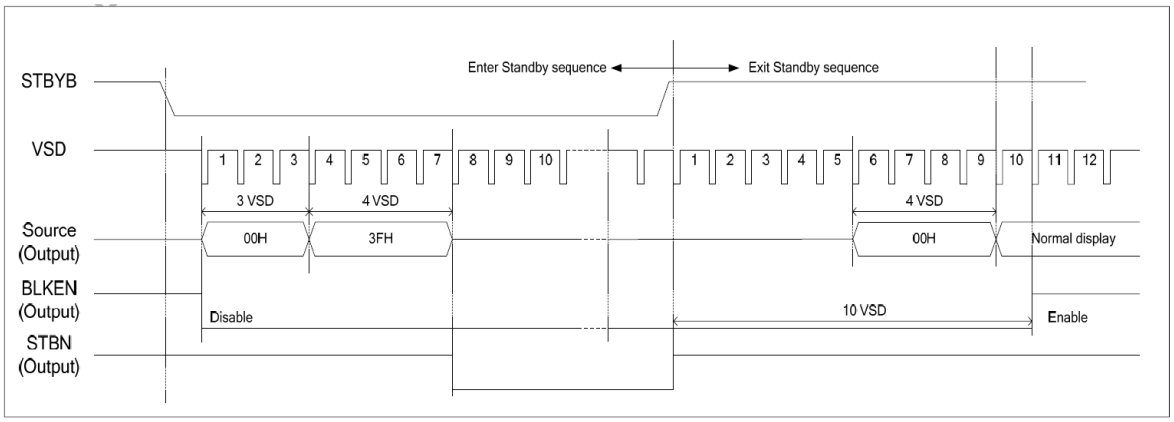


8.1.2. Power on/off control

HX8264-E has a power ON/OFF sequence control function. In order to prevent IC from power on reset fail, the rising time(T_{POR}) of the digital power supply VDD should be maintained within the given specifications.

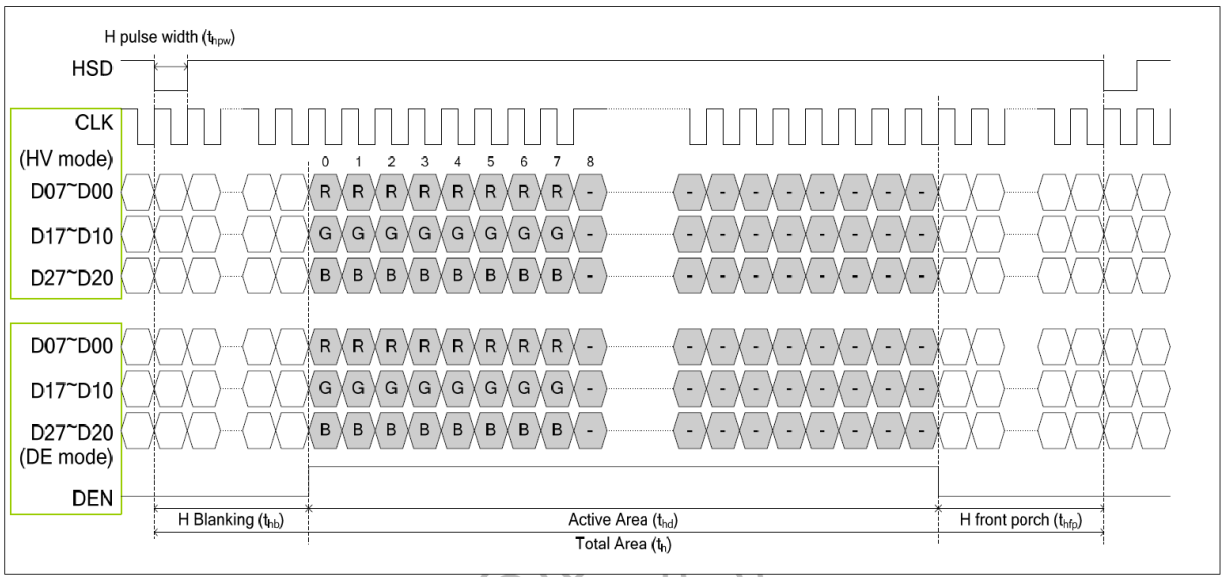


8.1.3. Enter and exit standby mode sequence



8.1.4. Data input format

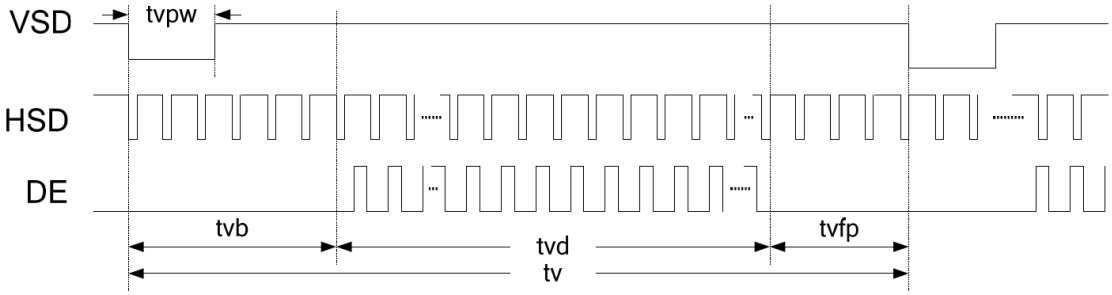
8.1.4.1. Horizontal timing



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd	-	800	-	DCLK
DCLK frequency	fclk	-	33.3	50	MHz
One Horizontal Line	th	862	1056	1200	DCLK
HS pulse width (Min.)	thpw		1		DCLK
HS pulse width (Typical.)	thpw		-		DCLK
HS pulse width (Max.)	thpw		40		DCLK
HS Back Porch (Blanking)	thb	46	46	46	DCLK
HS Front Porch	thfp	16	210	354	DCLK
DE mode Blanking	th-thd	45	256	400	DCLK

Preliminary

8.1.4.2. Vertical Timing



Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		480		TH
VS period time	tv	510	525	650	TH
VS pulse width	tvpw	1	-	20	TH
VS Back Porch (Blanking)	tvb	23	23	23	TH
VS Front Porch	tvfp	7	22	147	TH
DE mode Blanking	tv-tvd	4	45	170	TH

8.2. Touch Panel Interface Timing

8.2.1. START and STOP conditions (See fig.1)

A HIGH to LOW transition on the SDA line while SCL is HIGH indicates a START condition.

A LOW to HIGH transition on the SDA line while SCL is HIGH defines a STOP condition.

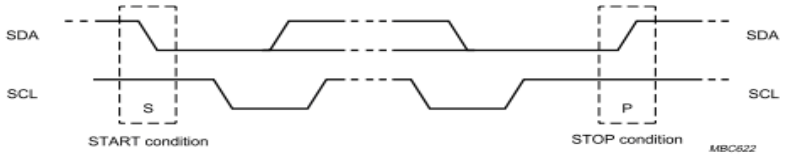


Fig.1 START and STOP conditions.

8.2.2. TRANSFERRING DATA

The data on the SDA line must be stable during the HIGH period of clock. The HIGH or LOW state of the data line can only change when clock signal on the SCL line is low (see fig.3) .

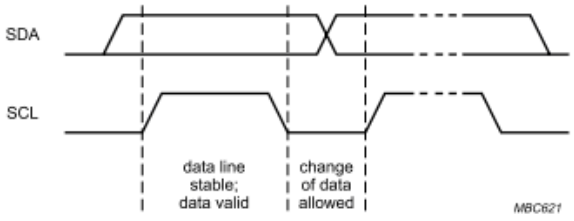


Fig 3 Bit transfer on the I²C-bus.

8.2.3. Acknowledge

The receiver must pull down the SDA line during the acknowledge clock pulse so that it remains stable LOW during the HIGH period of this clock pulse. (See fig.4**)**

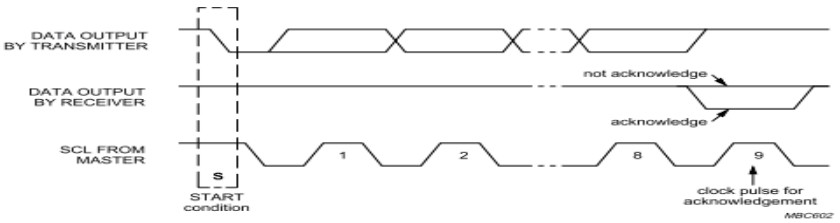


Fig 4 Acknowledge on the I²C-bus.

9. Quality Assurance

9.1. Purpose:

This standard for Quality Assurance assures the quality of LCD module products supplied to customer by New Vision Display.

9.2. Standard for Quality Test:

New Vision Display performs the following tests to ensure the quality of product before shipment.

9.2.1. Sampling Plan:

9.2.1.1. ANSI / ASQC Z1.4-2008. General Inspection Level Ⅱ.

9.2.1.2. Single sampling, normal inspection.

9.2.2. Sampling Criteria:

9.2.2.1. Visual inspection: AQL 1.5%

9.2.2.2. Electrical functional: AQL 0.65%.

9.2.3. Reliability Test:

9.2.3.1. Etailed requirement refer to Reliability Test Specification.

9.3. Nonconforming Analysis & Disposition

9.3.1. Nonconforming analysis:

9.3.1.1. Customer should provide overall information of non-conforming sample for their complaints.

9.3.1.2. After receipt of detailed information from customer, the analysis of nonconforming parts usually should be finished in one week.

9.3.1.3. If New Vision Display can not finish the analysis on time, customer will be notified with the progress status.

9.3.2. Disposition of nonconforming:

Non-conforming product over ppm level, New Vision Display will offer corrective actions, not over PPM, New Vision Display can offer FA if customer need. And the failures are confirmed to be New Vision Display responsibility and within the shelf life of 1 year, they will be replaced.

9.4. Agreement Items

9.4.1. New Vision Display and customer shall negotiate if the following situation occurs:

9.4.1.1. There is any discrepancy in standard of quality assurance.

9.4.1.2. Additional requirement to be added in product specification.

9.4.1.3. Any other special problem.

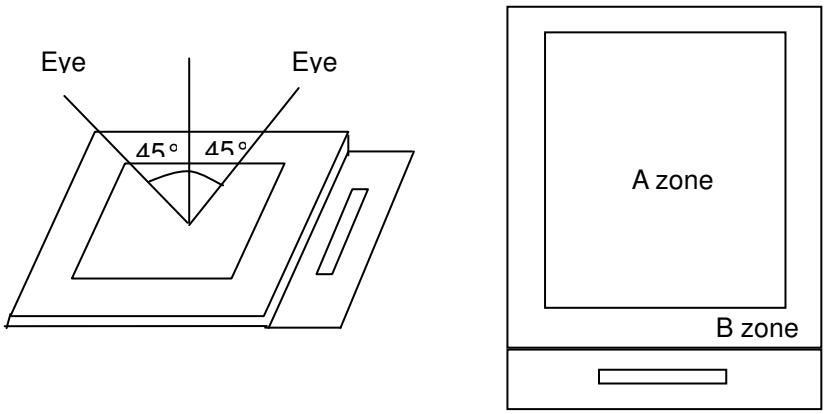
9.5. Standard of the Product Visual Inspection:

9.5.1. Appearance inspection:

9.5.1.1. The inspection must be under illumination about 750 – 1000 lux, and the distance of view must be at 35cm ± 5cm.

9.5.1.2. The viewing angle should be 45° from the vertical line without reflection light or follows customer's viewing angle specifications.

9.5.1.3. Definition of area: A Zone: Active Area, B Zone: Viewing Area,

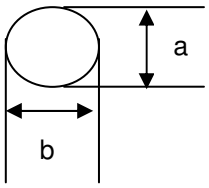


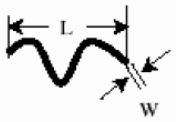
9.5.2. Basic principle:

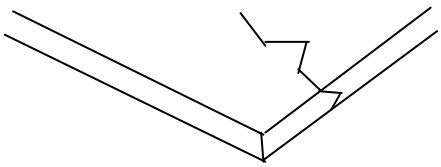
9.5.2.1. A set of sample to indicate the limit of acceptable quality level must be discussed by both New Vision Display and customer when there is any dispute.

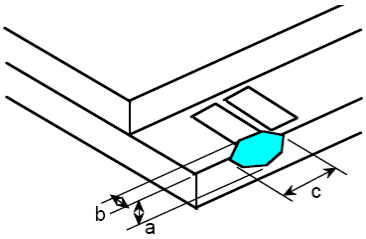
9.5.2.2. New item must be added on time when it is necessary.

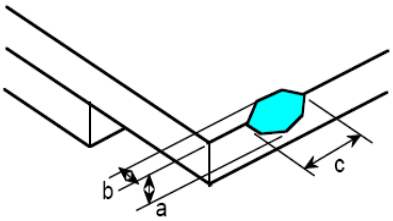
9.6. Inspection Specification:

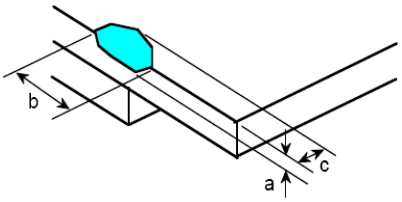
<table>
<tr><th>No.</th><th>Item</th><th>Criteria (Unit: mm)</th></tr>
<tr><td>01</td><td>Dot(Visual Defect)</td><td> 

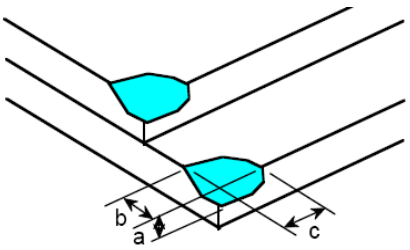
<table>
<tr><th>Area / Size</th><th>Acc. Qty</th></tr>
<tr><td>φ≤0.20</td><td>Ignore</td></tr>
<tr><td>0.2<φ≤0.4</td><td>3</td></tr>
<tr><td>0.4<φ</td><td>0</td></tr>
</table>
φ= (a + b) /2
Distance between 2 defects should greater or equal to 15mm.</td></tr>
<tr><td>02</td><td>Polarizer Bubble</td><td>“φ, a , b” definition is the same as upper item 01.
Distance between 2 defects should greater or equal to 15mm.
<table>
<tr><th></th><th>Acc Qty</th></tr>
<tr><td>φ≤0.25</td><td>Ignore</td></tr>
<tr><td>0.25<φ≤0.4</td><td>2</td></tr>
<tr><td>0.4<φ</td><td>0</td></tr>
</table></td></tr>
<tr><td>03</td><td>Dent</td><td>“φ, a , b” definition is the same as upper item 01.
Distance between 2 defects should greater or equal to 15mm.
<table>
<tr><th></th><th>Acc Qty</th></tr>
<tr><td>φ≤0.25</td><td>Ignore</td></tr>
<tr><td>0.25<φ≤0.5</td><td>4</td></tr>
<tr><td>0.5<φ</td><td>0</td></tr>
</table></td></tr>
<tr><td>04</td><td>Fiber(visual defect)</td><td> 

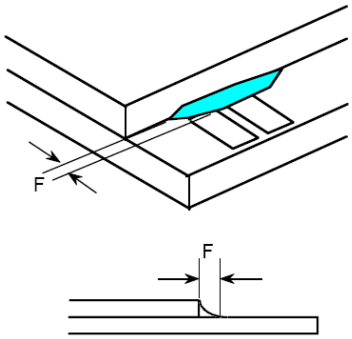
<table>
<tr><th>Length</th><th>Width</th><th>Acc. Qty</th></tr>
<tr><td>/</td><td>W ≦ 0.1</td><td>Ignore</td></tr>
<tr><td>L ≦ 2.5</td><td>0.1＜ W ≦ 0.2</td><td>4</td></tr>
<tr><td>2.5＜ L</td><td>0.2<W</td><td>0</td></tr>
</table></td></tr>
<tr><td>05</td><td>Scratched</td><td>“L, W” definition is the same as upper item 04.
<table>
<tr><th>Length</th><th>Width</th><th>Acc. Qty</th></tr>
<tr><td>/</td><td>W ≦ 0.05</td><td>Ignore</td></tr>
<tr><td>L ≦ 10</td><td>0.05 ＜ W ≦ 0.1</td><td>3</td></tr>
<tr><td>10＜ L</td><td>0.1 ＜ W</td><td>0</td></tr>
</table></td></tr>
<tr><td>06</td><td>Glass Crack</td><td> 
Crack is potential to enlarge, any type is not allowed.</td></tr>
</table>

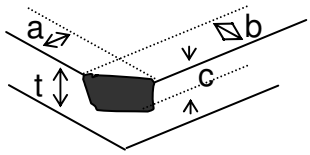
<table>
<tr><th>No.</th><th>Item</th><th>Criteria (Unit: mm)</th></tr>
<tr><td>07</td><td>Glass Chipping Pad Area:</td><td> 

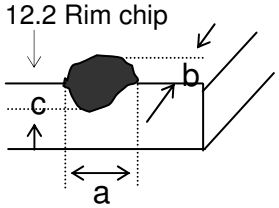
<table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c > 3.0, b< 1.0</td><td>1</td></tr>
<tr><td>c< 3.0, b< 1.0</td><td>3</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table></td></tr>
<tr><td>08</td><td>Glass Chipping Rear of Pad Area:</td><td> 

<table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c > 3.0, b< 1.0</td><td>1</td></tr>
<tr><td>c< 3.0, b< 1.0</td><td>2</td></tr>
<tr><td>c< 3.0, b< 0.5</td><td>4</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table></td></tr>
<tr><td>09</td><td>Glass Chipping Except Pad Area:</td><td> 

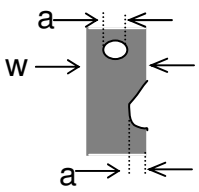
<table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c > 3.0, b< 1.0</td><td>1</td></tr>
<tr><td>c< 3.0, b< 1.0</td><td>2</td></tr>
<tr><td>c< 3.0, b< 0.5</td><td>4</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table></td></tr>
<tr><td>10</td><td>Glass Corner Chipping:</td><td><table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c < 3.0, b< 3.0</td><td>Ignore</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table>

</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th>Criteria (Unit: mm)</th></tr>
<tr><td>11</td><td>Glass Burr:</td><td>


<table>
<tr><td>Length</td><td>Acc. Qty</td></tr>
<tr><td>F < 1.0</td><td>Ignore</td></tr>
</table>
Glass burr don’t affect assemble and module dimension.
</td></tr>
<tr><td>12</td><td>Chip on IC</td><td>
12.1 Corner chip


<table>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td colspan="2">≤0.4mm</td><td>≤1/2t</td></tr>
</table>
Inner bonding wires invisible. The chip can’t attach on the surface of IC.
Size a, b and c should be measured after removing the chip.
t：Thickness of individual IC
12.2 Rim chip


<table>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Acceptable</td><td colspan="2">≤0.2mm</td></tr>
</table>
Inner bonding wires invisible. The chip can’t attach on the surface of IC.
Size a, b and c should be measured after removing the chip.
</td></tr>
</table>

13	FPC Defect:  	13.1 Dent, pinhole width a<w/3. (w: circuitry width.) 13.2 Open circuit is unacceptable. 13.3 No oxidation, contamination and distortion.
14	Bezel	14.1 No rust, distortion on the Bezel. 14.2 No visible fingerprints, stains or other contamination.
15	PCB	15.1 No distortion or contamination on PCB terminals. 15.2 All components on PCB must same as documented on the BOM/component layout. 15.3 Follow IPC-A-600F.
16	RTV	16.1 The RTV glue on the surface of IC isn’t permissible to be scratched. The RTV glue can’t exist on the surface of polarizer. 16.2 No visible non-metal foreign material and metal material in RTV. 16.3 Entrapped air bubble isn’t permissible to exist on the juncture of RTV glue and pins of LCD. 16.4 Air bubble and scratch on the surface of RTV glue invisible within 0.3 m distance is acceptable and the surface of the RTV glue can’t flow.
17	Soldering	Follow IPC-A-610C standard

18 Dot(Pixel Defect)

	A Zone	B Zone	Total
Bright Dot	N≤1	N≤2	N≤2
Dark Dot	N≤2	N≤3	N≤3
Total Dot	N≤2	N≤3	N≤4
Two Adjacent Dot	N≤0	N≤1	N≤1
There or More Adjacent Dot	Not Allowed		
Line Defect	Not Allowed		

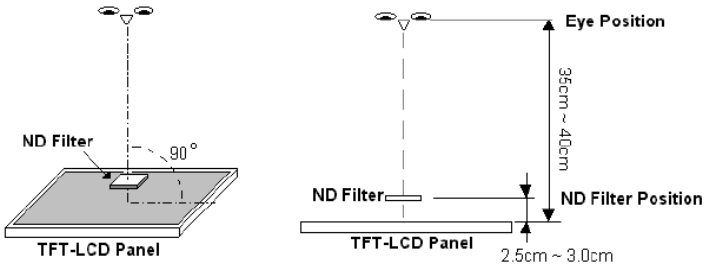
Distance between 2 defects should greater or equal to 15mm.

Remark:

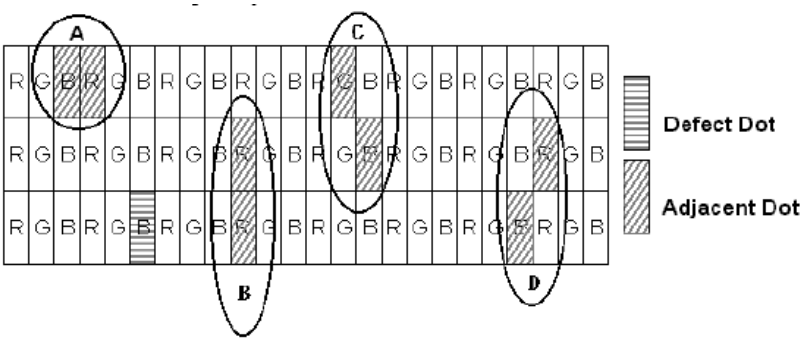
a. One pixel consists of 3 sub-pixels, including R,G and B dot(Sub-pixel=Dot)

b. The defective area of the dot is larger than 50% of one sub-pixel area as one defect; less than 50% of one sub-pixel area will be not made as one failure.

c. Bright dot is defined through 5% transmission ND filter as following:



d. Judge defect dot and adjacent dot as following. Allow below (as A, B, C and D status) adjacent defect dots, including bright and dark adjacent dot. And they will be counted as 2 defect dots in total quantity.



Defects on the black Matrix, out of viewing area, aren’t considered as a defect counted.

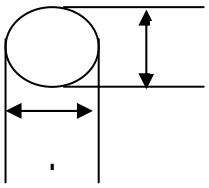
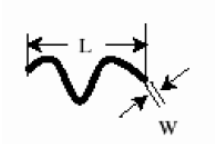
19	Electrical Defect (Major defect)	The below defects must be rejected. 19.1 Missing vertical / horizontal segment, 19.2 Abnormal Display. 19.3 No function or no display. 19.4 Current exceeds product specifications. 19.5 LCD viewing angle defect. 19.6 No Backlight. 19.7 Dark Backlight. 19.8 Touch Panel no function.

20 Glue Cosmetic Inspection Criteria

Item	Criteria	Judgment
Glue overflow	1.Not exceed sensor 2.Not over 2mm from frame 3. For product with frame≤ 2mm,not exceed LENS and not higher than sensor	Accept
	Exceed sensor	Reject
	Exceed 2mm from frame	Reject
	For product with frame≤ 2mm,exceed LENS and higher than sensor	Reject
Missing glue	1.Not in area A 2. ≤1/2 width of frame	Accept
	In area A	Reject
	Exceed 1/2 width of frame	Reject
Air bubble	For air bubble in area A, refer to foreign material inspection criteria	
	For air bubble not in area A, not exceed 1/2 width of frame	Accept
	For air bubble not in area A, exceed 1/2 width of frame	Reject
UV glue not fully cured	Uncured glue sticky	Reject
Uneven dot	Not visible at 35cm ± 5cm distance	Accept

Remark: a. LCD Panel Broken shall be rejected. Defect out of LCD viewing area is acceptable.
b. The CTP must be revalidated if the end product design changed, especially in hardware, software, TFT display or the assemble air gap between TFT and CTP.

9.7. Inspection Specification(for Touch Panel only):

<table>
<tr><th>No.</th><th>Item</th><th>Criteria (Unit: mm)</th></tr>
<tr><td>01</td><td>Dot Defect</td><td> 
<table>
<tr><th>Area / Size</th><th>Acc. Qty</th></tr>
<tr><td>φ≤0.20</td><td>Ignore</td></tr>
<tr><td>0.2<φ≤0.4</td><td>3</td></tr>
<tr><td>0.4<φ</td><td>0</td></tr>
</table>
φ= (a + b) /2
Distance between 2 defects should greater or equal to 15mm.</td></tr>
<tr><td>02</td><td>Polarizer Bubble</td><td>“φ, a , b” definition is the same as upper item 01.
Distance between 2 defects should greater or equal to 15mm.
<table>
<tr><th></th><th>Acc Qty</th></tr>
<tr><td>φ≤0.25</td><td>Ignore</td></tr>
<tr><td>0.25<φ≤0.4</td><td>2</td></tr>
<tr><td>0.4<φ</td><td>0</td></tr>
</table></td></tr>
<tr><td>03</td><td>Dent</td><td>“φ, a , b” definition is the same as upper item 01.
Distance between 2 defects should greater or equal to 15mm.
<table>
<tr><th></th><th>Acc Qty</th></tr>
<tr><td>φ≤0.25</td><td>Ignore</td></tr>
<tr><td>0.25<φ≤0.5</td><td>4</td></tr>
<tr><td>0.5<φ</td><td>0</td></tr>
</table></td></tr>
<tr><td>04</td><td>Scratched</td><td> 

<table>
<tr><th>Length</th><th>Width</th><th>Acc. Qty</th></tr>
<tr><td>/</td><td>W ≦ 0.05</td><td>Ignore</td></tr>
<tr><td>L ≦ 10</td><td>0.05 ＜ W ≦ 0.1</td><td>3</td></tr>
<tr><td>10＜ L</td><td>0.1 ＜ W</td><td>0</td></tr>
</table></td></tr>
</table>

<table>
<tr>
<td>05</td>
<td>Glue Cosmetic Inspection Criteria</td>
<td>
<table>
<tr><th>Item</th><th>Criteria</th><th>Judgment</th></tr>
<tr><td rowspan="4">Glue overflow</td><td>1.Not exceed sensor
2.Not over 2mm from frame
3. For product with frame≤ 2mm,not exceed LENS and not higher than sensor</td><td>Accept</td></tr>
<tr><td>Not exceed sensor</td><td>Reject</td></tr>
<tr><td>Exceed 2mm from frame</td><td>Reject</td></tr>
<tr><td>For product with frame≤ 2mm,exceed LENS and higher than sensor</td><td>Reject</td></tr>
<tr><td rowspan="3">Missing glue</td><td>1.Not in A area
2. ≤1/2 width of frame</td><td>Accept</td></tr>
<tr><td>Not in A area</td><td>Reject</td></tr>
<tr><td>Not exceed 1/2 width of frame</td><td>Reject</td></tr>
<tr><td rowspan="3">Air bubble</td><td>For air bubble in A area, refer to foreign material inspection criteria</td><td></td></tr>
<tr><td>For air bubble not in A area, not exceed 1/2 width of frame</td><td>Accept</td></tr>
<tr><td>For air bubble not in A area, exceed 1/2 width of frame</td><td>Reject</td></tr>
<tr><td>UV glue not Curing UV</td><td>Draw bench</td><td>Reject</td></tr>
<tr><td>Uneven dot</td><td>Not visible at 35cm ± 5cm distance</td><td>Accept</td></tr>
</table>
</td>
</tr>
</table>

9.8. Classification of Defects:

9.8.1. Visual defects (Except no / wrong label) are treated as minor defect and electrical defect is major.

9.8.2. Two minor defects are equal to one major in lot sampling inspection.

9.9. Identification/marking criteria:

9.9.1. Any unit with illegible / wrong /double or no marking/ label shall be rejected.

9.10. Packing:

9.10.1. There should be no damage of the outside carton box; each packaging box should have one identical label.

9.10.2. Modules inside package box should have compliant mark.

9.10.3. All direct package materials shall offer ESD protection.

10. Reliability Specification

Item	Condition	Cycle Time	Quantity	Remark
High Temp. Operation Test	+70 ℃	96hrs	5pcs	
Low Temp. Operation Test	-20 ℃	96hrs	5pcs	
High Temperature and High Humidity(operation)	Ta=+50 ℃, 90%RH	96 hrs	5pcs	
Thermal Shock Test	-20℃ (30min) → +70℃ (30min)	10cycles	5pcs	
Vibration Test (for packaging)	Frequency: 10Hz to 55Hz to 10Hz, Swing:1.5mm,time： X,Y,Z each 2H.	6hrs	One inner carton	
Packing Drop test (for packaging)	1 drop on a corner, 1 drop on three arris, 1 drop on six sides	1time	One inner carton	
ESD(On Final Product)	150pF,330Ω,±8KV contact. 150pF,330Ω,±15KV air.	10times	5pcs	*4

Note: 1.For humidity test, DI water should be used.
Inspection Standard: Inspect after 1-2hrs storage at room temperature, the sample shall be free from the following defects:

- Air bubble in the LCD
- Seal Leakage
- Non-display
- Missing Segment
- Glass Crack
- IDD is greater than twice initial value.
- Others as per QA Inspection Criteria

2. No defect is allowed after testing.
3. ESD should be applied to LCD glass panel, not other areas (such as on IC and so on)
IDD should be within twice initial value.
In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
4. For the item in end product, the test should be implemented by customer.

11. Precautions and Warranty

11.1. Safety

11.1.1. The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

11.1.2. Since the liquid crystal cells are made of glass, do not apply strong impact on them. Handle with care.

11.2.Handling

11.2.1. Reverse and use within ratings in order to keep performance and prevent damage.

11.2.2. Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.

11.3.Storage

11.3.1. Do not store the LCD module beyond the specified temperature ranges.

11.4.Metal Pin (Apply to Products with Metal Pins)

11.4.1. Pins of LCD and Backlight

11.4.1.1. Solder tip can touch and press on the tip of Pin LEAD during the soldering

11.4.1.2. Recommended Soldering Conditions

Solder Type: Sn96.3~94-Ag3.3~4.3-Cu0.4~1.1

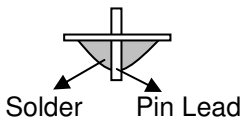
Maximum Solder Temperature: 370℃

Maximum Solder Time: 3s at the maximum temperature

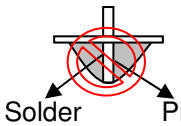
Recommended Soldering Temp: 350±20℃

Typical Soldering Time: ≤3s

11.4.1.3. Solder Wetting



Recommended



Not Recommended

11.4.2. Pins of EL

11.4.2.1. Solder tip can touch and press on the tip of EL leads during soldering.

11.4.2.2. No Solder Paste on the soldering pad on the motherboard is recommended.

11.4.2.3. Recommended Soldering Conditions

Solder type: Nippon Alimit Leadfree SR-34, size 0.5mm

Recommended Solder Temperature: 270～290℃

Typical Soldering Time: ≤2s

Minimum solder distance from EL lamp (body):2.0mm

11.4.2.4. No horizontal press on the EL leads during soldering.

11.4.2.5. 180° bend EL leads three times is not allowed.

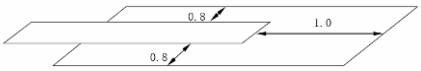
11.4.2.6. Solder Wetting

Recommended Not Recommended

11.4.2.7. The type of the solder iron:

Recommended Not Recommended

11.4.2.8. Solder Pad



11.5. Operation

11.5.1. Do not drive LCD with DC voltage

11.5.2. Response time will increase below lower temperature

11.5.3. Display may change color with different temperature

11.5.4. Mechanical disturbance during operation, such as pressing on the display area, may cause the segments to appear “fractured”.

11.6. Static Electricity

11.6.1. CMOS LSIs are equipped in this unit, so care must be taken to avoid the electro-static charge, by ground human body, etc.

11.6.2. The normal static prevention measures should be observed for work clothes and benches.

11.6.3. The module should be kept into anti-static bags or other containers resistant to static for storage.

11.7. Limited Warranty

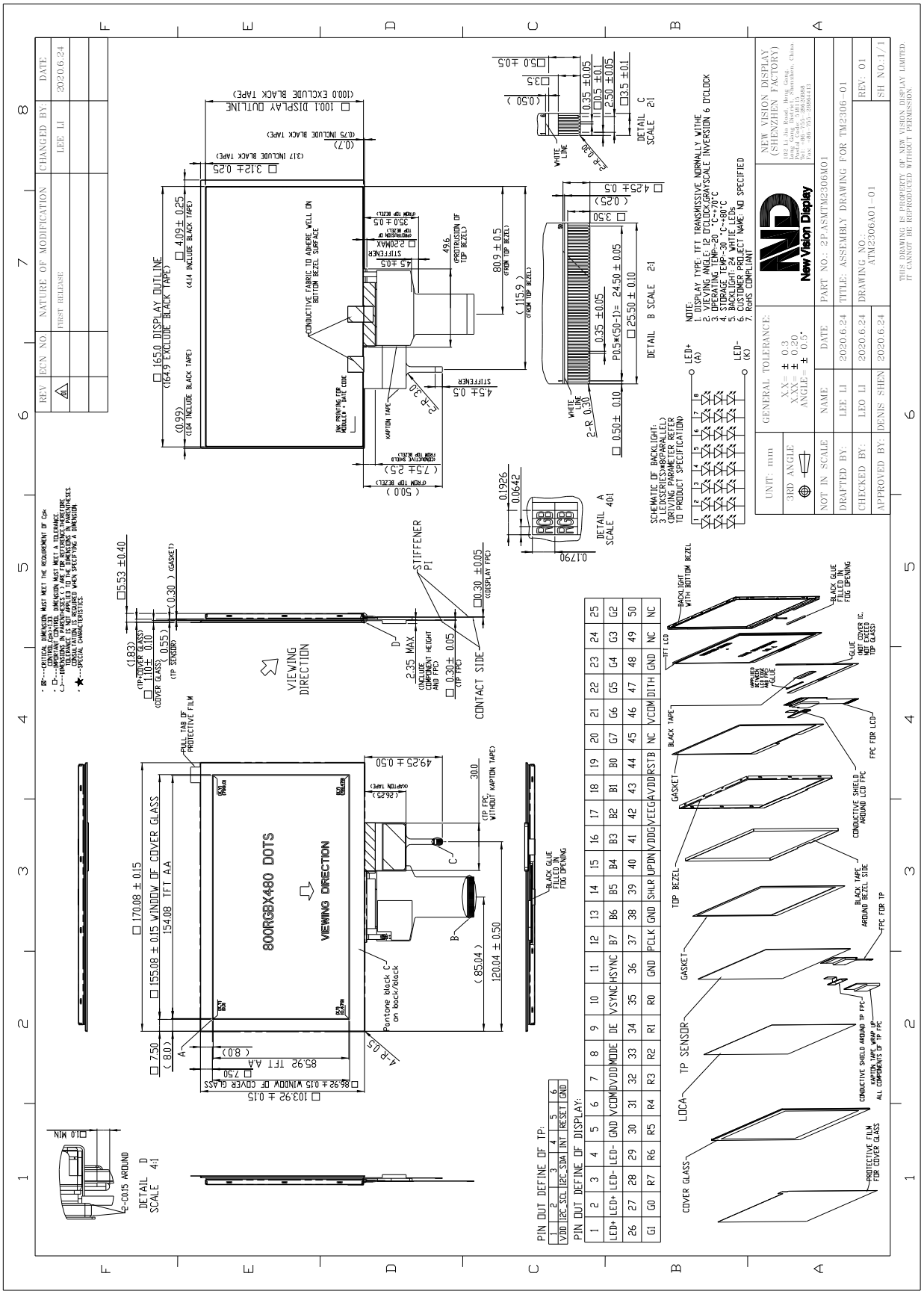
11.7.1. Unless otherwise agreed between New Vision Display and customer, New Vision Display will replace or repair any of its LCD and LCM which New Vision Display found to be defective electrically and visually when inspected in accordance with New Vision Display Quality Standards, for a period of one year from date of shipment.

11.7.2. The warranty liability of New Vision Display is limited to repair and/or replacement. New Vision Display will not be responsible for any consequential loss.

11.7.3. If possible, we suggest you use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used.

11.7.4. Excluded from this limited warranty are parts not performing to specification as a consequence of initializing the driver with parameters other than recommended by NVD.

12. Packaging

TBD

13. Outline Drawing