

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	1 / 18

Thin-Film-Transistor LCD Module
Model: XTPQ20NN03-01

Acceptance

Approved and Checked by

Approved by	Checked by		Made by

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	3 / 18

1.General Description and Features

XTPQ20NN03-01 is a TM (Transmissive) type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module and a driver circuit. The resolution of a 2.0" contains 240RGBx320 dots and can display up to 262K colors. The following table described the features of XTPQ20NN03-01

LCD Module

Item	Specification	Unit
Screen Size	2.0inches	Diagonal
Dot arrangement	240RGB(H)x320(V)	Dot
Active Area	30.24(H) x40.32 (V)	mm
Outline Dimension	33.24H) x 43.42(V) x 1.34MAX (D)	mm
Display Mode	Normally white/Transmissive	--
Pixel Arrangement	RGB-Vertical Stripe	--
Display Color	262K	--
Viewing Direction	6o'clock	--
Gray viewing Direction	12o'clock	--
Drive IC	ILI9341V	--

2.Mechanical Information

Item	Min.	Typ.	Max.	Unit	Note	
Module Size	Horizontal (H)	--	33.24	--	mm	--
	Vertical (V)	--	46.82	--	mm	(1)
	Thickness (T)	--	1.34	--	mm	(2)
Weight	--	N/A	--	g	--	

Note (1) Not include FPC.

Refer to the Outline Dimension for further information.

Product Specification				
Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	4 / 18

3. Electrical Specifications

3.1 Absolute Max. Ratings

3.1.1 Absolute Ratings of Environment

If the operating condition exceeds the following absolute maximum ratings, the TFT LCD module may be damaged permanently.

(Ta=25±2°C, V_{SS}=GND=0)

Item	Symbol	Min.	Max.	Unit	Note
Storage temperature	T _{STG}	-30	80	°C	(1)
Operating temperature	T _{OPR}	-20	70	°C	(1,2,3)

Note (1) 95 % RH Max. (40 °C ≥ Ta). Maximum wet-bulb temperature at 39 °C or less. (Ta > 40 °C)
No condensation.

Note (2) In case of below 0°, the response time of liquid crystal (LC) becomes slower and the color of panel becomes darker than normal one. Level of retardation depends on temperature, because of LC's character

Note (3) Only operation is guaranteed at operating temperature. Contrast, response time, another display quality are evaluated at +25°C.

3.2 Electrical Absolute Rating

3.2.1 TFT-LCD Module

(Voltage Referenced to V_{SS})

Item	Symbol	Value		Unit	Condition
		Min.	Max.		
Digital Power Supply Voltage	VDD	VSS-0.3	4.6	V	--

Note (1) Permanent damage to the device may occur if maximum values are exceeded or reverse voltage is loaded. Functional operation should be restricted to the conditions described under normal operating conditions.

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	5 / 18

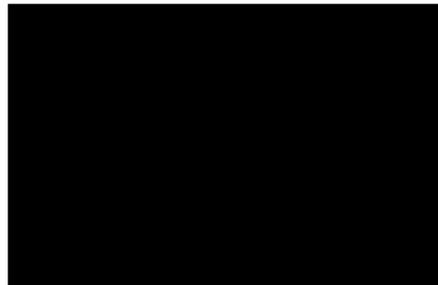
4 Electrical Characteristics

4.1 TFT-LCD Module (DC Characteristics)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V _{CC}	2.5	3.0	3.3	V	
Input High Threshold Voltage	V _{IH}	0.7 VDD	-	VDD	V	
Input Low Threshold Voltage	V _{IL}	0	-	0.3 VDD	V	
Power Supply Current	I _{CC}	-	6	19	mA	(1)
Power Consumption	P _L	-	-	-	mW	(1)

Note (1) The specified power consumption is under the conditions at VDD=3.3V , F_V=60Hz, whereas a Power dissipation check pattern below is displayed.

Black Pattern / 0 Gray



Active Area

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	6 / 18

5 Input Terminal Pin Assignment

5.1 Pin Assignment (LCD)

Pin No.	Symbol	Description
1	GND	System ground level for logic blocks
2	VCC	Power supply for logic circuits
3	RESET	This signal will reset the device and must be applied to properly initialize the chip. Signal is active low.
4	R5	18-bit parallel bi-directional data bus for MCU system and RGB interface mode
5	R4	
6	R3	
7	R2	
8	R1	
9	R0	
10	G5	
11	G4	
12	G3	
13	G2	
14	G1	
15	G0	
16	B5	
17	B4	
18	B3	
19	B2	
20	B1	
21	B0	
22	VSYNC	Frame synchronizing signal for RGB interface operation. <i>Fix to VDDI or VSS level when not in use.</i>
23	HSYNC	Line synchronizing signal for RGB interface operation. <i>Fix to VDDI or VSS level when not in use.</i>

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	7 / 18

24	DEN	Data enable signal for RGB interface operation. <i>Fix to VDDI or VSS level when not in use.</i>
25	CLK	Dot clock signal for RGB interface operation. <i>Fix to VDDI or VSS level when not in use.</i>
26	GND	System ground level for logic blocks
27	SDI	When IM[3] : Low, Serial in/out signal. When IM[3] : High, Serial input signal. The data is applied on the rising edge of the SCL signal.
28	SCL	This pin is used to select "Data or Command" in the parallel interface or 4-wire 8-bit serial data interface. When DCX = '1', data is selected. When DCX = '0', command is selected. This pin is used serial interface clock in 3-wire 9-bit / 4-wire 8-bit serial data interface.
29	CS	Chip select input pin ("Low" enable). This pin can be permanently fixed "Low" in MPU interface mode only. * note1,2
30	SDO	Serial output signal. The data is outputted on the falling edge of the SCL signal. If not used, open this pin

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	8 / 18

6 Optical Characteristics

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note (1).

Measuring equipment: BM-5A, BM-7,

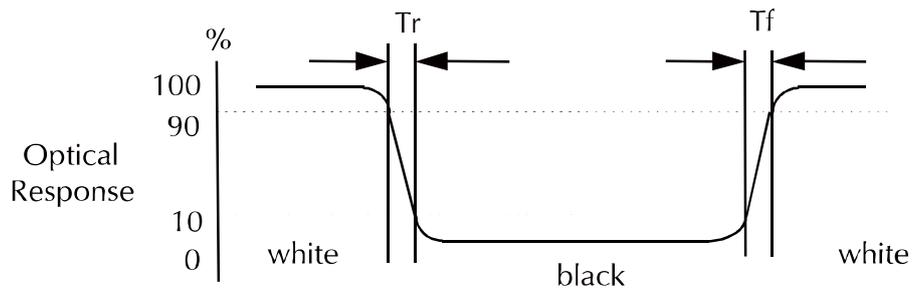
Item	Symbol	Condition	Min	Type	Max	Unit	Note
Brightness	B		--	--	--	cd/m ²	
Response time	T _r +T _f	θ=0° T=25°C	--	20	30	ms	.
Contrast ratio	CR		400	600	--	--	
Color Gamut	NTSC %	--	--	60	--	%	
Luminance Uniformity	ΔL		--	80	--	%	
Color Chromaticity (CIE 1931)	White	W _x	--	0.299	--	--	BM-7A
		W _y	--	0.355	--	--	
Viewing Angle	Hor.	θ _R	60	70	--	Degree	
		θ _L	60	70	--		
	Ver.	θ _U	60	70	--		
		θ _D	50	60	--		

a. Test equipment setup

After stabilizing and leaving the panel alone shall be warmed up for the stable operation of LCM, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7(fast) with a viewing angle of 2° at a distance of 50cm and normal direction.

b. Definition of response time: Tr and Tf

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".



Product Specification

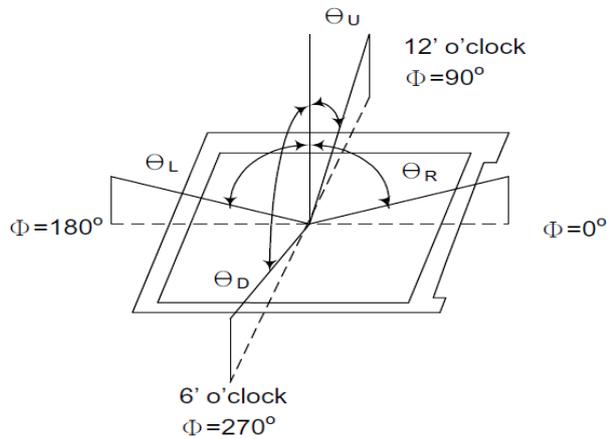
Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	9 / 18

c. Definition of contrast ratio:

$$\text{Contrast Ratio (CR)} = \frac{\text{Brightness measured when LCD is at "white state"}}{\text{Brightness measured when LCD is at "black state"}}$$

d. Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

e. View Angle



f. Definition of White Uniformity

$$\text{White Uniformity} = \frac{\text{Min. luminance of white among 9-points}}{\text{Max. luminance of white among 9-points}} \times 100\%$$

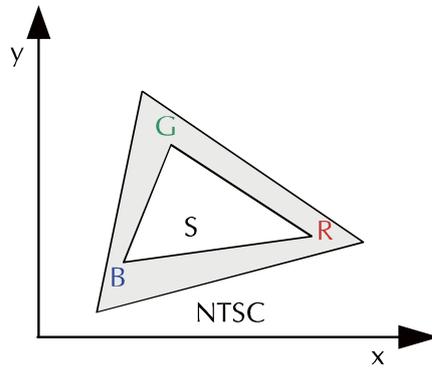
g. The definition of Color Gamut -Color Chromaticity CIE 1931

Color coordinate of white & red, green, blue at center point.

$$\text{Color Gamut : NTSC(\%)} = \left(\frac{\text{RGB Triangle Area}}{\text{NTSC Triangle Area}} \right) \times 100$$

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	10 / 18

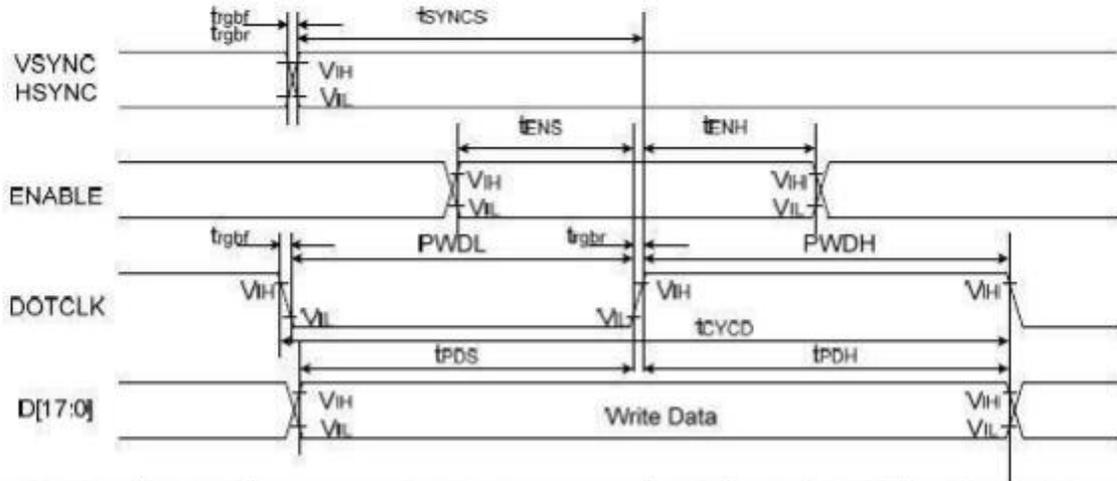


Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	11 / 18

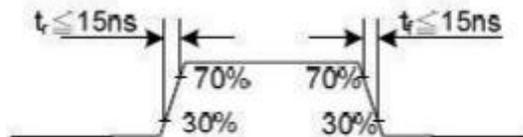
7 Interface Timing

Parallel 18/16-bit RGB Interface Timing Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
VSYNC / HSYNC	tSYNCS	VSYNC/HSYNC setup time	15	-	ns	18/16-bit bus RGB interface mode
	tSYNCH	VSYNC/HSYNC hold time	15	-	ns	
ENABLE	tENS	ENABLE setup time	15	-	ns	
	tENH	ENABLE hold time	15	-	ns	
DB[17:0]	tPOS	Data setup time	15	-	ns	
	tPDH	Data hold time	15	-	ns	
DOTCLK	PWDH	DOTCLK high-level period	15	-	ns	
	PWDL	DOTCLK low-level period	15	-	ns	
	tCYCD	DOTCLK cycle time	66	-	ns	
	t _{rgb, tgrb}	DOTCLK, HSYNC, VSYNC rise/fall time	-	15	ns	

Note: Ta = -30 to 70 °C, IOVCC=1.65V to 3.6V, VCI=2.5V to 3.3V, AGND=DGND=0V



Pixel Timing

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	12 / 18

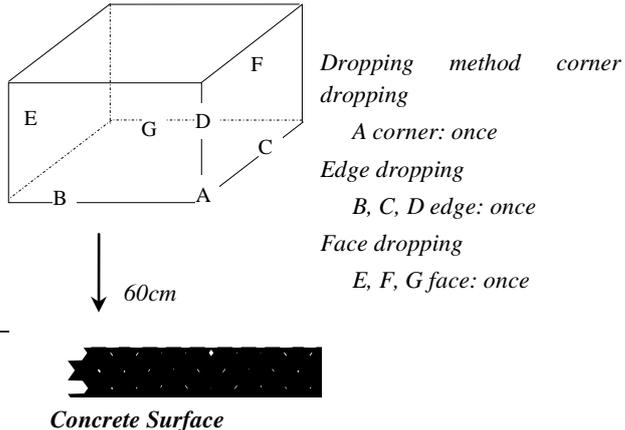
8 Reliability Condition for LCD

No change on display and in operation under the following test condition.

Condition: Unless otherwise specified, tests will be conducted under the following condition.

Temperature: 20±5°C Humidity: 65±5%RH

Tests will be not conducted under functioning state.

No.	Parameter	Condition	Notes
1	High Temperature Operating	70°C±2°C, 240hrs (Operation state)	--
2	Low Temperature Operating	-20°C±2°C, 240hrs (Operation state)	--
3	High Temperature Storage	80°C±2°C, 240hrs	--
4	Low Temperature Storage	-30°C±2°C, 240hrs	--
5	High Temperature and High Humidity Operation Test	60°C±2°C, 90%, 240hrs	--
6	Vibration Test	Total fixed amplitude: 1.5mm Vibration Frequency: 10~55Hz One cycle 60 seconds to 3 direction of X, Y, Z each 15 minutes.	--
7.	Drop Test	<p>To be measured after dropping from 60cm high on the concrete surface in packing state.</p>  <p style="margin-left: 20px;"> <i>Dropping method corner dropping</i> <i>A corner: once</i> <i>Edge dropping</i> <i>B, C, D edge: once</i> <i>Face dropping</i> <i>E, F, G face: once</i> </p>	--

- Notes:
1. No dew condensation to be observed.
 2. The function test shall be conducted after 4 hours storage at the normal temperature and humidity after removed from the test chamber.
 3. Vibration test will be conducted to the product itself without putting I in a container.

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	13 / 18

9 Dimensional outlines

CUSTOMER APPROVED: _____

NOTES:

- 1.DISPLAY TYPE: 2.0" TFT
- 2.VIEWING DIRECTION: 12:00
- 3.LCD DRIVE IC: IL9341
- 4.POLARIZER MODE: TRANSMISSIVE/POSITIVE
- 5.VCC : 2.8V/IOVCC:1.8V/2.8V
- 6.OPERATING TEMP: -20°C~+70°C
- 7.STORAGE TEMP: -30°C~+80°C
- 8.LUMARKER TOLERANCE: ±0.30
- 9.CONTROL DIMENSIONS:
- 10.REQUIREMENTS ON ENVIRONMENTAL PROTECTION: RoHS

1	GN0
2	VCC
3	RESET
4	RS
5	RL
6	R3
7	R2
8	R1
9	RL
10	RS
11	GL
12	G3
13	G2
14	G1
15	G1
16	BS
17	BL
18	B3
19	B2
20	B1
21	B1
22	VSSMC
23	HSVNC
24	DBN
25	CLK
26	GND
27	S01
28	SCL
29	C5
30	S00

DATE	VERSION	MODIFY THE CONTENT	XIAMEN AMOTEC DISPLAY CO.,LTD			
2015/202	01	First issue	DATE	2015/225	REV	02
2015/225	02	Modify FPC shape	UNIT : mm	Product :	XTPQ20NN03-01	BL Dwg.
			SCALE : 1/1	DRAWN :		
			SHEET : 1/1	CHECKED :		PAGE : 1/1

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	14 / 18

10 Incoming Inspection Standards

10.1 VISUAL & FUNCTION INSPECTION STANDARD

10.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

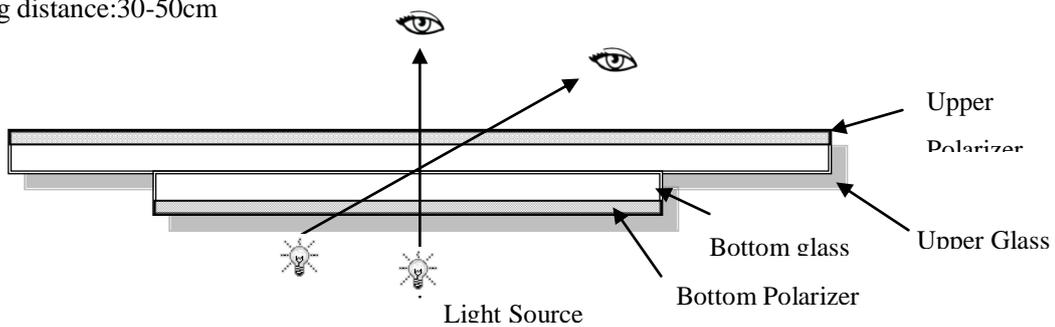
Temperature : $25 \pm 5^{\circ}\text{C}$

Humidity : $65\% \pm 10\% \text{RH}$

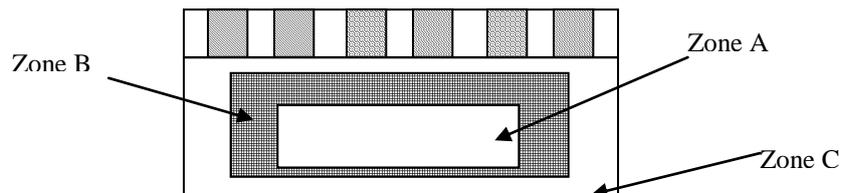
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



10.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer.

10.1.3 Sampling Plan

Product Specification				
Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	15 / 18

According to GB/T 2828-2003 ; , normal inspection, Class II

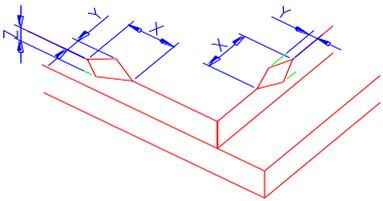
AQL:

Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

10.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken	(1) The edge of LCD broken	 <table border="1" data-bbox="833 1668 1375 1821"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td><Inner border line of the seal</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
X	Y	Z						
≤3.0mm	<Inner border line of the seal	≤T						

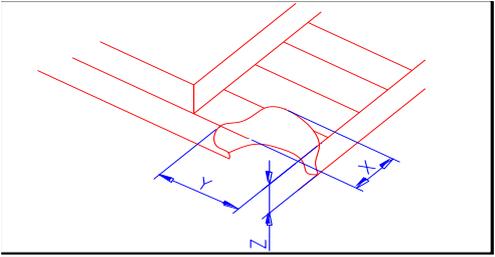
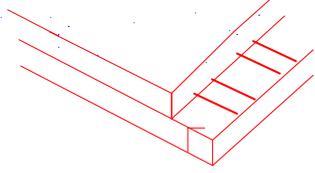
NOTE:

X: Length

Y: Width

Product Specification

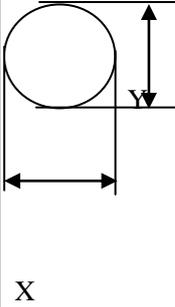
Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	16 / 18

Z: Height L: Length of ITO, T: Height of LCD	(2)LCD corner broken	 <table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: center;">X</td> <td style="text-align: center;">Y</td> <td style="text-align: center;">Z</td> </tr> <tr> <td style="text-align: center;">$\leq 3.0\text{mm}$</td> <td style="text-align: center;">$\leq L$</td> <td style="text-align: center;">$\leq T$</td> </tr> </table>	X	Y	Z	$\leq 3.0\text{mm}$	$\leq L$	$\leq T$
	X	Y	Z					
$\leq 3.0\text{mm}$	$\leq L$	$\leq T$						
(3) LCD crack	 Crack Not allowed							

Number	Items	Criteria (mm)
--------	-------	---------------

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	17 / 18

2.0	Spot defect	<p>① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)</p> <div style="display: flex; align-items: center;">  <table border="1" style="margin-left: 10px;"> <thead> <tr> <th style="text-align: center;">Zone</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <th style="text-align: center;">Size (mm)</th> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> <th style="text-align: center;">C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\Phi \leq 0.10$</td> <td colspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$0.10 < \Phi \leq 0.15$</td> <td colspan="3" style="text-align: center;">3(distance $\geq 10\text{mm}$)</td> </tr> <tr> <td style="text-align: center;">$0.15 < \Phi \leq 0.2$</td> <td colspan="3" style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">$0.2 < \Phi$</td> <td colspan="3" style="text-align: center;">0</td> </tr> </tbody> </table> </div> <p style="margin-top: 10px;">$\Phi = (X+Y)/2$</p> <p>② Dim spot (LCD/TP/Polarizer dim dot, light leakage, dark spot)</p> <table border="1" style="margin-left: 10px;"> <thead> <tr> <th style="text-align: center;">Zone</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <th style="text-align: center;">Size (mm)</th> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> <th style="text-align: center;">C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\Phi \leq 0.1$</td> <td colspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$0.1 < \Phi \leq 0.2$</td> <td colspan="3" style="text-align: center;">2(distance $\geq 10\text{mm}$)</td> </tr> <tr> <td style="text-align: center;">$0.2 < \Phi \leq 0.3$</td> <td colspan="3" style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">$\Phi > 0.3$</td> <td colspan="3" style="text-align: center;">0</td> </tr> </tbody> </table> <p>③ Polarizer accidented spot</p> <table border="1" style="margin-left: 10px;"> <thead> <tr> <th style="text-align: center;">Zone</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <th style="text-align: center;">Size (mm)</th> <th style="text-align: center;">A</th> <th style="text-align: center;">B</th> <th style="text-align: center;">C</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\Phi \leq 0.2$</td> <td colspan="3" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$0.2 < \Phi \leq 0.5$</td> <td colspan="3" style="text-align: center;">2(distance $\geq 10\text{mm}$)</td> </tr> <tr> <td style="text-align: center;">$\Phi > 0.5$</td> <td colspan="3" style="text-align: center;">0</td> </tr> </tbody> </table>	Zone	Acceptable Qty			Size (mm)	A	B	C	$\Phi \leq 0.10$	Ignore			$0.10 < \Phi \leq 0.15$	3(distance $\geq 10\text{mm}$)			$0.15 < \Phi \leq 0.2$	1			$0.2 < \Phi$	0			Zone	Acceptable Qty			Size (mm)	A	B	C	$\Phi \leq 0.1$	Ignore			$0.1 < \Phi \leq 0.2$	2(distance $\geq 10\text{mm}$)			$0.2 < \Phi \leq 0.3$	1			$\Phi > 0.3$	0			Zone	Acceptable Qty			Size (mm)	A	B	C	$\Phi \leq 0.2$	Ignore			$0.2 < \Phi \leq 0.5$	2(distance $\geq 10\text{mm}$)			$\Phi > 0.5$	0		
Zone	Acceptable Qty																																																																					
Size (mm)	A	B	C																																																																			
$\Phi \leq 0.10$	Ignore																																																																					
$0.10 < \Phi \leq 0.15$	3(distance $\geq 10\text{mm}$)																																																																					
$0.15 < \Phi \leq 0.2$	1																																																																					
$0.2 < \Phi$	0																																																																					
Zone	Acceptable Qty																																																																					
Size (mm)	A	B	C																																																																			
$\Phi \leq 0.1$	Ignore																																																																					
$0.1 < \Phi \leq 0.2$	2(distance $\geq 10\text{mm}$)																																																																					
$0.2 < \Phi \leq 0.3$	1																																																																					
$\Phi > 0.3$	0																																																																					
Zone	Acceptable Qty																																																																					
Size (mm)	A	B	C																																																																			
$\Phi \leq 0.2$	Ignore																																																																					
$0.2 < \Phi \leq 0.5$	2(distance $\geq 10\text{mm}$)																																																																					
$\Phi > 0.5$	0																																																																					

Product Specification

Amotec	Model: XTPQ20NN03-01	Rev. No.	Issued Date.	Page.
		A	2015.12.25	18 / 18

	Line defect (LCD/TP /Polarizer black/white line, scratch, stain)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Width(mm)</th> <th rowspan="2">Length(mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.03$</td> <td>Ignore</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$0.03 < W \leq 0.05$</td> <td>$L \leq 3.0$</td> <td colspan="2">$N \leq 2$</td> <td rowspan="2">Ignore</td> </tr> <tr> <td>$0.05 < W \leq 0.08$</td> <td>$L \leq 2.0$</td> <td colspan="2">$N \leq 2$</td> </tr> <tr> <td>$0.08 < W$</td> <td colspan="4">Define as spot defect</td> </tr> </tbody> </table>	Width(mm)	Length(mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.03$	Ignore	Ignore			$0.03 < W \leq 0.05$	$L \leq 3.0$	$N \leq 2$		Ignore	$0.05 < W \leq 0.08$	$L \leq 2.0$	$N \leq 2$		$0.08 < W$	Define as spot defect			
Width(mm)	Length(mm)	Acceptable Qty																											
		A	B	C																									
$\Phi \leq 0.03$	Ignore	Ignore																											
$0.03 < W \leq 0.05$	$L \leq 3.0$	$N \leq 2$		Ignore																									
$0.05 < W \leq 0.08$	$L \leq 2.0$	$N \leq 2$																											
$0.08 < W$	Define as spot defect																												
3.0	Polarizer Bubble	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td colspan="3">Ignore</td> </tr> <tr> <td>$0.2 < \Phi < 0.4$</td> <td colspan="3">2(distance ≥ 10mm)</td> </tr> <tr> <td>$0.4 < \Phi \leq 0.6$</td> <td colspan="3">1</td> </tr> <tr> <td>$0.6 < \Phi$</td> <td colspan="3">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore			$0.2 < \Phi < 0.4$	2(distance ≥ 10 mm)			$0.4 < \Phi \leq 0.6$	1			$0.6 < \Phi$	0						
Zone Size (mm)	Acceptable Qty																												
	A	B	C																										
$\Phi \leq 0.2$	Ignore																												
$0.2 < \Phi < 0.4$	2(distance ≥ 10 mm)																												
$0.4 < \Phi \leq 0.6$	1																												
$0.6 < \Phi$	0																												
4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect ,the others are minor defect.																											