

Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	1 / 19

Model: XTPQ43SN10-02

Acceptance

Approved and Checked by

Approved by	Checked by		Made by

Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	3 / 19

1.General Description and Features

XTPQ43SN10-02 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, a driver circuit and a back-light unit . The resolution of a 4.3" contains 480RGBx272 dots and can display up to 16.7M colors. The following table described the features of XTPQ43SN10-02

LCD Module

Item	Specification	Unit
Screen Size	4.3inches	Diagona
Display Resolution	480RGB(H)x272(V)	Dot
Active Area	95.04 (H) x 53.86 (V)	mm
Outline Dimension	105.5(W) x 67.2(H) x 2.9 (D)	mm
Display Mode	Normally white/Transmissive	--
Pixel Arrangement	RGB-Vertical Stripe	--
Display Color	16.7M	--
Gray scale inversion Direction	12 o'clock	
Viewing Direction	6 o'clock	--
Drive IC	ST7282T	--
Surface luminance	450 cd/m ²	

Product Specification				
Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	4 / 19

2.Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	--	105.5	--	mm	--
	Vertical (V)	--	67.2	--	mm	(1)
	Thickness (T)	--	2.9	--	mm	(2)
Weight		--	N/A	--	g	--

Note (1) Not include FPC.

Refer to the Outline Dimension for further information.

(2) Back-light unit are included.

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.

Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	5 / 19

3.2 Electrical Absolute Rating

3.2.1 TFT-LCD Module

(Voltage Referenced to VSS)

Item	Symbol	Value		Unit	Condition
		Min.	Max.		
Digital Power Supply Voltage	VDD	VSS-0.3	5.0	V	--

3.2.2 Back-Light Unit

(Ta=25±2°C)

Item	Symbol	Min.	Max.	Unit	Note
current	I _f	--	20	mA	(1)
voltage	V _R	--	5	V	(1)

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: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	6 / 19

4 Electrical Characteristics

4.1 TFT-LCD Module (DC Characteristics)

Item	Symbol	Specification			Unit
		Min	Typ.	Max	
TFT Gate On Voltage	VGH	-	15	-	V
TFT Gate Off Voltage	VGL	-	-10	-	V
TFT Common Electrode Voltage	VcomH	-	4	-	V
	VcomL	-	-1	-	

Note1: Vcom must be adjusted to optimize display quality: cross talk, contrast ratio and etc.

Note2: VGH is TFT gate on voltage

Note3: VGL is TFT gate off voltage

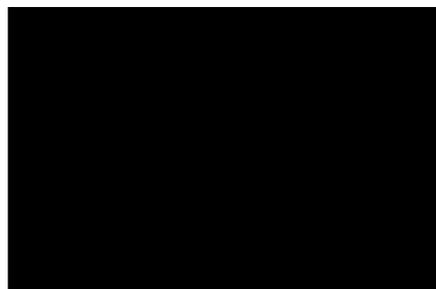
The storage capacitance structure of this product is Cst(Storage on Common).

The low voltage level of VGL signal must be fluctuated with same phase as Vcom, in case of Storage on Gate structure.

Note4: Environmental condition: 25°C

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: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	7 / 19

4.2 Backlight Unit

The back-light system is an edge-lighting type with ten white LEDs (Light Emitting Diode).

(Ta=25±2°C)

Item	Symbol	Value			Unit	Condition
		Min.	Typ.	Max.		
LED Voltage	V _F	14	16.5	19	V	
LED Current	I _F	-	40		mA	
Power Consumption	P _{BL}	-	660	-	mW	

Note (1) Where I_F =40A, V_F = 16.5V P_{BL} = V_F × I_F

Product Specification				
Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	9 / 19

6 Optical Characteristics

Light Source: C-light (With Normal Polarizer)

Ta=25°C

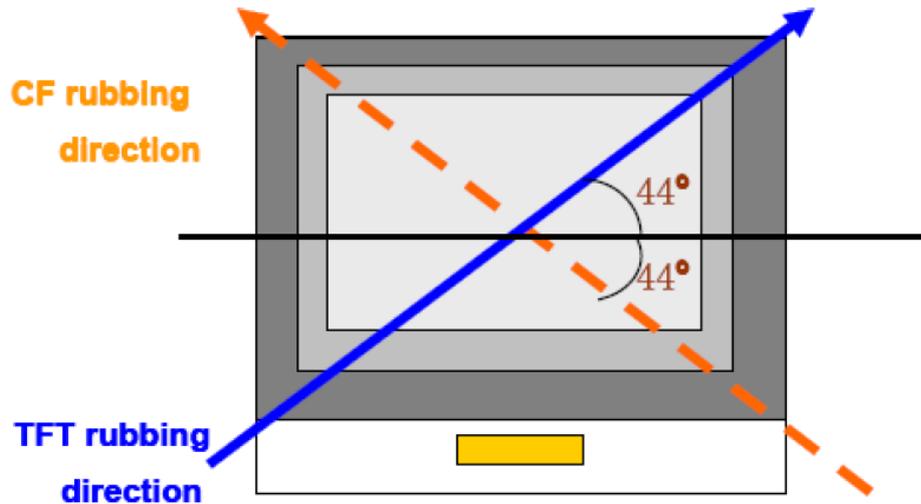
Item	Symbol	Condition	Min	Typ.	Max	Unit	Remark	
View Angles	θT	$CR \geq 10$	40	50	-	Degree	Note 2	
	θB		60	70	-			
	θL		60	70	-			
	θR		60	70	-			
Contrast Ratio	CR	$\theta=0^\circ$	400	500	-	-	Note1 Note3	
Response Time	T _{ON}	25°C	-	25	30	ms	Note1 Note4	
	T _{OFF}							
Chromaticity	White	x	C-light	0.260	0.310	0.360	-	Note5 Note1
		y		0.280	0.330	0.380		
	Red	x		0.540	0.590	0.640		
		y		0.300	0.350	0.400		
	Green	x		0.298	0.348	0.398		
		y		0.520	0.570	0.620		
	Blue	x		0.100	0.150	0.200		
		y		0.050	0.100	0.150		
NTSC	-	-	45	50	-	%	Note5	
Transmittance	L	-	5.7	6.1	-	%	Note1 Note7	

Test Conditions:

1. The ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.
3. The value of transmittance in this spec is a reference which will be affected by polarizer finally.

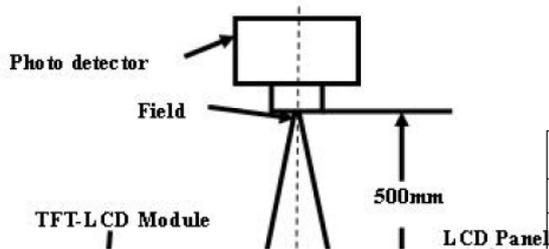
Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	10 / 19



Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



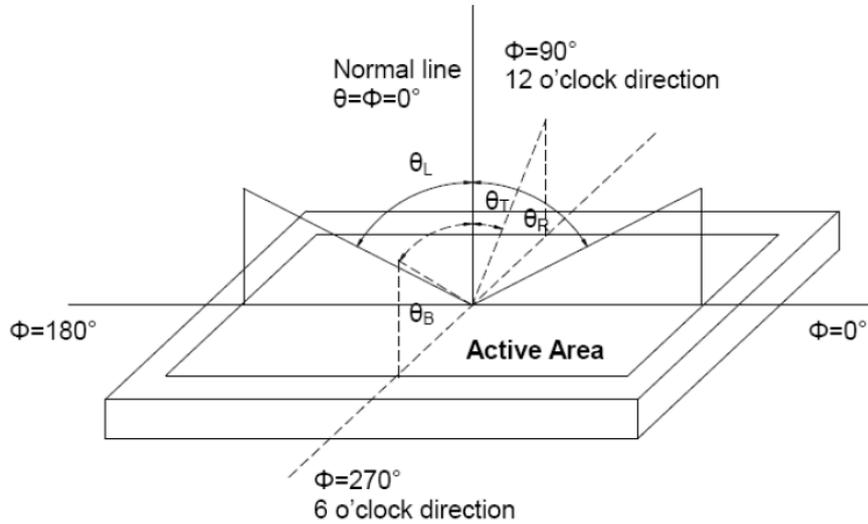
Item	Photo detector	Field
Contrast Ratio	BM-5A	1°
Chromaticity		

Note 2: Definition of viewing angle range and measurement system, viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

Viewing angle is measured With EWV Polarizer.

Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	11 / 19



Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

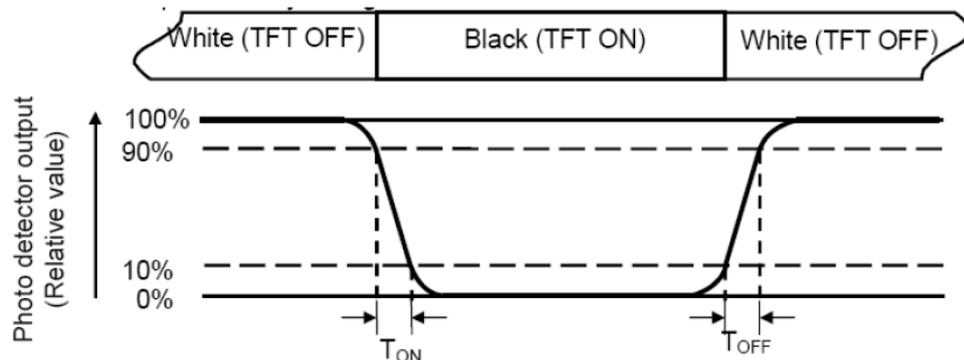
“White state “:The state is that the LCD should driven by V_{white} .

“Black state”: The state is that the LCD should driven by V_{black} .

V_{white} : To be determined V_{black} : To be determined.

Note 4: Definition of Response time

The response time is defined as the LCD optical switching time interval between “White” state and “Black” state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	12 / 19

7 Interface Timing

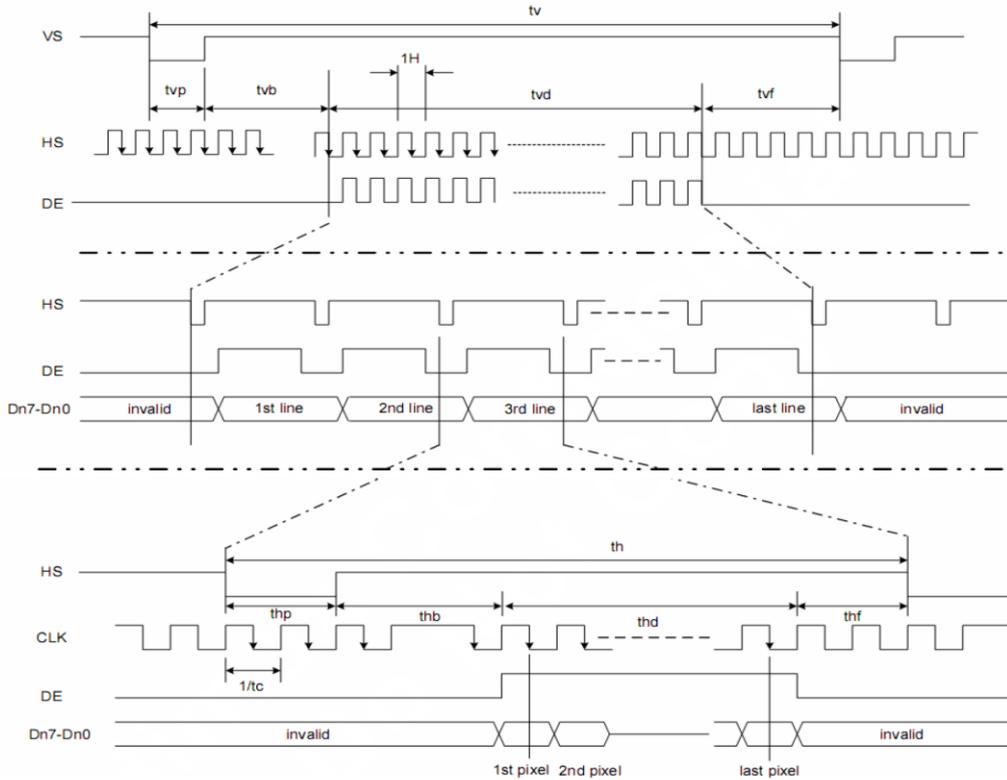
Parallel RGB input requirement

(480RGBx272, $T_A=25^\circ\text{C}$, $V_{DDIO}=1.8\text{V}$ to 3.6V , $DVSS=0\text{V}$)

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock cycle	$f_{\text{CLK}}^{(1)}$	-	9	15	MHz
Hsync cycle	$1/\text{th}$	-	17.14	-	KHz
Vsync cycle	$1/\text{tv}$	-	59.94	-	Hz
Horizontal Signal					
Horizontal cycle	th	525	525	605	CLK
Horizontal display period	thd	480	480	480	CLK
Horizontal front porch	thf	2	2	82	CLK
Horizontal pulse width	thp ⁽²⁾	2	41	41	CLK
Horizontal back porch	thb ⁽²⁾	2	2	41	CLK
Vertical Signal					
Vertical cycle	tv	285	286	399	H ⁽¹⁾
Vertical display period	tvd	272	272	272	H ⁽¹⁾
Vertical front porch	tvf	1	2	227	H ⁽¹⁾
Vertical pulse width	tvp ⁽²⁾	1	10	11	H ⁽¹⁾
Vertical back porch	tvb ⁽²⁾	1	2	11	H ⁽¹⁾

Note: (1) Unit: $\text{CLK}=1/f_{\text{CLK}}$, $\text{H}=\text{th}$,

(2) It is necessary to keep $\text{tvp}+\text{tvb}=12$ and $\text{thp}+\text{thb}=43$ in sync mode. DE mode is unnecessary to keep it.



Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	13 / 19

8 Reliability Condition for LCD

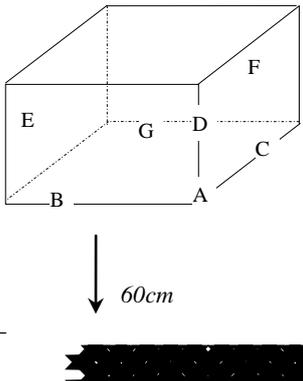
No change on display and in operation under the following test condition.

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> <div style="text-align: center;">  </div> <p style="text-align: right; margin-right: 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>	--
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- 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: XTPQ43SN10-02

Rev. No.

Issued Date.

Page.

A

2016,06,22

14 / 19

9 Dimensional outlines

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ROHS

FUNCTION DESCRIPTION

Pin	Symbol	Function Description
1	VLED+	Power for LED backlight cathode
2	VLED-	Power for LED backlight anode
3	0V0	Power ground
4	0V1	Power ground
5	R0	Red data(SB)
6	R1	Red data
7	R2	Red data
8	R3	Red data
9	R4	Red data
10	R5	Red data
11	R6	Red data
12	R7	Red data(MSB)
13	G0	Green data(LSB)
14	G1	Green data
15	G2	Green data
16	G3	Green data
17	G4	Green data
18	G5	Green data
19	G6	Green data
20	G7	Green data(MSB)
21	B0	Blue data(LSB)
22	B1	Blue data
23	B2	Blue data
24	B3	Blue data
25	B4	Blue data
26	B5	Blue data
27	B6	Blue data
28	B7	Blue data(MSB)
29	0V2	Power ground
30	0V3	Power ground
31	0V4	Power ground
32	0V5	Power ground
33	0V6	Power ground
34	0V7	Power ground
35	0V8	Power ground
36	0V9	Power ground
37	0V10	Power ground
38	0V11	Power ground
39	0V12	Power ground
40	0V13	Power ground
41	0V14	Power ground
42	0V15	Power ground
43	0V16	Power ground
44	0V17	Power ground
45	0V18	Power ground
46	0V19	Power ground
47	0V20	Power ground
48	0V21	Power ground
49	0V22	Power ground
50	0V23	Power ground
51	0V24	Power ground
52	0V25	Power ground
53	0V26	Power ground
54	0V27	Power ground
55	0V28	Power ground
56	0V29	Power ground
57	0V30	Power ground
58	0V31	Power ground
59	0V32	Power ground
60	0V33	Power ground
61	0V34	Power ground
62	0V35	Power ground
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67	0V40	Power ground
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76	0V49	Power ground
77	0V50	Power ground
78	0V51	Power ground
79	0V52	Power ground
80	0V53	Power ground
81	0V54	Power ground
82	0V55	Power ground
83	0V56	Power ground
84	0V57	Power ground
85	0V58	Power ground
86	0V59	Power ground
87	0V60	Power ground
88	0V61	Power ground
89	0V62	Power ground
90	0V63	Power ground
91	0V64	Power ground
92	0V65	Power ground
93	0V66	Power ground
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95	0V68	Power ground
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97	0V70	Power ground
98	0V71	Power ground
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112	0V85	Power ground
113	0V86	Power ground
114	0V87	Power ground
115	0V88	Power ground
116	0V89	Power ground
117	0V90	Power ground
118	0V91	Power ground
119	0V92	Power ground
120	0V93	Power ground
121	0V94	Power ground
122	0V95	Power ground
123	0V96	Power ground
124	0V97	Power ground
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133	0V106	Power ground
134	0V107	Power ground
135	0V108	Power ground
136	0V109	Power ground
137	0V110	Power ground
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139	0V112	Power ground
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151	0V124	Power ground
152	0V125	Power ground
153	0V126	Power ground
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157	0V130	Power ground
158	0V131	Power ground
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162	0V135	Power ground
163	0V136	Power ground
164	0V137	Power ground
165	0V138	Power ground
166	0V139	Power ground
167	0V140	Power ground
168	0V141	Power ground
169	0V142	Power ground
170	0V143	Power ground
171	0V144	Power ground
172	0V145	Power ground
173	0V146	Power ground
174	0V147	Power ground
175	0V148	Power ground
176	0V149	Power ground
177	0V150	Power ground
178	0V151	Power ground
179	0V152	Power ground
180	0V153	Power ground
181	0V154	Power ground
182	0V155	Power ground
183	0V156	Power ground
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185	0V158	Power ground
186	0V159	Power ground
187	0V160	Power ground
188	0V161	Power ground
189	0V162	Power ground
190	0V163	Power ground
191	0V164	Power ground
192	0V165	Power ground
193	0V166	Power ground
194	0V167	Power ground
195	0V168	Power ground
196	0V169	Power ground
197	0V170	Power ground
198	0V171	Power ground
199	0V172	Power ground
200	0V173	Power ground
201	0V174	Power ground
202	0V175	Power ground
203	0V176	Power ground
204	0V177	Power ground
205	0V178	Power ground
206	0V179	Power ground
207	0V180	Power ground
208	0V181	Power ground
209	0V182	Power ground
210	0V183	Power ground
211	0V184	Power ground
212	0V185	Power ground
213	0V186	Power ground
214	0V187	Power ground
215	0V188	Power ground
216	0V189	Power ground
217	0V190	Power ground
218	0V191	Power ground
219	0V192	Power ground
220	0V193	Power ground
221	0V194	Power ground
222	0V195	Power ground
223	0V196	Power ground
224	0V197	Power ground
225	0V198	Power ground
226	0V199	Power ground
227	0V200	Power ground
228	0V201	Power ground
229	0V202	Power ground
230	0V203	Power ground
231	0V204	Power ground
232	0V205	Power ground
233	0V206	Power ground
234	0V207	Power ground
235	0V208	Power ground
236	0V209	Power ground
237	0V210	Power ground
238	0V211	Power ground
239	0V212	Power ground
240	0V213	Power ground
241	0V214	Power ground
242	0V215	Power ground
243	0V216	Power ground
244	0V217	Power ground
245	0V218	Power ground
246	0V219	Power ground
247	0V220	Power ground
248	0V221	Power ground
249	0V222	Power ground
250	0V223	Power ground
251	0V224	Power ground
252	0V225	Power ground
253	0V226	Power ground
254	0V227	Power ground
255	0V228	Power ground
256	0V229	Power ground
257	0V230	Power ground
258	0V231	Power ground
259	0V232	Power ground
260	0V233	Power ground
261	0V234	Power ground
262	0V235	Power ground
263	0V236	Power ground
264	0V237	Power ground
265	0V238	Power ground
266	0V239	Power ground
267	0V240	Power ground
268	0V241	Power ground
269	0V242	Power ground
270	0V243	Power ground
271	0V244	Power ground
272	0V245	Power ground
273	0V246	Power ground
274	0V247	Power ground
275	0V248	Power ground
276	0V249	Power ground
277	0V250	Power ground
278	0V251	Power ground
279	0V252	Power ground
280	0V253	Power ground
281	0V254	Power ground
282	0V255	Power ground
283	0V256	Power ground
284	0V257	Power ground
285	0V258	Power ground
286	0V259	Power ground
287	0V260	Power ground
288	0V261	Power ground
289	0V262	Power ground
290	0V263	Power ground
291	0V264	Power ground
292	0V265	Power ground
293	0V266	Power ground
294	0V267	Power ground
295	0V268	Power ground
296	0V269	Power ground
297	0V270	Power ground
298	0V271	Power ground
299	0V272	Power ground
300	0V273	Power ground
301	0V274	Power ground
302	0V275	Power ground
303	0V276	Power ground
304	0V277	Power ground
305	0V278	Power ground
306	0V279	Power ground
307	0V280	Power ground
308	0V281	Power ground
309	0V282	Power ground
310	0V283	Power ground
311	0V284	Power ground
312	0V285	Power ground
313	0V286	Power ground
314	0V287	Power ground
315	0V288	Power ground
316	0V289	Power ground
317	0V290	Power ground
318	0V291	Power ground
319	0V292	Power ground
320	0V293	Power ground
321	0V294	Power ground
322	0V295	Power ground
323	0V296	Power ground
324	0V297	Power ground
325	0V298	Power ground
326	0V299	Power ground
327	0V300	Power ground

LED DRIVE DIAGRAM

Notes:

- GENERAL TOLERANCE: ±0.2
- BACKLIGHT: 10 WHITE LED
- Recommended Case Open Area Should Be Less Than LCD V.A.
- Referenced Dimension: ()
- UP POLARIZER SURFACE TREATMENT: CLEAR / THICKNESS

Aluminum Plating Zinc
Polarizer use sunypol

DATE: _____ VERSION: _____ MODIFY THE CONTENT

DATE: 20161207 REV: 01

UNIT: mm
SCALE: 1/1
SHEET: 1/1

Product: _____
DRAWN: _____
CHECKED: _____

Count Dwg. PAGE: 1/1

Product Specification				
Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	15 / 19

10 Incoming Inspection Standards

11.1 VISUAL & FUNCTION INSPECTION STANDARD

11.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

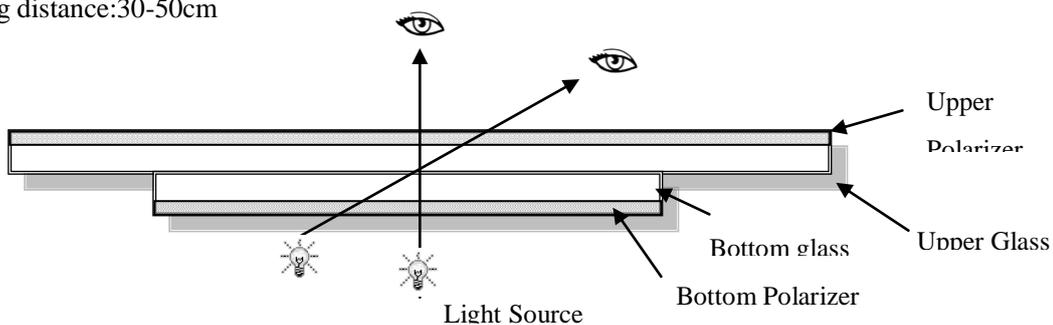
Temperature : $25 \pm 5^{\circ}\text{C}$

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

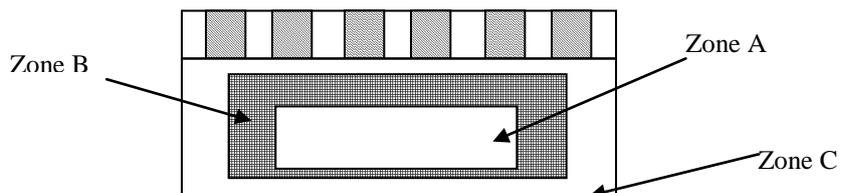
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



11.1.2 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.

11.1.3 Sampling Plan

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

Product Specification				
Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	16 / 19

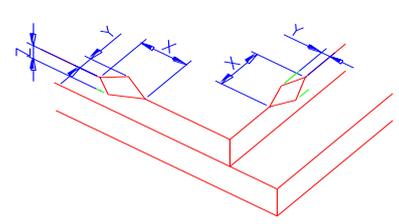
AQL:

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.	

11.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken	(1) The edge of LCD broken	 <table border="1" data-bbox="845 1657 1388 1814"> <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						

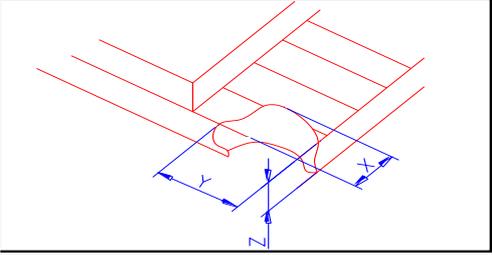
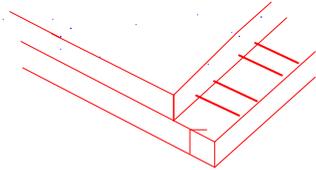
NOTE:

X: Length

Y: Width

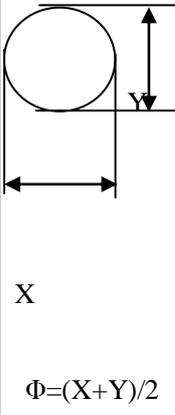
Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	17 / 19

<p>Z: Height L: Length of ITO, T: Height of LCD</p>	<p>(2) LCD corner broken</p>	 <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">X</th> <th style="padding: 5px;">Y</th> <th style="padding: 5px;">Z</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">$\leq 3.0\text{mm}$</td> <td style="padding: 5px;">$\leq L$</td> <td style="padding: 5px;">$\leq T$</td> </tr> </tbody> </table>	X	Y	Z	$\leq 3.0\text{mm}$	$\leq L$	$\leq T$
	X	Y	Z					
$\leq 3.0\text{mm}$	$\leq L$	$\leq T$						
<p>(3) LCD crack</p>	 <p style="text-align: center;">Crack Not allowed</p>							

Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	18 / 19

Number	Items	Criteria (mm)																																																																	
2.0	Spot defect  <p style="text-align: center;">$\Phi = (X+Y)/2$</p>	<p>① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Zone Size (mm)</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <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> <p>② Dim spot (LCD/TP/Polarizer dim dot, light leakage、 dark spot)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Zone Size (mm)</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <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="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Zone Size (mm)</th> <th colspan="3" style="text-align: center;">Acceptable Qty</th> </tr> <tr> <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 Size (mm)	Acceptable Qty			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 Size (mm)	Acceptable Qty			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 Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore			$0.2 < \Phi \leq 0.5$	2(distance $\geq 10\text{mm}$)			$\Phi > 0.5$	0		
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Product Specification

Amotec	Model: XTPQ43SN10-02	Rev. No.	Issued Date.	Page.
		A	2016,06,22	19 / 19

	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				
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