



TFT LCD Module

Product Specification

162GCOG BA BC
16x2 Characters COG

September 2, 2019

Remark:

Contents in this document are subject to change without notice. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without the express written permission of Displaytech.

Displaytech

Email: sales@displaytech.com.hk

Website: <http://www.displaytech.com.hk>

Revision Record

REV	CHANGES	DATE
00	First release	Sep 2, 2019

Table of Content

Revision Record	1
1. FEATURES.....	3
2. MECHANICAL SPECIFICATIONS.....	3
3. ELECTRICAL SPECIFICATIONS	3
3-1. Absolute Maximum Ratings	3
3-2. Electrical Characteristics.....	4
4. POWER SUPPLY	4
5. ELECTRO – OPTICAL CHARACTERISTICS FOR LCD	4
6. TERMINAL FUNCTIONS	5
7. AC CHARACTERISTICS	6
8. INSTRUCTION SET	7
9. QUALITY SPECIFICATIONS	8
9 -1. LCM Appearance and Electric inspection Condition	8
9 - 2. Definition	8
9-3. Acceptance	9
9-4. Criteria	9
10. RELIABILITY	16
11. HANDLING PRECAUTIONS	17
12. OUTLINEDIMENSION	18
13. PACKAGE DIMESION	19

1. FEATURES

The features of LCD are as follows

- * Display mode : STN (Y-G) /Reflective / Positive
- * Display Format : Character
- * IC : ST7032I
- * Interface Input Data : 6800-8bit interface
- * Driving Method : 1/16 DUTY , 1/5 BIAS
- * Viewing Direction : 6 O'clock

2. MECHANICAL SPECIFICATIONS

Item	Specification	Unit
Dimensional Outline	65.0(L)x27.7(W)x2.7 (H)	mm
LCD SIZE	65(L) x19.7/ 27.7(W) x2.1MAX(H)	mm
Viewing Area	61.0(L) x15.7(W)	mm
Character Font	Character number	-

3. ELECTRICAL SPECIFICATIONS

3-1. Absolute Maximum Ratings

(V_{SS}=0V)

Item	Symbol	Standard Value			Unit
		Min.	Type.	Max.	
Power Supply Voltage	V _{DD}	-0.3	-	+6.0	V
LCD Drive Voltage	D _{LCD}	7.0-V _{SS}	-	-0.3+V _{SS}	V
Input Voltage	V _{IN}	-0.3	-	V _{DD} +0.3	
Operating Temp.	T _{OP}	0	-	+50	°C
Storage Temp.	T _{ST}	-10	-	+60	°C
Weight	-	-	9.75	-	g/pcs

Note 1) V_{DD} based on V_{SS}=0V

3-2. Electrical Characteristics

(V_{SS}=0V)

Item	Symbol	Test condition	Min.	Typ.	Max.	Unit	
Logic Supply Voltage	V _{DD} -V _{SS}	Ta=-25°C	4.7	5.0	5.3	V	
LCD Drive Voltage (Recommended Voltage)	V _{OP} =V _O -V _{SS}	Ta=25°C	4.3	4.5	4.7	V	
Input Voltage	“H”Level	V _{IH}	Ta=25°C	0.7V _{DD}	--	--	V
	“L”Level			V _{IL}	0	--	0.2V _{DD}
Output Voltage	“H”Level	V _{OH}	I _{OH} =-1.0mA	0.75V _{DD}	--	--	V
	“L”Level	V _{OL}	I _{OL} =1.0mA	--	--	0.8	V
Current Consumption	I _{DD}	V _{IN} =V _{DD} or V _{SS}	-	0.23	--	mA	

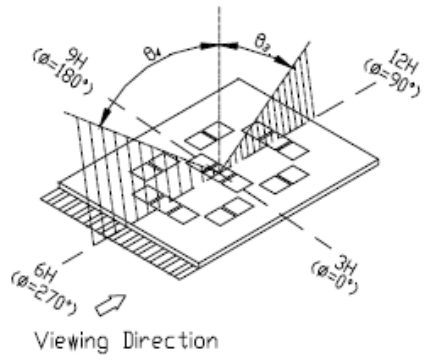
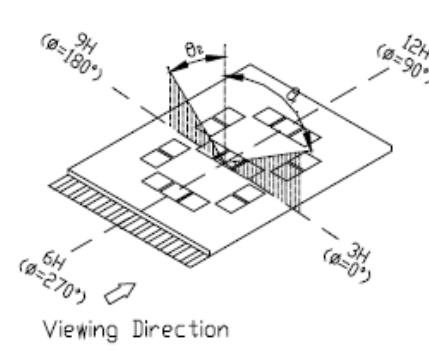
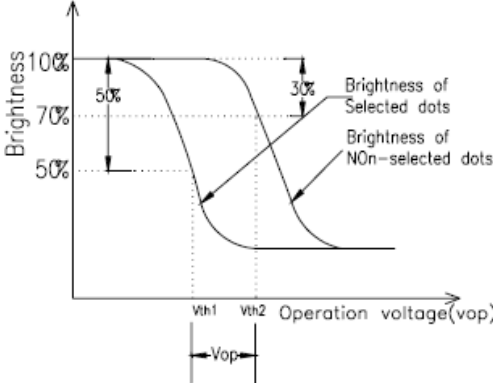
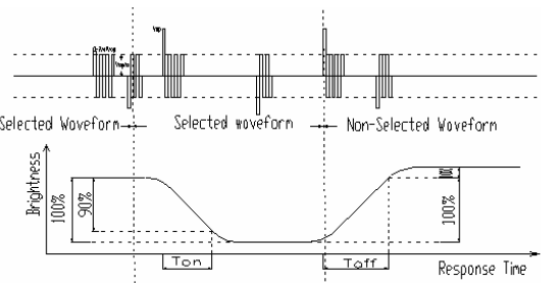
NOTE: 1) Duty Ratio=1/16, Bias Ratio=1/5

2).Measuring in Dots ON-state

4. POWER SUPPLY

5. ELECTRO – OPTICAL CHARACTERISTICS FOR LCD

Item	Symbol	Temp	Min	Type	Max	Unit	Conditions	Note
Driving Voltage	V _{OP}	25°C	4.3	4.5	4.7	V	-	-
Viewing Angle (Cr≥2)	θ(Φ=0°)	25°C	-	35	-	Degree	-	Note1 Note2
	θ(Φ=180°)		-	35	-			
	θ(Φ=90°)		-	30	-			
	θ(Φ=270°)		-	45	-			
Contrast Ratio	Cr	25°C	-	3	6	-	-	Note3
Response Time(rise)	Tr	0°C	-	400	800	ms	-	Note4
		25°C	-	80	160			
		50°C	-	60	120			
Response Time(fall)	Tf	0°C	-	450	900	ms	-	
		25°C	-	100	200			
		50°C	-	60	120			

<p>Note1 . Definition of Angle Θ&Φ</p> 	<p>Note2. Definition of Viewing Angle Θ_1&Θ_2</p> 
<p>Note3 . Definition of Contrast Ratio</p> 	<p>Note4. Definition of Response Time</p> 

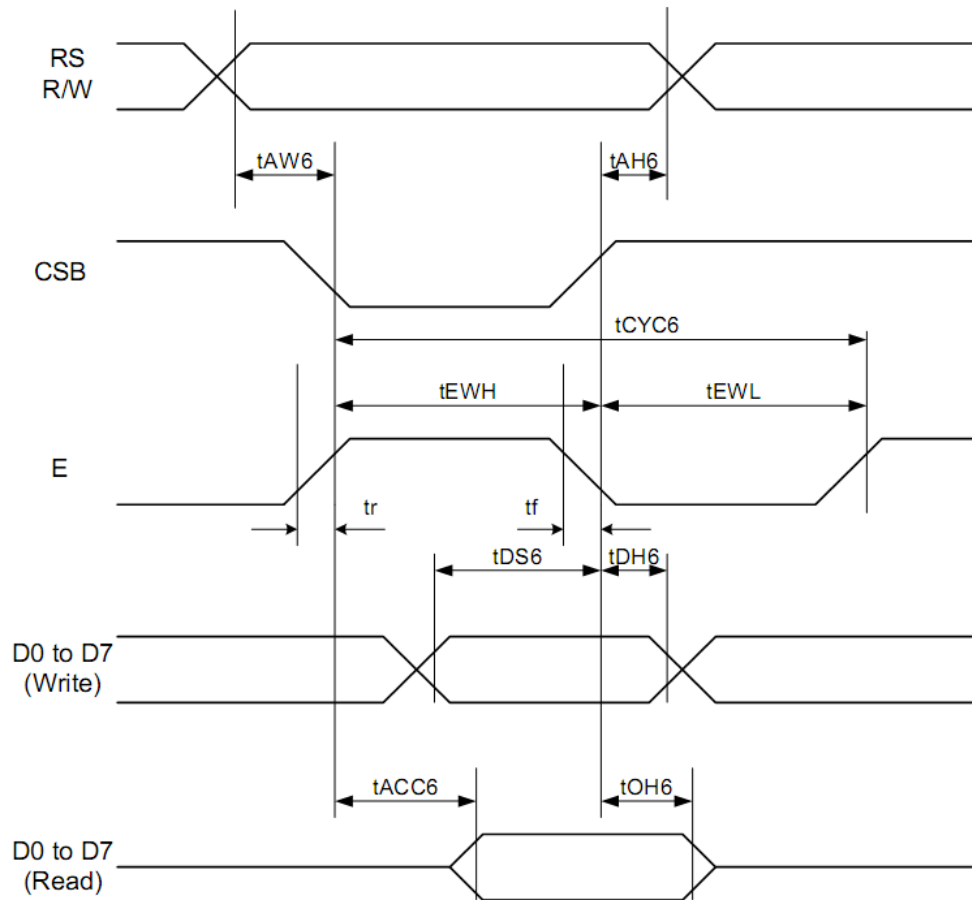
6. TERMINAL FUNCTIONS

Pin	Symbol	Function Description
1	RES	External reset pin.
2	RS	Select registers.
3	CS	Chip selection input with pull-high resistor
4	RW	Select read or write.
5	E	Starts data read/write.
6	D0	Four low order bi-directional data bus pins.
7	D1	
8	D2	
9	D3	
10	D4	Four high order bi-directional data bus pins.
11	D5	
12	D6	
13	D7	
14	VSS	Ground
15	VDD	Power supply input.
16	VOUT	LCD driver supply voltages.

7. AC CHARACTERISTICS

Timing Characteristics

68 Interface



($T_a = 25^\circ\text{C}$)

Item	Signal	Symbol	Condition	VDD=2.7 to 4.5V Rating		VDD=4.5 to 5.5V Rating		Units
				Min.	Max.	Min.	Max.	
Address hold time	RS	t_{AH6}	—	20	-	20	-	ns
Address setup time	RS	t_{AW6}		20	-	20	-	
System cycle time	RS	t_{CYC6}	—	400	-	280	-	ns
Data setup time	D0 to D7	t_{DS6}	—	100	-	80	-	ns
Data hold time	D0 to D7	t_{DH6}		40	-	20	-	
Access time	D0 to D7	t_{ACC6}	$C_L = 100\text{ pF}$	-	500	-	400	ns
Output disable time	D0 to D7	t_{OH6}		300	-	150	-	
Enable Rise/Fall time	E	t_r, t_f	—	-	20	-	20	ns
Enable H pulse time	E	t_{EWH}	—	200	-	120	-	ns
Enable L pulse time	E	t_{EWL}	—	150	-	130	-	ns

Note: All timing is specified using 20% and 80% of VDD as the reference.

8. INSTRUCTION SET

Instruction Table:

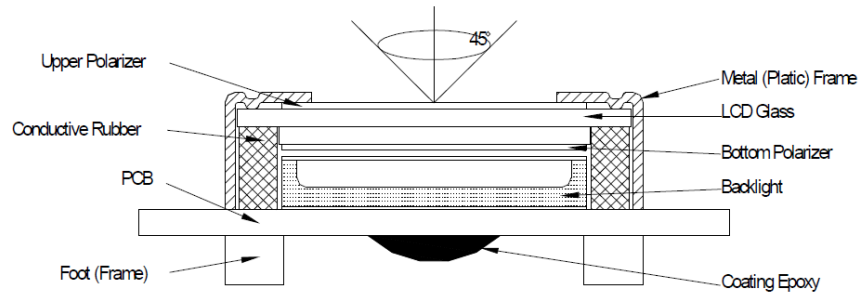
ST7032-0D (ITO option OPR1=1, OPR2=1)

b7-b4 b3-b0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0001	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
0010	o	s	"	z	B	R	b	n	e	E	F	4	W	X	z	o
0011	P	7	*	3	C	S	c	s	A	A	1	0	7	E	A	1
0100	d	n	*	4	D	T	d	t	A	A	1	I	T	P	C	1
0101	↑	Δ	%	5	E	U	e	u	A	A	*	7	*	1	A	B
0110	↓	θ	&	6	F	V	f	v	A	A	7	0	1	3	*	W
0111	→	Α	°	7	G	W	g	w	E	E	7	†	7	7	R	X
1000	←	Β	©	8	H	X	h	x	E	E	4	0	*	U	8	†
1001	□	Π	▷	9	I	Y	i	y	E	E	0	0	U	U	I	X
1010	▯	Σ	*	:	J	Z	j	z	E	E	0	0	▯	▯	A	X
1011	L	P	+	;	K	l	k	l	I	A	*	U	E	0	A	*
1100	U	θ	.	<	L	*	l	l	I	A	n	U	U	0	0	*
1101	.	U	—	=	M	l	m	l	1	A	a	X	U	U	0	†
1110	0	0	.	>	N	o	n	o	A	0	e	E	†	0	0	†
1111	0	0	/	?	0	l	o	o	A	0	U	U	U	U	0	†

9. QUALITY SPECIFICATIONS

9 -1. LCM Appearance and Electric inspection Condition

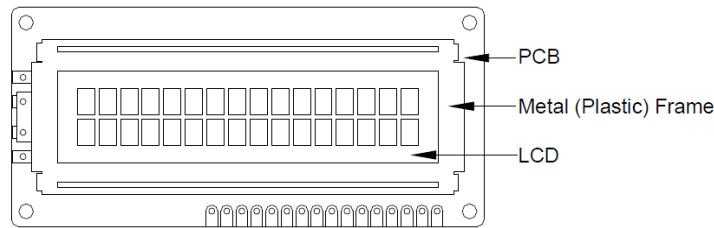
1. Inspection will be done by placing LCM 30cm away from inspector's eyeballs under normal illumination.



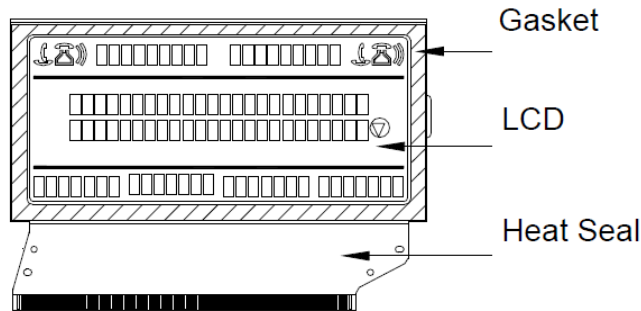
2. View Angle: with in 45° around perpendicular line.

9 - 2. Definition

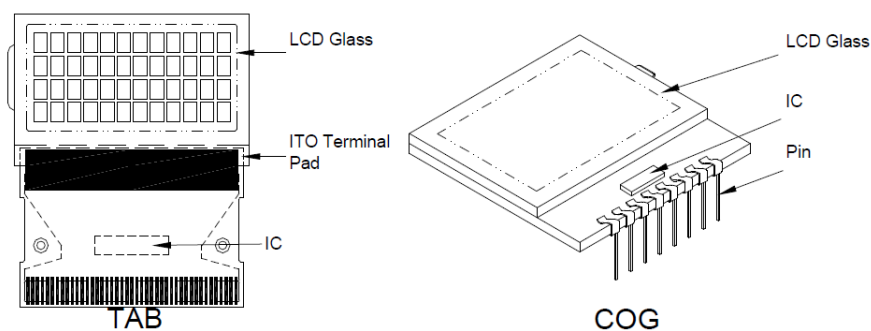
1、COB



2、Heat Seal



3、TAB and COG



9-3. Acceptance

Major defect: AQL = 0.65

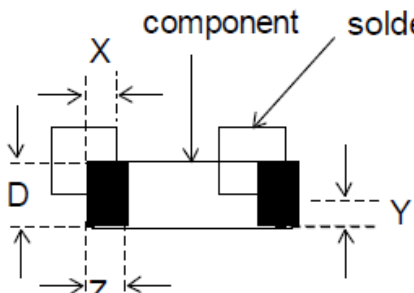
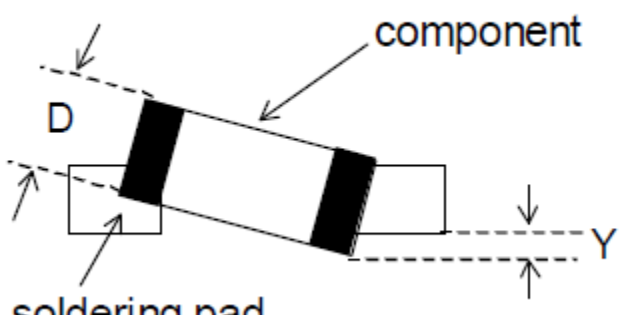
Minor defect: AQL = 1.5

9-4. Criteria

1.COB

Defect	Inspection Item	Inspection Standards	
Major	PCB copper flakes peeling off	Any copper flake in viewing Area should be greater than 1.0mm ²	Reject
Major	Height of coating epoxy	Exceed the dimension of drawing	Reject
Major	Void or hole of coating epoxy	Expose bonding wire or IC	Reject
Major	PCB cutting defect	Exceed the dimension of drawing	Reject

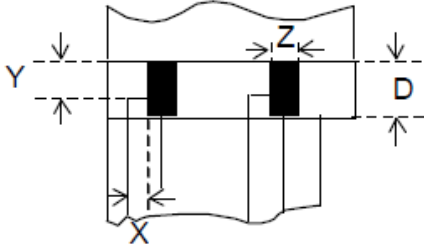
2.SMT

Defect	Inspection Item	Inspection Standards	
Minor	Component marking not readable		Reject
Minor	Component height	Exceed the dimension Of drawing	Reject
Major	Component solder defect (missing , extra, wrong component or wrong orientation)		Reject
Minor	<p>Component position shift</p> 	$X < 3/4Z$ $Y > 1/3D$	Reject Reject
Minor	<p>Component tilt</p> 	$Y > 1/3D$	Reject

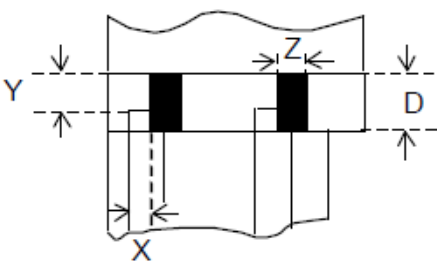
3. Metal (Plastic) Frame

Defect	Inspection Item	Inspection Standards		
Major	Crack/breakage	Anywhere		Reject
Minor	Frame Scratch	W	L	Acceptable of Scratch
		$W < 0.1\text{mm}$	Any	Ignore
		$0.1 \leq W < 0.2\text{mm}$	$L \leq 5.0\text{mm}$	2
		$0.2 \leq W < 0.3\text{mm}$	$L \leq 3.0\text{mm}$	1
		$W \geq 0.3\text{mm}$	Any	0
		Note : 1. Above criteria applicable to scratch lines with distance greater than 5mm. 2. Scratch on the back side of frame (not visible) can be ignored .		
Minor	Frame Dent , Prick $\Phi = \frac{L+W}{2}$			Acceptable of Dents / Pricks
		$\Phi < 1.0\text{mm}$	2	
		$1.0 < \Phi < 1.5\text{mm}$	1	
		$1.5\text{mm} < \Phi$	0	
		Note : 1. Above criteria applicable to any two dents / pricks with distance greater than 5mm 2. Dent / prick on the back side of frame (not visible) can be ignored		
Minor	Frane Deformation	Exceed the dimension of drawing		
Minor	Metal Frame Oxidation	Any rust		

4. Flexible Film Connector (FFC)

Defect	Inspection Item	Inspection Standards	
Minor	Tilted soldering	Within the angle $+5^{\circ}$	Acceptable
Minor	Uneven solder joint/bump		Reject
Minor	Hole $\Phi = \frac{L+W}{2}$	Expose the conductive line	Reject
		$\Phi > 1.0\text{mm}$	Reject
Minor	Position shift 	$Y > 1/3D$	Reject
		$X > 1/2Z$	Reject

5. Heat seal /TCP /FPC

Defect	Inspection Item		Inspection Standards	
Major	Scratch expose conductive layer			Reject
Minor	Hole	$\Phi = \frac{L+W}{2}$	$\Phi > 0.5\text{mm}$	Reject
Major	Adhesion strength		Less than the specification	Reject
Minor	Position shift 		$Y > 1/3D$	Reject
			$X > 1/2Z$	Reject
Major	Conductive line break			Reject

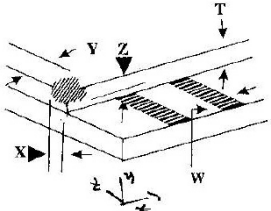
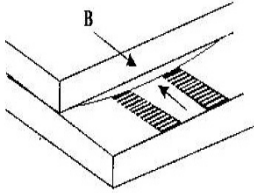
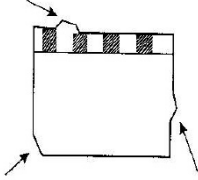
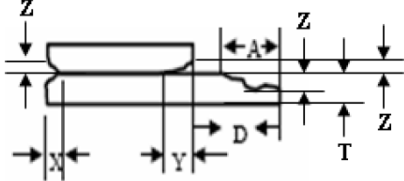
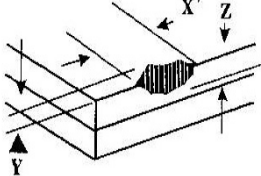
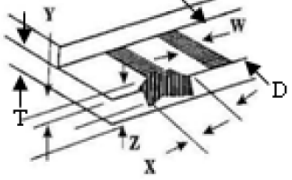
6. Backlight backing protective Film and Others

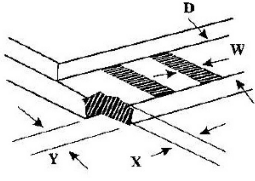
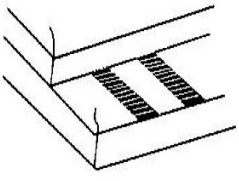
Defect	Inspection Item	Inspection Standards	
Minor	Backlight dirty,prick	Acceptable number of units	
		$\Phi < 0.25\text{mm}$	Ignore
		$0.25\text{mm} < \Phi < 0.35\text{mm}$	2
		$0.35\text{mm} < \Phi < 0.45\text{mm}$	1
		$\Phi > 0.45\text{mm}$	0
		The distance between any two spots should be $> 5\text{mm}$ Any spot/dot/void outside of viewing area is acceptable	
Minor	Protective film tilt	Not fully cover LCD	Reject

7. Electric Inspection

Defect	Inspection Item	Inspection Standards	
Major	Short		Reject
Major	Open		Reject

8. Inspection Specification of LCD

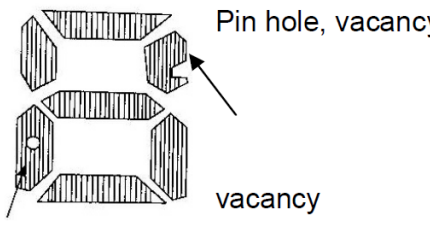
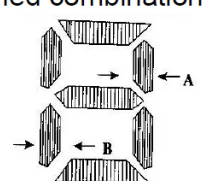
DEFECT	ITEM	CRITERIA
<p>1 Crack (minor)</p>		<p>1. $X > 1/8$ length of the long side REJ 2. Y: damaged, $1/3$ of the adhesive exposed REJ 3. Ignoring Z</p>
<p>2 Segment Deformation (major)</p>		<p>1. Ignoring the length 2. $B > 1/3$ width of conductor REJ</p>
<p>3 Segment Deformation (major)</p>		<p>Referring to the project-drawing</p>
<p>4 Segment Deformation (major)</p>		<p>1. $Z < T, X, Y$ not reaching $1/2$ width of main seal or conductive point . REJ 2. $A > 1/3D$.</p>
<p>5 Crack (minor)</p>		<p>1. $X > 1/8$ length of the long-side REJ 2. $Y 1/3$ of the Adhesive exposed REJ</p>
<p>6 Crack (minor)</p>		<p>1. At the side of conductor $Z \leq 1/2T$ ACC 2. At the side of non- conductor $Z \leq 1/2T$ $X > 5\text{mm}$ REJ $Y \geq 1/3D$ REJ $Z > 1/2T$ REJ</p>

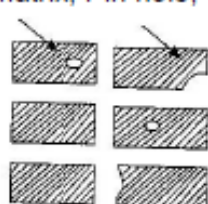
<p>7 Crack (minor)</p>		<p>1. $X \leq 2\text{mm}$ and $Y \leq 1.5\text{mm}$ ACC 2. $X > 2\text{mm}$ but not attach pin $Y \leq 1/2D$ ACC 3. $X \leq 1\text{mm}$ and $Y \leq 3/4D$, Ignoring Z ACC</p>																	
<p>8 Crack (major)</p>		<p>REJ</p>																	
<p>9 Dirty spots Round type Round type (minor)</p>	<p>Dirty spots Round type $\text{Ø} = (L+W)/2$</p>	<table border="1"> <thead> <tr> <th>POSITIVE MODE</th> <th>ACC QTY</th> </tr> </thead> <tbody> <tr> <td>$0\text{mm} < \text{Ø} \leq 0.3\text{mm}$</td> <td>Ignore</td> </tr> <tr> <td>$0.3\text{mm} < \text{Ø} \leq 0.4\text{mm}$</td> <td>4</td> </tr> <tr> <td>$0.4\text{mm} < \text{Ø} \leq 0.5\text{mm}$</td> <td>2</td> </tr> <tr> <td>$0.5\text{mm} < \text{Ø}$</td> <td>0</td> </tr> </tbody> </table>	POSITIVE MODE	ACC QTY	$0\text{mm} < \text{Ø} \leq 0.3\text{mm}$	Ignore	$0.3\text{mm} < \text{Ø} \leq 0.4\text{mm}$	4	$0.4\text{mm} < \text{Ø} \leq 0.5\text{mm}$	2	$0.5\text{mm} < \text{Ø}$	0							
POSITIVE MODE	ACC QTY																		
$0\text{mm} < \text{Ø} \leq 0.3\text{mm}$	Ignore																		
$0.3\text{mm} < \text{Ø} \leq 0.4\text{mm}$	4																		
$0.4\text{mm} < \text{Ø} \leq 0.5\text{mm}$	2																		
$0.5\text{mm} < \text{Ø}$	0																		
<p>10 minor</p>	<p>Polarizer deviated from the glass</p>	<p>1. Protruding the edge of glass beyond 0.2mm (Total dimension of glass must be within) the project-drawing permissible tolerance REJ 2. Distance inside the edge of glass is beyond 1.4mm REJ If project-drawing has other specifications refer to them</p>																	
<p>11 (minor)</p>	<p>Fiber Linear type Polarizer scratch (of visible state)</p>	<table border="1"> <thead> <tr> <th colspan="2">DIMENSION</th> <th rowspan="2">ACC QTY</th> </tr> <tr> <th>LENGTH</th> <th>WIDTH</th> </tr> </thead> <tbody> <tr> <td>—</td> <td>$\leq 0.08\text{mm}$</td> <td>Ignore</td> </tr> <tr> <td>$\leq 4\text{mm}$</td> <td>$\leq 0.10\text{mm}$</td> <td>2</td> </tr> <tr> <td>$\leq 3\text{mm}$</td> <td>$\leq 0.12\text{mm}$</td> <td>2</td> </tr> <tr> <td colspan="2">$W > 0.12\text{mm}$</td> <td>0</td> </tr> </tbody> </table> <p>Ignoring it, if beyond view area</p>	DIMENSION		ACC QTY	LENGTH	WIDTH	—	$\leq 0.08\text{mm}$	Ignore	$\leq 4\text{mm}$	$\leq 0.10\text{mm}$	2	$\leq 3\text{mm}$	$\leq 0.12\text{mm}$	2	$W > 0.12\text{mm}$		0
DIMENSION		ACC QTY																	
LENGTH	WIDTH																		
—	$\leq 0.08\text{mm}$	Ignore																	
$\leq 4\text{mm}$	$\leq 0.10\text{mm}$	2																	
$\leq 3\text{mm}$	$\leq 0.12\text{mm}$	2																	
$W > 0.12\text{mm}$		0																	

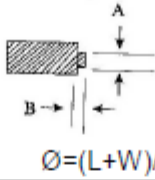
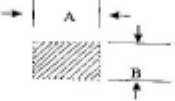
<p>12 (minor)</p>	<p>$\text{Ø} = (L+W)/2$ Air bubble between glass and polarizer, polarizer with folding trace (of visible state) $\text{Ø} = (L+W)/2$</p>	<table border="1"> <thead> <tr> <th>POSITIVE MODE</th> <th>ACC QTY</th> </tr> </thead> <tbody> <tr> <td>$\text{Ø} \leq 0.3\text{mm}$</td> <td>Ignore</td> </tr> <tr> <td>$0.3\text{mm} < \text{Ø} \leq 0.4\text{mm}$</td> <td>4</td> </tr> <tr> <td>$0.4\text{mm} < \text{Ø} \leq 0.5\text{mm}$</td> <td>2</td> </tr> <tr> <td>$0.5\text{mm} < \text{Ø}$</td> <td>0</td> </tr> </tbody> </table> <p>Ignoring it, if beyond view area</p>	POSITIVE MODE	ACC QTY	$\text{Ø} \leq 0.3\text{mm}$	Ignore	$0.3\text{mm} < \text{Ø} \leq 0.4\text{mm}$	4	$0.4\text{mm} < \text{Ø} \leq 0.5\text{mm}$	2	$0.5\text{mm} < \text{Ø}$	0
POSITIVE MODE	ACC QTY											
$\text{Ø} \leq 0.3\text{mm}$	Ignore											
$0.3\text{mm} < \text{Ø} \leq 0.4\text{mm}$	4											
$0.4\text{mm} < \text{Ø} \leq 0.5\text{mm}$	2											
$0.5\text{mm} < \text{Ø}$	0											

13 (minor)	Polarizer pricked and damaged(spots) (of visible state) $\varnothing=(L+W)/2$	Positive mode	Acc qty	Ignoring it, if beyond view area
		$\Phi \leq 0.8\text{mm}$	2	
		$0.8 < \Phi \leq 1.0\text{mm}$	1	
		$\varnothing > 1.0\text{mm}$	0	
14 (minor)	Conductor dirty	With oil-stain or foreign substance		REJ
15 (minor)	Polarizer without protected film			REJ
16 (minor)	The width of the Adhesive	$\leq 1/2$ of the average width		REJ
		$\geq 3/2$ of the average width		REJ
17 (minor)	The Adhesive deviation	Beyond view area		REJ
18 (major)	The Adhesive impure	\geq of the width of adhesive (Air bubble in the adhesive= of the width of the Adhesive REJ)		REJ
19 (major)	The Adhesive Varicolored			REJ
20 (minor)	Seal resin discolored or off the edge of the glass			REJ
21 (minor)	The height, width and deviation quantity of seal resin	Beyond project-drawing permissible tolerance		REJ
22 (minor)	Permeating resin (Permeating quantity of seal resin)	Beyond view area (If customers have special requirements, make additionally.)		REJ
23 (major)	Length and type of a pin	Referring the project-drawing		

24 (minor)	Pin leaning	If project-drawing has specifications, refer to them		
25 (minor)	Pin with resin except its head (including pin-let)			REJ
26 (minor)	Pin-resin uncured			REJ
27 (minor)	Polarizer dirty or space between Polarizer and glass with pin-resin			REJ

28 (minor)	Pin-resin's height excess the upper polarizer's	If project-drawing has specifications, refer to them. REJ										
29 (minor)	Pin resin broken	REJ										
30 (minor)	Carbureted-adhesive exposed	Excess 1/2 of the interval of conductor REJ (If customers have special requirements, make additionally.)										
31 (minor)	 <p>Pin hole, vacancy</p> <p>vacancy</p> <p>Pin hole $\varnothing=(L+W)/2$</p>	<table border="1"> <thead> <tr> <th></th> <th>ACC QTY</th> </tr> </thead> <tbody> <tr> <td>$0\text{mm} < \varnothing \leq 0.3\text{mm}$</td> <td>Ignore</td> </tr> <tr> <td>$0.3\text{mm} < \varnothing \leq 0.4\text{mm}$</td> <td>4</td> </tr> <tr> <td>$0.4\text{mm} < \varnothing \leq 0.5\text{mm}$</td> <td>2</td> </tr> <tr> <td>$0.5\text{mm} < \varnothing$</td> <td>0</td> </tr> </tbody> </table>		ACC QTY	$0\text{mm} < \varnothing \leq 0.3\text{mm}$	Ignore	$0.3\text{mm} < \varnothing \leq 0.4\text{mm}$	4	$0.4\text{mm} < \varnothing \leq 0.5\text{mm}$	2	$0.5\text{mm} < \varnothing$	0
	ACC QTY											
$0\text{mm} < \varnothing \leq 0.3\text{mm}$	Ignore											
$0.3\text{mm} < \varnothing \leq 0.4\text{mm}$	4											
$0.4\text{mm} < \varnothing \leq 0.5\text{mm}$	2											
$0.5\text{mm} < \varnothing$	0											
32 (minor)	<p>Inclined combination</p>  <p>$\varnothing=(L+W)/2$</p>	<p>1. $B-A > 0.25\text{mm}$ REJ</p> <p>2. $A/B \leq 3/4$ REJ</p> <p>3. Extra line made by inclined combination must be checked before acceptance according to the criteria of item 11 "linear type"</p> <p>4. Choose one freely between 1 and 2</p> <p>5. Convex spots made by inclined combination will be checked before acceptance according to the criteria of item 38.</p> <p>6. Character deformed will be checked before acceptable according to the limitation of the sample</p>										

33 (minor)	<p>Point matrix, Pin hole, vacancy</p> 	<table border="1"> <thead> <tr> <th></th> <th>ACC QTY</th> </tr> </thead> <tbody> <tr> <td>$0\text{mm} < \varnothing \leq 0.3\text{mm}$</td> <td>Ignore</td> </tr> <tr> <td>$0.3\text{mm} < \varnothing \leq 0.4\text{mm}$</td> <td>4</td> </tr> <tr> <td>$0.4\text{mm} < \varnothing \leq 0.5\text{mm}$</td> <td>2</td> </tr> <tr> <td>$0.5\text{mm} < \varnothing$</td> <td>0</td> </tr> </tbody> </table>		ACC QTY	$0\text{mm} < \varnothing \leq 0.3\text{mm}$	Ignore	$0.3\text{mm} < \varnothing \leq 0.4\text{mm}$	4	$0.4\text{mm} < \varnothing \leq 0.5\text{mm}$	2	$0.5\text{mm} < \varnothing$	0
	ACC QTY											
$0\text{mm} < \varnothing \leq 0.3\text{mm}$	Ignore											
$0.3\text{mm} < \varnothing \leq 0.4\text{mm}$	4											
$0.4\text{mm} < \varnothing \leq 0.5\text{mm}$	2											
$0.5\text{mm} < \varnothing$	0											

34 (minor)	Protrusion  $\varnothing = (L+W)/2$	1. $A > 1.0\text{mm}$ 2. $B > 0.2\text{mm}$	REJ REJ
35 (minor)	Point matrix: Combination of character inclined 	1. Quantity deformed $A \leq \pm 15\%$ 2. Quantity deformed $B \leq \pm 15\%$	ACC ACC
36 (minor)	Color variation	Referring to the limitation of the sample	
37 (major)	Segment crossing Segment missing		REJ
38 (major)	Conduction of silver-dot out of condition		REJ
39 (major)	Incomplete segment	Referring to the limitation of the sample	
40 (major)	Incomplete common		REJ
41 (major)	Excessive segment		REJ
42 (minor)	Reacting slowly	Referring to the limitation of the sample	
43 (major)	Strong current	$\geq 2\mu\text{A}/\text{Cm}^2$	REJ
44 (minor)	Uneven surface	Referring to the criteria of item 9	

10. RELIABILITY

NO.	Item	Condition	Criterion
1	High Temperature Operating	50°C, 240 Hrs	No defect in cosmetic and operational function allowable.
2	Low Temperature Operating	0°C, 240Hrs	
3	High Temperature Storage	60°C, 240Hrs	
4	Low Temperature Storage	-10°C, 240Hrs	
5	High Humidity	40°C, 90%RH, 240Hrs	Total current Consumption should be below double of initial value.
6	Thermal Shock	-10°C to 25°C to 60°C (30Min) (5Min) (30Min) 10Cycles	

Note: 1) For restrict products, the test conditions listed as above must be revised.

11. HANDLING PRECAUTIONS

(1) Mounting Method

The panel of the LCD Module consists of two thin glass plates with polarizers which easily get damaged since the Module is fixed by utilizing fitting holes in the printed circuit board. Extreme care should be taken when handling the LCD Modules.

(2) Caution of LCD handling & cleaning

When cleaning the display surface, use soft cloth with solvent (recommended below) and wipe lightly.

- Isopropyl alcohol
- Ethyl alcohol
- Trichlorotrifluoroethane

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Acetone
- Aromatics

(3) Caution against static charge

The LCD Module use C-MOS LSI drivers, so we recommend that you connect any unused input terminal to VDD or VSS, do not input any signals before power is turned on. And ground your body, Work/assembly table. And assembly equipment to protect against static electricity.

(4) Packaging

- Modules use LCD elements, and must be treated as such. Avoid intense shock and falls from a height.
- To prevent modules from degradation. Do not operate or store them exposed directly to sunshine or high temperature/humidity.

(5) Caution for operation

- It is indispensable to drive LCD's within the specified voltage limit since the higher voltage than the limit shorten LCD life. An electrochemical reaction due to direct current causes LCD deterioration, Avoid the use of direct current drive.
- Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's. Which will come back in the specified operating temperature range.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.
Usage under the relative condition of 40°C, 50%RH or less is required.

(6) Storage

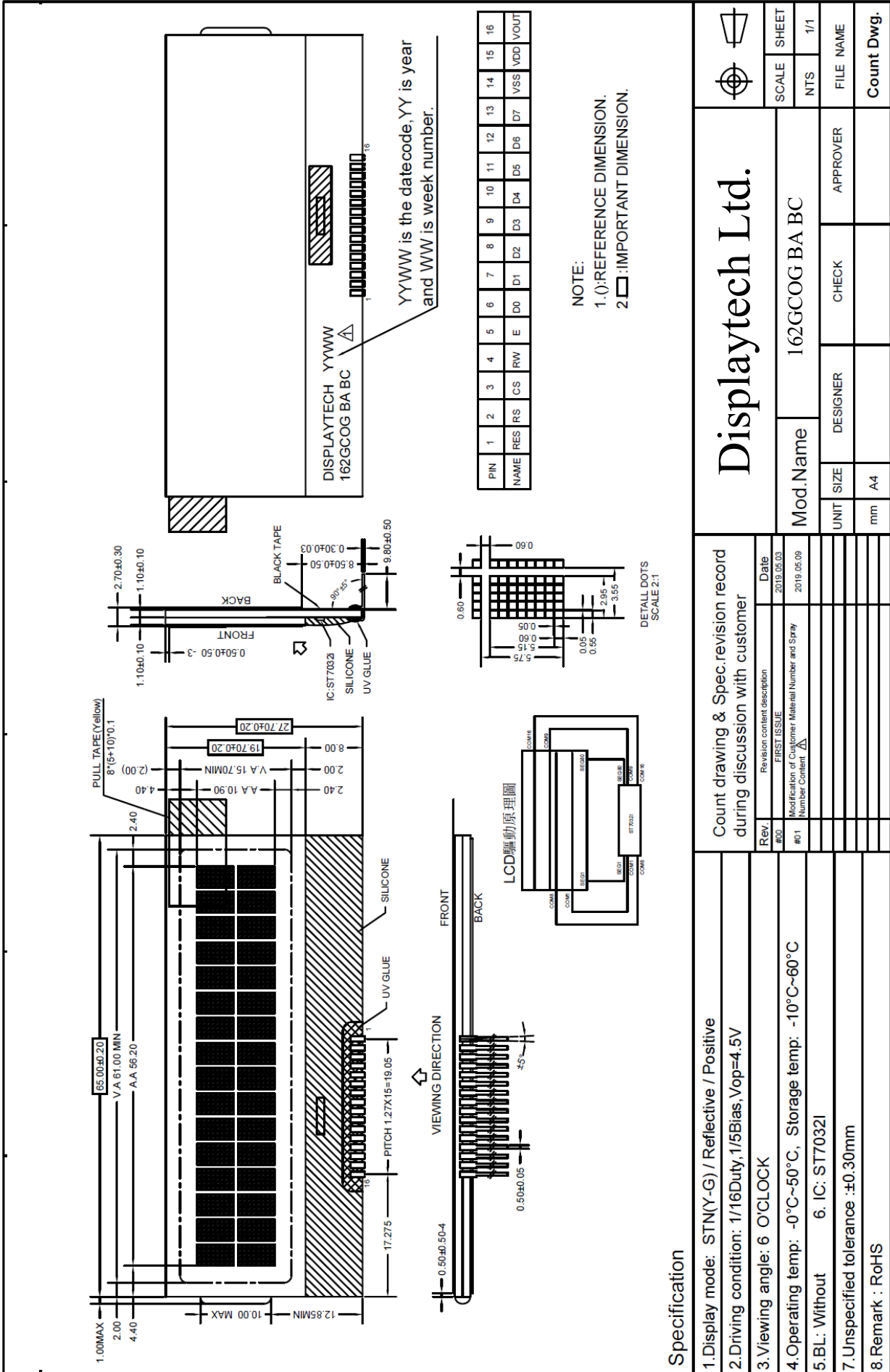
In the case of storing for a long period of time (for instance ,for years) for the purpose or replacement use, The following ways are recommended.

- Storage in a polyethylene bag with sealed so as not to enter fresh air outside in it, And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light. Keeping temperature in the specified storage temperature range.
- Storing with no touch on polarizer surface by the anything else. (It is recommended to store them as they have been contained in the inner container at the time of delivery)

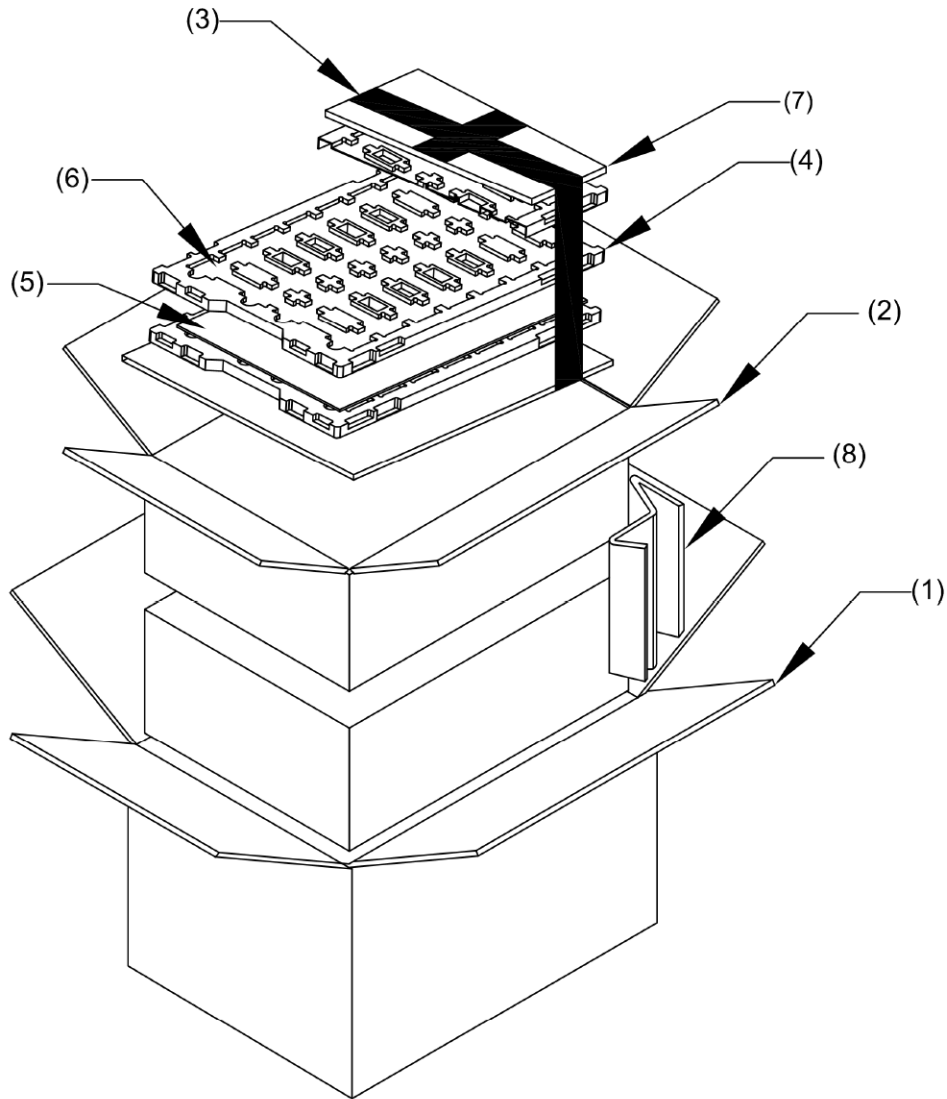
(7) Safety

- It is recommendable to crash damaged or unnecessary LCD into pieces and wash off liquid crystal by using solvents such as acetone and ethanol. Which should be burned up later.
- When any liquid crystal leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water.

12. OUTLINEDIMENSION



13. PACKAGE DIMESION



規格要求:

每個外箱內放2個內箱。
 一個內箱裝X層產品，共需X個吸塑盤，
 每層吸塑之間交錯180度放置，頂部放置1層空吸塑
 一個吸塑盤裝X*X=XX個模組，
 每層產品底部與頂部各放一層珍珠棉
 每個內箱里放X*X*(X-1)=XX個模組。
 一個外箱裝模組的數量：X*X*(X-1)*2=XXX
 最后，內箱和外箱封口

	NAME	UNIT	QTY PER	SPEC	MATERIAL	REMARK
1	外箱	PCS	1	XXX*XXX*XXX	PAPER	"A"TPY
2	內箱	PCS	X	XXX*XXX*XXX	PAPER	"B"TPY
3	膠帶	m	XX	X	PE	++ SHAPE
4	吸塑盤	PCS	XX	XXX*XXX*XXX	PET	ESD 10 ⁻⁶ -10 ⁻¹¹
5	珍珠棉	PCS	XX	XXX*XXX*XXX	EPE	ESD 10 ⁻⁶ -10 ⁻¹¹
6	MODULE	PCS	XXX	XXX*XXX*XXX		BE CAREFUL IN PUT
7	PAPER BOARD	PCS	X	XXX*XXX*XXX	PAPER	"B"TPY
8	PAPER BOARD	PCS	X	XXX*XXX*XXX	PAPER	"B"TPY

Part drawing & Spec.revision record during discussion with vendor			Displaytech Ltd					
Rec.#00	Revision content description FIRST ISSUE	Date 2019.07.17						
			UNIT	SIZE	DESIGNER	CHECK	APPROVER	FILE NAME
			mm	A4				Packing