

Specification

For

LCD Module

CTM800480N02

CUSTOMER APPROVED:

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PREPARED BY	CHECKED BY	APPROVED BY



RECORDS OF REVISION

Date	Rev.	Description	Note	Page
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Total : 17 Page



Contents

1. SPECIFICATIONS

- 1.1 Features
- 1.2 Mechanical Specifications
- 1.3 Absolute Maximum Ratings
- 1.4 DC Electrical Characteristics
- 1.5 Optical Characteristics
- 1.6 Backlight Characteristics

2. MODULE STRUCTURE

- 2.1 Counter Drawing
- 2.2 Interface Pin Description
- 2.3 Timing Characteristics
- 2.4 Display Command

3. QUALITY ASSURANCE SYSTEM

- 3.1 Quality Assurance Flow Chart
- 3.2 Inspection Specification

4. RELIABILITY TEST

- 4.1 Reliability Test Condition

5. PRECAUTION RELATING PRODUCT HANDLING

- 5.1 Safety
- 5.2 Handling
- 5.3 Storage
- 5.4 Terms of Warranty

Note : For detailed information please refer to IC data sheet :TBD.



1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	800*(R,G,B)*480 Dots
LCD Type	Color TFT , Transmissive , Extended Temp
Screen Size(inch)	7.0 (Diagonal)
Viewing Direction	6 O'clock
Backlight	White Edge LED B/L
Weight	TBD
Interface	Digital Parallel 24 bits RGB Data Bus
Other(controller/driver IC)	TBD

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	165(W) * 104(L) * 5.1(H)(Max)	mm
Active Area	152.4(W) * 91.44 (L)	mm
Dots Pitch	0.1905 (W)*0.1905(L)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply Voltage	V _{DD}	-	-0.3	5.0	V
Input Voltage	V _{IN}	-	V _{SS} -0.3	V _{DD} +0.3	V
Operating Temperature	T _{OP}	-	-20	70	°C
Storage Temperature	T _{ST}	-	-30	80	°C
Storage Humidity	H _D	Ta < 40 °C	20	90	%RH



1.4 DC Electrical Characteristics

$V_{DD} = 3.3\text{ V} \pm 10\%$, $V_{SS} = 0\text{ V}$, $T_a = 25^\circ\text{C}$

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{DD}	-	3.0	3.3	3.6	V
“H” Input Voltage	V_{IH}	-	$0.8 V_{DD}$	-	V_{DD}	V
“L” Input Voltage	V_{IL}	-	V_{SS}	-	$0.2 V_{DD}$	V
“H” Output Voltage	V_{OH}	-	$0.8 V_{DD}$	-	V_{DD}	V
“L” Output Voltage	V_{OL}	-	V_{SS}	-	$0.2 V_{DD}$	V
Supply Current	I_{DD}	$V_{DD} = 3.3\text{V}$	-	TBD		mA
LCM Driver Voltage	V_{COM}	$V_{COM}-V_{SS} (-20^\circ\text{C})$	-	-	-	V
		$V_{COM}-V_{SS} (25^\circ\text{C})$	-	-	-	
		$V_{COM}-V_{SS} (70^\circ\text{C})$	-	-	-	

1.5 Optical Characteristics

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

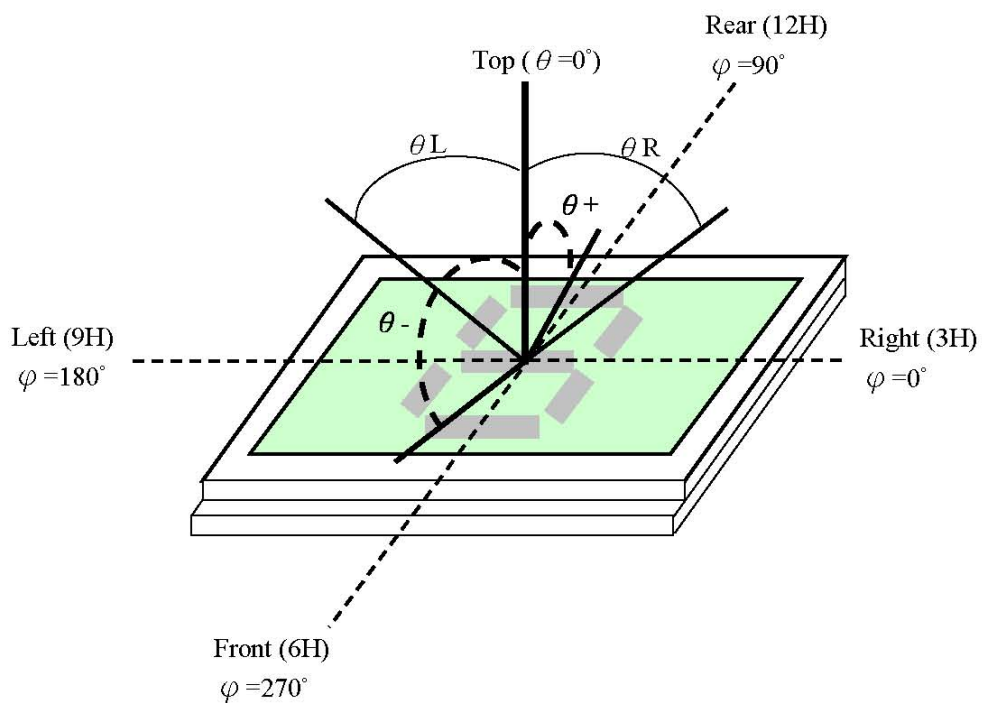
Item	Symbol	Conditions	Min.	Typ.	Max.	Reference	
View Angle	TOP	$C \geq 2.0, \varnothing = 0^\circ$	100°	120°	-	Notes 1 & 2	
	BOTTOM		100°	120°	-		
	LEFT		120°	140°	-		
	RIGHT		120°	140°	-		
CIE *1	WHITE	$T_a = 25^\circ$ $\varnothing_x, \varnothing_Y = 0^\circ$	X	0.273	0.313	0.353	
			Y	0.289	0.329	0.369	
	RED		X	0.539	0.569	0.599	
			Y	0.298	0.328	0.358	
	GREEN		X	0.319	0.349	0.379	
			Y	0.533	0.563	0.593	
	BLUE		X	0.124	0.154	0.184	
			Y	0.067	0.097	0.127	
Contrast Ratio	C	$\varnothing_Y = 5^\circ, \varnothing = 0^\circ$	350	450	-	Note 3	
Response Time(rise)	tr	$\theta = 5^\circ, \varnothing = 0^\circ$	-	10ms	15 ms	Note 2	
Response Time(fall)	tf	$\theta = 5^\circ, \varnothing = 0^\circ$	-	10ms	20 ms	Note 2	

*1: This value will be changed while mass product.

Note 1.

Optical characteristics-2

Viewing angle

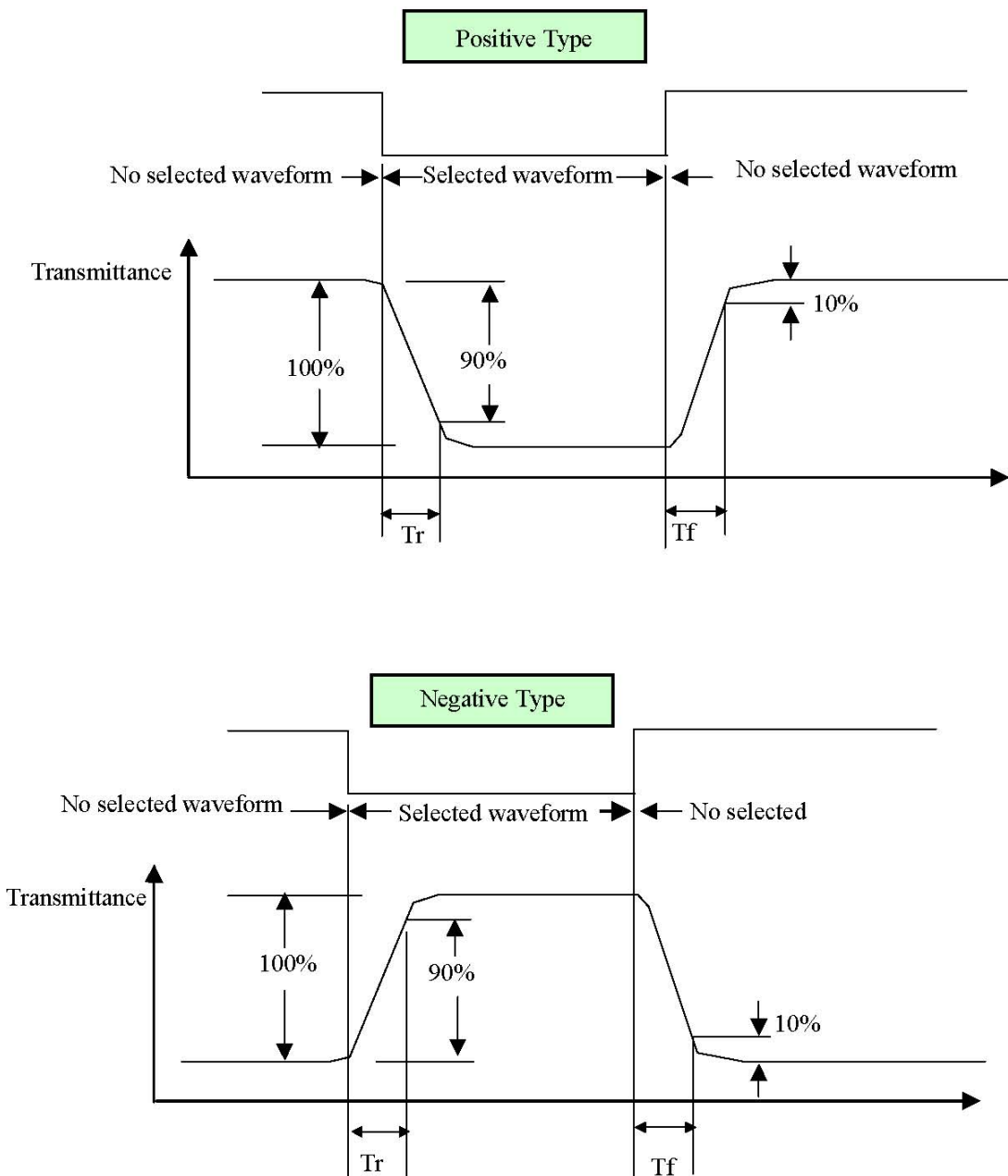


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

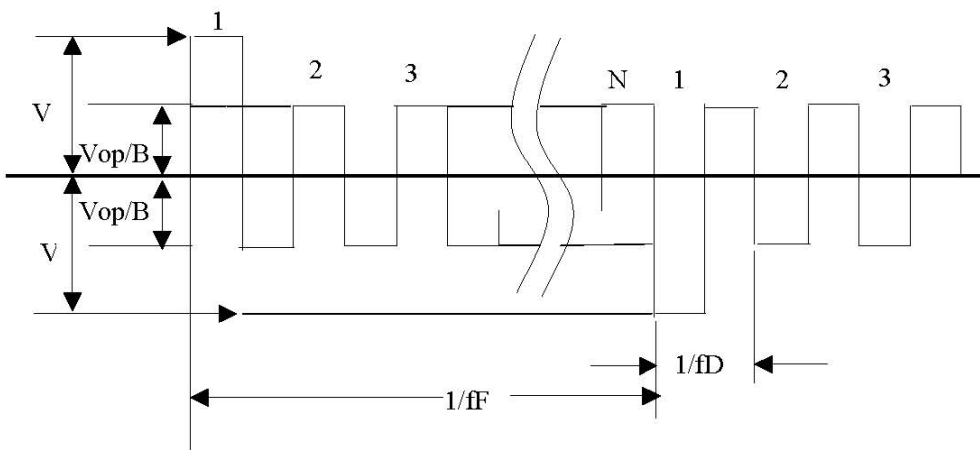
※2 Drive waveform

V_{op} : Drive voltage f_f : Frame frequency

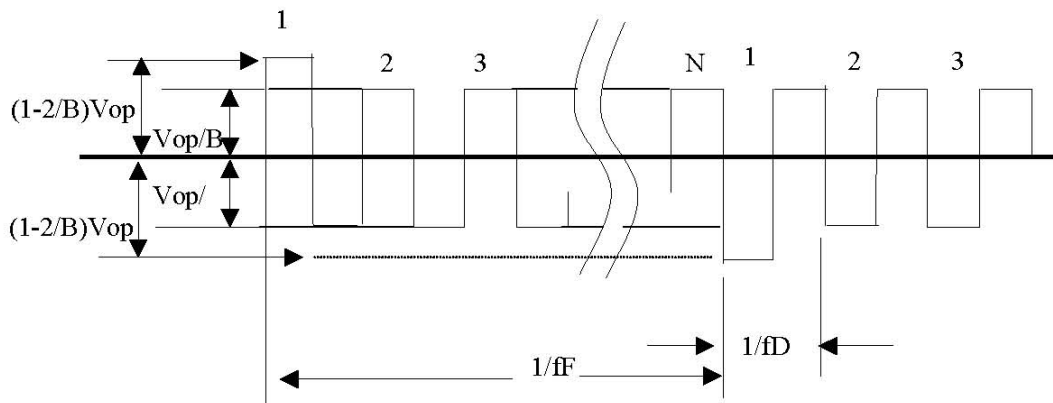
$1/B$: Bias f_D : Drive frequency

N : Duty

(1) Selected waveform



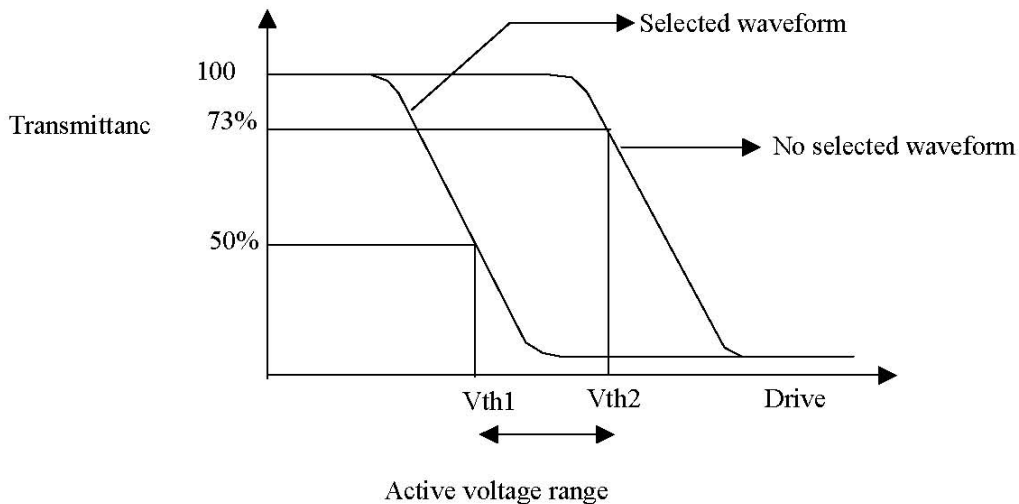
(2) Non- Selected wave form



Note:

Frame frequency is defined as follows: Common side supply voltage peak - to - peak / 2 = 1 period

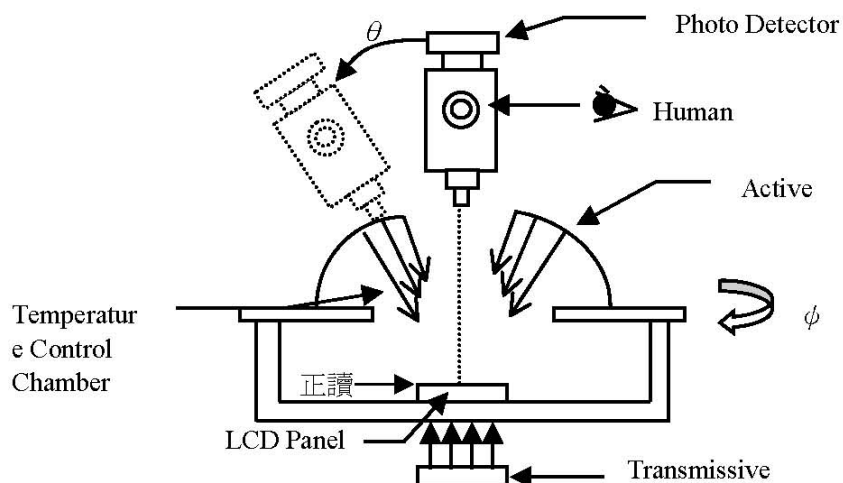
Note 3. : Definition of Vth



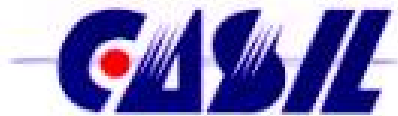
	Vth1	Vth2
View direction	10°	40°
Drive waveform	(Selected waveform)	(No selected waveform)
Transmittance	50%	73%

※1 Contrast ratio
 = (Brightness in OFF state) / (Brightness in ON state)

Outline of Electro-Optical Characteristics Measuring System



Measuring System: Autronic DMS-803



1.6 Backlight Characteristics

LCD Module with LED Backlight

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	I_F	One LED	-	25	mA
Reverse Voltage	V_R	One LED	-	15	V
Power Dissipation	P_d		-	1.5	W
Operating Temperature	T_{OP}	-	-20	70	°C
Storage Temperature	T_{ST}	-	-30	80	°C

Electrical / Optical Characteristics

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

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage(Single LED)	V_F	$I_F=140\text{ mA}$	8.31	9.3	10.29	V
Reverse Current	I_R	$V_R=9.5\text{ V}$	-	8	50	uA
Average Brightness (with LCD)	I_V	$I_F=140\text{ mA}$	160	200	-	cd/m ²
CIE Color Coordinate (Without LCD)	X	$I_F=140\text{ mA}$	0.27	0.305	0.34	-
	Y		0.28	0.33	0.34	
Color	White					



2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

Pin No.	Symbol	Function
1	AGND	Analog Ground
2	AVDD	Analog power supply
3	VCC	Digital power supply
4	R00	Red Data (LSB)
5	R01	Red Data
6	R02	Red Data
7	R03	Red Data
8	R04	Red Data
9	R05	Red Data
10	R06	Red Data
11	R07	Red Data (MSB)
12	G00	Green Data (LSB)
13	G01	Green Data
14	G02	Green Data
15	G03	Green Data
16	G04	Green Data
17	G05	Green Data
18	G06	Green Data
19	G07	Green Data (MSB)
20	B00	Blue Data (LSB)
21	B01	Blue Data
22	B02	Blue Data
23	B03	Blue Data
24	B04	Blue Data
25	B05	Blue Data
26	B06	Blue Data
27	B07	Blue Data (MSB)
28	DCLK	Dot clock
29	DE	Data enable
30	HSD	Horizontal sync
31	VSD	Vertical sync
32	MODE	DE/SYNC mode select; normal pull high; “H” DE mode, “L” Sync mode.
33	RSTB	Global reset Pin.normal pull high.
34	STBY	Standby mode,normal pull high, STBY=1 , normal mode; STBY=0, timing con.



35	SHLR	Left or right display control
36	VCC	Digital power
37	UPDN	UP/DOWN Display control
38	GND	Digital ground.
39	AGND	Analog ground.
40	AVDD	Analog power.
41	VCOM	Common voltage.
42	NC	Not Connect
43	NC	Not Connect
44	NC	Not Connect
45	V10	Gamma correction voltage reference
46	V9	Gamma correction voltage reference
47	V8	Gamma correction voltage reference
48	V7	Gamma correction voltage reference
49	V6	Gamma correction voltage reference
50	V5	Gamma correction voltage reference
51	V4	Gamma correction voltage reference
52	V3	Gamma correction voltage reference
53	V2	Gamma correction voltage reference
54	V1	Gamma correction voltage reference
55	NC	Not Connect
56	VGH	Positive Power for TFT
57	VCC	Digital Power
58	VGL	Negative Power for TFT
59	GND	Ground
60	NC	Not Connect

2.3 Timing Characteristics

TBD.

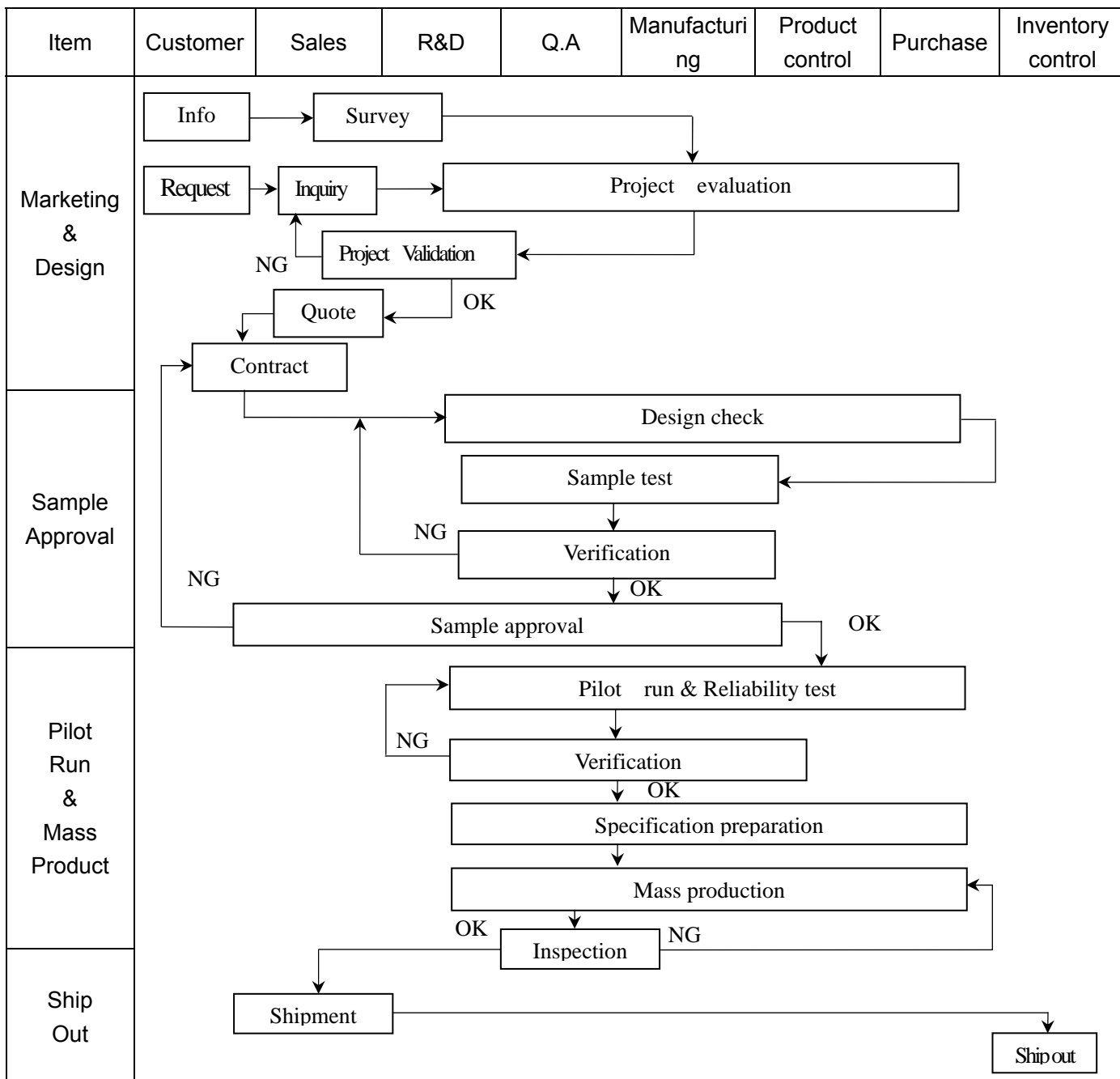
2.4 Display Command

TBD.



3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart





3.2 Inspection Specification

Inspection Standard : MIL-STD-105E Table Normal Inspection Single Sampling Level II

Equipment : Gauge , MIL-STD , Casilsemi Tester , Sample

IQC Defect Level : Major Defect AQL 0.4; Minor Defect AQL 1.5

FQC Defect Level : 100% Inspection

OUT Going Defect Level : Sampling

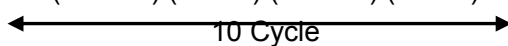
Specification :

NO	Item	Specification	Judge	Level
1	Part Number	The part number is inconsistent with work order of production	N.G.	Major
2	Quantity	The quantity is inconsistent with work order of production	N.G.	Major
3	Electronic characteristics of LCM $A=(L+W)/2$	The display lacks of some patterns.	N.G.	Major
		Missing line.	N.G.	Major
		The size of missing dot, A is $> 1/2$ Dot size	N.G.	Major
		There is no function.	N.G.	Major
		Output data is error	N.G.	Major
4	Appearance of LCD $A=(L+W)/2$ Dirty particle (Including scratch、bubble)	Material is different with work order of production	N.G.	Major
		LCD is assembled in inverse direction	N.G.	Major
		Bezel is assembled in inverse direction	N.G.	Major
		Shadow is within LCD viewing area + 0.5 mm	N.G.	Major
		The diameter of dirty particle, A is > 0.4 mm	N.G.	Minor
		Dirty particle length is > 3.0 mm, and 0.01 mm $<$ width ≤ 0.05 mm	N.G.	Minor
		Display is without protective film	N.G.	Minor
		Conductive rubber is over bezel 1mm	N.G.	Minor
		Polarizer exceeds over viewing area of LCD	N.G.	Minor
		Area of bubble in polarizer, A > 1.0 mm, the number of bubble is > 1 piece.	N.G.	Minor
		0.4 mm $<$ Area of bubble in polarizer, A < 1.0 mm, the number of bubble is > 4 pieces.	N.G.	Minor
5	Appearance of PCB $A=(L+W)/2$	Burned area or wrong part number is on PCB	N.G.	Major
		The symbol, character, and mark of PCB are unidentifiable.	N.G.	Minor
		The stripped solder mask , A is > 1.0 mm	N.G.	Minor
		0.3 mm $<$ stripped solder mask or visible circuit, A < 1.0 mm, and the number is ≥ 4 pieces	N.G.	Minor
		There is particle between the circuits in solder mask	N.G.	Minor
		The circuit is peeled off or cracked	N.G.	Minor
		There is any circuits risen or exposed.	N.G.	Minor
		0.2 mm $<$ Area of solder ball, A is ≤ 0.4 mm	N.G.	Minor
		The number of solder ball is ≥ 3 pieces	N.G.	Minor
The magnitude of solder ball, A is > 0.4 mm.	N.G.	Minor		



4. RELIABILITY TEST

4.1 Reliability Test Condition

NO	Item	Test Condition	
1	High Temperature Storage	Storage at $80 \pm 2^{\circ}\text{C}$ 96~100 hrs Surrounding temperature, then storage at normal condition 4hrs	
2	Low Temperature Storage	Storage at $-30 \pm 2^{\circ}\text{C}$ 96~100 hrs Surrounding temperature, then storage at normal condition 4hrs	
3	High Temperature /Humidity Storage	1.Storage 96~100 hrs $60 \pm 2^{\circ}\text{C}$, 90~95%RH surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer). or 2.Storage 96~100 hrs $40 \pm 2^{\circ}\text{C}$, 90~95%RH surrounding temperature, then storage at normal condition 4 hrs.	
4	Temperature Cycling	$-20^{\circ}\text{C} \rightarrow 25^{\circ}\text{C} \rightarrow 70^{\circ}\text{C} \rightarrow 25^{\circ}\text{C}$ (30mins) (5mins) (30mins) (5mins) 	
5	Vibration	10~55Hz (1 minute) 1.5mm X,Y and Z direction * (each 2hrs)	
6	ESD Test	Air Discharge: Apply 6 KV with 5 times discharge for each polarity +/-	Contact Discharge: Apply 250V with 5 times discharge for each polarity +/-
		Testing location: Around the face of LCD	Testing location: 1.Apply to bezel. 2.Apply to Vdd, Vss.
7	Drop Test	Packing Weight (Kg)	Drop Height (cm)
		0 ~ 45.4	100
		45.4 ~ 90.8	76
		90.8 ~ 454	61
		Over 454	46



5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

- 5.1.1 If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.
- 5.1.2 If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.

5.2 HANDLING

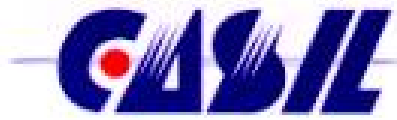
- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 The polarizing plate of the display is very fragile. So , please handle it very carefully, do not touch , push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)
- 5.2.5 Do not wipe the polarizing plate with a dry cloth , as it may easily scratch the surface of plate.
- 5.2.6 Do not touch the display area with bare hands , this will stain the display area.
- 5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 5.2.8 To control temperature and time of soldering is $280 \pm 10^{\circ}\text{C}$ and 3-5 sec.
- 5.2.9 To avoid liquid (include organic solvent) stained on LCM

5.3 STORAGE

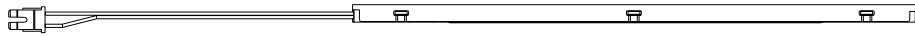
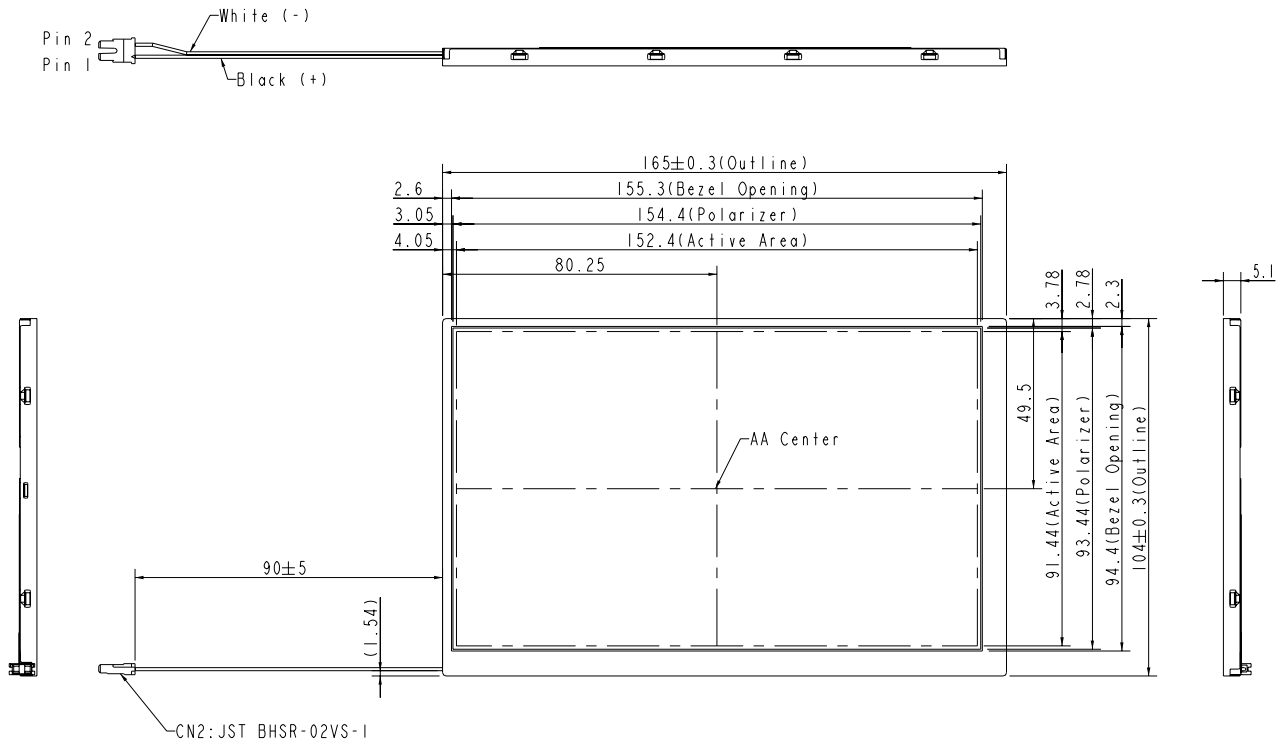
- 5.3.1 Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush , shake , or jolt the module.

5.4 TERMS OF WARRANTY

- 5.4.1 Applicable warrant period
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility
This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in nuclear power control equipment,

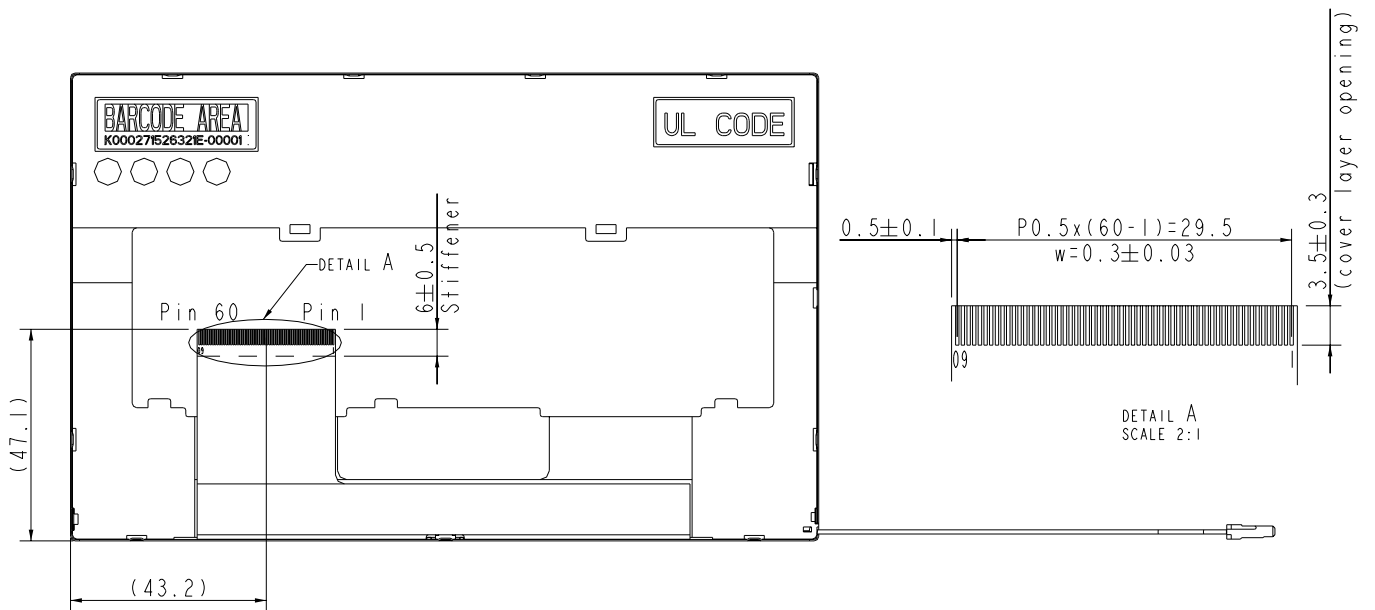


aerospace equipment , fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.



[Note] : Tolerance is $\pm 0.3\text{mm}$ unless noted

[Unit : mm]



[Note] : Tolerance is $\pm 0.3\text{mm}$ unless noted