

Specification

PG320240WRM-HNNIS1

Version Mai 2005



POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER : _____


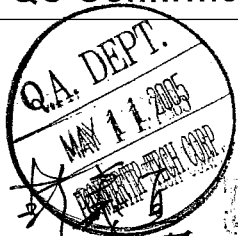

SAMPLE CODE (Ver.) : _____

MASS PRODUCTION CODE (Ver.) : PG320240WRM-HNNIS1(Ver.0)

DRAWING NO. (Ver.) : PG-03104-160 (Ver.0)

Customer Approved

Date: _____

Approved	QC Confirmed	Designer
		

Approval For Specifications Only.

* This specification is subject to change without notice.

Please contact Powertip or it's representative before designing your product based on this specification.

Approval For Specifications and Sample.

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RECORDS OF REVISION

Date	Rev.	Description	Note	Design by
2005/05/09	0	Mass production	-	Yuan

Total : 20 Page

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Note : For detailed information please refer to IC data sheet : Sitronix – ST8024-F4
ST8016-F3

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	320 * 240 Dots
LCD Type	STN, Negative, Transmissive
Driver Condition	LCD Module :1/240 Duty, 1/14 Bias
Viewing Direction	6 O'clock
Backlight	LED B/L
Weight	65 g
Interface	8 bits parallel data input
Other(controller/driver IC)	Sitronix – ST8024-F4, ST8016-F3

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	92.0 (W) × 71.3 (H) × 7.9 Max (T)	mm
Viewing Area	78.78 (L) * 59.58 (w)	mm
Active Area	76.78(L) * 57.58 (w)	mm
Dot Size	0.22 (W) * 0.22 (H)	mm
Dot Pitch	0.24 (W) * 0.24 (H)	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	7.0	V
LCD Driver Supply Voltage	V ₀	-	-0.3	25	V
Input Voltage	V _{IN}	-	-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

$V_{DD} = 5.0 \text{ V} \pm 10\%$, $V_{SS} = 0\text{V}$, $T_a = 25^\circ\text{C}$

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{DD}	-	4.5	5.0	5.5	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}	-	$V_{DD}-0.4$	-	-	V
“L” Output Voltage	V_{OL}	-	-	-	$V_{SS}+0.4$	V
Supply Current	I_{DD}	$V_{DD} = 5.0 \text{ V}$	-	10	30	mA
LCM Driver Voltage	V_{OP}	$V_{C9} (-20^\circ\text{C})$	20.7	20.9	21.1	V
		$V_{C9} (25^\circ\text{C})$	20.5	20.7	20.9	
		$V_{C9} (70^\circ\text{C})$	19.2	19.4	19.6	

1.5 Optical Characteristics

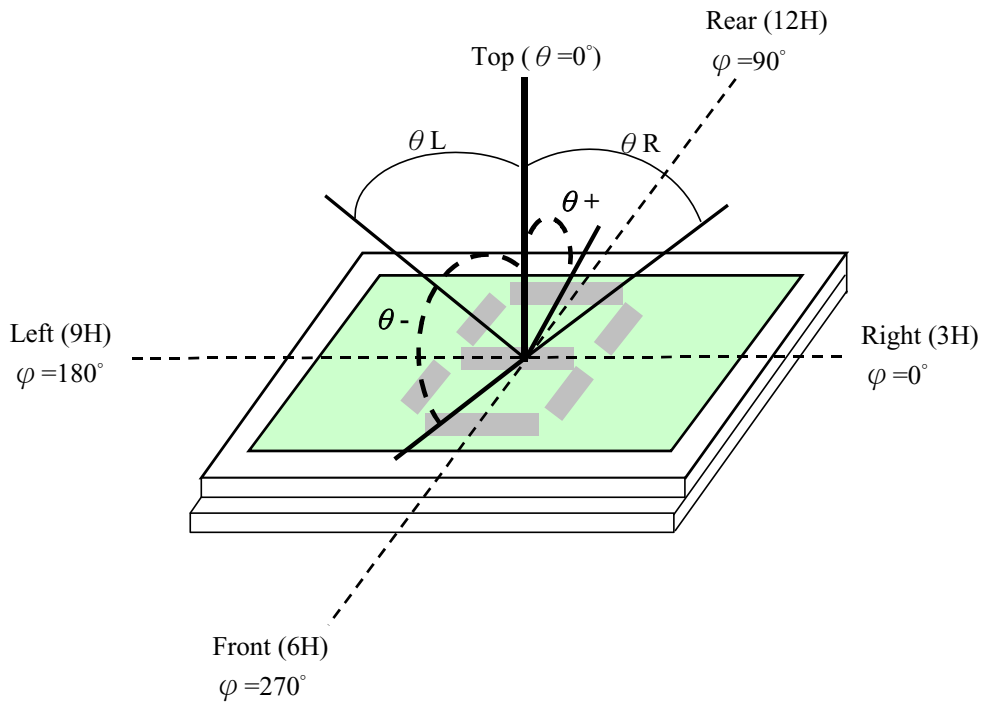
LCD Panel: 1/240 Duty, 1/15 Bias, $V_{LCD} = 22 \text{ V}$, $T_a = 25^\circ\text{C}$

Item	Symbol	Conditions	Min.	Typ.	Max.	Reference
View Angle	θ	$C \geq 2.0$, $\varnothing = 270^\circ$	-40	-	+40	Notes 1
Contrast Ratio	C	$\theta = -5^\circ$, $\varnothing = 270^\circ$	2	5	-	Note 3
Response Time(rise)	t_r	$\theta = -5^\circ$, $\varnothing = 270^\circ$	-	100	150	Note 2
Response Time(fall)	t_f	$\theta = -5^\circ$, $\varnothing = 270^\circ$	-	350	525	

Note 1.

Optical characteristics-2

Viewing angle

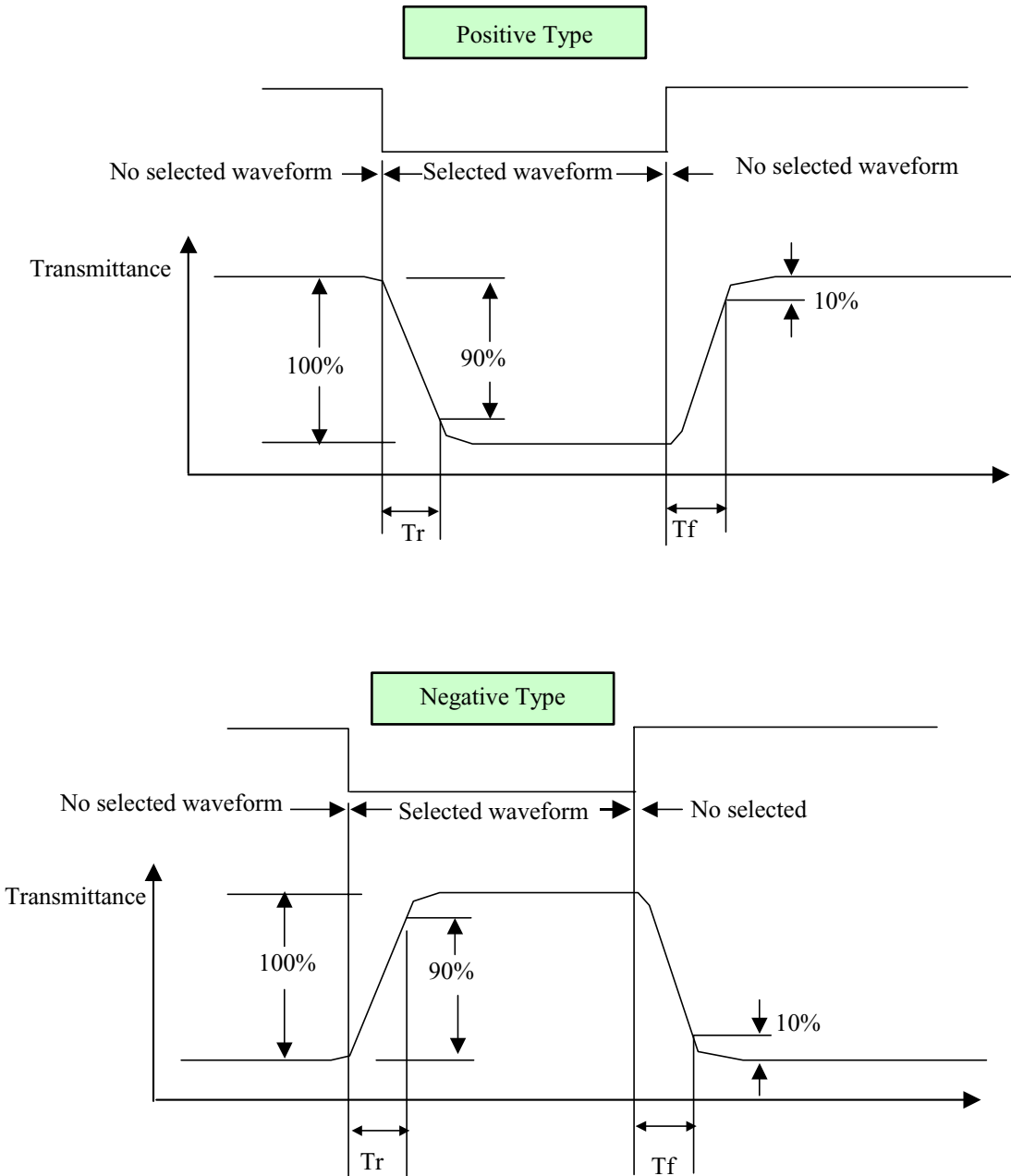


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

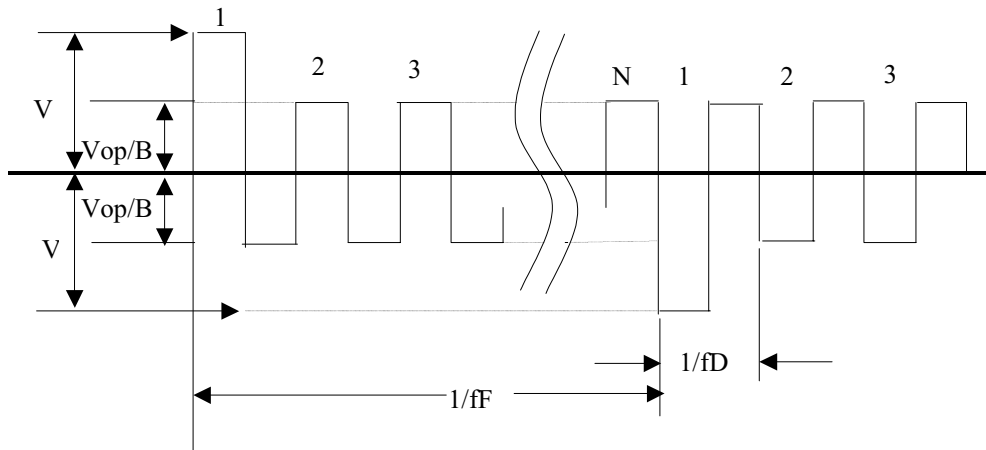
※2 Drive waveform

V_{op} : Drive voltage f_F : Frame frequency

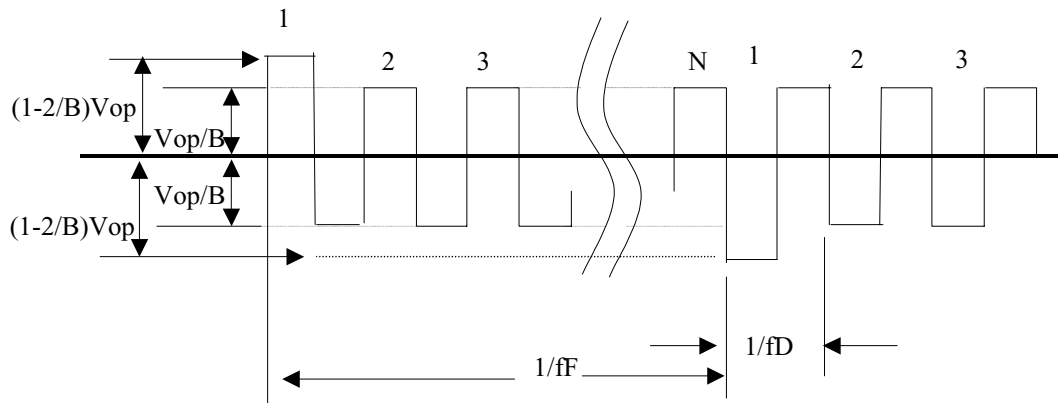
$1/B$: Bias f_D : Drive frequency

N: Duty

(1) Selected waveform



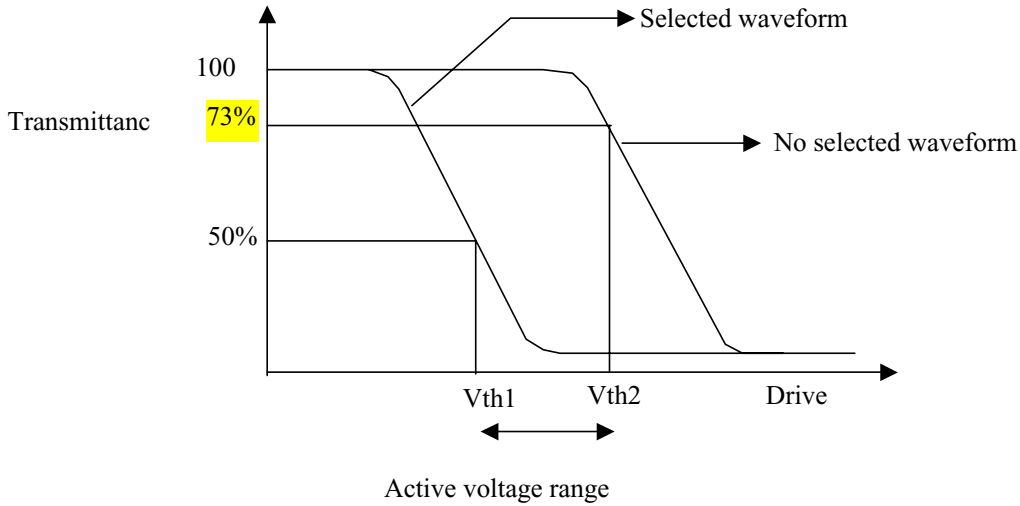
(2) Non- Selected waveform



Note:

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

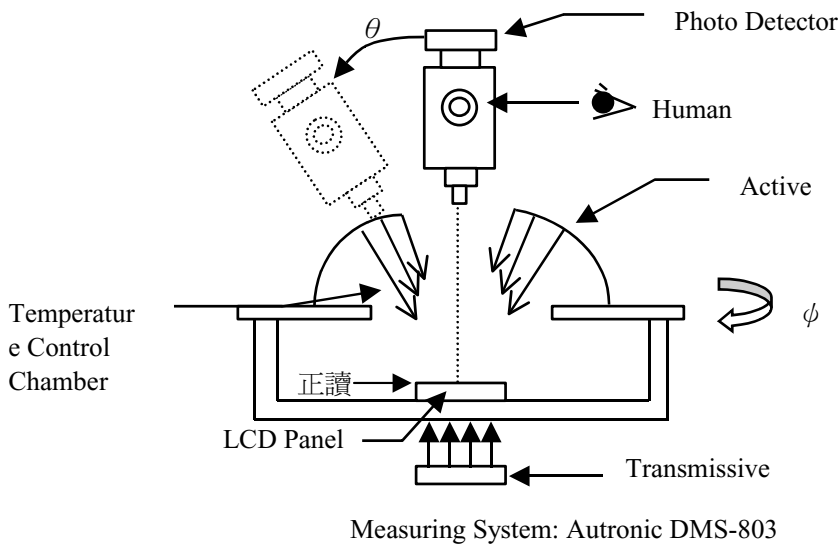
Note 3. : Definition of Vth



	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



1.6 Backlight Characteristics

LCD Module with LED Backlight

Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Forward Current	IF	Ta = 25 °C	-	120	mA
Reverse Voltage	VR	Ta = 25 °C	-	5	V
Power Dissipation	PO	Ta = 25 °C	-	0.51	W

Electrical / Optical Characteristics

Ta =25°C

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF = 120mA	-	3.7	4.1	V
Reverse Current	IR	VR = 5 V	-	-	0.01	mA
Average Brightness (with LCD) *1	IV	IF = 120 mA	25	36	-	cd/m ²
Uniformity *1	△B	IF= 120 mA	70	-	-	% *2
CIE Color Coordinate (With LCD) *1	X	IF = 120 mA	0.29	0.32	0.35	
	Y		0.29	0.32	0.35	
Color	White					

*1 This vaule will be changed while mass production.

*2 : $\Delta B = B(\text{min}) / B(\text{max})$

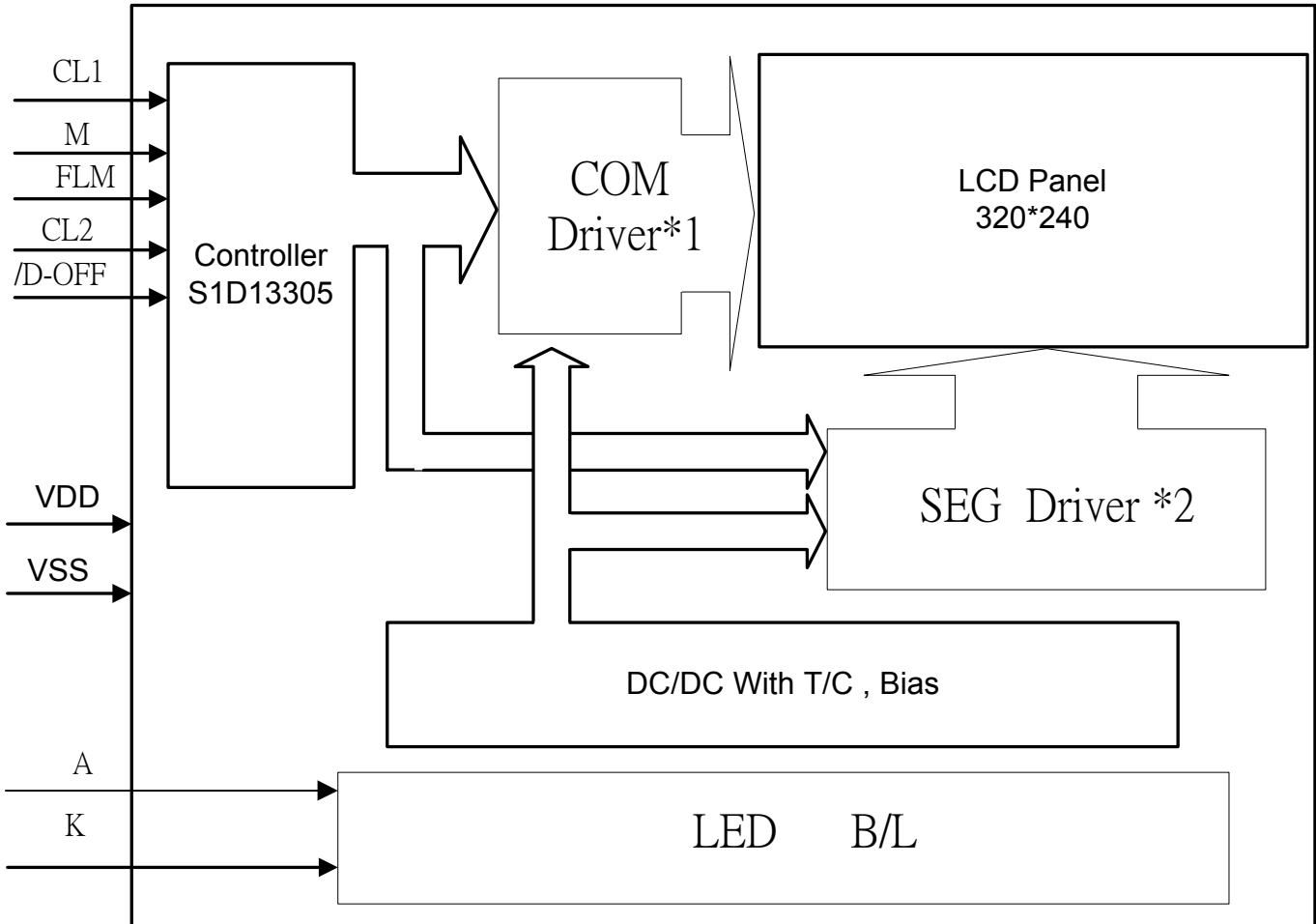
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

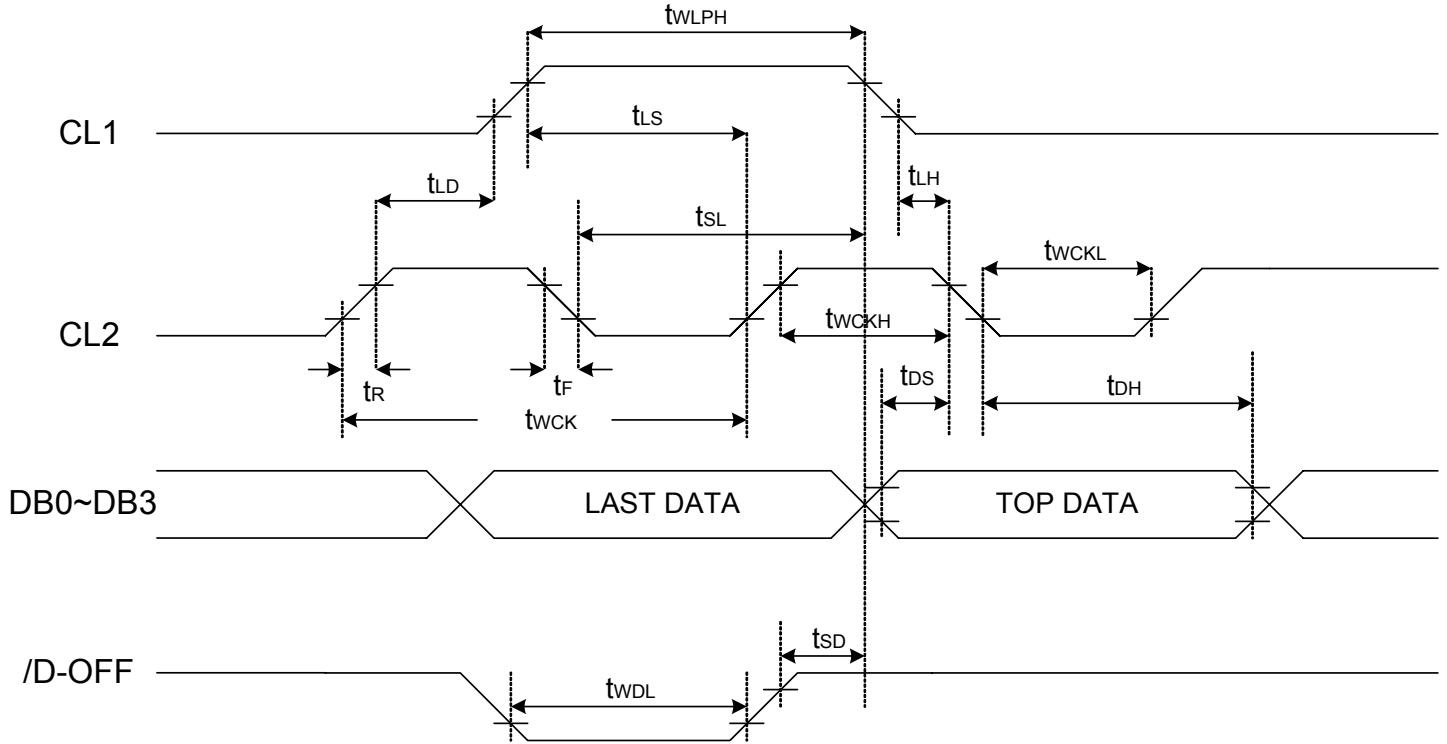
2.1.2 Block Diagram



2.2 Interface Pin Description

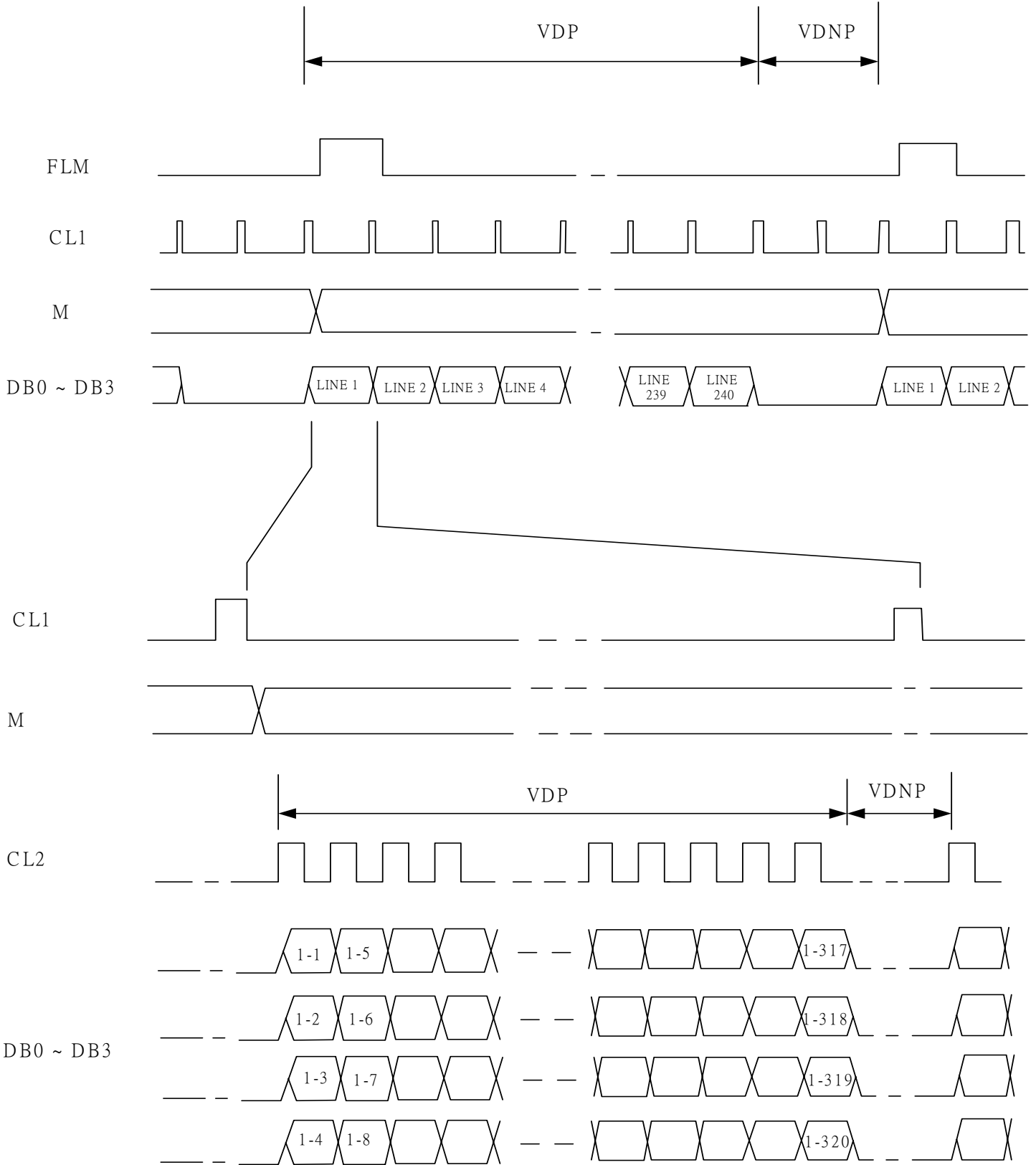
Pin No.	Symbol	Function
1	FLM	Indicates the beginning of each display cycle
2	M	AC signal input for LC driving waveform
3	CL1	Bi-directional shift register shift clock pulse input pin
4	CL2	Clock input pin for taking display data
5	/D-OFF	Control input pin for output deselect level
6	DB0	Display data input pin
7	DB1	Display data input pin
8	DB2	Display data input pin
9	DB3	Display data input pin
10	VDD	Power supply (+5V)
11	VSS	Ground
12	ADJ	LCD Contrast Adjust
13	VSS	Ground
14	NC	NO Connection
15	A	Power supply for LED (+)
16	K	Power supply for LED (-)

2.3 Timing Characteristics



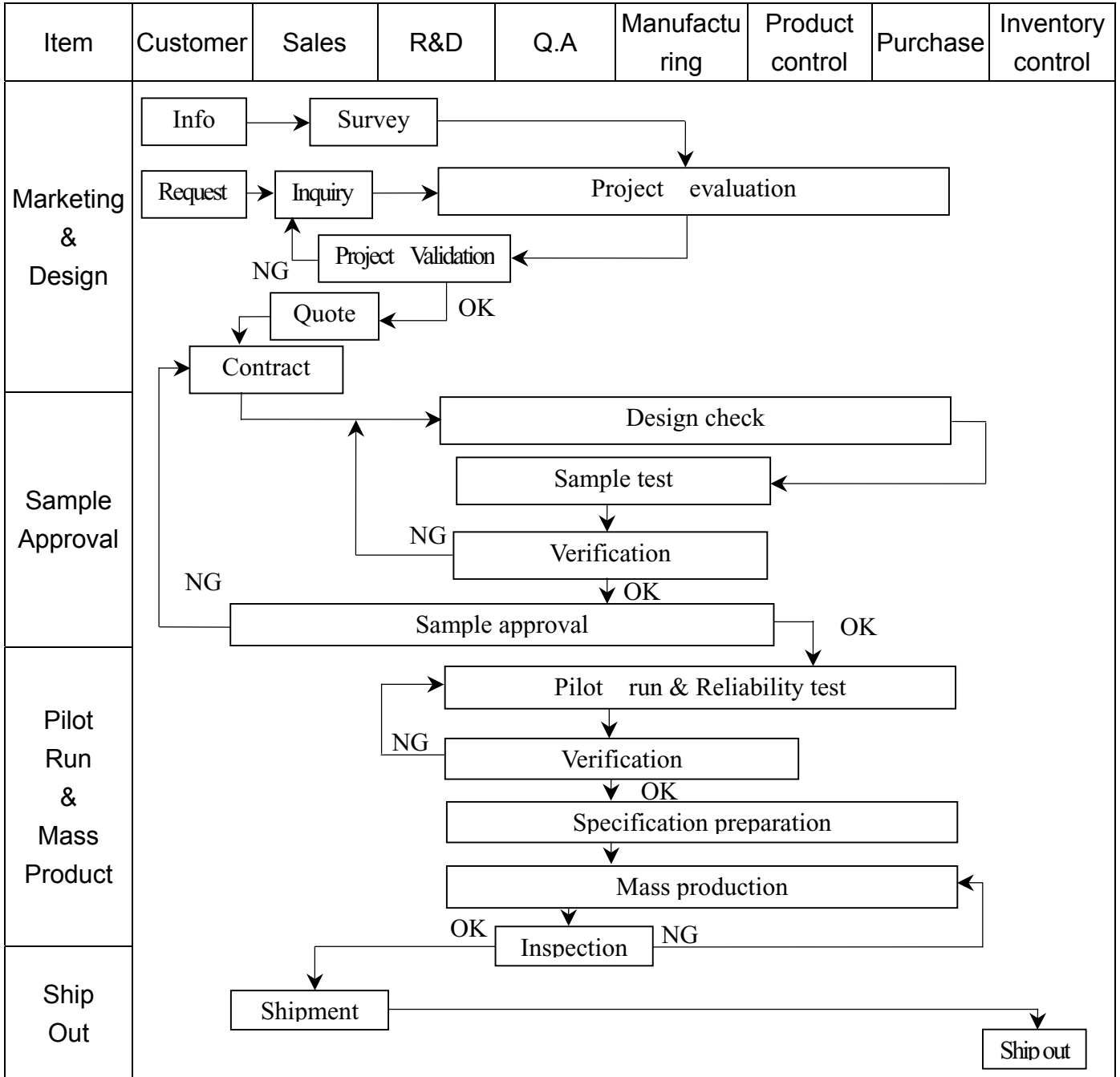
Parameter	Symol	Condition	Min.	Typ.	Max.	Unit
Shift clock period	t_{wck}	$t_r, t_f \leq 1 \text{ ns}$	125	-	-	ns
Shift clock "H" pulse width	t_{wckH}	-	51	-	-	ns
Shift clock "L" pulse width	t_{wckL}	-	51	-	-	ns
Data setup time	t_{ds}	-	30	-	-	ns
Data hold time	t_{dh}	-	40	-	-	ns
Latch pulse "H" pulse width	t_{wLPH}	-	51	-	-	ns
Shift clock rise to Latch pulse rise time	t_{LD}	-	0	-	-	ns
Shift clock fall to Latch pulse fall time	t_{SL}	-	51	-	-	ns
Latch pulse rise to Shift clock rise time	t_{LS}	-	51	-	-	ns
Latch pulse fall to Shift clock fall time	t_{LH}	-	51	-	-	ns
Input signal rise time	t_r	-	-	-	50	ns
Input signal fall time	t_f	-	-	-	50	ns
/D_OFF removal time	t_{sd}	-	100	-	-	ns
/D_OFF "L" pulse width	t_{wDL}	-	1.2	-	-	us
Output delay time (1)	t_{pd1}, t_{pd2}	CL=15 pF	-	-	1.2	us
Output delay time (2)	t_{pd3}	CL=15 pF	-	-	1.2	us

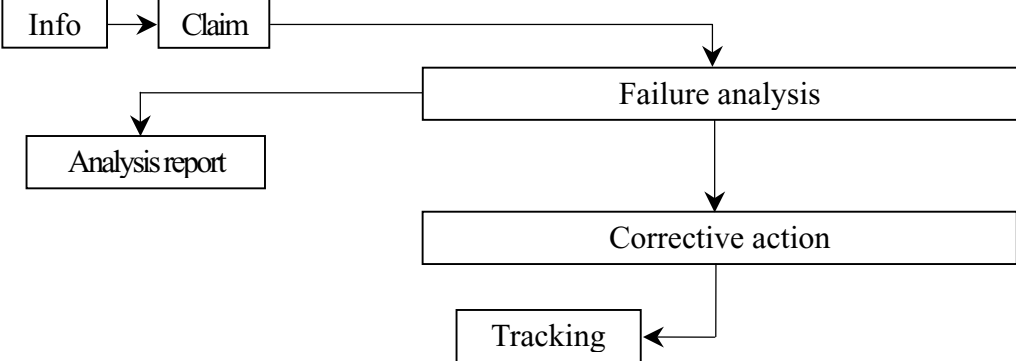
4 Bits Panel Timing



3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD Info[Info] --> Claim[Claim] Claim --> Failure[Failure analysis] Failure --> Report[Analysis report] Failure --> Action[Corrective action] Action --> Tracking[Tracking] </pre>							
Q.A Activity	1. ISO 9001 Maintenance Activities 3. Equipment calibration 5. Standardization Management				2. Process improvement proposal 4. Education And Training Activities			

3.2 Inspection Specification

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

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

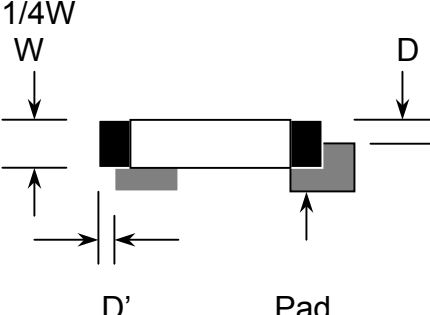
IQC Defect Level : Major Defect AQL 0.4; Minor Defect AQL 1.5

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 > 3.0mm, and 0.01mm < width ≤ 0.05mm	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 > 1.0mm, the number of bubble is > 1 piece.	N.G.	Minor
		0.4mm < Area of bubble in polarizer, A < 1.0mm, 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 > 1.0mm	N.G.	Minor
		0.3mm < stripped solder mask or visible circuit, A < 1.0mm, 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
		0.2mm < Area of solder ball, A is ≤ 0.4mm	N.G.	Minor
		The number of solder ball is ≥ 3 pieces	N.G.	Minor
The magnitude of solder ball, A is > 0.4mm.	N.G.	Minor		

NO	Item	Specification	Judge	Level
6	Appearance of molding $A = (L + W) / 2$	The shape of modeling is deformed by touching.	N.G.	Major
		Insufficient epoxy: Circuit or pad of IC is visible	N.G.	Minor
		Excessive epoxy: Diameter of modeling is > 20mm or height is > 2.5mm	N.G.	Minor
		The diameter of pinhole in modeling, A is > 0.2mm.	N.G.	Minor
7	Appearance of frame $A = (L + W) / 2$	The folding angle of frame must be > $45^\circ + 10^\circ$	N.G.	Minor
		The area of stripped electroplate in top-view of frame, A is > 1.0mm.	N.G.	Minor
		Rust or crack is (Top view only)	N.G.	Minor
		The scratched width of frame is > 0.06mm. (Top view only)	N.G.	Minor
8	Electrical characteristic of backlight $A = (L + W) / 2$	The color of backlight is nonconforming	N.G.	Major
		Backlight can't work normally.	N.G.	Major
		The LED lamp can't work normally	N.G.	Major
		The unsoldering area of pin for backlight, A is > 1/2 solder joint area.	N.G.	Minor
		The height of solder pin for backlight is > 2.0mm	N.G.	Minor
10	Assembly parts $A = (L + W) / 2$	The mark or polarity of component is unidentifiable.	N.G.	Minor
		The height between bottom of component and surface of the PCB is floating > 0.7mm	N.G.	Minor
		$D > 1/4W$ 	N.G.	Minor
		End solder joint width, D' is > 50% width of component termination or width of pad	N.G.	Minor
		Side overhang, D is > 25% width of component termination.	N.G.	Minor
		Component is cracked, deformed, and burned, etc.	N.G.	Minor
		The polarity of component is placed in inverse direction.	N.G.	Minor
		Maximum fillet height of solder extends onto the component body or minimum fillet height is < 0.5mm.	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	$-20^{\circ}\text{C} \rightarrow 25^{\circ}\text{C} \rightarrow 70^{\circ}\text{C} \rightarrow 25^{\circ}\text{C}$ $\leftarrow (30\text{mins}) (5\text{mins}) (30\text{mins}) (5\text{mins}) \rightarrow$ <p style="text-align: center;">10 Cycle</p>	
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	122
		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.

LCM Model PG320240WRM-HNNIS1

LCM包裝規格書

LCM Packaging Specifications

(For Tray)

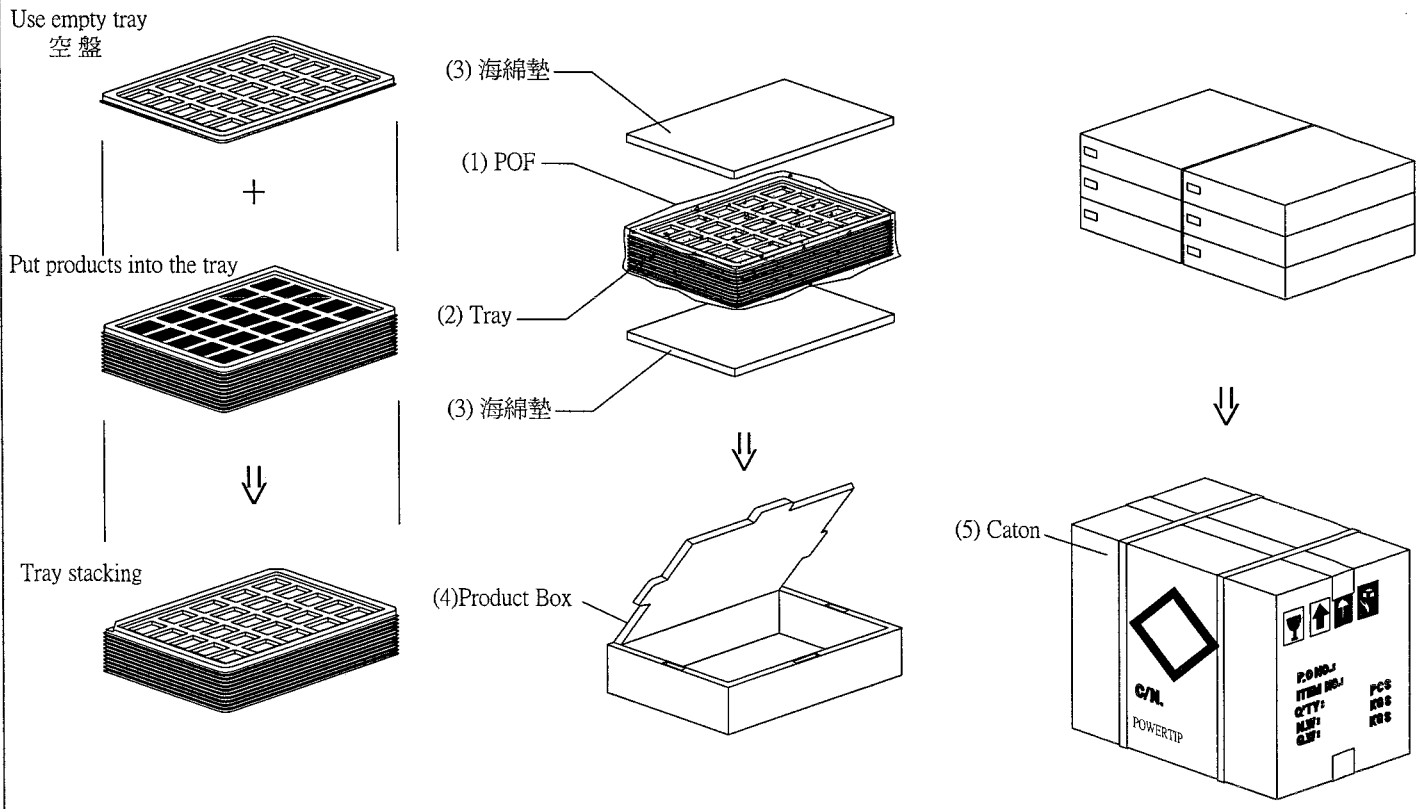
DATE	05'05.10	05'05.10	0
	初版	版次	Ver

1. 包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	Quantity
1	成品 (LCM)	PG320240WRM-HNNIS1	92.0 X 71.3	120
2	多層薄膜(1)POF	BA03	19"X350X0.015	6
3	TRAY 盤 (2)	BX320240H2TZ0A	295 X 245 X 17.4	36
4	海綿墊(3)	OTFOAM00006A0A	290 X 240 X 10	12
5	C3內盒(4)Product Box	BX31025510AA0A	310 X 255 X 100	6
6	外紙箱(5)Carton	BX52732536CC0A	527 X 325 X 360	1
7				
8				
9				

2. 單箱數量規格表 (Packaging Specifications and Quantity) :

(1) LCM quantity per box : no per tray	4	x no of tray	5	=	20
(2) Total LCM quantity in carton : quantity per box	20	x no of boxes	6	=	120



特 記 事 項 (REMARK)

1. Label Specifications :

MODEL:
LOT NO:
QUANTITY:
CHECK:

2. Rotate tray 180 degrees and place on top of stack.
(TRAY盤相疊時,需旋轉180度)



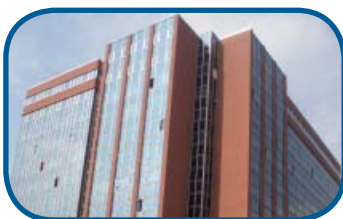
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