

SPECIFICATIONS

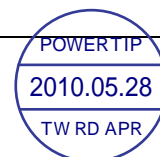
CUSTOMER	:	CSE021
SAMPLE CODE	:	-
MASS PRODUCTION CODE	:	PE240160WRT001IY1Q
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	001
DRAWING NO. (Ver.)	:	LMD-PE240160WRT001IY1Q (Ver.001)
PACKAGING NO. (Ver.)	:	PKG-PE240160WRT001IY1Q (Ver.001)

Customer Approved

Date:

Approved	Checked	Designer
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- ☐ Preliminary specification for design input
☒ Specification for sample approval



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History of Version

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Note : For detailed information please refer to IC data sheet : SITRONIX –ST7529-G

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	240 * 160 Dots
LCD Type	FSTN, Negative, Transmissive
Driver Condition	LCD Module : 1/160 Duty, 1/12 Bias
Viewing Direction	6 O'clock
Backlight	LED B/L
Weight	50.4 g
Interface	8-bit parallel bi-directional interface with 6800-series or 8080-series
Driver IC	SITRONIX – ST7529-G
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web side : http://www.powertip.com.tw/news/LatestNews.asp

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	96.2 (W) * 67.2 (L) * 5 (H)	mm
Viewing Area	80.78 (W) * 54.18 (L)	mm
Active Area	76.785 (W) * 51.185 (L)	mm
Dot Size	0.305 (W) * 0.305(H)	mm
Dot Pitch	0.32 (W) * 0.32 (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}	—	-0.5	4.0	V
LCD Driver Supply Voltage	V _{OP}	V _O –V _{SS}	-0.5	20	V
Operating Temperature	T _{OP}	—	-20	70	°C
Storage Temperature.	T _{ST}	—	-30	80	°C
Storage Humidity	H _D	T _a < 60 °C	-	90	%RH

1.4 DC Electrical Characteristics

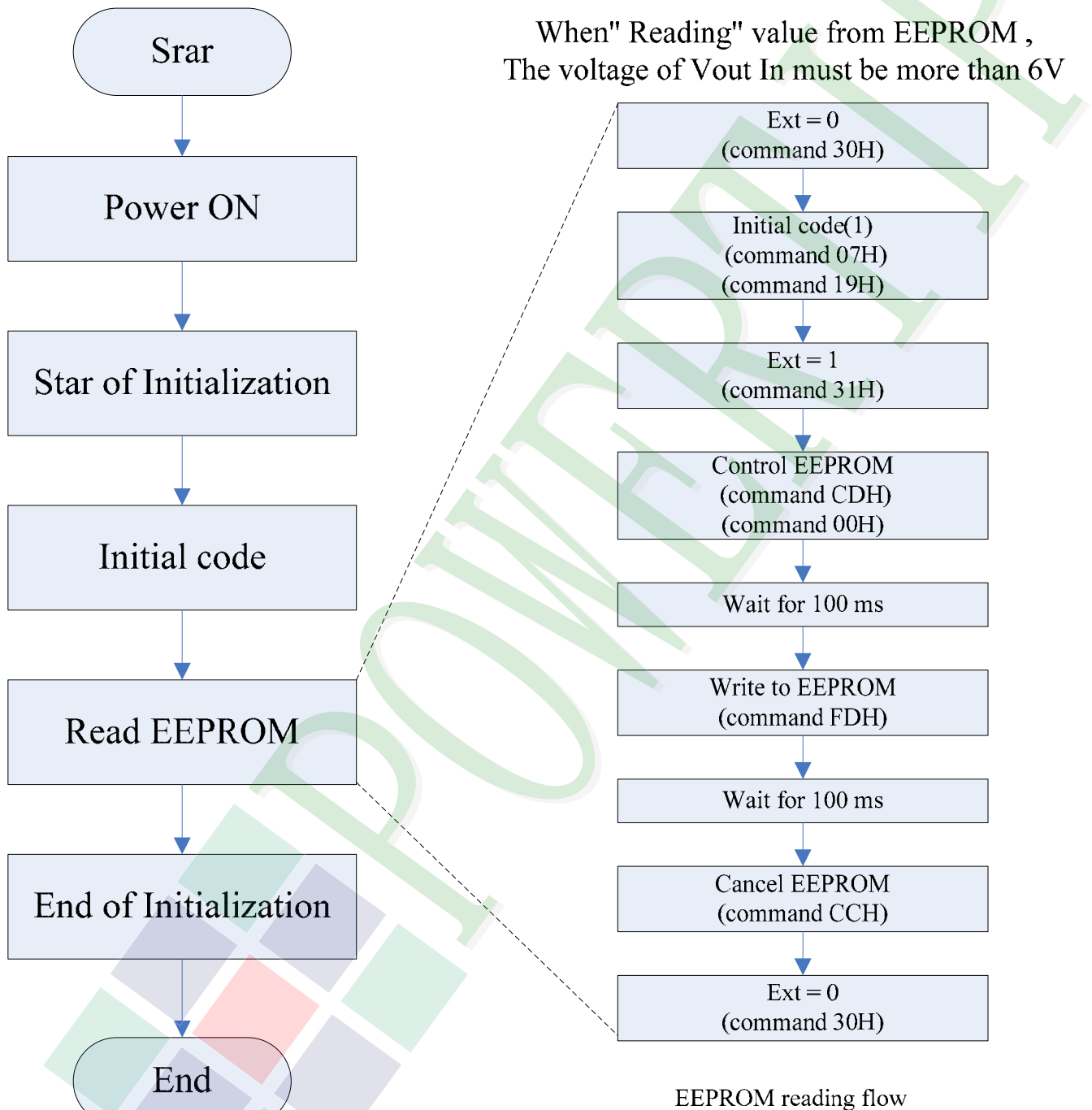
Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V _{dd}	-	2.7	3.0	3.3	V
“H” Input Voltage	V _{IH}	-	0.7V _{DD}	-	V _{DD}	V
“L” Input Voltage	V _{IL}	-	V _{SS}	-	0.3V _{DD}	V
High-level Output Current	I _{OH}	V _{DD} =2.7V, V _{OH} =2.2V	0.5	-	-	V
Low-level Output Current	I _{OL}	V _{DD} =2.7V, V _{OL} =0.5V	-	-	-0.5	V
Supply Current	I _{dd}	V _{DD} = 3.0V; V _{OP} = 15.0V; Pattern= Full display	-	1.5	-	mA
		V _{DD} = 3.0V; V _{OP} = 15.0V; Pattern= Net dots*1	-	5	8	
LCM Driver Voltage	V _{OP} *2	-20°C	17.4	17.5	17.6	V
		25°C	14.8	15.0	15.2	
		70°C	14.0	14.2	14.4	

NOTE: *1 The Maximum current display;

*2 The VOP test point is V0~VSS.

*3 The ST7529 offer read Electronic Control value function from the built-in EEPROM,
Must set up and carry out in initial value in order to avoid that it is unusual to export
Please see the following diagram.





*4 Initial code

```
MOV    A,#00110000B    ;EXT=0 SET
CALL   WRITE_COM
MOV    A,#11010001B    ;INTERNAL OSCILLATION ON
CALL   WRITE_COM
MOV    A,#10010100B    ;SLEEP OUT
CALL   WRITE_COM
MOV    A,#11001010B    ;DISPLAY CONTROL(CL,DUTY,FR)
CALL   WRITE_COM
MOV    A,#00000000B    ;CL DIVIDING RATIO(CLD=0)
CALL   WRITE_DATA
MOV    A,#00100111B    ;DRIVE DUTY(1/160 = 160/4 -1=39)
CALL   WRITE_DATA
MOV    A,#00000000B    ;FR INVERSE-SET VALUE
CALL   WRITE_DATA
MOV    A,#10111011B    ;COMMON SCAN DIRECTON
CALL   WRITE_COM
MOV    A,#00000001B    ;SET COM0->COM79,COM159->COM80
CALL   WRITE_DATA
MOV    A,#10000001B    ;ELECTRONIC VOLUME CONTROL
CALL   WRITE_COM
MOV    A, #00011101B    ;SETTING VOLUME VALUE
CALL   WRITE_DATA
MOV    A,#00000100B    ;SETTING BUILT-IN RESISTANCE VALUE3.6+(285*0.04)=15.0
CALL   WRITE_DATA
MOV    A,#00100000B    ;POWER CONTROL SET
CALL   WRITE_COM
MOV    A,#00001011B    ;VR=1,VF=1,VB=1 Internal VLCD
CALL   WRITE_DATA
```



```
MOV    A,#10100111B    ;INVERSE DISPLAY
CALL   WRITE_COM
MOV    A,#10101001B    ;PARTIAL OUT
CALL   WRITE_COM
MOV    A,#10111100B    ;DATA SCAN DIRECTION
CALL   WRITE_COM
MOV    A,#00000010B    ;NORMAL/INVERSE DISPLAY OF (THE LINE
CALL   WRITE_DATA      ;AND ADDRESS SCAN DIRECTION
MOV    A,#00000001B    ;NOT USED,D0 MUST BE 0
CALL   WRITE_DATA
MOV    A,#00000100B    ;GRAY-SCALE SETUP(3B3P 2MODE)
CALL   WRITE_DATA
MOV    A,#01110101B    ;LINE ADDRESS SET
CALL   WRITE_COM
MOV    A,#00000000B    ;START LINE SET 00
CALL   WRITE_DATA
MOV    A,#159          ;END LINE SET    159
CALL   WRITE_DATA
MOV    A,#00010101B    ;COLUMN ADDRESS SET
CALL   WRITE_COM
MOV    A,#5            ;START COLUMN SET    00
CALL   WRITE_DATA
MOV    A,#84           ;END COLUMN SET    (84-5+1=80 80*3=240)
CALL   WRITE_DATA
MOV    A,#00110001B    ;EXT=1 SET
CALL   WRITE_COM
MOV    A,#00110010B    ;Analog circuit set
CALL   WRITE_COM
MOV    A,#00000000B    ;OSC Frequency 12.7KHZ
```




```
CALL    WRITE_DATA
MOV     A,#00000001B    ;Booster Efficiency Set 6KHZ
CALL    WRITE_DATA
MOV     A,#00000010B    ;Bias Set 1/12
CALL    WRITE_DATA
MOV     A,#00110100B    ;Dithering OFF
CALL    WRITE_COM
```

=====READ EEPROM=====

```
MOV     A,#00110000B    ;EXT=0 SET
CALL    WRITE_COM
MOV     A,#00000111B    ;
CALL    WRITE_COM
MOV     A,#00011001B    ;
CALL    WRITE_DATA
MOV     A,#00110001B    ;EXT=1 SET
CALL    WRITE_COM
MOV     A,#11001101B    ;
CALL    WRITE_COM
MOV     A,#00000000B    ;
CALL    WRITE_DATA
CALL    DELAY00
CALL    DELAY00
CALL    DELAY00
CALL    DELAY00
CALL    DELAY00
MOV     A,#11111101B    ;
CALL    WRITE_COM
CALL    DELAY00
CALL    DELAY00
```



```
CALL    DELAY00
CALL    DELAY00
CALL    DELAY00
MOV     A,#11001100B    ;
CALL    WRITE_COM
MOV     A,#00110000B    ;EXT=0 SET
CALL    WRITE_COM
MOV     A,#10101111B    ;DISPLAY ON
CALL    WRITE_COM
```

1.5 Optical Characteristics

LCD Panel: 1/160 Duty, 1/12 Bias, $V_{LCD} = 15.0V$, $T_a = 25^{\circ}C$

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	25°C	-	150	225	ms	Note2
	Fall	tf	25°C	-	450	675		
Viewing angle range	Top	$\Theta Y+$	$CR \geq 2.0$, $\varnothing = 270^{\circ}$	-	25	-	degree	Note 1
	Bottom	$\Theta Y-$		-	40	-		
	Left	$\Theta X-$		-	45	-		
	Right	$\Theta X+$		-	45	-		
Contrast Ratio		CR	$\theta = 0^{\circ}$, $\varnothing = 270^{\circ}$	-	30	-	-	Note 3
Average Brightness (With LED B/L)		IV	IF= 40 mA	90	130	-	cd/m ²	-
CIE Color Coordinate (With LED B/L)	X	Y	IF= 40 mA	0.21	0.26	0.31	-	Note 4
	Y			0.21	0.26	0.31	-	
Uniformity		ΔB		70	-	-	%	

Note 4:

1 : $\Delta B = B(\min) / B(\max) * 100\%$

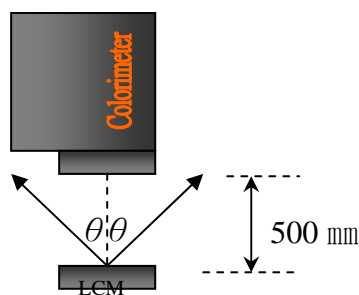
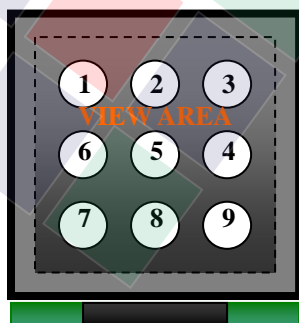
2 : Measurement Condition for Optical Characteristics:

a : Environment: 25 ±5 / 60±20% R.H , no wind , dark room below 10 Lux at typical lamp current and typical operating frequency.

b : Measurement Distance: 500 ± 50 mm , ($\theta = 0^{\circ}$)

c : Equipment: TOPCON BM-7 fast , (field 1°) , after 10 minutes operation.

d : The uncertainty of the C.I.E coordinate measurement ±0.01 , Average Brightness ± 4%



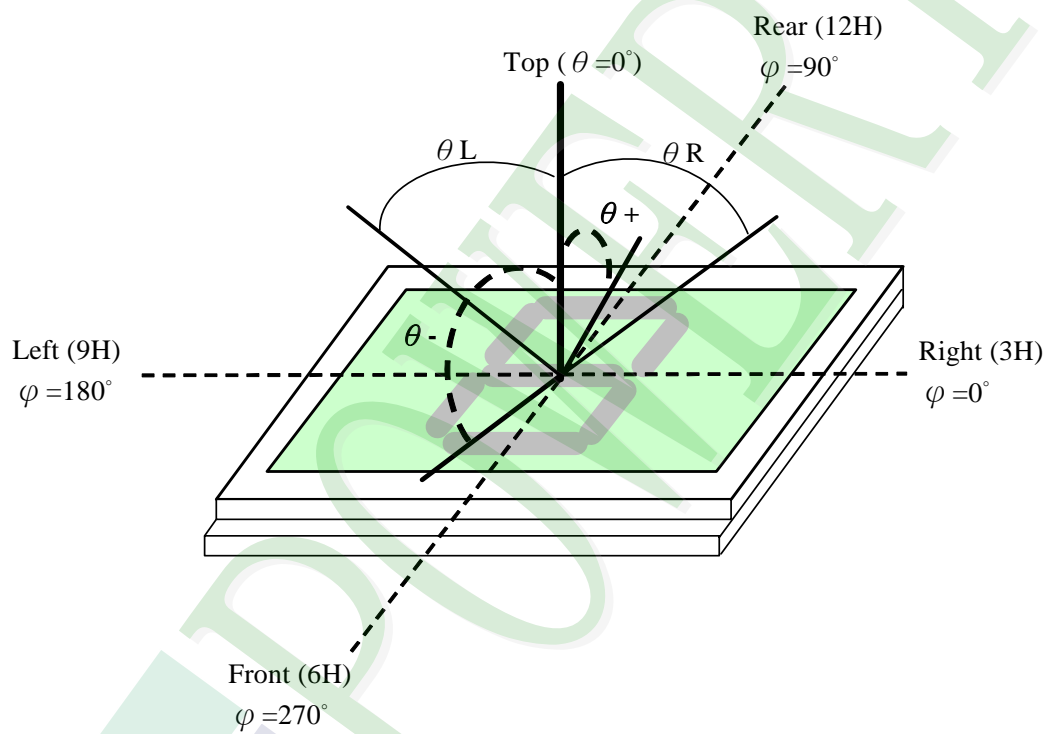
Colorimeter=BM-7 fast



Note 1.

Optical characteristics-2

Viewing angle



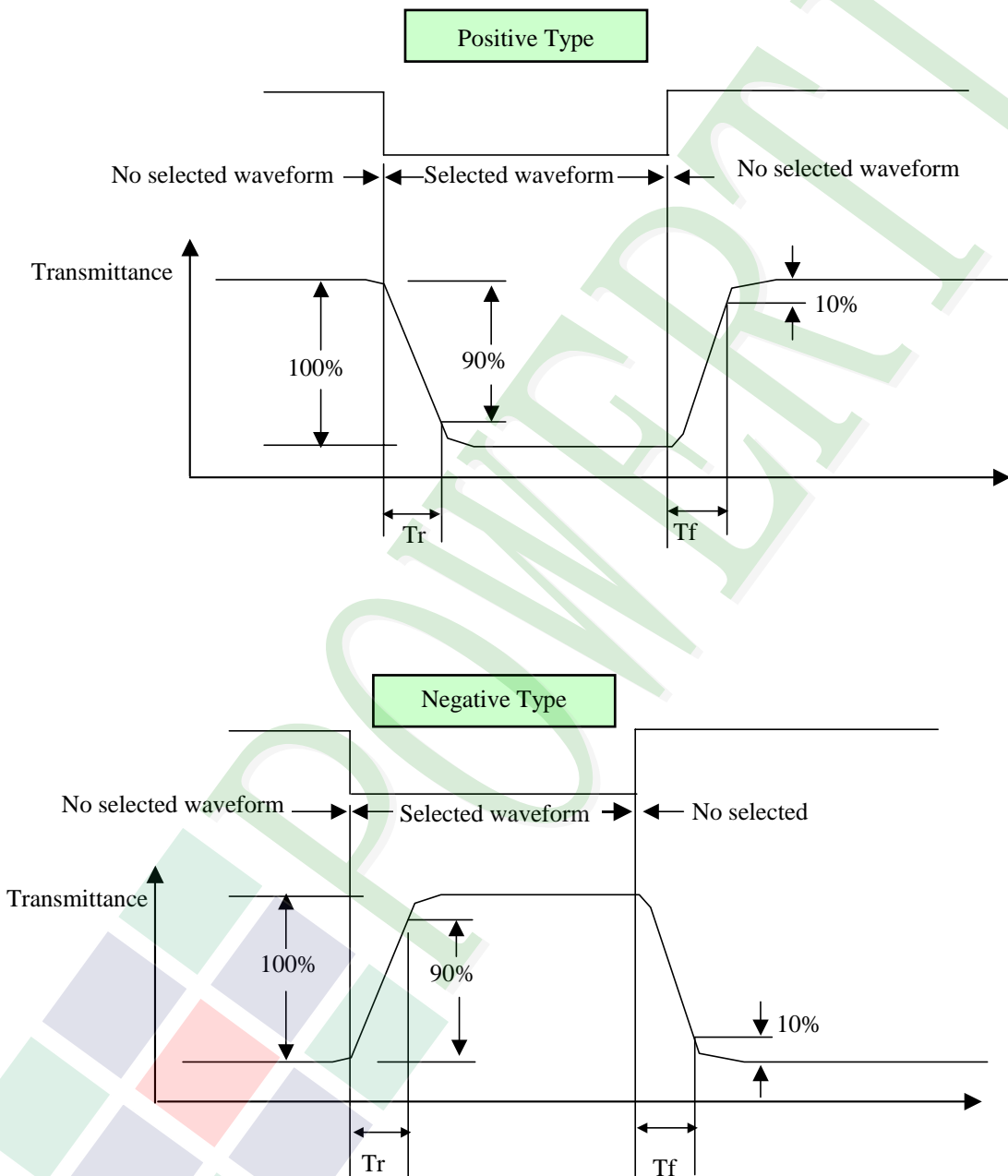
Viewing angle



Note 2.

Optical characteristics-3

Fig.2 Definition of response time





Electrical characteristics-2

2 Drive waveform

V_{op} : Drive voltage

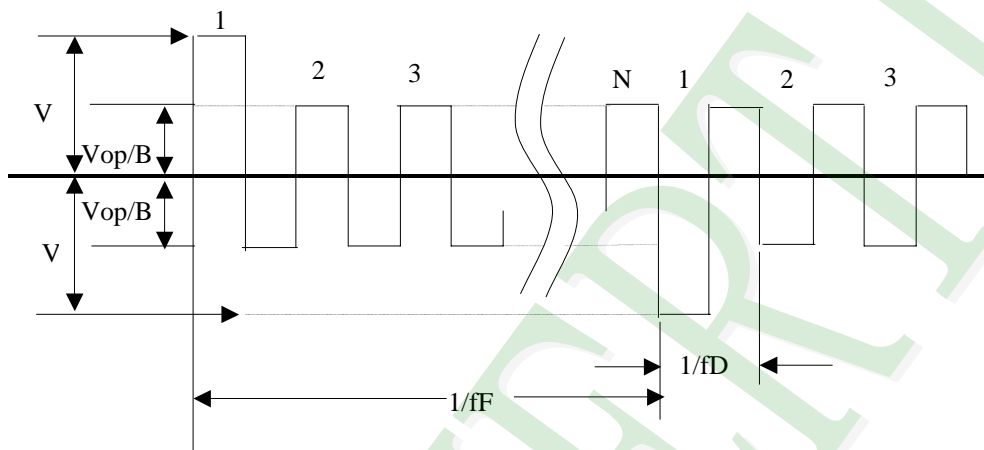
f_F : Frame frequency

$1/B$: Bias

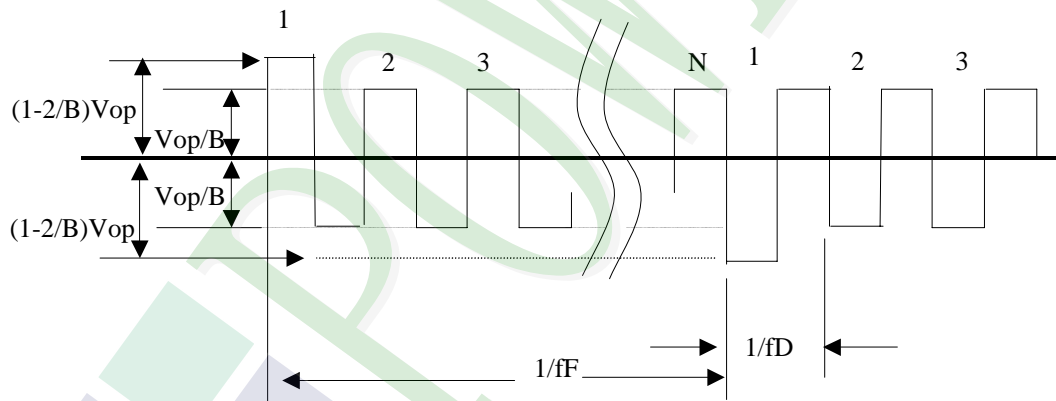
f_D : Drive frequency

N : Duty

(1) Selected waveform



(2) Non- Selected wave form

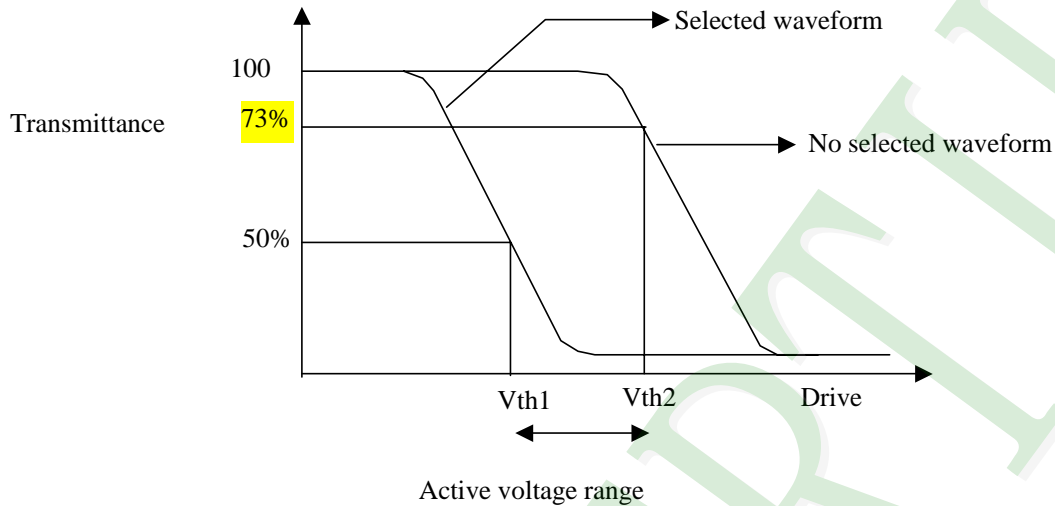


Note:

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



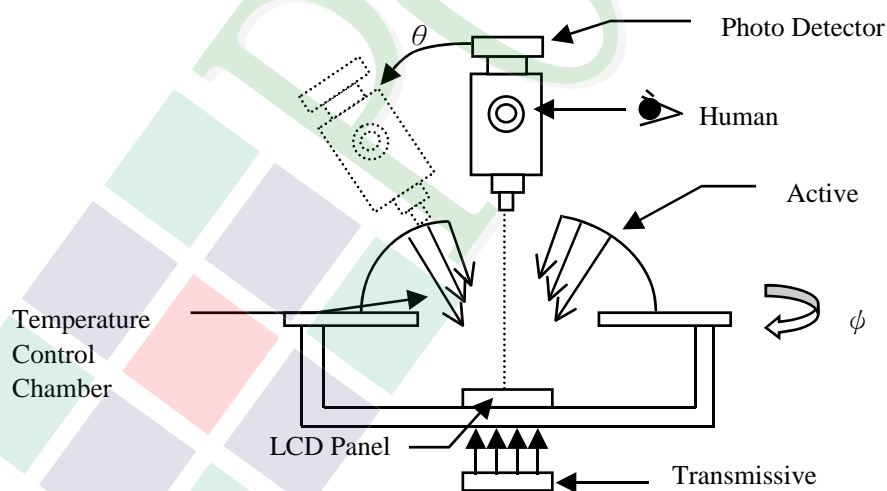
Note 3. : Definition of Vth



	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



1.6 Backlight Characteristics

LED Backlight

Maximum Ratings

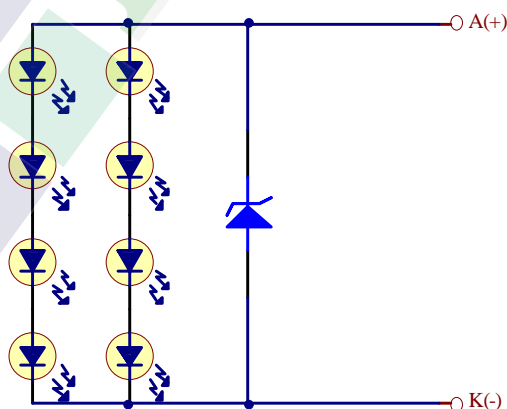
Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	I_F	$T_a = 25^\circ\text{C}$	-	50	mA
Reverse Voltage	V_R		-	20	V
Power Dissipation	PD		-	0.7	W
Operating Temperature	T_{OP}	-	-20	70	$^\circ\text{C}$
Storage Temperature.	T_{ST}	-	-30	80	$^\circ\text{C}$

Electrical / Optical Characteristics

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

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 40mA	-	12.8	14	V
Reverse Current	IR		-	-	0.1	mA
Average Brightness (Without LCD)	IV		650	-	-	cd/m ²
CIE Color Coordinate (Without LCD)	X		0.27	-	0.33	-
	Y		0.27	-	0.33	-
Uniformity	△B		70	-	-	%
Color	WHITE					

Internal Circuit Diagram:





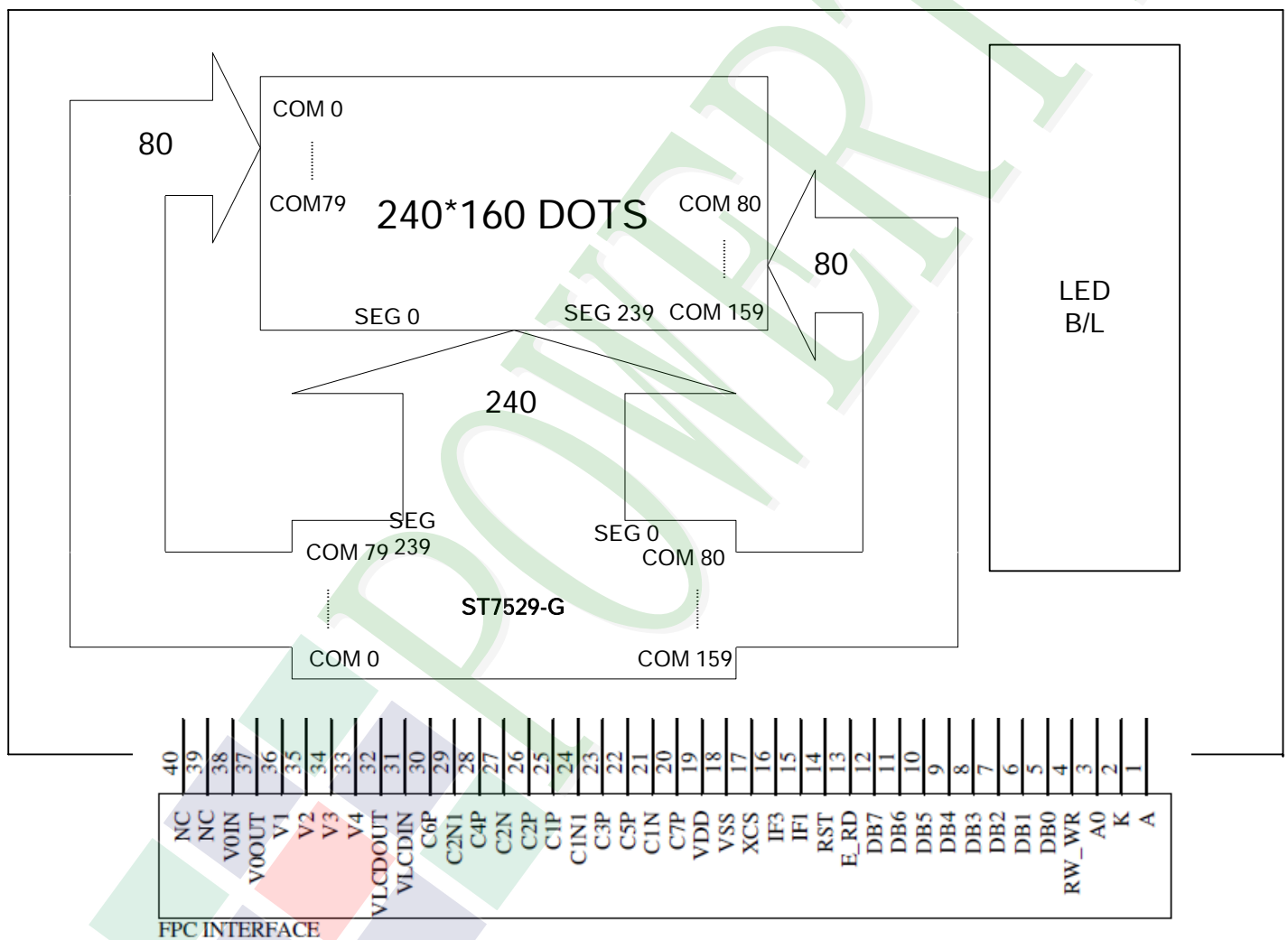
2. MODULE STRUCTURE

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	A	Power supply for LED Backlight Anode input.		
2	K	Power supply for LED Backlight Cathode input.		
3	A0	Register select input pin. A0 = "H":DB0 to DB7 are display data. A0 = "L":DB0 to DB7 are control data.		
4	RW_WR	Read / Write execution control pin		
		MPU type	RW_WR	Description
		8080-series	/WR	Write enable clock input pin. The data on D0 to D15 are latched at the rising edge of the /WR signal.
		6800-series	RW	Read / Write control input pin RW = "H" : read RW = "L" : write
5	DB0	They connect to the standard 8-bit MPU bus via the 8-bit bi-directional bus. When the following interface is selected and the XCS pin is high, the following pins become high impedance, which should be fixed to VDD or VSS.		
6	DB1			
7	DB2			
8	DB3			
9	DB4			
10	DB5			
11	DB6			
12	DB7			

Pin No.	Symbol	Function		
13	E_RD	Read / Write execution control pin.		
		MPU Type	E_RD	Description
		8080-series	/RD	Read enable clock input pin. When /RD is "L", D0 to D15 are in an output status.
		6800-series	E	Read / Write control input pin -RW = "H": When E is "H", DB0 to DB15 are in an output status. -RW = "L": The data on DB0 to DB15 are latched at the falling edge of the E signal.
14	RST	Reset input pin. When RST is "L", initialization is executed.		
15	IF1	Parallel / Serial data input select input.		
		IF1	IF3	MPU interface type
		H	L	80 series 8-bit parallel.
16	IF3	L	H	68 series 8-bit parallel.
17	XCS	Chip select input pins. Data/instruction I/O is enabled only when XCS is "L". When chip select is non-active, DB0 to DB7 may be high impedance.		
18	VSS	System Ground.		
19	VDD	Power Supply.		
20	C7P	DC / DC voltage converter. Connect a capacitor between this terminal and the VSS terminal.		

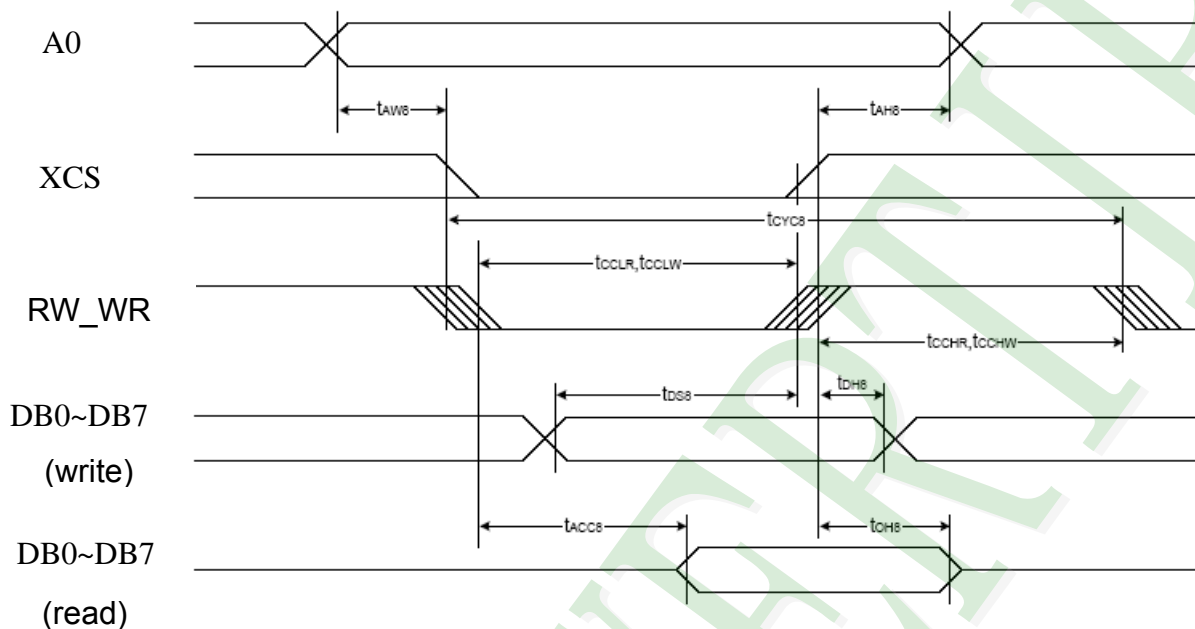
Pin No.	Symbol	Function
21	C1N	DC / DC voltage converter. Connect a capacitor between this terminal and the C5P terminal.
22	C5P	DC / DC voltage converter. Connect a capacitor between this terminal and the C1N terminal.
23	C3P	DC / DC voltage converter. Connect a capacitor between this terminal and the C1N1 terminal.
24	C1N1	DC / DC voltage converter. Connect a capacitor between this terminal and the C3P and C1P terminal.
25	C1P	DC / DC voltage converter. Connect a capacitor between this terminal and the C1N1 terminal.
26	C2P	DC / DC voltage converter. Connect a capacitor between this terminal and the C2N terminal.
27	C2N	DC / DC voltage converter. Connect a capacitor between this terminal and the C2P and C4P terminal.
28	C4P	DC / DC voltage converter. Connect a capacitor between this terminal and the C2N terminal.
29	C2N1	DC / DC voltage converter. Connect a capacitor between this terminal and the C6P terminal.
30	C6P	DC / DC voltage converter. Connect a capacitor between this terminal and the C2N terminal.
31	VLCDIN	An external LCD supply voltage can be supplied using the VLCDIN pad. In this case, VLCDOUT has to be left open, and the internal voltage generator has to be programmed to zero. (SET register V B=0)
32	VLCDOUT	If the internal voltage generator is used, the V LCDIN & VLCDOUT must be connected together. If an external supply is used, this pin must be left open.



Pin No.	Symbol	Function				
33	V4	LCD driver supply voltages V0In & V0out should be connected together in FPC area. Voltages should have the following relationship: $V0 \geq V1 \geq V2 \geq V3 \geq V4 \geq VSS$ When the internal power circuit is active, these voltages are generated as the following table according to the state of LCD bias.				
34	V3					
35	V2					
36	V1					
37	V0OUT	LCD bias	V1	V2	V3	V4
38	V0IN	1/N bias	$(N-1)/N * V0$	$(N-2)/N * V0$	$(2/N) * V0$	$(1/N) * V0$
NOTE: N=5 to 14.						
39	NC	Not Connection.				
40	NC	Not Connection.				

2.3 Timing Characteristics

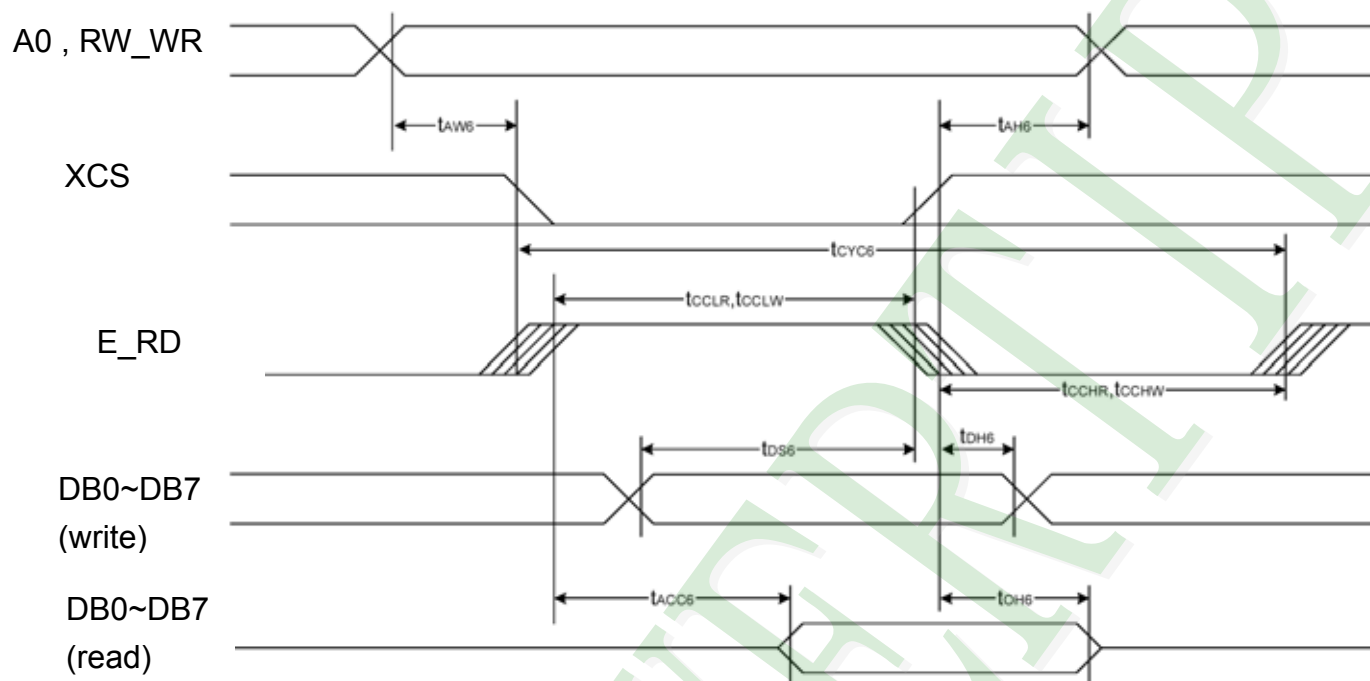
System Bus Read/Write Characteristics (For the 8080 Series MPU)



(VDD = 3.3 V, Ta = -20 ~ 85°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	tAH8	-	20	-	ns
Address setup time		tAW8	-	20	-	
System cycle time		tCYC8	-	200	-	
Enable L pulse width(WRITE)	RW_WR	tCCLW	-	100	-	
Enable H pulse width(WRITE)		tCCHW	-	100	-	
Enable L pulse width(READ)	RW_WR	tCCLR	-	100	-	
Enable H pulse width(READ)		tCCHR	-	100	-	
WRITE Data setup time	D0 TO D15	tDS8	-	150	-	
WRITE Address hold time		tDH8	-	20	-	
READ access time		tACC8	CL=100pF	-	40	
READ Output disable time		tOH8	CL=100pF	-	30	

System Bus Read/Write Characteristics (For the 6800 Series MPU)

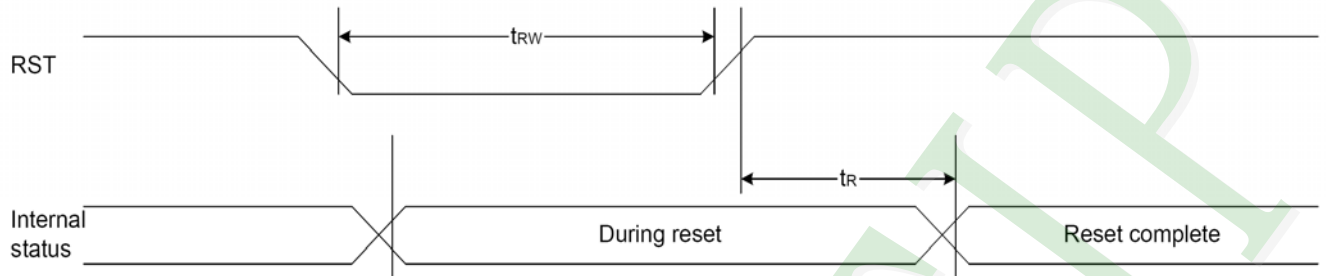


(VDD = 3.3 V, Ta = -20 ~ 85°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	TAH6	-	20	-	ns
Address setup time		TAW6	-	20	-	
System cycle time		TCYC6	-	200	-	
Enable L pulse width(WRITE)	E_RD	tEWLW	-	100	-	
Enable H pulse width(WRITE)		tEWHW	-	100	-	
Enable L pulse width(READ)	E_RD	tEWLR	-	100	-	
Enable H pulse width(READ)		tEWHR	-	100	-	
WRITE Data setup time	D0 TO D15	tDS6	-	150	-	
WRITE Address hold time		tDH6	-	20	-	
READ access time		tACC6	CL=100pF	-	40	
READ Output disable time		tOH6	CL=100pF	-	30	



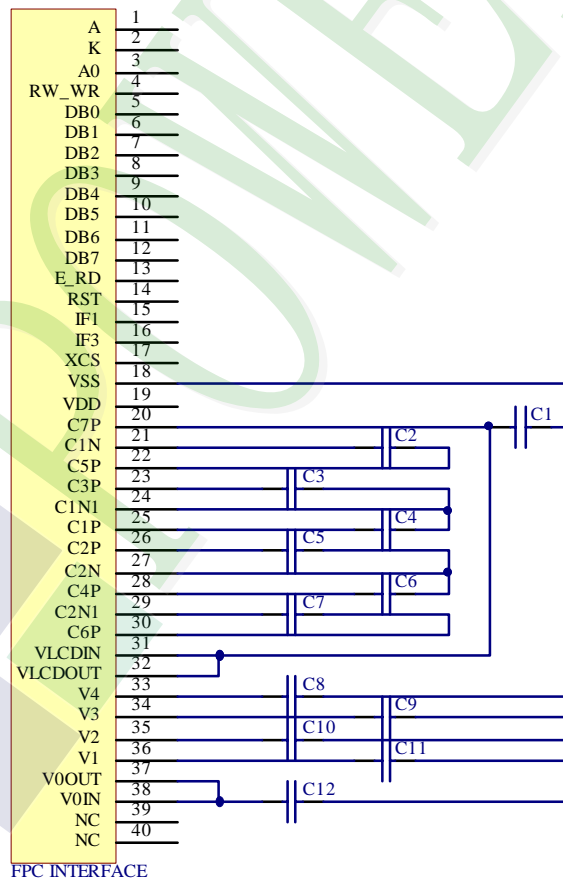
Reset timing



(VDD = 3.3 V, Ta = -20 ~ 85°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Reset time		tR	-	-	1	us
Reset "L" pulse width	RST	tRW	-	1	-	us

2.4 Power circuit

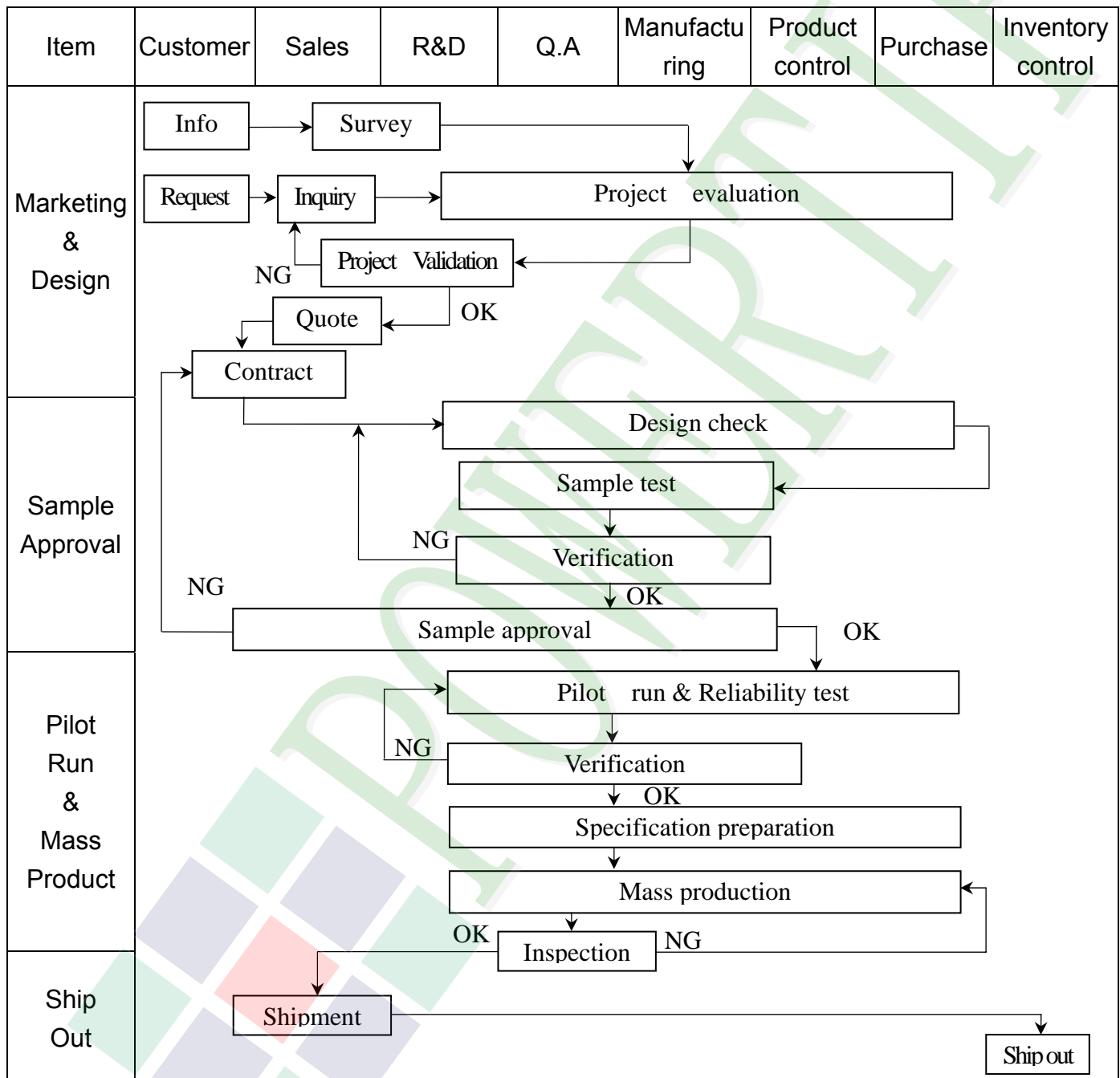


NOTE: Boost: 7X(internal)

C1~C12=1~2.2uF/25V

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 --> FA[Failure analysis] Claim --> AR[Analysis report] FA --> CA[Corrective action] CA --> Tracking[Tracking] </pre>							
Q.A Activity	<div> 1. ISO 9001 Maintenance Activities 3. Equipment calibration 5. Standardization Management </div> <div> 2. Process improvement proposal 4. Education And Training Activities </div>							

3.2 Inspection Specification

◆Scope : The document shall be applied to LCD Module for Monotype and Color STN(Ver. B01).

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

◆Equipment : Gauge 、 MIL-STD 、 Powertip Tester 、 Sample

◆Defect Level : Major Defect AQL : 0.4 ; Minor Defect : AQL : 1.5 .

◆OUT Going Defect Level : Sampling .

◆Manner of appearance test :

- (1). The test be under 20W×2 fluorescent light ' and distance of view must be at 30 cm.
- (2). Standard of inspection : (Unit : mm)
- (3). The test direction is base on about around 45° of vertical line. (Fig. 1)
- (4). Definition of area . (Fig. 2)

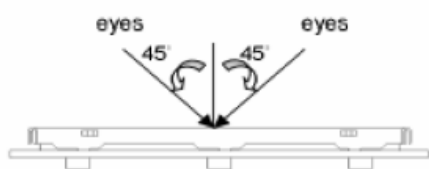


Fig.1

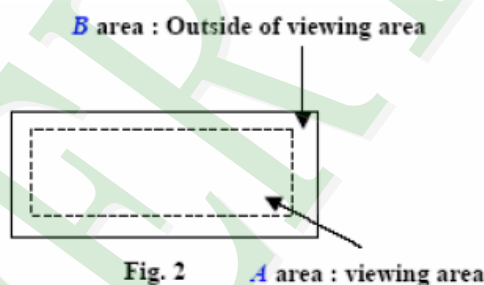


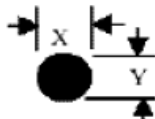
Fig. 2

◆ Specification:

NO	Item	Criterion	Level
01	Product condition	1. 1 The part number is inconsistent with work order of Production.	Major
		1. 2 Mixed production types.	Major
		1. 3 Assembled in inverse direction.	Major
02	Quantity	2. 1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	3. 1 Product dimension and structure must conform to Structure diagram.	Major
04	Electrical Testing	4. 1 Missing line character and icon.	Major
		4. 2 No function or no display.	Major
		4. 3 Output data is error.	Major
		4. 4 LCD viewing angle defect.	Major
		4. 5 Current consumption exceeds product specifications.	Major

◆Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level																			
05	Black or white dot 、 scratch 、 contamination	5. 1 Round type: 5. 1. 1 display only : <ul style="list-style-type: none">• White and black spots on display ≤ 0.30 mm , no more than 4 white or black spots present.• Densely spaced : NO more than two spots or lines within 3 mm. 5. 1. 2 Non-display :	Minor																			
	Round type	<table><tr><th rowspan="2">Dimension (diameter : Φ)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>$\Phi \leq 0.10$</td><td>Accept no dense</td><td rowspan="4">Ignore</td></tr><tr><td>$0.10 < \Phi \leq 0.20$</td><td>3</td></tr><tr><td>$0.20 < \Phi \leq 0.30$</td><td>2</td></tr><tr><td>Total quantity</td><td>4</td></tr></table>		Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.10$	Accept no dense	Ignore	$0.10 < \Phi \leq 0.20$	3	$0.20 < \Phi \leq 0.30$	2	Total quantity	4					
	Dimension (diameter : Φ)	Acceptance (Q'ty)																				
		A area		B area																		
	$\Phi \leq 0.10$	Accept no dense		Ignore																		
$0.10 < \Phi \leq 0.20$	3																					
$0.20 < \Phi \leq 0.30$	2																					
Total quantity	4																					
																						
$\Phi=(x+y)/2$																						
Line type	<table><tr><th colspan="2">Dimension</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>Length (L)</th><th>Width (W)</th><th>A area</th><th>B area</th></tr><tr><td>---</td><td>$W \leq 0.03$</td><td>Accept no dense</td><td rowspan="3">Ignore</td></tr><tr><td>$L \leq 3.0$</td><td>$0.03 < W \leq 0.05$</td><td rowspan="2">4</td></tr><tr><td>$L \leq 2.5$</td><td>$0.05 < W \leq 0.075$</td></tr><tr><td>---</td><td>$W > 0.075$</td><td colspan="2">As round type</td></tr></table>	Dimension		Acceptance (Q'ty)		Length (L)	Width (W)	A area	B area	---	$W \leq 0.03$	Accept no dense	Ignore	$L \leq 3.0$	$0.03 < W \leq 0.05$	4	$L \leq 2.5$	$0.05 < W \leq 0.075$	---	$W > 0.075$	As round type	
Dimension		Acceptance (Q'ty)																				
Length (L)	Width (W)	A area	B area																			
---	$W \leq 0.03$	Accept no dense	Ignore																			
$L \leq 3.0$	$0.03 < W \leq 0.05$	4																				
$L \leq 2.5$	$0.05 < W \leq 0.075$																					
---	$W > 0.075$	As round type																				
06	Polarizer Bubble	<table><tr><th rowspan="2">Dimension (diameter : Φ)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>$\Phi \leq 0.20$</td><td>Accept no dense</td><td rowspan="4">Ignore</td></tr><tr><td>$0.20 < \Phi \leq 0.50$</td><td>3</td></tr><tr><td>$0.50 < \Phi \leq 1.00$</td><td>2</td></tr><tr><td>$\Phi > 1.00$</td><td>0</td></tr><tr><td>Total quantity</td><td>4</td><td></td></tr></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.20$	Accept no dense	Ignore	$0.20 < \Phi \leq 0.50$	3	$0.50 < \Phi \leq 1.00$	2	$\Phi > 1.00$	0	Total quantity	4		Minor		
	Dimension (diameter : Φ)	Acceptance (Q'ty)																				
		A area	B area																			
	$\Phi \leq 0.20$	Accept no dense	Ignore																			
	$0.20 < \Phi \leq 0.50$	3																				
$0.50 < \Phi \leq 1.00$	2																					
$\Phi > 1.00$	0																					
Total quantity	4																					



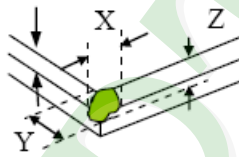
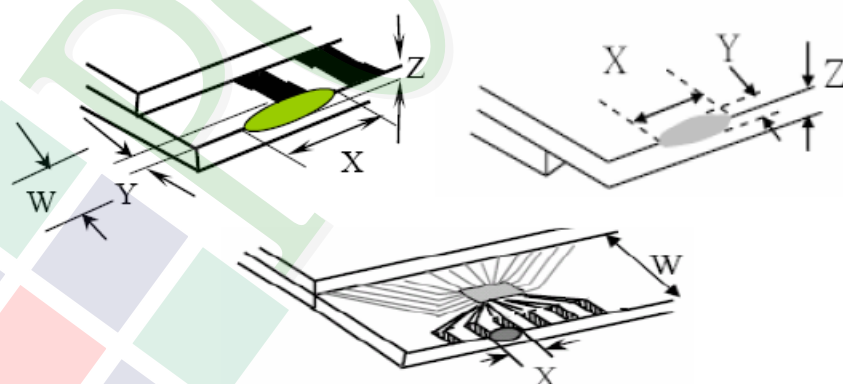
◆ Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level									
07	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Z : The thickness of crack t : The thickness of glass</p> <p>Y : The width of crack. W : terminal length a : LCD side length</p> <p>7.1 General glass chip :</p> <p>7.1.1 Chip on panel surface and crack between panels:</p> <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$\leq a$</td><td>Crack can't enter viewing area</td><td>$\leq 1/2 t$</td></tr><tr><td>$\leq a$</td><td>Crack can't exceed the half of SP width.</td><td>$1/2 t < Z \leq 2 t$</td></tr></table>	X	Y	Z	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$	$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$	Minor
X	Y	Z										
$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$										
$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$										

◆ Specification For Monotype and Color STN :

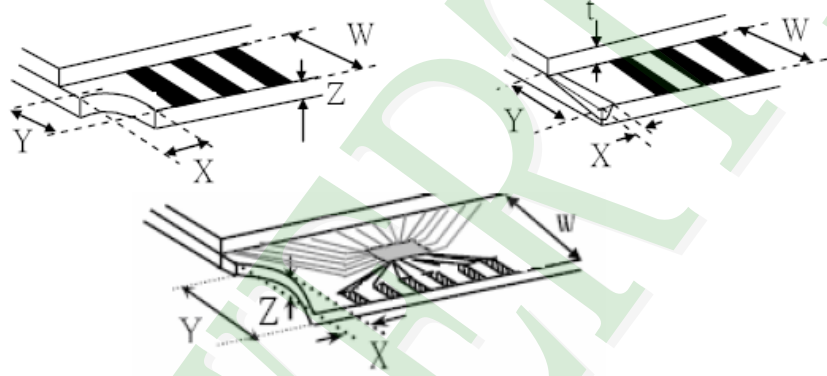
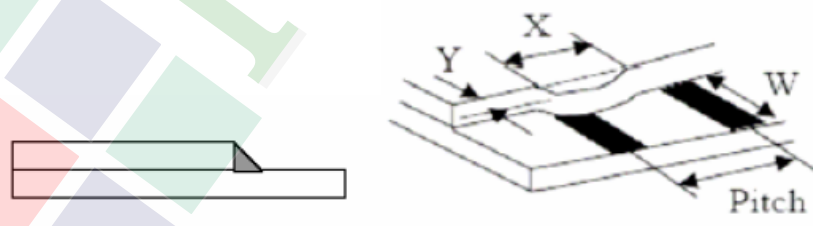
(Ver. B01)

NO	Item	Criterion	Level									
07	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Z : The thickness of crack t : The thickness of glass</p> <p>Y : The width of crack. W : terminal length a : LCD side length</p> <p>7.1.2 Corner crack :</p>  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$\leq 1/5 a$</td><td>Crack can't enter viewing area</td><td>$Z \leq 1/2 t$</td></tr><tr><td>$\leq 1/5 a$</td><td>Crack can't exceed the half of SP width.</td><td>$1/2 t < Z \leq 2 t$</td></tr></table>	X	Y	Z	$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$	$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$	Minor
		X	Y	Z								
$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$										
$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$										
<p>7.2 Protrusion over terminal :</p> <p>7.2.1 Chip on electrode pad :</p>  <table><tr><th></th><th>X</th><th>Y</th><th>Z</th></tr><tr><td>Front</td><td>$\leq a$</td><td>$\leq 1/2 W$</td><td>$\leq t$</td></tr><tr><td>Back</td><td colspan="3">Neglect</td></tr></table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	Neglect		
	X	Y	Z									
Front	$\leq a$	$\leq 1/2 W$	$\leq t$									
Back	Neglect											



◆ Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level									
07	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Z : The thickness of crack t : The thickness of glass</p> <p>Y : The width of crack. W : terminal length a : LCD side length</p>	Minor									
		<p>7.2.2 Non-conductive portion :</p>  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$\leq 1/3 a$</td><td>$\leq W$</td><td>$\leq t$</td></tr></table> <p>⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.</p> <p>7.2.3 Glass remain :</p>  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$\leq a$</td><td>$\leq 1/3 W$</td><td>$\leq t$</td></tr></table>		X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z
X	Y	Z										
$\leq 1/3 a$	$\leq W$	$\leq t$										
X	Y	Z										
$\leq a$	$\leq 1/3 W$	$\leq t$										



◆ Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level
08	Backlight elements	8. 1 Backlight can't work normally.	Major
		8. 2 Backlight doesn't light or color is wrong.	Major
		8. 3 Illumination source flickers when lit.	Major
09	General appearance	9. 1 Pin type must match type in specification sheet.	Major
		9. 2 No short circuits in components on PCB or FPC.	Major
		9. 3 Product packaging must the same as specified on packaging specification sheet.	Minor
		9. 4 The folding and peeled off in polarizer are not acceptable.	Minor
		9. 5 The PCB or FPC between B/L assembled distance (PCB or FPC) is ≤ 1.5 mm.	Minor

4. RELIABILITY TEST

4.1 Reliability Test Condition

(Ver.B01)

NO.	TEST ITEM	TEST CONDITION											
1	High Temperature Storage Test	Keep in +80 ±2℃ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.											
2	Low Temperature Storage Test	Keep in -30 ±2℃ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.											
3	High Temperature / High Humidity Storage Test	Keep in +60 ℃ / 90% R.H duration for 96 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)											
4	Temperature Cycling Storage Test	<div style="text-align: center;"><div><div>-30℃ → +25℃ → +80℃ → +25℃</div><div>(30mins) (5mins) (30mins) (5mins)</div><div>10 Cycle</div></div> Surrounding temperature, then storage at normal condition 4hrs.</div>											
5	ESD Test	Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/-	Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/-										
		1. Temperature ambiance : 15℃ ~35℃ 2. Humidity relative : 30%~60% 3. Energy Storage Capacitance(Cs+Cd) : 150pF±10% 4. Discharge Resistance(Rd) : 330Ω±10% 5. Discharge, mode of operation : Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%)											
6	Vibration Test (Packaged)	1. Sine wave 10 55 Hz frequency (1 min/sweep) 2. The amplitude of vibration :1.5 mm 3. Each direction (X、Y、Z) duration for 2 Hrs											
7	Drop Test (Packaged)	<table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table>		Packing Weight (Kg)	Drop Height (cm)	0 ~ 45.4	122	45.4 ~ 90.8	76	90.8 ~ 454	61	Over 454	46
		Packing Weight (Kg)	Drop Height (cm)										
0 ~ 45.4	122												
45.4 ~ 90.8	76												
90.8 ~ 454	61												
Over 454	46												
		Drop Direction :※1 corner / 3 edges / 6 sides each 1time											

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 $320 \pm 10^{\circ}\text{C}$ 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. and where extremely high levels of reliability are required.

[illegible]

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

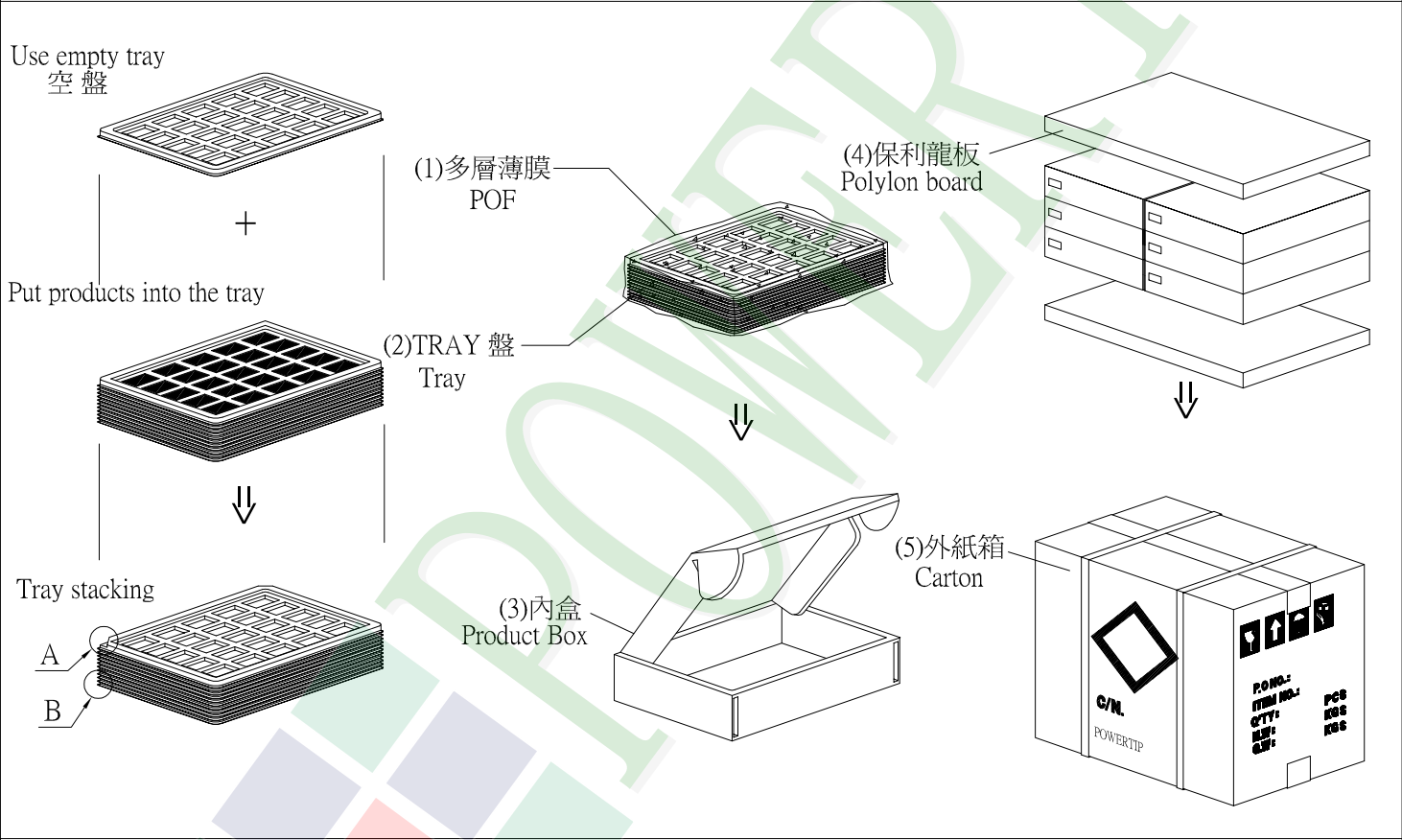
No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PE240160WRT001IY1Q	96.2 X 67.2	0.0504	108	5.4432
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TYPE24016001BB	352 X 260 X 17.8	0.1	24	2.4
4	內盒(3)Product Box	BX36627063ABBA	383 X 270 X 66	0.2692	6	1.6152
5	保利龍板(4)Polylon board	OTPLB00PL08ABA	550 X 393 X 20	0.0284	2	0.0568
6	外紙箱(5)Carton	BX57041027CCBA	570 X 410 X 265	1.4208	1	1.4208
7						
8						
9						

2.一整箱總重量 (Total LCD Weight in carton) : 10.94 Kg±10%

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

(1)LCM quantity per box : no per tray6x no of tray3= 18

(2)Total LCM quantity in carton : quantity per box18x no of boxes6= 108



特 記 事 項 (REMARK)

1. Label Specifications :

TYPE			
ID.NO		S/O	
Q'TY	Pcs	Date	
Lot.NO			
Note			

2. TRAY盤相疊時,需旋轉180度,請詳見B視圖
Rotate tray 180 degrees and place on top of stack.
Check the tray stack using Fig. B.

3. Tray料號:
Tray Number:TYPE24016001BB