POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	CNO003
SAMPLE CODE	:	SE240128WRF001HC1Q
MASS PRODUCTION CODE	:	PE240128WRF001HC1Q
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	005
DRAWING NO. (Ver.)	:	LMD-PE240128WRF001HC1Q (Ver:001)
PACKAGING NO. (Ver.)	:	PKG-PE240128WRF001HC1Q (Ver:001)

Customer Approved

Date:

Approved	Checked	Designer
廖志豪 Rex Liao	張慶源 Yuan Chang	謝章源 James Hsieh

POWERTIP
2010.02.01
TW RD APR

□ Preliminary specification for design input

■ Specification for sample approval

POWERTIP TECH. CORP.

Headquarters:

No.8, 6th Road, Taichung Industrial Park,
Taichung, Taiwan
台中市 407 工業區六路 8 號

TEL: 886-4-2355-8168
FAX: 886-4-2355-8166

E-mail: sales@powertip.com.tw
Http://www.powertip.com.tw

History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
11/27/2007	01	001	New Sample	-	Tony
06/10/2008	01	002	Modify the SPEC content,Add customer's circuit and software in appendix.	-	Yangdongli
07/04/2008	01	003	Mass production	-	Yangdongli
04/16/2009	01	004	Modify VOP:12.95V	-	Yangqinglong
01/29/2010	01	005	Add Read EPROM Procedures	5,6	JAMES

Total：32Pages

Contents

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

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	240*128 dots
LCD Type	FSTN,Positive,Transflective,Extend Temp.
Driver Condition	LCD Module :1/160Duty,1/10Bias
Viewing Direction	6 O'clock
Backlight	White LED B/L
Weight	-
Interface	Support 8 bit parallel interface with 8080 or 6800 series MPU
Other(controller / driver IC)	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	99.2(L) * 64.2(W) * 5.4(H)	mm
Viewing Area	93.0(L) * 49.0(W)	mm
Active Area	82.775(L) * 44.135(W)	mm
Dot Size	0.32(L) * 0.32(W)	mm
Dot Pitch	0.345(L) * 0.345(W)	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_{LCD}	—	-0.5	20	V
Input Voltage	V_{IN}	—	-0.5	V_{DD}+0.5	V
Operating Temperature	T_{OP}	—	-20	70	℃
Storage Temperature	T_{ST}	—	-30	80	℃
Storage Humidity	H_D	Ta＜60 ℃	-	90	%RH

1.4 DC Electrical Characteristics

V_{DD} =3.0±0.3V，V_{SS} =0V，Ta = 25℃

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
“H” Output Voltage	V_{OH}	-	-	-	-	V
“L” Output Voltage	V_{OL}	-	-	-	-	V
Supply Current	I_{DD}	V_{DD}=3.0V, V_{OP}: 12.95 V Pattern= Full OFF	-	1.2	—	mA
		V_{DD}=3.0V, V_{OP}:12.95 V Pattern= Full display *1	-	4.7	6.2	
LCM Driver Voltage	V_{OP}*2, *3,*4	-20℃	13.50	13.65	13.80	V
		25℃	12.80	12.95	13.10	
		70℃	11.90	12.05	12.20	

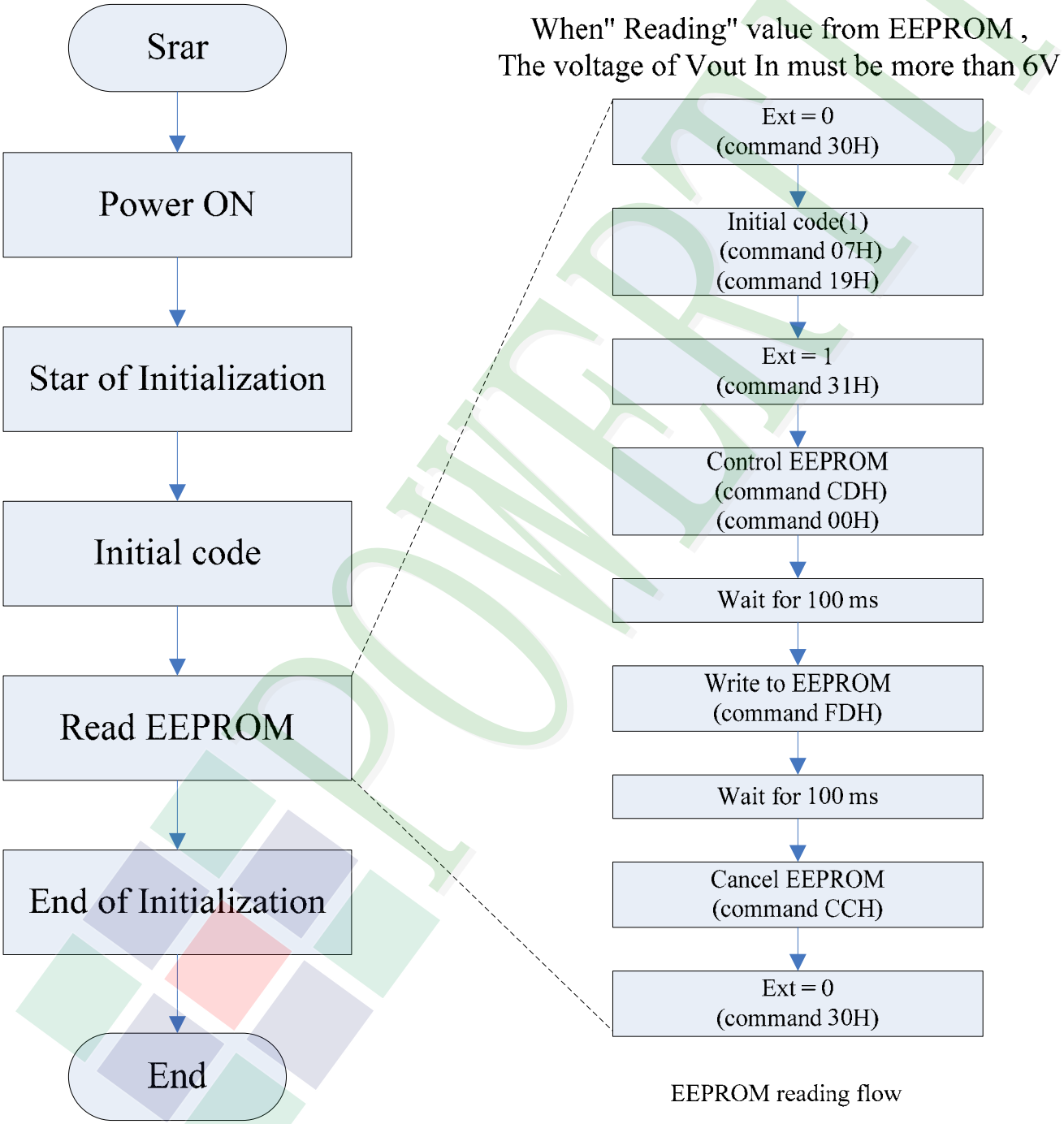
NOTE: *1 The maximum current display

*2 The V_{OP} test point is V0-V_{SS}

*3 The command is used to program the optimum LCD supply voltage V0.

	D7	D6	D5	D4	D3	D2	D1	D0
Command	1	0	0	0	0	0	0	1
Parameter Byte 1 (PB1)	*	*	1	0	1	0	1	0
Parameter Byte 2 (PB2)	*	*	*	*	*	0	1	1

*4 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.



EEPROM reading flow

1.5 Optical Characteristics

LCD Panel: 1/160 Duty, 1/13 Bias, V_{LCD} = 15.0 V, Ta = 25°C

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	C≥2.0, ∅ =270	-	135	205	ms	Note2
	Fall	tf		-	300	450		
Viewing angle range	Top	ΘY+		+45	-	-	Deg.	Notes 1
	Bottom	ΘY-		-40	-	-		
	Left	ΘX-		R45	-	-		
	Right	ΘX+		L40	-	-		
Contrast Ratio		C	-	6	8	-	-	Note 3
Average Brightness (with LCD) *2		IV	If=80 mA	40	55	-	cd/m^2	-
CIE Color Coordinate (With LCD)		X		0.25	0.30	0.35	-	Note 4
		Y		0.29	0.34	0.39		
Uniformity *1		△B	-	70	-	-	%	-

Note 4 ：

1：△B=B(min) / B(max) * 100%

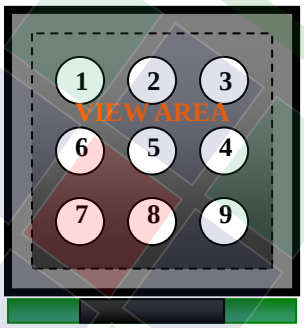
2：Measurement Condition for Optical Characteristics:

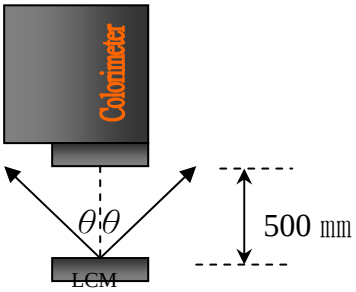
a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

b：Measurement Distance: 500 ± 50 ㎜ ，(θ= 0°)

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%



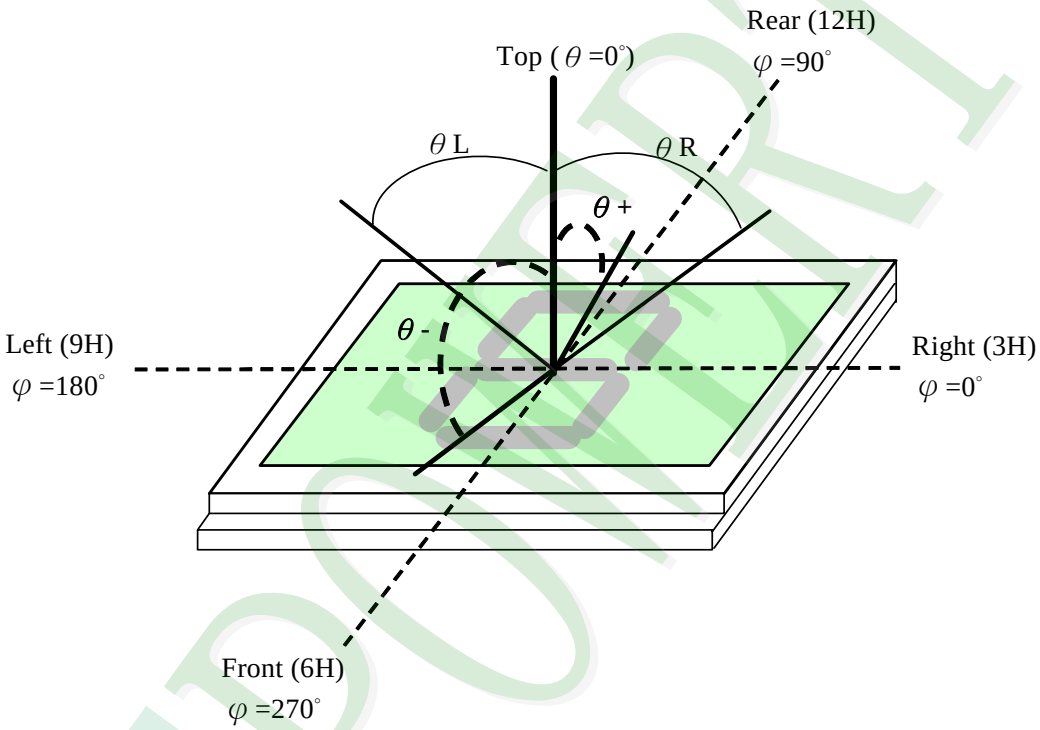


Colorimeter=BM-7 fast

Note 1.

Optical characteristics-2

Viewing angle

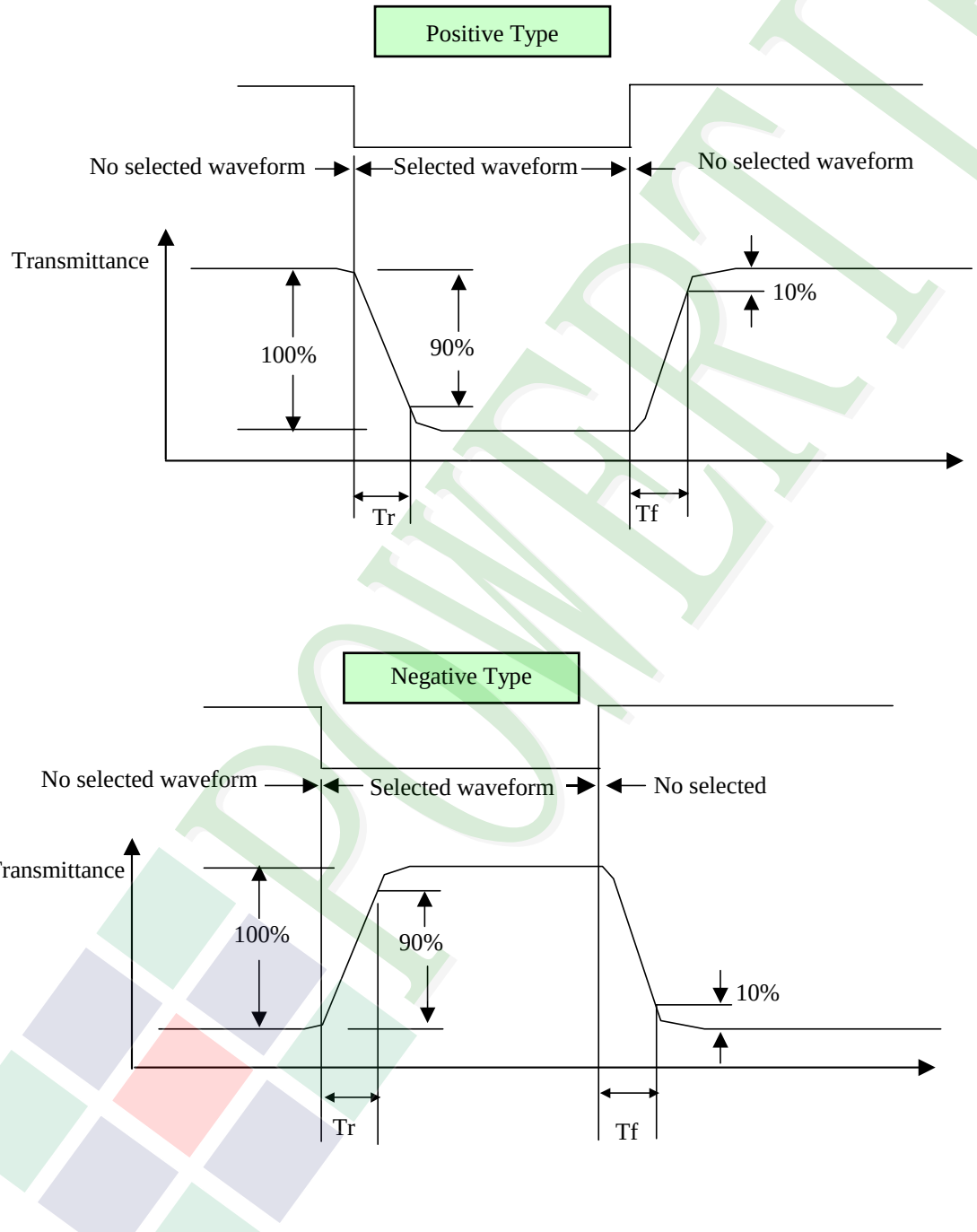


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

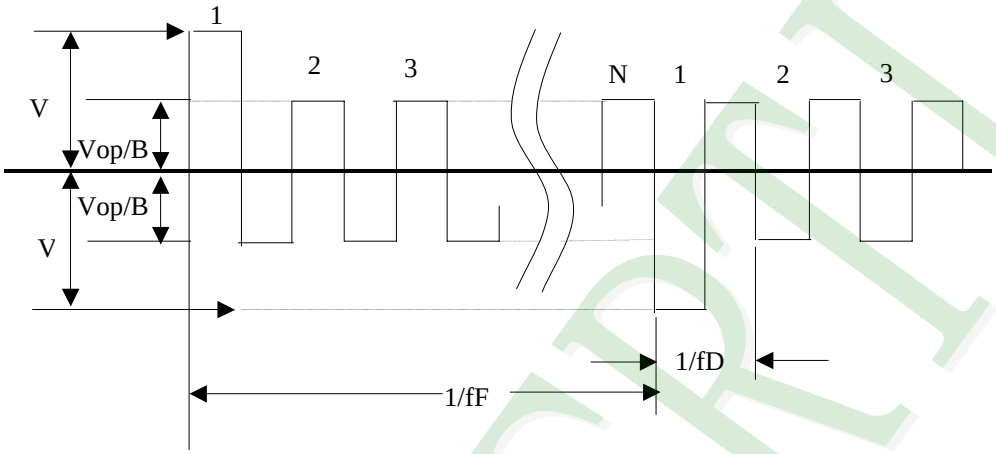
※2 Drive waveform

Vop: Drive voltage fF: Frame frequency

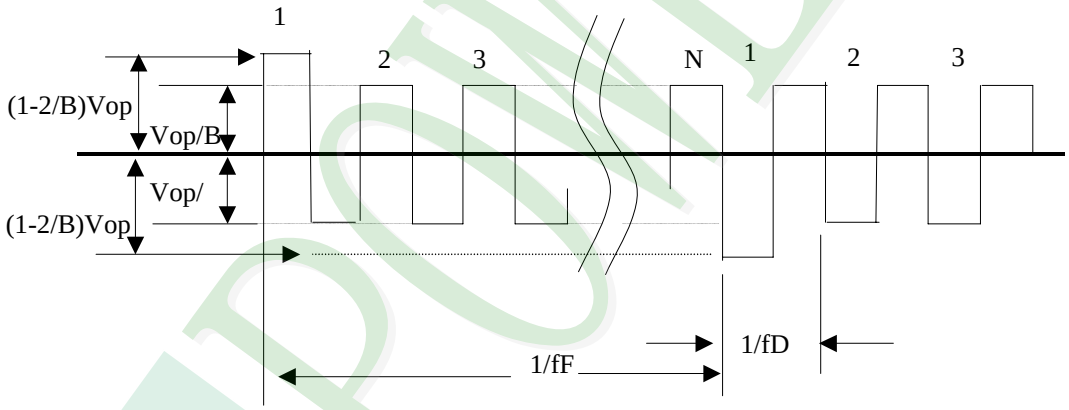
1/B: Bias fD: Drive frequency

N: Duty

(1) Selected waveform



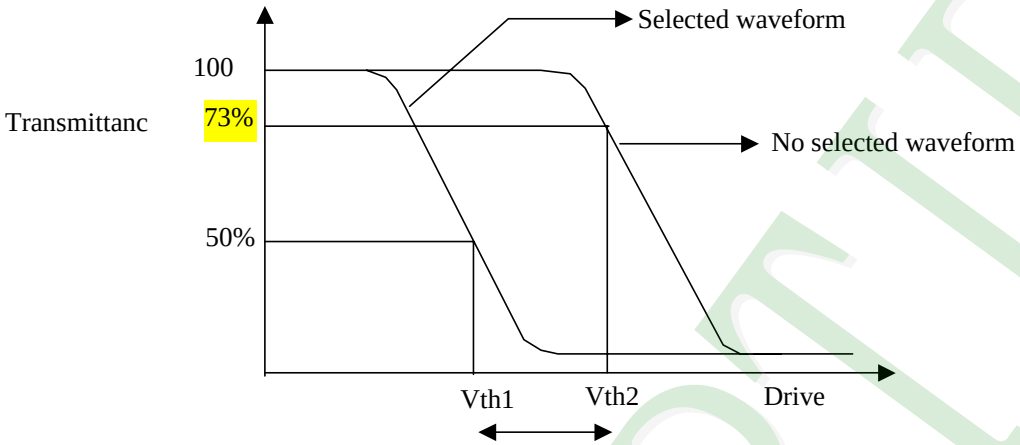
(2) Non- Selected wave form



Note:

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

Note 3. : Definition of Vth

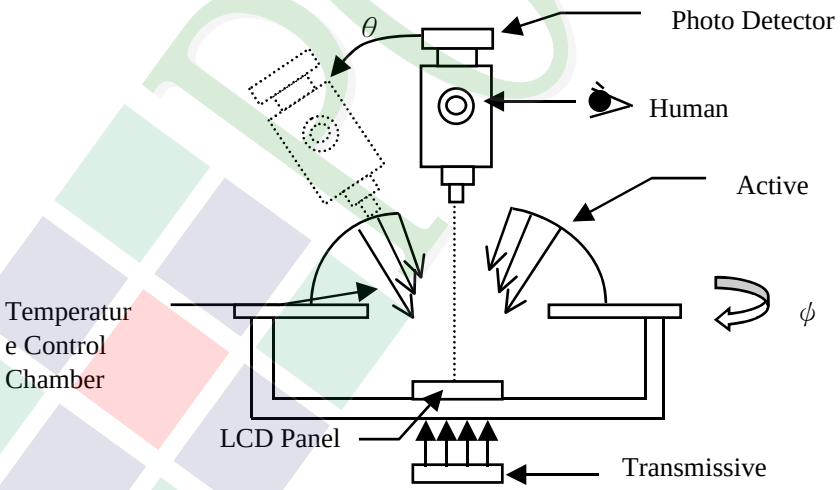


Active voltage range

	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

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	Vf	If=80 mA	-	3.3	3.6	V
Average Brightness (Without LCD)	IV		176	220	--	cd/m^2
Color	White					

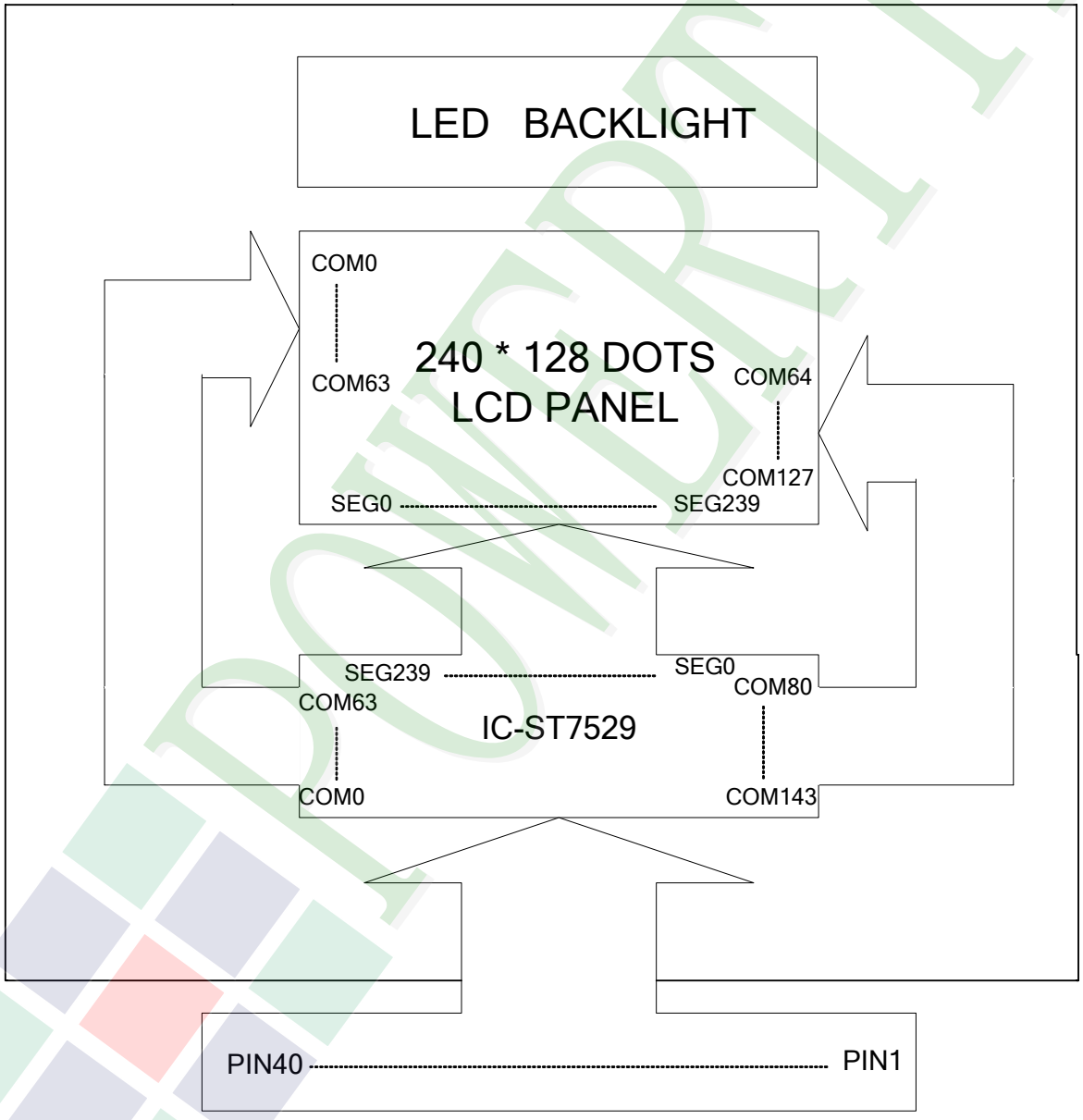
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



Please refer interface pin description for detail

2.2 Interface Pin Description

<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>1</td><td>A0</td><td>Register select input pin
– A0 = "H": DB0 to DB8 or SI are display data
– A0 = "L": DB0 to DB8 or SI are control data</td></tr>
<tr><td>2</td><td>RW_WR</td><td>Read / Write execution control pin
<table>
<tr><th>MPU Type</th><th>RW_WR</th><th>Description</th></tr>
<tr><td>6800</td><td>RW</td><td>Read / Write control input pin
RW = “H” : read
RW = “L” : write</td></tr>
<tr><td>8080</td><td>/WR</td><td>Write enable clock input pin
The data on DB0 to DB8 are latched at the rising edge of the /WR signal.</td></tr>
</table></td></tr>
<tr><td>3</td><td>DB0</td><td rowspan="8">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 highimpedance, which should be fixed to VDD or VSS.</td></tr>
<tr><td>4</td><td>DB1</td></tr>
<tr><td>5</td><td>DB2</td></tr>
<tr><td>6</td><td>DB3</td></tr>
<tr><td>7</td><td>DB4</td></tr>
<tr><td>8</td><td>DB5</td></tr>
<tr><td>9</td><td>DB6</td></tr>
<tr><td>10</td><td>DB7</td></tr>
<tr><td>11</td><td>E_RD</td><td>Read / Write execution control pin
<table>
<tr><th>MPU Type</th><th>RW_WR</th><th>Description</th></tr>
<tr><td>6800</td><td>E</td><td>Read / Write control input pin
-RW = “H”: When E is “H”, DB0 to DB8 are in an output status.
-RW = “L”: The data on DB0 to DB8 are latched at the falling edge of the E signal.</td></tr>
<tr><td>8080</td><td>/RD</td><td>Read enable clock input pin
When /RD is “L”, DB0 to DB8 are in an output status.</td></tr>
</table></td></tr>
<tr><td>12</td><td>RST</td><td>Reset input pin. When RST is “L”, initialization is executed.</td></tr>
</table>

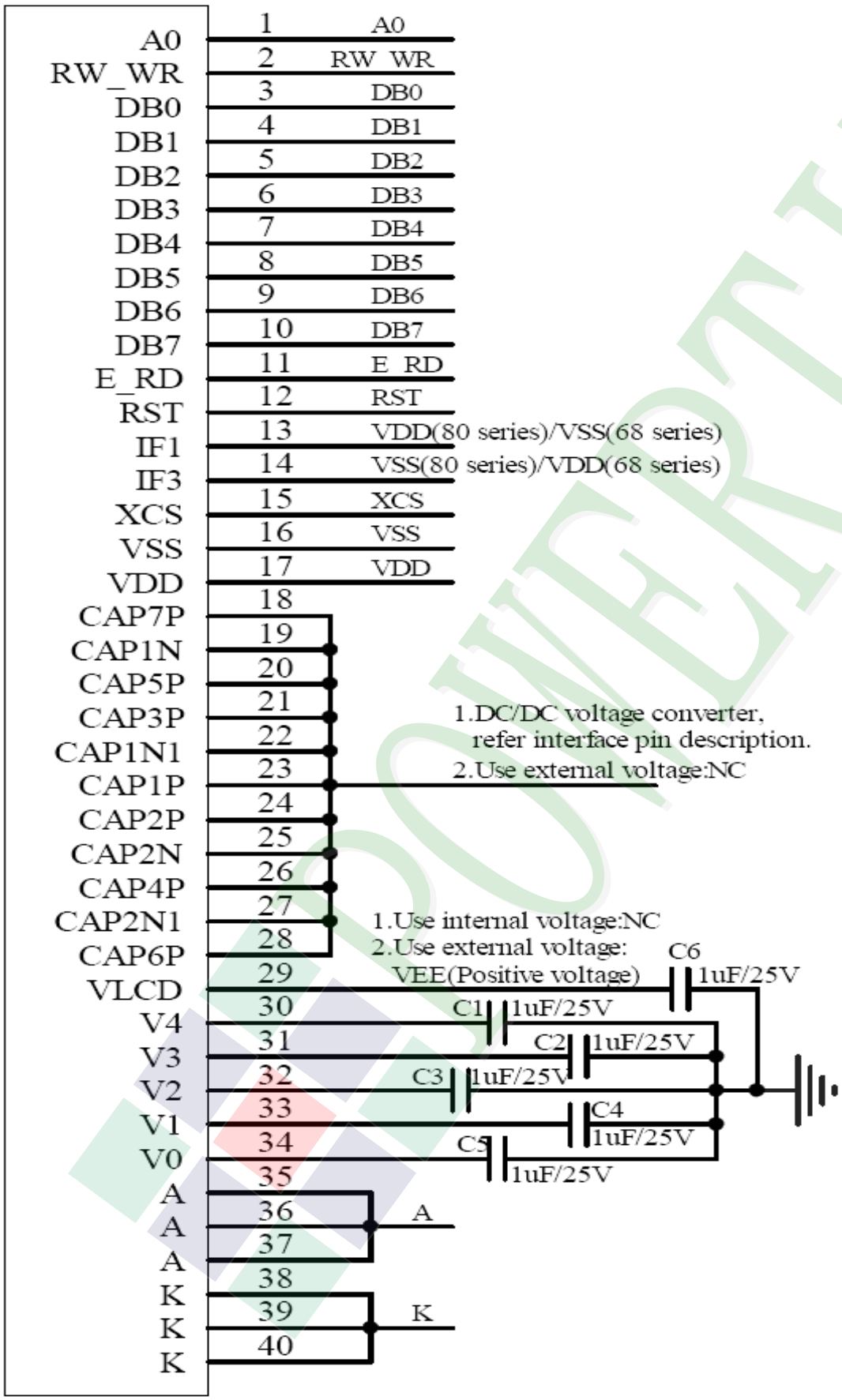
<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>13</td><td>IF1</td><td rowspan="2"><table>
<tr><td>IF1</td><td>IF3</td><td>MPU interface type</td></tr>
<tr><td>H</td><td>L</td><td>80 series 8-bit parallel</td></tr>
<tr><td>L</td><td>H</td><td>68 series 8-bit parallel</td></tr>
</table></td></tr>
<tr><td>14</td><td>IF3</td></tr>
<tr><td>15</td><td>XCS</td><td>Chip select input pins
Data/instruction I/O is enabled only when XCS is "L". When chip select is non-active, DB0 to DB8 may be high impedance.</td></tr>
<tr><td>16</td><td>VSS</td><td>Power supply (VSS=0)</td></tr>
<tr><td>17</td><td>VDD</td><td>Power supply (VDD=3.3V)</td></tr>
<tr><td>18</td><td>CAP7P</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the ≦7X VLCD; 8X CAP1N terminal.</td></tr>
<tr><td>19</td><td>CAP1N</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the ≦5X OPEN;≧6X also CAP5P; ≧8X also CAP7P terminal.</td></tr>
<tr><td>20</td><td>CAP5P</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the ≦5X VLCD; ≧6X CAP1N terminal.</td></tr>
<tr><td>21</td><td>CAP3P</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the ≦3X VLCD; ≧4X CAP1N1 terminal.</td></tr>
<tr><td>22</td><td>CAP1N1</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the CAP1P terminal.</td></tr>
<tr><td>23</td><td>CAP1P</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the CAP1N1 terminal.</td></tr>
<tr><td>24</td><td>CAP2P</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the 2X VLCD; ≧3X CAP2N terminal.</td></tr>
<tr><td>25</td><td>CAP2N</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the ≦2X OPEN; ≧3X CAP2P terminal.</td></tr>
<tr><td>26</td><td>CAP4P</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the ≦4X VLCD; ≧5X CAP2N terminal.</td></tr>
<tr><td>27</td><td>CAP2N1</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the ≦6X OPEN; ≧7X CAP6P terminal.</td></tr>
<tr><td>28</td><td>CAP6P</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the ≦6X VLCD; ≧7X CAP2N1 terminal.</td></tr>
<tr><td>29</td><td>VLCD</td><td>If the internal voltage generator is used, connect to a stabilizing capacitor(1uF/25V) between VSS and VLCD.
If an external supply is used, the external LCD supply voltage can be supplied using the VLCD pin. In this case, the internal voltage generator has to be programmed to zero(SET register VB=0). (Positive voltage:15±0.5V)</td></tr>
</table>

<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>30</td><td>V4</td><td rowspan="4">LCD driver supply voltages
V0In & V0out should be connected together in FPC area.
Voltages should have the following relationship:
V0 ≧ V1 ≧ V2 ≧ V3 ≧ V4 ≧ VSS
When the internal power circuit is active, these voltages are generated as the following table according to the state of LCD bias.

<table><tr><td>LCD Bias</td><td>V1</td><td>V2</td><td>V3</td><td>V4</td></tr><tr><td>1/N Bias</td><td>(N-1) / N x V0</td><td>(N-2) / N x V0</td><td>(2/N) x V0</td><td>(1/N) x V0</td></tr></table>
NOTE: N = 5 to 14
Connnect capacitors(1uF/25V) between these terminals and GND.</td></tr>
<tr><td>31</td><td>V3</td></tr>
<tr><td>32</td><td>V2</td></tr>
<tr><td>33</td><td>V1</td></tr>
<tr><td>34</td><td>V0</td></tr>
<tr><td>35~37</td><td>A</td><td>Power supply for Backlight (anode)</td></tr>
<tr><td>38~40</td><td>K</td><td>Power supply for Backlight (cathode)</td></tr>
</table>

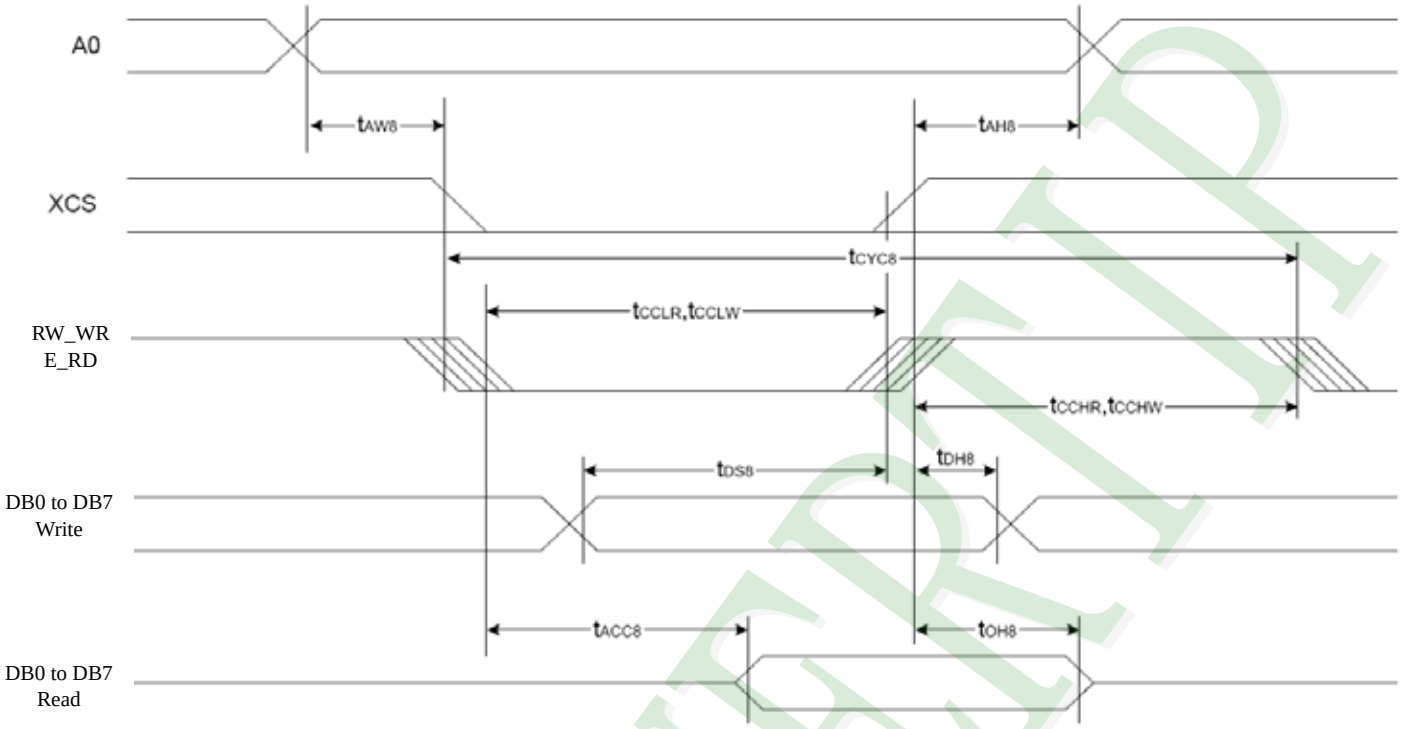
NOTE:IF an external voltage supply is used on VLCD terminal,PIN18~28:Not connect.

Reference circuit for using LCM module:



2.3 Timing Characteristics

For the 8080 Series MPU



V_{DD} =3.3V

Item	Signal	Symbol	Condition	Rating		Units
				Min	Max	
Address hold time	A0	t_{AH8}	-	20	-	ns
Address setup time		t_{AW8}	-	20	-	
System cycle time		t_{CYC8}	-	200	-	
Enable L pulse width (Write)	RW_WR	t_{CCLW}	-	100	-	
Enable H pulse width (Write)		t_{CCHW}	-	100	-	
Enable L pulse width (Read)	E_RD	t_{CCLR}	-	100	-	
Enable H pulse width (Read)		t_{CCHR}	-	100	-	
WRITE Data setup time	DB0 to DB7	t_{DS8}	-	150	-	
WRITE Address hold time		t_{DH8}	-	20	-	
READ access time		t_{ACC8}	C_L=100pF	-	40	
READ Output disable time		t_{OH8}	C_L=100pF	-	30	

VDD=2.7V

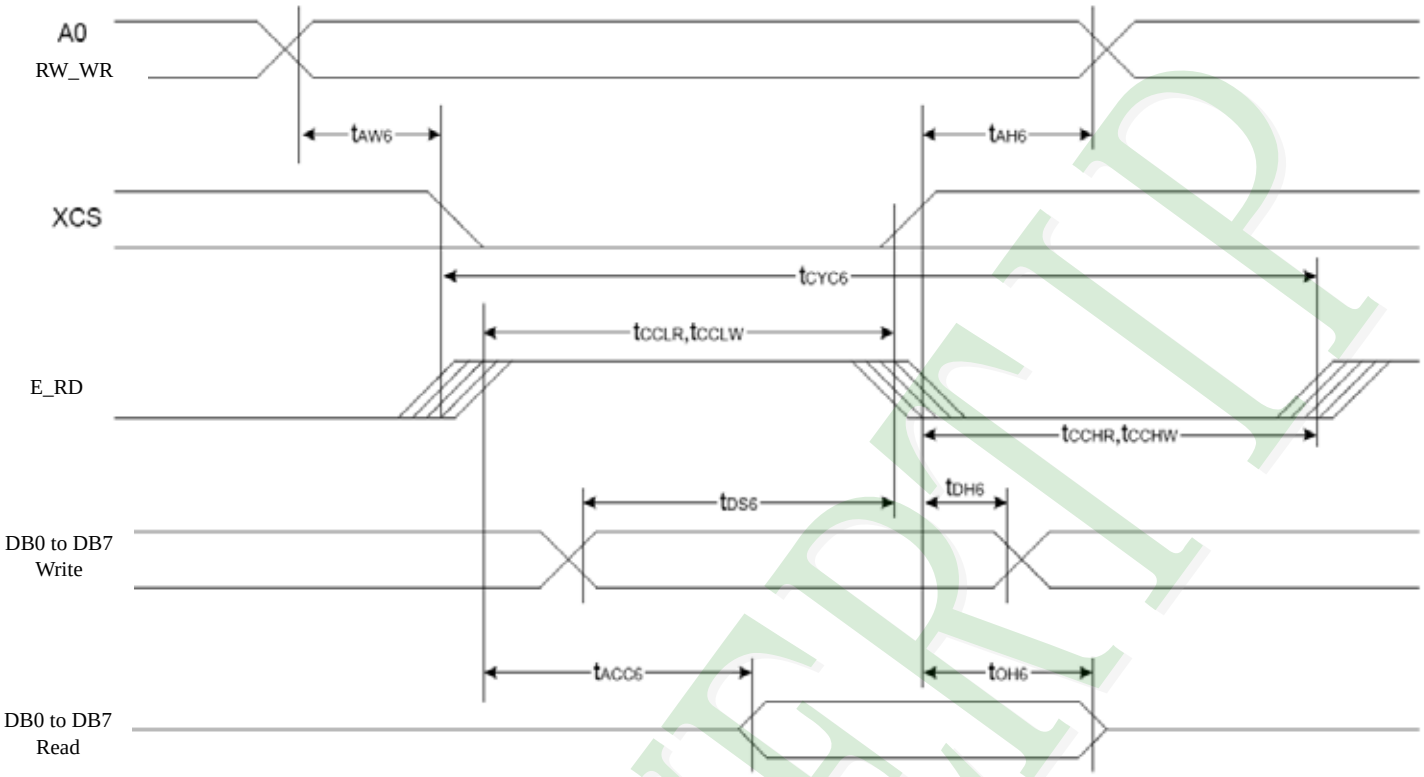
Item	Signal	Symbol	Condition	Rating		Units
				Min	Max	
Address hold time	A0	t_{AH8}	-	20	-	ns
Address setup time		t_{AW8}	-	30	-	
System cycle time		t_{CYC8}	-	250	-	
Enable L pulse width (Write)	RW_WR	t_{CCLW}	-	150	-	
Enable H pulse width (Write)		t_{CCHW}	-	100	-	
Enable L pulse width (Read)	E_RD	t_{CCLR}	-	150	-	
Enable H pulse width (Read)		t_{CCHR}	-	100	-	
WRITE Data setup time	DB0 to DB7	t_{DS8}	-	200	-	
WRITE Address hold time		t_{DH8}	-	20	-	
READ access time		t_{ACC8}	C_L=100pF	-	40	
READ Output disable time		t_{OH8}	C_L=100pF	-	30	

*1 The input signal rise time and fall time (tr, tf) is specified at 15 ns or less. When the system cycle time is extremely fast, $(t_r + t_f) \leqq (t_{CYC8} - t_{CCLW} - t_{CCHW})$ for $(t_r + t_f) \leqq (t_{CYC8} - t_{CCLR} - t_{CCHR})$ are specified.

*2 All timing is specified using 20% and 80% of VDD as the reference.

*3 t_{CCLW} and t_{CCLR} are specified as the overlap between XCS being “L” and WR and RD being at the “L” level.

For the 6800 Series MPU



V_{DD} =3.3V

Item	Signal	Symbol	Condition	Rating		Units
				Min	Max	
Address hold time	A0	t_{AH6}	-	20	-	ns
Address setup time		t_{AW6}	-	20	-	
System cycle time		t_{CYC6}	-	200	-	
Enable L pulse width (Write)	RW_WR	t_{EWLW}	-	100	-	
Enable H pulse width (Write)		t_{EWHW}	-	100	-	
Enable L pulse width (Read)	E_RD	t_{EWLR}	-	100	-	
Enable H pulse width (Read)		t_{EWHR}	-	100	-	
WRITE Data setup time	DB0 to DB7	t_{DS6}	-	150	-	
WRITE Address hold time		t_{DH6}	-	20	-	
READ access time		t_{ACC6}	C_L=100pF	-	40	
READ Output disable time		t_{OH6}	C_L=100pF	-	30	

VDD=2.7V

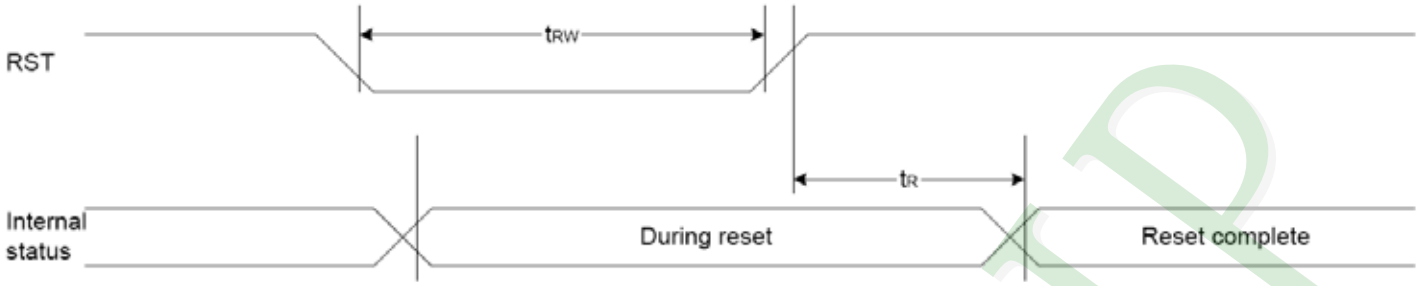
Item	Signal	Symbol	Condition	Rating		Units
				Min	Max	
Address hold time	A0	t_{AH6}	-	20	-	ns
Address setup time		t_{AW6}	-	30	-	
System cycle time		t_{CYC6}	-	250	-	
Enable L pulse width (Write)	RW_WR	t_{EWLW}	-	150	-	
Enable H pulse width (Write)		t_{EWHW}	-	100	-	
Enable L pulse width (Read)	E_RD	t_{EWLR}	-	150	-	
Enable H pulse width (Read)		t_{EWHR}	-	100	-	
WRITE Data setup time	DB0 to DB7	t_{DS6}	-	200	-	
WRITE Address hold time		t_{DH6}	-	20	-	
READ access time		t_{ACC6}	C_L=100pF	-	40	
READ Output disable time		t_{OH6}	C_L=100pF	-	30	

*1 The input signal rise time and fall time (tr, tf) is specified at 15 ns or less. When the system cycle time is extremely fast, $(t_r + t_f) \leqq (t_{CYC6} - t_{EWLW} - t_{EWHW})$ for $(t_r + t_f) \leqq (t_{CYC6} - t_{EWLR} - t_{EWHR})$ are specified.

*2 All timing is specified using 20% and 80% of VDD as the reference.

*3 t_{EWLW} and t_{EWLR} are specified as the overlap between XCS being “L” and E.

Reset Timing



V_{DD} =3.3V

Item	Signal	Symbol	Condition	Rating			Units
				Min	Typ	Max	
Reset time	-	t_R	-	-	-	1	μs
Reset “L” pulse width	RST	t_{RW}		1	-	-	μs

V_{DD} =2.7V

Item	Signal	Symbol	Condition	Rating			Units
				Min	Typ	Max	
Reset time	-	t_R	-	-	-	1.5	μs
Reset “L” pulse width	RST	t_{RW}		1.5	-	-	μs

2.4 Display Command

Ext=0 or Ext=1

Index	Command	A0	RD	WR	D7	D6	D5	D4	D3	D2	D1	D0	Function	Hex	Parameter
1	Ext In	0	1	0	0	0	1	1	0	0	0	0	Ext=0 Set	30	None
2	Ext Out	0	1	0	0	0	1	1	0	0	0	1	Ext=1 Set	31	None

Ext=0

Index	Command	A0	RD	WR	D7	D6	D5	D4	D3	D2	D1	D0	Function	Hex	Parameter
1	DISON	0	1	0	1	0	1	0	1	1	1	1	Display On	AF	None
2	DISOFF	0	1	0	1	0	1	0	1	1	1	0	Display Off	AE	None
3	DISNOR	0	1	0	1	0	1	0	0	1	1	0	Normal Display	A6	None
4	DISINV	0	1	0	1	0	1	0	0	1	1	1	Inverse Display	A7	None
5	COMSCN	0	1	0	1	0	1	1	1	0	1	1	COM Scan Direction	BB	1 byte
6	DISCTRL	0	1	0	1	1	0	0	1	0	1	0	Display Control	CA	3 bytes
7	SLPIN	0	1	0	1	0	0	1	0	1	0	1	Sleep In	95	None
8	SLPOUT	0	1	0	1	0	0	1	0	1	0	0	Sleep Out	94	None
9	LASET	0	1	0	0	1	1	1	0	1	0	1	Line Address Set	75	2 bytes
10	CASET	0	1	0	0	0	0	1	0	1	0	1	Column Address Set	15	2 bytes
11	DATSDR	0	1	0	1	0	1	1	1	1	0	0	Data Scan Direction	BC	3 bytes
12	RAMWR	0	1	0	0	1	0	1	1	1	0	0	Writing to Memory	5C	Data
13	RAMRD	0	1	0	0	1	0	1	1	1	0	1	Reading from Memory	5D	Data
14	PTLIN	0	1	0	1	0	1	0	1	0	0	0	Partial display in	A8	2 bytes
15	PTLOUT	0	1	0	1	0	1	0	1	0	0	1	Partial display out	A9	None
16	RMWIN	0	1	0	1	1	1	0	0	0	0	0	Read and Modify Write	E0	None
17	RMWOUT	0	1	0	1	1	1	0	1	1	1	0	RMW end	EE	None
18	ASCSET	0	1	0	1	0	1	0	1	0	1	0	Area Scroll Set	AA	4 bytes
19	SCSTART	0	1	0	1	0	1	0	1	0	1	1	Scroll Start Set	AB	1 byte
20	OSCON	0	1	0	1	1	0	1	0	0	0	1	Internal OSC on	D1	None
21	OSCOFF	0	1	0	1	1	0	1	0	0	1	0	Internal OSC off	D2	None
22	PWRCTRL	0	1	0	0	0	1	0	0	0	0	0	Power Control	20	1 byte
23	VOLCTRL	0	1	0	1	0	0	0	0	0	0	1	EC control	81	2 bytes
24	VOLUP	0	1	0	1	1	0	1	0	1	1	0	EC increase 1	D6	None
25	VOLDOWN	0	1	0	1	1	0	1	0	1	1	1	EC decrease 1	D7	None
26	RESERVED	0	1	0	1	0	0	0	0	0	1	0	Not Use	82	0
27	EPSRRD1	0	1	0	0	1	1	1	1	1	0	0	READ Register1	7C	None

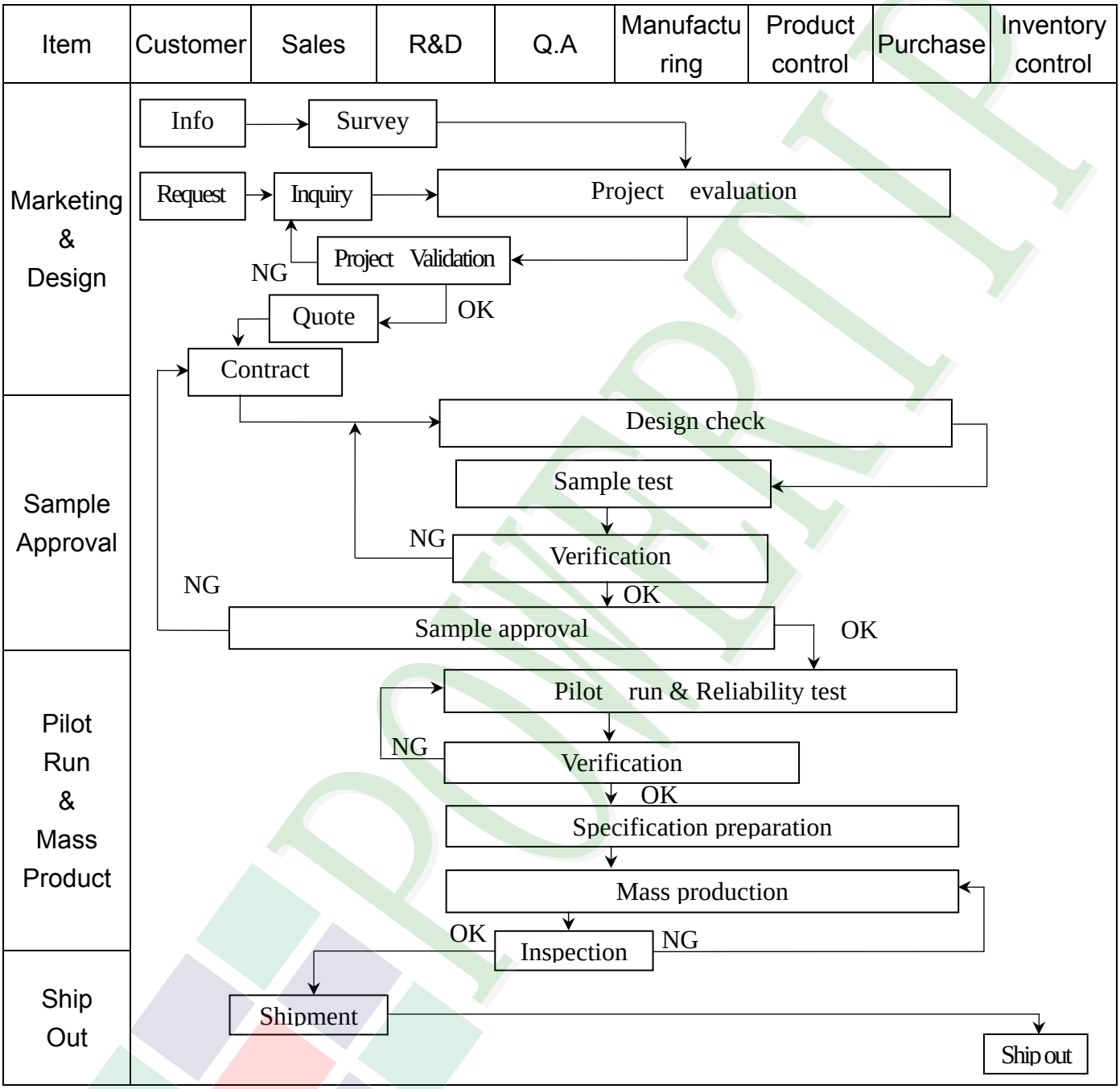
28	EPSRRD2	0	1	0	0	1	1	1	1	1	0	1	READ Register2	7D	None
29	NOP	0	1	0	0	0	1	0	0	1	0	1	NOP Instruction	25	None
30	STREAD	0	0	1	Read Data								Status Read		
31	EPINT	0	1	0	0	0	0	0	0	1	1	1	Initial code(1)	07	1 byte

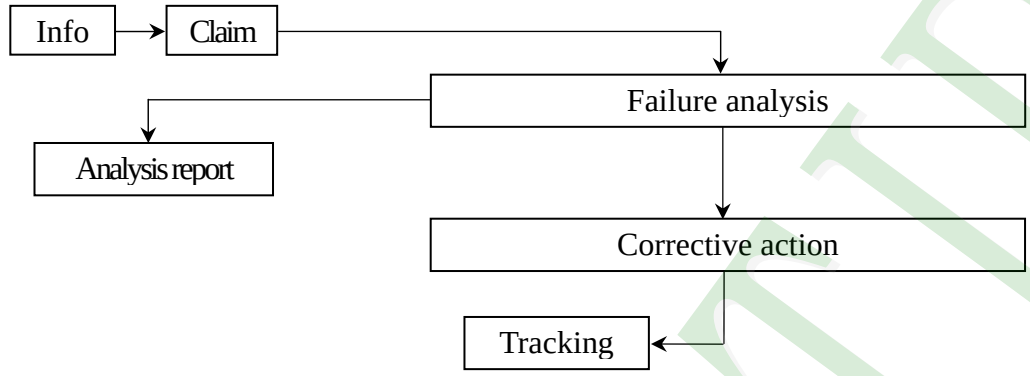
Ext=1

Index	*Command*	*A0*	*RD*	*WR*	*D7*	*D6*	*D5*	*D4*	*D3*	*D2*	*D1*	*D0*	*Function*	*Hex*	*Parameter*
1	Gray 1 Set	0	1	0	0	0	1	0	0	0	0	0	FRAME 1 Gray PWM Set	20	16 bytes
2	Gray 2 Set	0	1	0	0	0	1	0	0	0	0	1	FRAME 2 Gray PWM Set	21	16 bytes
3	Wt. Set	0	1	0	0	0	1	0	0	0	1	0	Weight Set	22	3 bytes
4	ANASET	0	1	0	0	0	1	1	0	0	1	0	Analog Circuit Set	32	3 bytes
5	DITHOFF	0	1	0	0	0	1	1	0	1	0	0	Dithering Circuit Off	34	None
6	DITHON	0	1	0	0	0	1	1	0	1	0	1	Dithering Circuit On	35	None
7	EPCTIN	0	1	0	1	1	0	0	1	1	0	1	Control EEPROM	CD	1 byte
8	EPCOUT	0	1	0	1	1	0	0	1	1	0	0	Cancel EEPROM	CC	None
9	EPMWR	0	1	0	1	1	1	1	1	1	0	0	Write to EEPROM	FC	None
10	EPMRD	0	1	0	1	1	1	1	1	1	0	1	Read from EEPROM	FD	None

3. QUALITY ASSURANCE SYSTEM

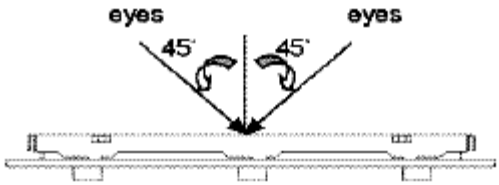
3.1 Quality Assurance Flow Chart

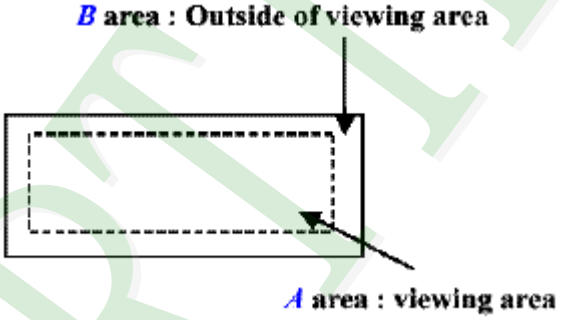


Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service								
Q.A Activity	1. ISO 9001 Maintenance Activities 2. Process improvement proposal 3. Equipment calibration 4. Education And Training Activities 5. Standardization Management							

3.2 Inspection Specification

◆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 40W×2 fluorescent light ’ and distance of view must be at 30 cm.
(2). The test direction is base on about around 45° of vertical line. (Fig. 1)
(3). Definition of area . (Fig. 2)

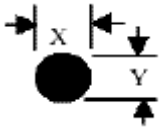


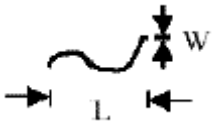


◆ Specification:

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、dot 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
05	Black or white dot、scratch、contamination Round type	5.1 Round type: 5.1.1 display only : · White and black spots on display ≦ 0.30mm, no more than Four white or black spots present. · Densely spaced : NO more than two spots or lines within 3mm	Minor

◆Specification :

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>level</th></tr>
<tr><td>05</td><td>Black or white dot、scratch、contamination
Round type
 

Φ=(x+y)/2
 
</td><td>5.1.2 Nom-display :
<table><tr><td>Dimension (diameter : Φ)</td><td>Acceptance(Q’ty)</td></tr><tr><td>Φ ≦0.10mm</td><td>Accept no dense</td></tr><tr><td>0.10mm＜ Φ ≦0.20mm</td><td>3</td></tr><tr><td>0.20mm＜ Φ ≦0.30mm</td><td>2</td></tr><tr><td>Total</td><td>4</td></tr></table>5.1.3 Line type:
<table><tr><td colspan="2">Dimension (diameter : Φ)</td><td colspan="2">Acceptance (Q’ty)</td></tr><tr><td>Length</td><td>width</td><td>A area</td><td>B area</td></tr><tr><td>---</td><td>w≦0.03mm</td><td>Accept no dense</td><td>Don’t count</td></tr><tr><td>L≦3.0mm</td><td>0.03mm＜ Φ ≦0.05mm</td><td rowspan="2">4</td><td>Don’t count</td></tr><tr><td>L≦2.5mm</td><td>0.05mm＜ Φ ≦0.075mm</td><td>Don’t count</td></tr><tr><td>---</td><td>w＞0.075mm</td><td colspan="2">As round type</td></tr></table></td><td>Minor</td></tr>
<tr><td>06</td><td>Polarizer Bubble</td><td><table><tr><td rowspan="2">Dimension (diameter : Φ)</td><td colspan="2">Acceptance(Q’ty)</td></tr><tr><td>A area</td><td>B area</td></tr><tr><td>Φ ≦0.20mm</td><td>Accept no dense</td><td>Don’t count</td></tr><tr><td>0.20mm＜ Φ ≦0.50mm</td><td>3</td><td>Don’t count</td></tr><tr><td>0.50mm＜ Φ ≦1.00mm</td><td>2</td><td>Don’t count</td></tr><tr><td>Φ ＞1.00mm</td><td>0</td><td>Don’t count</td></tr><tr><td>Total quantity</td><td>4</td><td>Don’t count</td></tr></table></td><td>Minor</td></tr>
<tr><td>07</td><td>The crack of glass</td><td>● Glass Crack:
7.1 Crack on the circuit of electrode terminal :
 

<table><tr><td></td><td>X</td><td>Y</td><td>Z</td></tr><tr><td>Front</td><td>X≦1/5 a</td><td>Y≦ 1/2 D</td><td>Z≦ t</td></tr><tr><td>Back</td><td colspan="3">Neglect</td></tr></table></td><td>Minor</td></tr>
</table>

◆Specification :

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="2">07</td><td>The crack of glass

X: The length of Crack

Y: The width of crack

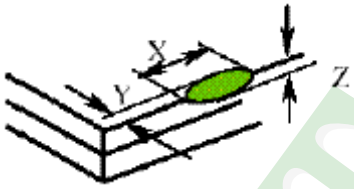
Z: The thickness of crack

D: terminal length

T: The thickness of glass

A : The length of glass</td><td>● Glass Crack:

7.2 General glass crack and corner edge:

7.2.1
 

<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>Neglect</td><td>Out A area</td><td>Neglect</td></tr></table>
7.2.2
 

<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>Neglect</td><td>Out A area</td><td>Neglect</td></tr></table></td><td>Minor</td></tr>
<tr><td>7.3 Glass remain:
 

<table><tr><td>X</td><td>Y</td></tr><tr><td>Neglect</td><td>≦ 1/3 d</td></tr></table></td><td>Minor</td></tr>
</table>

◆Specification :

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>07</td><td>The crack of glass

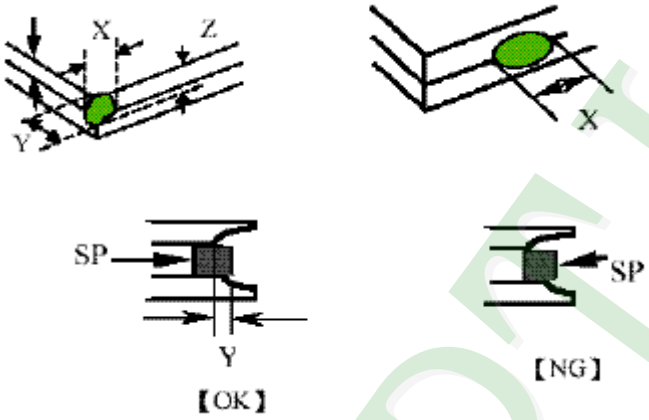
X: The length of Crack

Y: The width of crack

Z: The thickness of crack

D: terminal length

T: The thickness of glass

A : The length of glass</td><td>7.4 Corner crack and medial crack:
 

<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5a</td><td>Crack can’t enter viewing area</td><td>≦1/2t</td></tr>
<tr><td>≦1/5a</td><td>Crack can’t exceed the half of width of SP width of SP</td><td>1/2t<Z≦2t</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>08</td><td>Backlight elements</td><td>8.1 Backlight can’t work normally.</td><td>Major</td></tr>
<tr><td></td><td></td><td>8.2 Backlight doesn’t light or color is wrong.</td><td>Major</td></tr>
<tr><td></td><td></td><td>8.3 Illumination source flickers when lit.</td><td>Major</td></tr>
<tr><td>09</td><td>General appearance</td><td>9.1 pin type must match type in specification sheet</td><td>Major</td></tr>
<tr><td></td><td></td><td>9.2 No short circuits in components on PCB or FPC</td><td>Major</td></tr>
<tr><td></td><td></td><td>9.3Product packaging must the same as specified on packaging specification sheet.</td><td>Major</td></tr>
<tr><td></td><td></td><td>9.4 The folding and peeled off in polarizer are not acceptable</td><td>Major</td></tr>
<tr><td></td><td></td><td>9.5 The PCB or FPC between B/L assembled distance (PCB or FPC) is ≦1.5mm</td><td>Major</td></tr>
</table>

4. RELIABILITY TEST

4.1 Reliability Test Condition

<table>
<tr><th>NO.</th><th>TEST ITEM</th><th>TEST CONDITION</th></tr>
<tr><td>1</td><td>High Temperature Storage Test</td><td>Keep in 80 ±2℃ 96 hrs
Surrounding temperature, then storage at normal condition 4hrs</td></tr>
<tr><td>2</td><td>Low Temperature Storage Test</td><td>Keep in -30 ±2℃ 96 hrs
Surrounding temperature, then storage at normal condition 4hrs</td></tr>
<tr><td>3</td><td>High Humidity Storage</td><td>Keep in +60℃/90%RH duration for 96 hrs
Surrounding temperature, then storage at normal condition 4hrs
(Excluding the polarizer)</td></tr>
<tr><td rowspan="2">4</td><td rowspan="2">ESD Test</td><td>Air Discharge:
Apply 2 KV with 5 times
Discharge for each polarity +/-
Contact Discharge:
Apply 250V with 5 times
discharge for each polarity +/-</td></tr>
<tr><td>1. Temperature Ambient: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 s)
(Tolerance lf the output voltage indication: ±5%)</td></tr>
<tr><td>5</td><td>Temperature Cycling Test</td><td>-20℃ → 25℃ → 70℃ → 25℃
(30mins) (5mins) (30mins) (5mins)
10 Cycle
Surrounding temperature, then storage at normal condition 4hrs</td></tr>
<tr><td>6</td><td>Vibration Test (Packaged)</td><td>1. Sine wave 10～55HZ frequency (1 min)
2. The amplitude of vibration :1.5 mm
3. Each direction (XYZ) duration for 2 Hrs</td></tr>
<tr><td>7</td><td>Drop Test (Packaged)</td><td><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>Drop direction :※3 comer /1 edges /6 sides etch 1times</td></tr>
</table>

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±10℃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℃ ±5℃ 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.

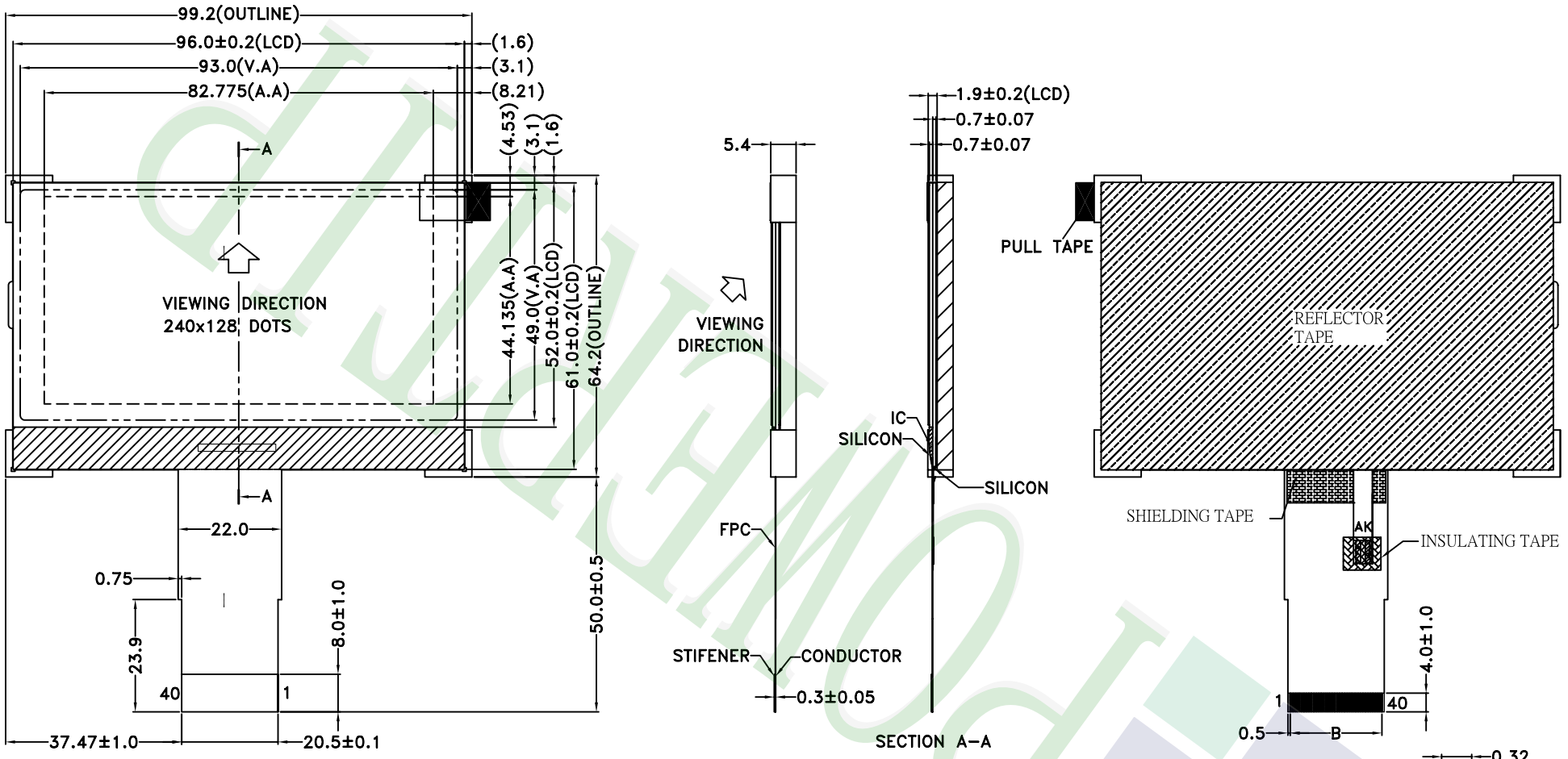
5.4 TERMS OF WARRANTY

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.



NOTES:
1.LCD TYPE: FSTN
2.LCD DISPLAY:POSITIVE/ TRANSFLECTIVE
3.VIEW DIRECTION: 6 O'CLOCK
4.TOP: −20~70°C TST:−30~80°C
5.B=P0.5x39=19.5±0.05,W=0.25±0.05
6.IC NO.:ST7529
7.THE COLERANCE UNLESS CLASSIFIED ±0.3MM
8.THIS PRODUCT CONFORMS ROHS

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003			
002			
001	NEW DRAWING	Mag	2010/01/26

PART NO: PE240128WRF001HC1Q

DRAWING NAME : LMD-PE240128WRF001HC1Q

TITLE: LCD MODULE DRAWING

久正光電股份有限公司
POWERTIP TECHNOLOGY CORPORATION

Design	Mag	⟨3⟩	Surface		
Check	Stone	Unit	MM	Material	
Approve	Linda	Scale	1:1.3	Thickness	
		Page	1/1	Quantity	

Length(Min) (mm) \ Tolerance \ Precision	Precision Level
1 ~ 4	-
4 ~ 16	-
16 ~ 63	-
63 ~ 250	-
250 ~ 1000	-

PT-A-054-01

Ver.001

Documents NO.	PKG-PE240128WRF001HC1Q

LCM包裝規格書
LCM Packaging Specifications (For Tray)

Approve	Check	Contact
Linda	Stone	Mag

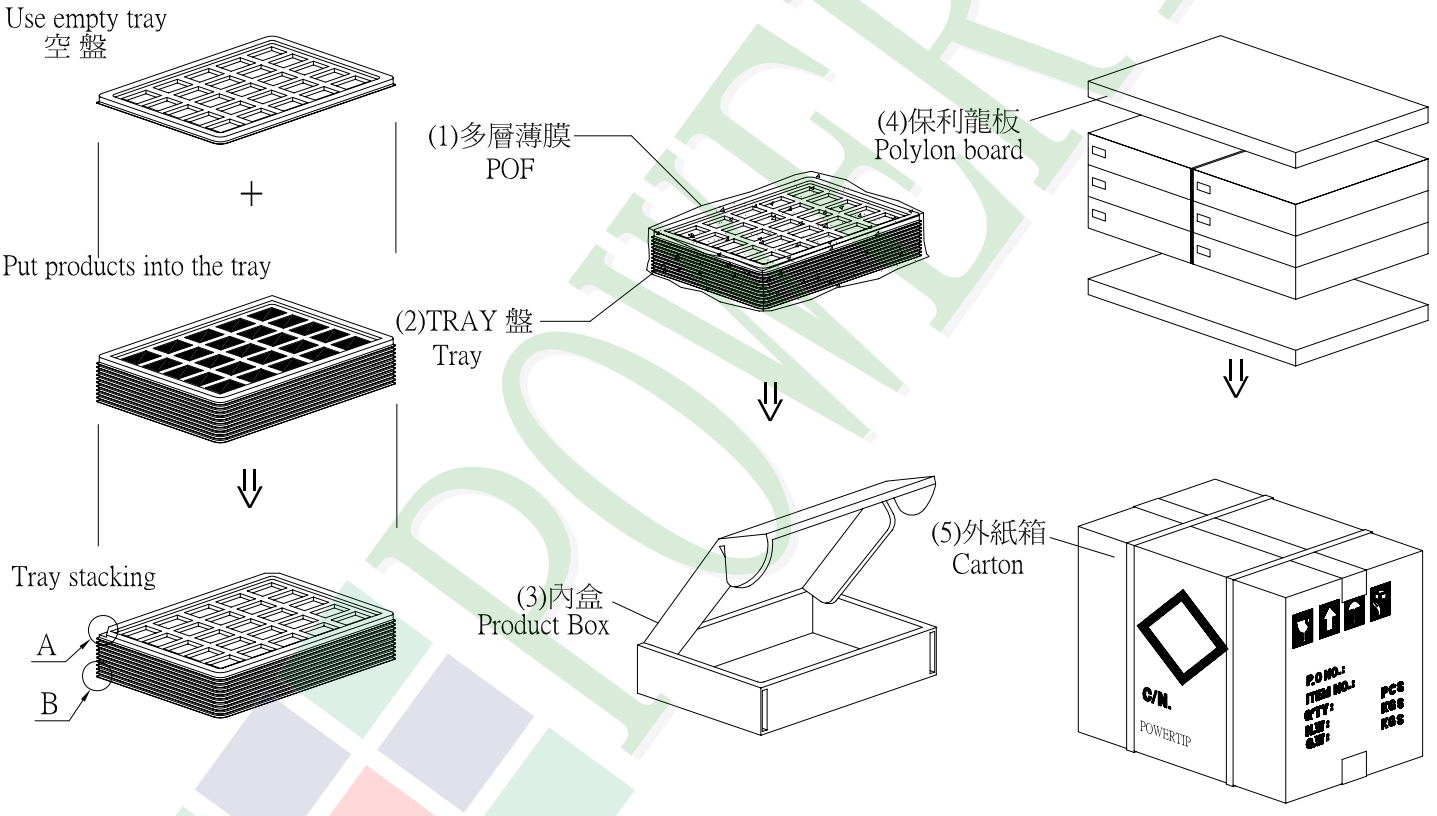
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PE240128WRF001HC1Q	99.2 X 64.2	0.05	180	9.0
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TYPG24012801BA	352 X 260 X 13.0	0.1	36	3.6
4	內盒(3)Product Box	BX36627063ABBA	393 X 274 X 68	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) : 15.69 Kg±10%

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

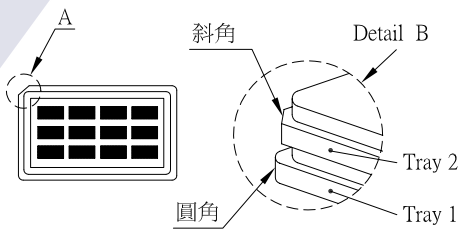
(1)LCM quantity per box : no per tray	6	x no of tray	5	=	30
(2)Total LCM quantity in carton : quantity per box	30	x no of boxes	6	=	180



特 記 事 項 (REMARK)

1. Label Specifications :

MODEL:
LOT NO:
QUANTITY:
CHECK:



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: PS240128WRF-001H05
Tray Number: PS240128WRF-001H05