Wincom Tech CO., LTD.

The LCD(M) Specialist

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RoHS

PART NO. : WG12864A V1.4
-STBLWHC06

FOR MESSRS. : _____

CONTENTS

ACCEPTED BY: _____ PROPOSED BY: _____

RECORD OF REVISION

DATE	PAGE	SUMMARY
2010-6-19	---	NEW ISSUE

3. General specifications

3.1 General specifications

PLEASE REFER TO:

"CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-10000)".

3.2 Quality Assurance and Warranty

PLEASE REFER TO:

"QUALITY ASSURANCE MANUL (MS-10-10001)".

3.3 This individual specification is prior to general specifications

4. Mechanical data

- Display format: 128 x 64 DOTS
- LCD type: STN Negative, Blue , Transmissive
- Backlight: White, LED,
- Viewing angle: 6:00
- Data transfer: 8Bit Parallel
- LCD controller: SBN0064 OR Equivalent
- Module size: 93 x 70 x 11.4 mm
- View area: 71.8 x 38.8 mm
- Dot size: 0.48 x 0.48 mm
- Dot pitch: 0.52 x 0.52mm
- Driving method: 1/64duty, 1/9 bias

5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

I T E M	SYMBOL	MIN.	MAX.	UNIT	COMMENT
POWER SUPPLY FOR LOGIC	V_{DD}-V_{SS}	-0.3	6	V	--------
INPUT VOLTAGE	V_I	V_{SS}	V_{DD}	V	--------
STATIC ELECTRICITY	---------	------	-----	V	--------
POWER SUPPLY FOR BACKLIGHT	V_S	0	3.4	V_{rms}	--------
	f_{FL}	------	------	KHz	--------
STARTING VOLTAGE FOR BACKLIGHT	------	------	------	V_{rms}	Ta = 25℃
	------	------	-----	V_{rms}	Ta = 25℃
POWER SUPPLY FOR LCD	V_{DD}-V_{EE}	------	15	V	---------

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5.2 Environmental absolute maximum ratings

I T E M	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20℃	70℃	-30℃	80℃	------
HUMIDITY	NOTE (2)		NOTE (2)		NO CONDENSATION
VIBRATION NOTE (3)	------	0.5G	------	2G	10~300Hz XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (3)	------	3G	------	5G	10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		------

NOTE (2): Ta ≦ 70℃: 75% RH MAX.

Ta ＞ 70℃: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 75% RH AT 70℃.

NOTE (3): 1G = 9.8 m/s^2

6. Electrical characteristics

Ta = 25℃ V_{DD} = 5.0 V

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Power supply voltage for circuit	V_{DD}-V_{SS}	------	4.75	5.0	5.25	V
Power supply voltage for LCD drive	V_{DD}-V_{EE}	------	-----	13	------	V
Data input voltage	V_{IH}	H LEVEL	2.4	------	V_{DD}	V
	V_{IL}	L LEVEL	-0.3	------	0.4	V
LCD display duty ratio	DUTY	------	------	1/64	------	------
LED BACKLIGHT	I_{fp}	I mseo plus 10% Dutg cyele		--		mA
		Operating voltage	2.9	3.1	3.2	V
		Forward current		65	85	mA
LED Lifetime	------	V_{FL}= 3.1Vrms f_{FL}= --KHz	------	100,000	------	Hr

NOTE: LED backlight: Due to the LED backlight working current is XXX Max,and LED chips Vop may be different, Wincom will adjust the backlight resistor according to the LED chips Vop, to meet the brightness maximum.

7. Optical characteristics

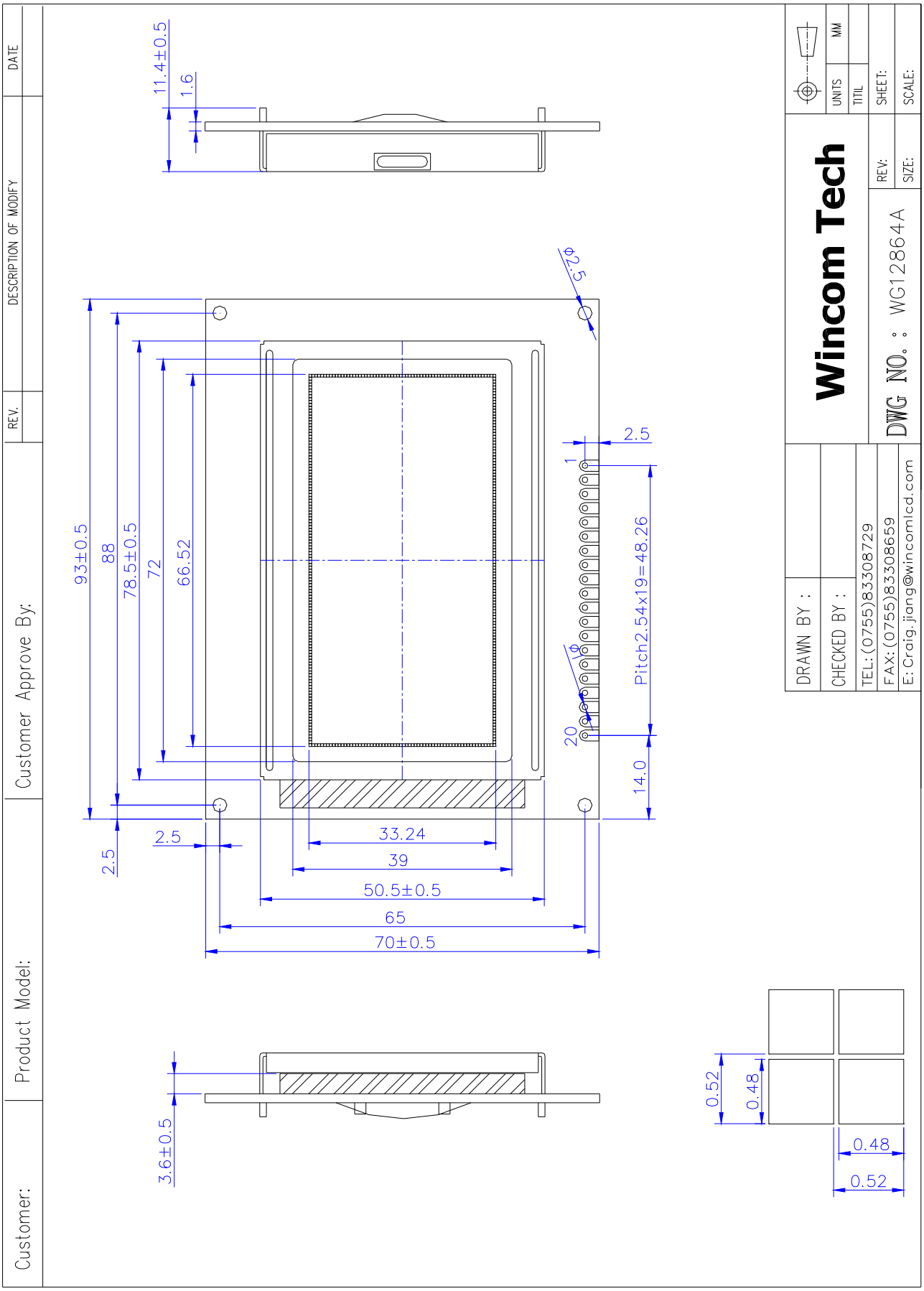
Ta = 25℃ V_{DD}-V_{EE} = 13V

I T E M	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Viewing angle	Φ2-Φ1	K ≧ 2.0	-35	----	20	deg.	1
Contrast ratio	K	Φ = 10° θ = 0°	4.0	----	------	------	1
Response time (at 25℃)	tr (rise)	Φ = 10° θ = 0°	------	-----	250	ms	1
	tf (fall)	Φ = 10° θ = 0°	------	-----	250	ms	1
The brightness of backlighting source	B	VFL= 3.1Vrms fFL= KHZ	------	400	------	cd/m^2	2

NOTE (1): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS

NOTE (2): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM

8. Outline dimension

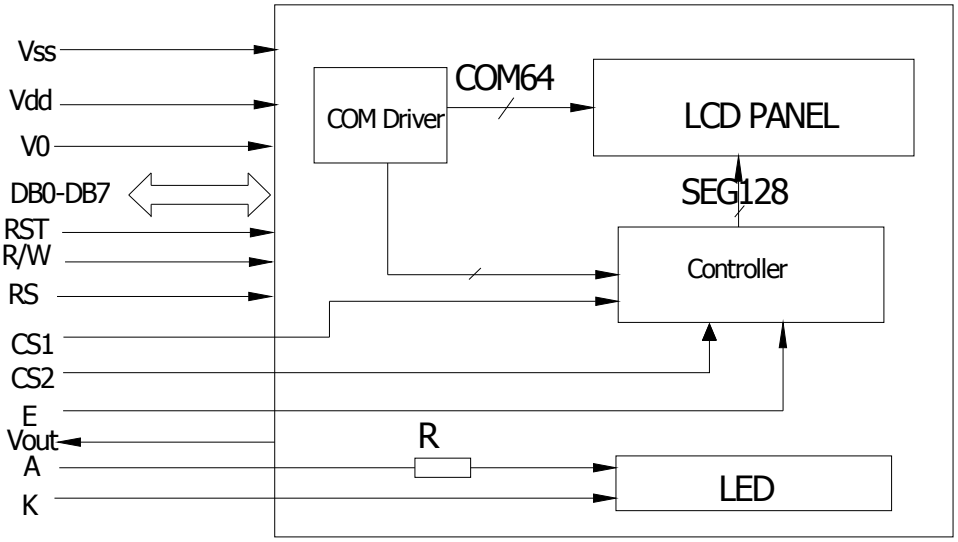


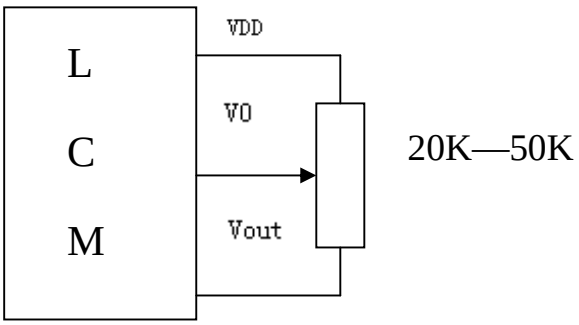
8.1 Interface

Pin Assignment

PIN NO.	Symbol	Function
1	VSS	Ground(-)
2	VDD	Power supply for logic circuit(+5V)
3	V0	Contrast adjust
4	RS	H : Data input L : Instruction Code Input
5	R/W	H : Data Read(LCD to MPU) L : Data Write(MPU to LCM)
6	E	Enable signal
7	DB0	Data Bus Line
8	DB1	Data Bus Line
9	DB2	Data Bus Line
10	DB3	Data Bus Line
11	DB4	Data Bus Line
12	DB5	Data Bus Line
13	DB6	Data Bus Line
14	DB7	Data Bus Line
15	CS1	Chip Selection Signal 1,active at “H”
16	CS2	Chip Selection Signal 2, active at “H”
17	RST	Reset (Active " Low")
18	Vout	Output Voltage for LCD Driver
19	A	Power supply for BL (+5V)
20	K	Power supply for BL (0V)

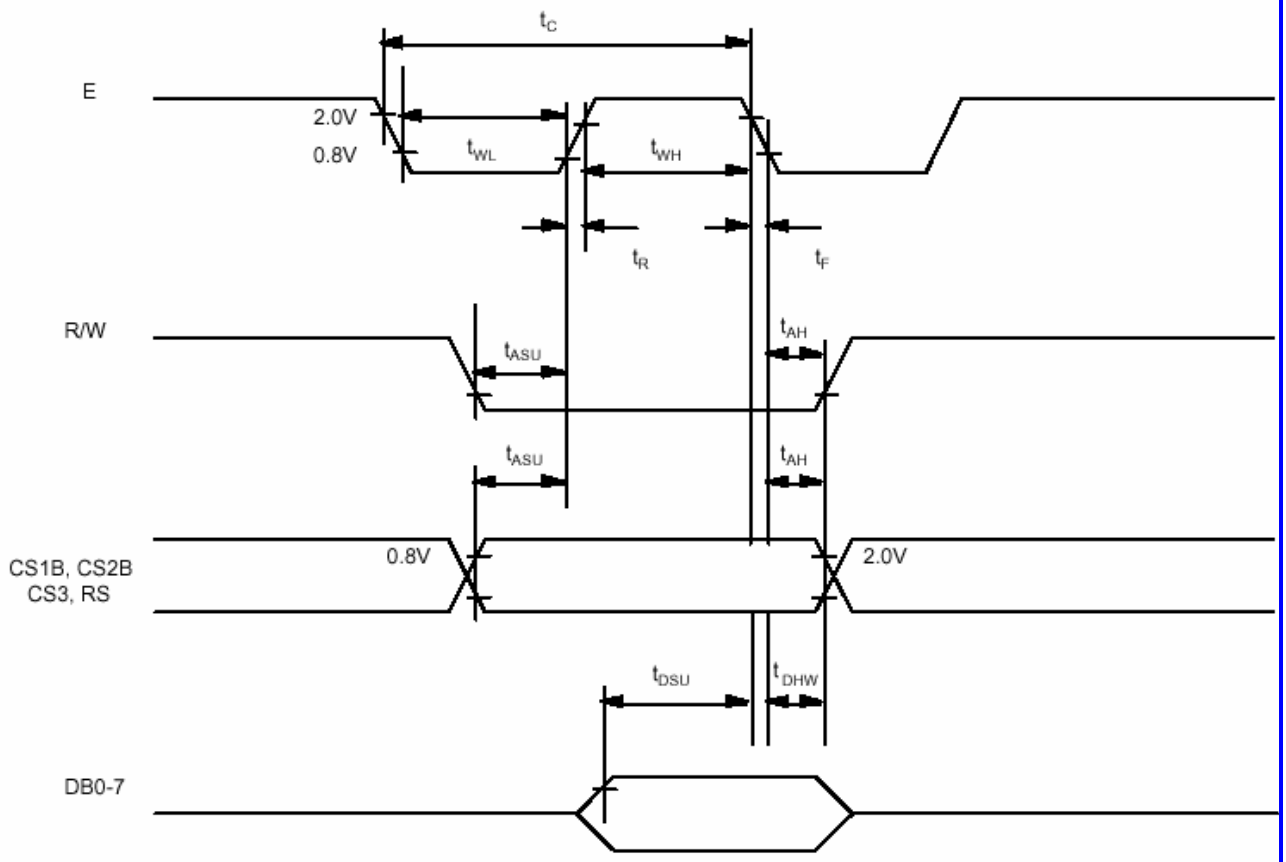
9. Block diagram



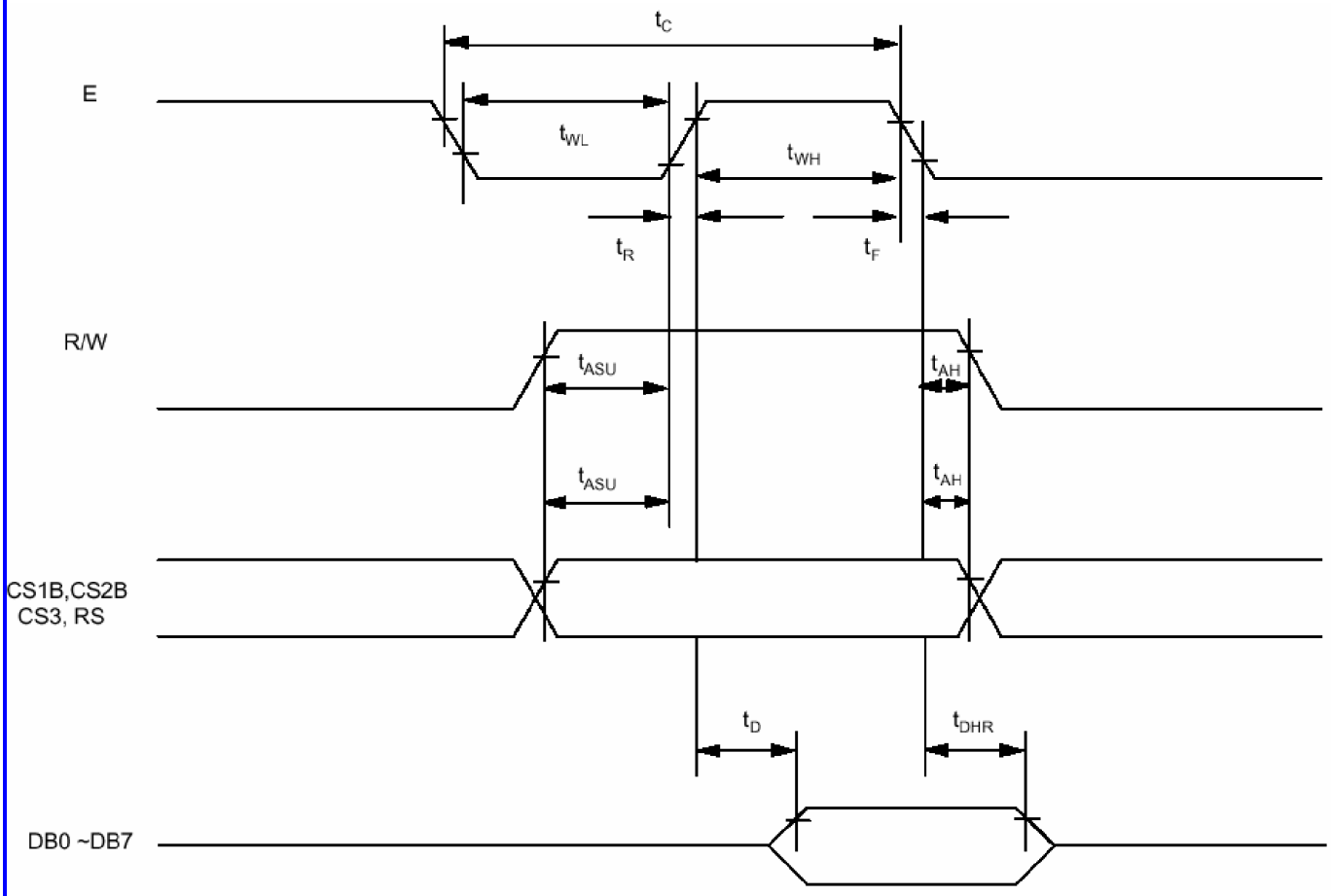


10.Interface Timing Chart

Characteristic	Symbol	Min	Typ	Max	Unit
E Cycle	t_C	1000	-	-	ns
E High Level Width	t_{WH}	450	-	-	ns
E Low Level Width	t_{WL}	450	-	-	ns
E Rise Time	t_R	-	-	25	ns
E Fall Time	t_F	-	-	25	ns
Address Set-Up Time	t_{ASU}	140	-	-	ns
Address Hold Time	t_{AH}	10	-	-	ns
Data Set-Up Time	t_{DSU}	200	-	-	ns
Data Delay Time	t_D	-	-	320	ns
Data Hold Time (Write)	t_{DHW}	10	-	-	ns
Data Hold Time (Read)	t_{DHR}	20	-	-	ns



MPU write timing



. MPU Read timing

11.Instruction Code

Instruction	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function
Display ON/OFF	L	L	L	L	H	H	H	H	H	L/H	Controls the display on or off. Internal status and display RAM data is not affected. L:OFF, H:ON
Set Address (Y address)	L	L	L	H	Y address (0~63)						Sets the Y address in the Y address counter.
Set Page (X address)	L	L	H	L	H	H	H	Page (0~7)			Sets the X address at the X address register.
Display Start Line (Z address)	L	L	H	H	Display start line (0~63)						Indicates the display data RAM displayed at the top of the screen.
Status Read	L	H	BUSY	L	ON/OFF	RESET	L	L	L	L	Read status. BUSY L: Ready H: In operation ON/OFF L: Display ON H: Display OFF RESET L: Normal H: Reset
Write Display Data	H	L	Write Data								Writes data (DB0:7) into display data RAM. After writing instruction, Y address is increased by 1 automatically.
Read Display Data	H	H	Read Data								Reads data (DB0:7) from display data RAM to the data bus.

12. Specification of quality assurance

AQL inspection standard

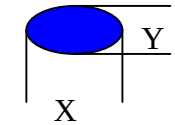
Sampling method: MIL-STD-105E, Level II, single sampling

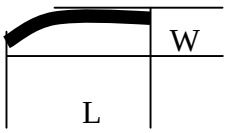
Defect classification **(Note: * is not including)**

Classify	Item		Note	AQL
Major	Display state	Short or open circuit	1	0.65
		LC leakage		
		Flickering		
		No display		
		Wrong viewing direction		
		Contrast defect (dim, ghost)	**2**	
		Back-light	**1,8**	
	Non-display	Flat cable or pin reverse	**10**	
		Wrong or missing component	**11**	
Minor	Display state	Background color deviation	**2**	**1.0**
		Black spot and dust	**3**	
		Line defect, Scratch	**4**	
		Rainbow	**5**	
		Chip	**6**	
		Pin hole	**7**	
	Polarizer	Protruded	**12**	
		Bubble and foreign material	**3**	
	Soldering	Poor connection	**9**	
	Wire	Poor connection	**10**	
	TAB	Position, Bonding strength	**13**	

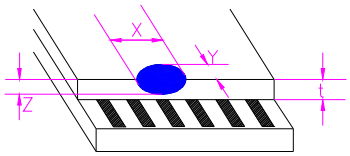
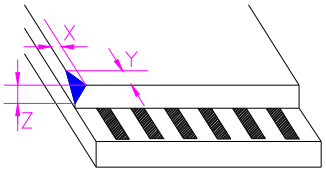
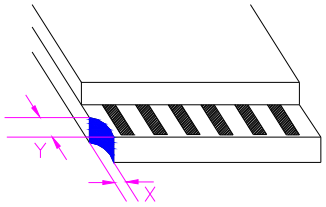
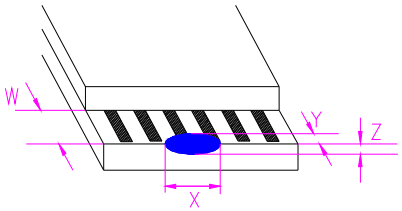
Note on defect classification

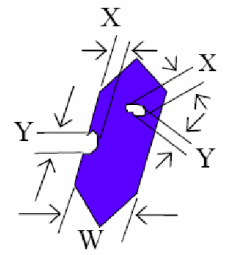
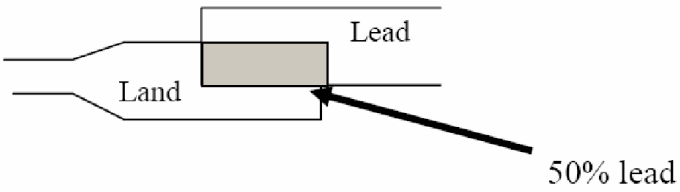
<table>
<tr><th>No.</th><th>Item</th><th>Criterion</th></tr>
<tr><td rowspan="6">1</td><td>Short or open circuit</td><td rowspan="6">Not allow</td></tr>
<tr><td>LC leakage</td></tr>
<tr><td>Flickering</td></tr>
<tr><td>No display</td></tr>
<tr><td>Wrong viewing direction</td></tr>
<tr><td>Wrong Back-light</td></tr>
<tr><td rowspan="2">2</td><td>Contrast defect</td><td rowspan="2">Refer to approval sample</td></tr>
<tr><td>Background color deviation</td></tr>
<tr><td>3</td><td>Point defect, Black spot, dust (including Polarizer)

ϕ = (X+Y)/2</td><td>


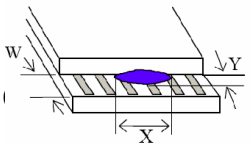
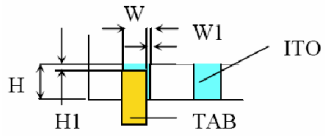
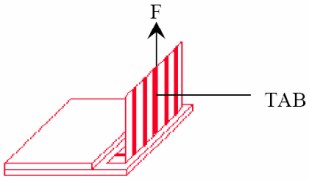
<table>
<tr><th>Point Size</th><th>Acceptable Qty.</th></tr>
<tr><td>ϕ <0.10</td><td>Disregard</td></tr>
<tr><td>0.10< ϕ ≤ 0.20</td><td>3</td></tr>
<tr><td>0.20< ϕ ≤ 0.25</td><td>2</td></tr>
<tr><td>0.25< ϕ ≤ 0.30</td><td>1</td></tr>
<tr><td>ϕ >0.30</td><td>0</td></tr>
</table>
Unit:mm
</td></tr>
<tr><td>4</td><td>Line defect, Scratch</td><td>


<table>
<tr><th colspan="2">Line</th><th>Acceptable Qty.</th></tr>
<tr><td>L</td><td>W</td><td></td></tr>
<tr><td>---</td><td>0.015≥W</td><td>Disregard</td></tr>
<tr><td>3.0≥L</td><td>0.03≥W</td><td rowspan="2">2</td></tr>
<tr><td>2.0≥L</td><td>.05≥W</td></tr>
<tr><td>1.0≥L</td><td>0.1＞W</td><td>1</td></tr>
<tr><td>---</td><td>0.05＜W</td><td>Applied as point defect</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>Rainbow</td><td>Not more than two color changes across the viewing area.</td></tr>
</table>

NO.	Item	Criterion
6	Chip Remark: X: Length direction Y: Short direction Z: Thickness direction t: Glass thickness W: Terminal Width	 Acceptable criterion X: ⩽2 | Y: 0.5mm | Z: ⩽t/2  Acceptable criterion X: ⩽2 | Y: 0.5mm | Z: ⩽t  Acceptable criterion X: ⩽3 | Y: ⩽2 | Z: ⩽t shall not reach to ITO  Acceptable criterion X: Disregard | Y: ⩽0.2 | Z: ⩽t

No.	Item	Criterion
7	Segment pattern W = Segment width ϕ = (X+Y)/2	(1) Pin hole ϕ < 0.10mm is acceptable.  Unit: mm
8	Back-light	(1) The color of backlight should correspond its specification. (2) Not allow flickering
9	Soldering	(1) Not allow heavy dirty and solder ball on PCB. (The size of dirty refer to point and dust defect) (2) Over 50% of lead should be soldered on Land. 
10	Wire	(1) Copper wire should not be rusted (2) Not allow crack on copper wire connection. (3) Not allow reversing the position of the flat cable. (4) Not allow exposed copper wire inside the flat cable.
11*	PCB	(1) Not allow screw rust or damage. (2) Not allow missing or wrong putting of component.

Point Size	Acceptable Qty
$\phi \leq 1/4W$	Disregard
$1/4W < \phi \leq 1/2W$	1
$\phi > 1/2W$	0

NO.	Item	Criterion
12	Protruded W: Terminal Width	 Acceptable Y ≤ 0.4
13	TAB	1. Position  W1≤1/3W H1≤1/3H 2 TAB bonding strength test  P (=F/TAB bonding width) ≥650gf/cm , (speed rate: 1mm/min) 5pcs per SOA (shipment)
14	Total no. of acceptable Defect	A. Zone Maximum 2 minor non-conformities per one unit. Defect distance: each point to be separated over 10mm B. Zone It is acceptable when it is no trouble for quality and assembly in customer's end product.