Wincom Tech CO., LTD.

The LCD(M) Specialist

RoHS

PART NO. : WG16080B V2.0
-SFYLYHC06

FOR MESSRS. : _____

CONTENTS

PROPOSED BY:

RECORD OF REVISION

DATE	PAGE	SUMMARY
2011-4-21	---	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: 160 x 80 DOTS
- LCD type: STN Positive Yellow-Green, Transflective
- Backlight color : Yellow-Green ,LED Side backlight
- Viewing angle : 6:00
- Data transfer: 8Bit Parallel
- LCD controller: T6963C or Equivalent
- Module size: 100.0 x 54.0 x 15.3mm
- View area : 72.3 x 37.8 mm
- Dot size : 0.39 x 0.39 mm
- Dot pitch : 0.42 x 0.42mm
- Driving method : 1/80duty, 1/10 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	5.5	V	---------
INPUT VOLTAGE	V_I	V_{SS}	V_{DD}	V	---------
STATIC ELECTRICITY	---------	------	-----	V	
POWER SUPPLY FOR BACKLIGHT	V_S	-----	3.3	V_{rms}	---------
	f_{FL}	------	------	KHz	---------
STARTING VOLTAGE FOR BACKLIGHT	------	------	------	V_{rms}	Ta = 25℃
	------	------		V_{rms}	Ta = 25℃
POWER SUPPLY FOR LCD	V_{lcd}	------	15	V	---------

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℃ VDD = 5.0 V

ITEM	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_{lcd}	------	-----	12	------	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	------	------	1/80	------	------
LED BACKLIGHT	I_{fp}	I mseo plus 10% Dutg cyele		--		mA
		Operating voltage		3.1	3.2	V
		Forward current		60	80	mA
LED Lifetime	------	V_{FL}= 3.1Vrms f_{FL}= --KHz	------	100,000	------	Hr

7. Optical characteristics

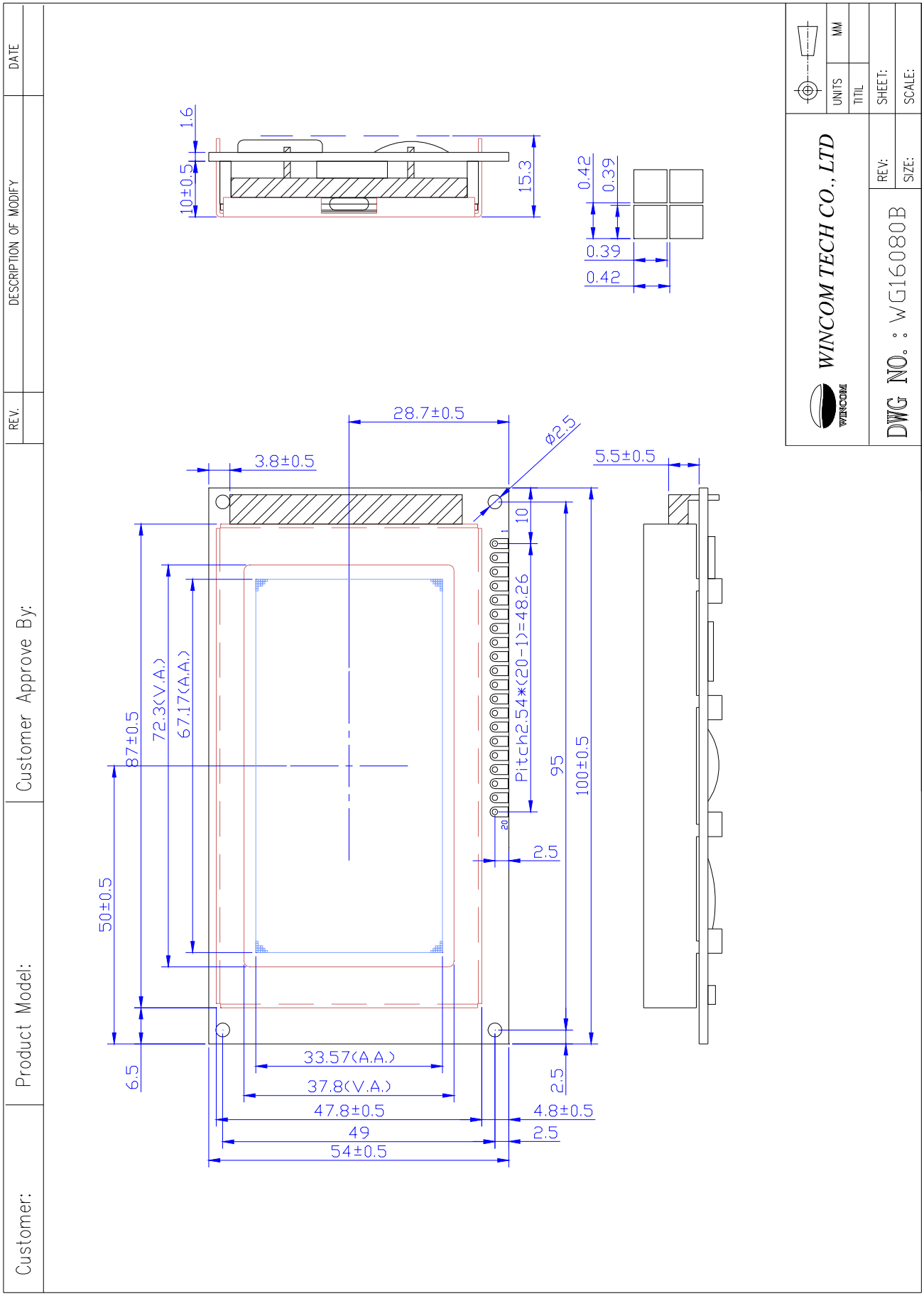
Ta = 25℃ V_{lcd} = 12V

ITEM	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	-------	150	-------	cd/m²	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

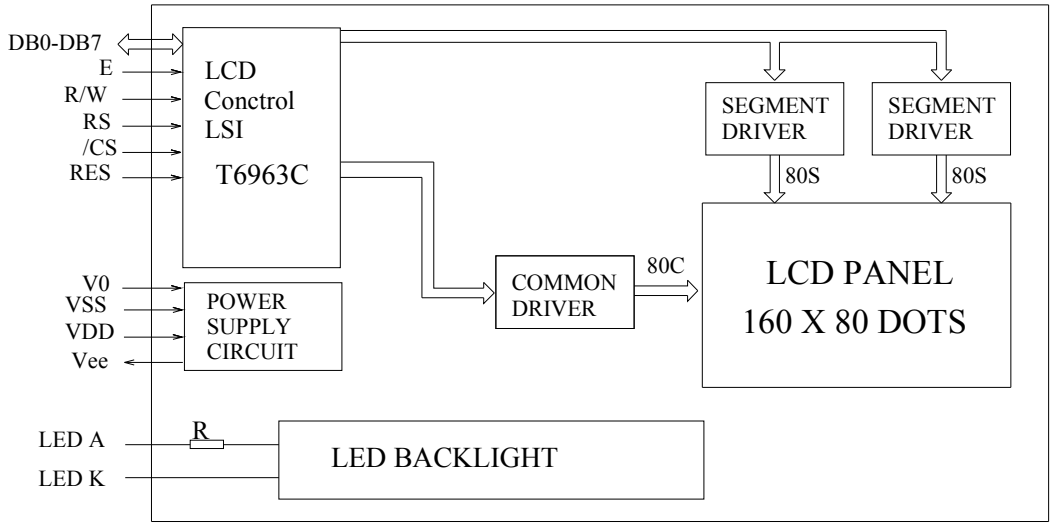


8.1 Interface

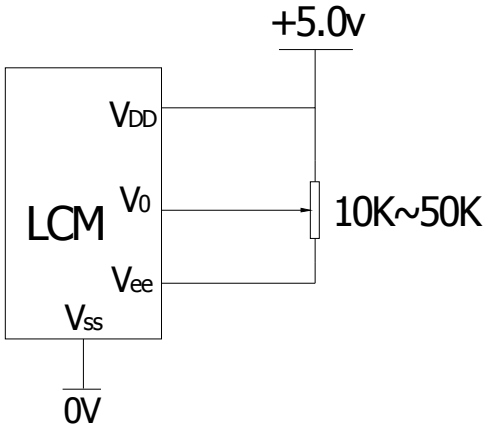
Pin Assignment

PIN NO.	Symbol	Leve	Function
1	Vout	-10V	DC-DC output
2	Vss	0V	Ground
3	VDD	5.0V	Power supply voltage for LCM(+)
4	V0	--	Contrast Adjust
5	/WR	L	Write Enable Signal
6	/RD	L	Read Enable Signal
7	/CE	L	Chip Enable Signal
8	C/D	H/L	H：Instruction; L：Data
9	/RST	L	Reset Signal
10	DB0	H/L	Data bit0
11	DB1	H/L	Data bit1
12	DB2	H/L	Data bit2
13	DB3	H/L	Data bit3
14	DB4	H/L	Data bit4
15	DB5	H/L	Data bit5
16	DB6	H/L	Data bit6
17	DB7	H/L	Data bit7
18	FS	H/L	Font Selection
19	A	(+5.0V)	Power supply for LED +
20	K	(-)	Power supply for LED -

9. Block diagram



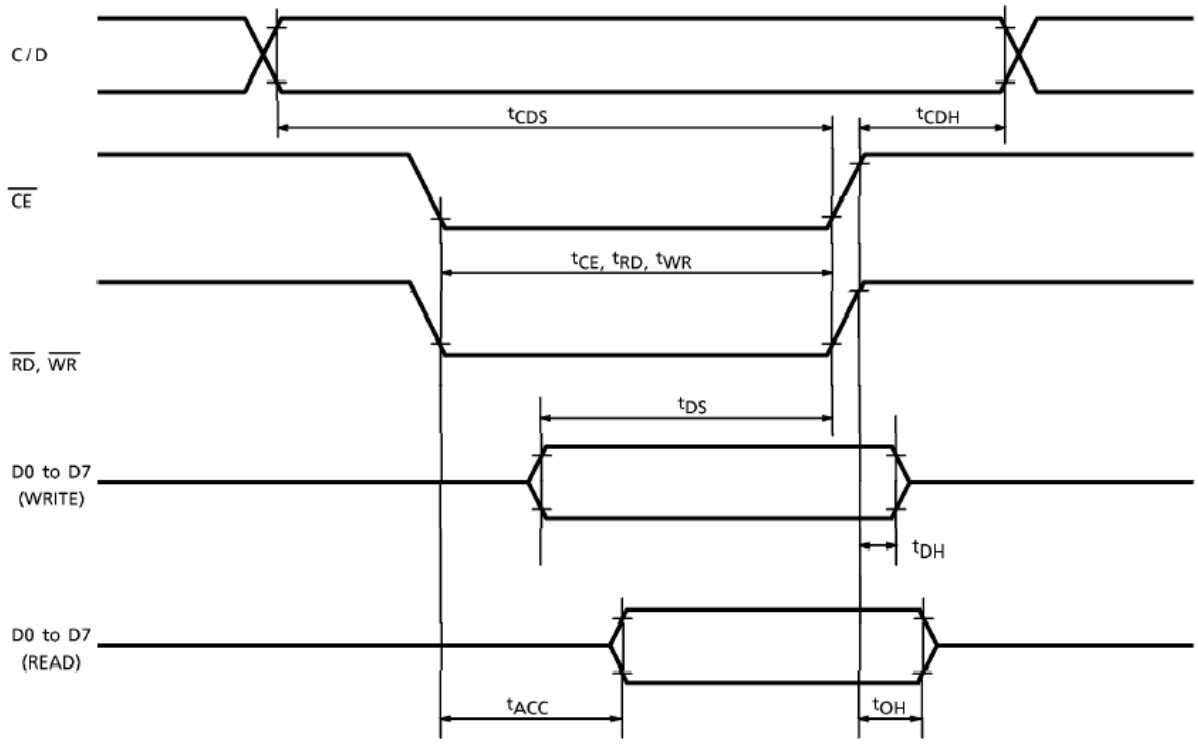
Power supply for LCM



10.Interface Timing Chart

10.1 Switching Characteristics

Bus Timing



TEST CONDITIONS (Unless otherwise noted, V_{DD} = 5.0V ± 10%, V_{SS} = 0V, Ta = − 20 to 75°C)

ITEM	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
C/D Set-up Time	t_{CDS}	—	100	—	ns
C/D Hold Time	t_{CDH}	—	10	—	ns
CE, RD, WR Pulse Width	t_{CE}, t_{RD}, t_{WR}	—	80	—	ns
Data Set-up Time	t_{DS}	—	80	—	ns
Data Hold Time	t_{DH}	—	40	—	ns
Access Time	t_{ACC}	—	—	150	ns
Output Hold Time	t_{OH}	—	10	50	ns

11.Instruction Code

COMMAND	CODE	D1	D2	FUNCTION
REGISTERS SETTING	00100001	X address	Y address	Set Cursor Pointer
	00100010	Data	00H	Set Offset Register
	00100100	Low address	High address	Set Address Pointer
SET CONTROL WORD	01000000	Low address	High address	Set Text Home Address
	01000001	Columns	00H	Set Text Area
	01000010	Low address	High address	Set Graphic Home Address
	01000011	Columns	00H	Set Graphic Area
MODE SET	1000X000	—	—	OR mode
	1000X001	—	—	EXOR mode
	1000X011	—	—	AND mode
	1000X100	—	—	Text Attribute mode
	10000XXX	—	—	Internal CG ROM mode
	10001XXX	—	—	External CG RAM mode
DISPLAY MODE	10010000	—	—	Display off
	1001XX10	—	—	Cursor on, blink off
	1001XX11	—	—	Cursor on, blink on
	100101XX	—	—	Text on, graphic off
	100110XX	—	—	Text off, graphic on
	100111XX	—	—	Text on, graphic on
CURSOR PATTERN SELECT	10100000	—	—	1-line cursor
	10100001	—	—	2-line cursor
	10100010	—	—	3-line cursor
	10100011	—	—	4-line cursor
	10100100	—	—	5-line cursor
	10100101	—	—	6-line cursor
	10100110	—	—	7-line cursor
	10100111	—	—	8-line cursor
DATA AUTO READ / WRITE	10110000	—	—	Set Data Auto Write
	10110001	—	—	Set Data Auto Read
	10110010	—	—	Auto Reset
DATA READ / WRITE	11000000	Data	—	Data Write and Increment ADP
	11000001	—	—	Data Read and Increment ADP
	11000010	Data	—	Data Write and Decrement ADP
	11000011	—	—	Data Read and Decrement ADP
	11000100	Data	—	Data Write and Nonvariable ADP
	11000101	—	—	Data Read and Nonvariable ADP
SCREEN PEEK	11100000	—	—	Screen Peek
SCREEN COPY	11101000			Screen Copy

COMMAND	CODE	D1	D2	FUNCTION
BIT SET / RESET	11110XXX	—	—	Bit Reset
	11111XXX	—	—	Bit Set
	1111X000	—	—	Bit 0 (LSB)
	1111X001	—	—	Bit 1
	1111X010	—	—	Bit 2
	1111X011	—	—	Bit 3
	1111X100	—	—	Bit 4
	1111X101	—	—	Bit 5
	1111X110	—	—	Bit 6
	1111X111	—	—	Bit 7 (MSB)

X : invalid

12.Character generator ROM

LSB / MSB	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2																
3																
4																
5																
6																
7																

13. Specification of quality assurance

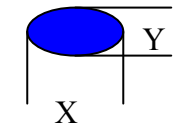
AQL inspection standard

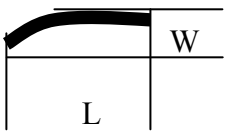
Sampling method: MIL-STD-105E, Level II, single sampling

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

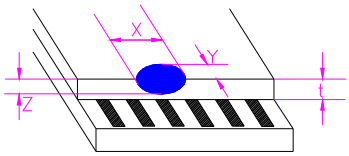
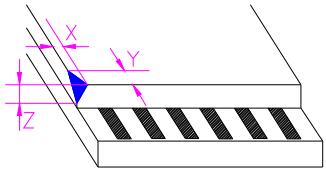
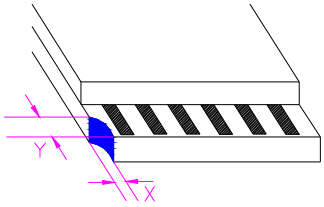
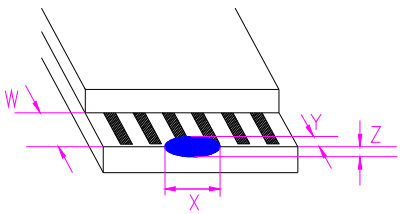
Classify	Item		Note	AQL
Major	Display state	Short or open circuit	1	0.65
		LC leakage		
		Flickering		
		No display		
		Wrong viewing direction		
		Contrast defect (dim, ghost)	**2**	
		Back-light	**1,8**	
	Non-display	Flat cable or pin reverse	**10**	
		Wrong or missing component	**11**	
Minor	Display 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**	

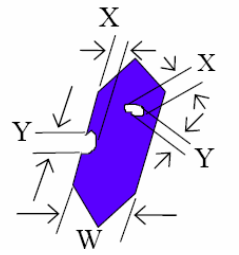
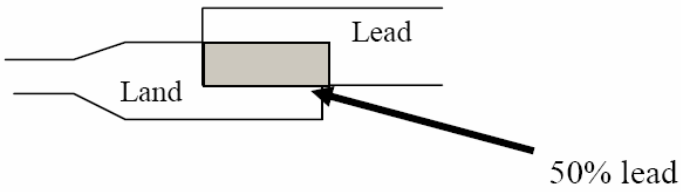
Note on defect classification

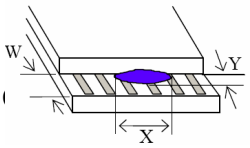
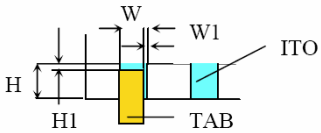
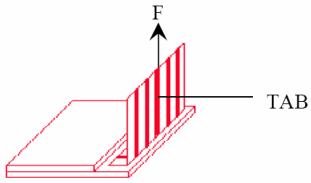
<table>
<tr><th>No.</th><th>Item</th><th>Criterion</th></tr>
<tr><td rowspan="5">1</td><td>Short or open circuit</td><td rowspan="5">Not allow</td></tr>
<tr><td>LC leakage</td></tr>
<tr><td>Flickering</td></tr>
<tr><td>No display</td></tr>
<tr><td>Wrong viewing direction</td></tr>
<tr><td>2</td><td>Wrong Back-light</td><td>Refer to approval sample</td></tr>
<tr><td>2</td><td>Contrast defect
Background color deviation</td><td>Refer to approval sample</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.  Point Size / Acceptable Qty ϕ≤1/4W: Disregard 1/4W< ϕ≤1/2W: 1 ϕ>1/2W: 0 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.

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.