SPECIFICATIONS FOR MODULE

CUSTOMER	STD
MODEL	WM-F0116V-JFLWa VER. 1
CUSTOMER APPROVED	

APPROVED BY	CHECKED BY	ORGANIZED BY
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☒ APPROVAL FOR SPECIFICATIONS ONLY

☐ APPROVAL FOR SPECIFICATIONS AND SAMPLE

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History of Version

Version	Contents	Date	Note
1	New version	5.Aug.2010	SPEC

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(1) LCM

1.1.1 Absolute Maximum Ratings

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Operating Temperature	TOP	0	-	+50	℃
Storage Temperature	TST	-20	-	+60	℃
Power Supply Voltage	VDD-VSS	-0.3	-	4.0	V
Static Electricity	Be sure that you are grounded when handing LCM.				

1.1.2 Electrical Characteristics

(Ta=25℃)

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage for System		VDD	-	3.0	3.3	3.6	V
Supply Current for System		*IDD	-	-	320	330	mA
Rush Current		Irush		-	-	2	A
Logic Input Voltage (LVDS: IN+,IN-)	Common Voltage	VCM		0.9	1.2	1.5	V
	Differential Input Voltage	| VID |		100	-	600	mV
	Threshold Voltage (HIGH)	VTH	Vcm=+1.2V	-	-	100	mV
	Threshold Voltage (LOW)	VTL	Vcm=+1.2V	-100			mV

*IDD Measurement condition is for all pixels on

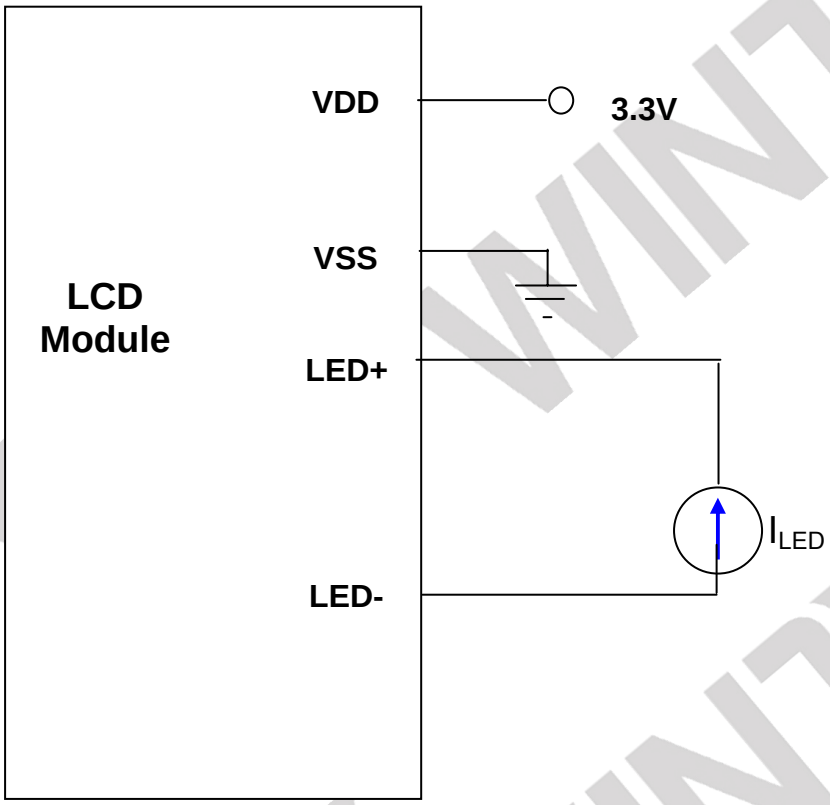
1.2 Interface Pin Function

CN1:

NO	SYMBOL	I / O	FUNCTION
1	NC	-	Not connected(Reserve)
2	VDD	P	Power supply 3.3V(Typ.)
3	VDD	P	Power supply 3.3V(Typ.)
4	VEDID	P	EDID +3.3V Power
5	NC	-	Not connected(Reserve)
6	CLK_EDID	I/O	EDID Clock Input
7	DAT_EDID	I/O	EDID Data Input
8	Rin0-	I/O	－LVDS differential data input(R0-R5,G0)
9	Rin0+	I/O	＋LVDS differential data input(R0-R5,G0)
10	GND	-	Ground
11	Rin1-	I/O	－LVDS differential data input(G1-G5,B0-B1)
12	Rin1+	I/O	＋LVDS differential data input(G1-G5,B0-B1)
13	GND	-	Ground
14	Rin2-	I/O	－LVDS differential data input(B2-B5,HS,VS,DE)
15	Rin2+	I/O	＋LVDS differential data input(B2-B5,HS,VS,DE)
16	GND	-	Ground
17	CLKN-	I/O	-LVDS differential clock input
18	CLKN+	I/O	+LVDS differential clock input
19	GND	-	Ground-Shield
20	NC	-	Not connected(Reserve)
21	NC	-	Not connected(Reserve)
22	GND	-	Ground-Shield
23	NC	-	Not connected(Reserve)
24	NC	-	Not connected(Reserve)
25	GND	-	Ground-Shield
26	NC	-	Not connected(Reserve)
27	NC	-	Not connected(Reserve)
28	GND	-	Ground-Shield
29	NC	-	Not connected(Reserve)
30	NC	-	Not connected(Reserve)
31	VLED_GND	P	LED Ground
32	VLED_GND	P	LED Ground
33	VLED_GND	P	LED Ground
34	NC	-	Not connected(Reserve)
35	VPWM_EN	I/O	System PWM Logic Input Level
36	VLED_EN	I/O	LED enable Input Level(+3.3V)
37	NC	-	Not connected(Reserve)

38	VLED	P	LED Power Supply 6　21V
39	VLED	P	LED Power Supply 6　21V
40	VLED	P	LED Power Supply 6　21V

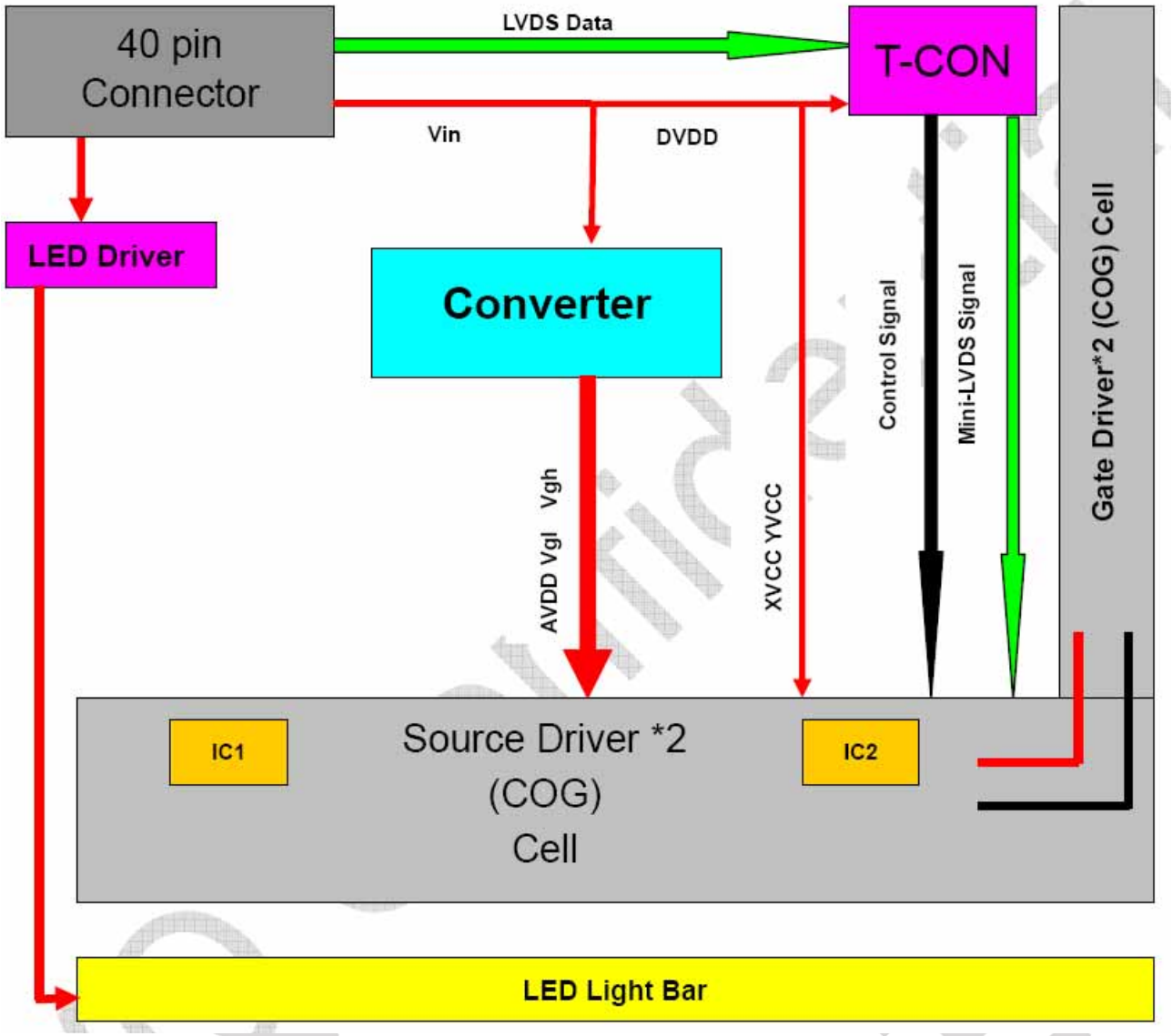
1.3 Power Supply for LCD Module



Note 1:Using Internal Voltage Generator VDD= 3.3V

1.4 Block Diagram with Display RAM Address

1.4-1. Block Diagram

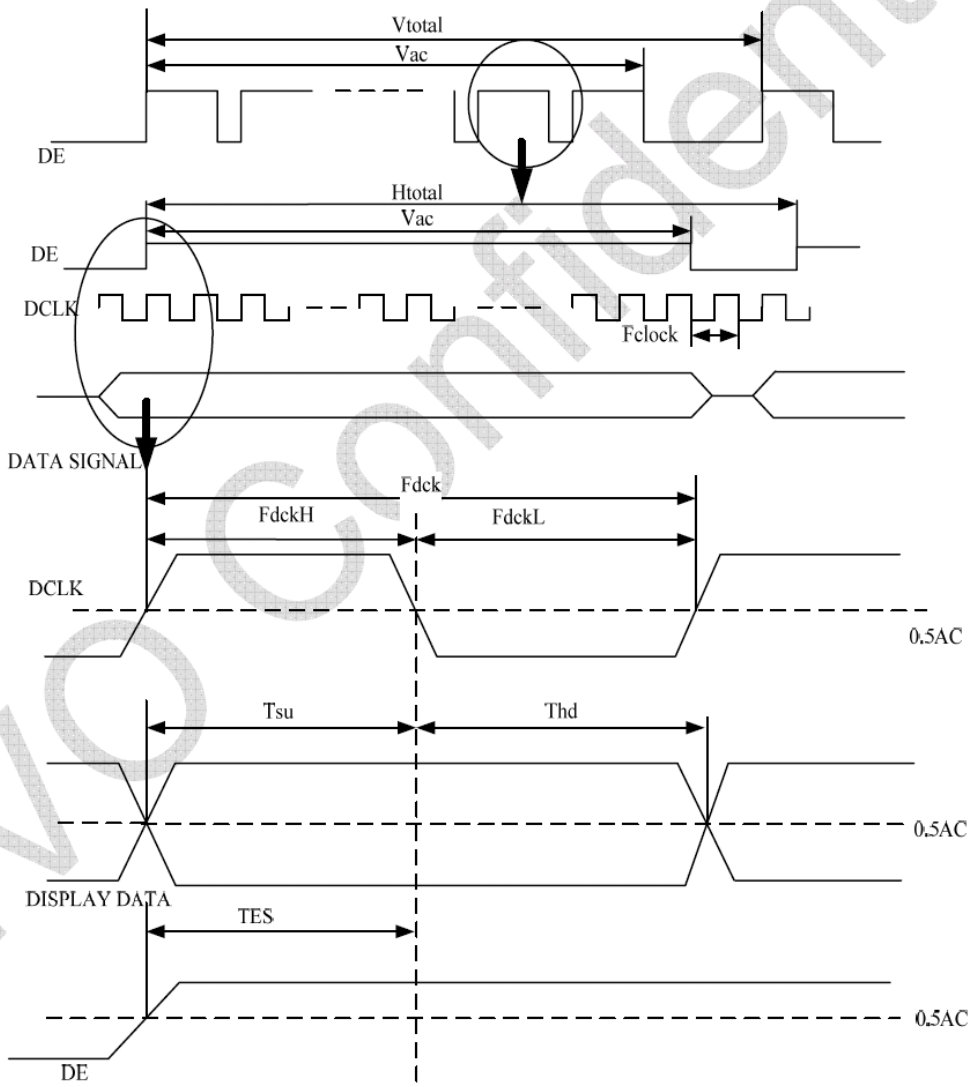


1.5 Timing Characteristic

Table 8 Interface Timings

Parameter	Symbol	Unit	min	Typ.	Max
LVDS Clock Frequency(single)	Fdck	MHz	61.87	75.44	106.59
H Total Time	Htotal	clocks	1446	1560	1936
H Active Time	Hac	clocks	1366	1366	1366
V Total Time	Vtotal	lines	778	806	888
V Active Time	Vac	lines	768	768	768
Frame Rate	Vsync	Hz	55	60	62

Figure 12 Timing Characteristics



Note: TES is data enable signal setup time.

1.6 Power ON/OFF SEQUENCE

VDD power, interface signals, and lamp on/off sequence are shown in Figure 13.Signals shall be Hi-Z state or low level when VDD is off.

Figure 13 Power Sequence

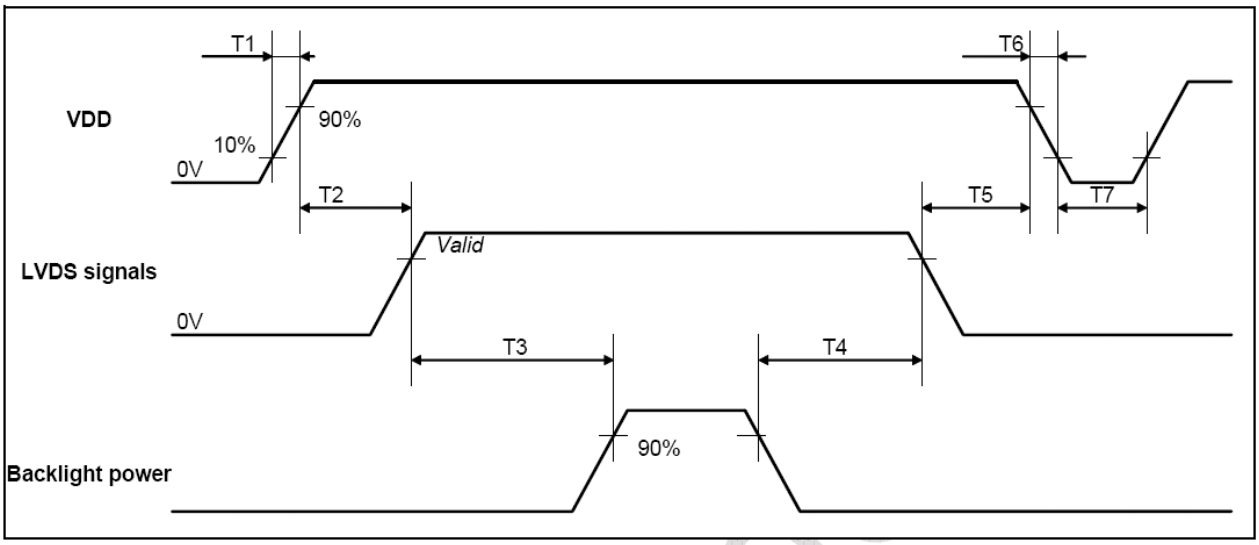


Table 10 Power Sequencing Requirements

Parameter	Symbol	Unit	min	Typ.	max
VDD Rise Time	T1	ms	0.5	--	10
VDD Good to Signal Valid	T2	ms	0	--	50
Signal Valid to Backlight On	T3	ms	200	--	--
Backlight Off to Signal Disable	T4	ms	200	--	--
Signal Disable to Power Down	T5	ms	0	--	50
VDD Fall Time	T6	ms	0	--	10
Power Off	T7	ms	400	--	--

(2) ATT(Advanced Touch Technology)

2.1 ATT Electrical Characteristics

(Ta=25℃)

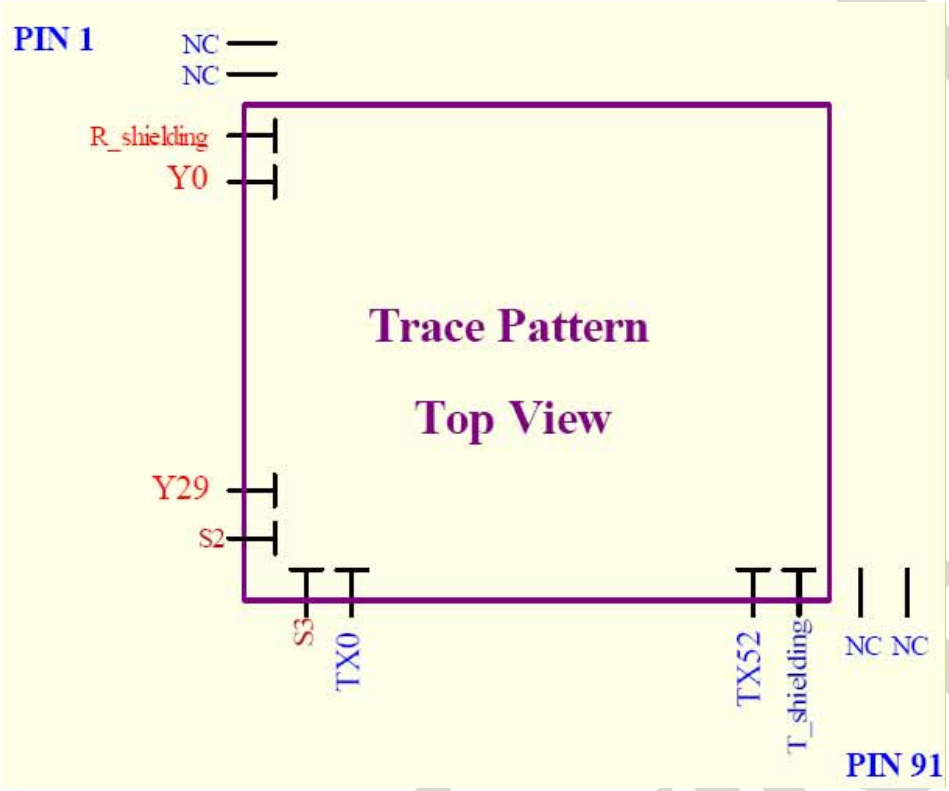
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remark
Input Power Voltage	V_{USB}	-	-	5	-	V	-
Interface	-	-	USB				-
Touch Panel Resolution	-	-	2048*2048				-
Supply Current	*IDD	-	-	TBD	TBD	mA	-
Input	Finger						-

2.2 ATT Interface Pin Function

NO.	SYMBOL	I/O	FUNCTION
1	SGND	P	Shielding Ground
2	VUSB_5V	P	USB power supply_5V
3	GND	O	Ground
4	USB_D+	I	USB Data+
5	USB_D-	I/O	USB Data-
6	GND	P	Ground
7	UART_TX	I	UART_TX
8	UART_RX	I	UART_RX
9	GND	P	Ground
10	GPIO	-	NC

2.3 ATT Schematic

Sensor trace :



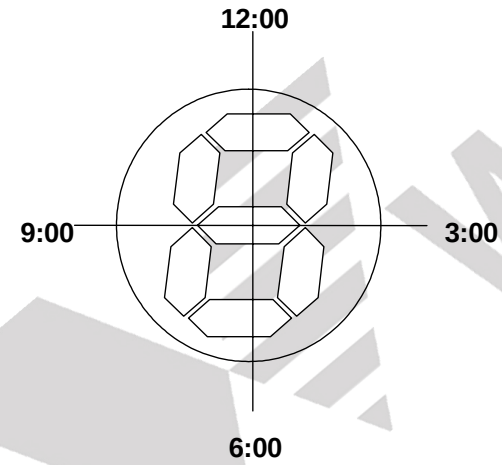
(3) Electro-optical Unit

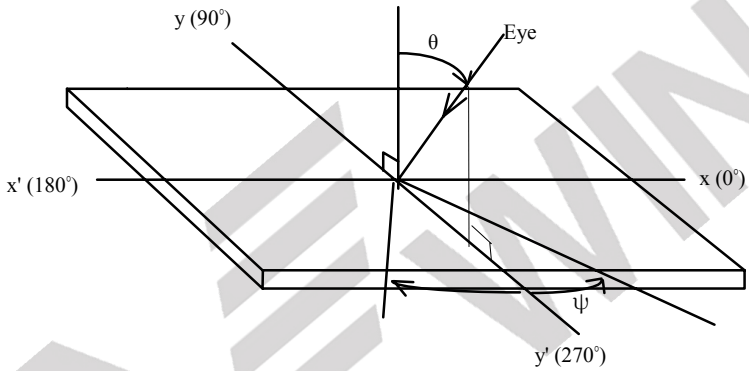
3.1 Electro-optical Characteristics

ITEM	SYMBOL		CONDITION	MIN.	TYP.	MAX.	UNIT
View Angle CR>10	ψ= 90 ° (12H)		-	10	15	-	deg.
	ψ= 270 ° (6H)			30	35	-	deg.
	ψ= 180 ° (9H)			40	45	-	deg.
	ψ= 0 ° (3H)			40	45	-	deg.
Contrast Ratio	CR		Ta=25℃	400	-	-	-
Response Time	Tr		Ta=25℃	-	10	-	ms
	Td						
Color Coordinate (CIE1931)	Red	Rx	Ta=25℃	0.573	0.603	0.633	-
		Ry		0.342	0.372	0.402	
	Green	Gx		0.316	0.346	0.376	
		Gy		0.540	0.570	0.600	
	Blue	Bx		0.125	0.155	0.185	
		By		0.107	0.137	0.167	
	White	Wx		0.283	0.313	0.343	
		Wy		0.299	0.329	0.359	
LCD Type	TFT , (POSITIVE / Transmissive)						
Gray Inversion Direction	6:00						

Notes：All the optical data should be measured when the display's driven under the TYP. condition.

3.2 Optical Definitions





View Angle

(4) LCM Mechanical Units

4.1 LCM Mechanical Diagram

NO	Document Number	Attachment file
1	MF0116V-AS1-101	

Double-Click the "Attachment Icon" above for opening attachment file.

4.2 Back-light Specification

LED Backlight Styles:

The LED chips are distributed over the whole light area of the illumination unit, which gives the most uniform light.

4.2-1. Data About LED Backlight

PARAMETER		SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Backlight Type		LED / WHITE					-
LED Light bar Driving		VL	27.0	-	31.5	V	Ta=25[deg C] Note A
LED Current		IL	70	80	90	mA	Ta=25[deg C]
LED Input		VLED	6.0	12.0	21.0	V	Ta=25[deg C]
LED Life Time		LT	10000	-	-	Hours	Ta=25[deg C] Note C
PWM Signal Voltage	High	VPWM_EN	2.2	3.3	3.6	V	-
	Low		0	-	0.5	V	
LED enable Voltage	High	VLED_EN	2.6	3.3	3.6	V	-
	Low		0	-	0.5	V	
Output PWM frequency		FPWM	-	200	1000	Hz	-
Luminous Intensity		IV	-	175	-	cd/m2	I_{LED}=20 mA
Luminous Intensity Ratio		-	60	-	-	%	I_{LED}=20 mA 13points
		-	80	-	-	%	I_{LED}=20 mA 5points

Note A: I_{LED}=20 mA (Per LED)
Note B: Calculator value for LED chip specification.
Note C: The LED life time define as the estimated time to 50% degradation of initial luminous.

4.2-2. Internal Circuit Diagram

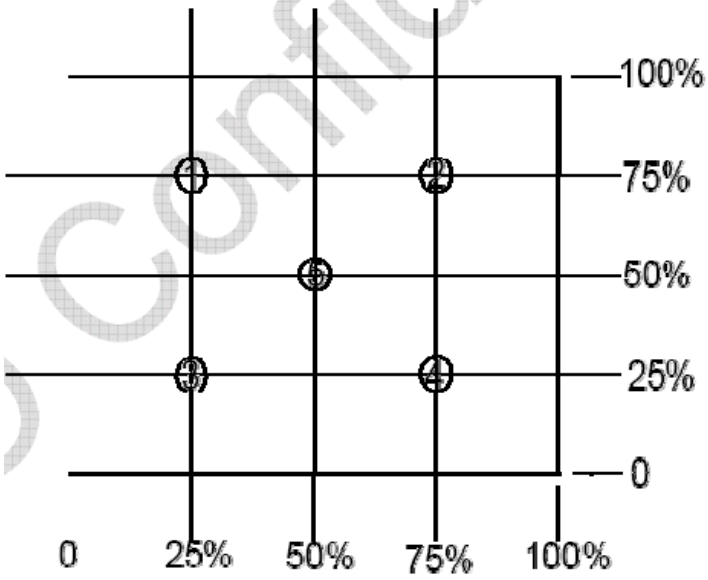
TBD

4.2-3. MEASURED METHOD (X*Y: Light Area)

A. Definition of Luminance White

Measure the luminance of gray level 63 at center point

$$\text{Display Luminance} = \frac{1 + 2 + 3 + 4 + 5}{5}$$



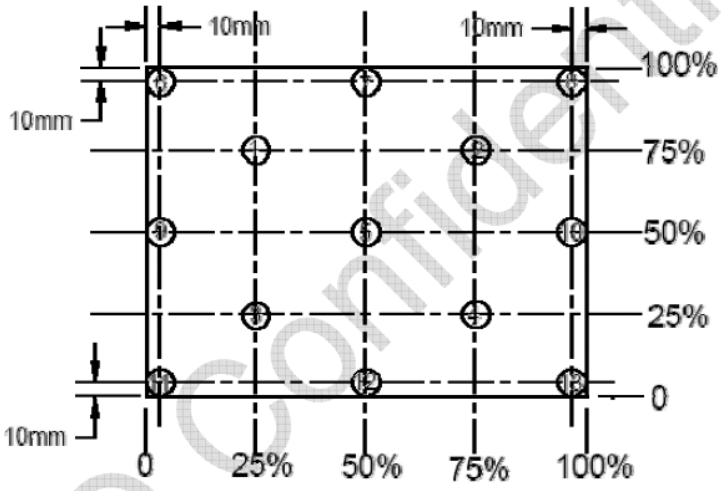
Screen Luminance Measurement Points (5)

B. Definition of Luminance Uniformity(Variation)

Measure the luminance of gray level 63 at 13 points.

$$\text{UNF(13pts)} = \frac{\min(L1, L2, \cdots L13)}{\max(L1, L2, \cdots L13)}$$

Figure 6 Measurement Locations of 13 Points



Screen Uniformity Measurement Points (13)

4.3 Packing Method

NO	Document Number	Attachment file
1	MF0116V-M1-01	

Double-Click the "Attachment Icon" above for opening attachment file.

(5) Quality Units

5.1 Specification of Quality Assurance

5.1-1.Purpose

This standard for Quality Assurance should affirm the quality of LCD module products to supply to purchaser by WINTEK CORPORATION (Supplier).

5.1-2.Standard for Quality Test

a. Inspection :

Before delivering, the supplier should take the following tests, and affirm the quality of product.

b. Electro-Optical Characteristics:

According to the individual specification to test the product.

c. Test of Appearance Characteristics:

According to the individual specification to test the product.

d. Test of Reliability Characteristics:

According to the definition of reliability on the specification for testing products.

e. Delivery Test:

Before delivering, the supplier should take the delivery test.

(i) Test method: According to **ANSI/ASQC Z1.4-2003.General Inspection Level Ⅱ take a single time.**

(ii) The defects classify of AQL as following:

Major defect: AQL=0.65

Minor defect: AQL=2.5

Total defects: AQL=2.5

5.1-3.Nonconforming Analysis & Deal With Manners

a. Nonconforming analysis:

(i) Purchaser should supply the detail data of non-conforming sample and the non-suitable state.

(ii) After accepting the detail data from purchaser, the analysis of nonconforming should be finished in two weeks.

(iii) If supplier can not finish analysis on time, must announce purchaser before two weeks.

b. Disposition of nonconforming:

(i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.

(ii) Both supplier and customer should analyze the reason and discuss the disposition of nonconforming when the reason of nonconforming is not sure.

5.1-4. Agreement items

Both sides should discuss together when the following problems happen.

a. There is any problem of standard of quality assurance, and both sides think that it must be modified.

b. There is any argument item which does not record in the standard of quality assurance.

c. Any other special problem.

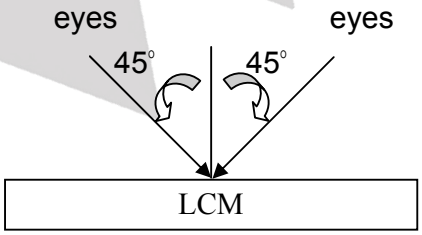
5.1-5. Standard of The Product Appearance Test

a. Manner of appearance test:

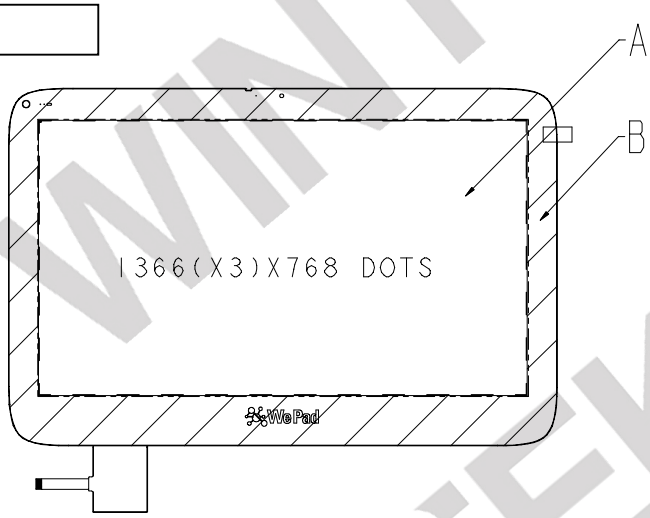
(i) The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30 cm.

(ii) When display on use front-light test, while display off use back-light test.

(iii)The test direction is base on about around 45° of vertical line.



(iv) Definition of area:



A Area : Viewing area.

B Area : Out of viewing area (Outside viewing area)

Any defect at area B could be ignored. If customer has particular requirement, this requirement should be clearly defined in inspection specification. If inspection specification has defined other criteria, the final judgement should follow the inspection specification .

b. Basic principle:

(i) It will accord to the AQL when the standard can not be described.

(ii) The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.

(iii) Must add new item on time when it is necessary.

5.1-6. Inspection specification

NO	Document Number	Attachment file
1	M1L070012	

Double-Click the "Attachment Icon" above for opening attachment file.

5.2 Standard Specification for Reliability

NO	Document Number	Attachment file
1	M3ET090001	

Double-Click the "Attachment Icon" above for opening attachment file.

5.3 Precautions in Use of LCM

5.3-1 Handling of LCM

- Don't give external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.

5.3-2 Storage

- Store in an ambient temperature of 5℃ to 45℃, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
- Storage in a clean environment, free from dust, active gas, and solvent.
- Store in anti-static electricity container.
- Store without any physical load.

5.3-3 Soldering

- Use the Sn-Ag-Cu (96.5, 3.0, 0.5) solder
- Iron : Temperature 300℃ and less than 5-6 sec during soldering.
- Rewiring : no more than 3 times.

5.3-4 Assembly

The front polarizer is covered with a protective foil which should be removed before use.

(6) Substance Management Units

6.1 Product Substances Management Documentation

NO	Document Number	Attachment file
1	Environment management standard(EMS-P-017-01)	

Double-Click the "Attachment Icon" above for opening attachment file.