SPECIFICATIONS FOR LCD MODULE

CUSTOMER	STD
MODEL	WM-F1216VT-6FLWa VER. 01
CUSTOMER APPROVED	

APPROVED BY	CHECKED BY	ORGANIZED BY
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History of Version

Version	Contents	Date	Note
a1	NEW VERSION	9.Apr.2009	SPEC

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(1) Electronic Units

1.1 Absolute Maximum Ratings

ITEM	SYMBOL	MIN	TYP	MAX	UNIT
Operating Temperature	TOP	-20	-	+70	℃
Storage Temperature	TST	-30	-	+80	℃
Supply Voltage for Analog	VCI-VSS	-0.3	-	5.5	V
Supply Voltage for Digita	VDD-VSS	-0.3	-	5.5	V
Logic input voltage range	VIN	-0.3	-	VDD+0.5	V
Static Electricity	Be sure that you are grounded when handing LCM.				

1.2 Electrical Characteristics

(Ta=25℃)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage for Analog	VCI	-	2.7	2.8	2.9	V
Supply Voltage for Digital	VDD	-	1.7	1.8	1.9	V
Input Signal High Voltage	VIH	-	0.8*VDD	-	-VDD	V
Input Signal Low Voltage	VIL	-	0	-	0.2*VDD	V
Output Signal High Voltage	VOH	IOH=-0.5mA	0.7*VDD	-	VDD	V
Output Signal Low Voltage	VOL	IOL=0.5mA	0	-	0.3*VDD	V
Supply Current for Analog	*ICI	-	-	-	2.3	mA
Supply Current for Digital	*IDD	-	-	-	0.01	mA
Used IC	S6D0151					

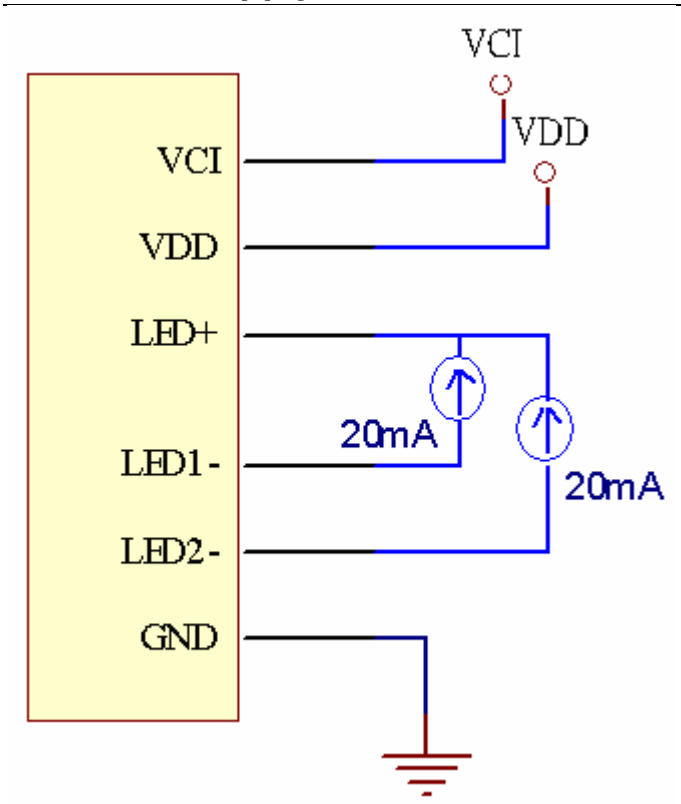
*ICI Measurement condition is for all pixels on
*IDD Measurement condition is for all pixels on

1.3 Interface Pin Function

CN1:

NO	SYMBOL	I / O	FUNCTION
1	D0	I/O	Data bus
2	D1	I/O	Data bus
3	D2	I/O	Data bus
4	D3	I/O	Data bus
5	D4	I/O	Data bus
6	D5	I/O	Data bus
7	D6	I/O	Data bus
8	D7	I/O	Data bus
9	D8	I/O	Data bus
10	D9	I/O	Data bus
11	D10	I/O	Data bus
12	D11	I/O	Data bus
13	D12	I/O	Data bus
14	D13	I/O	Data bus
15	D14	I/O	Data bus
16	D15	I/O	Data bus
17	D16	I/O	Data bus
18	D17	I/O	Data bus
19	RES	I	Reset signal input pin
20	CSX	I	Chip select input pin
21	WR	I	Write execution control pin
22	RD	I	Read execution control pin
23	DC	I	Data/Instruction select input pin
24	TE	O	Frame start signal
25	GND	P	Ground
26	VCI	P	Power supply voltage for Analog
27	VDD	P	Power supply voltage for Digital
28	GND	P	Ground
29	IM0	I	Selects the System interface mode.
30	IM1	I	Selects the System interface mode.
31	IM2	I	Selects the System interface mode.
32	IM3	I	Selects the System interface mode.
33	LED+	P	LED Backlighting Anode
34	LED1-	P	Cathode NO.1 for LED Backlighting
35	LED2-	P	Cathode NO.2 for LED Backlighting

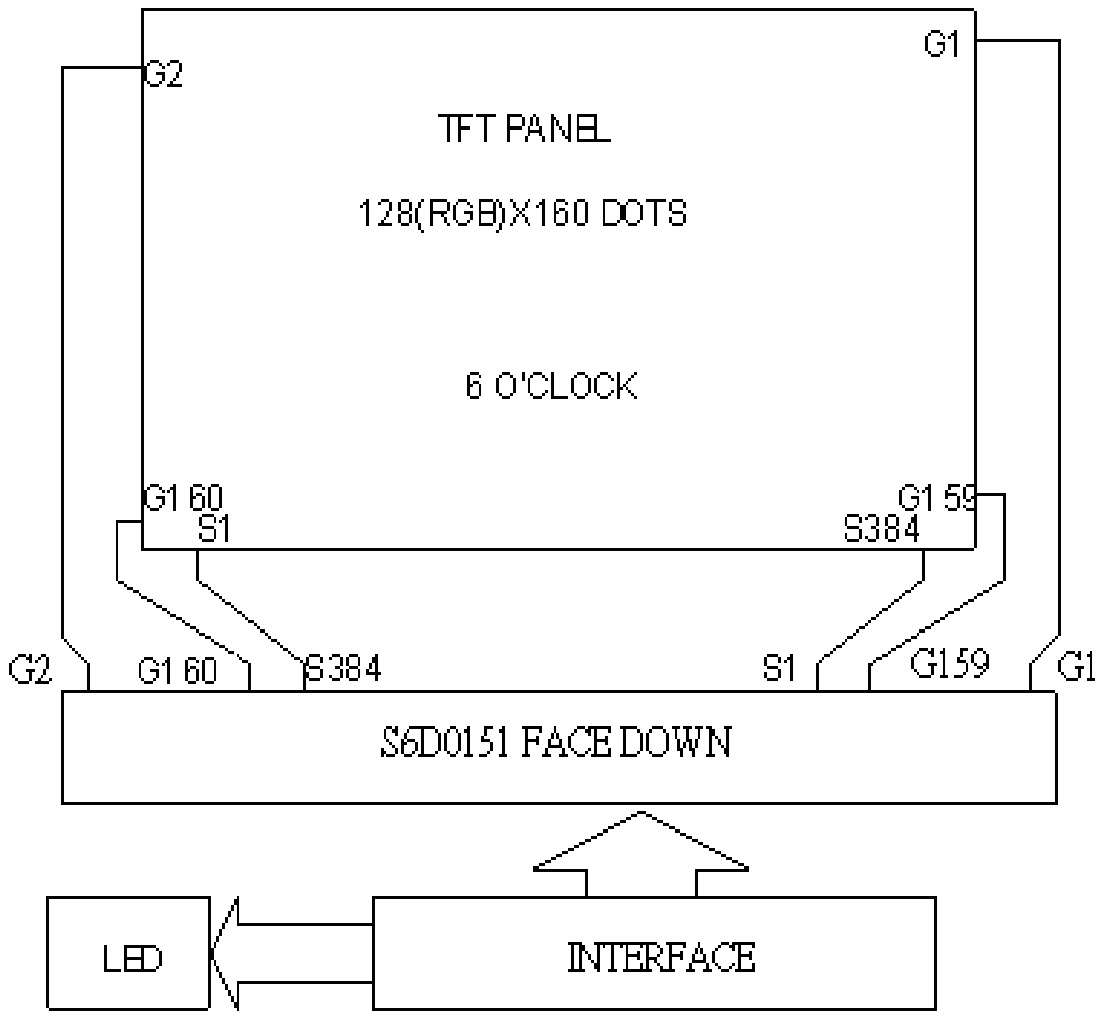
1.4 Power Supply for LCD Module



Note: 1. LCD module: V_{CI}=2.8V, V_{DD}=1.8V

1.5 Block Diagram with Display RAM Address

1.5-1. Block Diagram



1.5-2. Display Data RAM:

The image data stored in GRAM corresponds to real pixel on display as shown below.

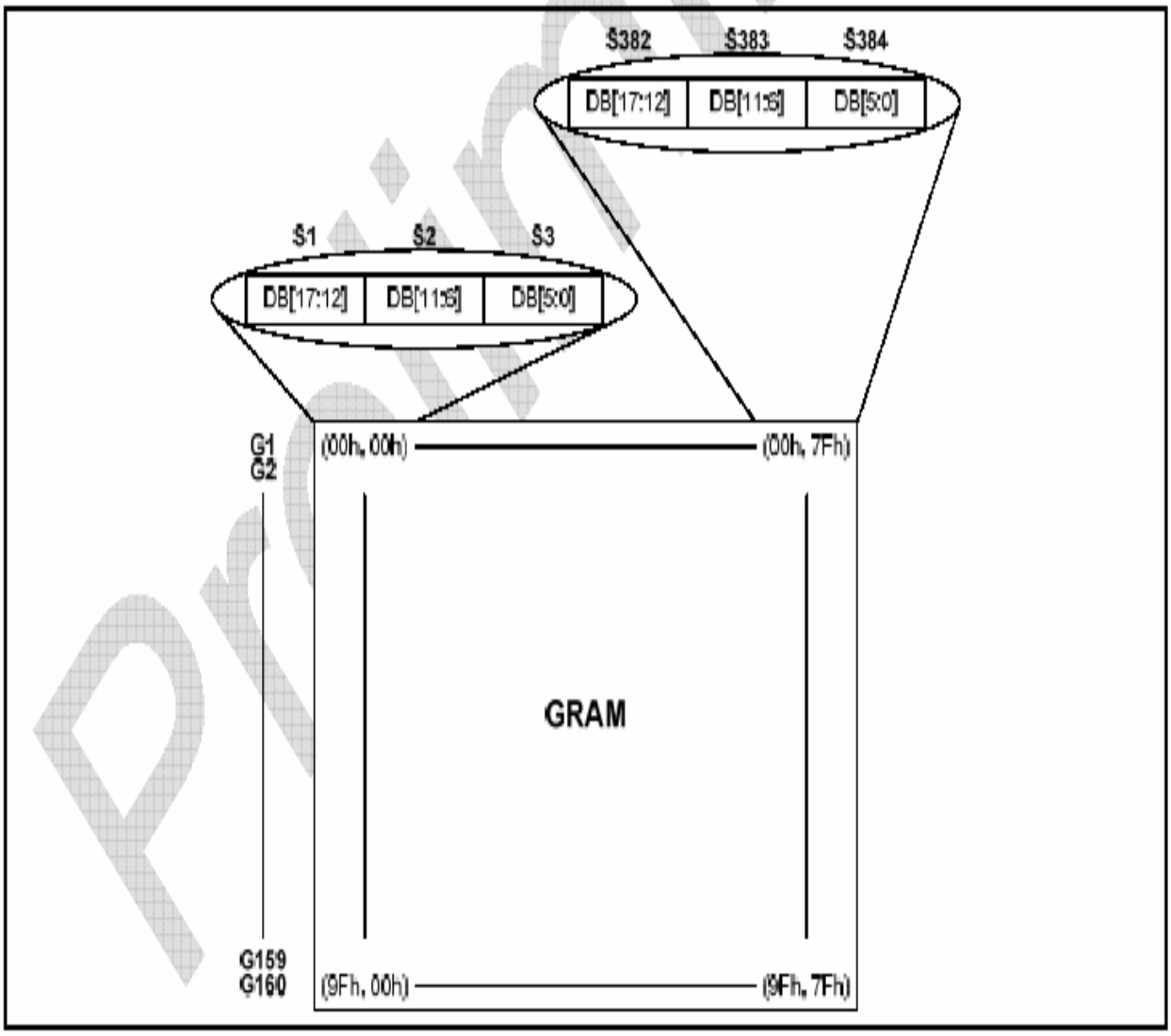


Figure 13. GRAM address and display image.

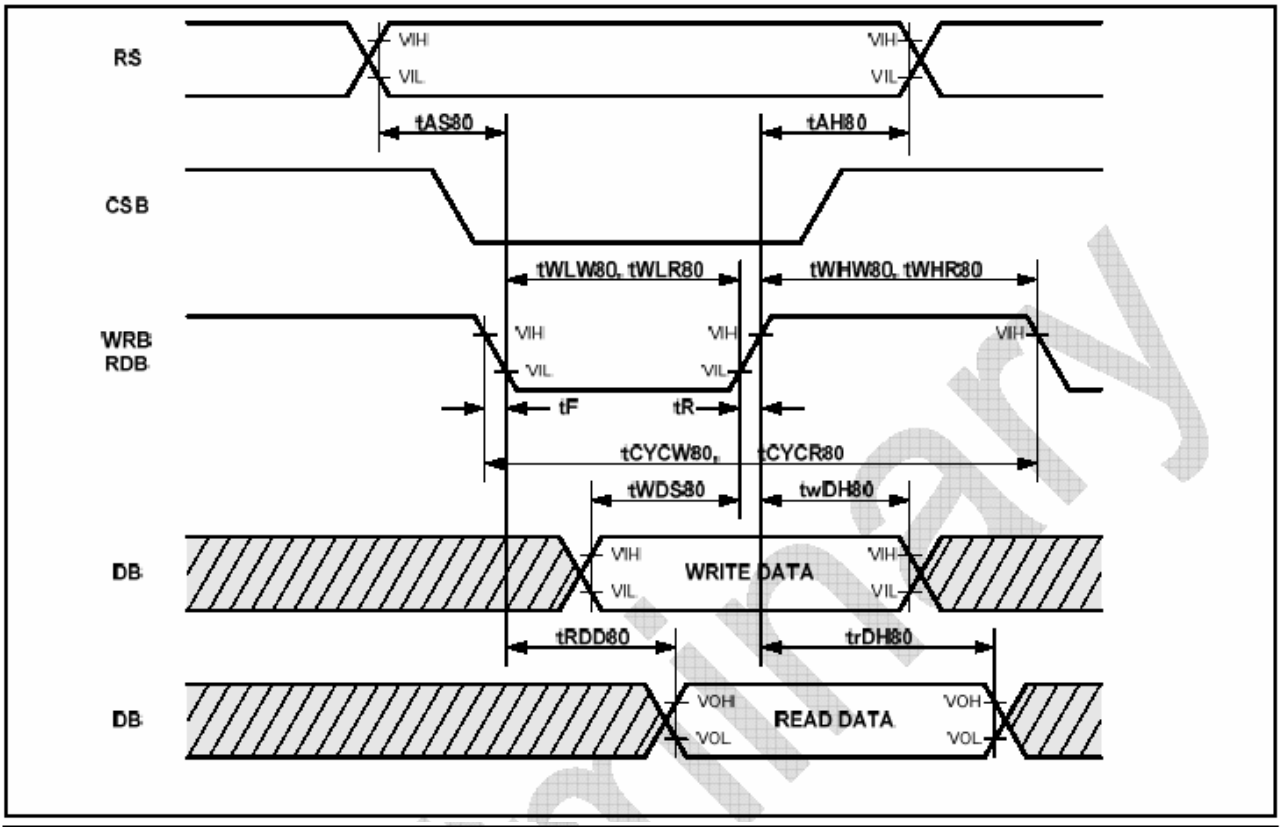
[Note] The display condition of this figure is SS = 0, BGR = 0, GS = 0.

1.5-3. Initialization Table:

NO	Document Number	Attachment file
1	DF1216XM-IN1-105	

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

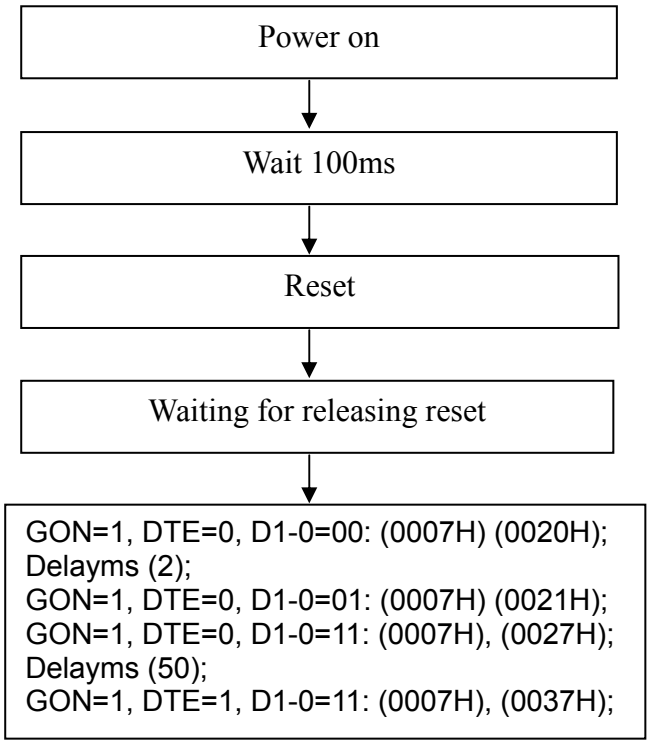
1.6 Timing Characteristic



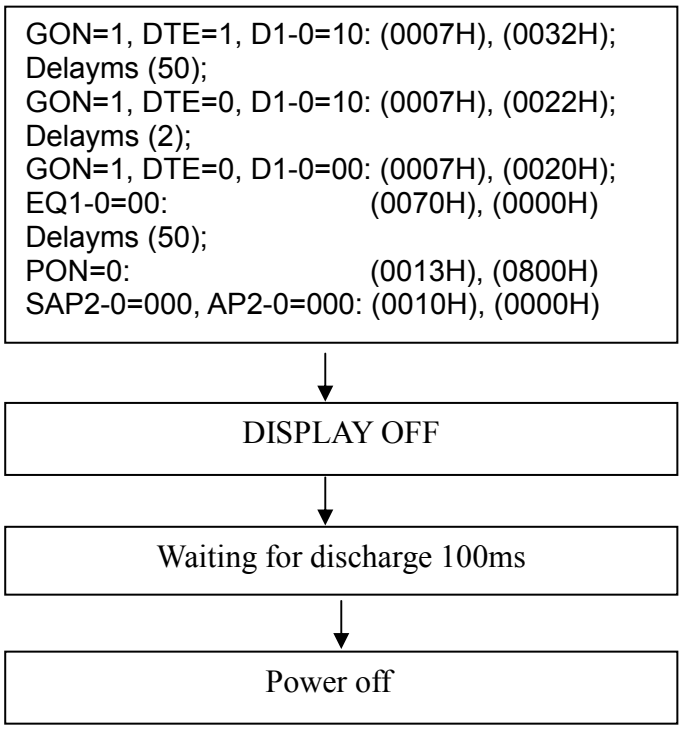
Parameter	Description	Min.	Max.	Unit
tCYCW80	Cycle time (Write)	100	-	ns
tCYCR80	Cycle time (Read)	500	-	ns
tR, tF	Pulse rise / fall time	-	10	ns
tWLW80	Pulse Width Low (Write)	40	-	ns
tWLR80	Pulse Width Low (Read)	250	-	ns
tWHW80	Pulse Width High (Write)	40	-	ns
tWHR80	Pulse Width High (Read)	200	-	ns
tAS80	RS to CSB, WRB (or RDB) setup time	0	-	ns
tAH80	RS to CSB, WRB (or RDB) hold time	0	-	ns
tWDS80	Write data setup time	60	-	ns
tWDH80	Write data hold time	2	-	ns
tRDD80	Read data delay time	-	200	ns
tRDH80	Read data hold time	5	-	ns

1.7 Power ON/OFF SEQUENCE

1.7.1 Power ON Sequence



1.7.2 Power OFF Sequence



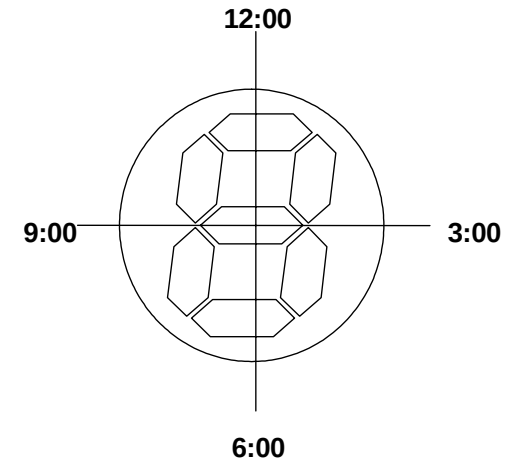
(2) Electro-optical Units

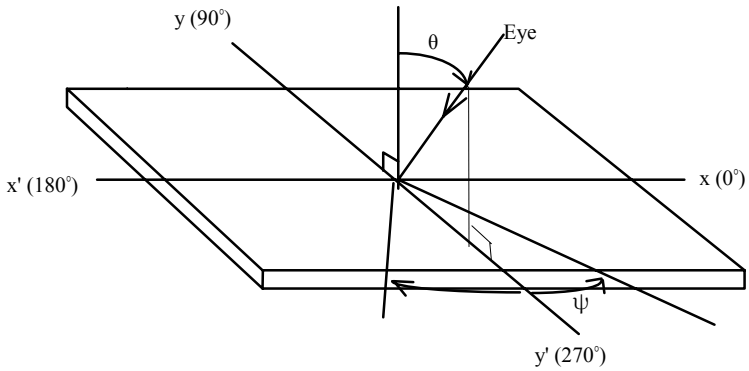
2.1 Electro-optical Characteristics

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
View Angle	ψ= 90 ° (12H)	CR>=10	45	50	-	deg.
	ψ= 270 ° (6H)		45	50	-	deg.
	ψ= 180 ° (9H)		20	25	-	deg.
	ψ= 0 ° (3H)		45	50	-	deg.
Contrast Ratio (Transmissive)	CR	Ta=25℃	300	350	-	-
Response Time	Tr+Td	Ta=25℃	-	24	48	ms
Color Coordinate	Rx	Ta=25℃	0.545	0.605	0.665	-
	Ry		0.281	0.341	0.401	
	Gx		0.274	0.334	0.394	
	Gy		0.513	0.573	0.633	
	Bx		0.088	0.148	0.208	
	By		0.047	0.107	0.167	
	Wx		0.241	0.301	0.361	
	Wy		0.252	0.312	0.372	
LCD Type	TFT , (POSITIVE / Transmissive)					
Viewing Direction	6:00					

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

2.2 Optical Definitions





View Angle

(3) Mechanical Units

3.1 Mechanical Diagram

NO	Document Number	Attachment file
1	MF1216VT-AS1-101	

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

3.2 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.

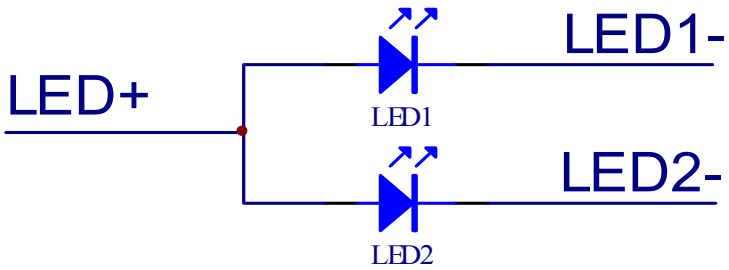
3.2-1. Data About LED Backlight

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION	NOTE
Backlight Type	LED / WHITE						-
Supply Current	ILED	-	40	-	mA	VLED<=4.4V	-
Reverse Voltage (Single chip)	VR	-	-	5.0	V	-	-
Luminous Intensity	IV	180	230	-	cd/m2	ILED=40mA	1 (With LCD)
Luminous Intensity Ratio	-			30	%	-	-

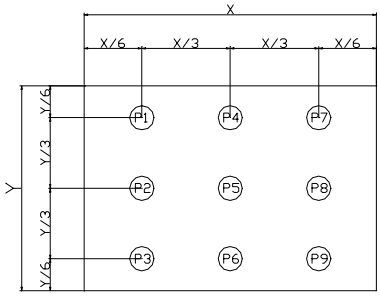
NOTE：1. Average Luminous Intensity of P1 – P9

2. Luminous Intensity Ratio = (MAX-MIN)./ MAX..

3.2-2. Internal Circuit Diagram



3.2-3. MEASURED METHOD (X*Y: Light Area)



(Effective spatial Distribution)

Hole Diameter φ3mm;1 to 9 per Position Measured Luminous Intensity Ratio

3.3 Packing Method

NO	Document Number	Attachment file
1	MF1216VT-M1-01	

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

(4) Quality Units

4.1 Specification of Quality Assurance

4.1-1.Purpose

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

4.1-2.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

4.1-3.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.

4.1-4. 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.

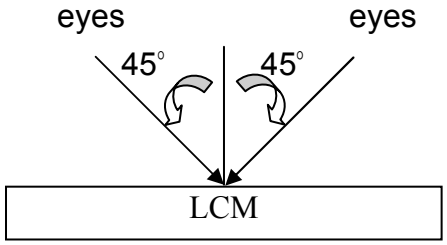
4.1-5. Standard of The Product Appearance Test

a. Manner of appearance test:

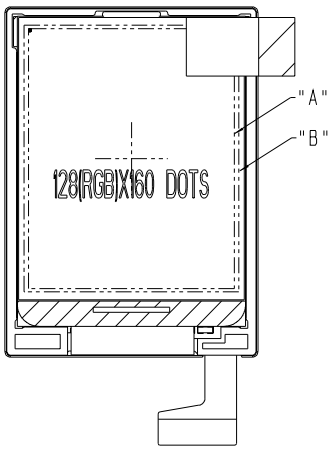
(i) The test must be under 20W ㄨ 2 or 40W fluorescent light, and the distance of view must be at 30 cm.

(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.

c. Standard of inspection:(Unit: mm)

4.1-6. Inspection specification

NO	Document Number	Attachment file
1	M1L070012	

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

4.2 Standard Specification for Reliability

NO	Document Number	Attachment file
1	M3ET090003	

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

4.3 Precautions in Use of LCM

4.3-1 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.

4.3-2 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.

4.3-3 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.

4.3-4 Assembly

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

(5) Substance Management Units

5.1 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.