



SPECIFICATIONS FOR MODULE

CUSTOMER	STD
MODEL	WM-F0133V-JFLWa VER. 2
CUSTOMER APPROVED	

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APPROVAL FOR SPECIFICATIONS ONLY

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History of Version

Version	Contents	Date	Note
a1	New version	3.Aug.2010	SPEC.
a2	Changes as follow by Wintek a. Modify 2.1 ATT Electrical Characteristics: Change ATT Input b. Modify 3.1 Electro-optical Characteristics: Delete Gray inversion direction,and Add Viewing direction c. Modify 4.1 LCM Mechanical Diagram: Change Assembly from MF0133V-AS1-101 to MF0133V-AS1-102 d. Modify 4.2-1. Data About LED Backlight: 1.Change Luminous Intensity Ratio(5P):MAX=20% 2.Change Luminous Intensity Ratio(13P):MAX=35% e. Modify 4.2-3. MEASURED METHOD: Change measuring points from 9 Points to 13 Points; f. Modify 5.2 Standard Specification for Reliability: Change Specification for Reliability from M3ET090001 to M3ET100001	25.Oct.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	-25	-	+65	
Power Supply Voltage	Vcc-VSS	0	-	4	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	VCC	-	3.0	3.3	3.6	V
Supply Current for System	*ICC	-	-	285	370	mA
Rush Current	Irush		-	-	2	A
Logic Input Voltage (LVDS: IN+,IN-)	Common Voltage	VCM	1.125	1.25	1.375	V
	Differential Input Voltage	VID	250	350	450	mV
	Threshold Voltage (HIGH)	VTH	-	-	100	mV
	Threshold Voltage (LOW)	VTL	-100			mV

*ICC Measurement condition is for all pixels on

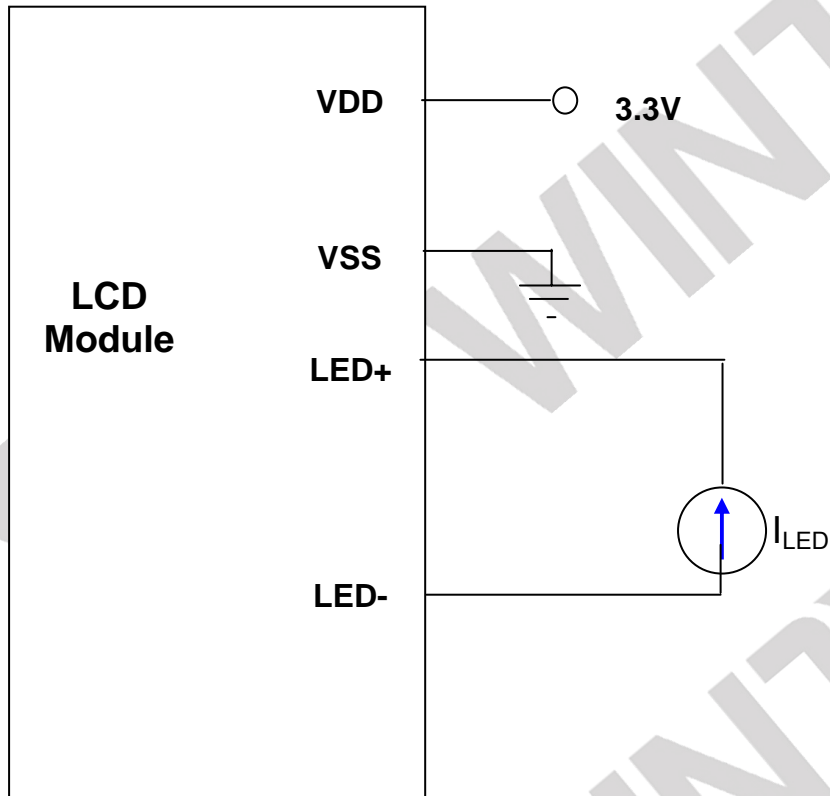
1.2 Interface Pin Function

CN1:

NO	SYMBOL	I / O	FUNCTION
1	NC	-	No connection
2	VDD	P	3.3V power supply
3	VDD	P	3.3V power supply
4	VEEDID	P	DDC 3.3V Power supply
5	NC	-	No connection
6	Clk EEDID	I/O	DDC Clock
7	DATA EEDID	I/O	DDC Data
8	Odd_Rin0-	I/O	- LVDS differential data input (R0-R5, G0) (odd pixels)
9	Odd_Rin0+	I/O	+ LVDS differential data input (R0-R5, G0) (odd pixels)
10	VSS	-	Ground – Shield
11	Odd_Rin1-	I/O	- LVDS differential data input (G1-G5, B0-B1) (odd pixels)
12	Odd_Rin1+	I/O	+ LVDS differential data input (G1-G5, B0-B1) (odd pixels)
13	VSS	-	Ground – Shield
14	Odd_Rin2-	I/O	- LVDS differential data input (B2-B5, HS, VS, DE) (odd pixels)
15	Odd_Rin2+	I/O	+ LVDS differential data input (B2-B5, HS, VS, DE) (odd pixels)
16	VSS	-	Ground – Shield
17	Odd_ClkIN-	I/O	- LVDS differential clock input (odd pixels)
18	Odd_ClkIN+	I/O	+ LVDS differential clock input (odd pixels)
19	NC	-	No connection
20	NC	-	No connection
21	NC	-	No connection
22	VSS	-	Ground – Shield
23	NC	-	No connection
24	NC	-	No connection
25	VSS	-	Ground-Shield
26	NC	-	No connection
27	NC	-	No connection
28	VSS	-	Ground-Shield
29	NC	-	No connection
30	NC	-	No connection
31	VSSLED	P	LED Ground
32	VSSLED	P	LED Ground

33	VSSLED	P	LED Ground
34	NC	-	No connection
35	PWM	I/O	System PWM Signal Input (+3.3V Swing
36	LED_EN	I/O	LED enable input (3.3V)
37	NC	-	No connection
38	VDDLED	P	7V – 21V LED power
39	VDDLED	P	7V – 21V LED power
40	VDDLED	P	7V – 21V LED power

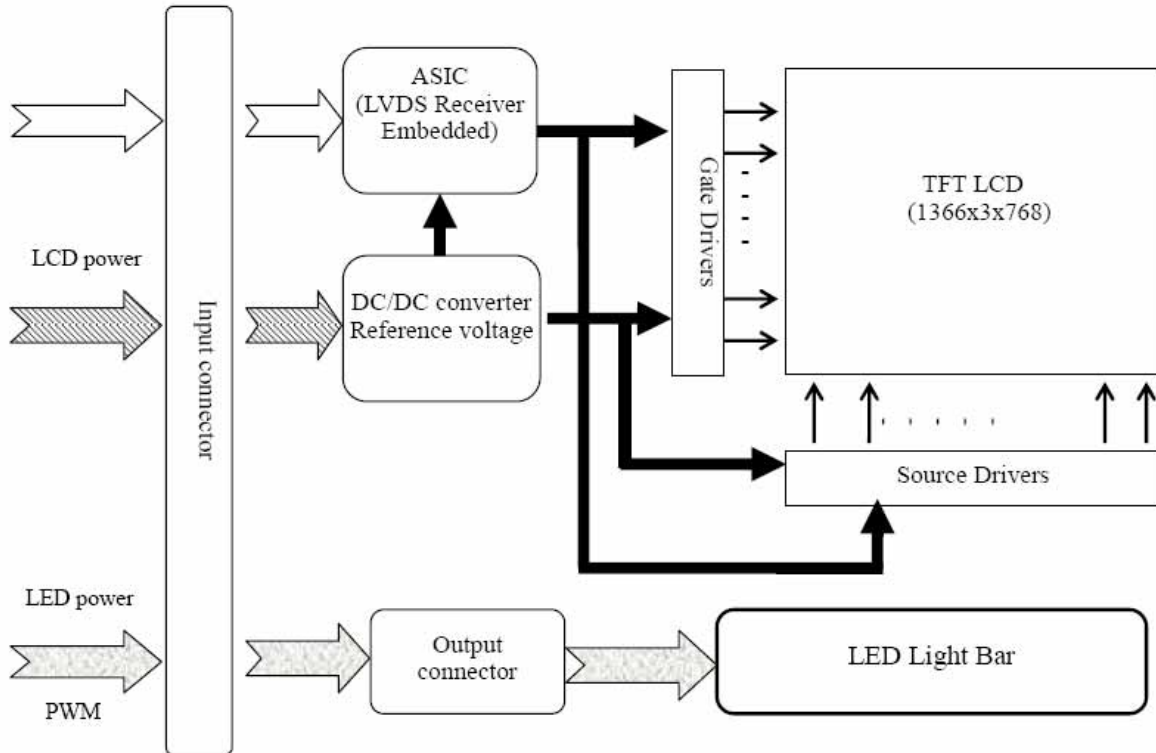
1.3 Power Supply for LCD Module



Note 1: Using Internal Voltage Generator VDD= 3.3V

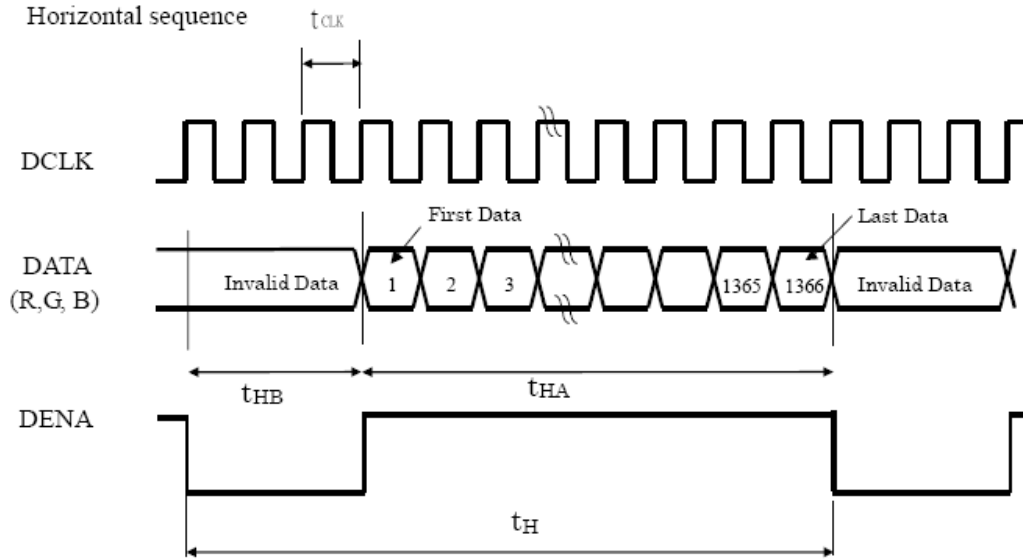
1.4 Block Diagram with Display RAM Address

1.4-1. Block Diagram

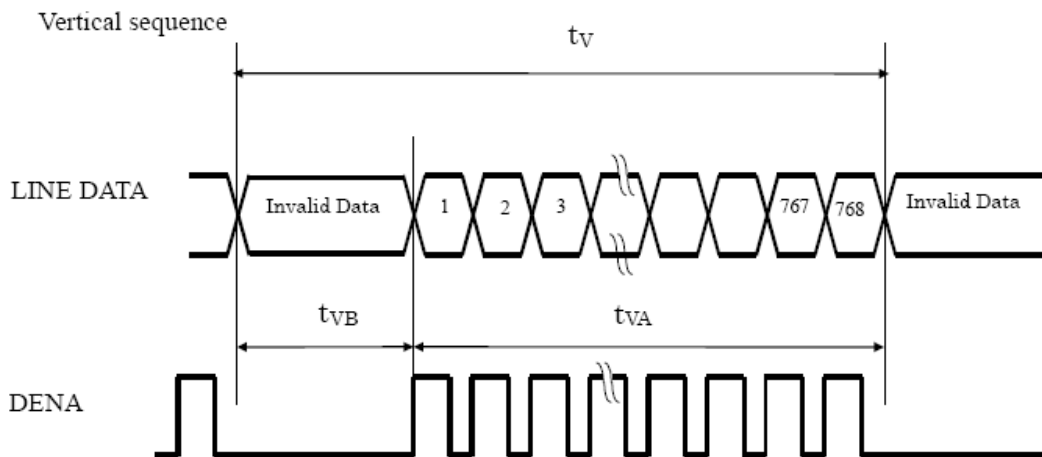


1.5 Timing Characteristic

(1)(a) LVDS input time sequence



(b) LCD input time sequence



(2) Timing Chart

ITEM		SYMBOL	MIN	TYP	MAX	UNIT		
LCD Timing	Frame Rate		-	55	60	65	Hz	
	DCLK	Frequency	f_{CLK}	65.93	75.44	88.74	MHz	
		Period	t_{CLK}	15.17	13.25	11.27	ns	
	DENA	Horizontal	Horizontal Total time	t_H	1498	1560	1665	t_{CLK}
			Horizontal Active time	t_{HA}	1366	1366	1366	t_{CLK}
			Horizontal Blank time	t_{HB}	132	194	299	t_{CLK}
		Vertical	Vertical Total time	t_V	800	806	820	t_H
			Vertical Active time	t_{VA}	768	768	768	t_H
			Vertical Blank time	t_{VB}	32	38	52	t_H
LVDS Spread Spectrum Range *3)				-2	2	%		

【Note】

- *1) DENA (DATA ENABLE) usually is positive.
- *2) During the whole blank period, DCLK should keep input.
- *3) LVDS input clock is 85MHz and modulation rate is fixed 300KHz

(3) DATA mapping

Color	Input Data	R DATA						G DATA						B DATA					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
		MS B					LS B	MS B					LS B	MS B					LS B
Basic Color	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Green	Green(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Blue	Blue(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

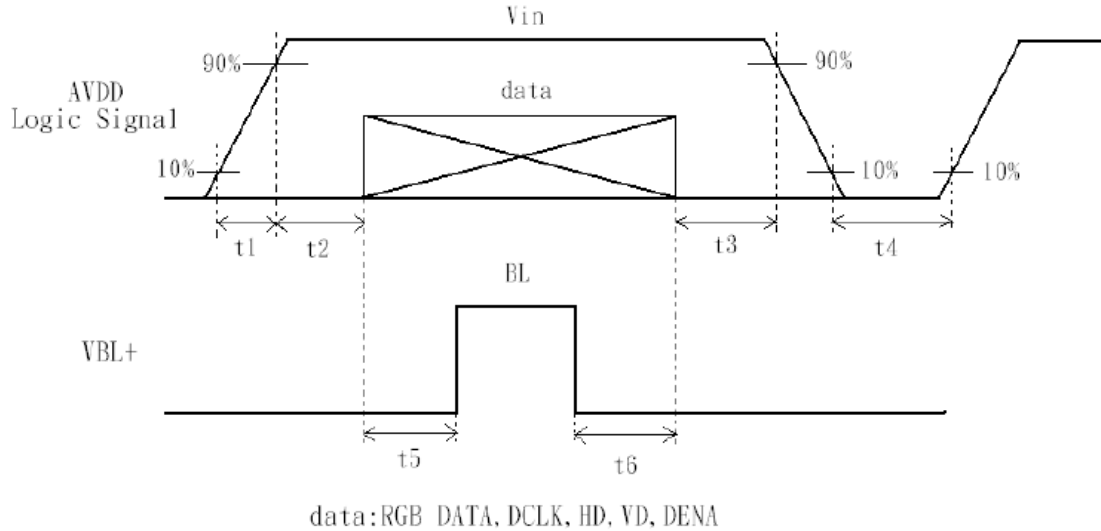
【Note】

- 1) Gray level:
Color(n) : n is level order; higher n means brighter level.
- 2) DATA:
1: high , 0: low

1.6 Power ON/OFF SEQUENCE

*1) Power Sequence :

$0.50\text{ ms} \leq t1 \leq 10\text{ ms}$	$500\text{ ms} \leq t4$
$0.01\text{ ms} < t2 \leq 50\text{ ms}$	$200\text{ ms} \leq t5$
$0.01\text{ ms} < t3 \leq 50\text{ ms}$	$200\text{ ms} \leq t6$



(2) ATT(Advanced Touch Technology)

2.1 ATT Electrical Characteristics

(Ta=25)

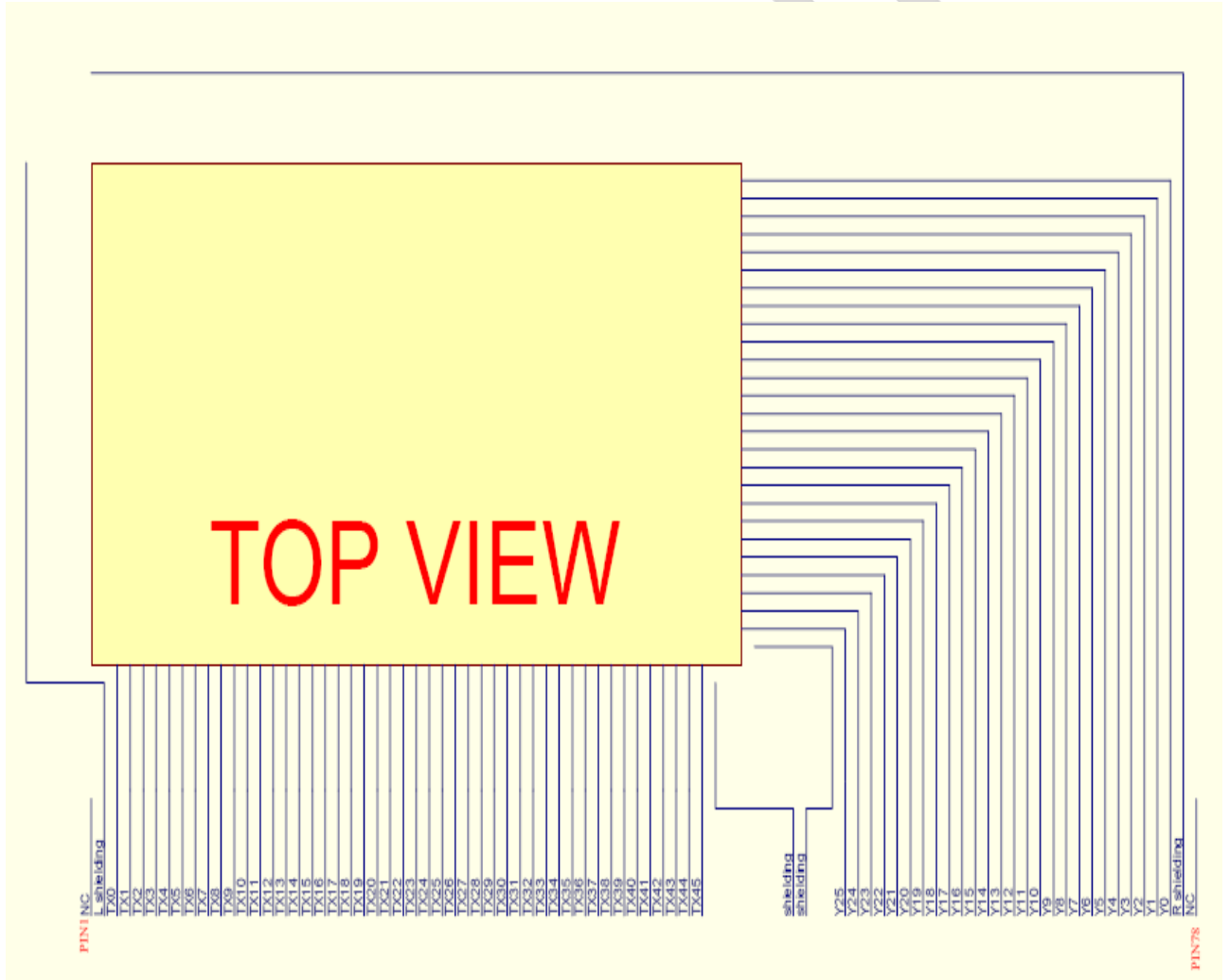
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	Remark
Input Power Voltage	V_{DD_TP}	-		3.3		V	-
Interface	-	-	USB				
Touch Panel Resolution	-	-	2048*2048				
Supply Current	*IDD	Usb 3.3v			TBD	mA	
Input	Finger(Real 2 points)						

2.2 ATT Interface Pin Function

NO.	SYMBOL	I/O	FUNCTION
1	VUSB	P	USB Power supply
2	USB_D-	I/O	USB data -
3	USB_D+	P	USB data +
4	NC	P	-
5	GND	P	Ground

2.3 ATT Schematic

Sensor trace :



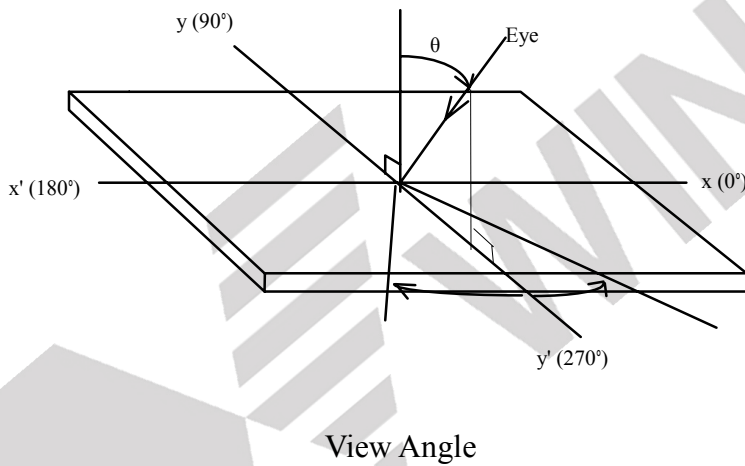
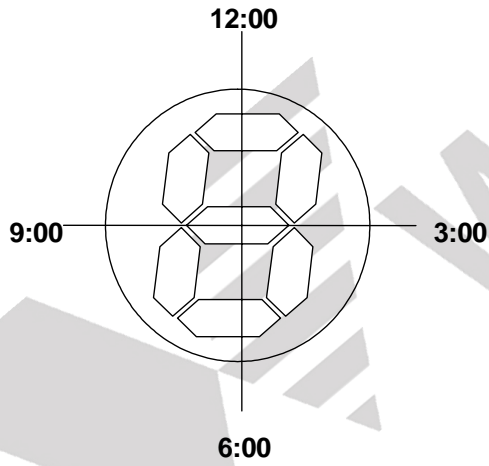
(3) Electro-optical Unit

3.1 Electro-optical Characteristics

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT			
View Angle CR>10	$\psi = 90^\circ$ (12H)	-	15	20	-	deg.			
	$\psi = 270^\circ$ (6H)		30	35	-	deg.			
	$\psi = 180^\circ$ (9H)		40	45	-	deg.			
	$\psi = 0^\circ$ (3H)		40	45	-	deg.			
Contrast Ratio	CR	Ta=25	500	600	-	-			
Response Time	Tr	Ta=25	-	8	16	ms			
	Tf		-	-	-	ms			
Color Coordinate	Red	Rx	Ta=25	0.550	0.580	0.610	-		
		Ry		0.310	0.340	0.370			
	Green	Gx		0.280	0.310	0.340			
		Gy		0.520	0.550	0.580			
	Blue	Bx		0.125	0.155	0.185			
		By		0.095	0.125	0.155			
	White	Wx		0.283	0.313	0.343			
		Wy		0.299	0.329	0.359			
	NTSC				42	45		-	%
	LCD Type	TFT , (POSITIVE / Transmissive)							
Viewing Direction	6 O'clock								


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

3.2 Optical Definitions



(4) LCM Mechanical Units

4.1 LCM Mechanical Diagram

NO	Document Number	Attachment file
1	MF0133V-AS1-102	

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.

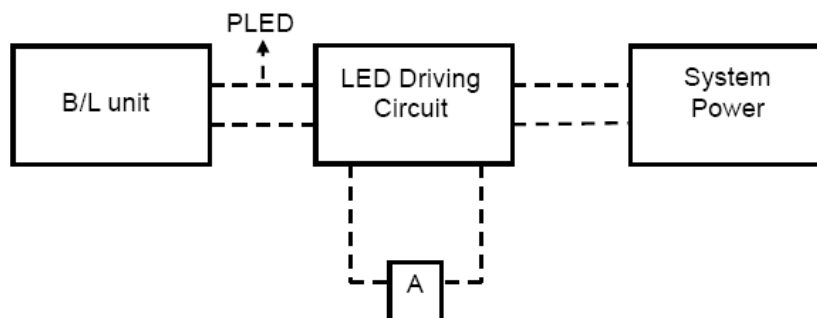
4.2-1. Data About LED Backlight

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Backlight Type	LED / WHITE					-
LED Driver Input Voltage	VBL+	7	12	21	V	-
LED Driver Input Current	IBL+	-	262	485	mA	-
Forward Voltage	VF	2.9	3.2	3.5	V	IF=19mA
Forward Current	IF	18.5	19	19.5	mA	IF=19mA
Power Consumption	PLED	2.6	2.87	3.1	W	IF=19mA
PWM Frequency	PWM_BL	180	200	1000	HZ	
Luminous Intensity	IV	-	175	-	cd/m2	-
Luminous Intensity Ratio	-			20	%	5 points
Luminous Intensity Ratio	-			35	%	13 points

NOTE:*1) Maximum LED Driver Input Current at 7V Input Voltage/PWM Duty 100%.

*2) Measure method : a. LED current is measured by utilizing a current meter as show below.

b. System power PLED is measured at input voltage 12V.



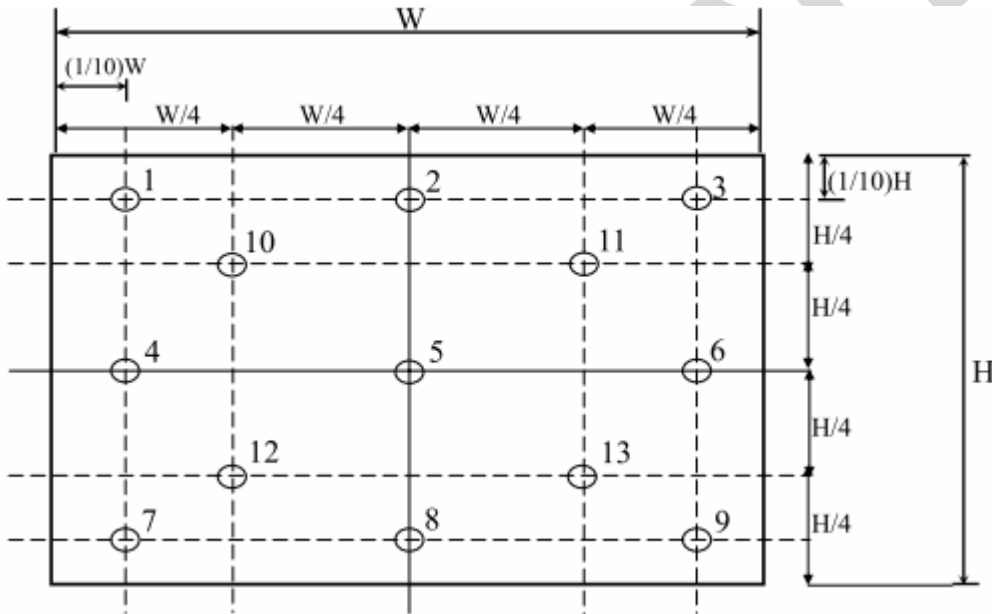
*3) Calculator value for reference $IF \times VF \times N = PLED$

*4) Life time means that estimated time to 50% degradation of initial luminous intensity

4.2-2. Internal Circuit Diagram

TBD

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




NOTE:

1. The measuring points of 5P are at 5、10、11、12、13.
2. The measuring points of 13P are at 1~13.
3. Hole Diameter $\phi 3\text{mm}$; 1 to 13 per Position Measured Luminous Intensity Ratio

(Effective spatial Distribution)

Hole Diameter $\phi 3\text{mm}$; 1 to 9 per Position Measured Luminous Intensity Ratio

4.3 Packing Method

NO	Document Number	Attachment file
1	MF0133V-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 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

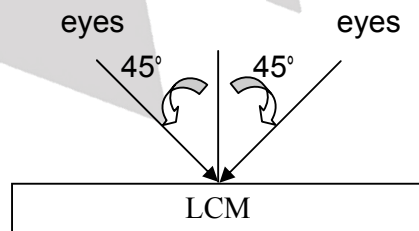
Both sides should discuss together when the following problems happen.

- 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.

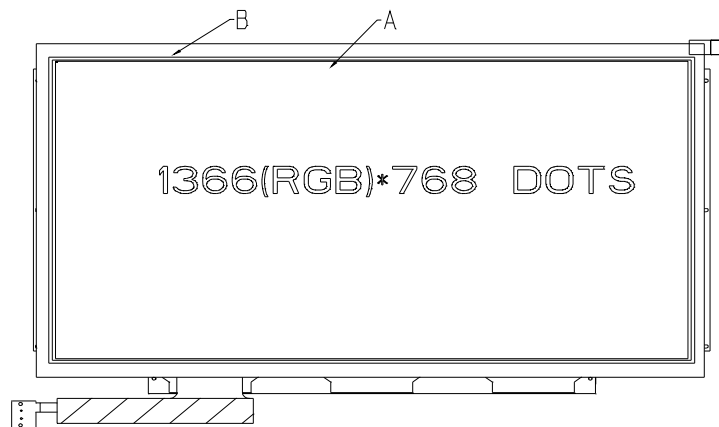
5.1-5. Standard of The Product Appearance Test

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	M3ET100001	

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.