TENTATIVE

All information in this technical data sheet is tentative and subject to change without notice.

4.3"WVGA

TECHNICAL SPECIFICATION

<u>AA043MA01</u>

MITSUBISHI ELECTRIC Corp.

Date: Jul.15,'11

MITSUBISHI (1/23) AA043MA01_02_00

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1. APPLICATION

This specification applies to color TFT-LCD module, AA043MA01.

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(1) Standard Usage

Computers, office equipment, factory automation equipment, test and measurement equipment, communications, transportation equipment(automobiles, ships, trains, etc.), provided, however, that operation is not influenced by TFT-LCD directly.

(2) Special Usage

Medical equipment, safety equipment, transportation equipment, provided, however, that TFT-LCD is necessary to its operation.

(3) Specific Usage

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2. OVERVIEW

AA043MA01 is 4.3" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver ICs, control circuit, and backlight unit.

By applying 6 bit or 8 bit digital data, 800×480 , 262k-color or 16.7M-color images are displayed on the 4.3" diagonal screen. Input power voltage is 3.3 V for LCD driving.

The type of data and control signals are digital and transmitted via CMOS interface per Typ. 30.4 MHz clock cycle.

Driver circuit for LED backlight is not included in this module. General specifications are summarized in the following table:

ITEM	SPECIFICATION
Display Area (mm)	93.0(H) × 55.8(V) (4.3-inch diagonal)
Number of Dots	$800 \times 3 \text{ (H)} \times 480 \text{ (V)}$
Pixel Pitch (mm)	$0.116(H) \times 0.116(V)$
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white
Number of Color	262k(6 bit/color), 16.7M(8 bit/color)
Luminance (cd/m²)	200
Viewing Angle (CR ≥ 10)	-65~65° (H), -65~45° (V)
Surface Treatment	Clear and hard-coating 2H
Electrical Interface	CMOS (6 bit/8 bit)
Viewing Direction	Higher Contrast ratio: 6 o'clock Less gray scale reversal: 12 o'clock
Module Size (mm)	$103.0(W) \times 67.5(H) \times 5.3(D)$
Module Mass (g)	58
Backlight Unit	Edge-light, LED

Characteristic value without any note is typical value.

3. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage for LCD	VCC	-0.3	4.0	V
Logic Input Voltage	VI	-0.3	6.0	V
Backlight (LED) Current	IF		35	mA
Operation Temperature (Panel) Note 1,2)	Top(Panel)	-20	70	°C
Operation Temperature (Ambient) Note 2)	Top(Ambient)	-20	70	°C
Storage Temperature Note 2)	T _{stg}	-20	80	°C

[Note]

- 1) Measured at the center of active area and at the center of panel back surface
- 2) Top, Tstg \leq 40°C : 90%RH max. without condensation

Top,Tstg > 40°C : Absolute humidity shall be less than the value of 90%RH at 40°C without condensation.

4. ELECTRICAL CHARACTERISTICS

(1) TFT- LCD Ambient temperature: Ta = 25°C

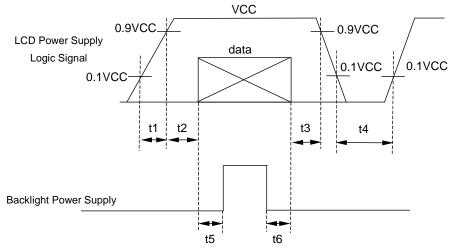
ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	Remarks
Power Supply Voltage	for LCD	VCC	3.0	3.3	3.6	V	*1)
Power Supply Current	for LCD	ICC		140	220	mA	*2)
Permissive Input Ripp	ole Voltage	VRP			100	mVp-p	VCC = +3.3V
Lagic Input Voltage	High	VIH	2.0		5.5	V	
Logic Input Voltage	VIL	0		0.8	V		

*1) Power and signals sequence:

 $0.1 \text{ ms} \le t1 \le 10 \text{ ms}$ $200 \text{ ms} \le t4$

 $0 < t2 \leq 50 \ ms \qquad \qquad 200 \ ms \leq t5$

 $0 < t3 \le 50 \ ms \qquad \qquad 0 \le t6$

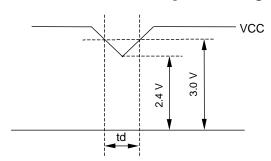


data: RGB DATA, DCLK, DENA, SC

VCC-dip conditions:

- 1) When $2.4 \text{ V} \le \text{VCC} < 3.0 \text{ V}$, $td \le 10 \text{ ms}$
- 2) When VCC < 2.4 V

VCC-dip conditions should also follow the power and signals sequence.



*2) VCC = + 3.3 V, f_H =31.6kHz, f_V =60Hz, f_{CLK} = 30.4MHz Display image at typical power supply current value is 256-gray-bar pattern (8 bit), 480 line mode.

*3) Fuse

Parameter	Fuse Type Name	Supplier	Remark
VCC	FCC16162AB	Kamaya Electric Co., Ltd.	*)

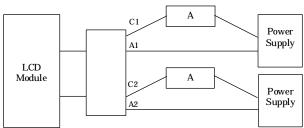
^{*)} The power supply capacity should be designed to be more than the fusing current.

(2) Backlight

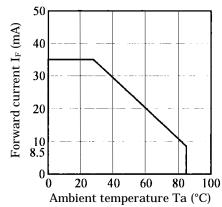
(x) Bueinight						
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Remarks
			(16.0)	17.5	V	IF = 15 mA, Ta = 25°C, *2)
LED Voltage	VF			18.2	V	$IF = 15 \text{ mA}, Ta = 0^{\circ}C$
				18.8	V	IF = 15 mA, $Ta = -20^{\circ}C$
LED Current	IF		15.0	20.0	mA	Ta = 25°C, *1), *3)

[Note]

- *1) Constant Current Drive
- *2) The Voltage deviation between strings: $|V_{f1} V_{f2}| \le 2V$
- *3) LED Current measurement method



Diode IF-Ta CHARACTERISTICS DIAGRAM



5. INTERFACE PIN CONNECTION

CN 1(Interface Signal)

Used connector: FH23-45S-0.3SHW(05) (HIROSE)

Pin No.	Symbol	Function
1	VCC	3.3 V Power Supply
2	VCC	3.3 V Power Supply
3	GND	
4	SC	Scan direction control (Low=Normal, High=Reverse)
5	DENA	Data enable signal (to settle the viewing area)
6	GND	, , , , , , , , , , , , , , , , , , ,
7	В7	Blue data signal(MSB)
8	В6	Blue data signal
9	B5	Blue data signal
10	B4	Blue data signal
11	В3	Blue data signal
12	B2	Blue data signal
13	B1	Blue data signal *3)
14	В0	Blue data signal(LSB) *3)
15	GND	
16	G7	Green data signal(MSB)
17	G6	Green data signal
18	G5	Green data signal
19	G4	Green data signal
20	G3	Green data signal
21	G2	Green data signal
22	G1	Green data signal *3)
23	G0	Green data signal(LSB) *3)
24	GND	
25	R7	Red data signal(MSB)
26	R6	Red data signal
27	R5	Red data signal
28	R4	Red data signal
29	R3	Red data signal
30	R2	Red data signal
31	R1	Red data signal *3)
32	R0	Red data signal(LSB) *3)
33	GND	
34	VD	Vertical sync signal *1)
35	HD	Horizontal sync signal *1)
36	GND	
37	DCLK	Clock signal for sampling catch data signal
38	GND	
39	NC	This pin should be open.
40	NC NC	This pin should be open.
41	NC	This pin should be open.
42	LED_C1	LED cathode1
43	LED_C2	LED cathode2
44	LED_A2	LED anode2
45	LED_A1	LED anode1

^{*1)} HD and VD are not being used for timing control.

^{*2)} Metal frame is connected to signal GND.

^{*3)} In case of 6 bit mode, Input signal should be low.

6. INTERFACE TIMING

(1) Timing Specifications

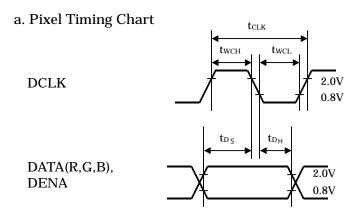
	ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT
	Frequency		fclk		30.4	45	MHz
	Period		tclk	22.2	32.9		ns
DCLK	Low Width		twcl	10			ns
	High Width	1	twch	10			ns
DATA(R,G,B),	Set up time	<u> </u>	t _{DS}	4			ns
DENA	Hold time		t _{DH}	4			ns
		Active Time	t _{HA}	800	800	800	t _{CLK}
	Hanimantal	Blanking Time	tнв	20	160		tclk
	Horizontal	Frequency	fн		31.6	45	kHz
		Period	tн	22.2	31.7		μs
DENA		Active Time	tva	480	480	480	tн
	Vantical	Blanking Time	tvв	4	45		tн
	Vertical	Frequency	f_V	55	60	75	Hz
		Period	tv	13.3	16.7	18.2	ms

[Note]

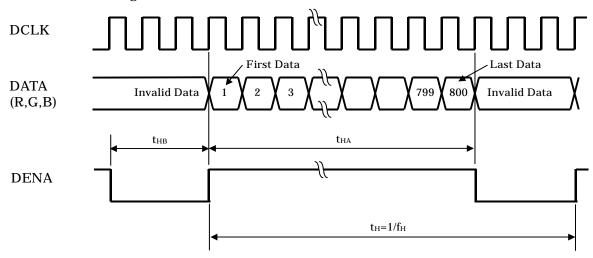
- 1) DATA is latched at fall edge of DCLK in this specification.
- 2) DENA (Data Enable) should always be positive polarity as shown in the timing specification.
- 3) DCLK should appear during all invalid period.
- 4) In case of blanking time fluctuation, please satisfy following condition.

$$t_{VBn} > t_{VBn-1} - 3(t_H)$$

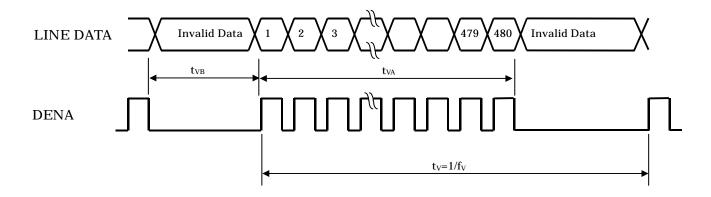
(2) Timing Chart



b. Horizontal Timing Chart



c. Vertical Timing Chart



(3) Color Data Assignment <u>a. 6 bit input</u>

									INPUT DATA																
CO	OLOR			I	R D	ATA							G D	ATA	.]	B D	ATA	١		
	LOR	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	В7	В6	В5	В4	ВЗ	B2	В1	В0
		MSB							LSB	MSB							LSB	MSB							LSB
	BLACK	0	0	0	0	0	0	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	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
BASIC	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0
COLOR	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0
	MAGENTA	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0
	YELLOW	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0
	RED(1)	0	0	0	0	0	1	0	0	0	0	0	0	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	0	0	0	0	0	0
RED		_																							
	RED(62)	1	1	1	1	1	0	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	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
GREEN																									
	GREEN(62)	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	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	0	0	0	0	1	0	0
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
BLUE																			•		 				
	BLUE(62)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0

[Note]

1) Definition of gray scale Color (n) --- n indicates gray scale level. Higher n means brighter level.

2) Data

1:High, 0: Low

b. 8 bit input

D. O DIC												INI	PUT	DA	ТА										
C	OLOR			I	R D	AT A	١					(G D	ATA						I	3 D.	ATA	1		
	JLOK	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	В7	В6	В5	В4	В3	В2	В1	В0
		MSB							LSB	MSB							LSB	MSB							LSB
	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BASIC	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
COLOR	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	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	1	1	1	1	1	1
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																					P	<u></u>			
RED																									
	RED(255)	1	1	1	1	1	1	1	1	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	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
GREEN																									
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	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	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	0	0	0	0	0	0	1	0
BLUE																									
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

[Note]

1) Definition of gray scale Color (n) --- n indicates gray scale level. Higher n means brighter level.

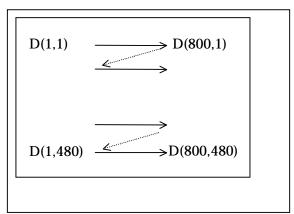
2) Data

1:High, 0: Low

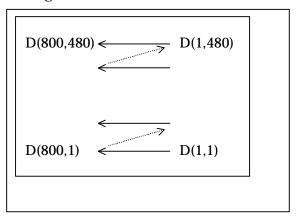
(4) Display Position and Scan Direction

D(X,Y) shows the data number of input signal.

SC: Low

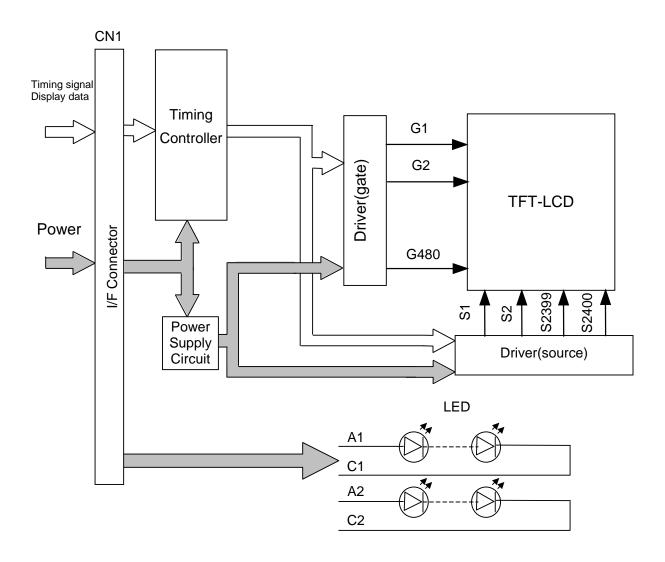


SC: High



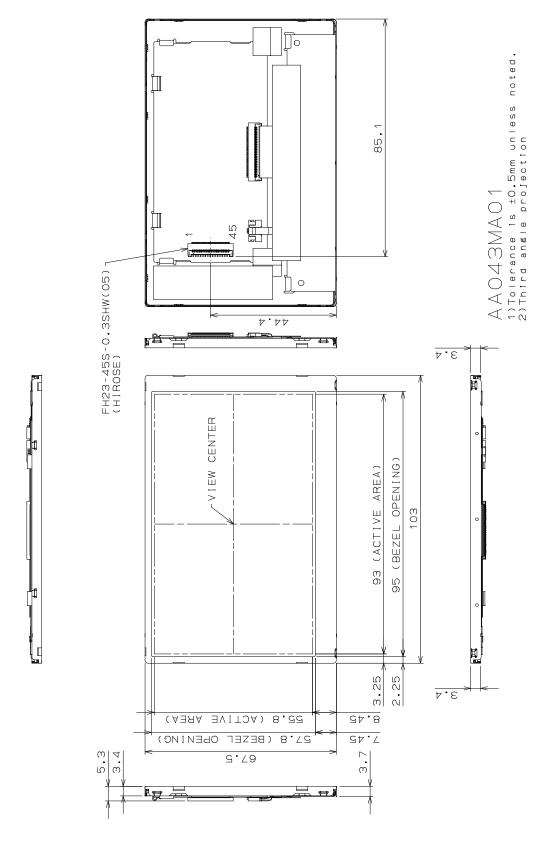
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7. BLOCK DIAGRAM



8. MECHANICAL SPECIFICATIONS

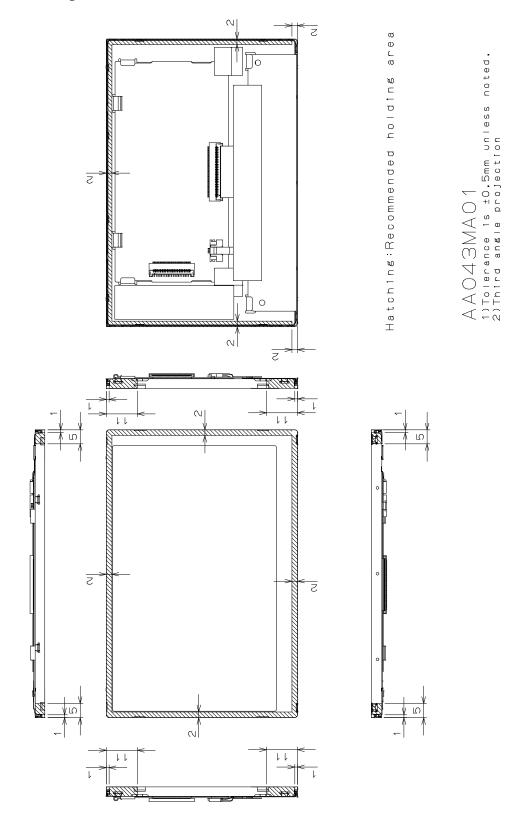
(1) Outline Dimensions



(Unit:mm)

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(2) Recommended Holding Area



(Unit:mm)

9. OPTICAL CHARACTERISTICS

Ta=25°C, VCC=3.3 V, Input Signals: Typ. values shown in Section 6

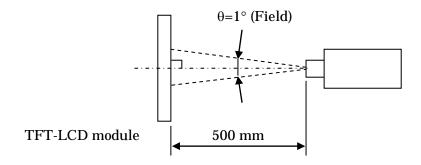
ITE			CONDITION	MIN.	TYP.	MAX.	UNIT	Remarks
Contrast Rat	io	CR	θv=0°, θн=0°	100	400			*1)*2)*5)
Luminance		Lw	θν=0°, θн=0°	100	200		cd/m²	*1)*5)
Luminance U	Jniformity	ΔLw	$\theta_V=0^\circ,\theta_H=0^\circ$			30	%	*1)*3)*5)
Response Tir	no	tr	$\theta_V=0^\circ,\theta_H=0^\circ$		5		ms	*1)*4)*5)
Response III	ne	tf	$\theta_V=0^\circ,\theta_H=0^\circ$		20		ms	*1)*4)*5)
	Horizontal	$\theta_{ ext{H}}$	CR ≥ 10	-50~50	-65~65		0	*1)*5)
Viewing	Vertical	$\theta_{ m V}$	CR ≥ 10	-40~30	-65~45		0	*1)*5)
Angle	Horizontal	$\theta_{ ext{H}}$	CR ≥ 5	-65~65	-80~80			*1)*5)
	Vertical	$\theta_{ m V}$	CR ≥ 5	-50~40	-80~50			*1)*5)
Image Sticki	ng	tis	2 h			2	S	*6)
	Red	Rx		0.565	0.615	0.665		
		Ry		0.312	0.362	0.412		
Color	Green	Gx		0.291	0.341	0.391		
Coordinates		Gy	θ _V =0°, θ _H =0°	0.545	0.595	0.645		*1)*5)
	Blue	Bx	0V-0 , 0H-0	0.101	0.151	0.201		
		Ву		0.088	0.138	0.188		
	White	Wx		0.282	0.332	0.382		
		Wy		0.308	0.358	0.408		

[Note]

These items are measured using EZContrast (ELDIM) for viewing angle and CS2000 (Minolta) or equivalent equipment for others under the dark room condition (no ambient light) after more than 30 minutes from turning on the backlight unless noted.

Condition: IF=15.0 mA

Measurement method for luminance and color coordinates is as follows.

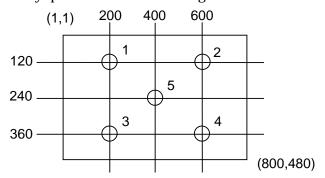


The luminance is measured according to FLAT PANEL DISPLAY MEASUREMENTS STANDARD (VESA Standard).

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*1) Measurement Point

Contrast Ratio, Luminance, Response Time, Viewing Angle, Color Coordinates: Display Center Luminance Uniformity: point 1~5 shown in a figure below

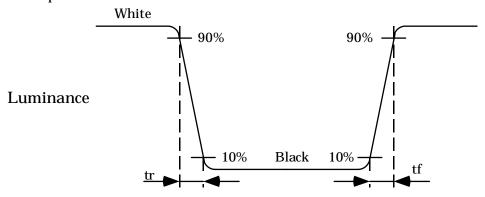


*2) Definition of Contrast Ratio

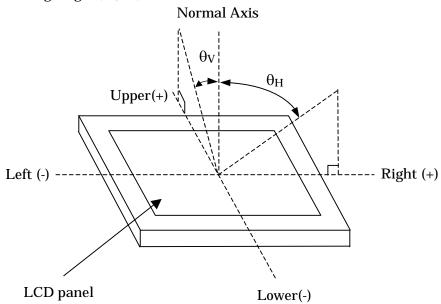
CR=Luminance with all white pixels / Luminance with all black pixels

*3) Definition of Luminance Uniformity $\Delta Lw=[Lw(MAX)/Lw(MIN)-1]\times 100$

*4) Definition of Response Time

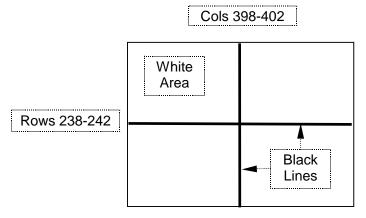


*5) Definition of Viewing Angle (θ_V , θ_H)



*6) Image Sticking

Continuously display the test pattern shown in the figure below for two-hours. Then display a completely white screen. The previous image shall not persist more than two seconds at 25° C.



TEST PATTERN FOR IMAGE STICKING TEST

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10. RELIABILITY TEST CONDITION

(1) Temperature and Humidity

ITEM	CONDITIONS
HIGH TEMPERATURE HIGH HUMIDITY OPERATION	40°C, 90%RH, 240 h (No condensation)
HIGH TEMPERATURE OPERATION	70°C, 240 h
LOW TEMPERATURE OPERATION	–20°C, 240 h
HIGH TEMPERATURE STORAGE	80°C, 240 h
LOW TEMPERATURE STORAGE	–20°C, 240 h
THERMAL SHOCK (NON-OPERATION)	−20°C (1h) ~ 80°C(1h), 100 cycles

(2) Shock & Vibration

ITEM	CONDITIONS
SHOCK (NON-OPERATION)	Shock level: 1470m/s² (150G) Waveform: half sinusoidal wave, 2ms
	Number of shocks: one shock input in each direction of three mutually perpendicular axis for a total of six shock inputs
VIBRATION (NON-OPERATION)	Vibration level: 9.8m/s ² (1.0G) Waveform: sinusoidal
	Frequency range: 5 to 500Hz Frequency sweep rate: 0.5 octave /min
	Duration: one sweep from 5 to 500 Hz in each of three mutually perpendicular axis(each x,y,z axis: 1 hour, total 3 hours)

(3) ESD Test

ITEM	CONDITIONS
CONTACT DISCHARGE (OPERATION)	150pF, 330 Ω , ± 8 kV, 10 times at 1 sec interval
SIGNAL PIN DISCHARGE (NON-OPERATION)	200pF, 0Ω , ± 200 V, 10 times at 1 sec interval

(4) Judgment standard

The judgment of the above tests should be made as follow:

Pass: Normal display image, no damage of the display function. (ex. no line defect)
Partial transformation of the module parts should be ignored.

Fail: No display image, damage of the display function. (ex. line defect)

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11. OTHER FEATURE

This LCD module complies with RoHS *) directive.

 $^{\ast)}$ RoHS: Restriction of the use of certain hazardous substances in electrical and electronic equipment

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12. HANDLING PRECAUTIONS FOR TFT-LCD MODULE

Please pay attention to the followings in handling TFT-LCD products;

(1) ASSEMBLY PRECAUTION

- a. Please do not bend or wrench the LCD module in assembling. Please do not drop, bend or twist the LCD module in handling.
- b. Please design display housing in accordance with the following guide lines.
 - (a) Housing case must be designed carefully so as not to put stresses on LCD and not to wrench module.
 - (b) Under high temperature environment, performance and life time of LED may heavily shorten. When you design with our LCD product, please consider radiating heat and ventilation for good heat management.
 - (c) Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. Approximately 1.0mm of the clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.
 - (d) When some parts, such as, FPC cable and ferrite plate, are installed underneath the LCD module, still sufficient clearance is required, such as 0.5mm. This clearance is, especially, to be reconsidered when the additional parts are implemented for EMI countermeasure.
 - (e) Design the LED driver location and connector position carefully so as not to give stress to LED backlight cable.
 - (f) Keep sufficient clearance between LCD module and the others parts, such as inverter and speaker so as not to interfere the LCD module. Approximately 1.0 mm of the clearance in the design is recommended.
 - (g) To avoid local elevation/decrease of temperature, considering location of heating element, heat release, thermal design should be done.
- c. Please do not push or scratch LCD panel surface with anything hard. And do not soil LCD panel surface by touching with bare hands. (Polarizer film, surface of LCD panel is easy to be flawed.)
- d. Please wipe off LCD panel surface with absorbent cotton or soft cloth in case of it being soiled.
- e. Please wipe off drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change.
- f. Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- g. Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
- h. Please handle metal frame carefully because edge of metal frame is very sharp.
- i. Please connect the metal frame of LCD module to GND in order to minimize the effect of external noise and EMI.

j. Be sure to connect the cables and the connecters correctly.

(2) OPERATING PRECAUTIONS

- a. Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
- b. Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification.
- c. The interface signal speed is very high. Please pay attention to transmission line design and other high speed signal precautions to satisfy signal specification.
- d. Condensation might happen on the surface and inside of LCD module in case of sudden change of ambient temperature. Please take care so as not to cause any damage mentioned on (1)-d.
- e. Please pay attention not to display the same pattern for very long time. Image sticking might happen on LCD. Although image sticking may disappear as the operation time proceeds, screen saver function is recommended not to cause image sticking.
- f. Please obey the same safe instructions as ones being prepared for ordinary electronic products.

(3) PRECAUTIONS WITH ELECTROSTATICS

- a. This LCD module use CMOS-IC on circuit board and TFT-LCD panel, and so it is easy to be affected by electrostatics. Please be careful with electrostatics by the way of your body connecting to the ground and so on.
- b. Please remove protection film very slowly from the surface of LCD module to prevent from electrostatics occurrence.

(4) STORAGE PRECAUTIONS

LCD should be stored in the room temperature environment with normal humidity. The LCD inventory should be processed by first-in first-out method.

(5) SAFETY PRECAUTIONS

- a. When you waste damaged or unnecessary LCDs, it is recommended to crush LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.
- b. If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.
- c. Be sure to turn off the power supply when inserting or disconnecting the LED backlight cable.
- d. LED driver should be designed carefully to limit or stop its function when over current is detected on the LED.

(6) OTHERS

- a. A strong incident light into LCD panel may cause deterioration to polarizer film, color filter, and other materials, which will degrade the quality of display characteristics. Please do not expose LCD module under strong Ultraviolet rays for a long time.
- b. Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- c. For the packaging box handling, please see and obey with the packaging specification datasheet.