



K50DWN0-V1-F

Product

Standard LCD Module
800 x RGB x 480 Dots
5" 16.7M colors TFT display
Wide temperature
With white LED backlight
With touch screen



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1. Document revision history :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
01	2010.07.22	First Release.	XW Lee	



2. General Description

NO.	Item	Unit	Specification	Remark
1	Screen Size	inch	5(Diagonal)	
2	Display Resolution	Dot	800RGB(W)x480(H)	
3	Overall Dimension	mm	120.8(W)x76.0(H)x4.2(D)	Note 1
4	Active Area	mm	108.0(W)x64.8(H)	
5	Pixel Pitch	mm	0.135(W)x0.135(H)	
6	Color Configuration	-	Tri-Gate	
7	Color Depth	-	16.7M Color	Note 2
8	NTSC Ratio	%	50	
9	Display Mode	-	Normally White	
10	Panel Surface Treatment	-	Anti-Glare, 3H	
11	Weight	g	TBD	
12	Panel Power Consumption	mW	TBD	
13	Backlight Power Consumption	W	TBD	
14	Viewing Direction		6 o'clock(Gray inversion)	

Note 1: Not include controller board and FPC.

Note 2: Full color display depends on 24-bit data signal.



3. Mechanical Specifications

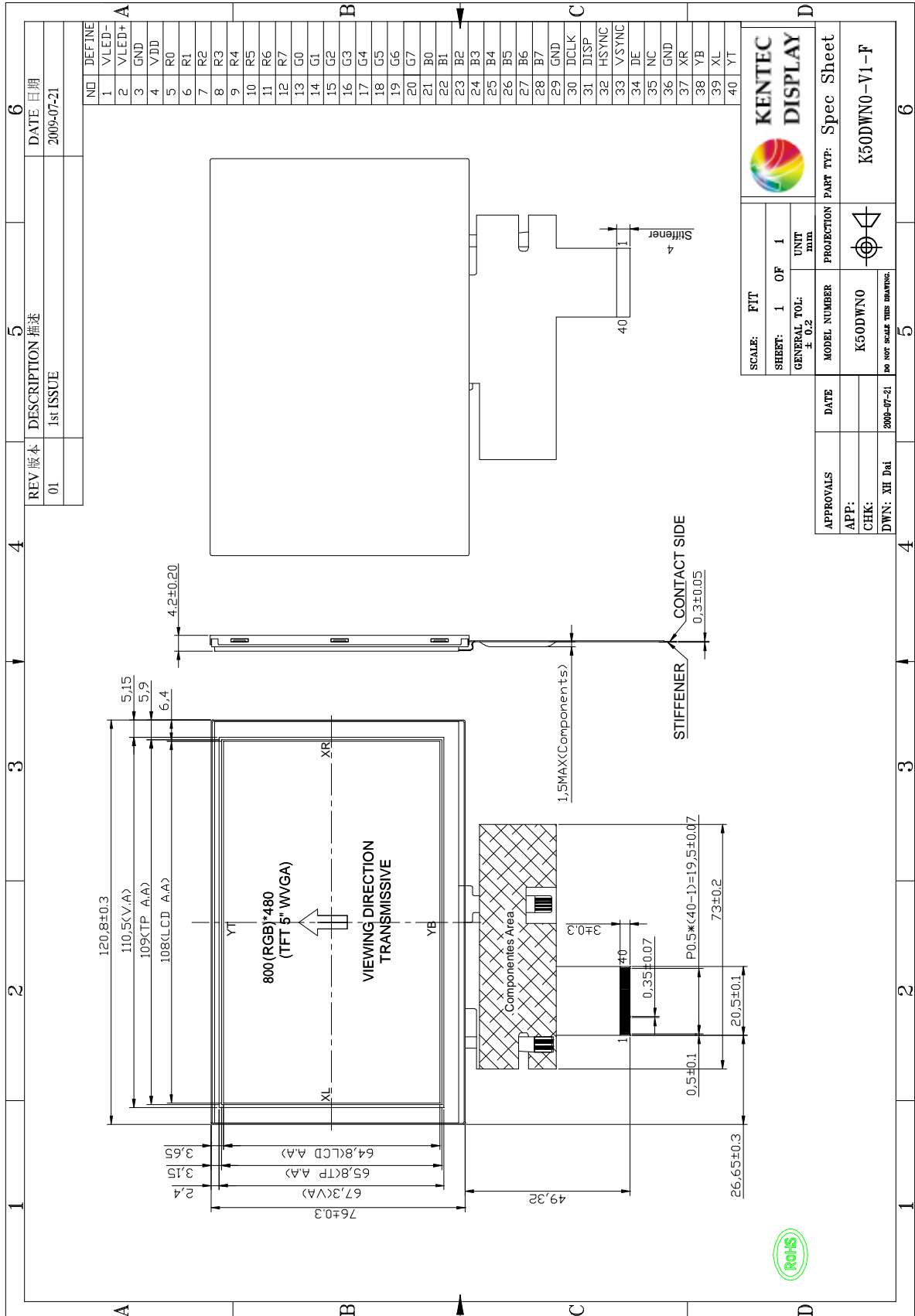


Figure 1-1: Outline Drawing



4. Interface signals

Table 2: Pin assignment

Pin No.	Symbol	I/O	Function
1	V _{LED-}	P	Power for LED backlight cathode
2	V _{LED+}	P	Power for LED backlight anode
3	GND	P	Power ground
4	V _{DD}	P	Power voltage
5	R0	I	Red data (LSB)
6	R1	I	Red data
7	R2	I	Red data
8	R3	I	Red data
9	R4	I	Red data
10	R5	I	Red data
11	R6	I	Red data
12	R7	I	Red data (MSB)
13	G0	I	Green data (LSB)
14	G1	I	Green data
15	G2	I	Green data
16	G3	I	Green data
17	G4	I	Green data
18	G5	I	Green data
19	G6	I	Green data
20	G7	I	Green data (MSB)
21	B0	I	Blue data (LSB)
22	B1	I	Blue data
23	B2	I	Blue data
24	B3	I	Blue data
25	B4	I	Blue data
26	B5	I	Blue data
27	B6	I	Blue data
28	B7	I	Blue data (MSB)
29	DGND	I	Digital ground
30	DCLK	I	Pixel clock
31	DISP	I	Display on/ off
32	HSYNC	I	Horizontal sync signal
33	VSYNC	I	Vertical sync signal
34	DE	I	Data enable
35	NC	-	No Connect
36	GND	P	Power ground
37	X_R	I/O	Right electrode - differential analog
38	Y_B	I/O	Bottom electrode - differential analog
39	X_L	I/O	Left electrode - differential analog
40	Y_T	I/O	Top electrode - differential analog

I/O: I: input, O: output, P: power



5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings – for IC Only

Table 3: Electrical Maximum Ratings – for IC

Parameter	Symbol	Min.	Max.	Unit	Note
Supply voltage	VCC	-0.3	5.0	V	1
LED forward current	If	--	30	mA	
LED reverse	Vr	--	5.0	V	

Note:

- 1.VCC, GND must be maintained.
- 2.The modules may be destroyed if they are used beyond the absolute maximum ratings.

5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (Tstg) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20°C	+70°C	-30°C	+80°C	Dry
Humidity (Note 1)	80% max. RH for Ta ≤ 40°C < 50% RH for 40°C < Ta ≤ Maximum operating temperature				No condensation

Note 1: Product cannot sustain at extreme storage conditions for long time.

6. Electrical Specifications

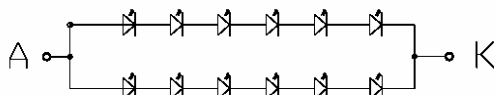
Typical Electrical Characteristics

At Ta = 25 °C, VCC=IOVCC= 3.3V, GND=0V.

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (logic)	VDD-GND		3	3.3	3.6	V
Supply voltage (analog)	AVDD-GND		4.8	5.0	5.2	V
Input signal voltage	VIH		0.8VDD	-	VDD	V
	VIL		0	-	0.2VDD	V
Supply current (Logic & LCD)	IDD	VDD=3.3V	-	15	19	mA
LED Backlight Supply current	ILED	Forward voltage VLED= ~19.2V @ 40mA	-	36	40	mA

Note (1): LED backlight required current constant power supply. LED circuit was in 2 chain parallel and with 6 LEDs serial per chain. Power consumption of LED backlight is 0.77W.





7. Optical Characteristics

Table 6: Optical specifications

Items	Symbol	Condition	Specifications			Unit	Note
			Min.	Typ.	Max.		
Luminance	L _w		200	250	-	cd/m ²	
Contrast Ratio	CR		480	600	-	-	
Response Time	T _R +T _F		-	10	20	ms	
Chromaticity	White	X _w	(0.292)	(0.307)	(0.322)	-	
		Y _w	(0.333)	(0.348)	(0.363)	-	
Viewing angle	Hor.	φ1 + φ2	Center CR=10	130	150	-	
	Ver.	θ1 + θ2		110	130	-	

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

L₆₃: Luminance of gray level 63

L₀: Luminance of gray level 0

$$\text{CR} = \text{CR} (10)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (TR, TF):

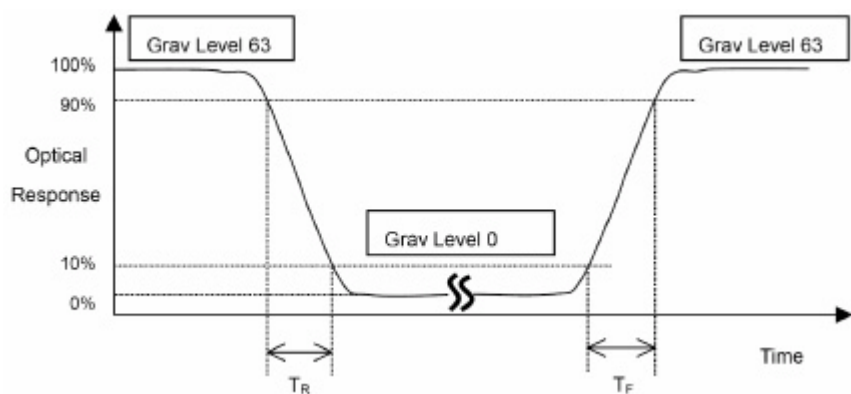


Figure 3

Note 3: Viewing Angle

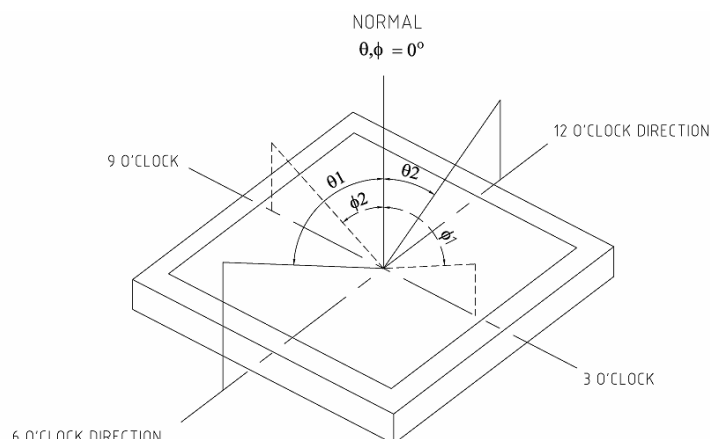




Figure 4

The above “Viewing Angle” is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 6 O’clock. Module maker can increase the “Viewing Angle” by applying Wide View Film.

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

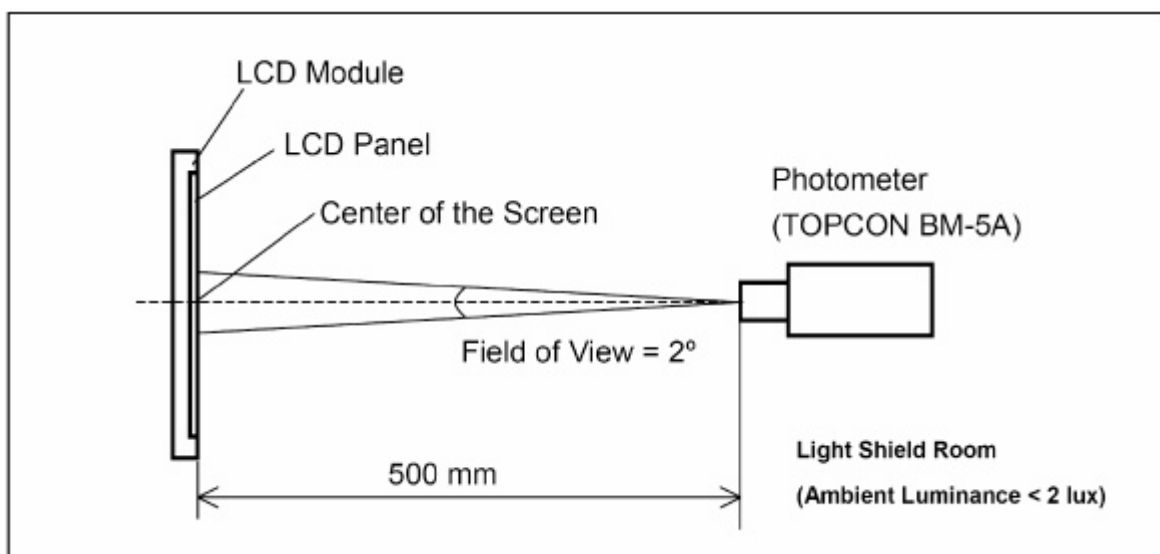
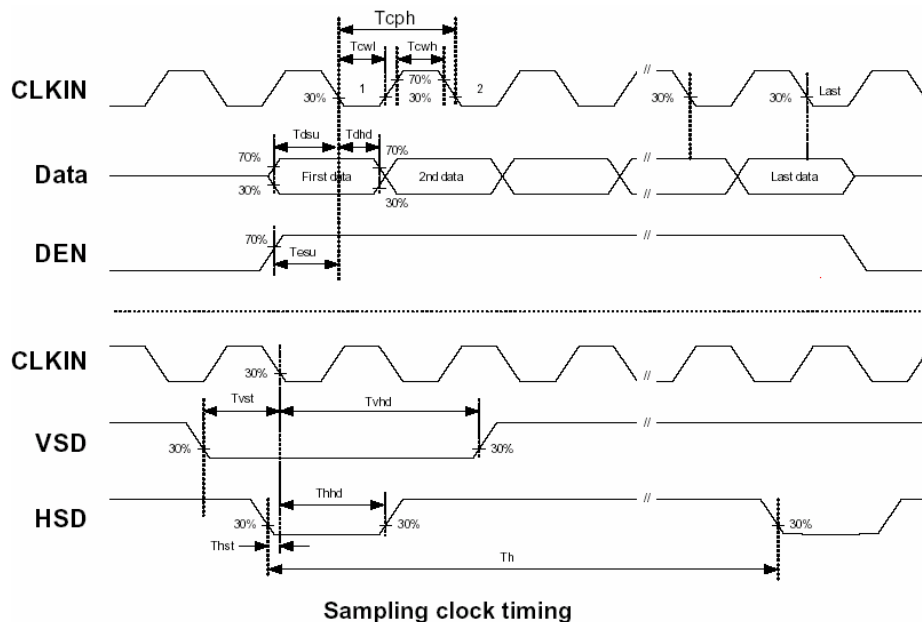


Figure 5

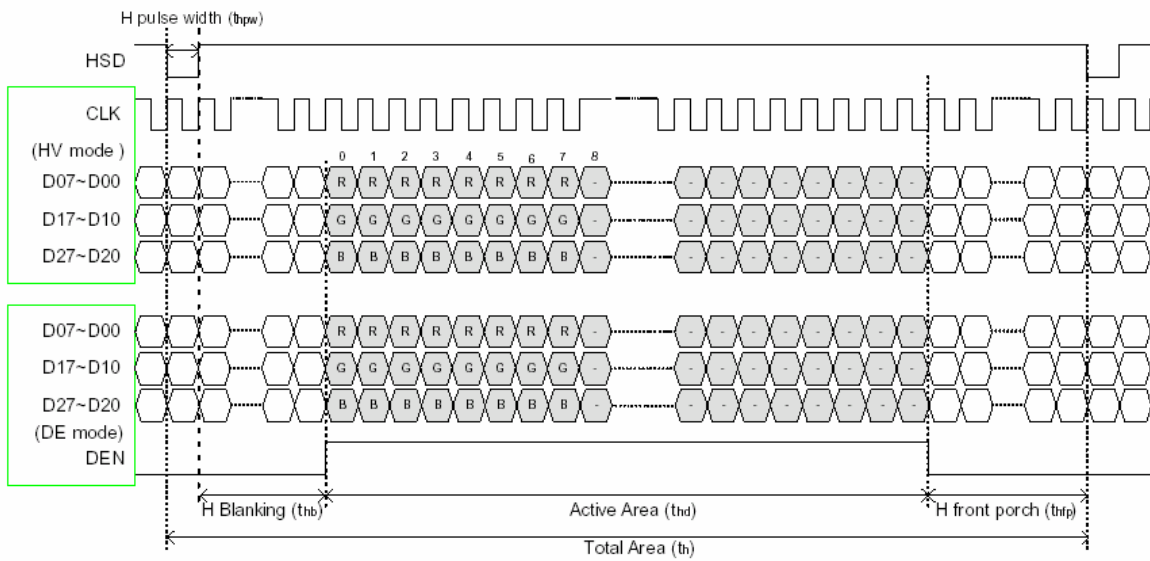


8. AC Characteristics and Signal timing

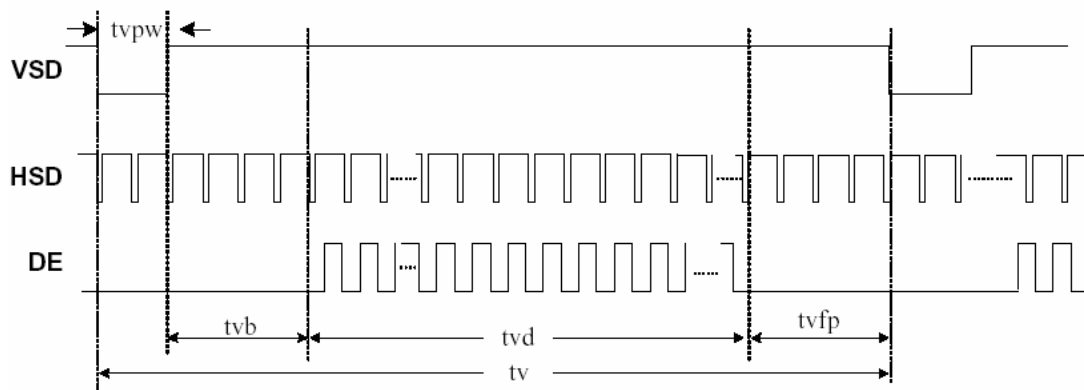
Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tclk	25			ns	
DCLK frequency	fclk		33	40	MHz	
DCLK pulse duty	Tcwh	40	50	60	%	
VSYNC setup time	Tvst	8			ns	
VSYNC hold time	Tvhd	8			ns	
HSYNC setup time	Thst	8			ns	
HSYNC hold time	Thhd	8			ns	
Data setup time	Tdasu	8			ns	
Data hold time	Tdahd	8			ns	
DE setup time	Tdesu	8			ns	
DE hold time	Tdehd	8			ns	
Horizontal display area	Thd		800		Tcph	
HSYNC period time	Th		928		Tcph	
HSYNC width	Thwh	1	48		Tcph	
HSYNC back porch	Thbp		40		Tcph	
HSYNC front porch	Thfp		40		Tcph	
Vertical display area	Tvd		480		th	
VSYNC period time	Tv		525		th	
VSYNC width	Tvwh		3		th	
VSYNC back porch	Tvbp		29		th	
VSYNC front porch	Tvfp		13		th	



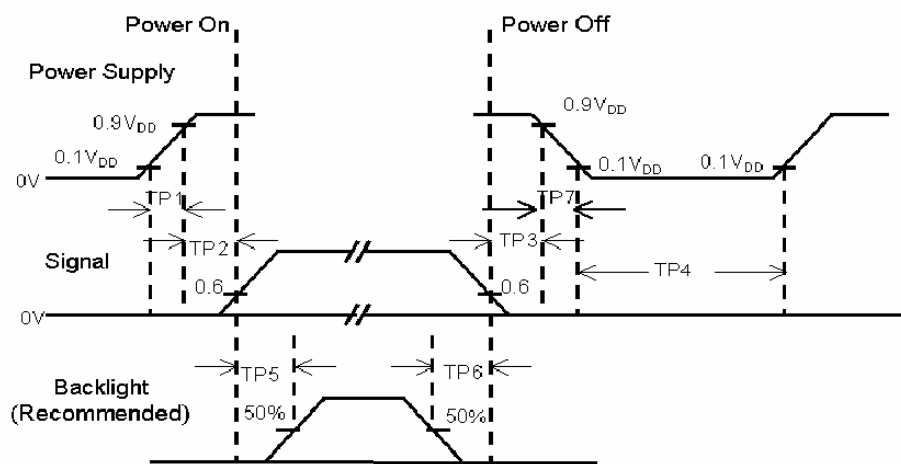
Sampling clock timing



Horizontal display timing range



Vertical timing



Power Sequence



Note :

- (1) The supply voltage of the external system for the module input should be the same as the definition of V_{DD} .
- (2) Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become white.
- (3) In case of V_{DD} = off level, please keep the level of input signal on the low or keep a high impedance.
- (4) TP4 should be measured after the module has been fully discharged between power off and on period.
- (5) Interface signal shall not be kept at high impedance when the power is on.

9. Reliability Test Item

	Test Item	Test Condition	Remark
1	High temperature storage	70 ; 240H	
2	Low temperature storage	-20 ; 240H	
3	High temperature High humidity	50 , 80%RH; 240H	Operation
4	High temperature operation	60 ; 240H	
5	Low temperature operation	-10 ; 240H	
6	Temperature Shock	-20 ? 60 ; 100cycle, 1Hrs/cycle	Non-operation
7	Electrostatic Discharge	Contact ±4kV, Class B Air ±8kV, Class B	
8	Image sticking	25 , 4H	
9	Vibration	Frequency range : 10~55Hz Stoke : 1.5mm Sweep : 10~55~10Hz 2 Hours for each direction of X,Y,Z (total 6 Hours)	Non-operation JIS C7021, A-10 Condition A : 15 minutes
10	Mechanical shock	100G, 6ms, ±X, ±Y, ±Z, 3 times for each direction	Non-operation JIS C7021, A-10 Condition C
11	Vibration (with carton)	Random vibration : 0.015G ² /Hz from 2~200Hz -6dB/Octave from 200~500Hz	ICE 68-34
12	Drop (with carton)	Height : 60cm 1 corner, 3 edges, 6 surfaces	
13	Pressure	5 kg, 5 sec	



10. Suggestions for using LCD modules

10.1 Handling of LCM

1. The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
2. If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
3. Don't apply excessive force on the surface of the LCM.
4. If the surface is contaminated ,clean it with soft cloth. If the LCM is severely contaminated , use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer . The following solvents is especially prohibited: water , ketone Aromatic solvents etc.
5. Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
6. Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
7. Don't disassemble the LCM.
8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Be sure to ground the body when handling the LCD modules.
 - Tools required for assembling, such as soldering irons, must be properly grounded.
 - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
 - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
9. Do not alter, modify or change the the shape of the tab on the metal frame.
10. Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.



11. Do not damage or modify the pattern writing on the printed circuit board.
12. Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
13. Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
14. Do not drop, bend or twist LCM.

10.2 Storage

1. Store in an ambient temperature of 5 to 45 °C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
2. Storage in a clean environment, free from dust, active gas, and solvent.
3. Store in antistatic container.

11. Packing Method

TBD

- END -