



# OSD DISPLAYS

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Customer: \_\_\_\_\_  
Model Number: OSD057T0877-45  
Specification Number: \_\_\_\_\_  
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For Customer's Acceptance

Approved by	Comments

Approved by	Reviewed by	Prepared by



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## 1. OVERVIEW

OSD057T0877-45 is 5.7" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver IC, and LED backlight.

General specifications are summarized in the following table:

Item	Specification
Display Area (mm)	116.16(H) × 87.12(V)
Resolution	640(H) × 3(RGB) × 480(V)
Pixel Pitch (mm)	0.1815(H) × 0.1815(V)
Pixel Arrangement	R,G,B vertical stripe
Display Mode	Normally White
Number of Color	262K
Viewing Direction	6 o'clock
Response Time (Tr+Tf)	30ms(typ)
Contrast Ratio	300 : 1
Luminance (cd/m <sup>2</sup> )	220nit(typ)
NTSC	50%(typ)
Viewing Angle   CR > 10	140 degree (Horizontal) , 100 degree(Vertical)
Electrical Interface	TTL
Power Consumption (W)	1.4W(typ)
Outline Dimension(mm)	127(W) × 100(H) × 6.6(D)
Module Weight(g)	110g(typ)
Backlight	LED
Surface Treatment	Anti-Glare , Surface hardness: 3H

## 2. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min	Max	Unit	Remarks
Power Supply Voltage for LCD	Vcc	-0.3	5	V	
Power Supply Voltage for LED	VLED	GND	30	V	
ICC Rush Current	IRUSH	-	1	A	*2)
Gate Off Voltage	VEEG	-20	0.3	V	
Operating temperature	Topa	-30	85	°C	*1)
Storage temperature	Tstg	-40	90	°C	*1)

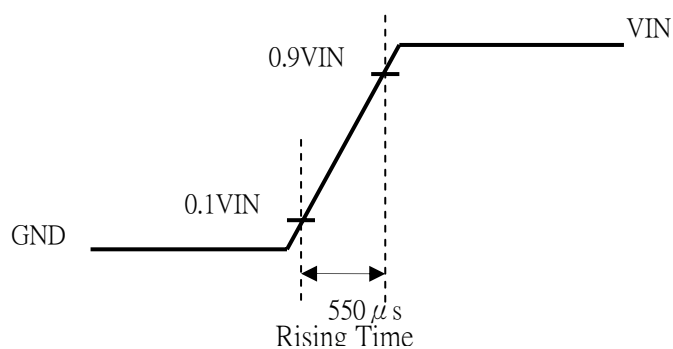
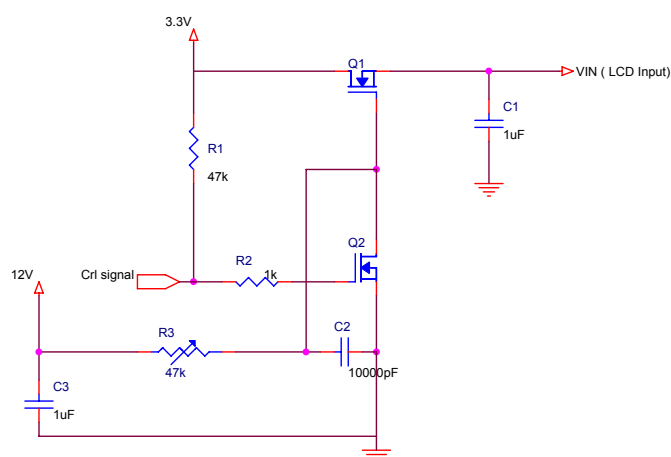
Remarks :

\*1) If the product were used out of the operation and storage range, it will have quality issue.

\*2) The input pulse-current measurement system is as below:

Control signal: High (+3.3V)→Low (GND)

Supply Voltage of rising time should be from R3 and C2 tune to 550  $\mu$ s.



### 3. ELECTRICAL CHARACTERISTICS

#### 3.1 TFT-LCD Power Supply Voltage

Ta=25°C

Item	Symbol	Min	Typ	Max	Unit	Remarks
Power Supply Voltage For LCD	V <sub>CC</sub>	3.0	3.3	3.6	V	
Power Supply Voltage For LED	V <sub>LED</sub>	3.0	5	5.5	V	
Logic Input Voltage	V <sub>IH</sub>	VCC*0.7	--	VCC	V	
	V <sub>IL</sub>	GND	--	VCC*0.3	V	
ADJ Input Voltage	V <sub>IH</sub>	3.0	--	3.3	V	
	V <sub>IL</sub>	GND	--	0.3	V	

#### 3.2 TFT-LCD Power Supply Current

Ta=25°C

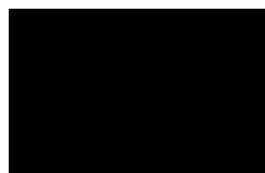
Item	Symbol	Conditions	Min	Typ	Max	Unit	Remarks
LCD Power Current	I <sub>CC</sub>	--	95	115	mA	*1)	
LED Power Current	I <sub>LED</sub>	--	210	380	mA	*2)	

Remarks :

\*1)Typical : 64 gray pattern , Maximum : Black pattern ◦



64 Gray Pattern

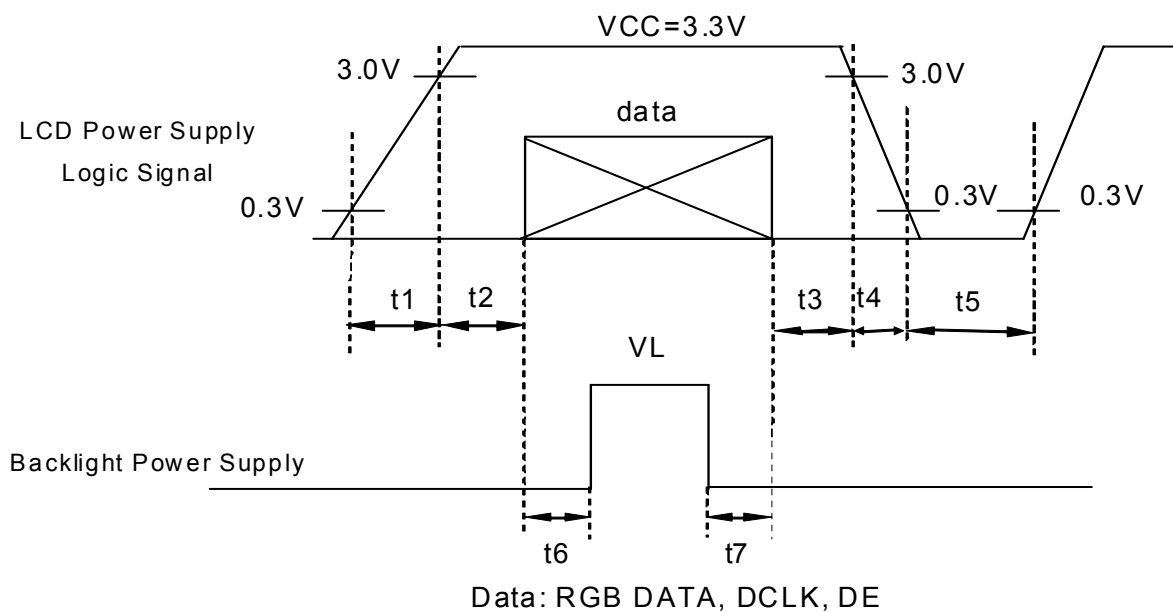


Black Pattern

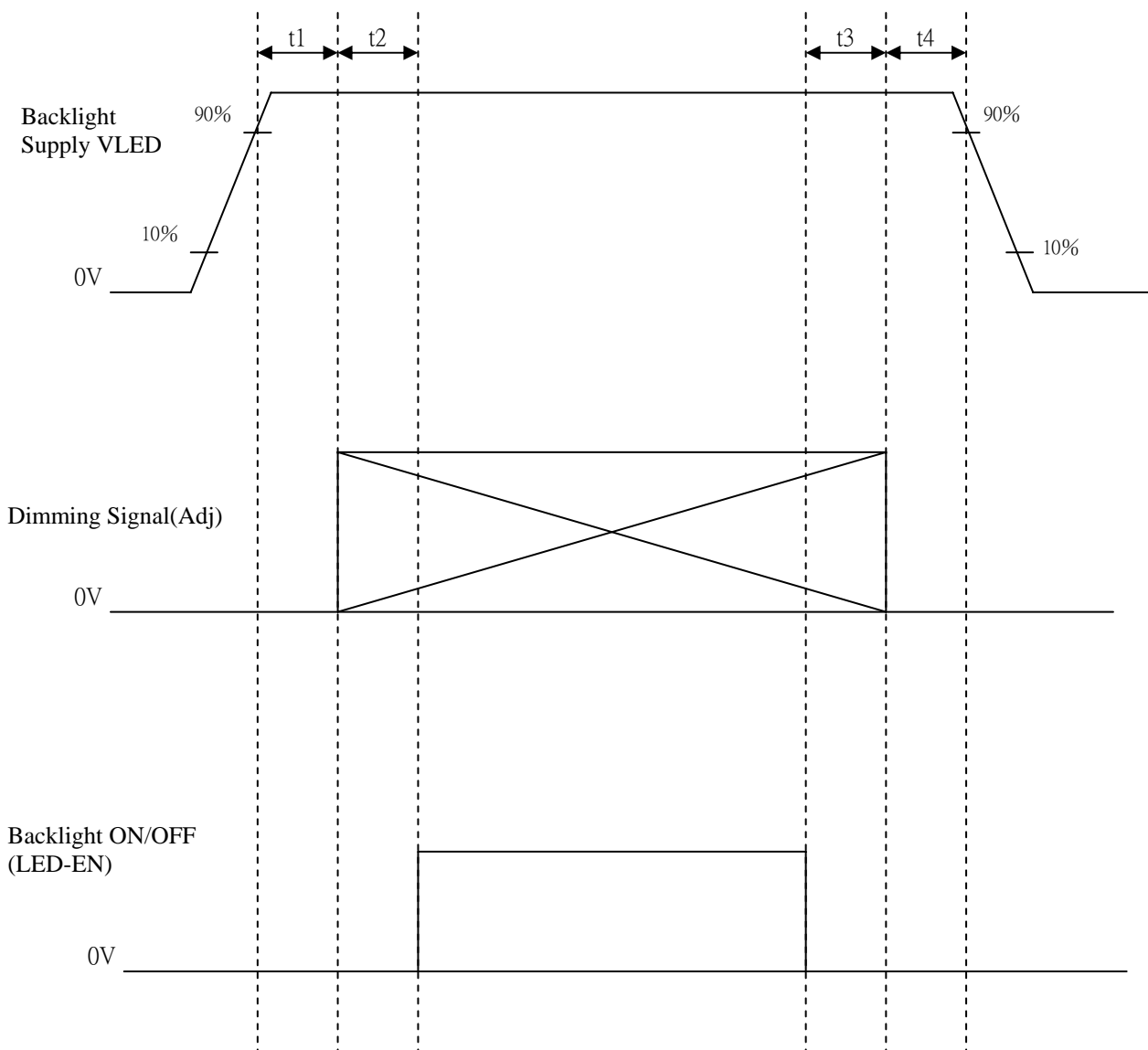
\*2) Typical: V<sub>LED</sub> = 5V  
Maximum: V<sub>LED</sub> = 3.0V

### 3.3 Power 、 Signal sequence

- |                              |                         |
|------------------------------|-------------------------|
| $0.5 < t_1 \leq 10\text{ms}$ | $200\text{ms} \leq t_5$ |
| $0 < t_2 \leq 50\text{ms}$   | $200\text{ms} \leq t_6$ |
| $0 < t_3 \leq 50\text{ms}$   | $200\text{ms} \leq t_7$ |
| $0 < t_4 \leq 10\text{ms}$   |                         |



$10\text{ms} \leq t1$   
 $10\text{ms} \leq t2$   
 $0\text{ms} \leq t3$   
 $10\text{ms} \leq t4$





### 3.4 Backlight

Item	Symbol	Condition	Min	Typ	Max	Unit	Remarks
LED Lifetime	-	Ta=25°C Each serial=20mA	30000			Hr	
		Ta=60°C Each serial=20mA	15000			Hr	

Remarks :

\*1) Definition LED lifetime : Luminance will decay less than 50%.

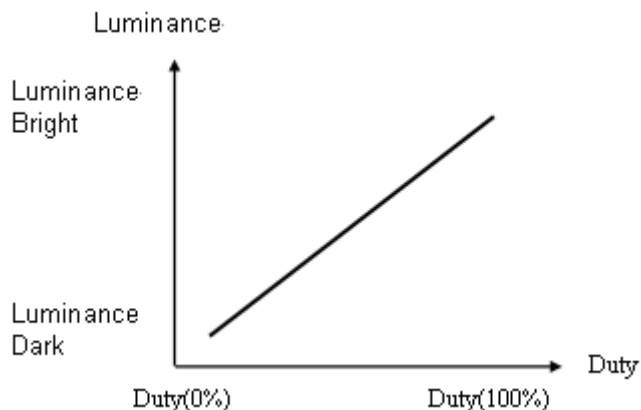
## 4. INTERFACE CONNECTION

(a) CN1 : Starconn. 089N40-000R00-G2-R

Pin NO.	Symbol	Description
1	U/D	Up / Down Display Control
2	DMS	DE / SYNC Mode Selection
3	Hsync	Horizontal SYNC.
4	V <sub>LED</sub>	Power Supply for LED
5	V <sub>LED</sub>	Power Supply for LED
6	V <sub>LED</sub>	Power Supply for LED
7	V <sub>cc</sub>	Power Supply for LCD
8	Vsync	Vertical SYNC.
9	DE	Data Enable
10	V <sub>SS</sub>	Power Ground
11	V <sub>SS</sub>	Power Ground
12	ADJ	Adjust for LED brightness
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	V <sub>SS</sub>	Power Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	V <sub>SS</sub>	Power Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	V <sub>SS</sub>	Power Ground
25	G2	Green Data 2
26	G1	Green Data 1
27	G0	Green Data 0 (LSB)
28	V <sub>SS</sub>	Power Ground
29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	V <sub>SS</sub>	Power Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0 (LSB)
36	V <sub>SS</sub>	Power Ground
37	V <sub>SS</sub>	Power Ground
38	DCLK	Clock Signals
39	V <sub>SS</sub>	Power Ground
40	L/R	Left / Right Display Control

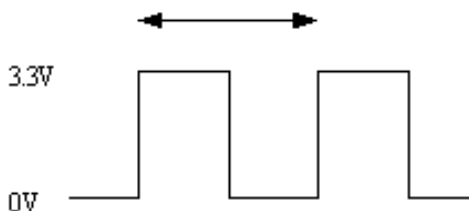
Remarks :

- \*1) VSS pin must be connected with GND. Don't let it be an empty pin.
- \*2) Adjust control pin (ADJ) controls brightness. The bigger pulse duty, the brighter luminance.



\*3) ADJ signal=0~3.3V, operation frequency: 25KHZ±5KHz.

$$F=25\text{KHz} \pm 5\text{KHz} , T=0.04\text{ms}$$



The ADJ should pull-high if not adjust brightness, this pin can't floating.

\*4) U/D & L/R Control Function

L/R	U/D	Function
1	0	Normal Display
0	0	Left / Right Contrary
1	1	Up / Down Reverse
0	1	Left / Right Contrary · Up / Down Reverse

\*5) DMS ( Selection DE / SYNC mode )

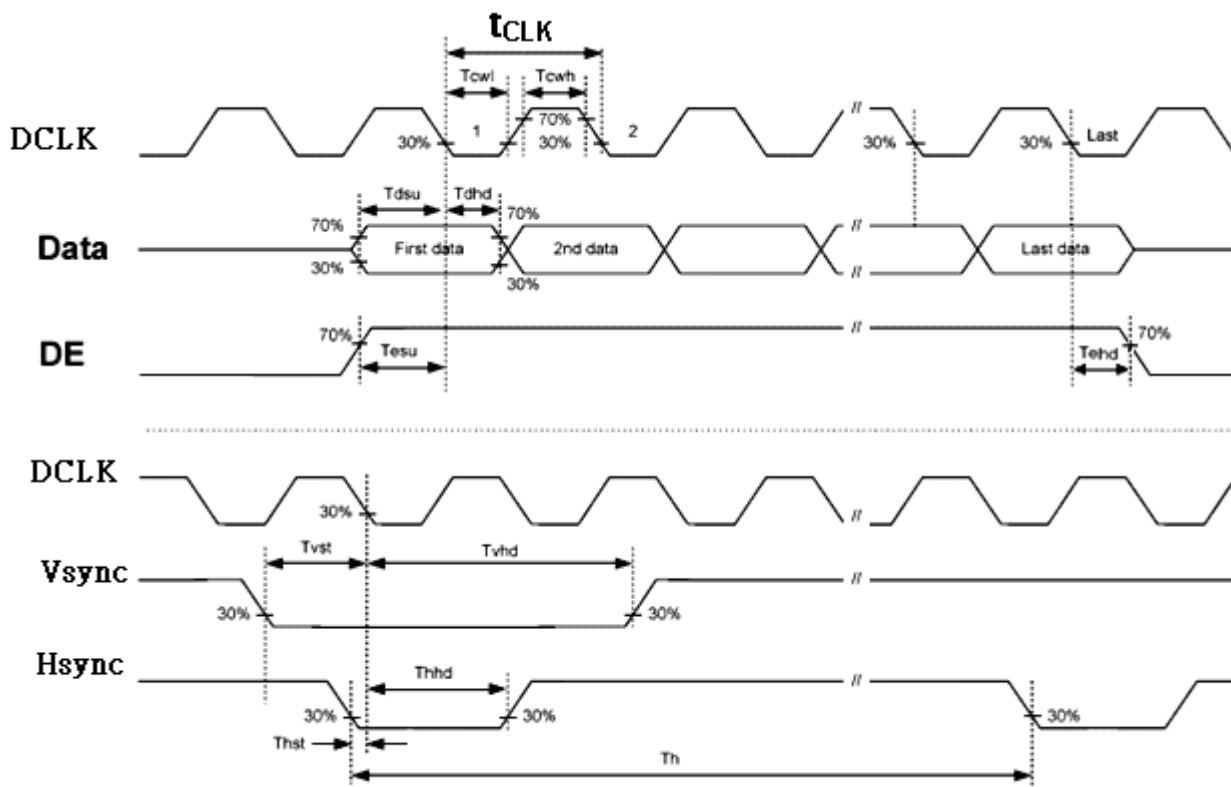
DMS	Function
1	DE Mode
0	SYNC Mode

## 5. INPUT SIGNAL (DE ONLY MODE)

### 5.1 Timing specification

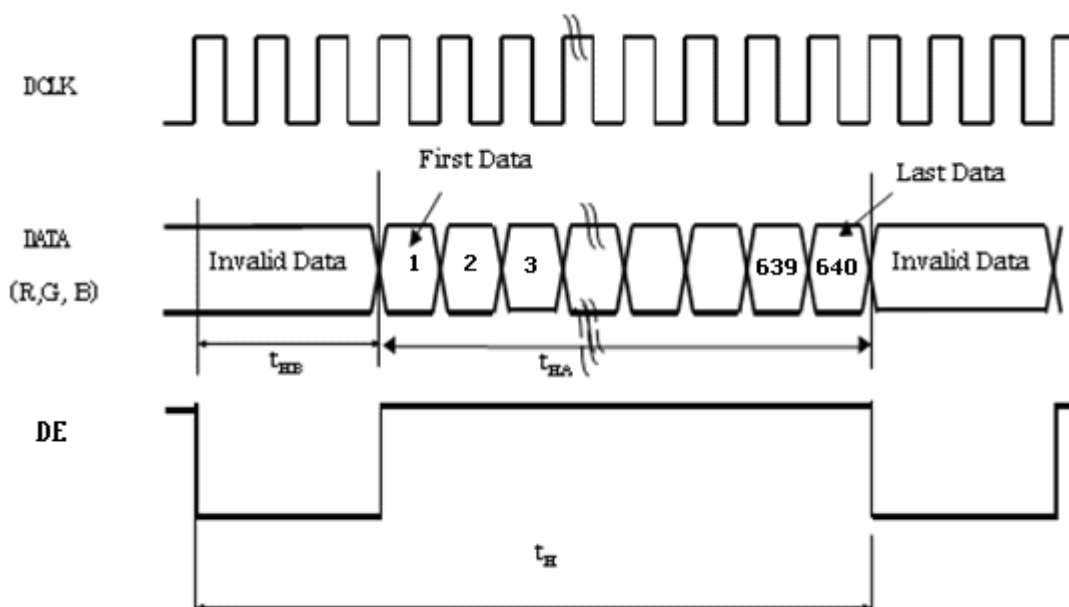
	Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
DCLK	Dot Clock	$1/t_{CLK}$	23	25	30	MHz	
	DCLK pulse duty	Tcwh	40	50	60	%	
DE	Setup Time	Tesu	8	-	-	ns	
	Hold time	Tehd	8	-	-	ns	
	Horizontal Period	$t_H$	750	800	900	$t_{CLK}$	
	Horizontal Valid	$t_{HA}$	640			$t_{CLK}$	
	Horizontal Blank	$t_{HB}$	110	160	260	$t_{CLK}$	
	Vertical Period	$t_V$	515	525	560	$t_H$	
	Vertical Valid	$t_{VA}$	480			$t_H$	
	Vertical Blank	$t_{VB}$	35	45	80	$t_H$	
SYNC	HSYNC Setup Time	Thst	8	-	-	ns	
	HSYNC Hold Time	Thhd	8	-	-	ns	
	VSYNC Setup Time	Tvst	8	-	-	ns	
	VSYNC Hold Time	Tvhd	8	-	-	ns	
	Horizontal Period	th	750	800	900	$t_{CLK}$	
	Horizontal Pulse Width	thpw	1	48	-	$t_{CLK}$	thb + thpw=88DCLK is fixed
	Horizontal Back Porch	thb	-	40	-	$t_{CLK}$	
	Horizontal Front Porch	thfp	22	72	172	$t_{CLK}$	
	Horizontal Valid	thd	640			$t_{CLK}$	
	Vertical Period	tv	515	525	560	th	
	Vertical Pulse Width	tvpw	1	3	-	th	tpw + tvb = 32th is fixed
	Vertical Back Porch	tvb	-	29	-	th	
	Vertical Front Porch	tvfp	3	13	48	th	
Vertical Valid	tvd	480			th		
DATA	Setup Time	Tdsu	8	-	-	ns	
	Hold Time	Tdhd	8	-	-	ns	

## 5.2 Timing Chart

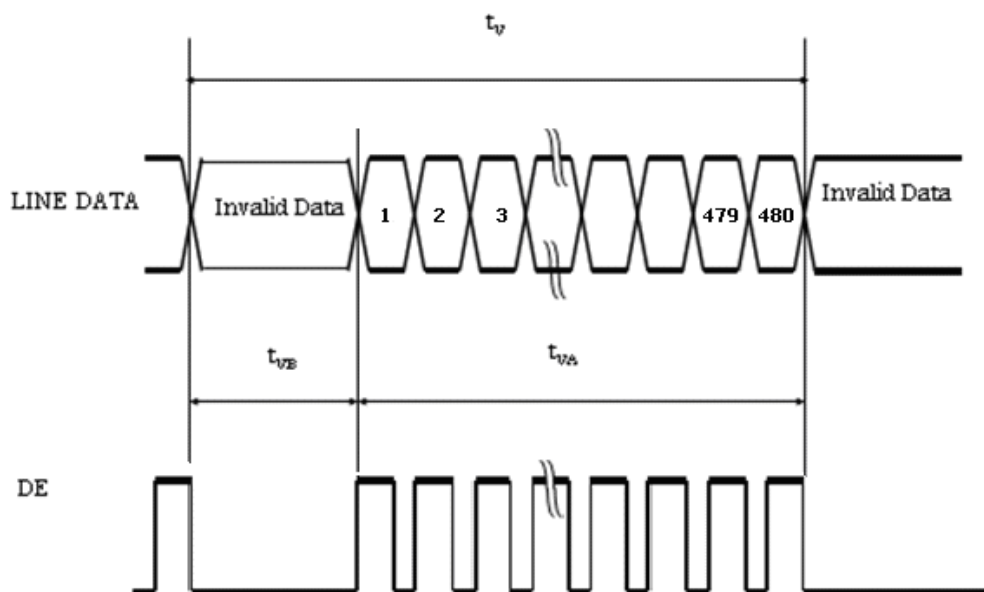


DE mode :

Horizontal Input Timing :

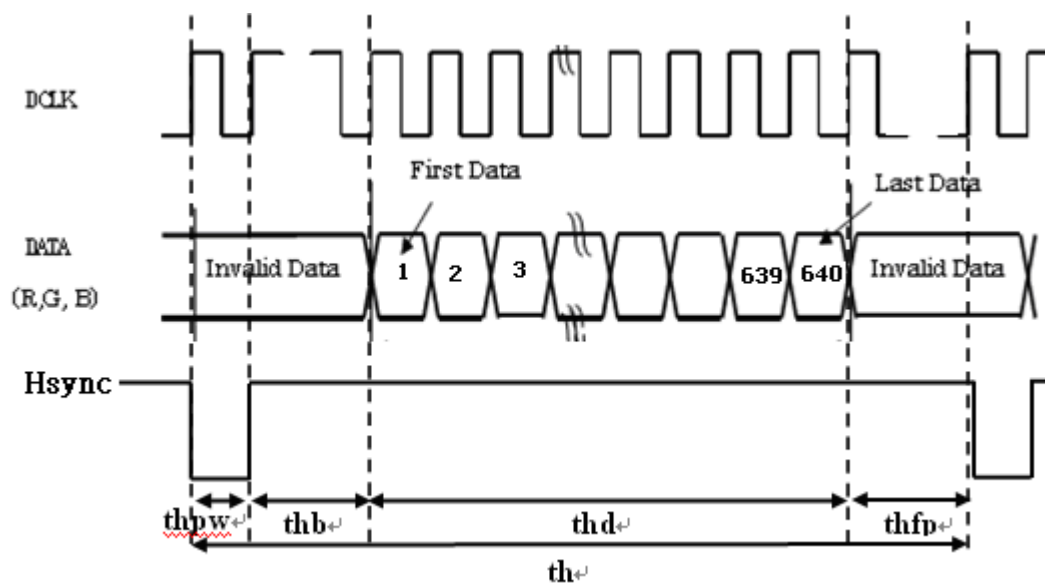


Vertical Input Timing :

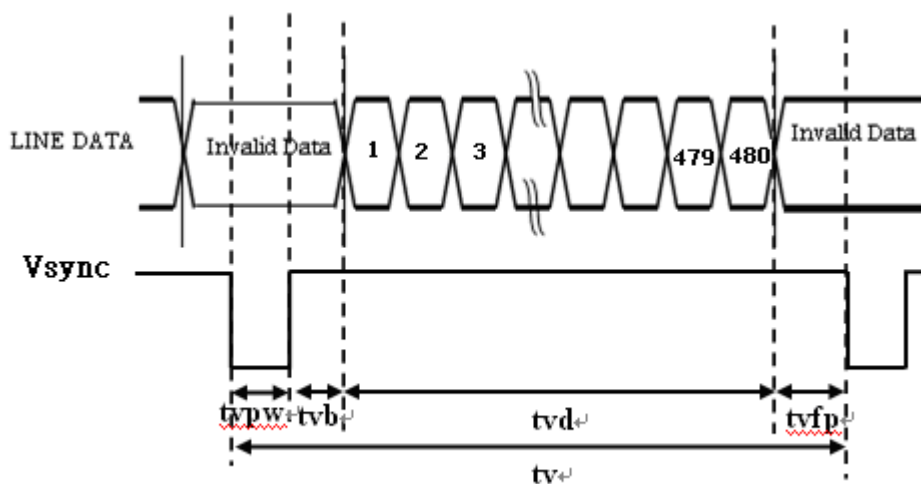


## SYNC mode

Horizontal Input Timing :

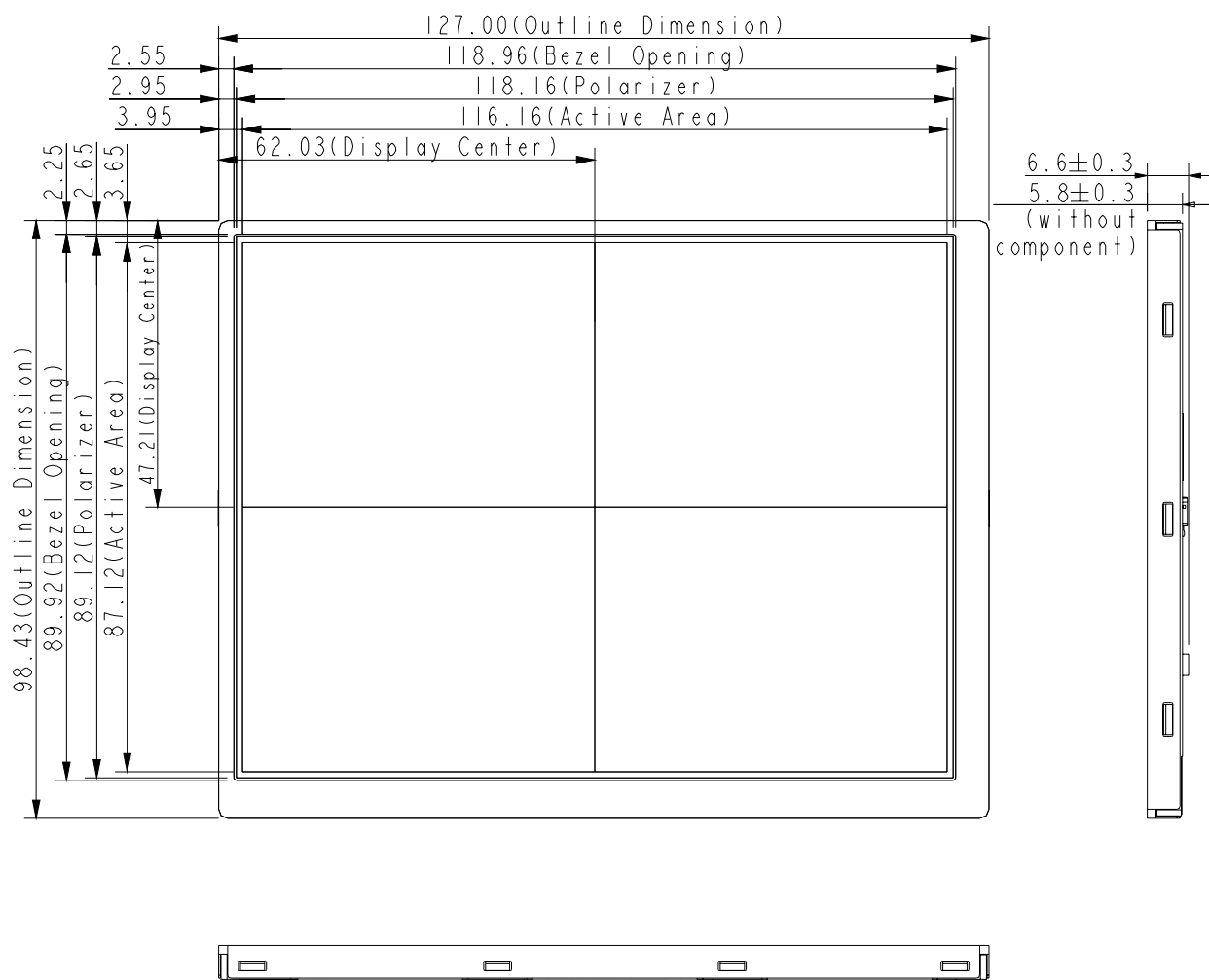


Vertical Input Timing :



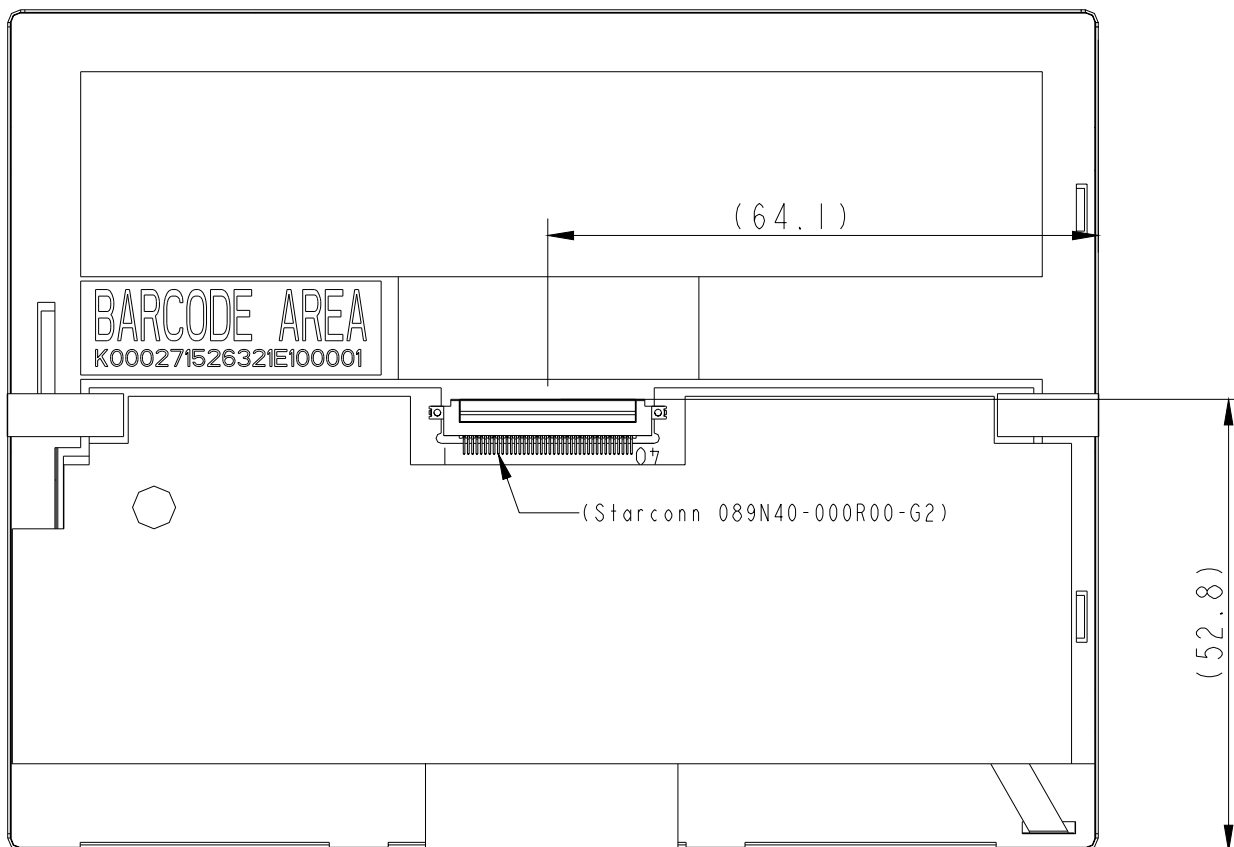
## 6. MECHANICAL DIMENSION

### 6.1 Front View





## 6.2 Rear View



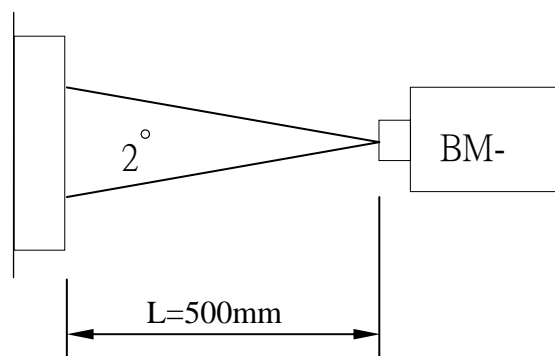
Remark: General tolerance  $\pm 0.3$  mm

## 7. OPTICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remarks	
Contrast	CR	Point-5	200	300	--	--	*1)*2)*3)	
Luminance	Center point	Lw	180	220	--	cd/m <sup>2</sup>	*2)*3)	
	Uniformity	ΔL	70	80	--	%	*2)*3)	
Response Time (White - Black)	Tr+ Tf		--	30	--	ms	*1)*3)*5)	
NTSC	-	Point-5	40	50		%	*1)*3)	
View angle	Horizontal	∅	CR ≥ 10	120	140	--	°	*1)*2)*4)
	Vertical	θ	Point-5	80	100	--	°	*1)*2)*4)
Color Coordination	White	Wx Wy	Point-5	0.273 0.289	0.313 0.329	0.353 0.369	--	*1)*3)
	Red	Rx Ry		TBD TBD	TBD TBD	TBD TBD		
	Green	Gx Gy		TBD TBD	TBD TBD	TBD TBD		
	Blue	Bx By		TBD TBD	TBD TBD	TBD TBD		

Remarks :

\*1) Measuring conditions : 25°C ± 2°C , 60 ± 10%RH , under 10 Lux in dark room ◦ BM-5A (TOPCON) , view cone = 2° , VCC = 3.3V , Vadj = 3.3V Duty 100% , after 10 minutes operation.

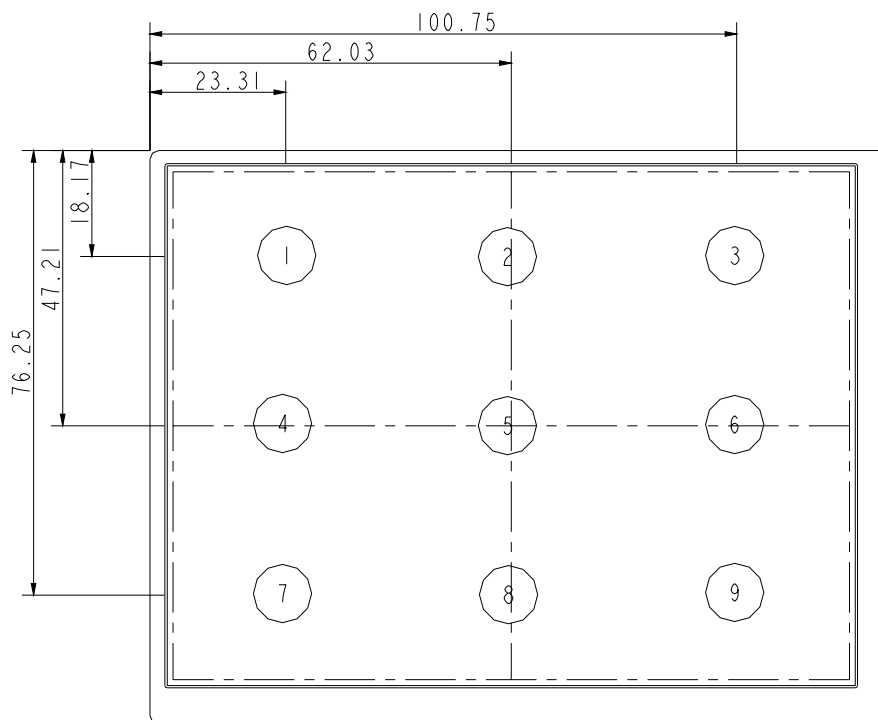


\*2) Contrast : CR= On (White Luminance) / Off (Black Luminance)

\*3) Luminance and Uniformity :

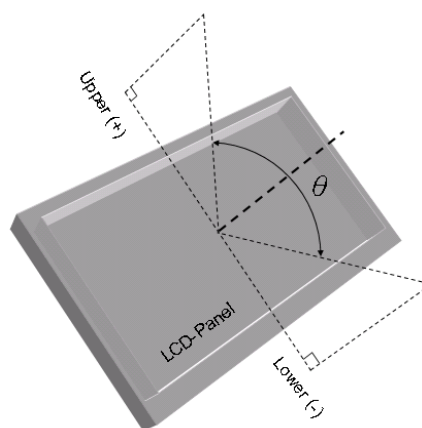
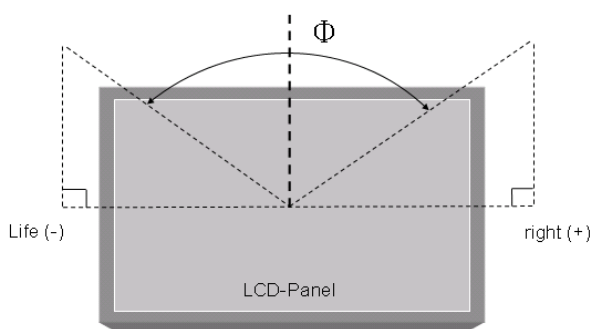
The center point of the Luminance : No 5 point.

Uniformity :  $\Delta L = [L(\text{MIN})/L(\text{MAX})] \times 100$



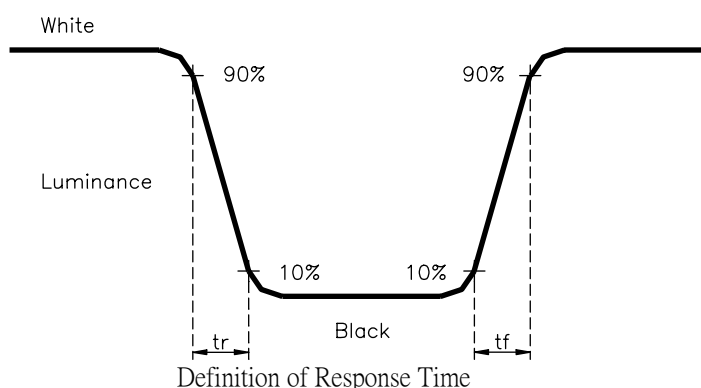
Measuring point

\*4) Viewing Angle ( $\theta$  ,  $\psi$ ) : (Measuring Device : EZ-CONTRAST)



Definition of View Angle

\*4) Response Time (White - Black)



## 8. RELIABILITY TEST

### 8.1 Temperature and Humidity

Item	Condition
High Temperature Operation	85° C , 240hrs
High Temperature Storage	95° C , 240hrs
High Temperature and High Humidity Operation	60° C , 90% RH, 240hrs(No condensation)
Low Temperature Operation	-30° C : 240hrs
Low Temperature Storage	-40° C : 240hrs
Thermal Shock	-30° C (0.5 hr)~85° C (0.5 hr), 200 CYCLE

### 8.2 Shock and Vibration

Item	Condition
Shock (Non-Operation)	100G 6msec 1/2 Sine wave, ±X , ±Y , ±Z , each axis 3times.
Vibration (Non-Operation)	Frequency range : 8~33.3Hz Stroke : 1.3mm Sweep : 2.9G , 33.3~400Hz Vibration : X , Z 2hrs each axis ◦ Y 4hrs each axis ◦ Sin wave ◦ Cycle time : 15min

### 8.3 ESD

Item	Condition	Remarks
E S D	150pF , 330Ω , ±8KV&±15KV air & contact test	*1)
	200pF , 0Ω , ±200V contact test	*2)

Remarks :

\*1) LCD glass and metal bezel ◦

\*2) IF connector pins ◦

### 8.4 Judgment Standard

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

Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.

Fail: No display image, obvious non-uniformity, or line defects.