US Micro Products

Electronic Products for the OEM

TFT-LCD PRODUCT SPECIFICATION

PART NUMBER:	**USMP-TT070WV-01E**
DESCRIPTION:	7.0" TFT LCD with 800 x 480 resolution, Digital 18-bits RGB Interface and 6 O'Clock Viewing Direction

ISSUE DATE	APPROVED BY (Customer Use Only)	CHECKED BY	PREPARED BY
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History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
11/20/2009	01	001	New Drawing	—	Yuan
02/05/2010	01	002	First Sample	—	Yuan

Total: 18 Page

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1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	800 * 3 (RGB) * 480 Dots
LCD Type	a-Si TFT , Normally white , Transmissive type
Screen size(inch)	7.0 inch
Viewing Direction	6 O'clock
Color configuration	RGB-Strip
Backlight Type	LED B/L
Interface	Digital 18-bits RGB
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web side : http://www.powertip.com.tw/news/LatestNews.asp

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	165(W) x 104.44(L) x 5.2 (H)	mm

LCD panel

Item	Standard Value	Unit
Active Area	152.4 (W) * 91.44 (L)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	VCC	GND=0	-0.3	6.0	V
Operating Temperature	T_{OP}	-	-20	70	°C
Storage Temperature	T_{ST}	-	-30	80	°C

1.4 DC Electrical Characteristics

Module GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VCC	-	3.0	3.3	3.6	V
Input H/L Level Voltage	VIH	-	0.7VCC	-	VCC	V
	VIL	-	0	-	0.3VCC	V
Supply Current	I_{CC}	VCC = 3.3 V Pattern= Full display	-	200	260	mA

Note1:Maximum current display

1.5 Optical Characteristics

TFT LCD Module VCC = 3.3 V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response time	Rise	Tr	Ta = 25°C θX, θY = 0°	-	6	10	ms	Note 2
	Fall	Tf		-	11	16		
Viewing angle	Top	θY+	CR ≥ 10	60	70	-	Deg.	Note 4
	Bottom	θY-		60	70	-		
	Left	θX-		50	60	-		
	Right	θX+		60	70	-		
Contrast ratio		CR	Ta = 25°C θX , θY = 0°	250	400	-		Note 3
Color of CIE Coordinate （With B/L）	White	X		0.249	0.299	0.349	-	Note1
		Y		0.278	0.328	0.378		
Average Brightness Pattern=white display (With LCD)*1		IV	-	300	350	-	cd/m^2	Note1
Uniformity (With LCD)*2		△B	-	70	-	-	%	Note1

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Note 1:

*1：△B=B(min) / B(max) * 100%

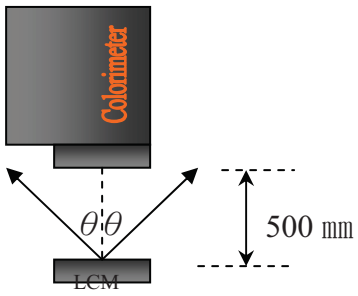
*2：Measurement Condition for Optical Characteristics:

a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

b：Measurement Distance: 500 ± 50 ㎜ ，(θ= 0°)

c：Equipment: TOPCON BM-7 fast，(field 1°)，after 10 minutes operation.

d：The uncertainty of the C.I.E coordinate measurement ±0.01，Average Brightness ± 4%



Colorimeter=BM-7 fast

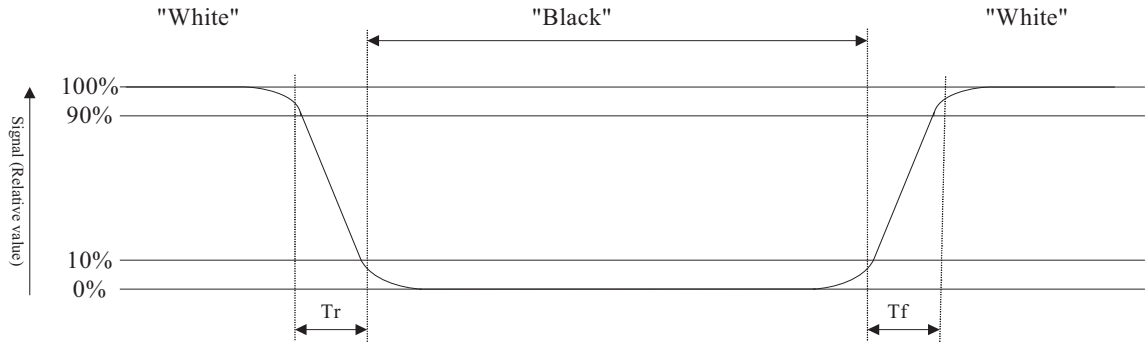
To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



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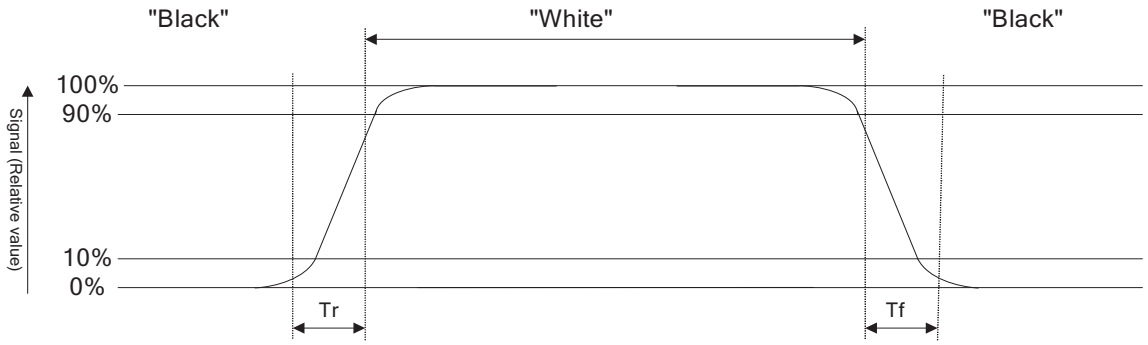
Normally Black



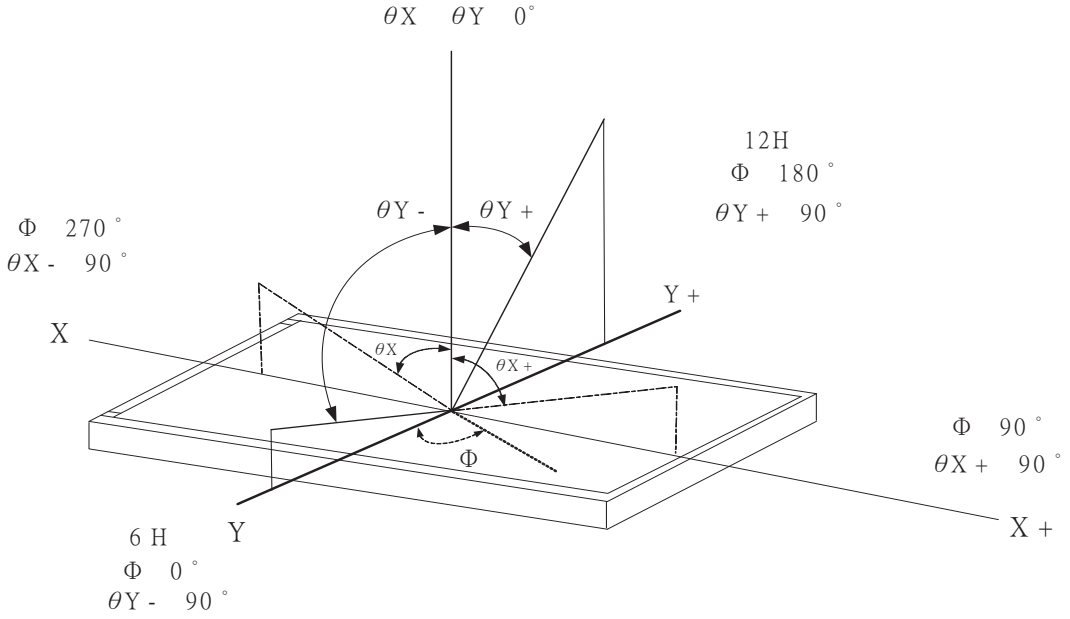
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at “White” state}}{\text{Photo detector output when LCD is at “Black” state}}$$

Note4: Definition of viewing angle:

Refer to figure as below:



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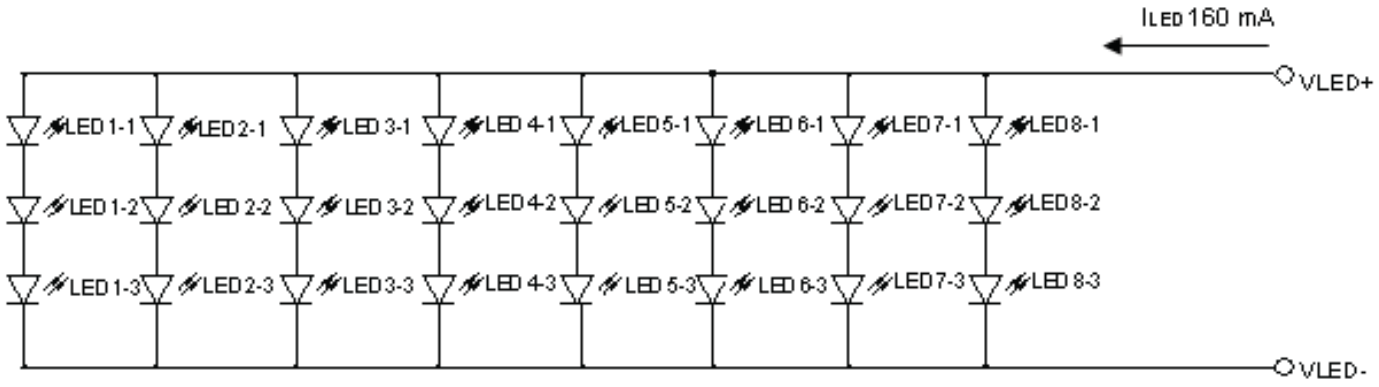
1.6 Backlight Characteristics

Backlight Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
LED current	ILED	-	-	160	-	mA
LED voltage	VLED		-	9.9	-	V
LED Life Time	-		10000	20000	-	-
Color	White					

Note: Brightness to be decreased to 50% of the initial value.



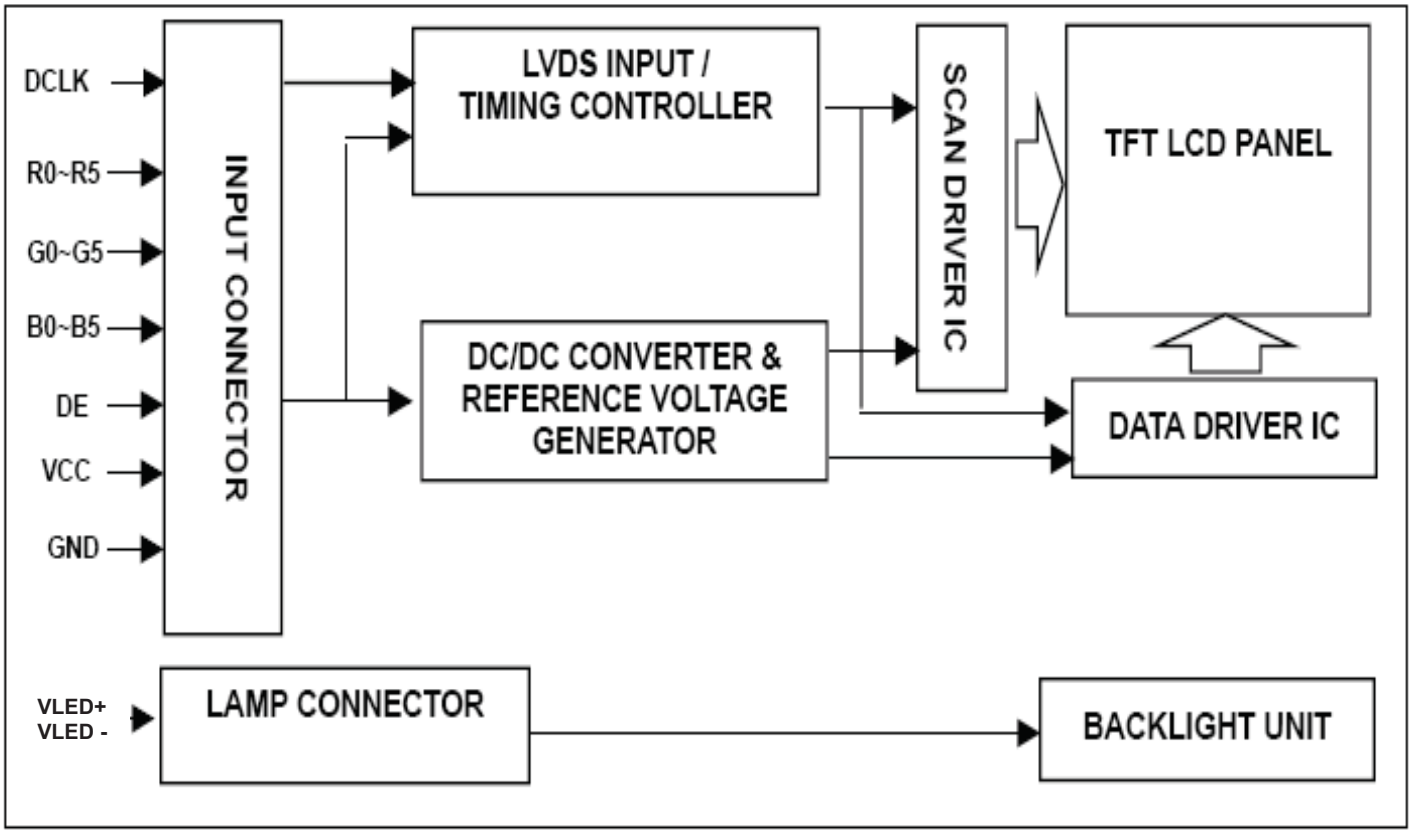
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

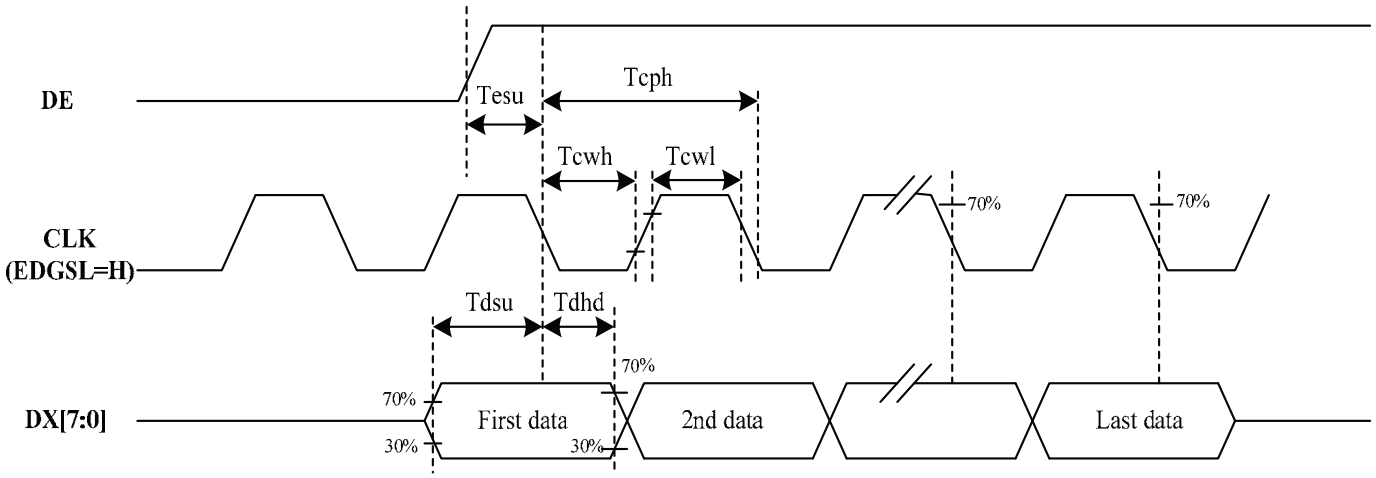
Pin NO.	SYMBOL	DESCRIPTION
1	GND	Power Ground
2	GND	Power Ground
3	NC	NC
4	Vcc	Power Supply for B/L circuit
5	Vcc	Power Supply for B/L circuit
6	Vcc	Power Supply for B/L circuit
7	Vcc	Power Supply for Digital Circuit LCD
8	NC	NC
9	DE	Data Enable
10	GND	Power Ground
11	GND	Power Ground
12	GND	The Brightness of B/L
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	GND	Power Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	GND	Power Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	GND	Power Ground
25	G2	Green Data 2
26	G1	Green Data 1
27	G0	Green Data 0 (LSB)
28	GND	Power Ground
29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	GND	Power Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0 (LSB)

36	GND	Power Ground
37	GND	Power Ground
38	DCLK	Clock Signals
39	GND	Power Ground
40	GND	Power Ground

Pin NO.	SYMBOL	DESCRIPTION
1	VLED+	LED Anode (Red)
2	VLED-	LED Cathode (White)

2.3 Timing Characteristics

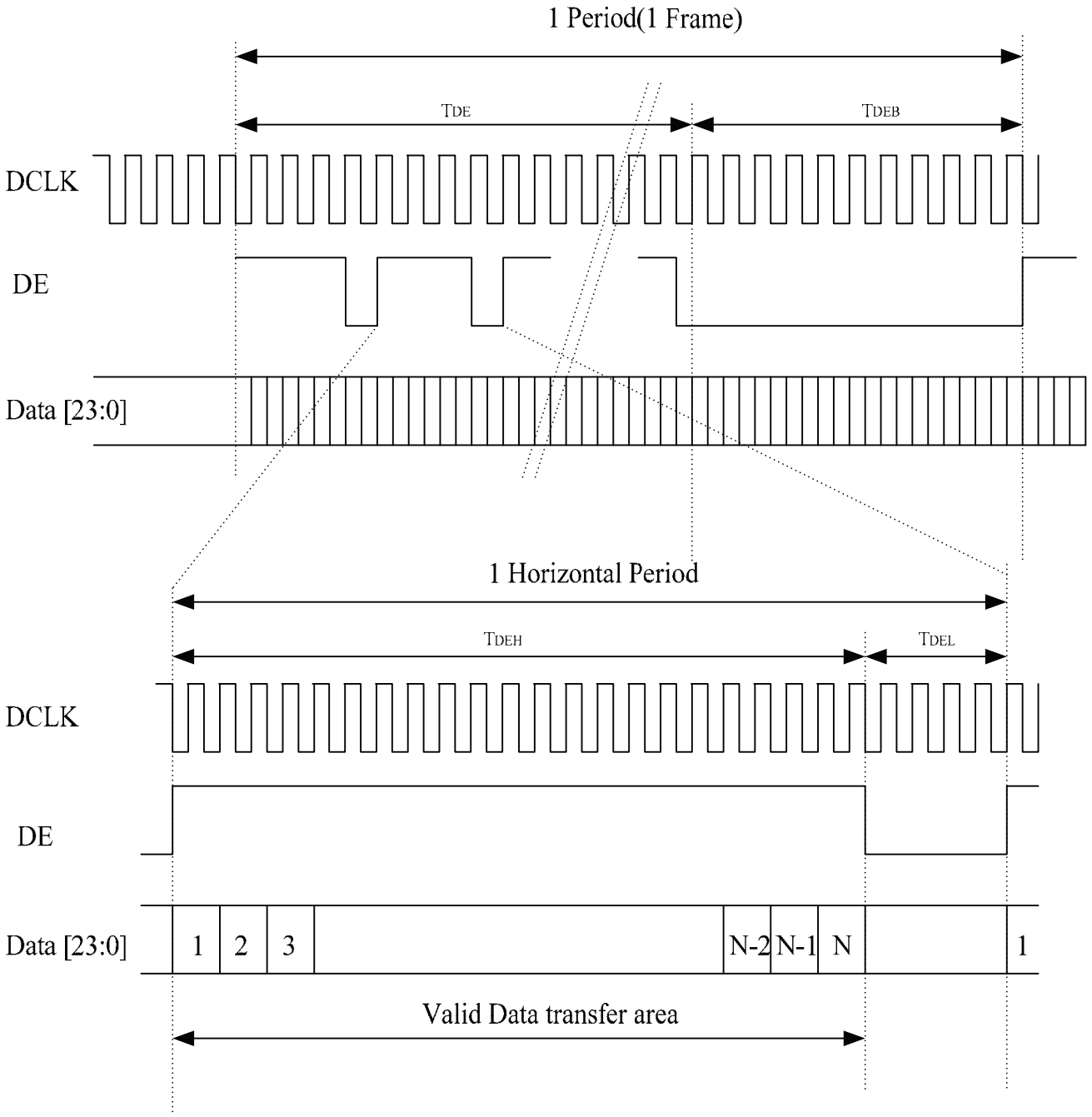
2.3.1 Clock and Data input waveforms



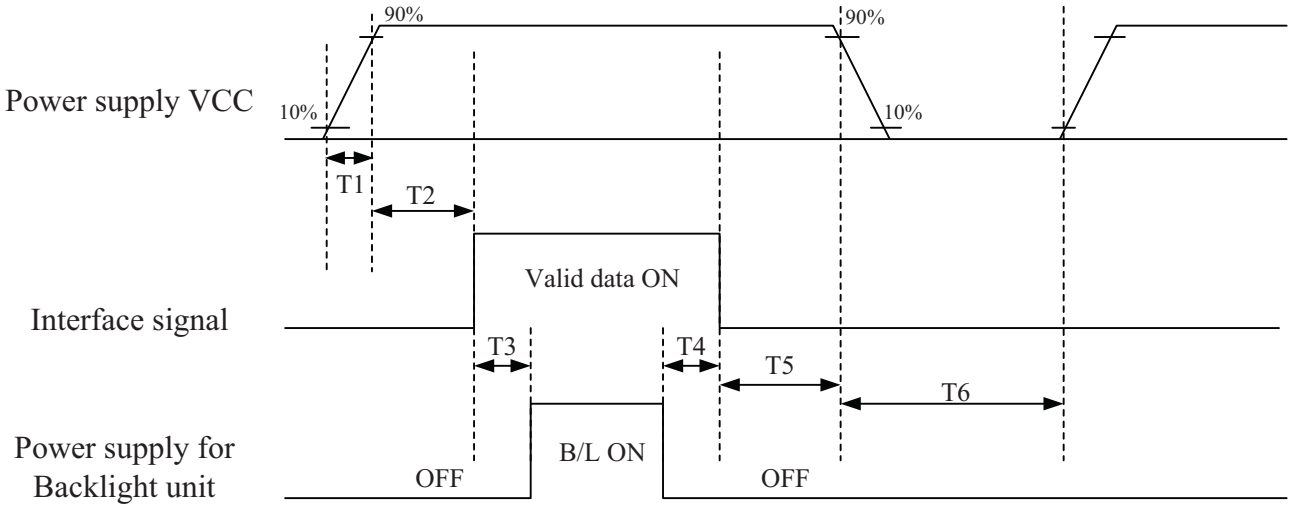
Parameter	Symbol	Rating			Unit
		Min.	Typ.	Max.	
Data setup time	Tdsu	6	-		ns
Data hold time	Tdhd	6	-	-	ns
CLK setup time	Tesu	6	-	-	ns
DE ferquency	FCPH	29.40	33.26	42.48	MHz
CLK period	TCPH	23.54	30.06	34.01	ns
CLK pulse duty	TCWH	40	50	60	%
CLK pulse duty	TCWL	40	50	60	%
DE Period	TDEH+TDEL	1000	1056	1200	TCPH
DE pules width	TDEH	-	800	-	TCPH
DE frame blanking	TDEB	10	45	110	TDEH+TDEL
DE frame width	TDE	-	480	-	TDEH+TDEL

Note：We suggest using the typical value, so it can have better performance.

2.3.2 Data input format



2.3.3 Power ON/OFF sequence



Parameter	Rating			Unit
	Min.	Typ.	Max.	
T1	1		2	ms
T2	0	60		ms
T3	200			ms
T4	200			ms
T5	1			ms
T6	1000			ms

3. QUALITY ASSURANCE SYSTEM

NO.	Test Items	Test Condition	REMARK
1	High Temperature Storage Test	Ta=80℃ Dry 240h	
2	Low Temperature Storage Test	Ta=-30℃ Dry 240h	
3	High Temperature Operation Test	Ta=70℃ Dry 240h	
4	Low Temperature Operation Test	Ta=-20℃ Dry 240h	
5	High Temperature and High Humidity Operation Test	Ta=60℃ 90%RH 240h	
6	Electro Static Discharge Test	150pF, 330Ω , ±8KV(Contact)/±15KV(Air), 5 points/panel, 5 times/point	
7	Shock Test (non-operating)	Half sine wave, 180G, 2ms one shock of each six faces (I.e. run 180G 2ms for all six faces)	
8	Vibration Test (non-operating)	Sine wave, 10 ~ 500 ~ 10Hz, 1.5G, 0.37oct/min 3 axis, 1hour/axis	
9	Thermal Shock Test	-20℃(0.5h) ~ 70℃(0.5h) / 100 cycles(Dry)	

***** Ta= Ambient Temperature

4. PRECAUTIONS

Please pay attention to the following when you use this TFT LCD module.

4.1 MOUNTING PRECAUTIONS

(1) You must mount a module using arranged in four corners or four sides.

(2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module.
And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.

(3) Please attach a transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to the resist external force.

(4) You should adopt radiation structure to satisfy the temperature specification.

(5) Acetic acid type and chlorine type materials for the cover case are not describe because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.

(6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are determined to the polarizer)

(7) When the surface becomes dusty, please wipe gently with adsorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.

(8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(9) Do not open the case because inside circuits do not have sufficient strength.

4.2 OPERATING PRECAUTIONS

(1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage：V=±200mV(Over and under shoot voltage)

(2) Response time depends on the temperature. (In lower temperature, it becomes longer.)

(3) Brightness depends on the temperature. (In lower temperature, it becomes lower)
And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.

(4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(5) When fixed patterns are displayed for a long time, remnant image is likely to occur.

(6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

4.3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wristband etc. And don't touch interface pin directly.

4.4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

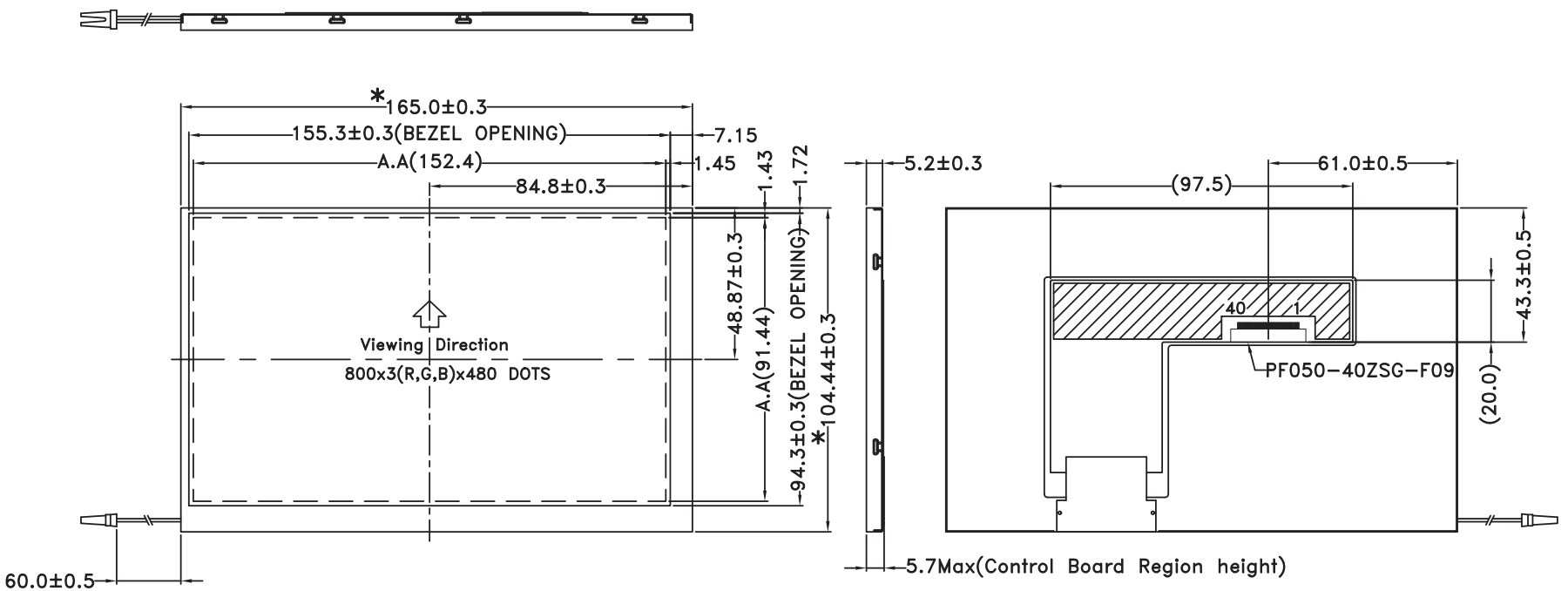
Strong light exposure causes degradation of polarizer and color filter.

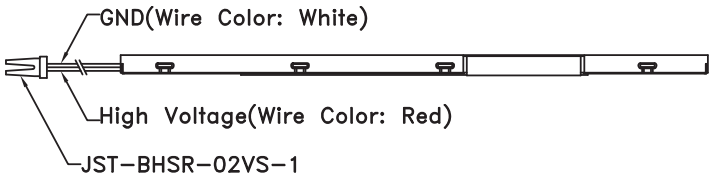
4.5 STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

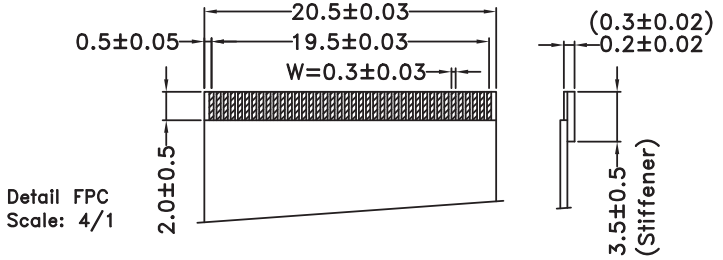
(1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5 and 35 ℃ ℃ at normal humidity.

(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.





Recommended FPC Outline Dimension
(Suitable connector PF050-40ZSG-F09
made by UJU Electronics or equivalent)



Detail FPC
Scale: 4/1

NOTE:
1.THE TOLERANCE UNLESS CLASSIFIED ±0.3mm
2.* Important Dimension
3. ▨ Component area

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003			
002			
001	NEW DRAWING	Mag	2009/11/20

PART NO: USMP-TT070WV-01E

DRAWING NAME : USMP-TT070WV-01E

TITLE: LCD MODULE DRAWING

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Design	Mag	(3)	Surface		
Check	Stone	Unit	MM	Material	
Approve	Linda	Scale	FIT	Thickness	
		Page	1/1	Quantity	

Precision Level (Length(Min) (mm) / Tolerance / Precision)	Precision Level
1 ~ 4	-
4 ~ 16	-
16 ~ 63	-
63 ~ 250	-
250 ~ 1000	-

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