SPECIFICATION FOR CTP+LCD MODULE

Part No.: TF185TM004-V1

Customer No.:

Date: 2026-4-21

Supplier			Customer
Prepared	Checked	Approved	Approved

Record of Revision

Rev.	Description	Page	Date
0	Preliminary specification released	/	20260421

Table of Contents

1 General Specifications

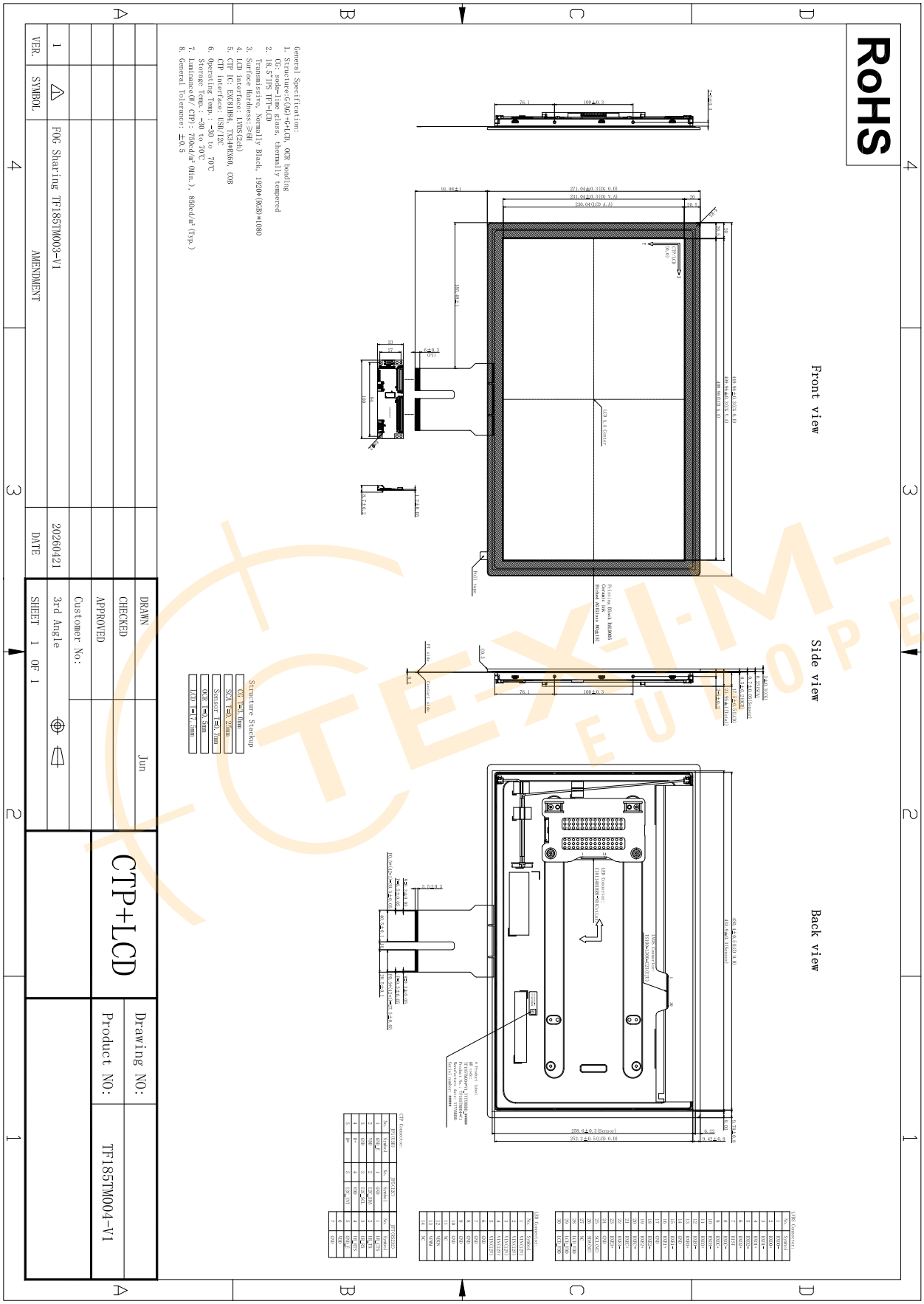
1.1 Definition

The specification is used for capacitive touch module with TFT LCD & Backlight Unit.

1.2 Features and General Description

General	Specification	Unit	Note
Module Size	18.5	inch	diagonal
Structure	G+G+LCD, OCR Bonding		
Resolution	1920(RGB) × 1080		
Display Mode	Normally Black. Transmissive		
Pixel Pitch	0.213(W) × 0.213(H)	mm	
Pixel Arrangement	RGB Vertical stripe		
Viewing Direction	ALL	O'clock	
Outline Dimensions	449.96(W) × 271.04(H) × 21.95(D)	mm	
Viewing Area	409.96(W) × 231.04(H)		
Active Area	408.96(W) × 230.04(H)	mm	
LCD Interface	LVDS(2ch)		
CTP Interface	USB / I2C / RS232		
CTP IC	EXC81H84		
Touch Point	10		
Surface Hardness	6	H	
Surface Treatment	Etched AG(Gloss: 80±15)		

2 Mechanical Drawing



3 Pin assignment

3.1 LCD Pin assignment

LVDS connector: IS100-L30O-C23(UJU)

Pin	Symbol	Description	Note
1	RXO0-	Negative Transmission data of Pixel 0 (ODD)	
2	RXO0+	Positive Transmission data of Pixel 0 (ODD)	
3	RXO1-	Negative Transmission data of Pixel 1 (ODD)	
4	RXO1+	Positive Transmission data of Pixel 1 (ODD)	
5	RXO2-	Negative Transmission data of Pixel 2 (ODD)	
6	RXO2+	Positive Transmission data of Pixel 2 (ODD)	
7	BIST	Bist function Bist on : H:2.7~3.6V Bist off : L :0~0.8V	
8	RXOC-	Negative Transmission Clock (ODD)	
9	RXOC+	Positive Transmission Clock (ODD)	
10	RXO3-	Negative Transmission data of Pixel 3 (ODD)	
11	RXO3+	Positive Transmission data of Pixel 3 (ODD)	
12	RXE0-	Negative Transmission data of Pixel 0 (EVEN)	
13	RXE0+	Positive Transmission data of Pixel 0 (EVEN)	
14	GND	Ground	
15	RXE1-	Negative Transmission data of Pixel 1 (EVEN)	
16	RXE1+	Positive Transmission data of Pixel 1 (EVEN)	
17	GND	Ground	
18	RXE2-	Negative Transmission data of Pixel 2 (EVEN)	
19	RXE2+	Positive Transmission data of Pixel 2 (EVEN)	
20	RXEC-	Negative Transmission Clock (EVEN)	
21	RXEC+	Positive Transmission Clock (EVEN)	
22	RXE3-	Negative Transmission data of Pixel 3 (EVEN)	
23	RXE3+	Positive Transmission data of Pixel 3 (EVEN)	
24	GND	Ground	
25	NC	No connection	
26	NC	No connection	
27	NC	No connection	
28	LCD_VDD	LCD Power Supply: +5V	
29	LCD_VDD	LCD Power Supply: +5V	
30	LCD_VDD	LCD Power Supply: +5V	

LED connector: CIO114M1HR0-NH (CviLux)

Pin	Symbol	Description
1	VIN(12V)	Supply Voltage 12V
2	VIN(12V)	Supply Voltage 12V
3	VIN(12V)	Supply Voltage 12V
4	VIN(12V)	Supply Voltage 12V
5	VIN(12V)	Supply Voltage 12V
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	GND	Ground
10	GND	Ground
11	NC	No connection
12	VBLON	LED-EN VIH>2V, VIL<0.8V
13	VPWM	PWM, 200Hz~1kHz, VIH>2V,VIL<0.8V, 5%~100%
14	NC	No connection

3.2 CTP Pin assignment

USB connector: JP1

Pin	Symbol	Description
1	GND_E	Ground
2	VDD	CTP Power Supply : 5V
3	GND	Ground
4	D+	CTP USB data port plus
5	D-	CTP USB data port minus

I2C connector: JP5

Pin	Symbol	Description
1	GND	Ground
2	I2C_SDA	CTP I2C SDA signal
3	I2C_SCL	CTP I2C SCL signal
4	VDD	CTP Power Supply : 5V
5	I2C_INT	CTP I2C INT signal

RS232 connector: JP5

Pin	Symbol	Description
1	UR_CTS	CTP RS232 CTS signal
2	UR_TX	CTP RS232 TX signal
3	UR_RX	CTP RS232 RX signal
4	UR_RTS	CTP RS232 RTS signal
5	GND_E	Ground
6	VDD	CTP Power Supply : 5V
7	GND	Ground

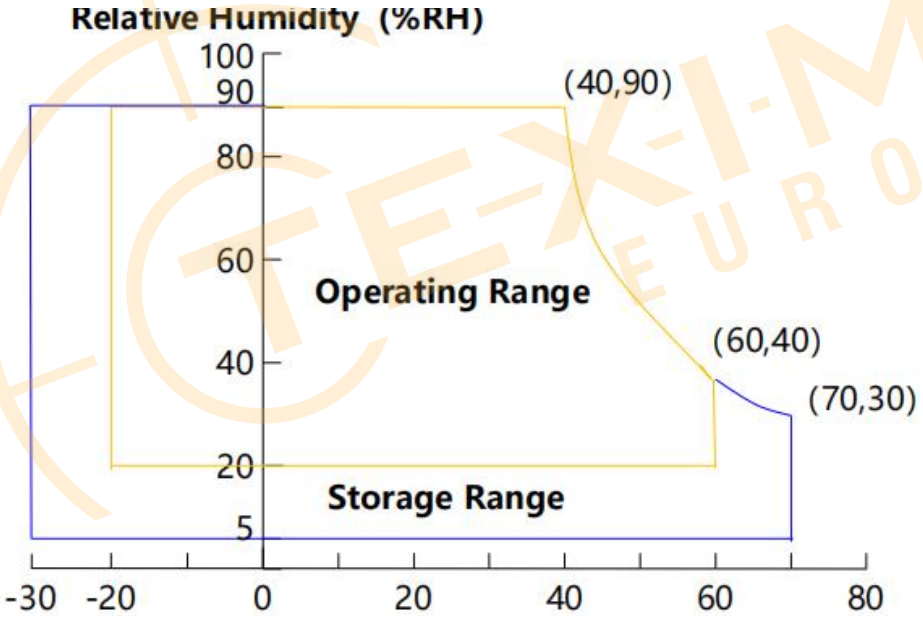
4 Absolute Maximum Rating

4.1 Absolute Ratings of Environment

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	VSS-0.3	6.5	V	Ta = 25 ℃
	VBLU	VSS-0.3	14	V	Ta = 25 ℃
Operating Temperature	T_{OP}	-20	+60	℃	Note 1
	T_{SUR}	-	+72	℃	
Storage Temperature	T_{ST}	-30	+70	℃	
Operating Ambient Humidity	Hop	5	80	%RH	
Storage Humidity	Hst	5	90	%RH	

Note 1 : Temperature and relative humidity range are shown in the figure below.Wet bulb temperature should be 39 ℃ max. and no condensation of water.



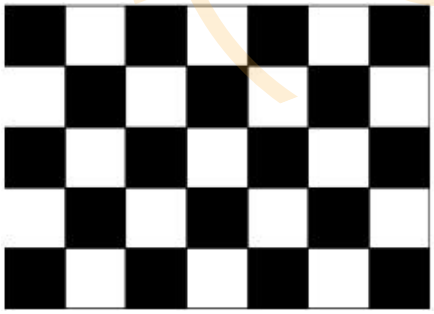
5 Electrical Characteristic

5.1 LCD Power Specifications

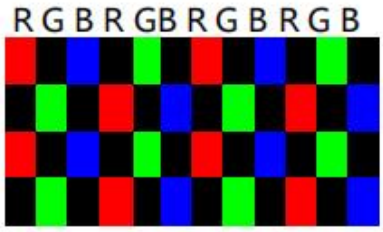
Parameter		Symbol	Values			Unit	Remark
			Min	Typ	Max		
Power Supply Input Voltage		VDD	4.5	5	5.5	V	
Power Supply Ripple Voltage		VRP	-	-	300	mV	
Power Supply Current		IDD	-	480	930	mA	Note 1
Power Consumption		PDD	-	2.4	4.65	Watt	
Rush current		IRUSH	-		3.0	A	Note 2
LVDS Interface	Differential Input High Threshold Voltage	VLVTH		-	+100	mV	
	Differential Input Low Threshold Voltage	VLVTL	-100	-	-	mV	
	Input Differential Voltage	| VID |	100	-	600	mV	
	Common Input Voltage	VLVC	1.0	1.2	1.4	V	
CMOS Interface	Input High Threshold Voltage	VIH	2.7	-	3.3		
	Input Low Threshold Voltage	VIL	0	-	0.6	V	

Note 1 : The supply voltage is measured and specified at the interface connector of LCM.
The current draw and power consumption specified is for VDD=5.0V,
Frame rate fV=60Hz and Clock frequency = 74.25MHz.
Test Pattern of power supply current

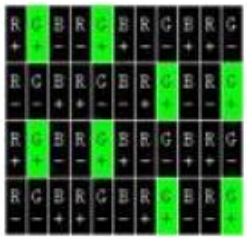
a) Typ : Mosaic 7X5 (L0/L255)



b) Max : Skip Subpixel (L255)



c) Flicker Pattern



5.2 Backlight input signal characteristics

Parameter			Min.	Typ.	Max.	Unit	Remarks
LED Forward Voltage		V_F	-	2.9	3.0	V	-
LED Forward Current		I_F	-	58	-	mA	-
LED Input Voltage		V_{IN}	10.8	12	13.2	V	
LED Input Current		I_{IN}	-	1.98	2.04	A	
LED Power Consumption		P_{LED}	-	23.74	24.56	W	Note 1
LED Life-Time		N/A	50000	-	-	Hour	IF = 58mA
PWM Control Level	PWM High Level	-	2.7	3.3	5	V	
	PWM Low Level	-	0	-	0.7	V	
LEDEN Control Level	LEDEN High Level	-	2.7	3.3	5	V	
	LEDEN Low Level	-	0	-	0.7	V	
PWM Control Frequency		F_{PWM}	200	-	1000	Hz	
Duty Ratio		-	5	-	100	%	

5.3 Interface Timing

5.3.1 Timing Parameters (DE only mode)

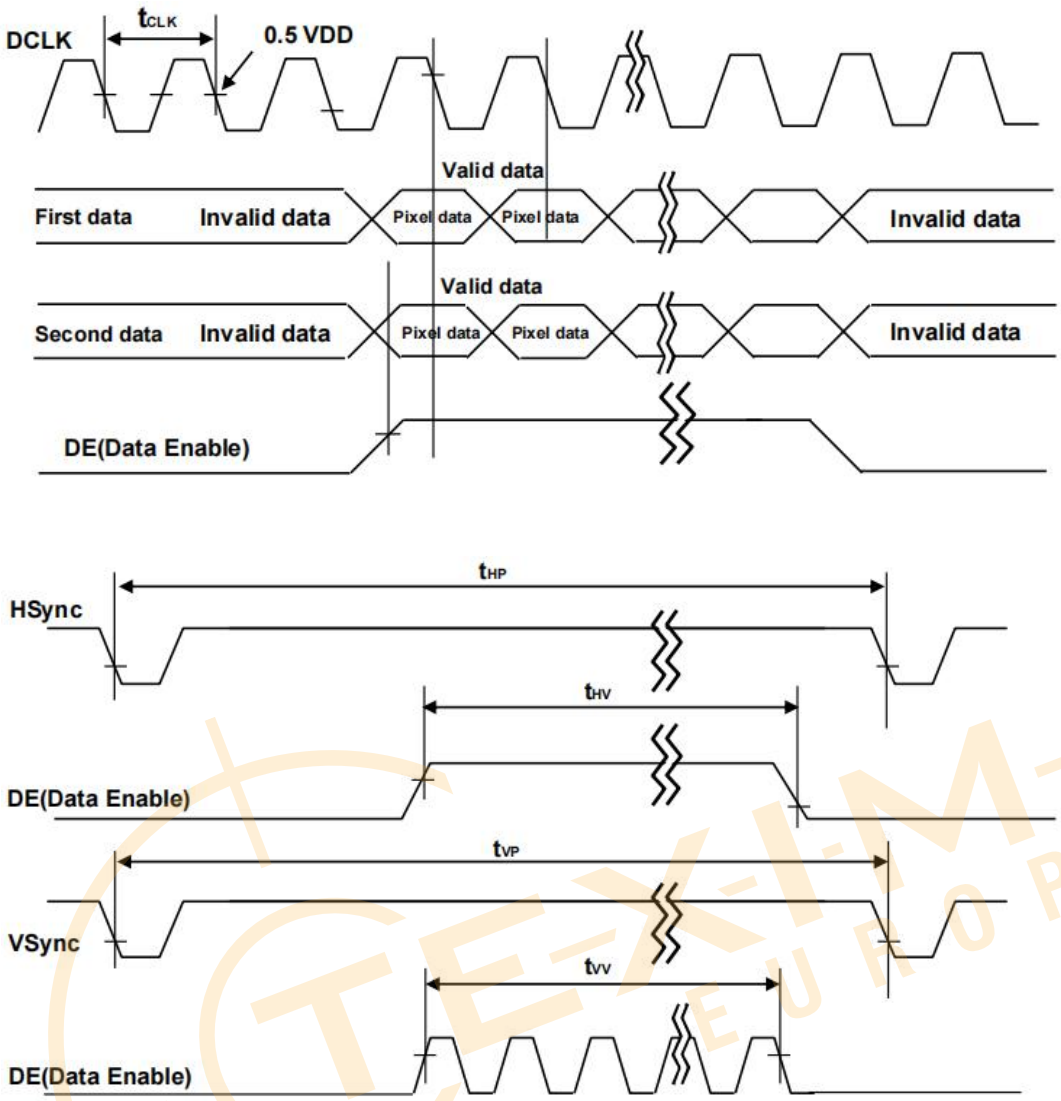
Item	Symbols		Min	Typ	Max	Unit	Note
DCLK	Period	tCLK	12.82	13.47	16.67	ns	
	Frequency	-	60	74.25	78	MHz	
Horizontal	Horizontal Period	tHP	1060	1100	1200	tCLK	
	Horizontal Valid	tHV		960		tCLK	
	Horizontal Blank	tHB	100	140	240		
	Frequency	fH	63.6	66	72	KHz	
Vertical	Vertical Period	tVP	1110	1125	1149	tHP	
	Vertical Valid	tVV		1080		tHP	
	Vertical Blank	tVB	20	45	69	tHP	
	Frequency	fV	48	60	63	Hz	
LVDS Rx Clock	CLK Jitter	TJitter	0	-	100	ps	

Note

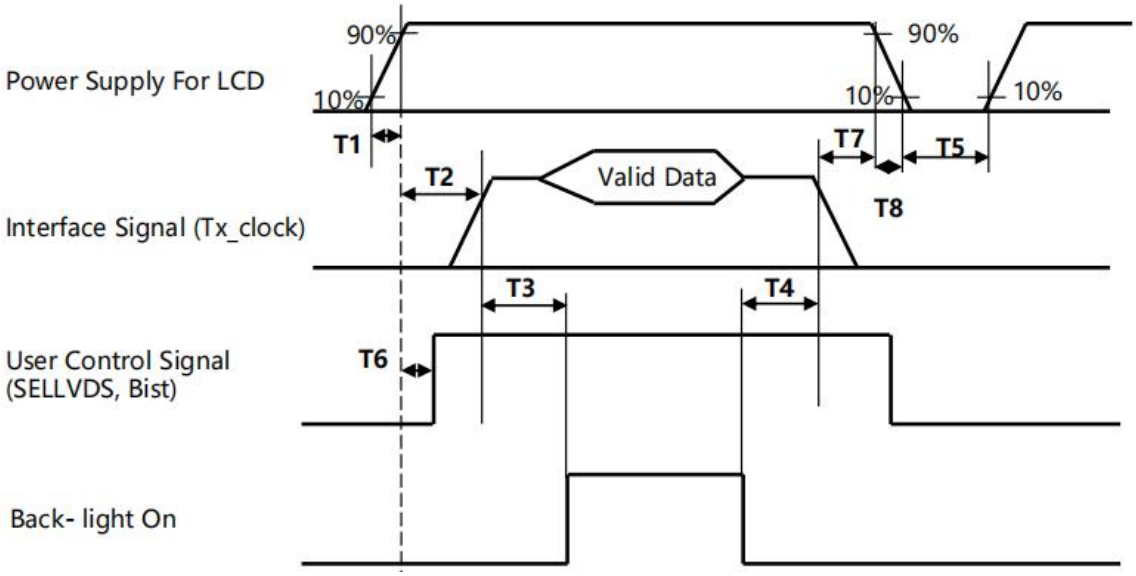
1. DE Only Mode， While operation, DE signal should be have the same cycle. The input of HSYNC & VSYNC signal does not have an effect on normal operation.
2. Best operation clock frequency is 74.25 Mhz.
3. Frequency] = [H Total] * [V Total] * [vertical Frame rate]
   H Total, V Total and Frame rate should operate within the range between Frequency_Min and Max
4. Except Best operation clock frequency, FOS(Flicker & Brightness & Crosstalk, Etc.) are not guaranteed.
5. Main frequency Max is 78MHz without spread spectrum

Symbol	Parameter	Condition	Min	Typ	Max	Unit
F_{LVMOD}	Modulating frequency of input clock during SSC		60	-	85	KHz
F_{LVDEV}	Maximum deviation of input clock frequency during SSC		-3	-	+3	%

5.3.2 Signal Timing Waveform



5.3.3 Power ON/OFF Sequence



Parameter	Values			Units
	Min	Typ	Max	
T1	0.5	-	10	ms
T2	0.1	-	T7	ms
T3	400	-	-	ms
T4	200	-	-	ms
T5	1	-	-	s
T6	0.1	-	T2	ms
T7	0.1	-	-	ms
T8	0.5	-	10	ms

Note 1: Even though T1 is over the specified value, there is no problem if the rush current is within Spec.

Note 2: When the power supply VDD is 0V, keep the level of input signals on the low or high impedance;

※ Please avoid floating state of interface signal at invalid period.

※ When the power supply for LCD (VDD) is off, be sure to pull down the valid and invalid data to 0V.

Note 3: The T3 / T4 is recommended value, the case when failed to meet a minimum specification, abnormal display would be shown. There is no reliability problem.

Note 4：T5 should be measured after the Module has been fully discharged between power off and on period

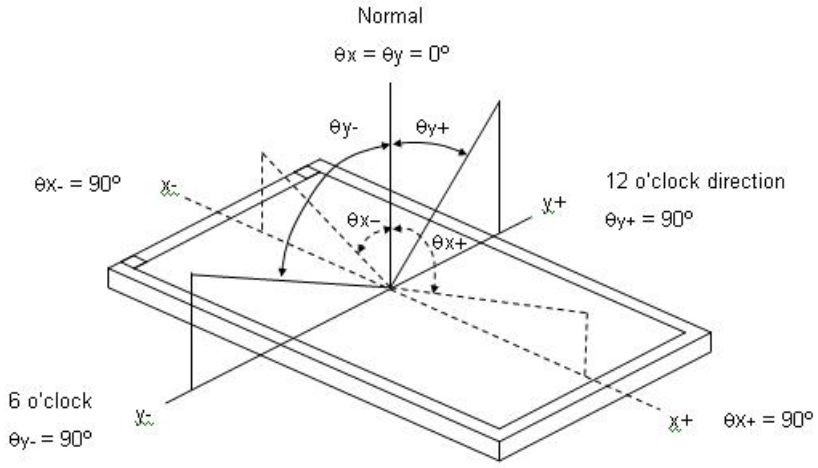
Note 5：If the on time of signals (Interface signal and user control signals) precedes the on time of Power (VLCD),it will be happened abnormal display. When T6 is NC status, T6 doesn’ t need to be measured

Note 6: T8: Voltage of VDD must decay smoothly after power-off , there should be none re-bounding voltage. (customer system decide this value)

6 Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	Horizontal	θ_X+	CR≧10	80	89	-	Deg.	(1), (5)
		θ_X-		80	89	-	Deg.	
	Vertical	θ_Y+		80	89	-	Deg.	
		θ_Y-		80	89	-	Deg.	
Luminance (W/ CTP)		Lv	θ_X=0°, θ_Y=0°	750	850	-	nit	(4), (5)
Uniformity	9 points	ΔY9		75	-	-	%	(5), (6)
Contrast ratio		CR		700	1000	-		(2), (5)
Color Chromaticity (CIE 1931)	White	W_x	θ_X=0°, θ_Y=0° R=G=B=255 Gray scale	Typ-0.05	0.313	Typ+0.05	-	(1), (5)
		W_y			0.329		-	
	Red	R_x			-		-	
		R_y			-		-	
	Green	G_x			-		-	
		G_y			-		-	
	Blue	B_x			-		-	
		B_y			-		-	
Response Time	T_R+T_F			-	14	20	ms	(3)

Note (1) Definition of Viewing Angle (θ_X, θ_Y):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L255 / L0

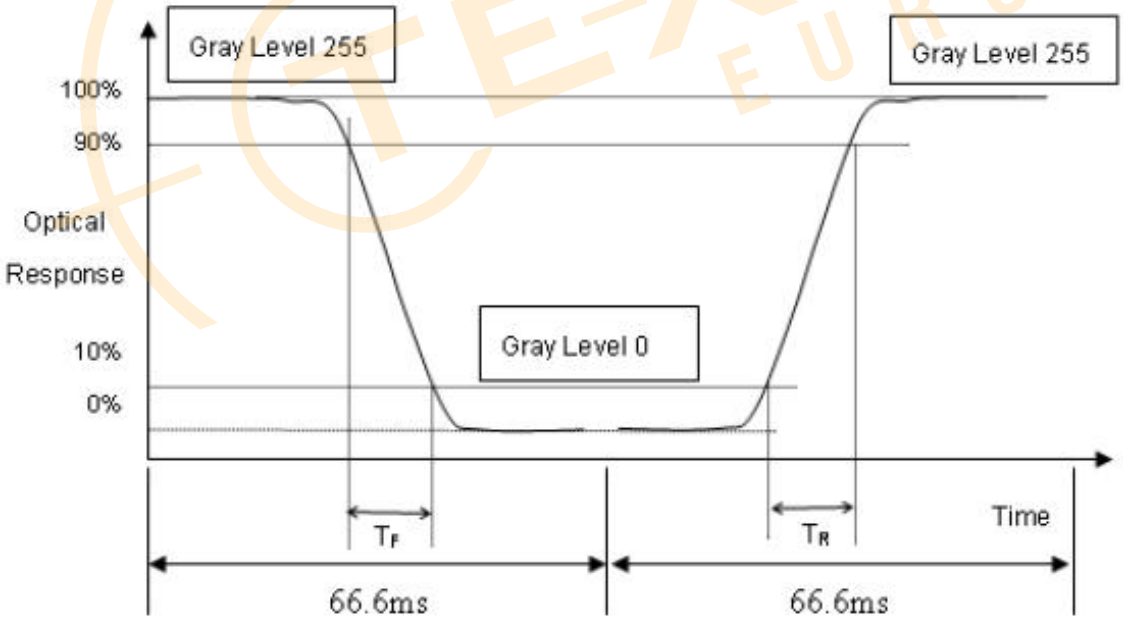
L255: Luminance of gray level 255

L 0: Luminance of gray level 0

CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time (T_R, T_F):



Note (4) Definition of Luminance of White (LC):

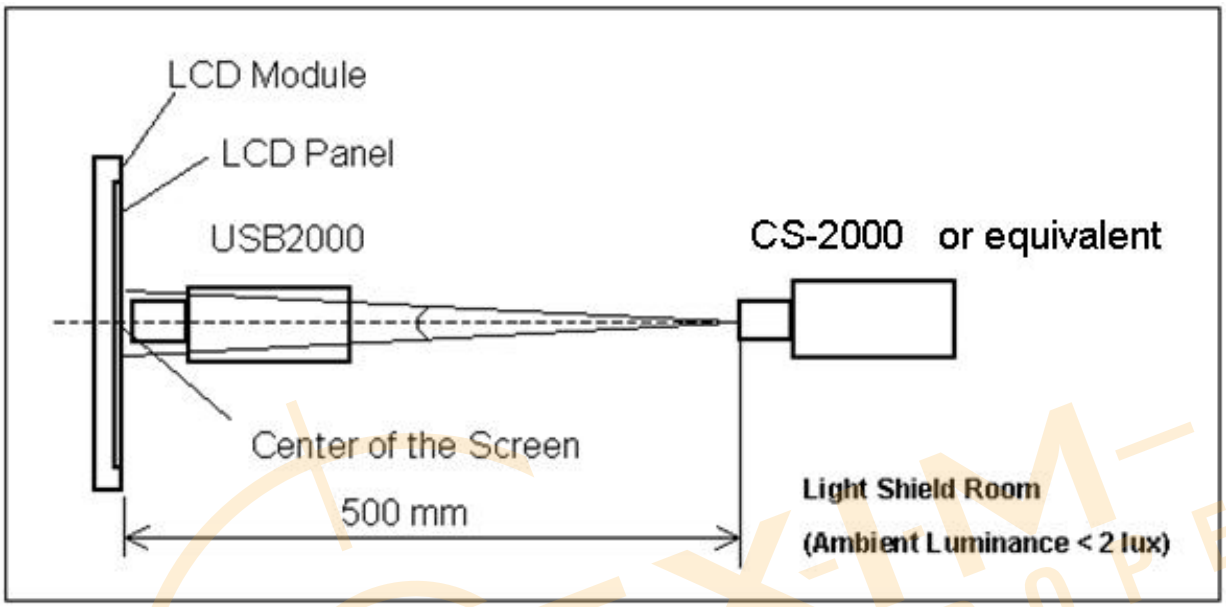
Measure the luminance of gray level 255 at center point

LC = L (5)

L (x) is corresponding to the luminance of the point X at Figure in Note (6).

Note (5) Measurement Setup:

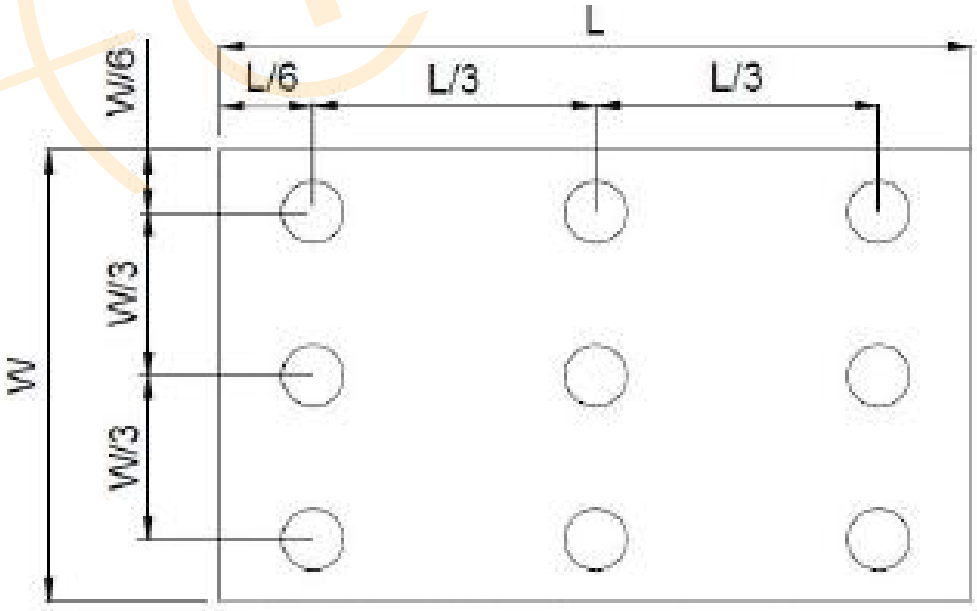
The LCD module should be stabilized at given temperature for 30 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 30 minutes in a windless room.



Note (6) Definition of White Variation (δ W):

Measure the luminance of gray level 255 at 9 points

δ W = (Minimum [L (1) ~ L (9)] / Maximum [L (1) ~ L (9)]) *100%



7 Reliability Test

Test Item	Condition
High Temperature Storage Test	70℃, 240 hrs
Low Temperature Storage Test	-30℃, 240 hrs
High Temperature Operation Test	60℃, 240 hrs
Low Temperature Operation Test	-20℃, 240 hrs
High temperature & high humidity operation Test	50℃, 80%RH, 240 hrs
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles
Electro-static discharge test (non-operating)	Air : 150 pF, 330Ω, 15 KV Contact : 150 pF, 330Ω, 8 KV

Note :

(1) There should be no condensation on the surface of panel during test.

(2) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.

(3) In the standard conditions, there is no function failure issue occurred. All the cosmetic specification is judged before reliability test.

(4) Before cosmetic and function test, the product must have enough recovery time, at least 24 hours at room temperature.

8 Appearance Inspection

8.1 Inspection Sampling Method:

Unless there is other agreement, the sampling plan for incoming inspection shall follow GB2828.1-2012.

(1) Lot size: Quantity per shipment as one lot (different model as different lot).
(2) Sampling type: Normal inspection, single sampling.
(3) Sampling level: Level II.

8.2 Inspection Conditions

The environmental condition and visual inspection shall be conducted as below:
(1) Light: 800~1400Lux;
(2) Vision requirement: Naked or corrected vision of at least 1.0 and no color blindness;
(3) Inspection background: black and white board is used as the background below the product;
(4) Inspection distance: 30~40cm from human eyes to the measured surface;
(5) Inspection Angle: the detected surface is 90 degree from to line of sight, and the measured Object should be rotated 45 degree from side to side;
(6) Inspection time: 5~10s;

8.3 Inspection equipment

Secondary elements, calipers, feelers, filinka, petroleum ether, ND filter

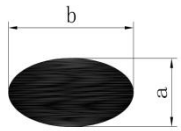
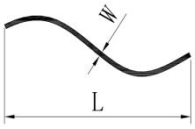
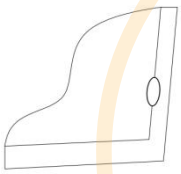
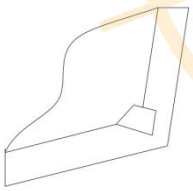
8.4 Defect code comparison table

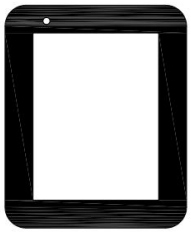
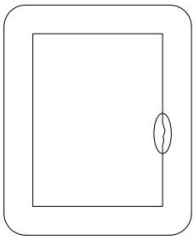
Code	Name (Unit)	Code	Name (Unit)
N	Number	D	Diameter (mm)
L	Length (mm)	H	Depth (mm)
W	Width (mm)	S	Distance (mm)
S	Area (mm^2)		

8.5 Inspection precautions

(1) Inspectors must wear finger gloves and electrostatic bracelets.
(2) Place the inspected product in front of the inspector, and hold the edge of the product with both hands carefully. Do not bend the product.

8.6 Inspection items and standards

Items	Standard	Conclusion	Inspection tools
Dot (white, black, heterochromatic)  D=(a+b)/2	D≤0.3	Ignore, dense density is not allowed	Visual inspection
	0.3＜D≤0.8	The distance with another dot is more than 10 mm, Transparent areas : N≤5, Ink areas : N≤6	
	D＞0.8	Not allow	
Linear defects (fibers/foreign bodies/ scratches, etc.)  	W≤0.08	Ignore, dense density is not allowed	Visual inspection
	0.08＜W≤0.2	L≤15, the distance with another scratch or impurity is more than 5mm Transparent areas : N≤5, Ink areas : N≤5	
	W＞0.2, L＞15	Not allow	
Bubble	According to the point standard		Visual inspection
Edge broken loss 	1. The sensor edge creaks, without damaging the line. The function test is OK for reception, and the front side is not visible after fitting. 2. Edge creak on front of cover plate: NG. 3. Back X＜0.5mm; Y＜0.5mm; Z＜1/3GT(GT= glass thickness), without affecting the functionality of the product, each side is allowed three		Visual inspection
Corner broken loss 			

Items	Standard	Conclusion	Inspection tools
Creak	Creaks found at any location are not allowed		Visual inspection
Size	Meet the requirements of finished product inspection drawings		
Ink pinhole 	D≤0.2	Ignore, dense density is not allowed	
	0.2＜D≤0.3	N≤6 DS≥10mm, Repair with a paint pen of the same color as the cover plate	
Ink sawtooth 	W≤0.2mm	Ignore, dense density is not allowed	
Newton’s rings	No more than 1/6 of the display area, light up invisible. If there are special requirements, the limited sample shall prevail.		
FPC 	1. Oxidation, breakage, residual glue, coating peeling, cracking and other phenomena of FPC gold fingers are not allowed. 2. Less components, false welding, deformation are not allowed.		
Color	Consistent with the sample, no serious color difference		
Mura/Waving/ Hot spot	Not visible through 5% ND filter		

9 Notices

9.1 Cautions for storage

Store the module in a dark room where must keep at 25±10℃ and 65%RH or less. Don't expose the products to the direct sunlight or stresses.

9.2 Cautions for operation

(1) Do not put a heavy, hard or sharp object on the product.
(2) Do not bend the product in order to assure the reliability.
(3) Do not put one product on the other. Otherwise, the product to may be scratched or be changed.
(4) Do not oile the touch panel, Do not put heavy goods on the touch panel.
(5) Do not use any organic solvent acid or alkali solution to clean the surface of the product. Please use dry clothes or soft clothes with ethanol to clean the surface.

9.3 Cautions for operation

Light transmission is an important factor for the product. So, please wear clean finger sacks, gloves and mask to protect the products from fingerprint or stain attach, and also must ensure the area where your finger touches is outside the view area when handing the panel.

9.4 Others

(1) Please note that dew gathering in the panel due to abrupt temperature or humidity change, etc. Which may cause deterioration of performance.
(2) When this product was built into the package, if there is vulcanization material such as vulcanized rubber which has a possibility of generating the salutation gas near the package since abnormalities will be caused to wring of the product and it will become the cause if functional degradation, please give a constitutional cations.
(3) Cation for product safety set

Although full care is taken to ensure product quality, failure modes such as degradation, short circuits, or open circuits might be caused, Therefore, to design a product set, please study the effects of any single failure of the panel in advance and consider the safety of product configuration.

Quality function livers for on year, outward appearance haves non-color variation in six months.

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