Part number: FLT-0700H3ETTXCHM5TC

Description: 7”wide TFT 800x480 500CD LVDS

Revision Number: 0_1

Prepared By: David

Prepared Date: 2016-Jun-08

Approved By: Ricky

Approved Date: 2016-Jun-09

0. Record of Revision

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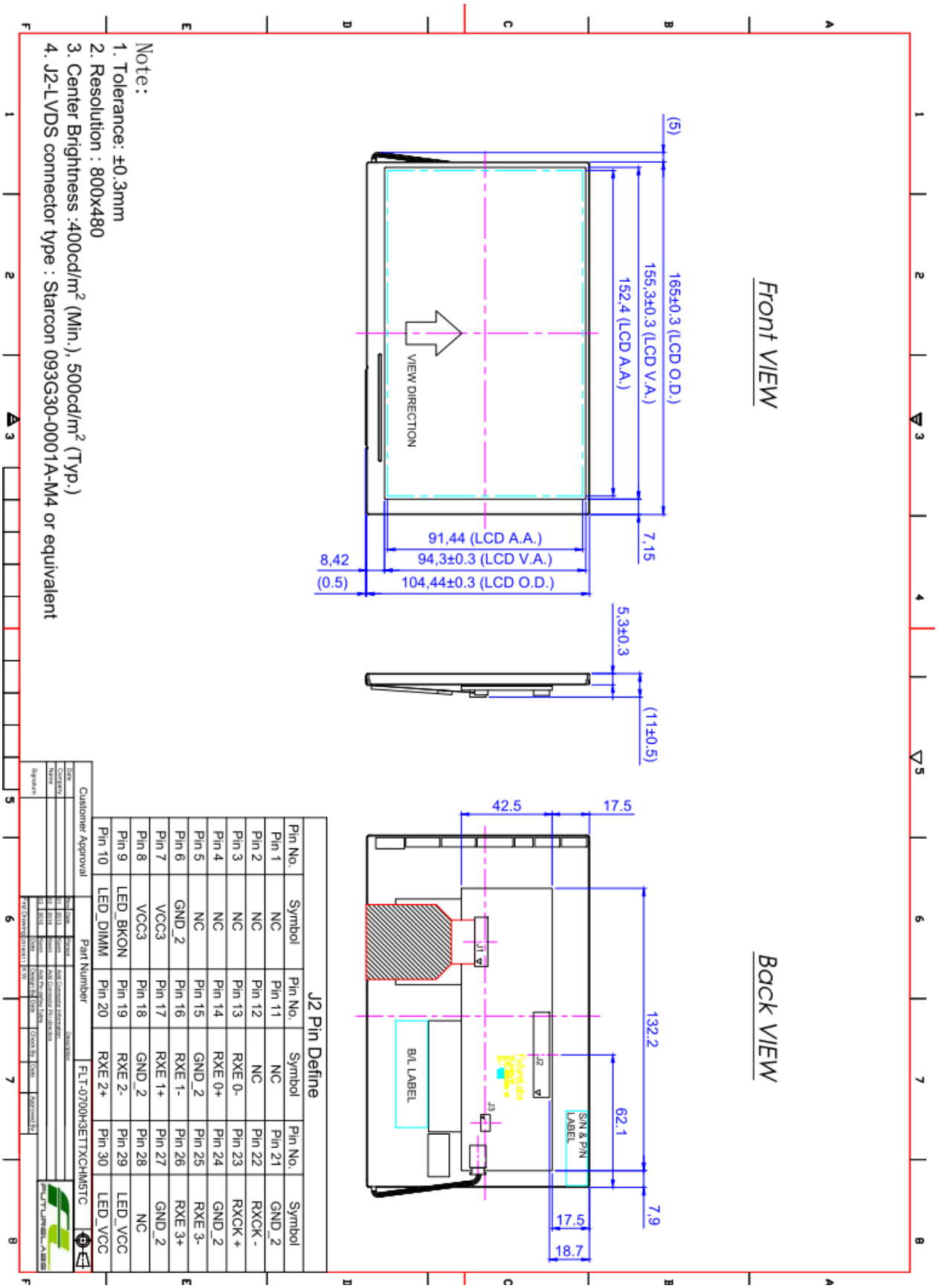
A) TFT LCD Drawing and P/N



Note:
1. Tolerance: ±0.3mm
2. Resolution : 800x480
3. Center Brightness :400cd/m^2 (Min.), 500cd/m^2 (Typ.)
4. J2-LVDS connector type : Starcon 093G30-0001A-M4 or equivalent

J2 Pin Define

Pin No.	Symbol	Pin No.	Symbol	Pin No.	Symbol
Pin 1	NC	Pin 11	NC	Pin 21	GND_2
Pin 2	NC	Pin 12	NC	Pin 22	RXCK -
Pin 3	NC	Pin 13	RXE 0-	Pin 23	RXCK +
Pin 4	NC	Pin 14	RXE 0+	Pin 24	GND_2
Pin 5	NC	Pin 15	GND_2	Pin 25	RXE 3-
Pin 6	GND_2	Pin 16	RXE 1-	Pin 26	RXE 3+
Pin 7	VCC3	Pin 17	RXE 1+	Pin 27	GND_2
Pin 8	VCC3	Pin 18	GND_2	Pin 28	NC
Pin 9	LED_BKON	Pin 19	RXE 2-	Pin 29	LED_VCC
Pin 10	LED_DIMM	Pin 20	RXE 2+	Pin 30	LED_VCC

Customer Approval

Part Number: FLT-0700H3ETTXCHM5TC

B) LCD Display Specifications

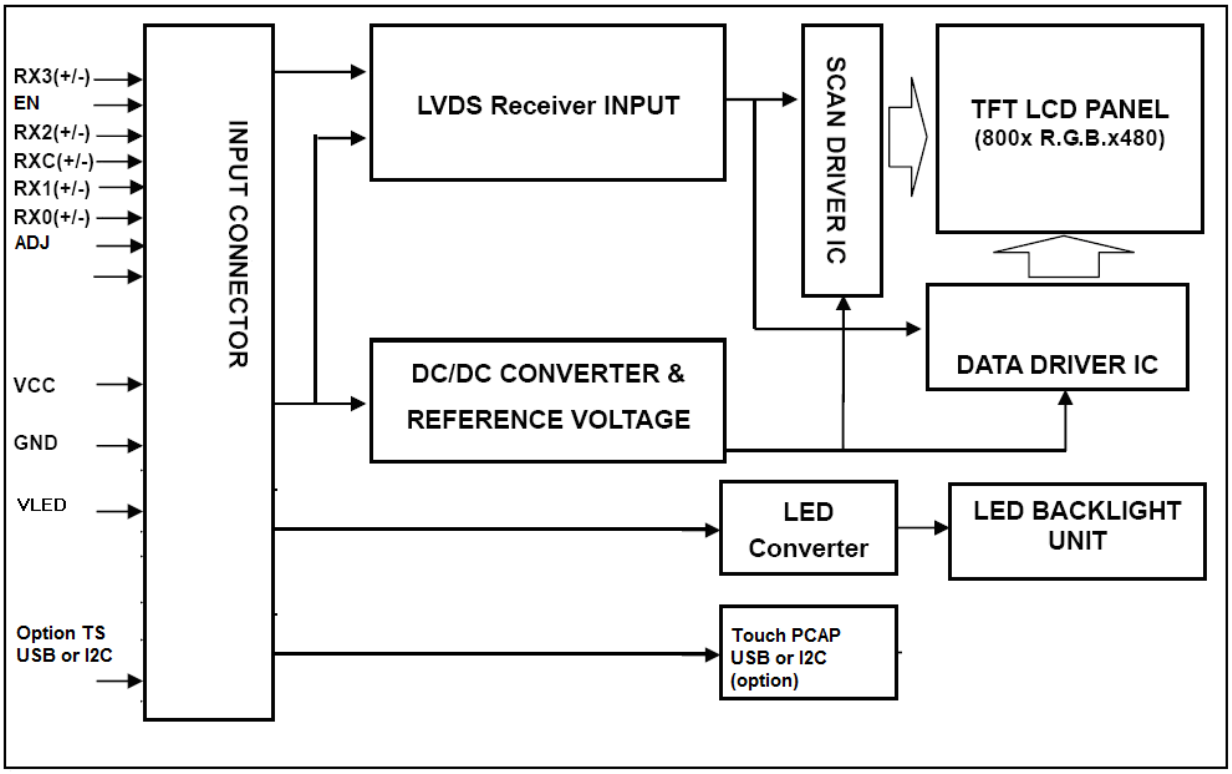
1. APPLICATION

Industrial, HMI, Pos, Automotive

2. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	7 (diagonal)	inch
Display Format	800(H) x (R,G,B) x 480(V)	dot
Active Area	152.4(H) x 91.44(V)	mm
Pixel Pitch	0.1905 (H) x 0.1905 (V)	mm
Pixel Configuration	Stripe	
Outline Dimension	165(W) x 104.44(H) x 11 (D)	mm
Surface treatment	Anti-glare and hard coating (3H)	
Back-light	LED	
Display mode	Normally white	
Interface	LVDS 24 bit (option 18 bit under request)	
Weight	150	g
View Angle direction(Gray inversion)	6 o'clock	
Our components and processes are compliant to RoHS standard		

3. BLOCK DIAGRAM



4 ABSOLUTE MAXIMUM RATINGS

GND=0V

Parameter		Symbol	MIN.	MAX.	Unit	Remark
Operating temperature		Top	-20	70	°C	Module surface*
Storage temperature		Tst	-30	+80	°C	-
Humidity	Operation	20%~90% relative humidity				Ta<=38°C
	Non Operation	5%~90% relative humidity				Ta<=38°C

5. ELECTRICAL CHARACTERISTICS

5.1 Operating Conditions

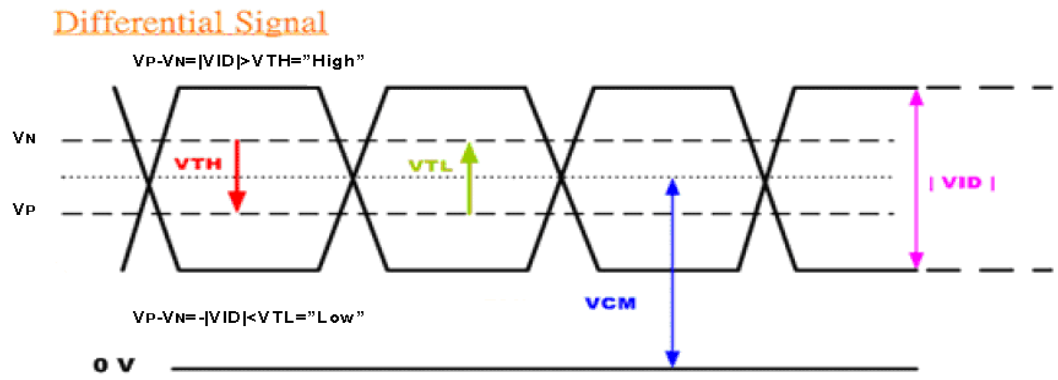
GND=0V, fH=31.5KHz, fV=60Hz, fCLK=33.26MHz,Ta=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	V_{CC3}	3.0	3.3	3.6	V	
Power Supply Current	I_{CC}		153	200	mA	V_{CC} =3.3V
Ripple voltage	V_{RF}	-	-	100	mV_{P-P}	
"H" level logical input voltage	V_{IH}	0.7Vcc	--	Vcc	V	
"L" level logical input voltage	V_{IL}	0	--	0.3Vcc	V	

6. BACKLIGHT UNIT

Item	Symbol	Min	Typ	Max	Unit	Note
LED Converter Voltage	Vi(LEDVCC)	4.7	5	5.7	V	
Enable Voltage	EN (LEDBKon)	-	3.3	VCC-	V	
Backlight ADJ	ADJ (LED Dimm)	-	3.3	VCC	V	
Adjust PWM Control Level	PWM High	0.7VCC	3.3	VCC	V	
	PWM Low	0	0	0.2	V	
Adjust PWM Control Ratio		20	-	100	%	
Adjust PWM Control Freq	fPWM	200	1K	-	Hz	
LED life time		--	40,000	--	Hr	Note2

7. LVDS AC timing



LVDS Differential Input High Threshold $V_{TH(LVDS)}$ 100 mV -

LVDS Differential Input Low Threshold $V_{TL(LVDS)}$ -100 mV -

LVDS Common Mode Voltage V_{CM} 1.2 V -

Note: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and LED Backlight Current IL =150 mA.

8. INPUT SIGNAL CHARACTERISTICS

8.1 Input timing Characteristics

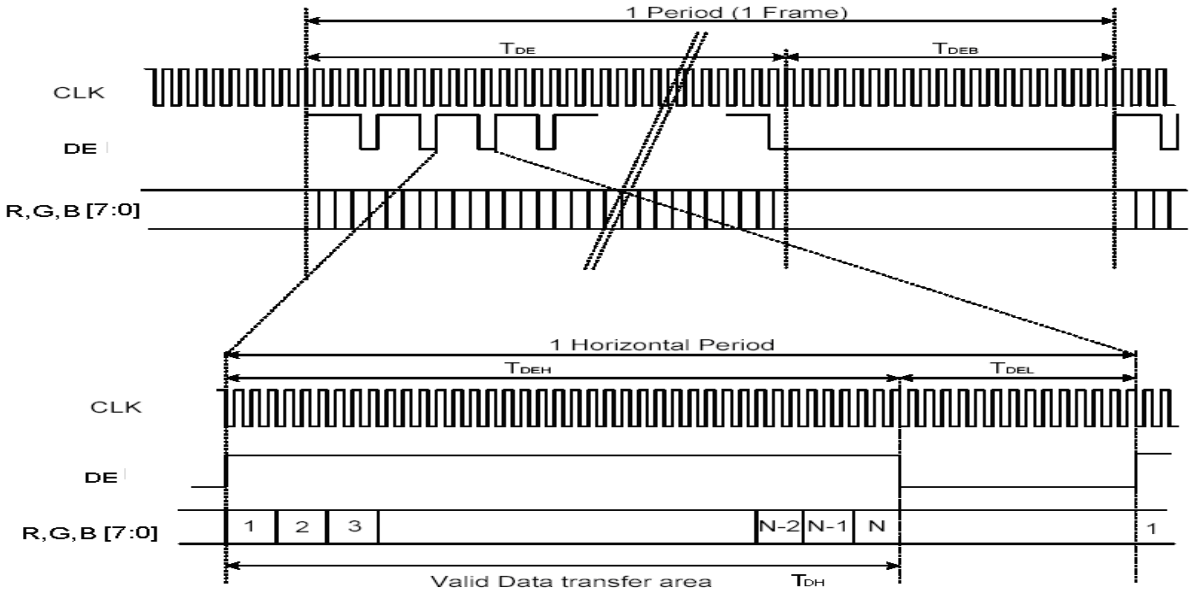
DE mode

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
CLK frequency		-	33.26	-	MHz
CLK period		-	30.06	-	ns
CLK pulse duty		40	50	60	%
H total period		1000	1056	1200	CLK
H Blank period			256		CLK
H display period		-	800	-	CLK
Vertical blanking		10	45	110	CLK
Vertical width		-	480	-	CLK
Vertical Total lines			525		line

8.2 Timing Controller Timing Chart

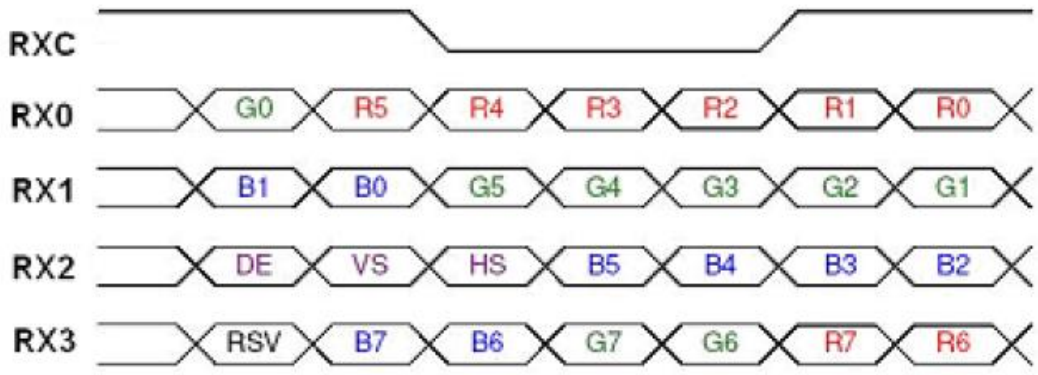
8.2.1 Clock and Data input waveforms

Figure 1 Clock and Data input waveforms.



8.2.2 Data Input format

8.2.3 LVDS Data Format



Note (1) R/G/B data 7: MSB, R/G/B data 0: LSB

8.3 Color Data Input Assignment

COLOR	DISPLAY	DATA SIGNAL																								GRAY SCALE LEVEL
		RED								GREEN								BLUE								
		R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7	
BASIC COLOR	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	-
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	-
	GREEN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	-
	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	-
	RED	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	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	-
GRAY SCALE OF RED	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	R0
	DARK ↑	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1
		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R3~R252
	↓ LIGHT	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
		1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R253
		0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R254
	RED	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R255
GRAY SCALE OF GREEN	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	G0
	DARK ↑	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G1
		0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G2
		:			:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	G3~G252
	↓ LIGHT	:			:	:	:	:	:	:			:	:	:	:	:	:			:	:	:	:	:	
		0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G253
		0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G254
	GREEN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	G255
GRAY SCALE OF BLUE	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	B0
	DARK ↑	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	B1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	B2
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B3~B252
	↓ LIGHT	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	B253
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	B254
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	B255

Note) Definition of Gray :

Rn : Red Gray, Gn : Green Gray, Bn : Blue Gray (n = Gray level)

Input Signal : 0 = Low level voltage, 1 = High level voltage

8.4 PIN CONNECTIONS J2 (30 pin)

Pin NO.	SYMBOL	I/O	DESCRIPTION
1	NC	I	No connection (see Note 2 in case of USB or I2C touch)
2	NC	I	No connection (see Note 2 in case of USB or I2C touch)
3	NC	I	No connection (see Note 2 in case of USB or I2C touch)
4	NC	I	No connection (see Note 2 in case of USB or I2C touch)
5	NC	I	No connection (see Note 2 in case of USB or I2C touch)
6	GND	I	Ground
7	VCC3	I	Power Supply Voltage (+3,3V)
8	VCC3	I	Power Supply Voltage (+3,3V)
9	EN (LED_BKON)	I	Enable PIN (0 - Off, +3,3V - On)
10	ADJ(LED_DIMM)	I	Backlight Adjust (PWM Input)
11	NC	I	No connection
12	NC	I	No connection
13	RX0-	I	LVDS differential data input Pair 0
14	RX0+	I	
15	GND	I	Ground
16	RX1-	I	LVDS differential data input Pair 1
17	RX1+	I	
18	GND	I	Ground
19	RX2-	I	LVDS differential data input Pair 2
20	RX2+	I	
21	GND	I	Ground
22	RXC-	I	LVDS differential clock input Pair
23	RXC+	I	
24	GND	I	Ground
25	RX3-	I	LVDS differential data input Pair 3
26	RX3+	I	

27	GND	I	Ground
28	NC	I	No connection
29	LED_VCC	I	LED Power supply input (+5V)
30	LED_VCC	I	LED Power supply input (+5V)

Note 1 :The LCM support DE mode.

J2-LVDS connector type : Starcon 093G30-0001A-M4 or equivalent

Note 2

In case of RTPC070W-XXXXX**-U** (USB interface) connected on J3

1	USB_VCC	I	Touch Panel USB VCC
2	D-	I	Touch Panel Data -
3	D+	I	Touch Panel Data +
4	GND1	I	Touch Panel Ground 1 (for USB)
5	NC	I	No connection

In case of RTPC070W-XXXXX**-I** (I2C interface) connected on J3

1	VDD	I	Touch Panel VDD (I2C)
2	SDA	I	Touch Panel SDA (I2C)
3	SCL	I	Touch Panel SCL (I2C)
4	GND1	I	Touch Panel Ground 1 (I2C)
5	INT	I	Touch Panel INT (I2C)

Remarks:

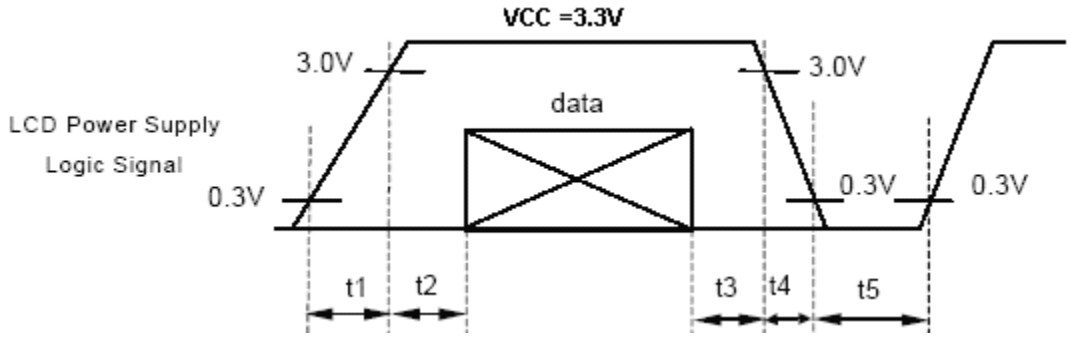
Power Signal sequence**:**

t1 ≤10ms **;** 1 sec≤ t5

50ms≤ t2 **;**

0<t3 ≤50ms **;**

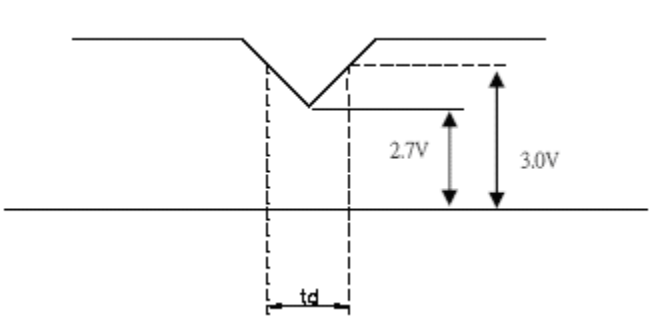
0<t4 ≤10ms



VCC -dip condition**:**

(1) 2.7V ≤VCC≤3.0V: td ≤10 ms

(2) VCC >3.0V: VCC -dip condition should be the same with VCC,-turn-on condition.

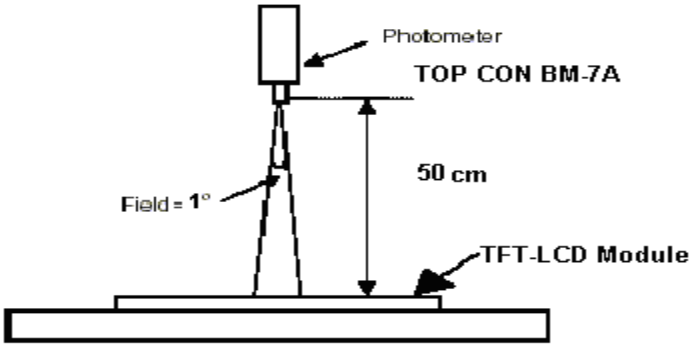


9. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ_X+	Center CR≥10	60	70	--	deg	Note 1,4
		θ_X-		60	70	--		
	Vertical	θ_Y+		40	50	--		
		θ_Y-		50	60	--		
Contrast Ratio		CR	at optimized viewing angle	300	400	--		Note 1,3
Response time	Rise	Tr	Center θx=θy =0°	-	5	10	ms	Note 1,6
	Fall	Tf		-	15	20	ms	
Uniformity		B-uni	θx=θy =0°	70	80	--	%	Note1,5
Brightness		L	θx=θy =0°	400	500	--	cd/㎡	Note 1,2
Chromaticity		x_W	Center θx=θy =0°	0.252	0.302	0.352		Note 1,7
		y_W		0.289	0.339	0.389		
		x_R		0.525	0.575	0.625		
		y_R		0.310	0.360	0.410		
		x_G		0.281	0.331	0.381		
		y_G		0.521	0.571	0.621		
		x_B		0.099	0.149	0.199		
		y_B		0.088	0.138	0.188		
Image sticking		tis	2 hours			2	Sec	Note 8

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance ≤1 lux, and at room temperature).
The operation temperature is 25°C±2°C and LED Backlight Current IL=180mA.
The measurement method is shown in Note1.

Note1: The method of optical measurement:

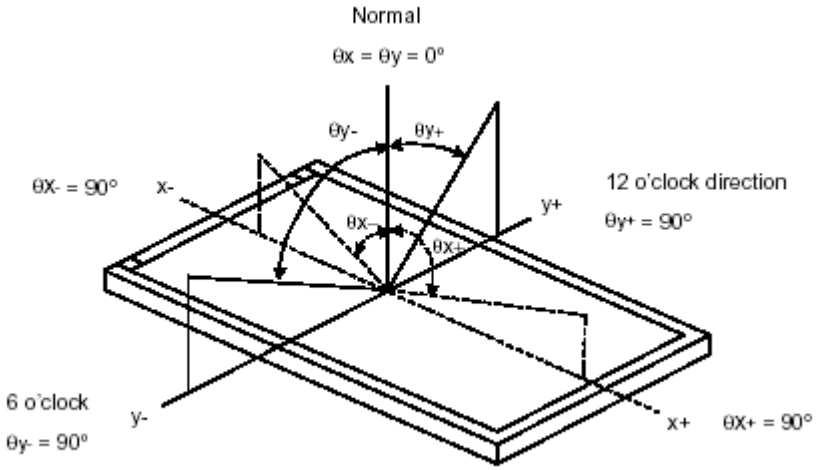


Note2: Measured at the center area of the panel and at the viewing angle of the $\theta x=\theta y =0°$

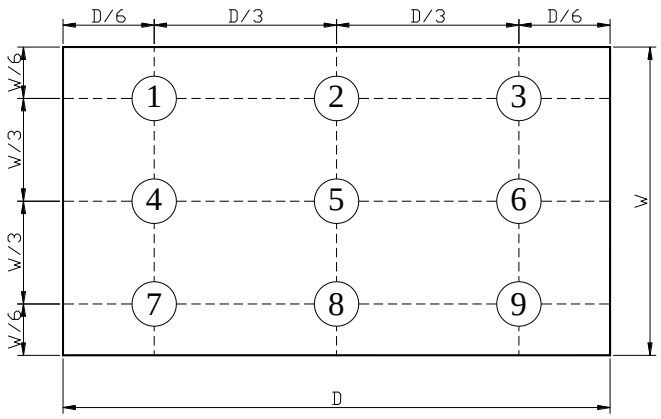
Note3: Definition of Contrast Ratio (CR):

$$CR = \frac{\text{Luminance with all pixels in white state}}{\text{Luminance with all pixels in Black state}}$$

Note4: Definition of Viewing Angle



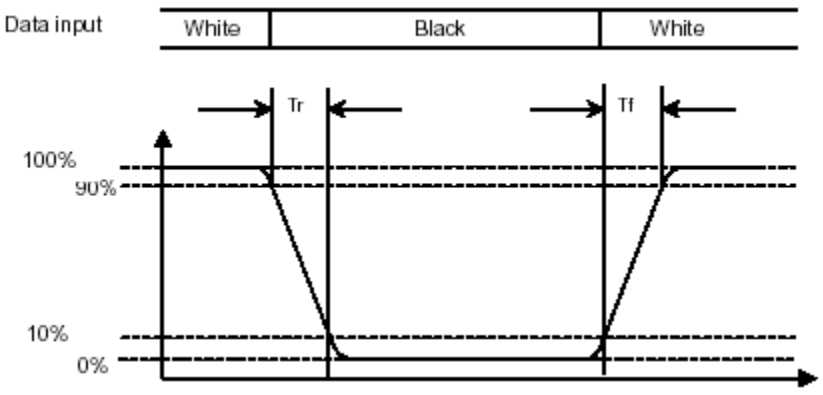
Note 5: Definition of Brightness Uniformity (B-uni):



$$\text{B-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9points}} \quad \text{(Note 5).}$$

Note6: Definition of Response Time:

The Response Time is set initially by defining the “Rising Time (Tr)” and the “Falling Time (Tf)” respectively. Tr and Tf are defined as following figure.



Note 7: Definition of Chromaticity:

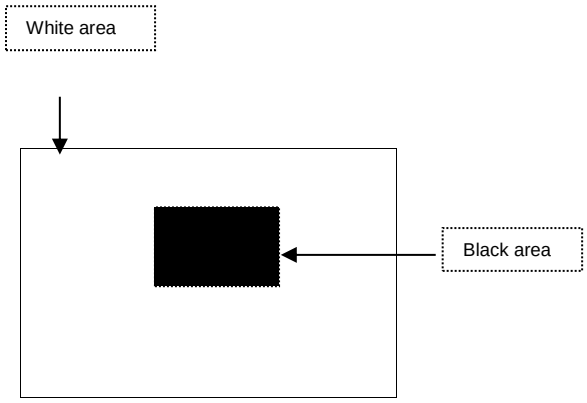
The color coordinates (x_W,y_W),(x_R,y_R),(x_G,y_G),and (x_B,y_B) are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

Note 8: Definition of Image sticking (tis):

Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen.

The previous image shall not persist more than 2 sec at 25 °C

Image sticking pattern



10. QUALITY ASSURANCE

Test Condition

11.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : 25 ± 5°C

Humidity : 65 ± 5%

11.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

11.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

11.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

11.1.5 Test Method

Reliability Test Item & Level		Test Level	remark
No.	Test Item		
1	High Temperature Storage Test	T=80℃,240hrs	IEC68-2-2
2	Low Temperature Storage Test	T=-30℃,240hrs	IEC68-2-1
3	High Temperature Operation Test	T=70℃,240hrs	IEC68-2-2
4	Low Temperature Operation Test	T=-20℃,240hrs	IEC68-2-1
5	High Temperature and High Humidity (No operation)	T=60℃,90%RH,240hrs	IEC68-2-3
6	Thermal Cycling Test (No operation)	-30℃→ +25℃→ +80℃, 100 Cycles 30 min 5 min 30 min	IEC68-2-14
7	Vibration Test (No operation)	Frequency :10 ~ 55 Hz Amplitude :1.5 mm Sweep time : 11 mins Test Period: 6 Cycles for each direction of X, Y, Z	IEC68-2-6
8	Drop test	Height :60cm 1 conner,3edges,6surfaces	IEC68-2-32

9	Shock test	100G,6ms,Direction:±X±Y±Z Cycle:3times	IEC68-2-27
10	Electrostatic Discharge Test	State: operating Location: LCM/TP surface Condition:150pf 330Ω Contact +/- 8kV Air +/-15kV Criteria: Class C	IEC-61000-4-2

11. PACKAGING: TBD