

CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: CH057DLCT-RT2

(Complied with RoHS)

Distributed by:



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Spec Condition Preliminary

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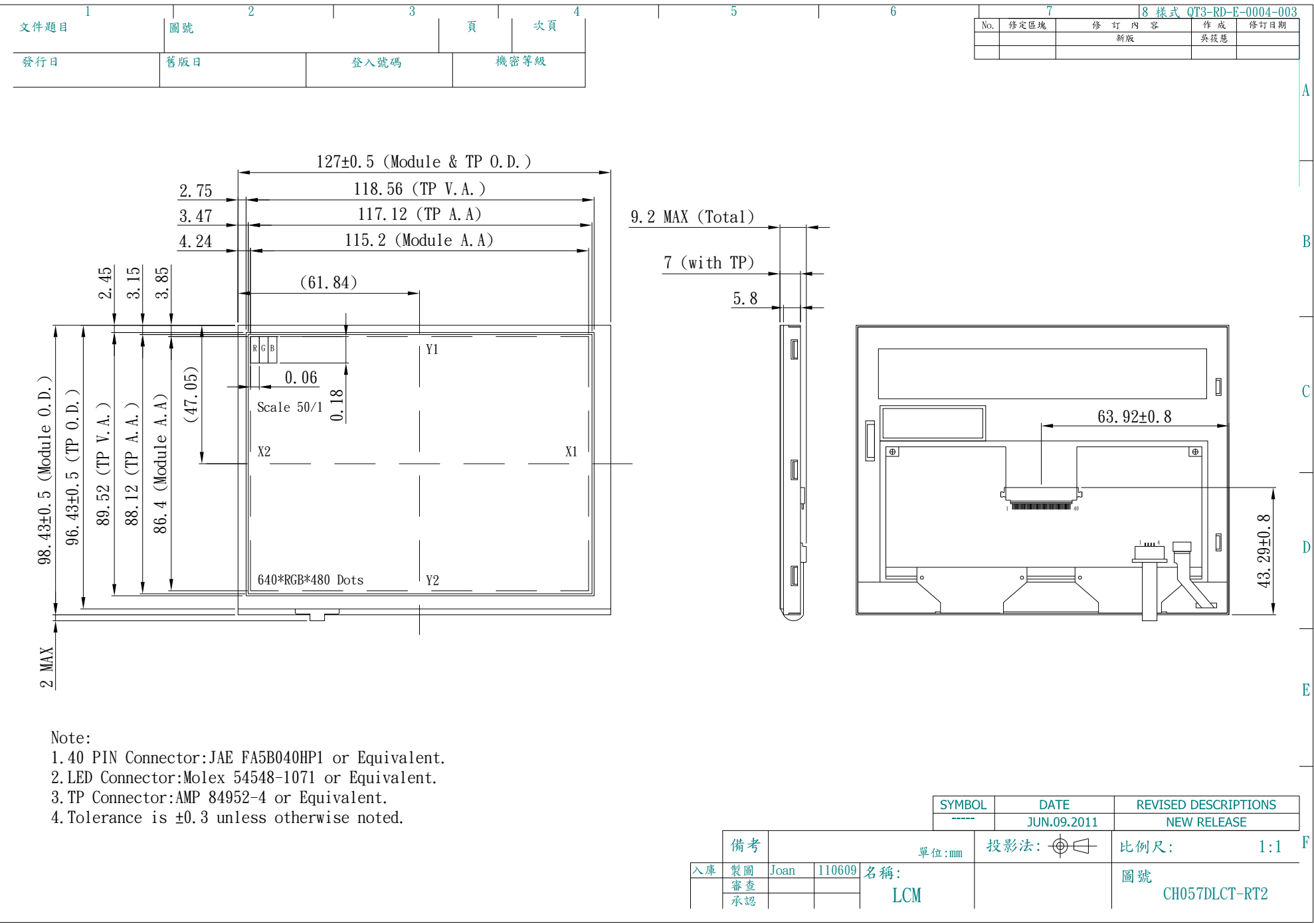
2.RECORD OF REVISION

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3.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	640(R.G.B) X 480
(2)	Module Size(mm)	127(W) X 98.43(H) X 9.2(D)
(3)	Active Area(mm)	115.2(H) X 86.4(V)
(4)	Dot Pitch(mm)	0.06(H) X 0.18(V)
(5)	LCD Model	TFT
(6)	LED Backlight Color	White
(7)	Color Configuration	R.G.B Stripe
(8)	Viewing Direction	6 O'clock
(9)	Driving Method	COG TYPE
(10)	Touch Panel Mode	4-Wire Analog Resistive
(11)	Module Weight(g)	128

4. OUTLINE DIMENSIONS



5. TFT LCD PANEL INTERFACE

Connector: JAE FA5B040HP1 or Equivalent.

PIN No.	SIGNAL	FUNCTION	Remark
1	U/D	Vertical display mode select signal Up / Down Scan control input	Note 1
2	NC	No Connection	
3	HSYNC	Horizontal SYNC.	
4	VLED	Power Supply for LED Driver circuit	
5	VLED	Power Supply for LED Driver circuit	
6	VLED	Power Supply for LED Driver circuit	
7	VCC	Power Supply for LCD	
8	VSYNC	Vertical SYNC.	
9	DE	Data Enable	Note 3
10	X2	Touch Panel control (Left)	
11	Y1	Touch Panel control (Up)	
12	ADJ	Brightness control for LED B/L	Note 2
13	B5	Blue signal data bus (MSB)	
14	B4	Blue signal data bus	
15	B3	Blue signal data bus	
16	VSS	Ground	
17	B2	Blue signal data bus	
18	B1	Blue signal data bus	
19	B0	Blue signal data bus (LSB)	
20	VSS	Ground	
21	G5	Green signal data bus (MSB)	
22	G4	Green signal data bus	
23	G3	Green signal data bus	
24	VSS	Ground	
25	G2	Green signal data bus	
26	G1	Green signal data bus	
27	G0	Green signal data bus (LSB)	
28	VSS	Ground	
29	R5	Red signal data bus (MSB)	
30	R4	Red signal data bus	
31	R3	Red signal data bus	
32	VSS	Ground	
33	R2	Red signal data bus	
34	R1	Red signal data bus	
35	R0	Red signal data bus (LSB)	
36	X1	Touch Panel control (Right)	

PIN No.	SIGNAL	FUNCTION	Remark
37	Y2	Touch Panel control (Down)	
38	DCLK	Clock Signals; Latch Data at the Falling Edge	
39	VSS	Ground	
40	R/L	Horizontal display mode select signal Right / Left Scan control input	Note 1

Note 1:

R/L	U/D	FUNCTION
1	0	Normally display
0	0	Right and Left opposite
1	1	Up and Down opposite
0	1	Right and Left opposite, Up and Down opposite

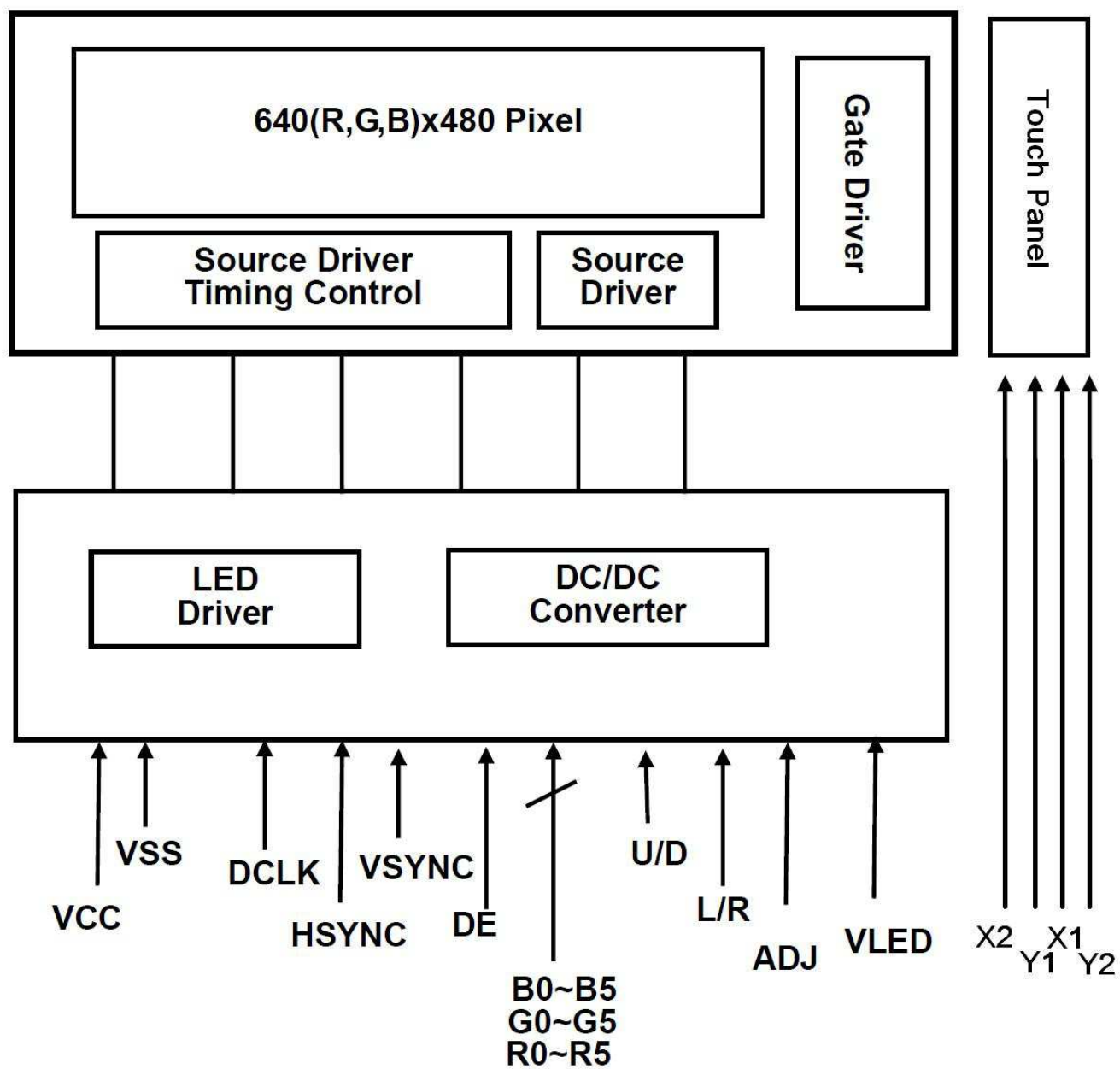
Note 2:

ADJ is brightness control Pin. The larger of the pulse duty is, the higher of the brightness.
ADJ signal is 0~3.3V. Operation frequency is 20KHz.

Note 3:

If DE signal is fixed low, SYNC mode is used. Otherwise, DE mode is used.

6. BLOCK DIAGRAM



7.ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage	VCC	-0.3	+5.0	V	GND=0
Logic Input Voltage	VI	-0.3	VCC+0.3	V	GND=0

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		COMMENT
	MIN	MAX	MIN	MAX	
Ambient Temperature(°C)	-20	70	-30	80	Note 1,2,3
Humidity(% RH)	-	90	-	90	Note 4

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Operation Ta=70°C & -20°C ≤ 240Hrs.

Note 4 : Operation Ta=60°C & RH=90% ≤ 240Hrs.

8.ELECTRICAL CHARACTERISTICS

8.1 LCM ELECTRICAL CHARACTERISTICS

VSS=0V,DCLK=25MHz,Ta=25°C

I T E M	SYMBOL	MIN.	TYP.	MAX.	UNIT
Power SupplyVoltage for LCD	VCC	3.0	3.3	3.6	V
	ICC	-	111	140	mA
Power SupplyVoltage for B/L	VLED	4.5	5	5.5	V
	ILED	-	333	400	mA
Logic Input Voltage	V _{IH}	0.7*VCC	-	VCC	V
	V _{IL}	0	-	0.3VCC	V
ADJ Frequency	-	19	20	21	KHz
ADJ Input Voltage	V _{IH}	3.0	-	3.3	V
	V _{IL}	0	-	0.3	V
LED Life Time (For Reference Only)	-	40000	50000	--	hr

Note 1: 50K hours is only an estimate for reference.

Note 2: “The LED Life Time” is defined as the brightness decrease to 50% original brightness that the ambient temperature is 22°C and LED Chip current=20mA.

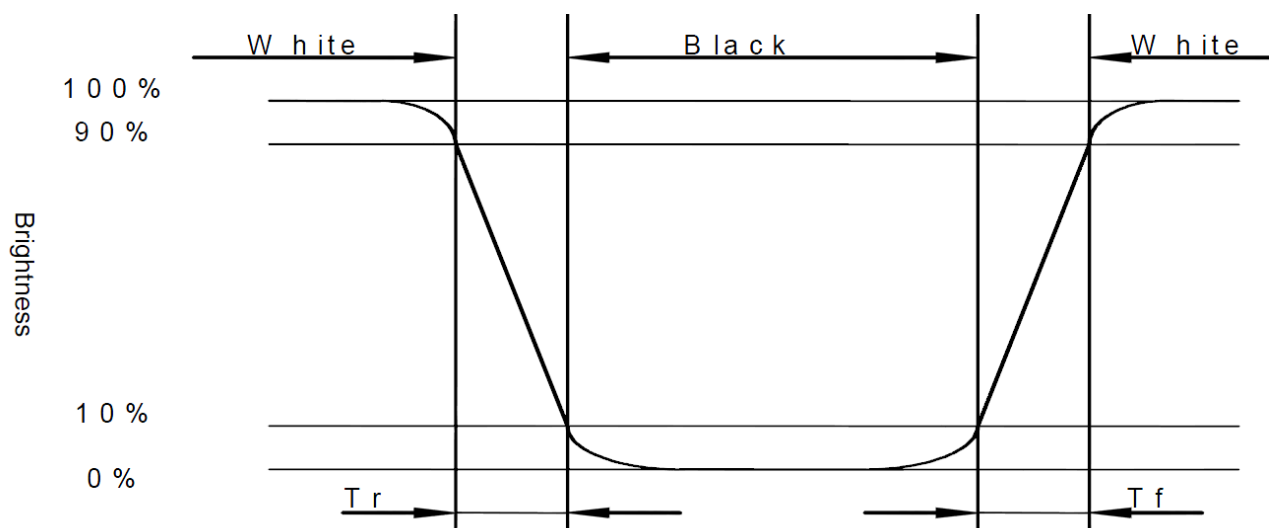
9.OPTICAL CHARACTERISTICS

9.1 OPTICAL CHARACTERISTICS OF LCM PANEL

Ta=25°C

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	REMARK
				MIN.	TYP.	MAX.		
Contrast ratio		CR	At optimized Viewing angle	200	300	-	-	Note(2)
Response time(Tr+Tf)			T=0	-	50	80	ms	Note(1)
Brightness			$\Theta X=\Theta Y=0^{\circ}$ ADJ=3.3V With T/P	400	500	-	cd/m2	Note(4)(5)
Uniformity			-	70	80	-	%	Note(6)
Chromaticity	White	X _W	Viewing normal angle $\Theta X=\Theta Y=0^{\circ}$	(0.265)	(0.315)	(0.365)	-	
		Y _W		(0.281)	(0.331)	(0.381)	-	
	Red	X _R		(0.555)	(0.605)	(0.655)	-	
		Y _R		(0.312)	(0.362)	(0.412)	-	
	Green	X _G		(0.292)	(0.342)	(0.392)	-	
		Y _G		(0.487)	(0.537)	(0.587)	-	
	Blue	X _B		(0.098)	(0.148)	(0.198)	-	
		Y _B		(0.063)	(0.113)	(0.163)	-	
Viewing angle		$\Theta X+$	Center CR≥ 10	60	70	-	Deg.	Note(3)
		$\Theta X-$		60	70	-	Deg.	
		$\Theta Y+$		50	60	-	Deg.	
		$\Theta Y-$		30	40	-	Deg.	
Image sticking		tis	2 hours	-	-	2	Sec	Note(7)

Note (1) Definition of Response Time (TR,TF) :

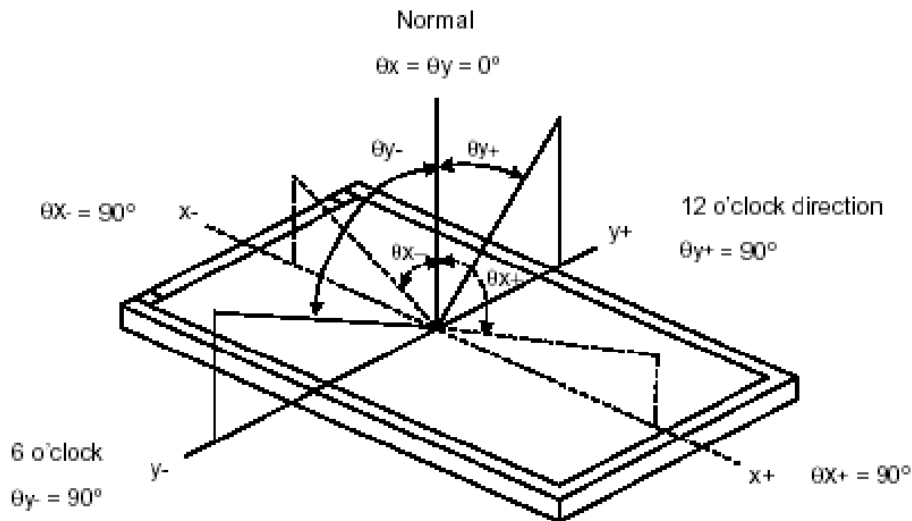


Note (2) Definition of Contrast Ratio “CR”:

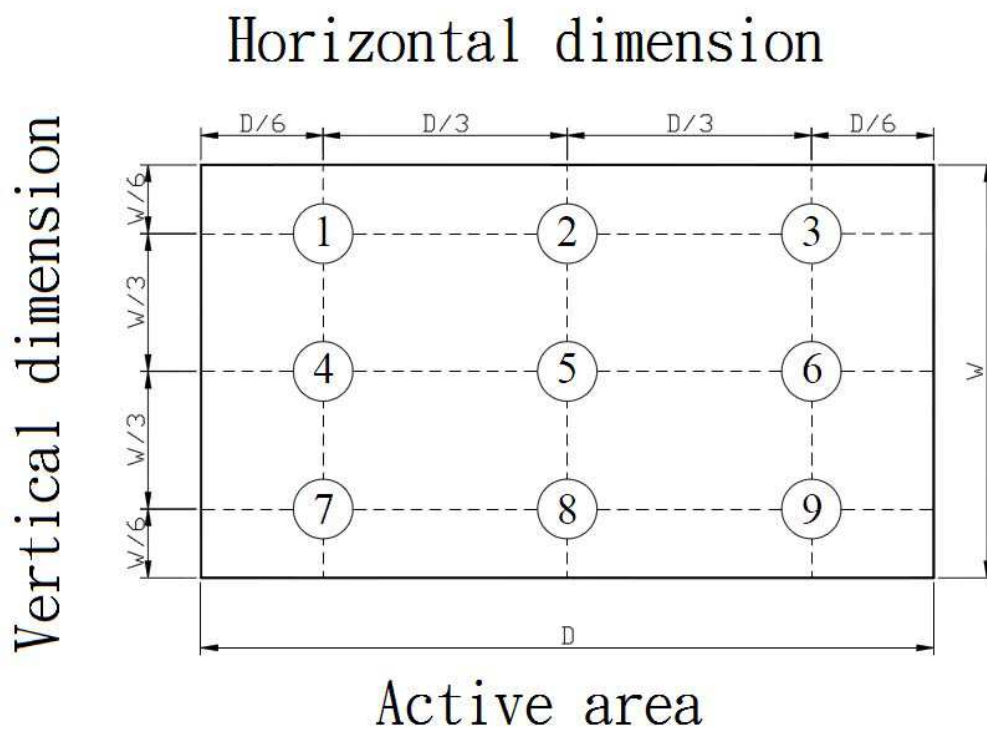
Contrast ratio is calculated with the following formula.

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

Note (3) Definition of Viewing Angle



Note (4) Measurement of the following 9 points on the display.



Note (5) The Brightness should be the average Brightness of point ① ~ ⑨ .

Note (6) Definition of the luminance uniformity .

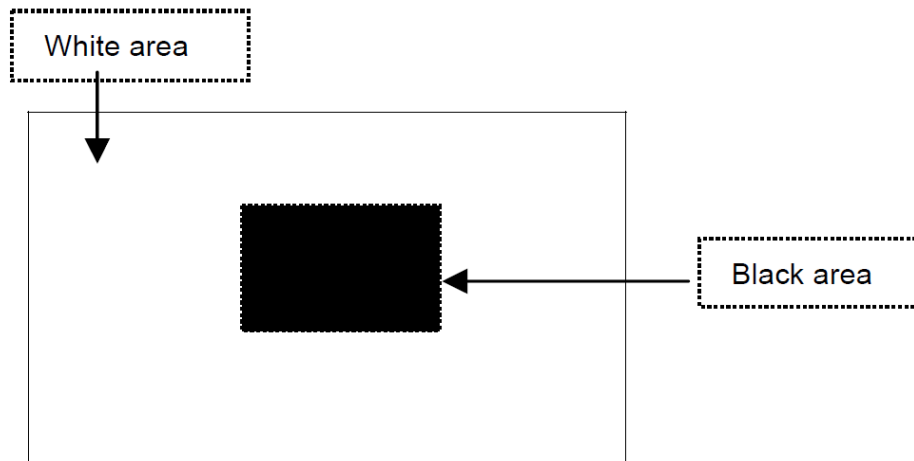
$$\left(1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}}\right) \times 100\% > 70\%$$

Note (7) Definition of Image sticking (tis):

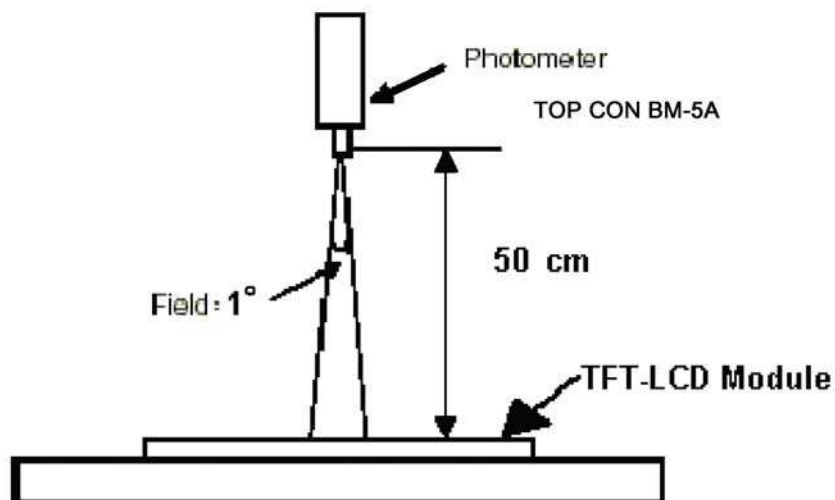
Continuously display the test pattern shown in the figure below for 2 hours.

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

Image sticking pattern



Note (8) the method of optical measurement:

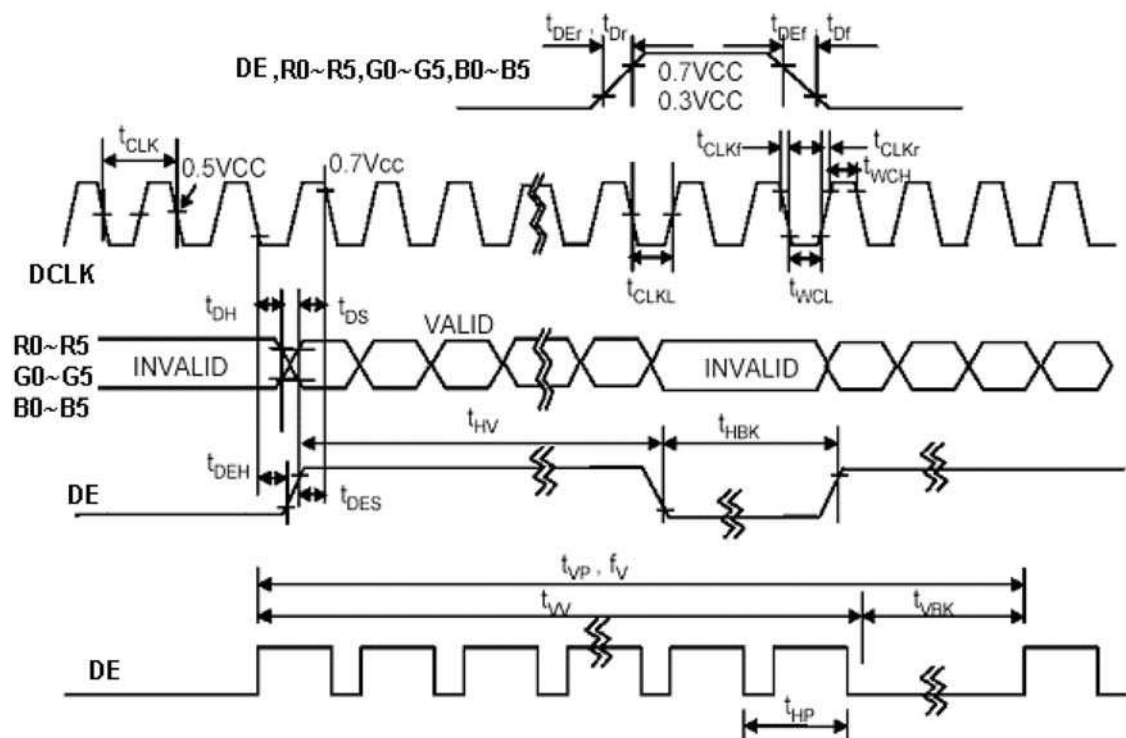


10. AC CHARACTERISTICS

10.1 DE mode input signal characteristics

Signal	Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remarks
DCLK	Period	t_{CLK}	33	40	43	ns	
	Frequency	f_{CLK}	23	25	30	MHz	
	Low Level Width	t_{WCL}	6	-	-	ns	
	High Level Width	t_{WCH}	6	-	-	ns	
	Rise, Fall Time	t_{CLKr}, t_{CLKf}	-	-	3	ns	
	Duty ⁽¹⁾	-	0.45	0.50	0.55	-	
DE (Data Enable)	Setup Time	t_{DES}	5	-	-	ns	
	Hold Time	t_{DEH}	10	-	-	ns	
	Rise, Fall Time	t_{DEr}, t_{DEf}	-	-	16	ns	
	Horizontal Period	t_{HP}	750	800	900	t_{CLK}	
	Horizontal Valid	t_{HV}	640	640	640	t_{CLK}	
	Horizontal Blank	t_{HBK}	110	160	260	t_{CLK}	
	Vertical Period	t_{VP}	515	525	560	t_{HP}	
	Vertical Valid	t_W	480	480	480	t_{HP}	
	Vertical Blank	t_{VBK}	35	45	80	t_{HP}	
	Vertical Frequency	f_V	55	60	65	Hz	
Data R,G,B	Setup Time	t_{DS}	5	-	-	ns	
	Hold Time	t_{DH}	10	-	-	ns	
	Rise, Fall Time	t_{Dr}, t_{Df}	-	-	3	ns	

10.1.1 DE mode timing waveform



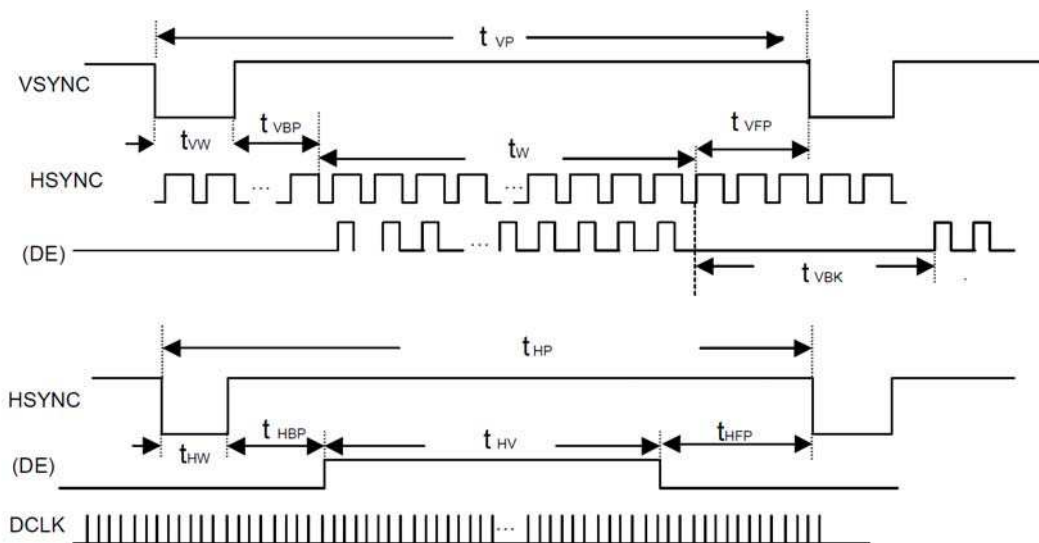
10.2 SYNC mode input signal characteristics

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remarks
Clock Period	t_{CLK}	33	40	43	ns	
Clock Frequency	f_{CLK}	23	25	30	MHz	
Clock Low Level Width	t_{WCL}	6	-	-	ns	
Clock High Level Width	t_{WCH}	6	-	-	ns	
Clock Rise, Fall Time	t_{CLKr}, t_{CLKf}	-	-	3	ns	
HSYNC Period	t_{HP}	750	800	900	t_{CLK}	
HSYNC Pulse Width	t_{HW}	5	30	-	t_{CLK}	
HSYNC Front Porch	t_{HFP}	1	16	116	t_{CLK}	
HSYNC Back Porch	t_{HBP}	1	114	139	t_{CLK}	
HSYNC Width + Back Porch	$t_{HW} + t_{HBP}$	144	144	144	t_{CLK}	
Horizontal Blank	t_{HBK}	1	160	260	t_{CLK}	
Horizontal Valid	t_{HV}	640	640	640	t_{CLK}	
VSYNC Period	t_{VP}	515	525	560	t_{HP}	
VSYNC Pulse Width	t_{VW}	1	3	5	t_{HP}	
VSYNC Front Porch	t_{VFP}	1	10	45	t_{HP}	
VSYNC Back Porch	t_{VBP}	30	32	34	t_{HP}	
VSYNC Width + Back Porch	$t_{VW} + t_{VBP}$	35	35	35	t_{CLK}	
Vertical Blank	t_{VBK}	35	45	80	t_{HP}	
Valid data Width	t_W	480	480	480	t_{HP}	
Data Setup Time	t_{DS}	5	-	-	ns	
Data Hold Time	t_{DH}	10	-	-	ns	

Note: (1) $t_{HBK} = t_{HFP} + t_{HW} + t_{HBP}$

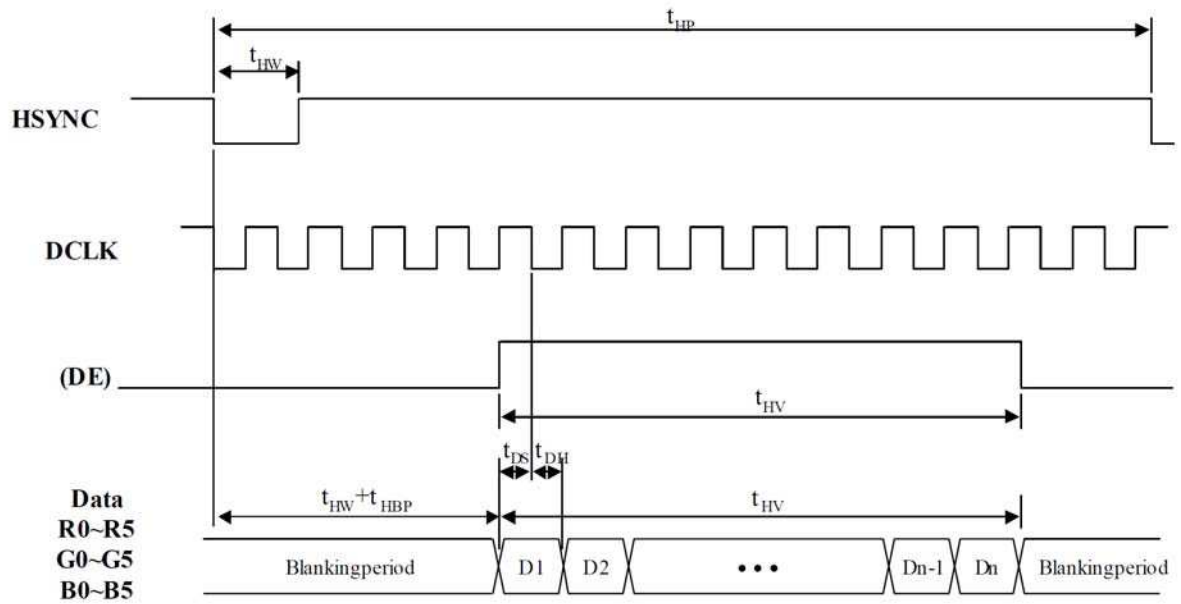
10.2.1 SYNC mode timing waveform

10.2.1.1 Input vertical timing



Remark : If SYNC mode is used, please fix DE signal to low, DE timing waveform is for reference only.

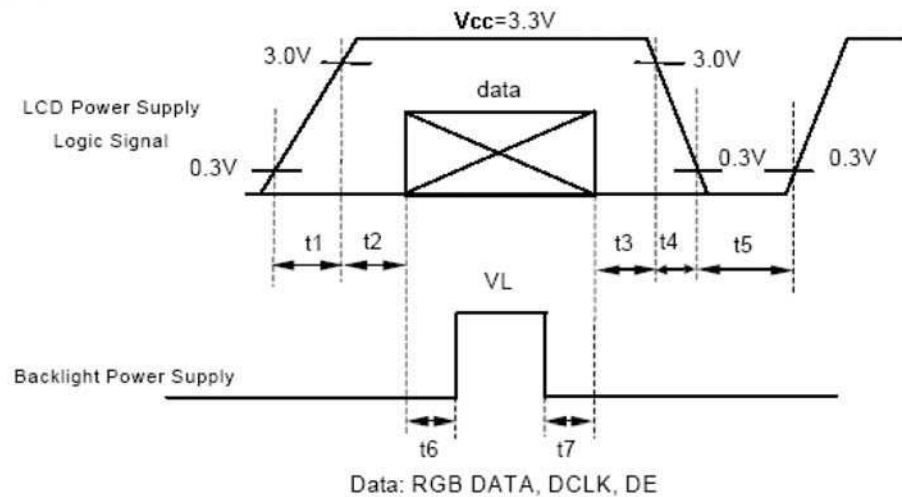
10.2.1.2 Input horizontal timing



Remark : If SYNC mode is used, please fix DE signal to low, DE timing waveform is for reference only.

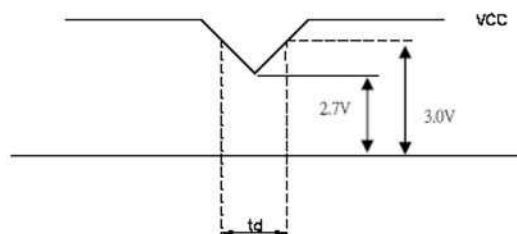
10.3 Power Signal Sequence

$t1 \leq 10\text{ms}$: $1\text{ sec} \leq t5$
 $50\text{ms} \leq t2$: $200\text{ms} \leq t6$
 $0 < t3 \leq 50\text{ms}$; $200\text{ms} \leq t7$
 $0 < t4 \leq 10\text{ms}$



VCC-dip condition:

- (1) $2.7\text{ V} \leq VCC < 3.0\text{V}$, $t_d \leq 10\text{ ms}$
- (2) $VCC > 3.0\text{V}$, VCC-dip condition should be the same with VCC-turn-on condition.



11. TOUCH PANEL CHARACTERISTICS

11.1. Input Method and Activation Force

Input Method	Average Activation Force
2mm dia. Delrin stylus	50gf Max

11.2. Typical Optical Characteristics

ITEM	Parameter
Visible Light Transmission	81% Typ
Haze	5% Typ

11.3. Mechanical Specification

ITEM	Parameter
Hardness of surface	3H

11.4. Electrical Specification

ITEM	Parameter
Operating Voltage	DC 7V Max
Contact current	According to individual design
Circuit close resistance	X 300Ω~1000Ω
	Y 100Ω~800Ω
Circuit open resistance	≥10MΩ at DC25V
Contact bounce	≤20ms

11.5. Linearity

ITEM	Parameter
Linear Test Specification Direction	X ≤1.5%
	Y ≤1.5%

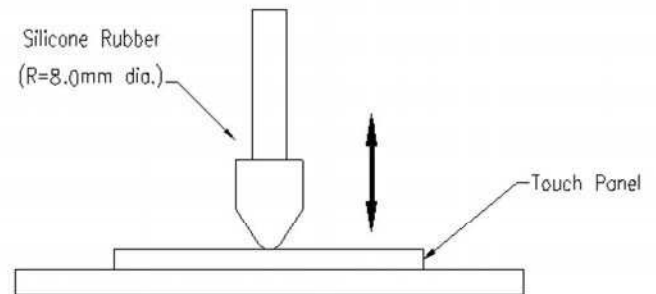
11.6. Specification

ITEM	Parameter
Operating Temperature	-20°C~+70°C ,humidity 20~90%RH
Storage Temperature	-30°C~+80°C ,humidity 10~90%RH

11.7. Durability test:

11.7.1 Touch panel is hit 1 millions times with a silicone rubber of R8 finger, hitting rate is by 200g. The measurement must satisfy the following:

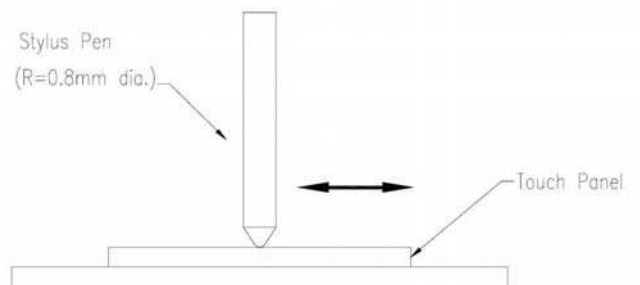
- Circuit close resistance: x 300Ω~1000Ω ;
y 100Ω~800Ω
- Circuit open resistance: ≥10MΩ at DC25V
- Contact bounce: ≤20ms
- Linearity test: ≤3%



11.7.2 Stylus writing

Touch panel is drawn by R0.8 Delrin stylus pen, at 250g forces, repeat one inch by 100k times. Writing speed: 60 mm / sec. The measurement must satisfy the following:

- Circuit close resistance: x 300Ω~1000Ω ;
y 100Ω~800Ω
- Circuit open resistance: ≥10MΩ at DC25V
- Contact bounce: ≤20ms
- Linearity test: ≤3%



12. RELIABILITY TEST

Environmental Test				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80℃	240HRS	
2	Low Temperature Storage	-30℃	240HRS	
3	High Temperature Humidity Operation	60℃/90%RH	240HRS	
4	High Temperature Operation	70℃	240HRS	
5	Low Temperature Operation	-20℃	240HRS	
6	Temperature Cycle	-30℃ ← 25℃ → 80℃ (30min) (5min) (30min)	200CYCLE	

13. WARRANTY

13.1 Acceptance inspection period

The period is within one month after the arrival of contracted commodity at the buyer's factory site.

13.2 Applicable warrant period

The period is within 12 months since the date of shipping out under normal using and storage conditions.