



**SPECIFICATION
FOR
LCM+CTP Module
KD043C-1A-C009A**

MODULE:	KD043C-1A-C009A
CUSTOMER:	

REV	DESCRIPTION	DATE
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PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

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常 备 库 存 Standing Stock	长 期 供 货 Long Time supply	支持小量 NO MOQ	品 种 齐 全 In Full Range	

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General Description

* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT

as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 4.3TFT-LCD contains 480x 272pixels, and can display up to 16.7M colors.

* Features

-Input Voltage: 3.3V(TYP)

-Display Colors of TFT LCD: 16.7M colors

-RGB Interface: 8/16/18/24 Bit RGB

-Internal Power Supply Circuit.

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	95.04(H) *53.86(V) (4.3inch)	mm	-
CTP View area	96.04(H)*54.86(V)	mm	
Driver element	TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	480(RGB) *272	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.066 (H) x 0.198 (V)	mm	-
Viewing angle	12 : 00	o'clock	-
TFT Controller IC	ILI6408B	-	-
CTP Driver IC	FT5316		
Display mode	Transmissive/ Normally White	-	-
Touch mode	5 points touch		
Operating temperature	-20 ~ +70	℃	-
Storage temperature	-30 ~ +80	℃	-

* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		105.4		mm	-
	Vertical(V)		67.15		mm	-
	Depth(D)		4.26		mm	-
Weight			TBD		g	-

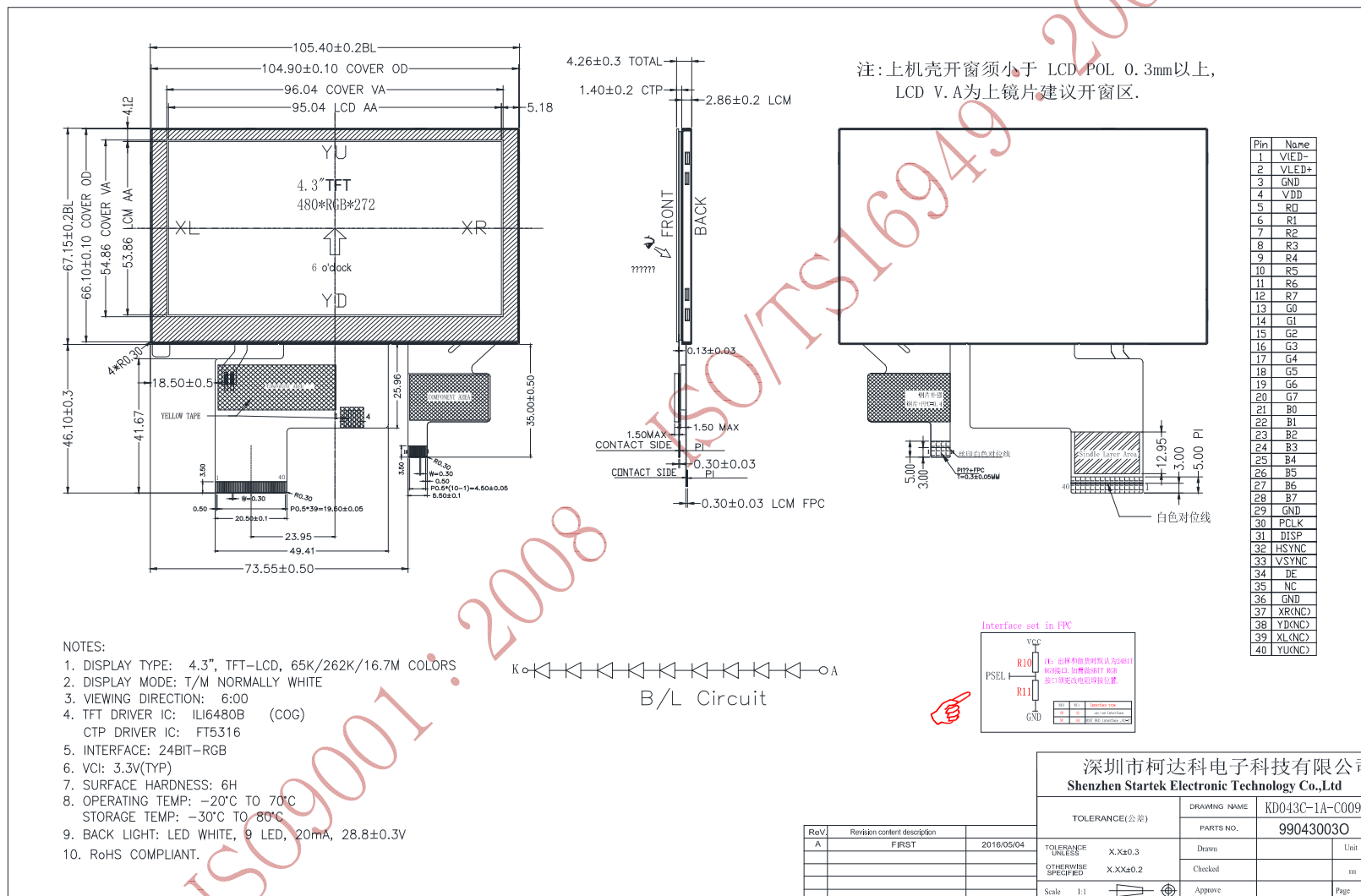


The diagram illustrates the electrical connections for the LED backlight system. At the top, a box labeled "Back Light" is connected to "LEDA" and "LEDK" inputs. Below it is the "320 (RGB) * 480 Panel". A "Driver" box is positioned at the bottom, connected to the "Source" input of the panel. The "Driver" also receives an "FPC" input from below. Two "Gate" inputs are shown: one on the left and one on the right, both connected to the panel. A large red watermark "ISO/TS16949" is visible across the bottom right portion of the diagram.

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2. Outline dimension



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Standing Stock

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Long Time supply

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3. Input terminal Pin Assignment

3.1 TFT

NO.	SYMBOL	DISCRIPTION	I/O
1	LEDK	Cathode pin OF backlight	P
2	LEDA	Anode pin of backlight	P
3	GND	Ground.	P
4	VDD	Supply voltage(3.3V).	P
5	R0	Red data input.	I
6	R1	Red data input.	I
7	R2	Red data input.	I
8	R3	Red data input.	I
9	R4	Red data input.	I
10	R5	Red data input.	I
11	R6	Red data input.	I
12	R7	Red data input.	I
13	G0	Green data input.	I
14	G1	Green data input.	I
15	G2	Green data input.	I
16	G3	Green data input.	I
17	G4	Green data input.	I
18	G5	Green data input.	I
19	G6	Green data input.	I
20	G7	Green data input.	I
21	B0	Blue data input.	I
22	B1	Blue data input.	I
23	B2	Blue data input.	I
24	B3	Blue data input.	I
25	B4	Blue data input.	I



26	B5	Blue data input.	I
27	B6	Blue data input.	I
28	B7	Blue data input.	I
29	GND	Ground.	P
30	PCLK	Clock signal. Latching data at the rising edge	I
31	DISP	Standby setting for testing, it should be connected to VDDIO in normal operation mode. If connected to GND, the IC is in standby mode.	I
32	HSYNC	Horizontal Sync input. Negative polarity.	I
33	VSNC	Vertical Sync input. Negative polarity.	I
34	DE	Data input Enable. Active High to enable the data input Bus under "DE Mode".	I
35	NC		
36	GND	Ground.	P
37	XR(NC)	Touch panel Right Glass Terminal	
38	YD(NC)	Touch panel Bottom Film Terminal	
39	XL(NC)	Touch panel LIFT Glass Terminal	
40	YU(NC)	Touch panel Top Film Terminal	



3.2 CTP

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground.	P
2	VDDIO	I/O power supply voltage.	P
3	VDD	Supply voltage.	P
4	SCL	I2C clock input.	I
5	SDA	I2C data input and output	I/O
6	INT	External interrupt to the host.	I
7	RST	External Reset, Low is active.	I
8	GND	Ground.	P

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4. LCD Optical Characteristics

4.1 Optical specification

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	60	70	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	60	70	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	40	50	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	60	70	-		
Response time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		400	500	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2 Note 5
	W_Y		0.28	0.33	0.38	-	
Transmittance	Tr		-	6.26	-	%	

Test Conditions:

- $V_{DD}=3.3V$, $I_L=20mA$ (Backlight current), the ambient temperature is 25• :
- The test systems refer to Note 2.



4.2 Measuring Condition

- Measuring surrounding: dark room
- Ambient temperature: 25±2℃
- 15min. warm-up time.

4.3 Measuring Equipment

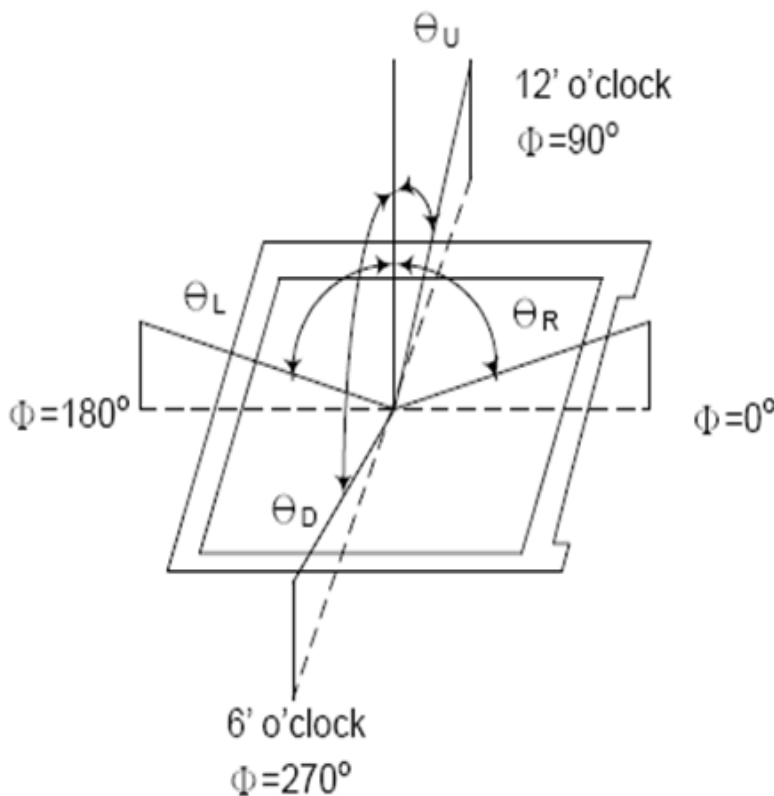
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■ FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

Note (1) Definition of Viewing Angle:

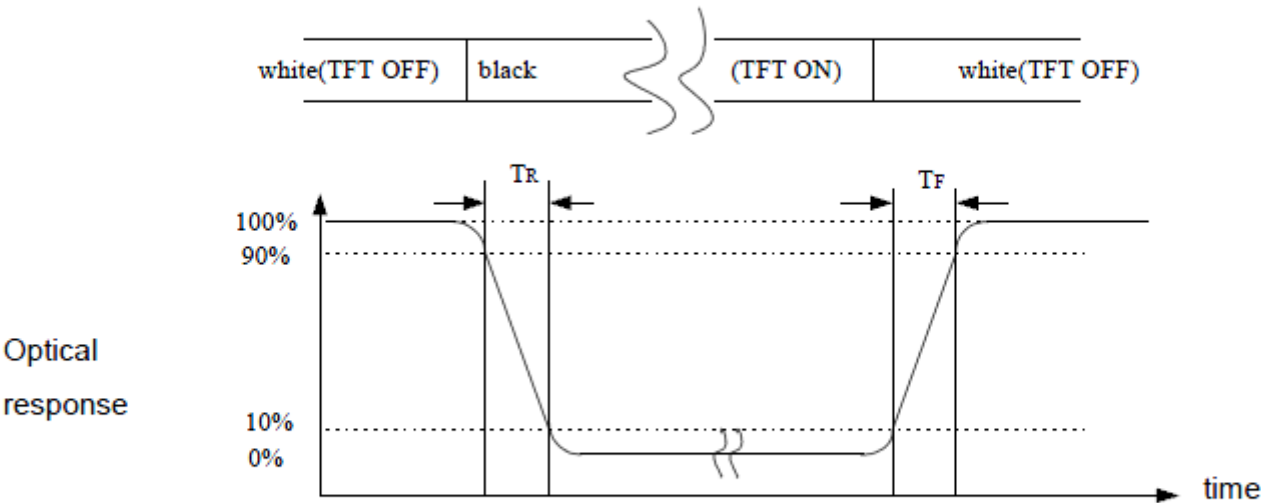


Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

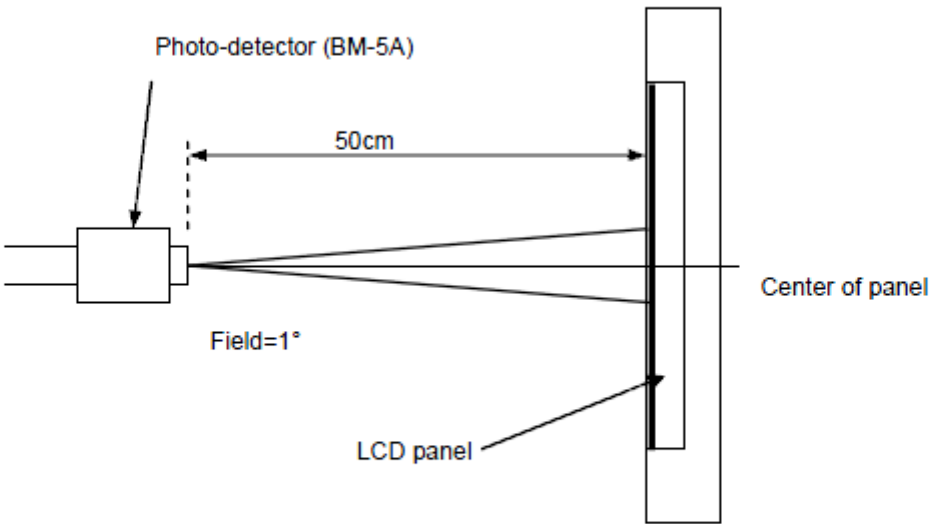
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$



Note (3) Definition of Response Time : Sum of T_R and T_F



Note (4) Definition of optical measurement setup



5. Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Analog Supply Voltage	AVDD	-0.3	7.0	V
Digital interface supply Voltage	IOVCC	-0.5	5.0	V
Operating temperature	T _{OP}	-20	+70	°C
Storage temperature	T _{ST}	-30	+80	°C

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	V _{CI} /V _{DD}	3.0	3.3	3.6	V	
Digital interface supply Voltage	IOVCC	1.8	-	V _{DD}	V	
Normal mode Current consumption	I _{DD}	--	8	--	mA	
Level input voltage	V _{IH}	0.7V _{DDIO}	--	V _{DDIO}	V	
	V _{IL}	GND	--	0.3V _{DDIO}	V	
Level output voltage	V _{OH}	0.8V _{DDIO}	--	V _{DDIO}	V	
	V _{OL}	GND	--	0.2V _{DDIO}	V	

5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 4 chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I _F	90	120	--	mA	
Forward Voltage	V _F	2.9	3.2	3.4	V	
LCM Luminance	L _V	300	--	--	cd/m ²	I _f =120mA



LED life time	Hr	50000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	

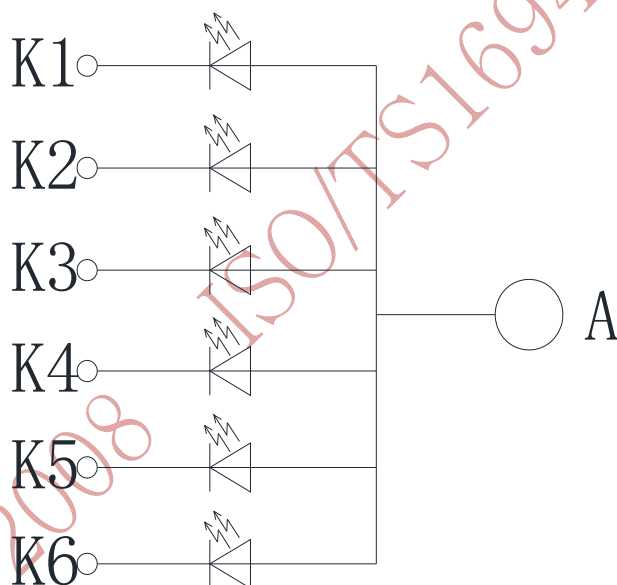
Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

Ta=25±3 °C, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at

Ta=25°C and IL=120mA. The LED lifetime could be decreased if operating IL is larger than 120mA. The

constant current driving method is suggested.



LED(B/L) CIRCUIT

6. TFT AC Characteristic

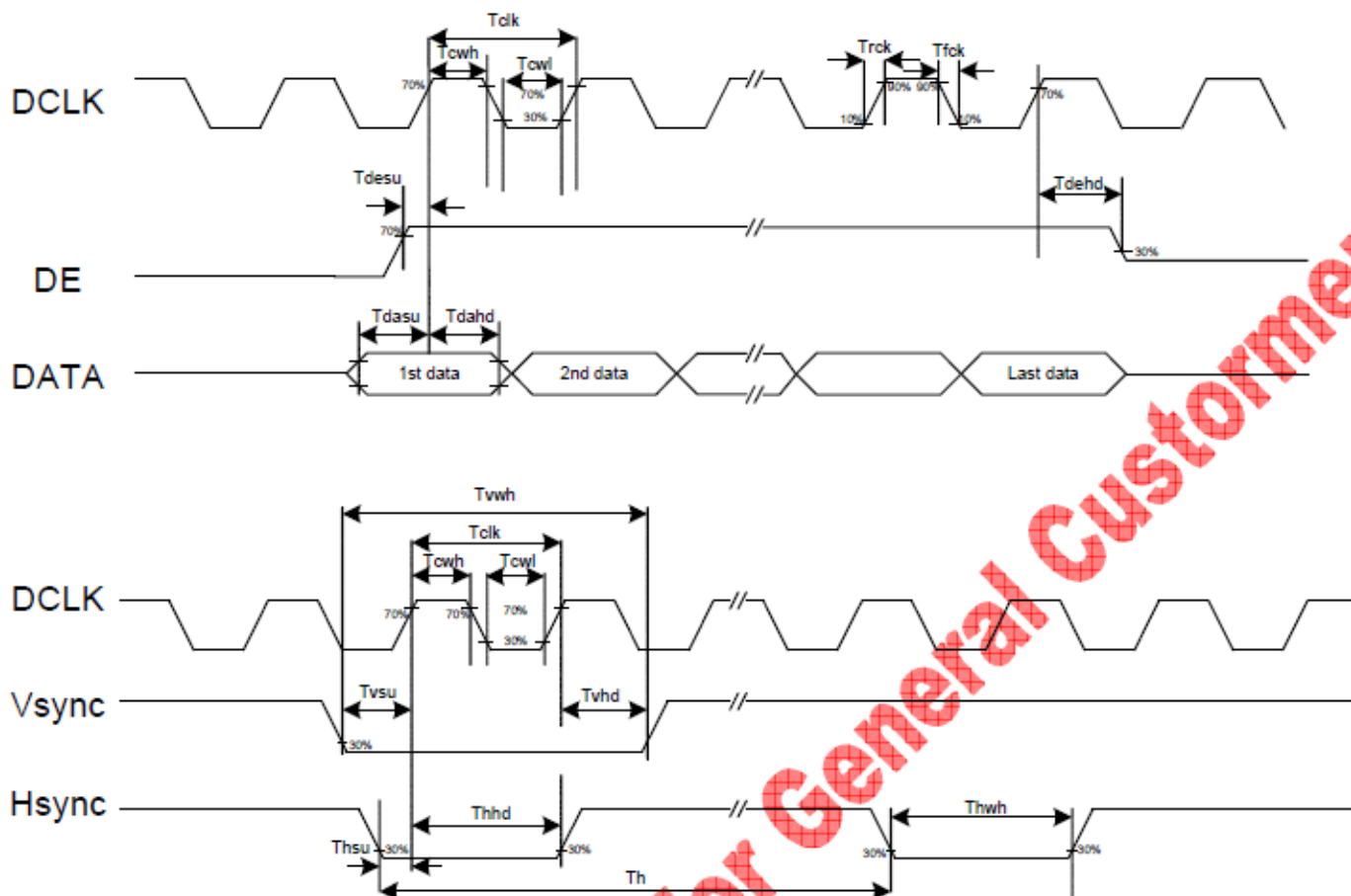
6.1 Input signal characteristics

AC Electrical Characteristics (VDDIO=VDD=3.0 to 3.6v, GND=0V, TA=-20 to +85 °C)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
System operation timing						
VDD power source slew time	TPOR	-	-	20	ms	From 0V to 99% VDD
GRB pulse width	tRSTW	10	50	-	us	R=10Kohm, C=1uF
Input Output timing						
DCLK clock time	Tclk	33.3	-	-	ns	DCLK=30MHz
DCLK clock low period	Tcwl	40	-	60	%	
DCLK clock high period	Tcwh	40	-	60	%	
Clock rising time	Trck	9	-	-	ns	
Clock falling time	Tfck	9	-	-	ns	
HSD width	Thwh	1	-	-	DCLK	
HSD period time	Th	55	60	65	us	
HSD setup time	Thsu	12	-	-	ns	
HSD hold time	Thhd	12	-	-	ns	
VSD width	Tvwh	1	-	-	Th	
VSD setup time	Tvsu	12	-	-	ns	
VSD hold time	Tvhd	12	-	-	ns	
Data setup time	Tdasu	12	-	-	ns	
Data hold time	Tdahd	12	-	-	ns	
DE setup time	Tdesu	12	-	-	ns	
DE hold time	Tdehd	12	-	-	ns	
Source output setting time	Tsst	-	-	TBD	us	10% to 90% CL=60pF, RL=2Kohm
Gate output setting time	Tgst	-	-	TBD	ns	10% to 90%, CL=60pF
VCOM output setting time	Tcst	-	-	TBD	us	10% to 90%, CL=40nF, RL=50ohm
Time from VSD to 1st line data input	Tvs	3	8	31	Th	HV mode By HDL[4:0] setting
3-wire serial communication AC timing						
Serial clock	Tsck	200	-	-	ns	For SCL pin
SCL pulse low period	Tckl	40	-	60	%	
SCL pulse low period	Tckh	40	-	60	%	
Serial data setup time	Tisu	50	-	-	ns	
Serial data hold time	Tihd	50	-	-	ns	
Serial clock high/low	Tssw	50	-	-	ns	
CSB to VSD	Tcv	1			us	
CSB distinguish time	Tcd	400	-	-	ns	
CSB input setup time	Tcsu	50	-	-	ns	
CSB input hold time	Tchd	50	-	-	ns	



6.2 Clock and Data Input Waveforms



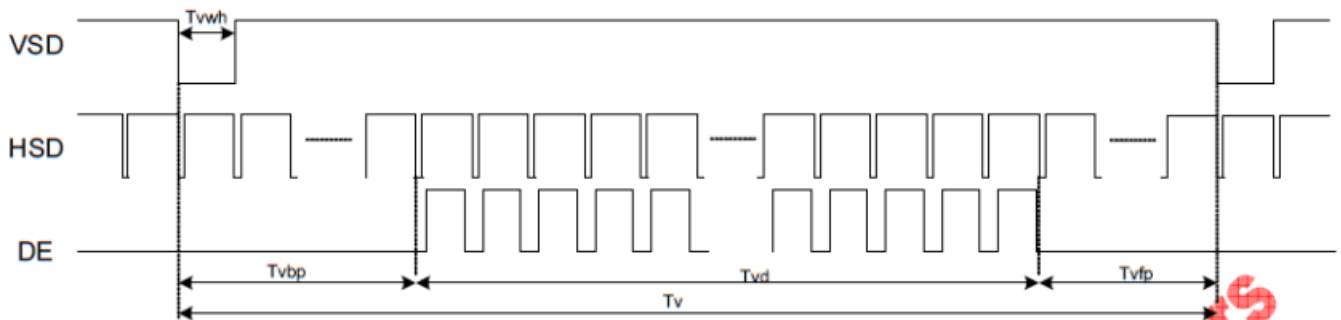
6.3 Data Input Format

ISO9001:2008

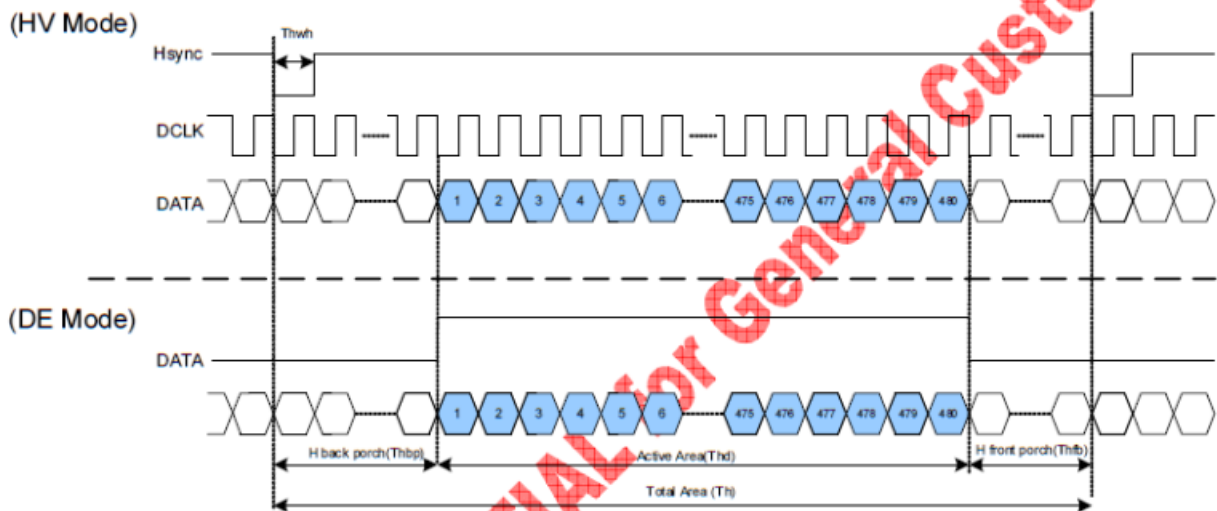
for General Customers

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Vertical input timing

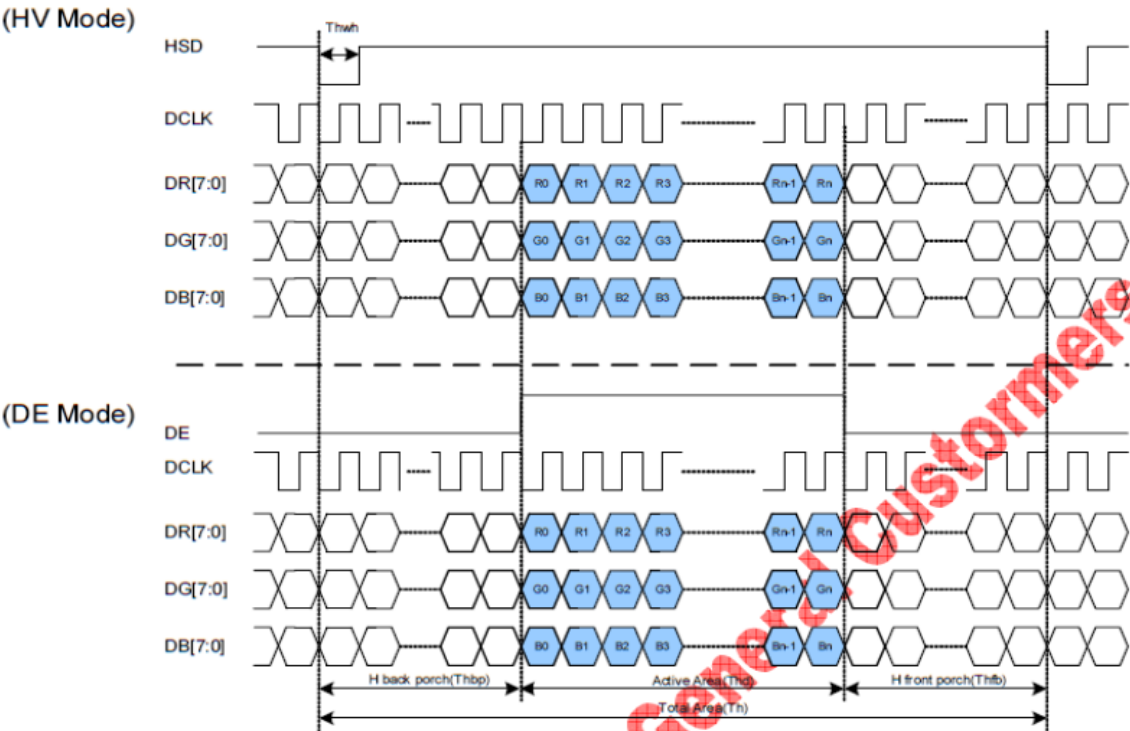


Serial 8-bit RGB Mode Data format



Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
DCLK frequency	Fclk	24	27	30	MHz	
DCLK cycle time	Tclk	83	110	200	ns	
DCLK pulse duty	Tcwh	40	50	60	%	
Time from HSD to source output	Thso	-	13	-	DCLK	
Time from HSD to gate output	Thgo	-	27	-	DCLK	
Time from HSD to gate output off	Thgz	-	3	-	DCLK	
Time from HSD to VCOM	Thvc	-	12	-	DCLK	

Parallel RGB Mode Data format



Parallel RGB input timign table

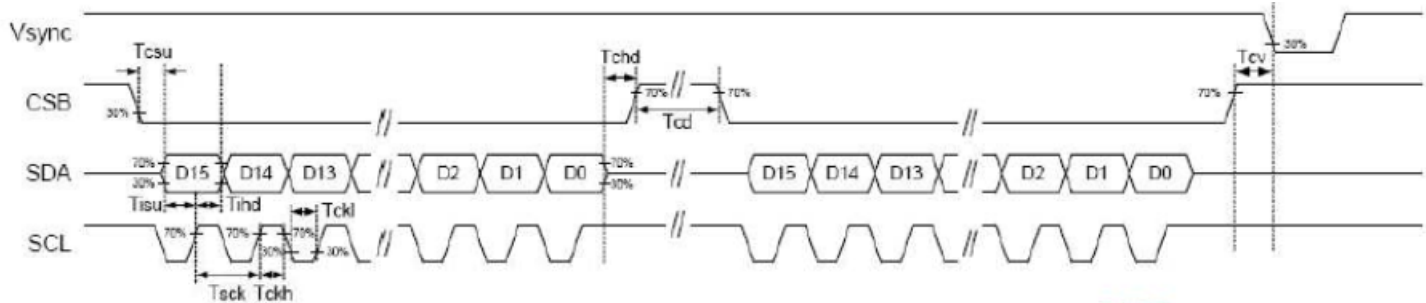
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	5	9	12	MHz
VSD period time	Tv	277	288	400	H
VSD display area	Tvd	272			H
VSD back porch	Tvb	3	8	31	H
VSD front porch	Tvfp	2	8	97	H
HSD period time	Th	520	525	800	DCLK
HSD display area	Thd	480			DCLK
HSD back porch	Thbp	36	40	255	DCLK
HSD front porch	Thfp	4	5	65	DCLK

Serial RGB input timign table

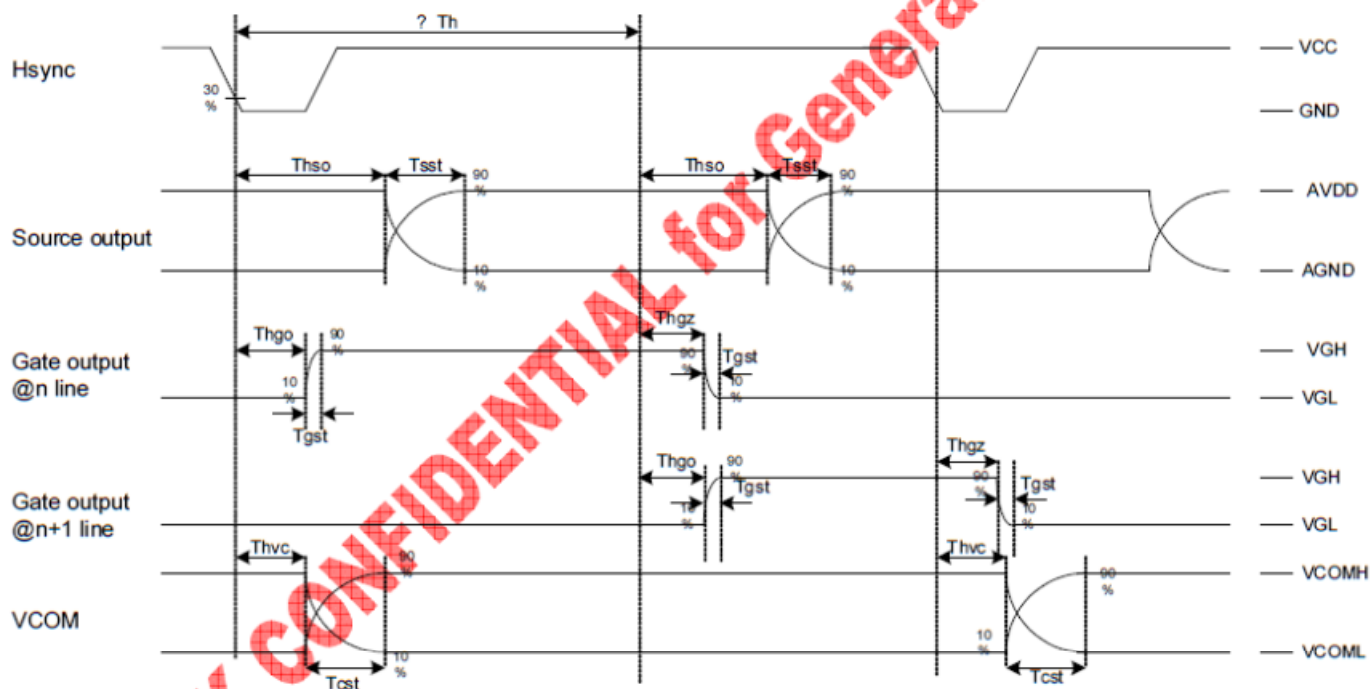
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency	fclk	-	27	-	MHz
VSD period time	Tv	277	288	400	H
VSD display area	Tvd	272			H
VSD back porch	Tvb	3	8	31	H
VSD front porch	Tvfp	2	8	97	H
HSD period time	Th	-	1728	-	DCLK
HSD display area	Thd	1440			DCLK

HSD back porch	Thbp	-	120	-	DCLK
HSD front porch	Thfp	-	168	-	DCLK

6.4 3-wire Timing Diagram



6.5 Output Timing Diagram



7. CTP Specification

7.1 Electrical Characteristics

7.1.1 Absolute Maximum Rating

Item	Symbol	Unit	Value	Note
Power Supply Voltage 1	VDDA - VSSA	V	-0.3 ~ +3.6	1, 2
Power Supply Voltage 2	VDD3 - VSS	V	-0.3 ~ +3.6	1, 3
I/O Digital Voltage	IOVCC	V	1.8~3.6	1
Operating Temperature	Topr	°C	-20 ~ +85	1
Storage Temperature	Tstg	°C	-55 ~ +150	1

Notes

- 1.If used beyond the absolute maximum ratings, FT5x16 may be permanently damaged. It is strongly recommended that the device be used within the electrical characteristics in normal operations. If exposed to the condition not within the electrical characteristics, it may affect the reliability of the device.
- 2.Make sure VDDA(high)≥VSSA (low)
- 3.Make sure VDD (high)≥VSS (low)

7.1.2 DC Electrical Characteristics

Table 3-2 DC Characteristics (VDDA=VDD3=2.8~3.6V, Ta=-20~85°C)

Item	Symbol	Unit	Test Condition	Min.	Typ.	Max.	Note
Input high-level voltage	VIH	V		0.7 x IOVCC	--	IOVCC	
Input low -level voltage	VIL	V		-0.3	--	0.3 x IOVCC	
Output high -level voltage	VOH	V	IOH=-0.1mA	0.7 x IOVCC	--	--	
Output low -level voltage	VOL	V	IOH=0.1mA	--	--	0.3 x IOVCC	
I/O leakage current	ILI	μA	Vin=0~VDDA	-1	--	1	
Current consumption (Normal operation mode)	Iopr	mA	VDDA=VDD3 = 2.8V Ta=25°C MCLK=24MHz	--	TBD	--	
Current consumption (Monitor mode)	Imon	mA	VDDA=VDD3 = 2.8V Ta=25°C MCLK=24MHz	--	TBD	--	
Current consumption (Sleep mode)	Islp	mA	VDDA=VDD3 = 2.8V Ta=25°C MCLK=24MHz	--	TBD	--	
Step-up output voltage	VDD5	V	VDDA=VDD3= 2.8V	4.5	5	5.2	1
Power Supply voltage	VDDA VDD3	V		2.8	--	3.6	

Notes

- 1.If VDDA and VDD3 are 3.3V, the max value of VDD5 is 6V.

7.2 CTP AC Characteristics

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Table 3-3 AC Characteristics of Oscillators

Item	Symbol	Unit	Test Condition	Min.	Typ.	Max.	Note
OSC clock 1	fosc1	MHz	VDD3 = 2.8V Ta=25°C	23.5	24	24.5	

Table 3-4 AC Characteristics of TX & RX

Item	Symbol	Unit	Test Condition	Min	Typ	Max	Note
TX acceptable clock	ftx	KHz		100	150	300	
TX output rise time	Ttxr	nS		--	140	--	
TX output fall time	Ttxf	nS		--	140	--	
RX input voltage	Trxi	V		1.2	--	1.6	

7.2.1 I2C Interface

The I2C is always configured in the Slave mode. The data transfer format is shown in Figure4-1:

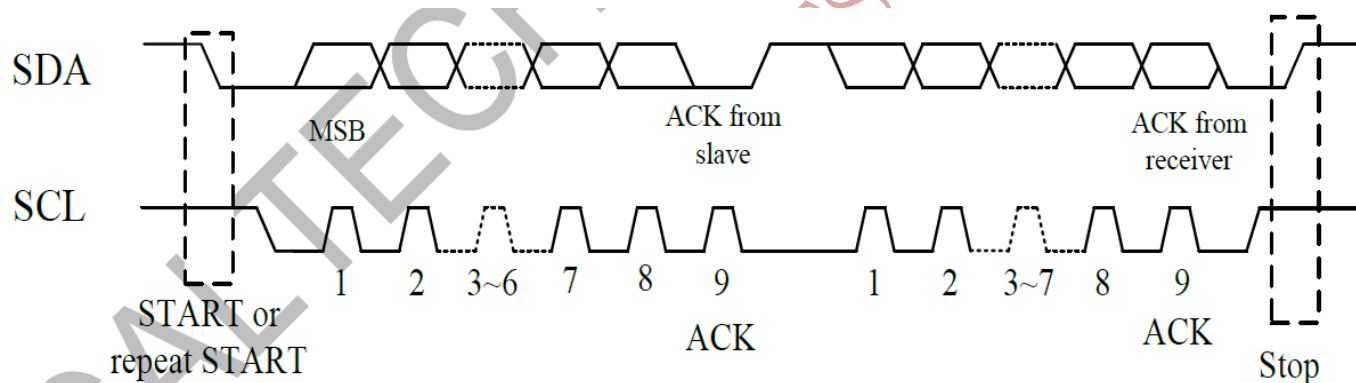


Figure 4-1 I2C Serial Data Transfer Format

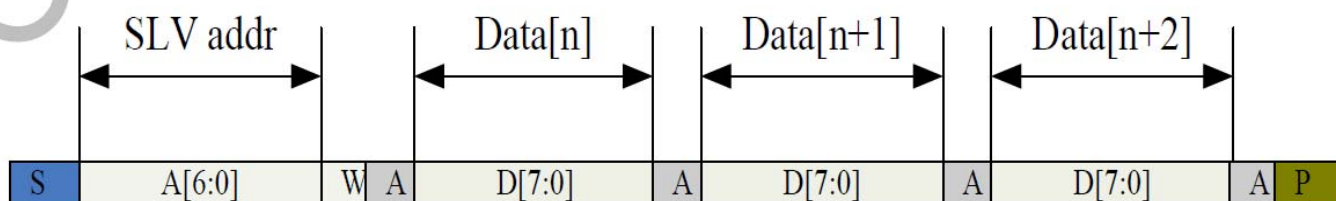


Figure 4-2 I2C master write, slave read

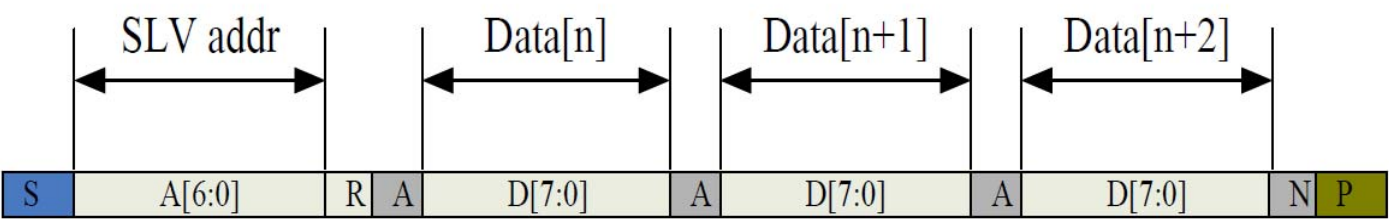


Figure 4-3 I2C master read, slave write

Table4-3 lists the meanings of the mnemonics used in the above figures.

Table 4-3 Mnemonics Description

Mnemonics	Description
S	I2C Start or I2C Restart
A[6:0]	Slave address
R/W	READ/WRITE bit, ‘1’ for read, ‘0’ for write
A(N)	ACK(NACK)
P	STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet)

I2C Slave address is 0x38.

I2C Interface Timing Characteristics is shown in Table4-4.

Table 4-4 I2C Timing Characteristics

Parameter	Min	Max	Unit
SCL frequency	10	400	KHz
Bus free time between a STOP and START condition	4.7	\	us
Hold time (repeated) START condition	4.0	\	us
Data setup time	250	\	ns
Setup time for a repeated START condition	4.7	\	us
Setup Time for STOP condition	4.0	\	us

8 LCD Module Out-Going Quality Level

8.1 VISUAL & FUNCTION INSPECTION STANDARD

8.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

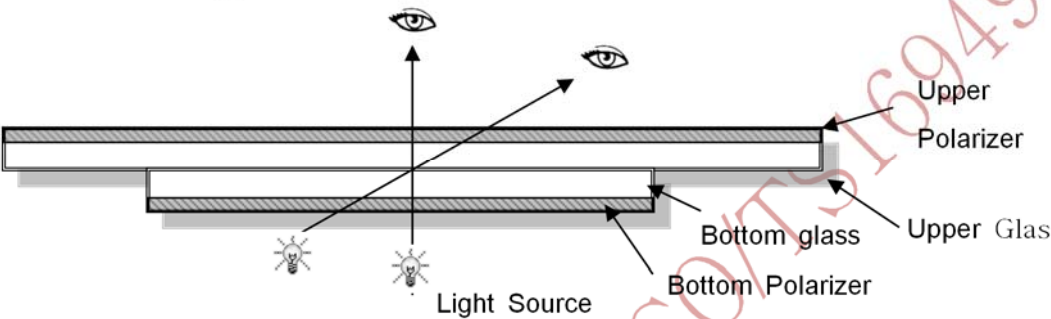
Temperature : 25±5℃

Humidity : 65%±10%RH

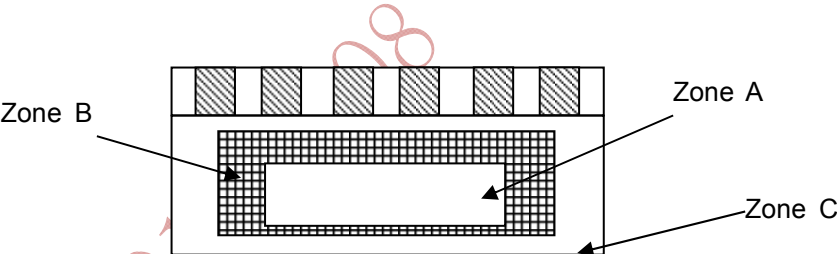
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



8.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer.

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8.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

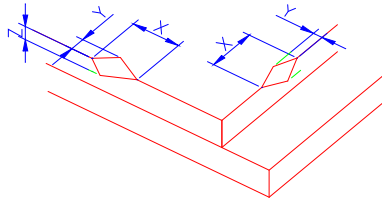
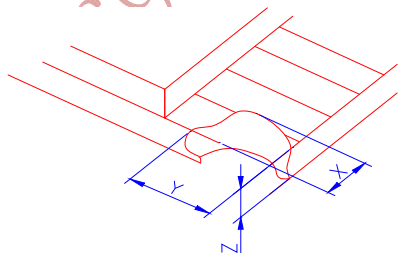
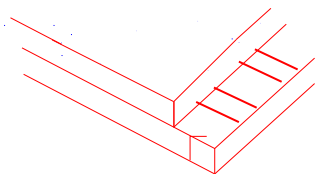
AQL:

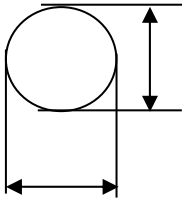
Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

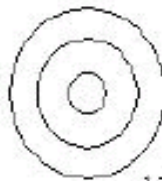


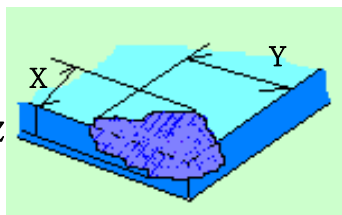
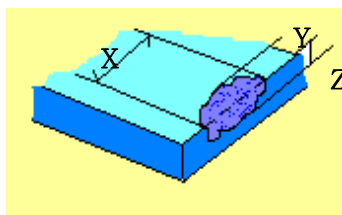
8.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken	(1) The edge of LCD broken	<div></div> <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td><Inner border line of the seal</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
	X	Y	Z					
	≤3.0mm	<Inner border line of the seal	≤T					
(2)LCD corner broken	<div></div> <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	≤L	≤T	
X	Y	Z						
≤3.0mm	≤L	≤T						
(3) LCD crack	<div></div> <div>Crack Not allowed</div>							

Number	Items	Criteria (mm)																							
2.0	<div>Spot defect</div> <div></div> <div>Y</div> <div>X</div> <div>$\Phi=(X+Y)/2$</div>	① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)																							
		<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Accep</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi\leq0.10$</td><td colspan="2">Ignore</td><td rowspan="4">Ignor</td></tr><tr><td>$0.10<\Phi\leq0.20$</td><td colspan="2">3(distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.20<\Phi\leq0.25$</td><td colspan="2">2</td></tr><tr><td>$\Phi > 0.25$</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Accep			A	B	C	$\Phi\leq0.10$	Ignore		Ignor	$0.10<\Phi\leq0.20$	3(distance $\geq 10\text{mm}$)		$0.20<\Phi\leq0.25$	2		$\Phi > 0.25$	0				
		Zone Size (mm)		Accep																					
			A	B	C																				
		$\Phi\leq0.10$	Ignore		Ignor																				
		$0.10<\Phi\leq0.20$	3(distance $\geq 10\text{mm}$)																						
		$0.20<\Phi\leq0.25$	2																						
		$\Phi > 0.25$	0																						
		②Dim spot (LCD/TP/Polarizer dim dot, light leakage、dark spot)																							
		<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi\leq0.1$</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.10<\Phi\leq0.20$</td><td colspan="2">3(distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.20<\Phi\leq0.30$</td><td colspan="2">2</td></tr><tr><td>$\Phi > 0.30$</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi\leq0.1$	Ignore		Ignore	$0.10<\Phi\leq0.20$	3(distance $\geq 10\text{mm}$)		$0.20<\Phi\leq0.30$	2		$\Phi > 0.30$	0				
		Zone Size (mm)		Acceptable Qty																					
			A	B	C																				
		$\Phi\leq0.1$	Ignore		Ignore																				
		$0.10<\Phi\leq0.20$	3(distance $\geq 10\text{mm}$)																						
		$0.20<\Phi\leq0.30$	2																						
		$\Phi > 0.30$	0																						
		③ Polarizer accidented spot																							
		<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi\leq0.2$</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.3<\Phi\leq0.5$</td><td colspan="2">2(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi>0.5$</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi\leq0.2$	Ignore		Ignore	$0.3<\Phi\leq0.5$	2(distance $\geq 10\text{mm}$)		$\Phi>0.5$	0							
		Zone Size (mm)		Acceptable Qty																					
			A	B	C																				
		$\Phi\leq0.2$	Ignore		Ignore																				
		$0.3<\Phi\leq0.5$	2(distance $\geq 10\text{mm}$)																						
		$\Phi>0.5$	0																						
		Line defect (LCD/TP/Polarizer black/white line, scratch, stain)																							
<table><tr><th rowspan="2">Width(mm)</th><th rowspan="2">Length(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi\leq0.03$</td><td>Igno</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.03<W\leq0.05$</td><td>$L\leq3.0$</td><td colspan="2">$N\leq2$</td></tr><tr><td>$0.05<W\leq0.08$</td><td>$L\leq2.0$</td><td colspan="2">$N\leq2$</td></tr><tr><td>$0.08<W$</td><td colspan="3">Define as spot defect</td></tr></table>	Width(mm)	Length(mm)	Acceptable Qty			A	B	C	$\Phi\leq0.03$	Igno	Ignore		Ignore	$0.03<W\leq0.05$	$L\leq3.0$	$N\leq2$		$0.05<W\leq0.08$	$L\leq2.0$	$N\leq2$		$0.08<W$	Define as spot defect		
Width(mm)			Length(mm)	Acceptable Qty																					
	A	B		C																					
$\Phi\leq0.03$	Igno	Ignore		Ignore																					
$0.03<W\leq0.05$	$L\leq3.0$	$N\leq2$																							
$0.05<W\leq0.08$	$L\leq2.0$	$N\leq2$																							
$0.08<W$	Define as spot defect																								

3.0	Polarizer Bubble	<div><div>Zone Size (mm)</div><div><div></div><div>Acceptable Qty</div><div><div>A</div><div>B</div><div>C</div></div></div></div>			
		$\Phi \leq 0.2$	Ignore		Ignore
		$0.2 < \Phi \leq 0.4$	3(distance ≥ 10)		
		$0.4 < \Phi \leq 0.6$	2		
		$0.6 < \Phi$	0		
		4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect ,the others are minor defect.	

		TP bubble/ accidented spot	Size Φ (mm)		Acceptable Qty		
					A	B	C
			$\Phi \leq 0.1$	Ignore			Ignore
			$0.1 < \Phi \leq 0.25$	3 (distance $\geq 10m$)			
			$0.25 < \Phi \leq 0.3$	2			
			$0.3 < \Phi$	0			
		Assembly deflection	beyond the edge of backlight $\leq 0.15mm$				

5.0	TP Related				 1 规律性						
					 2 非规律性						
					 似牛顿环						
		Newton Ring	Newton Ring area>1/3 TP are a NG Newton Ring area≤1/3 TP are a OK								
		TP corner broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤3.0mm</td><td>Y≤3.0mm</td><td>Z<LCD thickness</td></tr></table> <p>* Circuitry broken is not allowed.</p>	X	Y	Z	X≤3.0mm	Y≤3.0mm	Z<LCD thickness		
X	Y	Z									
X≤3.0mm	Y≤3.0mm	Z<LCD thickness									
		TP edge broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤6.0mm</td><td>Y≤2.0mm</td><td>Z<LCD thickness</td></tr></table> <p>* Circuitry broken is not allowed.</p>	X	Y	Z	X≤6.0mm	Y≤2.0mm	Z<LCD thickness		
X	Y	Z									
X≤6.0mm	Y≤2.0mm	Z<LCD thickness									

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

9. Reliability Test Result

9.1 Condition

Item	Condition	Sample Size	Test Result	Note
Low Temperature Operating Life test	-20℃, 96HR	3ea	pass	-
Thermal Humidity Operating Life test	70℃90%RH, 96HR	3ea	pass	-
Temperature Cycle ON/OFF test	-20℃ ↔ 70℃, ON/OFF, 20CYC	3ea	pass	(1)
High Temperature Storage test	80℃, 96HR	3ea	pass	-
Low Temperature Storage test	-30℃, 96HR	3ea	pass	-
ESD test	150pF, 330Ω, ±6KV(Contact)/± 8KV(Air), 5 points/panel, 10 times/point	3ea	pass	
Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: TSTL for 30 minutes -> normal temperature for 5 minutes -> TSTH for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours	3ea	pass	
Box Drop Test	1 Corner 3 Edges 6 faces, 66cm(MEDIUM BOX)	1box	pass	-

Note (1) ON Time over 10 seconds, OFF Time under 10 seconds

10. Cautions and Handling Precautions

10.1 Handling and Operating the Module

- (1) When the module is assembled, it should be attached to the system firmly.
Do not warp or twist the module during assembly work.
- (2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
- (3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
- (4) Do not allow drops of water or chemicals to remain on the display surface.
If you have the droplets for a long time, staining and discoloration may occur.
- (5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
- (6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.
Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static; it may cause damage to the CMOS ICs.
- (9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (10) Do not disassemble the module.
- (11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (12) Pins of I/F connector shall not be touched directly with bare hands.
- (13) Do not connect, disconnect the module in the "Power ON" condition.
- (14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

10.2 Storage and Transportation:

- (1) Do not leave the panel in high temperature, and high humidity for a long time.
It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%
- (2) Do not store the TFT-LCD module in direct sunlight.
- (3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
- (4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.
In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
- (5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

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常备库存 Standing Stock	长期供货 Long Time supply	支持小量 NO MOQ	品种齐全 In Full Range	



11. Packing

----TBD-----

ISO9001 : 2008 ISO/TS16949 : 2009

Part. No	KD043C-1A-C009A	REV	V1.0	Page 33 of 33
	常 备 库 存 Standing Stock	长 期 供 货 Long Time supply	支持小量 NO MOQ	品 种 齐 全 In Full Range