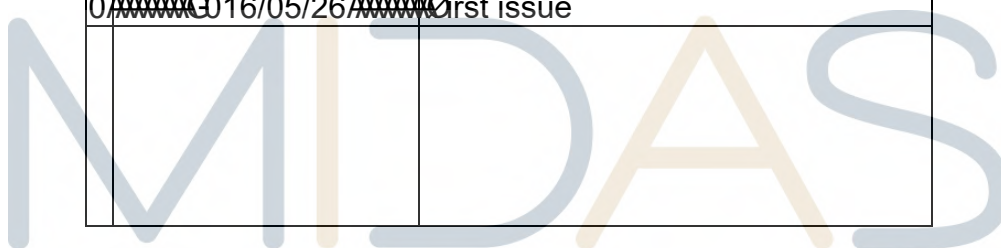


<b>Specification</b>	
Part Number:	MCT070Z0CW1W800480LML
Version:	1
Date:	26/05/2016
<b>Revision</b>	
0/00000	2016/05/26/00000 First issue



Display Size	7.0"
Resolution	800 x 480
VGA Size	N/A
Orientation	Landscape
Appearance	RGB
Logic Voltage	3.3V
Interface	RGB
Brightness	300 cd/m <sup>2</sup>
Touchscreen	Capacitive
Module Size W x H x D	165.00 x 100.00 x 7.475 mm
Operating Temperature	-20°C ~ +70°C
Pin Out	40 - Way



# Contents

1.Module Classification Information

2.Summary

3.General Specification

4.Interface

5.Contour Drawing

6.Block Diagram

7.Absolute Maximum Ratings

8.Electrical Characteristics

9.DC Characteristics

10.AC Characteristics

11.Optical Characteristics

12.Reliability

13.Touch Panel Information

14.Other



# Midas Active Matrix Display Part Number System

MC T 057 A 6 \* W 320240 L M L \* \*  
 1 2 3 4 5 6 7 8 9 10 11 12 13

- 1 = MC: Midas Components
- 2 = T: TFTA: Active Matrix OLED
- 3 = Size
- 4 = Series
- 5 = Viewing Angle: 6: 6 O'clock 12: 12 O'clock O: All Round Viewing Angle
- 6 = Blank: No Touch T: Resistive Touchscreen C: Capacitive Touchscreen
- 7 = Operating Temp Range: S: 0+50Deg C B: -20+60Deg C  
 W: -20+70Deg C E: -30+85Deg C  
 X: -30+80Deg C
- 8 = No of Pixels
- 9 = Orientation: P: Portrait L: Landscape
- 10 = Mode: R: Reflective M: Transmissive T: Transflective  
 S: Sunlight Readable (Transmissive) W: White on Black (Monochrome)
- 11 = Backlight: Blank: None L: LED C: CCFL
- 12 = Blank: No Module/board C: Controller board module (E-Tech)
- 13 = Blank: None OB: Optically Bonded IPS: In-plane switching

## 2.Summary

This technical specification applies to 7.0' color TFT-LCD panel. The 7.0' color TFT-LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays. This module follows RoHS.



### 3. General Specifications

- Size: 7.0 inch
- Dot Matrix: 800 x RGBx480(TFT) dots
- Module dimension: 165.0(W) x 100(H) x 7.475(D) mm
- Active area: 154.08 x 85.92 mm
- Dot pitch: 0.0642 x 0.179 mm
- LCD type: TFT, Normally White, Transmissive
- View Direction: 12 o'clock
- Gray Scale Inversion Direction: 6 o'clock
- CTP FW Version: 09
- Backlight Type: LED, Normally White
- With /Without TP: With CTP
- Surface: Glare

\*Color tone slight changed by temperature and driving voltage.

## 4.Interface

### 4.1. LCM PIN Definition

Pin	Symbol	Function	Remark
1	VLED-	Backlight ground	
2	VLED+	Power supply for backlight	
3	GND	Power ground	
4	VCC	Power for Digital Circuit	
5	R0	Red data(LSB)	Note 1
6	R1	Red data	Note 1
7	R2	Red data	
8	R3	Red data	
9	R4	Red data	
10	R5	Red data	
11	R6	Red data	
12	R7	Red data(MSB)	
13	G0	Green data(LSB)	Note 1
14	G1	Green data	Note 1
15	G2	Green data	
16	G3	Green data	
17	G4	Green data	
18	G5	Green data	
19	G6	Green data	
20	G7	Green data(MSB)	
21	B0	Blue data(LSB)	Note 1
22	B1	Blue data	Note 1
23	B2	Blue data	
24	B3	Blue data	
25	B4	Blue data	
26	B5	Blue data	
27	B6	Blue data	
28	B7	Blue data(MSB)	
29	GND	Power Ground	
30	CLK	Sample clock	Note 2
31	R/L	Right /Left selection	Note 3,4
32	Hsync	Horizontal Sync Input	
33	Vsync	Vertical Sync Input	
34	NC	No connection	
35	U/D	Up/down selection	Note 3,4
36	RESET	Global reset pin.	
37	NC	No connection	
38	NC	No connection	
39	NC	No connection	
40	NC	No connection	

Note 1: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

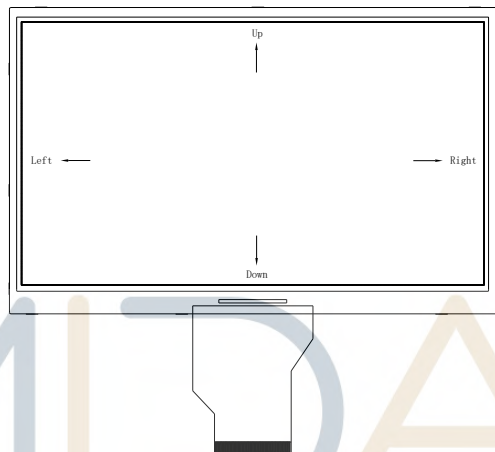
Note 2: Data shall be latched at the falling edge of CLK.

Note 3: Selection of scanning mode

Setting of scan control		Scanning direction
U/D	R/L	
GND	VCC	Up to down, left to right
VCC	GND	Down to up, right to left
GND	GND	Up to down, right to left
VCC	VCC	Down to up, left to right

Note 4: Definition of scanning direction.

Refer to the figure as below:



Note 5: Global reset pin. Active low to enter reset state . Suggest to connect with an RC reset circuit for stability. Normally pull high.

Note 6: Dithering function enable control, normally pull high.

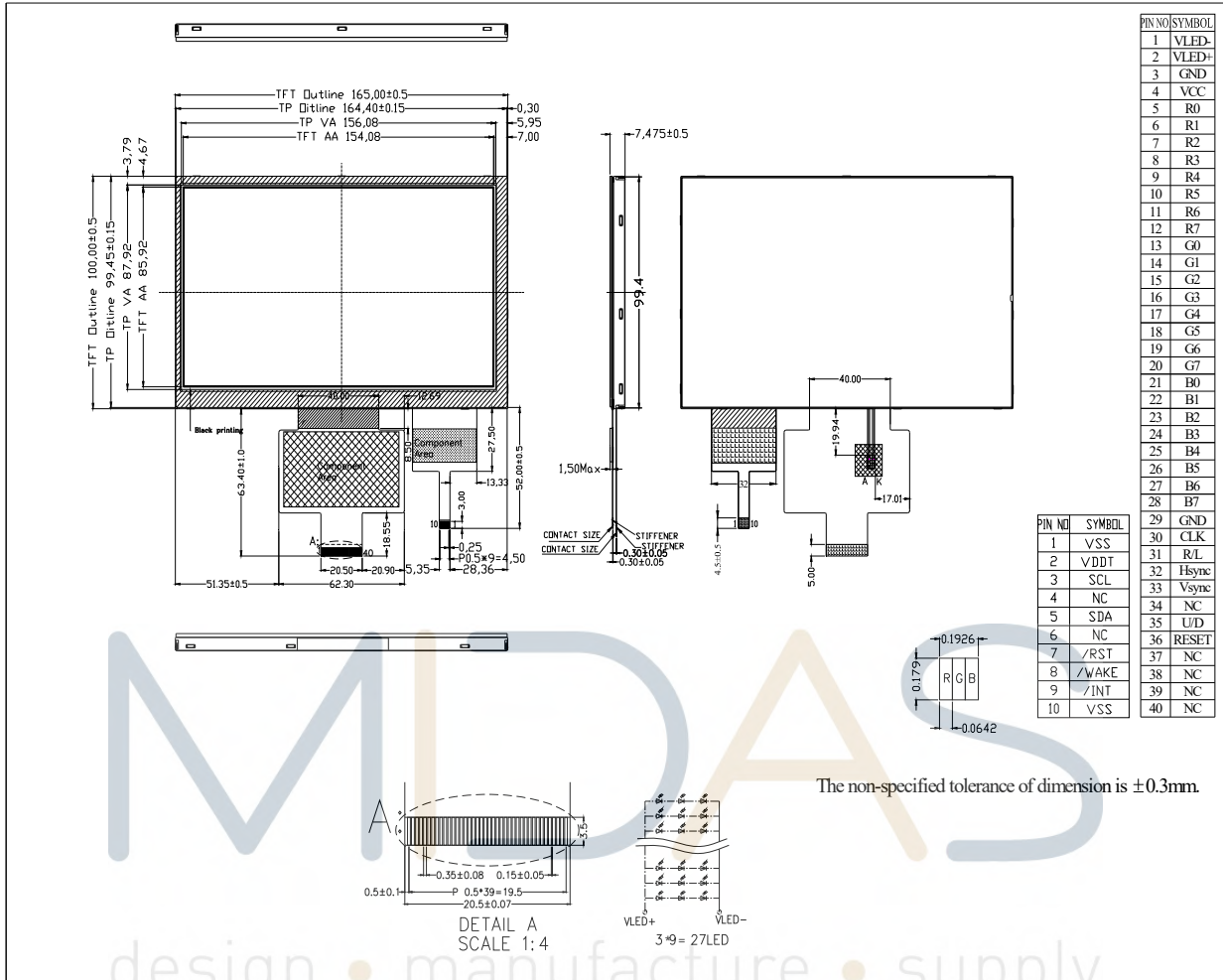
When DITHB="1", Disable internal dithering function,

When DITHB="0", Enable internal dithering function,

## 4.2. CTP PIN Definition

Pin	Symbol	Function	Remark
1	VSS	Ground for analog circuit	
2	VDDT	Power Supply : +3.0V	
3	SCL	I2C clock input	
4	NC	No connect	
5	SDA	I2C data input and output	
6	NC	No connect	
7	/RST	External Reset, Low is active	
8	/WAKE	External interrupt from the host	
9	/INT	External interrupt to the host	
10	VSS	Ground for analog circuit	

# 5. Contour Drawing



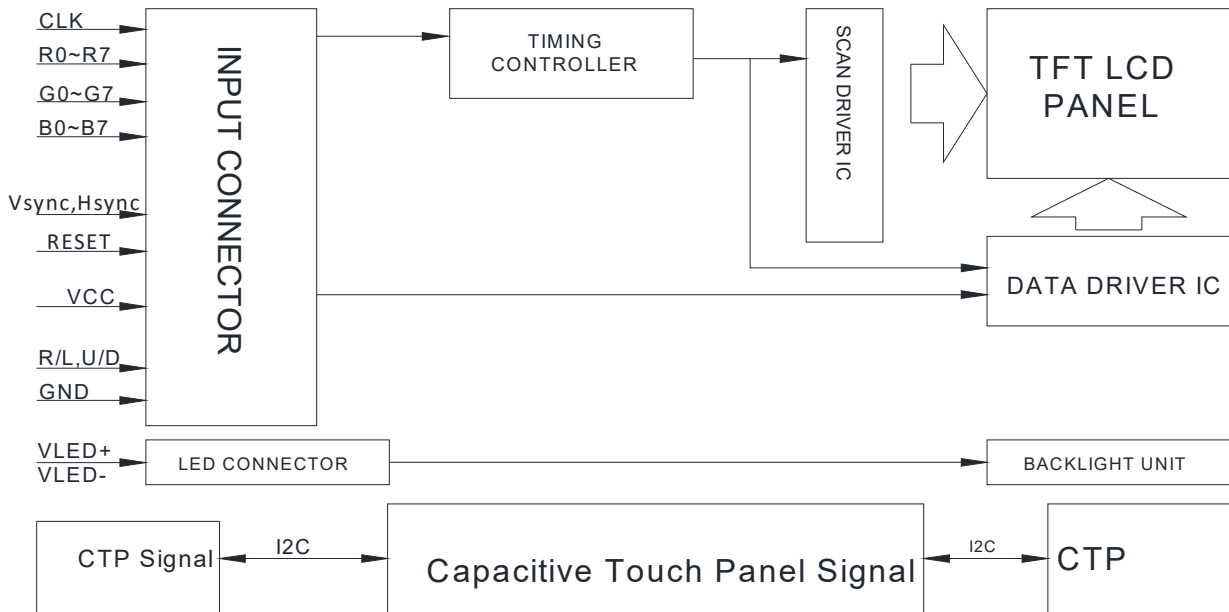
PIN NO	SYMBOL
1	VLED-
2	VLED+
3	GND
4	VCC
5	R0
6	R1
7	R2
8	R3
9	R4
10	R5
11	R6
12	R7
13	G0
14	G1
15	G2
16	G3
17	G4
18	G5
19	G6
20	G7
21	B0
22	B1
23	B2
24	B3
25	B4
26	B5
27	B6
28	B7
29	GND
30	CLK
31	R/L
32	Hsync
33	Vsync
34	NC
35	UD
36	RESET
37	NC
38	NC
39	NC
40	NC

PIN NO	SYMBOL
1	VSS
2	VDDT
3	SCL
4	NC
5	SDA
6	NC
7	/RST
8	/WAKE
9	/INT
10	VSS

The non-specified tolerance of dimension is ±0.3mm.



## 6. Block Diagram



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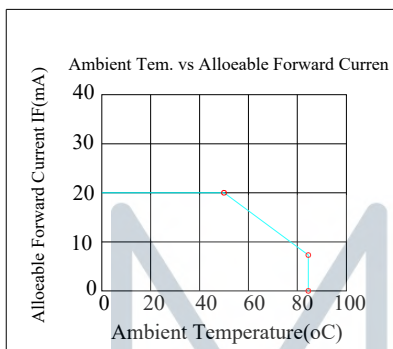
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## 7. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	-	+70	°C
Storage Temperature	TST	-30	-	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

- Temp. ≤ 60°C, 90% RH MAX. Temp. > 60°C, Absolute humidity shall be less than 90% RH at 60°C



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## 8. Electrical Characteristics

### 8.1. Operating conditions:

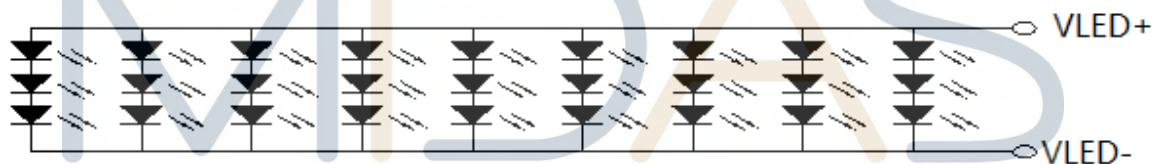
Item	Symbol	Min	Typ	Max	Unit	Remark
Supply Voltage For Logic	VCC	3.0	3.3	3.6	V	Note 1
Power Supply For Current	VCC =3.3V		110	165	mA	
Supply Voltage For Touch Logic	VDDT	2.8	-	3.3	V	

Note 1 : This value is test for Vcc=3.3V , Ta=25°C only

### 8.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	-	-	180	-	mA	-
Power Consumption	-	1620	-	1890	mW	-
LED voltage	A~K	9.0	-	10.5	V	Note 1
LED Life Time	-	-	50,000	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Backlight LED Circuit

Note 2 : Ta = 25 °C

Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

## 9.DC CHARATERISTICS

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	$V_{IL}$	0	-	0.3VCC	V	
High level input voltage	$V_{IH}$	0.7VCC	-	VCC	V	

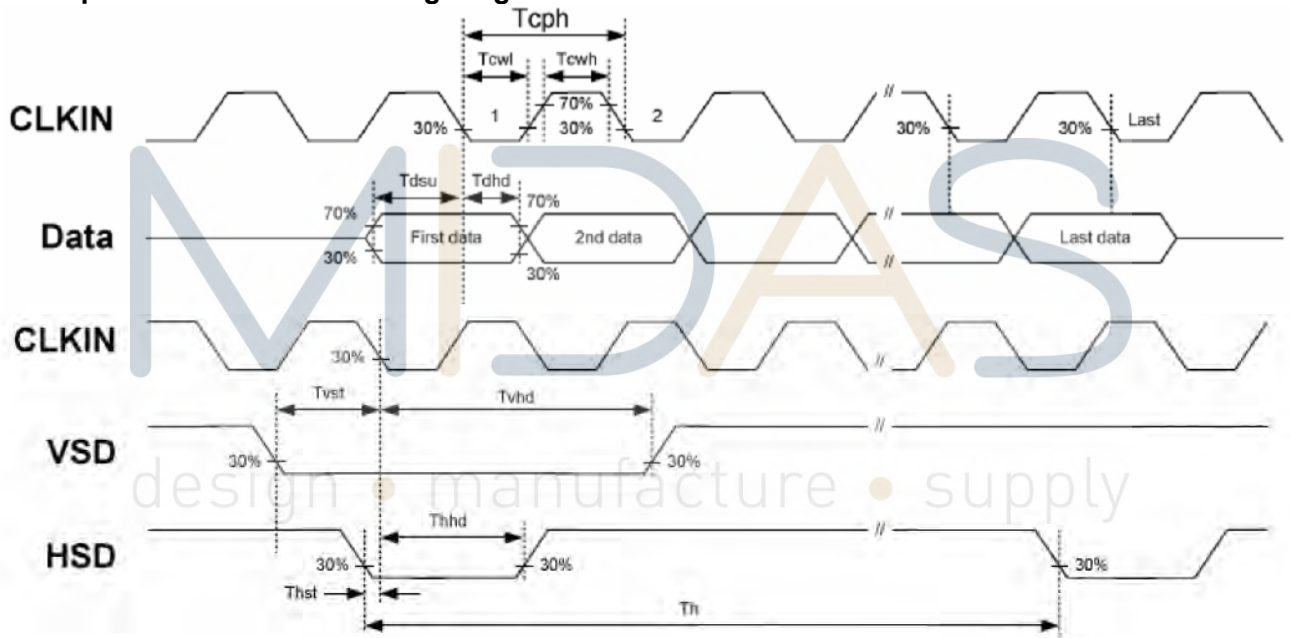
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# 10.AC CHARATERISTICS

## 10.1. AC Electrical Characteristics

Signal	Symbol	Min	Typ	Max	Unit
HS setup time	Thst	8	-	-	ns
HS hold time	Thhd	8	-	-	ns
VS setup time	Tvst	8	-	-	ns
VS hold time	Tvhd	8	-	-	ns
Data setup time	Tdsu	8	-	-	ns
Data hole time	Tdhd	8	-	-	ns
VCC Power On Slew rate	TPOR	-	-	20	ms
RESET pulse width	TRst	1	-	-	ms
DCLK cycle time	Tcoh	20	-	-	ns
DCLK pulse duty	Tcwh	40	50	60	%

## 10.2. Input Clock and Data Timing Diagram



### 10.3. Timing

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
CLK Frequency (DCLK)	fclk	26.4	33.3	46.8	MHz	
Horizontal Display Area	thd	-	800	-	CLK	
One Horizontal Line	th	862	1056	1200	CLK	
HS pulse width	thpw	1	-	40	CLK	
HS Blanking	thb	46	46	46	CLK	
HS Front Porch	thfp	16	210	354	CLK	
Vertical Display Area	tvd	-	480	-	TH	
VS period time	tv	510	525	650	TH	
VS pulse width	tvpw	1	-	20	TH	
VS Blanking	tvb	23	23	23	TH	
VS Front Porch	tvfp	7	22	147	TH	

### 10.4. Data Input Format

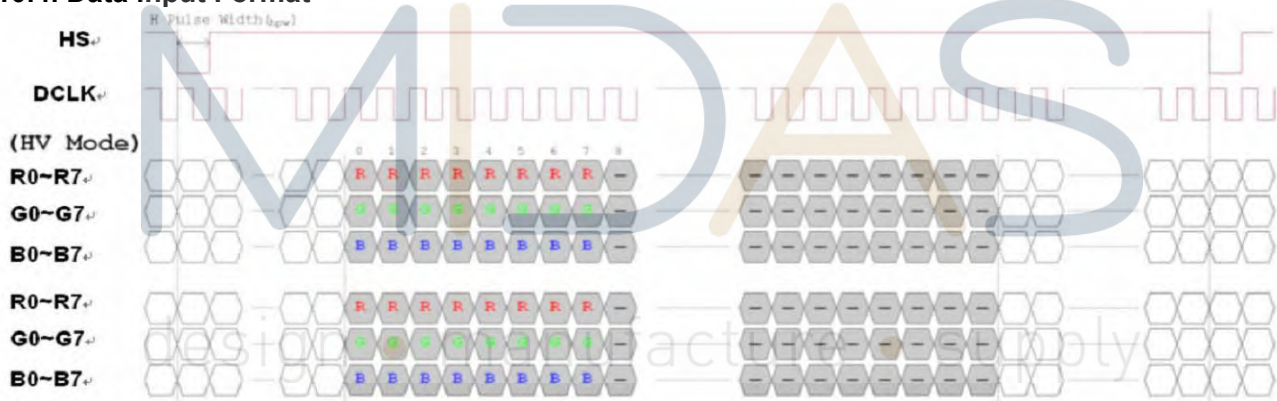


Fig. Horizontal input timing diagram

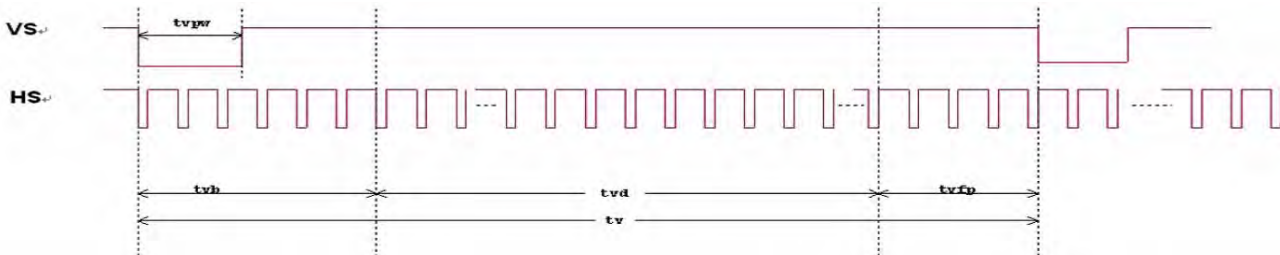


Fig. Vertical input timing diagram

# 11. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time	$T_r$	$\theta=0^\circ, \phi=0^\circ$	-	10	20	.ms	Note 3
	$T_f$		-	15	30	.ms	
Contrast ratio	CR	At optimized viewing angle	400	500	-	-	Note 4
Color Chromaticity	White	$\theta=0^\circ, \phi=0$	0.26	0.30	0.32	-	Note 2,5,6
			0.27	0.28	0.33	-	
Viewing angle (Gray Scale Inversion Direction)	Hor.	$\theta_R$	-	75	-	Deg.	Note 1
		$\theta_L$	-	75	-		
	Ver.	$\phi_T$	-	75	-		
		$\phi_B$	-	75	-		
Brightness	-	-	200	300	-	cd/m <sup>2</sup>	Center of display

Ta=25±2°C, IL=180mA

Note 1: Definition of viewing angle range

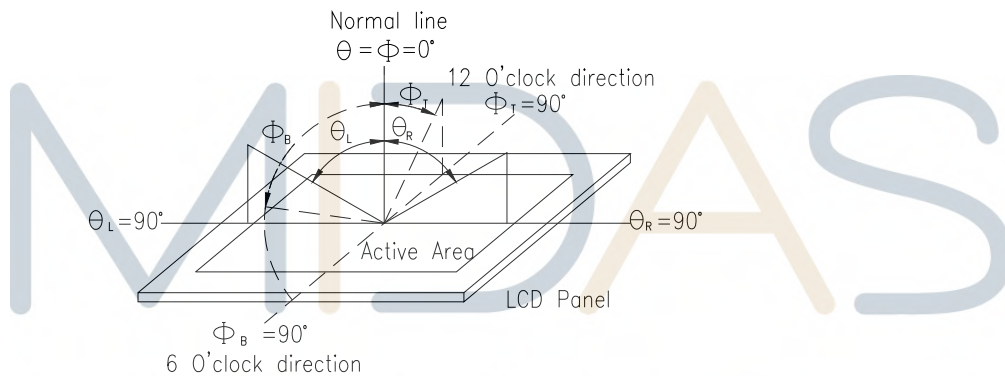


Fig. 11.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

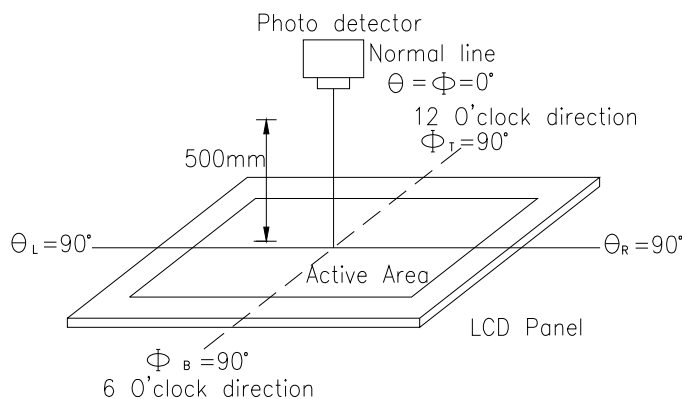
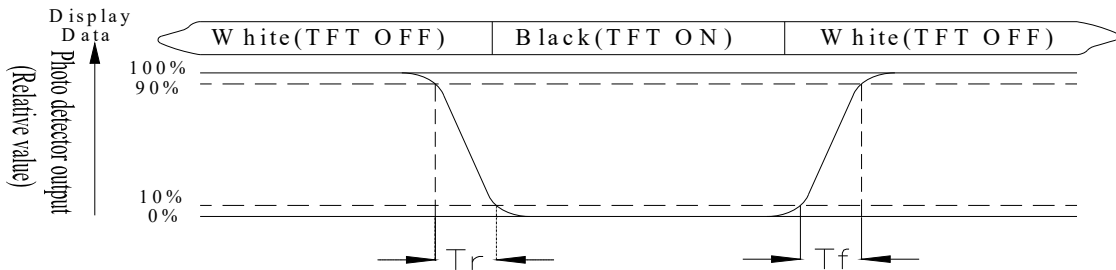


Fig. 11.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time,  $T_r$ , is the time between photo detector output intensity changed from 90% to 10%. And fall time,  $T_f$ , is the time between photo detector output intensity changed from 10% to 90%



Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White  $V_i = V_{i50} \pm 1.5V$

Black  $V_i = V_{i50} \pm 2.0V$

"±" means that the analog input signal swings in phase with VCOM signal.

"±" means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.



## 12. Reliability

Content of Reliability Test (Wide temperature, -20°C~70°C)

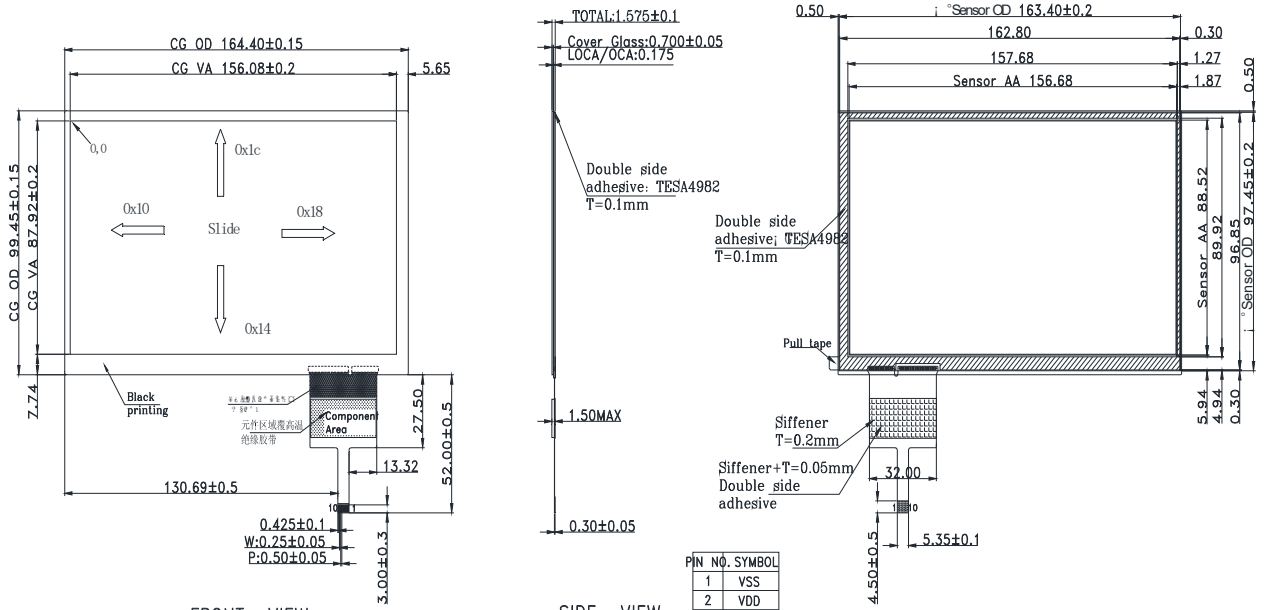
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C, 90%RH max	60°C, 90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation  <div style="text-align: center;"> <p style="margin: 0;">-20°C      25°C      70°C</p> <p style="margin: 0;">30min    5min    30min</p> <p style="margin: 0;">1 cycle</p> </div>	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 3 15mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X, Y, Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(contact) , ±800v(air), RS=330Ω CS=150pF 10 times	—

Note1: No dew condensation to be observed.

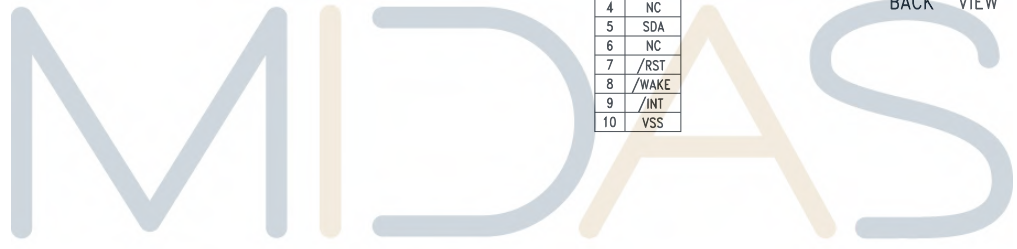
Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

# 13.Touch Panel Information

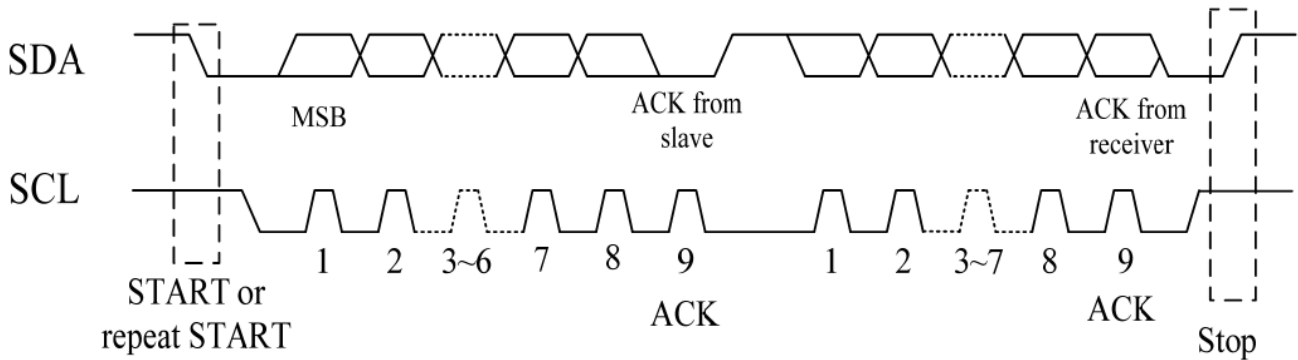


PIN NO.	SYMBOL
1	VSS
2	VDD
3	SCL
4	NC
5	SDA
6	NC
7	/RST
8	/WAKE
9	/INT
10	VSS

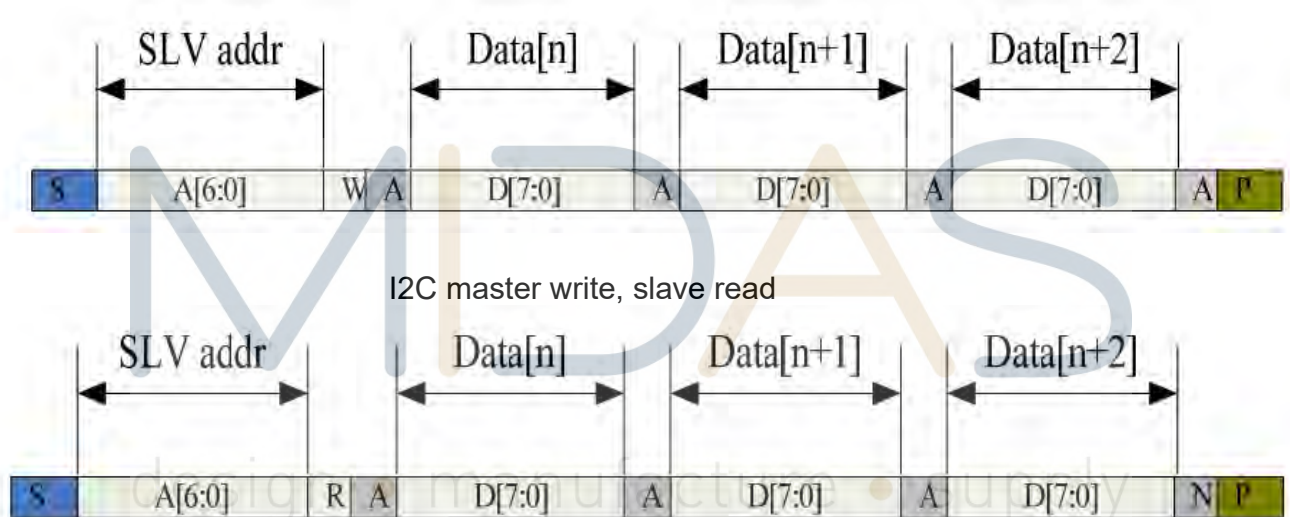


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### 13.1. CTP I2C Timing:



I2C Serial Data Transfer Format



I2C master read, slave write

Mnemonics	Description
S	12C Start or 12C Restart
A[6:0]	Slave address
R/W	READ/WRITE bit, '1' for read, '0' for write
A(N)	ACK(NACK) bit
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 beginning of the next packet)

Lists the meanings of the mnemonics used in the above figures

Parameter	Unit	Min	Max
SCL frequency	KHz	0	400
Bus free time between a STOP and START condition	us	4.7	\
Hold time (repeated) START condition	us	4.0	\
Data setup time	ns	250	\
Setup time for a repeated START condition	us	4.7	\
Setup time for STOP condition	us	4.0	\

Interface Timing Characteristics

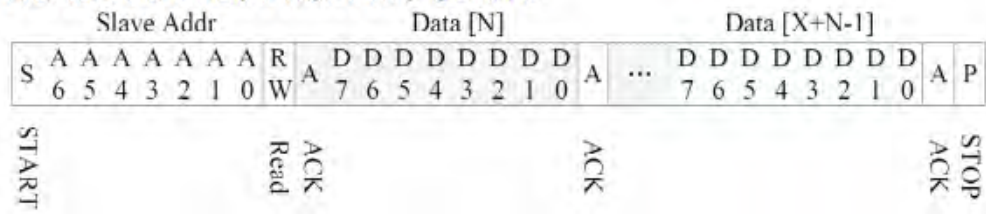
AS FOR STANDARD CTPM, HOST NEED TO USE BOTH INTERRUPT CONTROL SIGNAL AND SERIAL DATA INTERFACE TO GET THE TOUCH DATA.

HERE IS THE TIMING TO GET TOUCH DATA.

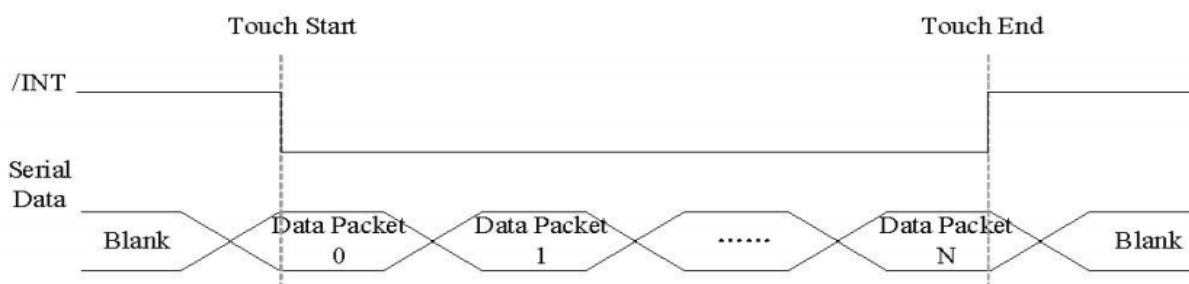
### 13.2. WRITE BYTES TO I2C SLAVE



### READ X BYTES FROM I2C SLAVE



AS FOR STANDARD CTPM, HOST NEED TO USE BOTH INTERRUPT CONTROL SIGNAL AND SERIAL DATA INTERFACE TO GET THE TOUCH DATA, HERE IS THE TIMING TO GET TOUCH DATA.



Address: 0X38

### TOUCH DATA READ PROTOCOL

NAME	VALUE	DESCRIPTION
START CH	0X00	START COMMAND FOR CTPM TOUCH DATA PACKET,HOST MUST SEND CTPM A START CH COMMAND BEFORE READ TOUCH DATA
1st READ BYTE ~ LAST READ BYTE		TOUCH DATA PACKET SENT BY CTPM,EACH BYTE HAS 8-BIT DATA ,A TOUCH DATA PACKET CONSISTS OF N BYTE

A DATA PACKET STARTS WITH A HEADER AND ENDS WITH CRC CODE,AS FOR 5 POINTS DATA PACKET,THE LENGTH OF THE PACKET IS ALWAYS 26 BYTES IN SPITE OF ACTUAL TOUCH POINTS.

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access
00h	Devide__Mode		Device Model[2:0]							RW
01h	Gest__ID	Gesture ID[7:0]								R
02h	TD__Status					Number of touch points[3:0]				R
03h	Touch1__XH	1 <sup>st</sup> Event Flag				1 <sup>st</sup> Touch X Position[11:8]				R
04h	Touch1__XL	1 <sup>st</sup> Touch X Position[7:0]								R
05h	Touch1__YH	1 <sup>st</sup> Touch ID[3:0]						1 <sup>st</sup> Touch Y Position[11:8]		R
06h	Touch1__YL	1 <sup>st</sup> Touch Y Position[7:0]								R
09h	Touch2__XH	2 <sup>nd</sup> Event Flag				2 <sup>nd</sup> Touch X Position[11:8]				R
0Ah	Touch2__XL	2 <sup>nd</sup> Touch X Position[7:0]								R

0Bh	Touch2__YH	2nd Touch ID[3:0]	2ndTouch Y Position[11:8]	R
0Ch	Touch2__YL	2nd Touch Y Position[7:0]		R
0Fh	Touch3__XH	3rdEvent Flag	3rdTouch X Position[11:8]	R
10h	Touch3__XL	3rd Touch X Position[7:0]		R
11h	Touch3__YH	3rdTouch ID[3:0]	3rdTouch Y Position[11:8]	R
12h	Touch3__YL	3rd Touch Y Position[7:0]		R
15h	Touch4__XH	4thEvent Flag	4thTouch X Position[11:8]	R
16h	Touch4__XL	4th Touch X Position[7:0]		R
17h	Touch4__YH	4thTouch ID[3:0]	4thTouch Y Position[11:8]	R
18h	Touch4__YL	4th Touch Y Position[7:0]		R
1Bh	Touch5__XH	5thEvent Flag	5thTouch X Position[11:8]	R
1Ch	Touch5__XL	5th Touch X Position[7:0]		R
1Dh	Touch5__YH	5thTouch ID[3:0]	5thTouch Y Position[11:8]	R
1Eh	Touch5__YL	5th Touch Y Position[7:0]		R

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