



Distributed by:



www.texim-europe.com

SPECIFICATION FOR LCM+CTP Module

Distributed by:



www.texim-europe.com

MODULE No:	KD030WVFID029-C028A
CUSTOMER:	

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Part. No

KD030WVFID029-C028A

REV

V1.0

Page 1 of 36

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

[illegible]

Distributed by www.texim-europe.com

Contents

1. Block Diagram.....	5
2. Outline dimension.....	6
3. Input terminal Pin Assignment.....	7
3.1 TFT.....	7
3.2 CTP.....	8
4. LCD Optical Characteristics.....	9
4.1 Optical specification.....	9
5. TFT Electrical Characteristics.....	12
5.1 Absolute Maximum Rating (Ta=25 VSS=0V).....	12
5.2 DC Electrical Characteristics.....	12
5.3 LED Backlight Characteristics.....	13
6. AC Characteristics.....	15
6.1 MIPI Interface Characteristics.....	15
6.1.1 High Speed Mode.....	15
6.1.2 Low Power Mode.....	15
6.1.3 Bursts Mode.....	15
6.2 Reset input timing.....	错误！未定义书签。
7. CTP Specification.....	20
7.1 Electrical Characteristics.....	20
7.1.1 Absolute Maximum Rating.....	20
7.1.2 DC Electrical Characteristics (Ta=25°C).....	20
7.1.3 AC Characteristics.....	21
7.2 I2C Timing.....	21
8. LCD Module Out-Going Quality Level.....	26
8.1 VISUAL & FUNCTION INSPECTION STANDARD.....	26
8.1.1 Inspection conditions.....	26
8.1.2 Definition.....	26
8.1.3 Sampling Plan.....	27
8.1.4 Criteria (Visual).....	28
9. Reliability Test Result.....	34
10. Cautions and Handling Precautions.....	35
10.1 Handling and Operating the Module.....	35
10.2 Storage and Transportation.....	35
11. Packing.....	36

* Description

This is a color active matrix TFT LCD using Low Temperature Poly-silicon TFT's (Thin Film Transistors) as an active switching devices. This module is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 2.99" TFT-LCD contains 268X800 pixels, and can display up to 16.7M colors.

* Features

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	24.12(H)*72.00(V) (2.99inch)	mm	
Driver element	TFT active matrix	-	
Display colors	16.7M	colors	
Number of pixels	268(RGB)*800	dots	
Pixel arrangement	RGB vertical stripe	-	
Pixel pitch	0.09(H)*0.09(V)	mm	
Viewing angle	FREE	o'clock	
Controller IC	ST7701	-	
Display mode	Transmissive /Normally Black	-	
LCM Interface	2-Lane MIPI	-	
Operating temperature	-20~+70	°C	-
Storage temperature	-30~+80	°C	-
Module bonding technology	Use Optical bonding between LCM and CTP	-	

*CTP Features

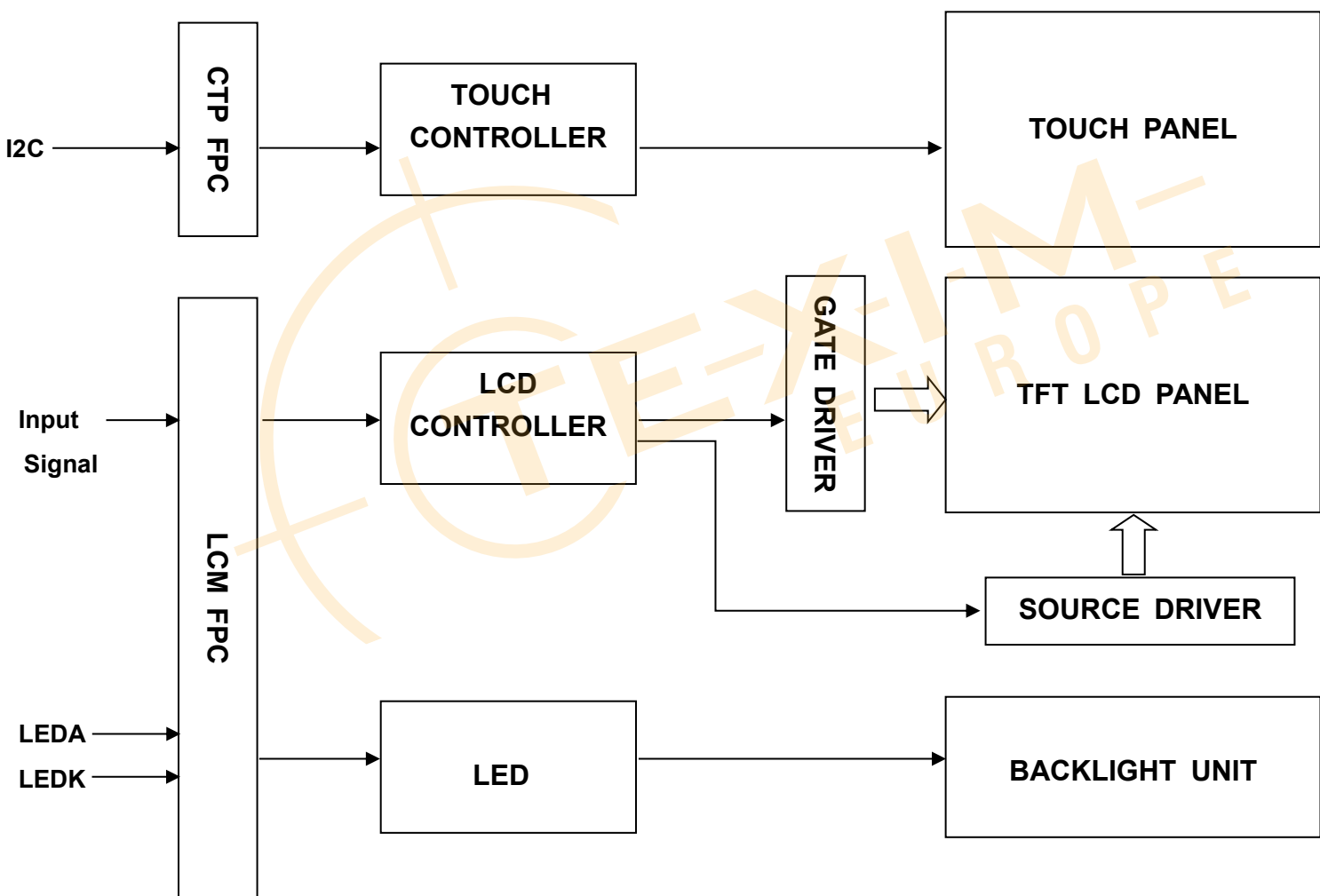
General Information Items	Specification	Unit	Note
	Main Panel		
Resolution	268(H)*800(V)	-	
Structure	G+G	-	
Controller IC	GT911	-	
Interface	I2C	-	
Slave Address	0x5D(7bit) or 0x14(7bit)	-	Note1
Touch mode	Five points	-	-
Logic level	3.3	V	

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 4 of 36
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	

*** Mechanical Information**

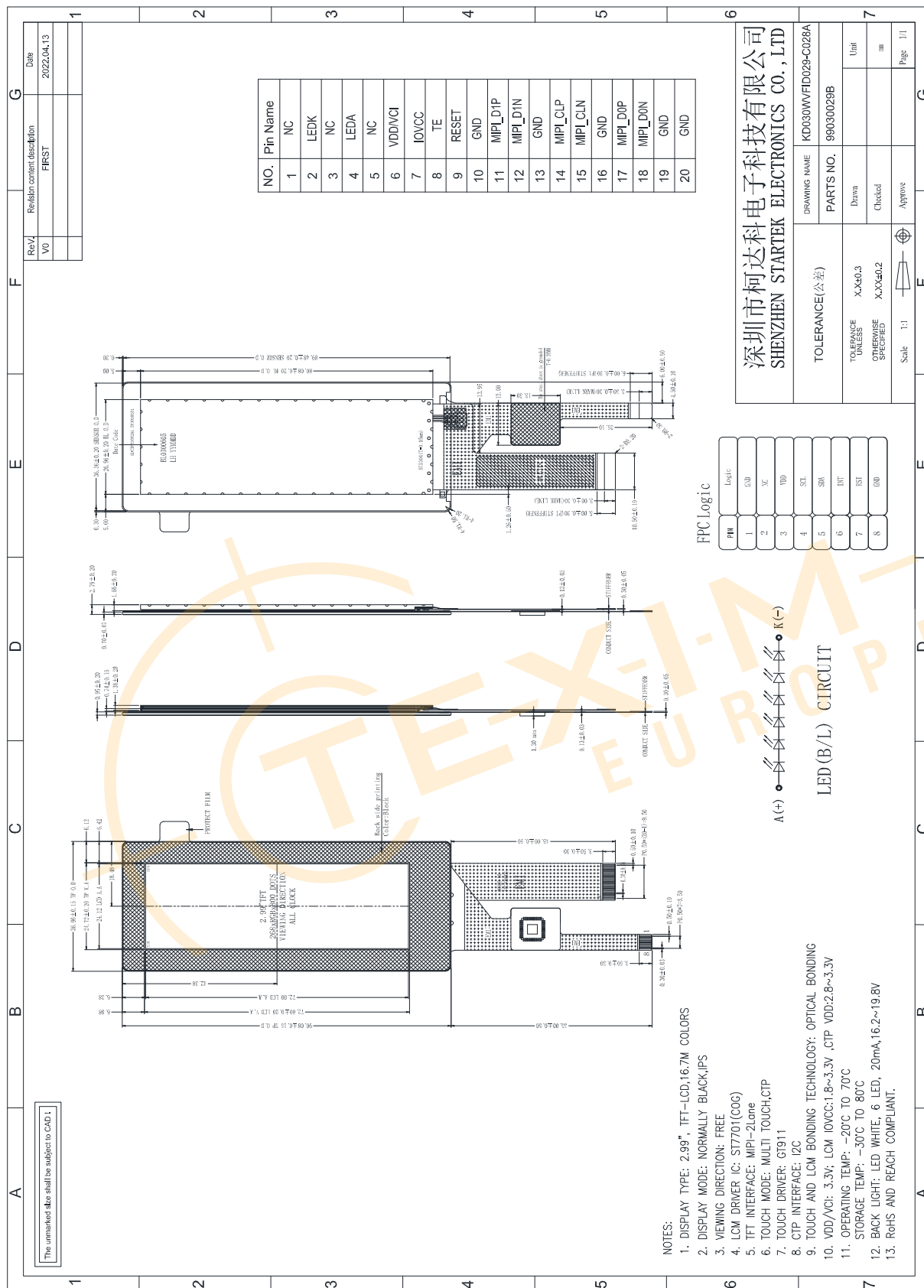
Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		36.96		mm	-
	Vertical(V)		90.08		mm	-
	Depth(D)		2.79		mm	-
Weight			15		g	-

1. Block Diagram





2. Outline dimension



Part. No

KD030WVFID029-C028A

REV

V1.0

Page 6 of 36

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

3. Input terminal Pin Assignment

3.1 TFT

NO.	SYMBOL	DISCRIPTION	I/O
1	NC	--	--
2	LEDK	Cathode pin of backlight.	P
3	NC	--	--
4	LEDA	Anode pin of backlight.	P
5	NC	--	--
6	VDD/VCI	Power supply for analog circuits.	P
7	IOVCC	Power supply for I/O pad	P
8	TE	Tearing effect output pin. Leave the pin open when not in use.	O
9	RESET	The external reset input Initializes the chip with a low input .Be sure to execute a power-on reset after supplying power. Fix to IOVCC level when not in use.	I
10	GND		P
11	MIPI_D1P	MIPI DSI differential data pair (Data lane 1)	I
12	MIPI_D1N		
13	GND	Ground	P
14	MIPI_CLP	MIPI DSI differential data pair .	I
15	MIPI_CLN		
16	GND		P
17	MIPI_D0P	MIPI DSI differential data pair (Data lane 0)	I
18	MIPI_D0N		
19	GND	Ground	P
20	GND	Ground.	P

3.2 CTP

NO.	SYMBOL	DISCRIPTION	I/O
1	GND	Ground.	P
2	NC	--	--
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



Part. No	KD030WVFID029-C028A	REV	V1.0	Page 8 of 36
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	

4. LCD Optical Characteristics

4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$ Normal viewing angle	800	1000	--		(1)(2)
Response time	Rising	T_{R+T_F}		--	30	40	msec	(1)(3)
	Falling							
Color gamut		S(%)		50	54.40		%	(1)
Color Filter Chromaticity	White	W_X		-0.04	0.282	+0.04		(1)(4)
		W_Y			0.309			
	Red	R_X			0.614			
		R_Y			0.355			
	Green	G_X			0.327			
		G_Y			0.573			
	Blue	B_X			0.151			
		B_Y			0.107			
Viewing angle	Hor.	Θ_L	CR>10	--	80	--		(1)(4)
		Θ_R		--	80	--		
	Ver.	Θ_U		--	80	--		
		Θ_D		--	80	--		
Option View Direction		FREE						(5)

*The data comes from the LCD specification.

Measuring Condition

Measuring surrounding : dark room

Ambient temperature : $25 \pm 2^\circ\text{C}$

15min. warm-up time.

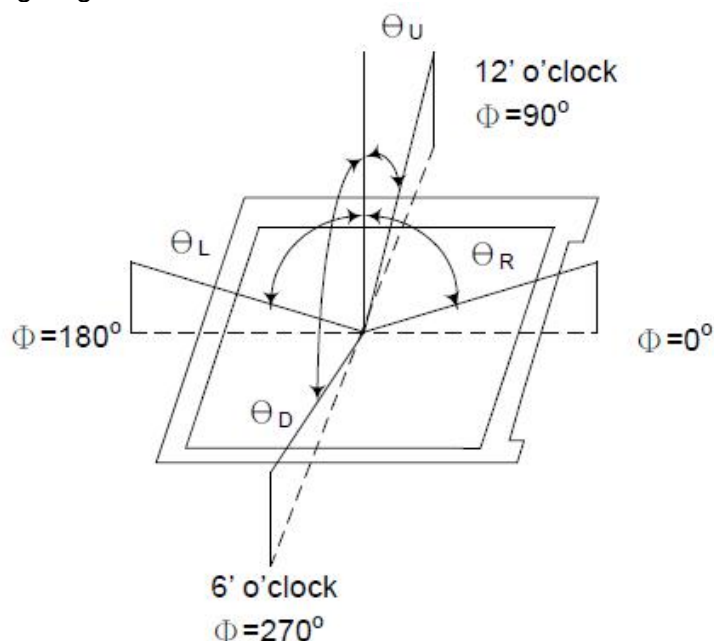
Measuring Equipment

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

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 9 of 36
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	



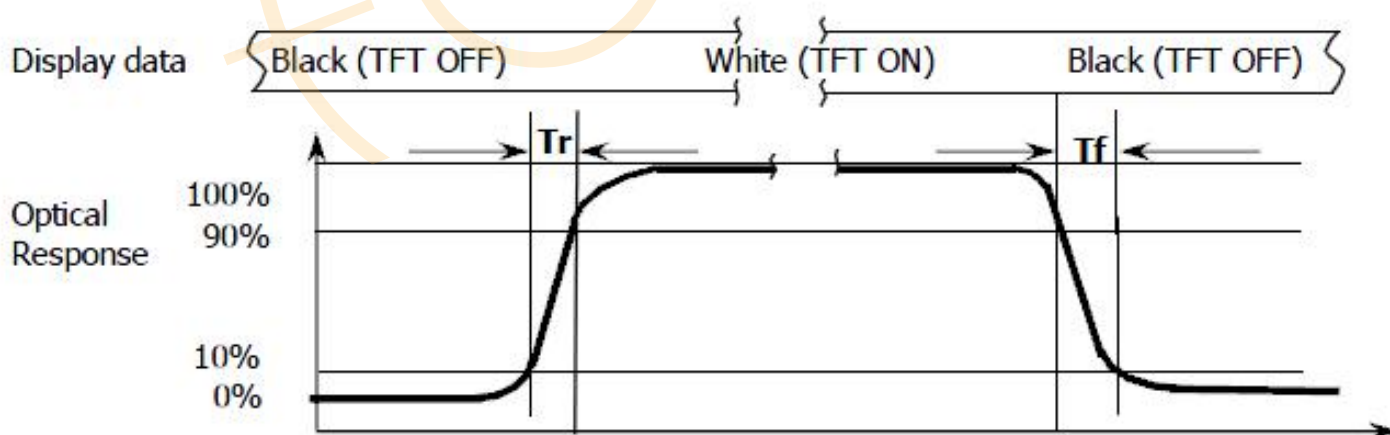
Note (1): Definition of Viewing Angle :



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

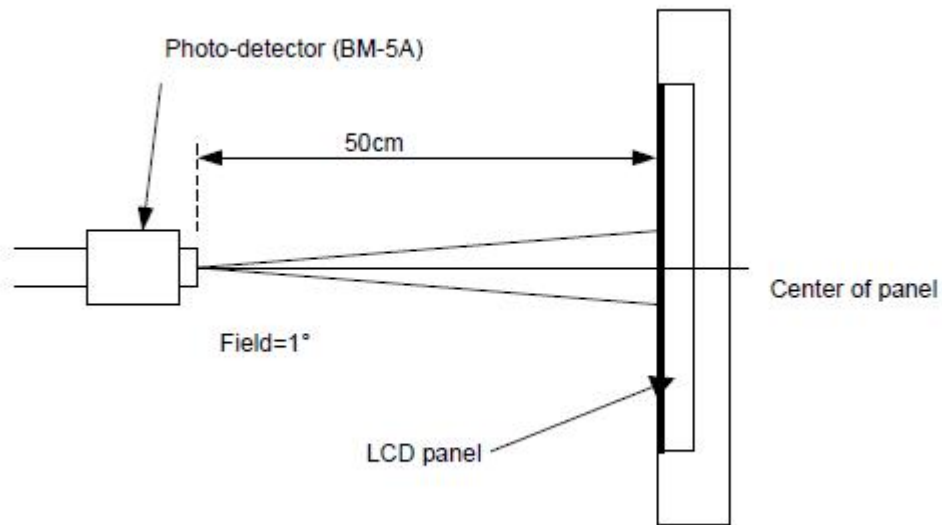
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3): Response Time





Note (4): Definition of optical measurement setup



Part. No

KD030WVFID029-C028A

REV

V1.0

Page 11 of 36

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

5. TFT Electrical Characteristics

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

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VDD/VCI	-0.3	4.6	V
Supply Voltage (Logic)	IOVCC	-0.3	4.6	V
Operating temperature	T _{OP}	-20	+70	°C
Storage temperature	T _{ST}	-30	+80	°C

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD/VCI	2.5	2.8	3.6	V	--
Supply Voltage (Logic)	IOVCC	1.65	1.8	3.3	V	--
Normal mode Current consumption	I _{VCI}	--	33	65	mA	--
Level input voltage	V _{IH}	0.7I _{OVCC}	--	I _{OVCC}	V	--
	V _{IL}	GND	--	0.3 I _{OVCC}	V	--
Level output voltage	V _{OH}	0.8I _{OVCC}	--	I _{OVCC}	V	--
	V _{OL}	GND	--	0.2I _{OVCC}	V	--

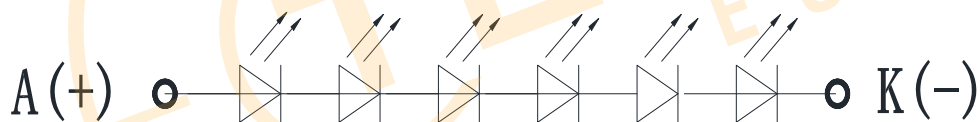
5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 6 chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	--	20	--	mA	--
Forward Voltage	V_F	--	16.2	--	V	--
LCM Luminance	L_v	300	350	--	cd/m2	Note3
LED life time	Hr	50000			Hour	Note1,2
Uniformity	AVg	80	--	--	%	Note3

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition: $T_a=25\pm3\text{ }^{\circ}\text{C}$, typical I_L 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 $T_a=25^{\circ}\text{C}$ and $I_L=40\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 40mA. The constant current driving method is suggested.

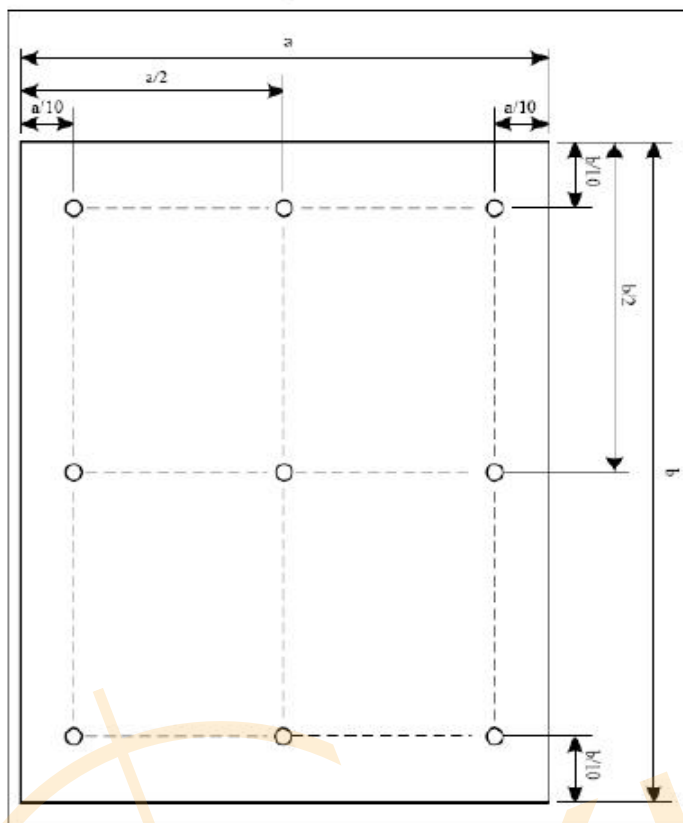


LED (B/L) CIRCUIT

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 13 of 36
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	



NOTE 3: Luminance Uniformity of these 9 points is defined as below:



$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

Part. No

KD030WVFID029-C028A

REV

V1.0

Page 14 of 36

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

6. AC Characteristics

6.1 MIPI Interface Characteristics:

6.1.1 High Speed Mode

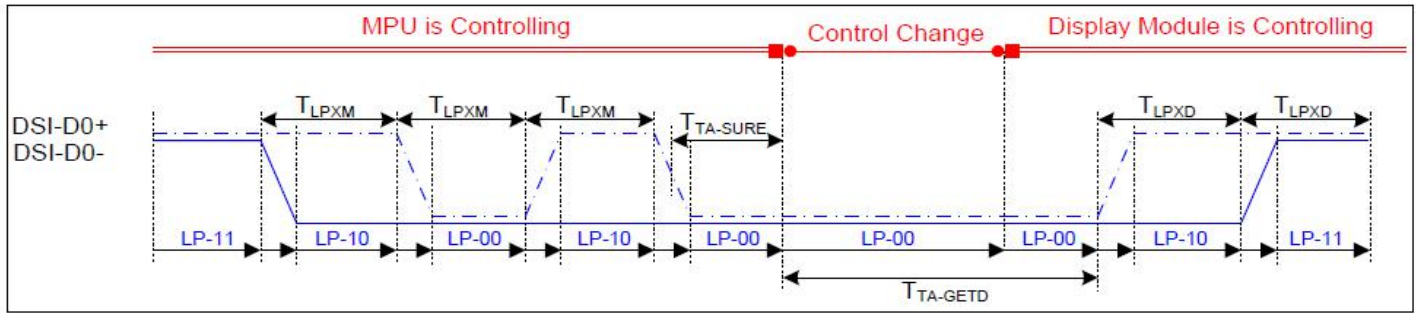


*DSI clock channel timing

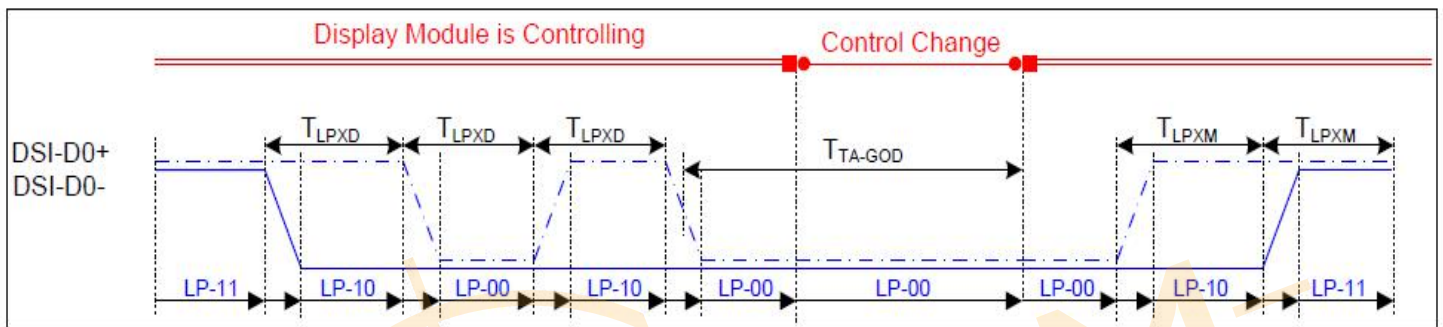
Signal	Symbol	Parameter	MIN	MAX	Unit	Description
DSI-CLK+/-	$2xUI_{INSTA}$	Double UI instantaneous	4	25	ns	
DSI-CLK+/-	UI_{INSTA} UI_{INSTB}	UI instantaneous halves	2	12.5	ns	$UI = UI_{INSTA} = UI_{INSTB}$
DSI-Dn+/-	tDS	Data to clock setup time	0.15	-	UI	
DSI-Dn+/-	tDH	Data to clock hold time	0.15	-	UI	

* Mipi Interface-High SpeedMode Timing Characteristics

6.1.2 Low Power Mode



* Bus Turnaround (BTA) from display module to MPU Timing



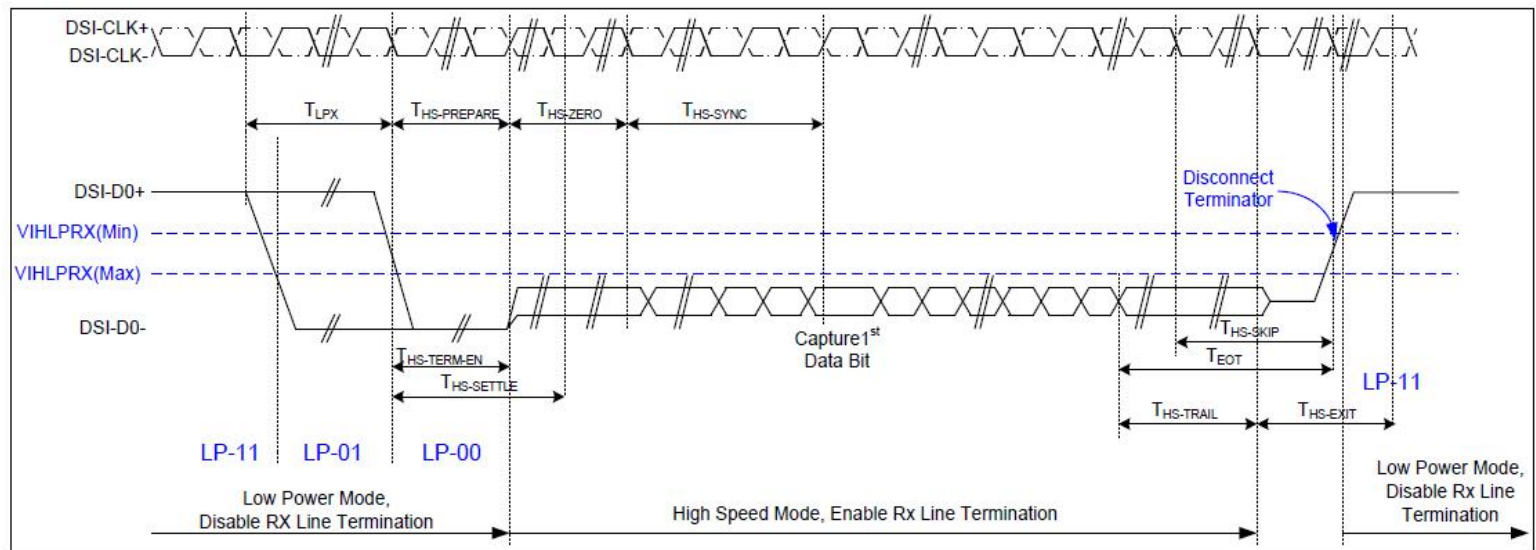
*Bus Turnaround (BTA) from MPU to display module Timing

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
DSI-D0+/-	TLPXM	Length of LP-00, LP-01, LP-10 or LP-11 periods MPU → Display Module	50	75	ns	Input
DSI-D0+/-	TLPXD	Length of LP-00, LP-01, LP-10 or LP-11 periods MPU → Display Module	50	75	ns	Output
DSI-D0+/-	TTA-SURED	Time-out before the MPU start driving	T_{LPXD}	$2 \times T_{LPXD}$	ns	Output
DSI-D0+/-	TTA-GETD	Time to drive LP-00 by display module	$5 \times T_{LPXD}$		ns	Input
DSI-D0+/-	TTA-GOD	Time to drive LP-00 after turnaround request-MPU	$4 \times T_{LPXD}$		ns	Output

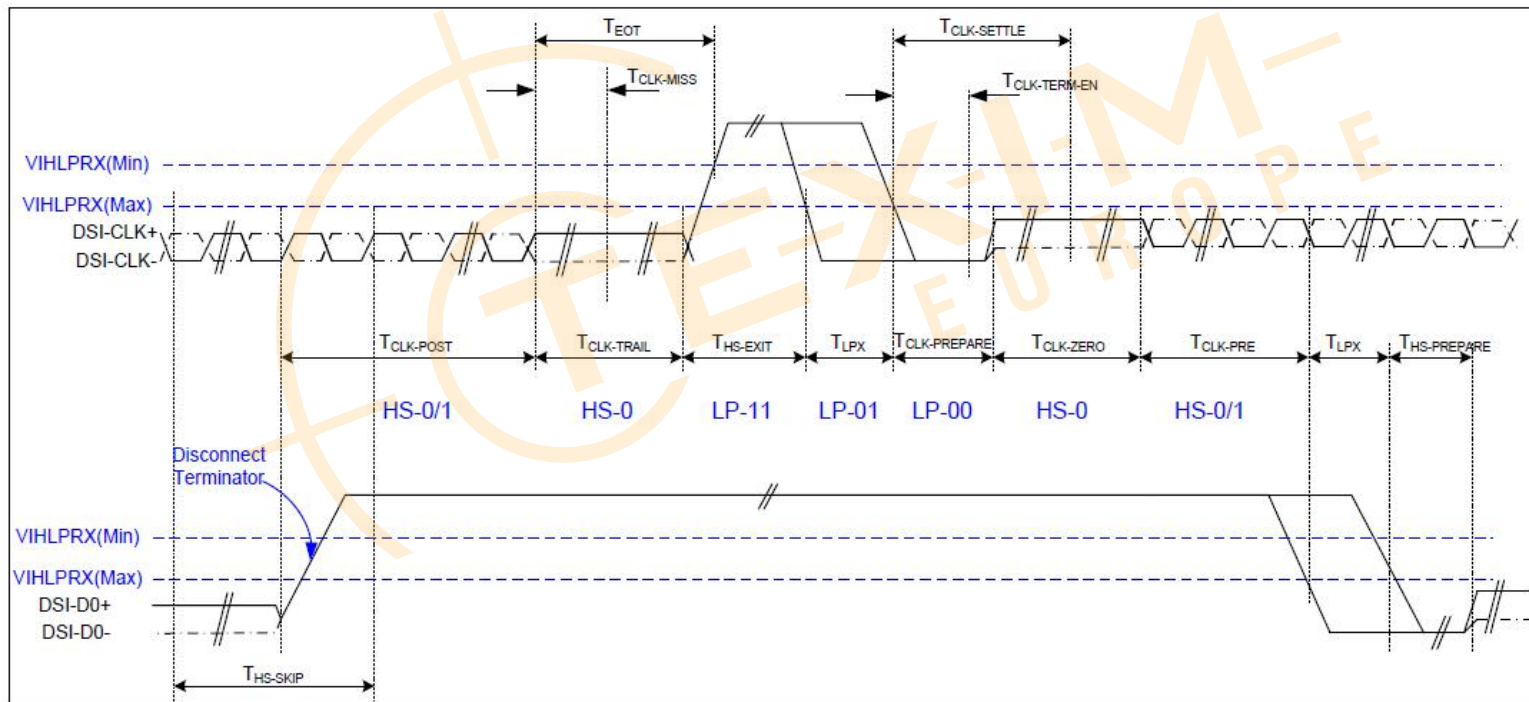
*Mipi Interface Low Power Mode Timing Characteristics

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 16 of 36
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	

6.1.3 Bursts Mode



*Data lanes-Low Power Mode to/from High Speed Mode Timing



*Clock lanes- High Speed Mode to/from Low Power Mode Timing

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 17 of 36
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	

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
Low Power Mode to High Speed Mode Timing						
DSI-Dn+/-	TLPX	Length of any low power state period	50	-	ns	Input
DSI-Dn+/-	THS-PREPARE	Time to drive LP-00 to prepare for HS transmission	40+4 UI	85+6 UI	ns	Input
DSI-Dn+/-	THS-TERM-EN	Time to enable data receiver line termination measured from when Dn crosses VILMAX	-	35+4 UI	ns	Input
DSI-Dn+/-	THS-PREPARE + THS-ZERO	THS-PREPARE + time to drive HS-0 before the sync sequence	140+ 10UI	-	ns	Input
High Speed Mode to Low Power Mode Timing						
DSI-Dn+/-	THS-SKIP	Time-out at display module to ignore transition period of EoT	40	55+4 UI	ns	Input
DSI-Dn+/-	THS-EXIT	Time to drive LP-11 after HS burst	100	-	ns	Input
DSI-Dn+/-	THS-TRAIL	Time to drive flipped differential state after last payload data bit of a HS transmission burst	60+4 UI	-	ns	Input
High Speed Mode to/from Low Power Mode Timing						
DSI-CLK+/-	TCLK-POS	Time that the MPU shall continue sending HS clock after the last associated data lane has transition to LP mode	60+5 2UI	-	ns	Input
DSI-CLK+/-	TCLK-TRAIL	Time to drive HS differential state after last payload clock bit of a HS transmission burst	60	-	ns	Input
DSI-CLK+/-	THS-EXIT	Time to drive LP-11 after HS burst	100	-	ns	Input
DSI-CLK+/-	TCLK-PREPARE	Time to drive LP-00 to prepare for HS transmission	38	95	ns	Input
DSI-CLK+/-	TCLK-TERM-EN	Time-out at clock lan display module to enable HS transmission	--	38	ns	Input
DSI-CLK+/-	TCLK-PREPARE + TCLK-ZERO	Minimum lead HS-0 drive period before starting clock	300	-	ns	Input
DSI-CLK+/-	TCLK-PRE	Time that the HS clock shall be driven prior to any associated data lane beginning the transition from LP to HS mode	8UI	-	ns	Input
DSI-CLK+/-	TEOT	Time form start of TCLK-TRAIL period to start of LP-11 state	-	105n s+12 UI	ns	Input

6.2 Reset input timing

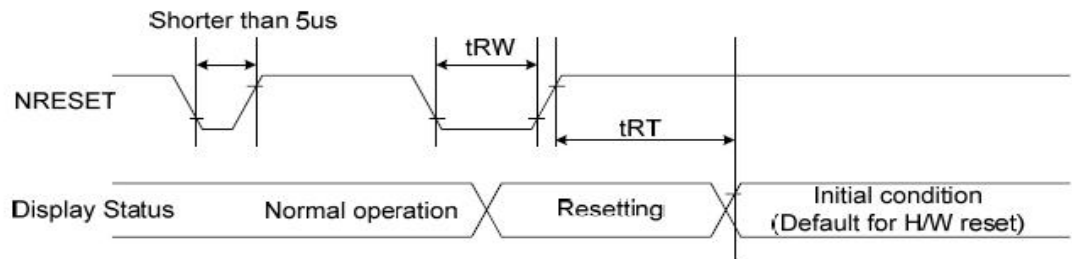


Figure 102 Reset Timing

Table 41 Reset Timing

Signal	Symbol	Parameter	Min	Max	Unit
RESX	t_{RW}	Reset pulse duration	10		us
	t_{RT}	Reset cancel		5(note 1,5)	ms
				120 (note 1,6,7)	ms

Note:

1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from OTP to registers. This loading is done every time when there is H/W reset cancel time (t_{RT}) within 5 ms after a rising edge of RESX.
2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the Table 43.

Table 42 Reset Descript

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

3. During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out mode. The display remains the blank state in Sleep In mode.) and then return to Default condition for Hardware Reset.
4. Spike Rejection also applies during a valid reset pulse as shown below:

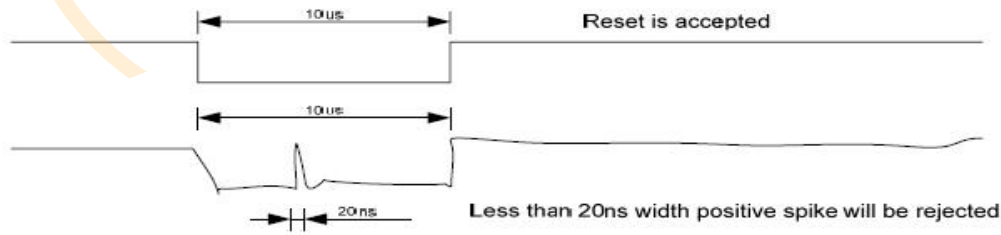


Figure 103 Positive Noise Pulse during Reset Low

5. When Reset applied during Sleep In Mode.
6. When Reset applied during Sleep Out Mode.
7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 19 of 36
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	

7. CTP Specification

7.1 Electrical Characteristics

7.1.1 Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDD	2.66	3.47	V	--
Operating temperature	T _{OP}	-20	+70	°C	--
Storage temperature	T _{ST}	-30	+80	°C	--

7.1.2 DC Electrical Characteristics (Ta=25°C)

(Ambient temperature:25°C, AVDD=2.8V, VDDIO=1.8V or VDDIO=AVDD)

Item	Min.	Typ.	Max.	Unit	Note
Normal mode operating current	--	8	14.5	mA	
Green mode operating current	--	3.3	--	mA	
Sleep mode operating current	70	--	120	uA	
Doze mode operating current	--	0.78	--	mA	
Digital Input low voltage/VIL	-0.3	--	0.25*VDD	V	
Digital Input high voltage/VIH	0.75*VDD	--	VDD+0.3	V	
Digital Output low voltage/VOL	--		0.15*VDD	V	
Digital Output high voltage/VOH	0.85*VDD			V	

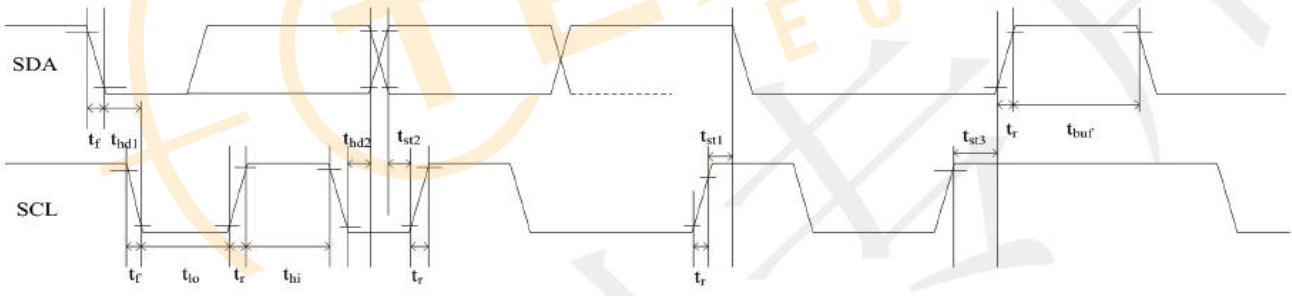
7.1.3 AC Characteristics

(Ambient temperature:25℃, AVDD=2.8V, VDDIO=1.8V)

Parameter	Min	Typ	Max	Unit
OSC oscillation frequency	59	60	61	MHZ
I/O output rise time,low to high	-	14	-	ns
I/O output rfall time,high to low	-	14	-	ns

7.2 I2C Timing

GT911 provides a standard I2C interface for SCL and SDA to communicate with the host. GT911 always serves as slave device in the system with all communication being initialized by the host. It is strongly recommended that transmission rate be kept at or below 400Kbps. The I2C timing is shown below:



Part. No	KD030WVFID029-C028A	REV	V1.0	Page 21 of 36
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	

Test condition 1: 1.8V host interface voltage, 400Kbps transmission rate, 2K pull-up resistor

Parameter	Symbol	Min.	Max.	Unit
SCL low period	t_{lo}	1.3	-	us
SCL high period	t_{hi}	0.6	-	us
SCL setup time for Start condition	t_{st1}	0.6	-	us
SCL setup time for Stop condition	t_{st3}	0.6	-	us
SCL hold time for Start condition	t_{hd1}	0.6	-	us
SDA setup time	t_{st2}	0.1	-	us
SDA hold time	t_{hd2}	0	-	us

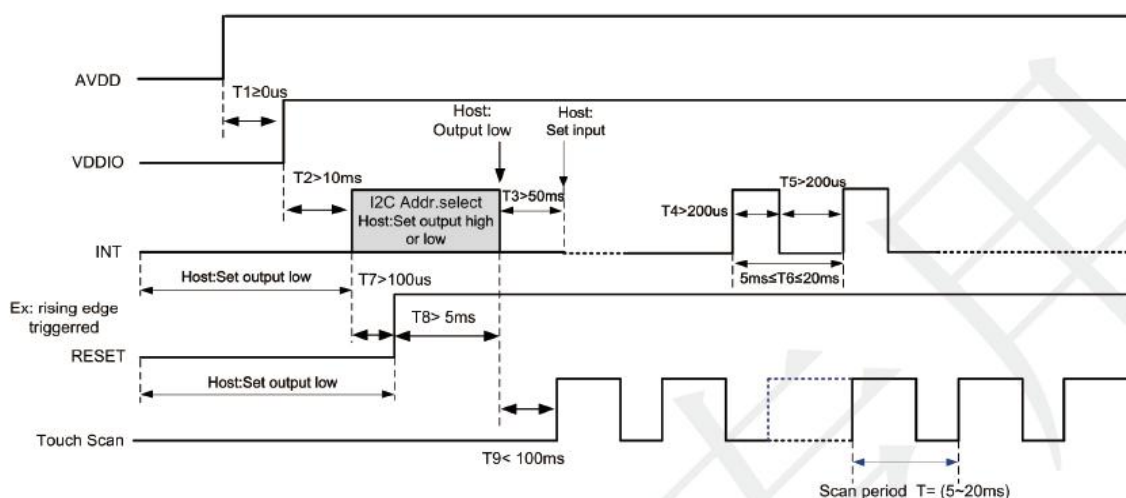
Test condition 2: 3.3V host interface voltage, 400Kbps transmission rate, 2K pull-up resistor

Parameter	Symbol	Min.	Max.	Unit
SCL low period	t_{lo}	1.3	-	us
SCL high period	t_{hi}	0.6	-	us
SCL setup time for Start condition	t_{st1}	0.6	-	us
SCL setup time for Stop condition	t_{st3}	0.6	-	us
SCL hold time for Start condition	t_{hd1}	0.6	-	us
SDA setup time	t_{st2}	0.1	-	us
SDA hold time	t_{hd2}	0	-	us

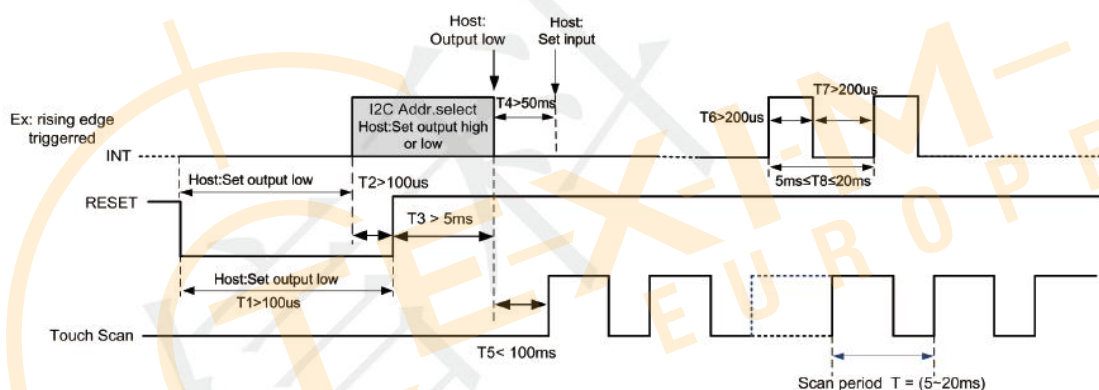
GT911 supports two I2C slave addresses: 0xBA/0xBB and 0x28/0x29. The host can select the address by changing the status of Reset and INT pins during the power-on initialization phase. See the diagram below for configuration methods and timings:



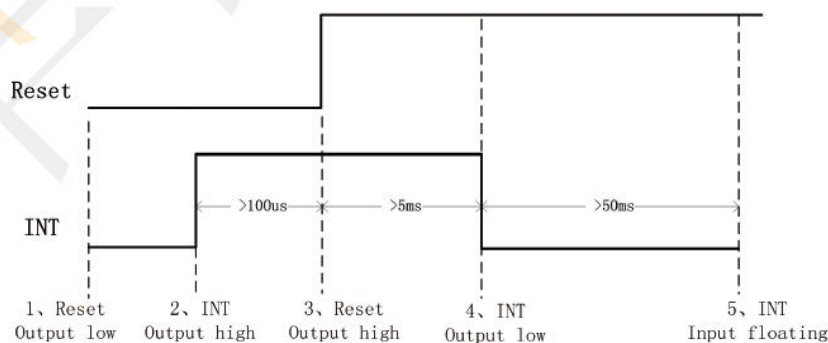
Power-on Timing:



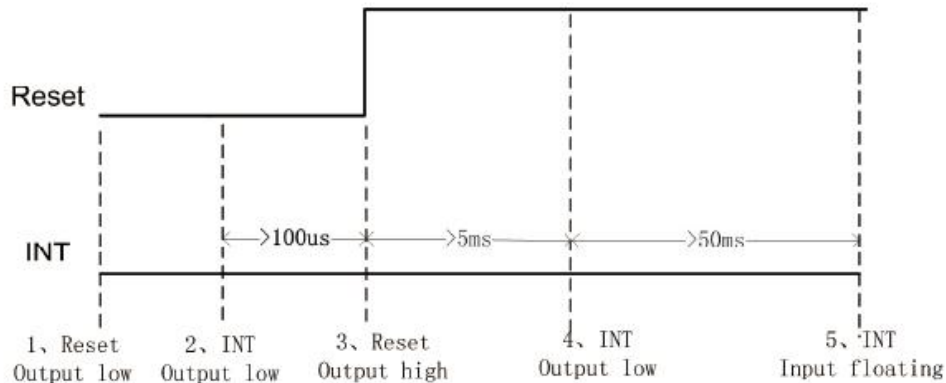
Timing for host resetting GT911:



Timing for setting slave address to 0x28/0x29:



Timing for setting slave address to 0xBA/0xBB:



a) Data Transmission

(For example: device address is 0xBA/0xBB)

Communication is always initiated by the host. Valid Start condition is signaled by pulling SDA line from “high” to “low” when SCL line is “high”. Data flow or address is transmitted after the Start condition.

All slave devices connected to I²C bus should detect the 8-bit address issued after Start condition and send the correct ACK. After receiving matching address, GT911 acknowledges by configuring SDA line as output port and pulling SDA line low during the ninth SCL cycle. When receiving unmatched address, namely, not 0XBA or 0XBB, GT911 will stay in an idle state.

For data bytes on SDA, each of 9 serial bits will be sent on nine SCL cycles. Each data byte consists of 8 valid data bits and one ACK or NACK bit sent by the recipient. The data transmission is valid when SCL line is “high”.

When communication is completed, the host will issue the STOP condition. Stop condition implies the transition of SDA line from “low” to “high” when SCL line is “high”.

b) Writing Data to GT911

(For example: device address is 0xBA/0xBB)



Timing for Write Operation

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 24 of 36
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	

The diagram above displays the timing sequence of the host writing data onto GT911. First, the host issues a Start condition. Then, the host sends 0xBA (address bits and R/W bit; R/W bit as 0 indicates Write operation) to the slave device.

After receiving ACK, the host sends the 16-bit register address (where writing starts) and the 8-bit data bytes (to be written onto the register).

The location of the register address pointer will automatically add 1 after every Write Operation. Therefore, when the host needs to perform Write Operations on a group of registers of continuous addresses, it is able to write continuously. The Write Operation is terminated when the host issues the Stop condition.

c) Reading Data from GT911

(For example: device address is 0xBA/0xBB)



Timing for Read Operation

The diagram above is the timing sequence of the host reading data from GT911. First, the host issues a Start condition and sends 0xBA (address bits and R/W bit; R/W bit as 0 indicates Write operation) to the slave device.

After receiving ACK, the host sends the 16-bit register address (where reading starts) to the slave device. Then the host sets register addresses which need to be read.

Also after receiving ACK, the host issues the Start condition once again and sends 0xBB (Read Operation). After receiving ACK, the host starts to read data.

GT911 also supports continuous Read Operation and, by default, reads data continuously. Whenever receiving a byte of data, the host sends an ACK signal indicating successful reception. After receiving the last byte of data, the host sends a NACK signal followed by a STOP condition which terminates communication.

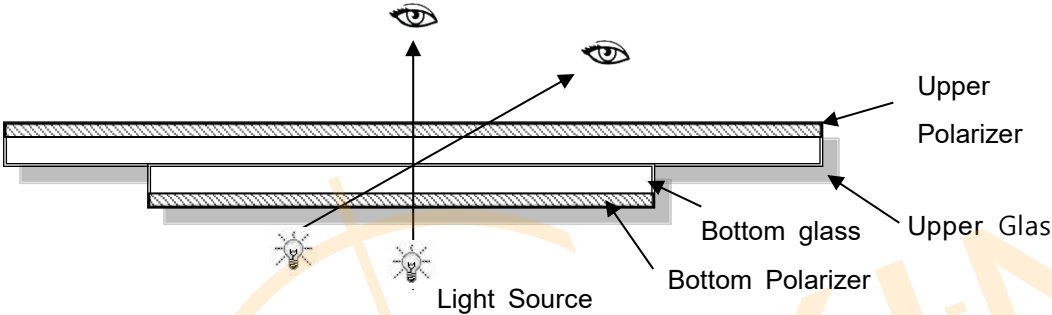
8. LCD Module Out-Going Quality Level

8.1 VISUAL & FUNCTION INSPECTION STANDARD

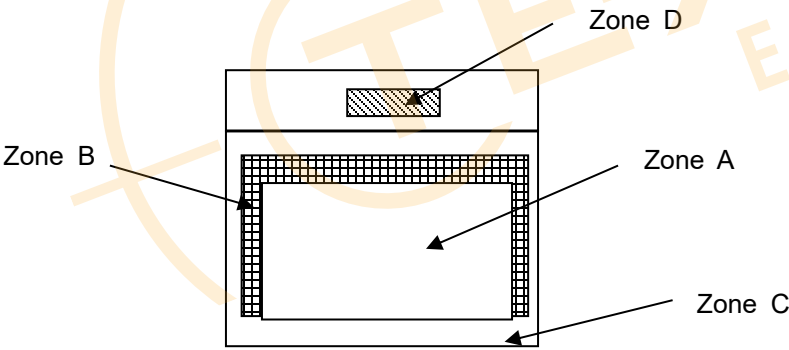
8.1.1 Inspection conditions

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 Cover (Zone A+Zone B) which can not be seen after assembly by customer .)
- Zone D : IC Bonding Area

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

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 26 of 36
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	

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.	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	Spot Line defect	Light dot, Dim spot, Polarizer Bubble ; Polarizer accidented spot.	
6	Soldering appearance	Good soldering , Peeling off is not allowed.	
7	LCD/Polarizer/CTP	Black/White spot/line, scratch, crack, etc.	

Note1: a) Light dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern.

b) Dim dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture.

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 27 of 36
----------	---------------------	-----	------	---------------

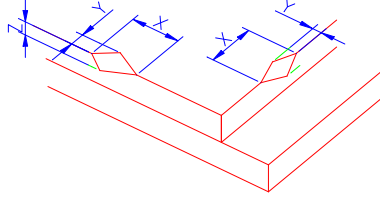
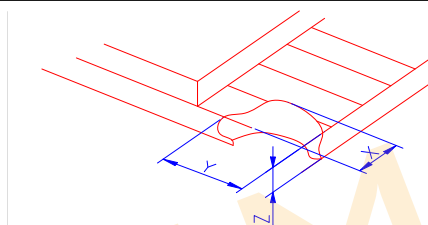
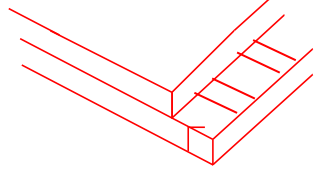
常备库存
Standing Stock

长期供货
Long Time supply

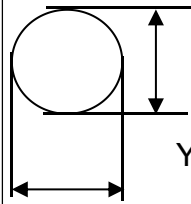
支持小量
NO MOQ

品种齐全
In Full Range

8.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of IT O, T: Height of LCD	(1) The edge of LCD broken	 <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	 <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	 Crack Not allowed							

Spot defect



$\Phi=(X+Y)/2$

① light dot (black/white spot , pinhole, stain, etc.)

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi\leq0.15$	Ignore		
$0.15<\Phi\leq0.25$	3(distance ≥10 mm)		
$0.25<\Phi\leq0.4$	2(distance ≥10 mm)		
$\Phi>0.4$	0		

② Dim spot (light leakage、dent、dark spot, etc)

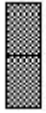
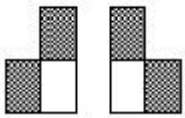
Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi\leq0.15$	Ignore		
$0.15<\Phi\leq0.25$	3(distance ≥10 mm)		
$0.25<\Phi\leq0.4$	2(distance ≥10 mm)		
$\Phi>0.4$	0		

③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi\leq0.2$	Ignore		
$0.2<\Phi\leq0.5$	2(distance ≥10 mm)		
$\Phi>0.5$	0		

④Polarizer Bubble

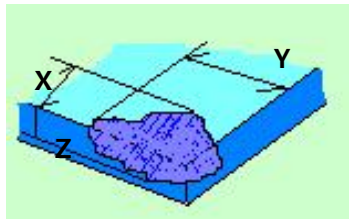
Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi\leq0.2$	Ignore		
$0.2<\Phi\leq0.4$	2(distance ≥10 mm)		
$\Phi>0.4$	0		

3.0	LCD Pixel defect	Pixel bad points																							
<table border="1"> <thead> <tr> <th>Item</th><th>Zone A</th><th>Acceptable Qt</th></tr> </thead> <tbody> <tr> <td rowspan="3">Bright dot</td><td>Random</td><td>$N \leq 2$</td></tr> <tr> <td>2 dots adjacent</td><td>$N \leq 0$</td></tr> <tr> <td>3 dots adjacent</td><td>$N \leq 0$</td></tr> <tr> <td rowspan="3">Dark dot</td><td>Random</td><td>$N \leq 3$</td></tr> <tr> <td>2 dots adjacent</td><td>$N \leq 0$</td></tr> <tr> <td>3 dots adjacent</td><td>$N \leq 0$</td></tr> <tr> <td>Distance</td><td> 1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot. </td><td>5mm</td></tr> <tr> <td colspan="2">Total bright and dark dot</td><td>$N \leq 4$</td></tr> </tbody> </table>			Item	Zone A	Acceptable Qt	Bright dot	Random	$N \leq 2$	2 dots adjacent	$N \leq 0$	3 dots adjacent	$N \leq 0$	Dark dot	Random	$N \leq 3$	2 dots adjacent	$N \leq 0$	3 dots adjacent	$N \leq 0$	Distance	1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot.	5mm	Total bright and dark dot		$N \leq 4$
Item	Zone A	Acceptable Qt																							
Bright dot	Random	$N \leq 2$																							
	2 dots adjacent	$N \leq 0$																							
	3 dots adjacent	$N \leq 0$																							
Dark dot	Random	$N \leq 3$																							
	2 dots adjacent	$N \leq 0$																							
	3 dots adjacent	$N \leq 0$																							
Distance	1. Minimum Distance Between Bright dots. 2. Minimum Distance Between dark dots 3. Minimum Distance Between dark and bright dot.	5mm																							
Total bright and dark dot		$N \leq 4$																							
Note: A) Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern. B) Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue picture. C) 2 dot adjacent = 1 pair = 2 dots Picture:  2 dot adjacent  2 dot adjacent (vertical)  2 dot adjacent  2 dot adjacent (slant)																									

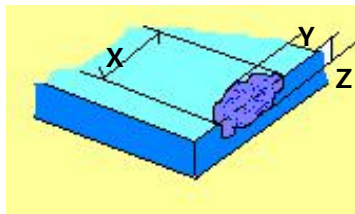


4.0	Line defect (LCD /Polarizer backlight black/white line, scratch, stain)  W: width, L : length N : Count	<table><tr><th rowspan="2">Width(mm)</th><th rowspan="2">Length(m)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi \leq 0.05$</td><td>Ignore</td><td colspan="3">Ignore</td></tr><tr><td>$0.05 < W \leq 0.06$</td><td>$L \leq 5.0$</td><td colspan="3">$N \leq 3$</td></tr><tr><td>$0.06 < W \leq 0.08$</td><td>$L \leq 4.0$</td><td colspan="3">$N \leq 2$</td></tr><tr><td>$W > 0.08$</td><td colspan="4">Define as spot defect</td></tr></table>	Width(mm)	Length(m)	Acceptable Qty			A	B	C	$\Phi \leq 0.05$	Ignore	Ignore			$0.05 < W \leq 0.06$	$L \leq 5.0$	$N \leq 3$			$0.06 < W \leq 0.08$	$L \leq 4.0$	$N \leq 2$			$W > 0.08$	Define as spot defect			
Width(mm)	Length(m)	Acceptable Qty																												
		A	B	C																										
$\Phi \leq 0.05$	Ignore	Ignore																												
$0.05 < W \leq 0.06$	$L \leq 5.0$	$N \leq 3$																												
$0.06 < W \leq 0.08$	$L \leq 4.0$	$N \leq 2$																												
$W > 0.08$	Define as spot defect																													
5.0	Electronic Components SMT.	Not allow missing parts, solderless connection, cold solder joint, mismatch, The positive and negative polarity opposite																												
6.0	Display color& Brightness.	1. Color: Measuring the color coordinates, The measurement standard according to the datasheet or samples. 2. Brightness: Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples.																												
7.0	LCD Mura/Waving/ Hot spot	Not visible through 5% ND filter in 50% gray or judge by limit sample if necessary.																												

8.0	CTP Related	CTP Cover sensor acc identified black/white spot	<table><tr><td rowspan="2">Size Φ(mm)</td><td colspan="3">Acceptable Qty</td></tr><tr><td>A</td><td>B</td><td>C</td></tr><tr><td>Φ≤0.15</td><td colspan="3">Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>0.15<Φ≤0.25</td><td colspan="3"></td></tr><tr><td>0.25<Φ≤0.35</td><td colspan="3"></td></tr><tr><td>Φ>0.35</td><td colspan="3">0</td></tr></table>				Size Φ(mm)	Acceptable Qty			A	B	C	Φ≤0.15	Ignore			Ignore	0.15<Φ≤0.25				0.25<Φ≤0.35				Φ>0.35	0		
			Size Φ(mm)	Acceptable Qty																										
				A	B	C																								
			Φ≤0.15	Ignore			Ignore																							
			0.15<Φ≤0.25																											
			0.25<Φ≤0.35																											
Φ>0.35	0																													

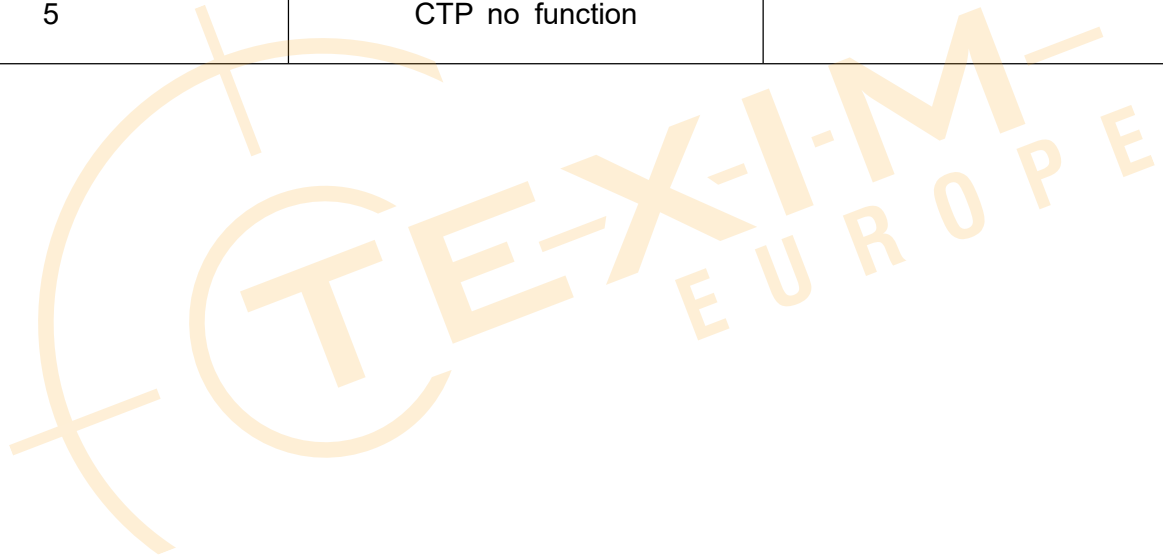
		CTP Cover	<table><tr><th rowspan="2">Width(mm)</th><th rowspan="2">Ignore (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi \leq 0.05$</td><td>Ignore</td><td colspan="3">Ignore</td></tr><tr><td>$0.05 < W \leq 0.06$</td><td>$L \leq 4.0$</td><td colspan="3">$N \leq 3$</td></tr><tr><td>$0.06 < W \leq 0.08$</td><td>$L \leq 3.0$</td><td colspan="3">$N \leq 2$</td></tr><tr><td>$0.08 < W$</td><td colspan="3">Define as spot defect</td></tr></table>	Width(mm)	Ignore (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.05$	Ignore	Ignore			$0.05 < W \leq 0.06$	$L \leq 4.0$	$N \leq 3$			$0.06 < W \leq 0.08$	$L \leq 3.0$	$N \leq 2$			$0.08 < W$	Define as spot defect		
Width(mm)	Ignore (mm)	Acceptable Qty																												
		A	B	C																										
$\Phi \leq 0.05$	Ignore	Ignore																												
$0.05 < W \leq 0.06$	$L \leq 4.0$	$N \leq 3$																												
$0.06 < W \leq 0.08$	$L \leq 3.0$	$N \leq 2$																												
$0.08 < W$	Define as spot defect																													
		CTP Cover Pinhole/ Lack of ink	<table><tr><th rowspan="2">Zone Size (mm)</th><th>Acceptable Qty</th></tr><tr><th>C</th></tr><tr><td>$\Phi \leq 0.2$</td><td>Ignore</td></tr><tr><td>$0.2 < \Phi \leq 0.3$</td><td>4(distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.3 < \Phi \leq 0.4$</td><td>2(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi > 0.4$</td><td>0</td></tr></table>	Zone Size (mm)	Acceptable Qty	C	$\Phi \leq 0.2$	Ignore	$0.2 < \Phi \leq 0.3$	4(distance $\geq 10\text{mm}$)	$0.3 < \Phi \leq 0.4$	2(distance $\geq 10\text{mm}$)	$\Phi > 0.4$	0																
Zone Size (mm)	Acceptable Qty																													
	C																													
$\Phi \leq 0.2$	Ignore																													
$0.2 < \Phi \leq 0.3$	4(distance $\geq 10\text{mm}$)																													
$0.3 < \Phi \leq 0.4$	2(distance $\geq 10\text{mm}$)																													
$\Phi > 0.4$	0																													
		CTP Bonding bubble/ accidented spot	<table><tr><th rowspan="2">Size $\Phi(\text{mm})$</th><th colspan="2">Acceptable Qty</th></tr><tr><th>A</th><th>B</th></tr><tr><td>$\Phi \leq 0.1$</td><td colspan="2">Ignore</td></tr><tr><td>$0.1 < \Phi \leq 0.2$</td><td colspan="2">4(distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.2 < \Phi \leq 0.3$</td><td colspan="2">2(distance $\geq 10\text{mm}$)</td></tr><tr><td>$\Phi > 0.3$</td><td colspan="2">0</td></tr></table>	Size $\Phi(\text{mm})$	Acceptable Qty		A	B	$\Phi \leq 0.1$	Ignore		$0.1 < \Phi \leq 0.2$	4(distance $\geq 10\text{mm}$)		$0.2 < \Phi \leq 0.3$	2(distance $\geq 10\text{mm}$)		$\Phi > 0.3$	0											
Size $\Phi(\text{mm})$	Acceptable Qty																													
	A	B																												
$\Phi \leq 0.1$	Ignore																													
$0.1 < \Phi \leq 0.2$	4(distance $\geq 10\text{mm}$)																													
$0.2 < \Phi \leq 0.3$	2(distance $\geq 10\text{mm}$)																													
$\Phi > 0.3$	0																													
		Assembly deflection	beyond the edge of backlight $\leq 0.2\text{mm}$																											
		CTP cover broken X : length Y : width Z : height	<table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$X \leq 0.5\text{mm}$</td><td>$Y \leq 0.5\text{mm}$</td><td>$Z < \text{cover thickness}$</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	$X \leq 0.5\text{mm}$	$Y \leq 0.5\text{mm}$	$Z < \text{cover thickness}$																					
X	Y	Z																												
$X \leq 0.5\text{mm}$	$Y \leq 0.5\text{mm}$	$Z < \text{cover thickness}$																												
																														



		CTP cover broken	X	Y	Z	
			X≤0.3mm	Y≤0.3mm	Z<cover thickness	
			* Circuitry broken is not allowed.			
		X : length				
		Y : width				
		Z : height				

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	CTP no function	Not allowed



9. Reliability Test Result

High Temperature Operating	70°C,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-20°C, 96HR	
High Temperature Storage	80°C, 96HR	
Low Temperature Storage	-30°C, 96HR	
High Temperature & High Humidity Storage	+60°C, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-30°C,30 min ↔ 80°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15°C~35°C, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80cm(MEDIUM BOX)	

Remark:

- 1.The test samples should be applied to only one test item.
- 2.Sample size for each test item is 5~10pcs.
- 3.For Damp Proof Test, Pure water(Resistance > 10MΩ) should be used.
- 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
- 5.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic
6. The color fading mura of polarizing filter should not care.

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 34 of 36
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	

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.

Part. No	KD030WVFID029-C028A	REV	V1.0	Page 35 of 36
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	



① Place the module on the tray (schematic diagram)

② After the product is loaded into the TRAY (as shown in Figure 2), a layer of EPE is added. (schematic diagram)

③ The product is normally loaded in the diagram (3) TRAY (as shown in Fig. 3, TRAY needs to be rotated 180 degrees), and then it is topped with a layer of BPT, and stacked with Fig. (2) TRAY. (schematic diagram)

④ As shown in figure (4): After stacking 2 layers of TRAY in figure (2) and TRAY in figure (3), an empty TRAY is added on top. (Tray size: 460x380, one pack of 10PCS, total 20PCS products)

⑤ As shown in figure (5): stack the OA TRAY, and then seal in the anti-static bag and vacuum it.

⑥ As shown in figure (6): Anti-static foam must be placed in the box, up, down, right, left, and right. (schematic diagram)

⑦ The outer box is sealed into "work" type and relabeled (schematic diagram)

⑧ As shown in figure (7), first insert (6) the package into the outer box of figure (7), then put the product of figure (6) into the outer box and seal it with tape. (schematic diagram), Carton size : 525x425x240mm.

Rev.	Revision content description	Date
A	FIRST	2020.06.28

TOLERANCE (公差)		PARTS NO.	
MAXIMUM SPECIFIED	MAX ±0.3	Drawn	Unit
	MAX ±0.2	Checked	mm

Scale	1:1	Approve

深圳市柯达电子科技有限公司

SHENZHEN STARTEK ELECTRONICS CO., LTD

SHENZHEN STARTEK ELECTRONICS CO., LTD		FINISHING MARK		PARTS NO.		Unit		mm		Page 1/1	
TOLERANCE(公差)		X.1 $\pm$ 0.3		X.3 $\pm$ 0.2		OTHERWISE SPECIFIED		1:1			

Distributed by www.texim-europe.com

Disclaimer

ALL PRODUCTS, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Texim Europe B.V. its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Texim"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Texim makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product.

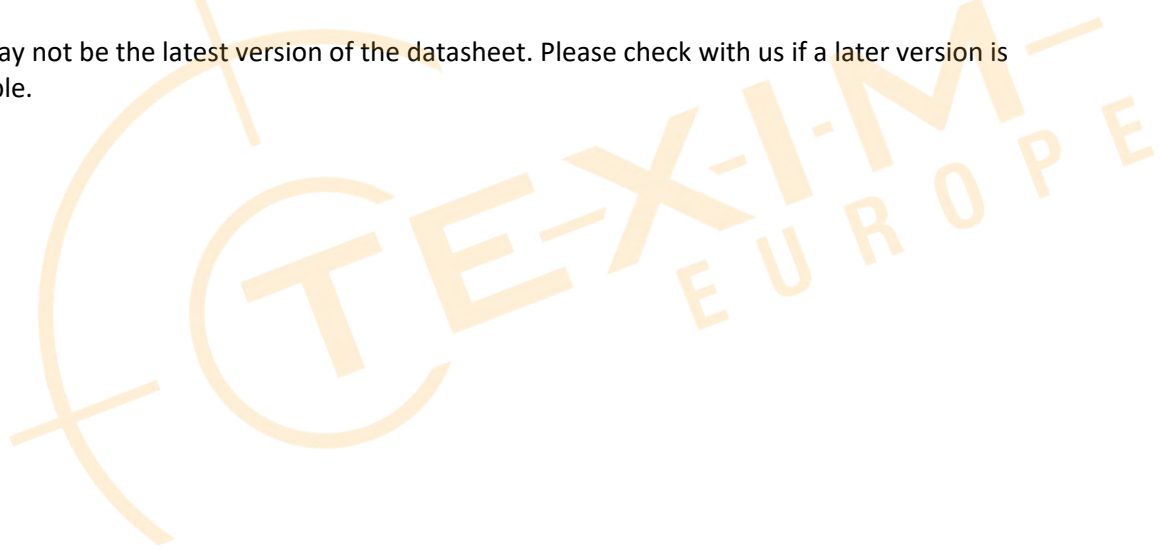
It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application.

Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time.

All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts.

Please contact us if you have any questions about the contents of the datasheet.

This may not be the latest version of the datasheet. Please check with us if a later version is available.





Headquarters & Warehouse

Elektrostraat 17
NL-7483 PG Haaksbergen
The Netherlands

T: +31 (0)53 573 33 33
E: info@texim-europe.com
Homepage: www.texim-europe.com



The Netherlands

Elektrostraat 17
NL-7483 PG Haaksbergen

T: +31 (0)53 573 33 33
E: nl@texim-europe.com



Belgium

Zuiderlaan 14, box 10
B-1731 Zellik

T: +32 (0)2 462 01 00
E: belgium@texim-europe.com



UK & Ireland

St Mary's House, Church Lane
Carlton Le Moorland
Lincoln LN5 9HS

T: +44 (0)1522 789 555
E: uk@texim-europe.com



Germany

Bahnhofstrasse 92
D-25451 Quickborn

T: +49 (0)4106 627 07-0
E: germany@texim-europe.com



Germany

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: muenchen@texim-europe.com



Austria

Warwitzstrasse 9
A-5020 Salzburg

T: +43 (0)662 216 026
E: austria@texim-europe.com



Nordic

Stockholmsgade 45
2100 Copenhagen

T: +45 88 20 26 30
E: nordic@texim-europe.com



Italy

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: italy@texim-europe.com