

# Shenzhen Leadtek Electronics Co.,Ltd

## PRODUCT SPECIFICATION

### TFT-LCD MODULE

**Module No:** LTK089FTHLM11-V1

- Approval Specification  
 Preliminary Specification

Designed by	Checked by	Approved by
<i>jona</i>	<i>tom</i>	<i>lan</i>

### Final Approval by Customer

Approved by	Comment

※The specification of "TBD" should refer to the measured value of sample . If there is difference between the design specification and measured value, we naturally shall negotiate and agree to solution with customer.



## 2.GENERAL INFORMATION

N0	Item	Specification	Unit	Remark
1	LCD Size	TFT"8.88	inch	-
2	Panel Type	IPS	-	-
3	Display Resolution	480 x RGB x 1920	pixel	-
4	Display mode	Normally Black	-	-
5	Display colors	16.7M	-	-
6	Viewing Direction	ALL	-	-
7	LCM Module Size	64.10(W) x231.20(V) x5.11(T)	mm	Note
8	Active Area	54.72(W)x218.88(V)	mm	Note
9	Pixel Pitch	0.114(W)x0.114(V)	mm	-
10	Weight	TBD	g	-
11	Driver IC	-	bit	-
12	Light Source	White LED	-	-
13	Interface	MIPI	-	-

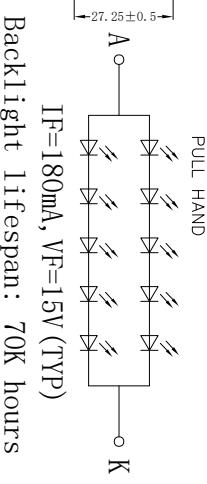
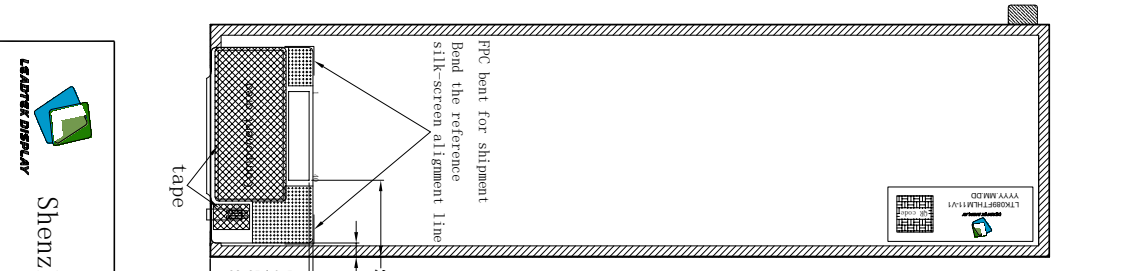
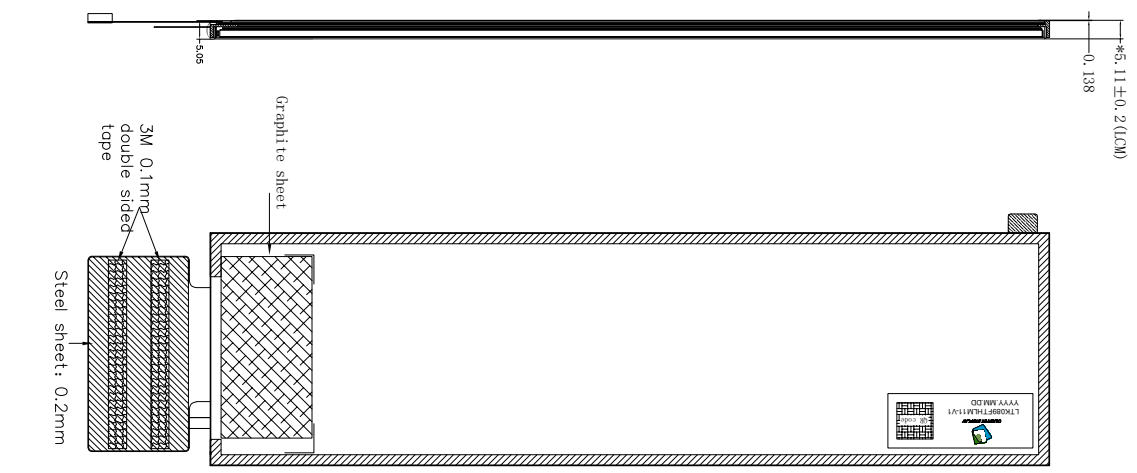
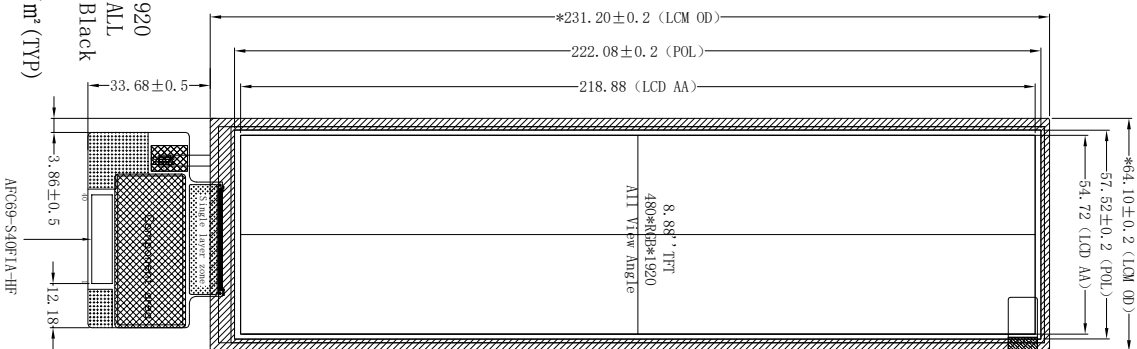
## 3. Mechanical Drawing

# Front View

# Side View

# Back View

# Back View



Pin	Name
1	NC
2	VCI
3	NC
4	GND
5	RESET
6	NC
7	GND
8	MPI 0N
9	MPI 0P
10	GND
11	MPI 1N
12	MPI 1P
13	GND
14	MPI 0KN
15	MPI 0KP
16	GND
17	MPI 2N
18	MPI 2P
19	GND
20	MPI 3N
21	MPI 3P
22	GND
23	NC
24	NC
25	GND
26	NC
27	NC
28	NC
29	NC
30	GND
31	LED-
32	LED-
33	NC
34	NC
35	NC
36	NC
37	NC
38	NC
39	LED+
40	LED+

- Notes:
1. Display : 8.88" , TFT
  2. Resolution: 480\*RGB\*1920
  3. LCD Viewing Direction: ALL
  5. Display Mode: Normally Black
  6. Drive IC: OTAF290B
  7. LCM Brightness: 1000cd/m² (TYP)
  8. unmark Tolerance: ±0.2
  9. OPERATING TEMP: -30° C~+85° C
  10. STORAGE TEMP: -40° C~+90° C
  11. Backlight lifespan: 70K hours
  12. Requirements on Environmental Protection: ROHS

REV	DESCRIPTION	DATE	NAME
3	Changes to LCM-FPC	2025.1.7	IAN
2	NEW	2024.12.10	IAN
1	NEW	2024.12.10	IAN

LEADTEK DISPLAY

Shenzhen Leadtek Electronics Co., Ltd

SCALE: 1/1 UNIT: mm PAGE: 1/1

Part No.: LTK089FTHLM11 VER: V1

Customer No.: Approve Kevin Check JOMA Drawn IAN

## 4. Input terminal Pin Assignment

### 4.1 TFT PIN Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	NC	No connected	--
2	VCI	Power supply for analog circuits.	P
3	NC	No connected	--
4	GND	Ground	P
5	RESET	Device reset signal.	I
6	NC	No connected	--
7	GND	Ground	P
8	MIPI_0N	MIPI Negative data signal (-)	I
9	MIPI_0P	MIPI Positive data signal (+)	I
10	GND	Ground	P
11	MIPI_1N	MIPI Negative data signal (-)	I
12	MIPI_1P	MIPI Positive data signal (+)	I
13	GND	Ground	P
14	MIPI_CKN	MIPI Negative clock signal (-)	I
15	MIPI_CKP	MIPI Positive clock signal (+)	I
16	GND	Ground	P
17	MIPI_2N	MIPI Negative data signal (-)	I
18	MIPI_2P	MIPI Positive data signal (+)	I
19	GND	Ground	P
20	MIPI_3N	MIPI Negative data signal (-)	I
21	MIPI_3P	MIPI Positive data signal (+)	I
22	GND	Ground	P
23	NC	No connected	--
24	NC	No connected	--
25	GND	Ground	P
26	NC	No connected	--
27	NC	No connected	--
28	NC	No connected	--
29	NC	No connected	--
30	GND	Ground	P
31	LED-	LED Cathode	P
32	LED-	LED Cathode	P
33	NC	No connected	--

34	NC	No connected	--
35	NC	No connected	--
36	NC	No connected	--
37	NC	No connected	--
38	NC	No connected	--
39	LED+	LED anode	P
40	LED+	LED anode	P

## 5. LCD Optical Characteristics

### 5.1 Optical specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio	CR	$\Theta=0$	640	800	--		(1)(2)
Response time	Rising	$T_{R+T_F}$	--	40	--	msec	(1)(3)
	Falling						
Color Gamut	S(%)		43	48	--	%	
Color Filter Chromacity	White	$W_X$	0.249	0.289	0.329		(1)(4) CF glass
		$W_Y$	0.275	0.315	0.355		
	Red	$R_X$	0.553	0.593	0.633		
		$R_Y$	0.311	0.351	0.391		
	Green	$G_X$	0.263	0.303	0.343		
		$G_Y$	0.495	0.535	0.575		
	Blue	$B_X$	0.108	0.148	0.188		
		$B_Y$	0.069	0.109	0.149		
Viewing angle	Hor.	$\Theta_L$	--	80	--		(1)(4)
		$\Theta_R$	--	80	--		
	Ver.	$\Theta_U$	--	80	--		
		$\Theta_D$	--	80	--		
Option View Direction	Free						

\*The data comes from the LCD specification.

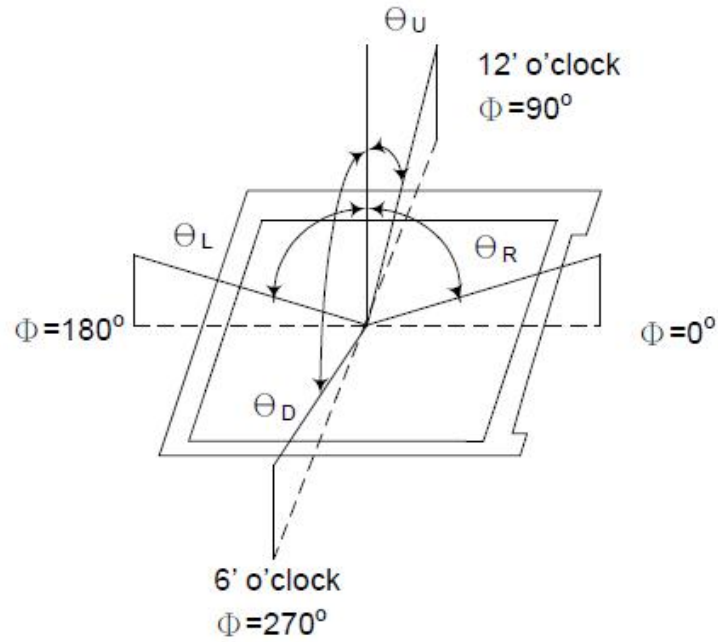
#### Measuring Condition

Measuring surrounding : dark room

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

15min. warm-up time.

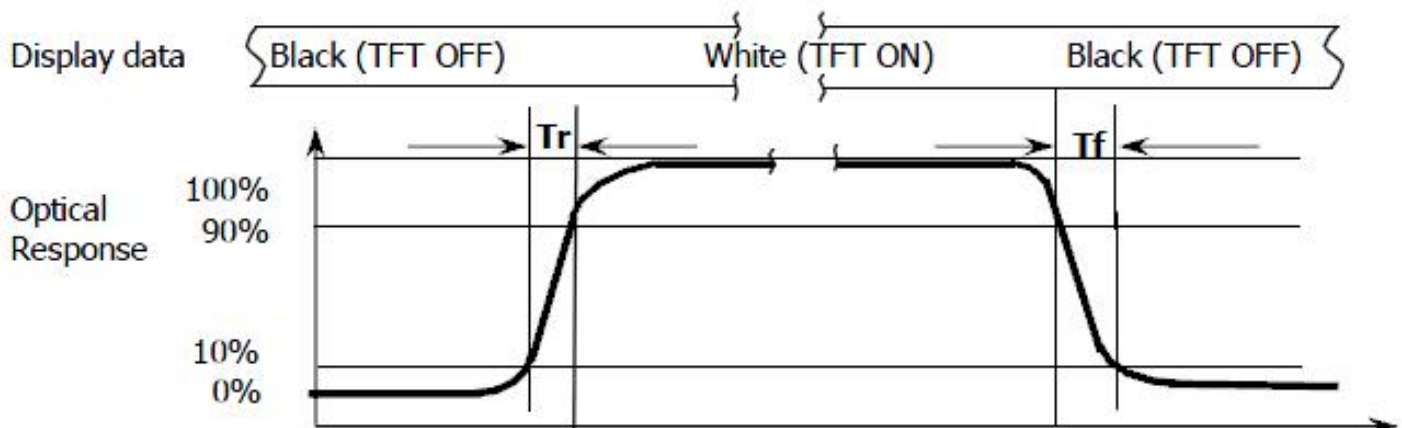
**Note (1):** Definition of Viewing Angle :



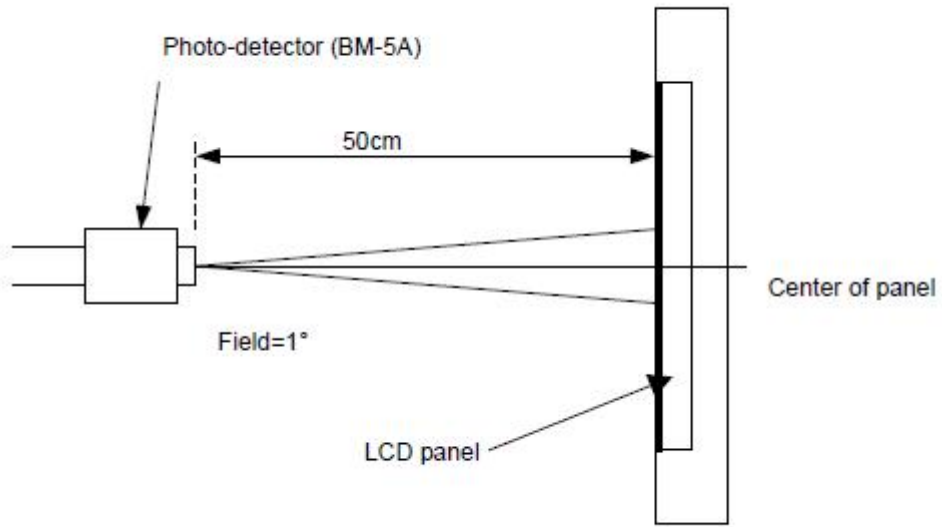
**Note (2):** Definition of Contrast Ratio(CR) :measured at the center point of panel

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

**Note (3):** Response Time



**Note (4):** Definition of optical measurement setup



## 6. TFT Electrical Characteristics

### 6.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit	Note
Digital Supply Voltage	V <sub>CI</sub>	-0.5	4.0	V	Note1
Operating temperature	T <sub>OP</sub>	-30	+85	°C	
Storage temperature	T <sub>ST</sub>	-40	+90	°C	

NOTE1: 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.

### 6.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	V <sub>CI</sub>	2.7	3.3	3.6	V	--
Normal mode Current consumption	I <sub>DD</sub>	--	380	--	mA	--
Level input voltage	V <sub>IH</sub>	0.7 V <sub>CI</sub>	--	V <sub>CI</sub>	V	--
	V <sub>IL</sub>	GND	--	0.3 V <sub>CI</sub>	V	--
Level output voltage	V <sub>OH</sub>	0.8* V <sub>CI</sub>	--	V <sub>CI</sub>	V	--
	V <sub>OL</sub>	GND	--	0.2V <sub>CI</sub>	V	--

### 6.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 10 chips White LED

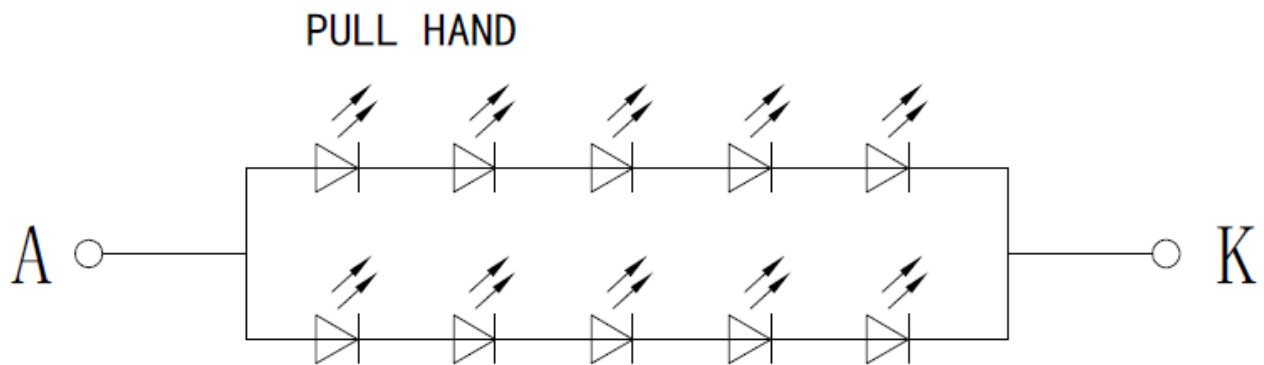
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	$I_F$	--	180	--	mA	
Forward Voltage	$V_F$	14	15	16	V	--
LCM Luminance $I_F=180\text{mA}$	$L_V$	--	1000	--	cd/m <sup>2</sup>	Note3
LED life time	Hr	70000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	Note3

Note1: LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

$T_a=25\pm 3\text{ }^\circ\text{C}$ , 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

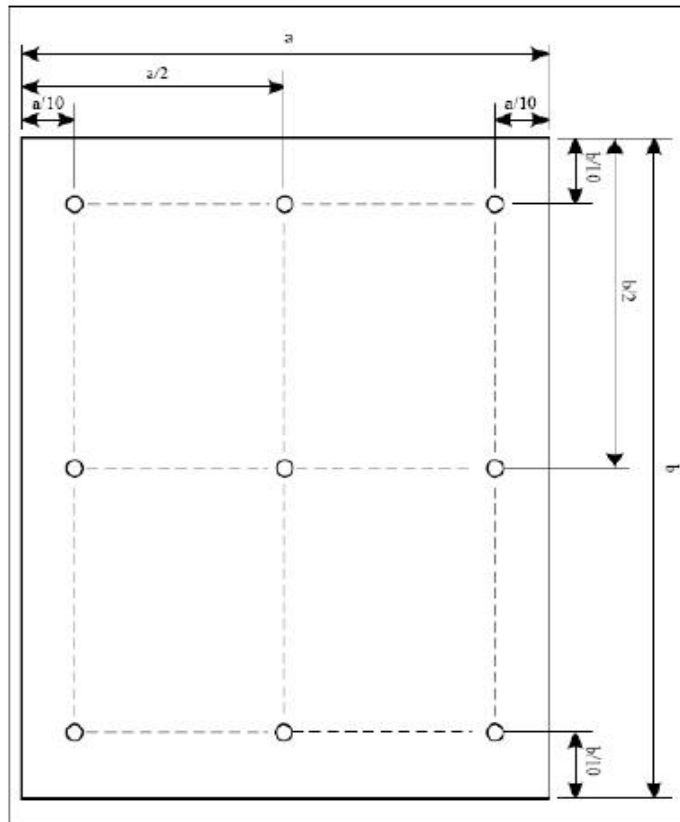
$T_a=25\text{ }^\circ\text{C}$  and  $I_L=180\text{mA}$ . The LED lifetime could be decreased if operating  $I_L$  is larger than 180mA. The constant current driving method is suggested.



$I_F=180\text{mA}$ ,  $V_F=15\text{V}$  (TYP)

Backlight lifespan: 70K hours

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



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

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

## 7. DC Characteristics

### 7.1 System characteristics

(VCC=1.5V, VDD=3.3V, AVDD=12V, VSS=VSSA=0V, TA=-20 to +85°C)

Parameter	Symbol	MIN.	Typ.	MAX.	UNIT	Conditions
VDD Input low voltage level	Vil1	0	-	0.3*VDD	V	For the VDD domain inputs.
VDD Input high voltage level	Vih1	0.7*VDD	-	VDD	V	For the VDD domain inputs.
VCC Input low voltage level	Vil2	0	-	0.2*VCC	V	For the VCC domain inputs.
VCC Input high voltage level	Vih2	0.8*VCC	-	VCC	V	For the VCC domain inputs.
I2C Low level input voltage	Vil3	1.65		VDD	V	For SDA/SCL inputs
I2C High level input voltage	Vih3	0		0.2	V	For SDA/SCL inputs
Input leakage current	Ii	-	-	+/- 1	μA	For the digital, I/O circuit (Not include the pull-up/down current)
Output high voltage level	Voh	0.8*VDD	-	-	V	For VDD domain outputs, Ioh = 400uA
Output low voltage level	Vol	-	-	0.2*VDD	V	For VDD domain outputs, Iol = 400uA
Differential input leakage Current	I <sub>DIFF</sub>	-10		+10	uA	For DxP, DxN, CLKP, CLKN (With steady state inputs)
Pull low/high resistor	Ri	100K	250K	500K	ohm	For the digital Input pin VDD=3.3, VCC=1.5
Output Voltage deviation	VOD1		±20	±35	mV	Vo = AGND+0.2V ~ AGND+1.5V Vo = HAVDD-0.2V ~ HAVDD-1.5V Vo = HAVDD+0.2V ~ HAVDD+1.5V
Output Voltage deviation	VOD2		±15	±20	mV	Vo = AGND+0.2V ~ AGND+1.5V Vo = AGND+1.5V ~ HAVDD-1.5V Vo = HAVDD+1.5V ~ AVDD-1.5V
Output Voltage Offset between Chips	VOC			±20		Vo = AGND+1.5V ~ HAVDD-1.5V Vo = HAVDD+1.5V ~ AVDD-1.5V
Input level of V1 ~ V7	Vref1	HAVDD+0.2	-	AVDD-0.2	V	Gamma positive voltage input
Input level of V8 ~ V14	Vref2	0.2	-	HAVDD-0.2	V	Gamma negative voltage input
Dynamic Range of Output	Vdr	0.2	-	AVDD-0.2	V	S0 ~ S1802
Sinking Current of Outputs	IOLy	80	-	-	μA	S0 ~ S1802
Driving Current of Outputs	IOHy	80	-	-	μA	S0 ~ S1802
Digital Operation current	Idd	-	TBD	-	mA	
Digital Stand-by current	Ist1	-	1.15	2.5	mA	
Analog Operation current	Idda	-	TBD	-	mA	
Analog Stand-by current	Ist2	-	3.5	6.9	mA	

## 7.2 MIPI DC Characteristics

### HS Receiver DC Specification

Parameter	Symbol	Rating			Unit	Note
		Min	Typ	Max		
Operation Voltage	VDD	1.5-10%	1.5	1.5+10%	mV	
Differential Input Voltage	VID	70	200	260	mV	
Common Mode Voltage	V <sub>CMRX(DC)</sub>	70	-	330	mV	
Differential Input High Threshold Voltage	V <sub>TH</sub>	-	-	70	mV	
Differential Input Low Threshold Voltage	V <sub>TL</sub>	-70	-	-	mV	
Singled-ended input high voltage	V <sub>IHHS</sub>	-	-	460	mV	
Singled-ended input low voltage	V <sub>ILHS</sub>	-40	-	-	mV	
Singled-ended threshold for HS termination enable	V <sub>TERM-EN</sub>	-	-	450	mV	
Differential input impedance	Z <sub>ID</sub>	80	100	125	ohm	
Pin leakage current	I <sub>LEAK</sub>	-10	-	10	uA	
Common-mode interference beyond 450MHz	ΔV <sub>CMRX(HF)</sub>	-	-	100	mV	
Common-mode interference 50MHz - 450MHz	ΔV <sub>CMRX(LF)</sub>	-50	-	50	mV	
Common-mode termination	C <sub>CM</sub>	-	-	60	pF	
Embedded Termination	R <sub>T</sub>	90	100	110	ohm	2bits RT_SEL[1: 0] for termination resistor selection 00 → 200ohm 10 , 01 → 150ohm 11 → 100ohm (default)  1bit ERMR_EN for termination resistor enable TERMR_EN=0, termr disable R=(OPEN) TERMR_EN=1, termr enable

Note:

- (1) Excluding possible additional RF interference of 100mV peak sine wave beyond 450MHz.
- (2) This table value includes a ground difference of 50mV between the transmitter and the receiver, the static common-mode level tolerance and variations below 450MHz.



**Input Characteristics**

Parameter	Symbol	Rating			Unit	Note
		Min	Typ	Max		
Pin signal voltage range	$V_{PIN}$	-50		1350	mV	
Pin leakage current	$I_{LEAK}$	-10		10	uA	
Ground shift	$V_{GND\Delta}$	-50		50	mV	
Transient pin voltage level	$V_{PIN(\Delta\>max)}$	-0.15		1.45	V	
Maximum transient time above $V_{PIN(max)}$ or below $V_{PIN(min)}$	$T_{V_{PIN(\Delta\>max)}}$			20	ns	

**Note:**

- (1) When the pad voltage is in the signal voltage range from  $V_{GND\Delta}$ , MIN to  $V_{OH} + V_{GND\Delta}$ , MAX and the Lane Module is in LP receive mode.
- (2) The voltage overshoot and undershoot beyond the  $V_{PIN}$  is only allowed during a single 20ns window after any LP-0 to LP-1 transition or vice versa. For all other situations it must stay within the  $V_{PIN}$  range.
- (3) This value includes ground shift.

## 8. AC Characteristics

### 8.1 System AC Characteristics

(VDD=3.3V, AVDD=12V, VSS=VSSA=0V, TA=-20 to +85°C)

Parameter	Symbol	MIN.	Typ.	MAX.	UNIT	Conditions
VDD Power On Slew rate	T	-	-	20	ms	From VSS to 90% VDD
RSTB pulse width	T	10	-	-	us	

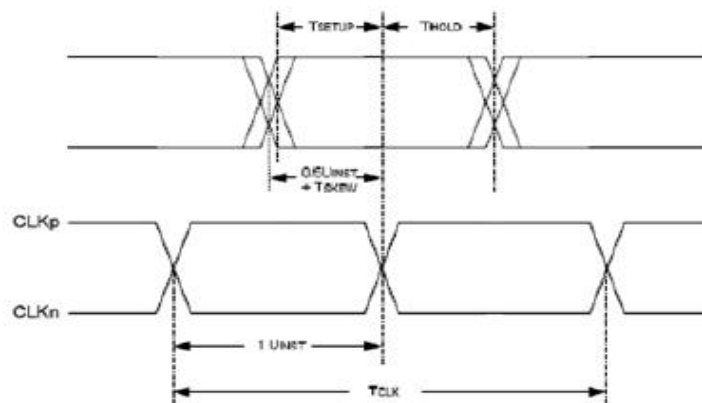
### 8.2 MIPI AC Characteristics

#### HS Receiver AC Timing Characteristics

Parameter	Symbol	Rating			Unit	Note
		Min	Typ	Max		
Bandwidth per lane	-	-	-	1000	Mbps	Bandwidth selected by register 'speedup' Speedup=0 → Max=550Mbps Speedup=1 → Max=1000Mbps
Operation frequency	-	-	-	500	MHz	
UI instantaneous	U <sub>INST</sub>	1	-	12.5	ns	1
Data to Clock Skew	T <sub>skew</sub>	-0.15	-	0.15	U <sub>INST</sub>	
Inter-lane static skew	T <sub>skew-lane</sub>	-	-	U <sub>INST</sub> /50	U <sub>INST</sub>	
Data to Clock Setup Time	T <sub>SETUP</sub>	0.25	-	-	U <sub>INST</sub>	2
Data to Clock Hold Time	T <sub>HOLD</sub>	0.25	-	-	U <sub>INST</sub>	
Common-mode interference beyond 450MHz	ΔV <sub>CMRX(HF)</sub>	-	-	100	mV	4
Common-mode interference 50MHz- 450MHz	ΔV <sub>CMRX(LF)</sub>	-50	-	50	mV	3,6
Common-mode termination	C <sub>CM</sub>	-	-	60	pF	5

Note:

- (1) Total silicon and package delay budget of  $0.3 \cdot U_{INST}$
- (2) Total setup and hold window for receiver of  $0.3 \cdot U_{INST}$
- (3) Excluding 'static' ground shift of 50mV
- (4) ΔV<sub>CMRX</sub> (HF) is the peak amplitude of a sine wave superimposed on the receiver input
- (5) For higher bit rates a 14pF capacitor will be needed to meet the common-mode return loss specification.
- (6) Voltage difference compared to the DC average common-mode potential.



### LP Receiver AC Timing Characteristics

Parameter	Symbol	Rating			Unit	Note
		Min	Typ	Max		
Input pulse rejection	$e_{\text{SPIKE}}$	-	-	300	V-ps	1.2,3
Minimum pulse width response	$T_{\text{MIN-RX}}$	20	-	-	ns	
Peak interference amplitude	$V_{\text{INT}}$	-	-	200	mV	
Interference frequency	$f_{\text{INT}}$	450	-	-	MHz	
Logic 1 input voltage	$V_{\text{IH}}$	880	-	-	mV	
Logic 0 input voltage, not in ULP State	$V_{\text{IL}}$	-	-	550	mV	
Logic 0 input voltage, ULP State	$V_{\text{IL-ULPS}}$	-	-	300	mV	
Input Hysteresis	$V_{\text{HYST}}$	25	-	-	mV	
Logic 1 contention threshold	$V_{\text{IHCD}}$	450	-	-	mV	
Logic 0 contention threshold	$V_{\text{ILCD}}$	-	-	200	mV	

Note:

- (1) Time-voltage integration of a spike above  $V_{\text{IL}}$  when being in LP-0 state or below  $V_{\text{IH}}$  when being in LP-1state.
- (2) An impulse less than this will not change the receiver state.
- (3) In addition to the required glitch rejection, implementers shall ensure rejection of known RF-interferers.

## 9. Timing for DSI video mode

Parameter	Symbol	Min.	Typ.	Max.	Unit
DCLK frequency	FCLK	--	(71)	--	MHz
Horizontal display area	HDISP	--	480	--	Clock
Horizontal Sync. Width	hpw	5	10	50	Clock
Horizontal Sync. Back Porch	hbp	35	50	100	Clock
Horizontal Sync. Front Porch	hfp	35	50	200	Clock
Vertical display area	VDISP	--	1920	--	Line
Vertical Sync. Width	vs	10	20	50	Line
Vertical Sync. Back Porch	vbp	20	30	100	Line
Vertical Sync. Front Porch	vfp	20	30	200	Line
Frame-Rate	Fr	--	60	--	Hz

Note:

The best frame rate setting : 2 data lanes : 50~60 Hz / 3 data lanes : 50~70 Hz / 4 data lanes : 50~70 Hz.

## 10. CTP Specification

### 10.1 Electrical Characteristics

#### 10.1.1 Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	VDD	2.7	3.6	V	1
Operating temperature	T <sub>OP</sub>	-30	+85	°C	-
Storage temperature	T <sub>ST</sub>	-40	+90	°C	-

#### NOTES:

1. If used beyond the absolute maximum ratings, FT7511 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 VDD3 (high) ≥ VSSLF (low)

#### 10.1.2 DC Electrical Characteristics (Ta=25°C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Digital supply voltage	VDD		2.7	3.3	3.6	V	
Normal operation mode Current consumption	I <sub>opr</sub>	VDD=3V Ta=25°C	-	11	-	mA	
Monitor mode Current consumption	I <sub>mon</sub>		-	0.43	-	mA	
Sleep mode Current consumption	I <sub>slp</sub>		-	42	-	uA	
Level input voltage	V <sub>IH</sub>		0.7VDD	-	VDD	V	
	V <sub>IL</sub>		-0.3	-	0.3VDD	V	
Level output voltage	V <sub>OH</sub>	I <sub>OH</sub> =3mA	0.7VDD	-	-	V	
	V <sub>OL</sub>	I <sub>OH</sub> =4.5mA	-	-	0.3VDD	V	

Notes: This sample data is intended for design guidance only. Values shown are typical for a 15Tx × 24Rx sensor configured at 80 Hz report rate. Actual current will depend on the particular sensor design and firmware options.

### 10.1.3 AC Characteristics

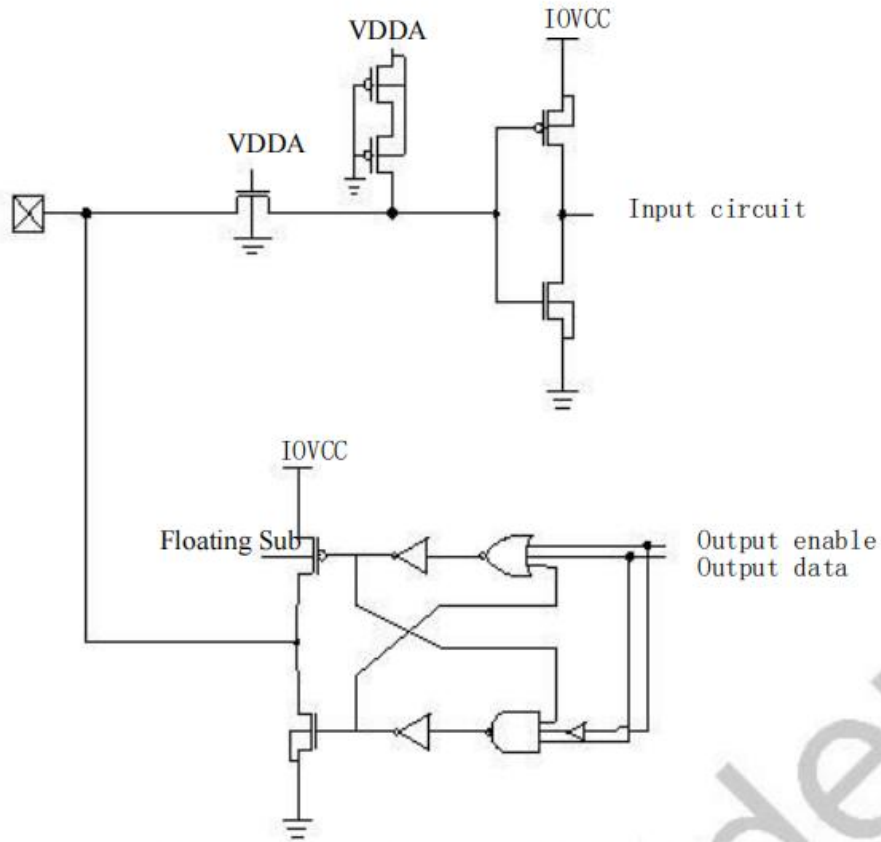
#### AC Characteristics of Oscillators

Item	Symbol	Unit	Test Condition	Min.	Typ.	Max.	Note
OSC clock 1	fosc1	MHz	VDD3 = 2.8V; Ta=25°C	49	50	51	

#### AC Characteristics of TX & RX

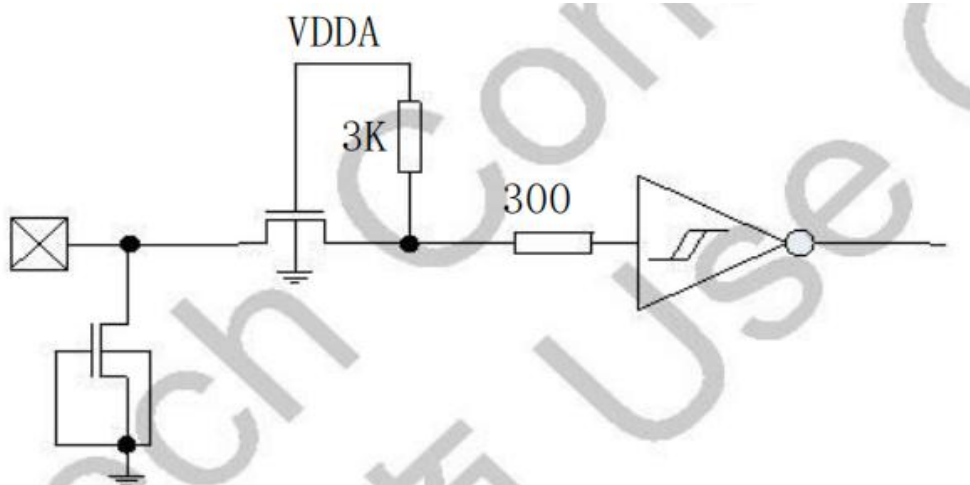
Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit	Note
TX acceptable clock	ftx		50	150	400	KHz	
TX output rise time	Ttxr		--	210	--	nS	
TX output fall time	Ttxf		--	210	--	nS	
RX input voltage	Trxi		1.2	--	1.6	V	

## 10.2 I/O Ports Circuits



*Figure 3-1 General Purpose In/Out Port Circuit.*

The input/output property can be configured via firmware setting. The firmware can also control its output behavior as push-pull or as open-drain that SDA of I2C interface is required.



*Figure 3-2 Reset Input Port Circuits*

### 10.3 POWER ON/Reset/Wake Sequence

Reset should be pulled down to be low before powering on and powering down. I2C shouldn't be used by other devices during Reset time after VDD powering on ( $T_{rtp}$ ). INT signal will be sent to the host after initializing all parameters and then start to report points to the host. If Power is down, the voltage of supply must be below 0.3V and  $T_{pdt}$  is more than 1ms.

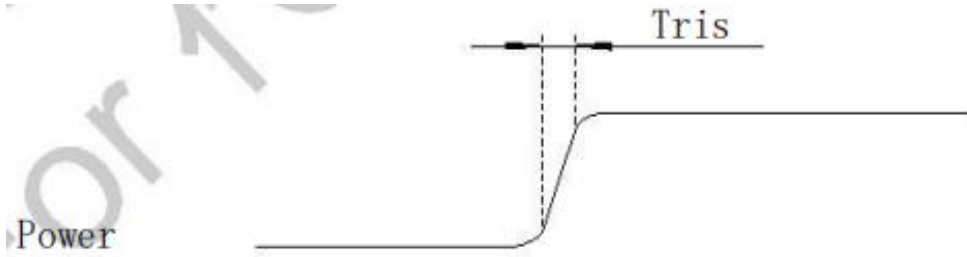


Figure 3-3 Power on time

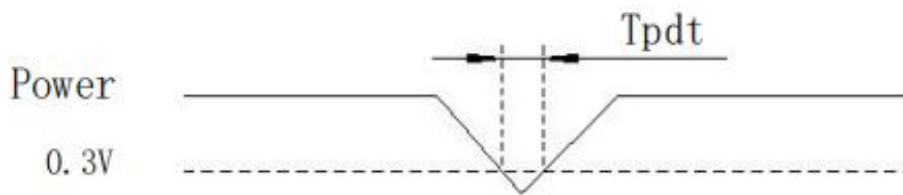


Figure 3-4 Power Cycle requirement

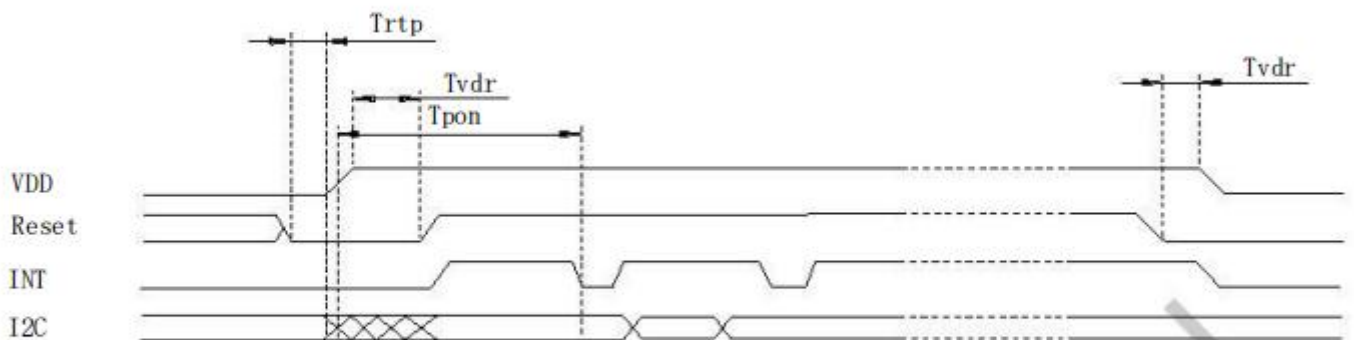


Figure 3-5 Power on Sequence

Reset time must be enough to guarantee reliable reset, the time of starting to report point after resetting approach to the time of starting to report point after powering on.

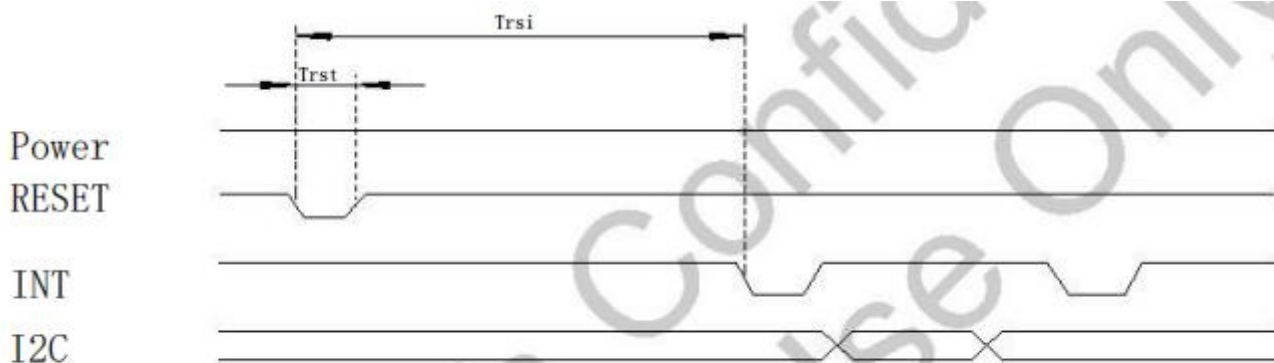


Figure 3-6 Reset Sequence

**Table 3-5 Power on/Reset Sequence Parameters**

Parameter	Description	Min	Max	Units
Tris	Rise time from 0.1VDD to 0.9VDD	--	5	ms
Tpdt	Time of the voltage of supply being below 0.3V	5	--	ms
Trtp	Time of resetting to be low before powering on	100	--	μs
Tpon	Time of starting to report point after powering on	--	200	ms
Tvdr	Reset time after VDD powering on	1	--	ms
Trsi	Time of starting to report point after resetting	--	200	ms
Trst	Reset time	1	--	ms

## 10.4 I2C Timing

FT7511 supports the I2C interfaces, which can be used by a host processor or other devices.

The I2C is always configured in the Slave mode. The data transfer format is shown in Figure 2-4.

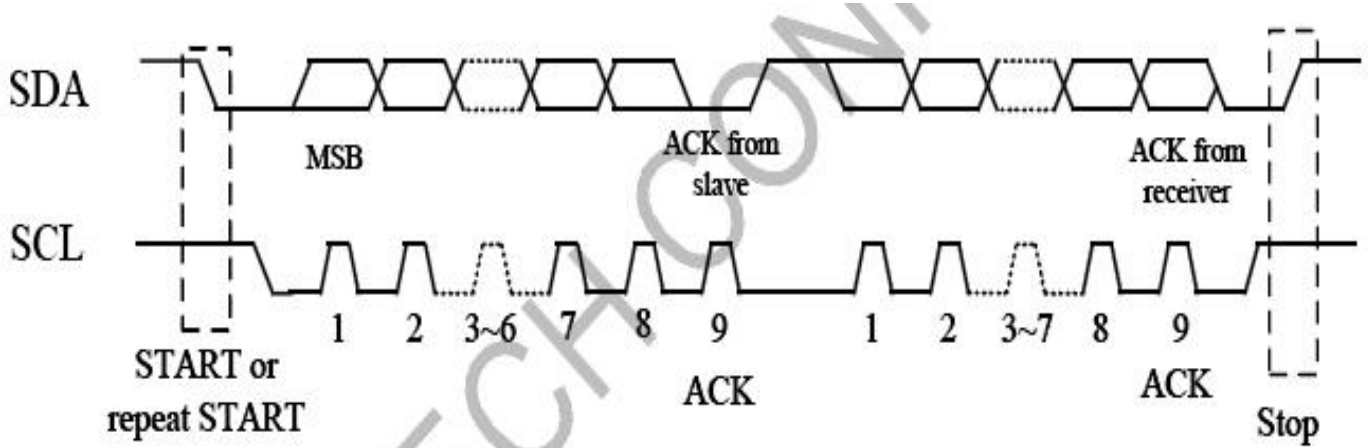


Figure 2-4 I2C Serial Data Transfer Format

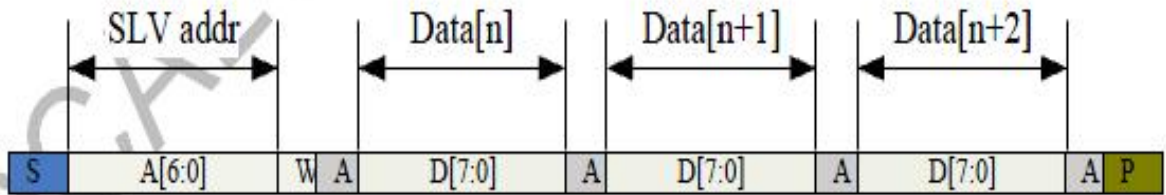


Figure 2-5 I2C master write, slave read

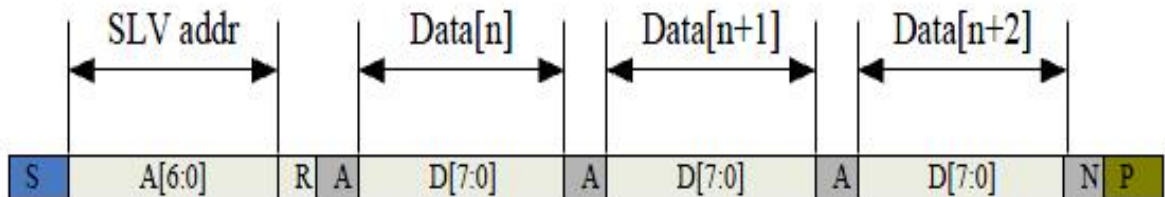


Figure 2-6 I2C master read, slave write

Table 2-1 lists the meanings of the mnemonics used in the above figures.

**Table 2-1 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) 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 the beginning of the next packet)

I2C Interface Timing Characteristics is shown in Table 2-2.

**Table 2-2 I2C Timing Characteristics**

Parameter	Min	Max	Unit
SCL frequency	0	400	KHz
Bus free time between a STOP and START condition	1.3		μs
Hold time (repeated) START condition	0.6		μs
Data setup time	100		ns
Setup time for a repeated START condition	0.6		μs
Setup time for STOP condition	0.6		μs
Rise time of both SDA and SCL signals	20	300	ns
Fall time of both SDA and SCL signals	20x (VDD/5.5V)	300	ns

## 11. Reliability test items

No.	Test Item	Test Condition	Notes
1	High Temp. Storage	+90°C / 48H	1. Functional test isOK. Missing Segment,short, unclear segment non-display,display abnormally and liquid crystal leakare un-allowed. 2. No low temperature bubbles,end seal loose andfall, frame rainbow.
2	Low Temp. Storage	-40°C / 48H	
3	High Tempe. Operating	+85°C / 48H	
4	Low Tempe. Operating	-30°C / 48H	
5	High Temperature /Humidity storage	50°C x 90%RH /48H	
6	Thermal and cold shock	Static state, -20°C (30min) ~60°C (30min), 50 cycles	
7	ESD test	±2KV,Human Body Mode, 150pF/330Ω; ±4KV, Air Mode, 150pF/330Ω;	

Note: All tests above are practiced at module type.

There is no display function NG issue occurred, All the cosmetic specification is judged before the reliability stress.

## 12.0 General Precaution

### 12.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

### 12.2 Assembly Precaution

- 1、 Please use the mounting hole on the module side in installing and do not bending or wrenching LCD in assembling. And please do not drop, bend or twist LCD module in handling.
- 2、 Please design display housing in accordance with the following guide lines.
- 3、 Housing case must be destined carefully so as not to put stresses on LCD all sides and not to wrench module. The stresses may cause non-uniformity even if there is no non-uniformity statically.
- 4、 Keep sufficient clearance between LCD module back surface and housing when the LCD module is mounted. The clearance in the design is recommended taking into account the tolerance of LCD module thickness and mounting structure height on the housing.
- 5、 Please do not push or scratch LCD panel surface with any-thing hard. And do not soil LCD panel surface by touching with bare hands. (Polarizer film, surface of LCD panel is easy to be flawed.)
- 6、 Please do not press any parts on the rear side such as source IC, gate IC, and FPC during handling LCD module. If pressing rear part is unavoidable, handle the LCD module with care not to damage them.
- 7、 Please wipe out LCD panel surface with absorbent cotton or soft cloth in case of it being soiled.
- 8、 Please wipe out drops of adhesives like saliva and water on LCD panel surface immediately. They might damage to cause panel surface variation and color change. 11.2.7 Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

### 12.3 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. Leadtek does not warrant the module, if customers disassemble or modify the module.

### 12.4 Breakage of LCD Panel

- 1、 If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.
- 2、 If liquid crystal contacts mouth or eyes, rinse out with water immediately.
- 3、 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
- 4、 Handle carefully with chips of glass that may cause injury, when the glass is broken.

## 12.5 Absolute Maximum Ratings and Power Protection Circuit

- 1、 Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.
- 2、 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
- 3、 It's recommended employing protection circuit for power supply.

### 11.6 Operation

- 1、 Do not touch, push or rub the polarizer with anything harder than HB pencil lead. Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
- 2、 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.
- 3、 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.
- 4、 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

## 12.6 Static Electricity

- 1、 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.
- 2、 Because LCD module uses CMOS-IC on TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge.
- 3、 Persons who handle the module should be grounded through adequate methods.

## 12.7 Disposal

When disposing LCD module, obey the local environmental regulations.

## 12.8 OTHERS

- 1、 A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight land strong UV rays.
- 2、 Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- 3、 For the packaging box, please pay attention to the followings:
- 4、 Packaging box and inner case for LCD are designed to protect the LCDs from the damage or scratching during transportation. Please do not open except picking LCDs up from the box.
- 5、 Please do not pile them up more than 6 boxes. (They are not designed so.) And please do not turn over.
- 6、 Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
- 7、 Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

## 13.0 Packing form-TBD



# 深圳市丽台电子有限公司

Shenzhen Leadtek Electronics Co.,Ltd

# Incoming Inspection Standard

## 品质允收标准

Model N0. /产品型号: Applicable to Leadtek Touch Display Screen

Updated Date /生效日期: 2025.04.01

Version / 版本号: V0

Record of Revision /修订履历.

Version /版本号	Revision Record /修订内容	Reviser /修订人	Revision Date /修订日期
V0	首发 / Initial release	Green	2025.04.01



## 1、Scope of application /适用范围.

适用于丽台电子触摸显示屏/ Applicable to Leadtek Touch Display Screen.

## 2、Inspection conditions and environment / 检验条件与环境.

### 2.1、Inspection Conditions / 检验条件:

2.1.1、Inspection Distance / 检测距离: 35cm ±5cm.

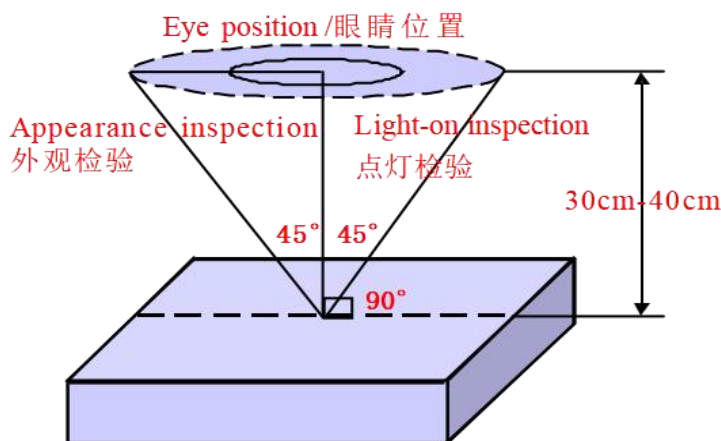
2.1.2、Inspection time /检验时间: Displays performance test /功能测试: 2~3S /Image, Appearance Inspection / 外观检验: 8~10S.

2.1.3、Inspection the viewing angle /检验视角:

Display Inspection Angle /显示检验角度: ±45°.

Appearance Inspection Angle /外观检验角度: ±45°.

Eye position /眼睛位置:



(Perpendicular to LCD panel surface /垂直于LCD表面)

### 2.2、Inspection environment /检验环境:

Temperature / 温度		25±5°C
Humidity / 湿度		55±5%RH
Brightness	Appearance Inspection / 外观检验	800~1000 Lux
亮度	Display Inspection / 功能检验	200~300 Lux

### 2.3、Sampling conditions / 抽样方式.

Sampling Plan / 抽样计划		GB/T 2828.1- 2003
		Batch single sampling/批量单次抽样
		General inspection level: II/一般检验水平: 二级
AQL	Major Defect / 主要缺陷	0.25
	Minor Defect / 次要缺陷	0.65

### 3、Terms and definitions / 术语和定义.

#### 3.1、Defect classification / 缺陷分类:

3.1.1、Major defects / 主要缺陷: Defects that cause the product to fail or reduce the usability of the product / 引起产品功能失效和减少产品的有效使用与操作的缺陷.

3.1.2、Minor defects / 次要缺陷: Defects that do not affect the functionality and effective use and operation of the product / 不影响产品功能和有效使用与操作的缺陷.

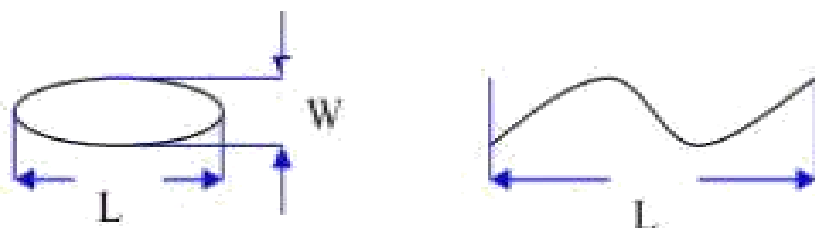
#### 3.2、Point defects / 点状缺陷:

The size of a punctate defect is defined by the diameter D, and the average diameter of the defect is  $D=1/2(W+L)$  / 点状缺陷由直径 D 定义大小, 缺陷的平均直径  $D=1/2(W+L)$ .

#### 3.3、line defects / 线状缺陷:

When defect size  $L \geq 2W$ , the defect count as liner type defect. Size of linear defect is defined by length (L) and the maximum width (W)

当缺陷尺寸  $L \geq 2W$  时, 被视为线状缺陷, 线状缺陷是由长度 (L) 和最大宽度 (W) 定义的.



### 3.4、LCD sub-pixels / LCD 子像素点:

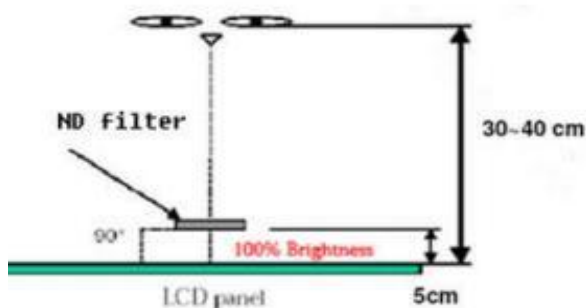
The sub-pixel defect area is greater than 50% of the LCD sub-pixel area, and is visible through ND5% masking

子像素点缺陷面积大于 50% LCD 子像素面积, 且透过 ND5%遮盖是可见的.

### 3.5、ND card test method / ND 卡检验方法:

Hold the ND card about 5cm above the display area, with your eyes 30-40cm away from the panel, and observe for 2~3 seconds

在显示区域上方大约 5cm 处握住 ND 卡, 眼睛距离面板 30-40cm, 观察 2~3 秒.



3.6、Surface substances that can be cleaned are not considered defects (e.g. finger prints on the protective film, dust particles)

可以被清洁干净的表面物质不视为缺陷 (如保护膜上的手指印, 尘粒) .

3.7、Defects that can be covered by the material and are not visible to the eye, and do not affect the function and use are not considered defects

能被物料覆盖目视不可见, 且不影响功能与使用的缺陷不视为缺陷.

3.8、AA shows that damage to the glass outside the area does not affect the effective line and does not expand the loss is acceptable

AA 显示区域以外的玻璃损伤, 不影响有效线路和不会在扩大损失的是可以接受的.

3.9、Issues not specified or defined in this document shall be dealt with through friendly negotiation between the parties / 本文件中未规定或定义的问题, 双方友好协商处理.

## 4.0、Inspection standards /检验标准:

### 4.1、Structural size standards / 结构尺寸标准:

Measurement items /测量项目		Specification /规格	Remark /备注
Name/名称	Unit /单位	Tolerance /公差	
Outside dimension: Length 尺寸: 长	mm /毫米	0.10mm~0.3mm	Please refer to the product specification for detailed dimensions and tolerances 详细的尺寸规格和公差请参考 产品规格书
Outside dimension: Width 尺寸: 宽	mm /毫米	0.10mm~0.3mm	
Outside dimension: Thickness 尺寸: 厚	mm /毫米	0.20mm~0.50mm	

### 4.2、Appearance Inspection standards:

( D : diameter, W : width, L : length, N : quantity, DS : spacing )

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
LCD	ITO	Full size 全尺寸	ITO can't open circuit, short circuit, ITO notch cannot exceed 70% of width. ITO 不能有开路 and 短路, ITO 缺口不能超过宽度的70%.	MA	
	Corners broken 崩边/崩角	Full size 全尺寸	1、 It cannot affect the appearance of valid routes and functions; 不能影响有效线路和功能外观.	MA	
			2、 There must be no extensible rips 不能有可延伸性裂纹.	MA	
Silicone 硅胶	Silicone coating 硅胶涂布	Full size 全尺寸	1、 The height cannot exceed the LCD CF surface / 高度不能超过 LCD CF 面.		MI
			2、 No overflow and lack of glue / 不能溢胶 and 缺胶.		MI
			3、 Silicone cannot cover POL and FPC/ 硅胶不能覆盖到 POL and FPC.		MI

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
PCBA FPC Connector 连接器	Appearance 表面外观	Full size 全尺寸	1.FPC is not allowed to have drape/bubble/fold / 不允许有披锋/气泡/褶皱.		MI
			2.Surface scratches do not allow copper leakage / 表面划伤不允许出现漏铜.	MA	
			3.Cracking is not allowed / 不允许破裂.	MA	
			4.Gold finger oxidation is not allowed 不允许金手指氧化.	MA	
			5.Chromatic aberration is not allowed 不允许出现色差.	MA	
	Components 元器件	Full size 全尺寸	1. Damage, missing parts, and incorrect models are not allowed 不允许损伤、缺件、型号错误.	MA	
			2.Components need to be insulated with high temperature adhesive (unless not required by the drawings) / 元器件需要有高温胶绝缘保护 (除非图纸无要求) .		MI
			3.The pads need to be glued with high temperature (unless not required by the drawings) / 焊盘需贴高温胶 (除非图纸无要求) .		MI
	Weld 焊接	Full size 全尺寸	1. False soldering, virtual soldering, and tinning are not allowed 不允许假焊、虚焊、连锡.	MA	
			2. No solder bead residue is allowed 不允许有锡珠残留.		MI
3.The pads need to be glued with high temperature (unless not required by the drawings) / 焊盘需贴高温胶 (除非图纸无要求) .				MI	
POL 偏光片	Scratches 划伤	Under 6 inches 6寸以下	1.W≤0.05mm; L≤5mm, Ignore (忽略) . 2.0.05mm < W≤0.10mm ; L≤5mm ; N≤2; DS≥10mm. 3.0.10mm < W; 5mm < L, Not allowable (不允许) .		MI
		6~10.0 inches 6寸~10.0寸	1.W≤0.07mm; L≤5mm, Ignore (忽略) . 2.0.07mm < W≤0.12mm ; L≤10mm ; N≤3 ; DS≥10mm. 3.0.12mm < W; 10mm < L, Not allowable (不允许) .		MI
		More than 10 inches 10寸以上	1.W≤0.10mm; L≤5mm, Ignore (忽略) . 2.0.10mm < W≤0.15mm ; L≤10mm ; N≤4 ; DS≥10mm. 3.0.15mm < W; 10mm < L, Not allowable (不允许) .		MI

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
POL 偏光片	Bubbles	Under 6 inches 6寸以下	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤2; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		More than 6 inches 6寸以上	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤3; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
	Bubbles around the edges 边缘气泡	Full size 全尺寸	1.Within 1/2BM of the display area, it is not allowed 显示区往外 1/2BM 区域内, 不允许. 2.The display area is 1/2 outside the BM area, and it is not controlled 显示区往外 1/2BM 区域以外, 不管控.		MI
	Point defects Embossing	Under 6 inches 6寸以下	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤2; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		6~10.0 inches 6寸~10.0寸	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤3; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
		More than 10 inches 10寸以上	1.D≤0.25mm, Ignore (忽略) . 2.0.25mm < D≤0.50mm; N≤4; DS≥10mm. 3.D > 0.50mm, Not allowable (不允许) .		MI
	Dirty 脏污	Full size 全尺寸	Dirt, finger prints, etc. are not allowed 不允许有脏污、手指印等.		MI
	Warping 起翘	Full size 全尺寸	Not allowed 不允许.		MI
	Paste offset 贴附偏位	Full size 全尺寸	It is not allowed to exceed the patch tolerance required by the drawing; After TP lamination, it is not allowed to leak the edges of the polarizer 不允许超出图纸要求的贴片公差; 在 TP 贴合后不允许漏偏光片边缘.		MI
	Angle mistake 角度错误	Full size 全尺寸	Not allowed 不允许.		MA
Mixture 混料	Full size 全尺寸	Not allowed 不允许.		MA	

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
TP	Scratches 划伤	Under 6 inches 6寸以下	1.W≤0.05mm; L≤5mm, Ignore (忽略) . 2.0.05mm < W≤0.10mm ; L≤5mm ; N≤2 ; DS≥10mm. 3.0.10mm < W; 5mm < L, Not allowable (不允许) . 4.There is a feeling scratch, Not allowable 有感划伤, 不允许.		MI
		6~10.0 inches 6寸~10.0寸	1.W≤0.07mm; L≤5mm, Ignore (忽略) . 2.0.07mm < W≤0.12mm ; L≤10mm ; N≤3 ; DS≥10mm. 3.0.12mm < W; 10mm < L, Not allowable (不允许) . 4.There is a feeling scratch, Not allowable 有感划伤, 不允许.		MI
		More than 10 inches 10寸以上	1.W≤0.10mm; L≤5mm, Ignore (忽略) . 2.0.10mm < W≤0.15mm ; L≤10mm ; N≤4 ; DS≥10mm. 3.0.15mm < W; 10mm < L, Not allowable (不允许) . 4.There is a feeling scratch, Not allowable 有感划伤, 不允许.		MI
	Black dots white dots 黑点/白点	Under 6 inches 6寸以下	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤2; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		6~10.0 inches 6寸~10.0寸	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤3; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
		More than 10 inches 10寸以上	1.D≤0.25mm, Ignore (忽略) . 2.0.25mm < D≤0.50mm; N≤4; DS≥10mm. 3.D > 0.50mm, Not allowable (不允许) .		MI
	OCA Bubbles 气泡	Full size 全尺寸	Not allowed 不允许.		MI
	Corners broken 崩边/崩角	Full size 全尺寸	1.Product front /产品正面: Edge and corner chipping is not allowed / 崩角、崩边不允许 2.Product back /产品背面: X≤0.5, Y≤0.5, Z≤1/2T; N≤4; DS≥10mm.	MA	
	Silk screen 丝印	Full size 全尺寸	The silk screen is clear, complete and correct 丝印清晰、完整、内容正确.		MI

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别
TP	Dirty 脏污	Full size 全尺寸	Uncleanable dirt, Not allowable. 不可擦拭的脏污, 不允许.	MI
	Broken 破损	Full size 全尺寸	Not allowable. 不允许.	MI
	Ink color aberration 油墨色差	Full size 全尺寸	$\Delta E > 1$ , Not allowable (不允许).	MI
	Cover pinholes 针孔	Full size 全尺寸	1.D $\leq$ 0.20mm, N $\leq$ 2, DS $\geq$ 10mm, allowable 2.D > 0.20mm, intensive pinholes (密集型针孔), Not allowable (不允许).	MI
	Paint off 掉漆	Full size 全尺寸	Touch-up on the back of the cover is allowed, and the touch-up area cannot exceed 2.0mm in diameter / 允许在盖板背面补漆, 补漆面积不 能超过直径 2.0mm.	MI
BL 背光	Backlight separation 背光分离	Full size 全尺寸	Not allowable 不允许.	MI
	Deformed 变形	Full size 全尺寸	Measured using a plug gauge, If the deformation exceeds 0.3mm, NG is judged 使用塞规测量, 形变超过 0.3mm, 判定 NG.	MI
	Iron frame Oxidation /abscission 铁框氧化/脱落	Full size 全尺寸	Not allowable 不允许.	MI
	Dirt/adhesive residue/solder beads 脏污/残胶/锡珠	Full size 全尺寸	Not allowable 不允许.	MI
	Inkjet/barcode/ QR code 喷码/条码/二维 码	Full size 全尺寸	The inkjet code is clear and complete, the barcode and QR code can be scanned normally, and the content and format meet the requirement / 喷码清晰完整、条码和二维码 可正常扫描, 内容和格式与要求相符.	MI
	Auxiliary materials 辅料	Full size 全尺寸	Accessories (vinyl, double-sided tape, insulating glue, etc.) are not allowed to be missed, misguided, defective, etc 辅料(黑胶、双面胶、绝缘胶等)不允许有漏贴、 贴偏、残缺等.	MI

### 4.3、Functional inspection standards:

( D : diameter, W : width, L : length, N : quantity, DS : spacing )

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
Display Screen 模组	Light leakage / Mura 漏光/ Mura	Full size 全尺寸	1.Use ND5% filter masking, visual invisibility is OK 使用 ND5%遮盖, 目视不可见即为 OK. 2.If necessary, sign off on the sample 必要时, 签限定样.		MI
	Brightness uniformity 亮度均匀性	Full size 全尺寸	Brightness uniformity < 85.0%, Not allowable 亮度均匀性 < 85.0%, 不允许.	MA	
	LCD bright spots/dark spots 玻璃亮点/暗点	Under 6 inches 6寸以下	1.D≤0.10mm, Ignore (忽略) . 2.0.10mm < D≤0.20mm; N≤2; DS≥10mm. 3.D > 0.20mm, Not allowable (不允许) .		MI
		6~10.0 inches 6寸~10.0寸	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤3; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		More than 10 inches 10寸以上	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤4; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
	Backlight black dots/white dots 背光黑点/白点	Under 6 inches 6寸以下	1.D≤0.15mm, Ignore (忽略) . 2.0.15mm < D≤0.30mm; N≤2; DS≥10mm. 3.D > 0.30mm, Not allowable (不允许) .		MI
		6~10.0 inches 6寸~10.0寸	1.D≤0.20mm, Ignore (忽略) . 2.0.20mm < D≤0.40mm; N≤3; DS≥10mm. 3.D > 0.40mm, Not allowable (不允许) .		MI
		More than 10 inches 10寸以上	1.D≤0.25mm, Ignore (忽略) . 2.0.25mm < D≤0.50mm; N≤4; DS≥10mm. 3.D > 0.50mm, Not allowable (不允许) .		MI
	Linear foreign bodies 线状异物	Under 6 inches 6寸以下	1.W≤0.05mm; L≤5mm, Ignore (忽略) . 2.0.05mm < W≤0.10mm ; L≤5mm ; N≤2; DS≥10mm. 3.0.10mm < W; 5mm < L, Not allowable (不允许) .		MI
		6~10.0 inches 6寸~10.0寸	1.W≤0.07mm; L≤5mm, Ignore (忽略) . 2.0.07mm < W≤0.12mm ; L≤10mm ; N≤3 ; DS≥10mm. 3.0.12mm < W; 10mm < L, Not allowable (不允许) .		MI
		More than 10 inches 10寸以上	1.W≤0.10mm; L≤5mm, Ignore (忽略) . 2.0.10mm < W≤0.15mm ; L≤10mm ; N≤4 ; DS≥10mm. 3.0.15mm < W; 10mm < L, Not allowable (不允许) .		MI

Material 检验区域	Inspection items 检验项目	Product size 适用尺寸	Inspection standards 检验规格	Category 缺陷类别	
Display Screen 模组	White/Black print 白印/黑印	Full size 全尺寸	Use ND5% filter masking, visual invisibility is OK 使用 ND5%遮盖, 目视不可见即为 OK.		MI
	Interference pattern/Newtonian pattern 干涉纹/牛顿纹	Full size 全尺寸	Not allowable 不允许.		MI
	Membranes displacement 膜材移位	Full size 全尺寸	Not allowable 不允许.		MI
	Color blocks 色斑	Full size 全尺寸	Use ND5% filter masking, visual invisibility is OK /使用 ND5%遮盖, 目视不可见即为 OK.		MI
	Display abnormal 画异	Full size 全尺寸	Not allowable 不允许.	MA	
	No display 无显示	Full size 全尺寸	Not allowable 不允许.	MA	
	Line/Missing Drawing 线条/缺画	Full size 全尺寸	Not allowable 不允许.	MA	
	Splash screen 闪屏	Full size 全尺寸	Not allowable 不允许.	MA	
	LCD grid LCD 网格	Full size 全尺寸	Not allowable 不允许.	MA	
	Afterimage 残影	Full size 全尺寸	Not allowable 不允许.	MA	
	Wrong viewing angle 可视角错误	Full size 全尺寸	Not allowable 不允许.	MA	
TP	No touch 无触摸	Full size 全尺寸	Not allowable 不允许.	MA	
	Touch the jump point 触摸跳点	Full size 全尺寸	Not allowable 不允许.	MA	
	Touch not sensitive 触摸不灵敏	Full size 全尺寸	Not allowable 不允许.	MA	