Product Specification

DLC Display Co., Limited

DLC-T4.0DDM#1

Features

480(RGB) X 480

IPS/MIPI Interface Display

Without Touch

Ph: 86-755-86029824
Fx: 86-755-86029827
www.dlcdisplay.com
sales@dlcdisplay.com

Table of contents

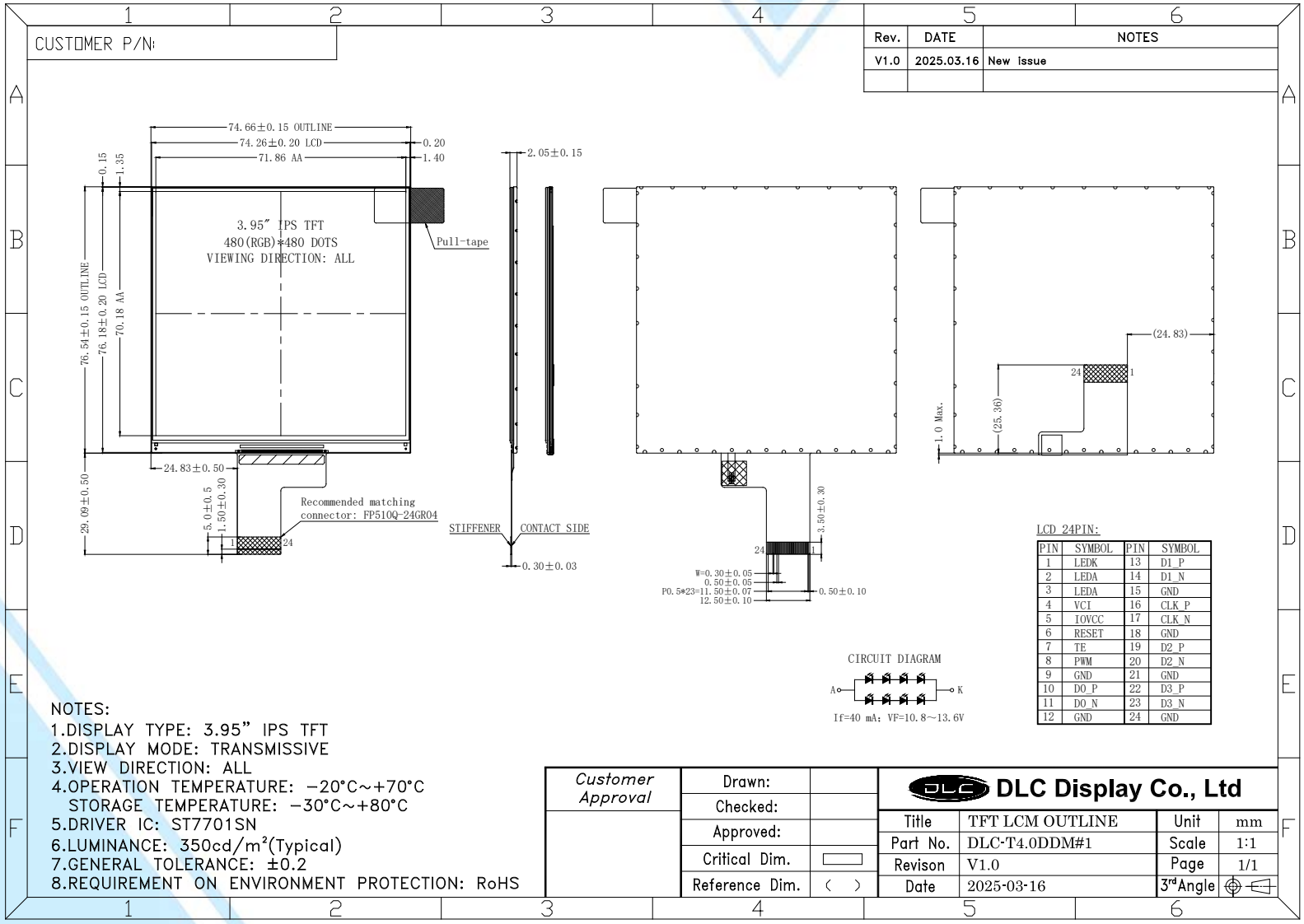
Document Revision History

Date	Revision#	Description
2025-03-16	1.0	Rev 1.0 was issued

General Description

Item	Contents	Unit
Size	3.95	inch
Resolution	480(RGB) x 480	/
Interface	MIPI	/
Technology type	IPS	/
Pixel pitch	0.1497 x 0.1462	mm
Pixel Configuration	R.G.B. Vertical Stripe	
Outline Dimension (W x H x D)	74.66 x 76.54 x 2.05	mm
Active Area	71.86 x 70.18	mm
Display Mode	Transmissive, Normally Black	/
Display Driver IC	ST7701SN	/
Viewing Direction	ALL	/
Backlight Type	LED	/

Mechanical Drawing



PIN assignment

No	Symbol	Description	Remarks
1	LEDK	LED backlight Cathode	
2~3	LEDA	LED backlight Anode	
4	VCI	Power supply for analog circuits.	
5	IOVCC	Power supply for I/O pin.	
6	RESET	Reset pin	
7	TE	Frame synchronization output signal pin	
8	PWM	No connection	
9	GND	Ground	
10	D0_P	Positive MIPI differential data inputs	
11	D0_N	Negative MIPI differential data inputs	
12	GND	Ground	
13	D1_P	Positive MIPI differential data inputs	
14	D1_N	Negative MIPI differential data inputs	
15	GND	Ground	
16	CLK_P	Positive MIPI differential clock inputs	
17	CLK_N	Negative MIPI differential clock inputs	
18	GND	Ground	
19	D2_P	No connection	
20	D2_N	No connection	
21	GND	Ground	
22	D3_P	No connection	
23	D3_N	No connection	
24	GND	Ground	

Connector: FP510Q-24GR04.

Absolute maximum Ratings

- Electrical Absolute max. ratings

Parameter	Symbol	MIN	MAX	Unit	Remark
Power Supply Voltage	VCI	-0.3	4.6	V	Ta=25° C
	IOVCC	-0.3	4.6	V	

- Environment Conditions

Item	Symbol	MIN	MAX	Unit	Remark
Operating Temperature	TOPR	-20	70	℃	
Storage Temperature	TSTG	-30	80	℃	

Electrical Specifications

- Electrical characteristics

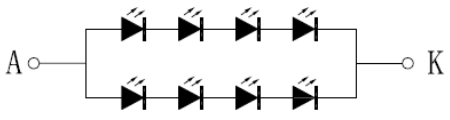
Item		Symbol	MIN	TYP	MAX	Unit	Remark
Power Supply Voltage		VCI	2.5	3.3	3.6	V	
		IOVCC	1.65	1.8	3.3	V	
Power Supply Current		ILCD	-	46	-	mA	VCI=3.3V
Input voltage	"H"	VIH	0.7*IOVCC	-	IOVCC	V	
	"L"	VIL	0	-	0.3*IOVCC	V	

- LED Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	IF	-	40	-	mA	Note1
Forward Voltage	VF	10.8	11.6	13.6	V	
LED Life time	-	30,000	-	-	Hr	Note2

Notes:
1. The LED Supply Voltage is defined by the number of LED at Ta=25℃ and IL =40mA.
2. The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and IL =40mA. The LED lifetime could be decreased if operating IL is larger than 40mA.

CIRCUIT DIAGRAM



If=40 mA; VF=10.8～13.6V

Command/AC Timing

● MIPI Interface Characteristics

◆ High Speed Mode

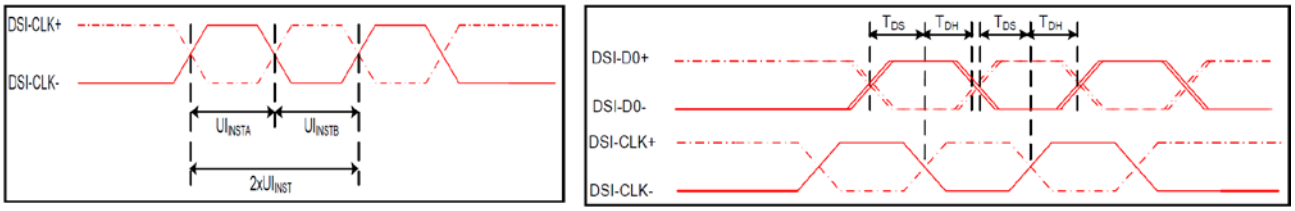


Figure: DSI clock channel timing

Signal	Symbol	Parameter	Min.	Max.	Unit	Description
DSI-CLK+/-	2xUIINSTA	Double UI instantaneous	4	25	ns	
DSI-CLK+/-	UIINSTA UIINSTB	UI instantaneous halfs	2	12.5	ns	UI=UIINSTA= UIINSTB
DSI-Dn+/-	tDS	Data to clock setup time	0.15	-	UI	
DSI-Dn+/-	tDH	Data to clock hold time	0.15	-	UI	

Table: MIPI Interface- High Speed Mode Timing Characteristics

◆ Lowe Power Mode

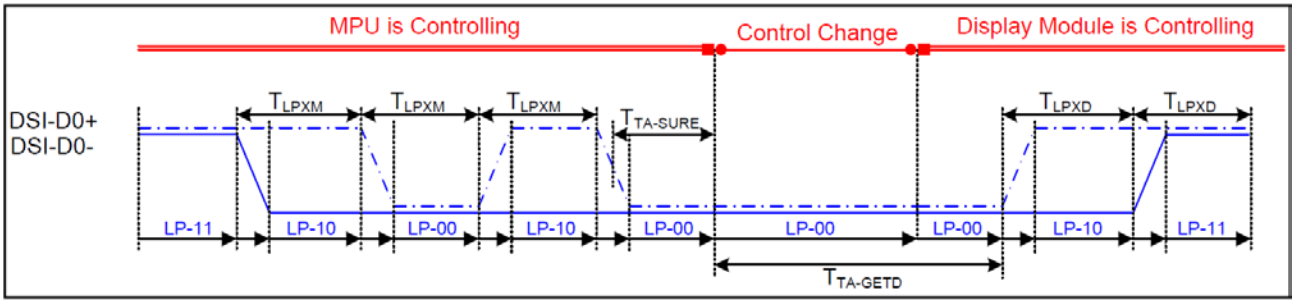


Figure: Bus Turnaround (BTA) from display module to MPU Timing

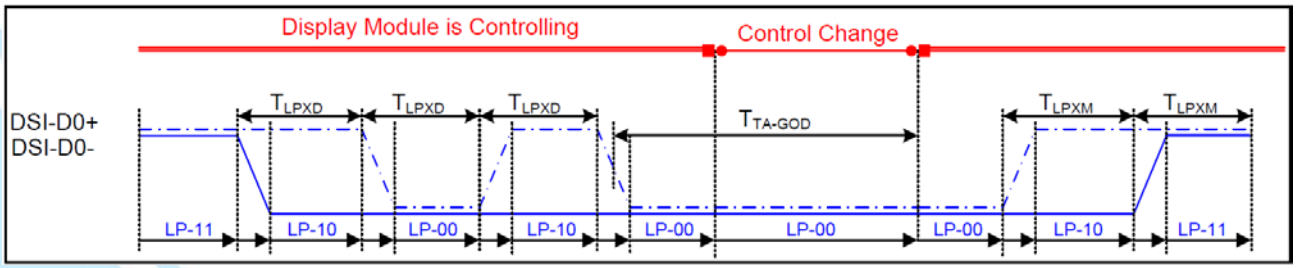


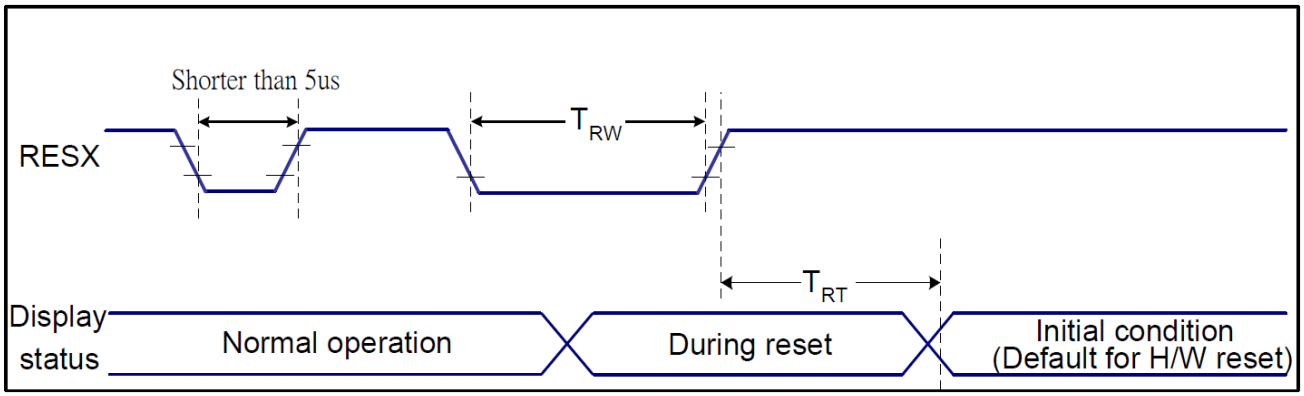
Figure: Bus Turnaround (BTA) from MPU to display module Timing

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	70	ns	Input
DSI-D0+/-	TLPXD	Length of LP-00, LP-01, LP-10 or LP-11 periods	50	75	ns	Output

		MPU→Display Module				
DSI-D0+/-	TTA-SURED	Time-out before the MPU start driving	TLPXD	2* TLPXD	ns	Output
DSI-D0+/-	TTA-GETD	Time to drive LP-00 by display module	5* TLPXD		ns	Input
DSI-D0+/-	TTA-GOD	Time to drive LP-00 after turnaround request-MPU	4* TLPXD		ns	Output

Table: MIPI Interface Low Power Mode Timing Characteristics

● Reset Timing



VDDI=1.8V, VDD=2.8V, AGND=DGND=0V, Ta=25℃

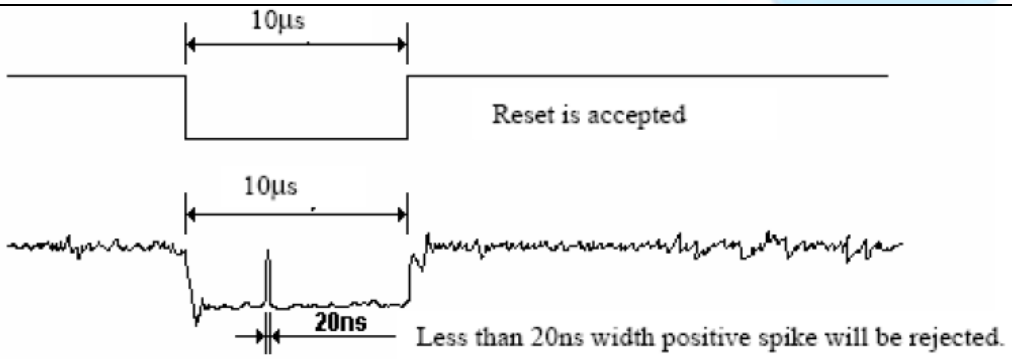
Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

Notes:

1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (tRT) 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 below:

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:



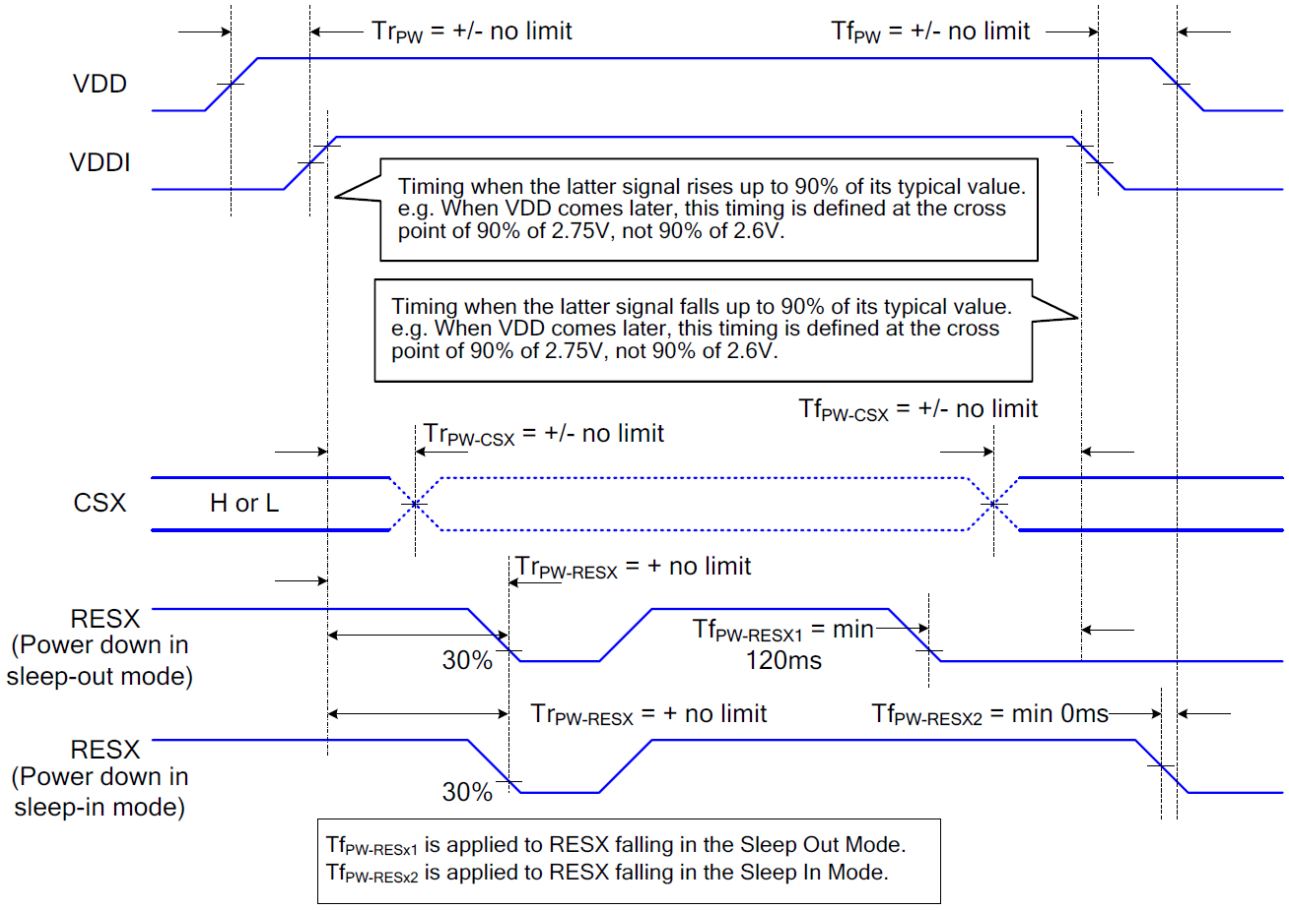
5. When Reset applied during Sleep In Mode.
6. When Reset applied during Sleep Out Mode.
7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

● Power On/Off Sequence

VDDI and VDDA can be applied or powered down in any order. During the Power Off sequence, if the LCD is in the Sleep Out mode, VDDA and VDDI must be powered down with minimum 120msec. If the LCD is in the Sleep In mode, VDDA and VDDI can be powered down with minimum 0msec after the RESX is released.

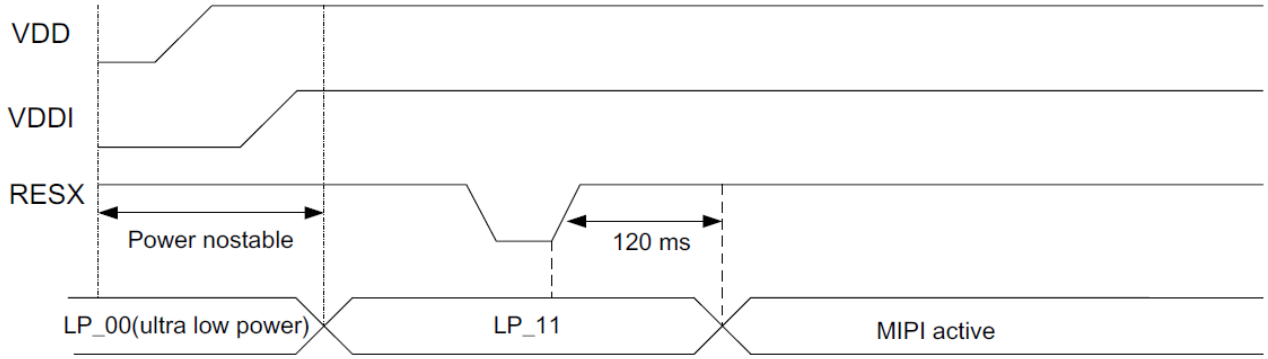
CSX can be applied at any timing or can be permanently grounded. RESX has high priority over CSX.

The power on/off sequence is illustrated below



Notes:

1. There will be no damage to the ST7701SN if the power sequences are not met.
2. There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.
3. There will be no abnormal visible effects on the display between the end of Power On Sequence and before receiving the Sleep Out command, and also between receiving the Sleep In command and the Power Off Sequence.
4. If the RESX line is not steadily held by the host during the Power On Sequence as defined in Uncontrolled Power Off, then it will be necessary to apply the Hardware Reset (RESX) after the completion of the Host Power On Sequence to ensure correct operations. Otherwise, all the functions are not guaranteed.
5. When VDDA is in power off State, the MIPI must set in Ultra Low Power Mode (GND Level).



For more details, please refer to IC datasheet: IC Datasheet

Optical Specification

Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
Contrast Ratio		CR	θ=0°	640	800	-		Note1 Note2
Response Time		TR+TF	25℃	-	25	35	ms	Note1 Note3
View Angles		ΘT	CR≧10	70	80	-	Degree	Note 4
		ΘB		70	80	-		
		ΘL		70	80	-		
		ΘR		70	80	-		
Chromaticity	White	x	Brightness is on	Typ-0.05	0.290	Typ+0.05		Note5, Note1
		y			0.325			
	Red	x			0.613			
		y			0.354			
	Green	x			0.316			
		y			0.567			
	Blue	x			0.139			
		y			0.099			
Luminance		L		300	350	-	cd/m^2	Note1 Note6
Uniformity (White)		U		80	-	-	%	Note1 Note7

Environmental / Reliability Tests

No	Test Item	Condition	Judgment criteria
1	High Temp Operation	Ta= 70℃, 96hrs	Per table in below
2	Low Temp Operation	Ta= -20℃, 96hrs	Per table in below
3	High Temp Storage	Ts= 80℃, 96hrs	Per table in below
4	Low Temp Storage	Ts= -30℃, 96hrs	Per table in below
5	High Temp & High Humidity Storage	Ts= +60℃, 90% RH 96hours	Per table in below (polarizer discoloration is excluded)
6	Thermal Shock (Non-operation)	-30℃ 30 min~+80℃ 30 min, Change time:5min, 10 Cycles	Per table in below
7	ESD (Operation)	C=150pF, R=330Ω， 5points/panel Air:±8KV, 5times; Contact:±4KV, 5 times;	Per table in below
8	Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z.	Per table in below
9	Shock (Non-operation)	60G 6ms, ±X,±Y,±Z 3times, for each direction	Per table in below
10	Package Drop Test	Height:80 cm, 1 corner, 3 edges, 6 surfaces	Per table in below

INSPECTION	CRITERION(after test)
Appearance	No Crack on the FPC, on the LCD Panel
Alignment of LCD Panel	No Bubbles in the LCD Panel No other Defects of Alignment in Active area
Electrical current	Within device specifications
Function / Display	No Broken Circuit, No Short Circuit or No Black line No Other Defects of Display