



<i>Product Specification</i>	<i>Model:</i>	AWK-640480T35N01	<i>Rev. No.</i>	<i>Issued Date.</i>	<i>Page.</i>
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Thin Film Transistor LCD MODULE
MODEL: AWK-640480T35N01

Customer's No.:

Acceptance

10-1 Floor, No. 192, Tahtung Road,
Sec. 3, Hsi-Chih Dist,
New Taipei City, Taiwan

Approved and Checked by

Approved by	Checked by		Made by
			



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1. Scope

This specification defines general provisions as well as inspection standards for TFT module supplied by ACROWISE electronics. If the event of unforeseen problem or unspecified items may occur, naturally shall negotiate and agree to solution

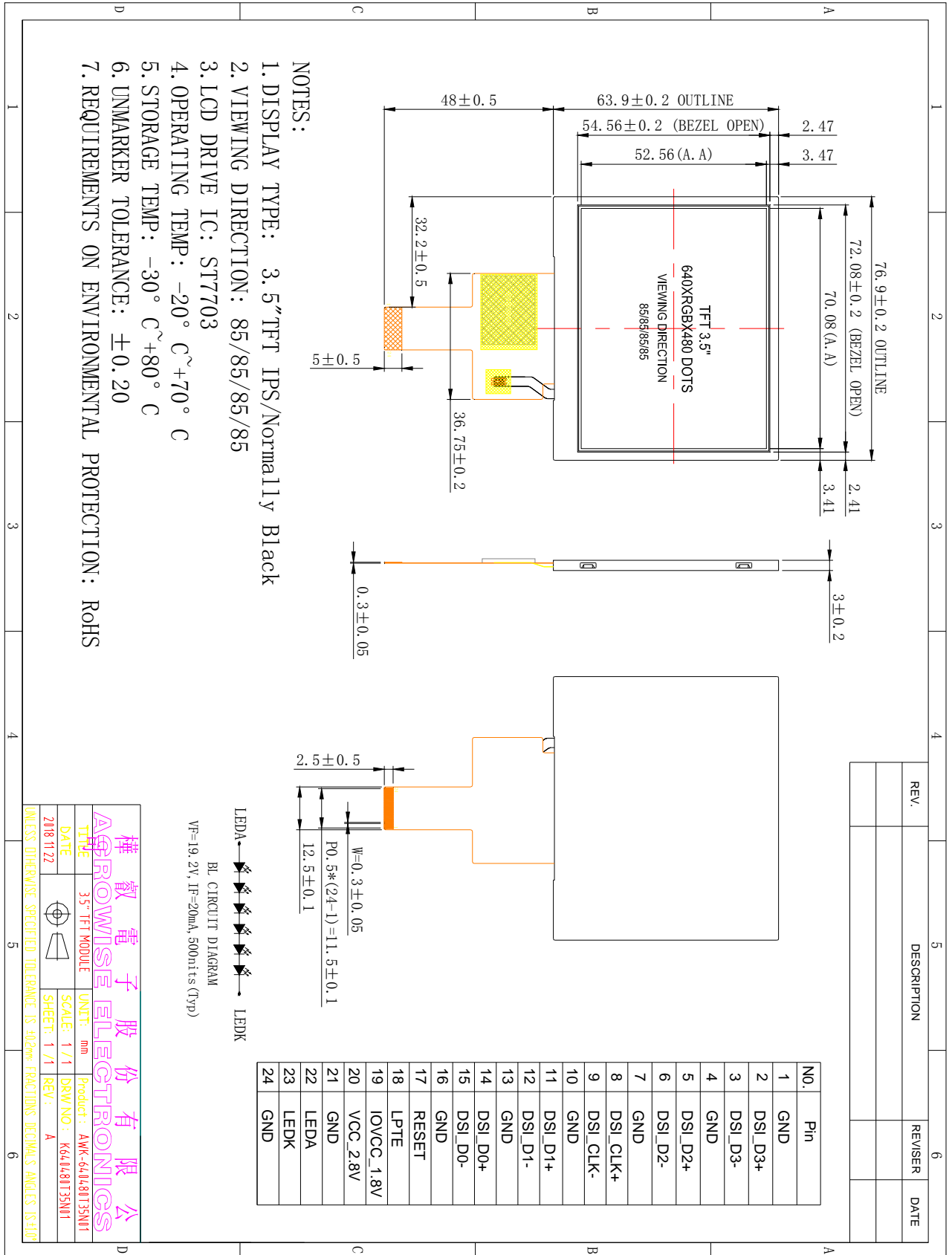
2. General Information

Item	Standard Values	Units
LCD type	3.5'TFT	--
Dot arrangement	640 (RGB)×480	dots
Color filter array	RGB vertical stripe	--
Display mode	IPS / Normally Black	--
Eyes Viewing Direction	ALL	--
Driver IC	ST7703	--
Module size	76.9(W)×63.9(H)×3.0(T)	mm
Active area	70.08(W)×52.56(H)	mm
Dot pitch	0.1095(W)×0.1095(H)	mm
Interface	MIPI	--
Operating temperature	-20 ~ +70	°C
Storage temperature	-30 ~ +80	°C
Back Light	6 White LEDS	--



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3. External Dimensions





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4. Interface Description

Pin No.	Pin Name	Description
1	GND	Power ground
2	DSI_D3+	MIPI DSI differential data pair
3	DSI_D3-	MIPI DSI differential data pair
4	GND	Power ground
5	DSI_D2+	MIPI DSI differential data pair
6	DSI_D2-	MIPI DSI differential data pair
7	GND	Power ground
8	DSI_CLK+	MIPI DSI differential clock pair
9	DSI_CLK-	MIPI DSI differential clock pair
10	GND	Power ground
11	DSI_D1+	MIPI DSI differential data pair
12	DSI_D1-	MIPI DSI differential data pair
13	GND	Power ground
14	DSI_D0+	MIPI DSI differential data pair
15	DSI_D0-	MIPI DSI differential data pair
16	GND	Power ground
17	RESET	Reset input pin
18	LPTE	TE Signal
19	IOVCC_1.8V	Logic Supply Voltage
20	VCC_2.8V	Analog Supply Voltage
21	GND	Power ground
22	LEDA	LED backlight (Anode).
23	LEDK	LED backlight (Cathode).
24	GND	Power ground



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5. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Analog Supply Voltage	IOVCC	-0.5	5.0	V
Power supply voltage	VCC	-0.5	5.0	V
Operating Temperature	TOP	-20	70	°C
Storage Temperature	TST	-30	80	°C
Storage Humidity	HD	20	90	%RH

6. DC Characteristics

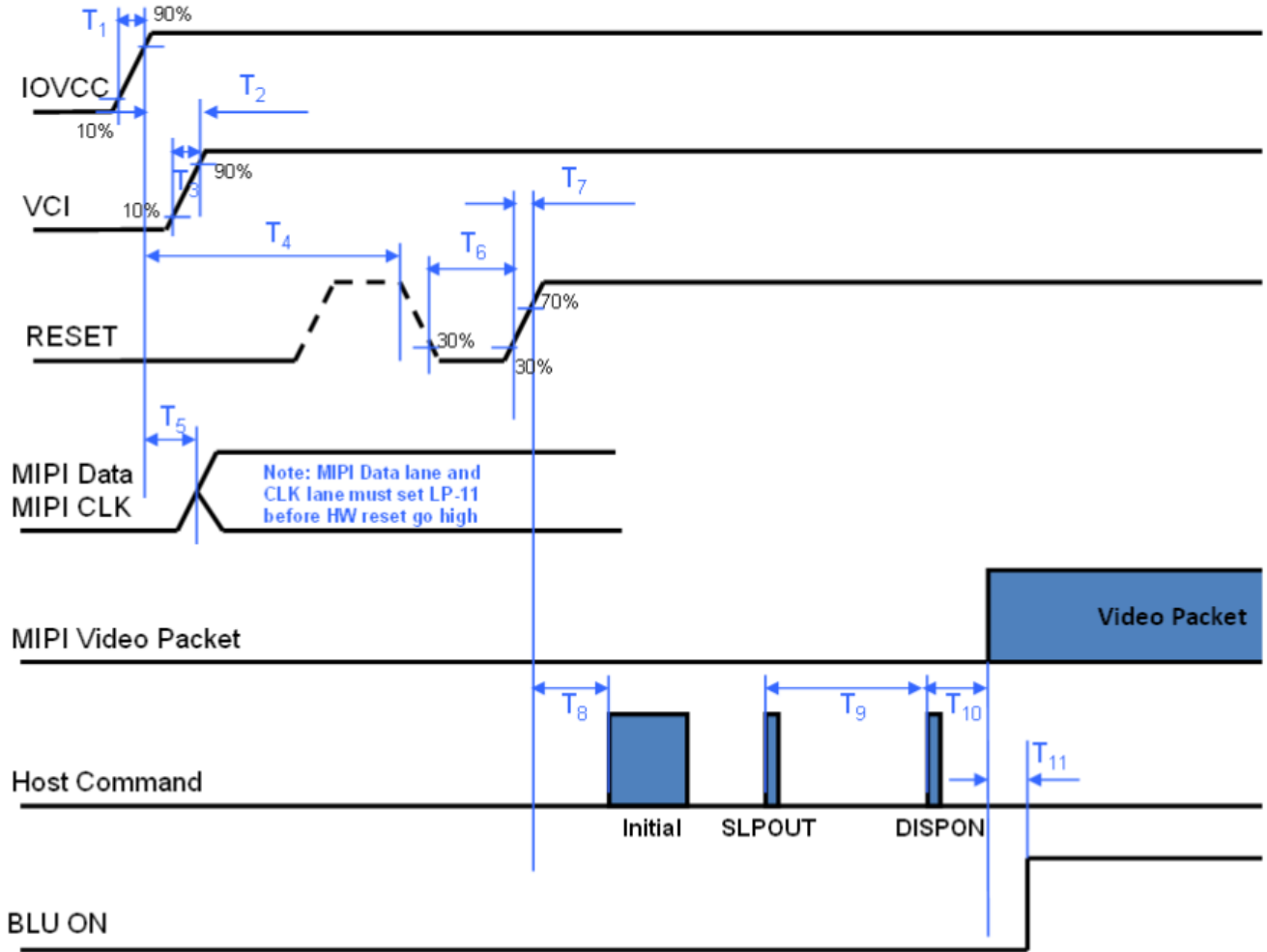
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Analog Supply Voltage	IOVCC	1.65	1.8	2.0	V	-
Power supply voltage	VCC	2.5	3.3	4.8	V	-
Input High Voltage	V _{IH}	0.7IOVCC	-	IOVCC	V	-
Input Low Voltage	V _{IL}	GND	-	0.3 IOVCC	V	-
Output High Voltage	V _{OH}	0.8IOVCC	-	IOVCC	V	-
Output Low Voltage	V _{OL}	GND	-	0.2IOVCC	V	-
I/O Leak Current	ILI	-	-	1	uA	-



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7. Timing Characteristics

7.1.1 Power On Timing of External Power IC



DSI Power On Sequence of Power IC Mode

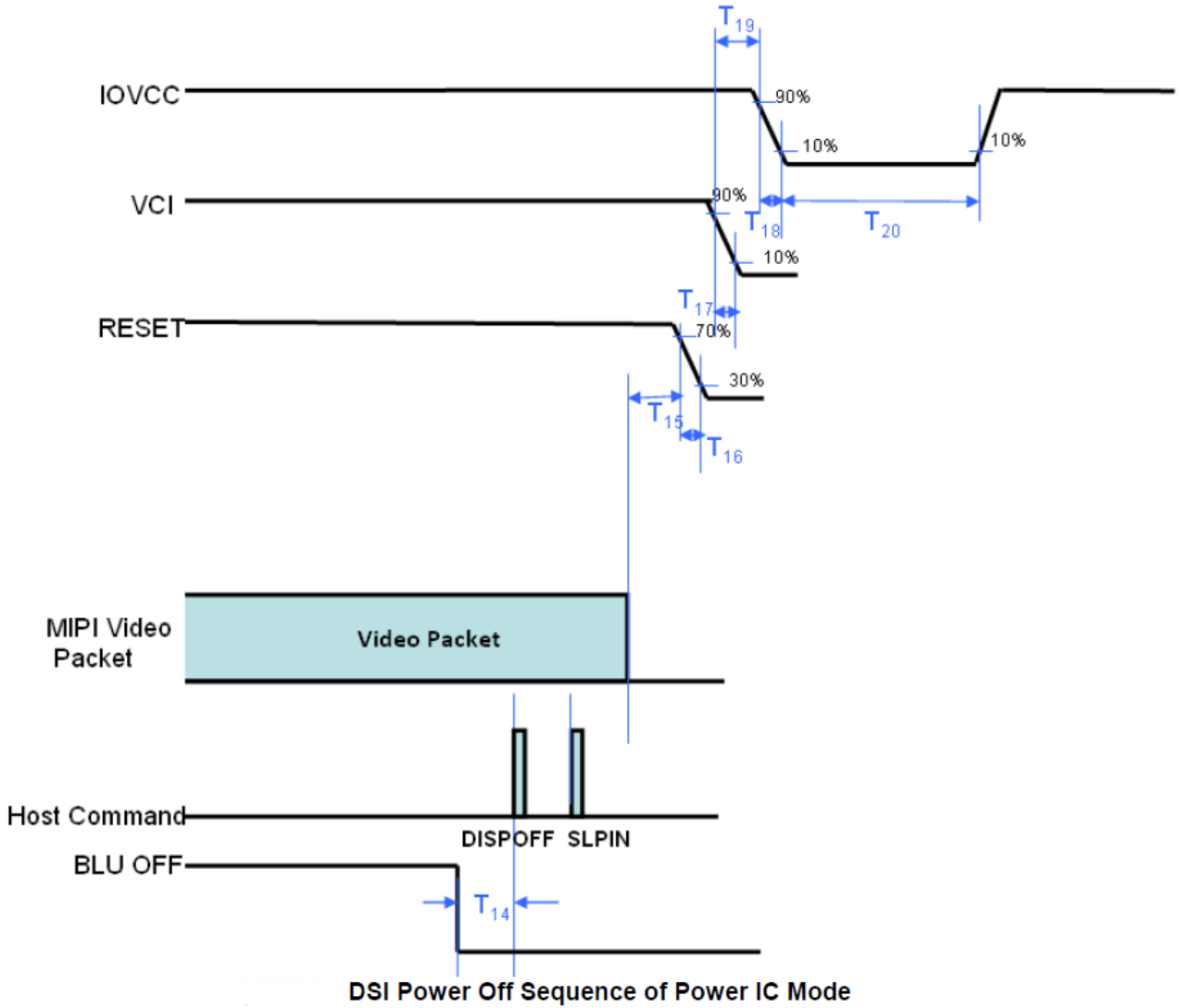
	Min.	Typ.	Max.	Unit
T1	0.01	-	10	ms
T2	No Limit			ms
T3	0.01	-	10	ms
T4	1	-	-	ms
T5	1	-	-	ms
T6	10	-	-	us
T7	No Limit			ns
T8	15	-	-	ms
T9	120	-	-	ms
T10	No Limit			ms
T11	100	150	-	ms

DSI Power On Timing of Power IC Mode



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7.1.2 Power Off Timing of External Power IC



	Min.	Typ.	Max.	Unit
T14	40	100	-	ms
T15	10	-	-	ms
T16		No Limit		ms
T17		No Limit		ms
T18		No Limit		ms
T19		No Limit		ms
T20	500			ms

DSI Power Off Timing of Power IC Mode

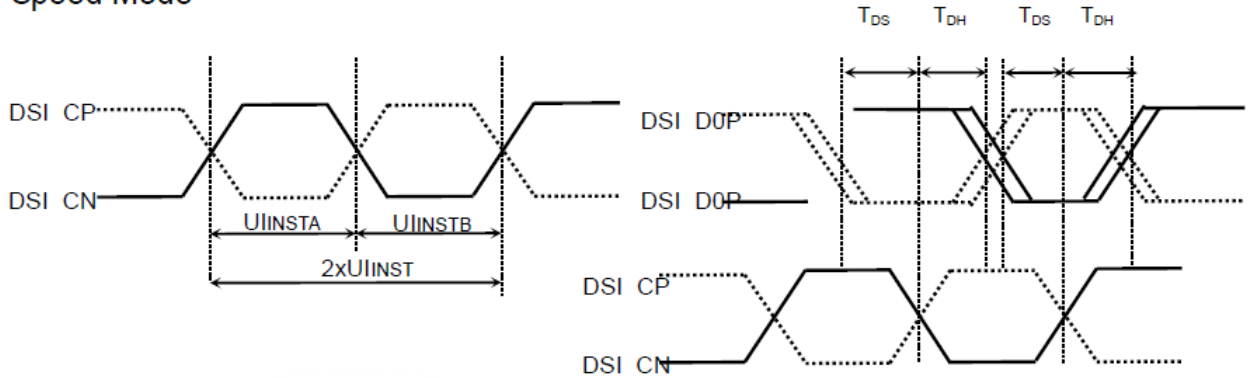


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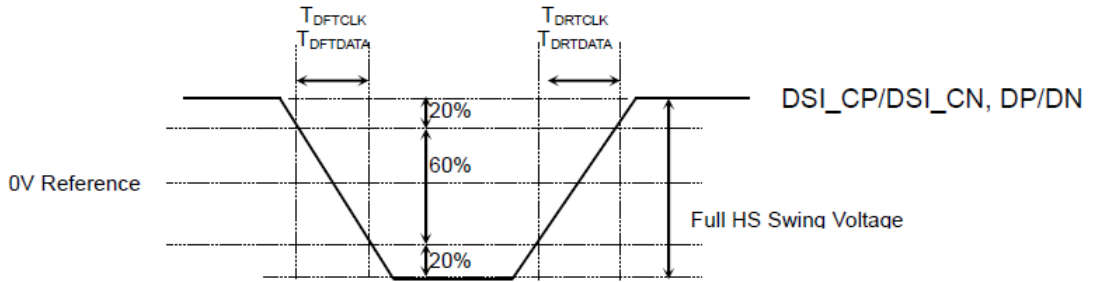
7.2 MIPI Characteristics

DSI Interface Timing Characteristics

High Speed Mode



DSI clock timing Characteristics



Rising and falling time on clock and data channel

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, T_A = -30 to 70°C)

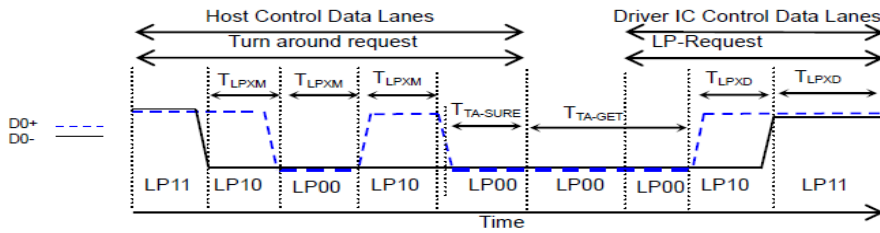
Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Double UI instantaneous	2xUIINST	TBD	-	25	ns
	UI instantaneous	UIINSTA UIINSTB	TBD	-	12.5	ns
DP/DN	Data to clock setup time	T _{DS}	0.15xUI	-	-	ps
	Data to clock hold time	T _{DH}	0.15xUI	-	-	ps
DSI_CP/ DSI_CN	Differential rise time for clock	T _{DRTCLK}	150	-	0.3UI	ps
	Differential fall time for clock	T _{DFTCLK}	150	-	0.3UI	ps
DP/DN	Differential rise time for data	T _{DRTDATA}	150	-	0.3UI	ps
	Differential fall time for data	T _{DFTDATA}	150	-	0.3UI	ps

DSI High Speed Mode Characteristics

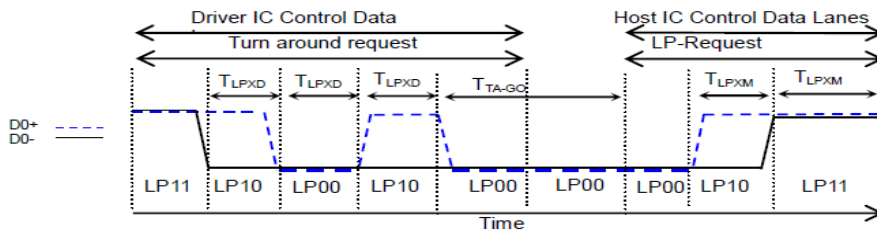


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Low Power Mode



BTA from HOST to Display Module Timing



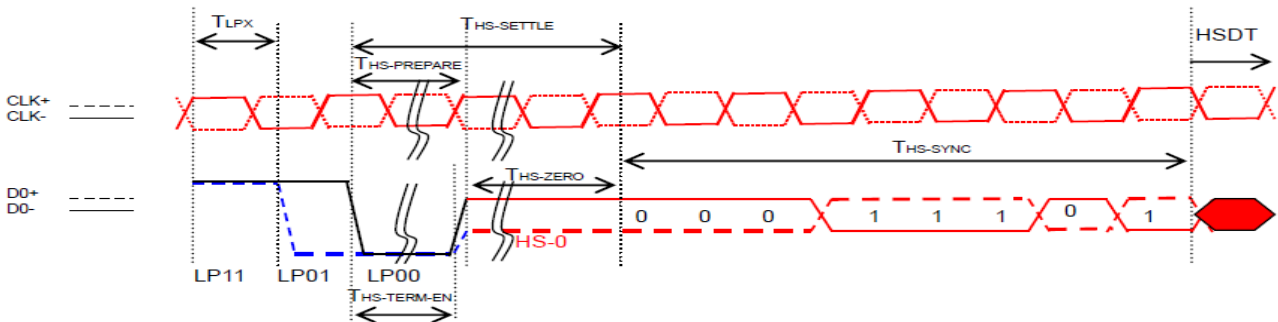
BTA from Display Module to HOST

(VSSA=0V, IOVCC=1.65V to 3.3V, VCI=2.3V to 3.3V, TA = -30 to 70°C)

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11 Host → Display module	TLPXM	50	-	-	ns
	Length of LP-00/LP01/LP10/LP11 Display module → Host	TLPXD	50	-	-	ns
	Time-out before the MPU start driver	T _{TA-SURE}	TLPXD	-	2xTLPXD	ns
	Time to drive LP-00 by display module	T _{TA-GET}	5xTLPXD	-	-	ns
	Time to drive LP-00 after turnaround request Host	T _{TAGO}	4xTLPXD	-	-	ns

DSI Low Power Mode Characteristics

DSI BURSTS

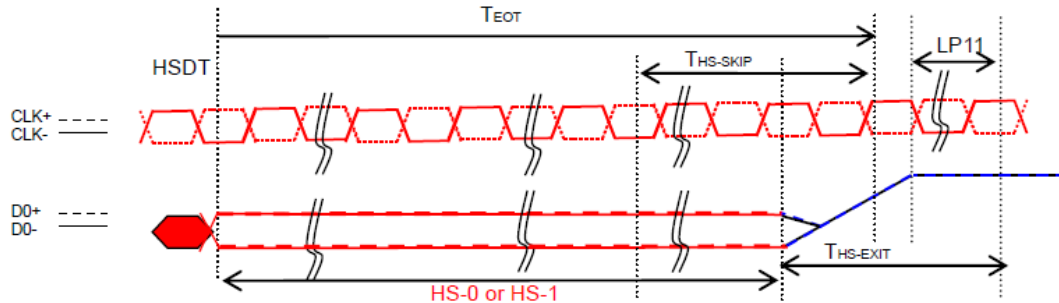


Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Length of LP-00/LP01/LP10/LP11	TLPX	50	-	-	ns
	Time to Driver LP-00 to prepare for HS transmission	T _{HS-PREPARE}	40+4UI	-	85+6UI	ns
	Time to enable data receiver line termination	T _{HS-TERM-EN}	-	-	35+4xUI	ns
	Time to drive LP-00 by display module	T _{TA-GET}	5xTLPXD	-	-	ns
	Time to drive LP-00 after turnaround request Host	T _{TAGO}	4xTLPXD	-	-	ns

DSI Low Power Mode to High Speed Mode Timing



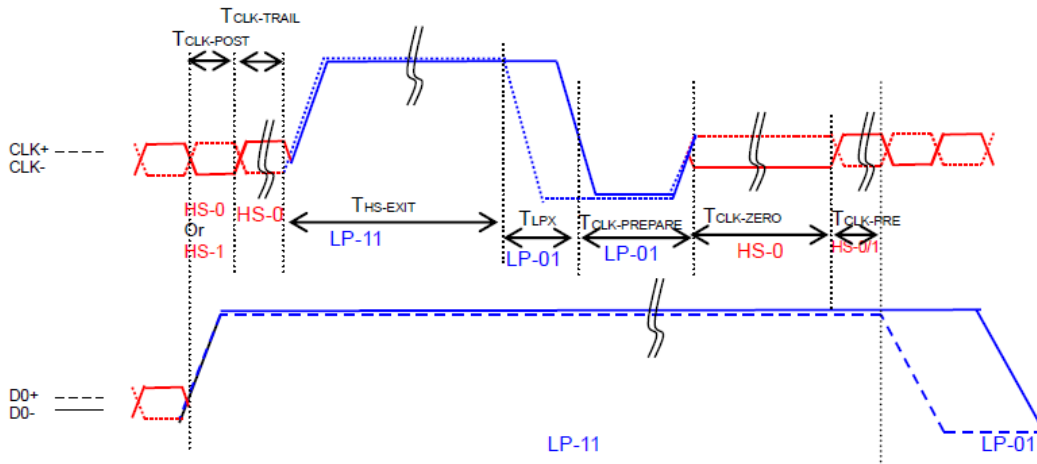
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NOTE:
If the last bit is HS-0, the transmitter changes from HS-0 to HS-1
If the last bit is HS-1, the transmitter changes from HS-1 to HS-0

Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_D0P/ DSI_D0P	Time-Out at Display Module to Ignore Transition Period of EoT	T _{HS-SKIP}	40	-	55+4xUI	ns
	Time to Driver LP-11 after HS Burst	T _{HS-EXIT}	100	-	-	ns

DSI Low Power Mode to High Speed Mode Timing



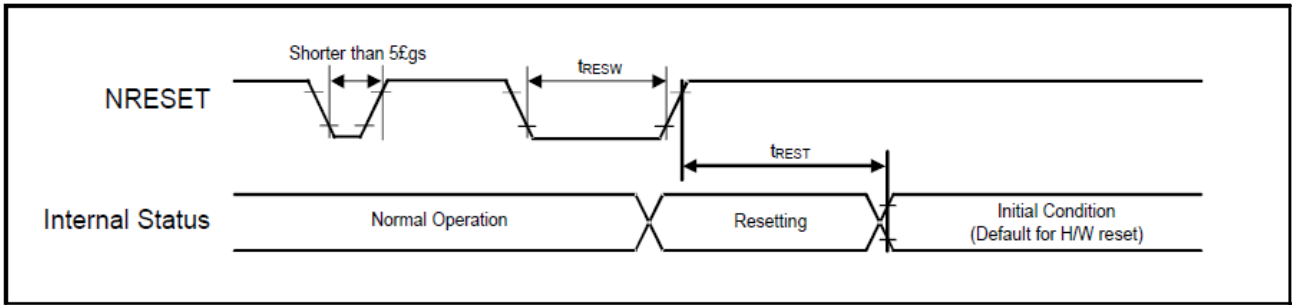
Signal	Item	Symbol	Spec.			Unit
			Min.	Typ.	Max.	
DSI_CP/ DSI_CN	Time that the MCU shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	T _{CLK-POST}	60+52xUI	-	-	ns
	Time to drive HS differential state after last payload clock bit of a HS transmission burst	T _{CLK-TRAIL}	60	-	-	ns
	Time to drive LP-11 after HS burst	T _{HS-EXIT}	100	-	-	ns
	Time to drive LP-00 to prepare for HS transmission	T _{CLK-PREPARE}	38	-	95	ns
	Time-out at Clock Lane Display Module to enable HS Termination	T _{CLK-TERM-EN}	-	-	38	ns
	Minimum lead HS-0 drive period before starting Clock	T _{CLK-PREPARE} + T _{CLK-ZERO}	300	-	-	ns
	Time that the HS clock shall be driven prior to any associated data Lane beginning the transition from LP to HS mode	T _{CLK-PRE}	8xUI			

Clock Lanes High Speed Mode to/from Low Power Mode Timing



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7.3 Reset Timing Characteristics



Reset input timing

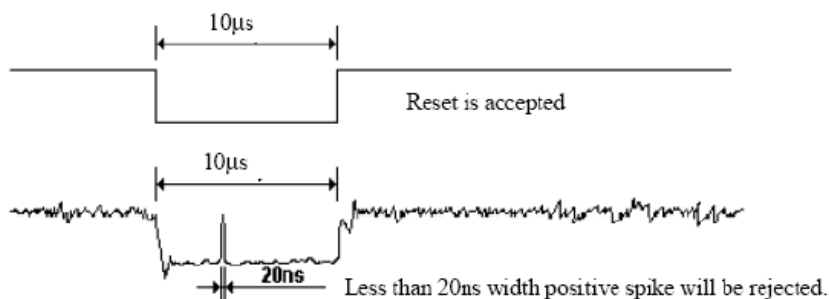
Symbol	Parameter	Related Pins	Spec.			Note	Unit
			Min.	Typ.	Max.		
tRESW	Reset low pulse width ⁽¹⁾	NRESET	10	-	-	-	μs
tREST	Reset complete time ⁽²⁾	-	15	-	-	When reset applied during SLPIN mode	ms
		-	120	-	-	When reset applied during SLPOUT mode	ms

Reset Input Timing

Note: (1) Spike due to an electrostatic discharge on NRESET line does not cause irregular system reset according to the following table.

NRESET Pulse	Action
Shorter than 5 μs	Reset Rejected
Longer than 10 μs	Reset
Between 5 μs and 10 μs	Reset Start

- (2) 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 H/W reset.
- (3) During Reset Complete Time, ID and VCOM value in OTP will be latched to internal register during this period. This loading is done every time when there is H/W reset complete time (tREST) within 15ms after a rising edge of NRESET.
- (4) Spike Rejection also applies during a valid reset pulse as shown as below:



- (5) It is necessary to wait 15msec after releasing NRESET before sending commands. Also Sleep Out command cannot be sent for 120msec.



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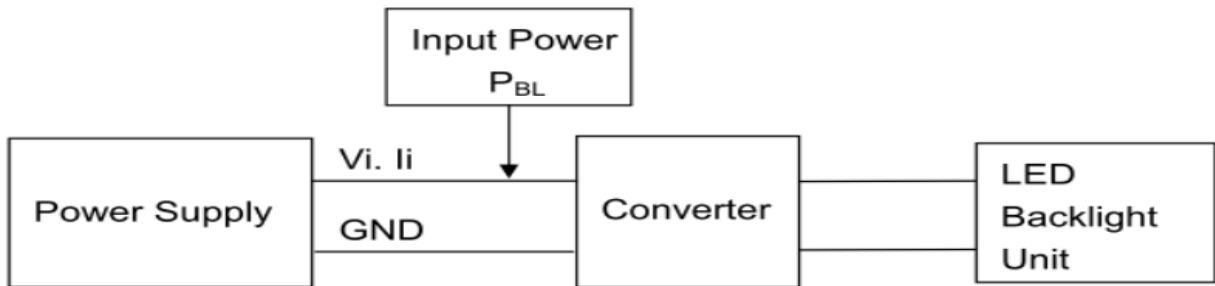
8. Backlight Characteristic



Item	Symbol	Min	Typ	Max	Unit	Test Condition
Supply Voltage	Vf	16.8	19.2	21	V	Note 1
Supply Current	If	-	20	-	mA	Note 2
Luminous Intensity for LCM	-	400	500	-	cd/m ²	
Uniformity for LCM	-	75	80	-	%	
Life Time	-	-	20000	-	Hr	Note 3,4
Backlight Color	White					

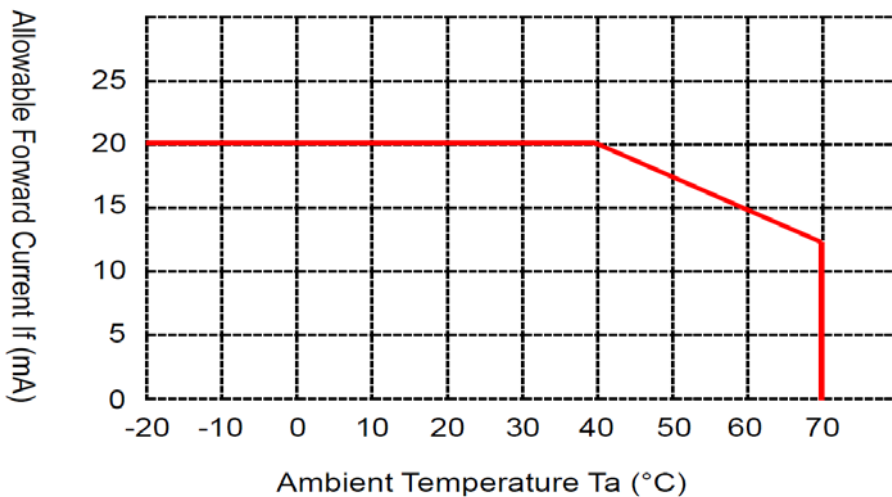
Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25°C and If=20mA.

Note 2: LED current is measured by utilizing a high frequency current meter as shown below:



Note 3: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and If=20mA. The LED lifetime could be decreased if operating If is larger than 20mA.

Note 4: LED light bar circuit:





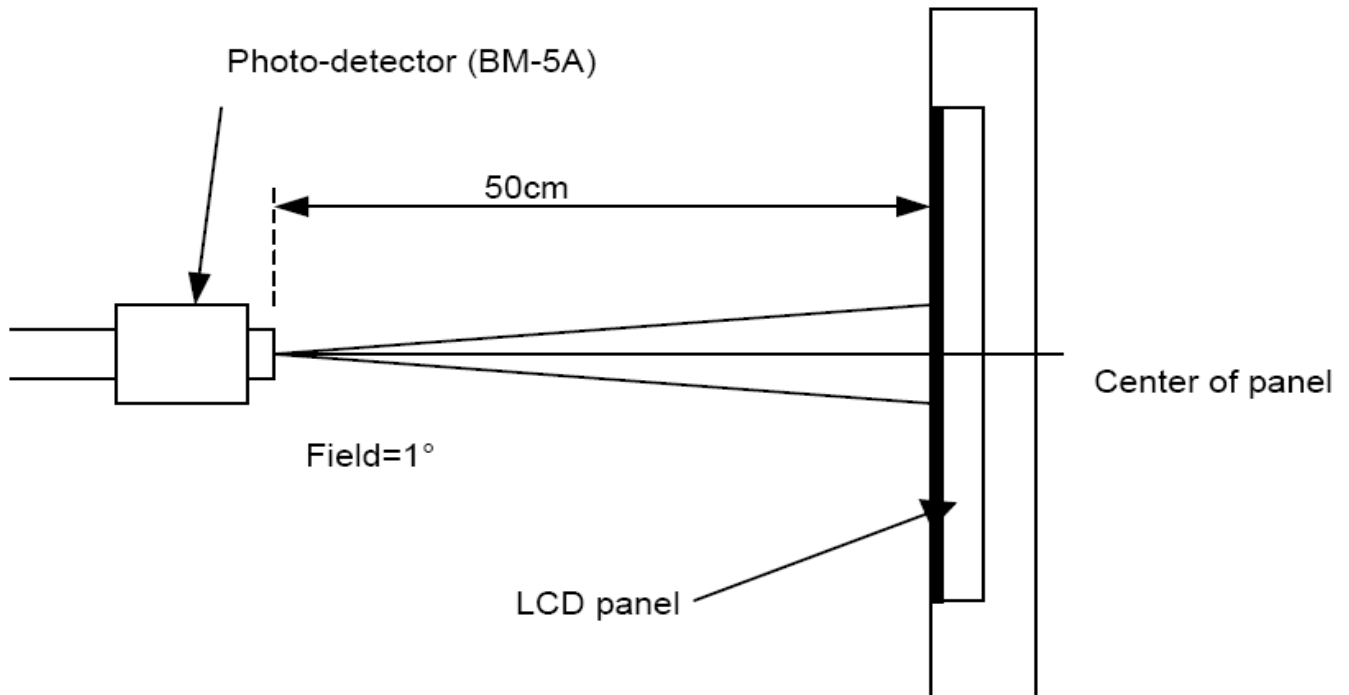
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9. Optical Characteristics

Item	Conditions	Min.	Typ.	Max.	Unit	Note	
Viewing Angle (CR>10)	Horizontal	θL	75	85	-	degree	(1),(2),(6)
		θR	75	85	-		
	Vertical	θT	75	85	-		
		θB	75	85	-		
Contrast Ratio	Center	600	800	-	-	(1),(3),(6)	
Response Time	Rising + Falling	-	25	50	ms	(1),(4),(6)	
CF Color Chromaticity (CIE1931)	Red x	0.50	0.55	0.60	-	(1), (6)	
	Red y	0.28	0.33	0.38	-		
	Green x	0.28	0.33	0.38	-		
	Green y	0.48	0.53	0.58	-		
	Blue x	0.09	0.14	0.19	-		
	Blue y	0.02	0.07	0.12	-		
	White x	0.26	0.31	0.36	-		
	White y	0.28	0.33	0.38	-		

Note (1) Measurement Setup:

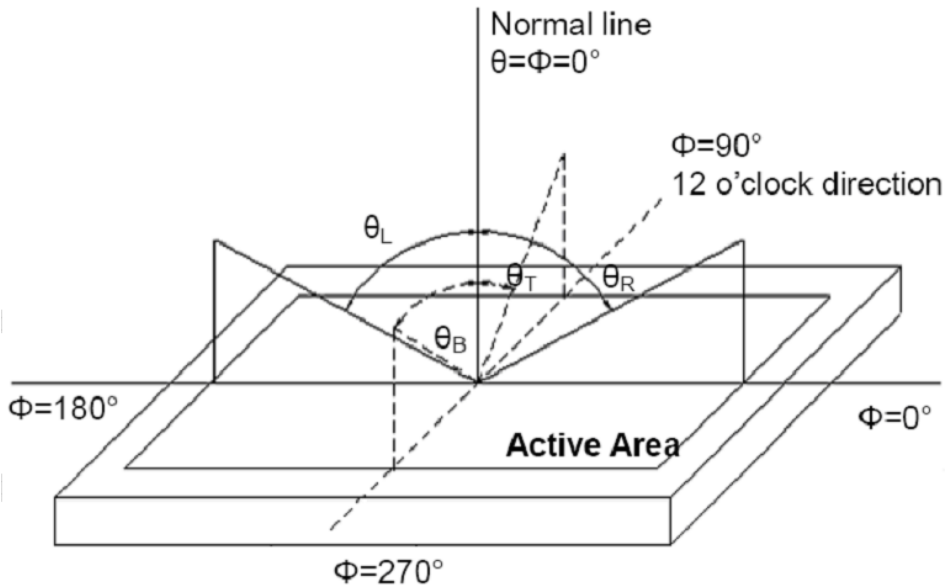
The LCD module should be stabilized at given temp. 25°C for 15 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.





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Note (2) Definition of Viewing Angle



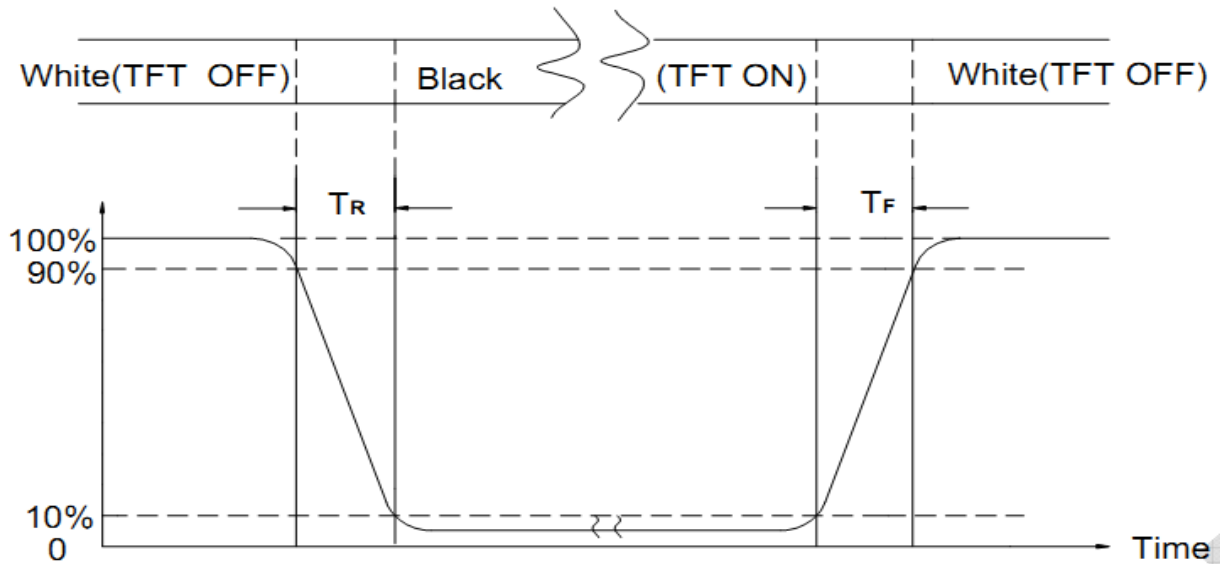
Note (3) Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression

$$\text{Contrast Ratio (CR)} = L63 / L0$$

L63: Luminance of gray level 63, L0: Luminance of gray level 0

Note (4) Definition of response time



Note (5) Definition of Transmittance (Module is without signal input)

$$\text{Transmittance} = \text{Center Luminance of LCD} / \text{Center Luminance of Back Light} \times 100\%$$

Note (6) Definition of color chromaticity (CIE1931)

Color coordinates measured at the center point of LCD



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10. Reliability Test Conditions and Methods

No.	Test Items	Test Condition	Inspection After Test
①	High Temperature Storage	80°C±2°C×96Hours	Inspection after 2~4hours storage at room temperature, the samples should be free from defects: 1, Air bubble in the LCD. 2, Seal leak. 3, Non-display. 4, Missing segments. 5, Glass crack. 6, Current IDD is twice higher than initial value. 7, The surface shall be free from damage. 8, The electric characteristic requirements shall be satisfied.
②	Low Temperature Storage	-30°C±2°C×96Hours	
③	High Temperature Operating	70°C±2°C×96Hours	
④	Low Temperature Operating	-20°C±2°C×96Hours	
⑤	Temperature Cycle(Storage)	-20°C ↔ 25°C ↔ 70°C (30min) (5min) (30min) ← Cycle → Total 10cycle	
⑥	Damp Proof Test (Storage)	50°C±5°C×90%RH×96Hours	
⑦	Vibration Test	Frequency:10Hz~55Hz~10Hz Amplitude:1.5mm X,Y,Z direction for total 3hours (packing condition test will be tested by a carton)	
⑧	Drooping Test	Drop to the ground from 1M height one time every side of carton. (packing condition test will be tested by a carton)	
⑨	ESD Test	Voltage:±8KV,R:330Ω,C:150PF,Air Mode,10times	

REMARK:

- The Test samples should be applied to only one test item.
- Sample side for each test item is 5~10pcs.
- For Damp Proof Test, Pure water(Resistance > 10MΩ)should be used.
- In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
- EL evaluation should be accepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.
- Failure Judgment Criterion: Basic Specification Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.



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11. Inspection Standard

11.1 Scope

Specifications contain

11.1.1 Display Quality Evaluation

11.1.2 Mechanics Specification

11.2 Sampling Plan

Unless there is other agreement, the sampling plan for incoming inspection shall follow MIL-STD-105E.

11.2.1 Lot size: Quantity per shipment as one lot (different model as different lot).

11.2.2 Sampling type: Normal inspection, single sampling.

11.2.3 Sampling level: Level II.

11.2.4 AQL: Acceptable Quality Level

Major defect: AQL=0.65

Minor defect: AQL=1.5

11.3 Panel Inspection Condition

11.3.1 Environment:

Room Temperature: 25±5°C.

Humidity: 65±5% RH.

Illumination: 300 ~ 700 Lux.

11.3.2 Inspection Distance:

35±5 cm

11.3.3 Inspection Angle:

The vision of inspector should be perpendicular to the surface of the Module.

11.3.4 Inspection time :

Perceptibility Test Time: 20 seconds max.



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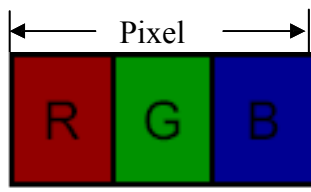
11.4 Inspection Plan

Class	Item	Judgment	Class
Packing & Indicate	1. Outside and inside package.	"MODEL NO.", "LOT NO." and "QUANTITY" should indicate on the package.	Minor
	2. Model mixed and quantity.	Other model mixed.....Rejected. Quantity short or	Critical
	3. Product indication.	"MODEL NO." should indicate on the product.	Major
Assembly	4. Dimension, LCD glass scratch and scribe defect.	According to specification or drawing.	Major
Appearance	5. Viewing area.	Polarizer edge or LCD's sealing line is visible in the viewing area.....Rejected.	Minor
	6. Blemish, black spot, white spot in the LCD and LCD glass cracks.	According to standard of visual inspection.(inside viewing area)	Minor
	7. Blemish, black spot, white spot and scratch on the polarizer.	According to standard of visual inspection.(inside viewing area)	Minor
	8. Bubble in polarizer.	According to standard of visual inspection.(inside viewing area)	Minor
	9. LCD's rainbow color.	Strong deviation color (or newton ring) of LCD.....Rejected. Or according to limited sample.(if needed and inside viewing area)	Minor
Electrical	10. Electrical and optical characteristics.(contrast Vop chromaticity....etc)	According to specification or drawing.(inside viewing area)	Critical
	11. Missing line.	Missing dot line character.....Rejected.	Critical
	12.Short circuit. Wrong pattern display.	No display, wrong pattern display, current consumption. Out of specification.....Rejected.	Critical
	13. Dot defect.(for color and TFT)	According to standard of visual inspection.	Minor



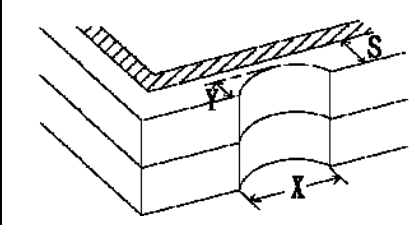
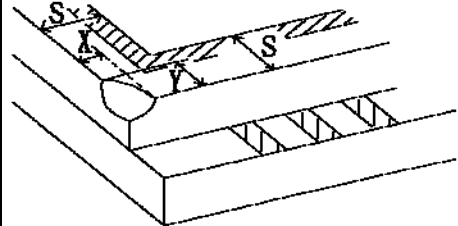
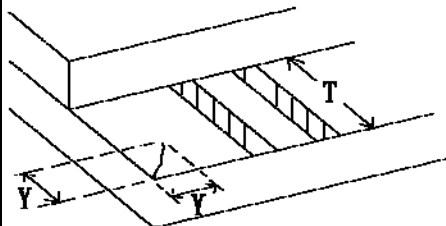
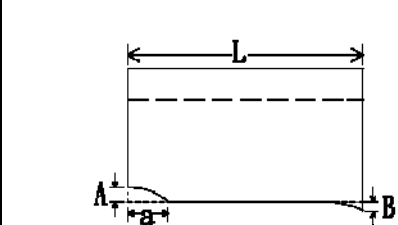
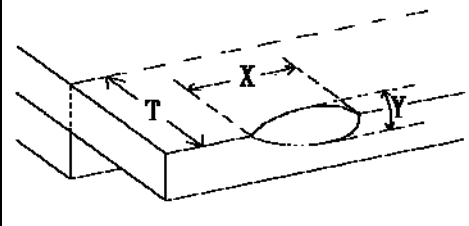
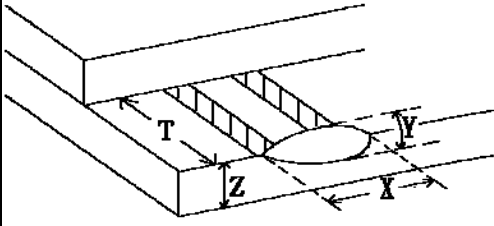
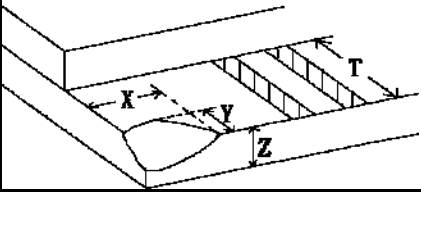
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11.5 Standard Of Visual Inspection

No.	Class	Item	Judgment																				
11.5.1	Minor	Black and white spot. Foreign materiel. Dust. Blemish. Scratch.	<p>(A) Round type: Unit: mm</p> <table border="1"> <thead> <tr> <th>Diameter (mm.)</th> <th>Acceptable O'tv</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td>Disregard</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.25$</td> <td>2(Distance>5mm)</td> </tr> <tr> <td>$0.25 < \Phi$</td> <td>0</td> </tr> </tbody> </table> <p>Note: $\Phi = (\text{length} + \text{width}) / 2$</p> <p>(B) Linear type: Unit: mm</p> <table border="1"> <thead> <tr> <th>Length</th> <th>Width (mm.)</th> <th>Acceptable O'tv</th> </tr> </thead> <tbody> <tr> <td>--</td> <td>$W \leq 0.03$</td> <td>Disregard</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.03 < W \leq 0.07$</td> <td>2(Distance>5mm)</td> </tr> <tr> <td>--</td> <td>$0.07 < W$</td> <td>FOLLOW ROUND</td> </tr> </tbody> </table>	Diameter (mm.)	Acceptable O'tv	$\Phi \leq 0.2$	Disregard	$0.2 < \Phi \leq 0.25$	2(Distance>5mm)	$0.25 < \Phi$	0	Length	Width (mm.)	Acceptable O'tv	--	$W \leq 0.03$	Disregard	$L \leq 5.0$	$0.03 < W \leq 0.07$	2(Distance>5mm)	--	$0.07 < W$	FOLLOW ROUND
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11.5.2	Minor	Dent on polarizer.	<p style="text-align: right;">Unit: mm.</p> <table border="1"> <thead> <tr> <th>Diameter</th> <th>Acceptable O'tv</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td>Disregard</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.5$</td> <td>2(Distance>5mm)</td> </tr> <tr> <td>$0.5 < \Phi$</td> <td>0</td> </tr> </tbody> </table>	Diameter	Acceptable O'tv	$\Phi \leq 0.2$	Disregard	$0.2 < \Phi \leq 0.5$	2(Distance>5mm)	$0.5 < \Phi$	0												
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11.5.3	Minor	Bubble in polarizer.	<p style="text-align: right;">Unit: mm.</p> <table border="1"> <thead> <tr> <th>Diameter</th> <th>Acceptable O'tv</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.2$</td> <td>Disregard</td> </tr> <tr> <td>$0.2 < \Phi \leq 0.5$</td> <td>2(Distance>5mm)</td> </tr> <tr> <td>$0.5 < \Phi$</td> <td>0</td> </tr> </tbody> </table>	Diameter	Acceptable O'tv	$\Phi \leq 0.2$	Disregard	$0.2 < \Phi \leq 0.5$	2(Distance>5mm)	$0.5 < \Phi$	0												
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11.5.4	Minor	Dot defect	<table border="1"> <thead> <tr> <th>Items</th> <th>Acceptable O'tv</th> </tr> </thead> <tbody> <tr> <td>Bright dot</td> <td>$N \leq 2$</td> </tr> <tr> <td>Dark dot</td> <td>$N \leq 3$</td> </tr> <tr> <td>Total dot</td> <td>$N \leq 4$</td> </tr> </tbody> </table> <p>Pixel define : </p> <p style="text-align: center;"> ◀Dot▶ ◀Dot▶ ◀Dot▶ </p> <p>Note1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot. Note 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern. Note 3: The bright dot defect must be visible through 2% ND filter Note 4: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue pattern.</p>	Items	Acceptable O'tv	Bright dot	$N \leq 2$	Dark dot	$N \leq 3$	Total dot	$N \leq 4$												
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No.	Class	Item	Judgment
11.5.5	Minor	LCD glass chipping.	 $Y > S$ Reject
11.5.6	Minor	LCD glass chipping.	 $X \text{ or } Y > S$ Reject
11.5.7	Major	LCD glass crack.	 $Y > (1/2) T$ Reject
11.5.8	Major	LCD glass scribe defect.	 <p>1. $a > L/3, A > 1.5\text{mm}$ Reject 2. B : According to dimension</p>
11.5.9	Minor	LCD glass chipping. (on the terminal area)	 $\Phi = (x+y)/2 > 2.5\text{mm}$ Reject
11.5.10	Minor	LCD glass chipping. (on the terminal surface)	 $Y > (1/3)T$ Reject
11.5.11	Minor	LCD glass chipping.	 $Y > T$ Reject



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12. Handling Precautions

12.1 Mounting Method

The LCD panel of ACROWISE TFT module consists of two thin glass plates with polarizers which easily be damaged. And since the module is so constructed as to be fixed by utilizing fitting holes in the printed circuit board.

Extreme care should be needed when handling the LCD modules.

12.2 Caution of LCD Handling And Cleaning

When cleaning the display surface, Use soft cloth with solvent

[Recommended below] and wipe lightly

- Isopropyl alcohol
- Ethyl alcohol

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface.

Do not use the following solvent:

- Water
- Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns

Do not use the following solvent on the pad or prevent it from being contaminated:

- Soldering flux
- Chlorine (Cl) , Sulfur (S)

If goods were sent without being silicon coated on the pad, ITO patterns could be damaged due to the corrosion as time goes on.

If ITO corrosion happens by miss-handling or using some materials such as Chlorine (Cl), Sulfur (S) from customer, Responsibility is on customer.

12.3 Caution Against Static Charge

The LCD module uses C-MOS LSI drivers, so we recommend that you:

Connect any unused input terminal to power or ground, do not input any signals before power is turned on, and ground your body, work/assembly areas, and assembly equipment to protect against static electricity.

12.4 Packing

- Module employs LCD elements and must be treated as such.
- Avoid intense shock and falls from a height.
- To prevent modules from degradation, do not operate or store them exposed directly to sunshine or high temperature/humidity

12.5 Caution for operation

- It is an indispensable condition to drive LCD's within the specified voltage limit since the higher



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voltage then the limit cause the shorter LCD life.

- An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.
- Response time will be extremely delayed at lower temperature then the operating temperature range and on the other hand at higher temperature LCD's how dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operation temperature.
- If the display area is pushed hard during operation, some font will be abnormally displayed but it resumes normal condition after turning off once.
- Slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit.

Usage under the maximum operating temperature, 50%Rh or less is required.

12.6 Storing

In the case of storing for a long period of time for instance, for years for the purpose or replacement use, the following ways are recommended.

- Storage in a polyethylene bag with the opening sealed so as not to enter fresh air outside in it. And with no desiccant.
- Placing in a dark place where neither exposure to direct sunlight nor light's keeping the storage temperature range.
- Storing with no touch on polarizer surface by the anything else.

[It is recommended to store them as they have been contained in the inner container at the time of delivery from us

12.7 Safety

- It is recommendable to crash damaged or unnecessary LCD's into pieces and wash off liquid crystal by either of solvents such as acetone and ethanol, which should be burned up later.
- When any liquid leaked out of a damaged glass cell comes in contact with your hands, please wash it off well with soap and water



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13. Precaution for Use

13.1

A limit sample should be provided by the both parties on an occasion when the both parties agreed its necessity. Judgment by a limit sample shall take effect after the limit sample has been established and confirmed by the both parties.

13.2

On the following occasions, the handing of problem should be decided through discussion and agreement between responsible of the both parties.

- When a question is arisen in this specification
- When a new problem is arisen which is not specified in this specifications
- When an inspection specifications change or operating condition change in customer is reported to ACROWISE TFT , and some problem is arisen in this specification due to the change
- When a new problem is arisen at the customer's operating set for sample evaluation in the customer site.