

SPECIFICATION

PRODUCT NO. : TCX080DTLN-12

VERSION : Ver 1.0

ISSUED DATE : 2019-10-30

This module uses ROHS material

FOR CUSTOMER: _____

☐: APPROVAL FOR SPECIFICATION

☒: APPROVAL FOR SAMPLE

DATE	APPROVED BY

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1. Revision Recode

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2. General Description and Features

The 8.0 inch Module named TCX080DTLN-12 is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, one Driver IC, one FPC and one Back-Light unit. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outsize	192.80 x 116.90 x 6.4	mm
(2)	LCD Active area	176.64 x 99.36	mm
(3)	Dot Number	800 x 3(RGB) x 480	/
(4)	Dot size	0.0736(W)x 0.207(H)	mm
(5)	LCD type	TFT Transmissive	/
(6)	Display Color	16.7M	/
(7)	Viewing direction	ALL (O-FILM)	O'clock
(8)	Backlight Type	36-chip LED	/
(9)	Power Supply	3.3 (TYP)	V
(10)	Interface	FPC 0.5mm_Pitch 50 pin	/
(11)	Interface type	RGB	/
(12)	Surface Treatment	Anti-glare	/
(13)	Module weight	TBD	g

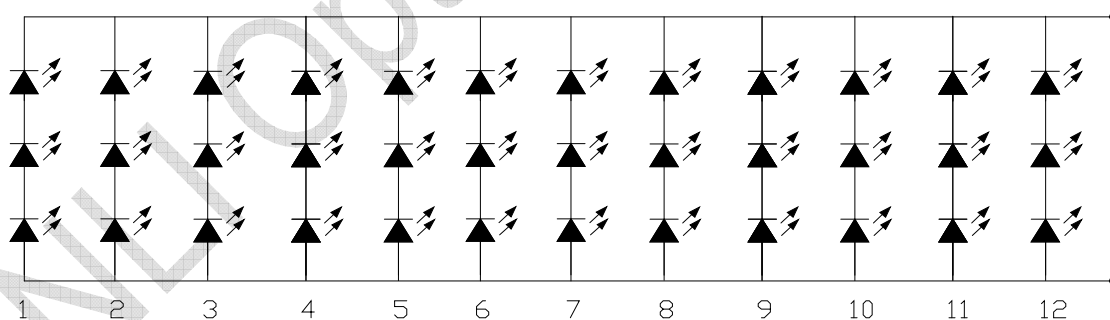
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4. Interface Pin Connection

NO	Symbol	Level	Description
1	VLED+	P	Backlight anode
2	VLED+	P	Backlight anode
3	VLED-	P	Backlight ground
4	VLED-	P	Backlight ground
5	GND	p	Power ground
6	VCOM	P	Common Voltage
7	DVDD	p	Power supply
8	MODE	I	DE / SYNC mode select. Normally pulled high H : DE mode. L : HSD/VSD mode.
9	DE	I	Data input enable
10	VS	I	Vertical SYNC input
11	HS	I	Horizontal SYNC input
12	B7	I	Blue data(MSB)
13	B6	I	Blue data
14	B5	I	Blue data
15	B4	I	Blue data
16	B3	I	Blue data
17	B2	I	Blue data
18	B1	I	Blue data
19	B0	I	Blue data(LSB)
20	G7	I	Green data(MSB)
21	G6	I	Green data
22	G5	I	Green data
23	G4	I	Green data
24	G3	I	Green data
25	G2	I	Green data
26	G1	I	Green data
27	G0	I	Green data(LSB)
28	R7	I	Red data(MSB)
29	R6	I	Red data
30	R5	I	Red data

31	R4	I	Red data
32	R3	I	Red data
33	R2	I	Red data
34	R1	I	Red data
35	R0	I	Red data(LSB)
36	GND	p	Power ground
37	DCLK	I	Clock for Input Data. Data latched at rising/falling edge of this signal. Default falling edge.
38	GND	p	Power ground
39	L/R	I	Source Right or Left sequence control. Normally pulled high. SHLR = "L", shift left: last data = S1 ← S2 ← S3..... ← S1200 = first data. SHLR = "H", shift right: first data = S1 → S2 → S3..... → S1200 = last data.
40	U/D	I	Gate Up or Down scan control. Normally pulled low. UPDN = "L", STV2 output vertical start pulse and UD pin output logical "0" to Gate driver. UPDN = "H", STV1 output vertical start pulse and UD pin output logical "1" to Gate driver.
41	VGH	P	Power supply for drive output High
42	VGL	P	Power supply for drive output Low
43	AVDD	P	Power for analog circuit
44	RESET	I	Global reset pin.
45	NC	-	No connection
46	VCOM	P	Common voltage
47	DITHB	I	Dithering function enable control. Normally pulled high DITHB = "1", Disable internal dithering function DITHB = "0", Enable internal dithering function
48	GND	p	Power ground
49	NC	-	No connection
50	NC	-	No connection

The diagram illustrates the internal components of the LCD panel system. At the top is the LED, which is connected to the LCD Panel. The LCD Panel is connected to the Scan Driver. The Scan Driver is connected to the Source Driver. The Source Driver is connected to the Input FPC. The Input FPC is connected to the CN connector.



6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	°C
Storage temperature	Tst	-30 to 80	°C
Power Voltage1	DVDD	-0.5~5	V
Power Voltage2	AVDD	-0.5~15	V

NOTE:

If the module was used these absolute maximum ratings as above, it may be damaged permanently. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability. VDD>GND must be maintained.

7. Electrical Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit
Power Voltage1		DVDD	3.0	3.3	3.6	V
Power Voltage2		AVDD	6.5	-	13.5	V
TFT Gate ON voltage		VGH	12	16	-	V
TFT Gate OFF voltage		VGL	-	-7	-4	V
TFT Common voltage		VCOM	4.2	4.4	4.6	V
Logic input signal Voltage	H level	V _{IH}	0.7*DVDD	-	DVDD	V
	L level	V _{IL}	0	-	0.3*DVDD	V
Logic output signal Voltage	H level	V _{OH}	DVDD-0.4	-	-	V
	L level	V _{OL}	-	-	GND+0.4	V

8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	8.4	9.3	10.2	V	IF=240mA
Number of LED	-	36			pcs	-
Power Consumption	PWF	-	2232	-	mW	-
LED life-span	-	(20000)	-	-	Hrs	-

9. Timing Characteristics

AC Characteristics

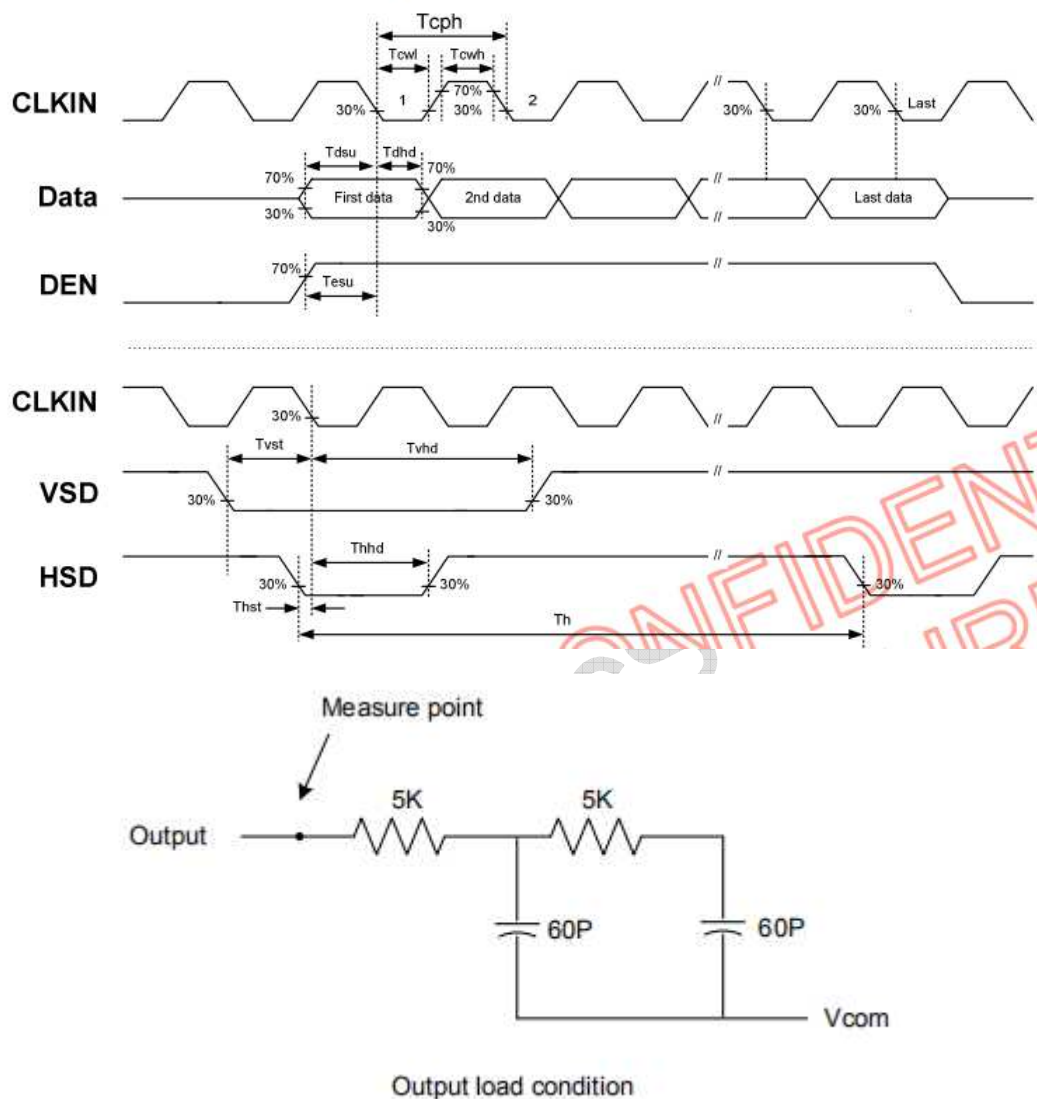
(TA = -20 to 85°C, VDD = 1.8 to 3.6V, AVDD = 6.5 to 13.5V, GND = AVSS = 0V)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
VDD Power On Slew rate	TPOR	From 0V to 90% VDD	-	-	20	ms
RSTB pulse width	TRST	CLKIN = 40MHz	1	-	-	ms
CLKIN cycle time	Tcph	-	20	-	-	ns
CLKIN pulse duty	Tcwh	-	40	50	60	%
VSD setup time	Tvst	-	8	-	-	ns
VSD hold time	Tvhd	-	8	-	-	ns
HSD setup time	Thst	-	8	-	-	ns
HSD hold time	Thhd	-	8	-	-	ns
Data set-up time	Tdsu	D0[7:0], D1[7:0], D2[7:0] to CLKIN	8	-	-	ns
Data hold time	Tdhd	D0[7:0], D1[7:0], D2[7:0] to CLKIN	8	-	-	ns
DEN setup time	Tesu	-	8	-	-	ns
DEN hold time	Tehd	-	8	-	-	ns
Output stable time	Tsst	10% to 90% target voltage. CL=120pF, R=10K ohm	-	-	6	us

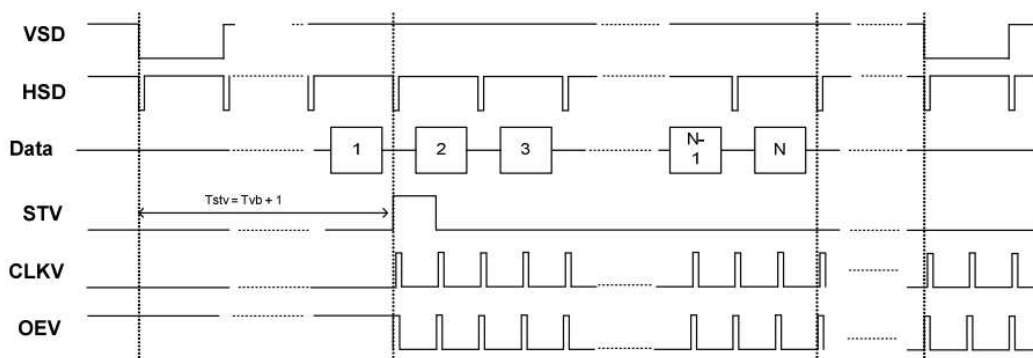
Parallel 24-bit RGB Mode

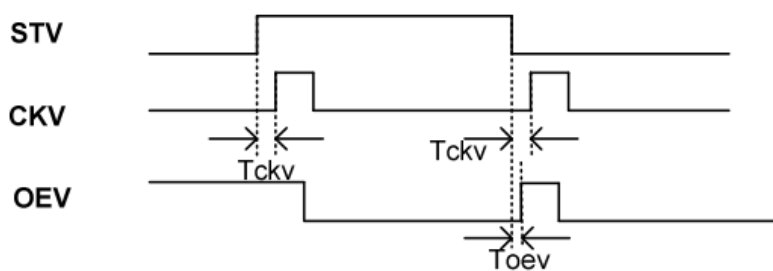
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLKIN Frequency	Fclk	-	33.3	50	MHz	VDD = 3.0V ~3.6V
CLKIN Cycle Time	Tclk	20	30	-	ns	
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk=Tcwh+cwl
	Tcwl	40	50	60	%	
VSD to STV	Tstv	-	24	-	H	HV mode
DEN to STV	Tstv	-	4	-	CLKIN	DE mode
STV pulse width	Twstv	-	0.5	-	H	
STV to CKV	Tckv	-	18	-	CLKIN	
STV to OEV	Toev	-	2	-	CLKIN	
CKV Pulse Width	Twckv	-	66	-	CLKIN	
OEV Pulse Width	Twoev	-	50	-	CLKIN	

Input Clock and Data Timing Diagram

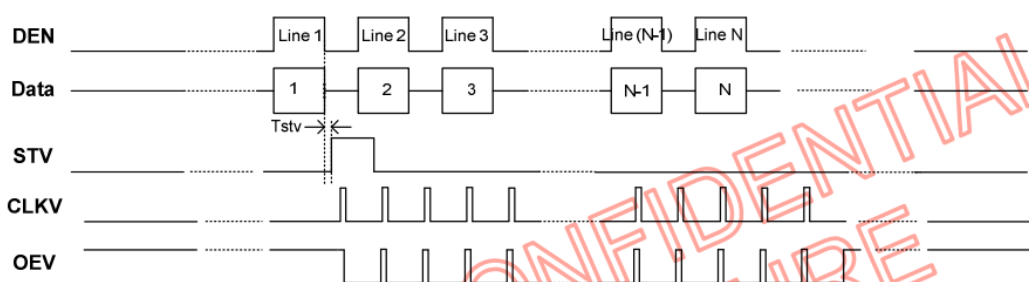


Vertical Timing Diagram (HV mode)





Vertical Timing Diagram (DE mode)



10. Application Circuit

Please consult our technical department for detail information.

11. Initial Code

Please consult our technical department for detail information.

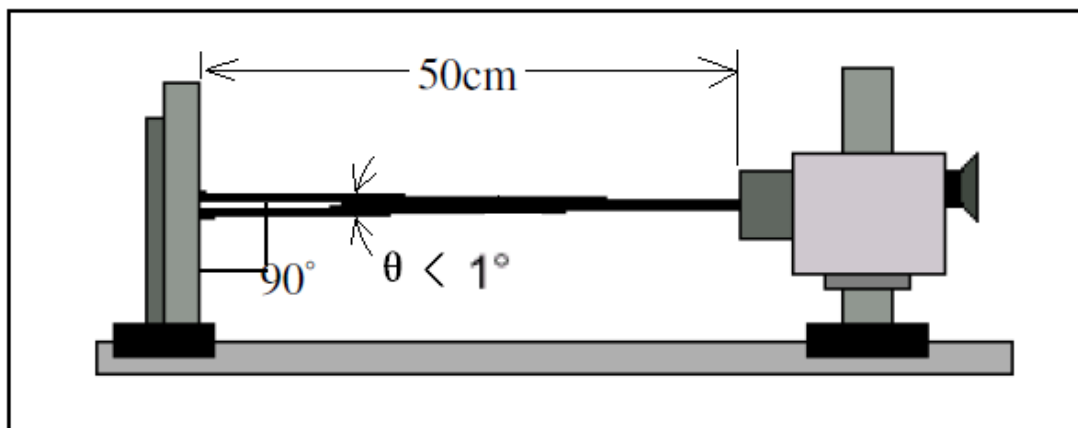
12. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Response time		Tr	$\theta = 0^\circ$	-	10	20	ms	4
		Tf	$\phi = 0^\circ$	-	15	30	ms	
Uniformity (Five point)		δ WHITE	Ta=25℃	-	80	-	%	7
Surface Luminance (Center point)		Lv		-	450	-	Cd/m ²	3,7
Viewing angle range		θ	$\phi = 90^\circ$	-	(75)	-	deg	6
			$\phi = 270^\circ$	-	(75)	-	deg	
			$\phi = 0^\circ$	-	(75)	-	deg	
			$\phi = 180^\circ$	-	(75)	-	deg	
Color filter chromaticity (x, y)	White	X	$\theta = \phi =$	TBD	TBD	TBD		7
		Y	0°	TBD	TBD	TBD		
	Red	X	$\theta = \phi =$	TBD	TBD	TBD		
		Y	0°	TBD	TBD	TBD		
	Green	X	$\theta = \phi =$	TBD	TBD	TBD		
		Y	0°	TBD	TBD	TBD		
	Blue	X	$\theta = \phi =$	TBD	TBD	TBD		
		Y	0°	TBD	TBD	TBD		

Note 1: Ambient temperature=25℃±2℃

Note 2: To be measured in the dark room with backlight unit.

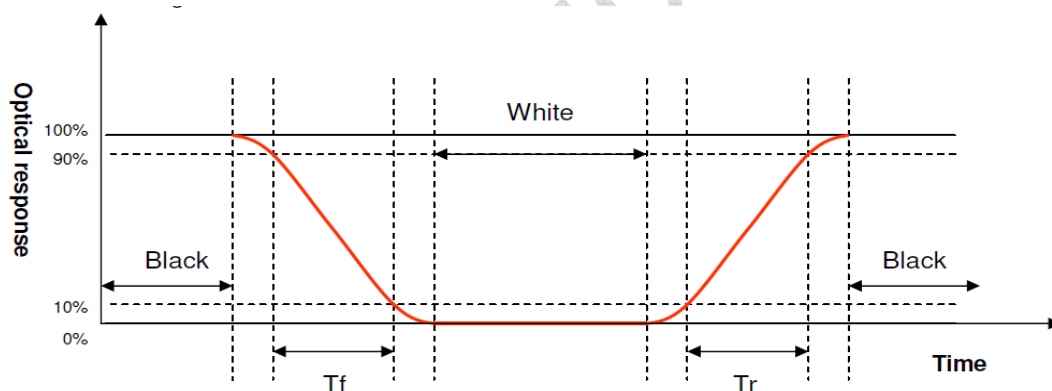
Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).



Note 4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black” to “white” (rising time) and from “white” to “black” (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.

Refer to figure as below.



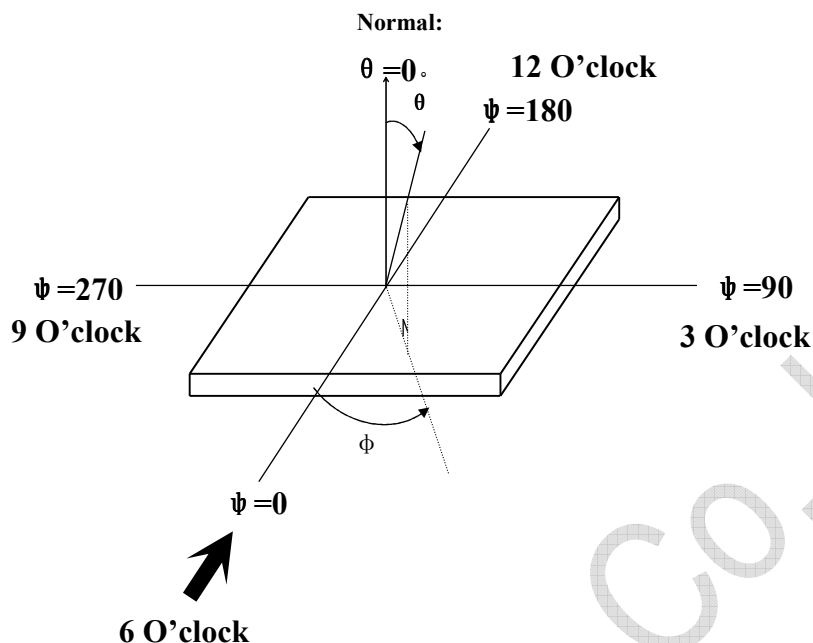
Note 5. Definition of contrast ratio:

Contrast ratio is calculated with the following formula:

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

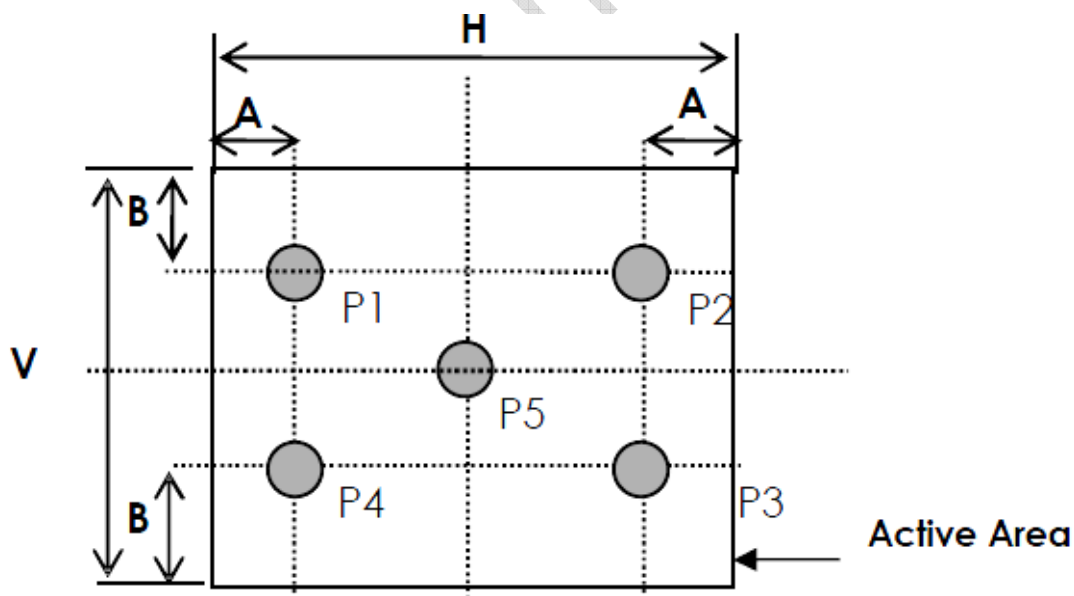
Note 6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 2, for TFT module the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.



Note 7. Surface luminance is the LCD surface from the surface with all pixels displaying white. Refer to figure as below.

Measuring method for Contrast ratio, surface luminance, Luminance uniformity, CIE (x, y) chromaticity



A : 5 mm B : 5 mm H, V : Active Area

Light spot size $\Phi = 7\text{mm}$, 500mm distance from the LCD surface to detector lens

measurement instrument is TOPCON's luminance meter BM-7A

Uniformity definition= [min of 5point/max of 5points]x100%

L_v = Surface Luminance with P5

13. Reliability Test

This standard reliability test is done only for the first lot of MP products. Customer and supplier must hold a discussion if other reliability test is requested by customer.

NO.	Test Item	Description	Test Condition
1	High temperature storage	Endurance test applying the high storage temperature for a long time	80℃,240 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30℃,240H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70℃,240H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20℃,240H
5	High temperature /humidity storage	Endurance test applying the high temperature and high humidity storage for a long time	60℃,90% RH, 240H
6	Temperature Cycle (Non operation)	Endurance test applying the low and high temperature cycle -30℃ ← → 25℃ ← → 80℃ 30min ← → 5min ← → 30min one cycle	-30℃/80℃, 10 cycles

14. Precautions for Operation and Storage

1. Precautions for Operation

- (1) Since LCD panel made of glass, in order to prevent from glass broken or color tone change, please do not apply any mechanical shock or impact or excessive force to it when installing the LCD module.
- (2) If LCD panel is broken and liquid crystal substance leaks out and contact your skin or clothes, please immediately wash it off by using soap and water.
- (3) The polarizer on the LCD surface is soft and easily scratched. Please be careful when handling.
- (4) If LCD surface becomes contaminated, please wipe it off gently by using

moisten soft cloth with normal hexane,do not use acetone,ketone,ethanol, alcohol or water.If there is saliva or water on the LCD surface,please wipe it off immediately.

(5)When handing LCD module,please be sure that the body and the tools are properly grounded.And do not touch I/F pins with bare hands or contaminate I/F pins.

(6)Do not attempt to disassemble or process the LCD module.

(7)LCD module should be used under recommended operating conditions shown in chapter 6 and 7.

(8)Response time will be extremely slower at lower temperature than at specified temperature and LCD will show different color when at higher temperature.The phenomenon will disappear when returning to specified condition.

(9)Foggy dew,moisture condensation or water droplets deposited on surface and contact terminals will cause polarizer stain or damage,the deteriorated display quality and electrochemical reaction then leads to the shorter life time and permanent damage to the module probably.Please pay attention to the environmental temperature and humidity.

2. Precautions for Storage

(1)Please store LCD module in a dark place,avoid exposure to sunlight,the light of fluorescent lamp or any ultraviolet ray.

(2)Keep the environment temperature at between 10℃ and 35℃ and at normal humidity.Avoid high temperature,high humidity or temperature below 0℃.

(3)That keeps the LCD modules stored in the container shipped from supplier before using them is recommended.

(4)Do not leave any article on the LCD module surface for an extended period of time.

3. Warranty period

Warrants for a period of 12 Months from the shipping date when stored or used under normal condition.

15. Package Specification

TBD.