SPECIFICATION

Model : TFT LCD MODULE LTD141LM0S-181

Customer :

AV- USE Marketing&Engineering Dept.					ISSUE DATE
Customer	ESIT	Design	Production	Sales	

Document Title	LTD141LM0S-181	Revision	1.0

Model : LTD141LM0S-181

Record of Revisions

Date	Rev.	Item	Old	New	Reason

- Contents -

SCOPE

This specification is applicable to Toshiba's 36.0cm diagonal size TFT-LCD module "LTD141LM0S-181" designed for AV/TV/NB.

FEATURES

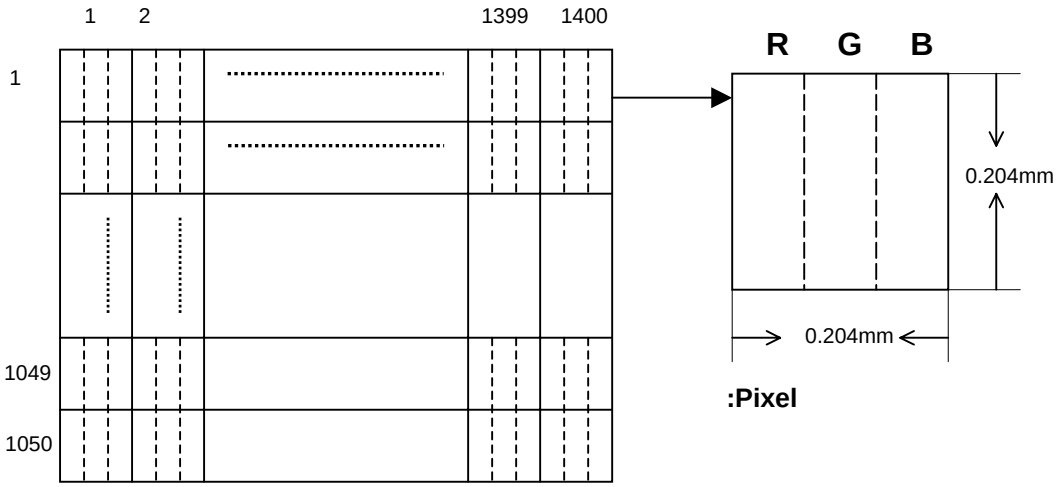
(1) SPWG-B dimension
(2) LVDS interface system(H-Sync, V-Sync)
(3) P-Si TFT-LCD Module

Applications

Multimedia player
New media equipment
OA equipment
Display terminals

General information

Item	Specifications
Display Mode	TN color (64gray scales, 262,144 color)
Viewing Direction	6 o'clock(in direction of maximum contrast)
Driving Method	TFT active matrix
Input Signals	LVDS interface
Active Area	285.65(*W*) × 214.27(*H*) mm
Bezel Opening	288.6(W) × 217.27(*H*) mm
Dimensional Outline	299.0(*W*) × 226.45(*H*) × 5.2(D) mm
Nomber of Pixels	1400(*W*) × 1050(*H*)
Pixels Pitch	0.204(*W*) × 0.204(*H*) mm
Pixels Arrangement	R G B vertical stripes
Surface Treatment	Anti-Reflection and hard coat 3H on LCD surface
Backlight	1 CCFL

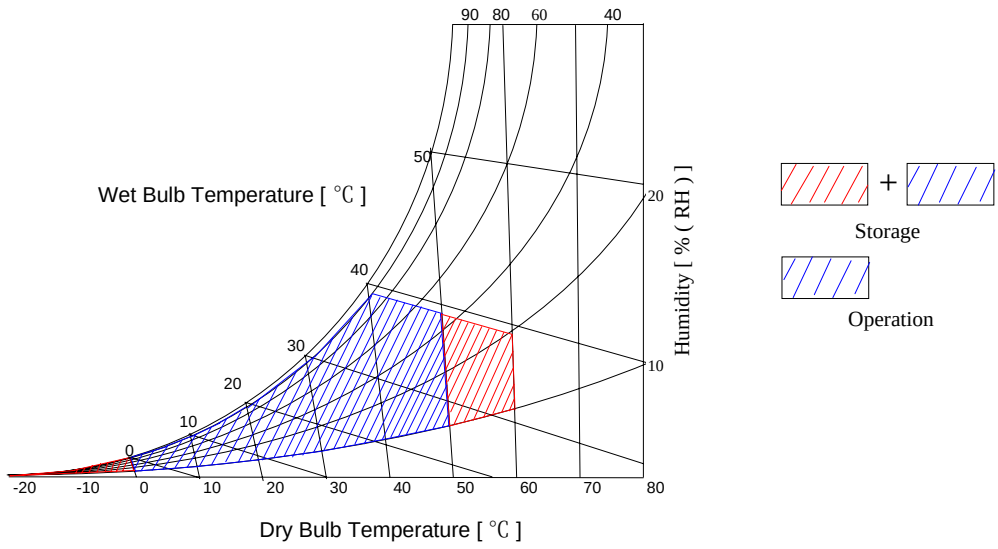


Absolute Maximum Rating

Absolute Rating of Environment

Item	Symbol	Min	Max	Unit	Checked Terminal 4)
Supply Voltage	V_{DD}	-0.3	4.0	V	V_{DD} - GND
Input Signal Voltage	V_{IN}	-0.3	V_{DD} +0.3	V	LVDS Interface
Operating Temperature of Panel 3)	--	0	60	℃	
Storage Temperature 2)	T_{STG}	-20	60	℃	
Storage Humidity 2)	H_{STG}	10	90	%(RH)	
Operating Ambient Temperature 2)	T_{OP}	0	50	℃	
Operating Ambient Humidity 2)	H_{OP}	10	90	%(RH)	

Note 1) Do not exceed the maximum rating values under the worst probable conditions taking into account the suppy voltage variation, input voltage variation, variation in part constants, and ambient temperature and so on. Otherwise the module may be damaged.
Note 2) Wet bulb temperature should be 39℃ Max, and no condensation of water. See figure below.
Note 3) The surface temperature caused by self heat radiation of cell itself is specified on this item.



Back-Light Unit

Item	Symbol	Min.	Max	UNit
Lamp voltage	V_L	560	700	V
Lamp current	I_L	2.0	6.5	mA
Lamp freqency	f_L	32	36	kHz

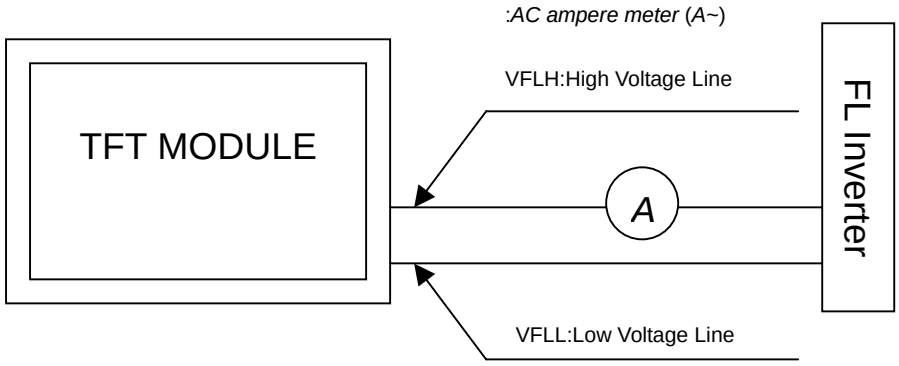
Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normally operating conditions.

Electrical Characteristics

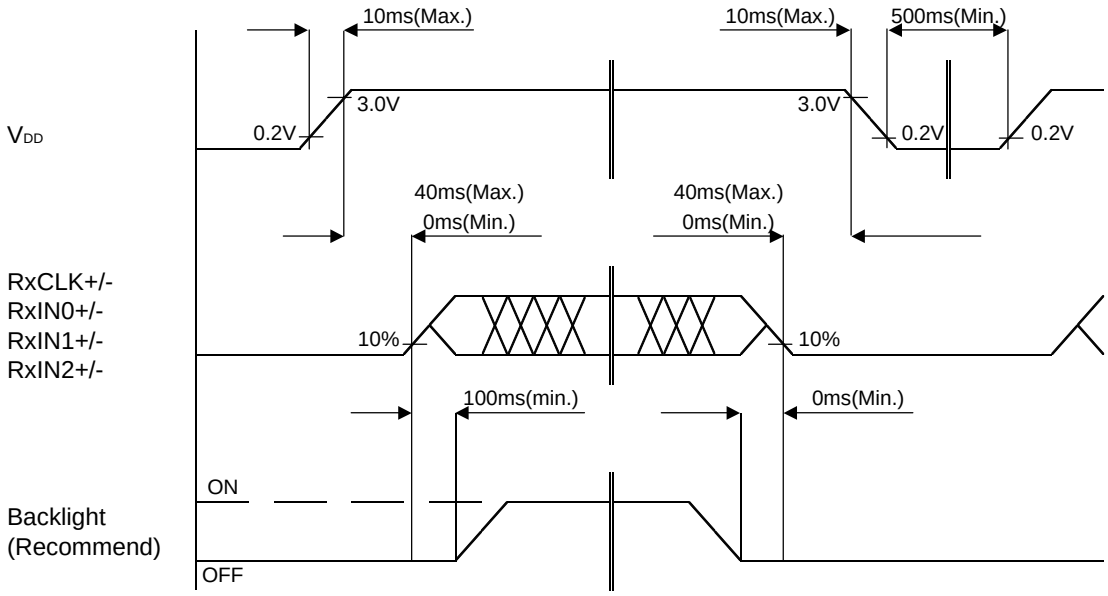
Item	Symbol	Min	Typ	Max	Unit	Remarks
Supply Voltage 4)	V_{DD}	3.0	3.3	3.6	V	
Differential Input Voltage 2)4)	V_{ID}	0.1	--	0.6	V	
Common Mode Input Voltage 5)	V_{CM}	0.5	1.2	1.5	V	
Current Consumption	I_{DD}	--	450	--	mA	*1
FL Input Current 6)7)8)	I_{FL}	--	6.0	--	mA(rms)	*2
FL Driving Voltage 6)	V_{FL}	--	625	--	V(rms)	I_{FL}=6.0mA(rms)
FL Driving Frequency 6)10)	f_{FL}		50		kHz	
FL Starting Voltage 6)9)	V_{SFL}	1550	--	1200	V(rms)	0℃
*1 *2 Power Consumption		--	(5.24)	--	W	I_{FL}=6.0mA(rms)

Refer to THC63LVDF84A Specification by Thine Electronics,Inc.
*1 : 8 color bars pattern. *2 : Excepting the efficiency FL inverter

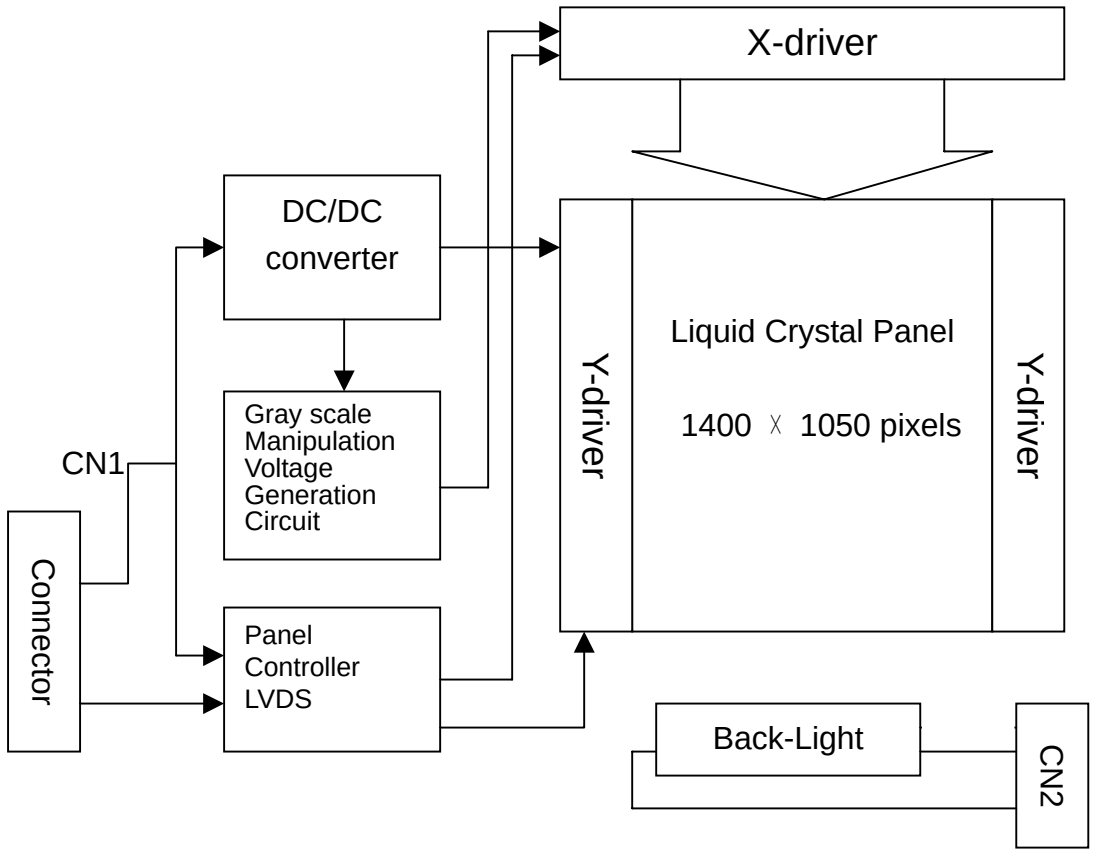
Note 1) The module should be always operated within these ranges. The “Typ” shows the recommendable value.
Note 2) Recommended LVDS transmitter: THC63LVDM83A (made by Thine Electronic,Inc.)
LVDS receiver included in this module is THC63LVDM83A (made by Thine Electronic,Inc.)
Refer to LVDS specifications.
Note 3) Checked pin Terminal: V_{DD}, GND (0V)
Note 4) Checked pin Terminal: IN0+/-, IN1+/-, IN2+/-, CLK+/-, GND(0V)
Measure: $|V_{IN0+} - V_{IN0-}|$, $|V_{IN1+} - V_{IN1-}|$, $|V_{IN2+} - V_{IN2-}|$, $|V_{CLK+} - V_{CLK-}|$
Note 5) Checked pin Terminal: IN0+/-, IN1+/-, IN2+/-, CLK+/-, GND(0V)
Measure: $1/2 \times (V_{IN0+} - V_{IN0-})$, $1/2 \times (V_{IN0+} - V_{IN0-})$, $1/2 \times (V_{IN0+} - V_{IN0-})$, $1/2 \times (V_{CLK+} - V_{CLK-})$
Note 6) Checked pin Terminal: $V_{FLH} - V_{FLL}$
Note 7) If FL input current (I_{FL}) is higher than typical value (6.0mA(rms)), thenFL lifetime becomes shorter.
Note 8) Measuring Method of I_{FL} .
Note 9) Input FL starting voltage (V_{SFL}) should not be less than one second.
If it were less than one second, it may cause unstable operation of FL.
Note10) Please adjuse LCD operating signal timing and FL driving frequency ,to optimize the display quality. There is a possibility that flicker is observed by the interference of LCD operating signal timing and FL driving condition (especially driving frequency), even if the condition satisfies above recommended operating conditions and timing specification shown in **6.**



Sequence of Power Supplies and Signals



Block Diagram

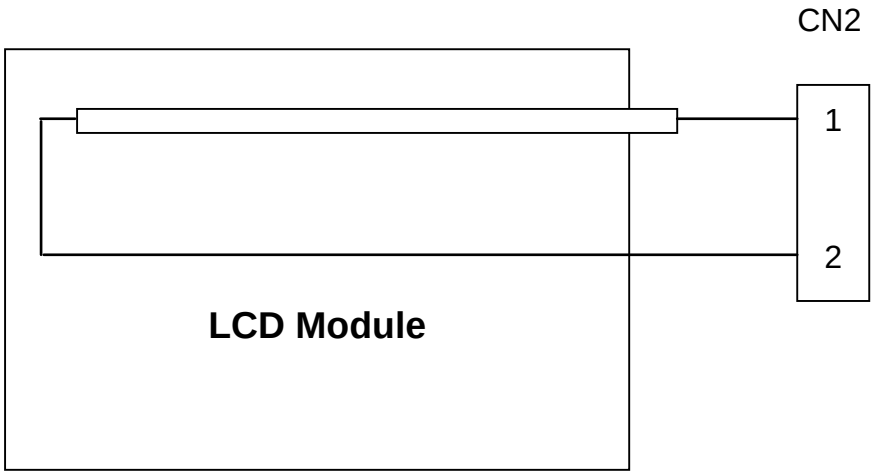


1400 pixels

1,1	2,1		X,1			1400,1
1.2						
1,Y			X,Y			
1,1050						1400,1050

1050 pixels

Back-Light Unit



Connector 2:

1. $V_{FL}1$
2. $G_{FL}1$

Connector Pin Assignment For Interface

CN1 Input Signal

Connector :FI-XB30SR-HF11 / JAE
Mating Connector : FI-X30M, FI-X30MR / JAE

Terminal No.	Symbol	Function
1	GND	GND
2	V_{DD}	POWER SUPPLY :+3.3V
3	V_{DD}	POWER SUPPLY :+3.3V
4	NC	Non-Connection
5	NC	Non-Connection
6	NC	Non-Connection
7	NC	Non-Connection
8	EIN0-	EVEN Transmission Data of Pixels 0(Negative: -)
9	EIN0+	EVEN Transmission Data of Pixels 0(Positive: +)
10	GND	GND
11	EIN1-	EVEN Transmission Data of Pixels 1(Negative: -)
12	EIN1+	EVEN Transmission Data of Pixels 1(Positive: +)
13	GND	GND
14	EIN2-	EVEN Transmission Data of Pixels 2(Negative: -)
15	EIN2+	EVEN Transmission Data of Pixels 2(Positive: +)
16	GND	GND
17	ECLK-	EVEN Sample Clock (Negative: -)
18	ECLK+	EVEN Sample Clock (Positive: +)
19	GND	GND
20	OIN0-	ODD Transmission Data of Pixels 0(Negative: -)
21	OIN0+	ODD Transmission Data of Pixels 0(Positive: +)
22	GND	GND
23	OIN1-	ODD Transmission Data of Pixels 1(Negative: -)
24	OIN1+	ODD Transmission Data of Pixels 1(Positive: +)
25	GND	GND
26	OIN2-	ODD Transmission Data of Pixels 2(Negative: -)
27	OIN2+	ODD Transmission Data of Pixels 2(Positive: +)
28	GND	GND
29	OCLK-	ODD Sample Clock (Negative: -)
30	OCLK+	ODD Sample Clock (Positive: +)

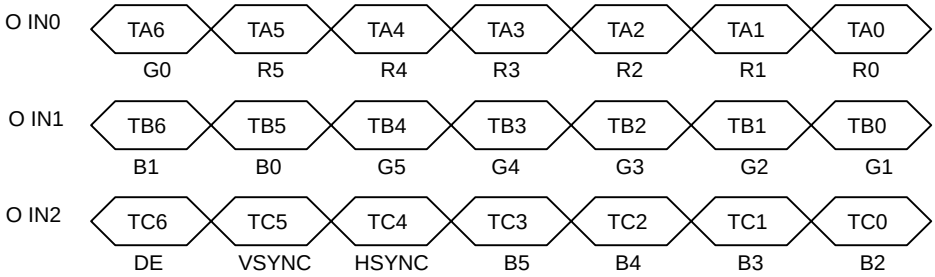
Note 1) Please connect NC pin to nothing. Don't connect it to grand nor to other signal input.
Please connect GND to ground. Don't use it as no-connent nor connection with high impedance.

Recommended Transmittre (THC63LVDM63A,THC63LVDM63A-85) To LTD141LM0S-181 Interface Assignment

Case 1: 6bit Transmitter

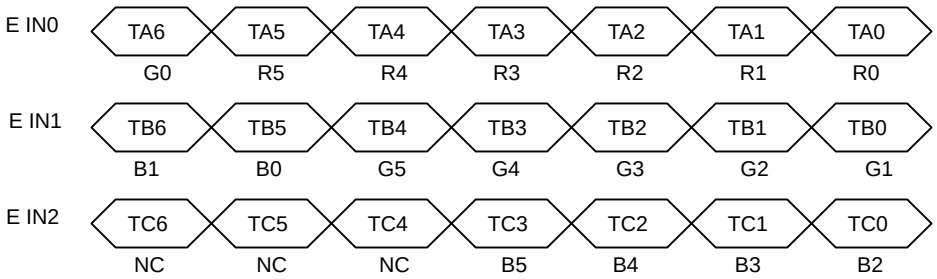
ODD DATA

Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol	LTD141LM0S-181 Interface (CN)	
Symbol	Terminal	Symbol	Function		Terminal	Symbol
TA0	44	R0	Red Pixels Display Data(LSB)	TA- TA+	No.20 No.21	OIN0- OIN0+
TA1	45	R1	Red Pixels Display Data			
TA2	47	R2	Red Pixels Display Data			
TA3	48	R3	Red Pixels Display Data			
TA4	1	R4	Red Pixels Display Data			
TA5	3	R5	Red Pixels Display Data(MSB)			
TA6	4	G0	Green Pixels Display Data(LSB)			
TB0	6	G1	Green Pixels Display Data	TB- TB+	No.23 No.24	OIN1- OIN1+
TB1	7	G2	Green Pixels Display Data			
TB2	9	G3	Green Pixels Display Data			
TB3	10	G4	Green Pixels Display Data			
TB4	12	G5	Green Pixels Display Data(MSB)			
TB5	13	B0	Blue Pixels Display Data(LSB)			
TB6	15	B1	Blue Pixels Display Data			
TC0	16	B2	Blue Pixels Display Data	TC- TC+	No.26 No.27	OIN2- OIN2+
TC1	18	B3	Blue Pixels Display Data			
TC2	19	B4	Blue Pixels Display Data			
TC3	20	B5	Blue Pixels Display Data(MSB)			
TC4	22	HSYNC	Horizontal Synchronized Signal			
TC5	23	VSYNC	Vertical Synchronized Signal			
TC6	25	DE	Compound Synchronization Signal			
CLK IN	26	NCLK	Data Sampling Clock	TCLK - TCLK +	No.29 No.30	OCLK- OCLK+



EVEN DATA

Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol	LTD141LM0S-181 Interface (CN)	
Symbol	Terminal	Symbol	Function		Terminal	Symbol
TA0	44	R0	Red Pixels Display Data(LSB)	TA- TA+	No.8 No.9	EIN0- EIN0+
TA1	45	R1	Red Pixels Display Data			
TA2	47	R2	Red Pixels Display Data			
TA3	48	R3	Red Pixels Display Data			
TA4	1	R4	Red Pixels Display Data			
TA5	3	R5	Red Pixels Display Data(MSB)			
TA6	4	G0	Green Pixels Display Data(LSB)			
TB0	6	G1	Green Pixels Display Data	TB- TB+	No.11 No.12	EIN1- EIN1+
TB1	7	G2	Green Pixels Display Data			
TB2	9	G3	Green Pixels Display Data			
TB3	10	G4	Green Pixels Display Data			
TB4	12	G5	Green Pixels Display Data(MSB)			
TB5	13	B0	Blue Pixels Display Data(LSB)			
TB6	15	B1	Blue Pixels Display Data			
TC0	16	B2	Blue Pixels Display Data	TC- TC+	No.14 No.15	EIN2- EIN2+
TC1	18	B3	Blue Pixels Display Data			
TC2	19	B4	Blue Pixels Display Data			
TC3	20	B5	Blue Pixels Display Data(MSB)			
TC4	22	NC	Non Connection (open)			
TC5	23	NC	Non Connection (open)			
TC6	25	NC	Non Connection (open)			
CLK IN	26	NCLK	Data Sampling Clock	TCLK - TCLK +	No.17 No.18	ECLK- ECLK+

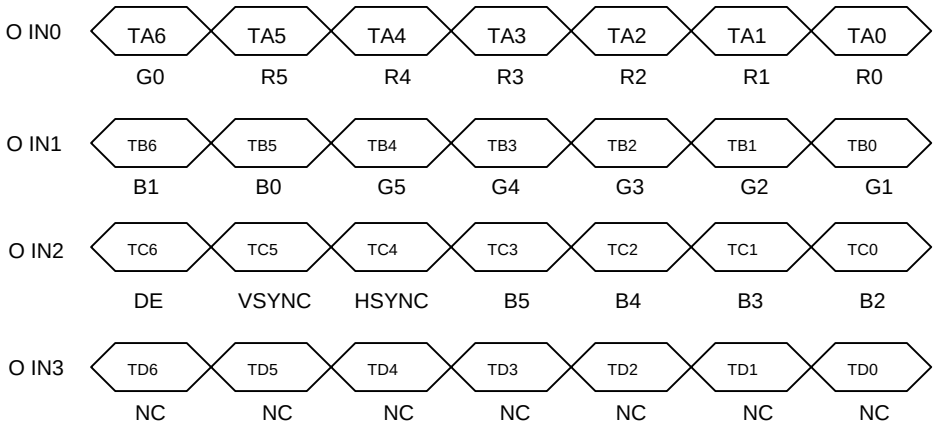


Recommended Transmittre (THC63LVDM63A,THC63LVDM63A-85) To LTD141LM0S-181 Interface Assignment

Case 2: 8bit Transmitter

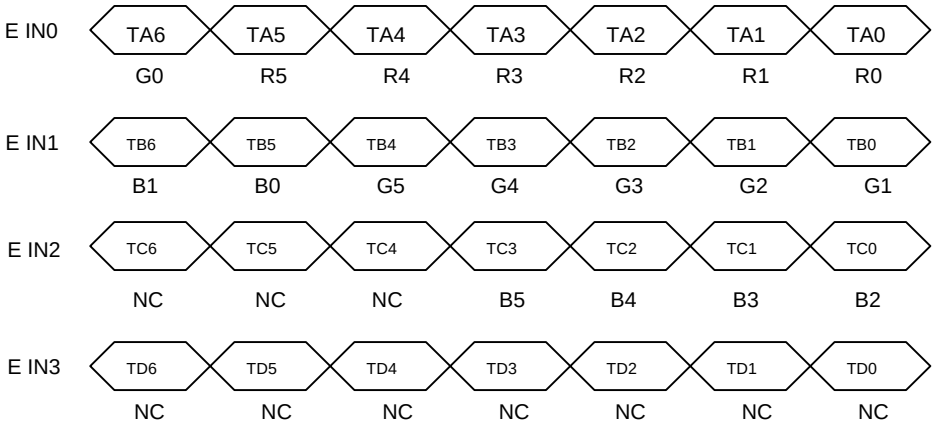
ODD DATA

Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol	LTD141LM0S-181 Interface (CN1)	
Symbol	Terminal	Symbol	Function		Terminal	Symbol
TA0	51	R0	Red Pixels Display Data(LSB)	TA- TA+	No.20 No.21	OIN0- OIN0+
TA1	52	R1	Red Pixels Display Data			
TA2	54	R2	Red Pixels Display Data			
TA3	55	R3	Red Pixels Display Data			
TA4	56	R4	Red Pixels Display Data			
TA5	3	R5	Red Pixels Display Data(MSB)			
TA6	4	G0	Green Pixels Display Data(LSB)			
TB0	6	G1	Green Pixels Display Data	TB- TB+	No.23 No.24	OIN1- OIN1+
TB1	7	G2	Green Pixels Display Data			
TB2	11	G3	Green Pixels Display Data			
TB3	12	G4	Green Pixels Display Data			
TB4	14	G5	Green Pixels Display Data(MSB)			
TB5	15	B0	Blue Pixels Display Data(LSB)			
TB6	19	B1	Blue Pixels Display Data			
TC0	20	B2	Blue Pixels Display Data	TC- TC+	No.26 No.27	OIN2- OIN2+
TC1	22	B3	Blue Pixels Display Data			
TC2	23	BE	Blue Pixels Display Data			
TC3	24	B5	Blue Pixels Display Data(MSB)			
TC4	27	HSYNC	Horizontal Synchronized Signal			
TC5	28	VSYNC	Vertical Synchronized Signal			
TC6	30	DE	Compound Synchroization Signal			
TD0	50	NC	Non Connection (open)	TD- TD+	-----	----
TD1	2	NC	Non Connection (open)			
TD2	8	NC	Non Connection (open)			
TD3	10	NC	Non Connection (open)			
TD4	16	NC	Non Connection (open)			
TD5	18	NC	Non Connection (open)			
TD6	25	NC	Non Connection (open)			
CLK IN	31	NCLK	Data Sampling Clock	TCLK- TCLK+	No.29 No.30	OCLK- OCLK+



EVEN DATA

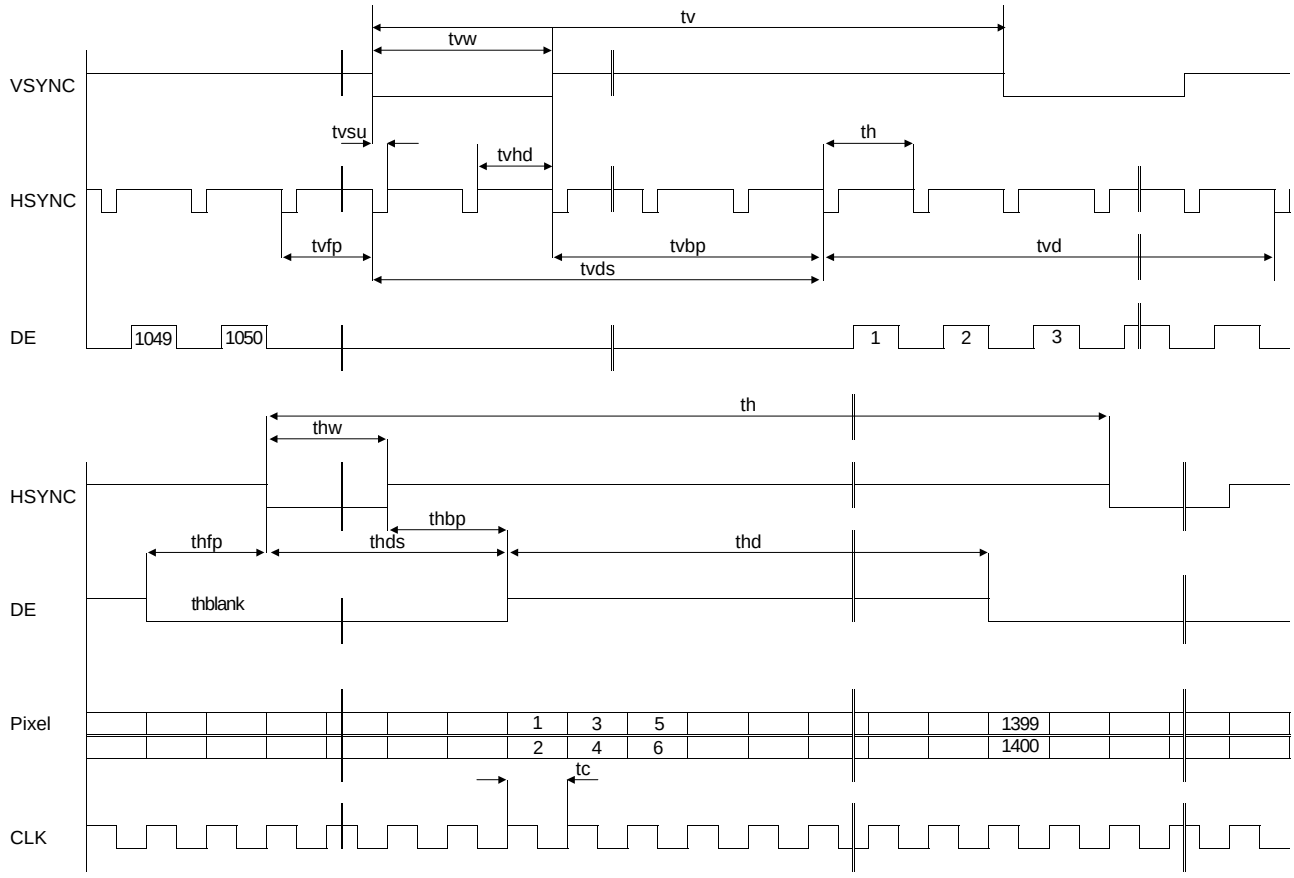
Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol	LTD141LM0S-181 Interface (CN1)	
Symbol	Terminal	Symbol	Function		Terminal	Symbol
TA0	51	R0	Red Pixels Display Data(LSB)	TA- TA+	No.8 No.9	EIN0- EIN0+
TA1	52	R1	Red Pixels Display Data			
TA2	54	R2	Red Pixels Display Data			
TA3	55	R3	Red Pixels Display Data			
TA4	56	R4	Red Pixels Display Data			
TA5	3	R5	Red Pixels Display Data(MSB)			
TA6	4	G0	Green Pixels Display Data(LSB)			
TB0	6	G1	Green Pixels Display Data	TB- TB+	No.11 No.12	EIN1- EIN1+
TB1	7	G2	Green Pixels Display Data			
TB2	11	G3	Green Pixels Display Data			
TB3	12	G4	Green Pixels Display Data			
TB4	14	G5	Green Pixels Display Data(MSB)			
TB5	15	B0	Blue Pixels Display Data(LSB)			
TB6	19	B1	Blue Pixels Display Data			
TC0	20	B2	Blue Pixels Display Data	TC- TC+	No.14 No.15	EIN2- EIN2+
TC1	22	B3	Blue Pixels Display Data			
TC2	23	BE	Blue Pixels Display Data			
TC3	24	B5	Blue Pixels Display Data(MSB)			
TC4	27	NC	Non Connection (open)			
TC5	28	NC	Non Connection (open)			
TC6	30	NC	Non Connection (open)			
TD0	50	NC	Non Connection (open)	TD- TD+	-----	----
TD1	2	NC	Non Connection (open)			
TD2	8	NC	Non Connection (open)			
TD3	10	NC	Non Connection (open)			
TD4	16	NC	Non Connection (open)			
TD5	18	NC	Non Connection (open)			
TD6	25	NC	Non Connection (open)			
CLK IN	31	NCLK	Data Sampling Clock	TCLK- TCLK+	No.17 No.18	ECLK- ECLK+



Colors Combination Table (262,144 color)

	Display	R5 R4 R3 R2 R1 R0	G5 G4 G3 G2 G1 G0	B5 B4 B3 B2 B1 B0	Gray Scale Level
Basic Color	Black	L L L L L L	L L L L L L	L L L L L L	
	Blue	L L L L L L	L L L L L L	H H H H H H	
	Green	L L L L L L	H H H H H H	L L L L L L	
	Light Blue	L L L L L L	H H H H H H	H H H H H H	
	Red	H H H H H H	L L L L L L	L L L L L L	
	Purple	H H H H H H	L L L L L L	H H H H H H	
	Yellow	H H H H H H	H H H H H H	L L L L L L	
	White	H H H H H H	H H H H H H	H H H H H H	
Gray Scale of Red	Black	L L L L L L	L L L L L L	L L L L L L	L0
	Dark	L L L L L H	L L L L L L	L L L L L L	L1
		L L L L H L	L L L L L L	L L L L L L	L2
	Light				L3…….L60
		H H H H L H	L L L L L L	L L L L L L	L61
		H H H H H L	L L L L L L	L L L L L L	L62
	Red	H H H H H H	L L L L L L	L L L L L L	Red L63
Gray Scale of Green	Black	L L L L L L	L L L L L L	L L L L L L	L0
	Dark	L L L L L L	L L L L L H	L L L L L L	L1
		L L L L L L	L L L L H L	L L L L L L	L2
	Light				L3……L60
		L L L L L L	H H H H L H	L L L L L L	L61
		L L L L L L	H H H H H L	L L L L L L	L62
	Green	L L L L L L	H H H H H H	L L L L L L	Green L63
Gray Scale of Blue	Black	L L L L L L	L L L L L L	L L L L L L	L0
	Dark	L L L L L L	L L L L L L	L L L L L H	L1
		L L L L L L	L L L L L L	L L L L H L	L2
	Light				L3……L60
		L L L L L L	L L L L L L	H H H H L H	L61
		L L L L L L	L L L L L L	H H H H H L	L62
	Blue	L L L L L L	L L L L L L	H H H H H H	Blue L63
Gray Scale of White & Black	Black	L L L L L L	L L L L L L	L L L L L L	L0
	Dark	L L L L L H	L L L L L H	L L L L L L	L1
		L L L L H L	L L L L H L	L L L L L L	L2
	Light				L3……L60
		H H H H L H	H H H H L H	H H H H L H	L61
		H H H H H L	H H H H H L	H H H H H L	L62
	White	H H H H H H	H H H H H H	H H H H H H	White L63

Timing Chart



Timing Specification

Item	Symble	Min	Typ	Max	Unit
Horizontal Scanning Term	*t*h	836	844	844	*T*c
H-sync Pulse Width	*thw*	4	--	--	*T*c
Horizontal Front Porch	*t*hfp	4	--	--	*T*c
Horizontal Back Porch	*thbp*	16	--	--	*T*c
Horizontal Blanking Term	*thblank*	136	144	324	*T*c
Horizontal Display Term	*thd*	700x*t*c	700x*t*c	700x*t*c	*T*c
Frame Period	*t*v	1060 x *th*	1066 x *th*	1066 x *th*	*Line*
V-sync Pulse Width	*tvw*	2	--	--	*T*hp
V-sync Set Up Time(to H-sync)	*t*vsu	8	--	--	*T*c
V-sync Hold Time	*t*vhd	8	--	--	--
Vertical Front Porch	*t*vfp	2	--	--	--
Vertical Back Porch	*t*vbp	6	--	--	--
Vertical Display Term	*tvd*	1050x*t*h	1050x*t*h	1050x*t*h	*Line*
Clock Period	*t*c	17.544	18.519	19.597	ns

Note 1) Refer to “Timing Chart” and LVDS (THC63LVDF84A-85) specifications by Thine Electronic, Inc..

Note 2) If DE is fixed to”H” or “L” level for certain period while NCLK is supplied, the panel displays black with some flicker.

Note 3) If NCLK is fixed to”H” or “L” level for certain period while DE is supplied, the panel may be damdged.

Note 4) Please adjuse LCD operating signal timing and FL driving frequency, to optimize the display quality.
There is a possibility that flicker is observed by the interferenoe of LCD operating signal timing and FL driving conditio(especially driving frequency), even if the condition satisfies above timing specifications and recommended operating conditions.

Note 5) Do not make *t*v, *t*vhd and *t*vds fluctuate. If *t*v, *t*vhd, and *t*vds are fluctuate, the panel display black.

Note 6) In case of using the long frame period, the detenoration of display quality,noise etc. may be occurred.

Note 7) NCLK count of each Horizontal Scanning Time should be always the same.
V-Blanking period should be “*n*” X “Horizontal Scanning Time”.(*n*: integer)
Frame period should be always the same.

Note 8) Please keep below equations.

VBL = *T*vfp + *T*vbp

HSPW = *HBL* – *T*hfp – ta

*T*hbp = *HSPW* + ta

Optical characteristics

Item		Symble	Conditions		Specification Min	Typ	Max	Unit	Remark
Viewing Angle		θ	*CR*>=10	ψ=180°	10	-	-	/	
				ψ=0°	30	-	-	/	
				ψ=90°	30	-	-	/	
				ψ=-90°	30	-	-	/	
Contrast Ratio		*CR*	θ=0°, ψ=0°		100	-	-	-	
Response Time		*t* ON	θ=0°, ψ=0°		-	-	50	ms	
		t OFF			-	-	50	ms	
Luminance		*L*	θ=0°,ψ=0°X=0.2890, Y=0.2880		160	200	-	cd/㎡	*I*FL=6.0mA(rms)
Chromaticity	Red	x_R	Gray Scale Level:L63		0.52	0.58	0.64		
		y_R	θ=0°,ψ=0°		0.27	0.33	0.39		
	Green	x_G	Ditto		0.26	0.32	0.38		
		y_G			0.47	0.53	0.59		
	Blue	x_B	Ditto		0.09	0.15	0.21		
		y_B			0.06	0.12	0.18		
	White	x_W	Ditto		0.26	0.32	0.38		
		y_W			0.27	0.33	0.39		

Note 1) Refer to “11.Measuring Method”.

Note 2) The above test limit must be applied for initial use. Characteristics will be shifted by iong period operation, but it is not irregular phenomena. Theoretically brightness characteristics will be decreased due to CCFL degradation and color shift due to optical components change.

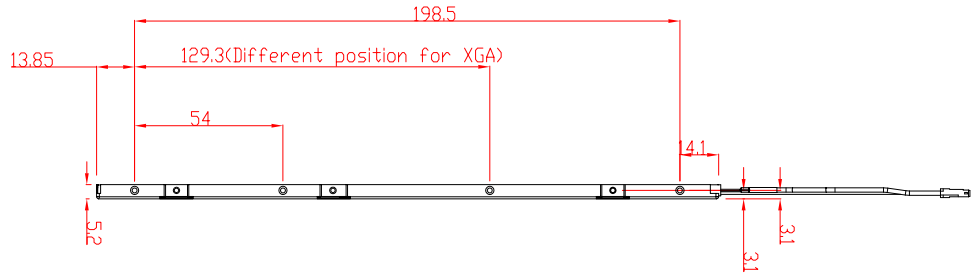
Document Title	LTD141LM0S-181	Revision	1.0

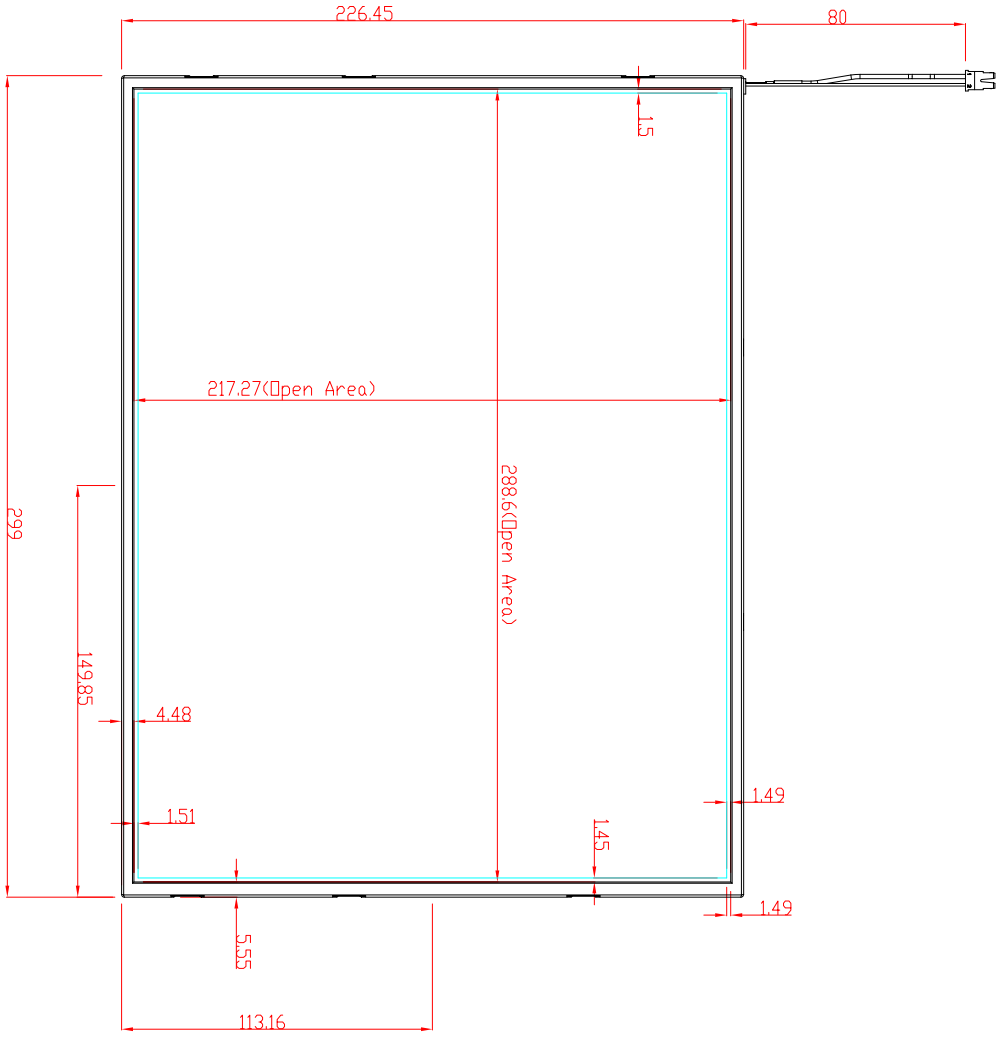
Outline dimension

Standard Tolerance:±0.5mm

(Front figure)

Unit : mm

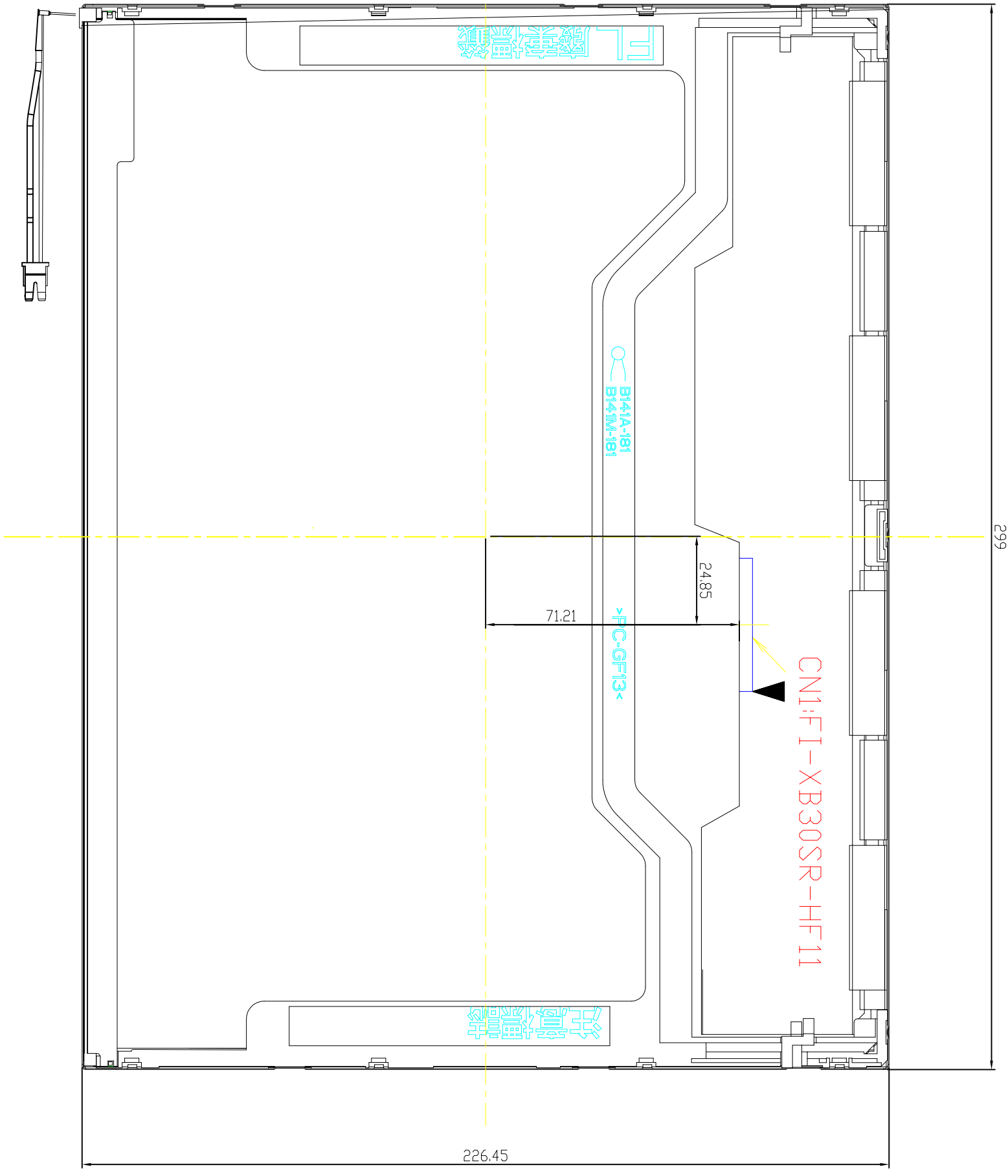




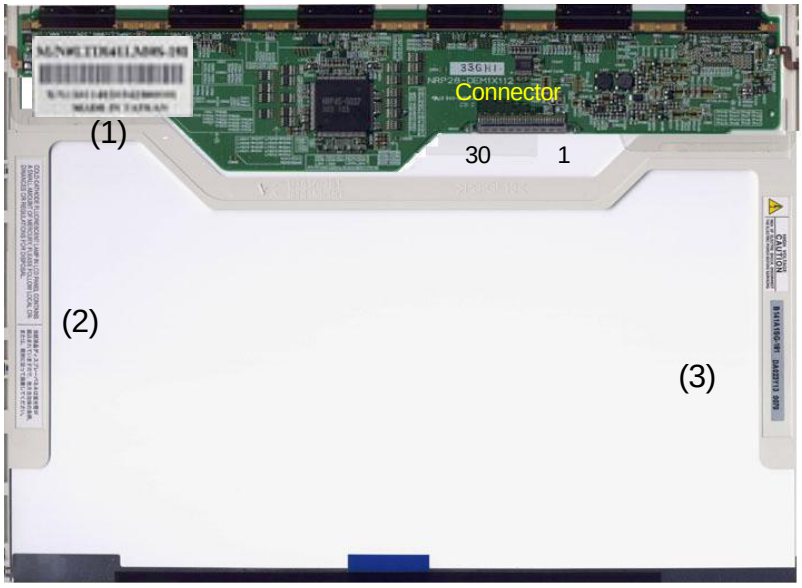
Outline dimension

(Back figure)

Standard Tolerance:+0.5mm



Product Label



(1)

← M/N number

← Bar code

← Serial number

← Place of origin

(2)

(3)

Quality

Inspection AQL

Total of Major Defects : AQL 0.65%

Sampling Method : MIL-STD-105EG Ⅱ

Test Conditions

Ambient Temperature : 25±2℃

Ambient Humidity : 65±20%(RH)

Reliability Test

Test Item		Test Conditions	PCS	Result
Operating	High Temperature and High Humidity Operation	50℃, 80%RH 192hr	3	OK
	Low Temperature Operation	0℃, 192hr	3	OK
	High Temperature Operation	50℃, 192hr	3	OK
	Continuous Operation	30sec ON / 30sec OFF 10000hr	3	OK
	Lifetime Test	25±2℃, 10000hr	3	OK
Storage	Low Temperature Operation	-20℃, 192hr	3	Ok
	High Temperature Operation	60℃, 192hr	3	OK
	Temperature Shock	60℃, 0.5hr / -20℃, 0.5hr 50cycles	3	Ok

Display Quality

Test Conditions

Inspection Area : Within active area

Test Pattern : White display pattern, Black display pattern, Red display pattern, Green display pattern and Blue display pattern.

Item	Description/Specification		Class
Function	No display, Malfunction		Major
Display Quality	Missing line		Major
	Missing Sub-Pixels		
	Bright defects	15pcs. Maximum	
	Dark defects	15pcs. Maximum	
	Total sub-pixel defects	20pcs. Maximum	
	Bright defects distance	Neglect	
	Dark defects distance	Neglect	
	Bright defects conjunction (2sub-pixels)	Neglect	
	Bright defects conjunction (3sub-pixels)	Neglect	
	Bright defects conjunction (4sub-pixels)	1sets Maximum	
	Bright defects conjunction (>4sub-pixels)	Nothing	
	Dark defects conjunction (2sub-pixels)	Neglect	
	Dark defects conjunction (3sub-pixels)	Neglect	
	Dark defects conjunction (4sub-pixels)	3sets Maximum	
	Dark defects conjunction (>4sub-pixels)	Neglect	
	Various uniformity (mura)	Neglect	-
	Inconspicuous flicker, cross talk, Newton's ring and other defects	Neglect	-
Black and White Spots/Lines	Inconspicuous defects	Neglect	-

*1, Defects of both color filter and black matrix are counted as bright or dark defects. Inspection area should be within the active area.

*2, Bright defect means a bright spot (sub-pixel) on the display pattern of gray scale L0. Dark defect mean a dark spot (sub-pixel) on the display pattern of gray scale L63.

*3 Bright defect which can not be found by using 5%ND-Filter shall not be counted as a defect.

Appearance Test

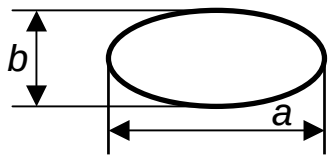
Specifications

<table>
<tr><th>Item</th><th>Description</th><th>Class</th></tr>
<tr><td>PCB Appearance</td><td>Pattern peeling snapping, electrically short</td><td>Major</td></tr>
<tr><td></td><td>Repair portion on PCB is not covered by epoxy resign</td><td>Minor</td></tr>
<tr><td>Soldering</td><td>Cold solder joint, lead move when pulled</td><td>Major</td></tr>
<tr><td>Connectors</td><td>Distinct stain, rust or scratch</td><td>Minor</td></tr>
<tr><td>Black and White Spots/Lines*1, 2</td><td>
<table>
<tr><th>Line Width (MM)</th><th>Length (MM)</th><th>Acceptable count</th></tr>
<tr><td>W<=0.10</td><td>-</td><td>neglect</td></tr>
<tr><td>0.10<<i>W</i><=0.15</td><td><i>L</i><=10</td><td><i>n</i><=8</td></tr>
<tr><td>0.15<<i>W</i><=0.20</td><td></td><td><i>n</i><=2</td></tr>
<tr><td>0.20<<i>W</i></td><td>-</td><td>-</td></tr>
</table>
<table>
<tr><th>Average diameter (mm)</th><th>Acceptable count/side</th></tr>
<tr><td>D<=0.20</td><td>neglect</td></tr>
<tr><td>0.20<<i>D</i><=0.50</td><td><i>n</i><=5</td></tr>
<tr><td>0.50<<i>D</i><=1.50</td><td><i>n</i><=2</td></tr>
<tr><td>1.50<<i>D</i></td><td>0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>Break and Crack of Panel Outside Edge</td><td>Break: less than 2mm inward from cell outside.
Worsening fine crack: reject</td><td>Minor</td></tr>
</table>

*1, Inspection area should be within active area.

*2,Dusts which are bigger not less than 0.20mm (0.20<W) shall be judged by “Average Diameter”.

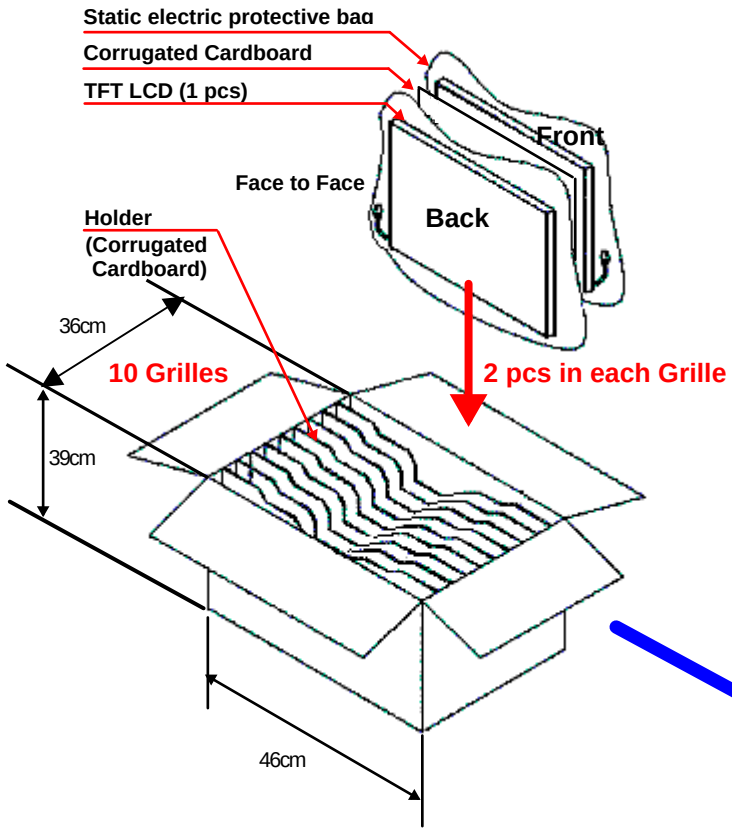
Average Diameter $D = (a+b)/2$ (mm)



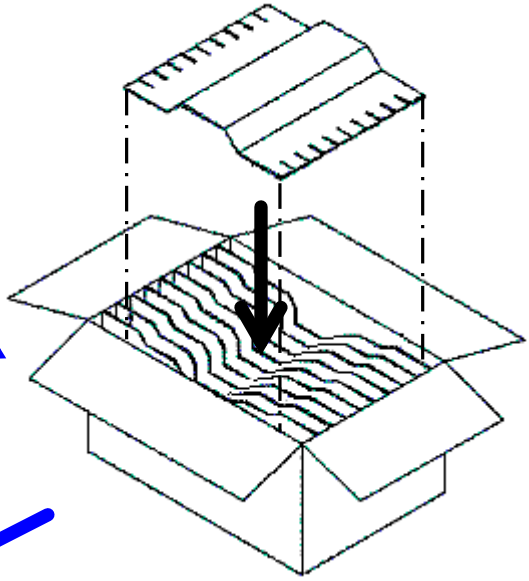
Packaging

Packaging From Corrugated Cardboard Box.
Packaging Method

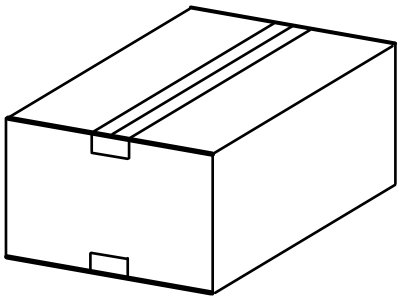
1. Total TFT-LCD Module : 20 pcs



2. Corrugated Cardboard Box



3. Total weight : (Approx) 12.2kg



4. Plastics Adhesive Tape

Number	Quantity	Description
1	20 pcs	Total TFT-LCD Module
2	1 set	Corrugated Cardboard Box
3	12.2Kg	Total weight
4	-	Plastics Adhesive Tape