

All information is subject to change without notice. Please read bottom notes.

## FEATURES

- (1) 14.1 SXGA+(1400x1050 pixels) display size for Notebook PC.
- (2) LVDS interface system (H-Sync, V-Sync)

**TENTATIVE**

## MECHANICAL SPECIFICATIONS

Item	Specifications
Dimensional Outline (typ.)	298.5 (W) x 226.5 (H) x 5.5max (D) mm
Number of Pixels	1400 (W) x 1050 (H) pixels
Active Area	285.6 (W) x 214.2 (H) mm
Viewing Area	287.6 (W) x 216.2 (H) mm
Pixel Pitch	0.204 (W) x 0.204 (H)
Weight (approximately)	325g
Backlight	Single CCFL, Sidelight type

## ABSOLUTE MAXIMUM RATINGS

Item	Min.	Max.	Unit	
Supply Voltage	(V <sub>DD</sub> )	-0.3	4.0	V
	(V <sub>FL</sub> )	0	2.0	kV(rms)
FL Driving Frequency (f <sub>FL</sub> )	(0)	(100)	KHz	
Input Signal Voltage (V <sub>IN</sub> )	-0.3	V <sub>DD</sub> +0.3	V	
Operating Ambient Temperature *1	0	50	°C	
Operating Temperature for Panel *2	0	60	°C	
Storage Temperature	-20	60	°C	
Storage Humidity (Max. wet bulb temperature = 39°C)	10	90	%(RH)	

\*1: Wet bulb temperature should be 39°C Max., and no condensation of water.

\*2: The surface temperature caused by self heat radiation of cell itself is specified on this item.

## ELECTRICAL SPECIFICATION (Ta=25°C)

Item	Min.	Typ.	Max.	Unit	Remarks	
Supply Voltage	(V <sub>DD</sub> )	3.0	3.3	3.6	V	
	(V <sub>FL</sub> )	---	(625)	---	V(rms)	I <sub>FL</sub> =6.0mA(rms)
FL Start Voltage	1550	---	---	V(rms)	Ta=0°C	
Differential Input Voltage	(V <sub>ID</sub> )	100	---	600	mV	
Common Mode Input Voltage	(V <sub>CM</sub> )	1.0	---	2.4-(V <sub>ID</sub> )/2	V	
Current Consumption	(I <sub>DD</sub> ) *3	---	380	---	mA	
	(I <sub>FL</sub> ) *4	2.0	---	6.0	mA(rms)	
Power Consumption *1 *2	---	(5.0)	---	W	I <sub>FL</sub> =6.0mA(rms)	

\*3 : Refer to TH63LVDF84A-85 Specification by Thine Electronics, Inc.

\*4: 8 color bars pattern

\*5: Except the efficiency of FL inverter

## OPTICAL SPECIFICATION (Ta=25°C)

Item	Min.	Typ.	Max.	Unit	Remarks
Contrast Ratio (CR)	100	250	---	---	
Response Time	(t <sub>ON</sub> )	---	50	ms	
	(t <sub>OFF</sub> )	---	50	ms	
Luminance (L)	---	200	---	cd/m <sup>2</sup>	I <sub>FL</sub> =6.0mA(rms)

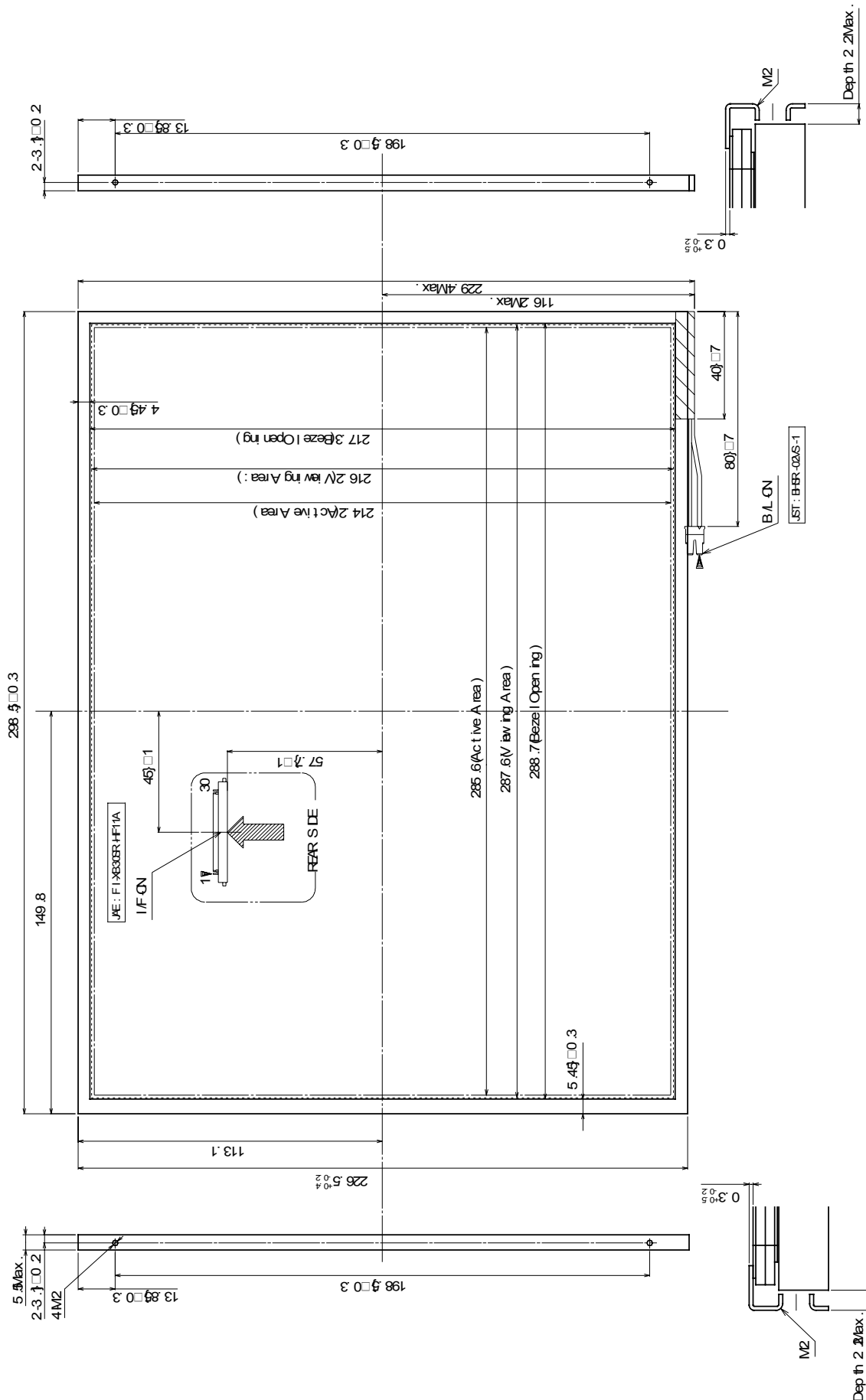
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\*The information contained herein may be changed without prior notice. It is therefore advisable to contact Toshiba Matsushita Display Technology before proceeding with the design of equipment incorporating this product.

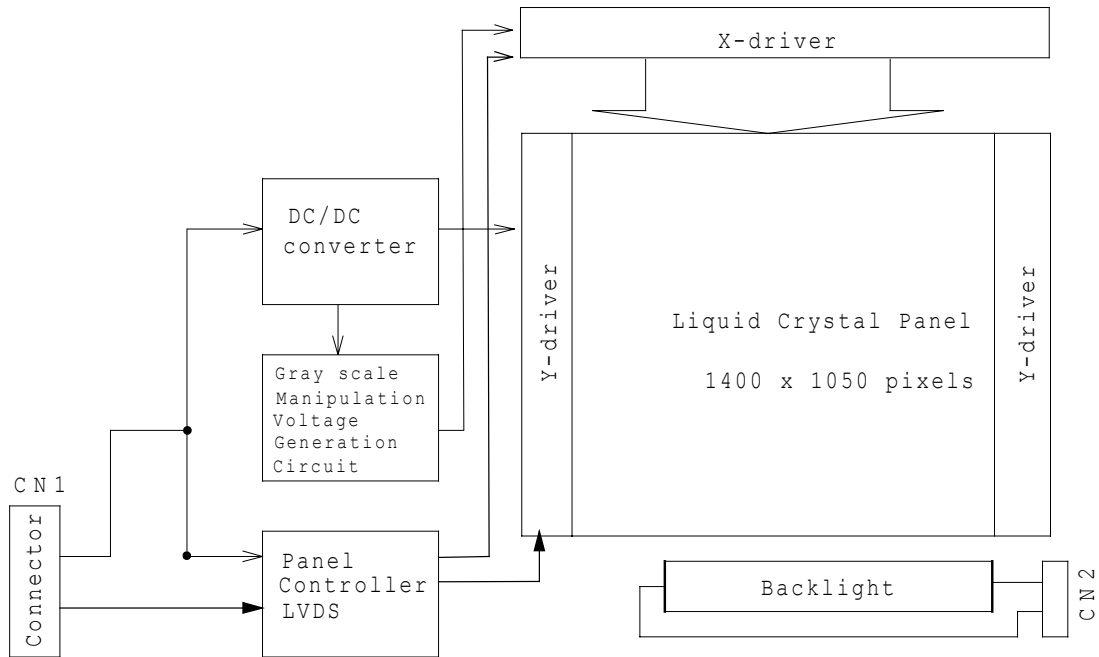
**DIMENSIONAL OUTLINE**  
(Front)

**TENTATIVE**

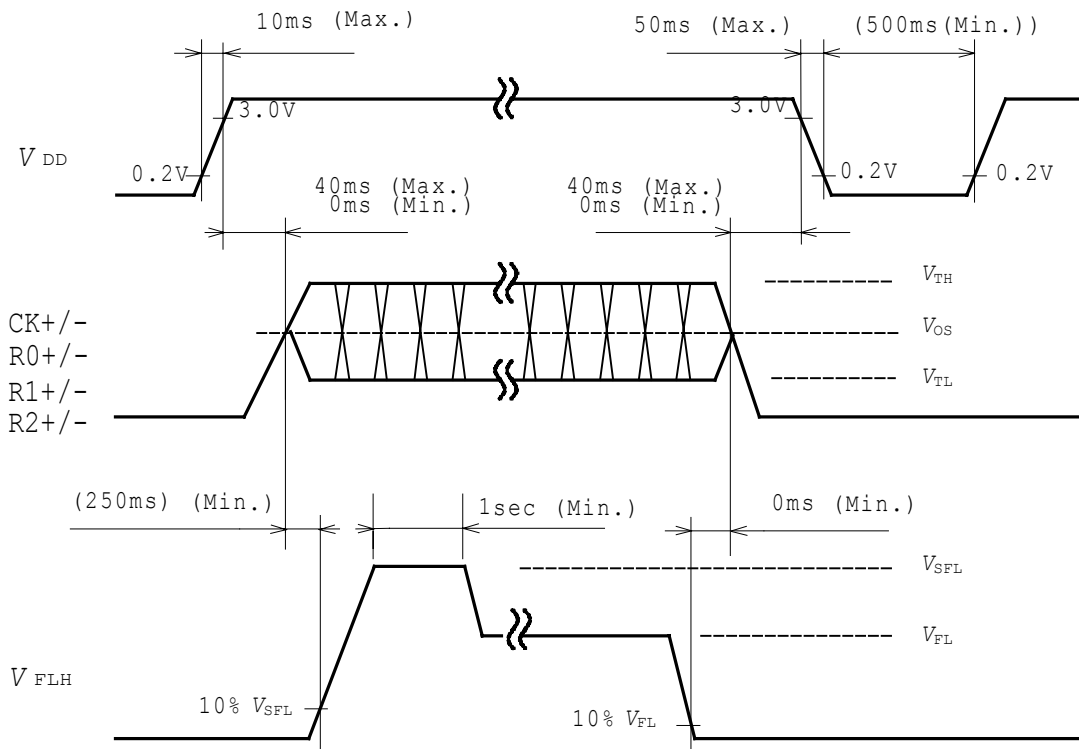
Unit : mm  
Standard tolerance : 0.5



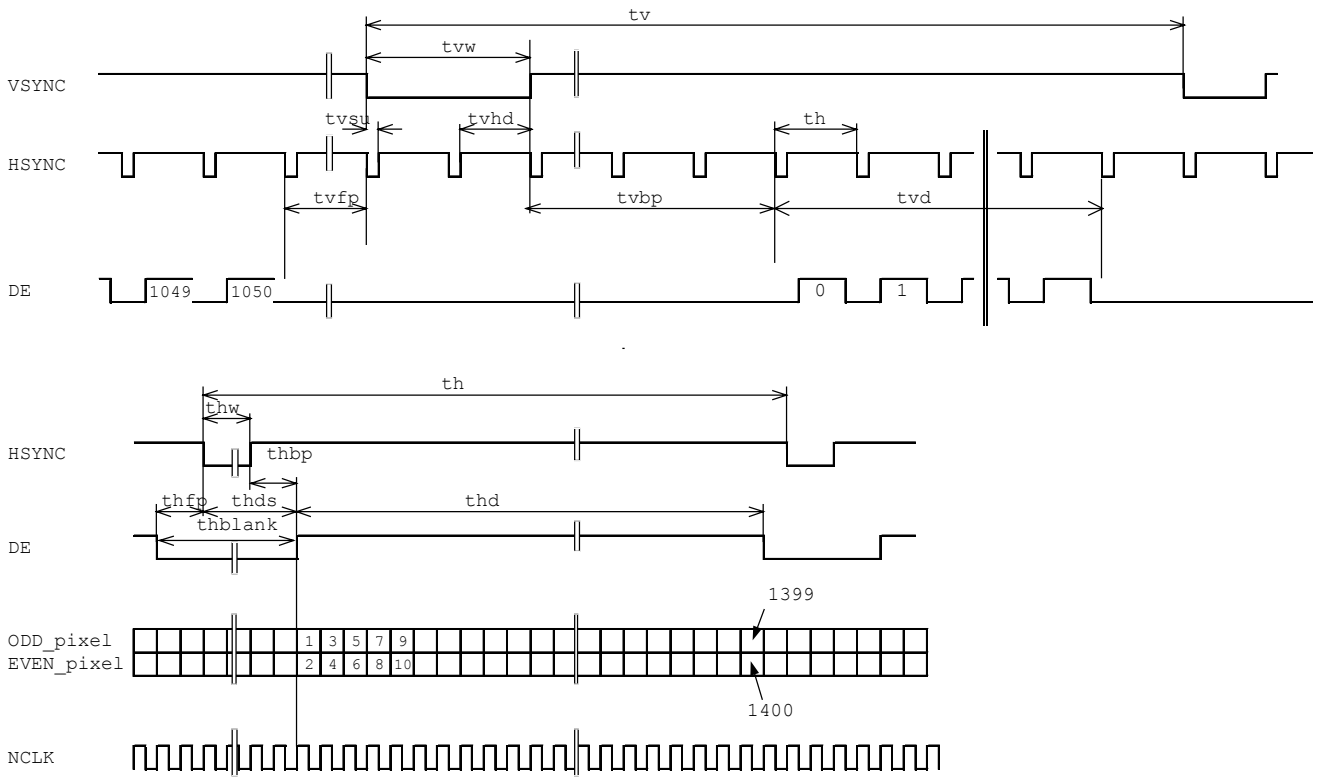
**BLOCK DIAGRAM**



**SEQUENCE OF POWER SUPPLIES AND SIGNALS**



**TIMING CHART**



**TIMING SPECIFICATION** <sup>1) 2) 3) 4) 5) 6) 7)</sup>

Item	Symbol	min.	typ.	max.	unit
Horizontal Scanning Term	$t_h$	$836 \times t_c$	$844 \times t_c$	$844 \times t_c$	-
H-sync Pulse Width	$t_{hw}$	$4 \times t_c$	-	-	-
Horizontal Front Porch	$t_{hfp}$	$4 \times t_c$	-	-	-
Horizontal Back Porch	$t_{hbp}$	$16 \times t_c$	-	-	-
Horizontal Blanking Term	$t_{hblank}$	$136 \times t_c$	$144 \times t_c$	$144 \times t_c$	-
Horizontal Display Term	$t_{hd}$	$700 \times t_c$	$700 \times t_c$	$700 \times t_c$	-
Frame Period	$t_v$	$1060 \times t_h$	$1066 \times t_h$	$1066 \times t_h$	-
V-sync Pulse Width	$t_{vw}$	$2 \times t_h$	-	-	-
V-sync Set Up Time (to H-sync)	$t_{vsu}$	$8 \times t_c$	-	-	-
V-sync Hold Time	$t_{vhd}$	$8 \times t_c$	-	-	-
Vertical Front Porch	$t_{vfp}$	$2 \times t_h$	-	-	-
Vertical Back Porch	$t_{vbp}$	$6 \times t_h$	-	-	-
Vertical Display Term	$t_{vd}$	$1050 \times t_h$	$1050 \times t_h$	$1050 \times t_h$	
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 ENAB 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 ENAB is supplied, the panel may be damaged.

Note 4) Please adjust 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 timing specifications and recommended operating conditions shown in 3.

Note5) Do not make  $t_v$ ,  $t_{vdh}$  and  $t_{vds}$  fluctuate.

If  $t_v$ ,  $t_{vdh}$ , and  $t_{vds}$  are fluctuate, the panel displays black.

Note6) In case of using the long frame period, the deterioration of display quality, noise etc. may be occurred.

Note7) 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.

## CONNECTOR PIN ASSIGNMENT FOR INTERFACE

### CN1 INPUT SIGNAL (FI-XB30S\*-HF\*\* or FI-X30S-HF\*\* / JAE)

[ Mating Connector :Wire Type FI-X30H(Housing), FI-XC3-1-15000(Contact)

FPC Type FI-X30M or FI-X30MR

Coax Type FI-X30C or FI-X30C2(Housing), FI-X30CH-7000(Shell)]

Terminal No.	Symbol	Function
Assist Terminal	V <sub>SS</sub>	GND
1	V <sub>SS</sub>	GND
2	V <sub>DD</sub>	POWER SUPPLY : +3.3V
3	V <sub>DD</sub>	POWER SUPPLY : +3.3V
4	V <sub>EDID</sub>	DDC 3.3V POWER SUPPLY : +3.3V
5	NC	Non-Connection
6	CLKEDID	DDC Clock
7	DATAEDID	DDC Data
8	RxOIN0-	Negative LVDS differential data input (Odd), [R0-R5, G0]
9	RxOIN0+	Positive LVDS differential data input (Odd), [R0-R5, G0]
10	V <sub>SS</sub>	GND
11	RxOIN1-	Negative LVDS differential data input (Odd), [G1-G5, B0-B1]
12	RxOIN1+	Positive LVDS differential data input (Odd), [G1-G5, B0-B1]
13	V <sub>SS</sub>	GND
14	RxOIN2-	Negative LVDS differential data input (Odd), [B2-B5, HS, VS, DE]
15	RxOIN2+	Positive LVDS differential data input (Odd), [B2-B5, HS, VS, DE]
16	V <sub>SS</sub>	GND
17	RxOCLKIN-	Negative LVDS differential clock input (Odd)
18	RxOCLKIN+	Positive LVDS differential clock input (Odd)
19	V <sub>SS</sub>	GND
20	RxEIN0-	Negative LVDS differential data input (Even), [R0-R5, G0]
21	RxEIN0+	Positive LVDS differential data input (Even), [R0-R5, G0]
22	V <sub>SS</sub>	GND
23	RxEIN1-	Negative LVDS differential data input (Even), [G1-G5, B0-B1]
24	RxEIN1+	Positive LVDS differential data input (Even), [G1-G5, B0-B1]
25	V <sub>SS</sub>	GND
26	RxEIN2-	Negative LVDS differential data input (Even), [B2-B5, HS, VS, DE]
27	RxEIN2+	Positive LVDS differential data input (Even), [B2-B5, HS, VS, DE]
28	V <sub>SS</sub>	GND
29	RxECLKIN-	Negative LVDS differential clock input (Even)
30	RxECLKIN+	Positive LVDS differential clock input (Even)
Assist Terminal	V <sub>SS</sub>	GND

Note 1) Please connect GND pin to ground. Don't use it as no-connect nor connection with high impedance.

Note 2) Please connect NC to nothing. Don't connect it to ground nor to other signal input.

### CN2 CCFL POWER SOURCE

Connector : BHSR-02VS-1 / JAPAN SOLDERLESS TERMINAL MFG CO., LTD.

Mating Connector : SM02B-BHS-1 / JAPAN SOLDERLESS TERMINAL MFG CO., LTD.

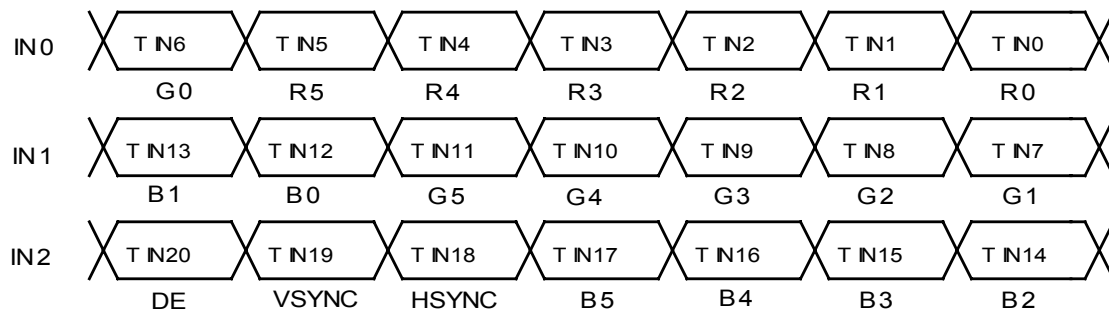
Terminal No.	Symbol	Function
1	V <sub>FLH</sub>	CCFL Power Supply ( high voltage)
2	V <sub>FLL</sub>	CCFL Power Supply (low voltage)

**RECOMMENDED TRANSMITTER (THC63LVDF63A, THC63LVDM63A, THC63LVDM63A-85)  
TO LTD141LM3S INTERFACE ASSIGNMENT**

**Case1: 6bit Transmitter**

THC63LVDF63A, THC63LVDM63A, THC63LVDM63A-85				LTD141LM3S Interface (CN1)		
Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol	Terminal	Symbol
Symbol	Terminal	Symbol	Function			
TIN0	44	R0	Red Pixels Display Data (LSB)	TOUT0- TOUT0+	No.5 No.6	IN0- IN0+
TIN1	45	R1	Red Pixels Display Data			
TIN2	47	R2	Red Pixels Display Data			
TIN3	48	R3	Red Pixels Display Data			
TIN4	1	R4	Red Pixels Display Data			
TIN5	3	R5	Red Pixels Display Data (MSB)			
TIN6	4	G0	Green Pixels Display Data (LSB)	TOUT1- TOUT1+	No.8 No.9	IN1- IN1+
TIN7	6	G1	Green Pixels Display Data			
TIN8	7	G2	Green Pixels Display Data			
TIN9	9	G3	Green Pixels Display Data			
TIN10	10	G4	Green Pixels Display Data			
TIN11	12	G5	Green Pixels Display Data (MSB)			
TIN12	13	B0	Blue Pixels Display Data (LSB)	TOUT2- TOUT2+	No.11 No.12	IN2- IN2+
TIN13	15	B1	Blue Pixels Display Data			
TIN14	16	B2	Blue Pixels Display Data			
TIN15	18	B3	Blue Pixels Display Data			
TIN16	19	B4	Blue Pixels Display Data			
TIN17	20	B5	Blue Pixels Display Data (MSB)			
TIN18	22	HSYNC	H-Sync	TCLK OUT- TCLK OUT+	No.14 No.15	CLK- CLK+
TIN19	23	VSYNC	V-Sync			
TIN20	25	DE	Compound Synchronization Signal			
CLK IN	26	CLK	Data Sampling Clock			

Note 1) Please connect NC pin to nothing. Don't connect it to ground nor to other signal input.

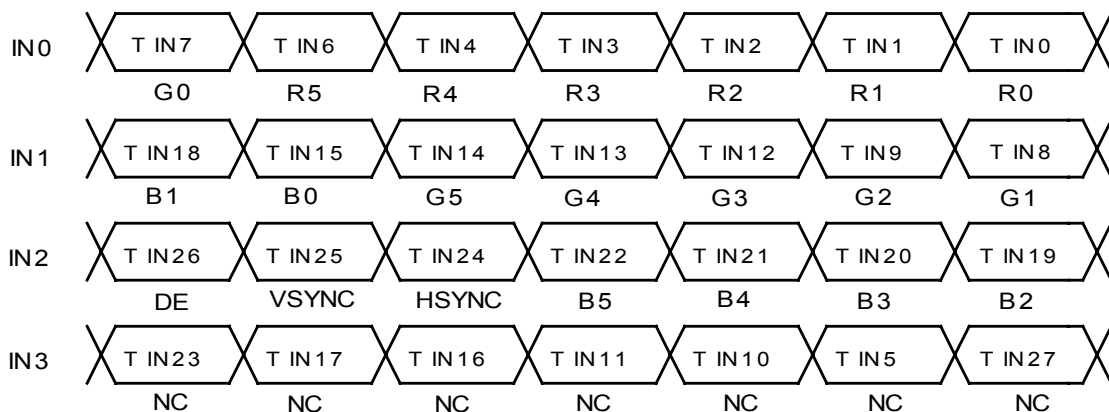


**RECOMMENDED TRANSMITTER (THC63LVDF63A, THC63LVDM63A, THC63LVDM63A-85)  
TO LTD141LM3S INTERFACE ASSIGNMENT**

**Case2: 8bit Transmitter**

THC63LVDF63A, THC63LVDM63A, THC63LVDM63A-85				LTD141LM3S Interface (CN1)		
Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol	Terminal	Symbol
Symbol	Terminal	Symbol	Function			
TIN0	51	R0	Red Pixels Display Data (LSB)	TOUT0- TOUT0+	No.5 No.6	IN0- IN0+
TIN1	52	R1	Red Pixels Display Data			
TIN2	54	R2	Red Pixels Display Data			
TIN3	55	R3	Red Pixels Display Data			
TIN4	56	R4	Red Pixels Display Data			
TIN6	3	R5	Red Pixels Display Data (MSB)	TOUT1- TOUT1+	No.8 No.9	IN1- IN1+
TIN7	4	G0	Green Pixels Display Data (LSB)			
TIN8	6	G1	Green Pixels Display Data			
TIN9	7	G2	Green Pixels Display Data			
TIN12	11	G3	Green Pixels Display Data			
TIN13	12	G4	Green Pixels Display Data	TOUT2- TOUT2+	No.11 No.12	IN2- IN2+
TIN14	14	G5	Green Pixels Display Data (MSB)			
TIN15	15	B0	Blue Pixels Display Data (LSB)			
TIN18	19	B1	Blue Pixels Display Data			
TIN19	20	B2	Blue Pixels Display Data			
TIN20	22	B3	Blue Pixels Display Data	TOUT3- TOUT3+		
TIN21	23	B4	Blue Pixels Display Data			
TIN22	24	B5	Blue Pixels Display Data (MSB)			
TIN24	27	HSYNC	H-Sync			
TIN25	28	VSYNC	V-Sync			
TIN26	30	DE	Compound Synchronization Signal	TCLK OUT- TCLK OUT+	No.14 No.15	CLK- CLK+
TIN27	50	NC	Non Connection (open)			
TIN5	2	NC	Non Connection (open)			
TIN10	8	NC	Non Connection (open)			
TIN11	10	NC	Non Connection (open)			
TIN16	16	NC	Non Connection (open)	CLK IN	31	CLK
TIN17	18	NC	Non Connection (open)			
TIN23	25	NC	Non Connection (open)			
CLK IN	31	CLK	Data Sampling Clock			

Note 1) Please connect NC pin to nothing. Don't connect it to ground nor to other signal input.





256k (k=1024) COLORS COMBINATION TABLE

	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 L L L	-
	Blue	L L L L L L L	L L L L L L L	H H H H H H H	-
	Green	L L L L L L L	H H H H H H H	L L L L L L L	-
	Light Blue	L L L L L L L	H H H H H H H	H H H H H H H	-
	Red	H H H H H H H	L L L L L L L	L L L L L L L	-
	Purple	H H H H H H H	L L L L L L L	H H H H H H H	-
	Yellow	H H H H H H H	H H H H H H H	L 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 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 L L L	L 0
	Dark ↑ ↓ Light	L L L L L L H	L L L L L L L	L L L L L L L	L 1
		L L L L L H L	L L L L L L L	L L L L L L L	L 2
		⋮	⋮	⋮	L3... L60
	Light	H H H H L H	L L 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 L L	L62
		H H H H H H	L L 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 L L L	L 0
	Dark ↑ ↓ Light	L L L L L L L	L L L L L L H	L L L L L L L	L 1
		L L L L L L L	L L L L L H L	L L L L L L L	L 2
		⋮	⋮	⋮	L3... L60
	Light	L L L L L L L	H H H H L H	L L L L L L L	L61
		L L L L L L L	H H H H H L	L L L L L L L	L62
		L L L L L L L	H H H H H H	L 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 L L L	L 0
	Dark ↑ ↓ Light	L L L L L L L	L L L L L L L	L L L L L L H	L 1
		L L L L L L L	L L L L L L L	L L L L H L	L 2
		⋮	⋮	⋮	L3... L60
	Light	L L 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 L L	H H H H H L	L62
		L L 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 L L L	L 0
	Dark ↑ ↓ Light	L L L L L H	L L L L L L H	L L L L L L H	L 1
		L L L L H L	L L L L H L	L L L L H L	L 2
		⋮	⋮	⋮	L3... L60
	Light	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
		H H H H H H	H H H H H H	H H H H H H	white L63

**FOR SAFETY**

LCD module is generally designed with precise parts to achieve light weighted thin mechanical dimensions. In using our Modules, make certain that you fully understand and put into practice the warnings and safety precautions detailed in Engineering Information No.EE-N001,"CAUTIONS AND INSTRUCTIONS FOR TOSHIBA LCD MODULES". Refer to individual specifications and TECHNICAL DATA sheets (hereinafter called "TD") for more detailed technical information.

**1) SPECIAL PURPOSES**

A) Toshiba Matsushita Display Technology's Standard LCD Modules have not been customized for operation in extreme environments or for use in applications where performance failures could be life-threatening or otherwise catastrophic.

B) Since Toshiba Matsushita Display Technology's Standard LCD Modules have not been designed for operation in extreme environments, they must never be used in devices that will be exposed to abnormally high levels of vibration or shock which exceed Toshiba Matsushita Display Technology's published specification limits.

C) In addition, since Toshiba Matsushita Display Technology Standard LCD Modules have not been designed for use in applications where performance failures could be life-threatening or catastrophic, they must never be installed in aircraft navigation control systems (such as, but not limited to Traffic Collision Avoidance System and Air Traffic Indicator), in military defense or weapons systems, in critical industrial process-control systems (e.g., those involved in the production of nuclear energy), or in critical medical device or patient life-support systems.

**2) 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.

Toshiba Matsushita Display Technology does not warrant the module, if customer disassembled or modified it.

**3) BREAKAGE OF LCD PANEL**

DO NOT INGEST liquid crystal material, DO NOT INHALE this material, and DO NOT CONTACT the material with skin, if LCD panel is broken and liquid crystal material spills out.

If liquid crystal material comes into mouth or eyes, rinse mouth or eyes out with water immediately.

If this material contact with skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

**4) GLASS OF LCD PANEL**

BE CAREFUL WITH CHIPS OF GLASS that may cause injuring fingers or skin, when the glass is broken.

**5) ELECTRIC SHOCK**

DISCONNECT POWER SUPPLY before handling LCD module.

DO NOT TOUCH the parts inside LCD module and the fluorescent lamp's connector or cables in order to prevent electric shock, because high voltage is supplied to these parts from the inverter unit while power supply is turned on.

**6) ABSOLUTE MAXIMUM RATINGS AND POWER PROTECTION CIRCUIT**

DO NOT EXCEED the absolute maximum rating values under the worst probable conditions caused by the supply voltage variation, input voltage variation, variation in parts' constants, environmental temperature, etc., otherwise LCD module may be damaged.

Employ protection circuit for power supply, whenever the specification or TD specifies it.

Suitable protection circuit should be applied for each system design.

**7) DISPOSAL**

When dispose LCD module, obey to the applicable environmental regulations.