Toshiba Matsushita Display Technology Co., Ltd

PRODUCT INFORMATION

14cm COLOUR TFT-LCD MODULE
(5.7 TYPE)

LTA057A341F
(a-Si TFT)

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

FEATURES: (1)5.7" QVGA color display
(2)Wide Viewing Angle (Vertical: 120 degrees, Horizontal: 140 degrees)
(3)LED B/L [18pcs. (6pcs. x 3rows)]
(4)Replaceable structure of LED unit
(5)RoHS compatible

TENTATIVE

RoHS compatible

MECHANICAL SPECIFICATIONS

Item	Specifications
Dimensional Outline (typ.)	144.0 (*W*) x 104.6 (*H*) x 7.8 typ.(*D*) mm
Number of Pixels	320 (*W*) x 240 (*H*) pixels
Active Area	115.2 (*W*) x 86.4 (*H*) mm
Pixel Pitch	0.36 (*W*) x 0.36 (*H*)
Weight (approximately)	125 g
Backlight	Sidelight (LEDs)

ABSOLUTE MAXIMUM RATINGS

Item		Min.	Max.	Unit
Supply Voltage	(V_{DD})	-0.3	4.0	V
	(V_{LED})	0	30.0	V
Input Signal Voltage	(V_{IN})	-0.3	V_{DD}+0.3	V
Operating Temperature *1		-20	70	°C
Storage Temperature		-30	80	°C
Storage Humidity (Max. wet bulb temperature = 39°C)		10	90	%(RH)

*1: Only operation is guarantied at Operating Temperature. Display quality is evaluated at +25°C.

ELECTRICAL SPECIFICATION (*Ta*=25°C) (RECOMMENDED OPERATION CONDITION)

Item		Min.	Typ.	Max.	Unit	Remarks
Supply Voltage	(V_{DD})	3.0	3.3	3.6	V	
	(V_{LED})*2	---	19.2	---	V	I_{LED} =15.0mA,
High Level Input Voltage	(V_{IH})	0.8 V_{DD}	---	V_{DD}	V	
Low Level Input Voltage	(V_{IL})	0	---	0.2 V_{DD}	V	
Current Consumption *3*4	(I_{DD})	---	150	---	mA	
	(I_{LED})	---	15.0	25.0	mA	
Power Consumption *3 *4		---	1.36	---	W	I_{LED} =15.0mA

*2: between V_{LED1+} - V_{LED1-} or V_{LED2+} - V_{LED2-} or V_{LED3+} - V_{LED3-} *3: 8 color bars pattern *4: Except the efficiency of LED driver

OPTICAL SPECIFICATION (*Ta*=25°C)

Item		Min.	Typ.	Max.	Unit	Remarks
Contrast Ratio	(CR)	250	500	---	---	
Viewing Angle ($CR \geq 10$)	(Upper+Lower)	---	120	---	degrees	
	(Left+Right)	---	140	---	degrees	
Response Time	(T_{ON})	---	---	50	ms	
	(T_{OFF})	---	---	50	ms	
Luminance	(L)	320	400	---	cd/m^2	I_{LED} =15.0mA
LED Life Time (MTBF) *5 *6			20,000		h	I_{LED} =15.0mA

*5: Conditions;*Ta*=25°C, continuous lighting

*6: Definitions of failure; 1) Lcd luminance becomes half of the minimum value. 2) LED doesn't light normally.

*The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by Toshiba Matsushita Display Technology or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Toshiba Matsushita Display Technology or others.

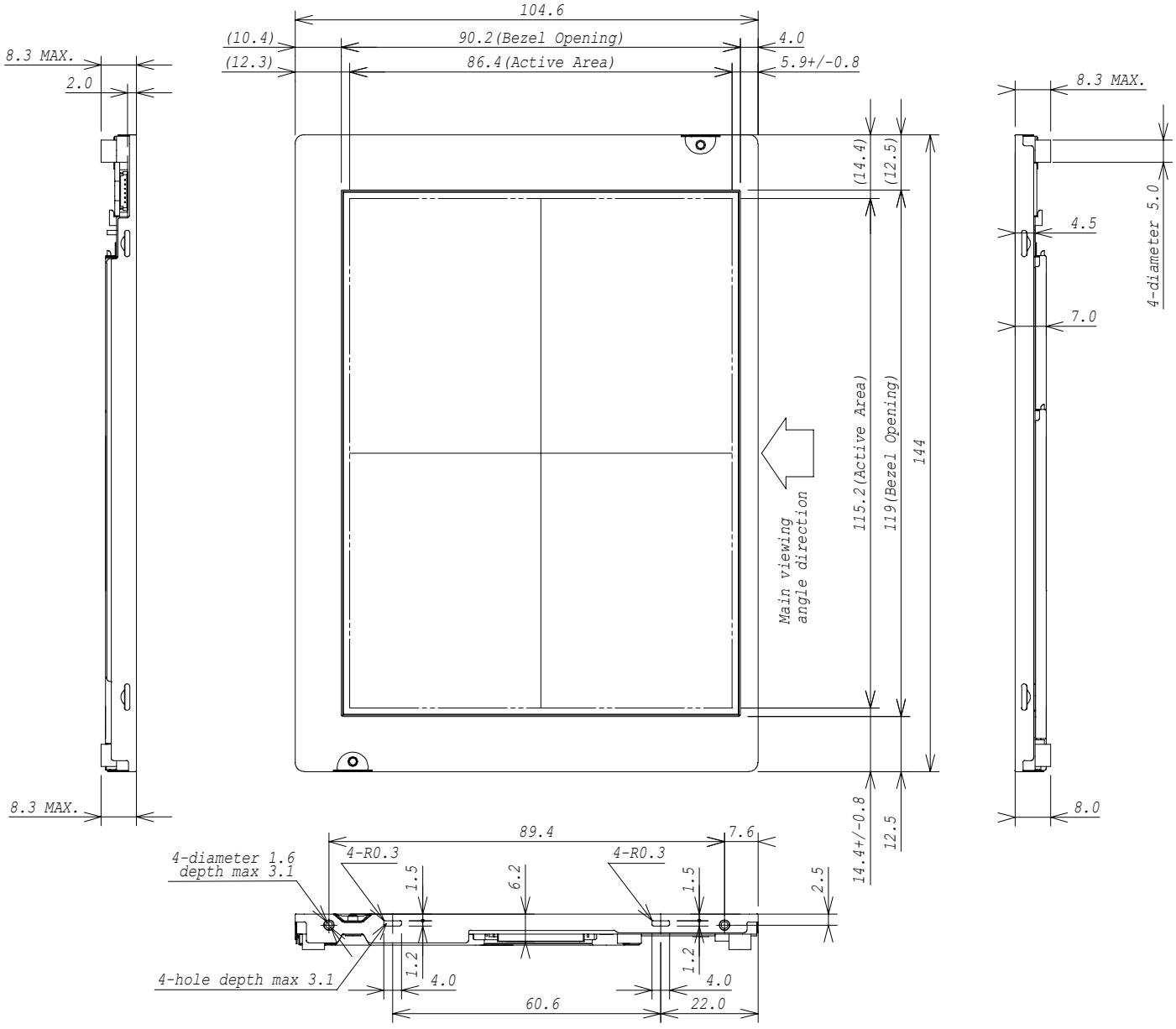
*The information contained herein may be changed without prior notice. It is therefore advisable to contact Toshiba Matsushita Display Technology before proceeding with the design of equipment incorporating this product.

DIMENSIONAL OUTLINE

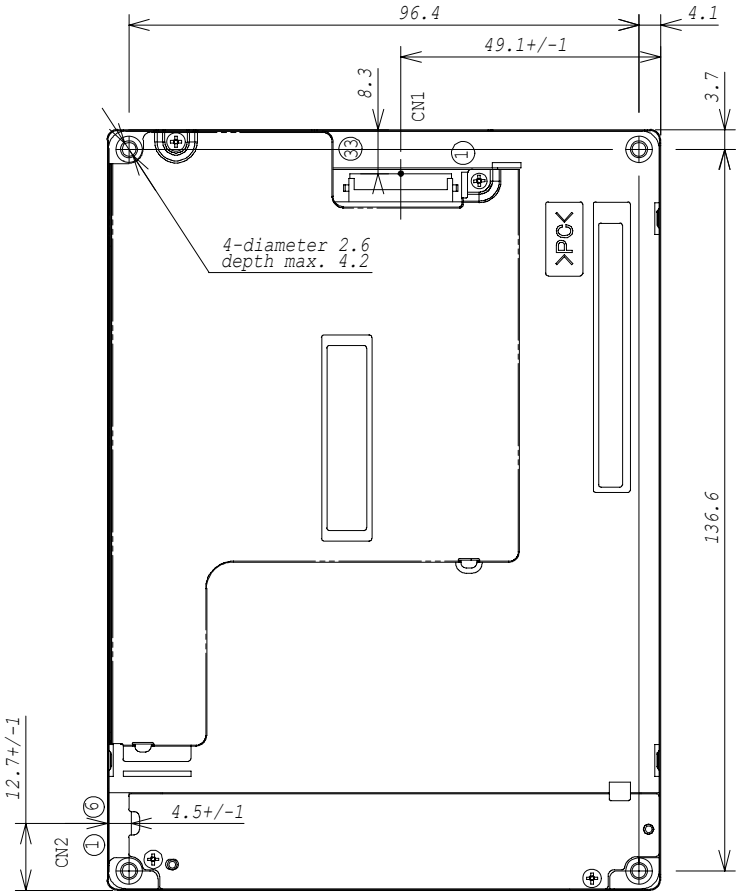
TENTATIVE

Unit : mm
Standard tolerance : ±0.5

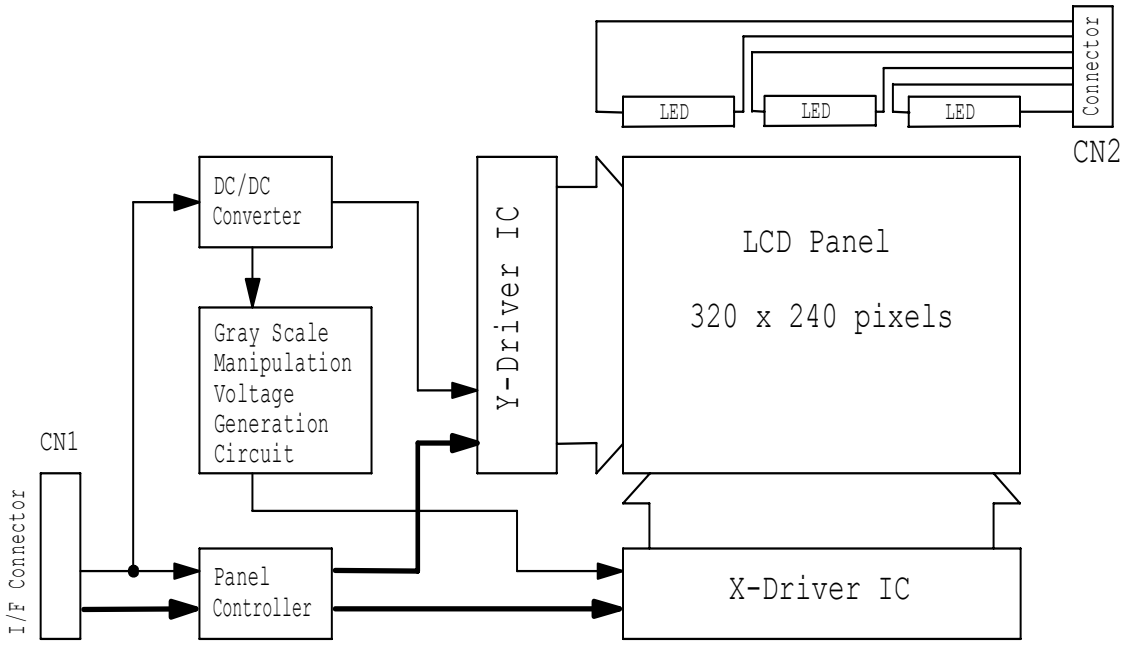
<Front side>

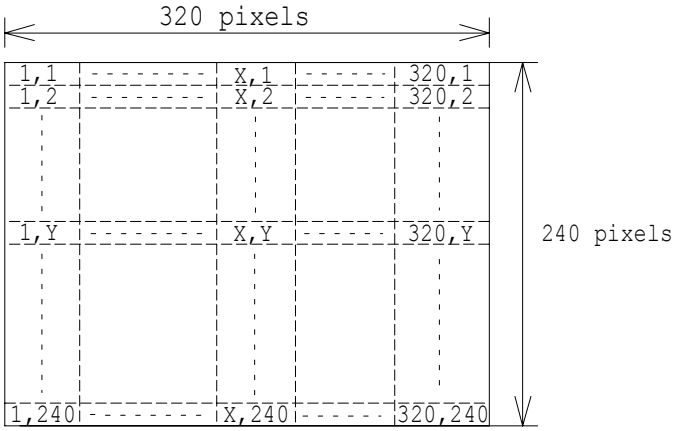


<Rear side>

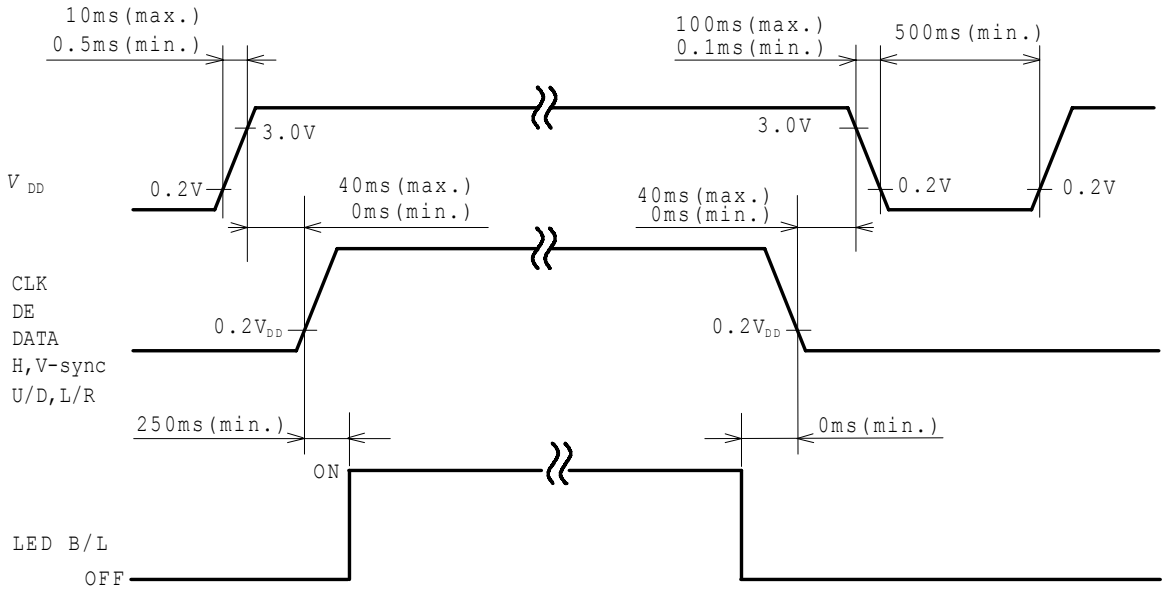

96.4
4.1
49.1+/-1
8.3
CN1
3.7
33
1
4-diameter 2.6
depth max. 4.2
PCX
136.6
12.7+/-1
4.5+/-1
CN2
6
1

BLOCK DIAGRAM

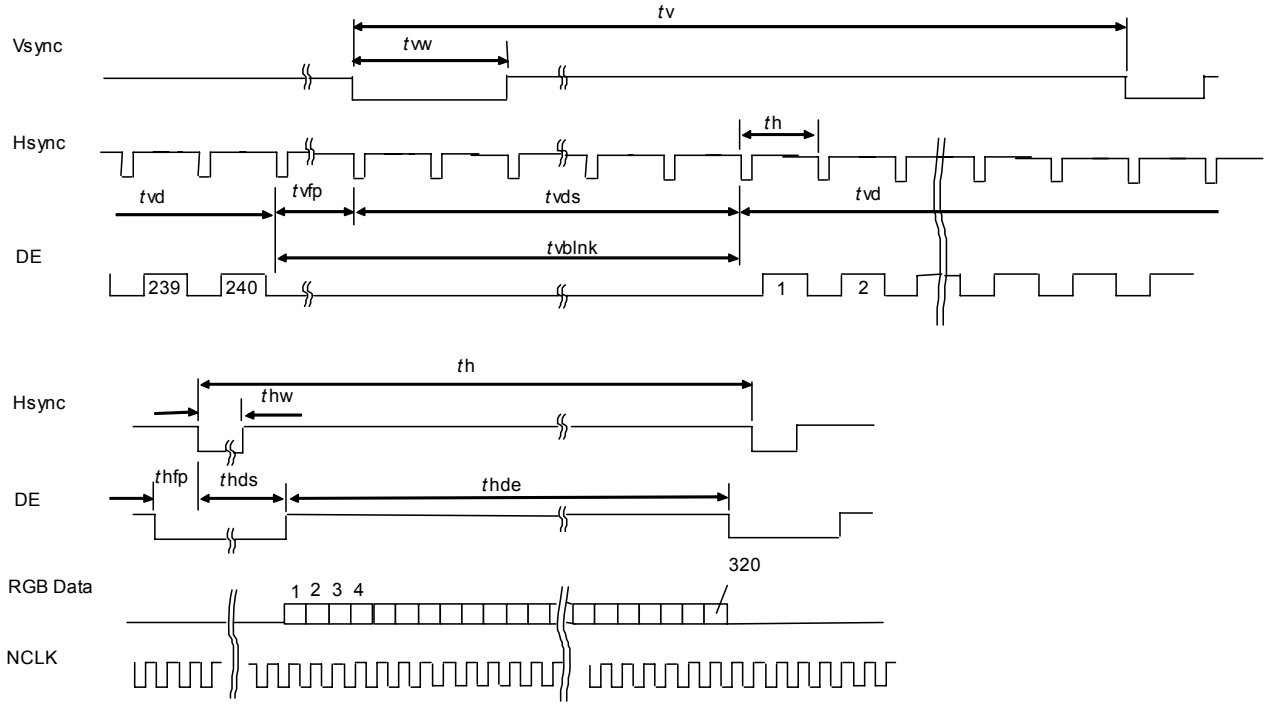




SEQUENCE OF POWER SUPPLIES AND SIGNALS



TIMING CHART



TIMING SPECIFICATION

Item	Symbol	Min.	Typ.	Max.	Unit
Frame Period	*t*v	260	262	340	th
		15.9	16.66	17.81	ms
Vertical Display Term	*tvde*	240	240	240	clk
Vertical Blanking Term	*t*vblnk	20	22	100	th
V-sync Pulse Width	*t*vw	1.0	2.0	3.0	th
Vertical Front Porch	*t*vfp	0	4.0	-	th
Vertical Data Sync Period	*t*vds	10	18	20	th
Horizontal Period	*t*h	410	424	436	tc
		49.5	63.6	64.1	us
Horizontal Display Term	thde	320	320	320	tc
H-sync Pulse Width	*t*hw	3	51	80	tc
Horizontal Front Porch	*t*hfp	16	18	40	tc
Horizontal Data Sync Period	*t*hds	50	86	100	tc
Clock Period	*t*c	120	150	156	ns
Clock "H" Time	*t*ch	7.0	-	-	ns
Clock "L" Time	*t*cl	7.0	-	-	ns
Set Up Time	*t*ds	5.0	-	-	ns
Hold Time	*t*dh	2.0	-	-	ns

CONNECTOR PIN ASSIGNMENT FOR INTERFACE

CN1 INPUT SIGNAL

Connector: IMSA-9637S-33A-GF / IRISO electronics co., LTD.

0.5mm pitch, lower face contacting (gilding)

Terminal No.	Symbol	Function
1	GND[1)]	
2	CLK	Clock
3	H-sync	Horizontal Sync
4	V-sync	Vertical Sync
5	GND[1)]	
6	R0[2)]	Red Display Data (LSB)
7	R1[2)]	Red Display Data
8	R2[2)]	Red Display Data
9	R3[2)]	Red Display Data
10	R4[2)]	Red Display Data
11	R5[2)]	Red Display Data (MSB)
12	GND[1)]	
13	G0[2)]	Green Display Data (LSB)
14	G1[2)]	Green Display Data
15	G2[2)]	Green Display Data
16	G3[2)]	Green Display Data
17	G4[2)]	Green Display Data
18	G5[2)]	Green Display Data (MSB)
19	GND[1)]	
20	B0[2)]	Blue Display Data (LSB)
21	B1[2)]	Blue Display Data
22	B2[2)]	Blue Display Data
23	B3[2)]	Blue Display Data
24	B4[2)]	Blue Display Data
25	B5[2)]	Blue Display Data (MSB)
26	GND[1)]	
27	DE	Data Enable
28	VDD	3.3V
29	VDD	3.3V
30	R/L	Horizontal Reverse(“L” level or Open : Normal, ”H “ level : Reverse)
31	U/D	Vertical Reverse(“H” level : Normal, “L” level or Open : Reverse)
32	NC[3)]	Non Connection
33	GND[1)]	

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

Note 2) Refer to 8 pages.

Note 3) NC terminal should be open. (Don’t use.)

CN2 LED POWER SOURCE

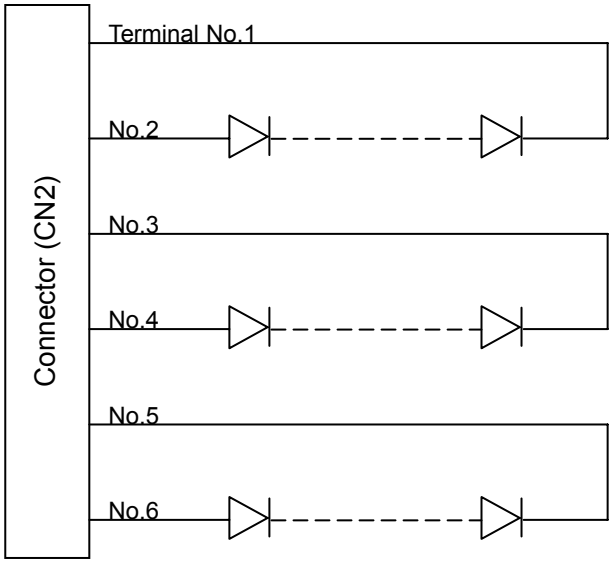
Connector: SM06B-SHLS-TF(LF)(SN) / JAPAN SOLDERLESS TERMINAL MFG CO., LTD.

Mating Connector: SHLP-06V-S-B (housing), SSHL-003T-P02 (contact pin)

/ JAPAN SOLDERLESS TERMINAL MFG CO., LTD.

Terminal No.	Symbol	Function
1	V_{LED1-}	LED1 POWER SUPPLY(Cathode)
2	V_{LED1+}	LED1 POWER SUPPLY(Anode)
3	V_{LED2-}	LED2 POWER SUPPLY(Cathode)
4	V_{LED2+}	LED2 POWER SUPPLY(Anode)
5	V_{LED3-}	LED3 POWER SUPPLY(Cathode)
6	V_{LED3+}	LED3 POWER SUPPLY(Anode)

EQUIVALENT CIRCUIT OF LED



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	---
	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	L 0
	Dark ↑ ↓ Light	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L 1
		L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L 2
					:						:						:			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	L 0
	Dark ↑ ↓ Light	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L 1
		L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L 2
					:						:						:			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	L 0
	Dark ↑ ↓ Light	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	H	L	L 2
					:						:						:			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	L 0
	Dark ↑ ↓ Light	L	L	L	L	L	H	L	L	L	L	L	H	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
		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

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 doses 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) RECOMMENDED OPERATION CONDITIONS

The performance and quality of the LCD panel are warranted only when the LCD panel is used within “the recommended operation conditions”. Toshiba Matsushita Display Technology Co., Ltd. never warrants the performance and quality of the LCD panel when you use the LCD panel over “the recommended operation conditions”, although within “the absolute maximum rating”.
To use the LCD panel over “the recommended operation conditions” may have bad influence on the characteristics and reliability of the LCD panel and may shorten the life of the LCD panel.
Therefore, when designing the whole set, not to be over “the recommended operation conditions”, you should fully take care of supply voltage change, characteristic of connection parts, serge of input-and-output line, and surrounding temperature.

8) DISPOSAL

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