Toshiba Matsushita Display Technology Co., Ltd.

PRODUCT INFORMATION

13.3cm Transmissive COLOUR TFT-LCD
(5.23 TYPE)

LT052MA92B00
(a-Si TFT)

TENTATIVE

FEATURES

(1) a-Si TFT-LCD for P-navi, PMP…etc
(2) WVGA 800(W) x 480(H) pixels
(3) Transmissive type Mode
(4) 16,777,216 colors (24 bit color depth)
(5) RGB I/F(24 bit)
(6) Cell + FPC + Backlight + Touch panel

MECHANICAL SPECIFICATIONS

Item	Specifications
Dimensional Outline (TYP.)	127.7(*W*) x 82.0(*H*) x 4.28(*D*) mm(Typ)
Number of Pixels	800(*W*) x 480 (*H*) pixels
Active Area	114.0 (*W*) x 68.4 (*H*) mm
Pixel Pitch	0.1425(*W*) x 0.1425(*H*)
Weight (approximately)	(90) g(Typ.)

ABSOLUTE MAXIMUM RATINGS

Item	Min.	Max.	Unit	Remarks
Power Supply for Logic	-0.3	5.0	V	
Power Supply for Analog	-0.3	5.5	V	
Operating Temperature	-20	70	°C	
Storage Temperature	-30	80	°C	
Storage Humidity (Max. wet bulb temp. = 39°C)	10	90	%(RH)	No dew condensation

ELECTRICAL SPECIFICATION

Item	Min.	Typ.	Max.	Unit	Remarks
Logic Power Supply Voltage(DVdd)	2.25	2.5	3.6	V	*1 Normal mode
Analog Power Supply Voltage(AVdd)	4.85	5.0	5.15	V	
LED forward Voltage (I_{LED}=20mA)	---	3.2	3.6	V	
Current Consumption	---	TBD	(1300)	mW	

*1: Final number will be specified with actual LCD samples

OPTICAL SPECIFICATION (*Ta*=25°C)

Item		Min.	Typ.	Max.	Unit	Remarks
Contrast Ratio (*CR*)		(150)	(300)	---	---	*2 Transmissive mode
Viewing Angle (CR>10) (Vertical) (θ)	ϕ =180°	TBD	(40)	---	°	*2 Transmissive mode
	ϕ =0°	TBD	(55)	---	°	
Viewing Angle (CR>10) (Horizontal) (θ)	ϕ =-90°	TBD	(60)	---	°	
	ϕ =+90°	TBD	(60)	---	°	
Luminance*3 (with TP)		350	500	---	cd/m^2	*2 Transmissive mode
NTSC ratio		---	50	---	%	*2 Transmissive mode
Response Time	(t_{ON})	---	30	50	ms	*2 Transmissive mode
	(t_{OFF})	---	30	50	ms	*2 Transmissive mode
Crosstalk		---	4	6	%	Refer to figure at next page
Optimum view angle		12 o'clock *4			---	

*2: Final number will be specified with actual LCD samples
*3: LED current=20mAx16LED
*4: Upper side of the panel is no color inversion. (6 o'clock : Color inversion. (contrast peak))

<Touch Panel Condition>

RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Touch Panel Supply Voltage	*VTP*	-	5	7	V	

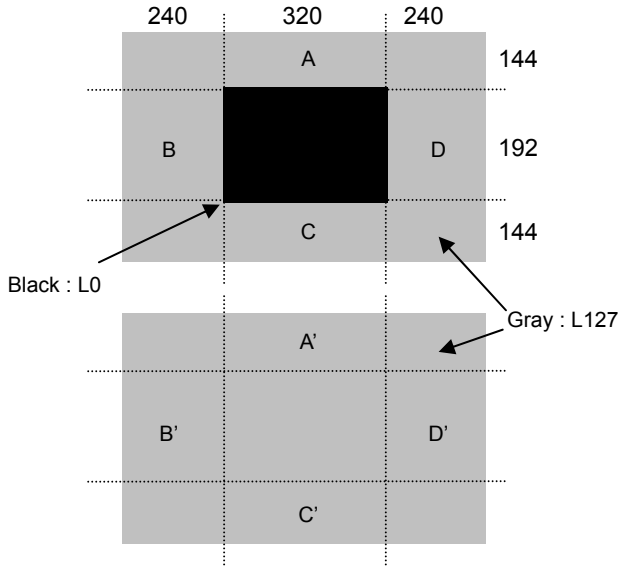
ELECTRICAL SPECIFICATIONS

Item		Symbol	Min.	Typ.	Max.	Unit	Remarks
Insulation resistance		Z	20	-	-	MOhm	DC25V, between upper and lower electrodes
Resistance between terminals	Upper electrode side	Rx	TBD	-	(1000)	Ohm	Between X1 and X2
	Lower electrode side	Ry	TBD	-	(1000)	Ohm	Between Y1 and Y2
Linearity		-	-	-	(4.0)	%	
Chattering		-	-	-	(15)	mS	

MECHANICAL SPECIFICATIONS

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Operating starting force	-	-	-	1.0	N	
Surface hardness	-	3	-	-	H	JIS K 5400 but 500gf

<Crosstalk Testing Pattern>

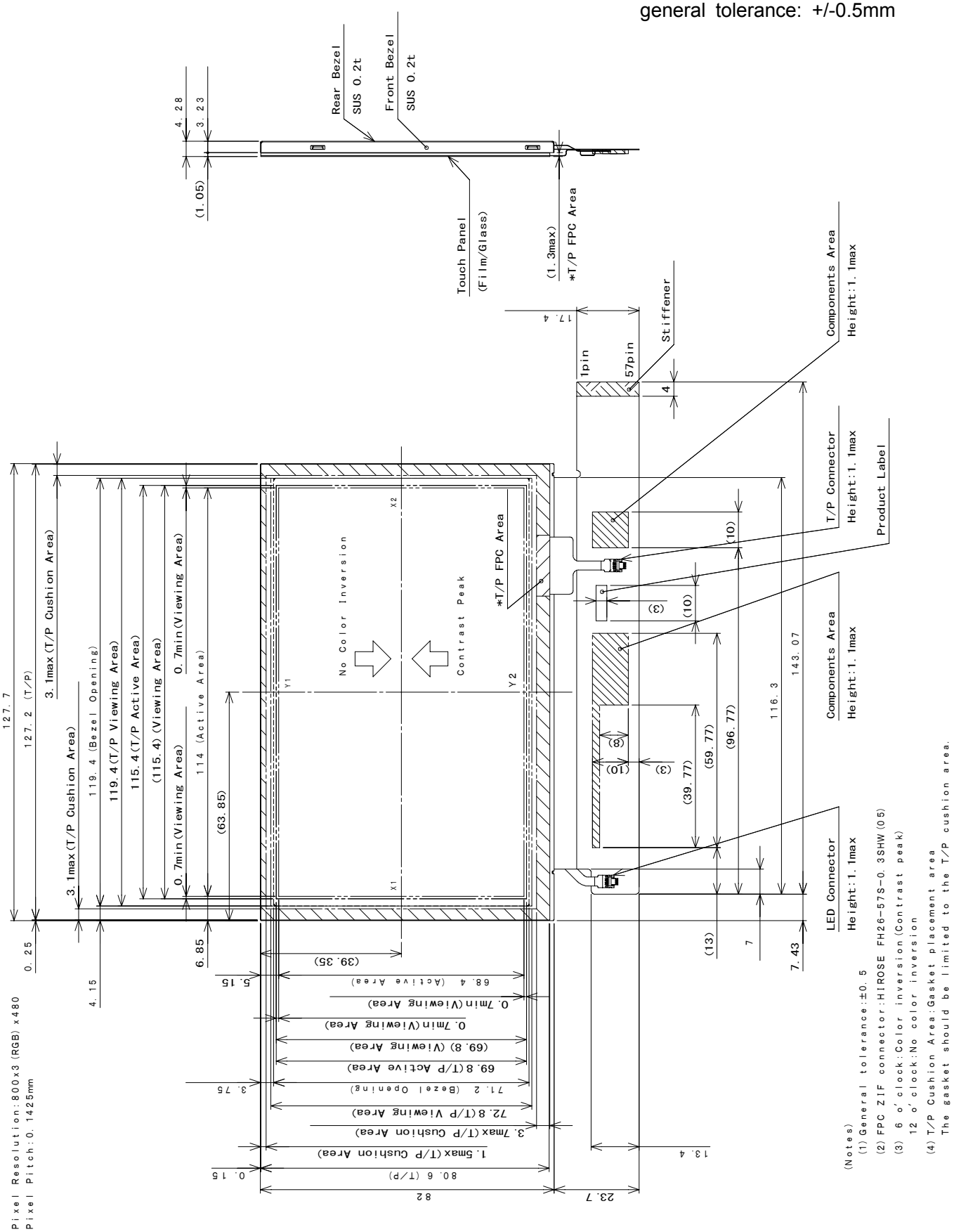


Crosstalk calculating formula = |(A-A')/A'|

Correspondence points : A to A', B to B'
C to C', D to D'

<Outline dimension(w/ TP) Front>

general tolerance: +/-0.5mm

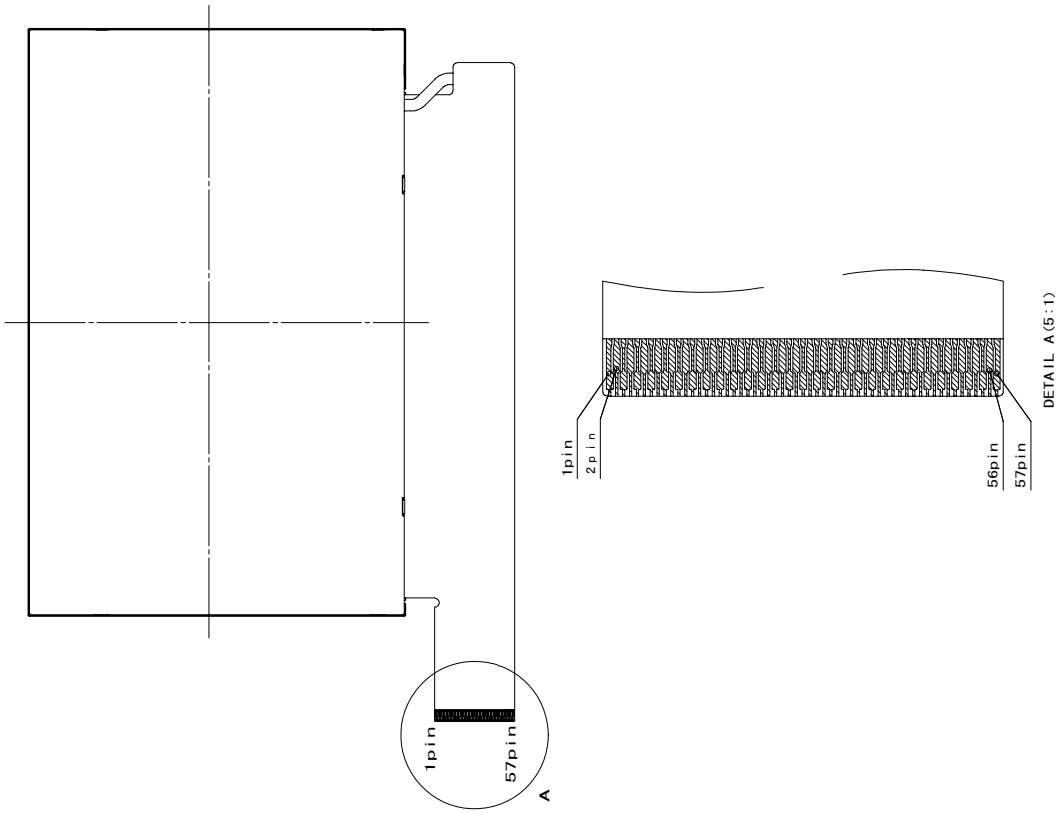


<Outline dimension(w/ TP) Rear>

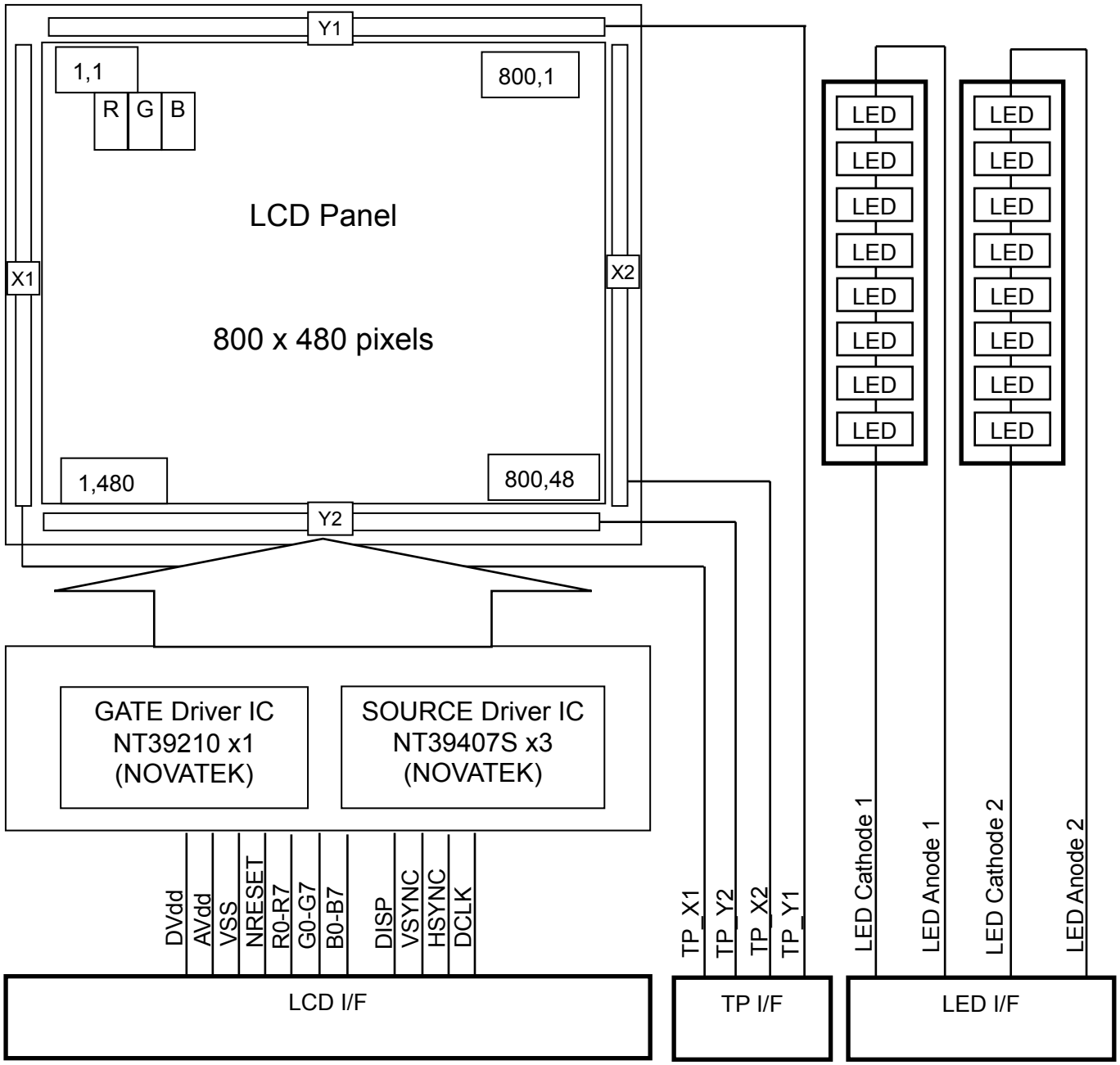
general tolerance: +/-0.5mm

Pin Assignment

No.	Pin Name
1	VSS
2	NRESET
3	DVDD
4	DVDD
5	VSS
6	VSS
7	VSS
8	VSS
9	AVDD
10	AVDD
11	AVDD
12	AVDD
13	VSS
14	DISP
15	HSYNC
16	VSYNC
17	VSS
18	DCLK
19	VSS
20	B7
21	B6
22	B5
23	B4
24	B3
25	B2
26	B1
27	B0
28	VSS
29	G7
30	G6
31	G5
32	G4
33	G3
34	G2
35	G1
36	G0
37	VSS
38	R7
39	R6
40	R5
41	R4
42	R3
43	R2
44	R1
45	R0
46	VSS
47	TP_Y1
48	TP_X2
49	TP_Y2
50	TP_X1
51	LED_K2
52	LED_K1
53	NC
54	NC
55	LED_A1
56	LED_A2
57	NC



<Block diagram>



<Table of Pin Assignment (RGB I/F)>

No.	Symbol	I/O	Signal	No.	Symbol	I/O	Signal
1	Vss	—		29	G7	I	(MSB)
2	NRESET[1)]	I	Reset	30	G6	I	
3	DVdd	—	Logic power source	31	G5	I	
4	DVdd	—	Logic power source	32	G4	I	Display data Signal(green) [2),3)]
5	Vss	—		33	G3	I	
6	Vss	—		34	G2	I	
7	Vss	—		35	G1	I	
8	Vss	—		36	G0	I	(LSB)
9	Avdd	—	Analog power sources	37	Vss	—	
10	Avdd	—	Analog power sources	38	R7	I	(MSB)
11	Avdd	—	Analog power sources	39	R6	I	
12	Avdd	—	Analog power sources	40	R5	I	
13	Vss	—		41	R4	I	Display data signal(red) [2),3)]
14	DISP	I	Display On/Off	42	R3	I	
15	HSYNC	I	Horizontal Sync.	43	R2	I	
16	VSYNC	I	Vertical Sync.	44	R1	I	
17	Vss	—		45	R0	I	(LSB)
18	DCLK	I	Dot clock	46	Vss	—	
19	Vss	—		47	TP_Y1	I	
20	B7	I	(MSB)	48	TP_X2	—	
21	B6	I		49	TP_Y2	—	
22	B5	I		50	TP_X1	—	
23	B4	I	Display data signal(blue)[2),3)]	51	LED_K2	—	Cathode 2 for B/L
24	B3	I		52	LED_K1	—	Cathode 1 for B/L
25	B2	I		53	NC	—	
26	B1	I		54	NC	—	
27	B0	I	(LSB)	55	LED_A1	—	Anode 1 for B/L
28	Vss	—		56	LED_A2	—	Anode 2 for B/L
				57	NC	—	

Note 1) Please put NRESET when you power on.(Please refer to the chapter of 2.6.1 Power On/Off sequence).

Note 2) All data 0 becomes a black display. (All data 1 becomes a white display.)

Note 3) 18 bit:Please connect R1 with R7 and R0 with R6 for Red. As for Green and Blue, it is similar.
16 bit:Please connect R2 with R7, R1 with R6 and R0 with R5 for Red. As for Blue, it is similar.
And please connect G1 with G7 and G0 with G6 for Green

<Mating Connector>

FH26-57S-0.3SHW(05)　(HRS)

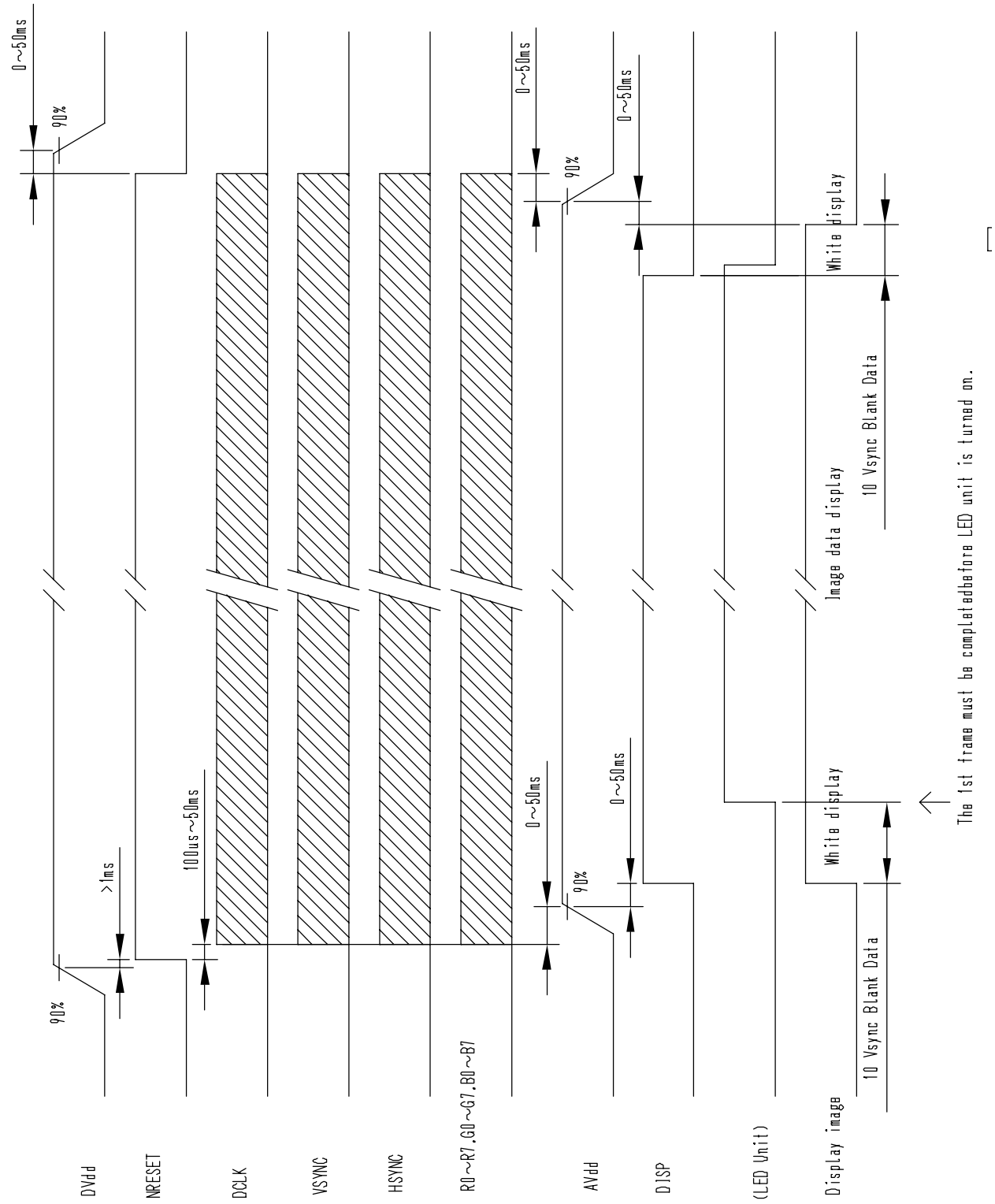
<Command/AC Timing>

Detail technical information of “command/data”, or “AC timing” can be available with following documents:
-IC specification of source driver IC with TCON　: NT39407S (by NOVATEK)
-IC specification of gate driver IC Built-in DC/DC : NT39210 (by NOVATEK)

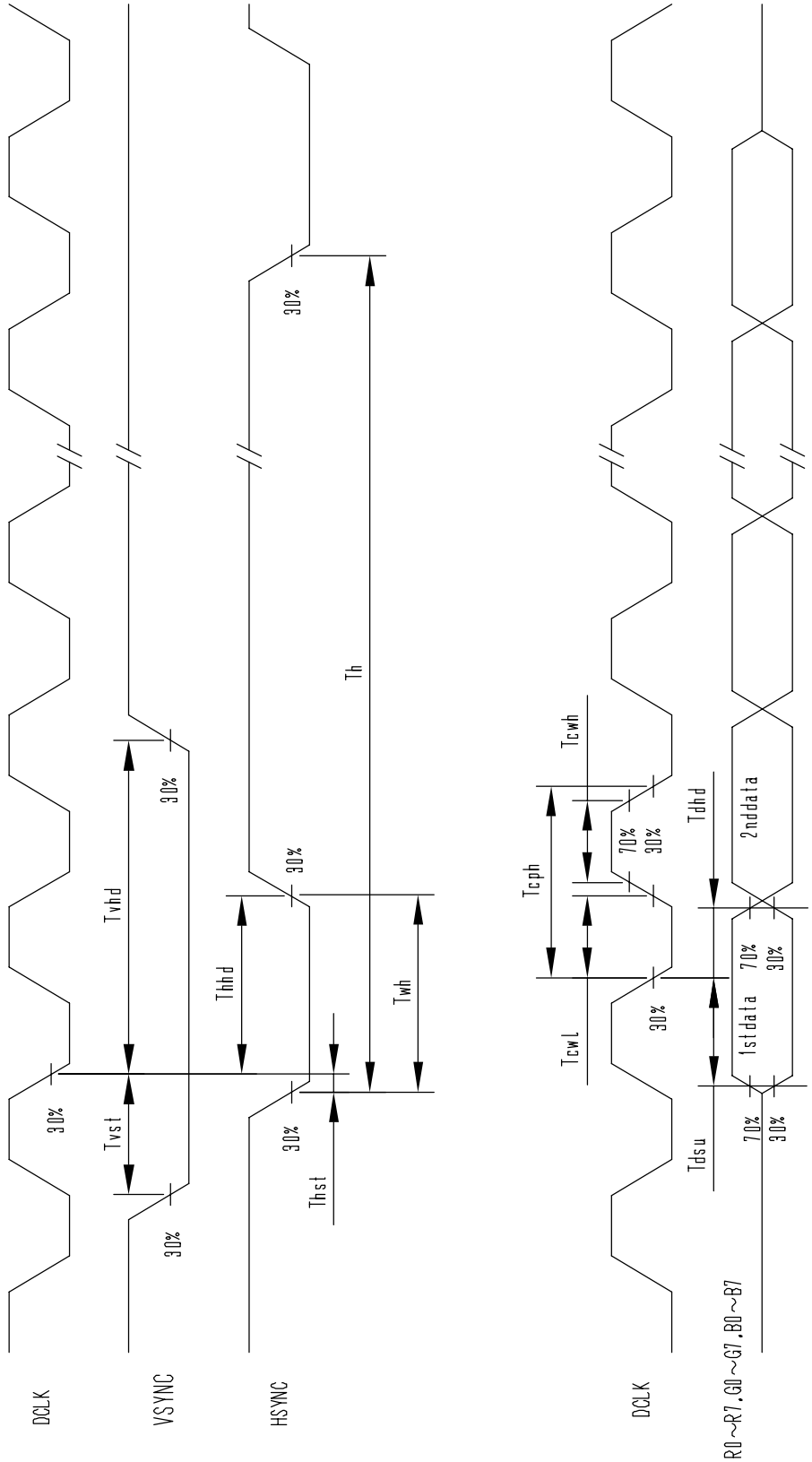
AC Specification

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
DCLK cycle time	Tcph		29.9		ns	
DCLK pulse width high	Tcwh	12			ns	
DCLK pulse width low	Tcwl	12			ns	
Vsync setup time	Tvst	12			ns	
Vsync hold time	Tvhd	12			ns	
Hsync setup time	Thst	12			ns	
Hsync hold time	Thhd	12			ns	
Data setup time	Tdsu	4			ns	
Data hold time	Tdhd	2			ns	
Time that Hsync width	Twh		20		Tcph	
Time that Vsync width	Twv		1		Th	
Hsync period time	Th		1056		Tcph	
Time that Hsync to 1st data	Thsd		89		Tcph	
Time that Vsync to 1st data	Tstv		33		Th	

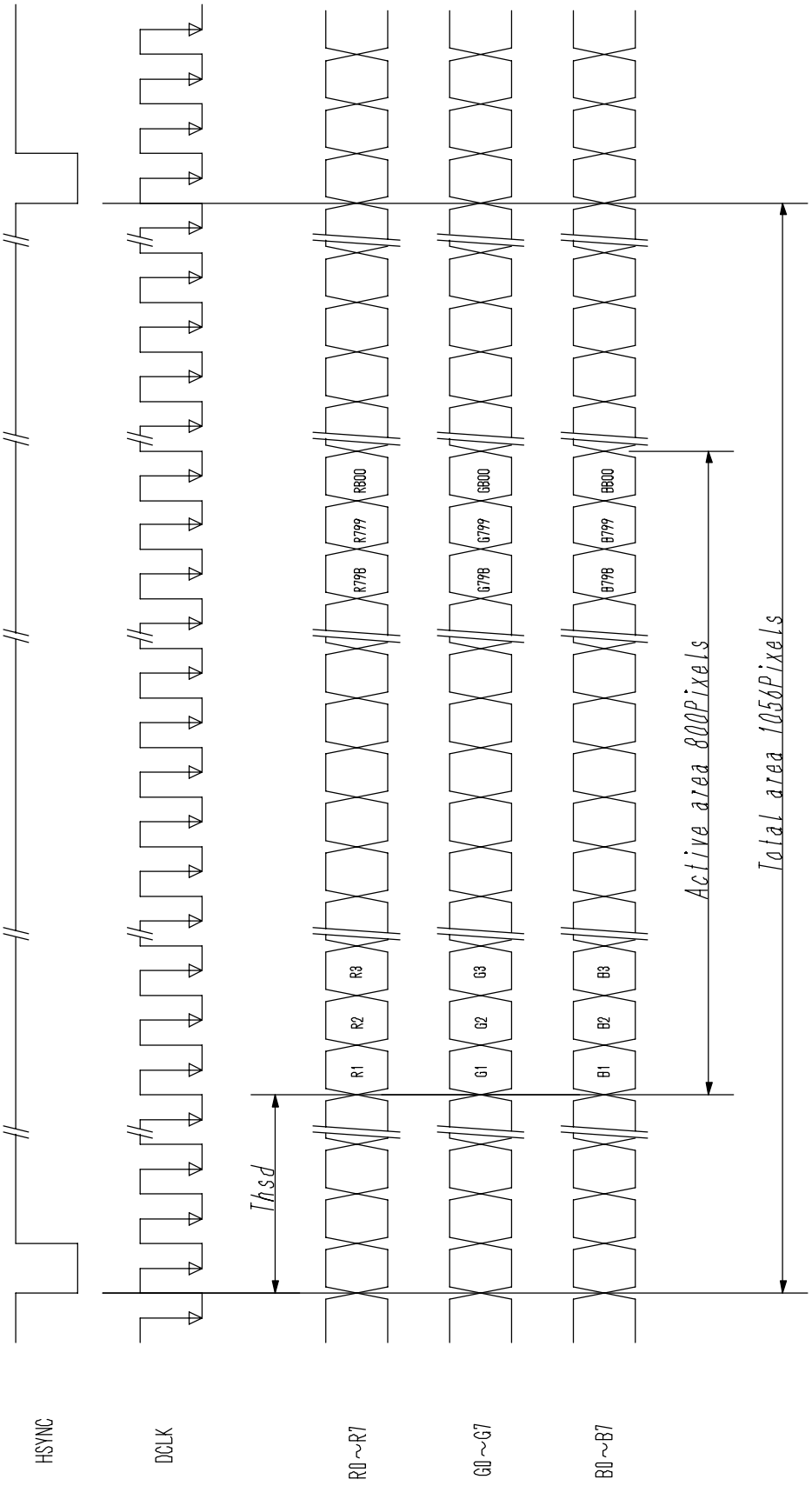
1. Power On/Off sequence



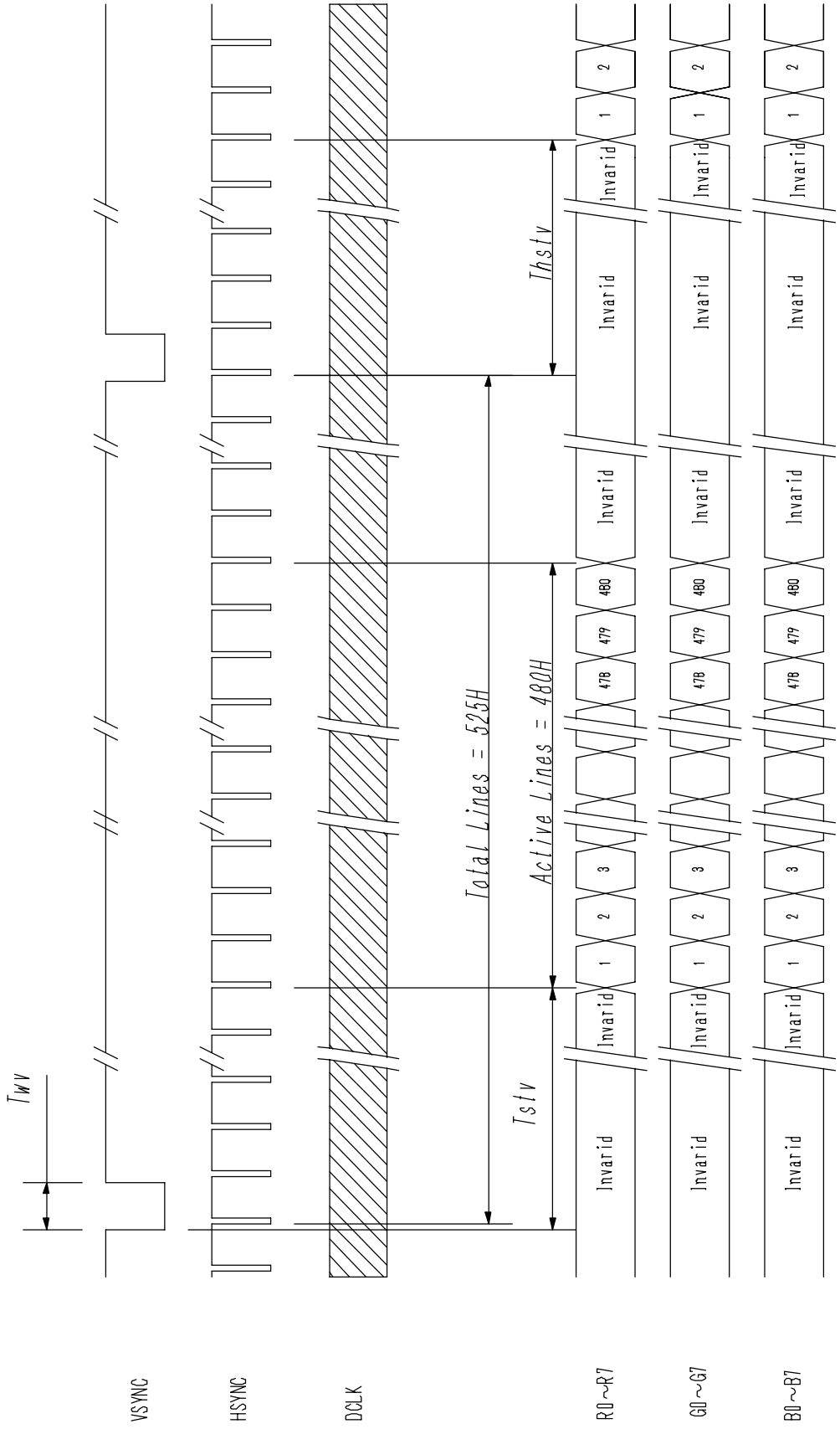
2. Timing of Input



3. Data format (Horizontal: Fclk=33.5MHz)



4. Data format(Vertical:Fclk=33.5MHz)



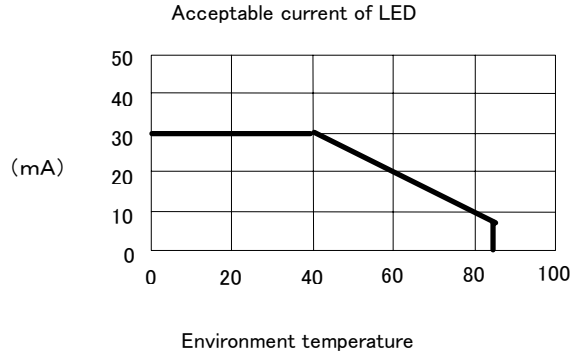
< LED specification>

Detail technical information of Luminous intensity and color coordinates can be available with following documents:

-Specification for TOYODA GOSEI chip type white LED

Model :E1S62-YW0S7-07(TOYODA GOSEI)

About the method of driving LED, please consider the content of specifications of LED and LED-Dr enough.



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 MATSUSHITA DISPLAY TECHNOLOGY CO.,LTD. LCD MODULES".
Refer to individual specifications and TECHNICAL DATA sheets (hereinafter called "TD") for more detailed technical information.

⚠ Warning

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 they have not been designed for operation in extreme environments, they must never be used in devices that will be exposed to temperatures above 50 degrees Celsius or below 0 degrees Celsius, to X-ray or Gamma-ray radiation, or to abnormally high levels of vibration or shock which exceed Toshiba Matsushita Display Technology's specification limits.

c) In addition, since Toshiba Matsushita Display Technology's Standard LCD modules have not been designed for use in applications where performance failures could be life-threatening of 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.

⚠ Caution

∗ 1) DISASSEMBLING OR MODIFICATION

DO NOT DISASSEMBLE OR MODIFY the modules.
Sensitive parts inside LCD module may be damaged, and dusts or scratches may mar the displays. Toshiba Matsushita Display Technology does not warrant the modules, if customer disassembled or modified them.

∗ 2) BREAKAGE OF LCD PANEL

DO NOT INGEST liquid crystal material, DO NOT INHALE this material, and DO NOT PERMIT this material to contact the skin, if glass of LCD panel is broken. If liquid crystal material contacts the skin, mouth or clothing, take the following actions immediately. In case contact to the eye or mouth, rinse with large amount of running water for more than 15 minutes. In case contact to the skin or clothing, wipe it off immediately and wash with soap and large amount of running water for more than 15 minutes. The skin or closing may be damaged if liquid crystal material is left adhered. In case ingestion, rinse out the mouth well with water. After spewing up by drinking large amount of water, get medical treatment.

∗ 3) GLASS OF LCD PANEL

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

4) ABSOLUTE MAXIMUM RATINGS

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.

5) POWER PROTECTION CIRCUIT

Employ protection circuit for power supply, whenever the specification specifies it. A suitable protection circuit should be applied, based on each system design. A fuse is not fitted to this module. Therefore, without a suitable power-supply protection device, dust or partial circuit failure may cause overheating and/or burning , which may lead to injury.

6) DISPOSAL

Always comply with all applicable environmental regulations, when disposing of the LCD.

7) EDGES OF PARTS

Be careful with edges of glass parts, it may cause injuring.

Be careful with handling the metal flame (bezel) of a module identically. Even though burr disposal treatment is performed

For designing the system, give special consideration that the wiring and parts do not touch those edges.

8)RECOMMENDED OPERATING CONDITIONS

Don't exceed “the recommended operation conditions” in this specification. (The LCD module should be used within “the recommended operation conditions”.)

The performance and quality of the LCD module are warranted only when the LCD module is used within “the recommended operation conditions”. Toshiba Matsushita Display Technology never warrants the performance and quality of the LCD module when you use the LCD module over “the recommended operation conditions”, although within “the absolute maximum rating”.

To use the LCD module over “the recommended operation conditions” may have bad influence on the characteristics and reliability of the LCD module and may shorten the life of the LCD module.

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.