Technical Document

LCD Specification

LCD Group

LS028B7UX01 LCD Module

Product Specification
June 2007

Transflective 240 × 400 portrait-mode LCD Module featuring high integration and wide viewing angles. Full Specifications Listing.

SHARP

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DEVICE SPECIFICATION FOR

CG-Silicon TFT-LCD module

MODEL No. **LS028B7UX01**

CUSTOMER'S APPROVAL

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(1) Application

This literature applies to LS028B7UX01.

(2) Overview

This module is a color transflective and active matrix LCD module incorporating CG silicon TFT (Thin Film Transistor), named mASV-TFT(mobile-ASV TFT). It is composed of a color TFT-LCD panel, a driver IC, a FPC, a back light and a back sealed casing.

Graphics and texts can be displayed on a 240×3×400 dots panel with 262,144 colors by supplying.

(3) General specifications

Table 1

Parameter	Specifications	Remarks
Screen size (Diagonal)	2.75” Diagonal	inch
Pixel format	240(H)×400(V) (1 pixel = R+G+B dots)	
Pixel pitch	0.050（H）×0.150（V）	
Top Polarizer	3H Hardcoat	
Interface	8/16 bit CPU bus	
Display active area	36.00(H)×60.00(V) mm	
Unit outline dimension	41.8(W)×70.5(H)×2.3 (D)	【Note3-1】
Mass	10 grams	(TYP.)

【Note 3-1】

Excluding protrusion. For detailed measurements and tolerances, please refer to Fig. 1.

(4)Absolute Maximum Ratings

Table 2 Ta=25℃

Parameter	Symbol	Condition	Ratings	Unit	Remark
Supply voltage for LCD	VDD	—	-0.5～+6.0	V	VDD≧ VDDIO
Supply voltage for Logic	VDDIO	—	-0.5～+6.0	V	
Input voltage (Digital)	V_{IN}	—	-0.5～VDDIO+0.5	V	【Note4-1】
LED Power dissipation	$P_{D\ LED}$	—	123	mW	【Note4-2】
LED current	I_L	—	30	mA	
Operating temperature (panel surface)	Top	—	-10～60	℃	【Note4-3】
Storage temperature	Tstg	—	-30～70	℃	

【Note4-1】 Applies to RESET,RS,CS,/WR,/RD,D0～D15

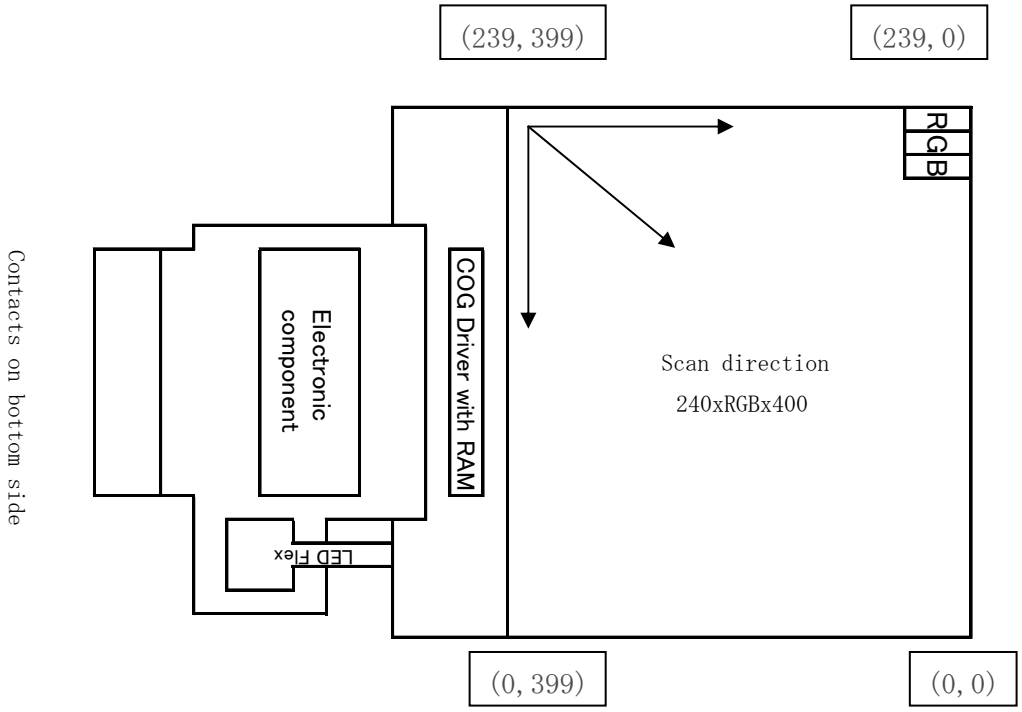
【Note4-2】 Specification for LED per 1pcs

【Note4-3】 Humidity: 95%RH Max.

(at Ta ≦ 40℃).Maximum wet-bulb temperature is less than 39℃

(at Ta ＞ 40℃). Condensation of dew must be avoided.

(5)Pixel and polarization configuration



(6)Input/Output terminal

6-1)TFT-LCD panel driving section

Table3

Pin No.	Symbol	I/O	Description	Remarks
1	VDDIO	-	Logic I/O power supply	-
2	VPP	-	Open or VDDIO	-
3	VDD	-	LCD power supply	-
4	BWS0	I	BWS0=L :16bit, BWS0=H :8bit	-
5	RESET	I	Reset signal input	“L” active
6	VSYNCO	O	Indicates start of frame	
7	VSS	-	GND	
8	CS	I	Chip select input	“L” active
9	RS	I	Register select input	-
10	/RD	I	Read control input	“L” active
11	/WR	I	Write control input	“L” active
12	VSS	-	GND	-
13	D0	I/O	Data bus(LSB)	-
14	D1	I/O	Data bus	-
15	D2	I/O	Data bus	-
16	D3	I/O	Data bus	-
17	D4	I/O	Data bus	-
18	D5	I/O	Data bus	-
19	D6	I/O	Data bus	-
20	D7	I/O	Data bus	-
21	VSS	-	GND	-
22	D8	I/O	Data bus　If 8bit-I/F is used, connect to GND level.	-
23	D9	I/O	Data bus　If 8bit-I/F is used, connect to GND level.	-
24	D10	I/O	Data bus　If 8bit-I/F is used, connect to GND level.	-
25	D11	I/O	Data bus　If 8bit-I/F is used, connect to GND level.	-
26	D12	I/O	Data bus　If 8bit-I/F is used, connect to GND level.	-
27	D13	I/O	Data bus　If 8bit-I/F is used, connect to GND level.	-
28	D14	I/O	Data bus　If 8bit-I/F is used, connect to GND level.	-
29	D15	I/O	Data bus(MSB)　If 8bit-I/F is used, connect to GND level.	-
30	VSS	-	GND	-
31	LED_AN	-	LED Anode	-
32	LED_CA	-	LED Cathode	-

Used connetion: 0.5mm pitch FPC connector

Correspondable connector: 32FLH-SM1-TB(JST)

(7)Color Input Reference & Data Transfer

Colors & Gray Scale	Gray scale Levels	Data Signal																	
		R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Black	--	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue	--	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
Green	--	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Cyan	--	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
Red	--	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Magenta	--	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
Yellow	--	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
White	--	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⇑ Darker	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⇑	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⇑	↓				↓					↓						↓			
⇓	↓				↓					↓						↓			
⇓ Brighter	GS61	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
⇓	GS62	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Red	GS63	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⇑ Darker	GS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
⇑	GS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
⇑	↓				↓					↓						↓			
⇓	↓				↓					↓						↓			
⇓ Brighter	GS61	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
⇓	GS62	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
Green	GS63	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
⇑ Darker	GS1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
⇑	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
⇑	↓				↓					↓						↓			
⇓	↓				↓					↓						↓			
⇓ Brighter	GS61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
⇓	GS62	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
Blue	GS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

SRAM Data and 8-bit+8-bit 2 times transfer

CPU bus data																	
1st 8bit									2nd 8-bit								
D7	D6	D5	D4	D3	-	D2	D1	D0	D7	D6	D5	D4	D3	D2	D1	D0	-
RAM data																	
D17	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0
RDATA						GDATA						BDATA					
1 pixel																	

*Disply RAM data D12 and D0 are complemented by CPU bus data DB7 of the first transfer and DB4 of the second transfer.

(8)Electrical characteristics

8-1)Recommended operating conditions

A) TFT-LCD panel driving section

Table 4 VSS=0V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Applicable Pin
Supply voltage for LCD	VDD-VSS	Ta=-10～60 °C	2.8	3.3	3.35	V	VDD
Supply voltage for Logic	VDDIO-VSS		1.6	3.3	3.35	V	VDDIO 【Note8-1】
Input leakage current	I_{LI}	Ta=-10～60 °C V_{IN}= VSS or VDDIO	-	-	10	μA	【Note8-2】
”H” level input voltage	V_{IH}	Ta=-10～60 °C	$0.8V_{DDIO}$	-	-	V	
”L” level input voltage	V_{IL}		-	-	$0.2V_{DDIO}$	V	
”H” level output voltage	V_{OH}	Ta=-10～60 °C	$0.8V_{DDIO}$	-	-	V	【Note8-3】
”L” level output voltage	V_{OL}	I_{OH}=-1 00 μA , I_{OL}= 1 00 μA	-	-	$0.2V_{DDIO}$	V	

【Note8-1】 $V_{DD} \geqq V_{DDIO}$

【Note8-2】 Input mode of D0～D15pins, RESET, RS, /RD, /WR, CS

【Note8-3】 Output mode of D0～D15 pins,VSYNCO

B) Back light driving section

Table 5 Ta=25 ℃

Parameter	Symbol	MIN	TYP	MAX	Units	Remarks terminal
LED voltage	V_{L1}-V_{L2}	－	16	17.5	V	
LED current	I_L	－	20	25	mA	
Power consumption	W_L	－	320	350	mW	【Note 8-4】

【Note 8-4】Measurement Conditions

4V applied to 5 LED’s in series.

Calculated reference value($I_{L(TYP)} \times (V_{L1} - V_{L2})$)

8-2)Power consumption

Table 6 Ta=25 °C

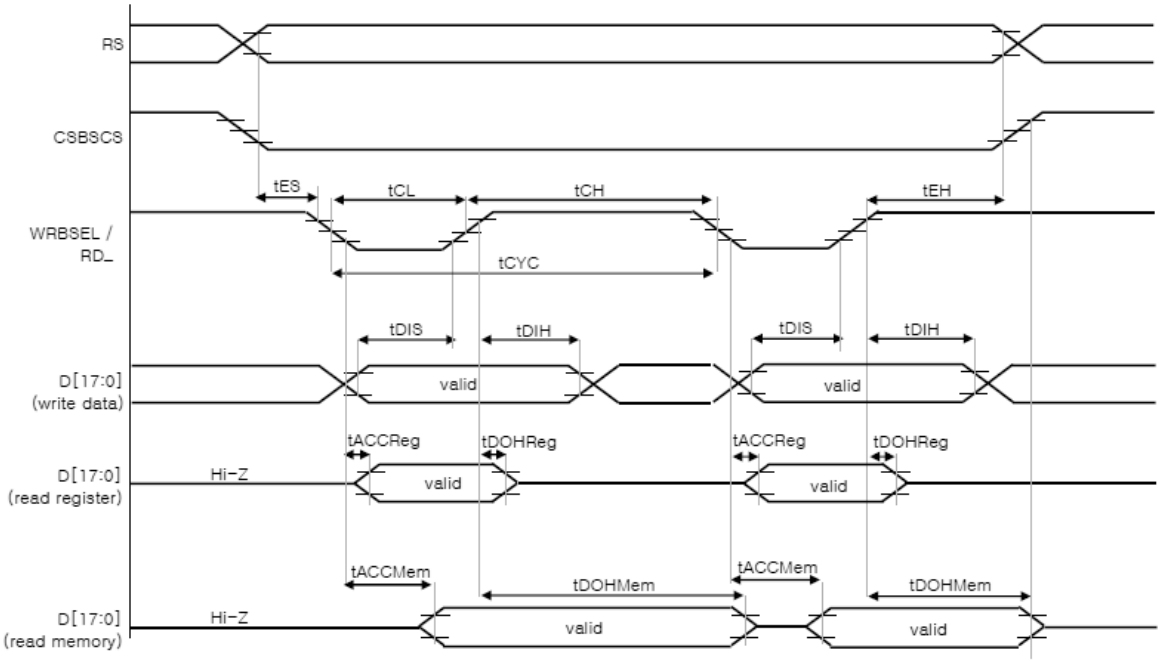
Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit	Remarks
Power consumption, Panel	P_{LCD}	VDD=3.3V VDDIO=3.3V VSS=0V	-	33	46.2	mW	【Note 8-5】
Power consumption, Standby	P_{ST}		-	-	200	μ W	【Note 8-6】

【Note 8-5】Measurement Conditions
frame frequency= 60 Hz
262k-color mode
All white pattern
No Host CPU access

【Note 8-6】Measurement Conditions
Standby mode（Oscillasion OFF/ Display OFF）
No Host CPU access
VDD & VDDIO present; RESET,/RD,/WR,CS are high, VPP=N.C.

8-3) Timing diagrams of input signals(80-family MPU access)

a)Write/Read timing

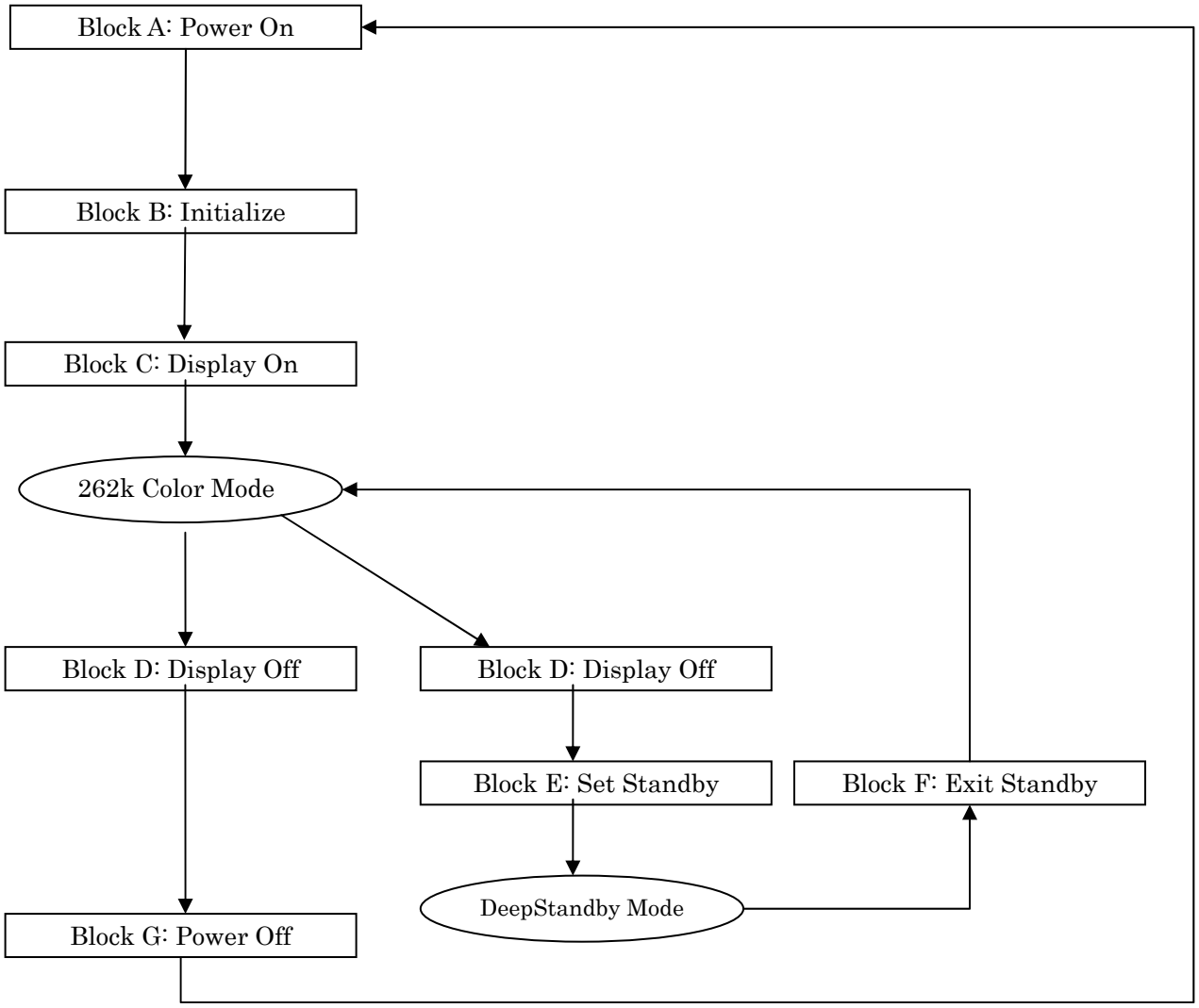


The read or write operation starts when both of the /CS and /WR(/RD) are low.
(TA=25℃, DGND=AGND=0V, VDDC=VDDIO=Recommended Operating Conditions)

Item	記号	condition		MIN	TYP	MAX	unit
enable Setup Time	tES	CSBCS,RS		40			nS
enable Hold Time	tEH	CSBCS,RS		40			nS
Clock Cycle Period	tCYC	Write Register		80			nS
		Write Memory		110			nS
		Read Register	VDDIO>=2.2V	125			nS
		CL=10pF	VDDIO<2.2V	160			nS
		Read Register	VDDIO>=2.2V	180			nS
		CL=30pF	VDDIO<2.2V	240			nS
		Read Memory	VDDIO>=2.2V	225			nS
		CL=10pF	VDDIO<2.2V	240			nS
		Read Memory	VDDIO>=2.2V	255			nS
		CL=30pF	VDDIO<2.2V	300			nS
Clock Low Width	tCL	Write Register/Memory		40			nS
		Read Register	VDDIO>=2.2V	85			nS
		CL=10pF	VDDIO<2.2V	120			nS
		Read Register	VDDIO>=2.2V	140			nS
		CL=30pF	VDDIO<2.2V	200			nS
		Read Memory	VDDIO>=2.2V	155			nS
		CL=10pF	VDDIO<2.2V	170			nS
		Read Memory	VDDIO>=2.2V	185			nS
		CL=30pF	VDDIO<2.2V	230			nS
Clock High Width	tCH	Write/Read Register		40			nS
		Write/Read Memory		70			nS
Write Data Setup Time	tDIS	D0-D17		40			nS
Write Data Hold Time	tDIH	D0-D17		30			nS
Register Access Delay	tACCReg	D0-D17	VDDIO>=2.2V			75	nS
		CL=10pF	VDDIO<2.2V			100	nS
		D0-D17	VDDIO>=2.2V			130	nS
		CL=30pF	VDDIO<2.2V			190	nS
Memory Access Delay	tACCMem	D0-D17	VDDIO>=2.2V			135	nS
		CL=10pF	VDDIO<2.2V			150	nS
		D0-D17	VDDIO>=2.2V			165	nS
		CL=30pF	VDDIO<2.2V			210	nS
Read Data(Register) Hold Time	tDOHReg	D0-D17		10		50	nS
Read Data(Memory) Hold Time	tDOHMem	D0-D17		10		50	nS
Rising/Falling Time	tr,tf	All signals				15	nS

(9)Software Flow & Register Settings

9-1) Software Flow



9-2) Register Settings

Block A: Power On

Step	Register	Setting	Operation
1			RESETB=L
2			VDDIO ON
3			VDD ON
4			Wait 10ms
5			Logic initial state (CSB, WRB, RDB=H)
6			Reset release. (RES = "L" →"H")
7			Wait 0.5ms

Block B: Initialize

Step	Register	Data	Operation
1	01	02	8bit 8/8 transfer
2	68	07	
3	69	40	
4	08	00	Normally black
5	10	F0	Panel X-size=240
6	11	90	Panel Y-size=400
7	12	01	
8	1E	50	Number of vertical line=400
9	1D	07	RAM write direction:landscape
10	1A	EF	RAM pointer X
11	1B	8F	RAM pointer Y
12	1C	01	
13	30	81	Select the display-RAM data
14	33	02	Non-display data color
15	42	07	Vertical front poach=7h
16	43	01	Vertical back poach=1h
17	44	0F	H scan interval=47clock
18	45	08	GSP start position=4clock
19	46	06	GCK start position=6clock
20	48	01	VCOM inversion position=1clock
21	4A	01	Signal setting
22	4B	A8	SSD setting
23	4C	07	ASW start position=7clock
24	5A	00	Battery pull-out detection off
25	62	29	ASW width5, interval 1clock
26	65	02	AMP bias current setting
27	66	05	VGM5.1V
28	6A	02	VCOM output
29	81	44	VR, VS boost clock setting
30	82	15	DCK, DCKB timing setting
31	83	27	DCDC dual, VS5.4V, DCDC drivability=min
32	84	12	VR setting
33	85	26	DCDC dual, VR5.3V, DCDC drivability=min
34	86	17	VS setting
35	90	25	Auto on timing setting
36	91	05	Auto ON/OFF setting(1V)
37	92	15	Auto OFF timing setting
38	31	01	VAL

Block C: Display On

Step	Register	Setting	Operation
1	03		RAM write
2	3E	01	Auto ON sequence
3	Wait 120ms		

Block D: Display Off

Step	Register	Setting	Operation
1	30	80	All black display
2	Wait 50ms		
3	C0	00	
4	3E	02	Auto OFF sequence
5	Wait 100ms		

Block E: Set Standby

Step	Register	Setting	Operation
1	07	00	Sscillator OFF
2	80	01	Deep standby

Block F: Exit Standby

Step	Register	Setting	Operation
1	80	81	Deep standby out
2	Wait 0.1ms		
3	07	01	Oscillator on
4	Wait 1ms		
5	C0	02	
6	Wait 1ms		
7	3E	01	Auto ON sequence
8	Wait 120ms		
9	30	81	Display ON

Block G: Power Off

Step	Register	Setting	Operation
1	RESETB=L		
2	VDD OFF (Analog voltage Off)		
3	VDDIO OFF (IO voltage OFF)		

(10)Optical characteristics

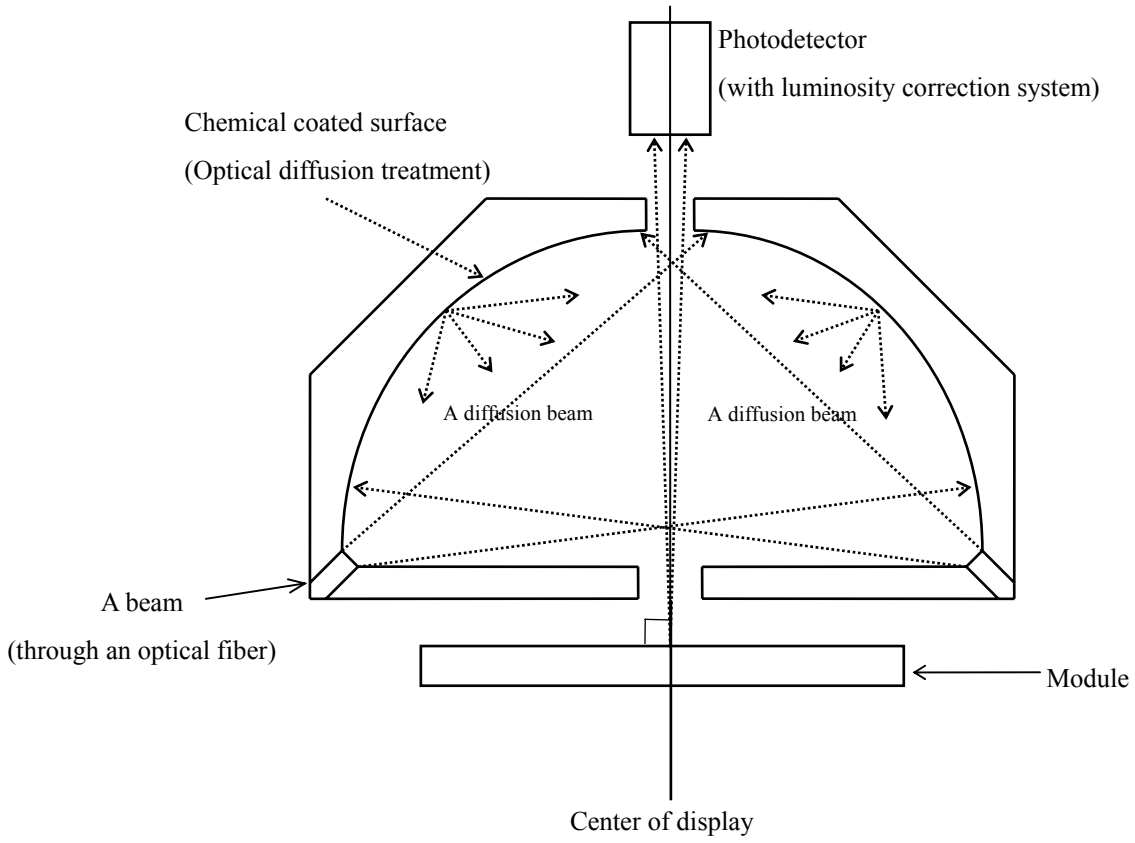
10-1)Not driving the Back light condition

Table 7　　VDD=3.3V、VDDIO=1.8V　　Ta=25℃

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remarks
Viewing angle range		θ21,22	CR≥2	40	50	-	degree	[Note 10-1,2]
		θ11		40	50	-	degree	
		θ12		40	50	-	degree	
Contrast ratio		CR	θ =0°	9	13	-	-	[Note 10-2,3]
Response time	Rise	τ r	θ =0°	-	20	30	ms	[Note 10-4]
	Fall	τ d		-	10	15	ms	
White chromaticity		x	θ =0°	-	0.31	-	-	
		y		-	0.34	-	-	
Reflection ratio		R	θ =0°	1.6	2.5	-	%	[Note 10-5]

* The measuring method of the optical characteristics is shown by the following figure.

* A measurement device is Otsuka luminance meter LCD5200.(With the diffusion reflection unit.)



Measuring method (a) for optical characteristics

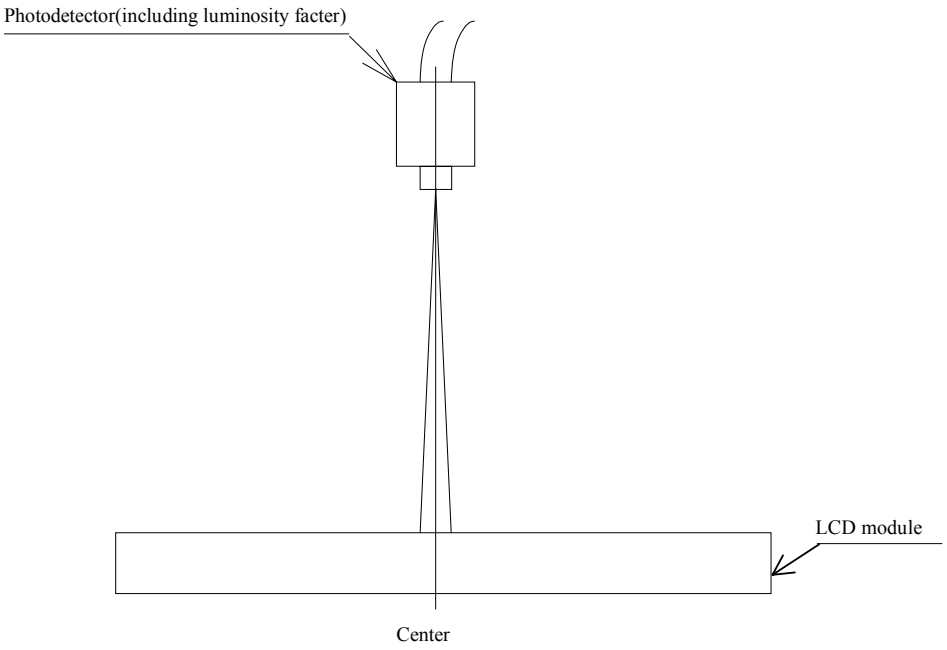
10-2)Driving the Back light condition

Table 8　　VDD=3.0V、VDDIO=1.8V　　Ta=25°C

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Remarks
Viewing angle range		θ11	CR≥5	55	80	-	degree	[Note 10-1,2]
		θ12		55	80	-	degree	
		θ21		55	80	-	degree	
		θ22		55	80		degree	
Contrast ratio		CR	θ = 0°	280	400	-	-	[Note 10-2]
Response time	Rise	τ r	θ = 0°	-	25	35	ms	[Note 10-4]
	Fall	τ d		-	15	20	ms	
White chromaticity		x	θ = 0°	0.25	0.30	0.35	-	
		y		0.27	0.32	0.37	-	
Brightness		Y	θ = 0°	210	300	-	cd/m^2	I_L=20mA
NTSC ratio				-	70	-	%	

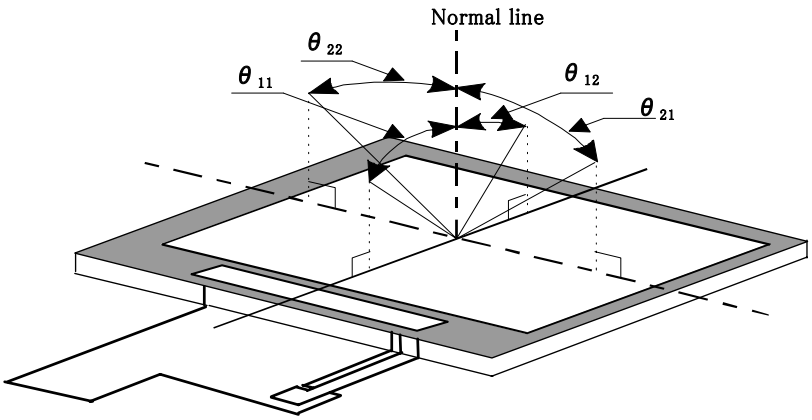
* The measuring method of the optical characteristics is shown by the following figure.

* A measurement device is TOPCON luminance meter SR-3.(Viewing cone 1)



Measuring method (c) for optical characteristics

[Note 10-1] Viewing angle range is defined as follows.



Definition for viewing angle

[Note10-2] Definition of contrast ratio:

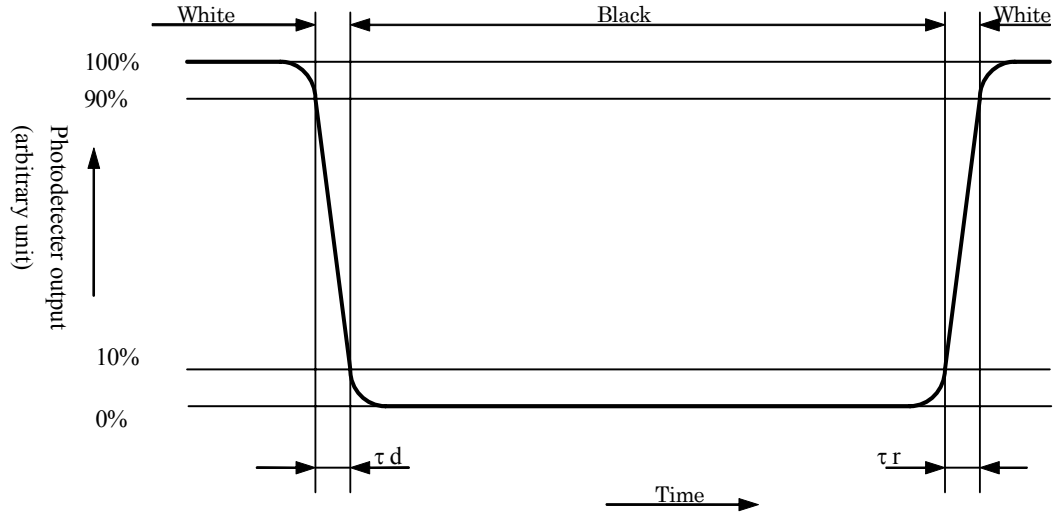
The contrast ratio is defined as follows:

$$\text{Contrast ratio(CR)} = \frac{\text{Photodetecter output with all pixels white(GS63)}}{\text{Photodetecter output with all pixels black(GS0)}}$$

[Note10-3] A measurement device is Minolta CM-2002.

[Note10-4] Definition of response time:

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".



[Note10-5] Definition of reflection ratio

$$\text{Reflection ratio} = \frac{\text{Light detected level of the reflection by the LCD module}}{\text{Light detected level of the reflection by the standard white board}}$$

(11)Display quality

The display quality of the color TFT-LCD module shall be in compliance with the Incoming Inspection Standards for TFT-LCD.

(12)Mechanical characteristics

12-1) External appearance

See Fig. 1

12-2) FPC (for LCD panel) characteristics

(1)Specific connector

32FLH-SM1-TB(JST)

(13)Handling Precautions

13-1) Insertion and taking out of FPCs

Be sure insert and take out of the FPC into the connector of the set after turning off the power supply on the set side.

13-2) Handling of FPCs

The FPC for LCD panel shall be bent only slit portion. The bending slit shall be bent uniformly on the whole slit portion with bending radius larger than 0.6mm ,and only inner side (back side of the module). Don't bend it outer side (display surface side).

Don't give the FPCs too large force, for example, hanging the module with holding FPC.

13-3) Installation of the module

On mounting the module, be sure to fix the module on the same plane. Taking care not to warp or twist the module.

13-4) Precaution when mounting

(1) If water droplets and oil attaches to it for a long time, discoloration and staining occurs. Wipe them off immediately.

(2) Glass is used for the TFT-LCD panel. If it is dropped or bumped against a hard object, it may be broken. Handle it with sufficient care.

(3)As the CMOS IC is used in this module, pay attention to static electricity when handling it. Take a measure for grounding on the human body.

13-5) Others

(1) The liquid-crystal is deteriorated by ultraviolet rays. Do not leave it in direct sunlight and strong ultraviolet rays for many hours.

(2) If it is kept at a temperature below the rated storage temperature, it becomes coagulated and the panel may be broken. Also, if it is kept at a temperature above the rated storage temperature, it becomes isotropic liquid and does not return to its original state. Therefore, it is desirable to keep it at room temperature as much as possible.

(3) If the LCD breaks, don't put internal liquid crystal into the mouth. When the liquid crystal sticks to the hands, feet and clothes, wash it out immediately.

(4) Wipe off water drop or finger grease immediately. Long contact with water may cause discoloration or spots.

(5) Observe general precautions for all electronic components.

(14) Reliability Test Conditions for TFT-LCD Module

Table 9

No.	Test items	Test conditions	
1	Low temperature storage test	Ta=-30℃	240h
2	High temperature storage test	Ta=+70℃	240h
3	Thermal Shock storage test	Ta=-30℃:1h～70℃:1h	50cycles
4	Low temperature operating test	Ta=-10℃	240h
5	High temperature operating test	Ta=+60℃	240h
6	High temperature and high humidity operating test	Ta=+40℃ , 95%RH (But no condensation of dew)	240h
7	Electro static discharge test	±2kV・100pF(1.5kΩ) 1 time for each terminals	
8	Shock test	980 m/s^2, 6 ms ±X,±Y,±Z 3 times for each direction (JIS C0041, A-7 Condition C)	
9	Vibration test	Frequency range: 10Hz～55Hz Stroke: 1.5 mm Sweep: 10Hz～55Hz X,Y,Z 2 hours for each direction (total 6 hours) (JIS C0040,A-10 Condition A)	

【Note】Ta = Ambient temperature

【Check items】Test No.1～9 : In the standard condition, there shall be no practical problems that may affect the display function.

(15) Others

15-1) Indication of lot number

The lot number is printed in the position shown in Fig. 1. (Outline Dimensions).

07E○○○○○○
①② ③

①product year 2007:7, 2008:8

②product month Jan:A, Feb:B, Mar:C, ・・・・・・Oct:J, Nov:K, Dec:L

③serial number

15-2) Used Regulation of Chemical Substances Breaking Ozone Stratum

Substances with the object of regulating : CFCS, Carbon tetrachloride, Halon
1,1,1-Trichloro ethane (Methyl chloroform)

(a) This LCD module, Constructed part and Parts don't contain the above substances.

(b) This LCD module, Constructed part and Parts don't contain the above substances in processes of manufacture.

15-3) If some problems arise about mentioned items in this document and other items, the user of the TFT-LCD module and Sharp will cooperate and make efforts to solve the problems with mutual respect and good will.

(16) Forwarding form

a) Piling number of cartons : 8 deep

b) Package quantity in one cartons : 400(pcs)

c) Carton size : (w) 382×(D) 578×(H) 255 (mm)

d) Total mass of 1 carton filled with full modules : approximately 9.5 (Kg)

Conditions for storage

Environment

(1)Temperature	: 0～40℃
(2)Humidity	: 60%RH or less (at 40℃) No dew condensation at low temperature and high humidity.
(3)Atmosphere	: Harmful gas, such as acid or alkali which bites electronic components and/or wires, must not be detected.
(4)Period	: about 3 months
(5)Opening of the package	: In order to prevent the LCD module from breakdown by electrostatic charges, please control the room humidity over 50%RH and open the package taking sufficient countermeasures against electrostatic charges, such as earth, etc.

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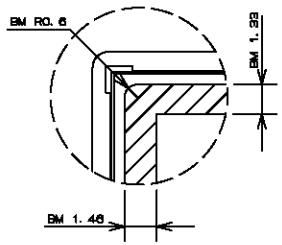

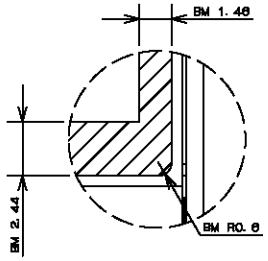

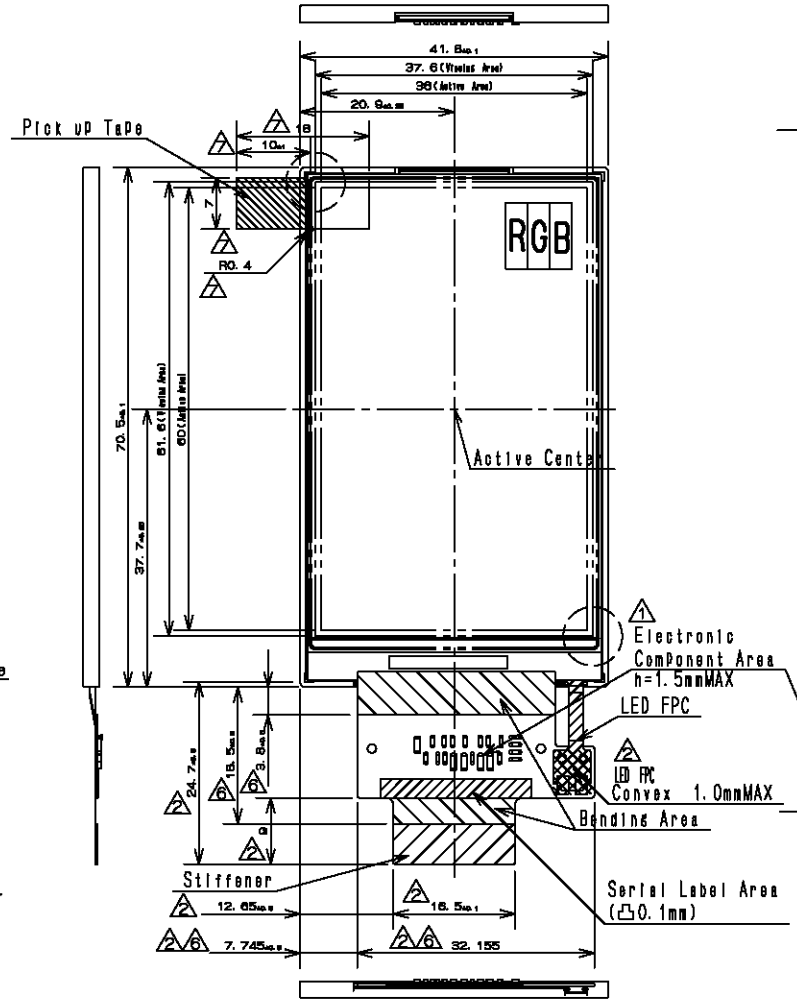

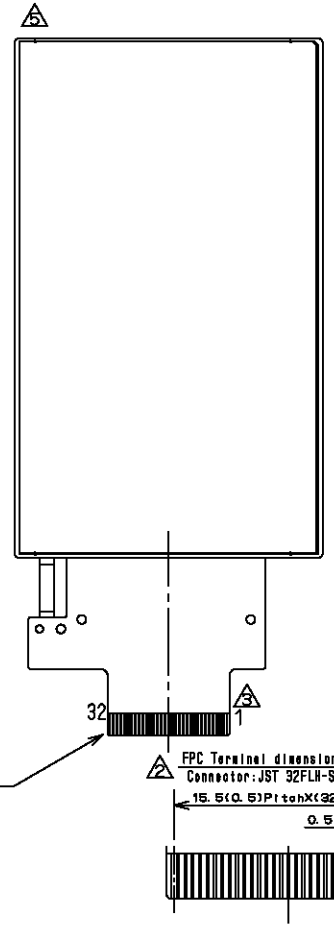

4
- It has to be carefully designed by the user so that user's components have enough clearance from the rear side of the LCD module to avoid them from touching.
- General tolerance is ±0.3
- Guarantee of appearance = Active Area +0.6
- LCD-FPC should bended only bending area.
- LCD/LED-FPC bend larger than 0.6 in radius.
- Any foreign materials and contamination outside the Active Area are to be treated as 'No-Count' at our inspections.
- Take care in set design to hide the scratches and bubbles appeared on the polarizer or other frame area which is located outside of guarantee area.
- The light of Back Light is leaking from BM outside. Please light shielding by the set.
- The tolerance of module width are exclude warp of frame.

NOTE.
The drawing above are tentative as the some parts are currenty being under review. which may be changed in future.

改訂日	改訂記事 REVISION	担当
7 07. 5.11	Addition Pick up Tape	shimizu
6 07. 3.27	It changes the size for the FPC position fixation.	tawasaki
5 07. 2. 7	Module outline change.(changed the frame from of the module back.)	tawasaki
4 07. 2. 2	Module outline change and note addition.	tawasaki
3 07. 1.19	Terminal number addition	tawasaki
2 07. 1.17	Addition terminal dimension. FPC outline dimension.	tawasaki
1 06.12.20	Addition dimensions	tawasaki

設計 DESIGNER	製図 DRAFTER	検図 DSN CK	検図 DSN CK	承認 ENG APPD
Kawasaki				

8インチワイド液晶事業本部
(MB液晶第2(事本))設計C 第7開発部
SHARP CORPORATION
[MOBILE LCD GROUP I] DESIGN CENTER ENGINEERING DEPT. W

ORIGINAL MODEL	LS028B7UX01
画面サイズ他 ACTIVE AREA SIZE . ETC	Dots:240(RGB)×400 Pitch=0.150
尺度 SCALE 1/1	日付 DATE 15/Dec/2006
単位 Unit mm	名称 NAME 2.75° Module Outline dimension
原紙サイズ A4	図番 DRAWING NO LDM-03258F

Fig.1 Outline Dimensions

LCP-2707023-19

Technical Document

LCD Specification

LCD Group

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