

SPECIFICATION



YMSG-G12864PDYSYWN

September 29, 2007
Version 1.01



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1. GENERAL SPECIFICATIONS :

1-1 SCOPE:

This specification covers the delivery requirements for the liquid crystal display delivered by YAoyu TECHNOLOGY to Customer ◦

1-2 PRODUCTS:

Liquid Crystal Display Module (LCM)

1-3 MODULE NAME:

YMSG-G12864PDNSYWN

2. FEATURES :

2-1 MAIN LCD (LARGE)

Item	Standard Value
Display Type	128 * 64 dots
LCD Type	STN, Yellow-Green, Reflective, positive,, Normal TEMP
Driver Condition	LCD Module: 1/65 Duty, 1/9Bias
Viewing Direction	6 O'clock
Backlight Type	WITHOUT B/L
Weight	TBD
Interface	8080 MPU interface
Driver IC	Driver IC: SPLC501C

3. MACHANICAL SPECIFICATIONS :

ITEM	SPECIFICATIONS	UNIT
OUTLINE DIMENSIONS	39.0(L) X41.0(W) X2.8max(H) (Include FPC) 39.0(L) X29.0(W) X 2.8max(H) (Exclude FPC)	mm
VIEWING AREA	36(L) x23.0(W)	mm
ACTIVE AREA	31.98(L) X16.94(W)	mm
DISP.CONSTRUCTION	128*64 dots	---
DOT SIZE	0.22(L) x 0.235(W)	mm
DOT PITCH	0.25(L) x 0.265(W)	mm
ASSY.TYPE	COG	---

WEIGHT	TBD	g
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Note : For detailed information please refer to LCM drawing

4. ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY FOR LOGIC	VDD	Ta=25°C	-0.3	—	4.0	V
POWER SUPPLY FOR LCD DRIVING	Vlcd	Ta=25°C	-12	—	+0.3	V
INPUT VOLTAGE	VIN	Ta=25°C	VSS-0.3	—	VDD+0.3	V
OPERATION TEMPERATURE	TOPR	---	0	—	+50	°C
STORAGE TEMPERATURE	TSTG	---	-20	—	+60	°C
Storage Humidity	H _D	Ta < 40 °C	-		90	%RH

NOTES:

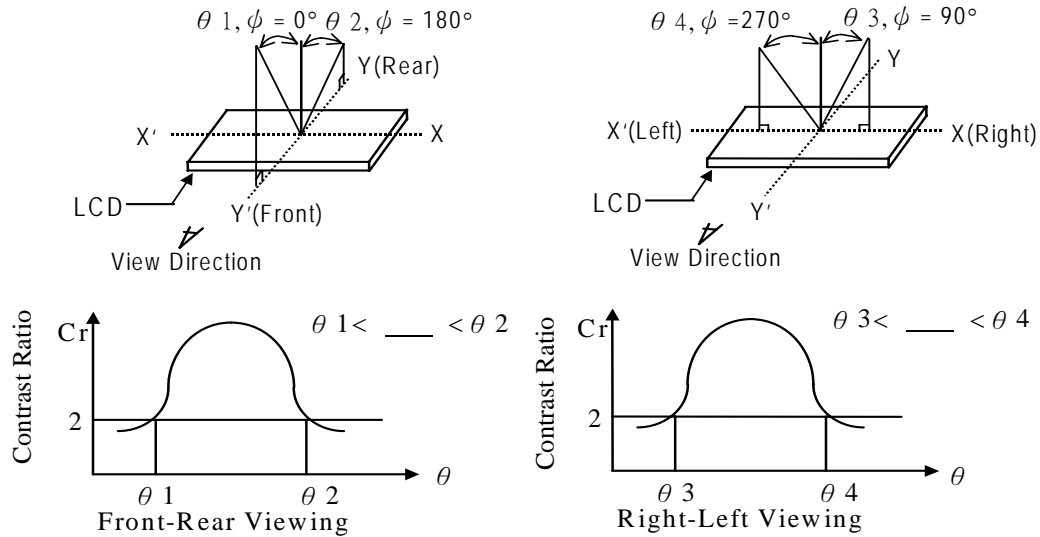
- (1) LCM should be grounded during handling LCM.

5. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY VOLTAGE	VDD—VSS	Ta= +25°C	2.8	3.0	3.2	V
POWER SUPPLY FOR LCD DRIVING	VDD-V0	Ta= +25°C	10.2	10.5	10.8	V
INPUT VOLTAGE "H" LEVEL	VIH	—	0.8VDD	—	VDD	V
INPUT VOLTAGE "L" LEVEL	VIL	—	VSS	—	0.2VDD	V
OUTPUT VOLTAGE "H" LEVEL	VOH	IOH=-0.5mA	0.8VDD	—	VDD	V
OUTPUT VOLTAGE "L" LEVEL	VOL	IOL=0.5mA	VSS	—	0.2VDD	V
Supply Current	I _{DD}	V _{DD} = 3.0 V	-	0.3	0.5	mA
LCM Driver Voltage	V _{OP}	VDD-V0 (-20°C)	-	-	-	V
		VDD-V0 (25°C)	-	10.5	-	
		VDD-V0 (70°C)	-	-	-	

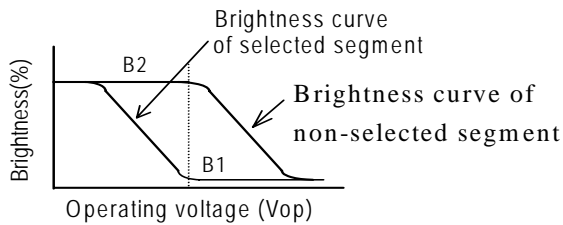
6. OPTICAL CHARACTERISTICS

(1) DEFINITION OF VIEWING ANGLE

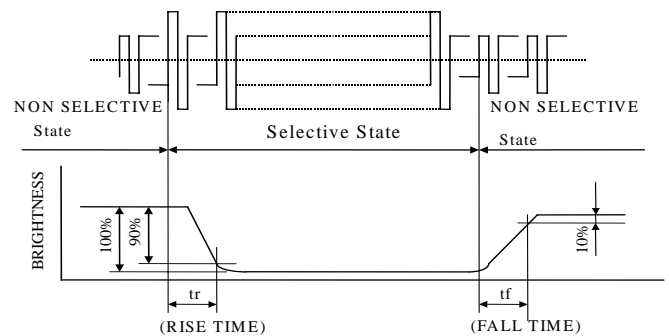


(2) DEFINITION OF CONTRAST

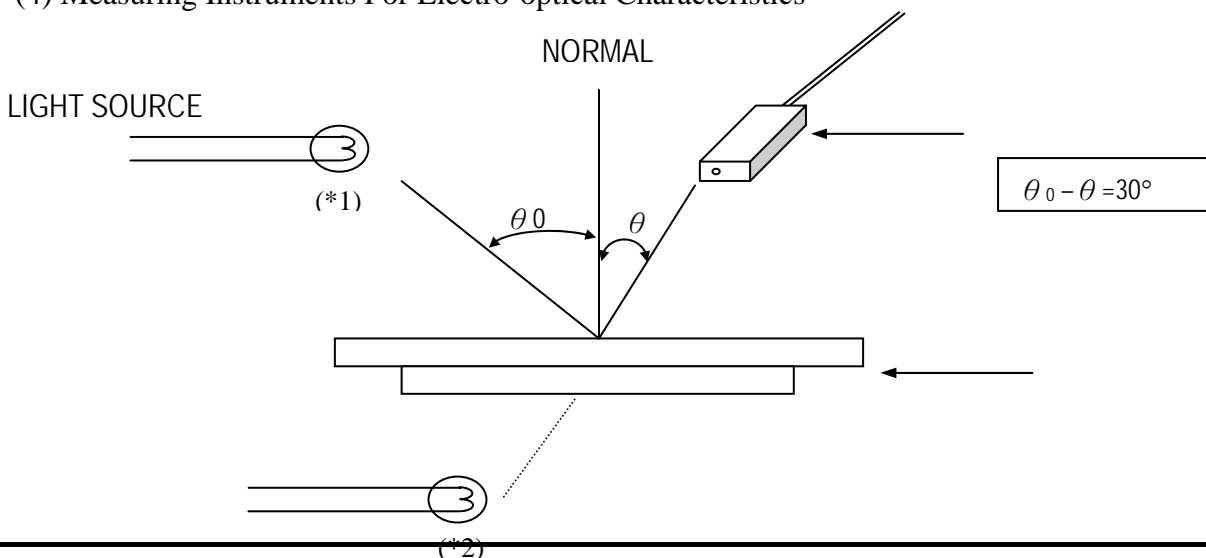
$$C.R = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



(3) DEFINITION OF RESPONSE

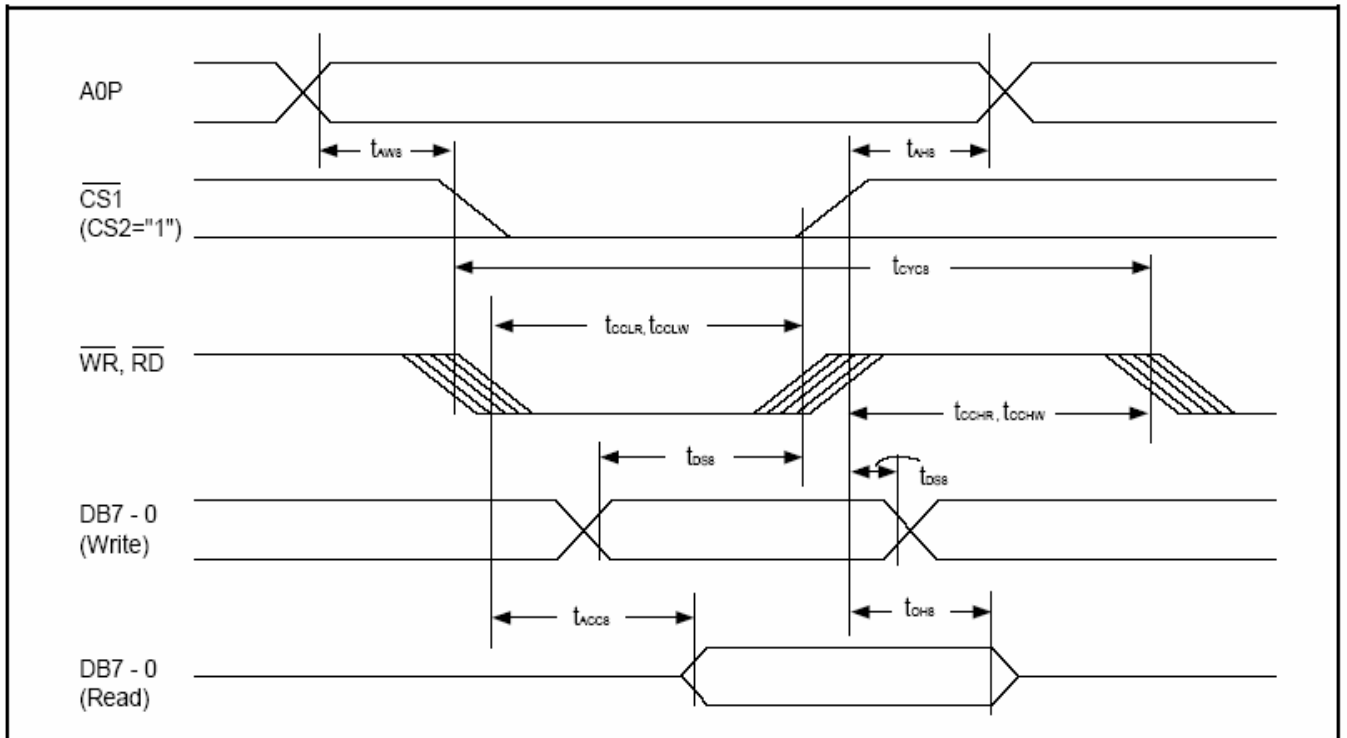


(4) Measuring Instruments For Electro-optical Characteristics





7. TIMING CHARACTERISTICS



(VDD = 2.7V to 4.5V, T_A = 25°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0P	t_{AHS}		0	-	ns
Address setup time	A0P	t_{AWS}		0	-	ns
System cycle time	A0P	t_{CYCS}		300	-	ns
Control L pulse width (\overline{WR})	\overline{WR}	t_{OCLW}		60	-	ns
Control L pulse width (\overline{RD})	\overline{RD}	t_{OCLR}		120	-	ns
Control H pulse width (\overline{WR})	\overline{WR}	t_{OCHW}		60	-	ns
Control H pulse width (\overline{RD})	\overline{RD}	t_{OCHR}		60	-	ns
Data setup time	DB7 - 0	t_{DSS}		40	-	ns
Address hold time		t_{OHS}		15	-	ns
RD access time		t_{ACS}	$C_L = 100pF$	-	140	ns
Output disable time		t_{OHS}		10	100	ns

Note1: The input signal rise time and fall time (t_r , t_f) is specified at 15 ns or less. When the system cycle time is extremely fast, $(t_r + t_f) \leq (t_{CYCS} - t_{COLW} - t_{COHW})$ for $(t_r + t_f) \leq (t_{CYCS} - t_{COLR} - t_{COHR})$ are specified.

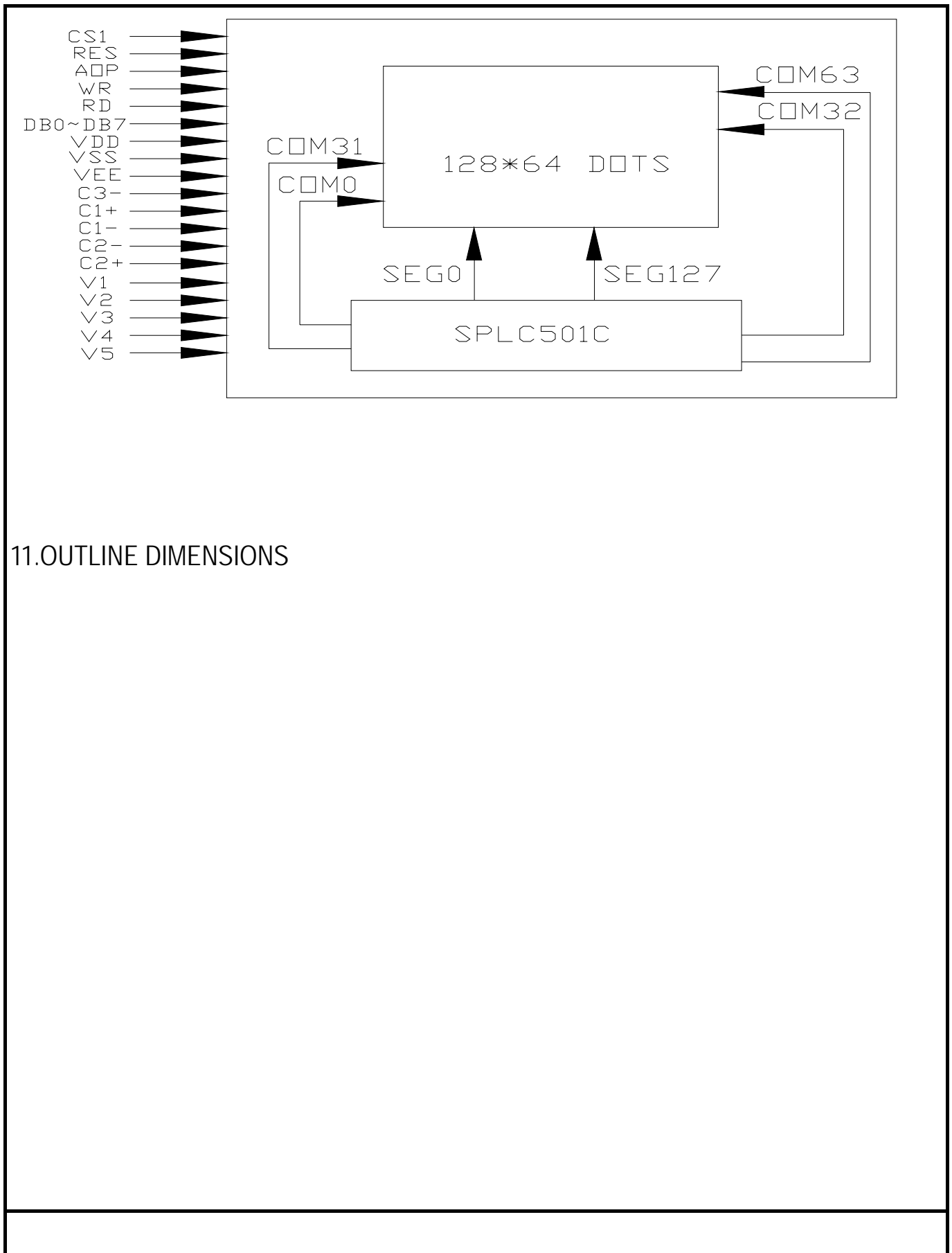
Note2: All timing is specified using 20% and 80% of VDD as the reference.

Note3: t_{COLW} and t_{COLR} are specified as the overlap between CS1 being 'L' (CS2 = 'H') and WR and RD being at the 'L' level.

9. PIN ASSIGNMENT

Pin NO.	Symbol	Input/O utput	Description
1	CS1	I	These pins are the chip select inputs
2	/RES	I	This pin is reset signal input.
3	AOP	I	This pin is Data/Command control pin.
4	WR	I	When connected to an 8080 MPU, this is LOW active.
5	RD	I	When connected to an 8080 MPU, this is LOW active.
6~13	DB0~DB7	I/O	This is an 8-bit bi-directional data bus that connects to an 8-bit or 16-bit standard MPU data bus.
14	VDD	I	LOGIC VOLTAGE SUPPLY
15	VSS	I	POWER GROUD
16	VEE	I	This is the most negative voltage supply pin of the chip.
17	C3-	I	Capacitor 3-pad for Internal DC/DC voltage converter
18	C1+	I	Capacitor 1+pad for Internal DC/DC voltage converter
19	C1-	I	Capacitor 1-pad for Internal DC/DC voltage converter
20	C2-	I	Capacitor 2-pad for Internal DC/DC voltage converter
21	C2+	I	Capacitor 2+pad for Internal DC/DC voltage converter
22~26	V1~V5	I	These are the LCD driving voltage levels. All these levels are referenced to V _{DD} .

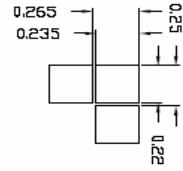
10. BLOCK DIAGRAM



11.OUTLINE DIMENSIONS

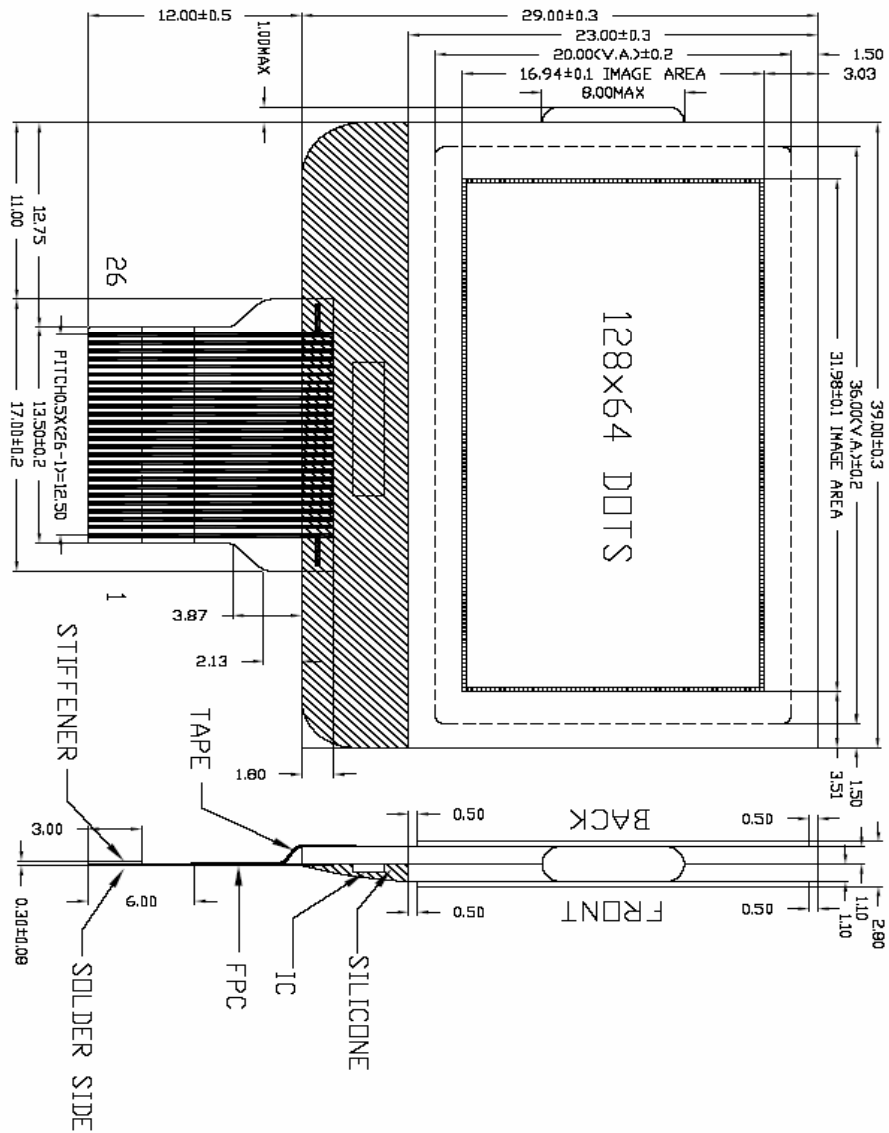


DISPLAY PATTERN



DISPLAY TYPE: STN/YELLOW-GREEN
 POSITIVE
 DISPLAY MODE: REFLECTIVE
 VIEWING DIRECTION: 6:00
 DRIVING METHOD: 1/65 DUTY 1/9 BIAS
 OPERATING VOLTAGE: 10.5V
 OPERATING TEMPERATURE: 0°~50°C
 STORAGE TEMPERATURE: -10°~60°C
 CONTROLLER: SPLC501
 UNMARKED TOLERANCE: ±0.3
 INTERFACE:

1	2	3	4	5	6	7	8	9	10	11	12	13	
VDD	CS1	RES	AOP	RD	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	
VSS	RES	AOP	WR	RD	DB0	DB1	DB2	DB3	DB4	DB5	DB6	DB7	
VOUT	14	15	16	17	18	19	20	21	22	23	24	25	26
C3-													
C1+													
C1-													
C2-													
C2+													
V1													
V2													
V3													
V4													
V5													



DRAWN:	CHECKED:	QA CHECKED:	APPROVED:	LCM NO: SP639-LCM/C	UNITS: mm
				DWG NO: FI-1037-LCM/C	SHEET 1 OF 1



12. ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	CONDITIONS	CRITERION
OPERATING TEMPERATURE	TOPR	0°C ~ +50°C	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
STORAGE TEMPERATURE	TSTG	-20°C ~ +60°C	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
HUMIDITY	—	See Note	WITHOUT CONDENSATION

13. RELIABILITY

13-1 RELIABILITY TEST

ITEM	CONDITIONS	CRITERION
OPERATING TEMPERATURE	HIGH TEMPERATURE +50°C 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERATURE 0°C 240HRS	
STORAGE TEMPERATURE	HIGH TEMPERATURE +60°C 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERATURE - 10°C 240HRS	
HUMIDITY	40°C 90%RH 240HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
VIBRATION	<ul style="list-style-type: none"> • Operating Time: thirty minutes exposure for each direction (X,Y,Z) • Sweep Frequency: 10~55Hz (1 min) • Amplitude: 1.5mm 	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
THERMAL SHOCK	0°C (30mins) ←→50°C (30mins) 10 cycles	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION

*NOTE: TEST CONDITION

(1) TEMPERATURE AND HUMIDITY: IF NO SPECIFICATION, TEMP. SET AT 25±2°C, HUMIDITY SET AT 60±5%RH

(2) OPERATING STATE: SAMPLES SUBJECT TO THE TESTS SHALL BE IN "OPERATING" CONDITION



14. Precaution for Use

The following precautions should be followed, since this module contains precise parts.

- (1) Do not store module for an extended periods of time under the conditions of high temperature and high humidity.
- (2) Avoid using or storing the module in areas that expose it to direct sunlight or ultraviolet rays.
- (3) Use protective finger covers when handling the module to avoid scratching or staining the module.
- (4) Care should be taken not to expose the module to static electricity, because the module contains C-MOS LSI's.
- (5) The LSI is sensitive to light.
The user's product should be designed so that LSI is not exposed to any light during operation.
- (6) During installation, cover the display area with acrylic protection plates to protect the polarizer plate and LCD cells.
- (7) Do not apply any excessive shocks to the module because the module contains sensitive LCD cells.
Do not use a module, which has experienced strong mechanical shock.
- (8) Care should be taken when the power supply turns on as following.
 - (a) Do not apply any input signals before the supplying voltage is applied.
 - (b) Do not turn off the power supply while any input signals are applied.

Caution

- (1) Dangerous. Do not shock glass because glass can break.
- (2) If module breaks, do not touch it directly.
(Glass could stick or cut skin.)
- (3) Do not swallow Liquid Crystal.
(In case of broken LCD panel, do not swallow liquid crystal even if there is no proof that liquid crystal is poisonous.)
- (4) If liquid crystal is exposed to skin, wash the area thoroughly with alcohol or soap.
- (5) When disposing of the product, please observe industrial waste disposal laws in each country and district.
- (6) In case of injury, give immediate treatment and consult with a doctor.
- (7) This product is constructed precisely. Don't disassemble or modify.

※ Neglecting this mark can cause injury to humans and damage to materials