DISPLAY Elektronik GmbH

DATA SHEET

LCD MODULE

DEM 128064H1 SYH-PY

Product Specification ***Version: 1***

28.11.2017

GENERAL SPECIFICATION

MODULE NO. :

DEM 128064H1 SYH-PY

CUSTOMER P/N

Version No.	Change Description	Date
0	Original Version	18.08.2017
1	Update PCB Drawing	28.11.2017

PREPARED BY: HJ DATE: 28.11.2017

APPROVED BY: MH DATE: 28.11.2017

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1. FUNCTIONS & FEATURES

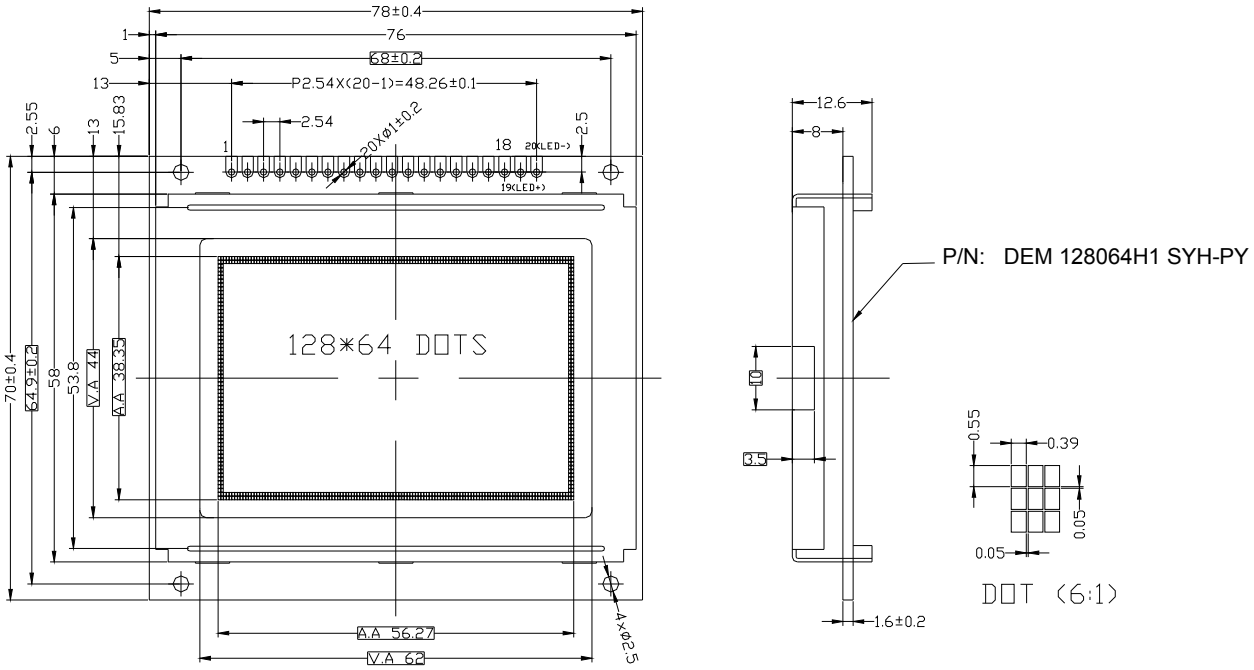
MODULE NAME	LCD Type	Remark
DEM 128064H1 SYH-PY	STN Yellow-Green Transflective Positive Mode	RAM LY6264SL-70LL

- Glass Thickness : 1.1mm
- Viewing Direction : 6 O'clock
- Driving Scheme : 1/64Duty, 1/9 Bias
- Power Supply for logic : 5.0 Volt (typ.)
- Display Format : 128x64 Dots
- V_{LCD} : 12.6 Volt (typ.)

2. MODULE ARTWORK

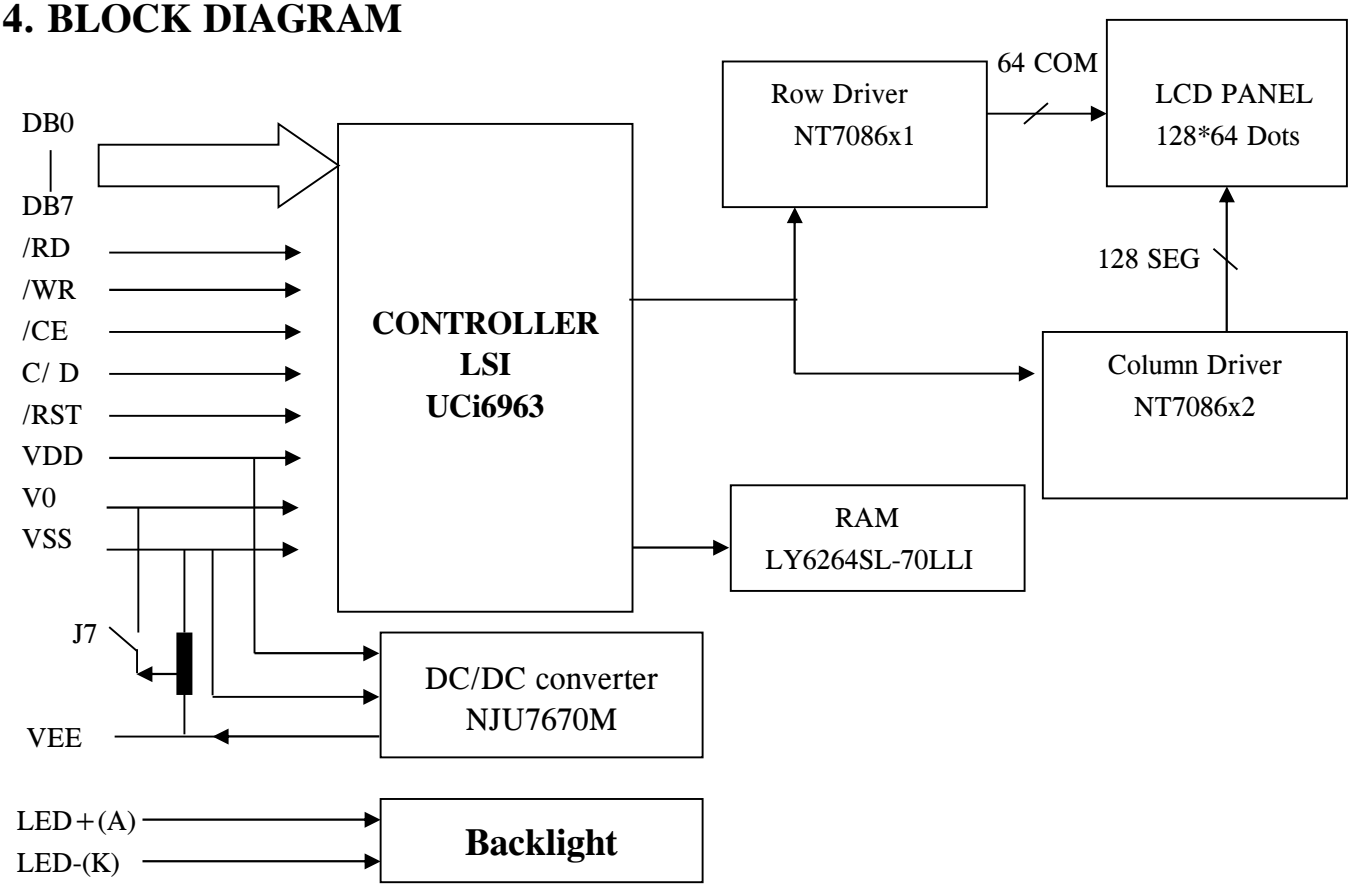
- Module Size : 78.00 x 70.00 x 12.60 mm
- Viewing Area : 62.00 x 44.00 mm
- Active Area : 56.27 x 38.35 mm
- Dot Pitch : 0.44 x 0.60 mm
- Dot Size : 0.39 x 0.55 mm
- Dot Gap : 0.05 mm

3. EXTERNAL DIMENSIONS



REMARKS:
1.UNMARKED TOLERANCE IS ±0.3;
2.ALL MATERIAL COMPLY WITH ROHS.

4. BLOCK DIAGRAM

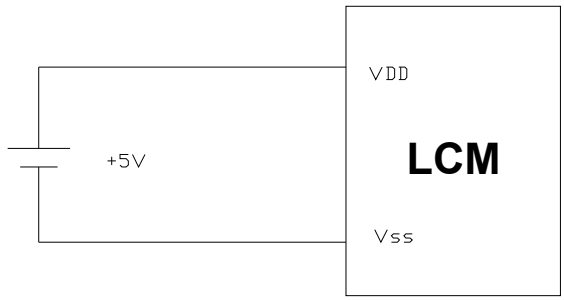


5. PIN ASSIGNMENT

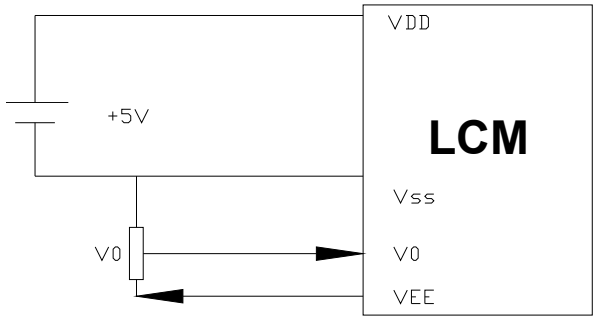
NO.	SYMBOL	FUNCTION
1	VEE	Power supply output for LCD
2	VSS	Ground (0V)
3	VDD	Power Supply(+5V)
4	V0	Power Supply for LCD Drive
5	/WR	Data write. Write data to controller UCi6963 when “L”
6	/RD	Data read. Read data from controller UCi6963 when “L”
7	/CE	Chip enable of controller when “L”
8	C/ D	Command/Data read/write. “H” for command read/write and “L” for data read/write
9	/RST	Controller reset when “L”
10	DB0	Data input/output(LSB)
11	DB1	Data input/output
12	DB2	Data input/output
13	DB3	Data input/output
14	DB4	Data input/output
15	DB5	Data input/output
16	DB6	Data input/output
17	DB7	Data input/output(MSB)
18	FS	Font select. “H” for 6x8 font & “L” for 8x8 font
19	LED+(A)	Anode of LED backlight
20	LED-(K)	Cathode of LED backlight

6. POWER SUPPLY

- **Mode (Internal Contrast Regulation) - J7 is close**

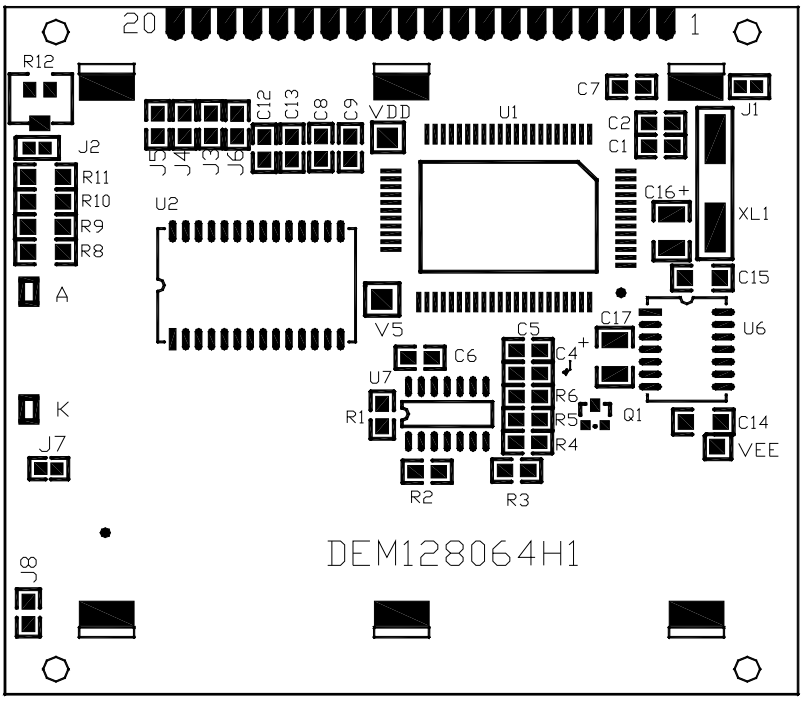


- **Mode (External Contrast Regulation) - J7 is open**



7. PCB DRAWING

7.1. PCB DRAWING



Note: The part no. DEM128064H1 is printed on the PCB

7.1 PCB DESCRIPTION:

7.2.1.The polarity of the pin 19 and the pin 20:

symbol / state		J3,J5	J6, J4	LED Polarity	
				19 Pin	20 Pin
J6,J4	Each solder-bridge	Each closed	Each open	Anode	Cathode
J3,J5	Each solder-bridge	Each open	Each closed	Cathode	Anode

Note: In application module, J3＝J5 ＝0 Ohm, J4＝J6＝open.

7.2.2. The metal-bezel is set be on ground when the J1 is closed

Note: In application module, J1＝0 Ohm

7.2.3. The LED resistor on board are used when J2 is open.

Note: In application module, J2＝open

7.2.4. The module use internal contrast regulation when J7 is closed.

Note: In application module, J7 is open, but potentiometer is calibrated by the factory.

7.2.5. The R8 and the R9, R10, R11 are the LED resistor.

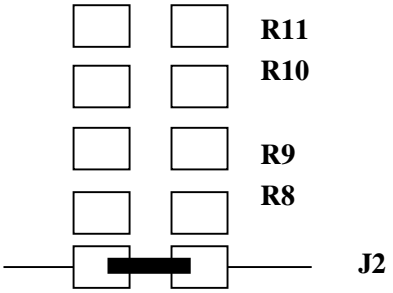
Note: In application module, R8＝47 Ohm R9＝33Ohm, R10＝R11＝Not used.

7.2.6. The J8 is to set the mounting holes to ground.

Note: In application module, J8＝0 Ohm.

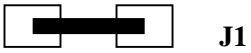
7.2 Example Application

7-2-1. The LED resistor should be bridged as following.

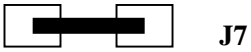


7-2-2. The 19 pin is the anode and the 20 pin is the cathode as following.

7-2-3. The metal-bezel is on ground as following.



7-2-4. The module use internal contrast regulation as following.

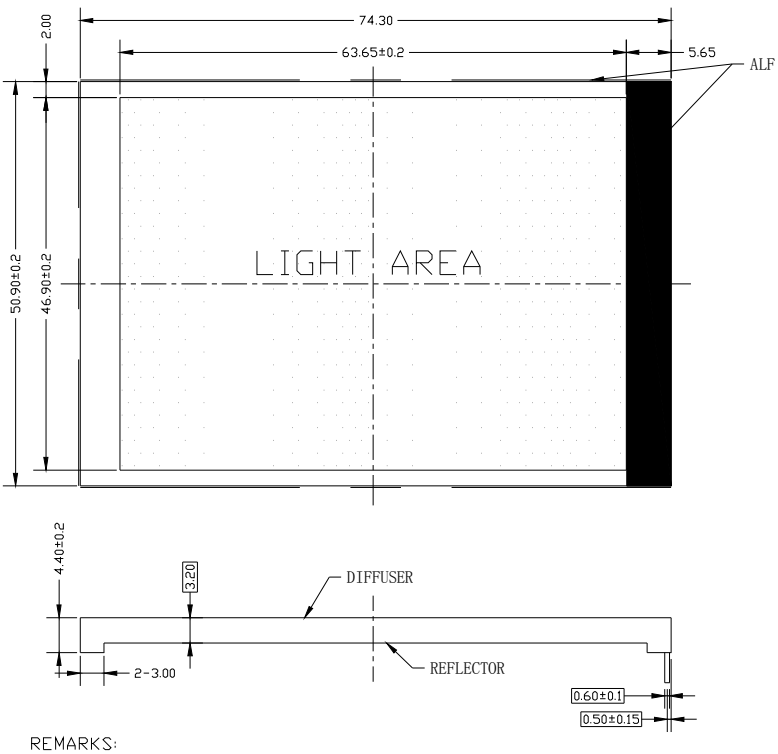


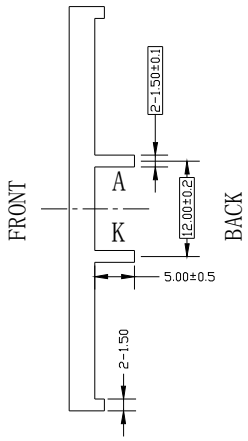
7-2-5. The mounting holes are on ground as following

8. BACKLIGHT ELECTRICAL/OPTICAL SPECIFICATIONS

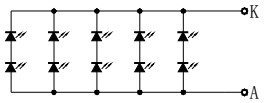
ELECTRICAL–OPTICAL CHARACTERISTICS

Item	Symbol	min.	typ.	max.	Unit	Condition
Forward Voltage	Vf	3.7	4.0	4.3	V	If= 50 mA
Reverse Current	Ir		35		μA	Vr= 0.8 V
Peak wave length	λP	569	572	575	nm	If= 50 mA
Spectral Line Half width	Δλ				nm	If= 50 mA
Luminance	Lv	23	33		cd/m²	If= 50 mA





CIRCUIT DIAGRAM (LED 2X5=10 dies)



REMARKS:
1,UNMARKED TOLERANCE IS ±0.3,
2,THE MATERIAL IS LEAD-FREE,
3,THE COLOR IS YELLOW-GREEN.

9. ABSOLUTE MAXIMUM RATINGS (Vss=0V, Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage (Logic)	V_{DD}	-0.3 to 7.0	V
Input Voltage	V_{IN}	-0.3 to VDD +0.3	V
Operating Temperature	Topr	-20 to +70	°C
Storage Temperature	Tstg	-25 to +75	°C

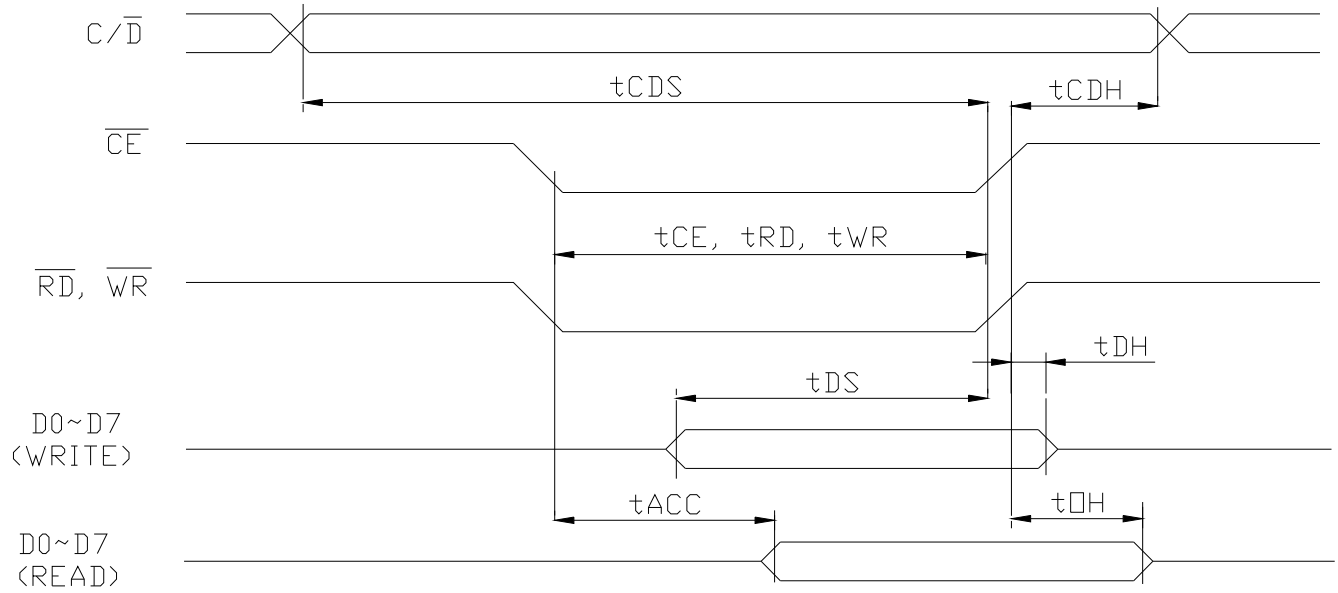
10. ELECTRICAL Characteristics

10.1 DC Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Voltage (Logic)	V_{DD}	-	4.7	5.0	5.3	V
High Level Input Voltage	V_{IH}	-	0.8V_{DD}	-	V_{DD}	V
Low Level Input Voltage	V_{IL}	-	0	-	0.2 V_{DD}	V
High Level Output Voltage	V_{OH}		V_{DD}-0.3	-	V_{DD}	V
Low Level Output Voltage	V_{OL}		0	-	0.3	V
Current Consumption(Operating)	$I_{DD(1)}$	V_{DD}=5.0V f_{OSC} = 4.0 MHz	-	TBD	-	mA

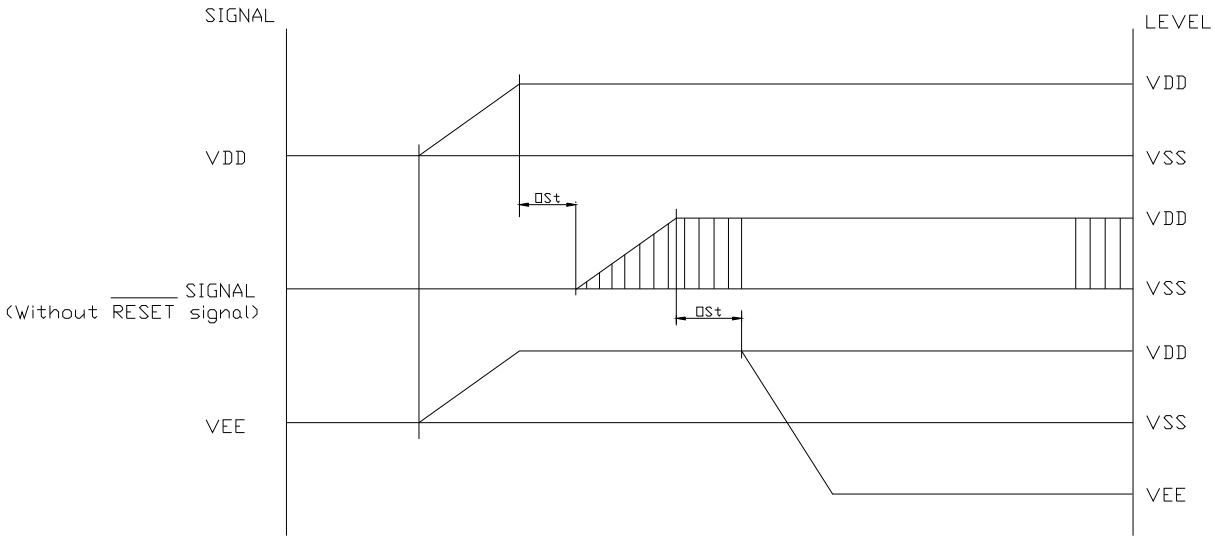
10.2 AC Characteristics

Parameter	Symbol	Min.	Max.	Units
C/D Setup Time	t_{CDS}	100	-	ns
C/D Hold Time	t_{CDH}	10	-	ns
CE, RD, WR Pulse Width	$t_{CE.}$, t_{RD}, t_{WR}	80	-	ns
Data Setup Time	t_{DS}	80	-	ns
Data Hold Time	t_{DH}	40	-	ns
Access Time	t_{ACC}	-	150	ns
Output Hold Time	t_{OH}	10	50	ns

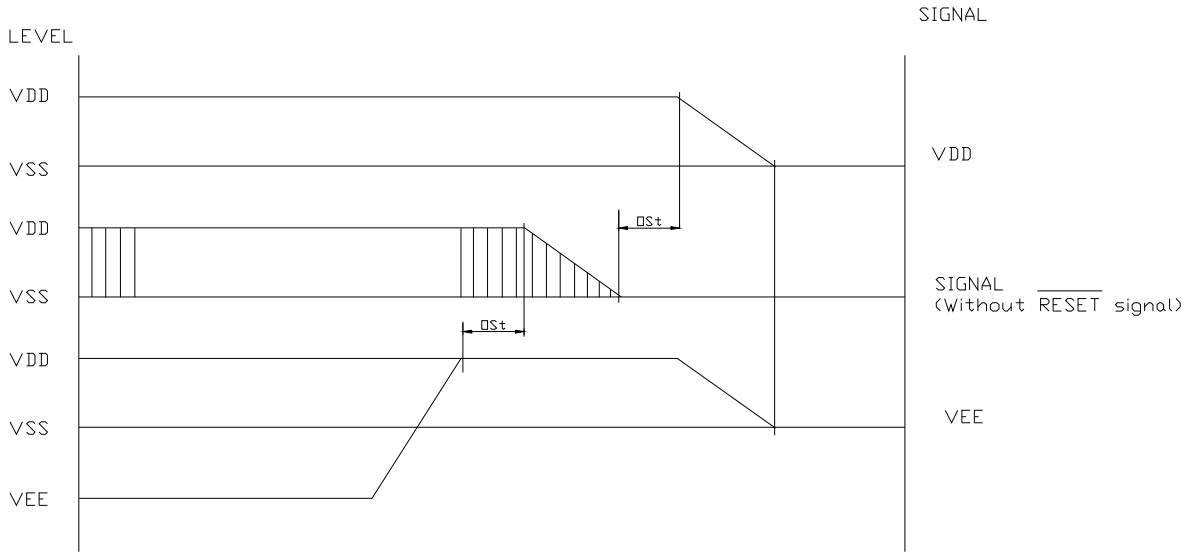


10.3 Power Supply ON/OFF Sequence

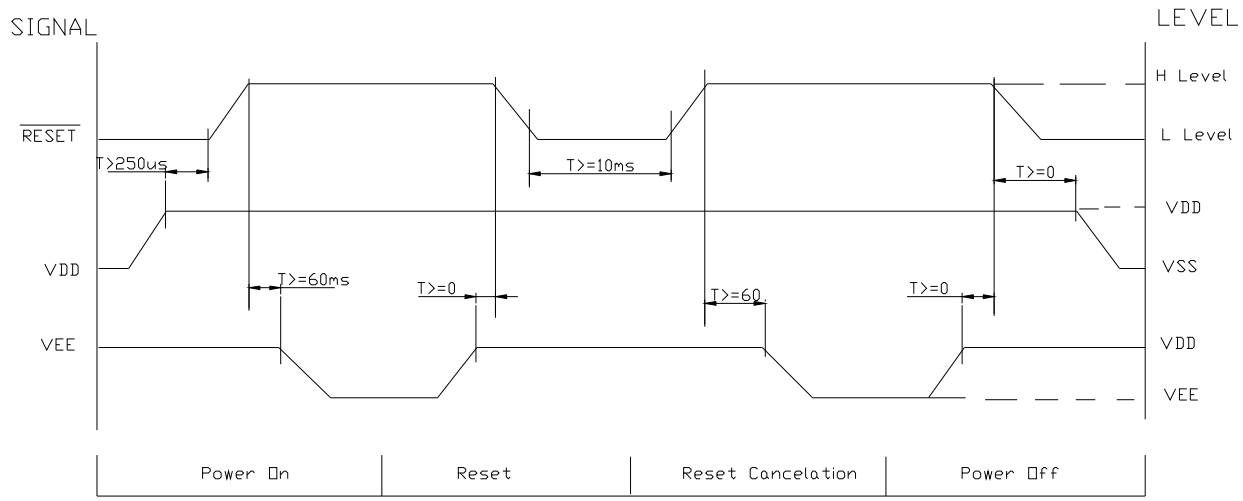
- **ON Sequence**



- **OFF Sequence**



- **Reset Sequence**



Please maintain the above sequence when turning on and off the power supply of the module.

If VEE is supplied to the module while internal altemate signal for LCD driving (M) is unstable or RESET is active, DC component will be supplied to the LCD panel. This may cause damage to the LCD module.

11. COMMAMD DEFINITIONS

No.	Command	C/D	W/R	D7	D6	D5	D4	D3	D2	D1	D0	Action	Value
1.	Set Cursor Pointer	1	0	0	0	1	0	0	0	0	1		21h
		0	0	#	#	#	#	#	#	#	#	Set X address	
		0	0	#	#	#	#	#	#	#	#	Set Y address	
2.	Set Offset Register	1	0	0	0	1	0	0	0	1	0		22h
		0	0	#	#	#	#	#	#	#	#	Data	
		0	0	0	0	0	0	0	0	0	0		00h
3.	Set Address Pointer	1	0	0	0	1	0	0	1	0	0		24h
		0	0	#	#	#	#	#	#	#	#	Low address	
		0	0	#	#	#	#	#	#	#	#	High address	
4.	Set Text Home Addr.	1	0	0	1	0	0	0	0	0	0		40h
		0	0	#	#	#	#	#	#	#	#	Low address	
		0	0	#	#	#	#	#	#	#	#	High address	
5.	Set Text Area	1	0	0	1	0	0	0	0	0	1		41h
		0	0	#	#	#	#	#	#	#	#	Columns	
		0	0	0	0	0	0	0	0	0	0		
6.	Set Graphic Home Addr.	1	0	0	1	0	0	0	0	1	0		42h
		0	0	#	#	#	#	#	#	#	#	Low address	
		0	0	#	#	#	#	#	#	#	#	High address	
7.	Set Graphic Area	1	0	0	1	0	0	0	0	1	1		43h
		0	0	#	#	#	#	#	#	#	#	Columns	
		0	0	0	0	0	0	0	0	0	0		
8.	OR mode	1	0	1	0	0	0	–	0	0	0		8xh
9.	EXOR mode	1	0	1	0	0	0	–	0	0	1		
10.	AND mode	1	0	1	0	0	0	–	0	1	1		
11.	Text Attribute mode	1	0	1	0	0	0	–	1	0	0		
		0	0	–	–	–	–	#	#	#	#		
12.	Internal CG ROM mode	1	0	1	0	0	0	0	–	–	–		
13.	External CG RAM mode	1	0	1	0	0	0	1	–	–	–		
14.	Display Mode	1	0	1	0	0	1	#	#	#	#	Switch Graphic/Text/Cursor/Blink ON/OFF	9xh
15.	Cursor Pattern Select	1	0	1	0	1	0	0	#	#	#	Set cursor: 1~8-line	Axh
16.	Data-write and Increase ADP	1	0	1	1	0	0	0	0	0	0		C0h
		0	0	#	#	#	#	#	#	#	#	Data	
17.	Data-read and Increase ADP	1	1	1	1	0	0	0	0	0	1		C1h
18.	Data-write and Decrease ADP	1	0	1	1	0	0	0	0	1	0		C2h
		0	0	#	#	#	#	#	#	#	#	Data	
19.	Data-read and Decrease ADP	1	1	1	1	0	0	0	0	1	1		C3h
20.	Data-write and Non-variable ADP	1	0	1	1	0	0	0	1	0	0		C4h
		0	0	#	#	#	#	#	#	#	#	Data	
21.	Data-read and Non-variable ADP	1	1	1	1	0	0	0	1	0	1		C5h
22.	Set Data Auto Write	1	0	1	0	1	1	0	0	0	0		B0h
23.	Set Data Auto Read	1	0	1	0	1	1	0	0	0	1		B1h
24.	Auto Reset	1	0	1	0	1	1	0	0	1	0		B2h
25.	Screen Peek	1	0	1	1	1	0	0	0	0	0		E0h
26.	Screen Copy	1	0	1	1	1	0	1	0	0	0		E8h
27.	Bit Set/Reset	1	0	1	1	1	1	#	#	#	#	Set/Reset Bit 0~7	Fxh
28.	Whole Screen Reverse (Triple-byte command)	1	0	1	1	0	1	0	0	0	0		D0h
		0	0	–	–	–	–	–	–	–	#	0: Normal 1: Reverse	
		0	0	–	–	–	–	–	–	–	–	(Don't Care)	

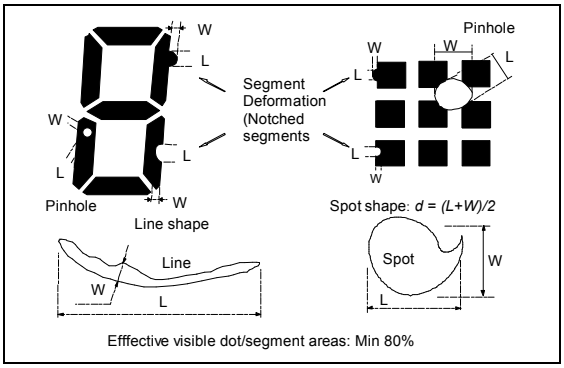
No.	Command	C/D	W/R	D7	D6	D5	D4	D3	D2	D1	D0	Action	Value
29.	Blink Time (Triple-byte command)	1	0	0	1	0	1	0	0	0	0		50h
		0	0	–	–	–	–	–	#	#	#	000b: 0.066s 100b: 1s 001b: 0.25s 101b: 1.25s **010b: 0.5s** 110b: 1.5s 011b: 1.75s 111b: 2s	010b
		0	0	–	–	–	–	–	–	–	–	(Don't Care)	
30.	Cursor Auto Moving (Triple-byte command)	1	0	0	1	1	0	0	0	0	0		60h
		0	0	–	–	–	–	–	–	–	#	**0: disable** 1: enable	
		0	0	–	–	–	–	–	–	–	–	(Don't Care)	
31.	CGROM Font Select (Triple-byte command)	1	0	0	1	1	1	0	0	0	0		70h
		0	0	–	–	–	–	–	–	#	#	00b: Don't care 01b: Don't care 10b: CGROM Font-01 11b: CGROM Font-02	
		0	0	–	–	–	–	–	–	–	–	(Don't Care)	

12. QUALITY DESCRIPTION

DEFECT SPECIFICATION:

Specific type-related items are covered in this sheet.

a: Table for Cosmetic defects
(Note: nc = not counted).
Sizes and number of defects
(Max. Qty)

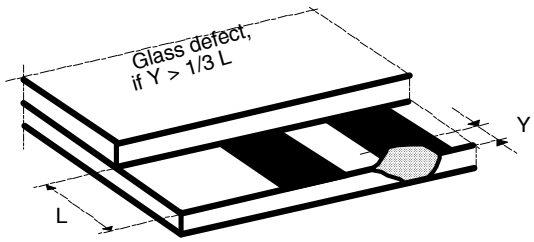


Examples/ Shapes

Defect Type	Max. defect size [μm] d or L W	Max. Quantity.
Black or White Spots	d ≤ 150	nc
	150< d ≤300	3
Black or White Lines	-- W ≤ 10	nc
	L ≤ 5000 W ≤ 30	3
	L ≤ 2000 W ≤ 50	2
Pinhole	d ≤ 150 150< d ≤ 300	Nc 1/segment
(Total defects)		(5)
Segment Deformation	W ≤ 100	nc
Bubble (e.g. under pola)	d ≤ 150	nc
	200< d ≤ 400	2

b: Glass defects

b1:Glass defects at contact ledge



b2:Glass chipping in other areas shall not be in conflict with the product's function.

13. MODULE ACCEPT QUALITY LEVEL (AQL)

13.1 AQL Standard Value: Fatal Defect =0.1, Major Defect=0.65; Minor Defect =2.5.

13.2 Inspection Plan: MIL-STD-105E, Normal Inspection Level II, Single Sampling Plan.

14. RELIABILITY TEST

Operating life time: Longer than 50000 hours (at room temperature without direct irradiation of sunlight)
Reliability characteristics shall meet following requirements.

TEMPERATURE TESTS	NORMAL GRADE
High Temperature Storage	+75°C *96hrs (Without Polarizer)
Low Temperature Storage	-25°C *4hrs
High Temperature Operation	+70°C *96hrs
Low Temperature Operation	-20°C *4hrs
High Temperature, High Humidity	+70°C * 95%RH *96hrs (Without Polarizer)
Thermal Shock	-20°C *30min. 10s ↓ 5Cycles ← +70°C *30min. →
Vibration Test	Frequency *Swing * Time 40Hz * 4mm * 4hrs
Drop Test	Drop height*Times 1.0m * 6times

15. PRECAUTION FOR USING LCM

1. LIQUID CRYSTAL DISPLAY (LCD)

LCD is made up of glass, organic sealant, organic fluid, and polymer based polarizer. The following precautions should be taken when handing,

(1). Keep the temperature within range of use and storage. Excessive temperature and humidity could cause polarization degredation, polarizer peel off or bubble.

(2). Do not contact the exposed polarizer with anything harder than an HB pencil lead. To clean dust off the display surface, wipe gently with cotton, chamois or other soft material soaked in petroleum benzin.

(3). Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause polarizer deformation or color fading, while an active LCD with water condensation on its surface will cause corrosion of ITO electrodes.

(4). Glass can be easily chipped or cracked from rough handling, especially at corners and edges.

(5). Do not drive LCD with DC voltage.

2. LIQUID CYRSTALO DISPLAY MODULES (LCM)

2.1 Mechanical considerations

LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.

(1). Do not tamper in any way with the tabs on the metal frame

(2). Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattern.

(3). Do not touch the elastomer connector, especially insert a backlight panel (for example, EL).

(4). When mounting a LCM make sure that the PCB is not under any stress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.

(5). Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.

2.2. Static Electricity

LCM contains CMOS LSI's and the same precaution for such devices should apply, namely

(1). The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.

(2). The modules should be kept in antistatic bags or other containers resistant to static for storage.

(3). Only properly grounded soldering irons should be used.

(4). If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.

(5). The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended.

(6). Since dry air is inductive to static, a relative humidity of 50-60% is recommended.

2.3. Soldering

(1). Solder only to the I/O terminals.

(2). use only soldering irons with proper grounding and no leakage.

(3). Soldering temperature: 280℃±10℃

(4). Soldering time: 3 to sec.

(5). Use eutectic solder with resin flux fill.

(6). If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed after wards.

2.4 Operation

(1). The viewing angle can be adjusted by varying the LCD driving voltage V0.

(2). Driving voltage should be kept within specified range; excess voltage shortens display life.

(3). Response time increases with decrease in temperature.

(4). Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

(5). Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

2.5 Storage

If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

2.6 Limited Warranty

Unless otherwise agreed between DISPLAY and customer, DISPLAY will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DISPLAY acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DISPLAY is limited to repair and/or replacement on the terms set forth above. DISPLAY will not responsible for any subsequent or consequential events.