

CUSTOMER :
MODEL : MOG-128GB12D-S Series
DESCRIPTION : LCD MODULE

◆ CUSTOMER APPROVAL

	CHECKED	CHECKED	APPROVAL
APPROVAL			
REMARK			

◆ SUPPLIER APPROVAL

PREPARED	CHECKED		APPROVAL

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1. General Specification

(1) Mechanical Dimension

Item	Dimension	Unit
Number of Dots	128 x 128	dots
Module dimension (L x W x H)	72.4 x 70.0 x 15.0(MAX)-LED B/L 72.4 x 70.0 x 10.0(MAX)-EL or No B/L	mm
View area	49.0 x 49.0	mm
Active area	44.7 x 44.7	mm
Dot size	0.32 x 0.32	mm
Dot pitch	0.35 x 0.35	mm

(2) Controller IC: **LC7981 controller**

(3) Temperature Range

	Normal	Wide
Operating	0 ~+50°C	-20 ~+70°C
Storage	-10 ~+60°C	-30 ~+80°C

2. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T _{OP}	0	—	+50	°C
Storage Temperature	T _{ST}	-20	—	+70	°C
Input Voltage	V _I	V _{SS}	—	V _{DD}	V
Supply Voltage For Logic	V _{DD} -V _{SS}	-0.3	—	+7	V
Supply Voltage For LCD	V _{DD} -V _O	0	—	28	V

3. Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	Vdd-Vss	—	4.5	—	5.5	V
Supply Voltage For LCD	Vdd-Vo	*Ta=-20°C Ta=25°C *Ta=+70°C	— — 15.3	— 16.0 —	18.3 — —	V
Input High Volt.	V _{IH}	—	2.2	—	Vdd	V
Input Low Volt.	V _{IL}	—	0	—	0.8	V
Output High Volt.	V _{OH}	—	2.4	—	Vdd	V
Output Low Volt.	V _{OL}	—	0	—	0.4	V
Supply Current	I _{dd}	Vdd=5V	—	45	50	mA

4. Optical Characteristics

a. STN

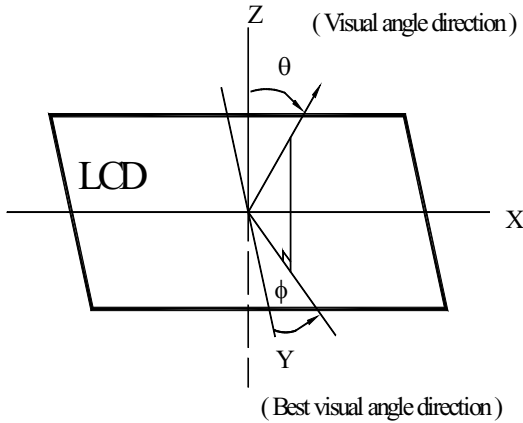
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
View Angle	(V) θ	CR \geq 2	10		45	deg
	(H) φ	CR \geq 2	-30		30	deg
Contrast Ratio	CR	—		3		—
Response Time 25°C	T rise	—		100	150	ms
	T fall	—		150	200	ms

b. FSTN

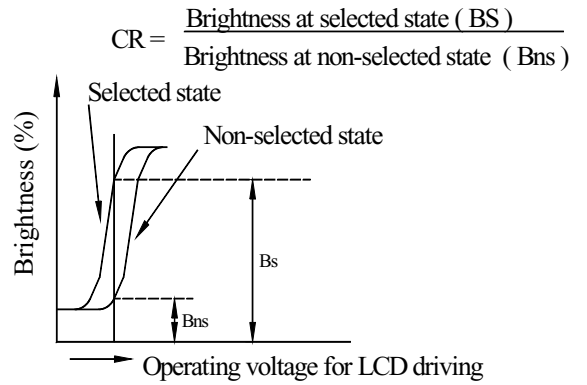
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
View Angle	(V) θ	CR \geq 3	10		60	deg
	(H) φ	CR \geq 3	-45		45	deg
Contrast Ratio	CR	—		5		—
Response Time 25°C	T rise	—		100	150	ms
	T fall	—		150	200	ms

4.1 Definitions

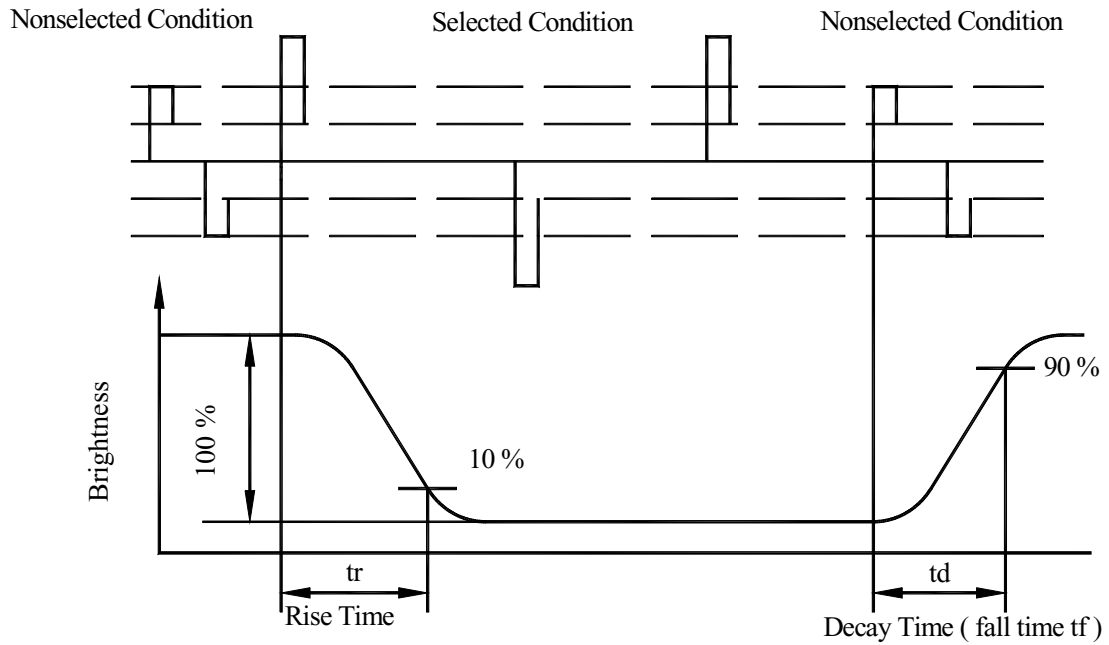
■ View Angles



■ Contrast Ratio



■ Response Time

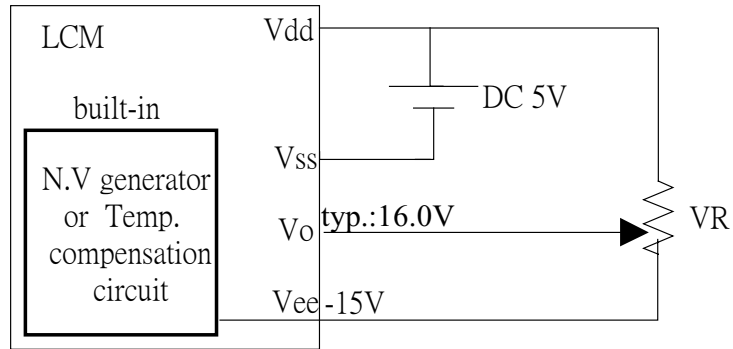


5. Interface Description

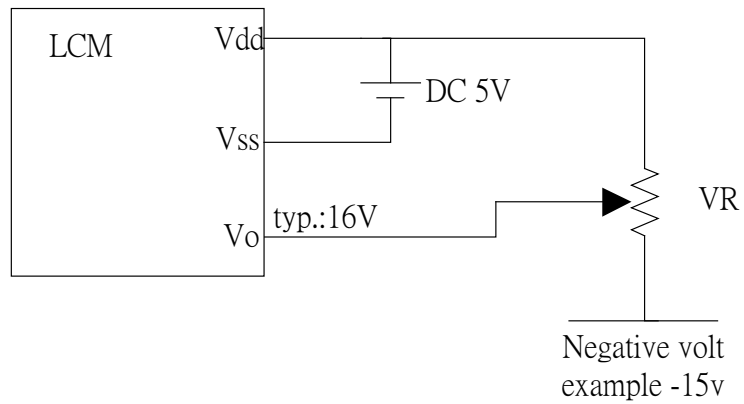
No.	Symbol	Function
1	DB0	Data Bus Line
2	DB1	Data Bus Line
3	DB2	Data Bus Line
4	DB3	Data Bus Line
5	DB4	Data Bus Line
6	DB5	Data Bus Line
7	DB6	Data Bus Line
8	DB7	Data Bus Line
9	RS	H-Data Input(L-Instruction Input)
10	R/W	H-Data Read(L-Data Write)
11	E	Enable Signal
12	/CS	Chip Enable
13	/RES	Reset
14	VO	Supply Voltage for LCD
15	VDD	Power Supply for Logic(+5V)
16	VSS	Ground (0V)
17	VEE	Negative Power Supply output (-15V)
18	/DISPOFF	Display Off Control
19	A	Power supply for Led B/L(+)
20	K	Power supply for Led B/L(GND)

6. Power Supply for LCD Module and LCD Operating Voltage a Adjustment

*(Option) LCM operating on " DC 5V " input with built-in negative voltage



*(Option)LCM operating on " DC 5V " input with external negative voltage



7. Backlight Information

7.1 Specification

(1) LED array / yellow-green

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Supply Current	I _{LED}	—	220		mA	V=4.2V
Supply Voltage	V	—	4.2	4.3	V	
Reverse Voltage	V _R	—	—	8	V	
Luminous Intensity	I _V	60	—	—	cd/m ²	I _{LED} =220mA
Wave Length	λ _p		570		nm	I _{LED} =220mA
Life Time		—	100000	—	Hr.	V ≤ 4.2V
Color	Yellow Green					

(1) LED edge/white

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Supply Current	I _{LED}	—	80		mA	V=3.2V
Supply Voltage	V	—	3.2	3.3	V	
Reverse Voltage	V _R	—	—	8	V	
Luminous Intensity	I _V	80	—	—	cd/m ²	I _{LED} =80mA
Wave Length	λ _p				nm	I _{LED} =80mA
Life Time		—	15000	—	Hr.	V ≤ 3.2V
Color	WHITE					

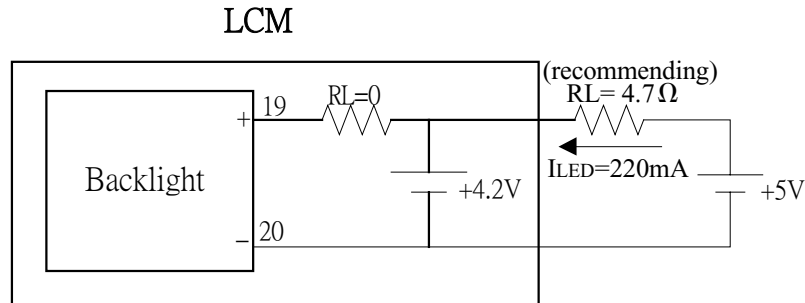
(2) EL / white

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Drive Voltage	Vmax	—	110	170	Vrms	25°C
Drive Wave	Fmax	—	400	1000	Hz	25°C
Brightness	—	25	—	—	cd/m ²	110V/400Hz
Power Consumption	—	—	130	—	mW	110V/400Hz
Chromatism	X	—	0.330	—	—	110V/400Hz
	Y	—	0.365	—	—	
Life time	—	5000hrs				110V/400Hz
Color	—	White				Light on 110V/400Hz

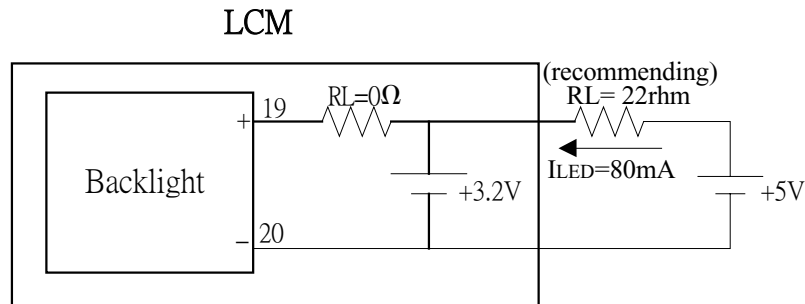
7.2 Backlight driving methods

a. LED B/L drive from pin19 (LED+) pin20 (LED-)

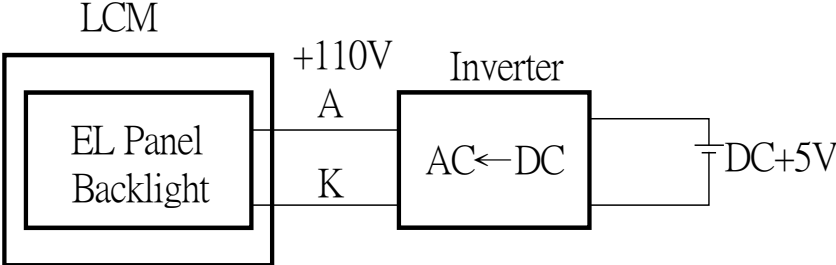
a.1 array / yellow-green



b edge/white



c. EL B/L driven from A.K pin directly



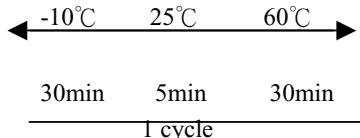
8. Quality Assurance

* Screen Cosmetic Criteria

No.	Defect	Judgement Criterion	Partition																				
1	Spots	<p>A)Clear</p> <table border="1"> <thead> <tr> <th>Size:d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.1$</td> <td>Disregard</td> </tr> <tr> <td>$0.1 < d \leq 0.2$</td> <td>6</td> </tr> <tr> <td>$0.2 < d \leq 0.3$</td> <td>2</td> </tr> <tr> <td>$0.3 < d$</td> <td>0</td> </tr> </tbody> </table> <p>Note:Including pin holes and defective dots which must be within one pixel size.</p> <p>B)Unclear</p> <table border="1"> <thead> <tr> <th>Size:d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.2$</td> <td>Disregard</td> </tr> <tr> <td>$0.2 < d \leq 0.5$</td> <td>6</td> </tr> <tr> <td>$0.5 < d \leq 0.7$</td> <td>2</td> </tr> <tr> <td>$0.7 < d$</td> <td>0</td> </tr> </tbody> </table>	Size:d mm	Acceptable Qty in active area	$d \leq 0.1$	Disregard	$0.1 < d \leq 0.2$	6	$0.2 < d \leq 0.3$	2	$0.3 < d$	0	Size:d mm	Acceptable Qty in active area	$d \leq 0.2$	Disregard	$0.2 < d \leq 0.5$	6	$0.5 < d \leq 0.7$	2	$0.7 < d$	0	Minor
Size:d mm	Acceptable Qty in active area																						
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$0.2 < d \leq 0.5$	6																						
$0.5 < d \leq 0.7$	2																						
$0.7 < d$	0																						
2	Bubbles in Polarizer	<table border="1"> <thead> <tr> <th>Size:d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.3$</td> <td>Disregard</td> </tr> <tr> <td>$0.3 < d \leq 1.0$</td> <td>3</td> </tr> <tr> <td>$1.0 < d \leq 1.5$</td> <td>1</td> </tr> <tr> <td>$1.5 < d$</td> <td>0</td> </tr> </tbody> </table>	Size:d mm	Acceptable Qty in active area	$d \leq 0.3$	Disregard	$0.3 < d \leq 1.0$	3	$1.0 < d \leq 1.5$	1	$1.5 < d$	0	Minor										
Size:d mm	Acceptable Qty in active area																						
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$0.3 < d \leq 1.0$	3																						
$1.0 < d \leq 1.5$	1																						
$1.5 < d$	0																						
3	Scratch	In accordance with spots cosmetic criteria. When the light reflects on the panel surface, the scratches are not to be remarkable.	Minor																				
4	Allowable Density	Above defects should be separated more than 30mm each other.	Minor																				
5	Coloration	Not to be noticeable coloration in the viewing area of the LCD panels. Back-light type should be judged with back-light on state only.	Minor																				

9. Reliability

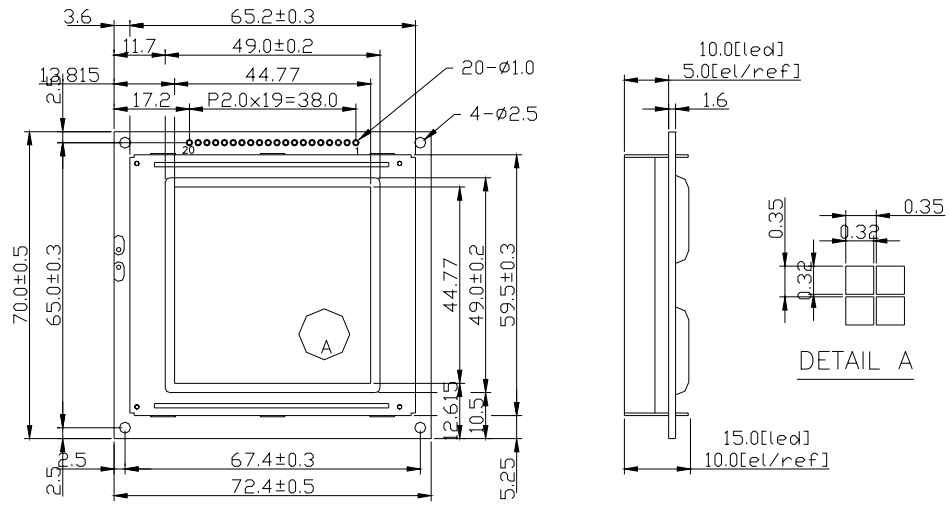
* Content of Reliability Test

Environmental Test				
No.	Test Item	Content of Test	Test Condition	Applicable Standard
1	High Temperature storage	Endurance test applying the high storage temperature for a long time.	60°C 200hrs	—
2	Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-10°C 200hrs	—
3	High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	50°C 200hrs	—
4	Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	0°C 200hrs	—
5	High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	70°C,90%RH 96hrs	—
6	High Temperature/ Humidity Operation	Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.	40°C,90%RH 96hrs	—
7	Temperature Cycle	Endurance test applying the low and high temperature cycle. 	-10°C/60°C 10 cycles	—
Mechanical Test				
8	Vibration test	Endurance test applying the vibration during transportation and using.	10~22Hz→1.5mmp-p 22~500Hz→1.5G Total 0.5hrs	—
9	Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G Half sign wave 11 msdc 3 times of each direction	—
10	Atmospheric pressure test	Endurance test applying the atmospheric pressure during transportation by air.	115mbar 40hrs	—
Others				
11	Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V,RS=1.5kΩ CS=100pF 1 time	—

***Supply voltage for logic system=5V. Supply voltage for LCD system = Operating voltage at 25°C

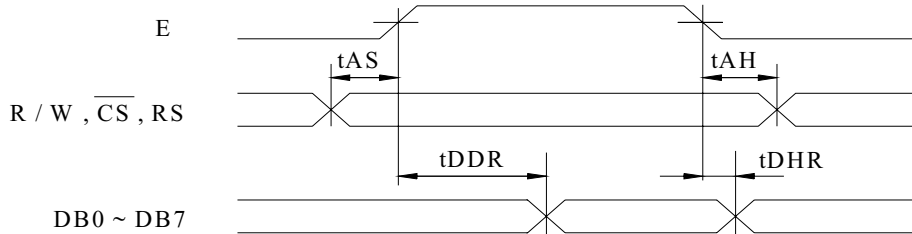
10. Appendix

10-1 Drawing

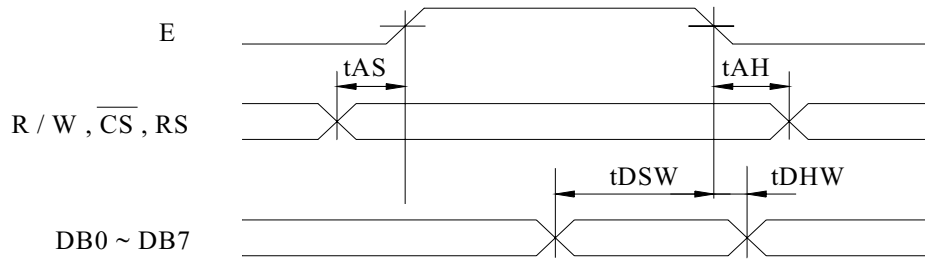


10-2. Timing Characteristics

Read cycle



Write cycle



(V_{SS} = 0 V, V_{DD} = 5 V)

Item	Symbol	Min	Typ	Max	Unit
Address set-up time	tAS	90	—	—	ns
Address hold time	tAH	10	—	—	ns
Data delay time (read)	tDDR	—	—	140	ns
Data hold time (read)	tDHR	10	—	—	ns
Data set-up time (write)	tDSW	220	—	—	ns
Data hold time (write)	tDHW	20	—	—	ns