



ALL SHORE INDUSTRIES, INC.

SPECIFICATION FOR LIQUID CRYSTAL DISPLAY MODULE

MODULE #: ASI-_-1286GS-EC-_YD/X

Item	Dimension	Unit
Number of Characters	128 x 64 Dots	-
Module dimension	75.0 x 52.7 x 8.9(MAX)	mm
View area	60.0 x 32.6	mm
Active area	55.0 x 27.48	mm
Dot size	0.39 x 0.39	mm
Dot pitch	0.43 x 0.43	mm
LCD type	STN Positive, Transflective	
Duty	1/64	
View direction	6 o'clock	
Backlight Type	LED Yellow-Green	



MODEL NO : ASI-_-1286GS-EC-_YD/X

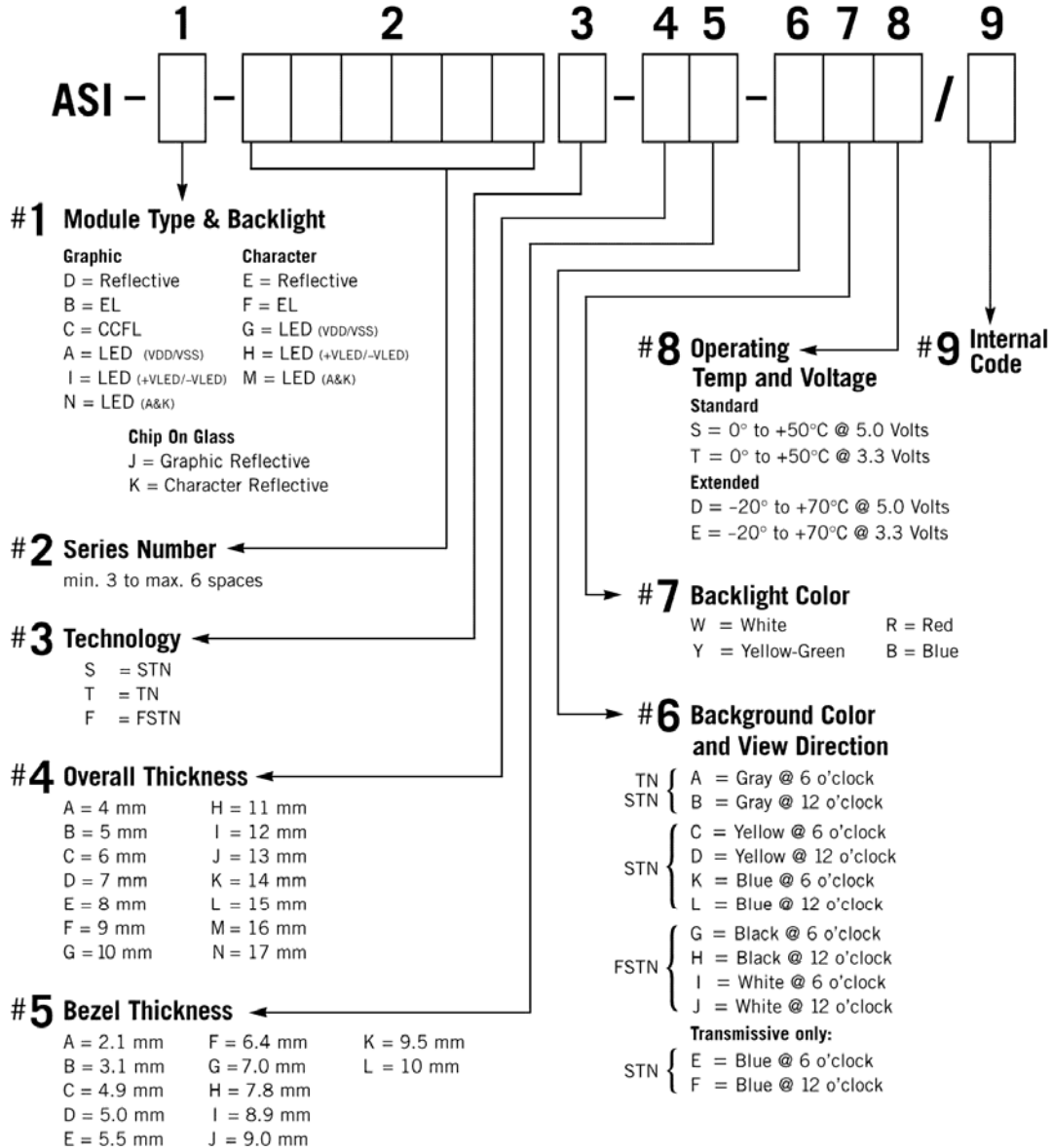
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LCD MODULE PART NUMBERING SYSTEM



NOTE: Some options may not be available in specific modules. Please contact your Sales Representative to check availability.



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Precautions in use of LCD Modules

- (1) Avoid applying excessive shocks to the module or making any alterations or modifications to it.
- (2) Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD module.
- (3) Don't disassemble the LCM.
- (4) Don't operate it above the absolute maximum rating.
- (5) Don't drop, bend or twist LCM.
- (6) Soldering: only to the I/O terminals.
- (7) Storage: please storage in anti-static electricity container and clean environment.

General Specification

Item	Dimension	Unit
Number of Characters	128 x 64 Dots	-
Module dimension	75.0 x 52.7 x 8.9(MAX)	mm
View area	60.0 x 32.6	mm
Active area	55.0 x 27.48	mm
Dot size	0.41 x 0.41	mm
Dot pitch	0.44 x 0.44	mm
LCD type	STN Positive, Transflective	
Duty	1/64	
View direction	6 o'clock	
Backlight Type	LED Yellow-Green	



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Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	-	+70	°C
Storage Temperature	T_{ST}	-30	-	+80	°C
Input Voltage	V_I	0	-	V_{DD}	V
Supply Voltage For Logic	V_{DD}	0	-	6.7	V
Supply Voltage For LCD	$V_{DD}-V_{LCD}$	0	-	16.7	V

Electrical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	-	4.5	5.0	5.5	V
Supply Voltage For LCD	$V_{DD}-V_0$	$T_a=-20^{\circ}\text{C}$	-	-	9.6	V
		$T_a=25^{\circ}\text{C}$	-	8.0	-	V
		$T_a=+70^{\circ}\text{C}$	7.6	-	-	V
Input High Volt.	V_{IH}	-	2.0	-	V_{DD}	V
Input Low Volt.	V_{IL}	-	0	-	0.8	V
Output High Volt.	V_{OH}	-	2.4	-	V_{DD}	V
Output Low Volt.	V_{OL}	-	-	-	0.4	V
Supply Current	I_{DD}	$V_{DD}=5\text{V}$	2.0	2.5	4.0	mA

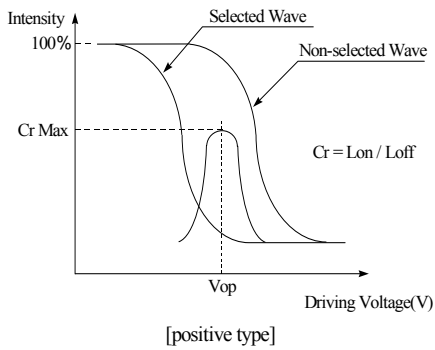


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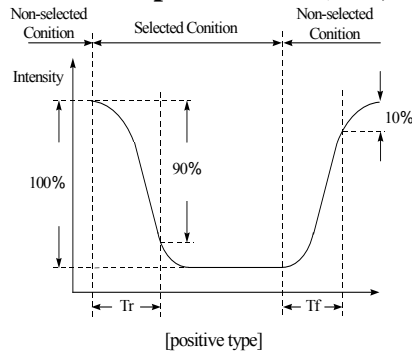
Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V) θ	$CR \geq 2$	20	-	40	deg
	(H) ϕ	$CR \geq 2$	-30	-	30	deg
Contrast Ratio	CR	-	-	3	-	-
Response Time	T rise	-	-	200	300	ms
	T fall	-	-	200	300	ms

Definition of Operation Voltage (Vop)



Definition of Response Time (Tr , Tf)



Conditions :

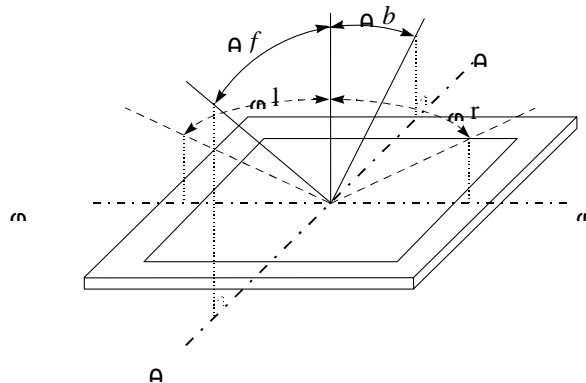
Operating Voltage : Vop

Viewing Angle(θ , ϕ) : 0° , 0°

Frame Frequency : 64 HZ

Driving Waveform : 1/N duty , 1/a bias

Definition of viewing angle(CR 2)





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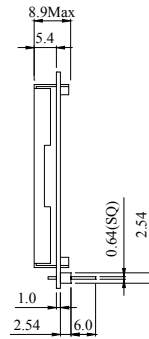
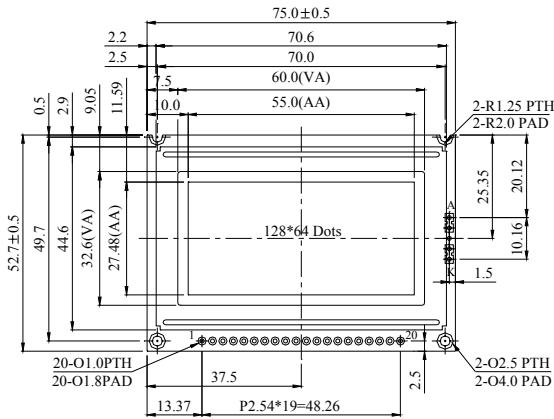
Interface Description

Pin No.	Symbol	Level	Description
1	VDD	5.0V	Supply Supply (+5V)
2	V _{SS}	0V	Power Supply (GND)
3	V _o	(Variable)	Contrast Adjustment
4	DB0	H/L	Data bus line
5	DB1	H/L	Data bus line
6	DB2	H/L	Data bus line
7	DB3	H/L	Data bus line
8	DB4	H/L	Data bus line
9	DB5	H/L	Data bus line
10	DB6	H/L	Data bus line
11	DB7	H/L	Data bus line
12	CS1	L	Chip select IC1
13	CS2	L	Chip select IC2
14	RST	L	Reset signal
15	R/W	H/L	Data read /write
16	D/I	H/L	Data/ Instruction
17	E	H	Enable signal
18	Vee	-	Negative Voltage output
19	A	-	Power Supply for LED (+ 4.2V)
20	K	-	Power Supply for LED (0V)



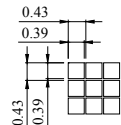
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Contour Drawing & Block Diagram

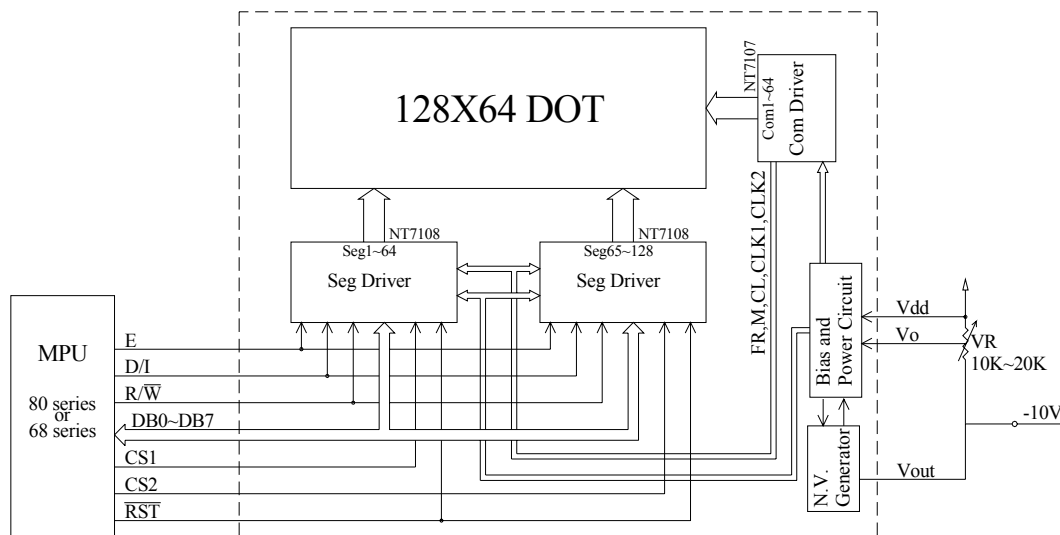


LED B/L

PIN NO.	SYMBOL
1	Vdd
2	Vss
3	Vo
4	DB0
5	DB1
6	DB2
7	DB3
8	DB4
9	DB5
10	DB6
11	DB7
12	CS1
13	CS2
14	RST
15	R/W
16	D/I
17	E
18	Vee
19	A
20	K



DOT SIZE
SCALE 10/1



External contrast adjustment.



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Timing Characteristics

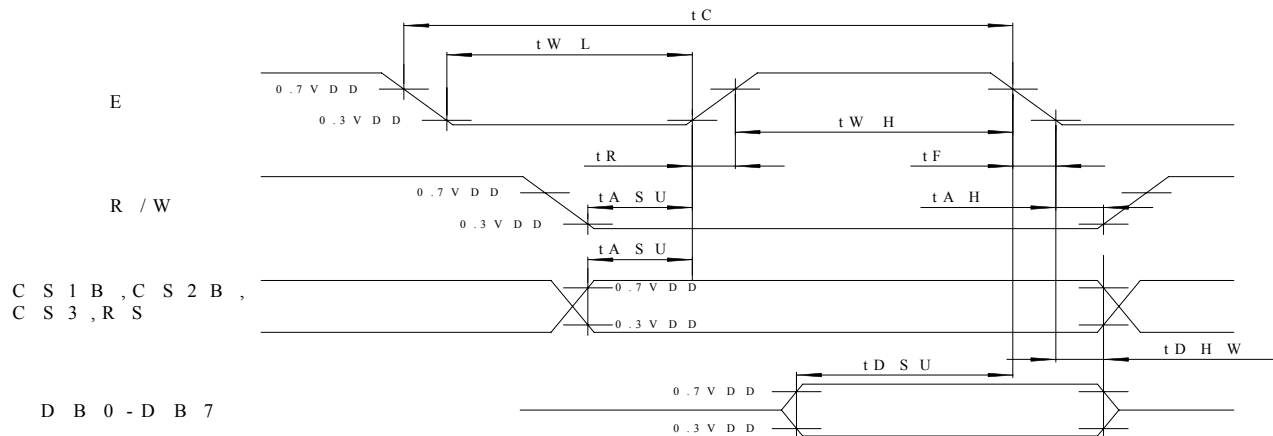
MPU Interface

(T=25°C, VDD=+5.0V±0.5)

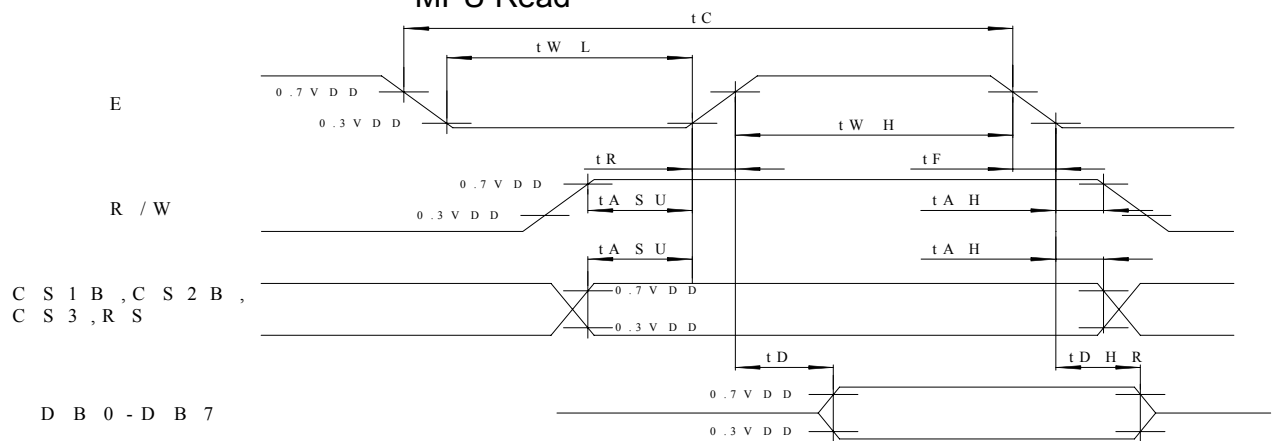
Characteristic	Symbol	Min	Typ	Max	Unit
E cycle	tcyc	1000	-	-	ns
E high level width	twhE	450	-	-	ns
E low level width	twlE	450	-	-	ns
E rise time	tr	-	-	25	ns
E fall time	tf	-	-	25	ns
Address set-up time	tas	140	-	-	ns
Address hold time	tah	10	-	-	ns
Data set-up time	tdsw	200	-	-	ns
Data delay time	tddr	-	-	320	ns
Data hold time (write)	tdhw	10	-	-	ns
Data hold time (read)	tdhr	20	-	-	ns



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MPU Read



MPU Write Timing



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Display Control Instruction

The display control instructions control the internal state of the NT7108. Instruction is received from MPU to NT7108 for the display control. The following table shows various instructions

Instruction	D/I	R/ W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function
Display ON/OFF	L	L	L	L	H	H	H	H	H	L/H	Controls the display on or off. Internal status and display RAM data are not affected. 0:OFF, 1:ON
Set Address	L	L	L	H	Y address (0~63)					Sets the Y address in the Y address counter.	
Set Page (X address)	L	L	H	L	H	H	H	Page (0 ~7)			Sets the X address at the X address register.
Display Start Line	L	L	H	H	Display start line(0~63)					Indicates the display data RAM displayed at the top of the screen.	
Status Read	L	H	B U S Y	L	ON/ OFF	R E S E T	L	L	L	L	Read status. BUSY 0:Ready 1:In operation ON/OFF 0:Display ON 1:Display OFF RESET 0:Normal 1:Reset
Write Display Data	H	L	Display Data								Writes data (DB0:7) into display data RAM. After writing instruction, Y address is increased by 1 automatically.
Read Display Data	H	H	Display Data								Reads data (DB0:7) from display data RAM to the data bus.



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Detailed Explanation

Display On/Off

R/W	D/I	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	1	1	1	1	1	D

The display data appears when D is 1 and disappears when D is 0. Though the data is not on the screen with D = 0, it remains in the display data RAM. Therefore, you can make it appear by changing D = 0 into D = 1.

Display Start Line

R/W	D/I	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	1	AC5	AC4	AC3	AC2	AC1	AC0

Z address (AC0~AC5) (binary) of the display data RAM is set in the display start line register and displayed at the top of the screen. shows examples of display (1/64 duty cycle) when the start line = 0-3. When the display duty cycle is 1/64 or more (ex. 1/32, 1/24 etc.), the data of total line number of LCD screen, from the line specified by display start line instruction, is displayed

Set Page (X Address)

R/W	D/I	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	0	1	1	1	AC2	AC1	AC0

X address (AC0~AC2) (binary) of the display data RAM is set in the X address register. After that, writing or reading to or from MPU is executed in this specified page until the next page is set. See Figure 1.

Set Y Address

R/W	D/I	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0

Y address (AC0~AC5) (binary) of the display data RAM is set in the Y address counter. After that, Y address counter is increased by 1 every time the data is written or read to or from MPU.



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Status Read

R/W	D/I	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	1	Busy	0	On/Off	RESET	0	0	0	0

Busy

When busy is 1, the LSI is executing internal operations. No instruction are accepted while busy is 1, so you should make sure that busy is 0 before writing the next instruction.

ON/OFF

Shows the liquid crystal display condition: on condition or off condition.

When on/off is 1, the display is in off condition.

When on/off is 0, the display is in on condition

RESET

RESET = 1 shows that the system is being initialized. In this condition, no instructions except status read can be accepted.

RESET = 0 shows that initializing has system is in the usual operation condition.

Write Display Data

R/W	D/I	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	D7	D6	D5	D4	D3	D2	D1	D0

Writes 8-bit data (D0~D7) (binary) into the display data RAM. The Y address is increased by 1 automatically.

Read Display Data

R/W	D/I	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	1	D7	D6	D5	D4	D3	D2	D1	D0

Reads out 8-bit data (D0~D7) (binary) from the display data RAM. Then Y address is increased by 1 automatically.

One dummy read is necessary right after the address setting. For details, refer to the explanation of output register in “Function of Each Block”.



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Quality Assurance

Screen Cosmetic Criteria

No.	Defect	Judgment Criterion	Partition
1	Spots	<p>A)Clear</p> <p><u>Size: d mm</u> <u>Acceptable Qty in active area</u></p> <p>d \square 0.1 Disregard</p> <p>0.1 < d \square 0.2 6</p> <p>0.2 < d \square 0.3 2</p> <p>0.3 < d 0</p> <p>Note: Including pin holes and defective dots which must be within one pixel size.</p> <p>B)Unclear</p> <p><u>Size: d mm</u> <u>Acceptable Qty in active area</u></p> <p>d \square 0.2 Disregard</p> <p>0.2 < d \square 0.5 6</p> <p>0.5 < d \square 0.7 2</p> <p>0.7 < d 0</p>	Minor
2	Bubbles in Polarize	<p><u>Size: d mm</u> <u>Acceptable Qty in active area</u></p> <p>d \square 0.3 Disregard</p> <p>0.3 < d \square 1.0 3</p> <p>1.0 < d \square 1.5 1</p> <p>1.5 < d 0</p>	Minor
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



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Reliability

Content of Reliability Test

Environmental Test			
Test Item	Content of Test	Test Condition	Applicable Standard
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	—
Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30°C 200hrs	—
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	—
High Temperature Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	80°C,90%RH 96hrs	—
High Temperature Humidity Operation	Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.	70°C,90%RH 96hrs	—
Temperature Cycle	Endurance test applying the low and high temperature cycle. -30°C 25°C 80°C 30min 5min 30min 1 cycle	-30°C/80°C 10 cycles	—
Mechanical Test			
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 15mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Zfor Each 15 minutes	—
Others			
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



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Backlight Information

Specification

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Supply Current	I _{LED}	80	100	150	mA	V=4.2V
Supply Voltage	V	4.0	4.2	4.4	V	-
Reverse Voltage	V _R	-	-	8	V	-
Luminous Intensity	I _V	14	18	-	cd/m ²	I _{LED} =100mA
Wave Length	λ _p	560	570	580	nm	I _{LED} =100mA
Life Time	-	-	50K	-	Hr.	I _{LED} □100mA
Color	Yellow Green					

Note: 1. The Luminous intensity is measured through LCD panel.

2.The LED of B/L is drive by current only, drive voltage is for reference only. drive voltage can make driving current under safety area (current between minimum and maximum).

LCM Sample Estimate Feedback Sheet

All Shore Industries, Inc. One Edgewater Plaza, Staten Island, NY 10305



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Module Number : _____

Page: 1

1、 Panel Specification :

- | | | |
|----------------------------|-------------------------------|-------------------------------|
| 1. Panel Type : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 2. View Direction : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 3. Numbers of Dots : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 4. View Area : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 5. Active Area : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 6. Operating Temperature : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 7. Storage Temperature : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 8. Others : | | |

2、 Mechanical Specification :

- | | | |
|-----------------------------|-------------------------------|-------------------------------|
| 1. PCB Size : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 2. Frame Size : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 3. Material of Frame : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 4. Connector Position : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 5. Fix Hole Position : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 6. Backlight Position : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 7. Thickness of PCB : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 8. Height of Frame to PCB : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 9. Height of Module : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 10. Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |

3、 Relative Hole Size :

- | | | |
|-----------------------------|-------------------------------|-------------------------------|
| 1. Pitch of Connector : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 2. Hole size of Connector : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 3. Mounting Hole size : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 4. Mounting Hole Type : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 5. Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |



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4. Backlight Specification :

- | | | |
|---|-------------------------------|-------------------------------|
| 1.B/L Type : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 2.B/L Color : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 3.B/L Driving Voltage
(Reference for LED Type) : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 4.B/L Driving Current : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 5.Brightness of B/L : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 6.B/L Solder Method : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 7.Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |

5. Electronic Characteristics of Module :

- | | | |
|-----------------------------|-------------------------------|-------------------------------|
| 1.Input Voltage : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 2.Supply Current : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 3.Driving Voltage for LCD : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 4.Contrast for LCD : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 5.B/L Driving Method : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 6.Negative Voltage Output : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 7.Interface Function : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 8.LCD Uniformity : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 9.ESD test : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |
| 9.Others : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , |

6. Summary :

Sales signature :

Customer Signature : _____ **Date :** / /

The information presented in this datasheet has been carefully checked and is believed to be accurate; however, no responsibility is assumed for inaccuracies. Information contained herein is for selection purposes only, and is subject to change without notice. Please contact ASI for current datasheets prior to designing.