



**SPECIFICATION FOR
LIQUID CRYSTAL DISPLAY MODULE**

MODULE # : ASI_-162DS-GF-_YS/W

- (1) NUMBER OF CHARACTERS----- 16 CH * 2 LINE
- (2) MODULE SIZE ----- 85.0 W * 36.0 H * 15.0 mm
- (3) EFFECTIVE AREA----- 64.5 W * 16.0 H mm
- (4) CHARACTER PATTERN----- 5 * 7 DOTS + CURSOR
- (5) CHARACTER SIZE ----- 2.96 W * 4.86 H mm
- (6) CHARACTER PITCH----- 3.55 mm
- (7) DOT SIZE ----- 0.56 W * 0.66 H mm
- (8) DOT PITCH----- 0.60 W * 0.70 H mm



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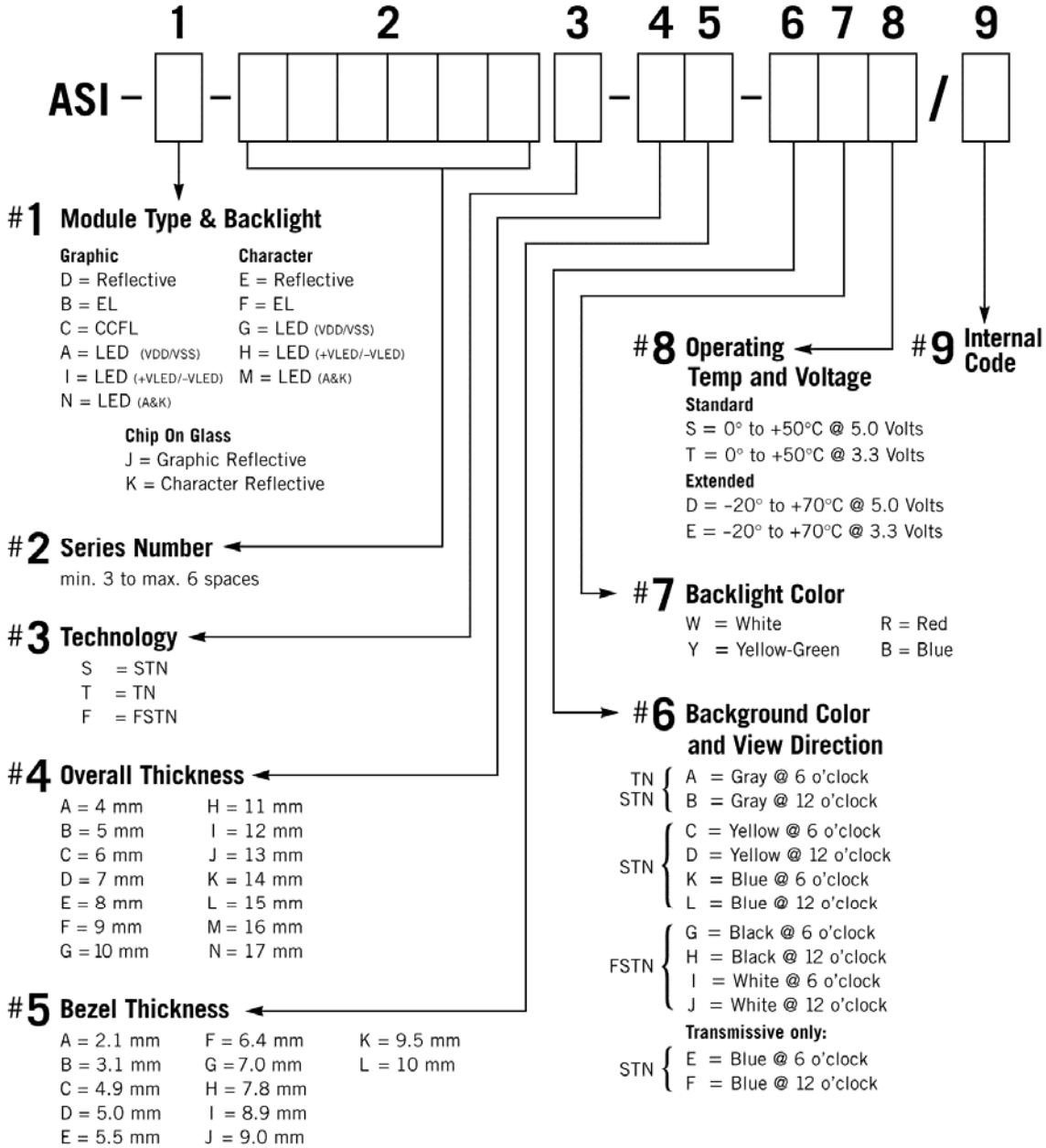
RECORD OF REVISION

DATE	PAGE	SUMMARY



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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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3. General specifications

3.1 General specifications

*PLEASE REFER TO:
"CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-12780)".*

3.2 This individual specification is prior to general specifications

4. Mechanical data

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5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

<i>ITEM</i>	<i>SYMBOL</i>	<i>MIN.</i>	<i>MAX.</i>	<i>UNIT</i>	<i>COMMENT</i>
POWER SUPPLY FOR LOGIC	V _{DD} -V _{SS}	0	6.0	V	-----
INPUT VOLTAGE	V _I	V _{SS}	V _{DD}	V	-----
STATIC ELECTRICITY	-----	-----	100	V	NOTE (1)
POWER SUPPLY FOR LED	V _{LED}	-----	NOTE(2)	V	-----

NOTE (1): ELECTRO-STATIC DISCHARGE RESISTANCE IS TESTED BY CHARGING A 200PF CAPACITOR AND DISCHARGING IT BY CONTACT WITH A INTERFACE CONNECTOR PIN.

NOTE (2):

<i>SYMBOL</i>	<i>V_{LED} MAX.</i>	<i>LED TYPE</i>
V _{LED}	5.5V	YELLOW-GREEN,AMBER,ORANGE,RED
	5.0V	BLUE,PURE GREEN,WHITE

5.2 Environmental absolute maximum ratings

<i>ITEM</i>	<i>CONDITION</i>	<i>OPERATING</i>		<i>STORAGE</i>		<i>COMMENT</i>
		<i>MIN.</i>	<i>MAX.</i>	<i>MIN.</i>	<i>MAX.</i>	
AMBIENT TEMPERATURE	NORMAL	0°C	50°C	-20°C	70°C	-----
	WIDE	-20°C	70°C			
HUMIDITY	-----	NOTE (2)		NOTE (2)		NO CONDENSATION
VIBRATION NOTE (3)	-----	-----	0.5G	-----	2G	10~300Hz XYZ DIRECTIONS 1 Hr EACH
SHOCK NOTE (3)	-----	-----	3G	-----	50G	10 msec XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	-----	NOT ACCEPTABLE		NOT ACCEPTABLE		-----

NOTE (2): T_a ≤ 50°C: 90% RH MAX.

T_a > 50°C: ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90% RH AT 50°C. (80%RH AT 60°C)

NOTE (3): 1G = 9.8 m/s²


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6. Electrical characteristics

$T_a = 25^\circ \text{ VDD} = 5.0 \pm 0.25 \text{ V}$

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	
INPUT VOLTAGE	V _{IH}	-----	2.2	-----	-----	V	
	V _{IL}	-----	-----	-----	0.6	V	
OUTPUT VOLTAGE	V _{OH}	I _{OH} = 0.205 mA	2.4	-----	-----	V	
	V _{OL}	I _{OL} = 1.2 mA	-----	-----	0.4	V	
POWER SUPPLY CURRENT	I _{DD}	V _{DD} = 5.0V	-----	1.0	1.5	mA	
RECOMMENDED LCD DRIVING VOLTAGE, NOTE(1)	V _{DD} -V _O	STN/ FSTN DUTY =1/16 Φ=10° NOTE(2)	T _a =-20°C	-----	4.8	-----	V
			T _a = 0°C	-----	4.7	-----	V
			T _a = 25°C	-----	4.5	-----	V
			T _a = 50°C	-----	4.3	-----	V
			T _a = 70°C	-----	4.2	-----	V
		TN DUTY =1/16 Φ=25° NOTE(2)	T _a =-20°C	-----	4.7	-----	V
			T _a = 0°C	-----	4.6	-----	V
			T _a = 25°C	-----	4.2	-----	V
			T _a = 50°C	-----	3.8	-----	V
			T _a = 70°C	-----	3.7	-----	V
POWER SUPPLY CURRENT FOR NOTE(3)	I _{LED}	V _{LED} NOTE(3)	-----	30	40	mA	

NOTE (1): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT $\pm 0.5\text{V}$ BY EACH MODULE.

- (2): $\theta = 0^\circ$: VIEWING ANGLE AT 6 O'CLOCK
 $\theta = 180^\circ$: VIEWING ANGLE AT 12 O'CLOCK

(3): LED CURRENT OF DIFFERENT LED TYPE

LED B.L TYPE	V _{LED}	I _{LED}				LED COLOR
		MIN.	TYP.	MAX.	UNIT.	
A	4.8V	-----	30	40	mA	YELLOW-GREEN、AMBER、ORANGE、RED
B	4.0V	-----	30	40	mA	BLUE、WHITE、PURE GREEN


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7. Optical characteristics
Ta = 25° VDD= 5.0V
TN TYPE LCD
Ta = 25 °C V_{DD}-V_O = 4.2V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	Φ2-Φ1	K = 1.4 NOTE(1)	20	30	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 25° NOTE(1)	2.0	3.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	Φ = 25° NOTE(1)	----	150	250	ms	NOTE(2)
	tf (fall)	Φ = 25° NOTE(1)	----	150	250	ms	NOTE(2)

STN TYPE LCD
Ta = 25 °C V_{DD}-V_O = 4.5V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	Φ2-Φ1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 10° NOTE(1)	3.0	4.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	Φ = 10° NOTE(1)	----	200	350	ms	NOTE(2)
	tf (fall)	Φ = 10° NOTE(1)	----	300	400	ms	NOTE(2)

FSTN /STN BLUE TYPE LCD
Ta = 25 °C V_{DD}-V_O = 4.5V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	Φ2-Φ1	K = 2.0 NOTE(1)	30	40	----	deg.	NOTE(2)
CONTRAST RATIO	K	Φ = 10° NOTE(1)	4.0	5.0	----	----	NOTE(2)
RESPONSE TIME	tr (rise)	Φ = 10° NOTE(1)	----	200	350	ms	NOTE(2)
	tf (fall)	Φ = 10° NOTE(1)	----	300	400	ms	NOTE(2)

Brightness for LED backlight

SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	LED TYPE	NOTE
B	Φ = 0° θ = 0°	4.0	----	----	cd/m ²	YELLOW-GREEN、RED、 AMBER、ORANGE	NOTE(2)
		6.0	----	----		BLUE、PURE GREEN、 WHITE	NOTE(3)

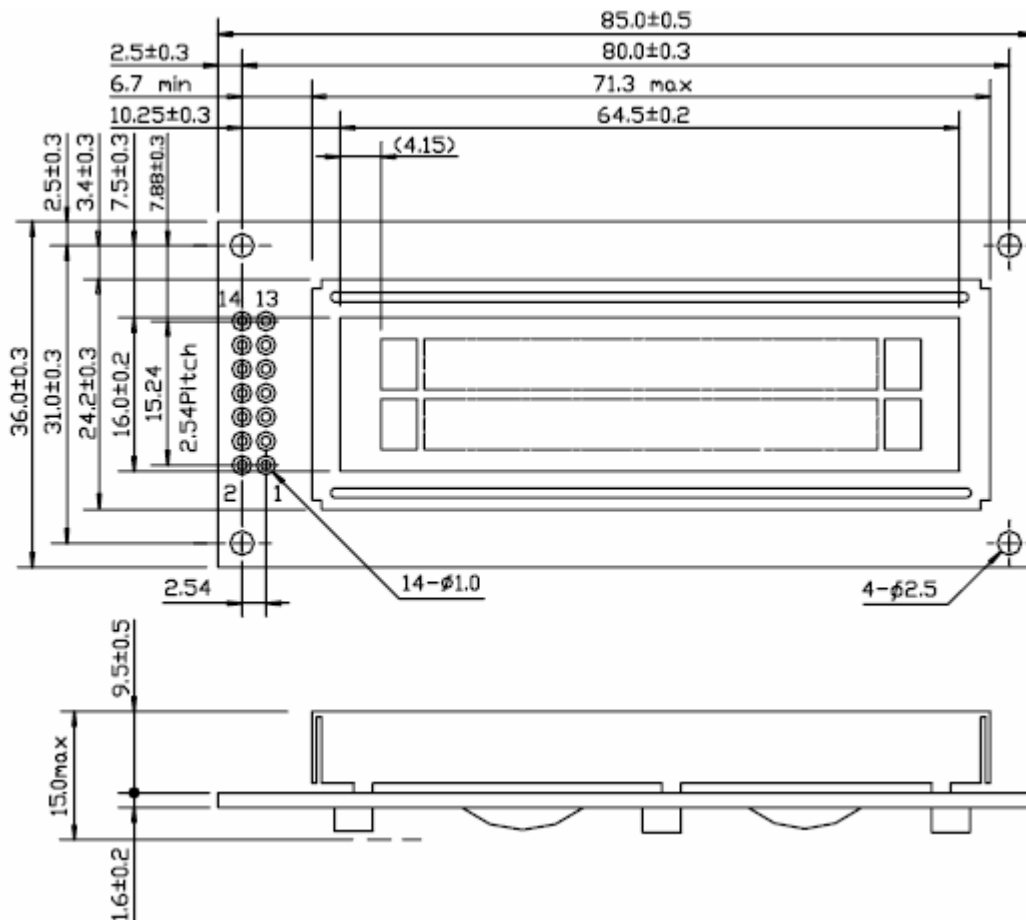
NOTE (1): θ = 0° WHEN VIEWING ANGLE AT 6 O'CLOCK
θ = 180° WHEN VIEWING ANGLE AT 12 O'CLOCK

(2): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR
DEFINITION OF OPTICAL CHARACTERISTICS.

(3): UNDER NORMAL TEMPERATURE AND HUMIDITY IN A DARK ROOM.

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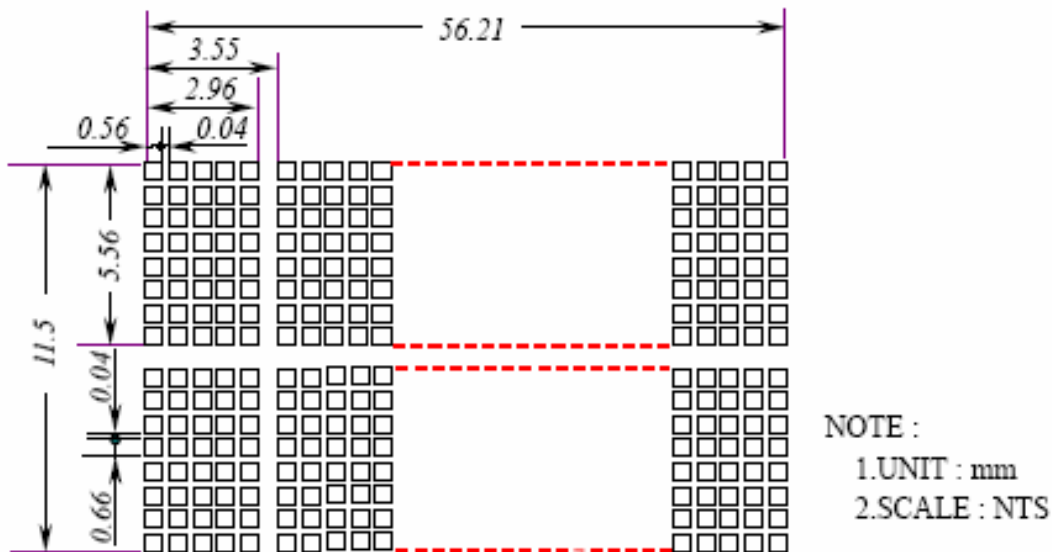
8. Outline dimension



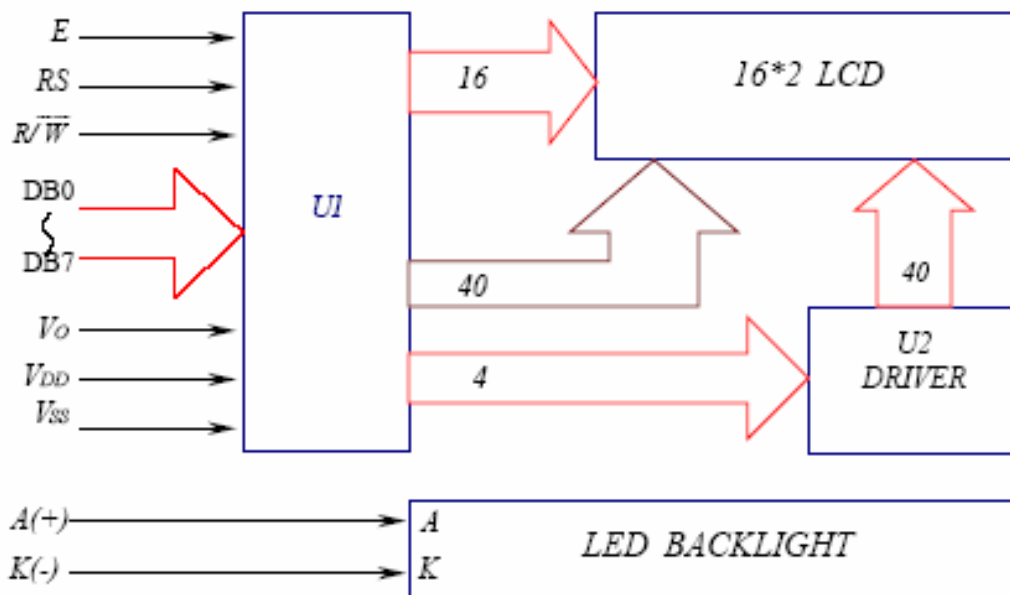
Interface pin connection

PIN NO.	1	2	3	4	5	6	7
SYMBOL	VSS	VDD	VO	RS	R/W	E	DB0
PIN NO.	8	9	10	11	12	13	14
SYMBOL	DB1	DB2	DB3	DB4	DB5	DB6	DB7

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9 Block diagram



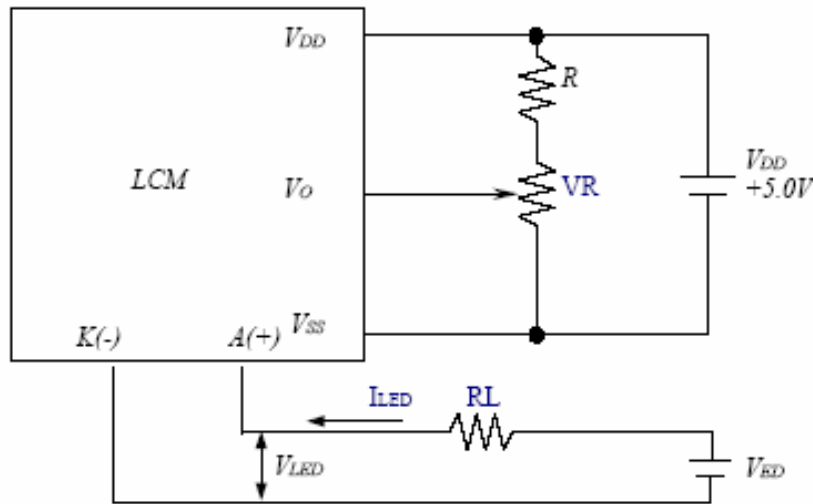


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Display data address charts

Character	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
LINE 2	40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F

10. Power supply for LCM



RECOMMENDED RESISTOR R : $V_{DD}-V_o \geq 1.5V$
 $V_{DD}-V_o$: LCD DRIVING VOLTAGE
 VR: 10KΩ~20KΩ

ITEM	LED TYPE	CONDITION
Limit resistor of LED (RL)	A	$RL \geq ((V_{ED}-4.8V) / I_{LED})$, $I_{LED} \leq 40mA$
	B	$RL \geq ((V_{ED}-4.0V) / I_{LED})$, $I_{LED} \leq 40mA$



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