



ALL SHORE INDUSTRIES, INC.

SPECIFICATION FOR LIQUID CRYSTAL DISPLAY MODULE

MODEL #: ASI-G-204B-/P

(1)	NUMBER OF CHARACTER	-----	20 CH X 4 LINES
(2)	MODULE SIZE	-----	77.0W X 47.0H X 12.2T (max.) mm
(3)	EFFECTIVE AREA	-----	60.0W X 22.0H mm
(4)	CHARACTER FONT	-----	5 X 7 DOTS + CURSOR
(5)	CHARACTER SIZE	-----	2.30W X 4.03H mm
(6)	DOT SIZE	-----	0.42W X 0.46H mm
(7)	DOT PITCH	-----	0.47W X 0.51H mm
(8)	LCD TYPE	-----	STN YELLOW, GRAY
(9)	DRIVING METHOD	-----	1 / 16 DUTY MULTIPLEX DRIVE
(10)	VIEWING DIRECTION	-----	6 or 12 O ' CLOCK
(11)	BACK - LIGHT	-----	YELLOW LED
(12)	CONTROLLER	-----	KS0066 OR SED1278

**MODEL NO : ASI-G-204B-/P**

RECORDS OF REVISION			DOC . FIRST ISSUE DEC.12,1999
DATE	REVISED DRAWING NO.	SUMMARY	



MODEL NO : ASI-G-204B-/P

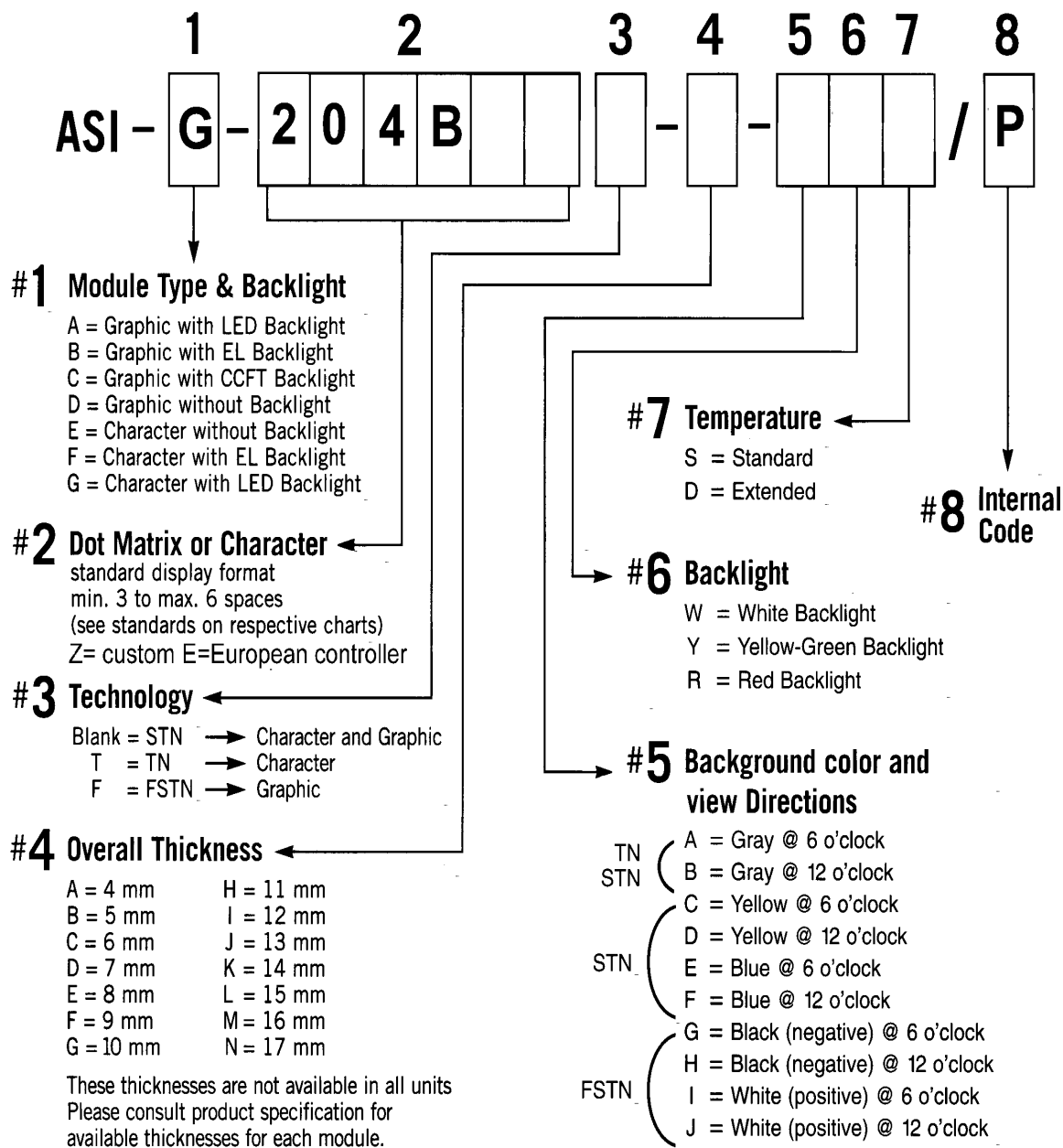
TABLE OF CONTENTS

NO.	ITEM	PAGE
1.	GENERAL SPECIFICATIONS -----	5
2.	MECHANICAL SPECIFICATIONS -----	5
3.	ABSOLUTE MAXIMUM RATINGS -----	6
4.	DC ELECTRICAL CHARACTERISTICS -----	7
5.	AC ELECTRICAL CHARACTERISTICS -----	8
6.	TIMING CHARACTERISTICS -----	9
7.	OPTICAL CHARACTERISTICS -----	10
8.	OUTLINE DIMENSION -----	11
9.	DETAIL DRAWING OF DOT MATRIX -----	12
10.	BLOCK DIAGRAM -----	12
11.	INTERFACE SIGNALS -----	13
12.	POWER SUPPLY -----	14
13.	CHARACTER PATTERN -----	15
14.	DISPLAY COMMANDS -----	16



MODEL NO : ASI-G-204B-/P

LCD MODULE PART NUMBERING SYSTEM





MODEL NO : ASI-G-204B-/P

1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER : KS0066 or SED1278

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

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3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
POWER SUPPLY FOR LOGIC	VDD	-3.0	7.0	V
POWER SUPPLY FOR LCD DRIVE	VO	-0.3	VDD+0.3	V
INPUT VOLTAGE	VIN	-0.3	VDD+0.3	V

3.2 LED BACKLIGHT CHARACTERISTICS

3.2.1 MAXIMUM RATINGS

PARAMETER	SYMBOL	CONDITION	MIN.	MAX.	UNIT
REVERSE VOLTAGE	VR	Ta=25°C	8	10	V
OPERATING TEMPERATURE	TOPR	----	0	50	°C
STORAGE TEMPERATURE	TSTG	----	-20	70	°C

3.2.2 ELECTRICAL RATINGS

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
FORWARD VOLTAGE	VF	IF=150 mA	----	4.2	----	V
REVERSE CURRENT	IR	VR=8V	----	----	0.2	mA
LUMINOUS INTENSITY	IV	IF=150 mA	200	250	----	cd/m ²
WAVELENGTH	λ_p	YELLOW GREEN	565	568	571	nm



MODEL NO : ASI-G-204B-/P

3.3 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

I T E M	OPERATING		STORAGE		COMMENT
	MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	0°C	50°C	-10 °C	60 °C	NOTE (2)
HUMIDITY *	SEE NOTE 3		SEE NOTE 3		WITHOUT CONDENSATION
VIBRATION	--	4 . 9 m /s ² (0.5G)	--	1 9 . 6 m /s ² (2G)	
SHOCK	--	2 9 . 4 m /s ² (3G)	--	490.0 m /s ² (50G)	XYZ DIRECTIONS
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

* No dew to be found

NOTE(2) : Ta AT 60 ° C : 50HR MAX.

NOTE (3) : Ta ≤ 40 ° C : 90% RH MAX.

Ta > 40 ° C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 40 °C.

4. DC ELECTRICAL CHARACTERISTICS

(VDD=+5V+/-10%, VSS=0V, Ta=25°C)

PARAMETER	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT
LOGIC SUPPLY VOLTAGE	VDD	----	4.5	----	5.5	V
H LEVEL INPUT VOLTAGE	VIH1	----	2.0	----	VDD	V
L LEVEL INPUT VOLTAGE	VIL1	----	VSS	----	0.8	V
H LEVEL OUTPUT VOLTAGE	VOH1	----	2.4	----	----	V
L LEVEL OUTPUT VOLTAGE	VOL1	----	----	----	0.4	V

**MODEL NO : ASI-G-204B-/P****5. AC ELECTRICAL CHARACTERISTICS****Read Cycle**

(Vdd=+5V+/-10%, Vss=0V, Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Pin
Enable cycle time	t_c	500	---	---	ns	E
Enable "H" level pulse width	t_w	220	---	---	ns	E
Enable rise/fall time	t_r, t_f	---	---	25	ns	E
RS, R/W setup time	t_{su}	40	---	---	ns	RS, R/W
RS, R/W address hold time	t_h	10	---	---	ns	RS, R/W
Read data output delay	t_d	60	---	120	ns	DB0~DB7
Read data hold time	t_{DH}	20	---	---	ns	DB0~DB7

Write Cycle

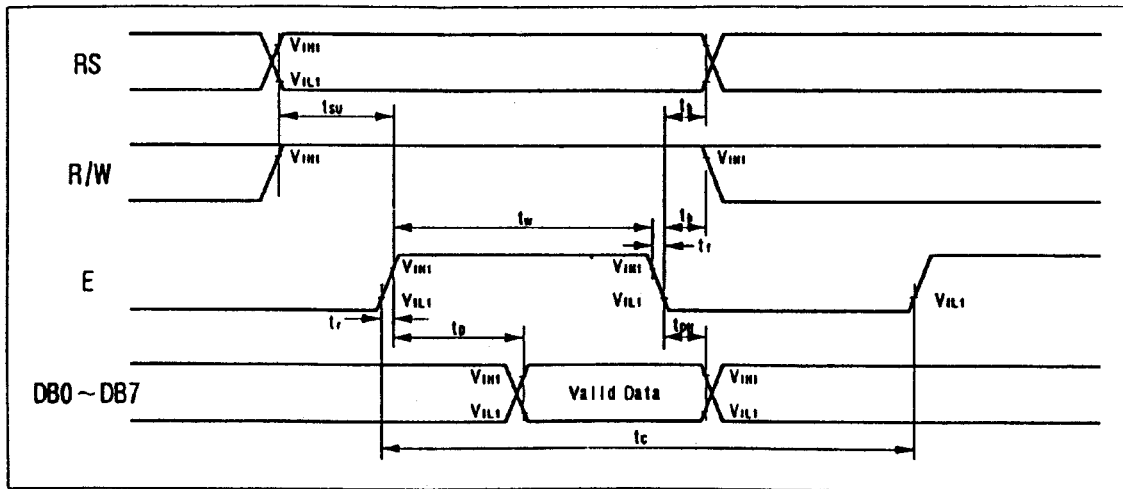
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Pin
Enable cycle time	t_c	500	---	---	ns	E
Enable "H" level pulse width	t_w	220	---	---	ns	E
Enable rise/fall time	t_r, t_f	---	---	25	ns	E
RS, R/W setup time	T_{su1}	40	---	---	ns	RS, R/W
RS, R/W address hold time	T_{h1}	10	---	---	ns	RS, R/W
Read data output delay	T_{su2}	60	---	---	ns	DB0~DB7
Read data hold time	t_{DH}	20	---	---	ns	DB0~DB7



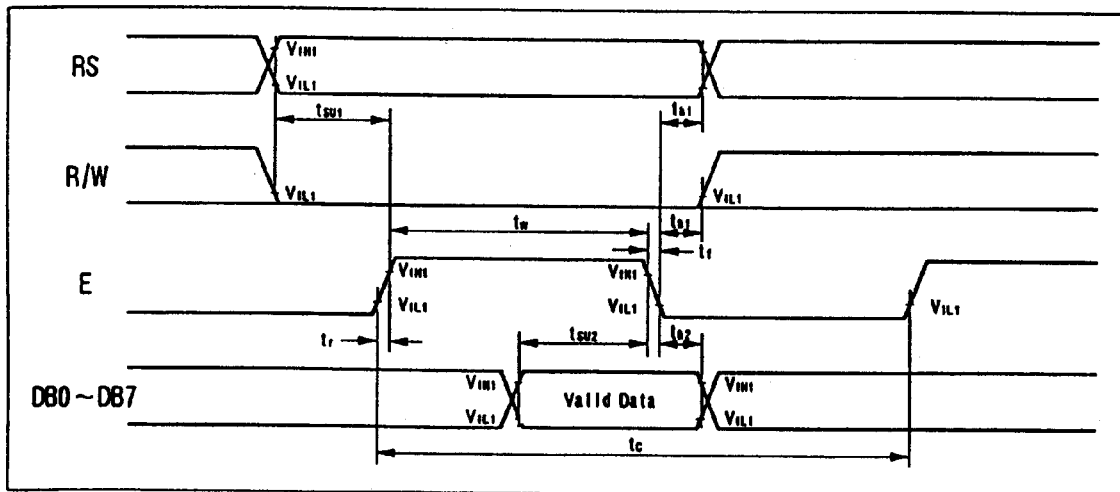
MODEL NO : ASI-G-204B-/P

6. TIMING CHARACTERISTICS

Read cycle



Write cycle



**MODEL NO : ASI-G-204B-/P****7 . OPTICAL CHARACTERISTICS .**

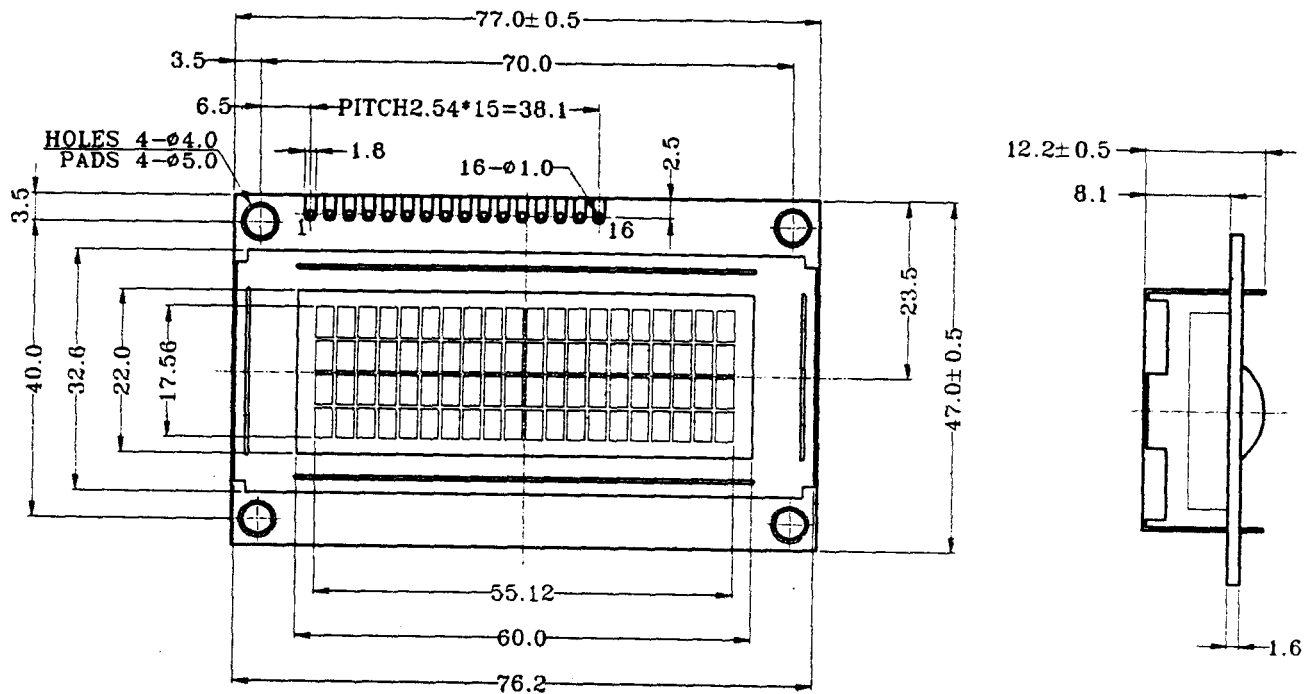
Ta = 25°C VDD = 5.0 V

I T E M	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT	NOTE
VIEW ANGLE	$\phi 2 - \phi 1$	K = 2.0	60	----	----	deg .	1
CONTRAST RATIO	K	$\phi = 10^\circ$ $\theta = 0^\circ$	5	----	-----	-----	2
RESPONSE TIME	tr (rise)	$\phi = 10^\circ$ $\theta = 0^\circ$	----	150	250	ms	3
	tf (fall)	$\phi = 10^\circ$ $\theta = 0^\circ$	----	200	300	ms	

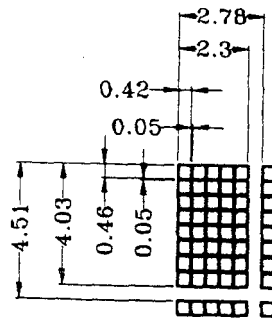


MODEL NO : ASI-G-204B-/P

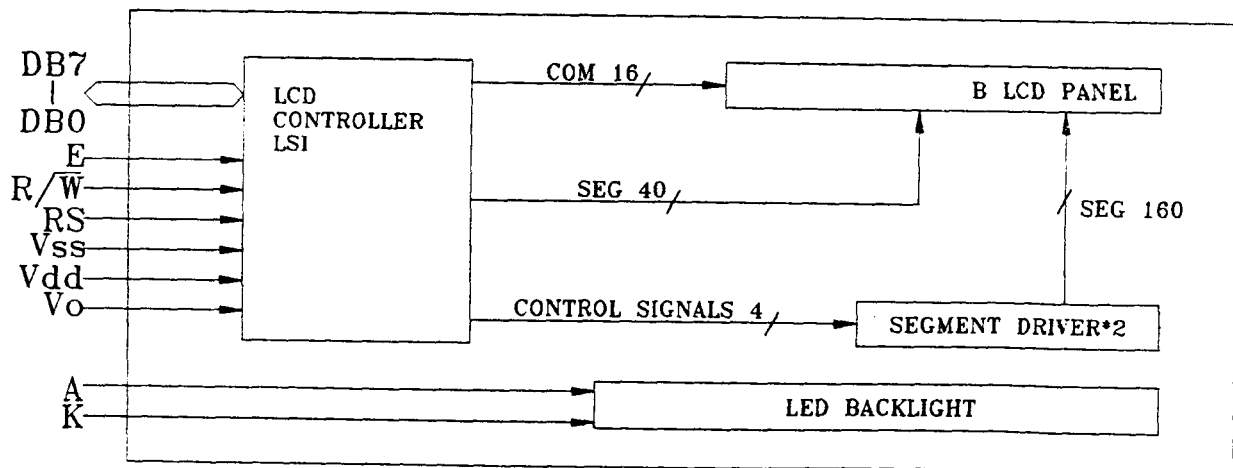
8. OUTLINE DIMENSION



PIN NO.	SIGNAL
1	Vss
2	Vdd
3	Vo
4	RS
5	R/ \overline{W}
6	E
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7

MODEL NO : ASI-G-204B-/P9. DETAIL DRAWING OF DOT MATRIX

SCALE:4/1

10. BLOCK DIAGRAMThe tolerance unless classified $\pm 0.3\text{mm}$



MODEL NO : ASI-G-204B-/P

11 . INTERFACE SIGNALS

PIN NO.	SYMBOL	FUNCTION
1	VSS	SIGNAL GROUND (GND)
2	VDD	POWER SUPPLY FOR LOGIC (+5V)
3	VO	OPERATING VOLTAGE FOR LCD (VARIABLE)
4	RS	REGISTER SELECTION INPUT HIGH = DATA REGISTER LOW = INSTRUCTION REGISTER (FOR WRITE) BUSY FLAG ADDRESS COUNTER (FOR READ)
5	R/W	R/W SIGNAL INPUT IS USED TO SELECT THE READ/WRITE MODE HIGH = READ MODE, LOW = WRITE MODE
6	E	START ENABLE SIGNAL TO READ OR WRITE THE DATA
7-10	DB0 - DB3	FOR LOW ORDER BI-DIRECTIONAL THREE-STATE DATA BUS LINES. USED FOR DATA TRANSFER BETWEEN THE MPU AND THE LCD MODULE. THESE FOUR ARE NOT USED DURING 4-BIT OPERATION.
11-14	DB4 - DB7	FOR HIGH ORDER BI-DIRECTIONAL THREE-STATE DATA BUS LINES. USED FOR DATA TRANSFER BETWEEN THE MPU AND THE LCD MODULE. DB7 CAN BE USED AS A BUSY FLAG
15	A	POWER SUPPLY FOR LED BACKLIGHT (+)
16	K	POWER SUPPLY FOR LED BACKLIGHT (-)

MODEL NO : ASI-G-204B-/P**12 . POWER SUPPLY****12.1 LED CHARACTERISTICS**

Long life, low power consumption and simple power supply. Three different colors of red, green and orange are available, or color can be changed alternatively. Two backlight types are available, array illumination and edge illumination.

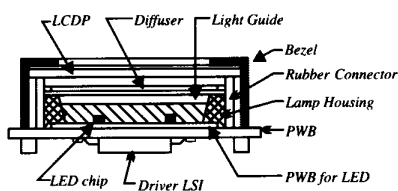
Features

- Low voltage driving(DC)is available without inverter.
- Long life time 100,000 hours (average)
- No noise occurrence.

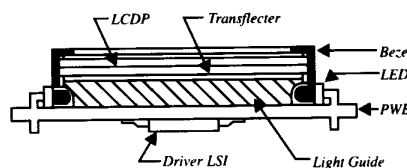
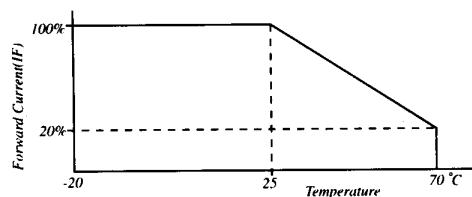
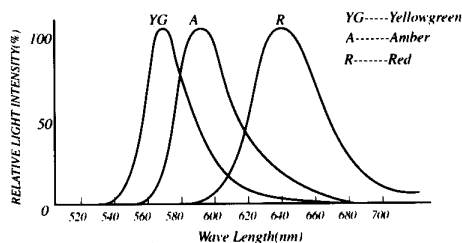
- Various color of red, green and orange etc.
(multi-color by alternative switch is also available)
- Operating characteristics of this series is
4.2V, 210mA, 250cd/m²

Array Illumination

Less quantity of chip offers even illumination.

**Edge Illumination**

Combination LED with light guide offers thin structure type of illumination.

**Electrical Characteristics(Reference Data)****Forward Current****Operating Curve****Wave Length Vs Relative Light Intensity**



MODEL NO : ASI-G-204B-/P

CHARACTER PATTERN (SO)

Lower 4 Bits	Upper 4 Bits	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	
xxxx0000	CG RAM (1)				0	a	P	`	P				一	夕	ミ	α	ρ	
xxxx0001	(2)			!	1	H	Q	a	4				。	ア	チ	厶	ǎ	q
xxxx0010	(3)			"	2	B	R	b	r				「	イ	ツ	×	Ɔ	θ
xxxx0011	(4)			#	3	C	S	c	s				」	ウ	テ	モ	ε	∞
xxxx0100	(5)			\$	4	D	T	d	t				、	エ	ト	†	μ	Ω
xxxx0101	(6)			%	5	E	U	e	u				・	オ	ナ	1	σ	Ü
xxxx0110	(7)			&	6	F	V	f	v				ヲ	カ	ニ	ヨ	ρ	Σ
xxxx0111	(8)			'	7	G	W	g	w				ア	キ	ヌ	ヲ	q	π
xxxx1000	(1)			(8	H	X	h	x				イ	ク	ネ	リ	ƒ	×
xxxx1001	(2))	9	I	Y	i	y				ウ	ツ	ル	レ	ˆ	Ÿ
xxxx1010	(3)			*	:	J	Z	j	z				エ	コ	ン	レ	j	〒
xxxx1011	(4)			+	;	K	C	k	c				オ	サ	ヒ	ロ	*	⌘
xxxx1100	(5)			,	<	L	¥	l	¥				カ	シ	フ	ワ	¢	⌘
xxxx1101	(6)			-	=	M	I	m	}				ユ	ズ	ハ	ン	も	÷
xxxx1110	(7)			.	>	N	^	n	÷				ヨ	セ	ホ	°	⌘	
xxxx1111	(8)			/	?	O	_	o	+				ッ	ソ	マ	°	ö	■



MODEL NO : ASI-G-204B-/P

DISPLAY COMMANDS

Command	RS	R/W	DB ₇	DB ₆	DB ₅	DB ₄	DB ₃	DB ₂	DB ₁	DB ₀	excution time (fosc = 250kHz)	Remark
DISPLAY CLEAR	L	L	L	L	L	L	L	L	L	H	1.64ms	
RETURN HOME	L	L	L	L	L	L	L	L	H	X	1.64ms	cursor move to first digit
ENTRY MODE SET	L	L	L	L	L	L	L	H	ID	SH	40 μ s	<div>• ID: set cursor move direction<div><div>ID</div><div>H Increase</div><div>L Decrease</div></div></div> <div>• SH: Specifies shift of display<div><div>SH</div><div>H display is shifted</div><div>L display is not shifted</div></div></div>
DISPLAY ON/OFF	L	L	L	L	L	L	H	D	C	B	40 μ S	<div>• Display<div><div>D</div><div>H Display on</div><div>L Display off</div></div></div> <div>• Cursor<div><div>C</div><div>H Cursor on</div><div>L Cursor off</div></div></div> <div>• Blinking<div><div>B</div><div>H Blinking on</div><div>L Blinking off</div></div></div>
SHIFT	L	L	L	L	L	H	S/C	R/L	X	X	40 μ S	<div><div>SC</div><div>H Display shift</div><div>L Cursor move</div></div> <div><div>R/L</div><div>H Right shift</div><div>L Left shift</div></div>
SET FUNCTION	L	L	L	L	H	DL	N	F	X	X	40 μ S	<div><div>DL</div><div>H 8 bits interface</div><div>L 4 bits interface</div></div> <div><div>N</div><div>H 2 line display</div><div>L 1 line display</div></div> <div><div>F</div><div>H 5X10 dots</div><div>L 5X7 dots</div></div>
SET CG RAM ADDRESS	L	L	L	H	CG RAM address (corresponds to cursor address)						40 μ S	CG RAM Data is sent and received after this setting
SET DO RAM ADDRESS	L	L	H	DO RAM address						40 μ S	DO RAM Data is sent and received after this setting	
READ BUSY FLAG & ADDRESS	L	H	BF	Address Counter used for Both DO & CG RAM address						0 μ S	<div><div>BF</div><div>H Busy</div><div>L Ready</div></div> <div>— Reads BF indication internal operating is being performed.</div> <div>— reads address counter contents</div>	
WRITE DATA	H	L	Write Data								46 μ S	Write data into DO or CG RAM
READ DATA	H	H	Read Data								46 μ S	Read data from DO or CGRAM

X: Don't care.