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CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL :

40400 (LED TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE : _____

BY : _____

MODEL :	VERSION
40400 (LED TYPES)	2

NUMBERING SYSTEM

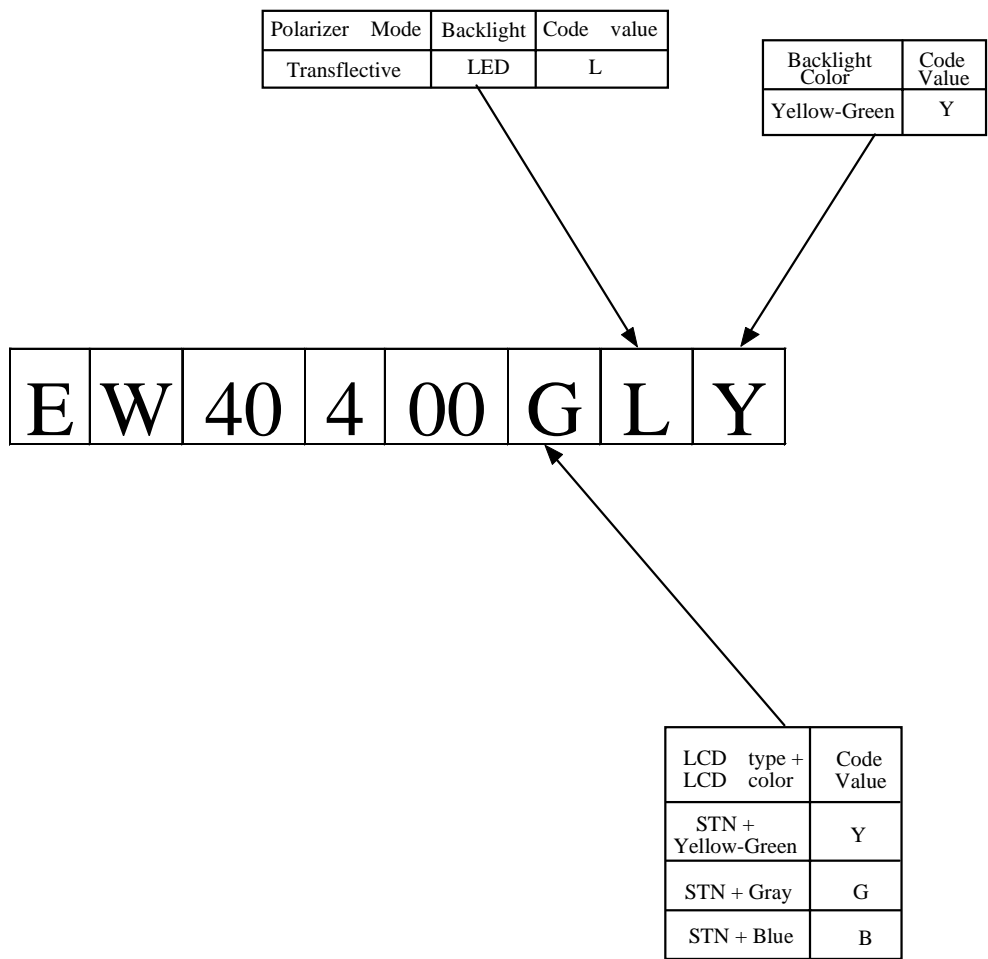


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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - 0 0 2 A

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER :

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - K S 0 0 6 6

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF CHARACTER ----- 40 CH * 4 LINES
- (2) MODULE SIZE ----- 190.0W * 54.0H * 14.5D (max.) mm
- (3) EFFECTIVE AREA ----- 149.0W * 31.0H mm
- (4) CHARACTER FONT ----- 5 * 7 DOTS + CURSOR
- (5) CHARACTER SIZE ----- 2.78W * 4.89H mm
- (6) CHARACTER PITCH ----- 3.53W * 5.49H mm
- (7) DOT SIZE ----- 0.50W * 0.55H mm
- (8) DOT PITCH ----- 0.57W * 0.62H mm
- (9) LCD TYPE *
- (10) DRIVING METHOD ----- 1 / 16 DUTY MULTIPLEX DRIVE
- (11) BACK - LIGHT ----- LED, COLOR : YELLOW-GREEN

* PLEASE REFER TO NUMBERING SYSTEM

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS . (AT Ta = 25 °C)

PARAMETER	SYMBOL	MIN .	MAX .	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD - VSS	0	7.0	V	
POWER SUPPLY FOR LCD DRIVE	VDD - VO	0	13.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER DISSIPATION	PD	—	4.4	W	
LED FORWARD CURRENT	IF	—	880	mA	
LED REVERSE VOLTAGE	VR	—	8	V	

NOTE (1) : TEST METHOD AND CONDITIONS :
 AFTER CHARGING UP 200 PF CAPACITOR BY STATED VOLTAGE , THE CAPACITOR IS CONNECTED WITH INTERFACE PINS OF THE MODULE .

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS .

I T E M	OPERATING		STORAGE		REMARK
	MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	-20 °C	70 °C	-30 °C	80 °C	NOTE (2), (3)
HUMIDITY	—	90 % RH	—	90 % RH	WITHOUT CONDENSATION
VIBRATION	—	4.9 m/s ² (0.5 G)	—	19.6 m/s ² (2 G)	
SHOCK	—	29.4 m/s ² (3 G)	—	490.0 m/s ² (50 G)	XYZ DIRECTIONS
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT (-30°C) : 48HR MAX .
 (80 °C) : 168HR MAX .

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

4. ELECTRICAL CHARACTERISTICS

Ta = 25°C

VDD = 5.0 ± 0.25 V

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
H LEVEL INPUT VOLTAGE	VIH	—	2.2	—	—	V
L LEVEL INPUT VOLTAGE	VIL	—	—	—	0.6	V
H LEVEL OUTPUT VOLTAGE	VOH	-IOH = 0.2 mA	2.4	—	—	V
L LEVEL OUTPUT VOLTAGE	VOL	IOL = 1.2 mA	—	—	0.4	V
POWER SUPPLY CURRENT (LOGIC)	IDD	VDD = 5.0 V	—	4.0	10.0	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD - VO ∅ = 10° θ = 0° DUTY = 1/16	Ta = -20 °C	—	4.4	—	V
		Ta = 25 °C	—	4.4	—	V
		Ta = 70 °C	—	4.4	—	V
CLOCK OSCILLATION FREQUENCY	Fosc	Ta = 25 °C	—	270	—	KHZ
LED FORWARD VOLTAGE	VF	IF = 460 mA	—	4.2	4.6	V
LED FORWARD CURRENT	IF	—	—	460	—	mA
LED REVERSE CURRENT	IR	VR = 8 V	—	—	200	uA

5. OPTICAL CHARACTERISTICS .

Ta = 25 °C

VDD = 5.0 V

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE	
VIEWING AREA	∅ 2 - ∅ 1	K ≥ 1.4	30	—	—	deg.	1	
CONTRAST RATIO	K	∅ = 10° θ = 0°	—	5	—	—	1	
RESPONSE TIME	tr (rise)	∅ = 10° θ = 0°	Ta = -20°C	—	5538	—	ms	1
			Ta = 25°C	—	228	—		
			Ta = 70°C	—	104	—		
	tf (fall)		Ta = -20°C	—	2316	—		
			Ta = 25°C	—	174	—		
			Ta = 70°C	—	85	—		
THE BRIGHTNESS OF BACKLIGHT	L	IF = 460 mA	35	50	—	cd/m ²	1,2	
PEAK EMISSION WAVELENGTH	λP	IF = 460 mA	—	570	—	nm	1	

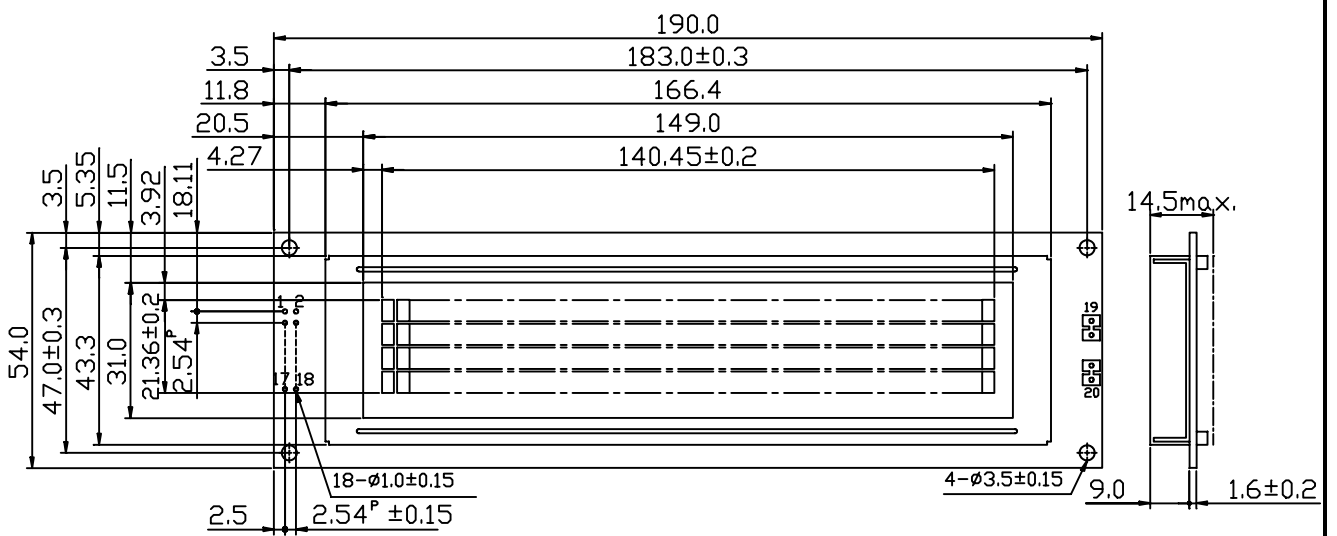
NOTE (1) : PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATION : EU-002A

NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

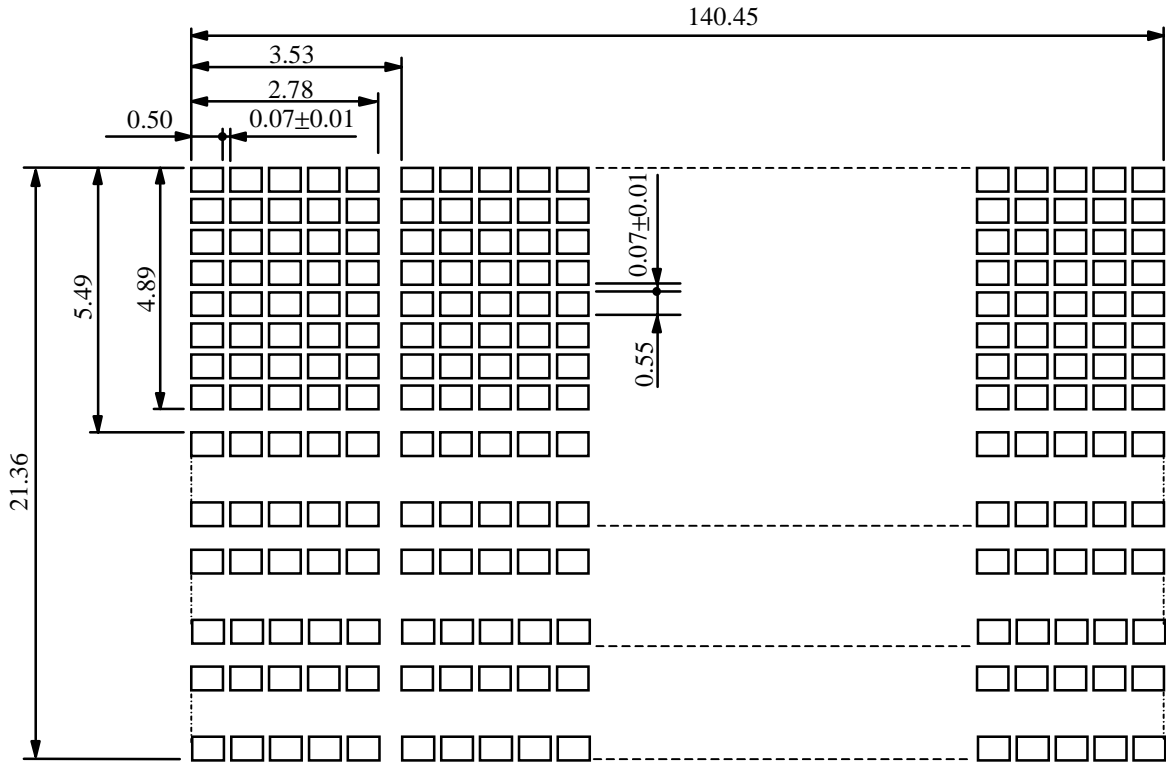
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6. OUTLINE DIMENSION



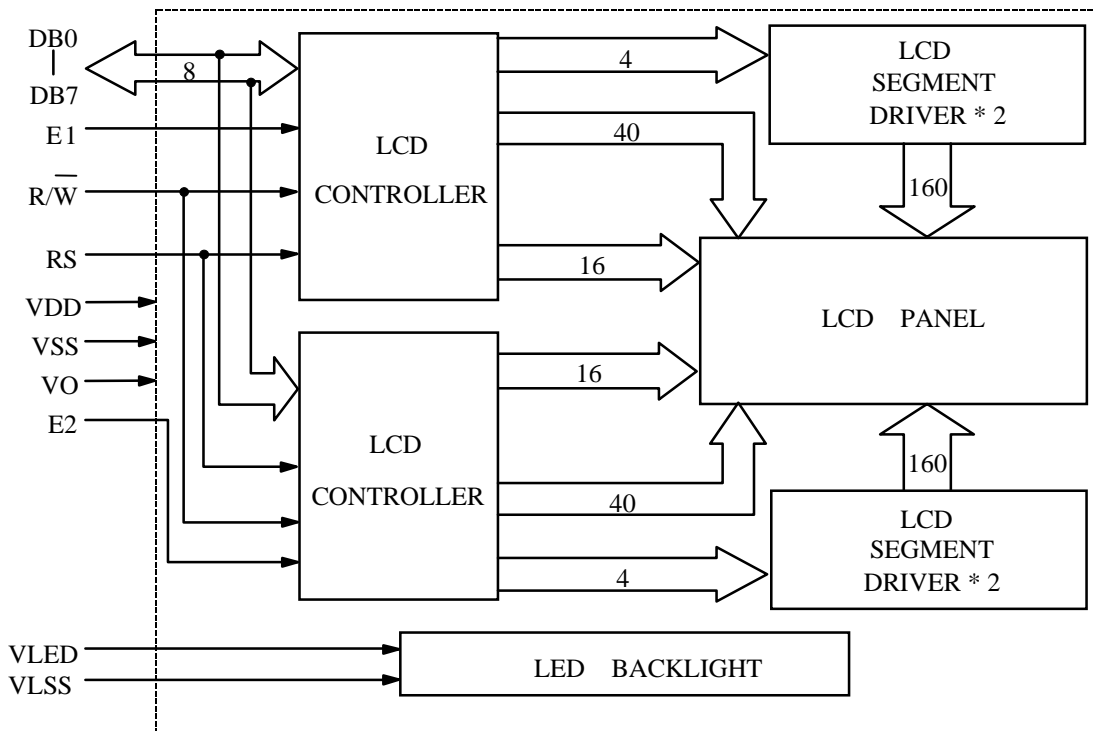
UNIT : mm
 SCALE : NTS
 NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



UNIT : mm
 SCALE : NTS
 NOT SPECIFIED TOLERANCE IS ±0.1

8. BLOCK DIAGRAM

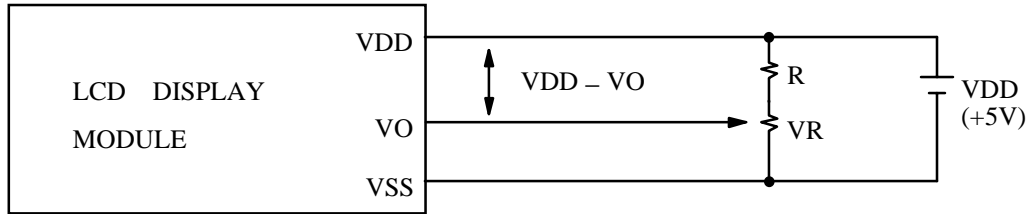


9. INTERFACE SIGNALS

PIN NO.	SYMBOL	DESCRIPTION	FUNCTION
1	DB7	DATA INPUT/OUTPUT LINES	4 BIT/8BIT SELECTABLE 4 BIT : DB4 - DB7 8 BIT : DB0 - DB7
2	DB6		
3	DB5		
4	DB4		
5	DB3		
6	DB2		
7	DB1		
8	DB0		
9	E1	ENABLE INPUT	
10	$\overline{R/W}$	READ/WRITE SELECTION	$\overline{R/W} = 0$: REGISTER WRITE $\overline{R/W} = 1$: REGISTER READ
11	RS	INSTRUCTION/DATA REGISTER SELECTION	RS = 0 : INSTRUCTION REGISTER RS = 1 : DATA REGISTER
12	VO	LCD CONTRAST ADJUSTMENT	
13	VSS	GROUND	0V (GND)
14	VDD	POWER SUPPLY FOR LOGIC CIRCUIT	+5V
15	E2	ENABLE INPUT	
16	NC	NO CONNECTION	
17	NC	NO CONNECTION	
18	NC	NO CONNECTION	
19	VLED	POWER SUPPLY FOR LED BACKLIGHT (ANODE)	
20	VLSS	POWER SUPPLY FOR LED BACKLIGHT (CATHODE)	0V (GND)

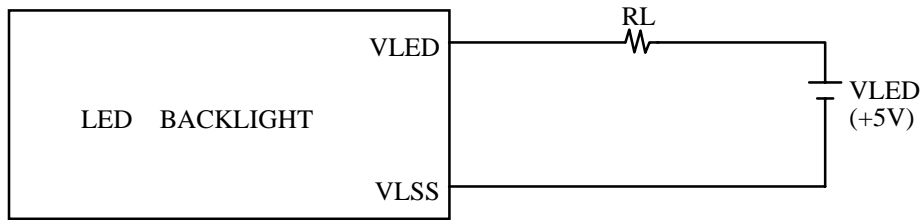
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



VDD - VO : LCD DRIVING VOLTAGE
 RECOMMENDED RESISTOR R : $VDD - VO \geq 1.5 V$
 VR : 10KΩ ~ 20KΩ

10.2 POWER SUPPLY FOR EL BACKLIGHT



RECOMMENDED RESISTOR RL : 2.3Ω, 1/2 WATT (CONTROLLED BY USER)

11. DISPLAY DATA RAM ADDRESS

CHARACTER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90	91	92	93
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3
LINE 3	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90	91	92	93
LINE 4	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF	D0	D1	D2	D3
CHARACTER	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
LINE 1	94	95	96	97	98	99	8A	9B	9C	9D	9E	9F	A0	A1	A2	A3	A4	A5	A6	A7
LINE 2	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF	E0	E1	E2	E3	E4	E5	E6	E7
LINE 3	94	95	96	97	98	99	8A	9B	9C	9D	9E	9F	A0	A1	A2	A3	A4	A5	A6	A7
LINE 4	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF	E0	E1	E2	E3	E4	E5	E6	E7