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CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL :

40420 (LED TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL :

40420 (LED TYPES)

VERSION

3

DOC . FIRST ISSUE

MAY.02,2001

RECORDS OF REVISION

D A T E	REVISED PAGE NO.	S U M M A R Y
JUL.06,2001	1	2 . MECHANICAL SPECIFICATIONS (6) CHARACTER PITCH : 5.49 mm → 6.09 mm
	4	6 . OUTLINE DIMENSION 21.36 ± 0.2 → 21.16 ± 0.2
	5	7 . DETAIL DRAWING OF DOT MATRIX 5.49 → 6.09 , 21.36 → 23.16
AUG.27,2001	4	6 . OUTLINE DIMENSION PIN 15 → PIN 17 ,PIN 16 → PIN 18 16-Ø1.0±0.15 → 18-Ø1.0±0.15

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	LED	L
Transmissive	LED	M

Backlight Color	Code Value
Yellow-Green	Y

E W 4 0 4 2 0 G L Y

LCD type + color	Code Value
STN + Yellow-Green	Y
STN + Gray	G
STN + Blue	B

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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - 002A

1.2 APPLICATION NOTES FOR CONTROLLER / DRIVER :

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - KS0066

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 * 6.09H 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 Ø = 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	—	2 7 0	—	KHz
LED FORWARD VOLTAGE	VF	IF = 460 mA	—	4 . 2	4 . 6	V
LED FORWARD CURRENT	IF	—	—	4 6 0	—	mA
LED REVERSE CURRENT	IR	VR = 8 V	—	—	2 0 0	uA

5. OPTICAL CHARACTERISTICS .

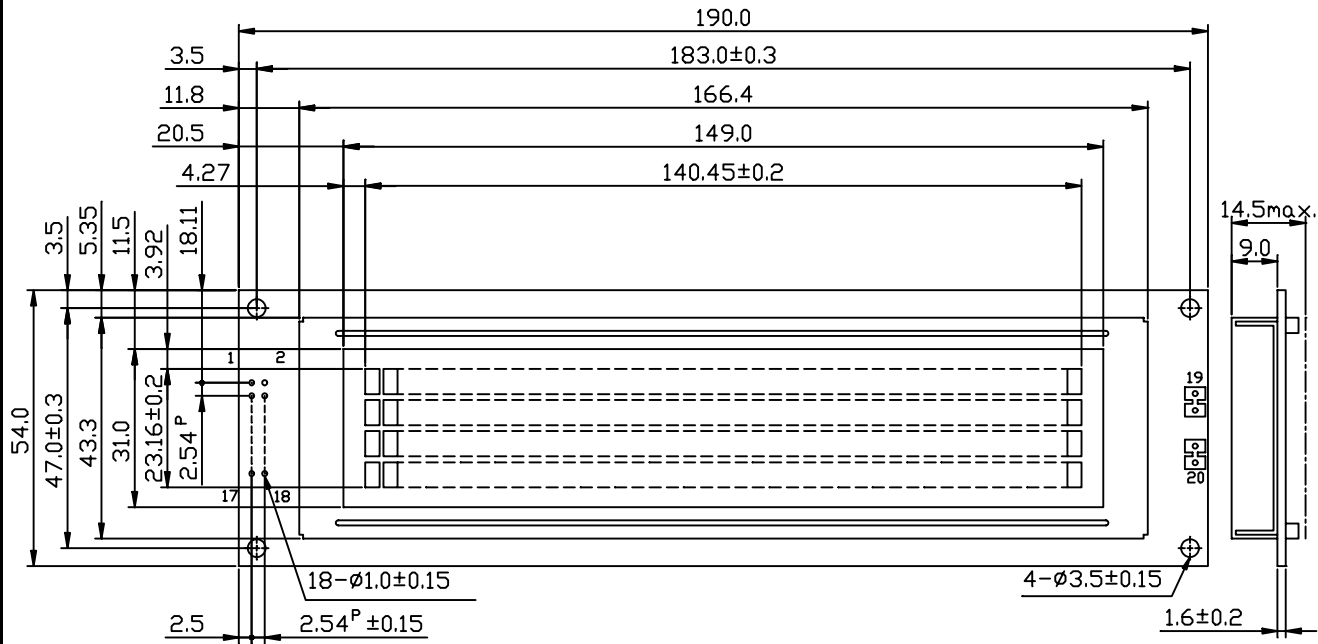
Ta = 25 °C

VDD = 5.0 V

I T E M	SYMBOL	CONDITION		MIN .	TYP .	MAX .	UNIT	NOTE
VIEWING AREA	Ø 2 – Ø 1	K ≥ 1.4		3 0	—	—	deg.	1
CONTRAST RATIO	K	Ø = 10° θ = 0°		—	5	—	—	1
RESPONSE TIME	tr (rise)	Ø = 10° θ = 0°	Ta = -20°C	—	3000	—	ms	1
			Ta = 25°C	—	200	—		
			Ta = 70°C	—	110	—		
	tf (fall)		Ta = -20°C	—	1900	—		
			Ta = 25°C	—	120	—		
			Ta = 70°C	—	80	—		
THE BRIGHTNESS OF BACKLIGHT	L	IF = 460 mA		35	50	—	cd/m2	1,2
PEAK EMISSION WAVELENGTH	λP	IF = 460 mA		—	5 7 0	—	nm	1

NOTE (1) : PLEASE REFER TO :
CUSTOMER ACCEPTANCE STANDARD SPECIFICATION : EU-002A
NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

6. OUTLINE DIMENSION



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

Technical drawing of a rectangular plate with dimensions and tolerances. The overall dimensions are 140.45 (width) and 23.16 (height). The drawing shows a grid of 10 columns and 6 rows of rectangular features. Key dimensions and tolerances are indicated:

- Overall width: 140.45
- Overall height: 23.16
- Distance from left edge to first column center: 0.50
- Distance between column centers: 3.53
- Distance from first column center to second column center: 2.78
- Distance from second column center to third column center: 0.07 ± 0.01
- Distance from top edge to first row center: 6.09
- Distance from first row center to second row center: 4.89
- Distance from second row center to third row center: 0.07 ± 0.01
- Distance from third row center to fourth row center: 0.55

The diagram illustrates the internal connections of the LCD module. It features two LCD CONTROLLER blocks, two LCD SEGMENT DRIVER * 2 blocks, one LCD PANEL block, and one LED BACKLIGHT block. The connections are as follows:

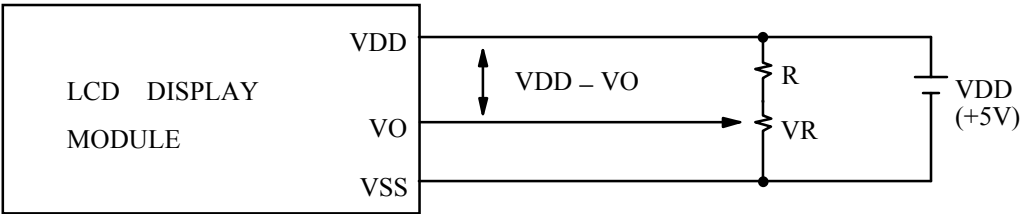
- DB0** and **DB7** are connected to the top LCD CONTROLLER via an 8-bit bus.
- E1** is connected to the top LCD CONTROLLER.
- R/W** is connected to both LCD CONTROLLER blocks.
- RS** is connected to the top LCD CONTROLLER.
- VDD**, **VSS**, and **VO** are connected to the power pins of both LCD CONTROLLER blocks.
- E2** is connected to the bottom LCD CONTROLLER.
- The top LCD CONTROLLER is connected to the top LCD SEGMENT DRIVER * 2 (4-bit), the LCD PANEL (16-bit), and the bottom LCD CONTROLLER (40-bit).
- The bottom LCD CONTROLLER is connected to the LCD PANEL (16-bit), the bottom LCD SEGMENT DRIVER * 2 (40-bit), and the top LCD CONTROLLER (4-bit).
- The top LCD SEGMENT DRIVER * 2 is connected to the LCD PANEL (160-bit).
- The bottom LCD SEGMENT DRIVER * 2 is connected to the LCD PANEL (160-bit).
- VLED** and **VLSS** are connected to the LED BACKLIGHT.

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	$\overline{R/\overline{W}}$	READ/WRITE SELECTION	$\overline{R/\overline{W}} = 0$: REGISTER WRITE $\overline{R/\overline{W}} = 1$: REGISTER READ
11	RS	INSTRUCTION/DATA REGISTER SELECTION	RS = 0 : INSTRUCTION REGISTER RS = 1 : DATA REGISTER
12	VO	LCD CONTRAST ADJUSTMENT	
13	VSS	GROUND	OV (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)

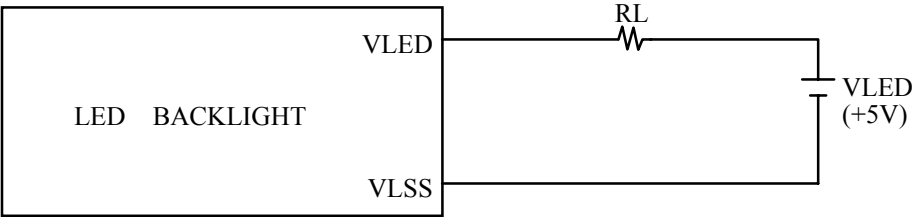
1 0 . POWER SUPPLY

1 0 . 1 POWER SUPPLY FOR LCD MODULE



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

1 0 . 2 POWER SUPPLY FOR EL BACKLIGHT



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

1 1 . 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