

EXAMINED BY :  <i>Jony Chen</i>	EMERGING DISPLAY  TECHNOLOGIES CORPORATION	FILE NO . CAS-10042
APPROVED BY:  <i>David Chang</i>		ISSUE :NOV.18,1999
		TOTAL PAGE : 8
		VERSION : 3

CUSTOMER                      ACCEPTANCE                      SPECIFICATIONS

MODEL :

162A0(LED TYPES)

FOR MESSRS :

\_\_\_\_\_

CUSTOMER'S APPROVAL

DATE :  
\_\_\_\_\_

BY :  
\_\_\_\_\_



NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	LED	L
Transmissive	LED	M

Backlight Color	Code Value
Yellow-Green	Y

Module type : D : TN Character Modules  
W : Wide Temp. Modules

E W 1 6 2 A 0 Y L Y \*

Viewing direction  
NIL. : 6 o'clock  
U : 12 o'clock

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

\* : AVAILABLE ONLY FOR TN TYPE

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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 ----- 16 CH \* 2 LINES
- (2) MODULE SIZE ----- 80.0W \* 36.0H \* 14.0D (max.) mm
- (3) EFFECTIVE AREA ----- 66.0W \* 16.0H mm
- (4) CHARACTER FONT ----- 5 \* 7 DOTS + CURSOR
- (5) CHARACTER SIZE ----- 2.95W \* 4.35H mm
- (6) CHARACTER PITCH ----- 3.65W \* 5.05H mm
- (7) DOT SIZE ----- 0.55W \* 0.50H mm
- (8) DOT PITCH ----- 0.60W \* 0.55H mm
- (9) LCD TYPE \*
- (10) DRIVING METHOD ----- 1 / 16 DUTY MULTIPLEX DRIVE
- (11) VIEWING DIRECTION \*
- (12) BACK-LIGHT \*

\* 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	—	1.3	W	
LED FORWARD CURRENT	IF	—	260	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	ED	0 °C	50 °C	-20 °C	70 °C	NOTE (2) , (3)
	EW	-20 °C	70 °C	-30 °C	80 °C	
HUMIDITY		—	90 % RH	—	90 % RH	WITHOUT CONDENSATION
VIBRATION		—	4.9 m/s <sup>2</sup> (0.5 G)	—	19.6 m/s <sup>2</sup> (2 G)	
SHOCK		—	29.4 m/s <sup>2</sup> (3 G)	—	490.0 m/s <sup>2</sup> (50 G)	XYZ DIRECTIONS
CORROSIVE GAS		NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -20°C(-30°C FOR W.T.) : 48HR MAX .  
70°C (80°C FOR W.T.) : 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	—	1.0	3.0	mA	
RECOMMENDED LCD DRIVING VOLTAGE	VDD - VO ∅ = 25°, θ = ** DUTY= 1/16	ED	Ta = 0 °C	—	4.2	—	V
			Ta = 25 °C	—	3.8	—	V
			Ta = 50 °C	—	3.4	—	V
	VDD - VO ∅ = 10°, θ = 0° DUTY= 1/16	EW	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 = 130 mA	—	4.2	4.6	V	
LED FORWARD CURRENT	IF	—	—	130	—	mA	
LED REVERSE CURRENT	IR	VR = 8V	—	—	0.2	mA	

∅ = 25° FOR TN TYPE

∅ = 10° FOR STN TYPE

\*\* θ = 0° WHEN VIEWING DIRECTION IS 6 O'CLOCK

θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK

5. OPTICAL CHARACTERISTICS .

Ta = 25 °C      VDD = 5.0 V

I T E M		SYMBOL	CONDITION		MIN .	TYP .	MAX .	UNIT	NOTE
VIEWING AREA	ED	$\varnothing 2 - \varnothing 1$	$K \geq 1.4$		2 0	—	—	deg.	1
	EW				3 0	—	—	deg.	1
CONTRAST RATIO	ED	K	$\varnothing = 25^\circ, \theta = **$		—	3	—	—	1
	EW		$\varnothing = 10^\circ, \theta = 0^\circ$		5	—	—	—	1
RESPONSE TIME	ED	tr ( rise )	$\varnothing = 25^\circ$	Ta = 25°C	—	150	250	ms	1
				Ta = 25°C	—	100	150		
	EW	tr ( rise )	$\varnothing = 10^\circ$	Ta = -20°C	—	5538	—		
				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 BACK-LIGHT		L	IF = 130 mA		—	31	—	cd/m <sup>2</sup>	1, 2
					—	67	—		1, 3
PEAK EMISSION WAVELENGTH		$\lambda P$	IF = 130 mA		—	5 7 2	—	nm	1

$\varnothing = 25^\circ$  FOR TN TYPE

$\varnothing = 10^\circ$  FOR STN TYPE

\*\*  $\theta = 0^\circ$  WHEN VIEWING DIRECTION IS 6 O'CLOCK

$\theta = 180^\circ$  WHEN VIEWING DIRECTION IS 12 O'CLOCK

NOTE (1): PLEASE REFER TO :

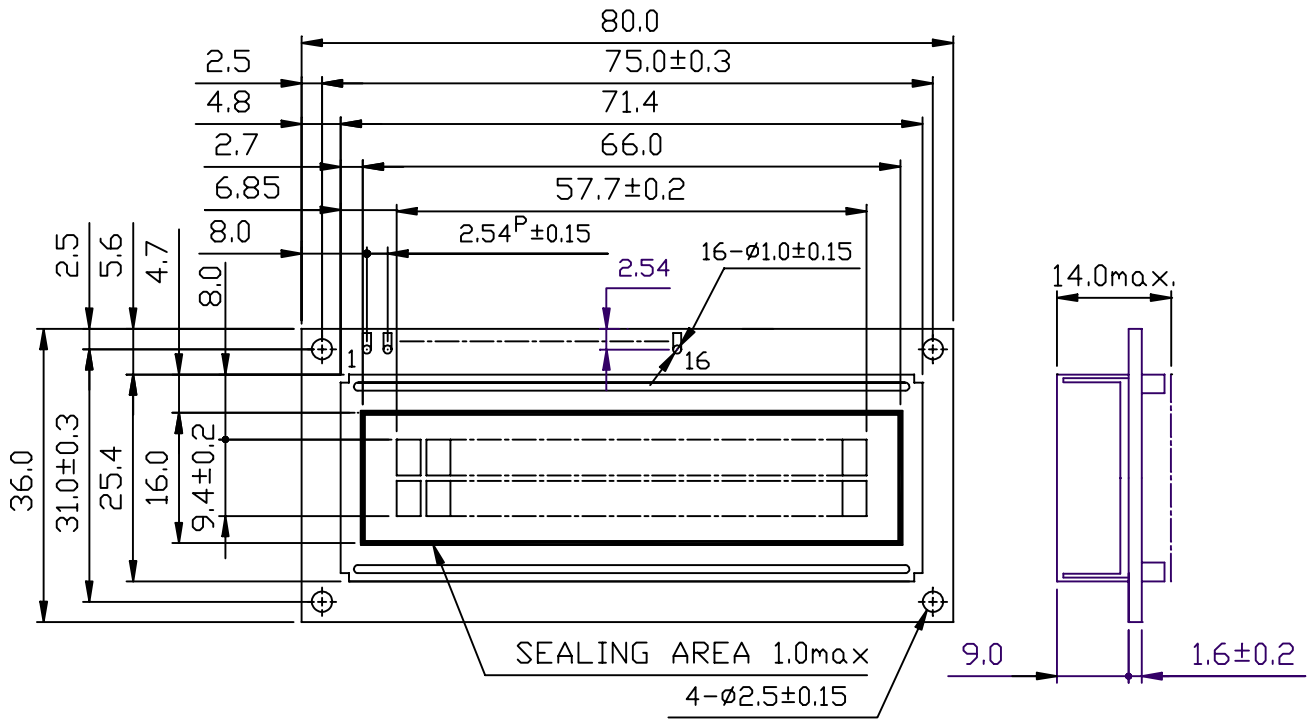
CUSTOMER ACCEPTANCE STANDARD SPECIFICATION : EU-002A

NOTE (2): POLARIZER MODE : TRANSFLECTIVE

NOTE (3): POLARIZER MODE : TRANSMISSIVE

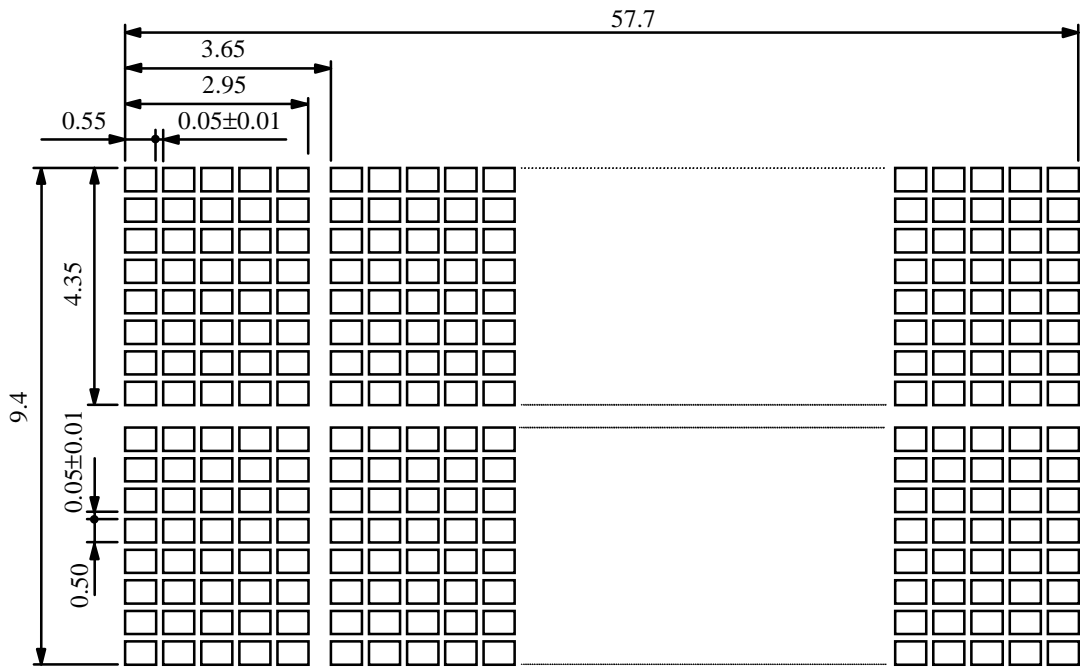


6. OUTLINE DIMENSION



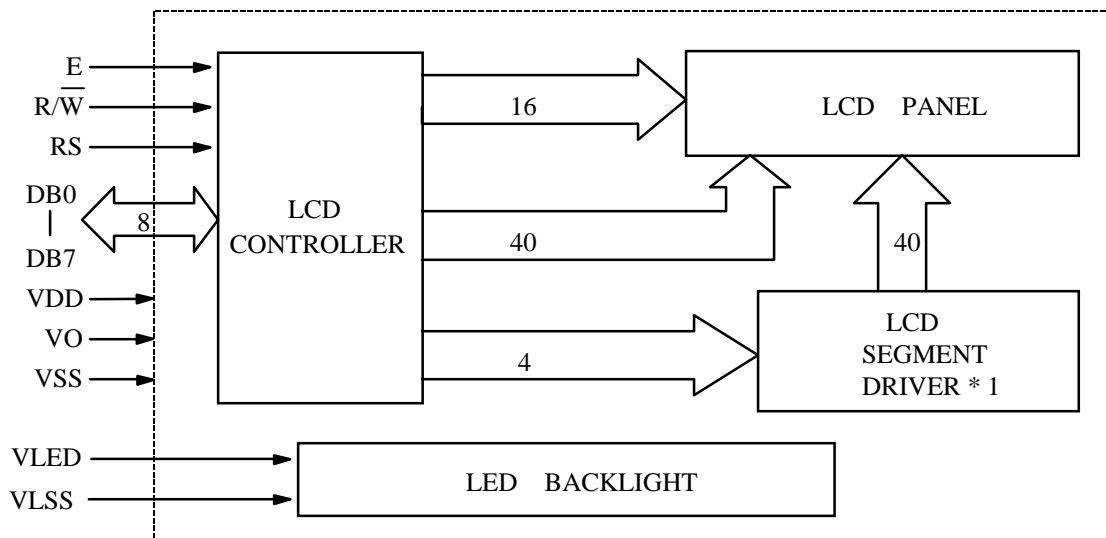
UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM

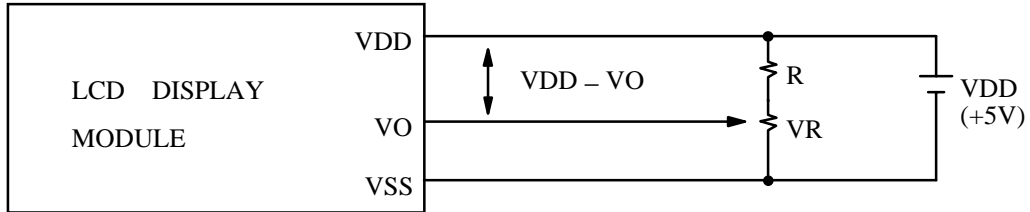


9. INTERFACE SIGNALS

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

## 10. POWER SUPPLY

### 10.1 POWER SUPPLY FOR LCD MODULE

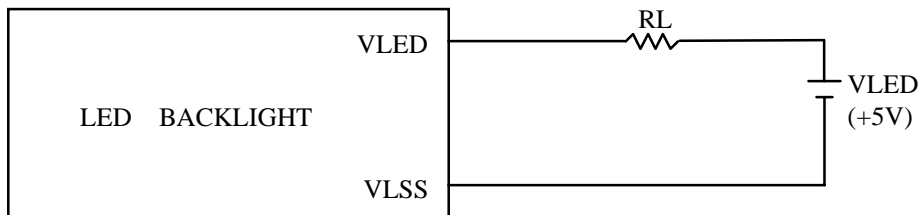


VDD - VO : LCD DRIVING VOLTAGE

VR : 10K $\Omega$  ~ 20K $\Omega$

RECOMMENDED RESISTOR R : VDD - VO  $\geq$  1.5 V

### 10.2 POWER SUPPLY FOR LED BACKLIGHT



RECOMMENDED RESISTOR RL : 6~15 $\Omega$ , 1/4 WATT (CONTROLLED BY USER)

\* THE BRIGHTNESS WOULD BE ALTERED SUBJECT TO DIFFERENT VALUES OF RL

## 11. DISPLAY DATA RAM ADDRESS

CHARACTER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF