

EXAMINED BY : Kevin kuo	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-10443
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		TOTAL PAGE : 7
		VERSION : 1

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

40200(LED TYPES)
(RoHS)
FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL :	VERSION	PAGE
40200(LED TYPES) (RoHS)	1	0-1

RECORDS OF REVISION

DOC . FIRST ISSUE	OCT.14,2005
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DATE	REVISED PAGE NO.	SUMMARY

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	LED	L
Transmissive	LED	M

Backlight Color	Code Value
Yellow-Green	Y

E	W	40	2	00	G	L	Y
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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 :

E U - 0 0 2 B

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 .

1.4 MATERIAL SAFETY DESCRIPTION

ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB) AND POLYBROMINATED DIPHENYL ETHERS (PBDE)

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF CHARACTER ----- 40 CH * 2 LINES
- (2) MODULE SIZE ----- 182.0W * 33.5H * 14.0D (max.) mm
- (3) EFFECTIVE AREA ----- 154.4W * 15.8H mm
- (4) CHARACTER FONT ----- 5 * 7 DOTS + CURSOR
- (5) CHARACTER SIZE ----- 3.20W * 5.55H mm
- (6) CHARACTER PITCH ----- 3.70W * 5.95H mm
- (7) DOT SIZE ----- 0.60W * 0.65H mm
- (8) DOT PITCH ----- 0.65W * 0.70H mm
- (9) LCD TYPE *
- (10) DRIVING METHOD ----- 1 / 16 DUTY MULTIPLEX DRIVE
- (11) BACK-LIGHT *

* PLEASE REFER TO NUMBERING SYSTEM

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

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	—	2.7	W	
LED FORWARD CURRENT	IF	—	580	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℃	70℃	- 30℃	80℃	NOTE (1) , (3)
HUMIDITY	NOTE (2)		NOTE (2)		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 (1) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT
TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

NOTE (2) : Ta ≤ 60℃ : 90%RH MAX. (96HRS MAX.)
Ta > 60℃ : ABSOLUTE HUMIDITY MUST BE
LOWER THAN THE HUMIDITY OF 90%RH AT 60℃. (96HRS MAX.)

NOTE (3) : Ta AT -30℃ : WILL BE < 48hrs
80℃ : WILL BE < 168hrs

4. ELECTRICAL CHARACTERISTICS

$T_a = 25\text{ }^{\circ}\text{C}$ $V_{DD} = 5.0 \pm 0.25\text{ V}$

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD	—	4.75	5.0	5.25	V
H LEVEL INPUT VOLTAGE	VIH	—	2.2	—	—	V
L LEVEL INPUT VOLTAGE	VIL	—	—	—	0.6	V
H LEVEL OUTPUT VOLTAGE	VOH	$-I_{OH} = 0.2\text{ mA}$	2.4	—	—	V
L LEVEL OUTPUT VOLTAGE	VOL	$I_{OL} = 1.2\text{ mA}$	—	—	0.4	V
POWER SUPPLY CURRENT (LOGIC)	IDD	VDD = 5.0 V	—	2.0	5.0	mA
RECOMMENDED LCD DRIVING VOLTAGE	VDD – VO $\theta_y = 10^{\circ}$ $\theta_x = 0^{\circ}$ DUTY = 1/16	$T_a = -20\text{ }^{\circ}\text{C}$	3.9	4.4	4.9	V
		$T_a = 25\text{ }^{\circ}\text{C}$	3.9	4.4	4.9	V
		$T_a = 70\text{ }^{\circ}\text{C}$	3.9	4.4	4.9	V
CLOCK OSCILLATION FREQUENCY	FOSC	$T_a = 25\text{ }^{\circ}\text{C}$	—	270	—	KHz
LED FORWARD VOLTAGE	VF	$I_F = 280\text{ mA}$	—	4.2	4.6	V
LED FORWARD CURRENT	IF	—	—	280	—	mA
LED REVERSE CURRENT	IR	$V_R = 8\text{ V}$	—	—	0.2	mA

5. OPTICAL CHARACTERISTICS

$T_a = 25\text{ }^{\circ}\text{C}$ $V_{DD} = 5.0 \pm 0.25\text{ V}$

I T E M	SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	θ_{y+}	$K \geq 1.5$	$\theta_{x}=0^{\circ}$	(60)	(65)	—	d e g .	1
	θ_{y-}			(50)	(55)	—		
	θ_{x+}		$\theta_{y}=0^{\circ}$	(42)	(47)	—		
	θ_{x-}			(44)	(49)	—		
CONTRAST RATIO	K	$\theta_{y-}=10^{\circ}$, $\theta_{x}=0^{\circ}$		2.6	5.1	—	—	1
RESPONSE TIME	tr (rise)	$\theta_{y-}=10^{\circ}$ $\theta_{x}=0^{\circ}$	Ta = -20 °C	—	5538	7199	ms	1
			Ta = 25 °C	—	228	296		
			Ta = 70 °C	—	104	135		
	tf (fall)		Ta = -20 °C	—	2316	3011		
			Ta = 25 °C	—	174	226		
			Ta = 70 °C	—	85	111		
THE BRIGHTNESS OF BACK-LIGHT	L	IF = 280 mA		15	20	—	cd/m ₂	1, 2
				22.5	30	—		1, 3
PEAK EMISSION WAVELENGTH	λ P	IF = 280 mA		569	572	575	nm	1

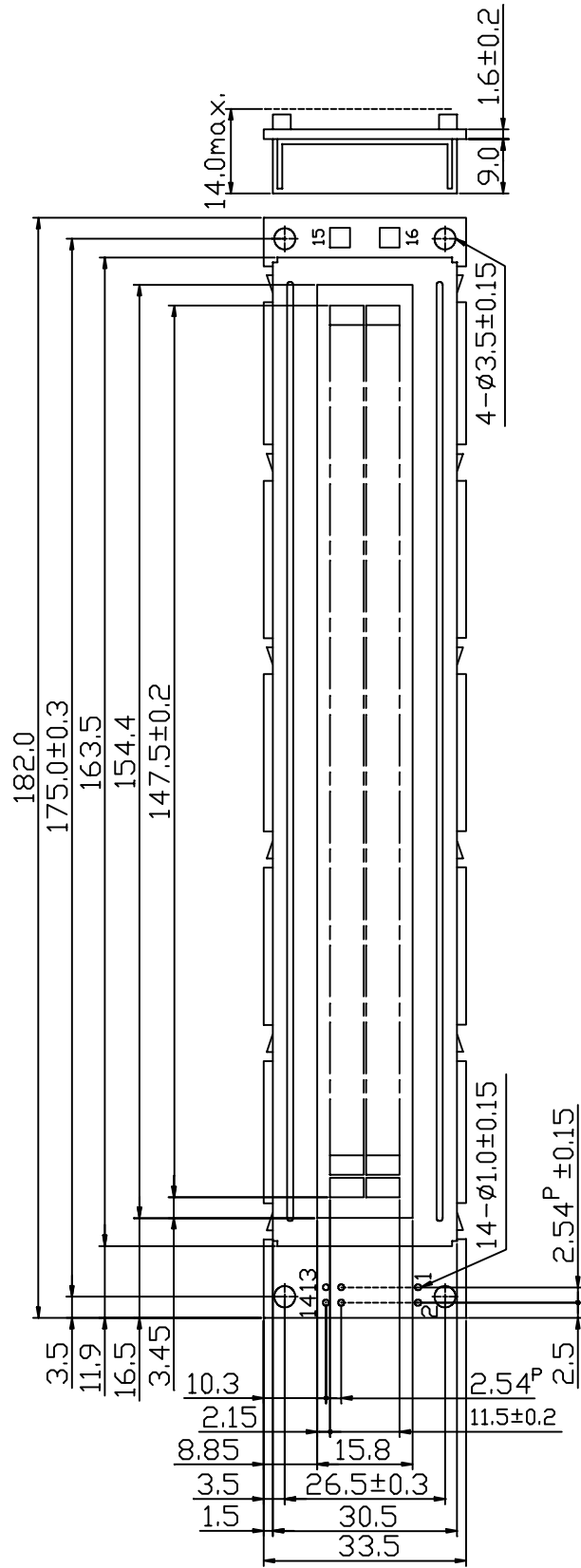
NOTE (1): PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATION : EU-002B

NOTE (2): POLARIZER MODE : TRANSFLECTIVE

NOTE (3): POLARIZER MODE : TRANSMISSIVE

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 147.5 (width) and 11.5 (height). The drawing shows a grid of small squares, likely representing a mesh or a pattern. Key dimensions and tolerances are indicated:

- Overall width: 147.5
- Overall height: 11.5
- Top-left corner dimensions:
 - Horizontal distance from left edge to first vertical grid line: 0.60
 - Horizontal distance between first and second vertical grid lines: 0.05 ± 0.01
 - Horizontal distance between second and third vertical grid lines: 3.20
 - Horizontal distance between third and fourth vertical grid lines: 3.70
- Vertical distance between first and second horizontal grid lines: 5.55
- Vertical distance between second and third horizontal grid lines: 0.05 ± 0.01
- Vertical distance between third and fourth horizontal grid lines: 0.65

The diagram illustrates the interconnections for the LCD module. A dashed vertical line separates the external control signals from the module's internal components.

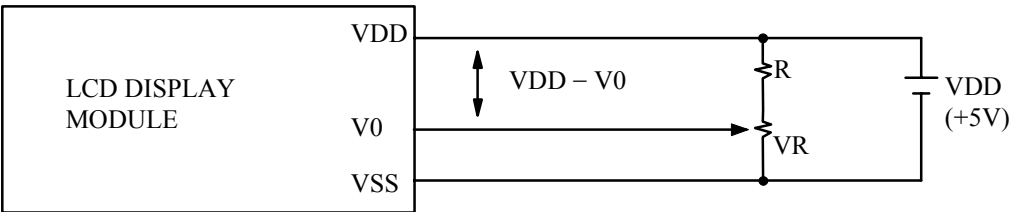
- External Control Signals (Left):**
 - E , $R/\overline{W}$, and RS are input signals to the **LCD CONTROLLER**.
 - $DB0$ through $DB7$ are bidirectional data bus signals (8-bit) connecting the **LCD CONTROLLER** to the **LCD PANEL**.
 - VDD , $V0$, and VSS are power and control signals for the **LCD CONTROLLER**.
 - $VLED$ and $VLSS$ are power signals for the **LED BACKLIGHT**.
- Internal Module Components and Connections:**
 - LCD CONTROLLER** (Central Block):
 - Outputs a 16-bit signal to the **LCD PANEL**.
 - Outputs a 40-bit signal to the **LCD PANEL**.
 - Outputs a 4-bit signal to the **LCD SEGMENT DRIVER * 2**.
 - LCD PANEL** (Top Right Block):
 - Receives control and data signals from the **LCD CONTROLLER**.
 - Outputs a 160-bit signal to the **LCD SEGMENT DRIVER * 2**.
 - LCD SEGMENT DRIVER * 2** (Bottom Right Block):
 - Receives a 4-bit control signal from the **LCD CONTROLLER** and a 160-bit data signal from the **LCD PANEL**.
 - LED BACKLIGHT** (Bottom Block):
 - Powered by $VLED$ and $VLSS$ signals.

9. INTERFACE SIGNALS

PIN NO.	SYMBOL	DESCRIPTION	FUNCTION
1	VSS	GROUND	0V (GND)
2	VDD	POWER SUPPLY FOR LOGIC CIRCUIT	+5V
3	V0	LCD CONTRAST ADJUSTMENT	
4	RS	INSTRUCTION/DATA REGISTER SELECTION	RS = 0 : INSTRUCTION REGISTER RS = 1 : DATA REGISTER
5	R / $\overline{W}$	READ/WRITE SELECTION	R / $\overline{W}$ = 0 : REGISTER WRITE R / $\overline{W}$ = 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 BACKLIGHT (ANODE)	
16	VLSS	POWER SUPPLY FOR LED BACKLIGHT (CATHODE)	0V (GND)

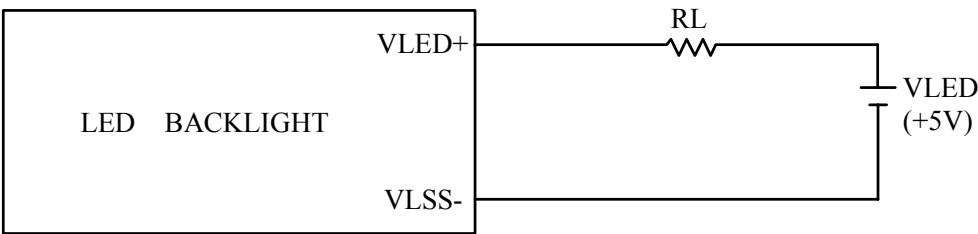
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



VDD - V0 : LCD DRIVING VOLTAGE
VR : 10KΩ ~ 20KΩ
RECOMMENDED RESISTOR R : $VDD - V0 \geq 1.5\text{ V}$

10.2. POWER SUPPLY FOR LED BACK-LIGHT



RECOMMENDED RESISTOR RL : 2.8~5.6Ω, 1/2 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	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
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