

EXAMINED BY :	EMERGING DISPLAY  TECHNOLOGIES CORPORATION	FILE NO . CAS-10072
<i>Vincent Uh</i>		ISSUE : OCT.31,2002
APPROVED BY:		TOTAL PAGE : 9
<i>Roger Yang</i>		VERSION : 3

CUSTOMER

ACCEPTANCE

SPECIFICATIONS

MODEL NO. :

13B30(LED TYPES)

FOR MESSRS :

\_\_\_\_\_

CUSTOMER'S APPROVAL

DATE :

\_\_\_\_\_

BY :

\_\_\_\_\_



Polarizer Mode	Backlight	Code value
Transflective	LED	L
Transmissive	LED	M

E W 13 B 30 G L Y

LCD type + LCD color	Code Value
STN + Yellow-Green	Y
STN + Gray	G
FSTN + White	F

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1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - 002 A

1.2 APPLICATION NOTES FOR CONTROLLER

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - 100

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- |                    |       |                               |
|--------------------|-------|-------------------------------|
| (1) NUMBER OF DOTS | ----- | 128W * 64H DOTS               |
| (2) MODULE SIZE    | ----- | 93.0W * 70.0H * 14.0D(max) mm |
| (3) EFFECTIVE AREA | ----- | 70.7W * 38.8H mm              |
| (4) ACTIVE AREA    | ----- | 65.25W * 32.61H mm            |
| (5) DOT SIZE       | ----- | 0.48W * 0.48H mm              |
| (6) DOT PITCH      | ----- | 0.51W * 0.51H mm              |
| (7) LCD TYPE *     |       |                               |
| (8) DRIVING METHOD | ----- | 1 / 64 DUTY MULTIPLEX DRIVE   |
| (9) BACKLIGHT *    | ----- | LED , COLOR : YELLOW-GREEN    |

\* 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	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER DISSIPATION	PD	—	3.6	W	
LED FORWARD CURRENT	IF	—	720	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		COMMENT
	MIN .	MAX .	MIN .	MAX .	
AMBIENT TEMPERATURE	-20 °C	70 °C	-30 °C	80 °C	NOTE (2) , (3)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	3.92 m/s <sup>2</sup> (0.4 G)	—	11.76 m/s <sup>2</sup> (1.2 G)	10 ~ 100 HZ XYZ DIRECTIONS 1 Hr . EACH
SHOCK	—	29.4 m/s <sup>2</sup> (3 G)	—	490.0 m/s <sup>2</sup> (50 G)	1 mSECONDS XYZ DIRECTIONS 1 TIME EACH
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 V

PARAMETER	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD – VSS	—	4.75	5.0	5.25	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	0.7*VDD	—	VDD	V
	VIL	L LEVEL	GND	—	0.3*VDD	V
OUTPUT VOLTAGE NOTE (1)	VOH	H LEVEL	VDD-0.4	—	—	V
	VOL	L LEVEL	—	—	0.4	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD – VSS = 5.0 V VDD – VO = 9.2 V	—	7.0	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD – VO ∅ = 10° θ = 0°	Ta = -20 °C	—	9.2	—	V
		Ta = 25 °C	—	9.2	—	
		Ta = 70 °C	—	8.4	—	
LED FORWARD VOLTAGE	VF	IF = 360 mA	—	4.2	4.6	V
LED FORWARD CURRENT	IF	—	—	360	—	mA
LED REVERSE CURRENT	IR	VR = 8V	—	—	200	μA

NOTE (1) : APPLIED TO TERMINALS CS1, CS2, R/ $\overline{W}$ , D/I, DB0~DB7, E,  $\overline{RET}$ .

NOTE (2) : THE DISPLAY PATTERN IS ALL “ON”. / “OFF”.

NOTE (3) : RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ±1.0V BY EACH MODULE .

5. INTERFACE TIMING CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	FIG.
E cycle time	$t_{CYC}$	1000	—	—	nS	1,2
E high level	$P_{WEH}$	450	—	—	nS	1,2
E low level width	$P_{WEL}$	450	—	—	nS	1,2
E rise time	$t_r$	—	—	25	nS	1,2
E fall time	$t_f$	—	—	25	nS	1,2
Address setup time	$t_{AS}$	140	—	—	nS	1,2
Address hold time	$t_{AH}$	10	—	—	nS	1,2
Data setup time	$t_{DSW}$	200	—	—	nS	1
Data delay time	$t_{DDR}$	—	—	320	nS	2
Data hold time (Write)	$t_{DHW}$	10	—	—	nS	1
Data hold time (Read)	$t_{DHR}$	20	—	—	nS	2

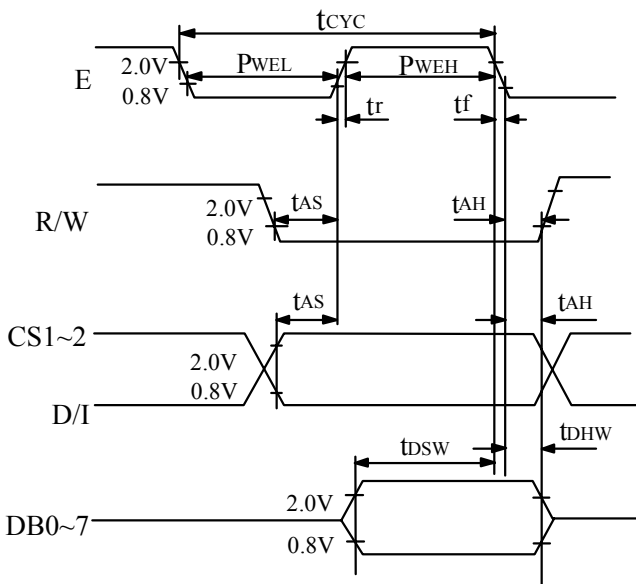


Fig. 1 CPU Write Timing

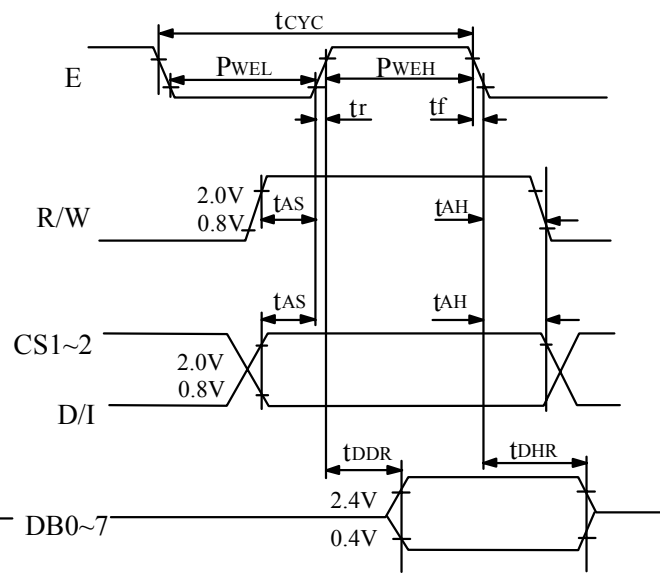


Fig. 1 CPU Read Timing



6. OPTICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 V

VDD - V0 = 9.2 V

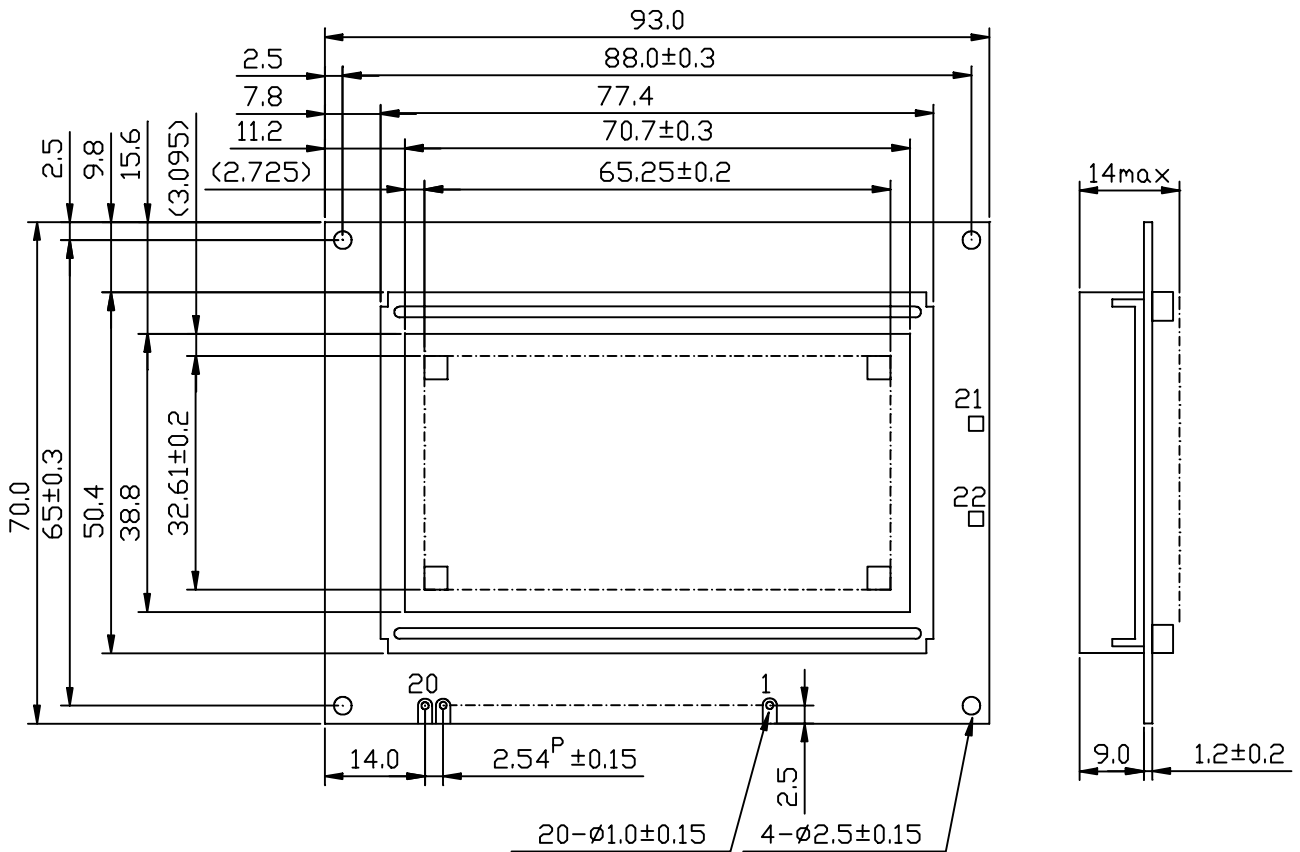
I T E M		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING AREA	STN	∅2 - ∅1	K ≥ 1.4	30	—	—	deg.	1
	FSTN			40	—	—	deg.	1
CONTRAST RATIO	STN	K	∅ = 10° θ = 0°	—	5	—	—	1
	FSTN			—	8	—	—	1
RESPONSE TIME	tr ( rise )	∅=10° θ = 0°	Ta = -20 °C	—	5538	—	ms	1
			Ta = 25 °C	—	228	—		
			Ta = 70 °C	—	104	—		
	tf ( fall )		Ta = -20 °C	—	2316	—		
			Ta = 25 °C	—	174	—		
			Ta = 70 °C	—	85	—		
THE BRIGHTNESS OF BACK-LIGHT	L	IF =360 mA	—	40	—	cd/m <sup>2</sup>	1, 2	
			—	75	—		1, 3	
PEAK EMISSION WAVELENGTH	λP	IF =360 mA	—	570	—	nm	1	

NOTE (1) : PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.  
E U - 0 0 1 A

NOTE (2) : POLARIZER MODE : TRANFLECTIVE

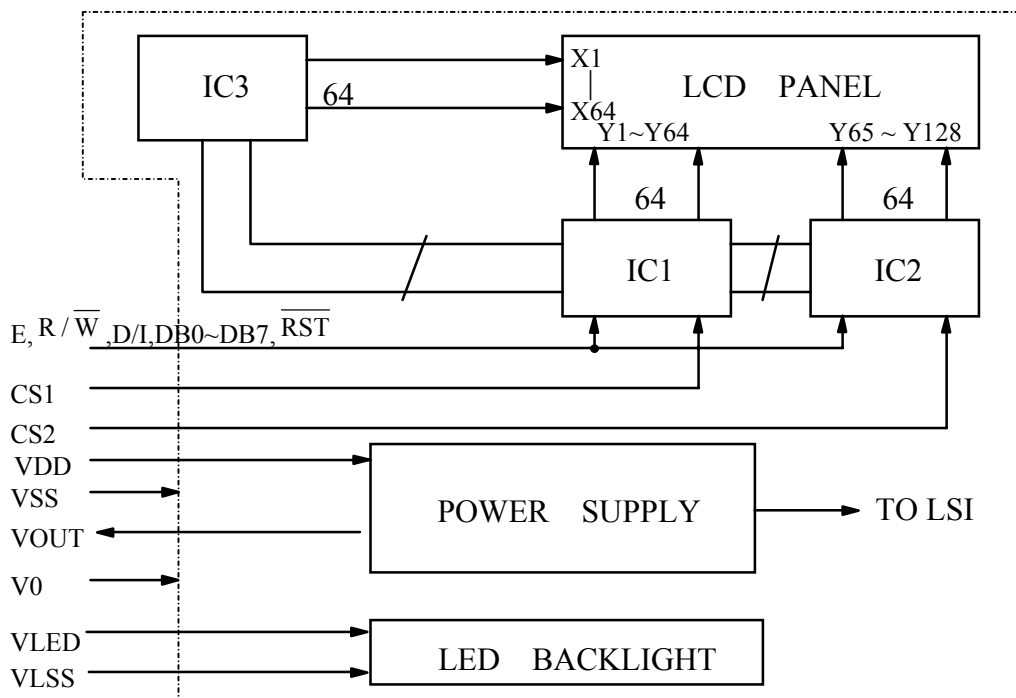
NOTE (3) : POLARIZER MODE : TRANSMISSIVE

7. OUTLINE DIMENSION

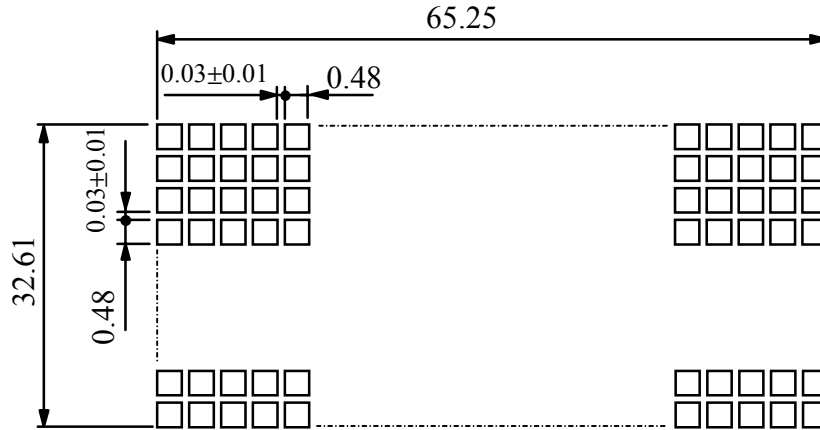


UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ±0.5mm

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



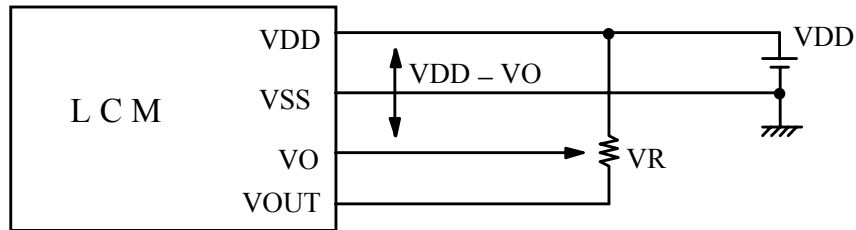
UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS  $\pm 0.1$

10. INTERFACE SIGNALS

PIN NO	SYMBOL	LEVEL	FUNCTION
1	VSS	—	GROUND
2	VDD	—	POWER SUPPLY FOR LOGIC CIRCUIT
3	VO	—	OPERATING VOLTAGE FOR LCD DRIVING
4	D/I	H/L	H: DATA INPUT L: INSTRUCTION CODE INPUT
5	R/ $\bar{W}$	H/L	H: DATA READ (LCD MODULE $\rightarrow$ MPU) L : DATA WRITE (LCD MODULE $\leftarrow$ MPU)
6	E	H,H $\rightarrow$ L	ENABLE SIGNAL
7   14	DB0   DB7	H/L	DATA BUS LINE
15	CS1	H	CHIP SELECTION FOR IC1
16	CS2	H	CHIP SELECTION FOR IC2
17	$\bar{RST}$	L	RESET
18	VOUT	—	POWER SUPPLY FOR LCD DRIVING
19	VLED	—	POWER SUPPLY FOR LED BACKLIGHT
20	VLSS	—	POWER SUPPLY FOR LED BACKLIGHT

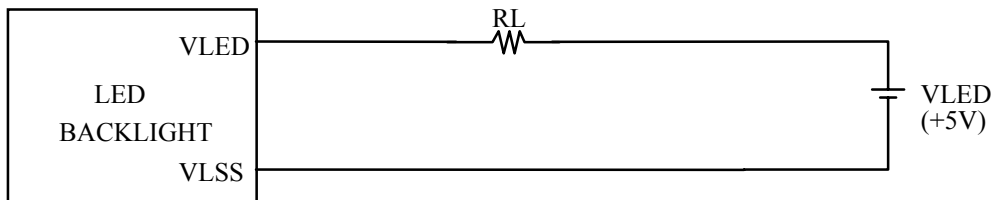
1 1 . POWER SUPPLY

1 1 . 1 POWER SUPPLY FOR LCM



VDD - VO : LCD DRIVING VOLTAGE  
VR : 10K ~ 20KΩ

1 1 . 2 POWER SUPPLY FOR LED BACK - LIGHT



RECOMMENDED RESISTOR  $R_L = 2.2 \sim 4.4\Omega$ , 1/2WATT (CONTROLLED BY USER)  
\* THE BRIGHTNESS WOULD BE ALTERED SUBJECT TO DIFFERENT VALUES OF  $R_L$

1 1 . 3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

