

EXAMINED BY : <i>[Signature]</i>	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-10072
APPROVED BY: <i>[Signature]</i>		ISSUE : JUL.30,2004
		TOTAL PAGE : 9
		VERSION : 4

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

13B30(LED TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

RECORDS OF REVISION

DOC. FIRST ISSUE

FEB.19,1998

DATE	REVISED PAGE NO.	SUMMARY																																																																																																																																		
OCT.21,1999	1~3, 5	THE ENTIRE PAGES REVISED																																																																																																																																		
OCT.31,2002	2	3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS. VIBRATION OPERATING : MAX. = 0.25 G → 0.4G , 2.45 m/s ² → 3.92 m/s ²																																																																																																																																		
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NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	LED	L
Transmissive	LED	M

Backlight Color	Code Value
Yellow-Green	Y
RED	R

E	W	13	B	30	G	L	Y
---	---	----	---	----	---	---	---

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

TABLE OF CONTENTS

NO.	ITEM	PAGE
1.	GENERAL SPECIFICATIONS -----	1
2.	MECHANICAL SPECIFICATIONS -----	1
3.	ABSOLUTE MAXIMUM RATINGS -----	2
4.	ELECTRICAL CHARACTERISTICS -----	3
5.	INTERFACE TIMING CHARACTERISTICS -----	4
6.	OPTICAL CHARACTERISTICS -----	5
7.	OUTLINE DIMENSIONS -----	6
8.	BLOCK DIAGRAM -----	7
9.	DETAIL DRAWING OF DOT MATRIX -----	8
10.	INTERFACE SIGNALS -----	8
11.	POWER SUPPLY -----	9

1. GENERAL SPECIFICATIONS

1.1 GENERAL SPECIFICATIONS

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - 002A

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 *

* 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	Y-G	3.6	W	
		RED	3.3		
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 ² (0.4 G)	—	11.76 m/s ² (1.2 G)	10 ~ 100 HZ XYZ DIRECTIONS 1 Hr . EACH
SHOCK	—	29.4 m/s ² (3 G)	—	490.0 m/s ² (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

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	10	mA	
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD – VO ∅ = 10° θ = 0°	Ta = -20 °C	8.2	9.2	10.2	V	
		Ta = 25 °C	8.2	9.2	10.2		
		Ta = 70 °C	7.4	8.4	9.4		
LED FORWARD VOLTAGE	VF	IF = 360mA	Y-G	—	4.2	4.6	V
			RED	—	3.7	4.6	
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”.

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

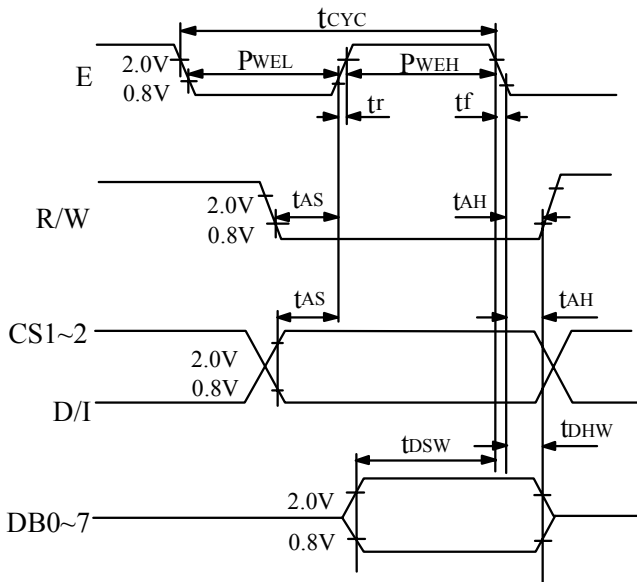


Fig. 1 CPU Write Timing

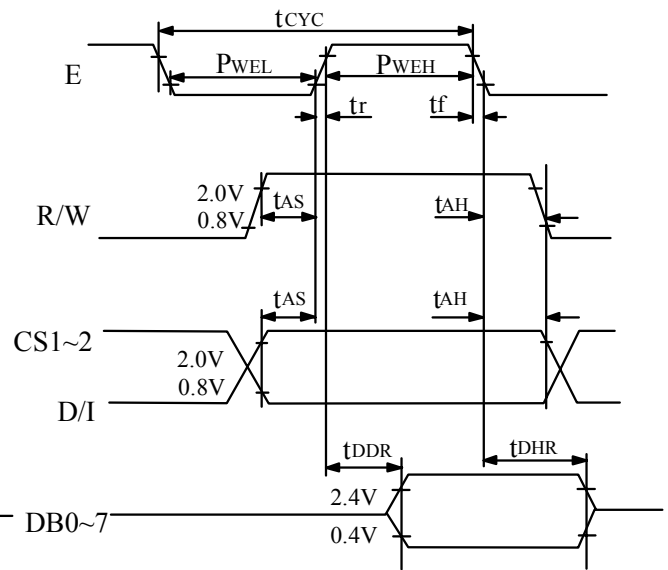


Fig. 1 CPU Read Timing

6. OPTICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 V

VDD - V0 = 9.2 V

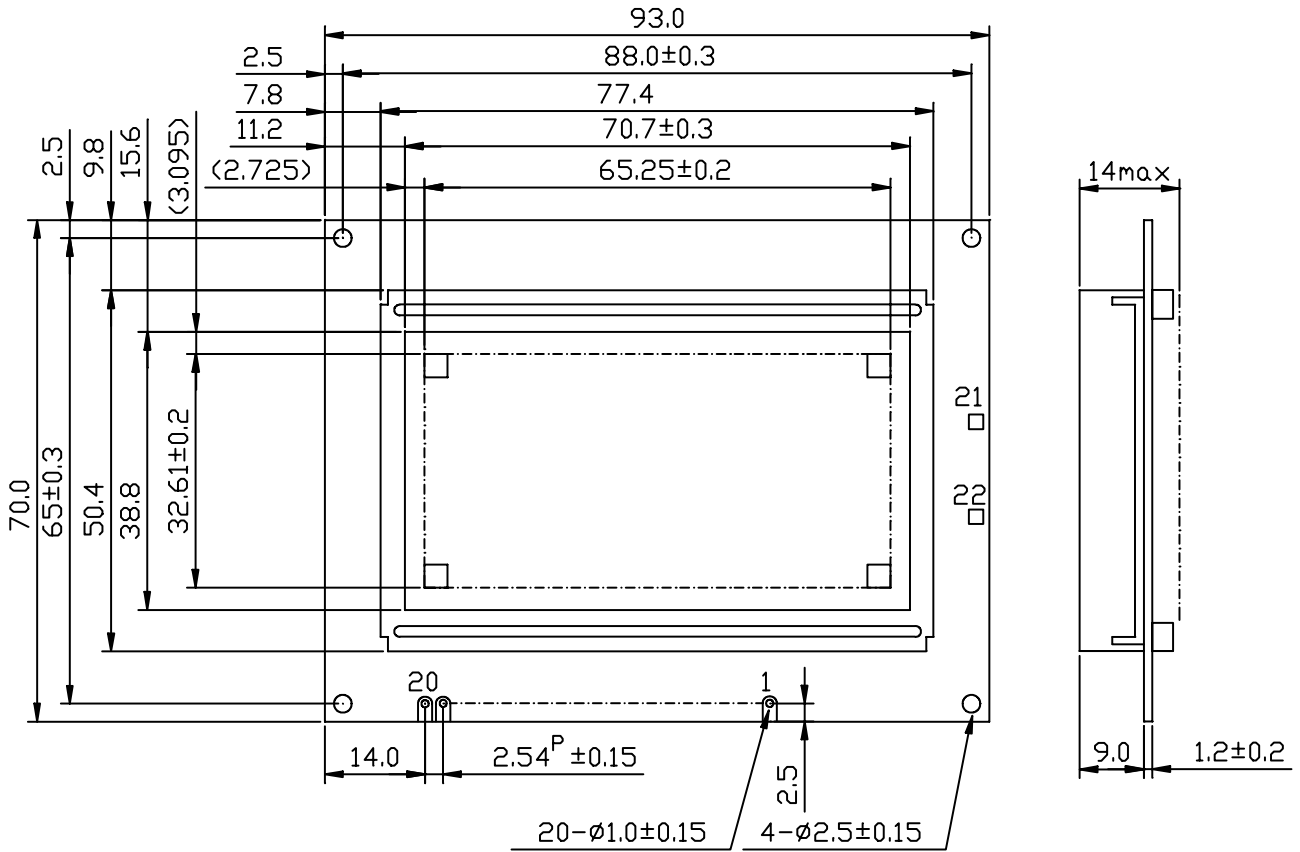
I T E M		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
VIEWING ANGLE	STN	∅ 2 - ∅ 1	K ≥ 1.4	3.0	—	—	deg.	1
	FSTN			4.0	—	—	deg.	1
CONTRAST RATIO	STN	K	∅ = 10° θ = 0°	—	5	—	—	1
	FSTN			—	8	—	—	1
RESPONSE TIME	tr (rise)	∅=10° θ = 0°	Ta = -20 °C	—	5538	11076	ms	1
			Ta = 25 °C	—	228	456		
			Ta = 70 °C	—	104	208		
	tf (fall)		Ta = -20 °C	—	2316	4632		
			Ta = 25 °C	—	174	348		
			Ta = 70 °C	—	85	170		
THE BRIGHTNESS OF MODULE	L	IF =360 mA	Y-G	15	25	—	cd/m ²	1, 2
				22.5	37.5			1, 3
			RED	8.5	10.5	—		1, 2
				12.8	15.8			1, 3
PEAK EMISSION WAVELENGTH	λP	IF =360 mA	Y-G	—	570	—	nm	1
			RED	618	—			

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

NOTE (2) : POLARIZER MODE : TRANFLECTIVE

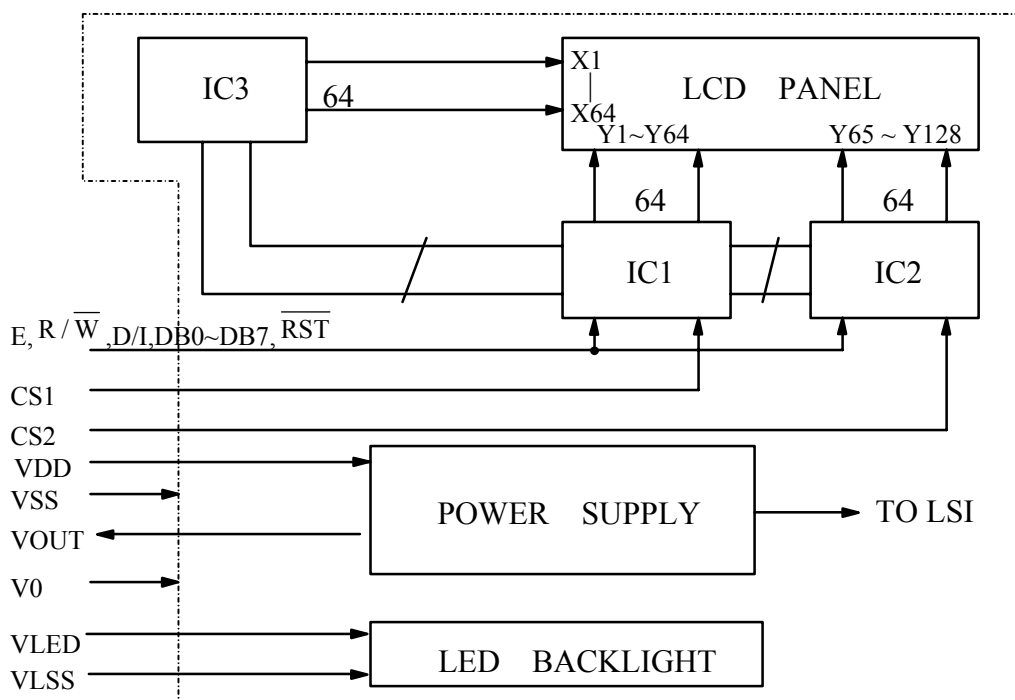
NOTE (3) : POLARIZER MODE : TRANSMISSIVE

7. OUTLINE DIMENSIONS

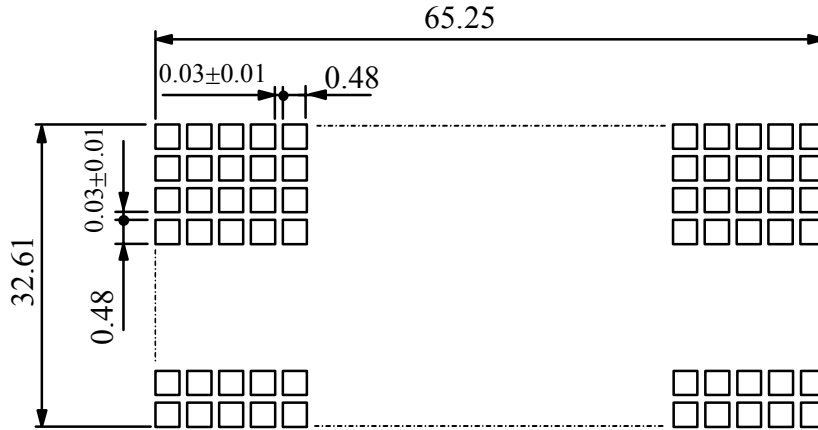


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ±0.5mm

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



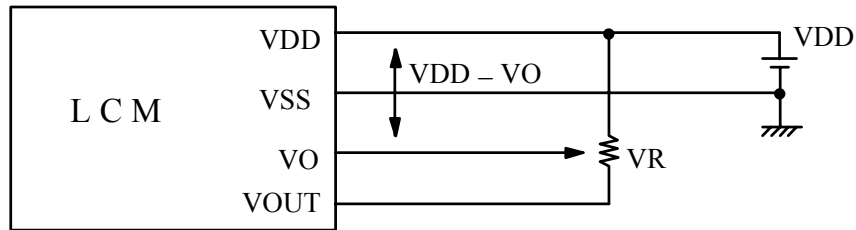
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1

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

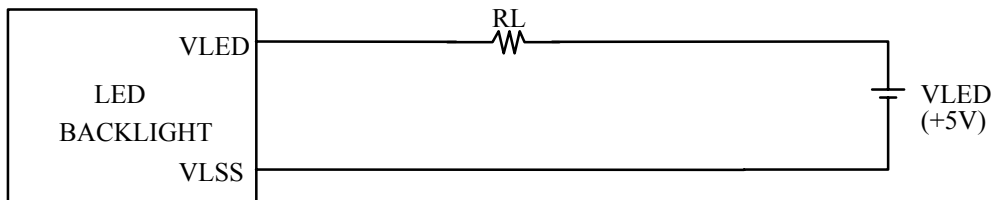
1 1 . POWER SUPPLY

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

