

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

MODEL NO .
13B10(LED TYPES)

VERSION
2

RECORDS OF REVISION

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SUMMARY

NOV.01,1999

1~3,5

THE ENTIRE PAGES REVISED

Polarizer Mode	Backlight	Code value
Transflective	LED	L
Transmissive	LED	M

E W 13 B 10 G L Y

LCD type + 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 :

E U - 0 0 2 A

1.2 APPLICATION NOTES FOR CONTROLLER

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - 1 0 0

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOTS ----- 128W * 64H DOTS
- (2) MODULE SIZE ----- 77.8W * 69.8H * 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		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20℃	70℃	-30℃	80℃	NOTE(2),(3)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s ² (0.25 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)	10 mSECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -30℃ : 48HR MAX.

80℃ : 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 = 9.2V	—	7.0	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD-V0 Ø = 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/W, D/I, DB0~DB7, E, RET.

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

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

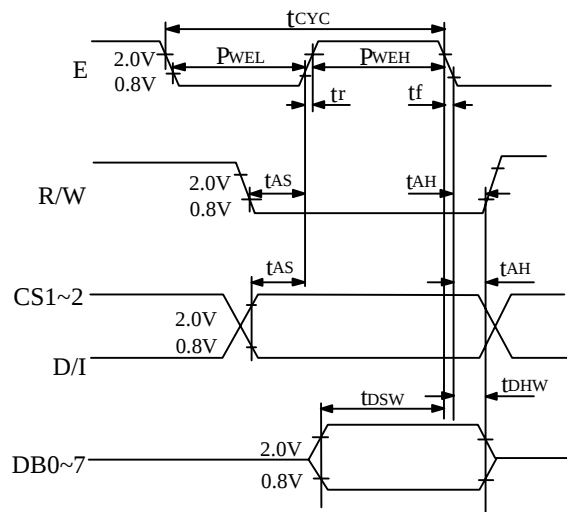


Fig . 1 CPU Write Timing

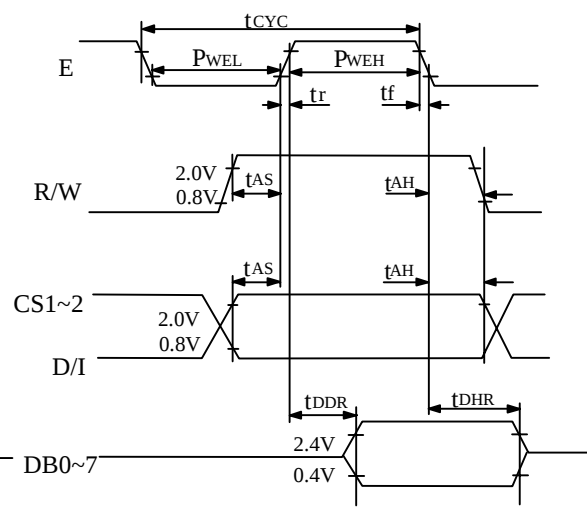


Fig . 1 CPU Read Timing

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	$\varnothing 2 - \varnothing 1$	$K \geq 1.4$	30	—	—	deg.	1
	FSTN			40	—	—	deg.	1
CONTRAST RATIO	STN	K	$\varnothing = 10^\circ$	—	5	—		1
	FSTN		$\theta = 0^\circ$	—	8	—		1
RESPONSE TIME	tr (rise)	$\varnothing = 10^\circ$	Ta = -20°C	—	5538	—	ms	1
			Ta = 25°C	—	228	—		
			Ta = 70°C	—	104	—		
	tf (fall)	$\theta = 0^\circ$	Ta = -20°C	—	2316	—		
			Ta = 25°C	—	174	—		
			Ta = 70°C	—	85	—		
THE BRIGHTNESS OF BACK-LIGHT	L	IF =360 mA		—	40	—	cd/m ²	1, 2
				—	75	—		1, 3
PEAK EMISSION WAVELENGTH		λP	IF =360 mA	—	572	—	nm	1

NOTE (1) : PLEASE REFER TO :

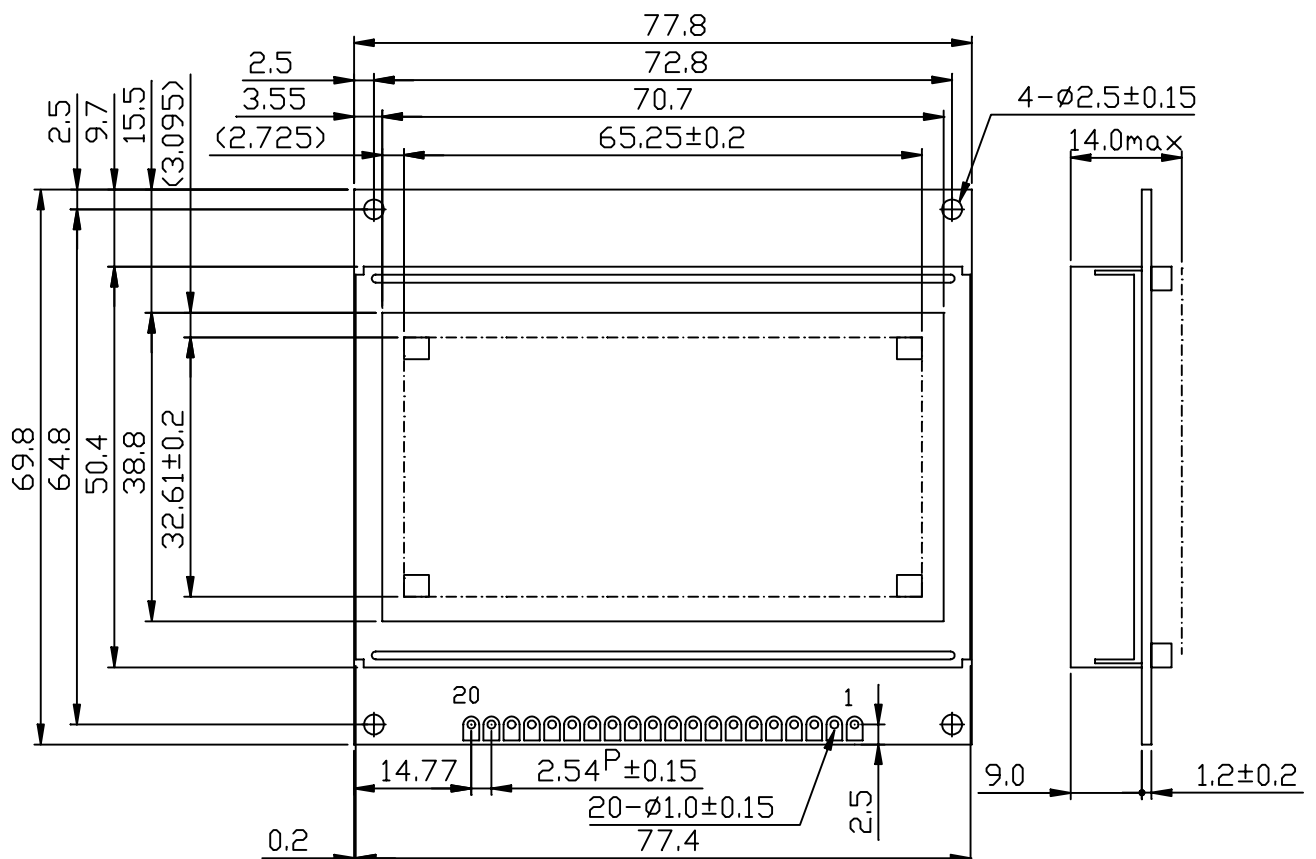
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.

EU-001A

NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

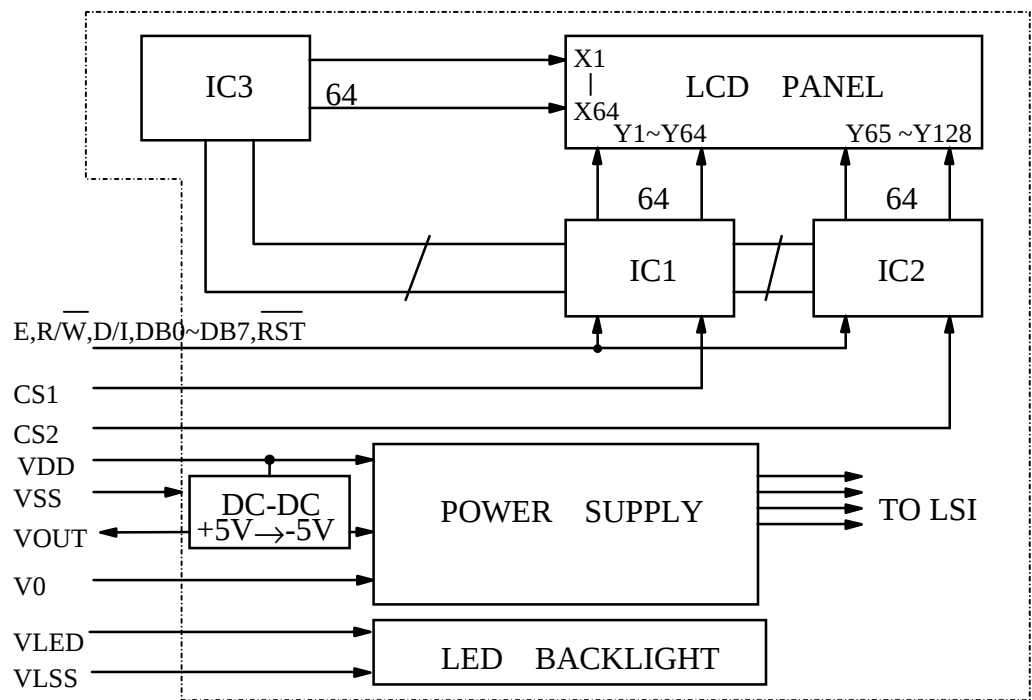
NOTE (3) : POLARIZER MODE : TRANSMISSIVE

7. OUTLINE DIMENSION

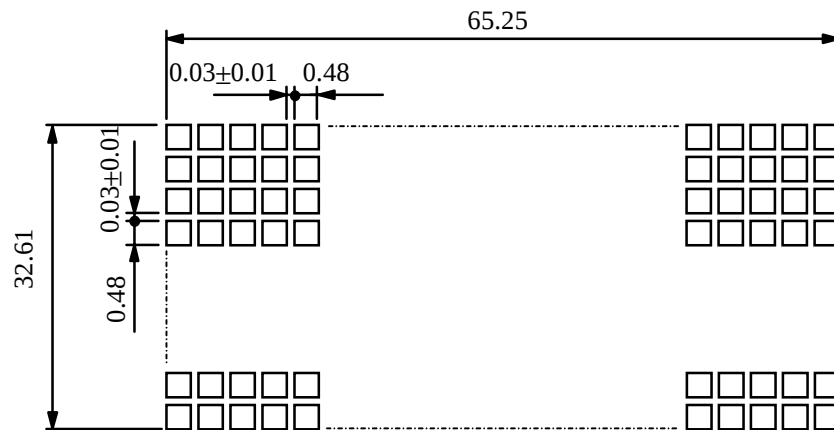


UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5

8. BLOCK DIAGRAM



9. DETAIL DRAWING OF DOT MATRIX



UNIT : mm

SCALE : NTS

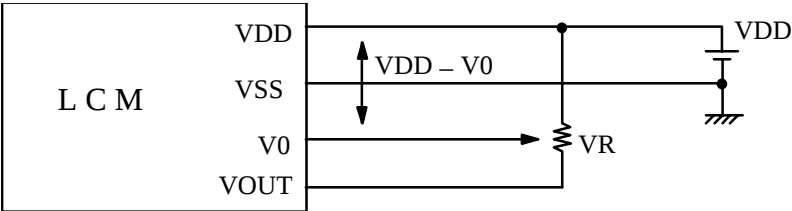
NOT SPECIFIED TOLERANCE IS ± 0.1

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	$\overline{R/W}$	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	RST	L	RESET
18	VOUT	—	POWER SUPPLY FOR LCD DRIVING
19	VLED	—	POWER SUPPLY FOR LED BACKLIGHT
20	VLSS	—	POWER SUPPLY FOR LED BACKLIGHT

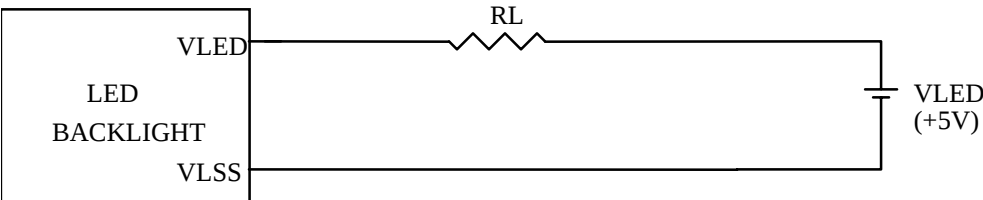
11. POWER SUPPLY

11.1 POWER SUPPLY FOR LCM



VDD - V0 : LCD DRIVING VOLTAGE
VR : 10K ~ 20K Ω

11.2 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

11.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

