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APPROVED BY:		TOTAL PAGE : 8
<i>David Chang</i>		VERSION : 4

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

24B00(EL TYPES)

FOR MESSRS :

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CUSTOMER'S APPROVAL

DATE :

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BY :

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EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO. <b>24B00(EL TYPES)</b>	VERSION <b>4</b>
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RECORDS OF REVISION	DOC . FIRST ISSUE APR.10,1998
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DATE	REVISED PAGE NO.	SUMMARY
NOV.11, 1998	1	2. MECHANICAL SPECIFICATIONS (2) MODULE SIZE 11.5D → 12.0D
	3	4. ELECTRICAL CHARACTERISTICS THE NUMBERS OF "RECOMMENDED LCD DRIVING VOLTAGE" REVISED AS BELOW : W.T. Ta = -20 °C 10.8 → 12.0 Ta = 25 °C 9.6 → 12.0 Ta = 70 °C 8.8 → 12.0
	6	6. OUTLINE DIMENSION : 11.5 MAX. → 12.0 MAX.
MAR.25,1999	3	4. ELECTRICAL CHARACTERISTICS THE NUMBERS OF "RECOMMENDED LCD DRIVING VOLTAGE" REVISED AS BELOW : W.T. Ta = -20 °C 12.0 → 13.9 Ta = 25 °C 12.0 → 12.1 Ta = 60 °C 12.0 → 11.3
AUG.03,2000	1 ~ 4	THE ENTIRE PAGES REVISED .

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	EL	E
Transmissive	EL	F

Backlight Color	Code Value
White	W
Blue-green	B

E W 24 B 00 G E W

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

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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 / DRIVER : T6963C

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - T6963C

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOTS ----- 240W \* 64H DOTS
- (2) MODULE SIZE ----- 180.0W \* 65.0H \* 12.0D (max.) mm
- (3) EFFECTIVE AREA ----- 133.0W \* 40.0H mm
- (4) ACTIVE AREA ----- 127.16W \* 33.88H mm
- (5) DOT SIZE ----- 0.49W \* 0.49H mm
- (6) DOT PITCH ----- 0.53W \* 0.53H mm
- (7) LCD TYPE \*
- (8) DRIVING METHOD ----- 1 / 64 DUTY MULTIPLEX DRIVE
- (9) VIEWING DIRECTION \*
- (10) 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	6.5	V	
POWER SUPPLY FOR LCD DRIVING	VDD - VEE	0	22.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
POWER SUPPLY FOR EL BACKLIGHT	VOLTAGE	VEL	—	AC200	Vrms Fel=1.0KHZ 60 SEC. MAX
	FREQUENCY	Fel	—	2.0	KHZ AC115Vrms 60 SEC. MAX

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 °C	70 °C	-30 °C	80 °C	NOTE (2) , (3)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	4.9 m/s <sup>2</sup> (0.5 G)	—	19.6 m/s <sup>2</sup> (2 G)	10~300 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)	10 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

PARAMETER	SYMBOL	CONDITION	MIN .	TYP .	MAX .	UNIT
POWER SUPPLY VOLTAGE FOR LOGIC	VDD - VSS	—	4.75	5.0	5.25	V
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VEE - VSS	—	- 2.0	—	- 10.0	V
INPUT VOLTAGE NOTE (1)	VIH	H LEVEL	VDD - 2.2	—	VDD	V
	VIL	L LEVEL	0	—	0.8	V
OUTPUT VOLTAGE NOTE (1)	VOH	H LEVEL	VDD - 0.3	—	VDD	
	VOL	L LEVEL	0	—	0.3	
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD-VSS = 5.0 V VDD-VEE = 8.7 V	—	9.0	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD-VEE ∅ = 10° θ = 0° DUTY=1/64	Ta = - 20 °C	—	8.7	—	V
		Ta = 25 °C	—	8.7	—	V
		Ta = 70 °C	—	8.7	—	V
CLOCK OSCILLATION FREQUENCY	f OSC	—	—	3.58	—	MHZ
POWER SUPPLY FOR EL BACKLIGHT	VEL	Fel=400HZ	—	100	—	Vrms
	IEL	VEL=100V Fel=400HZ	—	7	—	mArms

NOTE (1): APPLIED TO TERMINALS (WR, RD, CE, C/D, RST, FS, D0~D7)

NOTE (2): THE DISPLAY PATTERN IS ALL "OFF"/"ON"

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

5. OPTICAL CHARACTERISTICS

Ta = 25 °C

VDD = 5.0 V

I T E M		SYMBOL	CONDITION	MIN .	TYP .	MAX.	UNIT	NOTE
VIEWING AREA	STN	$\emptyset 2 - \emptyset 1$	$K \geq 1.4$	40	—	—	deg.	1
	FSTN			50	—	—	deg.	1
CONTRAST RATIO	STN	K	$\emptyset = 10^\circ$ $\theta = 0^\circ$	—	5	—	—	1
	FSTN			5	—	—	—	1
RESPONSE TIME	tr ( rise )	$\emptyset = 10^\circ$ $\theta = 0^\circ$	Ta = -20°C	—	3982	—	ms	1
			Ta = 25°C	—	228	—		
			Ta = 70°C	—	83	—		
	tf ( fall )		Ta = -20°C	—	3752	—		
			Ta = 25°C	—	176	—		
			Ta = 70°C	—	94	—		
THE BRIGHTNESS OF BACKLIGHT	B	$\emptyset = 10^\circ$ $\theta = 0^\circ$	—	7	—	cd/m <sup>2</sup>	2	
			—	12	—		3	

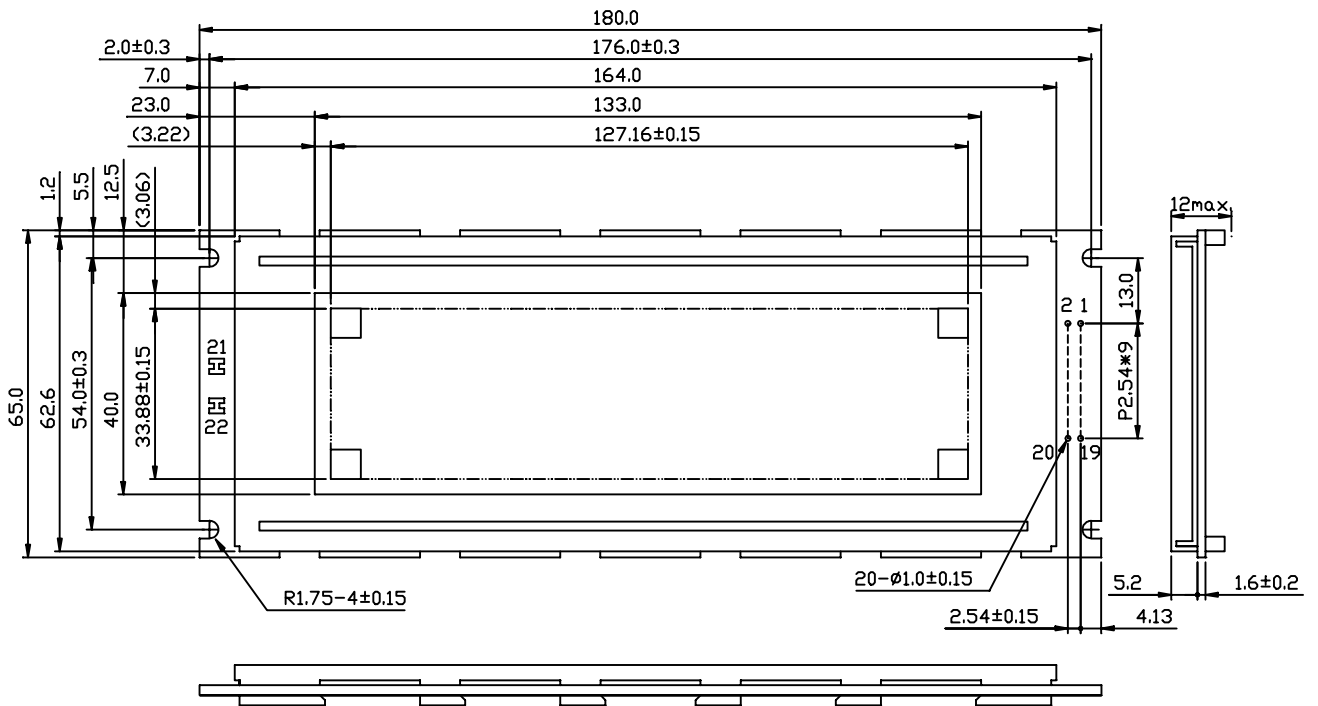
NOTE (1) : PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.  
EU - 002 A

NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

NOTE (3) : POLARIZER MODE : TRANSMISSIVE

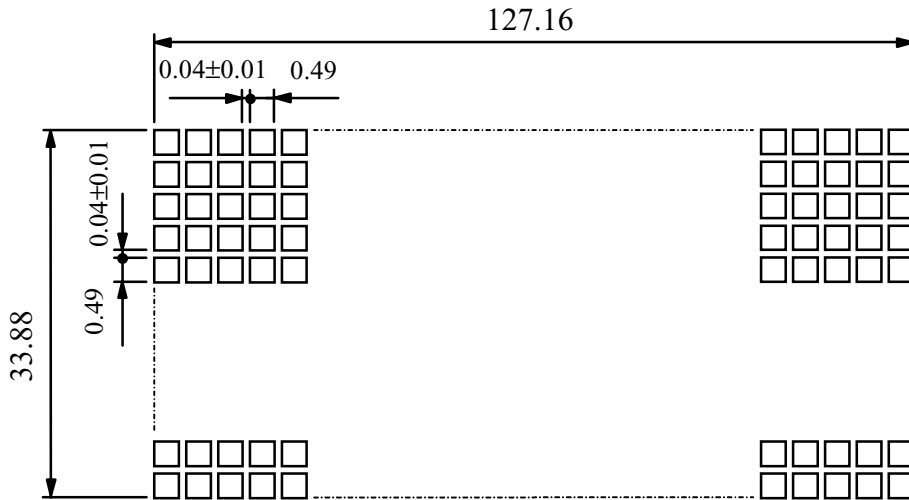


6. OUTLINE DIMENSION



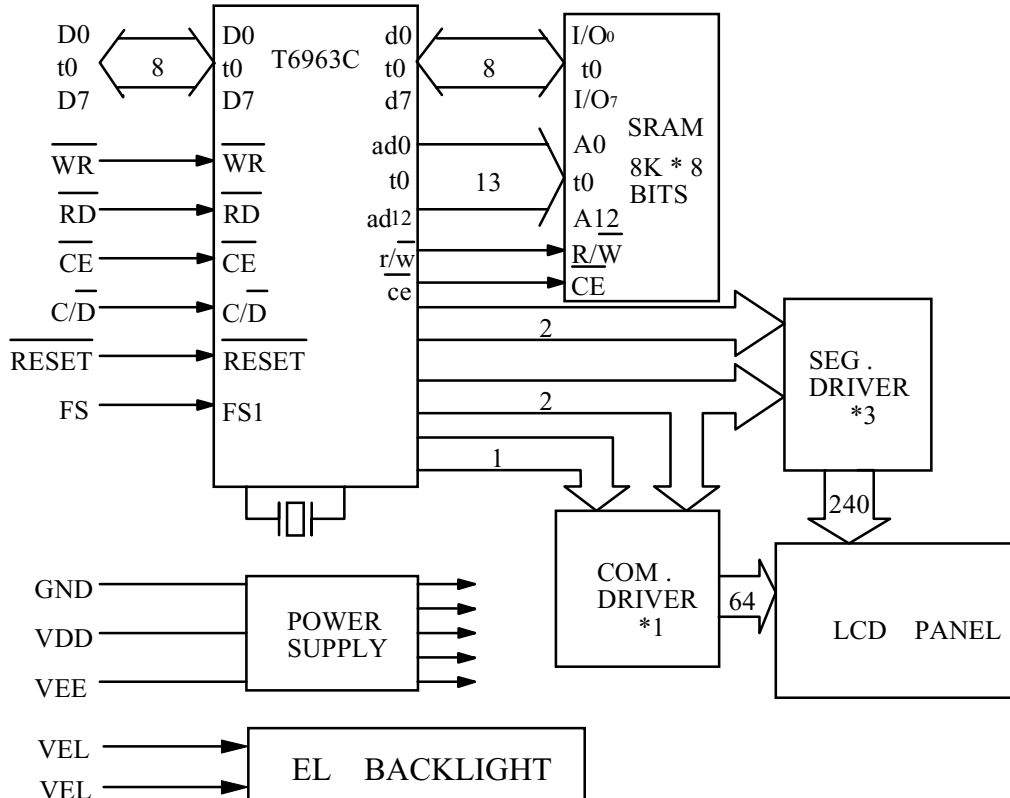
UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM



9. INTERFACE SIGNALS

PIN NO.	SIGNAL	FUNCTION
1	FGND	FRAME GROUND (0V)
2	GND	GROUND
3	VDD	POWER SUPPLY FOR LOGIC (+5V)
4	VEE	POWER SUPPLY FOR LCD DRIVER
5	$\overline{\text{WR}}$	DATA WRITE
6	$\overline{\text{RD}}$	DATA READ
7	$\overline{\text{CE}}$	CHIP ENABLE
8	C/D	$\overline{\text{WR}} = "L", \overline{\text{C/D}} = "H" : \text{COMMAND WRITE}$ $\text{---} \quad \text{C/D} = "L" : \text{DATA WRITE}$ $\text{RD} = "L", \text{C/D} = "H" : \text{STATUS READ}$ $\text{C/D} = "L" : \text{DATA READ}$
9	NC	—————
10	$\overline{\text{RESET}}$	CONTROLLER RESET
11~18	D0~D7	DATA INPUT/OUTPUT
19	FS	FONT SELECT : CONNECT TO VDD : 6*8 PIXEL/FONT CONNECT TO GND : 8*8 PIXEL/FONT
20	NC	—————
21	VEL	POWER SUPPLY FOR EL BACKLIGHT
22	VEL	