

EXAMINED BY :	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-00924
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APPROVED BY:		TOTAL PAGE : 8
<i>David Chang</i>		VERSION : 3

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

13D00(LED 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 . 13D00 (LED TYPES)	VERSION 3
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RECORDS OF REVISION	DOC . FIRST ISSUE OCT.15,1997
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DATE	REVISED PAGE NO.	SUMMARY
JUN.03,1999	2 , 3 , 4 , 5 , 8	REVISE SPECIFICATION OF LED BACKLIGHT.
SEP.06,2000	1 , 2 , 3 , 4	ALL NORMAL TEMPERATURE'S DATA WAS DELETED
	3	4. ELECTRICAL CHARACTERISTICS VF = 10.5V → 12V VF(max) = 11.5V → 14V
	8	10.2 POWER SUPPLY FOR LED BACK - LIGHT VLED = 10.5 V → 12V

Polarizer Mode	Backlight	Code value
Transflective	LED	L

Backlight Color	Code Value
Yellow-Green	Y

E W 13 D 00 G L Y

LCD type + color	Code Value
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 - 002A

1.2 APPLICATION NOTES FOR CONTROLLER : 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    | ----- | 128W * 128H DOTS               |
| (2) MODULE SIZE       | ----- | 84.4W * 100.0H * 14.0D(max) mm |
| (3) VIEWING AREA      | ----- | 62.0W * 62.0H mm               |
| (4) ACTIVE AREA       | ----- | 55.01W * 55.01H mm             |
| (5) DOT SIZE          | ----- | 0.4W * 0.4H mm                 |
| (6) DOT PITCH         | ----- | 0.43W * 0.43H mm               |
| (7) LCD TYPE *        |       |                                |
| (8) DRIVING METHOD    | ----- | 1 / 128 DUTY MULTIPLEX DRIVE   |
| (9) VIEWING DIRECTION | ----- | 6 O'CLOCK                      |
| (10) 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	
POWER SUPPLY FOR LCD DRIVING	VDD - VEE	0	22.0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	100	V	NOTE (1)
LED POWER DISSIPATION	PD	—	1.1	W	
LED FORWARD CURRENT	IF	—	100	mA	
LED REVERSE VOLTAGE	VR	—	20	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 °C	70 °C	-30 °C	80 °C	NOTE (2) , (3)
HUMIDITY	—	85 % RH	—	85 % RH	WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s <sup>2</sup> (0.25 G)	—	19.6 m/s <sup>2</sup> (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)	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

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
POWER SUPPLY VOLTAGE FOR LCD DRIVE	VEE - VSS	—	-9.0	-12.5	-16.0	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	V
	VOL	L LEVEL	0	—	0.3	V
POWER SUPPLY CURRENT FOR LOGIC NOTE (2)	IDD	VDD - VSS = 5.0 V VEE - VSS = -12.5 V	—	9.0	—	mA
POWER SUPPLY CURRENT FOR DRIVE	IEE	VDD - VSS = 5.0 V VEE - VSS = -12.5 V	—	3.0	—	mA
RECOMMENDED LCD DRIVING VOLTAGE NOTE (3)	VDD - V0 ∅ = 10 ° θ = 0 °	Ta = -20 °C	—	17.9	—	V
		Ta = 25 °C	—	17.5	—	
		Ta = 70 °C	—	16.5	—	
CLOCK OSCILLATION FREQUENCY	f <sub>osc</sub>	—	—	5.0	—	MHZ
LED FORWARD VOLTAGE	VF	IF = 40 mA	—	12	14	V
LED FORWARD CURRENT	IF	—	—	40	—	mA
LED REVERSE CURRENT	IR	VR = 20V	—	—	200	μA

NOTE (1): APPLIED TO TERMINALS  $\overline{WR}$ ,  $\overline{RD}$ ,  $\overline{CE}$ ,  $\overline{C/D}$ ,  $\overline{RST}$ , FS, DB0 ~ DB7.

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

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

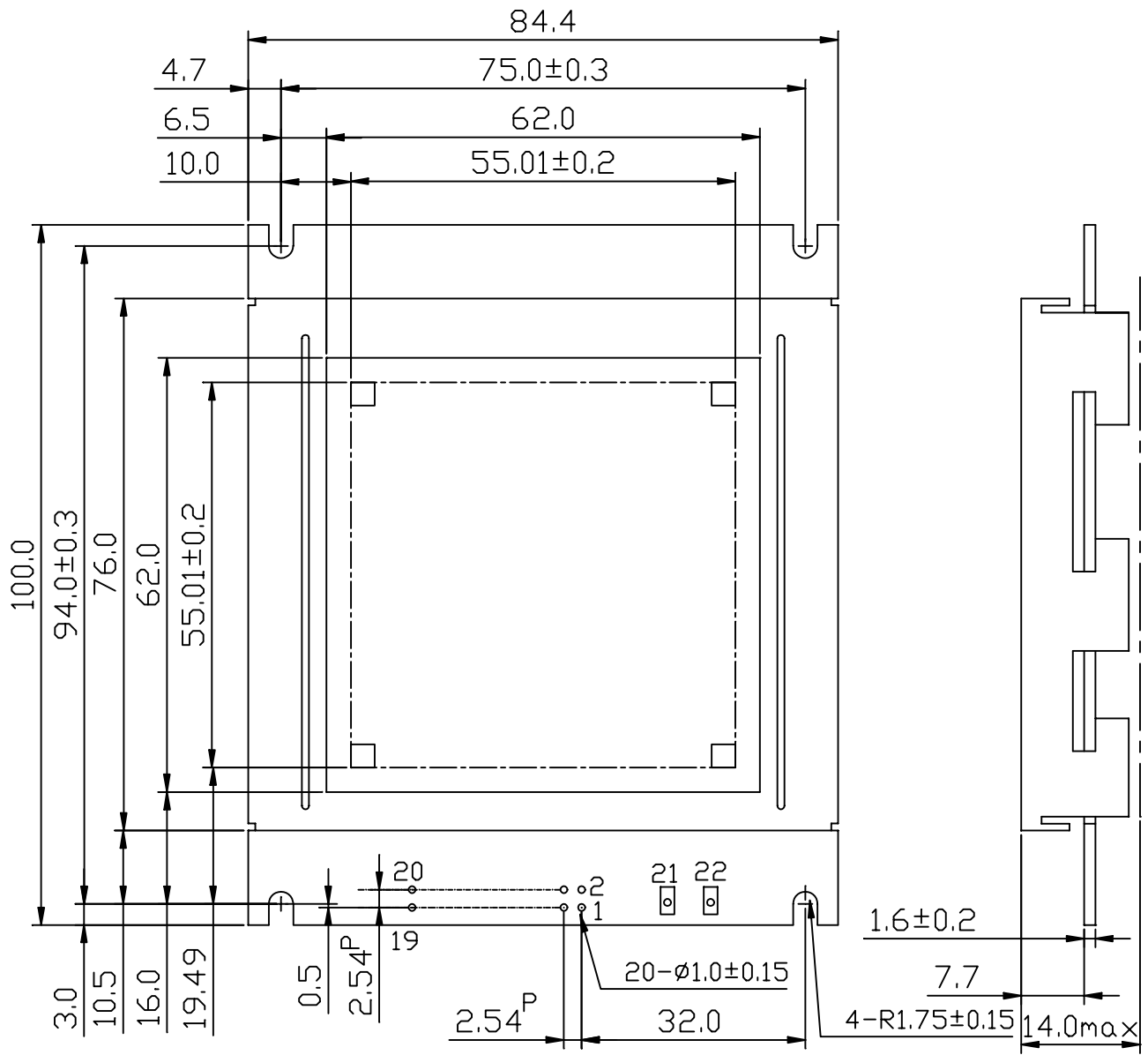
5. OPTICAL CHARACTERISTICS

I T E M		SYMBOL	CONDITION	MIN .	TYP .	MAX.	UNIT	NOTE
VIEWING AREA	STN	$\varnothing 2 - \varnothing 1$	$K \geq 1.4$	40	—	—	deg.	1
	FSTN			50	—	—	deg.	1
VIEWING AREA	STN	K	$\varnothing = 10^\circ$ $\theta = 0^\circ$	—	5	—	—	1
	FSTN			5	—	—	—	1
REPOSE TIME	tr ( rise )	$\varnothing = 10^\circ$ $\theta = 0^\circ$	Ta = -20°C	—	1400	—	ms	1
			Ta = 25°C	—	150	—		
			Ta = 70°C	—	50	—		
	tf ( fall )		Ta = -20°C	—	6500	—		
			Ta = 25°C	—	300	—		
			Ta = 70°C	—	85	—		
THE BRIGHTNESS OF BACK-LIGHT	L	IF = 40 mA	—	20	—	cd/m <sup>2</sup>	1	
PEAK EMISSION WAVELENGTH	$\lambda P$	IF = 40 mA	—	570	—	nm	1	

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

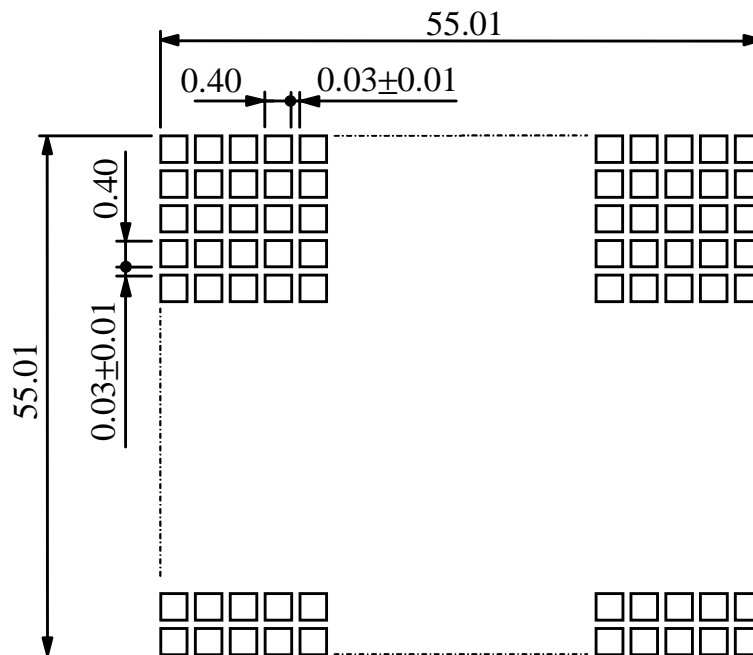


6. OUTLINE DIMENSION



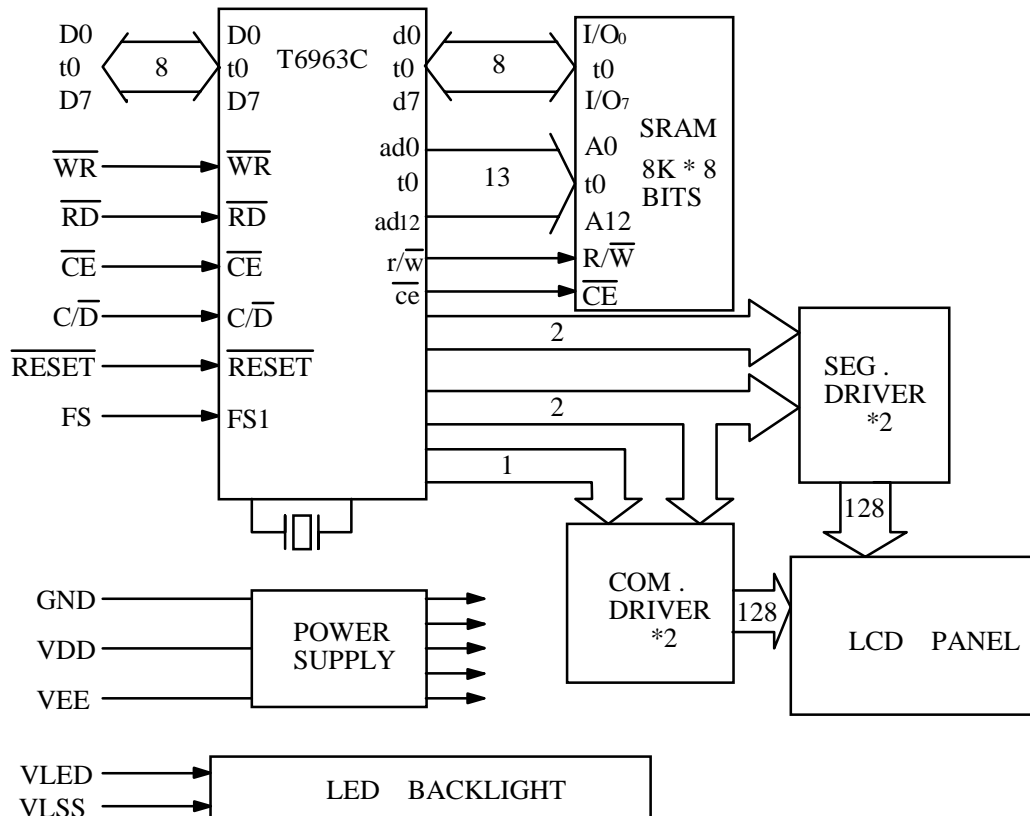
UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM

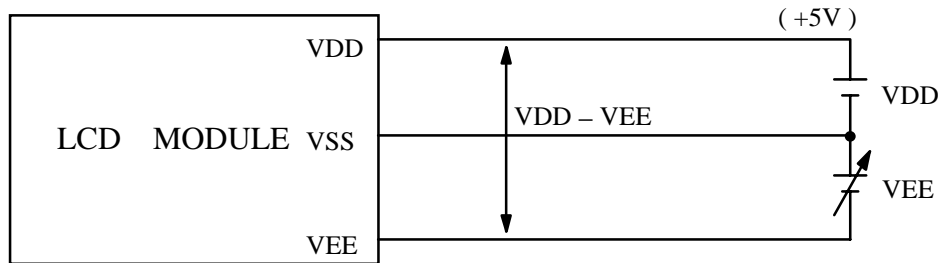


9. INTERFACE SIGNALS

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 DRIVE
5	$\overline{\text{WR}}$	DATA WRITE
6	$\overline{\text{RD}}$	DATA READ
7	$\overline{\text{CE}}$	CHIP ENABLE
8	$\overline{\text{C/D}}$	$\overline{\text{WR}}$ = " L ", C/D = " H " : COMMAND WRITE $\overline{\text{C/D}}$ = " L " : DATA WRITE $\overline{\text{RD}}$ = " L ", C/D = " H " : STATUS READ $\overline{\text{C/D}}$ = " L " : 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	VLED	POWER SUPPLY FOR LED BACKLIGHT ( ANODE )
22	VLSS	POWER SUPPLY FOR LED BACKLIGHT ( CATHODE )

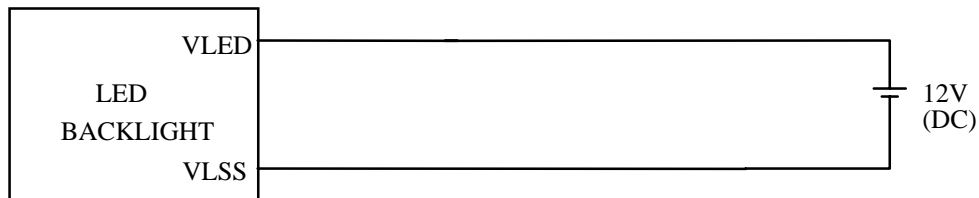
10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCM



VDD - VEE : LCD DRIVING VOLTAGE

10.2 POWER SUPPLY FOR LED BACK - LIGHT



10.3 TIMING OF POWER SUPPLY AND INTERFACE SIGNAL

