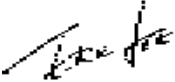



EXAMINED BY : 	<b>EMERGING DISPLAY</b>  TECHNOLOGIES CORPORATION	FILE NO . CAS-10240
APPROVED BY:  		ISSUE : MAR.20,2001
		TOTAL PAGE : 7
		VERSION : 1

CUSTOMER	ACCEPTANCE	SPECIFICATIONS
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MODEL NO. :

ES16201(TRANSFLECTIVE TYPES)

FOR MESSRS :

\_\_\_\_\_

CUSTOMER'S APPROVAL

DATE : \_\_\_\_\_

BY : \_\_\_\_\_

EMERGING DISPLAY  
TECHNOLOGIES CORPORATION

MODEL NO .  
ES16201(TRANSFLECTIVE TYPES)

VERSION  
1

RECORDS OF REVISION

DOC . FIRST ISSUE

MAR.20,2001

DATE	REVISED PAGE NO.	SUMMARY

NUMBERING SYSTEM

Polarizer Mode	Backlight	Code value
Transflective	—	P

Module type:  
S : Chip on glass

E S 16 2 01 G P

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

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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 / DRIVER : NT7603

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - N T 7 6 0 3

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- |                               |                                |
|-------------------------------|--------------------------------|
| (1) NUMBER OF CHARACTER ..... | 16 CH * 2 LINE                 |
| (2) MODULE SIZE .....         | 69.0W * 30.0H * 3.0D (max.) mm |
| (3) EFFECTIVE AREA .....      | 63.0W * 18.0H mm               |
| (4) CHARACTER FONT .....      | 5 * 7 DOTS + CURSOR            |
| (5) CHARACTER SIZE .....      | 2.96W * 5.56H mm               |
| (6) CHARACTER PITCH .....     | 3.55(W)*5.94 (H)               |
| (7) DOT SIZE .....            | 0.56W * 0.66H mm               |
| (8) DOT PITCH .....           | 0.60W * 0.70H mm               |
| (9) LCD TYPE *                |                                |
| (10) DRIVING METHOD .....     | 1 / 16 DUTY MULTIPLEX DRIVE    |

\* PLEASE REFER TO NUMBERING SYSTEM

### 3 . ABSOLUTE MAXIMUM RATINGS

#### 3 . 1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS . ( AT Ta = 25 °C )

PARAMETER	SYMBOL	MIN .	MAX .	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VDD – VSS	0	7 . 0	V	
POWER SUPPLY FOR LCD DRIVE	VDD – VO	0	5 . 0	V	
INPUT VOLTAGE	VI	VSS	VDD	V	
STATIC ELECTRICITY	—	—	1 0 0	V	NOTE ( 1 )

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	- 2 0 °C	7 0 °C	- 3 0 °C	8 0 °C	NOTE ( 2 ) , ( 3 )
HUMIDITY	—	9 0 % RH	—	9 0 % RH	WITHOUT CONDENSATION
VIBRATION	—	4 . 9 m /s <sup>2</sup> ( 0 . 5 G )	—	1 9 . 6 m /s <sup>2</sup> ( 2 G )	
SHOCK	—	2 9 . 4 m /s <sup>2</sup> ( 3 G )	—	4 9 0 . 0 m /s <sup>2</sup> ( 5 0 G )	XYZ DIRECTIONS
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	Ta = 25°C			UNIT	NOTE
			MIN .	TYP .	MAX .		
H LEVEL INPUT VOLTAGE	VIH	—	2.2	—	VDD	V	2
L LEVEL INPUT VOLTAGE	VIL	—	-0.3	—	0.8	V	—
H LEVEL OUTPUT VOLTAGE	VOH	-IOH = 0.2 mA	2.4	—	—	V	2
L LEVEL OUTPUT VOLTAGE	VOL	IOL = 1.2 mA	—	—	0.4	V	—
POWER SUPPLY CURRENT (LOGIC)	IDD	VDD = 5.0 V	—	1.0	1.5	mA	—
RECOMMENDED LCD DRIVING VOLTAGE	VDD - VO ∅ = 10° θ = 0° DUTY = 1/16	Ta = -20 °C	—	4.5	—	V	—
		Ta = 25 °C	—	4.5	—		
		Ta = 70 °C	—	4.5	—		
CLOCK OSCILLATION FREQUENCY	FOSC	Ta = 25 °C	380	540	700	KHZ	—

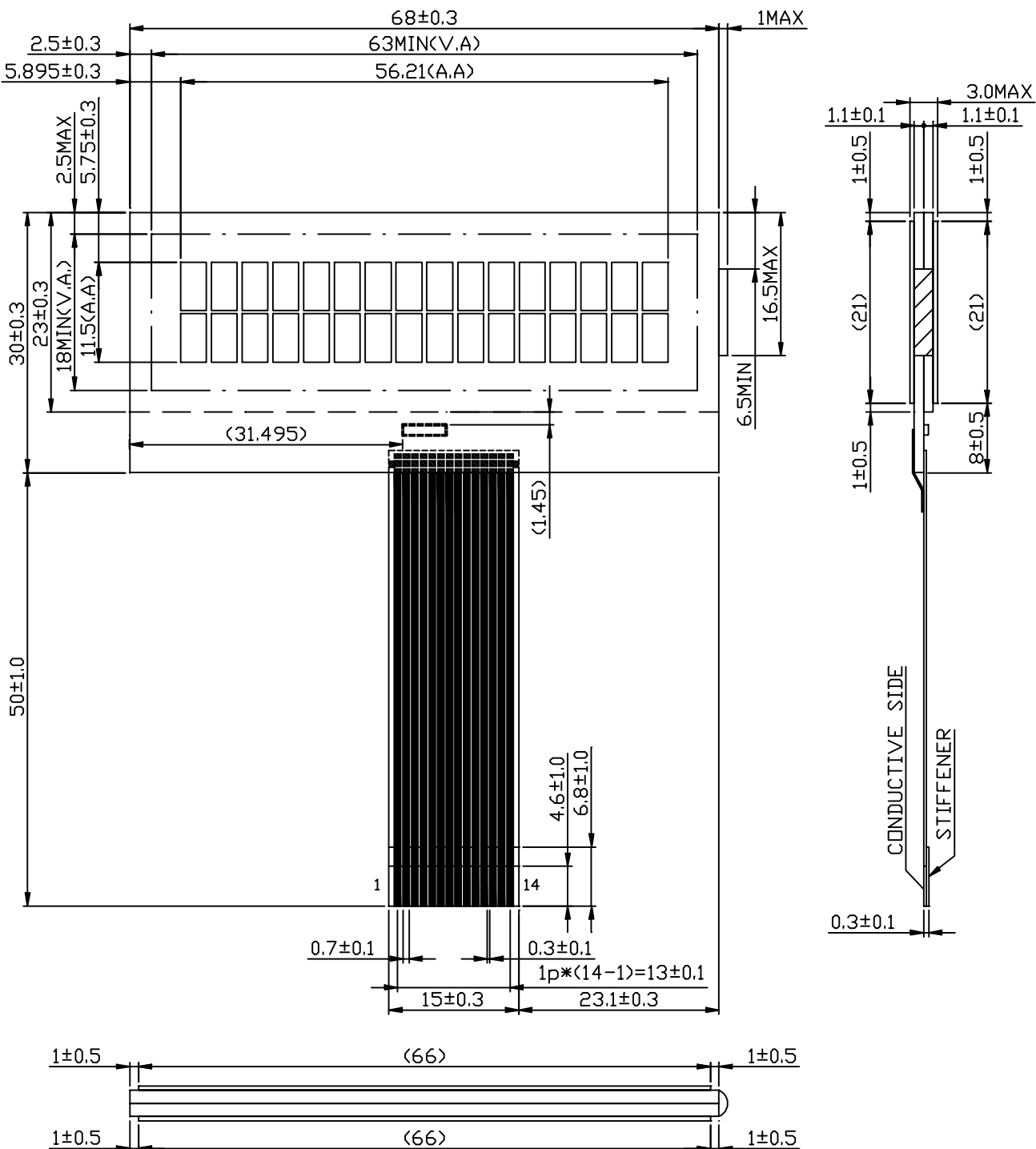
5. OPTICAL CHARACTERISTICS .

I T E M	SYMBOL	CONDITION	Ta = 25°C			UNIT	NOTE	
			MIN .	TYP .	MAX .			
VIEWING AREA	∅ 2 - ∅ 1	K ≥ 1.4	30	—	—	deg.	1	
CONTRAST RATIO	K	∅ = 10° θ = 0°	—	5	—	—	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	—		

NOTE (1) : PLEASE REFER TO :  
CUSTOMER ACCEPTANCE STANDARD SPECIFICATION : E U - 002 A

NOTE (2) : APPLICABLE : DB0 ~ DB7 , RS , R/W , E

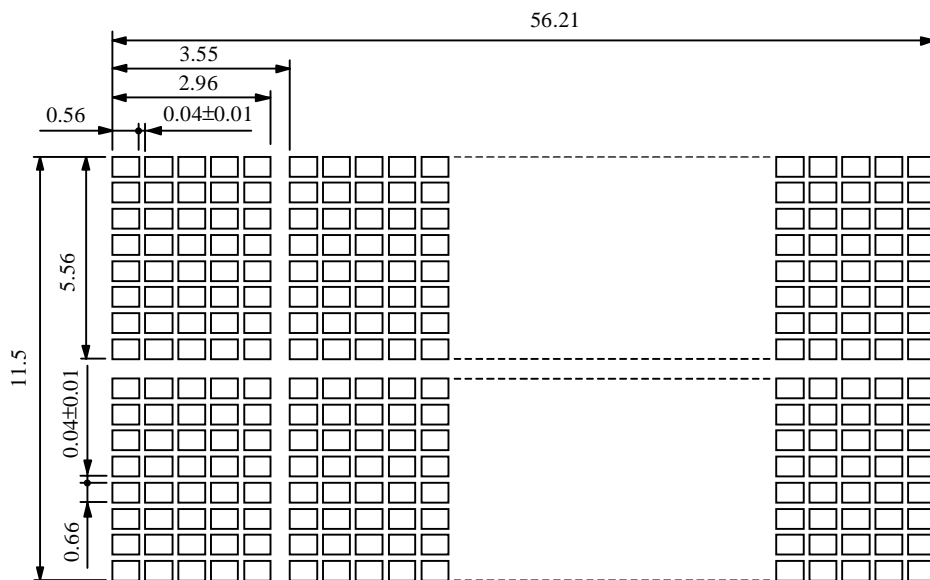
6. OUTLINE DIMENSION



UNIT : mm  
SCALE : NTS  
NOT SPECIFIED TOLERANCE IS  $\pm 0.5$

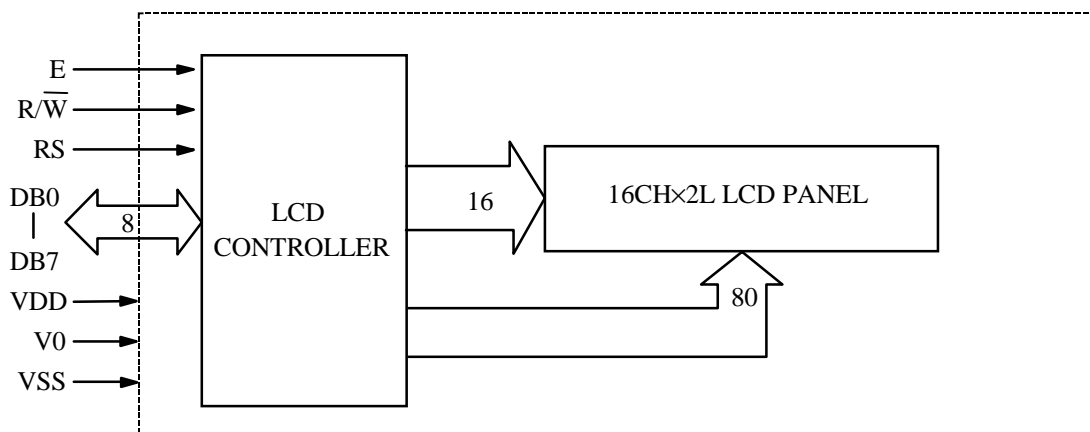


7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM

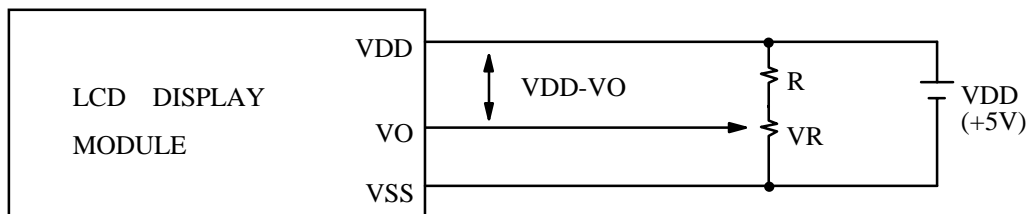


9. INTERFACE SIGNALS

PIN NO.	SYMBOL	DESCRIPTION	FUNCTION
1	VSS	GROUND	0V (GND)
2	VO	LCD CONTRAST ADJUSTMENT	
3	VDD	POWER SUPPLY FOR LOGIC CIRCUIT	+5V
4	RS	INSTRUCTION/DATA REGISTER SELECTION	RS = 0 : INSTRUCTION REGISTER RS = 1 : DATA REGISTER
5	$\overline{R/W}$	READ/WRITE SELECTION	$\overline{R/W}$ = 0 : REGISTER WRITE $\overline{R/W}$ = 1 : REGISTER READ
6	E	ENABLE INPUT	
7	DB0	DATA INPUT/OUTPUT LINES	4 BIT/8BIT SELECTABLE 4 BIT : DB4 - DB7 8 BIT : DB0 - DB7
8	DB1		
9	DB2		
10	DB3		
11	DB4		
12	DB5		
13	DB6		
14	DB7		

## 10. POWER SUPPLY

### 10.1 POWER SUPPLY FOR LCD MODULE



VDD - VO : LCD DRIVING VOLTAGE

VR : 10K  $\Omega$  ~ 20K  $\Omega$

RECOMMENDED RESISTOR R :  $VDD - VO \geq 1.5 V$

### 11. DISPLAY DATA RAM ADDRESS

CHARACTER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
LINE 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
LINE 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF