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CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL :

162C0(WHITE LED TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

EMERGING DISPLAY
TECHNOLOGIES CORPORATION

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| RECORDS OF REVISION | DOC . FIRST ISSUE | FEB.04,2005 |
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|------|------------------------|---------|
| | | |

NUMBERING SYSTEM

| Polarizer Mode | Backlight | Code value |
|----------------|-----------|------------|
| Transflective | LED | L |
| Transmissive | LED | M |

| Backlight Color | Code Value |
|-----------------|------------|
| WHITE | W |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| E | W | 1 | 6 | 2 | C | 0 | G | L | W |
|---|---|---|---|---|---|---|---|---|---|

| LCD type + LCD color | Code Value |
|----------------------|------------|
| STN + Yellow-Green | Y |
| STN + Gray | G |
| STN + Blue | B |
| FSTN + Black | N |
| 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 / DRIVER : HD44780U
PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

E U - H D 4 4 7 8 0 U

1.3 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL
SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF CHARACTER ----- 16 CH * 2 LINES
- (2) MODULE SIZE ----- 85.0W * 36.0H * 14.0D (max.) mm
- (3) EFFECTIVE AREA ----- 63.5W * 15.8H mm
- (4) CHARACTER FONT ----- 5 * 7 DOTS + CURSOR
- (5) CHARACTER SIZE ----- 2.96W * 5.56H mm
- (6) CHARACTER PITCH ----- 3.55W * 5.94H mm
- (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
- (11) VIEWING DIRECTION ----- 6 O'CLOCK
- (12) BACK-LIGHT *

* 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 | 6.0 | V | |
| POWER SUPPLY FOR LCD DRIVE | VDD - VO | 0 | 6.0 | V | |
| INPUT VOLTAGE | VI | VSS | VDD | V | |
| STATIC ELECTRICITY | — | — | 100 | V | NOTE (1) |
| POWER SUPPLY FOR LED B.L. | VLED-VLSS | — | 5 | 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 | — | 90 % RH | — | 90 % RH | WITHOUT CONDENSATION |
| VIBRATION | — | 4.9 m/s ² (0.5 G) | — | 19.6 m/s ² (2 G) | |
| SHOCK | — | 29.4 m/s ² (3 G) | — | 490.0 m/s ² (50 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

Ta = 25 °C VDD = 5.0 ± 0.25 V

| PARAMETER | SYMBOL | CONDITION | MIN . | TYP . | MAX . | UNIT |
|---------------------------------|---|-----------------|-------|-------|-------|------|
| H LEVEL INPUT VOLTAGE | VIH | — | 2.2 | — | — | V |
| L LEVEL INPUT VOLTAGE | VIL | — | — | — | 0.6 | V |
| H LEVEL OUTPUT VOLTAGE | VOH | -IOH = 0 . 2 mA | 2.4 | — | — | V |
| L LEVEL OUTPUT VOLTAGE | VOL | IOL = 1 . 2 mA | — | — | 0.4 | V |
| POWER SUPPLY CURRENT (LOGIC) | IDD | VDD = 5 . 0 V | — | 25 | 30 | mA |
| RECOMMENDED LCD DRIVING VOLTAGE | VDD - VO ∅ = 10° θ = 0° DUTY = 1/16 | Ta = -20 °C | 3.9 | 4 . 4 | 4.9 | V |
| | | Ta = 25 °C | 3.9 | 4 . 4 | 4.9 | V |
| | | Ta = 70 °C | 3.9 | 4 . 4 | 4.9 | V |
| CLOCK OSCILLATION FREQUENCY | FOSC | Ta = 25 °C | — | 270 | — | KHz |
| LED FORWARD VOLTAGE | VF | IF = 20 mA | — | 5 | — | V |
| LED FORWARD CURRENT | IF | — | — | 20 | — | mA |

5. OPTICAL CHARACTERISTICS .

Ta = 25 °C VDD = 5.0 V

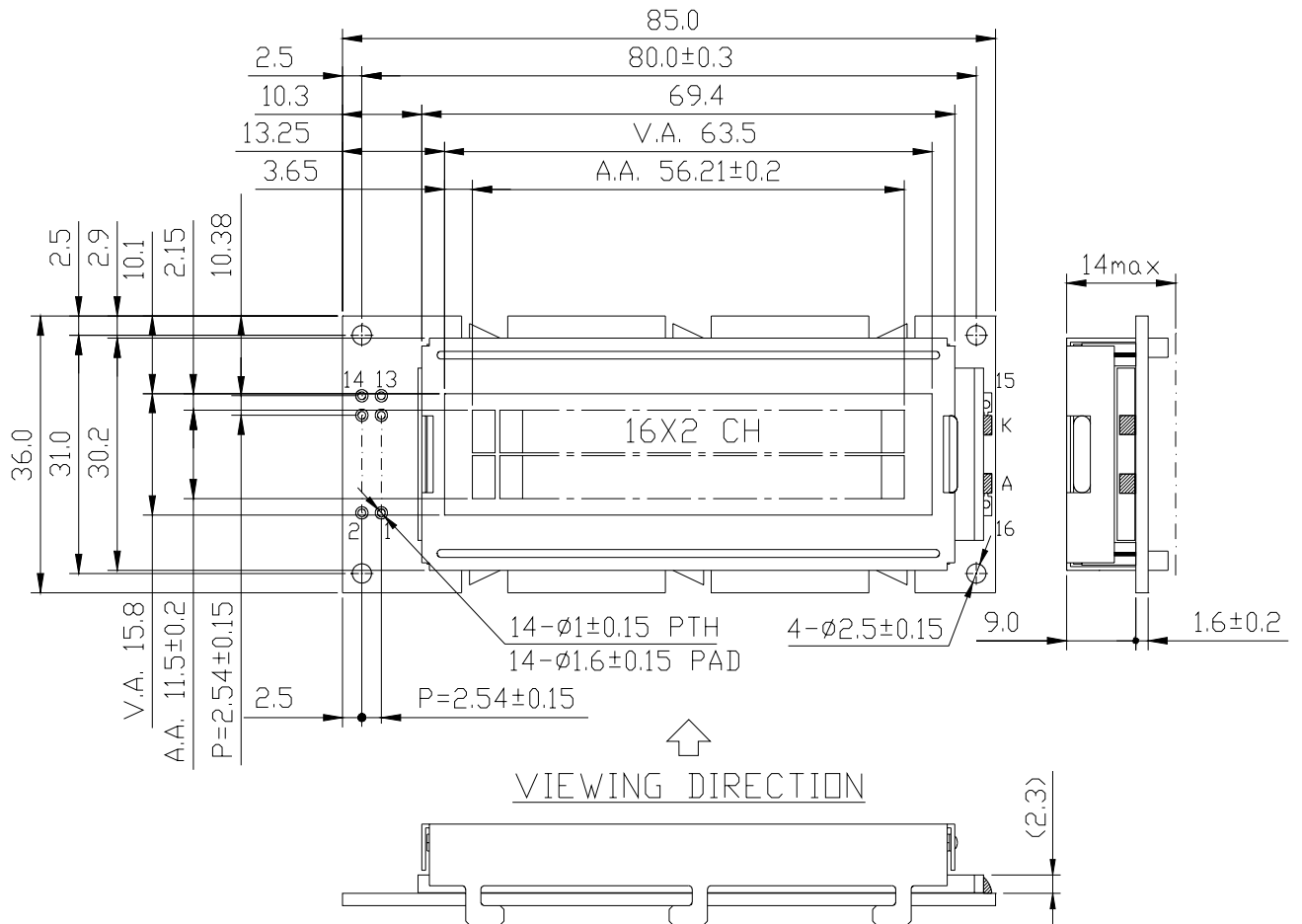
| I T E M | SYMBOL | CONDITION | MIN . | TYP . | MAX . | UNIT | NOTE | |
|--------------------------|-------------|-------------------|-------------|-------|-------|-------------------|------|---|
| VIEWING ANGLE | ∅ 2 - ∅1 | K ≥ 1.4 | 3 0 | — | — | deg. | 1 | |
| CONTRAST RATIO | K | ∅ = 10° θ = 0° | 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 | — | | |
| THE BRIGHTNESS OF MODULE | L | VLED = 5.0 V | 7 | 8 | — | cd/m ² | 1, 2 | |
| | | | 10.5 | 12 | — | | 1, 3 | |

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

NOTE (2) : POLARIZER MODE : TRANSFLECTIVE

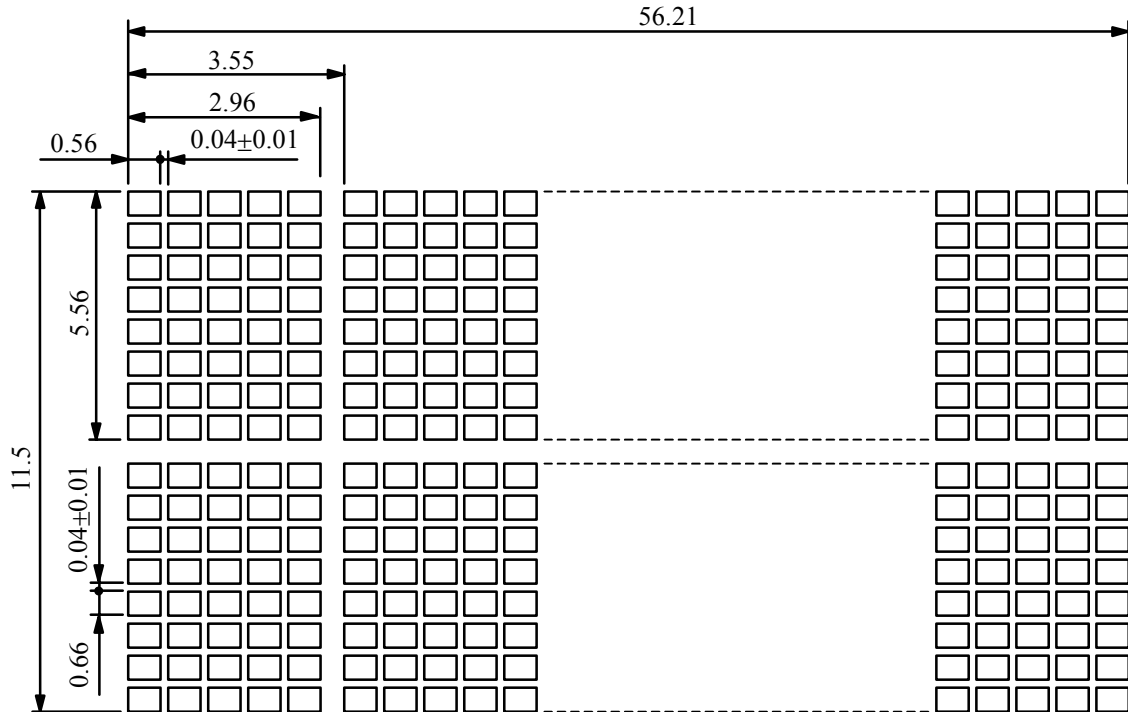
NOTE (3) : POLARIZER MODE : TRANSMISSIVE

6. OUTLINE DIMENSIONS



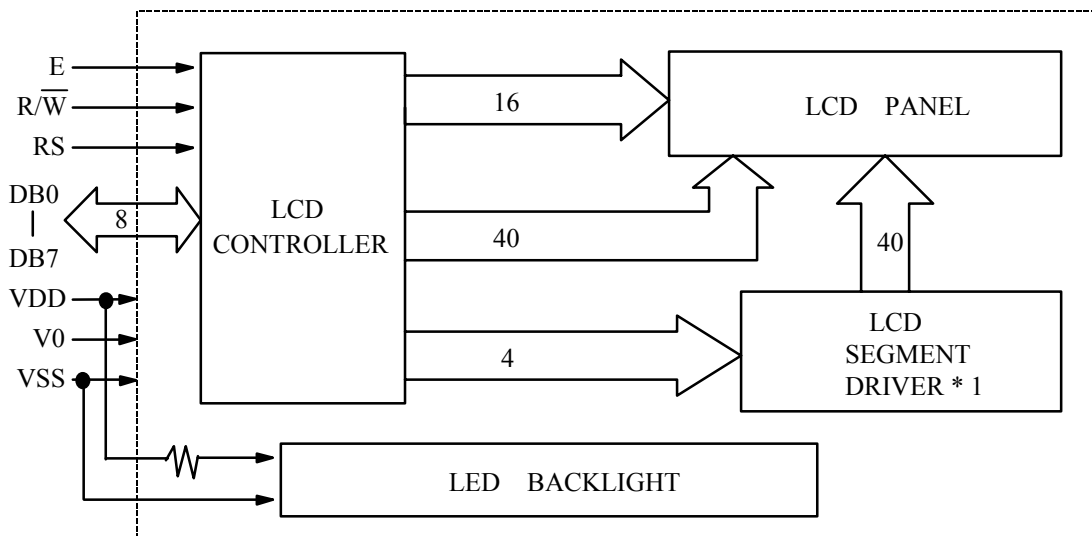
UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5 mm

7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM

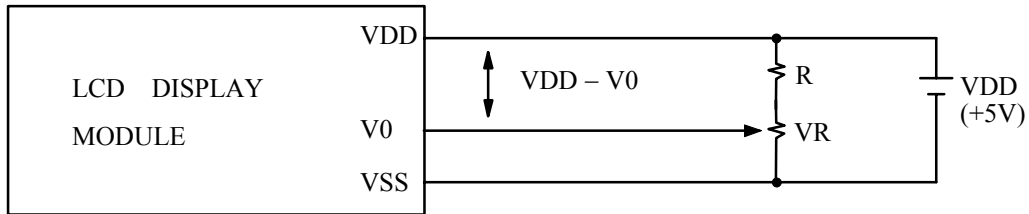


9. INTERFACE SIGNALS

| PIN NO. | SYMBOL | DESCRIPTION |
|---------|------------------|---|
| 1 | VSS | GROUND (0V) |
| 2 | VDD | POWER SUPPLY FOR LOGIC (+5V) |
| 3 | VO | LCD CONTRAST ADJUSTMENT |
| 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 |
| 8 | DB1 | |
| 9 | DB2 | |
| 10 | DB3 | |
| 11 | DB4 | |
| 12 | DB5 | |
| 13 | DB6 | |
| 14 | DB7 | |

10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCD MODULE



$VDD - V0$: LCD DRIVING VOLTAGE
 VR : $10K\Omega \sim 20K\Omega$

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 |