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| | | VERSION : 1 |

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

50008(REFLECTIVE TYPES)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

MITSUTECH INT'L CORP.

| | |
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| MODEL NO . | VERSION |
| 50008(REFLECTIVE TYPES) | 1 |

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| RECORDS OF REVISION | DOC . FIRST ISSUE | MAR.29,2000 |
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| | | |

NUMBERING SYSTEM

| Polarizer Mode | Backlight | Code value |
|----------------|-----------|------------|
| Reflective | — | R |

Module type : W : Wide Temp. Module
 G : Graphic Module

E G 50 0 08 G R U

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

Viewing direction
 NIL : 6 o'clock
 U : 12 o'clock

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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

PLEASE REFER TO :

CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS :

EU - 200

1.3 THIS INDIVIDUAL SPECIFICATION IS PRIOR TO GENERAL SPECIFICATIONS .

2. MECHANICAL SPECIFICATIONS

- (1) NUMBER OF DOTS ----- 120 * 16 DOTS
- (2) MODULE SIZE ----- 116.0W * 37.0H * 10.0D (max.) mm
- (3) EFFECTIVE AREA ----- 83.0W * 18.6H mm
- (4) ACTIVE AREA ----- 74.35W * 11.47H mm
- (5) DOT SIZE ----- 0.57W * 0.67H mm
- (6) DOT PITCH ----- 0.62W * 0.72H mm
- (7) LCD TYPE*
- (8) DRIVING METHOD ----- 1/32 DUTY MULTIPLEX DRIVE
- (9) VIEWING DIRECTION *

* PLEASE REFER TO NUMBERING SYSTEM

NOTE : N.T. : NORMAL TEMPERATURE

W.T. : WIDE TEMPERATURE

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 | |
| INPUT VOLTAGE | VI | VSS | VDD | V | |
| STATIC ELECTRICITY | — | — | 100 | 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 | N.T. | 0 °C | 50 °C | -20 °C | 70 °C | NOTE (2), (3) |
| | W.T. | -20 °C | 70 °C | -30 °C | 80 °C | |
| 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 -20°C (-30 °C FOR W.T.): 48HR MAX .

70°C (80 °C FOR W.T.) : 168HR MAX .

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE .

4 . ELECTRICAL CHARACTERISTICS

Ta = 25°C VDD = 2.4 ~ 6.0V

| PARAMETER | SYMBOL | CONDITION | MIN . | TYP. | MAX . | UNIT | |
|--|--|-------------------|-------------|------|-------------|------|---|
| H LEVE INPUT VOLTAGE NOTE (1) | VIH | — | 0.7*VDD | — | VDD | V | |
| | | VDD=2.7 V | 0.8*VDD | — | VDD | | |
| L LEVE INPUT VOLTAGE NOTE (1) | VIL | — | VSS | — | 0.3*VDD | V | |
| | | VDD=2.7 V | VSS | — | 0.2*VDD | | |
| H LEVE OUTPUT VOLTAGE NOTE (1) | VOH | IOH = -1.0mA | 0.8* VDD | — | VDD | V | |
| L LEVE OUTPUT VOLTAGE NOTE (1) | VOL | IOL = 1 . 0 mA | VSS | — | 0.2* VDD | V | |
| POWER SUPPLY CURRENT FOR LOGIC NOTE (2) | IDD | VDD =5 . 0 V | — | 48 | 96 | μA | |
| RECOMMENDED LCD DRIVING VOLTAGE NOTE (3) | VDD – T3 ∅ = 10°, θ = * DUTY =1/32 | N.T. | Ta = 0 °C | — | 6.3 | — | V |
| | | | Ta = 25 °C | — | 6.0 | — | V |
| | | | Ta = 50 °C | — | 5.6 | — | V |
| | | W.T | Ta = -20 °C | — | 6.79 | — | V |
| | | | Ta = 25 °C | — | 6.79 | — | V |
| | | | Ta = 70 °C | — | 6.32 | — | V |
| CLOCK OSCILLATION F REQUENCY | f _{osc} | Ta = 25 °C | — | 20 | — | KHZ | |
| LCD DISPLAY DUTY RATIO | DUTY | — | — | 3 2 | — | — | |

NOTE (1) : APPLIED TO TERMINALS D0 TO D7 , A0 , R/ \overline{W} , E.

NOTE (2) : THE DISPLAY PATTERN IS ALL “ Q ” .

NOTE (3) : RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT
± 1 . 0V BY EACH MODULE .

* θ = 0° WHEN VIEWING DIRECTION IS 6 O'CLOCK.

θ = 180° WHEN VIEWING DIRECTION IS 12 O'CLOCK.

5. OPTICAL CHARACTERISTICS

Ta = 25 °C VDD = 5.0 V

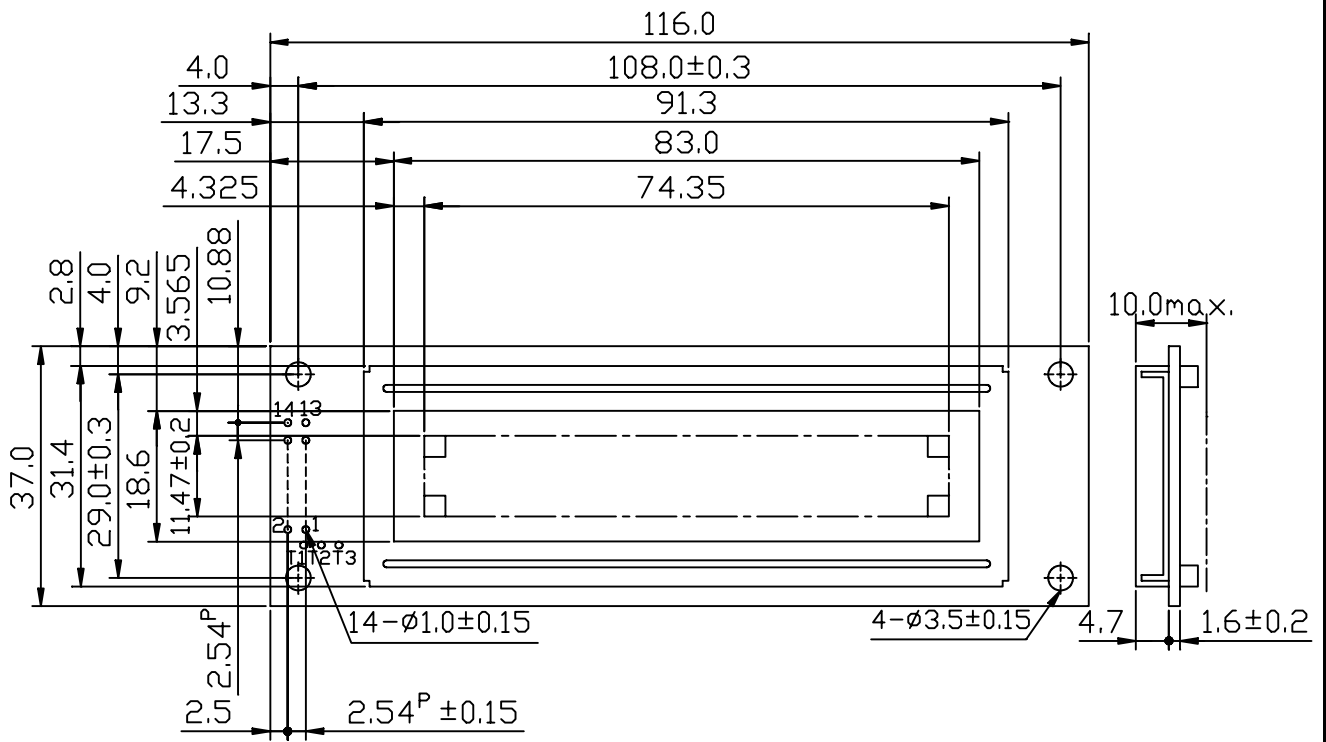
| I T E M | | SYMBOL | CONDITION | | MIN. | TYP. | MAX. | UNIT | NOTE |
|----------------|------|-------------|-------------------|------------|------|------|------|------|------|
| VIEWING AREA | | ∅ 2 - ∅1 | K ≥ 1.4 | | 40 | — | — | deg. | 1 |
| CONTRAST RATIO | | K | ∅ =10 °, θ* = 0 ° | | — | 5 | — | — | 1 |
| RESPONSE TIME | N.T | tr (rise) | ∅ =10 ° | Ta = 25 °C | — | 150 | — | ms | 1 |
| | | tf (fall) | | Ta = 25 °C | — | 300 | — | | |
| | W.T. | tr (rise) | ∅ =10 ° | Ta = 25 °C | — | 142 | — | | |
| | | tf (fall) | | Ta = 25 °C | — | 304 | — | | |

* θ = 0 ° WHEN VIEWING DIRECTION IS 6 O'CLOCK.
 θ = 180 ° WHEN VIEWING DIRECTION IS 12 O'CLOCK.

NOTE (1) : PLEASE REFER TO :
 CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS.
 E U - 0 0 2 A

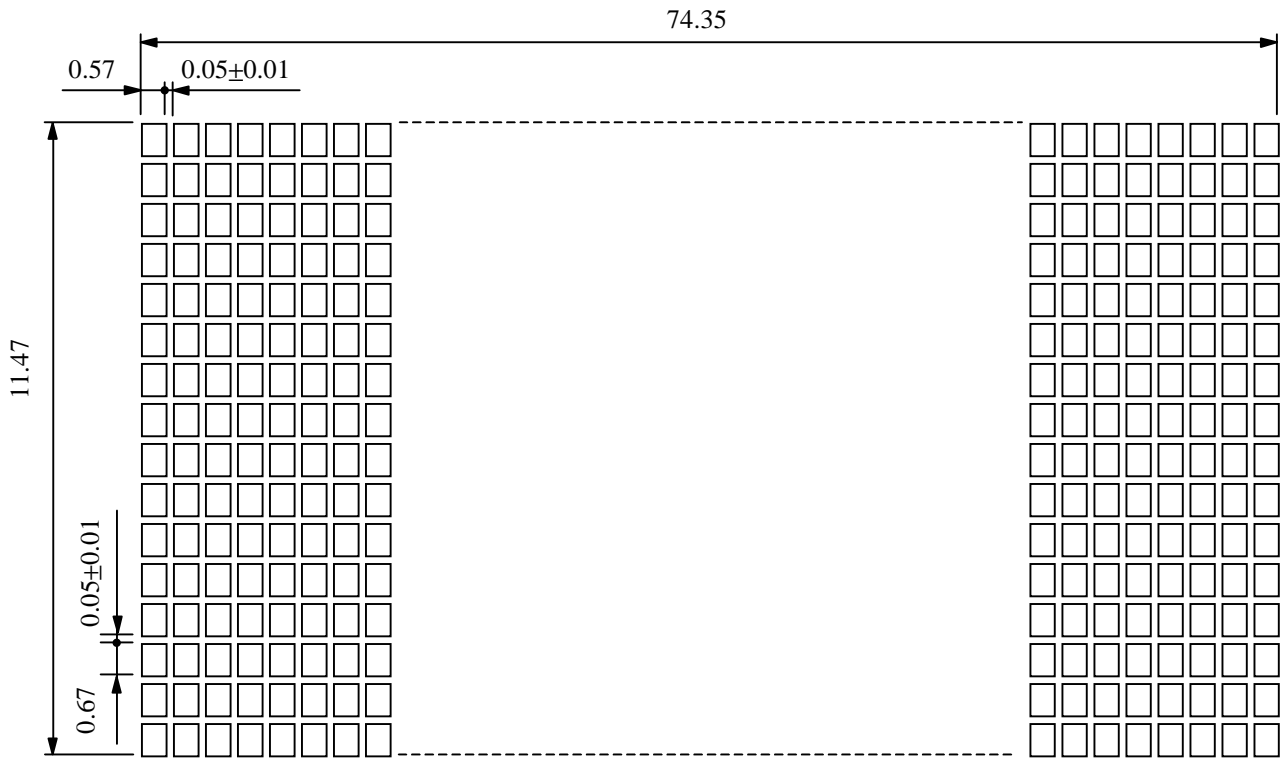
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6. OUTLINE DIMENSION



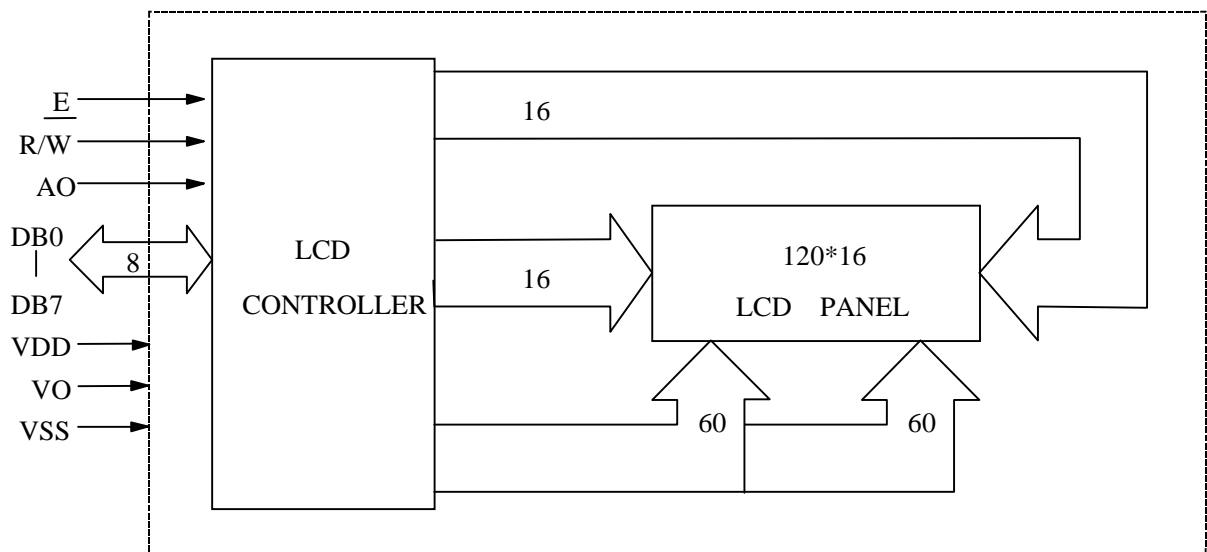
UNIT : mm
 SCALE : NTS
 NOT SPECIFIED TOLERANCE IS ± 0.5

7. DETAIL DRAWING OF DOT MATRIX



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

8. BLOCK DIAGRAM

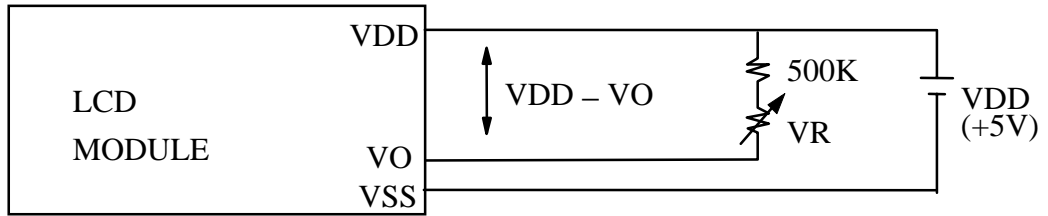


9. INTERFACE SIGNALS

| PIN NO | SYMBOL | DESCRIPTION | FUNCTION |
|--------|------------------|---------------------------------------|---|
| 1 | VSS | GROUND | 0V (GND) |
| 2 | VDD | POWER SUPPLY FOR LOGIC CIRCUIT | +5V |
| 3 | VO | LCD CONTRAST ADJUSTMENT | |
| 4 | AO | INSTRUCTION / DATA REGISTER SELECTION | AO = 0 : INSTRUCTION REGISTER AO = 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 - VO : LCD DRIVING VOLTAGE

VR : 500KΩ

1 1 . SAMPLE PROGRAM

```

EG50008_INIT:           ;SOURCE PROGRAM FOR 80C31
MOV    A,#B7H           ;SET POWER CONTROL
call   PutIR_1          ;THEN SET DISPLAY ON COMMAND
CALL   DELAY            ;BEFORE SET DISPLAY ON COMMAND
CALL   DELAY            ;MUST DELAY 0.2 SEC
CALL   DELAY
CALL   DELAY
MOV    A,#8FH           ;SET ELECTRONIC CONTROL
call   PutIR_1
MOV    A,#A9H           ;SET 1/32 DUTY
call   PutIR_1
MOV    A,#C0H           ;DISPLAY START LINE
call   PutIR_1
MOV    A,#B8H           ;SET PAGE
call   PutIR_1
MOV    A,#00H           ;SET COLUMN ADDRESS
call   PutIR_1
MOV    A,#A0H           ;SET ADC
call   PutIR_1
MOV    A,#A4H           ;SET STATIC DRIVER OFF
call   PutIR_1
MOV    A,#AFH           ;DISPLAY ON
call   PutIR_1
RET

```