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PART NO. : MC1602F-SYR

FOR MESSRS. : _____

CONTENTS

| <i>NO.</i> | <i>ITEM</i> | <i>PAGE</i> |
|------------|----------------------------|-------------|
| 1. | COVER | 1 |
| 2. | RECORD OF REVERSION | 2 |
| 3. | GENERAL SPECIFICATION | 3 |
| 4. | MECHANICAL DATA | 3 |
| 5. | ABSOLUTE MAXIMUM RATINGS | 4 |
| 6. | ELECTRICAL CHARACTERISTICS | 5 |
| 7. | OPTICAL CHARACTERISTICS | 5 |
| 8. | OUTLINE DIMENSION | 6 |
| 9. | BLOCK DIAGRAM | 7 |
| 10. | POWER SUPPLY FOR LCM | 7 |
| | | |
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ACCEPTED BY : _____ PROPOSED BY : _____

RECORD OF REVISION

| DATE | PAGE | SUMMARY |
|------|------|---------|
| | | |

3. General specifications

3.1 General specifications

PLEASE REFER TO:

“CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (MS-10-12780)”.

3.2 This individual specification is prior to general specifications

4. Mechanical data

- (1) NUMBER OF CHARACTERS -----16 CH * 2 LINE
- (2) MODULE SIZE-----85.0 W * 36.0 H * 10.0 mm
- (3) EFFECTIVE AREA -----64.5 W * 16.0 H mm
- (4) CHARACTER PATTERN-----5 * 7 DOTS + CURSOR
- (5) CHARACTER SIZE-----2.96 W * 4.86 H mm
- (6) CHARACTER PITCH-----3.55 mm
- (7) DOT SIZE -----0.56 W * 0.66 H mm
- (8) DOT PITCH-----0.60 W * 0.70 H mm
- (9) VIEWING DIRECTION -----6 O' CLOCK
- (10) LCD TYPE-----STN.YELLOW-GREEN.REFLECTIVE.

5. Absolute maximum ratings

5.1 Electrical absolute maximum ratings

| <i>I T E M</i> | <i>SYMBOL</i> | <i>MIN.</i> | <i>MAX.</i> | <i>UNIT</i> | <i>COMMENT</i> |
|------------------------|----------------------------------|-----------------|-----------------|-------------|----------------|
| POWER SUPPLY FOR LOGIC | V _{DD} -V _{SS} | 0 | 6.0 | V | ----- |
| INPUT VOLTAGE | V _I | V _{SS} | V _{DD} | V | ----- |
| STATIC ELECTRICITY | ----- | ----- | 100 | V | NOTE (1) |

NOTE (1): ELECTRO-STATIC DISCHARGE RESISTANCE IS TESTED BY CHARGING A 200PF CAPACITOR AND DISCHARGING IT BY CONTACT WITH A INTERFACE CONNECTOR PIN.

5.2 Environmental absolute maximum ratings

| <i>I T E M</i> | <i>OPERATING</i> | | <i>STORAGE</i> | | <i>COMMENT</i> |
|-----------------------|-------------------|-------------|-------------------|-------------|---|
| | <i>MIN.</i> | <i>MAX.</i> | <i>MIN.</i> | <i>MAX.</i> | |
| AMBIENT TEMPERATURE | 0 | 50 | -20 | 70 | ----- |
| HUMIDITY | NOTE (2) | | NOTE (2) | | NO CONDENSATION |
| VIBRATION NOTE (3) | ----- | 0.5G | ----- | 2G | 10~300Hz XYZ DIRECTIONS 1 Hr EACH |
| SHOCK NOTE (3) | ----- | 3G | ----- | 50G | 10 msec XYZ DIRECTIONS 1 TIME EACH |
| CORROSIVE GAS | NOT ACCEPTABLE | | NOT ACCEPTABLE | | ----- |

NOTE (2) : Ta = 50 : 90%RH MAX.

Ta > 50 : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE
HUMIDITY OF 90% RH AT 50 . (80%RH AT 60)

NOTE (3): 1G = 9.8 m/s²

6. Electrical characteristics

Ta = 25 VDD = 5.0 ± 0.25 V

| <i>I T E M</i> | <i>SYMBOL</i> | <i>CONDITION</i> | <i>MIN.</i> | <i>TYP.</i> | <i>MAX.</i> | <i>UNIT</i> | |
|---------------------------------------|---------------------------------|--------------------------|-------------|-------------|-------------|-------------|---|
| INPUT VOLTAGE | V _{IH} | ----- | 2.2 | ----- | ----- | V | |
| | V _{IL} | | ----- | ----- | 0.6 | V | |
| OUTPUT VOLTAGE (H LEVEL) | V _{OH} | -I _{OH} = 0.2mA | 2.4 | ----- | ----- | V | |
| | V _{OL} | I _{OL} = 1.2 mA | ----- | ----- | 0.4 | V | |
| POWER SUPPLY CURRENT | I _{DD} | V _{DD} = 5.0V | ----- | 1.0 | 1.5 | mA | |
| RECOMMENDED LCD DRIVING VOLTAGE | V _{DD} -V _O | DUTY= 1/16 | Ta= 0 | ----- | 4.9 | ----- | V |
| | | =10 ° | Ta=25 | ----- | 4.5 | ----- | V |
| | | = 0 ° | Ta=50 | ----- | 4.1 | ----- | V |

NOTE (1): RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ± 0.5V BY EACH MODULE.

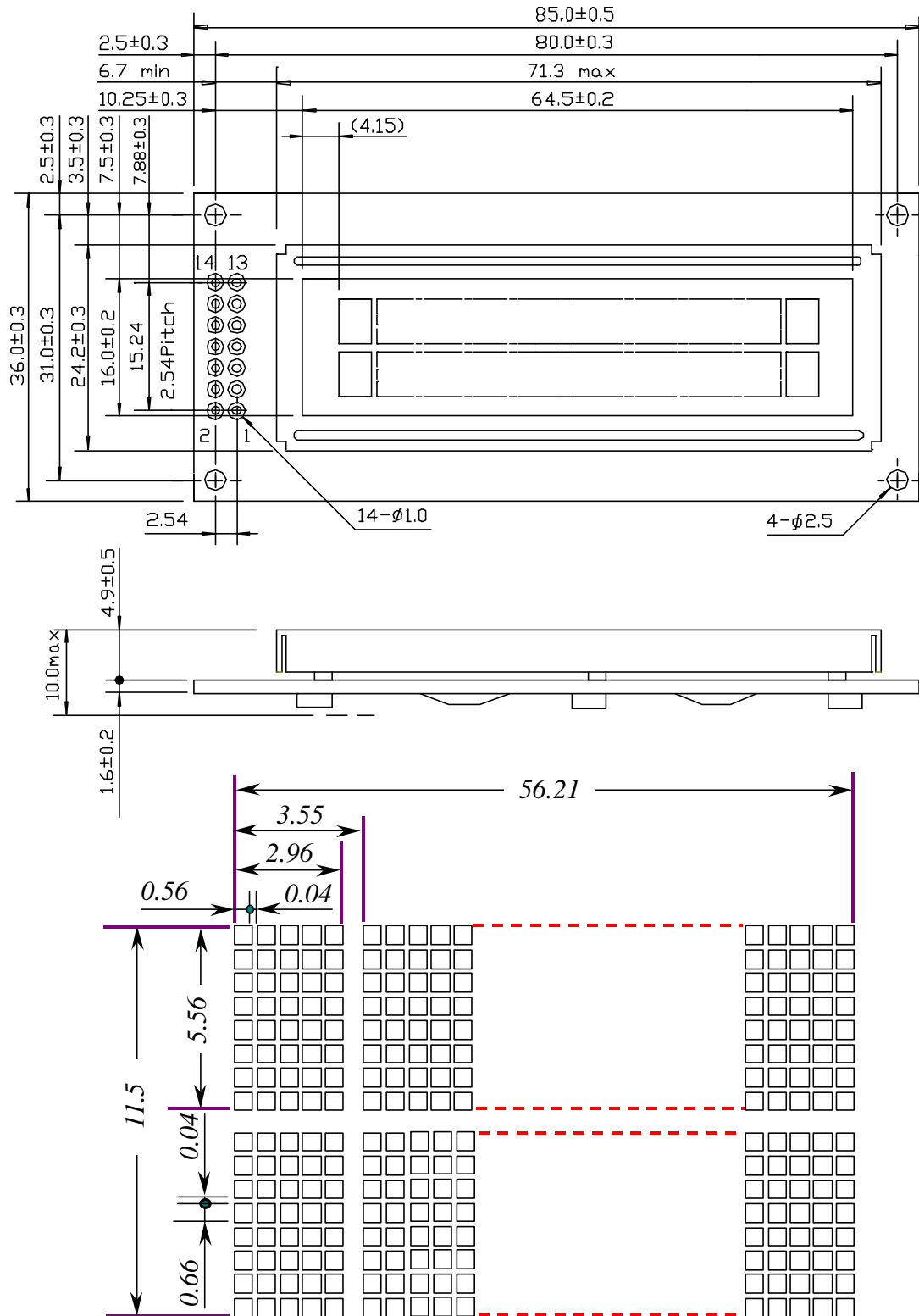
7. Optical characteristics

Ta = 25 VDD= 5.0V

| <i>I T E M</i> | <i>SYMBOL</i> | <i>CONDITION</i> | <i>MIN.</i> | <i>TYP.</i> | <i>MAX.</i> | <i>UNIT</i> | <i>NOTE</i> |
|----------------|---------------|------------------|-------------|-------------|-------------|-------------|-------------|
| VIEWING ANGLE | 2- 1 | K = 2.0 | 30 | 40 | ----- | deg. | 2 |
| CONTRAST RATIO | K | = 10 ° = 0 ° | 3.0 | 4.0 | ----- | ----- | 2 |
| RESPONSE TIME | tr (rise) | = 10 ° = 0 ° | ----- | 200 | 350 | ms | 2 |
| | tf (fall) | = 10 ° = 0 ° | ----- | 300 | 400 | ms | 2 |

NOTE (2): SEE CUSTOMER ACCEPTANCE STANDARD SPECIFICATION FOR DEFINITION OF OPTICAL CHARACTERISTICS.

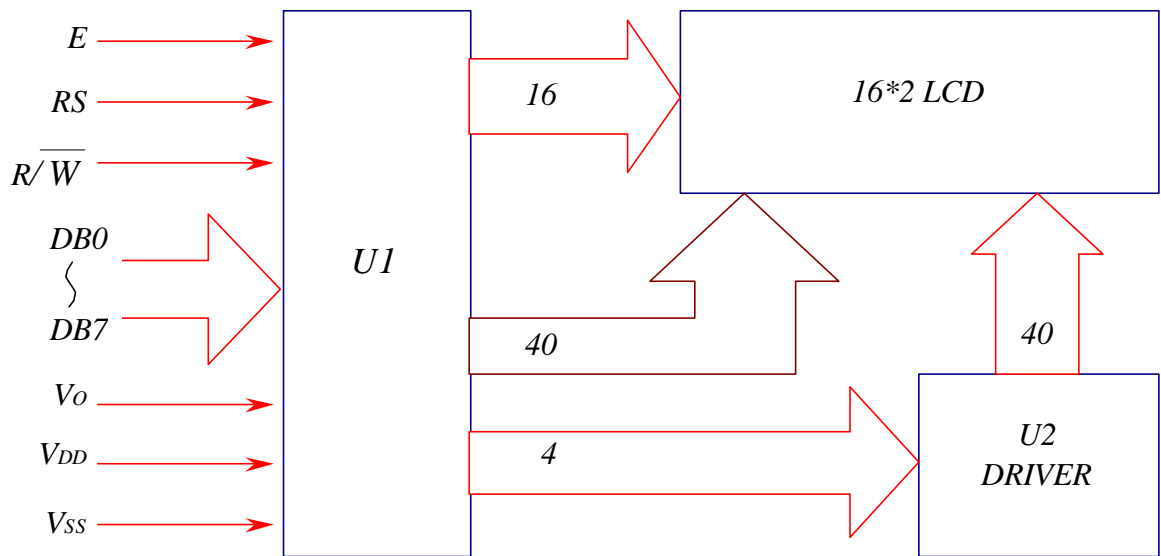
8. Outline dimension



Interface pin connection

| | | | | | | | |
|----------------|-----------------|-----------------|----------------|-----------|-----------|-----------|-----------|
| PIN NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| SYMBOL | V _{SS} | V _{DD} | V _O | RS | R/W | E | DB0 |
| PIN NO. | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| SYMBOL | DB1 | DB2 | DB3 | DB4 | DB5 | DB6 | DB7 |

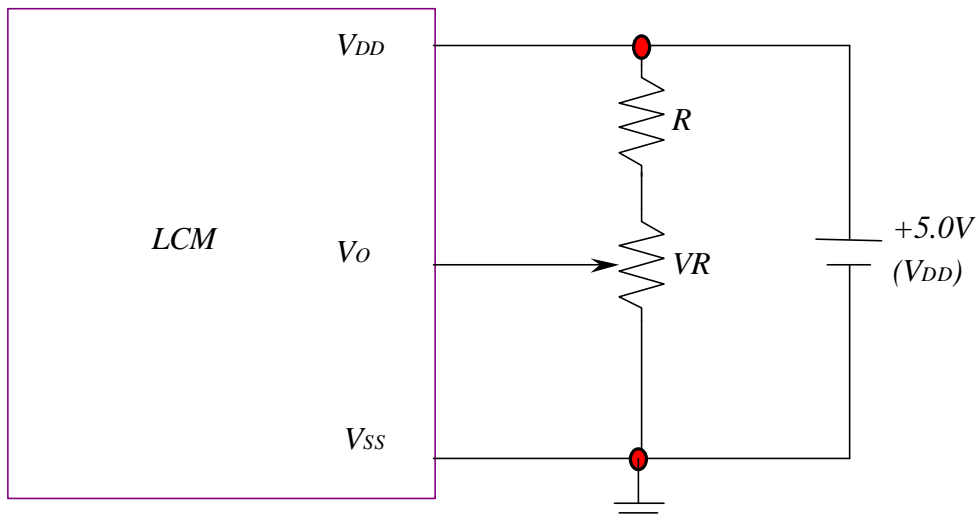
9. Block diagram



Display data address charts

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| LINE 1 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F |
| LINE 2 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 4A | 4B | 4C | 4D | 4E | 4F |

10. Power supply for LCM



RECOMMENDED RESISTOR R: $V_{DD} - V_O \quad 1.5V$
 $V_{DD} - V_O$: LCD DRIVING VOLTAGE
 VR: 10K ~20K