

|                 |                      |
|-----------------|----------------------|
| <b>CUSTOMER</b> | :                    |
| <b>MODEL</b>    | : <b>XLINK1602B0</b> |
| <b>SEC CODE</b> | :                    |

|              |                    |   |  |
|--------------|--------------------|---|--|
| Data Type    | Datasheet          |   |  |
| Lang Code    | English            |   |  |
| Total Page   |                    |   |  |
| Author       | tzero              | / |  |
| Accepted by  |                    | / |  |
| Proposed by  |                    | / |  |
| Date         |                    |   |  |
| Model Number | <b>XLINK1602B0</b> |   |  |

Recode of Revision

| <b>XLINK1602B0</b> |          |        |                   |
|--------------------|----------|--------|-------------------|
| Date               | Revision | Author | Description       |
| 2008/12/03         | 1.0.0    | tzero  | Document Creation |
| 2009/07/09         | 1.0.1    |        | update            |

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## 1. FEATURES

- Display Type: FSTN
- Display Format: 191X24 dots
- Display Mode: Positive, Reflective
- Driving Mode: 1/27Duty, 1/6.2Bias
- Number of data line:8-bit parallel
- Operating Voltage: 5.0V
- Viewing Direction: 6 O'clock
- ROHS COMPLIANT AND LEAD FREE

## 2. ABSOLUTE MAXIMUM RATING

| Item                       | Symbol | Min. | Max.    | Unit |
|----------------------------|--------|------|---------|------|
| Power Supply for Logic     | VDD    | -0.3 | +7.0    | V    |
| Power Supply for LCD Drive | Vlcd   | -0.3 | 17.0    | V    |
| Input Voltage              | Vin    | -0.3 | VDD+0.3 | V    |
| Operating Temperature      | Ta     | -20  | +70     | °C   |
| Storage Temperature        | Tsto   | -30  | +80     | °C   |

## 3. MECHANICAL PARAMETERS

| Item                  | Description          | Unit |
|-----------------------|----------------------|------|
| LCM Outline Dimension | 122x 44.0 x14.5(MAX) | mm   |
| Viewing Area          | 99.0 x 24.0          | mm   |
| Weight                | 50                   | g    |

## 4. PIN ASSIGNMENT

| NO. | Symbol | Level  | Function   |
|-----|--------|--------|--|
| 1   | VSS    | --     | 0V   |
| 2   | VDD    | --     | +4.8V  |
| 3   | VL     | --     | for LCD  |
| 4   | RS     | H/L    | Register Select<br>H: Data register<br>L: Instruction register |
| 5   | R/W    | H/L    | H--Read L--Write   |
| 6   | E      | H, H-L | Enable Signal  |
| 7   | DB0    | H/L    | Data bus used in 8 bit transfer                                |
| 8   | DB1    | H/L    |  |
| 9   | DB2    | H/L    |  |
| 10  | DB3    | H/L    |  |
| 11  | DB4    | H/L    |  |
| 12  | DB5    | H/L    |  |
| 13  | DB6    | H/L    |  |
| 14  | DB7    | H/L    |  |
| 15  | LED A  | -      | Backlight anode  |
| 16  | LED K  | -      | Backlight cathode  |

## 5. DC CHARACTERISTIC

| Item                                      | Symbol    | Min          | Typ | Max         | Unit | Test Condiion  | Notes |
|---|-----------|--------------|-----|-------------|------|--|-------|
| Input high voltage(1)<br>(except OSC1)    | $V_{IH1}$ | $0.7V_{CC}$  | -   | $V_{CC}$    | V    |  | 5.6   |
| Input low voltage(1)<br>(except OSC1)     | $V_{LH1}$ | -0.3         | -   | $0.2V_{CC}$ | V    | $V_{CC} = 2.4$ to $3.0V$   | 5.6   |
|   |           | -0.3         | -   | 0.6         | V    | $V_{CC} = 2.4$ to $4.5V$   | 5.6   |
| Input high voltage(2)<br>(OSC1)           | $V_{IH2}$ | $0.7V_{CC}$  | -   | $V_{CC}$    | V    |  | 15    |
| Input low voltage(2)<br>(OSC1)            | $V_{LH2}$ | -            | -   | $0.2V_{CC}$ | V    |  | 15    |
| Output high voltage (1)<br>(D0-D7)        | $V_{OH1}$ | $0.75V_{CC}$ | -   | -           | V    | $-I_{OH} = 0.1mA$  | 7     |
| Output low voltage (1)<br>(D0-D7)         | $V_{OL1}$ | -            | -   | $0.2V_{CC}$ | V    | $I_{OL} = 0.1mA$   | 7     |
| Output high voltage (2)<br>(except D0-D7) | $V_{OH2}$ |              | -   | -           | V    | $-I_{OH} = 0.04mA$   | 8     |
| Output low voltage (2)<br>(except D0-D7)  | $V_{OL2}$ | -            | -   | $0.2V_{CC}$ | V    | $I_{OL} = 0.04mA$  | 8     |
| Driver ON resistance<br>(COM)             | $R_{COM}$ | -            | -   | 20          | K    | $I_d = 0.05mA$<br>$V_{LCD} = 4V$   | 13    |
| Driver ON resistance<br>(SEG)             | $R_{SEG}$ | -            | -   | 30          | K    | $I_d = 0.05mA$<br>$V_{LCD} = 4V$   | 13    |
| I/O leakage current                       | $I_U$     | -1           | -   | 1           | A    | $V_{IN} = 0$ to $V_{CC}$   | 9     |
| Pull-up MOS current<br>(RESET* pin)       | $-I_P$    | 5            | 50  | 120         | A    | $V_{CC} = 3V$<br>$V_{IN} = 0V$   |       |
| Power supply current                      | $I_{CC1}$ | -            | 150 | 300         | A    | Rf Oscillation,<br>External clock<br>$V_{CC} = 3V$<br>$f_{OSC} = 215kHz$ | 10.14 |
|   | $I_{CC2}$ | -            | 25  | -           | A    | Sleep mode<br>$V_{CC} = 3V$<br>$f_{OSC} = 215kHz$                        |       |
| LCD Voltage                               | $V_{LCD}$ | 3.0          | -   | 15.0        | V    | $V_{CC} - V_5$   | 16    |

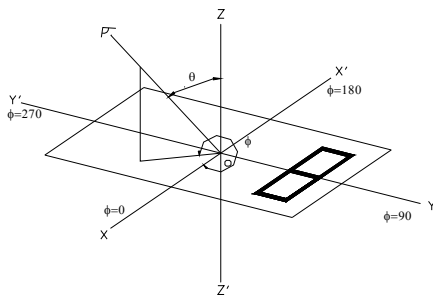
## 6. CHARACTERISTICS OF LCD MODULE

| Item          | Symbol         | Test Temp. | Min. | Standard | Max. | Unit       |
|---------------|----------------|------------|------|----------|------|------------|
| Viewing Angle | $\Delta\theta$ | 25°C       | 20   | 25       |      | ° (Degree) |
| Contrast      | Cr             |            | 3    | 6        |      |            |
| Response Time | $t_r$          | 25°C       |      | 200      | 250  | ms         |
|               |                | 0°C        |      | 800      | 1200 |            |
|               |                | -20°C      |      | 1250     | 1750 |            |
|               | $t_d$          | 25°C       |      | 250      | 300  |            |
|               |                | 0°C        |      | 1000     | 1500 |            |
|               |                | -20°C      |      | 1600     | 2500 |            |

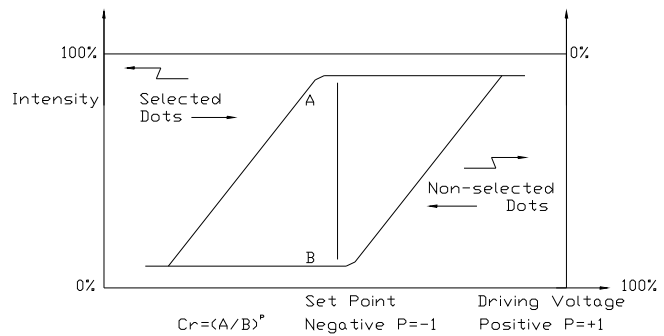
The Test Condition Of Viewing Angle :

- 1)  $Cr \geq 3$
- 2) 6 o'clock  $\theta = 0^\circ$  , 12 o'clock  $\theta = 180^\circ$  , 3 o'clock  $\theta = 90^\circ$  , 9 o'clock  $\theta = 270^\circ$

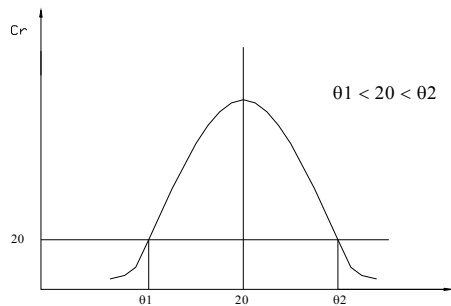
### a. THE DEFINITIONS OF NORMAL CHARACTERISTICS



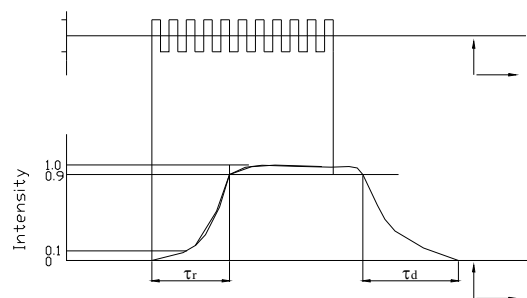
Definition of Angle  $\phi, \theta$



Definition of Contrast



Definition of Viewing Angle



Definition of Response Time



## 7. AC CHARACTERISTIC(VDD=2.4V~5.5V,Ta=-30~+75°C)

| Item                       |                                       | Symbol           | Min | Typ | Max | Unit | Test Condon                                 | Notes |
|----------------------------|---------------------------------------|------------------|-----|-----|-----|------|---|-------|
| External Clock Operation   | External clock frequency              | f <sub>cp</sub>  | 80  | 215 | 350 | kHz  | V <sub>cc</sub> =2.4 to 2.7V                | 11    |
|                            |                                       |                  | 80  | 215 | 550 | kHz  | V <sub>cc</sub> =2.4 to 2.7V                |       |
|                            | External clock duty                   | Duty             | 45  | 50  | 55  | %    |   |       |
|                            | External clock rise time              | t <sub>ncp</sub> | -   | -   | 0.2 | μs   |   |       |
|                            | External clock fall time              | t <sub>ncp</sub> | -   | -   | 0.2 | μs   |   |       |
| R <sub>f</sub> oscillation | Clock oscillation frequency(XD1602A0) | f <sub>osc</sub> | 110 | 150 | 200 | kHz  | R <sub>f</sub> =150 kΩ, V <sub>cc</sub> =3V | 12    |

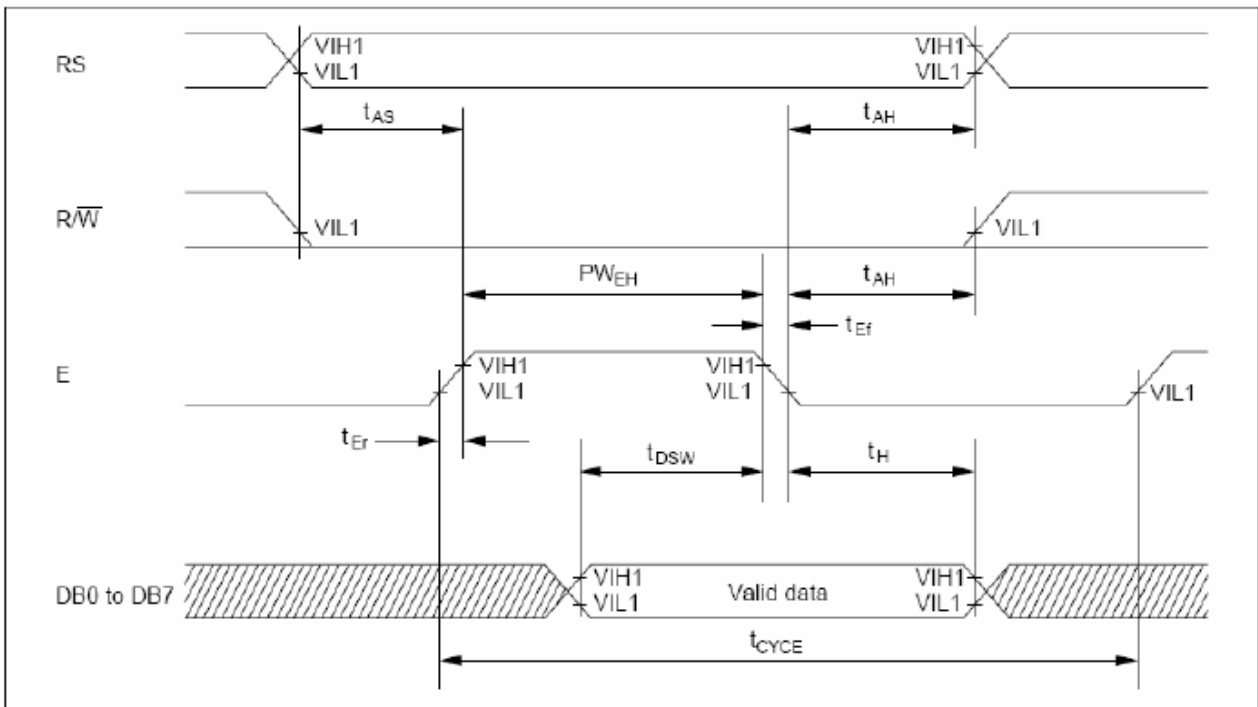
(Write mode)

| Characteristic            | Symbol | Min. | Typ. | Max. | Unit |
|---------------------------|--------|------|------|------|------|
| E Cycle Time              | Tc     | 500  | --   | --   | ns   |
| E Pulse Width (High, Low) | Tr, Tf | 150  | --   | ---  | ns   |
| E Rise/Fall Time          | Tpw    | ---  | --   | 20   | ns   |
| R/W, RS AND E Setup Time  | Tas    | 40   | --   | --   | ns   |
| R/W, RS AND E Hold Time   | Tah    | 30   | --   | --   | ns   |
| DB0-DB7 Data Setup Time   | Tdsw   | 80   | --   | --   | ns   |
| DB0-DB7 Data Hold Time    | Th     | 30   | --   | --   | ns   |

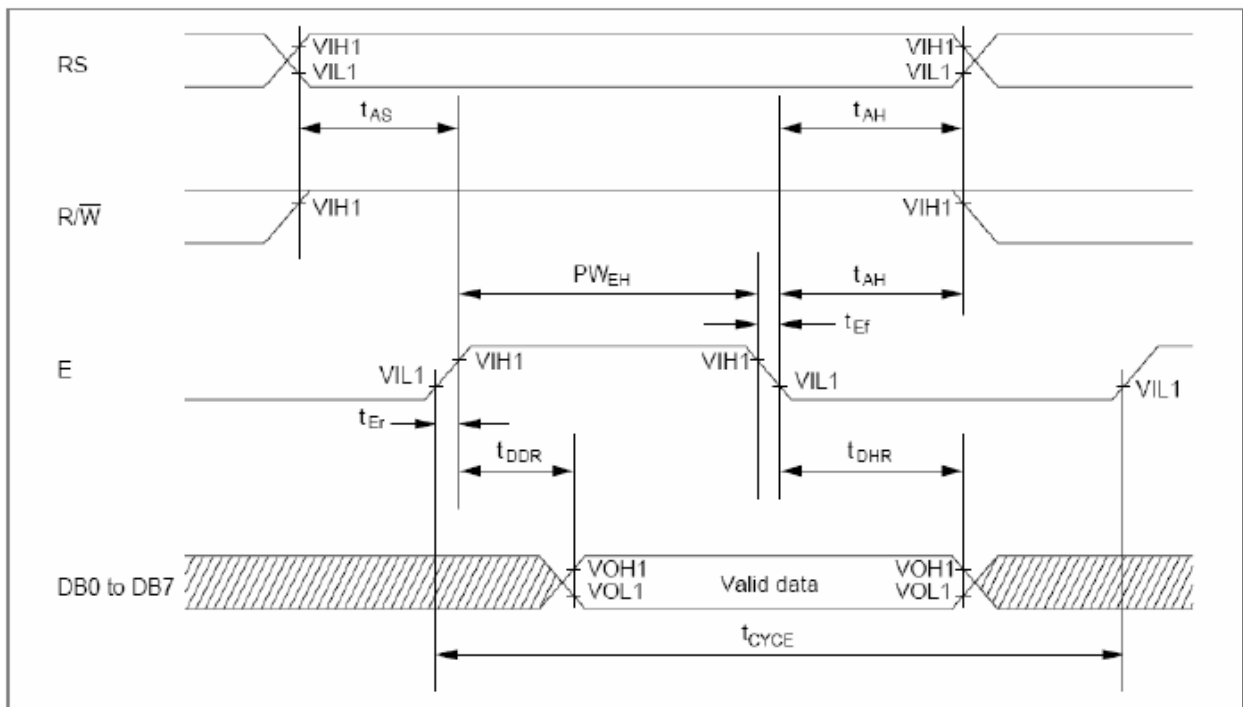
(Read mode)

| Characteristic            | Symbol | Min. | Typ. | Max. | Unit |
|---------------------------|--------|------|------|------|------|
| E Cycle Time              | Tc     | 500  | --   | --   | ns   |
| E Pulse Width (High, Low) | Tr, Tf | 230  | --   | ---  | ns   |
| E Rise/Fall Time          | Tpw    | ---  | --   | 20   | ns   |
| R/W, RS and E Setup Time  | Tas    | 40   | --   | --   | ns   |
| R/W, RS and E Hold Time   | Tah    | 30   | --   | --   | ns   |
| Data Setup Time           | Tddr   | --   | --   | 160  | ns   |
| Data Hold Time            | Th     | 5    | --   | --   | ns   |

7-1. WRITE OPERATION



7-2. READ OPERATION



## 8. BACKLIGHT CHARACTERISTICS

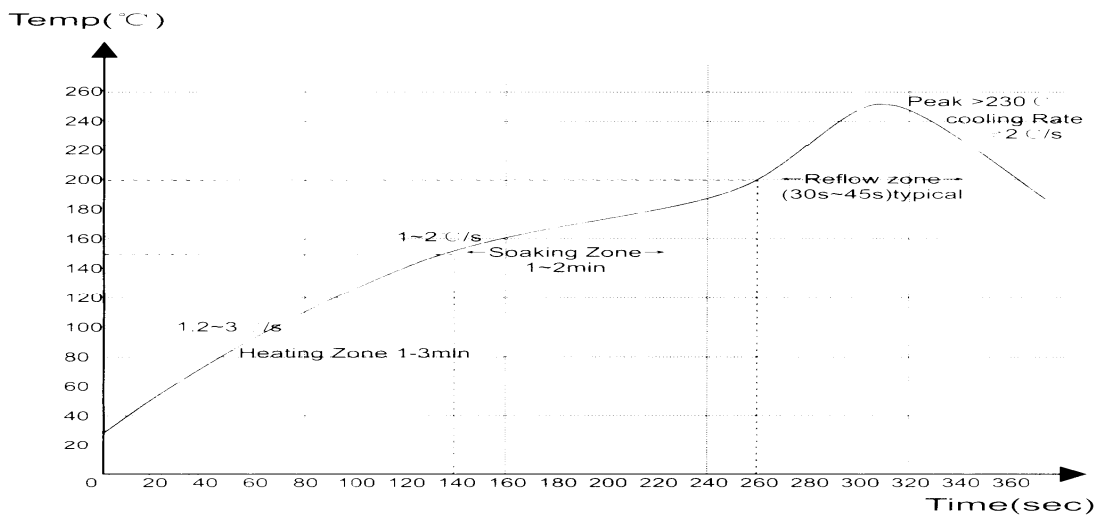
| Item                     | Symbol           | Conditions     | Min. | Typ. | Max. | Unit |
|--------------------------|------------------|----------------|------|------|------|------|
| Forward Voltage          | Vf               | If=30mA        | -    | 4.0  | -    | V    |
| Supply Current *1)       | If               | Only backlight | 20   | -    | 32   | mA   |
| Peak wave length         | $\lambda P$      | If=30mA        | 465  | 470  | 475  | nm   |
| Spectral Line Half width | $\Delta \lambda$ | If=30mA        | -    | 30   | -    | nm   |
| Luminance *2)            | Lv               | Vf=4.0         | 56   | 70   | -    | cd/2 |

\*1). This value will be changed while mass production.

\*2). Only backlight

## 9. SOLDERING PROFILE

- a. soldering must be lead free
- b. soldering temp. (260dec)
- c. soldering time



▲ 高温焊锡膏回流曲线图

## 10. PARTS LIST

| Part      | Spec              | Number | Description     |
|-----------|-------------------|--------|-----------------|
| LCD       | CSL-20625AW       |        |                 |
| BEZEL     | OPTO0419CF        |        |                 |
| ZEBRA     | OPTO0419CF        |        |                 |
| BL        | TX462A-02         |        |                 |
| PCB       | OPTO0419CFB(V2.0) |        |                 |
| RESISTOR  | 1/10W-J-100K      | 1      | R9              |
| RESISTOR  | 1/10W-J-4.7K      | 4      | R4,R5,R7,R8     |
| RESISTOR  | 1/10W-J-10K       | 1      | R6              |
| RESISTOR  | 1/10W-J-0R        | 1      | R11             |
| RESISTOR  | 1/10W-J-220R      | 4      | R10,R13,R14,R15 |
| CAPACITOR | 0.1uF-Z-16V       | 3      | C1,C7,C8        |
| CAPACITOR | 1uF-Z-16V         | 2      | C2,C3           |
| CAPACITOR | 47pF-Z-16V        | 4      | C4,C5,C6        |
| TR        | MMBT6428LI1G      | 1      | Q1              |
| IC        | XD1602A0          | 1      | U1              |
| IC        | ST7065C           | 3      | U2,U3,U4        |

## 11. CONTROL AND DISPLAY COMMAND

| Reg No | Index (Hex) | Register                 | Code |    |     |       |      |      |     |     |     |     | Description   | Execution Clock Cycle     |
|--------|-------------|--------------------------|------|----|-----|-------|------|------|-----|-----|-----|-----|---|---------------------------|
|        |             |                          | R/W  | RS | DB7 | DB6   | DB5  | DB4  | DB3 | DB2 | DB1 | DB0 |   |                           |
| IR     | —           | Index (IDR)              | 0    | 0  | —   | —     | —    | —    | ID3 | ID2 | ID1 | ID0 | Designates the register number of the instruction register to access. ID = 0000: R0 to 1001: R9   | 12                        |
| SR     | —           | Status (STR)             | 1    | 0  | BF  | NF1   | NF0  | -    | LF3 | LF2 | LF1 | LF0 | Indicates the busy flag (BF), display read line position (NF1/0), display read rasterrow position(NL0 to NL3).  | 0                         |
| R0     | 0           | Entry Mode (EMR)         | 0    | 1  | 0   | 0     | 0    | 0    | 0   | I/D | RM1 | RM0 | Designates RAM address in incrementation or decrementation (I/D) and RAM selection (RM1/0).   | 12                        |
| R1     | 1           | Function Set (FSR)       | 0    | 1  | 0   | BST X | EXT2 | EXT1 | DT1 | DT0 | 0   | DCL | DCL Clears display (DCL) and initializes the DDRAM address. Selects duty drive ratio(DT1/0), enables extension driver (EXT2/1) and sets the booster operation on. | DCL = 1: 492<br>Other: 12 |
| R2     | 2           | Cursor Control (CCR)     | 0    | 1  | 0   | 0     | 0    | 0    | CHM | C   | CM1 | CM0 | Designates cursor-on (C) and cursor display mode(CM1/0). Executes cursor home (CHM) instruction.  | 12                        |
| R3     | 3           | Display Control 1 (DCR1) | 0    | 1  | 0   | 0     | 0    | 0    | 0   | ST  | DC  | DS  | Designates standby mode (ST), character display on (DC), and segment display on (DS).   | 12                        |
| R4     | 4           | Display Control 2 (DCR2) | 0    | 1  | 0   | 0     | NC1  | NC0  | 0   | 0   | NL1 | NL0 | Sets the number of display characters(NC1/0) and display lines(NL1/0).  | 12                        |
| R5     | 5           | Scroll Control 1 (SCR1)  | 0    | 1  | 0   | SN1   | SN0  | 0    | SL3 | SL2 | SL1 | SL0 | Sets the display start line (SN1/0) and start raster-row (ST0 to ST3).  | 12                        |
| R6     | 6           | Scroll Control 2 (SCR2)  | 0    | 1  | 0   | 0     | PS1  | PS0  | SE4 | SE3 | SE2 | SE1 | Designates partial scroll columns (PS1/0) and scroll display line enable(SE1 to SE4).   | 12                        |

|    |   |                        |     |   |     |     |     |     |     |     |     |     |  |    |
|----|---|------------------------|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|--|----|
| R7 | 7 | Scroll Control3 (SCR3) | 0   | 1 | 0   | 0   | SQ5 | SQ4 | SQ3 | SQ2 | SQ1 | SQ0 | Sets the number of dots to be scrolled (SQR0 to SQR5).                               | 12 |
| R8 | 8 | RAM Address (RAR)      | 0   | 1 | RA7 | RA6 | RA5 | RA4 | RA3 | RA2 | RA1 | RA0 | Resets the address address counter for DDRAM/CGRAM/SEGRAM. RAM is selected by RM1/0. | 12 |
| R9 | 9 | RAM Data (RDR)         | 0/1 | 1 | RD7 | RD6 | RD5 | RD4 | RD3 | RD2 | RD1 | RD0 | Writes or reads data to and from DDRAM/CGRAM/SEGRAM. RAM is selected by RM1/0.       | 12 |
| RF | F | Test (TSR)             | 0   | 1 | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | This is a test register. Set 00 in this register.                                    | 12 |

Note: The execution time depends on the input or oscillation frequency.

BF = 1: Internal processing being performed

NF1/0: Position of display read line

LF0 to LF3: Position of display read raster-row

ID= 1: Address increment

= 0: Address decrement

RM1/0: RAM selection (00/01: DDRAM, (10: GGRAM, 11: SEGRAM)

BST = X: Always Booster on (Don't care)

EXT2 = 1: Common driver extension enable

EXT1 = 1: Segment driver extension enable

DT1/0: Duty ratio (00: 1/14, 01: 1/27, 10: 1/40, 11: 1/53)

DCL = 1: Executes display-clear instruction

CHM = 1: Executes cursor-home instruction

C = 1: Cursor on

CM1/0: Designates cursor mode (00: 12th raster-row, 01: blinking, 10: white/black inverse)

ST = 1: Standby mode

DC = 1: Character display on

DS = 1: Segment display on

NC1/0: Sets the number of display characters (6 to 40 characters)

NL1/0: Sets the number of display lines (00: 1 line, 01: 2 lines, 11: 4 lines)

SN1/0: Designates the line to start displaying (00: first line, 01: second line, 10: third line, 11: fourth line)

SL0 to SL3: Designates scroll starting raster-row(0000: first raster-row, 1100: 13th raster-row)

PS1/0: Designates partial scroll (00: all columns scroll, 01: the leftmost column fixed, 10: the two leftmost columns fixed, 11: the three leftmost columns fixed)

SE1 to SE4: Designates which line to scroll (SE = 1: enables the first line to be scrolled, etc.)

SQ0 to SQ5: Number of dots to scroll (0 to 48 dots)

RA0 to RA7: RAM address

RD0 to RD7: RAM data

## 12. RELIABILITY

| No | TEST ITEM          | DESCRIPTION                            | TEST CONDITION  | REMARK   |          |
|----|--------------------|--|---|--|----------|
| 1  | ENVIRONMENTAL TEST | HIGH TEMPERATURE STORAGE               | APPLYING THE HIGH STORAGE TEMPERATURE UNDER NORMAL HUMIDITY FOR A LONG TIME CHECK NORMAL PERFORMANCE.                   | <30%RH<br>70°C<br>100H   |          |
| 2  |                    | LOW TEMPERATURE STORAGE                | APPLYING THE LOW STORAGE TEMPERATURE UNDER NORMAL HUMIDITY FOR A LONG TIME CHECK NORMAL PERFORMANCE.                    | -20°C<br>100H  |          |
| 3  |                    | HIGH TEMPERATURE OPERATION             | APPLY THE ELECTRIC STRESS (VOLTAGE & CURRENT) UNDER HIGH TEMPERATURE FOR A LONG TIME                                    | <30%RH<br>70°C<br>100H   | #1       |
| 4  |                    | LOW TEMPERATURE OPERATION              | APPLY THE ELECTRIC STRESS UNDER LOW TEMPERATURE FOR A LONG TIME   | -20°C<br>100H  | #1<br>#2 |
| 5  |                    | HIGH TEMPERATURE/HIGH HUMIDITY STORAGE | APPLY HIGH TEMPERATURE AND HIGH HUMIDITY STORAGE FOR A LONG TIME  | 93%RH<br>40°C<br>100H  | #2       |
| 6  |                    | TEMPERATURE CYCLE                      | APPLY THE LOW AND HIGH TEMPERATURE CYCLE<br>-20°C<->25°C<->70°C<->25°C<br>←-----><br>1CYCLE<br>CHECK NORMAL PERFORMANCE | -20°C/70°C<br>10CYCLE  |          |
| 7  | MECHANICAL TEST    | VIBRATION TEST (PACKAGE STATE)         | APPLYING VIBRATION TO THE PRODUCT CHECK NORMAL PERFORMANCE  | FREQ: 1-55HZ<br>MAX.<br>ACCELERATION:<br>5G<br>1CYCLE TIME: 1<br>MIN TIME<br>X.Y.X. EACH<br>DIRECTION<br>FOR 15 MINES. |          |
| 8  |                    | SHOCK TEST (PACKAGE STATE)             | APPLYING SHOCK TO THE PRODUCT CHECK NORMAL PERFORMANCE  | DROP THEM THROUGH 70CM HEIGHT TO STRIKE HORIZONTAL PLANE   |          |
| 9  | OTHER              | LIFE TIME                              | EXPECTED LIFE IS MORE THAN 50000 HRS  | NORMAL OPERATION CONDITION   |          |

**Remark:**

#1: Normal operations condition

a. Power supply for LCD driver : 8.0V

b. Power supply voltage for LCD system: Getting optimum contrast at 25°C.

#2: Pay attention to keep dewdrops from the module during this test

## 13. SPECIFICATION OF QUALITY ASSURANCE

### 12-1. Acceptable Quality Level

Each lot should be satisfied the quality level defined as follows.

-Inspection method ; MIL-STD-105E level II Normal One Time sampling.

-AQL

| Partition | AQL   | Definition   |
|-----------|-------|--|
| A: Major  | 0.65% | Functional defective as Product                                    |
| B: Minor  | 1.5%  | Satisfy all functions as product but not satisfy cosmetic standard |

### 12-2. Definition of "LOT"

One lot means the delivery quantity for customer at one time.

### 12-3. Conditions of Cosmetic & Functional Inspection

#### 1). Environmental Condition

The inspection should be performed at the 1m of height from the LCD module under 2 PCS of 40W white fluorescent lamps (Normal temperature 20 ~ 25°C and normal humidity 85±15%RH).

#### 2). Inspection Method

The visual check should be performed vertically at more 30cm's distance from the LCD panel.

#### 3). Driving Voltage

Operating voltage according to specification.

#### 4). Test pattern

Pattern will automatically displayed according to the software.



## 14. INSPECTION CRITERIA

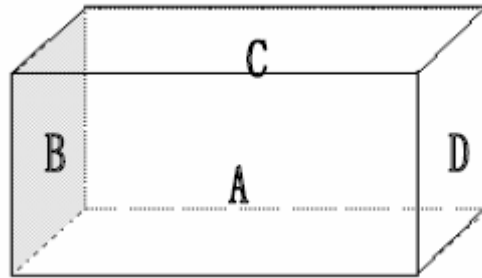
| No | Item                        | Judgment criteria   | Def.classify |
|----|-----------------------------|---|--------------|
| 1  | Outline dimension           | Incorrect outline dimension according to product drawing  | major        |
| 2  | PCB warpage                 | Excess warpage of PCB which may affect module assembly  | minor        |
| 3  | Damaged PCB                 | Broken PCB  | major        |
| 4  | Metal frame deformed        | Deformed may affect module assembly   | major        |
| 5  | Dice epoxy improper sealing | Bonding wire protruded out of epoxy seal  | major        |
| 6  | Operating voltage           | Module can not operate normally under designed voltage  | major        |
| 7  | Missing segment.            | a. All dot matrix do not light up<br>b. Part of dot does not light up   | major        |
| 8  | Extra pattern               | Extra pattern lights up   | major        |
| 9  | Display pattern test        | Pattern does not progress correctly according to the software   | major        |
| 10 | LCD rainbow                 | Arches, circular or parallel colorful spreads   | minor        |
| 11 | LCD black spot              | Blank spot, foreign materials<br>Diameter (mm)      Acc. No.<br>D<0.1                    Ignore<br>0.1<D<0.2                1<br>0.2<D                      0   | minor        |
| 12 | Dot matrix pinhole          | Size (mm)              Acc. No.<br>D<0.15                    Ignore<br>0.15<D<0.2                1  | minor        |
| 13 | Polarizer bubble            | Bubbles with spot shape within the effective viewing area<br>Size (mm)              Acc. No.<br>D<0.2                      Ignore<br>0.2<D<0.3                1 | minor        |
| 14 | Scratch on Polarizer        | Failure if scratch within the viewing area on the surface<br>Size (mm)              Acc. No.<br>Length<1                    1<br>Width<0.2                      | minor        |

## 15. MASTER CARTON BOX

The Master Carton contains 8 Inner PolyForm Boxes.

The Outer Dimensions are: 550(mm) X320 (mm) X290 (mm)

The Indications are applied to four faces A, B, C and D of the Master Carton Box as shown below.



FACE B

GROSS WEIGHT: \_\_\_\_\_ KGS  
 NET : \_\_\_\_\_ KGS  
 M : 55X32X29

↑ ↑    ☉    ☂

FACE A



CUSTOMER NAME: \_\_\_\_\_  
 CUSTOMER P. O. NO: \_\_\_\_\_  
 PART NO: \_\_\_\_\_  
 DESCRIPTION: \_\_\_\_\_  
 QTY: \_\_\_\_\_  
 DATE: \_\_\_\_\_

FACE C

GROSS WEIGHT: \_\_\_\_\_ KGS  
 NET : \_\_\_\_\_ KGS  
 M : 55X32X29

↑ ↑    ☉    ☂

FACE D



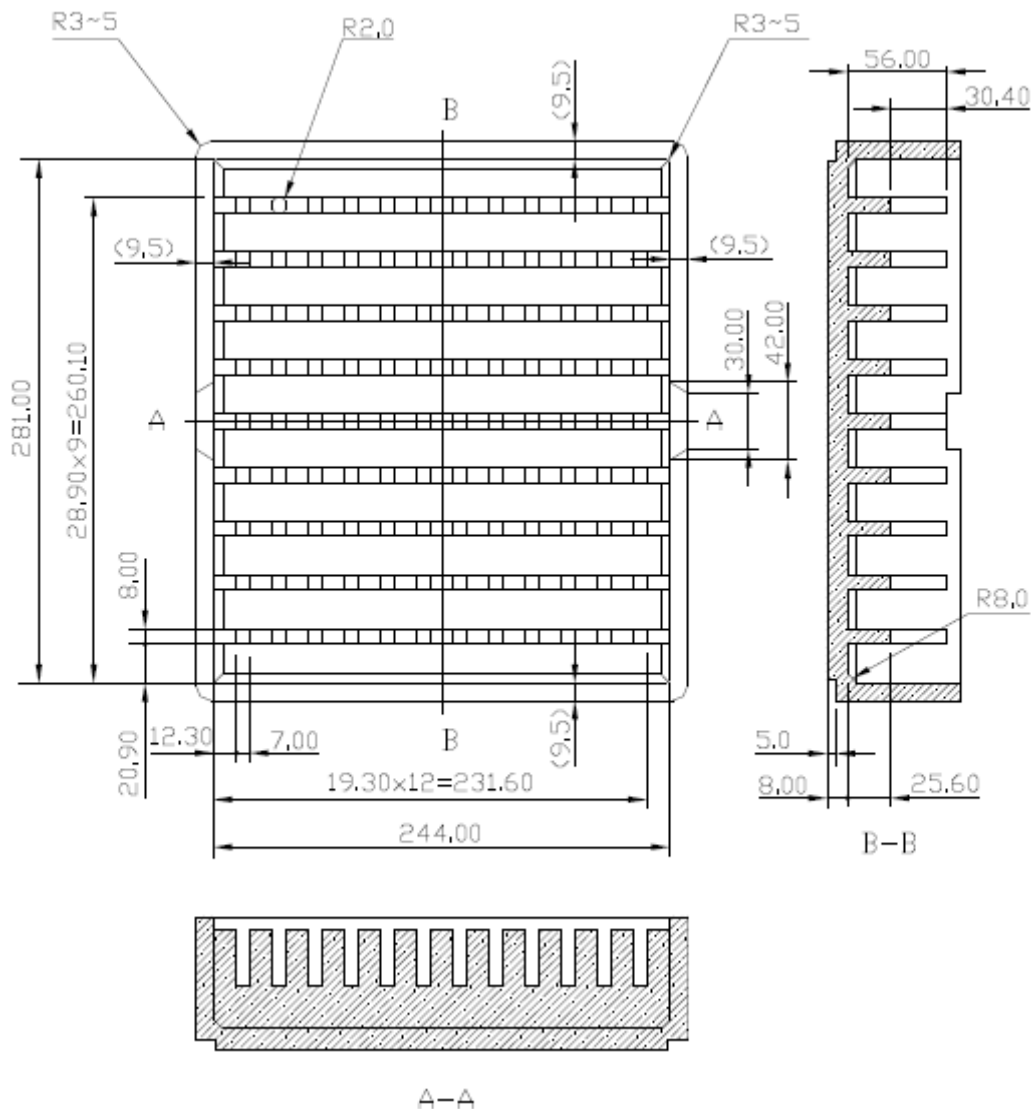
CUSTOMER NAME: \_\_\_\_\_  
 CUSTOMER P. O. NO: \_\_\_\_\_  
 PART NO: \_\_\_\_\_  
 DESCRIPTION: \_\_\_\_\_  
 QTY: \_\_\_\_\_  
 DATE: \_\_\_\_\_

## 16. PACKAGE SPECIFICATION

### Inner PolyForm Box

The Inner PolyForm containing 20 pcs .of LCD Module (OPTO0419CFB), each module is wrapped with an Antistatic pouch.

The following diagram shows the detail information for the polyform box.



## 17. PRECAUTION IN USE OF LCD PANELS & LCM

### 17.1 Storage

When long term storage is required, the following precautions are necessary.

- (1) Store them in a sealed polyethylene bag (Antistatic type), seal the opening, and store it where it is not subjected to direct sunshine, or to the light of a fluorescent lamp. If properly sealed, there is no need for desiccant.
- (2) Store them in the temperature range of 0°C -35°C and low humidity is recommended.

### 17.2 Precaution for handing LCD modules

LCD modules are assembled and adjusted with a high degree of precision, do not applying excessive shocks to it or making any alterations or modifications to it. The following precautions should be taken when handing.

- (1) Do not drop, bend or bend or twist the module.
- (2) Do not alter or making any modification on the shape of the metal frame.
- (3) Do not change the shape, the pattern wiring or add any extra hole on the printed circuit board.
- (4) Do not modify or touch the zebra rubber strip (conductive rubber) with another object.
- (5) Do not change the positions of components on the PCB.

### 17.3 Electro-static discharge control

Careful attention should be paid to control the electrostatic discharge of the modules, since LCD modules contain no. of COMS LSI.

- (1) Make sure you are grounded properly when removing LCD module from its antistatic bag. Be sure that the module and your body have the same electric potential.
- (2) Only properly grounded soldering iron should be used.
- (3) Modules should store in antistatic bag or other containers resistant to static after remove from its

original package.

- (4) When using the electric screwdriver is used, make sure the screwdriver had been ground potentiality to minimize the transmission of EM waves produced by commutator sparks.
- (5) In order to reduce the generation of static electricity, a relative humidity of 50-60% is recommended.
- (6) Electrostatic discharge value:4 KV.

#### 17.4 Precaution for operation

- (1) Adjust liquid crystal driving voltage ( $V_o$ ) to varies viewing angle and obtain the best contrast.
- (2)  $V_o$  should be kept in proper range stated in the specification. Excess voltage will shorten the LCD life.
- (3) Response time is greatly delayed at temperatures below the operating temperature range. It will recover when it returns to the specified temperature range.
- (4) If the display area is pushed hard during operation, the display will become abnormal. However, it will return off and then back on.
- (5) Condensation on terminals can cause an electrochemical reaction disrupting the terminal circuit. Therefore it must be used under the relative condition of 50% RH.

