PART NO :ACM320240-1(GG3224N2SGC1S)

FOR MESSRS :_____

CONTENTS



Accepted by :_____ Proposed by :_____

Date : 06,13,2003

# RECORD OF REVISION

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

## 3. GENERAL SPECIFICATIONS AND MECHANICAL DATA.

### 3.1 GENERAL SPECIFICATIONS.

PLEASE REFER TO :

”CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (SP-10-000)”.

3.2 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS.

3.3 MECHANICAL DATA

(1) NUMBER OF DOTS ---------- 320W*240H DOTS

(2) MODULE SIZE ---------- 167.1W*109.0H*11.0T (MAX) mm

(3) VIEWING AREA ---------- 122.0W*92.0H mm

(4) DISPLAY AREA ---------- 115.17W*86.37H mm

(5) DOT SIZE ---------- 0.33W*0.33H mm

(6) DOT PITCH ---------- 0.36W*0.36H mm

(7) VIEWING DIRECTION---------- 6 O′CLOCK

(8) LCD TYPE ---------- STN ,BLUE,NEGATIVE TYPE, TRANSMISSIVE

(9) BACK LIGHT ---------- CCFL

## 4. ABSOLUTE MAXIMUM RATINGS.

### 4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

| ITEM | SYMBOL | MIN. | MAX. | UNIT | COMMENT |
|---|---|---|---|---|---|
| POWER SUPPLY FOR LOGIC | VDD-VSS | -0.3 | 7.0 | V | |
| POWER SUPPLY FOR LCD DRIVE | VDD-VEE | 0 | 35 | V | |
| INPUT VOLTAGE | VI | -0.3 | VDD+0.3 | V | |
| STATIC ELECTRICITY | ———— | ——— | 100 | V | NOTE (1) |

NOTE(1) : TEST METHOD AND CONDITIONS AFTER CHARGING UP 200PF CAPACITOR BY STATED VOLTAGE , THE CAPACITOR IS CONNECTED WITH INTERFACE PINS OF THE MODULE.

### 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

| ITEM | OPERATING | | STORAGE | | COMMENT |
|---|---|---|---|---|---|
| | MIN. | MAX. | MIN. | MAX. | |
| AMBIENT TEMPERATURE | 0℃ | 50℃ | -20℃ | 60℃ | NOTE (2) |
| HUMIDITY | NOTE (3) | | NOTE (3) | | WITHOUT CONDENSATION |
| VIBRATION | — — | 4.9 $m/s^2$ (0.5G) | — — | 19.6 $m/s^2$ (2G) | 10~300HZ XYZ DIRECTIONS 1 Hr.EACH |
| SHOCK | — — | 29.4 $m/s^2$ (3G) | — — | 49.0 $m/s^2$ (5G) | 10 mSEC XYZ DIRECTIONS 1 TIME EACH |
| CORROSIVE GAS | NOT ACCEPTABLE | | NOT ACCEPTABLE | | |

NOTE(2) : Ta AT -20℃ : 48HR MAX.
60℃ : 168HR MAX.

NOTE(3) : Ta ≦ 40℃ : 90% RH MAX.
Ta ＞ 40℃ : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF90%RH AT 40℃. (50%RH AT 50°C)

## 5. ELECTRICAL CHARACTERISTICS

VDD = 5.0 ± 0.25V

| ITEM | SYMBOL | CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| LOGIC CIRCUIT POWER SUPPLY VOLTAGE | VDD-VSS | ---------- | 4.5 | 5.0 | 5.5 | V |
| LCD DRIVER CIRCUIT POWER SUPPLY VOLTAGE | VSS -VEE | ---------- | 12 | -------- | 32 | V |
| INPUT VOLTAGE NOTE (1) | VIH | H LEVEL | 0.8*VDD | -------- | VDD | V |
| | VIL | L LEVEL | 0 | -------- | 0.2*VDD | V |
| LOGIC CIRCUIT POWER SUPPLY CURRENT NOTE (2) | IDD | VDD-VSS=5.0V VSS -VEE =-14.4V | -------- | 7.0 | 10 | mA |
| LCD DRIVER CIRCUIT POWER SUPPLY CURRENT NOTE (2) | IEE | VDD-VSS=5.0V VSS -VEE =-14.4V | -------- | 4.0 | -------- | mA |
| RECOMMENDED LCD DRIVING VOLTAGE NOTE (3) | VDD - VO Φ=10° θ=0° DUIT = 1/240 | Ta = 0°c | -------- | (18.9) | -------- | v |
| | | Ta = 25°c | -------- | 19.4 | -------- | v |
| | | Ta = 50°c | -------- | (19.9) | -------- | v |
| FLM FREQUENCY | fFLM | ---------- | 70.0 | 75.0 | 80.0 | HZ |
| THE POWER SUPPLY FOR CCFL | VCCFL | fCCFL = 30 KHz | ------- | 300.0 | ------- | Vrms |
| | ICCFL | ---------- | ------- | 5.0 | ------- | mA |

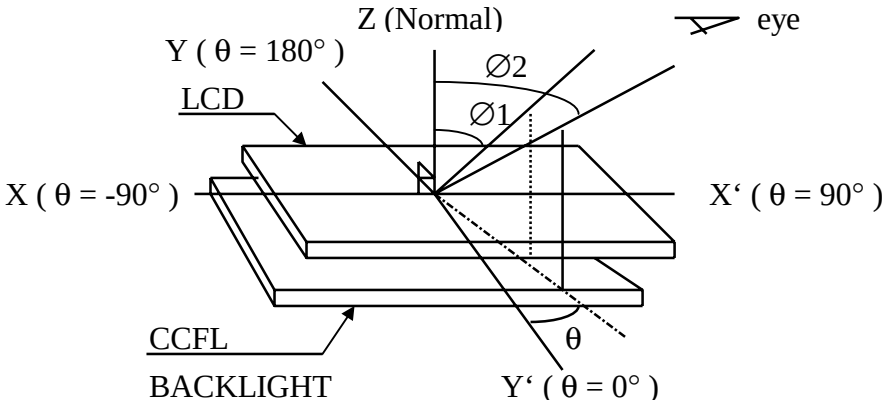
NOTE(1) : APPEND TO TERMINALS FLM,CL1,CL2,D0~D3
NOTE(2) : THE DISPLAY PATTERN IS ALL “Q”
NOTE(3) : RECOMMENDED LCD DRIVING VOLTAGE MAY FLUCTUATE ABOUT ±0.5V BY EACH MODULE

## 6. OPTICAL CHARACTERISTICS.

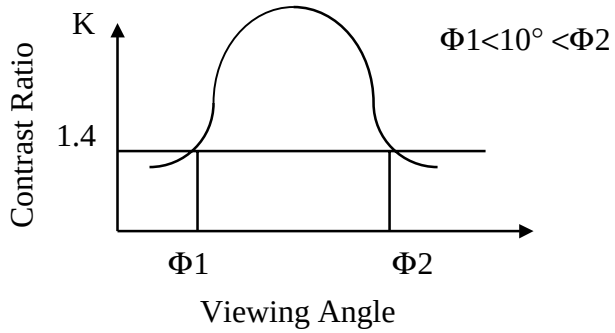
Ta = 25°C VDD = 5.0 VDD-VO=19.4V

| I T E M | SYMBOL | CONDITION | MIN. | TYP. | MAX. | UNIT | NOTE |
|---|---|---|---|---|---|---|---|
| VIEWING ANGLE | Φ2-Φ1 | K≧ 1.4 | —— | 40 | ——— | deg. | 1,2 |
| CONTRAST RATIO | k | Φ = 10°<br>θ = 0° | 1.4 | 8 | ——— | —— | 3 |
| RESPONSE TIME | tr (rise) | Φ = 10°<br>θ = 0° | —— | 220 | ——— | ms | 4 |
| | tf (fall) | Φ = 10°<br>θ = 0° | —— | 240 | ——— | ms | 4 |
| THE BRIGHTNESS OF BRIGHTNESS SOURCE | B | DOTS OFF<br>Φ = 10° θ = 0° | —— | 140 | ——— | $cd/m^2$ | 5 |

NOTE (1) : DEFINITION OF θ AND Φ

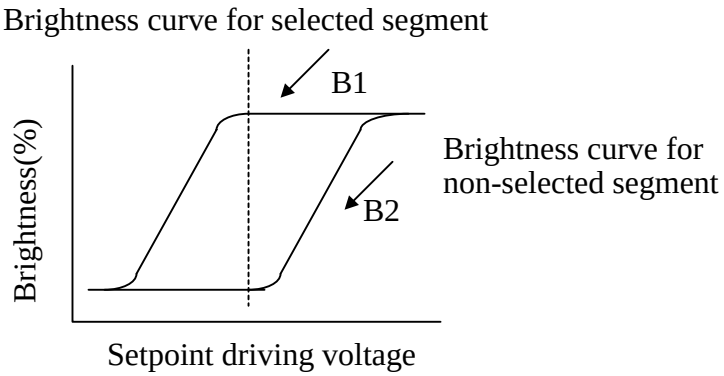



NOTE (2) : DEFINITION OF VIEWING ANGLE Φ1 AND Φ2

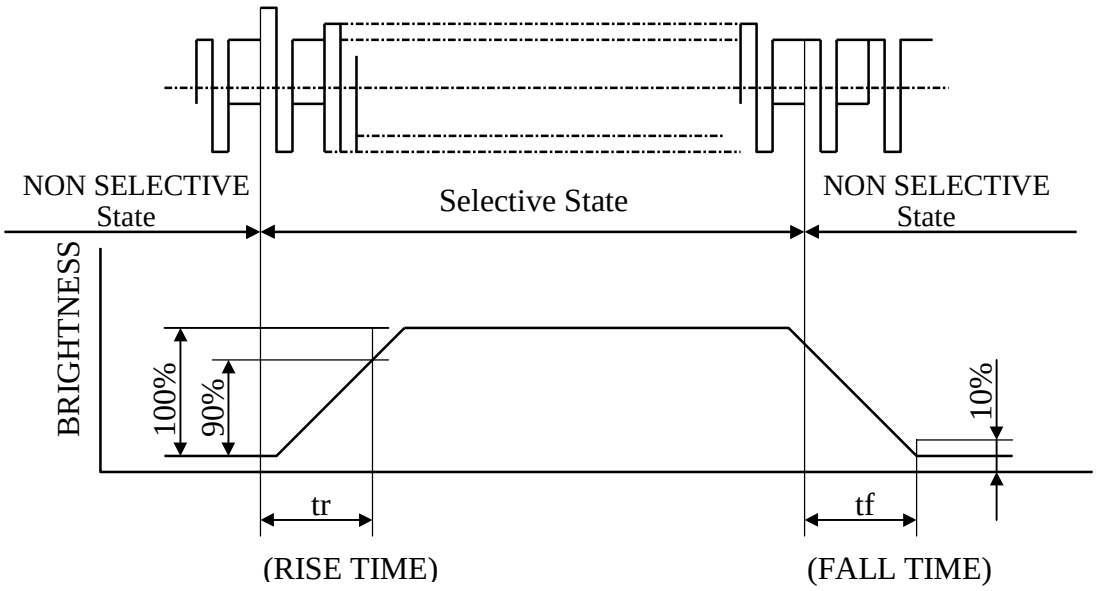


NOTE (3) : DEFINITION OF CONTRAST“K”

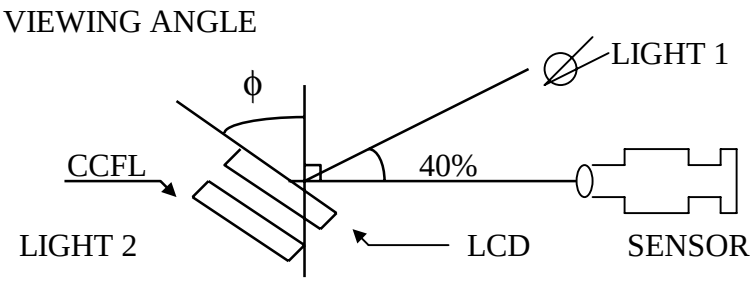
$$K = \frac{\text{Brightness of selected segment(B1)}}{\text{Brightness of non-selected segment (B2)}}$$



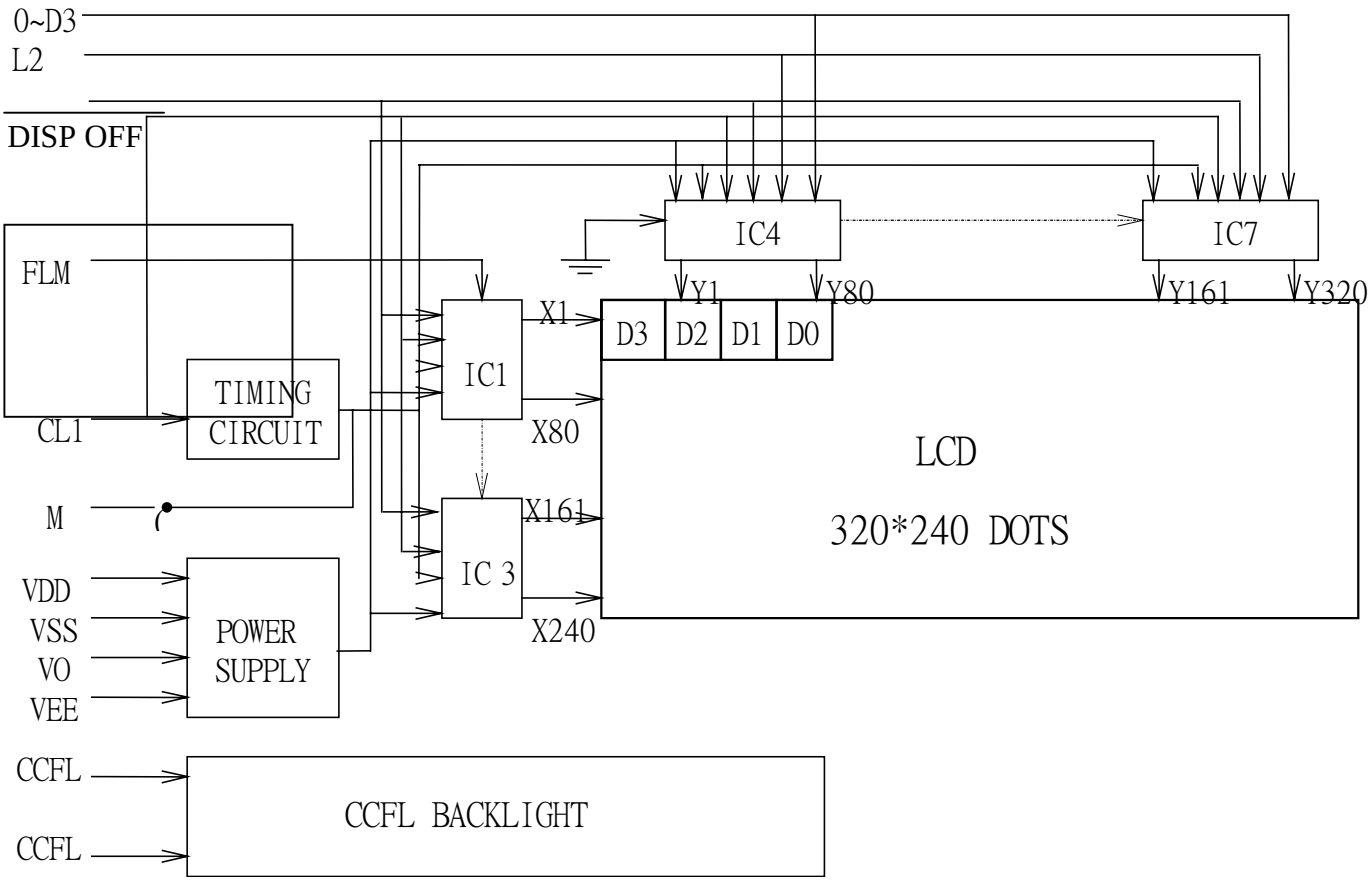

NOTE(4) : DEFINITION OF OPTICAL RESPONSE




NOTE(5) : OPTICAL OF LIGHT

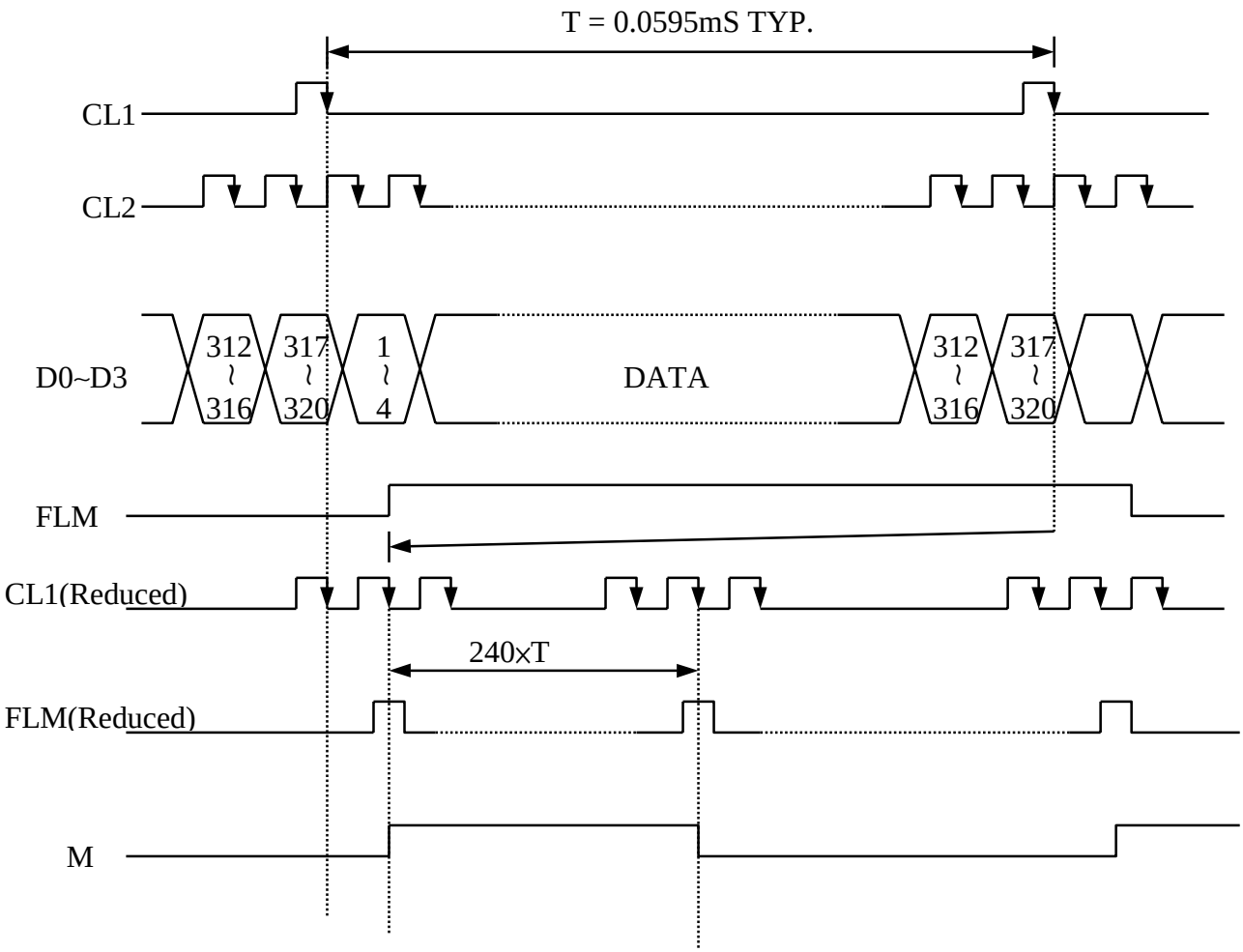


## 7.BLOCK DIAGRAM.



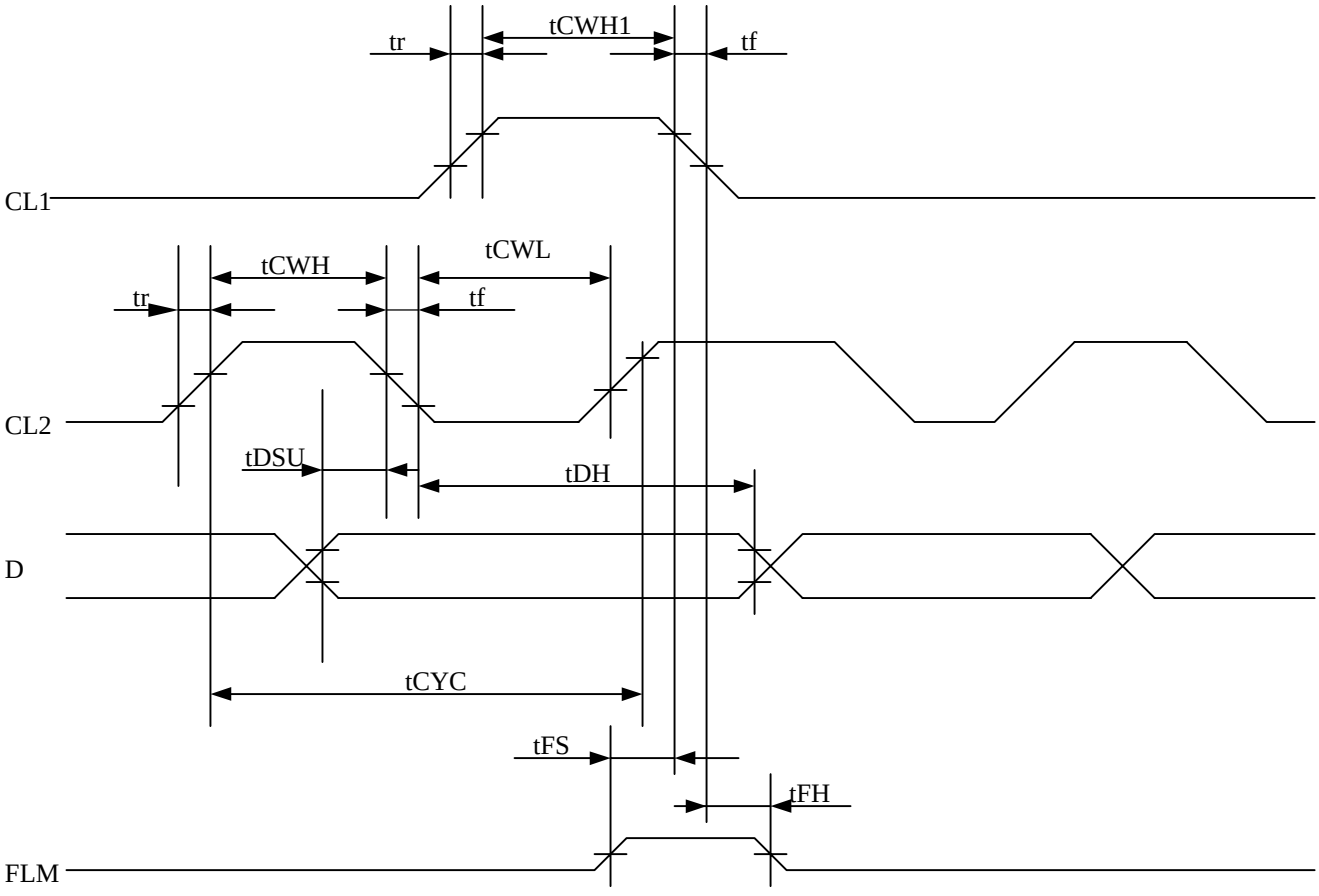
## 8. TIMING CHARACTERISTICS.

### 8.1 INTERFACE TIMING.

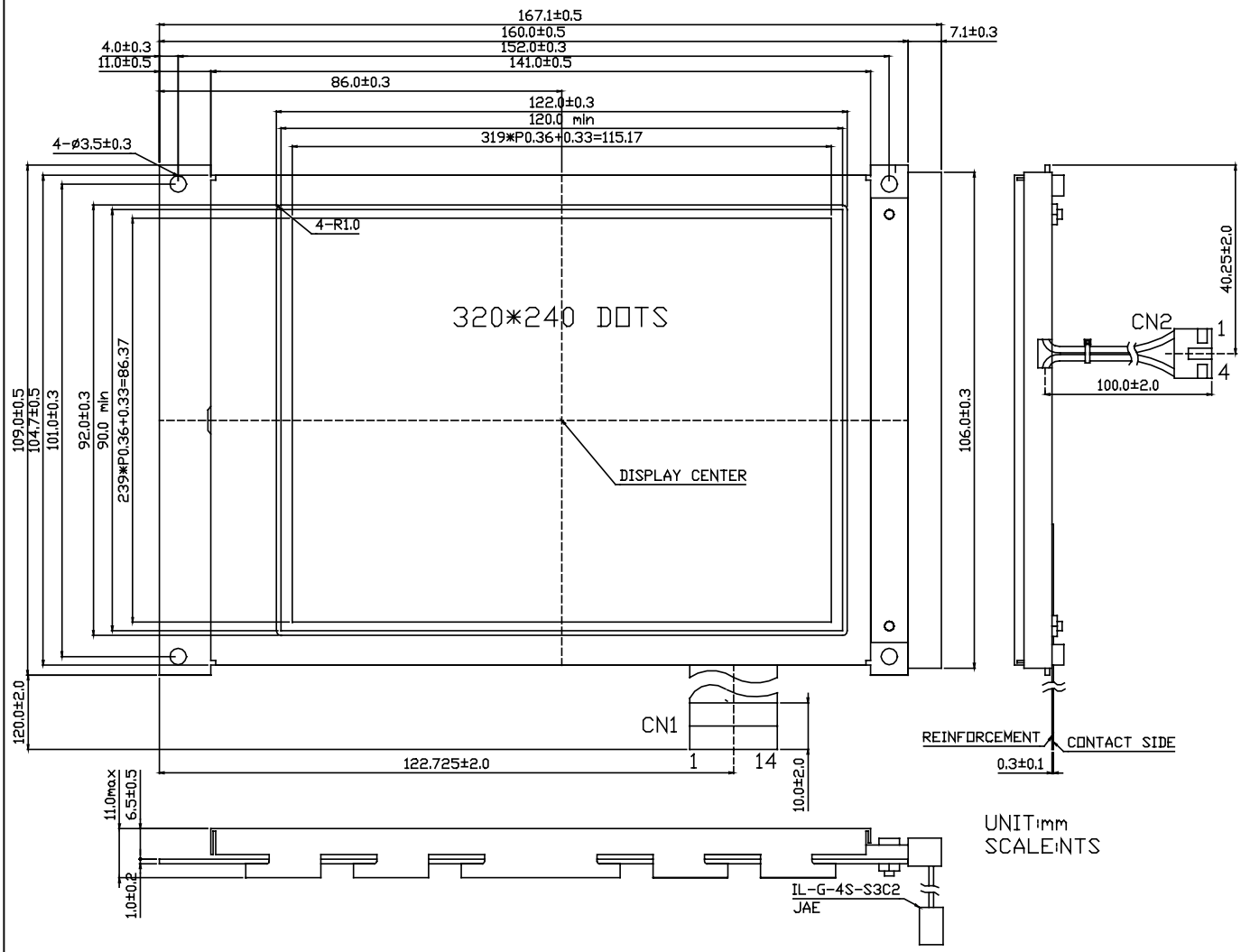


**8.2 INTERFACE TIMING.**

| I T E N | SYMBOL | MIN. | TYP | MAX. | UNIT |
|---|---|---|---|---|---|
| CL2 cycle time | tCYC | 300 | -------- | -------- | ns |
| CL2 pulse width (H) | tCWH | 100 | -------- | -------- | ns |
| CL2 pulse width (L) | tCWL | 100 | -------- | -------- | ns |
| CL1pulse width (H) | tCWH1 | 63 | -------- | -------- | ns |
| CLOCK rise/fall time | tr , tf | -------- | -------- | 50 | ns |
| Data set up time | tDSU | 80 | -------- | -------- | ns |
| Data hold time | tDH | 80 | -------- | -------- | ns |
| CL1 delay time | tCL | -------- | -------- | 250 | ns |
| FLM set up time | tFS | 100 | -------- | -------- | ns |
| FLM hold time | tFH | 100 | -------- | -------- | ns |



## 11.OUTLINE DIMENSION.

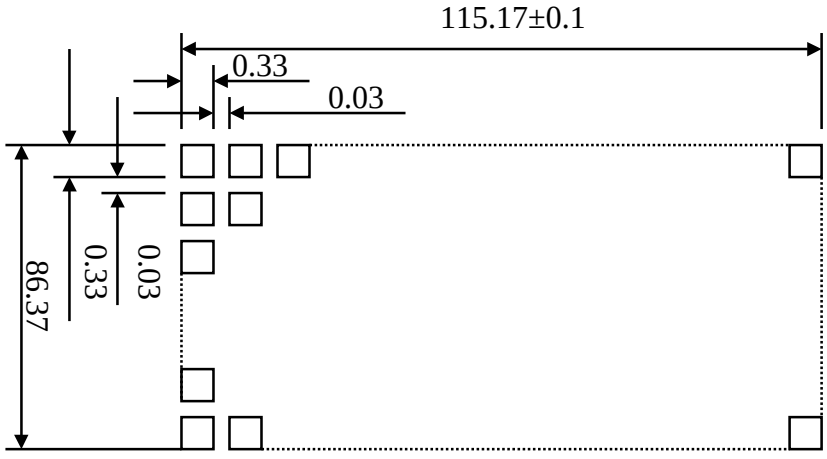


**9.1 INTERFACE PIN CONNECTION.**

| CN1: CN2: INTERFACE PIN CONNECTION | | | |
|---|---|---|---|
| PIN NO. | SYMBOL | LEVEL | FUNCTION |
| 1 | FLM | H/L | FRAME SIGNAL |
| 2 | CL1 | H → L | DATA LATCH SIGNAL |
| 3 | CL2 | H → L | DATA SHIFT CLOCK SIGNAL |
| 4 | M/NC | ---------- | CONTROL SIGNAL FOR AC DRIVING/NC |
| 5 | VO | ---------- | POWER SUPPLY FOR LCD CONTROL |
| 6 | VDD | ---------- | POWER SUPPLY FOR LOGIC CIRCUIT |
| 7 | VSS | ---------- | GROUND |
| 8 | VEE | ---------- | POWER SUPPLY FOR LCD DRIVING |
| 9 | DO | H/L | DISPLAY DATA |
| 10 | D1 | H/L | |
| 11 | D2 | H/L | |
| 12 | D3 | H/L | |
| 13 | $\overline{\text{DISPOFF}}$ | H/L | H : DISPLAY ON L : DISPLAY OFF |
| 14 | NC | ---------- | NO CONNECTION |

| CN3 : INTERFACE PIN CONNECTION | | | | |
|---|---|---|---|---|
| PIN NO | 1 | 2 | 3 | 4 |
| SYMBOL | VCCFL | NC | NC | VCCFL |

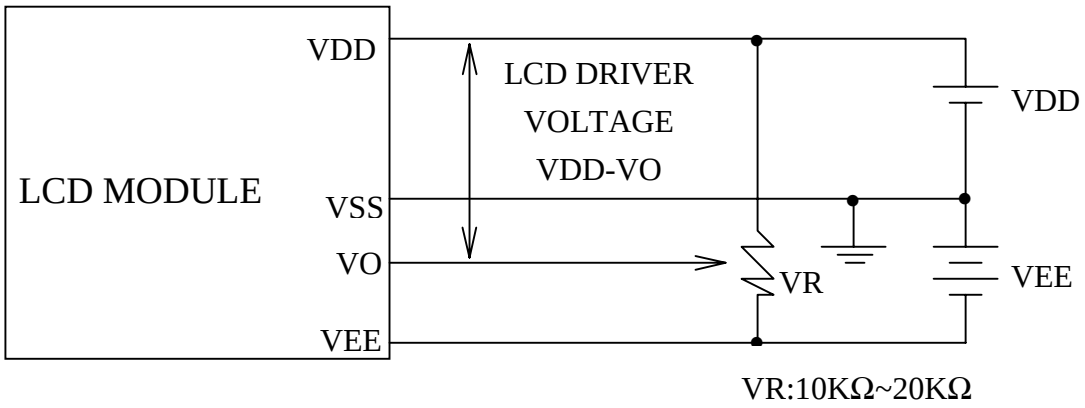
**9.2 DISPLAY PATTERN.** NOT SPFC IFIED TOLERANCE: ±0.01mm




UNIT : mm
SCALE : NTS

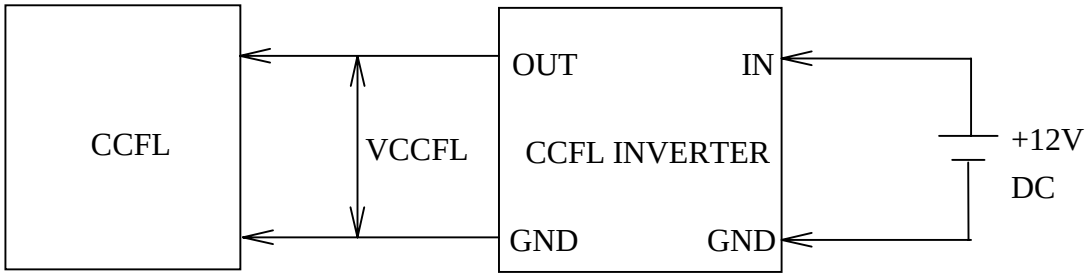
## 10.POWER SUPPLY FOR LCD MODULE.

### 10.1POWER SUPPLY FOR LCM.




VR:10KΩ~20KΩ

### 10.2POWER SUPPLY FOR CCFL.




### 10.3POWER AND INTERFACE TIMING SEQUENCE.