# LMG6401PLGE 240*128 Dots

## FEATURES

- **Blue on Grey STN Type**
- **Transflective Mode**
- **Low Power EL Backlight**
- **Built-in LCD Controller HD61830B**

## MECHANICAL DATA

| Item | Value | Unit |
|---|---|---|
| Module Dimensions | 159.4*101*9.5 | mm |
| Viewing Area | 126*71 | mm |
| Resolution | 240*128 | dots |
| Dot Size | 0.47*0.47 | mm |
| Dot Pitch | 0.5*0.5 | mm |
| Weight | 160 | g |

## OPTICAL DATA

| Item | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Contrast Ratio | K | Ø=10°, θ=0°, Note 1 | - | 3.0 | - | - |
| Brightness | - | - | - | 10 | - | $cd/m^2$ |
| Viewing Direction | | - | | 6 | | o'clock |
| Viewing Angle | Ø2 - Ø1 | K=1.4, Note 1 | - | 40 | - | degree |
| Response Time (Rise) | $t_R$ | Ø=10°, θ=0°, Note 1 | - | 250 | 400 | ms |
| Response Time (Fall) | $t_F$ | Ø=10°, θ=0°, Note 1 | - | 300 | 450 | ms |

## ABSOLUTE MAXIMUM RATINGS

| Item | Symbol | Condition | Min | Max | Unit |
|---|---|---|---|---|---|
| Supply Voltage (Logic) | $V_{DD}$ - $V_{SS}$ | - | 0 | 7 | V |
| Supply Voltage (LC Drive) | $V_{DD}$ - $V_{EE}$ | - | 0 | 22 | V |
| Input Voltage | $V_I$ | - | VSS | VDD | V |
| Operating Temperature | $T_{OP}$ | Note 4,5 | 0 | 50 | °C |
| Storage Temperature | $T_{ST}$ | Note 4,5 | -20 | 60 | °C |

## DATA INTERFACE PIN ASSIGNMENT

| Pin No | Symbol | Level | Function |
|---|---|---|---|
| A1 | VSS (0V) | - | Ground |
| A2 | VDD (+5V) | - | Power supply for logic |
| A3 | V0 | - | Power supply for LCD drive |
| A4 | RS | - | Register select |
| A5 | R/W | - | Read / Write |
| A6 | E | - | Enable |
| A7-A14 | DB0 - DB7 | - | Data bus |
| A15 | Not CS | - | Chip select |
| A16 | Not RES | - | Reset |
| A17 | VEE (15.0V) | - | Power supply for LCD drive |
| A18-A20 | NC | - | No connection |
| E1-E2 | VEL | - | Power supply for EL driving |

## ELECTRICAL CHARACTERISTICS

| Item | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Supply Voltage (Logic) | $V_{DD}$ - $V_{SS}$ | - | 4.75 | 5.0 | 5.25 | V |
| Supply Voltage (LC Drive) | $V_{EE}$ - $V_{SS}$ | - | -14.5 | -15.0 | -15.5 | V |
| Supply Current | $I_{DD}$ | Note 2 | - | 6.0 | - | mA |
| | $I_{EE}$ | Note 2 | - | 4.0 | - | mA |
| Input Voltage (High Level) | $V_{IH}$ | High Level | 0.8* VDD | - | VDD | V |
| Input Voltage (Low Level) | $V_{IL}$ | Low Level | 0 | - | 0.2* VDD | V |
| Frame Frequency | $f_{FLM}$ | - | - | 75 | - | Hz |
| Duty Ratio | | - | | 1/128 | | - |
| Recommended LC Drive Voltage | $V_{DD}$ -$V_O$ | Duty=1/128 T=0°C, Ø=10°, Note 3 | - | 16.9 | - | V |
| | | Duty=1/128 T=25°C, Ø=10°, Note 3 | - | 15.8 | - | V |
| | | Duty=1/128 T=40°C, Ø=10°, Note 3 | - | 15.4 | - | V |
| Backlight Tile Voltage | $V_{EL}$ | $f_{EL}$=400Hz | - | 100 | - | Vrms |
| Backlight Lamp Frequency | $f_{EL}$ | - | - | 400 | - | Hz |
| Backlight Tile Current | $I_{EL}$ | $V_{EL}$=100Vrms, $f_{EL}$=400Hz | - | - | 160 | mArms |

## TIMING CHARACTERISTICS

| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Enable cycle time | tCYC | 1000 | - | - | ns |
| Enable pulse width (High level) | tWEH | 450 | - | - | ns |
| Enable pulse width (Low level) | tWEL | 450 | - | - | ns |
| Enable rise time | tEr | - | - | 25 | ns |
| Enable fall time | tEf | - | - | 25 | ns |
| Set up time of CS, R/W, RS | tAS | 140 | - | - | ns |
| Set up time of Input Data | tDIS | 225 | - | - | ns |
| Data delay time | tDD | - | - | 225 | ns |
| Hold time of Data | tH | 10 | - | - | ns |
| Hold time of CS, R/W, RS | tAH | 10 | - | - | ns |
| Data hold time | tDH | 20 | - | - | ns |

## CONNECTORS

| Connector | |
|---|---|
| No special connector required | |

Note1: Definition of optical data, see page XXX

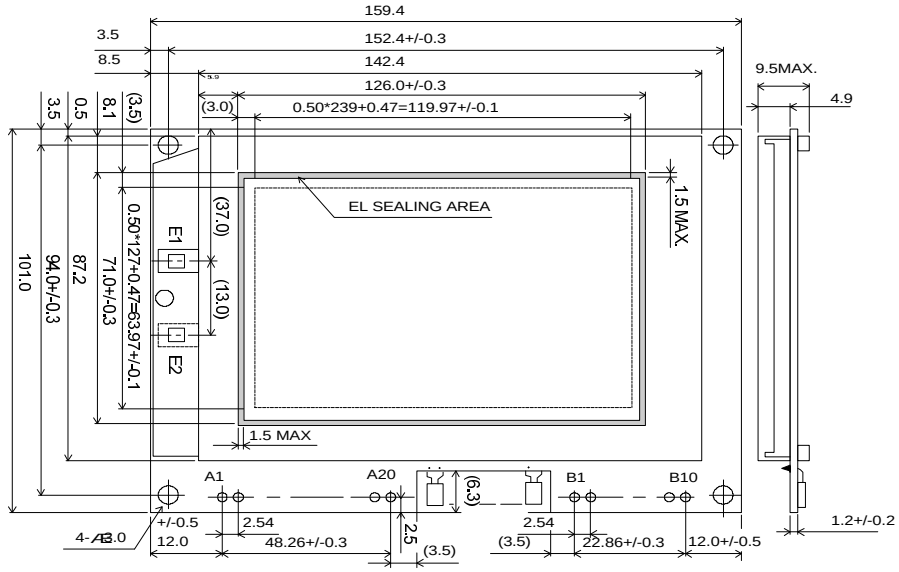
Note 2: fFLM=75Hz, VDD-V0=15.8V, D=GND(VSS)

Note 3: Recommended LC driving voltage may fluctuate about +- 0.5V by each module

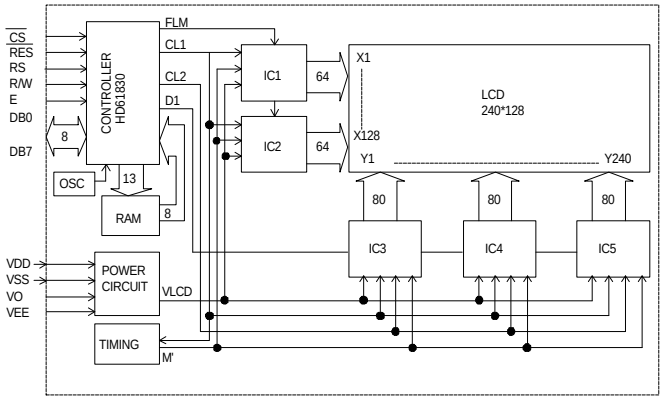
Note 4: Background colour of the LCD changes depending on temperature. Between 40-50°C optical characteristics of the LCD like contrast and viewing angle change but the LCD remains readable.

Note 5: Storage at -20°C < 48 hr.

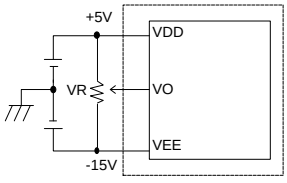
## MECHANICAL DIMENSIONS




## BLOCK DIAGRAM

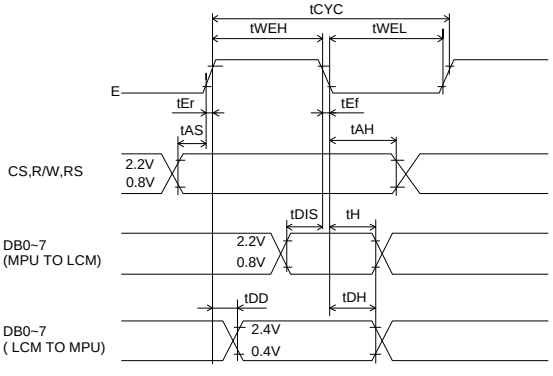



## POWER SUPPLY

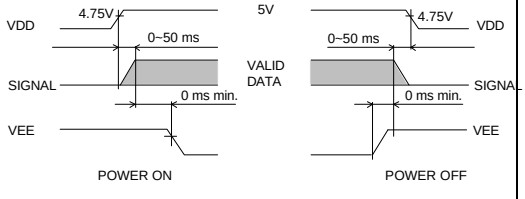



VR: 10~20KΩ

## INTERFACE TIMING DIAGRAM




## POWER UP TIMING DIAGRAM

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