

# LMG6381QHGE

# 256\*64 Dots

## FEATURES

- ◆ Blue on Grey STN Type
- ◆ Transflective Mode

- ◆ Low Power EL Backlight
- ◆ Built in LCD Controller HD61830

## MECHANICAL DATA

| Item              | Value      | Unit |
|-------------------|------------|------|
| Module Dimensions | 160*68*9.5 | mm   |
| Viewing Area      | 126.3*37.0 | mm   |
| Resolution        | 256*64     | dots |
| Dot Size          | 0.44*0.44  | mm   |
| Dot Pitch         | 0.47*0.47  | mm   |
| Weight            | 115        | g    |

## OPTICAL DATA

| Item                 | Symbol         | Condition                 | Min | Typ | Max | Unit              |
|----------------------|----------------|---------------------------|-----|-----|-----|-------------------|
| Contrast Ratio       | K              | ∅=10°,<br>Q=0°,<br>Note 1 | -   | 3.0 | -   | -                 |
| Brightness           | -              | -                         | -   | 10  | -   | cd/m <sup>2</sup> |
| Viewing Direction    | -              | -                         | -   | 6   | -   | o'clock           |
| Viewing Angle        | ∅2 - ∅1        | K=1.4,<br>Note 1          | -   | 40  | -   | degree            |
| Response Time (Rise) | t <sub>R</sub> | ∅=10°,<br>Q=0°,<br>Note 1 | -   | 250 | 400 | ms                |
| Response Time (Fall) | t <sub>F</sub> | ∅=10°,<br>Q=0°,<br>Note 1 | -   | 300 | 450 | ms                |

## ABSOLUTE MAXIMUM RATINGS

| Item                      | Symbol                            | Condition | Min             | Max             | Unit |
|---------------------------|-----------------------------------|-----------|-----------------|-----------------|------|
| Supply Voltage (Logic)    | V <sub>DD</sub> - V <sub>SS</sub> | -         | 0               | 7               | V    |
| Supply Voltage (LC Drive) | V <sub>DD</sub> - V <sub>EE</sub> | -         | 0               | 22              | V    |
| Input Voltage             | V <sub>I</sub>                    | -         | V <sub>SS</sub> | V <sub>DD</sub> | V    |
| Operating Temperature     | T <sub>OP</sub>                   | Note 4,5  | 0               | 50              | °C   |
| Storage Temperature       | T <sub>ST</sub>                   | Note 4,5  | -20             | 60              | °C   |

## DATA INTERFACE PIN ASSIGNMENT

| Pin No  | Symbol    | Level | Function                    |
|---------|-----------|-------|-----------------------------|
| A1      | VSS       | -     | Ground                      |
| A2      | VDD       | -     | 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 | -     | Display data                |
| A15     | Not CS    | -     | Chip select                 |
| A16     | Not RES   | -     | Reset                       |
| A17     | VEE       | -     | Power supply for LCD        |
| 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 <sub>DD</sub> - V <sub>SS</sub> | -  | 4.75                | 5.0   | 5.25                | V                 |
| Supply Voltage (LC Drive)    | V <sub>EE</sub> - V <sub>SS</sub> | -  | -12.5               | -13.0 | -13.5               | V                 |
| Supply Current               | I <sub>DD</sub>                   | -  | -                   | 35    | -                   | mA                |
|                              | I <sub>FE</sub>                   | -  | -                   | 2     | -                   | mA                |
| Input Voltage (High Level)   | V <sub>IH</sub>                   | High Level,<br>Note 2  | 0.8*V <sub>DD</sub> | -     | V <sub>DD</sub>     | V                 |
| Input Voltage (Low Level)    | V <sub>IL</sub>                   | Low Level,<br>Note 2   | 0                   | -     | 0.2*V <sub>DD</sub> | V                 |
| Frame Frequency              | f <sub>FLM</sub>                  | -  | -                   | -     | -                   | Hz                |
| Duty Ratio                   | -                                 | -  | -                   | 1/64  | -                   | -                 |
| Recommended LC Drive Voltage | V <sub>DD</sub> - V <sub>O</sub>  | Duty=1/64,<br>T=0°C,<br>∅=10°,<br>Note 3                         | -                   | 16.2  | -                   | V                 |
|                              |                                   | Duty=1/64,<br>T=25°C,<br>∅=10°,<br>Note 3                        | -                   | 15.3  | -                   | V                 |
|                              |                                   | Duty=1/64,<br>T=40°C,<br>∅=10°,<br>Note 3                        | -                   | 14.7  | -                   | V                 |
| Backlight Lamp Voltage       | V <sub>BL</sub>                   | F <sub>EL</sub> =400Hz   | -                   | 100   | -                   | V <sub>rms</sub>  |
| Backlight Lamp Frequency     | f <sub>BL</sub>                   | -  | -                   | 400   | -                   | Hz                |
| Backlight Lamp Current       | I <sub>BL</sub>                   | V <sub>EL</sub> =100V <sub>rms</sub> ,<br>F <sub>EL</sub> =400Hz | -                   | -     | 100                 | mA <sub>rms</sub> |

## TIMING CHARACTERISTICS

| Item                            | Symbol           | Min  | Typ | Max | Unit |
|---------------------------------|------------------|------|-----|-----|------|
| Enable cycle time               | t <sub>CYC</sub> | 1000 | -   | -   | ns   |
| Enable pulse width (High level) | t <sub>WEH</sub> | 450  | -   | -   | ns   |
| Enable pulse width (Low level)  | t <sub>WEL</sub> | 450  | -   | -   | ns   |
| Enable rise time                | t <sub>Er</sub>  | -    | -   | 25  | ns   |
| Enable fall time                | t <sub>Ef</sub>  | -    | -   | 25  | ns   |
| Set up time                     | t <sub>AS</sub>  | 140  | -   | -   | ns   |
| Data set up time                | t <sub>DSW</sub> | 225  | -   | -   | ns   |
| Data delay time                 | t <sub>DDR</sub> | -    | -   | 225 | ns   |
| Hold time of Data               | t <sub>H</sub>   | 10   | -   | -   | ns   |
| Address hold time               | t <sub>AH</sub>  | 10   | -   | -   | ns   |
| Data hold time                  | t <sub>DH</sub>  | 20   | -   | -   | ns   |

## INVERTER AND CONNECTORS

| Recommended Inverter | Connector                     |
|----------------------|-------------------------------|
| NEC NEL-D32-48       | No special connector required |

- Note 1: Definition of optical data, see page 84
- Note 2: Applied to DB0-DB7, NotCS, E, R/W, RS
- 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 display remains readable.
- Note 5: Storage at -20°C < 48 hr.

