
Genesys Logic, Inc.

# GL860

## USB 2.0 PC Camera Controller

**Datasheet Revision 1.01**

**Jan. 04, 2006**

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# Revision History

| Revision | Date | Description |
|---|---|---|
| 0.10 | 04/29/2004 | First draft release |
| 0.20 | 05/25/2004 | 1. Added Pin List and Pin Description in Chapter 3.<br>2. Changed Features contents in Chapter 2.<br>3. Changed CCD/CMOS Sensor interface function description in Chapter 4. |
| 0.30 | 06/25/2004 | Changed mass contents. |
| 0.40 | 07/26/2004 | 1. Removed 32-pin QFN package.<br>2. Changed 64-pin name.<br>3. Added 100-pin PQFP package |
| 0.90 | 11/10/2004 | First draft release |
| 1.00 | 09/27/2005 | 1. Modify pin list and description.<br>2. Added and modify sensor register.<br>3. Remove pin 64 pin list and pin decription.<br>4. Remove features “Complies with USB Video Class specification rev. 1.0”. |
| 1.01 | 01/04/2006 | 1. Add 48 pin assignment.<br>2. Add 48 pin Descriptions<br>3. Add Application circuit |

# TABLE OF CONTENTS



# LIST OF FIGURES



# LIST OF TABLES



# CHAPTER 1 GENERAL DESCRIPTION

The GL860 is a high performance USB 2.0 controller for PC Camera application. With the Genesys Logic's highly recognized self-developed USB high-speed transceiver, GL860 provides up to 480Mbps bandwidth for fulfilling the mass bandwidth demand of video transferring. GL860 also support USB isochronous mode to provide certain bandwidth to insure user can get satisfied usage experience on video application even running high bandwidth consumption devices concurrently.

The GL860 integrates a highly flexible sensor interface to make it easily adopted with variety sensors in which include most popular CCD sensor module and CMOS sensors. The Gl860's low power consumption, low operation temperature characteristic also make it is easy to implement a high quality PC Camera without worry about the noise signals of sensors to affect by high performance USB controller.

# CHAPTER 2 FEATURES

- USB specification compliance
  - Complies with 480Mbps Universal Serial Bus specification rev. 2.0.
  - Complies with 12Mbps Universal Serial Bus specification rev. 2.0..
  - Support USB 2.0 Isochronous Video pipe to 24MB/s.
- Sensor interface
  - Programmable interface for popular general CCD module/CMOS sensor
- Non-processing video streaming (USB High-speed connection)
- Support 4 USB endpoints
  - Endpoint 0: Control PIPE.
  - Endpoint 1: Isochronous/Bulk data in (configurable).
  - Endpoint 2: Interrupt OUT.
  - Endpoint 3: Interrupt IN.
- Embedded 8052 micro-controller
  - Operate @ 15 MHz clock.
  - 8K ROM.
- Support firmware stored in external FLASH memory for development of customer's firmware
- Support USB remote wakeup.
- Maximum 15 GPIO ports.
- 3.3V/1.8V operation.
- 3.3V to 1.8V regulator is built-in.
- Capability to support on-line download program
- Available in 100-pin QFP and 48-pin LQFP/QFN/LQFN package.

# CHAPTER 3 PIN ASSIGNMENT

## 3.1 Pinout

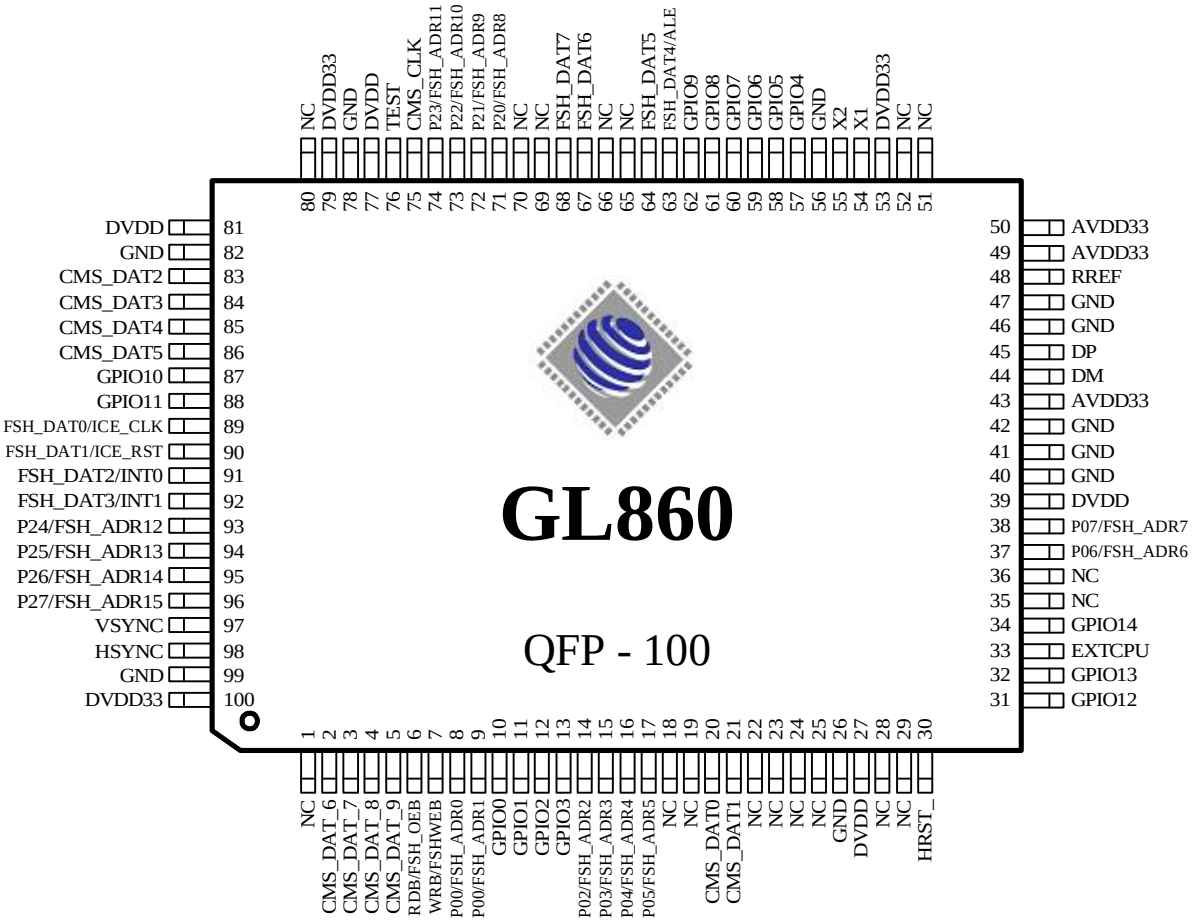



**Figure 3.1 - 100 Pin QFP Pinout Diagram**

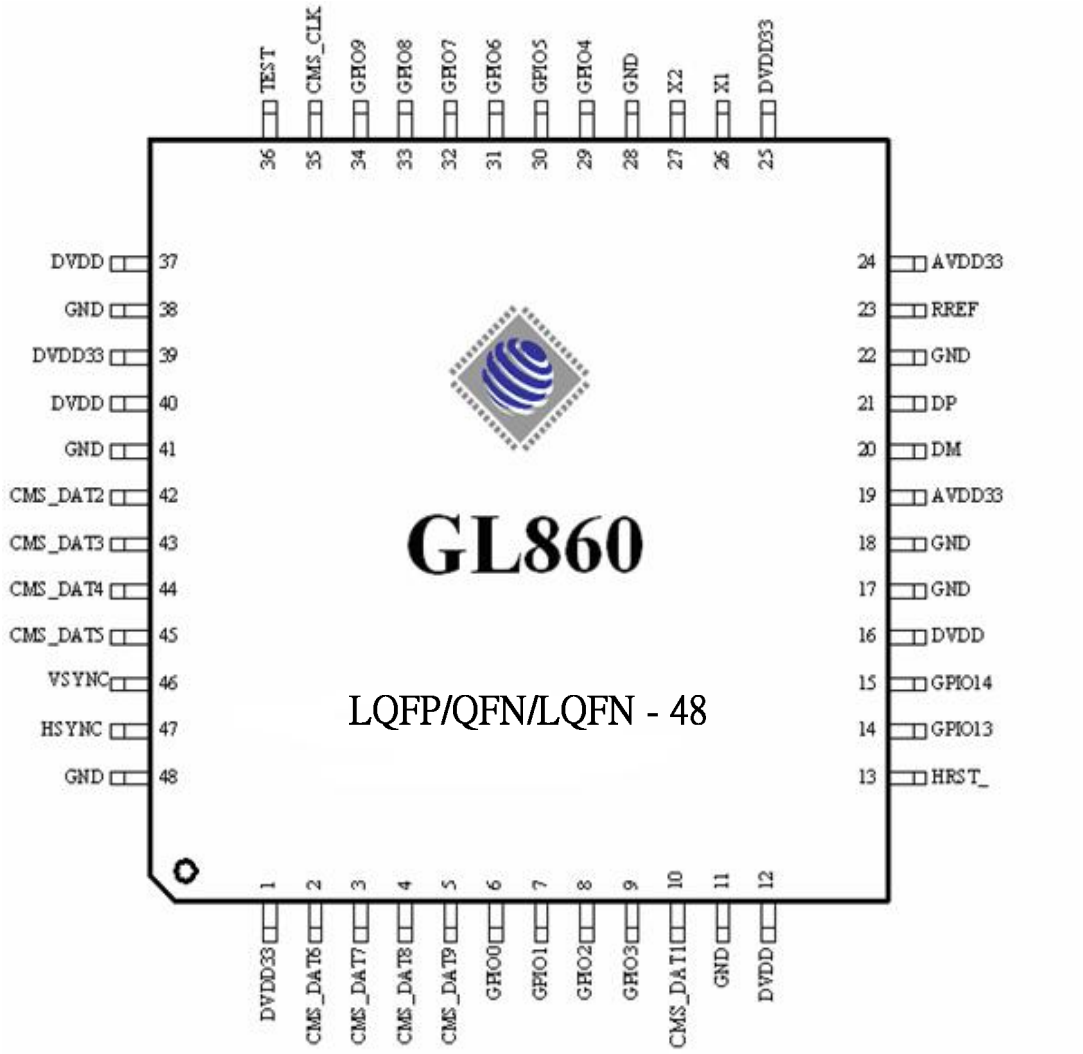



**Figure 3.2 - 48 Pin LQFP/QFN/LQFN Pinout Diagram**

## 3.2 Pin List

Three type packages:

Case 1

- 100 pin
- w/ICE and flash memory
- 10 bit sensor interface
- 15 GPIO pins
- QFP package

Case 2

- 48 pin
- 8 bit sensor interface
- 12 GPIO pins
- LQFP/QFN/LQFN package

**Table 3.1 - 100-Pin QFP Pin List**

| Pin# | Pin Name | Type | Pin# | Pin Name | Type | Pin# | Pin Name | Type | Pin# | Pin Name | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | NC | - | 26 | GND | P | 51 | NC | - | 76 | TEST | I |
| 2 | CMS_DAT6 | I | 27 | DVDD | P | 52 | NC | - | 77 | DVDD | P |
| 3 | CMS_DAT7 | I | 28 | NC | - | 53 | DVDD33 | P | 78 | GND | P |
| 4 | CMS_DAT8 | I | 29 | NC | - | 54 | X1 | I | 79 | DVDD33 | P |
| 5 | CMS_DAT9 | I | 30 | HRST_ | I | 55 | X2 | I/O | 80 | NC | P |
| 6 | FSH_OEB | I | 31 | GPIO12 | I/O | 56 | GND | P | 81 | DVDD | P |
| 7 | FSH_WEB | I | 32 | GPIO13 | I/O | 57 | GPIO4 | I/O | 82 | GND | P |
| 8 | FSH_ADR0 | I/O | 33 | EXTCPU | I | 58 | GPIO5 | I/O | 83 | CMS_DAT2 | I |
| 9 | FSH_ADR1 | I/O | 34 | GPIO14 | I/O | 59 | GPIO6 | I/O | 84 | CMS_DAT3 | I |
| 10 | GPIO0 | I/O | 35 | NC | - | 60 | GPIO7 | I/O | 85 | CMS_DAT4 | I |
| 11 | GPIO1 | I/O | 36 | NC | - | 61 | GPIO8 | I/O | 86 | CMS_DAT5 | I |
| 12 | GPIO2 | I/O | 37 | FSH_ADR6 | I/O | 62 | GPIO9 | I/O | 87 | GPIO10 | I/O |
| 13 | GPIO3 | I/O | 38 | FSH_ADR7 | I/O | 63 | FSH_DAT4 | I/O | 88 | GPIO11 | I/O |
| 14 | FSH_ADR2 | I/O | 39 | DVDD | P | 64 | FSH_DAT5 | I/O | 89 | FSH_DAT0 | I/O |
| 15 | FSH_ADR3 | I/O | 40 | GND | P | 65 | NC | - | 90 | FSH_DAT1 | I/O |
| 16 | FSH_ADR4 | I/O | 41 | GND | P | 66 | NC | - | 91 | FSH_DAT2 | I/O |
| 17 | FSH_ADR5 | I/O | 42 | GND | P | 67 | FSH_DAT6 | I/O | 92 | FSH_DAT3 | I/O |
| 18 | NC | - | 43 | AVDD33 | P | 68 | FSH_DAT7 | I/O | 93 | FSH_ADR12 | I/O |
| 19 | NC | - | 44 | DM | I/O | 69 | NC | - | 94 | FSH_ADR13 | I/O |
| 20 | CMS_DAT0 | I | 45 | DP | I/O | 70 | NC | - | 95 | FSH_ADR14 | I/O |
| 21 | CMS_DAT1 | I | 46 | GND | P | 71 | FSH_ADR8 | I/O | 96 | FSH_ADR15 | I/O |
| 22 | NC | - | 47 | GND | P | 72 | FSH_ADR9 | I/O | 97 | VSYNC | I |
| 23 | NC | - | 48 | RREF | A | 73 | FSH_ADR10 | I/O | 98 | HSYNC | I |
| 24 | NC | - | 49 | AVDD33 | P | 74 | FSH_ADR11 | I/O | 99 | GND | P |
| 25 | NC | - | 50 | AVDD33 | P | 75 | CMS_CLK | I/O | 100 | DVDD33 | P |

**Table 3.2 - 48-Pin LQFP/QFN/LQFN Pin List**

| Pin# | Pin Name | Type | Pin# | Pin Name | Type | Pin# | Pin Name | Type | Pin# | Pin Name | Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | DVDD33 | P | 13 | HRST_ | I | 25 | DVDD33 | P | 37 | DVDD | P |
| 2 | CMS_DAT6 | I | 14 | GPIO13 | I/O | 26 | X1 | I | 38 | GND | P |
| 3 | CMS_DAT7 | I | 15 | GPIO14 | I/O | 27 | X2 | I/O | 39 | DVDD33 | P |
| 4 | CMS_DAT8 | I | 16 | DVDD | P | 28 | GND | P | 40 | DVDD | P |
| 5 | CMS_DAT9 | I | 17 | GND | P | 29 | GPIO4 | I/O | 41 | GND | P |
| 6 | GPIO0 | I/O | 18 | GND | P | 30 | GPIO5 | I/O | 42 | CMS_DAT2 | I |
| 7 | GPIO1 | I/O | 19 | AVDD33 | P | 31 | GPIO6 | I/O | 43 | CMS_DAT3 | I |
| 8 | GPIO2 | I/O | 20 | DM | I/O | 32 | GPIO7 | I/O | 44 | CMS_DAT4 | I |
| 9 | GPIO3 | I/O | 21 | DP | I/O | 33 | GPIO8 | I/O | 45 | CMS_DAT5 | I |
| 10 | CMS_DAT1 | I/O | 22 | GND | P | 34 | GPIO9 | I/O | 46 | VSYNC | I/O |
| 11 | GND | P | 23 | RREF | A | 35 | CMS_CLK | I/O | 47 | HSYNC | I/O |
| 12 | DVDD | P | 24 | AVDD33 | P | 36 | TEST | I | 48 | GND | P |

## 3.3 Pin Descriptions

**Table 3.3 - 100-Pin QFP Pin Descriptions**

| Pin Name | Pin# | Type | Description |
|---|---|---|---|
| DVDD | 27,39,77,81 | P | 1.8V core power |
| CMS_DAT0~9 | 20,21,83~86, 2~5 | I | Sensor data bit 0~9 |
| FSH_OEB | 6 | I | Read strobe of Output enable for flash memory. Low active |
| FSH_WEB | 7 | I | Write strobe of Write enable for flash memory. Low active |
| FSH_ADR0~15 | 8,9,14~17, 37,38,71~74 , 93~96 | I/O | Port 0 and Port 2 for Address of flash memory |
| GPIO0~14 | 10~13,57~62, 87,88,31,32,34 | I/O (pd) | GPIO pins bit 0~14 |
| GND | 26,40,41,42, 46,47,56,78, 82,99 | P | Ground |
| HRST_ | 30 | I (pu) | Hardware reset, low active |
| EXTCPU | 33 | I | Use external CPU mode for firmware development. |
| AVDD33 | 43,49,50 | P | 3.3V analog power |
| DM | 44 | I/O | USB D- |
| DP | 45 | I/O | USB D+ |
| RREF | 48 | A | Reference R |
| DVDD33 | 53,79,100 | P | 3.3V power |
| X1 | 54 | I | 12M crystal in |
| X2 | 55 | I/O | 12M crystal out |
| FSH_DAT0~7 | 89,90,91,92, 63,64,67,68 | I/O | Data bus of flash memory |
| CMS_CLK | 75 | I/O | Sensor clock |
| TEST | 76 | I (pd) | Test mode |
| VSYNC | 97 | I/O | Sensor Vsync |
| HSYNC | 98 | I/O | Sensor Hsync |
| NC | 1,18,19,22~25, 28,29,35,36, 51,52,65,66, 69,70,80 | - | No connection |

**Table 3.4 - 48-Pin LQFP/QFN/LQFN Pin Descriptions**

| Pin Name | Pin# | Type | Description |
|---|---|---|---|
| DVDD | 12,16,37,40 | P | 1.8V power for crystal |
| CMS_DAT1~9 | 10,42~45,2~5 | I | Sensor data bit 1~9 |
| GPIO0~9,13,14 | 6~9,29~34, 14,15 | I/O (pd) | GPIO pins bit 0~9,13,14 |
| GND | 11,17,18,22, 28,38,41,48 | P | Ground |
| DVDD33 | 1,25,39 | P | 3.3V core power |
| HRST | 13 | I (pu) | Hardware reset, low active |
| AVDD33 | 19,24 | P | 3.3V analog power |
| DM | 20 | I/O | USB D- |
| DP | 21 | I/O | USB D+ |
| RREF | 23 | A | Reference R |
| X1 | 26 | I | 12M crystal in |
| X2 | 27 | I/O | 12M crystal out |
| CMS_CLK | 35 | I/O | Sensor clock |
| TEST | 36 | I (pd) | Test mode |
| VSYNC | 46 | I/O | Sensor Vsync |
| HSYNC | 47 | I/O | Sensor Hsync |
| NC | 10 | - | No connection |

**Notation:**

| | | |
|---|---|---|
| **Type** | **O** | Output |
| | **I** | Input |
| | **B** | Bi-directional |
| | **B/I** | Bi-directional, default input |
| | **B/O** | Bi-directional, default output |
| | **P** | Power / Ground |
| | **A** | Analog |
| | **pu** | Internal pull up |
| | **pd** | Internal pull down |
| | **odpu** | Open drain with internal pull up |

# CHAPTER 4 FUNCTIONAL DESCRIPTION

## 4.1 Function Block

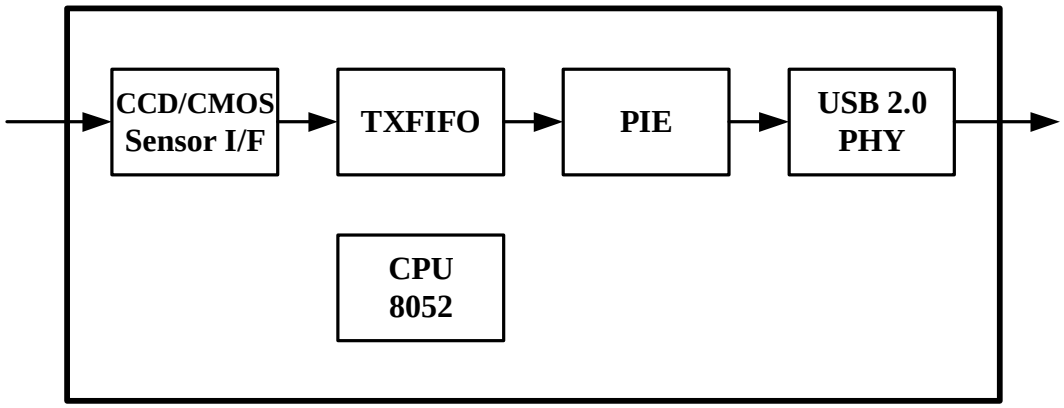



**Figure 4.1 - Block Diagram**

- ### CCD Module/CMOS Sensor Interface

  GL860 can link with popular CMOS sensor on market for PC camera application. GL860 can be configured by different sensor requirement. If sensor is acting as master, GL860 can accept HSYNC/VSYNC from sensor. If GL860 is configured as a master HSYNC/VSYNC will be provided by GL860 to sensor. GL860 keep the most flexibility to fit most of the sensors. The detail of configuration needs to refer to GL860 Application Note. For most sensors no matter of YUV format or RGB format, they can be easily transferred image data to PC by GL860.

- ### TXFIFO

  GL860 build in 6K byte internal buffer for USB high bandwidth application. This 6K internal buffer can be used as transmitted buffer of isochronous pipe or bulk pipe. In USB specification, the highest bandwidth of isochronous pipe is 24M byte/second, that can be easily derived to maximum frame rate depending on configuration. For example, frame rate can be easily achieved to 30 frames per second if image size is 640 x 480 if raw data output and sensor clock is 15M.

- ### PIE

  PIE handles the USB protocol defined in chapter 8 of *USB specification Revision 2.0*. It co-works with CPU to play the role of the chip's kernel. The main functions of PIE include the state machine of USB protocol flow, CRC check, PID error check, and timeout check. Unlike USB1.1, bit stuffing/de-stuffing is implemented in UTMI, not in PIE.

- ### USB 2.0 PHY (UTMI )

  UTMI handles the low level USB protocol and signaling. It's designed based on the Intel's UTMI specification 1.01. The major functions of UTMI logic are to handle the data and clock recovery, NRZI encoding/decoding, Bit stuffing /de-stuffing, supporting USB2.0 test modes, and serial/parallel conversion.

- ### CPU

  CPU is the micro-processor unit of GL860. It is an 8-bit 8052 processor with 8K ROM and 256 bytes RAM. It operates at 15Mhz clock to decode the USB command issued from host and then prepares the data to respond to the host. In addition, $\mu$C can handle GPIO (general purpose I/O) settings and reading content of EEPROM to support high flexibility for customers of different configurations of chip. These configurations include self/bus power mode setting, individual/gang mode setting, downstream port number setting, device removable/non-removable setting, and PID/VID setting.

## 4.2 Operation Mode

For customized firmware, flash memory can use as external program memory of CPU. This is for customer to develop their firmware. This is only available for 100-pin package type.

### 4.2.1 with Flash Memory

- Only available in 100-pin QFP package
- Force EXTCPU = 0
- GPIO9 pull down
- GPIO13/GPIO14 used as serial bus to configure sensor

### 4.2.2 without Flash Memory

- If 100 pin, set EXTCPU = 0
- GPIO9 pull down
- GPIO13/GPIO14 are used as serial bus to configure sensor

# CHAPTER 5 ELECTRICAL CHARACTERISTICS

## 5.1 Maximum Ratings

**Table 5.1 - Maximum Ratings**

| Symbol | Parameter | Min. | Max. | Unit |
|---|---|---|---|---|
| $V_{IN}$ | 3.3V Input Voltage | 3.0 | 3.6 | V |
| $T_A$ | Ambient Temperature under bias | 0 | +100 | $^oC$ |
| $F_{OSC}$ | Frequency | 12 MHz ± 500ppm | | |

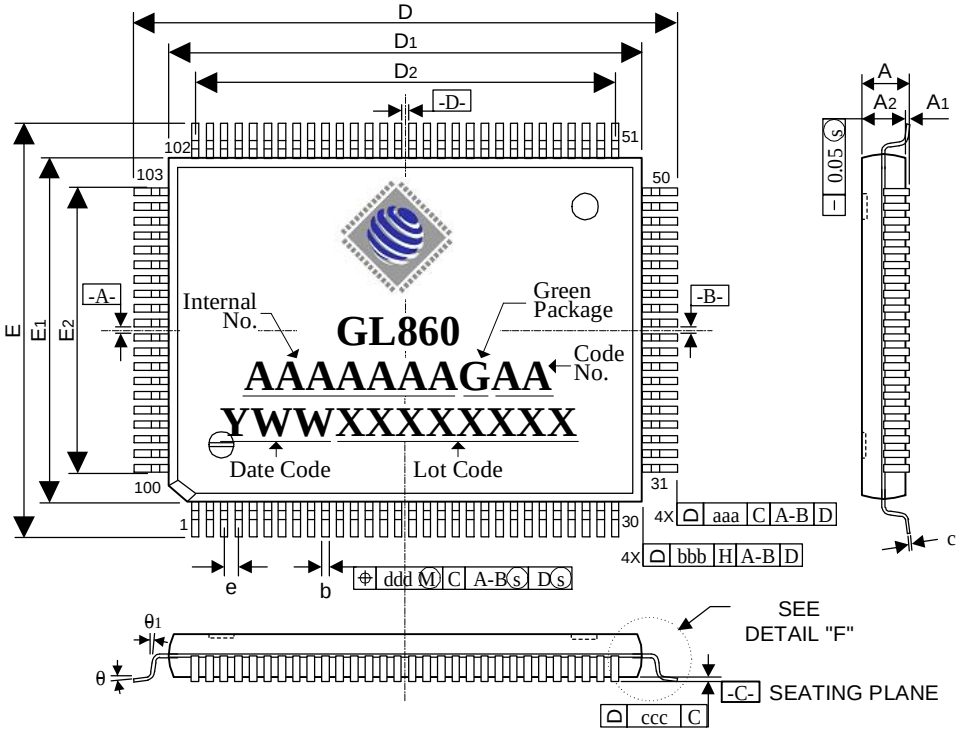
## 5.2 DC Characteristics

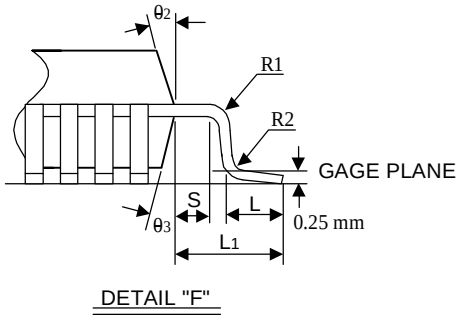
**Table 5.2 - DC Characteristics Except USB Signals**

| Symbol | Parameter | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| $P_D$ | Power Dissipation | - | - | - | mA |
| $V_{DD}$ | Power Supply Voltage | 3 | 3.3 | 3.6 | V |
| $V_{IL}$ | LOW level input voltage | - | - | 0.9 | V |
| $V_{IH}$ | HIGH level input voltage | 2.0 | - | - | V |
| $V_{TLH}$ | LOW to HIGH threshold voltage | 1.36 | 1.48 | 1.62 | V |
| $V_{THL}$ | HIGH to LOW threshold voltage | 1.36 | 1.48 | 1.62 | V |
| $V_{OL}$ | LOW level output voltage when $I_{OL}$=8mA | - | - | 0.4 | V |
| $V_{OH}$ | HIGH level output voltage when $I_{OH}$=8mA | 2.4 | - | - | V |
| $I_{OLK}$ | Leakage current for pads with internal pull up or pull down resistor | - | - | - | µA |
| $R_{DN}$ | Pad internal pull down resister | - | - | - | Ω |
| $R_{UP}$ | Pad internal pull up resister | - | - | - | Ω |

# CHAPTER 6 PACKAGE DIMENSION




CONTROL DIMENSIONS ARE IN MILLIMETERS.

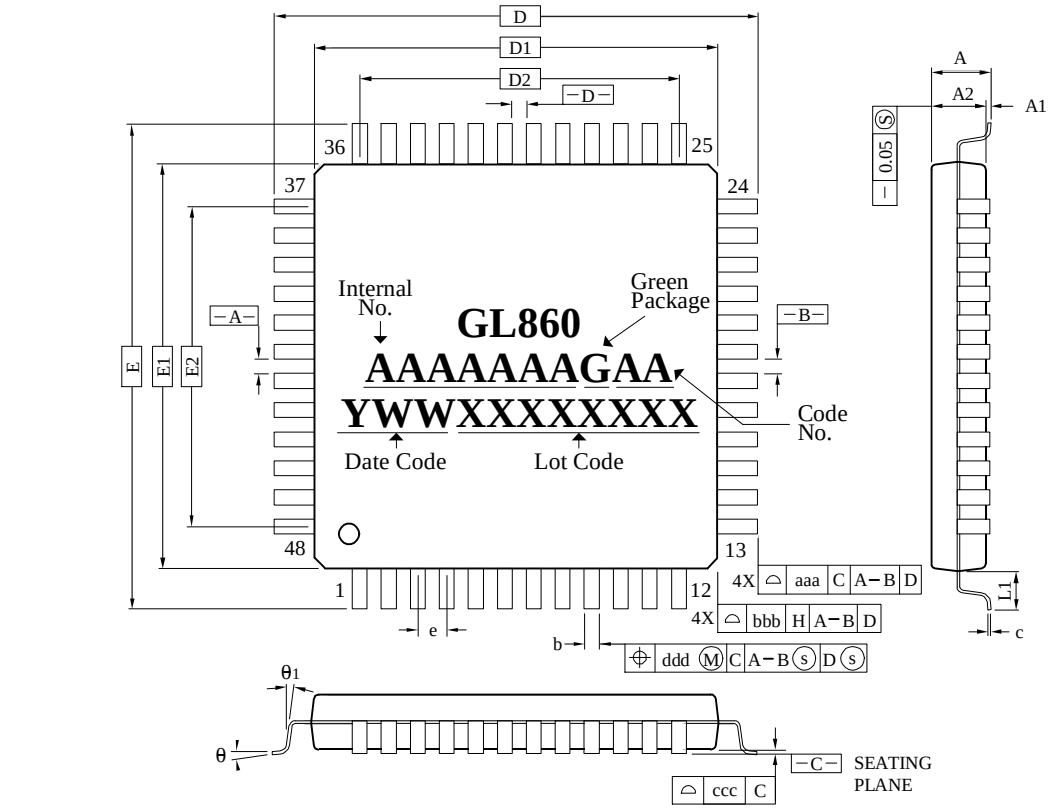
| SYMBOL | MILLIMETER | | | INCH | | |
|---|---|---|---|---|---|---|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | — | — | 3.40 | — | — | 0.134 |
| A1 | 0.25 | — | — | 0.010 | — | — |
| A2 | 2.50 | 2.72 | 2.90 | 0.098 | 0.107 | 0.114 |
| D | 23.20 BASIC | | | 0.913 BASIC | | |
| E | 17.20 BASIC | | | 0.677 BASIC | | |
| D1 | 20.00 BASIC | | | 0.787 BASIC | | |
| E1 | 14.00 BASIC | | | 0.551 BASIC | | |
| D2 | 18.85 BASIC | | | 0.742 BASIC | | |
| E2 | 12.35 BASIC | | | 0.486 BASIC | | |
| R1 | 0.13 | — | — | 0.005 | — | — |
| R2 | 0.13 | — | 0.30 | 0.005 | — | 0.012 |
| θ | 0 | — | 7 | 0 | — | 7 |
| θ1 | 0 | — | — | 0 | — | — |
| θ2 | 15 REF | | | 15 REF | | |
| θ3 | 15 REF | | | 15 REF | | |
| c | 0.11 | 0.15 | 0.23 | 0.004 | 0.006 | 0.009 |
| L | 0.73 | 0.88 | 1.03 | 0.029 | 0.035 | 0.041 |
| L1 | 1.60 REF | | | 0.063 REF | | |
| S | 0.20 | — | — | 0.008 | — | — |
| b | 0.22 | 0.30 | 0.38 | 0.009 | 0.012 | 0.015 |
| e | 0.65 BASIC | | | 0.026 BASIC | | |
| TOLERANCES OF FORM AND POSITION | | | | | | |
| aaa | 0.25 | | | 0.010 | | |
| bbb | 0.20 | | | 0.008 | | |
| ccc | 0.13 | | | 0.005 | | |
| ddd | 0.10 | | | 0.004 | | |

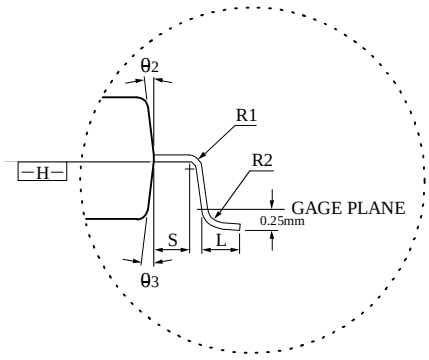
NOTES :

1. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25 mm PER SIDE. D1 AND E1 ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH.
2. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED THE MAXIMUM b DIMENSION BY MORE THAN 0.08mm. DAMBAR CAN NOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND AN ADJACENT LEAD IS 0.07mm.

**Figure 6.1 - GL860 100 Pin QFP Package**




CONTROL DIMENSIONS ARE IN MILLIMETERS.

| SYMBOL | MILLIMETER | | | INCH | | |
|---|---|---|---|---|---|---|
| | MIN. | NOM. | MAX. | MIN. | NOM. | MAX. |
| A | — | — | 1.60 | — | — | 0.063 |
| A1 | 0.05 | — | 0.15 | 0.002 | — | 0.006 |
| A2 | 1.35 | 1.40 | 1.45 | 0.053 | 0.055 | 0.057 |
| D | 9.00 BASIC | | | 0.354 BASIC | | |
| E | 9.00 BASIC | | | 0.354 BASIC | | |
| D1 | 7.00 BASIC | | | 0.276 BASIC | | |
| E1 | 7.00 BASIC | | | 0.276 BASIC | | |
| D2 | 5.50 BASIC | | | 0.217 BASIC | | |
| E2 | 5.50 BASIC | | | 0.217 BASIC | | |
| R1 | 0.08 | — | — | 0.003 | — | — |
| R2 | 0.08 | — | 0.20 | 0.003 | — | 0.008 |
| θ | 0° | 3.5° | 7° | 0° | 3.5° | 7° |
| θ1 | 0° | — | — | 0° | — | — |
| θ2 | 11° | 12° | 13° | 11° | 12° | 13° |
| θ3 | 11° | 12° | 13° | 11° | 12° | 13° |
| c | 0.09 | — | 0.20 | 0.004 | — | 0.008 |
| L | 0.45 | 0.60 | 0.75 | 0.018 | 0.024 | 0.030 |
| L1 | 1.00 REF | | | 0.039 REF | | |
| S | 0.20 | — | — | 0.008 | — | — |
| b | 0.17 | 0.20 | 0.27 | 0.007 | 0.008 | 0.011 |
| e | 0.50 BASIC | | | 0.020 BASIC | | |
| TOLERANCES OF FORM AND POSITION | | | | | | |
| aaa | 0.20 | | | 0.008 | | |
| bbb | 0.20 | | | 0.008 | | |
| ccc | 0.08 | | | 0.003 | | |
| ddd | 0.08 | | | 0.003 | | |

NOTES :

1. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.25 mm PER SIDE. D1 AND E1 ARE MAXIMUM PLASTIC BODY SIZE DIMENSIONS INCLUDING MOLD MISMATCH.

2. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED THE MAXIMUM b DIMENSION BY MORE THAN 0.08mm. DAMBAR CAN NOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND AN ADJACENT LEAD IS 0.07mm.

**Figure 6.2 - GL860 48 Pin LQFP Package**

| SYMBOL | DIMENSION MM (MIL) | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 0.70 (28) | 0.75 (30) | 0.80 (32) |
| A1 | 0.00 (0) | 0.02 (0.8) | 0.05 (2) |
| A3 | 0.20 (8) REF | | |
| b | 0.18 (7) | 0.25 (10) | 0.30 (12) |
| D | 7.00 (276) BSC | | |
| E | 7.00 (276) BSC | | |
| D2 | 5.10 (201) | 5.20 (205) | 5.30 (209) |
| E2 | 5.10 (201) | 5.20 (205) | 5.30 (209) |
| e | 0.50 (20) BSC | | |
| L | 0.30 (12) | 0.40 (16) | 0.50 (20) |
| y | --- | --- | 0.08 (3) |
| k | 0.20 (8) | --- | --- |

NOTE: 1. REFER TO JEDEC MO-220
2. ALL DIMENSIONS IN MILLIMETERS.

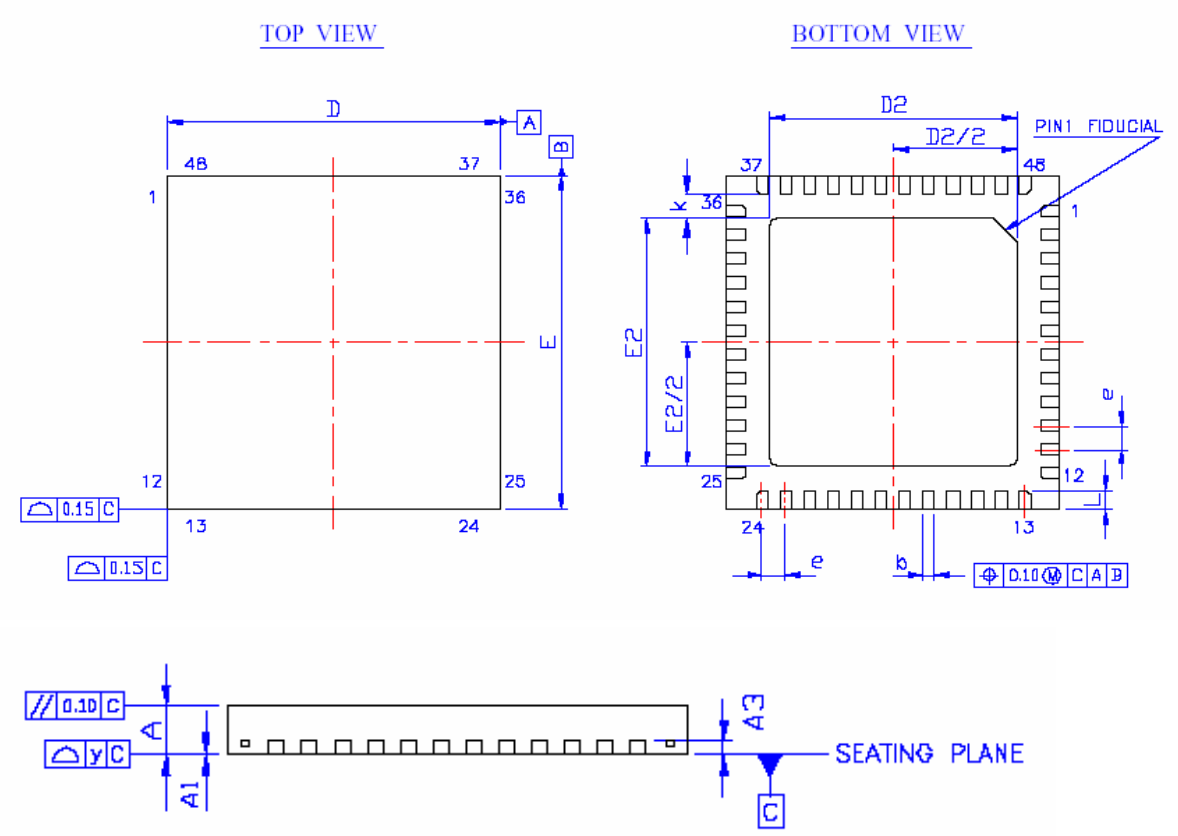



**Figure 6.3 - GL860 48 Pin QFN Package**

| SYMBOL | DIMENSION MM (MIL) | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 0.61 (24) | 0.66 (26) | 0.70 (28) |
| A1 | 0.00 (0) | 0.02 (0.8) | 0.05 (2) |
| A3 | | 0.13 (5) REF | |
| b | 0.18 (7) | 0.25 (10) | 0.30 (12) |
| D | | 7.00 (276) BSC | |
| E | | 7.00 (276) BSC | |
| D2 | 5.10 (201) | 5.20 (205) | 5.30 (209) |
| E2 | 5.10 (201) | 5.20 (205) | 5.30 (209) |
| e | | 0.50 (20) BSC | |
| L | 0.30 (12) | 0.40 (16) | 0.50 (20) |
| y | --- | 0.08 (3) | --- |
| k | 0.20 (8) | --- | --- |

NOTE: 1. ALL DIMENSIONS IN MILLIMETERS.

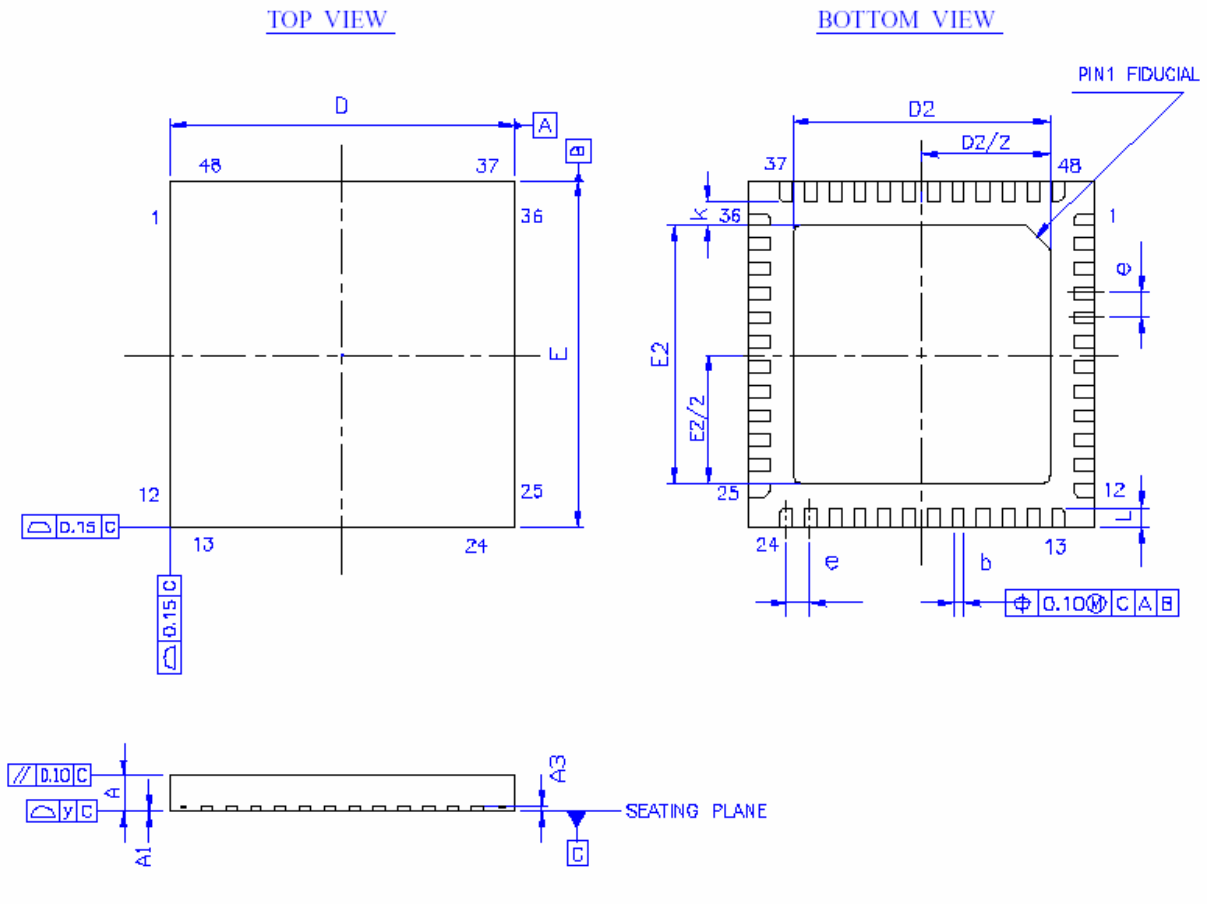



**Figure 6.4 - GL860 48 Pin LQFN Package**

# CHAPTER 7 ORDERING INFORMATION

**Table 7.1 - Ordering Information**

| Part Number | Package | Status |
|---|---|---|
| GL860 | 100-pin QFP | |
| GL860 | 48-pin LQFP/QFN/LQFN | |

# Appendix A. Application circuit

The schematic below represents a very basic example to the controller and is subject to variations depending on application intentions.