# OTi-6888

## USB 1.1 USB Host with MP3 Interface Controller

## ■ DESCRIPTION

The OTi-6888 is a USB host with MP3 interface controller. User can stores the mp3 file in the USB device (USB flash disk , USB card reader and USB portable hard Disk). When the USB device plug in USB port and push the play key. The OTi6888 will read the mp3 file from USB device, and send the data to MP3 decoder and DAC. The user can hear MP3 song where stores in USB device.

The USB interfaces are for full speed operation (12Mb/s). It conforms to USB Specification, Version 1.1. The USB transceiver is embedded in this controller. With stable slew-rate control, the controller reduces EMI.

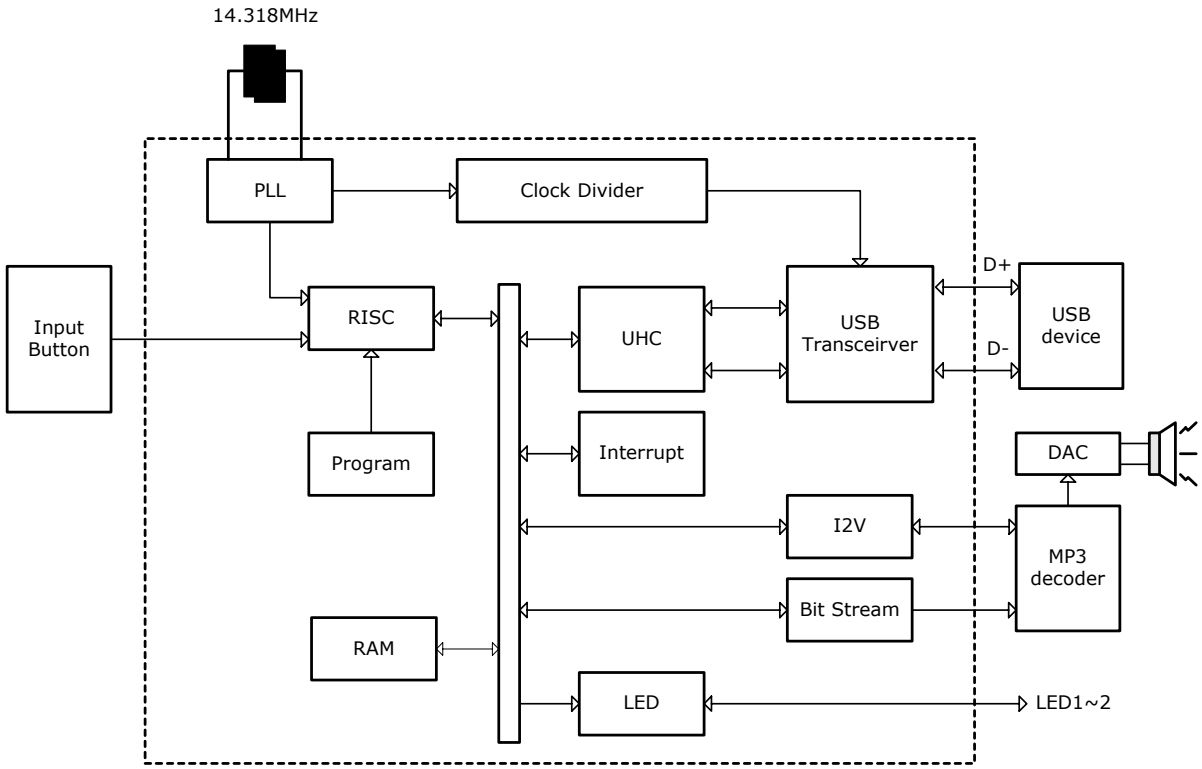
The OTi-6888 has a Phase Lock Loop (PLL) embedded. The PLL provides all clocks needed in this controller. It needs an externally provided clock operating in 14.318MHz.

The controller has two LED control pin.

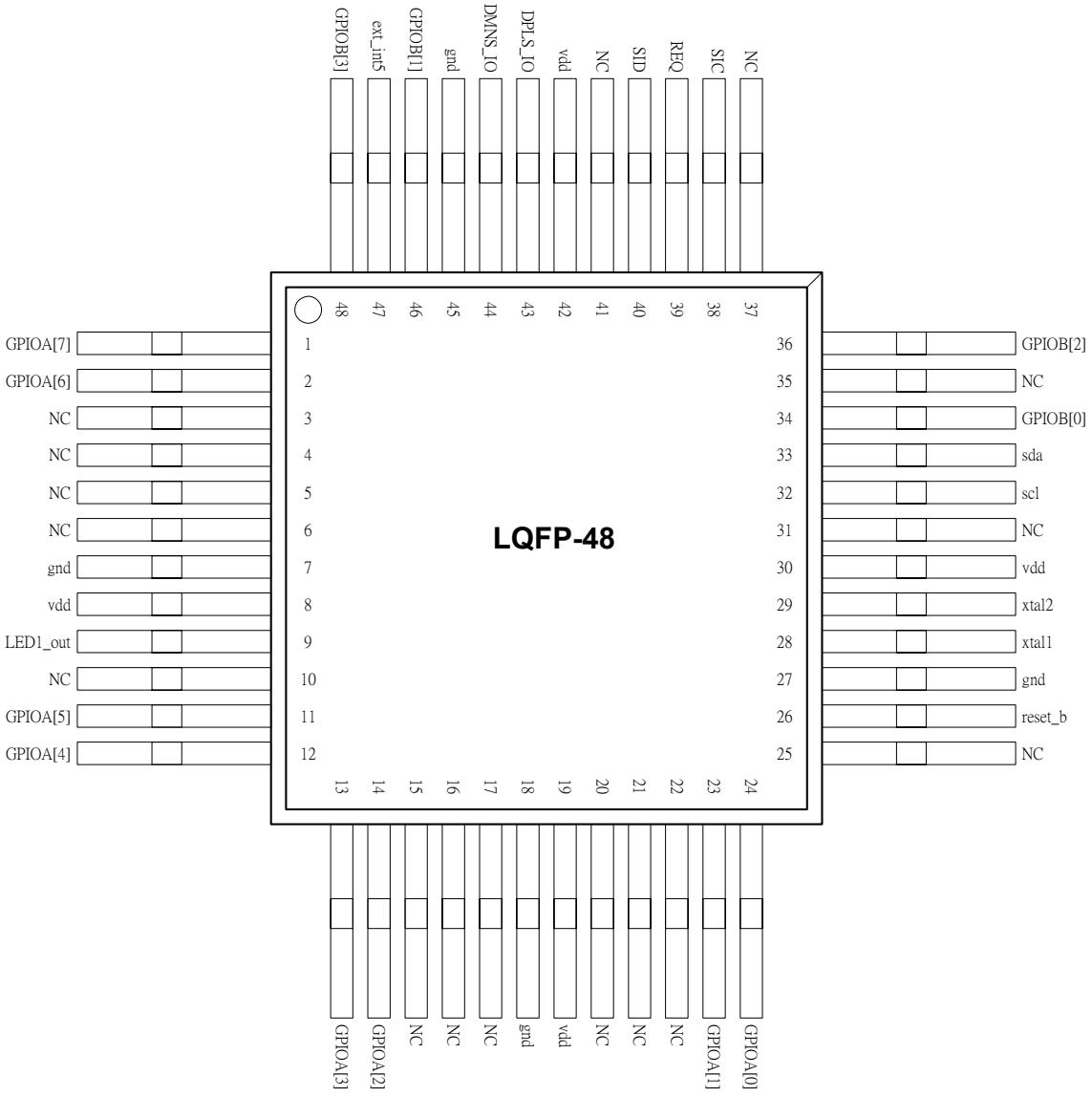
## ■ FEATURES

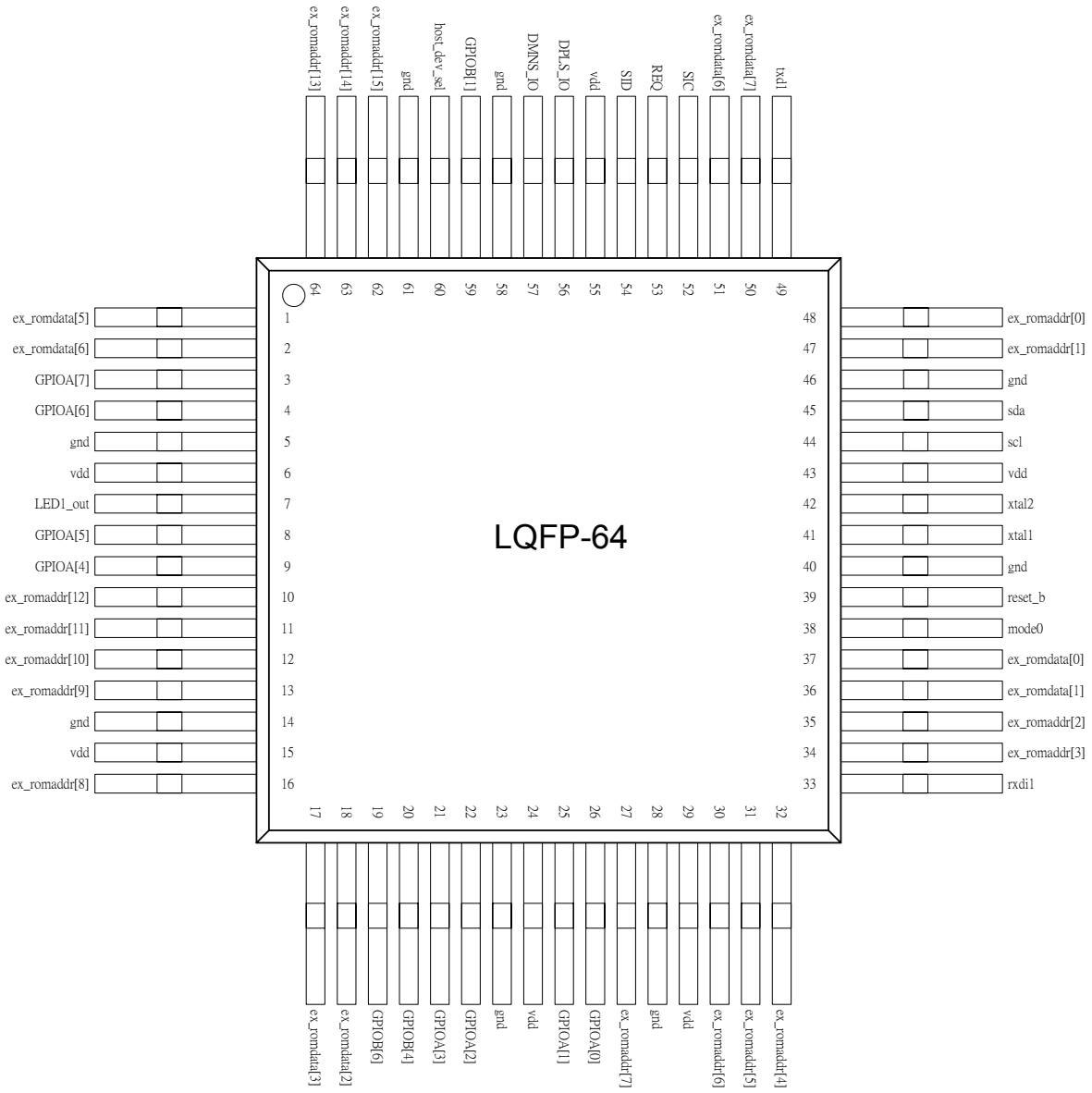
- The host controller conforms to Full-speed (12Mb/s) USB Specification, Version 1.1
- Supports the USB flash disk device(Version 1.1 or 2.0) with Mass storage class
- Supports the USB card reader device(Version 1.1 or 2.0) with Mass storage class
- Supports the USB portable hard disk(Version 1.1 or 2.0) with Mass storage class
- Integrated USB transceiver
- Integrated RISC micro-controller
  — High-performance RISC architecture
  — Single cycle instruction execution
- 14.318 MHz external clock
- 3.3 V power operation
- Integrated PLL
- Small form factor - standard 48-pin LQFP (7mmX7mm) package
- Supports File System including FAT12、FAT16、FAT32
- Search for whole disk (MP3 File)
- Input button for Play (Pause), Previous, Next , Volume + and Volume –

## ■ BLOCK DIAGARAM



## ■ PIN CONFIGUARTION




LQFP-64
1 ex_romdata[5]
2 ex_romdata[6]
3 GPIOA[7]
4 GPIOA[6]
5 gnd
6 vdd
7 LED1_out
8 GPIOA[5]
9 GPIOA[4]
10 ex_romaddr[12]
11 ex_romaddr[11]
12 ex_romaddr[10]
13 ex_romaddr[9]
14 gnd
15 vdd
16 ex_romaddr[8]
17 ex_romdata[3]
18 ex_romdata[2]
19 GPIOB[6]
20 GPIOB[4]
21 GPIOA[3]
22 GPIOA[2]
23 gnd
24 vdd
25 GPIOA[1]
26 GPIOA[0]
27 ex_romaddr[7]
28 gnd
29 vdd
30 ex_romaddr[6]
31 ex_romaddr[5]
32 ex_romaddr[4]
33 rxdi1
34 ex_romaddr[3]
35 ex_romaddr[2]
36 ex_romdata[1]
37 ex_romdata[0]
38 mode0
39 reset_b
40 gnd
41 xtal1
42 xtal2
43 vdd
44 scl
45 sda
46 gnd
47 ex_romaddr[1]
48 ex_romaddr[0]
49 txd1
50 ex_romdata[7]
51 ex_romdata[6]
52 SIC
53 REQ
54 SID
55 vdd
56 DPLS_IO
57 DMNS_IO
58 gnd
59 GPIOB[1]
60 host_dev_sel
61 gnd
62 ex_romaddr[15]
63 ex_romaddr[14]
64 ex_romaddr[13]

## ■ PIN DESCRIPTION

OTi-6888 has two different kinds of package, 48-pin and 64-pin. OTi-6888 with 48-pin package provides fundamental USB host function, however, it can provide external ROM functions if you choose 64-pin package.

Note: OTi-6888 with 48-pin package does not external ROM function.

| Pin No. | Pin Name | Attribute | Description |
|---|---|---|---|
| 1 | GPIOA[7] | I/O | GPIO |
| 2 | GPIOA[6] | I/O | GPIO |
| 3 | NC | | NC |
| 4 | NC | | NC |
| 5 | NC | | NC |
| 6 | NC | | NC |
| 7 | gnd | I | gnd |
| 8 | vdd | I | vdd |
| 9 | LED1_out | O | Status indication |
| 10 | NC | | NC |
| 11 | GPIOA[5] | I/O | GPIO |
| 12 | GPIOA[4] | I/O | GPIO |
| 13 | GPIOA[3] | I/O | GPIO |
| 14 | GPIOA[2] | I/O | GPIO |
| 15 | NC | | NC |
| 16 | NC | | NC |
| 17 | NC | | NC |
| 18 | gnd | I | gnd |
| 19 | vdd | I | vdd |
| 20 | NC | | NC |
| 21 | NC | | NC |
| 22 | NC | | NC |
| 23 | GPIOA[1] | I/O | GPIO |
| 24 | GPIOA[0] | I/O | GPIO |
| 25 | NC | O | NC |
| 26 | reset_b | I | Power on reset input , low active |
| 27 | gnd | I | gnd |

| | | | |
|---|---|---|---|
| 28 | xtal1 | I | Crystal input |
| 29 | xtal2 | O | Crystal output |
| 30 | vdd | I | vdd |
| 31 | NC | | NC |
| 32 | scl | O | The clock pin for I2C |
| 33 | sda | I/O | The data pin for I2C |
| 34 | GPIOB[0] | I/O | GPIO |
| 35 | NC | | NC |
| 36 | GPIOB[2] | I/O | GPIO |
| 37 | NC | | NC |
| 38 | SIC | O | The clock pin for bit stream |
| 39 | REQ | I | The request pin for bit stream |
| 40 | SID | O | The data pin for bit stream |
| 41 | NC | O | NC |
| 42 | vdd | I | vdd |
| 43 | DPLS_IO | I/O | USB D+ |
| 44 | DMNS_IO | I/O | USB D- |
| 45 | gnd | I | gnd |
| 46 | GPIOB[1] | I/O | GPIO |
| 47 | ext_int5 | I | External interrupt input |
| 48 | GPIOB[3] | I/O | GPIO |

Note : OTi-6888 with 64-pin package with External ROM functions.

| Pin No. | Pin Name | Attribute | Pad Name |
|---|---|---|---|
| 1 | ex_romdata[5] | I | ex_romdata_pad[5] |
| 2 | ex_romdata[4] | I | ex_romdata_pad[4] |
| 3 | GPIOA[7] | I/O | GPIOA_pad[7] |
| 4 | GPIOA[6] | I/O | GPIOA_pad[6] |
| 5 | gnd | I | gnd |
| 6 | vdd | I | vdd |
| 7 | LED1_out | O | LED1_out_pad |
| 8 | GPIOA[5] | I/O | GPIOA_pad[5] |
| 9 | GPIOA[4] | I/O | GPIOA_pad[4] |

| | | | |
|---|---|---|---|
| 10 | ex_romaddr[12] | O | ex_romaddr_pad[12] |
| 11 | ex_romaddr[11] | O | ex_romaddr_pad[11] |
| 12 | ex_romaddr[10] | O | ex_romaddr_pad[10] |
| 13 | ex_romaddr[9] | O | ex_romaddr_pad[9] |
| 14 | gnd | I | gnd |
| 15 | vdd | I | vdd |
| 16 | ex_romaddr[8] | I | ex_romaddr_pad[8] |
| 17 | ex_romdata[3] | I | ex_romdata_pad[3] |
| 18 | ex_romdata[2] | I | ex_romdata_pad[2] |
| 19 | GPIOB[6] | I/O | GPIOB_pad[6] |
| 20 | GPIOB[4] | I/O | GPIOB_pad[4] |
| 21 | GPIOA[3] | I/O | GPIOA_pad[3] |
| 22 | GPIOA[2] | I/O | GPIOA_pad[2] |
| 23 | gnd | I | gnd |
| 24 | vdd | I | vdd |
| 25 | GPIOA[1] | I/O | GPIOA_pad[1] |
| 26 | GPIOA[0] | I/O | GPIOA_pad[0] |
| 27 | ex_romaddr[7] | O | ex_romaddr_pad[7] |
| 28 | gnd | I | gnd |
| 29 | vdd | I | vdd |
| 30 | ex_romaddr[6] | O | ex_romaddr_pad[6] |
| 31 | ex_romaddr[5] | O | ex_romaddr_pad[5] |
| 32 | ex_romaddr[4] | O | ex_romaddr_pad[4] |
| 33 | rxdi1 | I | rxd1i_pad |
| 34 | ex_romaddr[3] | O | ex_romaddr_pad[3] |
| 35 | ex_romaddr[2] | O | ex_romaddr_pad[2] |
| 36 | ex_romdata[1] | O | ex_romdata_pad[1] |
| 37 | ex_romdata[0] | O | ex_romdata_pad[0] |
| 38 | mode0 | I | mode0_pad |
| 39 | reset_b | I | reset_b_pad |
| 40 | gnd | I | gnd |
| 41 | xtal1 | I | xtal1_pad |
| 42 | xtal2 | O | xtal2_pad |

| | | | |
|---|---|---|---|
| 43 | vdd | I | vdd |
| 44 | scl | O | scl_pad |
| 45 | sda | I/O | sda_pad |
| 46 | gnd | I | gnd |
| 47 | ex_romaddr[1] | O | ex_romaddr_pad[1] |
| 48 | ex_romaddr[0] | O | ex_romaddr_pad[0] |
| 49 | txd1 | O | txd1_pad |
| 50 | ex_romdata[7] | I | ex_romdata_pad[7] |
| 51 | ex_romdata[6] | I | ex_romdata_pad[6] |
| 52 | SIC | O | SIC_pad |
| 53 | REQ | I | REQ_pad |
| 54 | SID | O | SID_pad |
| 55 | vdd | I | vdd |
| 56 | DPLS_IO | I/O | DPLS_IO_pad |
| 57 | DMNS_IO | I/O | DMNS_IO_pad |
| 58 | gnd | I | gnd |
| 59 | GPIOB[1] | I/O | GPIOB_pad[1] |
| 60 | host_dev_sel | I | host_dev_sel_pad |
| 61 | gnd | I | gnd |
| 62 | ex_romaddr[15] | O | ex_romaddr_pad[15] |
| 63 | ex_romaddr[14] | O | ex_romaddr_pad[14] |
| 64 | ex_romaddr[13] | O | ex_romaddr_pad[13] |

## ■ D.C. CHARACTERS

DC Characteristics-1 (Ta=0 °C to +70 °C, Vcc = 3.3V ±10%)

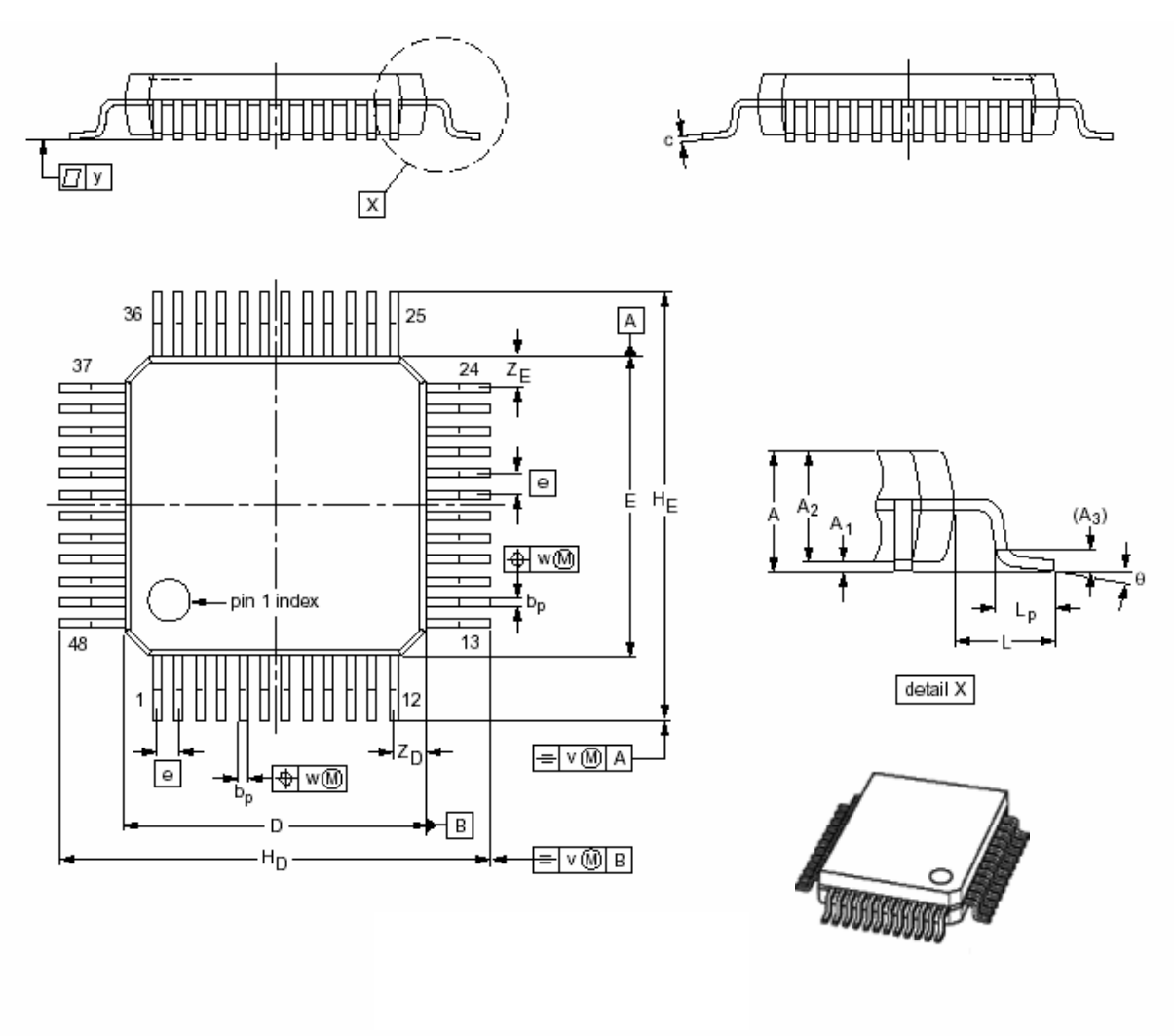
| Parameter | Symbol | MIN | TYP | MAX | Unit |
|---|---|---|---|---|---|
| Power Supply | VDD | 3 | 3.3 | 3.6 | V |
| Input Voltage | VIH | 0.9x VDD | -- | 5 | V |
| | VIL | -0.3 | -- | 0.2 x VDD | V |
| Output Voltage | VOH | VDD-0.4 | -- | -- | V |
| | VOL | -- | -- | 0.4 | V |
| Input leakage current | ILK | -1 | -- | 1 | uA |
| Working Current | IRW | -- | | -- | mA |
| Operating Temperature | Ta | 0 | 70 | | °C |
| Storage Temperature | Ts | -55 | + | 150 | °C |
| IO output current | IOH | -- | 4 | -- | mA |
| | IOL | -- | 4 | -- | mA |

## ■ A.C. CHARACTERS

| Parameter | Symbol | MIN | TYP | MAX | Unit |
|---|---|---|---|---|---|
| Input rising delay | TPIlh | 0.35(2PF) | 0.4(4PF) | 0.54(8PF) | ns |
| Input falling delay | TPIhl | 0.46(2PF) | 0.53(4PF) | 0.64(8PF) | ns |
| Output rising delay | TPOlh | 1.35(10PF) | 1.97(30PF) | 2.59(50pF) | ns |
| Output falling delay | TPOhl | 1.61(10PF) | 2.41(30PF) | 3.21(50pF) | ns |

## ■ PACKAGE INFORMATION

**LQFP-48** : plastic low profile quad flat package; 48 leads; body 7 x 7 x 1.4 mm



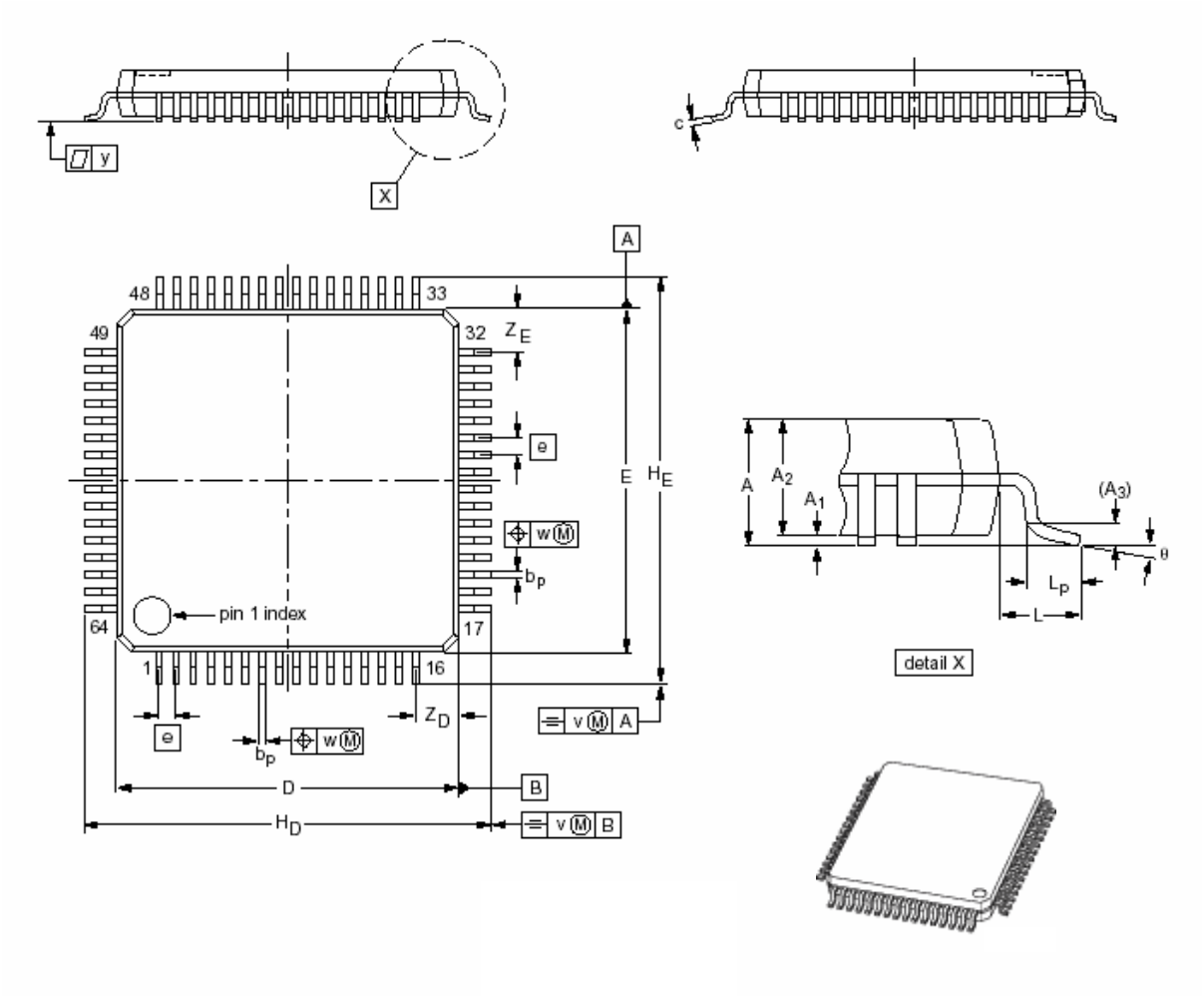

DIMENSIONS (mm are the original dimensions)

| UNIT | A Max. | $A_1$ | $A_2$ | $A_3$ | bp | c | $D^{(1)}$ | $E^{(1)}$ | e | $H_D$ | $H_E$ | L | Lp | v | W | y | $Z_D^{(10)}$ | $Z_E^{(1)}$ | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.6 | 0.20<br>0.05 | 1.45<br>1.35 | 0.25 | 0.27<br>0.17 | 0.18<br>0.12 | 7.1<br>6.9 | 7.1<br>6.9 | 0.5 | 9.15<br>8.85 | 9.15<br>8.85 | 1 | 0.75<br>0.45 | 0.2 | 0.12 | 0.1 | 0.95<br>0.55 | 0.95<br>0.55 | 7°<br>0° |

Note:

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

**LQFP-64** : plastic low profile quad flat package; 64 leads; body 10 x 10 x 1.4 mm




DIMENSIONS (mm are the original dimensions)

| UNIT | A<br>Max. | $A_1$ | $A_2$ | $A_3$ | bp | c | $D^{(1)}$ | $E^{(1)}$ | e | $H_D$ | $H_E$ | L | Lp | v | W | y | $Z_D^{(10)}$ | $Z_E^{(1)}$ | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.6 | 0.20<br>0.05 | 1.45<br>1.35 | 0.25 | 0.27<br>0.17 | 0.18<br>0.12 | 10.1<br>9.9 | 10.1<br>9.9 | 0.5 | 12.15<br>11.85 | 12.15<br>11.85 | 1 | 0.75<br>0.45 | 0.2 | 0.12 | 0.1 | 1.45<br>1.05 | 1.45<br>1.05 | 7°<br>0° |

Note:

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

**Note:**

**OTI reserves the right to make any changes without further notice to any products herein.**

**How to reach us:**

**OURS TECHNOLOGY INC.**

**1F, No. 85, Kung-Ming 6th Rd., Jubei City, Hsin-Chu Hsien, Taiwan, R.O.C.**

**TEL: +886-3-553-7511 FAX: +886-3-555-5804**