# LM072 Bluetooth 2.0 / 2.1 + EDR Serial Data Module
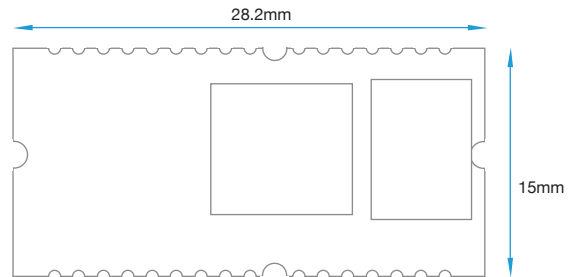## Class 1 BC04, 8MB Flash, Up to 100m

Product | LM072
Part No | 072-0110
Revised | 03/MAR/2015



28.2mm

15mm

## Features

- Bluetooth standard v2.0 and BT v2.1 + EDR specification
- SPP firmware supported by default.
- CSR Bluecore BC04 chipset
- 802.11 Coexistance supported
- RoHS compliant
- External Antenna
- Extensive Technical Support available
- Support for encryption data and authentication
- Low Cost Solution
- Low Power, Robust Design
- AT Command Set provided for module configuration
- Small outline: 28.2mm x 15mm x 2.8mm
- Class 1 radio - Output power +18 dBm
- 100m range in open space

## Applications

- Serial Communications
- Medical Devices
- Domestic and Industrial Applications
- Embedded Devices
- Remote Monitoring and Control
- GPS, POS, Barcode Readers
- Payment Terminals



## Overview

LM072 is LM Technologies Ltd Class 1 Bluetooth Data module with external antenna. This module is a CSR Bluecore 4 (BC04) chip based surface mount module available with Bluetooth Serial Port Profile (SPP) firmware.

This module is ideal for adding long range wireless connectivity to embedded products. The module acts as a standalone unit (i.e. it does not need a host to drive it) and can interface with embedded microcontrollers via UART.

It operates over a voltage range of 3.0 V to 3.6 V and gives excellent performance over a distance of 70-100 m with external antenna. This is a tried and tested module also used in other LM best selling products like LM048 and LM058 serial adapter as well as LM400 and LM410 Data Modules.

# LM072 Bluetooth 2.0 / 2.1 + EDR Serial Data Module
## Class 1 BC04, 8MB Flash, Up to 100m

## Packaging Options

**Individual BT2.1**
Part No 072-0110

LM072 with BT2.1 + EDR firmware

**Tray BT2.1**
Part No 072-0112

LM072 with BT2.1 + EDR firmware

**Tape & Reel BT2.1**
Part No 072-0111

LM072 with BT2.1 + EDR firmware

**Individual BT2.0**
Part No 072-0125

LM072 with BT2.0 + EDR firmware

**Tray BT2.0**
Part No 072-0126

LM072 with BT2.0 + EDR firmware

**Tape & Reel BT2.0**
Part No 072-0127

LM072 with BT2.0 + EDR firmware

- User Guides, Manuals and Widcomm Configuration Software available to download via our website - http://www.lm-technologies.com/support/downloads

## General Specification

| | |
|---|---|
| Chipset | CSR Bluecore 4 BC04 |
| Power Classification | Class 1 |
| Module Type | Surface Mount SMT |
| Bluetooth Specification | Bluetooth 2.0 and Bluetooth 2.1 + EDR |
| Frequency | 2402 - 2480 MHz |
| Data Rate | Up to 3 Mbps in HCI Mode |
| Range | Up to 100m in open space |
| Rx Sensitivity | -82 dBm typical |
| Antenna | External Antenna |
| Voltage operation | 3.0V - 3.6V |
| Average Current Consumption (Receiving Data) | 114 mA |
| Power Output | +18 dBm |
| Default Firmware | v4.55 (BT2.0), v6.18 (BT2.1) |
| Size | 28.2mm x 15mm x 2.8mm |
| Bluetooth Profile | Serial Port Profile (SPP) |
| Interface | UART |
| Serial Parameters | Default 19200, 8 N 1 |
| UART lines | TxD, RxD, GND, CTS, RTS |
| Baud Rates | 1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2/230.4/460.8/921.6 kbps |
| Configuration | AT Command Set |
| Flash Memory | 8MB |
| RoHS Compliant | Yes |
| Certifications | CE, FCC, BQB |

# LM072 Bluetooth 2.0 / 2.1 + EDR Serial Data Module
Class 1 BC04, 8MB Flash, Up to 100m

## Pin Assignments

| Pin | Name | Type | Description |
|---|---|---|---|
| 1 | GND | Ground | Common Ground |
| 2 | PVCC | Power | Power Amp. Power supply (3.3V) |
| 3 | AIO 0 | I/O | Programmable Input / Output |
| 4 | AIO 1 | I/O | Programmable Input / Output |
| 5 | PIO 0 | I/O | Programmable Input / Output |
| 6 | PIO 1 | I/O | Programmable Input / Output |
| 7 | PIO 2 | I/O | Programmable Input / Output |
| 8 | PIO 3 | I/O | Programmable Input / Output |
| 9 | PIO 4 | I/O | Programmable Input / Output |
| 10 | GND | Ground | Common Ground |
| 11 | PIO 5 | I/O | Programmable Input / Output |
| 12 | PIO 6 | I/O | Programmable Input / Output |
| 13 | PIO 7 | I/O | Programmable Input / Output |
| 14 | PIO 8 | I/O | Programmable Input / Output |
| 15 | PIO 9 | I/O | Programmable Input / Output |
| 16 | RESET | CMOS Input | Reset Input of Module, Active Low |
| 17 | VCC | Power | Module input Supply, 3.3V DC |
| 18 | GND | Ground | Common Ground |
| 19 | GND | Ground | Common Ground |
| 20 | USB_DP | I/O | USB Data Plus |
| 21 | USB_DN | I/O | USB Data Minus |
| 22 | PCM_SYNC | I/O | Synchronous Data Sync |
| 23 | PCM_IN | CMOS Input | Synchronous Data Input |
| 24 | PCM_OUT | CMOS Output | Synchronous Data Output |
| 25 | PCM_CLK | I/O | Synchronous Data Clock |
| 26 | UART_RX | CMOS Input | UART Data Input |
| 27 | UART_TX | CMOS Output | UART Data Output |
| 28 | UART_RTS | CMOS Output | UART Request to Send (Active Low) |
| 29 | GND | Ground | Common Ground |
| 30 | UART_CTS | CMOS Input | UART Clear to Send (Active Low) |
| 31 | SPI_MOSI | CMOS Input | Serial Peripheral Interface Data Input |
| 32 | SPI_CSB | CMOS Input | Chip Select for Serial Peripheral Interface (Active Low) |
| 33 | SPI_CLK | CMOS Input | Serial Peripheral Interface Clock |
| 34 | SPI_MISO | CMOS Output | Serial Peripheral Interface Data Output |
| 35 | PIO 11 | I/O | Programmable Input Output |
| 36 | PIO 10 | I/O | Programmable Input Output |
| 37 | RF_IO | Analogue | Antenna Interface |
| 38 | GND | Ground | Common Ground |

## General Electrical Specification

| Parameter | Description | Min | Typical | Max | Units |
|---|---|---|---|---|---|
| Carrier Frequency | - | 2.402 | - | 2.480 | GHz |
| RF Output Power | Measured with 50Ω ant | 15 | 16.5 | 18 | dBm |
| Rx Sensitivity | - | - | -88 | -86 | dBm |
| Load Impedance | No abnormal oscillation | - | - | 5:1 | - |
| Input Low Voltage | RESET, UART, GPIO, PCM | -0.3 | - | 0.8 | DCV |
| Input High Voltage | RESET, UART, GPIO, PCM | 0.7VDD | - | VDD+0.3 | DCV |
| Output Low Voltage | UART, GPIO, PCM | - | - | 0.4 | DCV |
| Output High Voltage | UART, GPIO, PCM | VDD-0.4 | - | - | DCV |
| Average Current Consumption | Receive DM1 | - | 114 | - | mA |

## Block Diagram
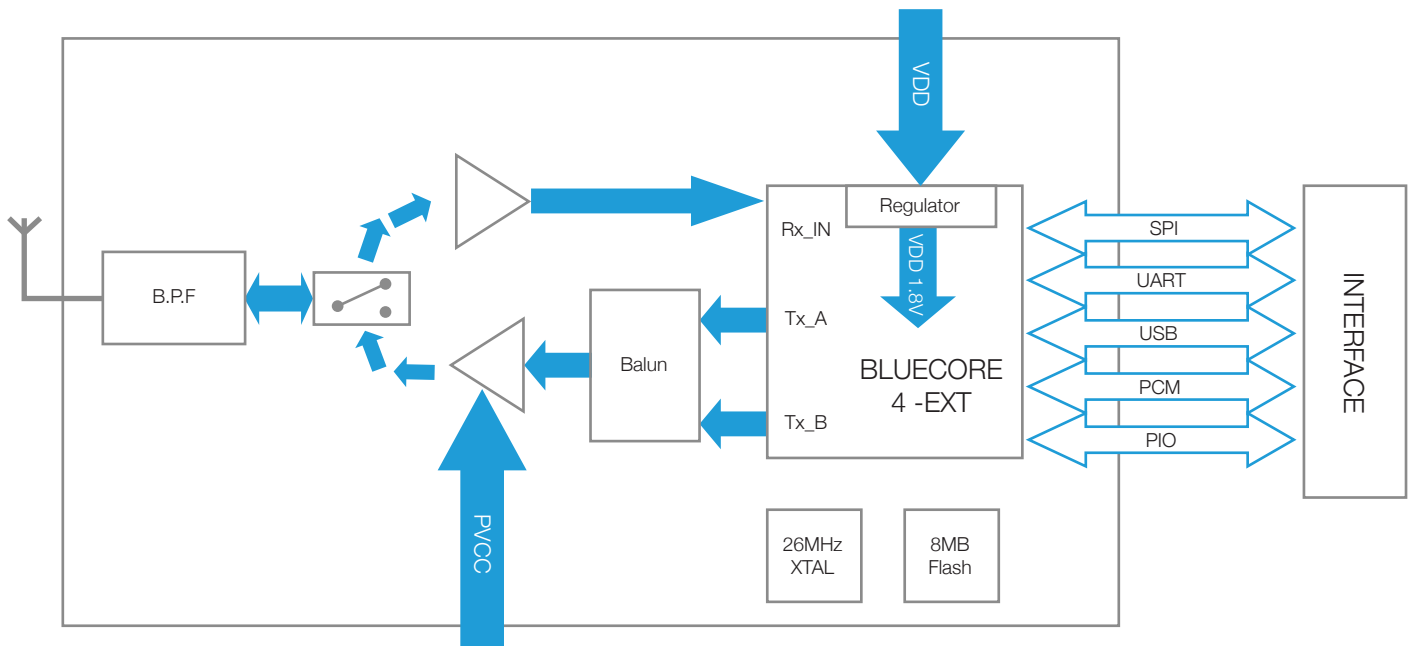


Note: USB and PCM interface are not handled by LM firmware at present

## Factory Settings

The factory settings of the COM Port are as follows:

| | |
|---|---|
| Baud Rate | 19200 bps |
| Data Bits | 8 |
| Parity | None |
| Stop Bits | 1 |
| Flow Control | Hardware (BT2.0) or None (BT2.1) |

## Electrical Characteristics   Absolute Maximum Ratings

| Parameter | Min | Max | Units |
|---|---|---|---|
| Storage Temperature | -40 | +85 | °C |
| Supply Voltage (VDD) | +2.7 | +3.6 | V |
| Supply Voltage (PVCC) | +3.0 | +3.6 | V |
| All other pins | VSS - 0.4 | VDD+0.4 | V |

## Electrical Characteristics   Recommended Operating Conditions

| Parameter | Min | Max | Units |
|---|---|---|---|
| Storage Temperature | -20 | +75 | °C |
| Supply Voltage (VDD) | +3.0 | +3.3 | V |
| Supply Voltage (PVCC) | +3.0 | +3.3 | V |

## Dimensions   All measurements in mm
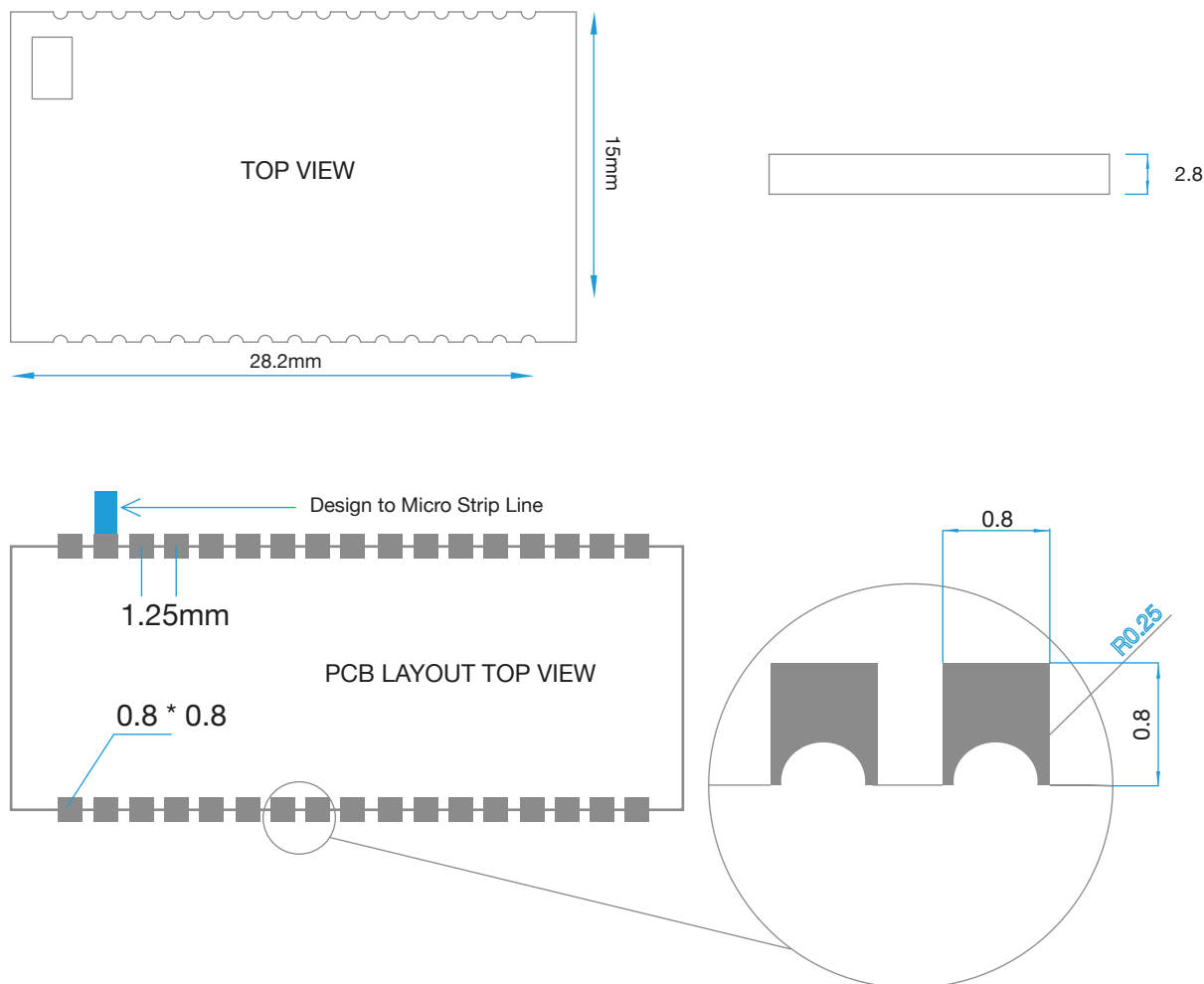
TOP VIEW

15mm

28.2mm

2.8

Design to Micro Strip Line

1.25mm

PCB LAYOUT TOP VIEW

0.8 * 0.8

0.8

R0.25

0.8

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### Class 1 BC04, 8MB Flash, Up to 100m

Product     LM072
Part No     072-0110
Revised     03/MAR/2015

## FCC Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

### NOTE 1

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

### NOTE 2

Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

### Note 1

This module certified that complies with RF exposure requirment under portable or mobile or fixed condition, this module is to be installed only in portable or mobile or fixed applications.

A portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

### Note 2

Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

### Note 3

The device must not transmit simultaneously with any other antenna or transmitter.

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## FCC Radiation Exposure Statement (Continued)

### Note 4

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module
is integrated with the host, LM Technologies Ltd shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

### Note 5

FCC ID label on the final system must be labeled with "Contains FCC ID: VVXLM072" or "Contains transmitter module FCC ID: VVXLM072".

The transmitter module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the host product. LM Technologies Ltd is responsible for the compliance of the module in all final hosts.

## Application Schematic
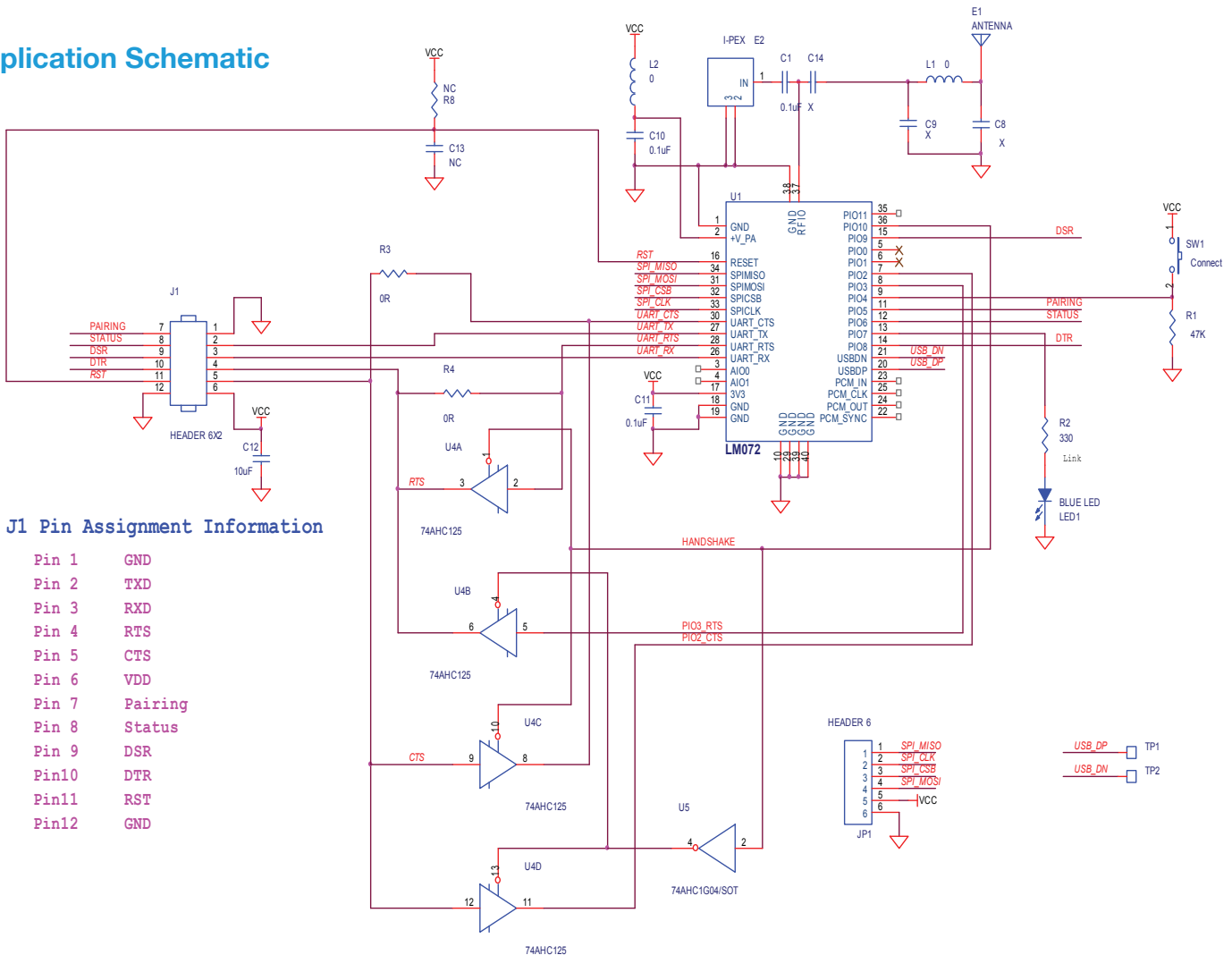


### J1 Pin Assignment Information

| Pin   | Assignment |
| ----- | ---------- |
| Pin 1 | GND        |
| Pin 2 | TXD        |
| Pin 3 | RXD        |
| Pin 4 | RTS        |
| Pin 5 | CTS        |
| Pin 6 | VDD        |
| Pin 7 | Pairing    |
| Pin 8 | Status     |
| Pin 9 | DSR        |
| Pin10 | DTR        |
| Pin11 | RST        |
| Pin12 | GND        |

## Revision History

| | | |
|---|---|---|
| 1.0 | 17/12/2010 | First Version |
| 1.1 | 03/07/2012 | Updated Datasheet |
| 1.2 | 11/07/2012 | Updated Datasheet |
| 1.3 | 02/MAR/2015 | Updated Datasheet |