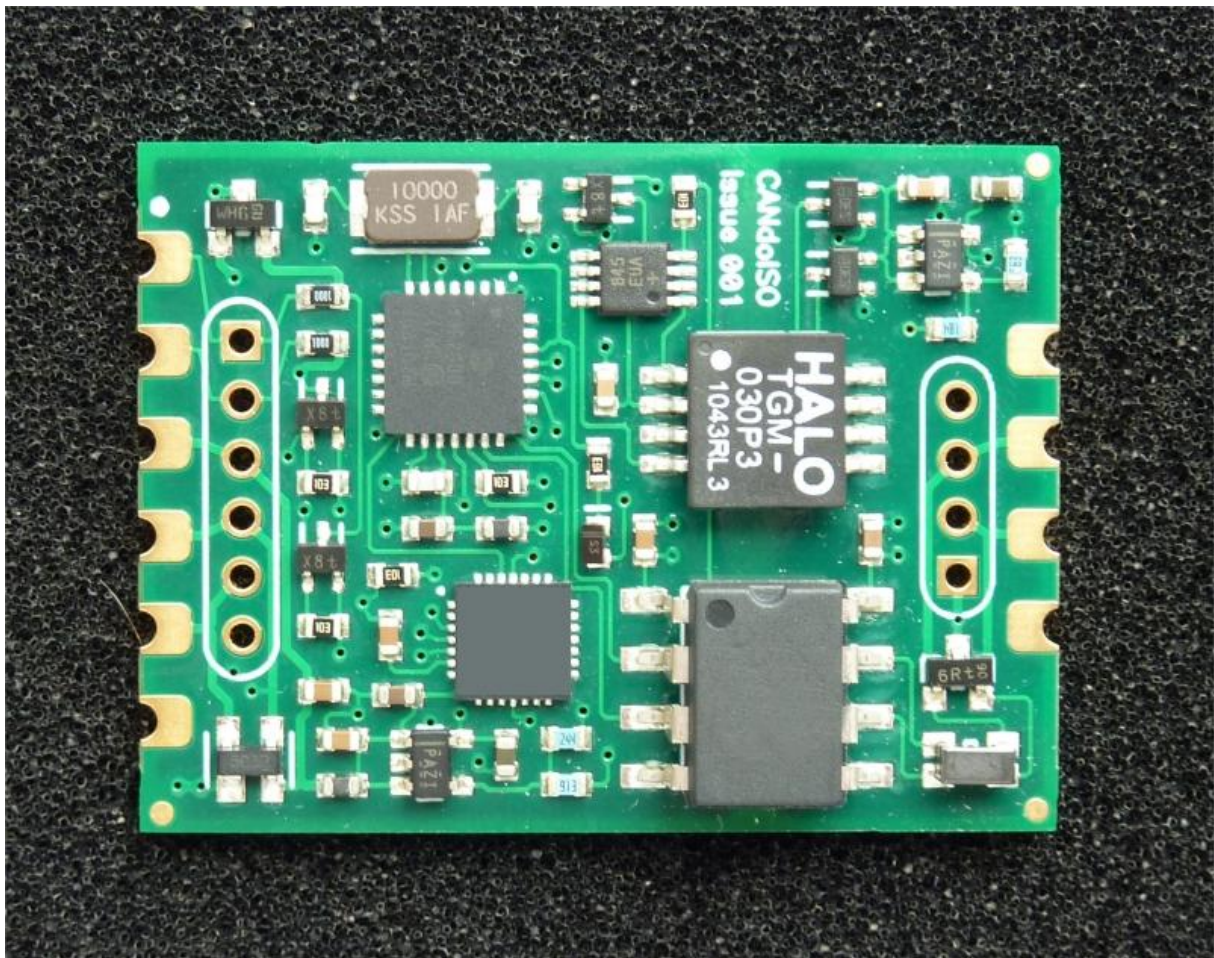


# CANdoISO Module Datasheet

## 1 Overview

The **CANdoISO** Module is an isolated USB to CAN bus interface in a format suitable for SMT or through hole PCB mounting. The module is based on the standard encased version of the **CANdoISO** Interface & is compatible with the **CANdo** SDK & **CANdo** Application software.

- High speed CAN bus ISO11898-2 compliant interface
- Supports 11 bit (CAN 2.0A) & 29 bit (CAN 2.0B) arbitrators
- Receive, status & error messages timestamped
- USB v1.1, v2.0 & v3.0 compatible
- USB self powered
- 500V Galvanic isolation between USB & CAN bus
- SMT & PTH mounting options
- Compact dimensions (40mm x 30mm x 6mm)
- 40MHz CPU clock
- Upgradable firmware
- FREE **CANdo** Application CAN bus analyser software
- FREE **CANdo** SDK



CANdoISO Module

## 2 History

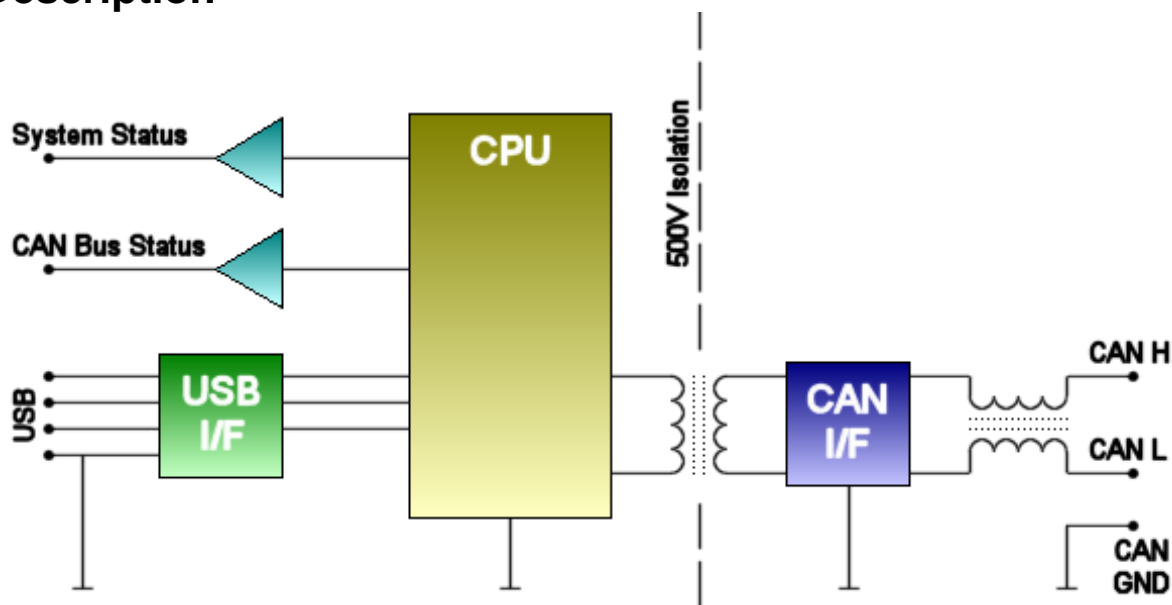
Version	Date	Modifications	Author
1.0	28/06/11	Created	MJB
1.1	14/08/13	Block diagram added	„
1.2	01/08/14	Removed references to OSs	„

### ESD Caution



The **CANdoISO** Module is an electrostatic discharge (ESD) sensitive device. The USB & CAN bus I/O pins are protected against ESD, but mishandling the module during assembly may expose the internal circuit nodes to ESD events. To prevent damage to the module, ESD precautions must be taken during assembly & test.

## Description



CANdoISO Module Block Diagram

The **CANdoISO** Module is a compact USB to CAN bus interface designed for embedded use. The module greatly simplifies the task of interfacing between a CAN bus & a PC. The low powered module derives its power from the USB port of the PC. The module provides an isolation barrier between the CAN bus & the USB port, to prevent ground loops or leakage currents that may cause damage to inter-connected equipment.

### 2.1 USB I/F

The 'USB I/F' provides power & communication to the module when connected to a PC. The module requires no other power source, as all the power is taken from the 'USB I/F'. Various applications are available to communicate with the module via the 'USB I/F' –

- **CANdo** Application software – converts the module into a CAN bus analyser
- **CANdo** SDK – allows the module to be integrated into 3<sup>rd</sup> party applications
- **CANdo** Programmer – allows firmware within module to be upgraded or customised

### 2.2 Status

The status outputs are the digital equivalent of the status LEDs in the **CANdoISO** Interface. These are open drain outputs referenced to GND & as such only sink current to GND, thus requiring a pull up to VUSB or other +ve supply. The 'System Status' indicates the power & error status of the module. The 'CAN Bus Status' indicates the reception & transmission of messages on the CAN bus.

Status Outputs		
Output State	Module Status	
System Status	VUSB/+ve	No power to module
	Toggling	System error
	GND	System OK
CAN Bus Status	VUSB/+ve	High CAN bus load
	Toggling	CAN messages received/transmitted
	GND	No CAN messages received or transmitted

### 2.3 CPU

The **CANdoISO** Module serves as a USB to embedded CAN bus interface & maybe used to view, analyse & transmit CAN messages on the CAN bus using a PC, with either the **CANdo** Application software or the **CANdo** SDK. Using the **CANdo** SDK, custom programs may be written to perform

specific tasks, such as downloading software over the CAN bus to an ECU or requesting & displaying OBD data from a vehicle.

## 2.4 CAN I/F

The CAN interface provides the electrical connection to the CAN bus & is electrically isolated from the other parts of the module by a 500V barrier. This isolation allows the module to be connected to the CAN bus in a safe manner, especially where higher voltages exist.

If isolation between the 'USB I/F' & the 'CAN I/F' is not required in the end application, then the 'GND' & 'GNDISO' connections may be joined.

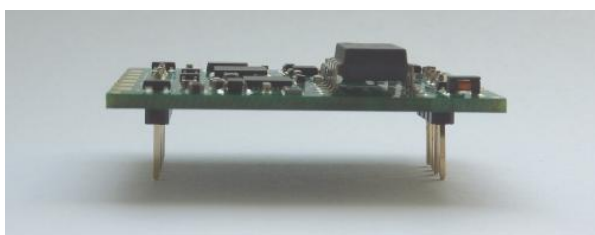
## 2.5 Mounting

The module is designed so that it may be mounted in a variety of ways. Using the gold plated castellated edge pads at each end of the PCB, the module may be soldered directly onto another PCB as an SMT style component. This method minimises the total height of the assembly.



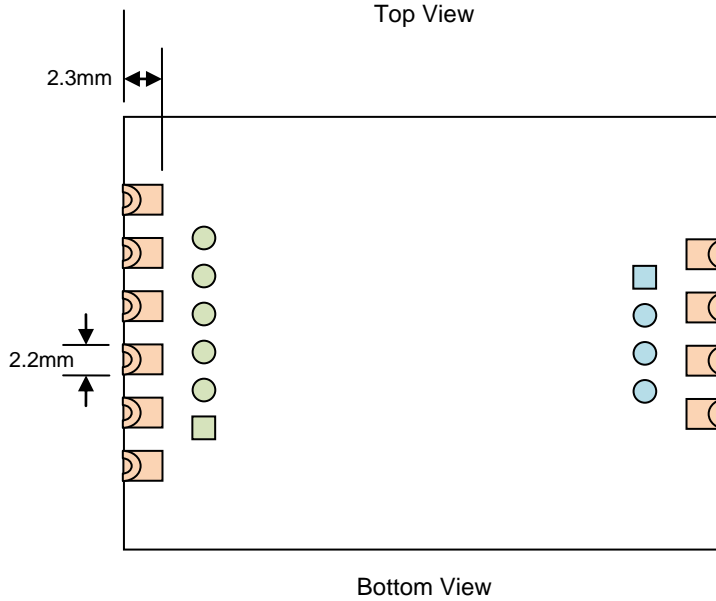
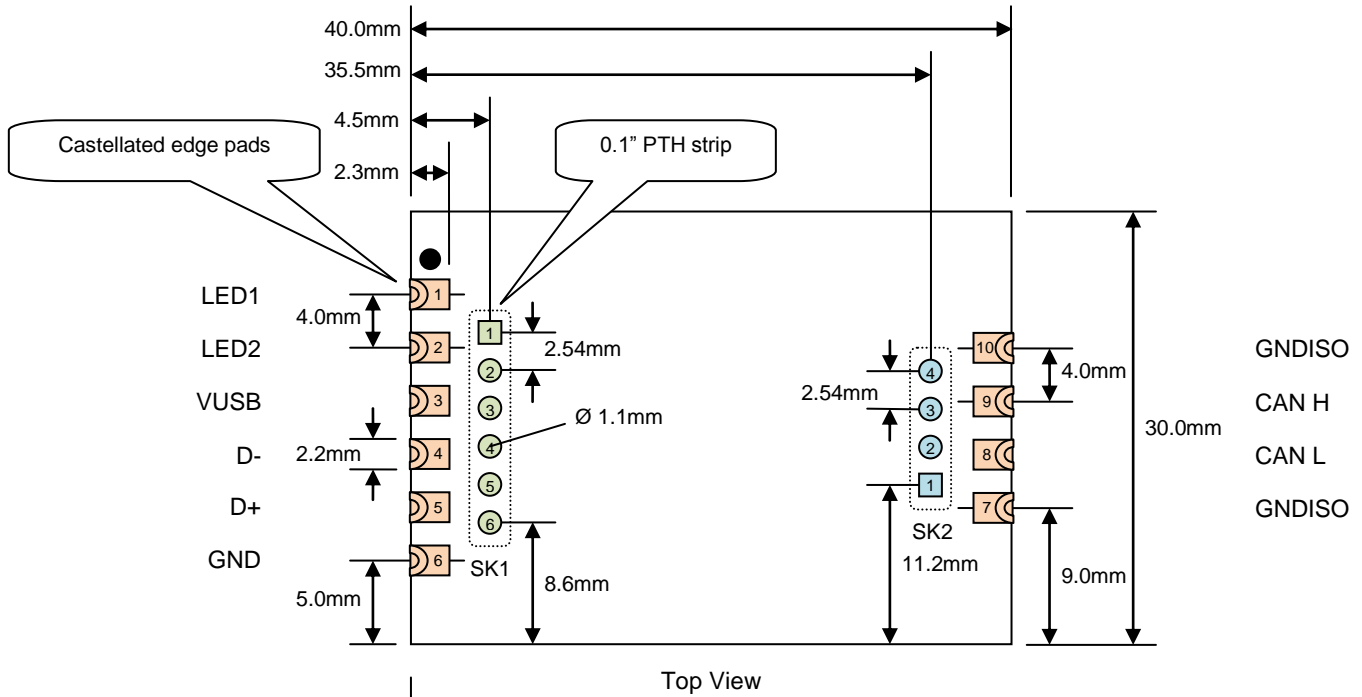
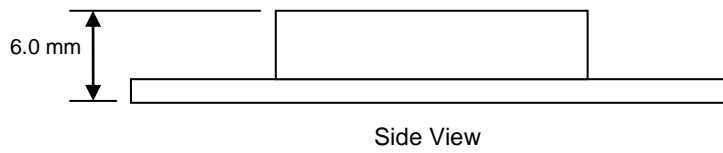
Castellated edge pads for SMT style mounting

The same I/O connections that are present on the castellated edge pads, are also available on 2 strips of 0.1" plated through holes (PTHs), one at each end of the PCB. These PTHs are suitable for taking either 0.1" header strips or for direct wire connections.



0.1" header strips fitted

### 3 Dimensions & Pinning Information

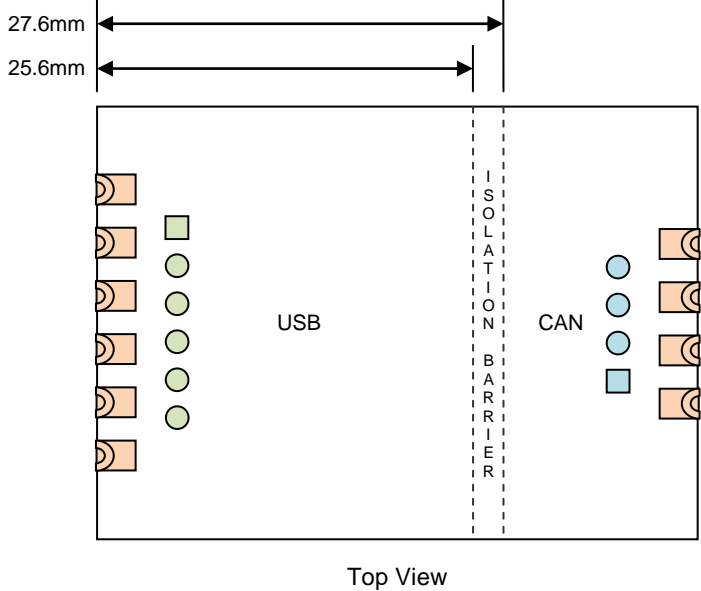


EDGE PAD NO.	SK1 PIN NO.	SIGNAL
1	1	LED1 (Power/Status)
2	2	LED2 (CAN Activity)
3	3	VUSB
4	4	D-
5	5	D+
6	6	GND

EDGE PAD NO.	SK2 PIN NO.	SIGNAL
7	1	GNDISO
8	2	CAN L
9	3	CAN H
10	4	GNDISO

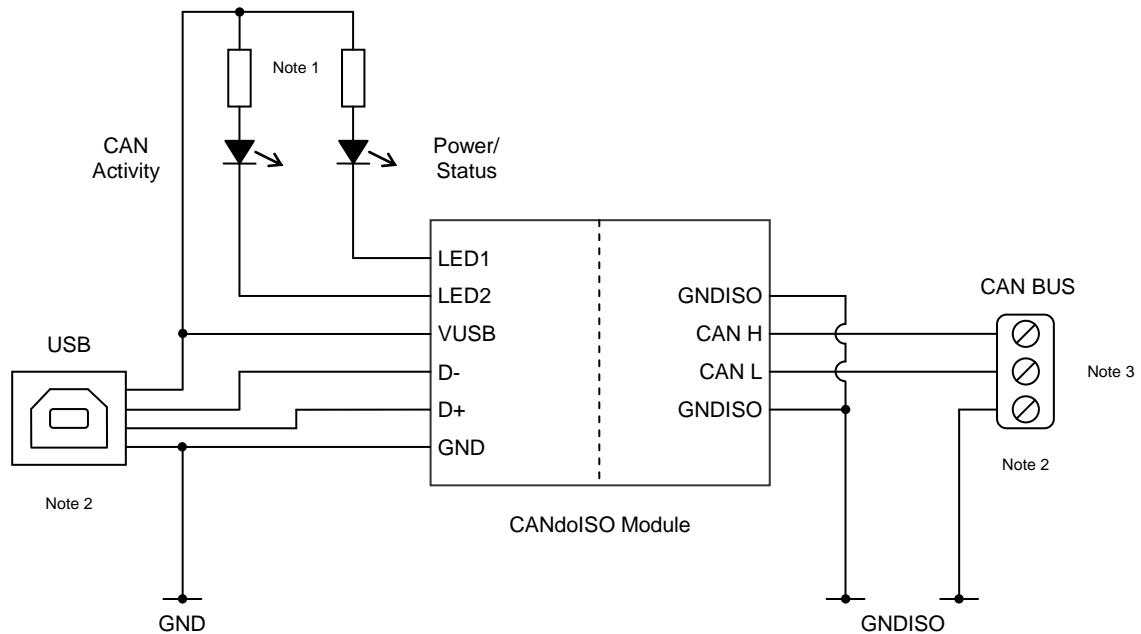
# 4 Isolation Barrier

The CANdoISO Module provides galvanic isolation between the USB & CAN bus I/O pins. If this isolation is required in the end application, then care must be taken in embedding the module to ensure that the isolation barrier is kept intact & not externally bridged by any conductors. The diagram below details the position & size of the isolation barrier within the module.



## 5 Application Information

The diagram below shows the CANdoISO Module in a typical application circuit.



Note 1 : If the LEDs are powered from the VUSB supply, then the total LED current must not exceed 10mA. For higher currents use an external power supply.

Note 2 : The USB & CAN bus I/O pins are ESD protected within the module.

Note 3 : Each end of the CAN bus must be terminated by a 120 Ohm resistor. The CANdoISO module contains no internal CAN bus termination.

The LED1 & 2 outputs are open drain & sink current to GND only. The LEDs maybe powered from an external power supply (referenced to GND) for higher currents than the USB power supply supports. If only logic level signals are required for the Power/Status & CAN Activity O/Ps (LED1 & 2 O/P respectively), then only the pull up resistors shown above are required & the LEDs maybe omitted.

## 6 Electrical Characteristics

Parameter	Min.	Typ.	Max.	Units
<b>USB</b>				
USB supply voltage	4.5	-	5.5	V
USB supply current	-	65	100	mA
USB suspend current	-	350	500	uA
<b>LED</b>				
Voltage range relative to GND	0	-	20	V
Current sink to GND	0	-	80	mA
Short circuit output current	-	-	200	mA
<b>CAN</b>				
Bus output voltage - dominant state				
CAN L	0.8	1.2	1.5	V
CAN H	2.9	3.5	4.5	V
Bus output voltage - recessive state				
CAN L	2.0	2.3	3.0	V
CAN H	2.0	2.3	3.0	V
Common mode range relative to GNDISO	-27	-	40	V
Short circuit output current	-110	-	110	mA
<b>Isolation</b>				
USB to CAN bus	500	-	-	V

## 7 Environmental

Parameter	Min.	Typ.	Max.	Units
Operating temperature range	-20	-	80	°C
Storage temperature range	-40	-	120	°C