

IMP001-US-B Datasheet

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| | |
|------------------------------|---|
| DiGi Electronics Part Number | IMP001-US-B-DG |
| Manufacturer | Electric Imp Inc. |
| Manufacturer Product Number | IMP001-US-B |
| Description | IMP 802.11B/G/N NODE CARD |
| Detailed Description | RF Transceiver, WLAN 2.4GHz 802.11 b/g/n I2C, SPI, UART 1Mbps |

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Purchase and inquiry

Manufacturer Product Number:

IMP001-US-B

Series:

-

Function:

Transceiver, WLAN

Frequency:

2.4GHz

Interface:

I2C, SPI, UART

Power - Output:

16.75dBm

Features:

LED Indicator

Base Product Number:

IMP001

Manufacturer:

Electric Imp Inc.

Product Status:

Not For New Designs

Modulation or Protocol:

802.11 b/g/n

Applications:

Wireless LAN

Sensitivity:

-97dBm

Data Rate (Max):

1Mbps

Voltage - Supply:

1.8V ~ 3.6V

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

ECCN:

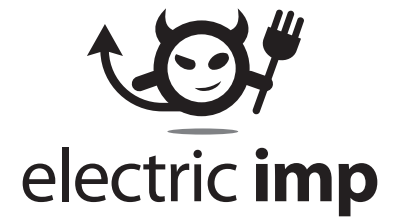
5A991B

Moisture Sensitivity Level (MSL):

1 (Unlimited)

HTSUS:

8517.62.0090



specification: imp001

version 20130611

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1. Product description

1.1 General description

The imp is a complete wireless network node in a module. It is available both in a memory card form-factor (imp001) and in a solder-down module form-factor (imp002). It works in conjunction with the imp service to allow easy connection of any device to the internet.

One of the big advantages of having WiFi inside an user-removable card is all the wireless regulatory approvals happen at the card level. This relieves the need for wireless regulator certification at the product level.

1.2 Features

- 802.11 b/g/n WiFi
 - 20MHz 11n channels, 1 x 1
 - +16.75dBm max output power (802.11b)
 - -97dBm typical sensitivity (1Mbps)
 - Integrated antenna with 2.5dBi max gain
- 32-bit Cortex M3 processor
 - Robust embedded operating system with fail-safe firmware updates
 - Virtual machine for vendor firmware
- Embedded bi-color red/greenLED for status indication
- Embedded phototransistor for our patent-pending BlinkUp optical configuration technology
- 6 user selectable I/Os
 - GPIO, PWM, Analog input & output
 - SPI (2 channels), UART (3 channels), I2C (2 channels)
- Low power 6uA sleep mode
- FCC, CE, IC C-Tick certified

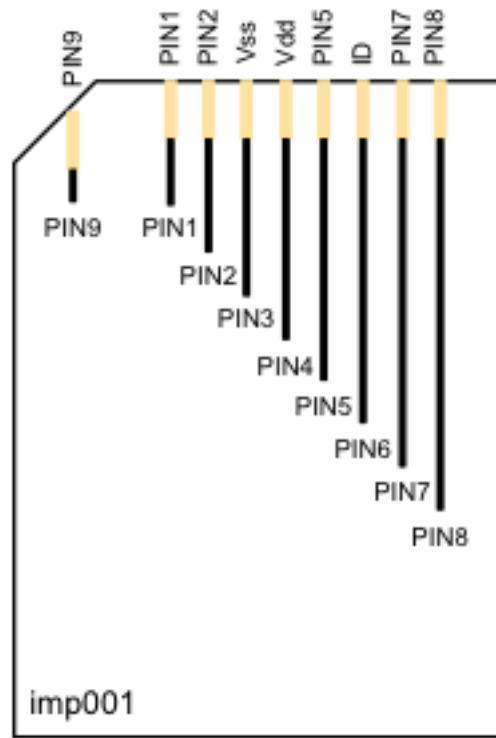
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2. imp terminology

| Term | Description |
|---------------|--|
| API | The Application Programming Interface through which imp scripts may access hardware and cloud functions |
| BlinkUp | Our patent-pending optical programming process for commissioning an imp using a smart device (phone or tablet) |
| Commissioning | Initializing an imp by associating it with a user account and WiFi credentials, usually via BlinkUp |
| electric imp | http://electricimp.com/aboutus/ (lower case by brand convention) |
| Planner | The imp cloud service which provides for the connection and configuration of imps and gateway communication with other devices |
| Registration | The process by which an imp card or module becomes associated with host hardware |
| Server | The electric imp cloud service with which imps communicate |
| Firmware | Vendor provided code that runs within the imp's virtual machine |
| Agent | Vendor provided code that runs within the imp service |

3. Pin assignments

Back view (gold fingers facing up)



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4. Pin description

| Pin number | Pin name | Description |
|-------------------|------------------|-------------------------------------|
| 3 | VSS | Ground |
| 4 | VDD | Power input |
| 1, 2, 5, 7, 8 & 9 | PIN1,2,5,7,8 & 9 | I/O, please refer to Pin mux table |
| 6 | ID | Connects to the Atmel ATSHA ID chip |

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5. Pin mux

In addition to acting as a GPIO, each pin on the imp001 can be configured to one of several specialized functions. While pins may only have one function at a time, they may be reconfigured during run-time to change function as needed. For example, a pin may first be configured as a DAC and then reconfigured as an ADC. Additionally, not all the pins in a hardware function need to be assigned to that function. For example, pins 8 and 9 could be used as UART and pins 1 and 2 could be used as I2C.

All I/O pins are initially tri-stated.

The imp001 can be woken from low power sleep mode with a rising edge on PIN1. If this signal is pulsed, the minimum pulse width is 20ms.

| Pin | GPIO | UART | I2C | SPI | DAC | ADC | PWM | Pulse Count | Wake |
|------|------|---------------|--------|-----------|-----|-----|-----|-------------|------|
| PIN1 | Yes | U1-CTS, U3-TX | I1-SCL | SPI1-SCLK | Yes | Yes | Yes | Yes | Yes |
| PIN2 | Yes | U1-RTS, U3-RX | I1-SDA | SPI2-MISO | | Yes | Yes | | |
| PIN5 | Yes | U2-TX | | SPI2-SCLK | Yes | Yes | Yes | | |
| PIN7 | Yes | U2-RX | | SPI2-MOSI | | Yes | Yes | | |
| PIN8 | Yes | U1-TX | I2-SCL | SPI1-MOSI | | Yes | Yes | | |
| PIN9 | Yes | U1-RX | I2-SDA | SPI1-MISO | | Yes | Yes | | |

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7. Electrical characteristics

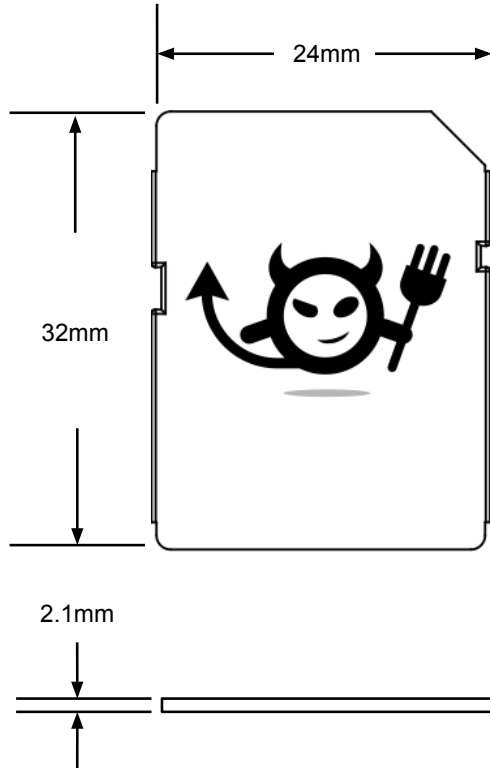
| Parameter | Condition | Min | Typ | Max | Unit. |
|---------------------------|---|--------------------|-----|--------------------|-------|
| Operating temperature | | -20 | | 55 | °C |
| V_{DD} | Operating voltage | 1.8 ^[1] | 3.3 | 3.6 | V |
| I_{DD} | Normal operation, WiFi on | | 80 | 400 ^[2] | mA |
| | Normal operation, WiFi power-save mode enabled | | 5 | 400 ^[2] | mA |
| | WiFi is off, processor sleep, RTC on, nvram preserved | | 6 | | μA |
| V_{IH} | I/O input high level voltage | $0.7V_{DD}$ | | 3.6 | V |
| V_{IL} | I/O input low level voltage | $V_{SS}-0.3$ | | $0.3V_{DD}$ | V |
| I_{OUT} | Maximum current drive on I/O pins | -4 | | 4 | mA |
| I/O input leakage current | $V_{SS} \leq V_{IN} \leq V_{DD}$ | | | 4 | μA |
| Load capacitance | Pins 1 to 9 | | 20 | | pF |

[1] WiFi requires 2.5v minimum for operation, but user code can run at 1.8v. The POWER_EN pin is driven to enable an external boost converter that will provide 2.5v+ during WiFi usage.

[2] 400mA current is during worst-case TX events. These are a maximum of ~4.8ms long (802.11b 1Mbps)

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8. Package outline

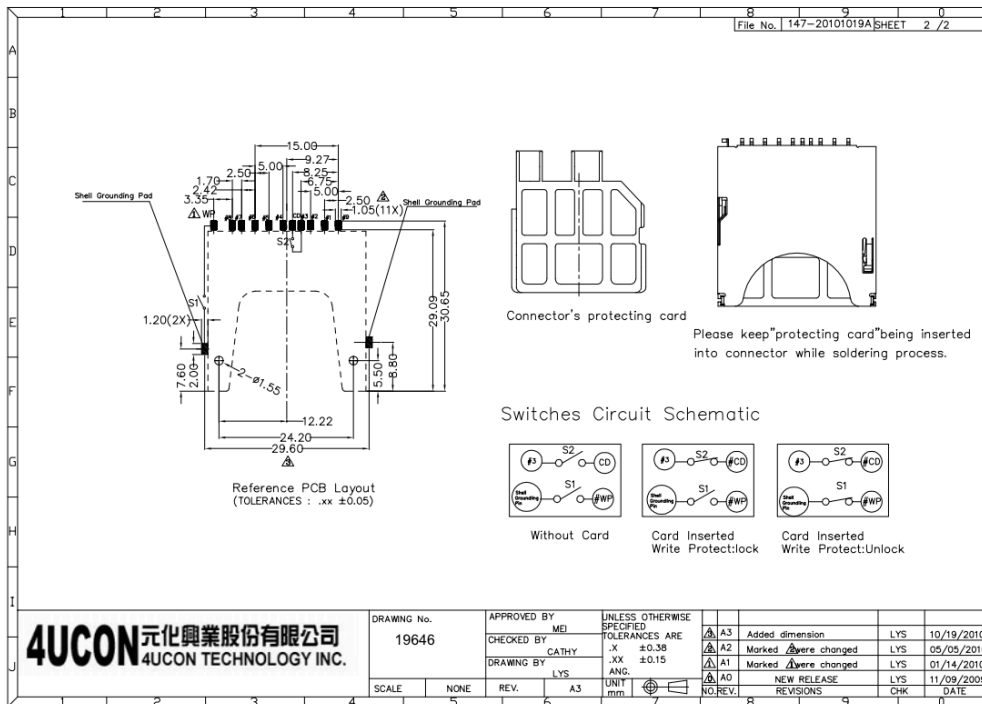
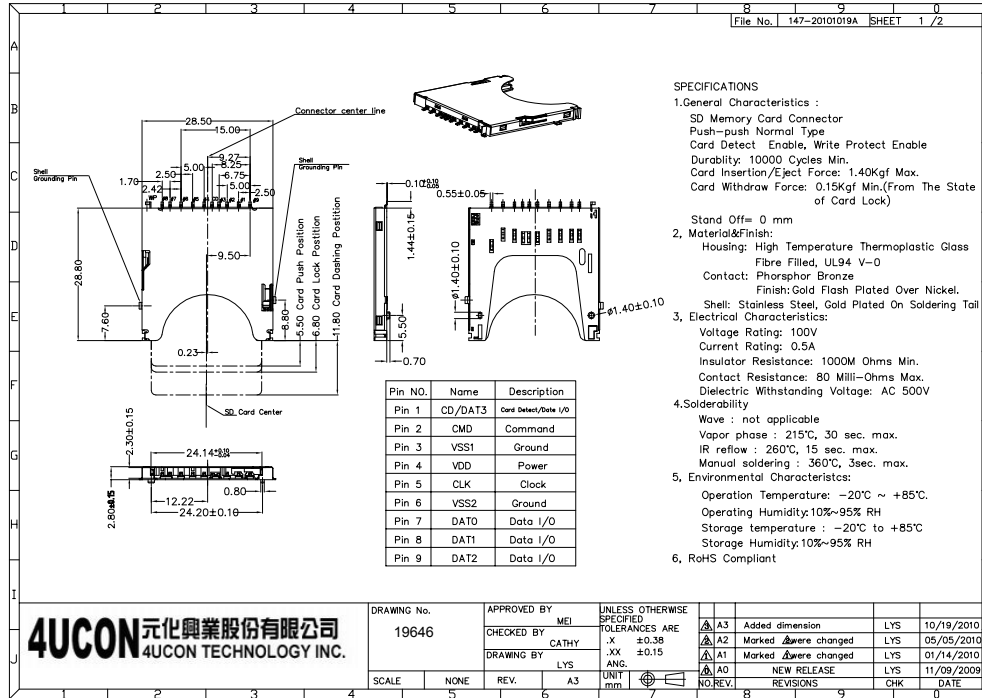


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9. Recommended socket

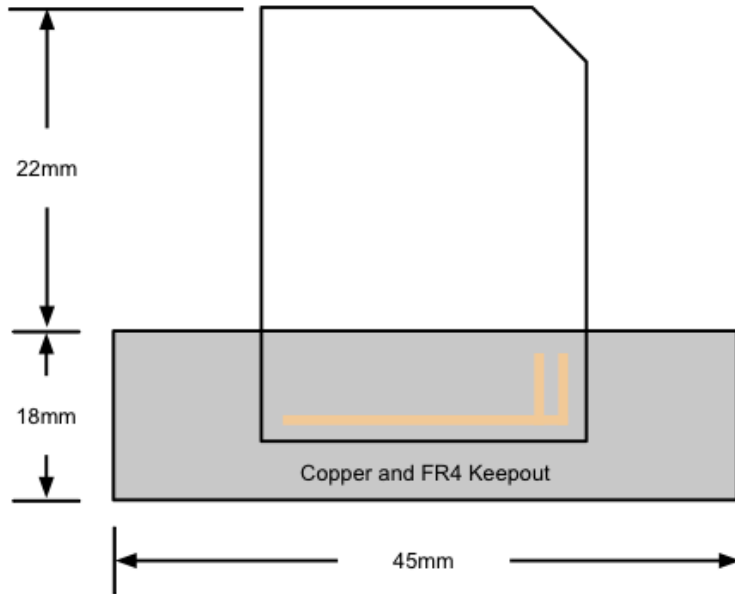
Manufacturer = 4UCON

Part number = 19646



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10. Layout recommendations



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| Version | Change description |
|----------|---|
| 20130419 | added recommended layout |
| 20130611 | update electrical characteristics table |
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