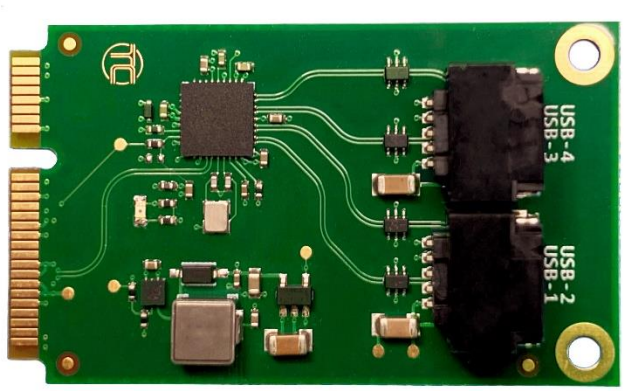
4-Port USB Hub PCIe Mini Card

Features

- 4 High Speed USB 2.0 Expansion Ports
- Positive-Locking USB Port Connector
- 500mA Current Limit for each USB Port
- ESD Protection ±4 kV on all USB Signals
- Supports Low Power USB Suspend Mode
- -40°C to +85°C Operating Temperature
- Lead-Free and RoHS Compliant
- Made in the USA



Description

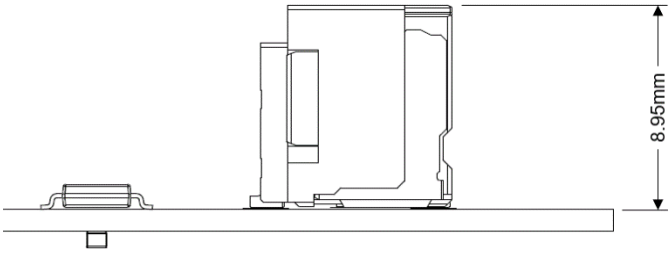
TC-001-01 is a rugged, high performance full size PCIe Mini Card which adds 4 high speed USB 2.0 ports to any embedded system or computer. Each downstream port is backwards compatible with Full Speed and Low Speed devices, and supports all standard USB devices including flash drives, wireless controllers, audio devices, keyboards and mice.

TC-001-01 is fully compliant with USB 2.0 specifications, utilizing one of the highest performance IC hubs on the market. Robust ESD protection on all USB ports and flexible grounding configurations ensures operation in harsh electrical environments. The Molex Micro-Lock Plus connector provides the highest reliability in cable retention and sets the TC-001-01 apart from other products in its class. An audible positive-locking connector and large metal solder tabs ensure a solid, reliable connection in high vibration and industrial temperature environments.

PCIe Mini Card Height

TC-001-01 is a standard 30.00mm x 50.95mm full size PCIe Mini Card. It is designed with bottom-side clearance of less than 1.35mm to ensure compatibility with any full size PCIe Mini Card slot. The top-side of the card features a Molex Micro-Lock Plus connector. This connector has a height of 8.95mm and should be accounted for in the mechanical system design.

Contact Tracer Circuits for product customization information, including single-row connector and low-profile connector options.



Specifications

General

PARAMETER	VALUE
Upstream Interface	USB 2.0 High Speed (480 Mbit/s)
4x Downstream Interfaces	USB 2.0 High Speed (480 Mbit/s)
USB Battery Charging	Not Supported
Removable Port Configuration	All Ports Set as Removable
Port Power Control	Individual Port Control
Port Overcurrent Protection	Individual Port Protection

Electrical

PARAMETER	MIN	TYP	MAX	UNIT
PCIe Mini Card Input Voltage		3.3		V
Operating Power: USB Suspend Mode		40		mW
Operating Power: 0 Active Downstream Ports		200		mW
Operating Power: 4 Active Downstream Ports		260		mW
VBUS Voltage		5.0		V
USB Port Current Limit		500	850	mA

NOTE: Typical operating power measured at 25°C. Excludes downstream power draw from VBUS.

Mechanical

PARAMETER	VALUE	UNIT
Dimensions	30.00 x 50.95	mm
Weight	0.21	oz
Board Connector	Molex 5054482071	
Mating Connector Housing	Molex 5054322001	
Mating Crimp Terminals (Tin-Bismuth Plating)	Molex 5054311000	

Environmental

PARAMETER	MIN	TYP	MAX	UNIT
Operating Temperature	-40		85	°C
Relative Humidity (non-condensing)	5		95	%
Electrostatic Discharge Rating (Human Body Model)		±4		kV

Pin Configuration and Functions

CONNECTOR	PORT	PIN	I/O	SIGNAL DESCRIPTION
J1	USB-4	1	Bidirectional	High Speed USB-4 Positive Data (DP)
		2	GND	Ground
		3	Bidirectional	High Speed USB-4 Negative Data (DM)
		4	Output	USB-4 VBUS (5V)
		5	GND	Ground
	USB-3	6	GND	Ground
		7	Bidirectional	High Speed USB-3 Positive Data (DP)
		8	GND	Ground
		9	Bidirectional	High Speed USB-3 Negative Data (DM)
		10	Output	USB-3 VBUS (5V)
	USB-2	11	Bidirectional	High Speed USB-2 Positive Data (DP)
		12	GND	Ground
		13	Bidirectional	High Speed USB-2 Negative Data (DM)
		14	Output	USB-2 VBUS (5V)
		15	GND	Ground
	USB-1	16	GND	Ground
		17	Bidirectional	High Speed USB-1 Positive Data (DP)
		18	GND	Ground
		19	Bidirectional	High Speed USB-1 Negative Data (DM)
		20	Output	USB-1 VBUS (5V)

VBUS Power

The TC-001-01 is capable of providing 500mA of current to each USB port, for a total output power of 10W across 4 ports. Because the PCIe Electrical Specifications limits the maximum sustained power draw of a PCIe Mini Card to 3.6W, it is critical to verify the power capacity of carrier board and PCIe Mini Card slot being used with the TC-001-01. Some carrier boards may not provide more than the required 3.6W of power to the TC-001-01. All power is sourced from the 3.3Vaux power rail of the carrier board.

Ground Pins

Each USB port on the TC-001-01 provides two identical ground signals that are directly connected together. This design allows flexibility for a USB ground wire and a USB shield drain wire. Some devices may not require a shield, such as USB 1.0 Low Speed devices, in which case the second ground pin can be left unconnected. Grounding and shielding are dependent on each system's unique design, but in most cases connecting both the USB ground wire and the USB shield drain wire to the TC-001-01 is recommended.

Hardware Reset Configuration

Following PCIe Electrical Specifications, the TC-001-01 uses the PERST# signal to hold all card functions in reset until the PCIe power rails have reached their nominal voltage levels. This signal can be pulled low at any time to reset all card functions and registers. Because the TC-001-01 uses a USB 2.0 upstream interface and does not use a PCIe link, the PERST# can be electrically disconnected with a resistor modification, if required.

Contact Tracer Circuits for product customization information, including factory loaded resistor options.