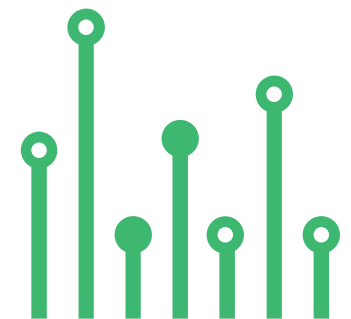THE

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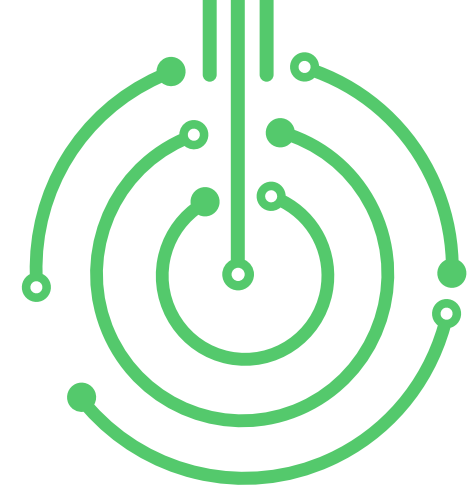Open Source Hardware Electronics Projects

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Isolated USB Repeater - USB2.0

SKU: EL148185

Isolated USB Repeater - USB2.0

The project presented here is a USB port-powered, USB 2.0 isolator that isolates the USB host and USB device. It is a galvanically-isolated USB2.0 repeater, that supports low speed 1.5Mbps, and full speed 12Mbps communication. The project automatically connects and detects the bus speed. This USB 2.0 isolator is efficiently powered from the USB port and requires no external power, on board isolated DC-DC converter U1 provides 5V to the other side of the circuitry and USB port. U2 LDO provides 3.3V to the chip. L1 and L2 ferrite beads take care of noise immunity on the DC bus. The project protects the host USB port from noise and high voltage.

> **Note:** Output USB Connector CN3 can supply 5V to an external USB device, DC-DC converter can output a maximum 400mA. The user must take care not to overload the Output of the USB Power, the load has to be within 400mA. The output of USB is isolated and continuously protected from short circuits.

FEATURES

- Compliant to USB 2.0
- Supports low speed (1.5 Mbps) and full speed (12 Mbps) signaling
- Automatic speed and connection detection
- Supports L1 (sleep) and L2 (suspend) low-power states
- Supports automatic role reversal for USB On-The-Go (OTG) and Type-C® Dual Role Port (DRP) designs
- VBUS voltage range: 4.25 V to 5.5 V (Power Supply from USB Port)
- Meets CISPR32 class B emissions limits
- Ambient temperature range: –40°C to +125°C
- Safety-related certifications:
- 7071-VPK VIOTM and 2121-VPK VIORM (Reinforced) per DIN EN IEC 60747-17 (VDE 0884-17)
- 5000-VRMS isolation for 1 minute per UL 1577
- IEC 62368-1, IEC 60601-1 and IEC 61010-1 certifications
- CQC, TUV and CSA certifications
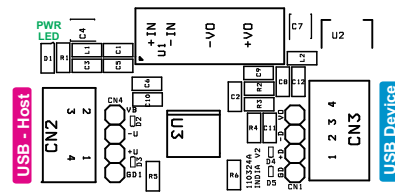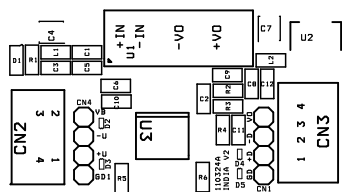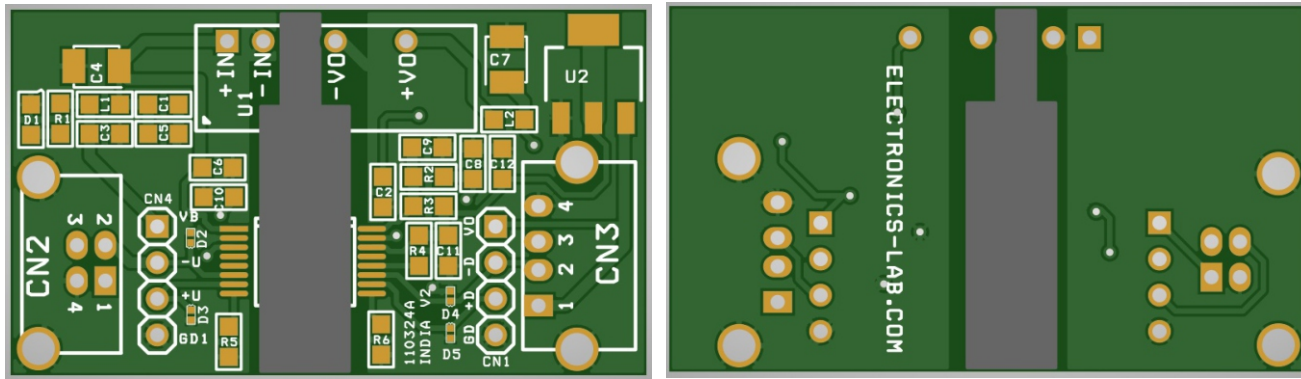- PCB Dimensions 44.77X25.72MM
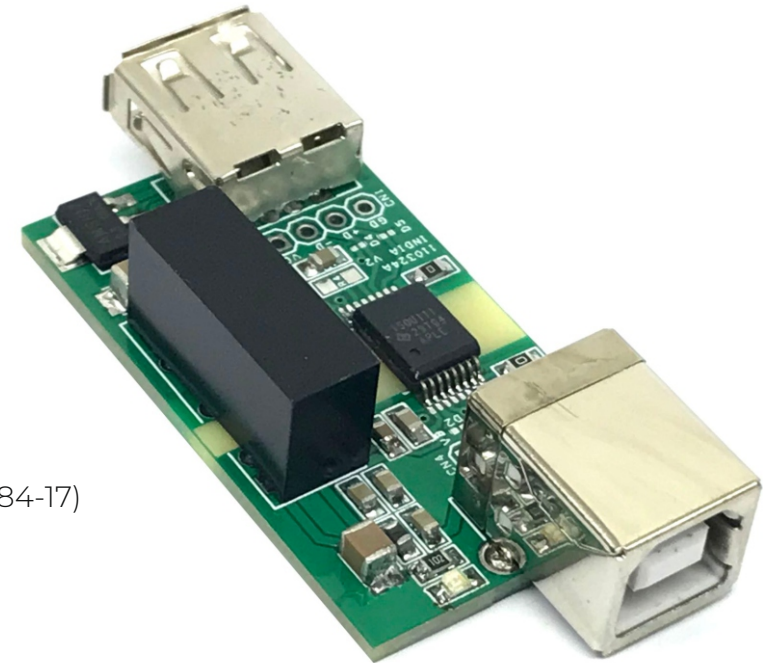
FEATURES OF DC-DC Converter

- Continuous short-circuit protection
- Input 5V DC
- Output 5V DC
- Maximum Load Current 400mA
- No-load input current as lowas 8mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency upto 86%
- High power density
- I/O isolation test voltage 1.5kVDC

The ISOUSB111 is a galvanically-isolated USB 2.0 compliant repeater supporting low speed (1.5 Mbps) and full speed (12 Mbps) signaling rates. The device supports automatic connect and speed detection, reflection of pull-ups/pull-downs, and link power management allowing drop-in USB hub, host, peripheral, and cable isolation. The device also supports automatic role reversal – if after disconnect, a new connect is detected on the Upstream facing port, then the Upstream and Downstream port definitions are reversed. This feature enables the device to support USB On-The-Go (OTG) and Type-C Dual Role Port (DRP) implementations. This device uses a silicon dioxide (SiO2) insulation barrier with a withstand voltage of up to 5000 VRMS and a working voltage of 1500 VRMS. Used in conjunction with isolated power supplies, the device protects against high voltage and prevents noise currents from the bus from entering the local ground. The ISOUSB111 device is available for reinforced isolation. It supports a wide ambient temperature range of –40°C to +125°C.
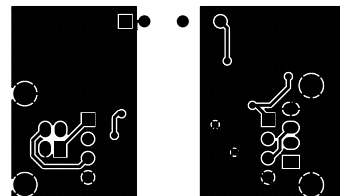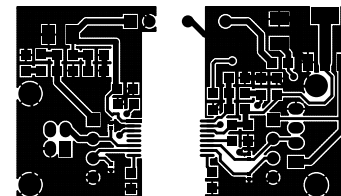
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Schematic

Connections

Open Source Hardware Projects

PCB

PCB GERBER FILES AVAILABLE

SILK SCREEN TOP

BOTTOM LAYER

PCB DIMENSIONS 44.77X25.72MM

TOP LAYER

Parts List

NO	QNTY	REF	DESC	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
			BOM			
1	4	CN1,R2,R4,CN4	DNP			DO NOT INSTALL
2	1	CN2	USB-B (USB TYPE-B)	MOLEX		WM17113-ND
3	1	CN3	USB-A (USB TYPE-A)	MOLEX		WM4993-ND
4	3	C1,C2,C12	1uF/25V CERAMIC SMD SIZE 0805	YAGEO/MURATA		
5	6	C3,C5,C8,C9,C10,C11	100nF/50V CERAMIC SMD SIZE 0805	YAGEO/MURATA		
6	2	C4,C7	10uF/16V CERAMIC SMD SIZE 1210 OR 1206	YAGEO/MURATA		
7	1	C6	2.2uF/25V CERAMIC SMD SIZE 0805	YAGEO/MURATA		
8	1	D1	LED SMD SIZE 0805	OSRAM		475-1278-1-ND
9	2	L1,L2	LI0805G301R-10 FERRITE BEAD	LAIRD		
10	1	R1	1K 5% SMD SIZE 0805	YAGEO/MURATA		
11	3	R3,R5,R6	0E SMD SIZE 0805	YAGEO/MURATA		
12	1	U1	B0505S-2WR3 DC-DC CONVERTER	MORNSUN AMERICA		2725-B0505S-2WR3-ND
13	1	U2	LM1117-3.3V	TI		LM1117IMPX-3.3/NOPBCT-ND
14	1	U3	ISOUSB111DWXR	TI		296-ISOUSB111DWXRCT-ND
15	4	D2,D3,D4,D5	PESD5V0C1USF OPTIONAL	NEXPERIA	DIGIKEY	1727-PESD5V0C1USFYLCT-ND

Open Source Hardware Projects

Notes

APP

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Android App

DOWNLOAD

Android App launched in 2017 and has 100k+ downloads - rated with 4.5 stars.

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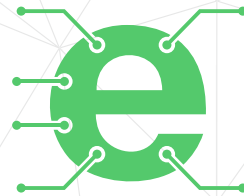
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