

BPI-7402 IEEE 802.3at PoE module

The BPI-7402 series of modules are designed to extract power from a conventional twisted pair Category 5 Ethernet cable, conforming to the IEEE 802.3af and IEEE 802.3at Power-over-Ethernet(PoE) standard.it is 30W POE PD Module (Isolation Model),The BPI-7402 signature and control circuit provides the PoE compatibility signature and power classification required by the Power Sourcing Equipment (PSE) before applying up to 30W power to the port.

The DC/DC converter operates over a wide input voltage range and provides a regulated output. The DC/DC converter also has built-in short-circuit output protection.

Features

- IEEE802.3at and IEEE802.3af compliant
- Maximum 30W output power
- Input voltage range 36V to 57V
- Integral high efficiency DC/DC converter.
- Low output ripple and noise
- High performance with low price
- Short-circuit protection
- Transformer isolation ,1000V isolation (input to output)
- Easy to use, with a minimum number of external components.

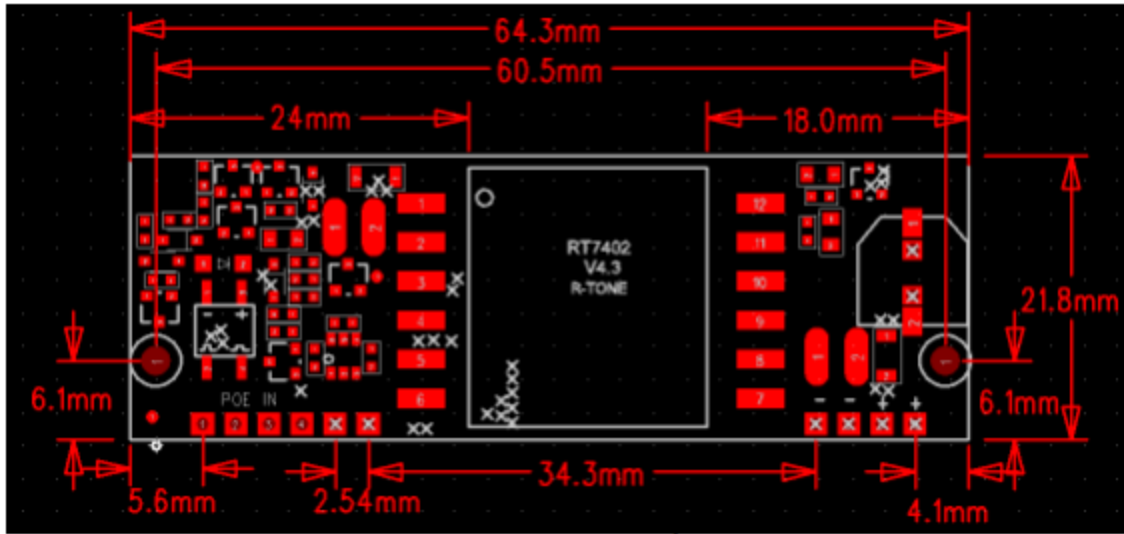
Applications

- IoT gateway
- IP Cameras
- Wireless access point
- Security and alarm systems
- VOIP telephone
- Point of sale network terminal equipment

PBI-7402 PoE Hardware

Module size





Pin Description

BPI-7402 at PoE module		
Pin #	Name	Description
1	VA1	RX Input (1). This input pin is used in conjunction with VA2 and connects to the centre tap of the transformer connected to pins 1 & 2 of the RJ45 connector (RX) - it is not polarity sensitive.
2	VA2	TX Input (2). This input pin is used in conjunction with VA1 and connects to the centre tap of the transformer connected to pins 3 & 6 of the RJ45 connector (TX) - it is not polarity sensitive.
3	VB1	Direct Input (1). This input pin is used in conjunction with VB2 and connects to pin 4 & 5 of the RJ45 connector - it is not polarity sensitive.
4	VB2	Direct Input (2). This input pin is used in conjunction with VB1 and connects to pin 7 & 8 of the RJ45 connector - it is not polarity sensitive.
5	AT-DET+	Internal rectifier bridge output +

6	GND	Internal GND
7	-VDC	DC Return. This pin is the return path for the +VDC output.
8	-VDC	DC Return. This pin is the return path for the +VDC output.
9	+VDC	DC Output. This pin provides the regulated output from the DC/DC converter.
10	+VDC	DC Output. This pin provides the regulated output from the DC/DC converter.

DC Electrical Characteristics

	DC Characteristic	Sym	Min	Typ1	Max	Units	Test Comments
1	Nominal Output Voltage	+VDC	11.5	12.0	12.5	V	
2	Line Regulation	VLINE		0.1		%	@ 50% Load
3	Load Regulation	VLOAD		1		%	@ VIN=48V
4	Output Ripple and Noise	VRN		180		mVp-p	@ Max load2
5	Minimum Load	RLOAD	200			mA	
6	Short-Circuit Duration3	TSC			∞	sec	
7	Efficiency @ 80% Load	EFF		87		%	
8	Isolation Voltage (I/O)	VISO		1500		VPK	Impulse Test
9	Temperature Coefficient	TC		0.02		%	Per °C

Note

- 1: Typical figures are at 25°C with a nominal 48V supply and are for design aid only. Not Guaranteed
- 2: The output ripple and noise can be reduced with an external filter, see application note.
- 3: Continuous short circuit duration is applicable at 25°C ambient temperature in free air. At higher temperatures or with restricted airflow (e.g. in a sealed enclosure) the duration will need to be limited to avoid overheating.

Absolute Maximum Ratings

BPI-7402 PoE module

	Parameter	Symbol	Min	Max	Units
1	DC Supply Voltage	VCC	-0.3	60	V
2	DC Supply Voltage Surge for 1ms	VSURGE	-0.6	80	V
3	Storage Temperature	TS	-40	100	OC

Note 1: Exceeding the above ratings may cause permanent damage to the product. Functional operation under these conditions is not implied. Maximum ratings assume free airflow.

Recommended Operating Conditions

	Parameter	Symbol	Min	Typ	Max	Units
1	Input Supply Voltage ¹	VIN	36	54	57	V
2	Under Voltage Lockout	VLOCK	30		36	V
3	Operating Temperature ²	TOP	-20	25	70	Ta / °C
4	Operating Temperature 30W Continuous	TOP	-20	25	50	Ta / °C
	24W Continuous				70	
	14W Continuous				85	

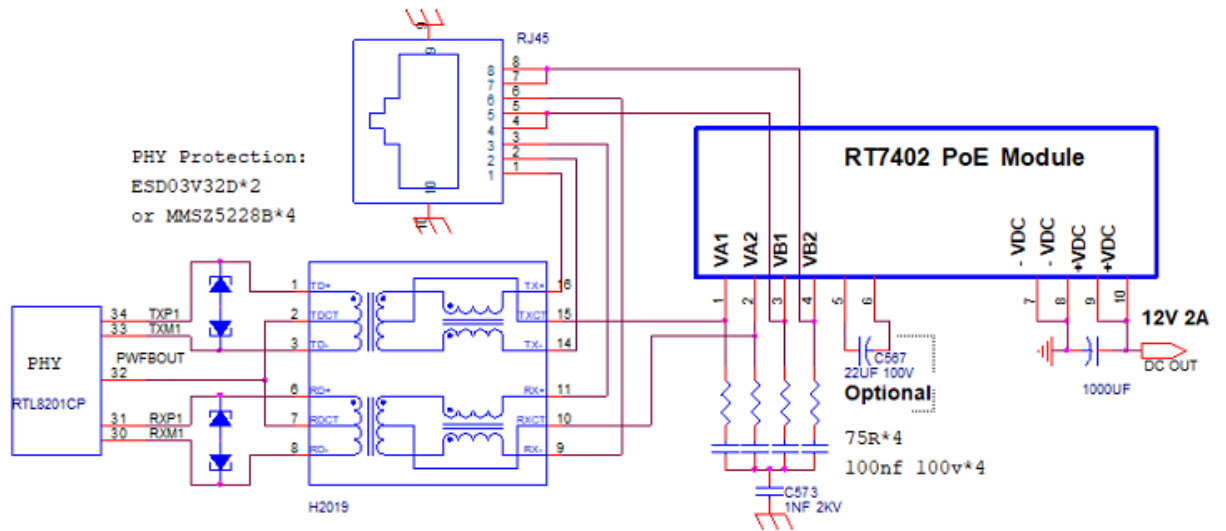
Note

- 1: With minimum load
- 2: See Section Operating Temperature Range

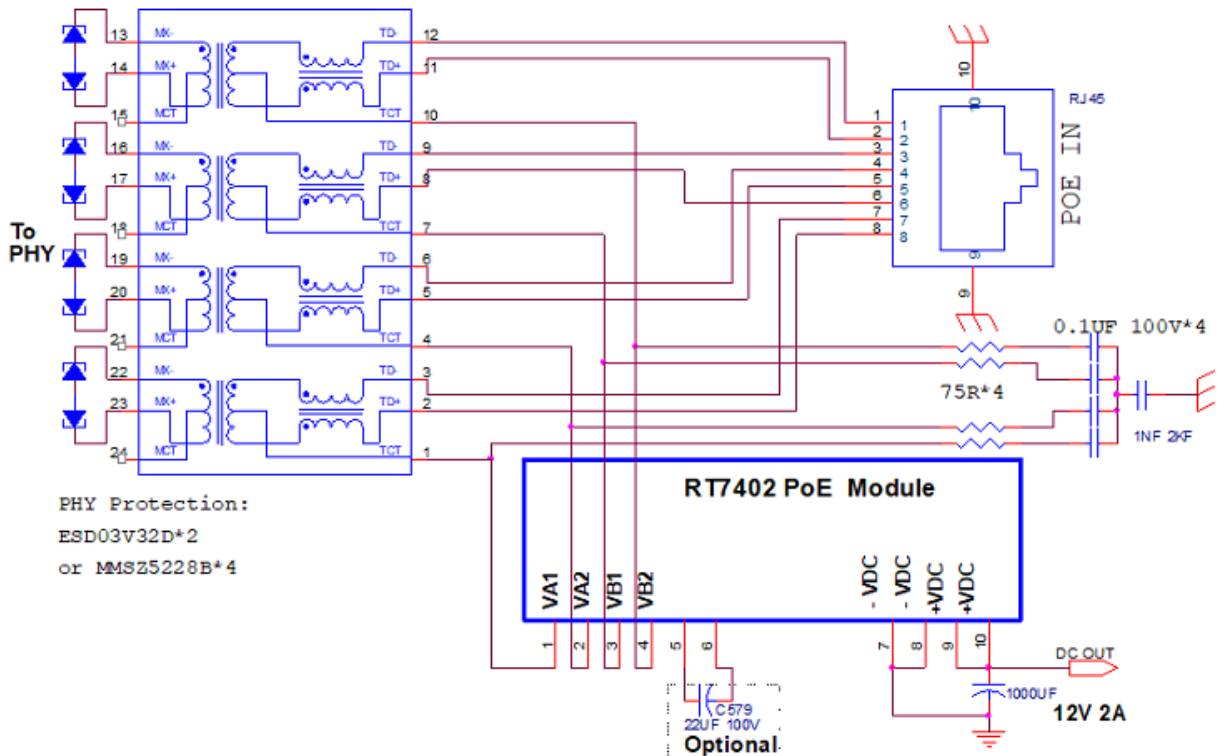
Extended use close to, or at the maximum operating temperature can reduce the life time of the device.

Typical Connection Diagram

100M Internet



1000M Internet



Power Classification

The BPI-7402 classification is fixed at Class 4, this means that an IEEE802.3at Type 1 or an IEEE802.3af PSE will default to Class 0. However an IEEE802.3at PSE will recognise the Class 4 as a Type 2 PD.

AT Detection

AT-DET output pin which is used to detect a Two Event Physical Layer classification as described in IEEE802.3at. If required the AT-DET pin can be connected directly to an opto-coupler.

If the detects a Two Event Physical Layer classification, the (AT True) switch will close and Opto1 will turn ON. Opto1 will be connected across the isolation barrier and the output collector can be connected to a controller (with a pull-up resistor connected to the controller's power rail). When Opto1 is ON the collector (output) will be Logic 0, the controller will then know that the PSE is capable of delivering over 15.4W. To complete the protocol the controller should then confirm that it is a Type 2 PD over the Data Link Layer.

If the detects a Single Event Physical Layer classification, Opto1 will be OFF and the output collector will be Logic 1 (via pull-up resistor). The controller should then assume that the PSE is limited to delivering up to 15.4W.

If the PSE does not support the Physical Layer classification, Opto1 will be OFF. The RT7402 will operate with non IEEE802.3at compliant POE+ PSE's.

- Note: There are several PSEs (including Cisco) that will only delivery $\leq 15.4W$ until they receive Type 2 PD confirmation, over the Data Link Layer.