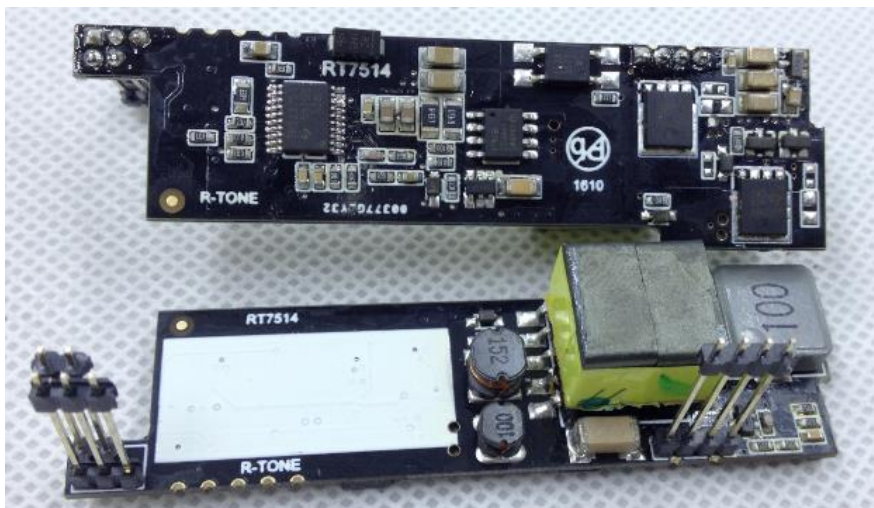


# RT7514

POE PD Module (AT Isolation Model)

## Product Description



Version	Date	Author	Approved By	Remarks
V2.0	2016/3/30	LI xiao yan	Rock	Based on RT7513 V5.6

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## Features:

- IEEE802.3at and IEEE802.3af compliant
- Maximum 24W 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 ,1500V isolation (input to output)
- Easy to use, with a minimum number of external components.



## Applications:

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

## Description:

The RT7514 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.

The RT7514 signature and control circuit provides the PoE compatibility signature and power classification required by the Power Sourcing Equipment (PSE) before applying up to 18W 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.

## ● Absolute Maximum Ratings

	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	°C

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	48	57	V
2	Under Voltage Lockout	VLOCK	30		36	V
3	Operating Temperature 2	TOP	-20	25	70	Ta / °C

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.

## ● DC Electrical Characteristics

	DC Characteristic	Sym	Min	Typ1	Max	Units	Test Comments
1	Nominal Output Voltage	+VDC	4.75	5.0	5.25	V	
2	Line Regulation	VLINE		2		%	@ 50% Load
3	Load Regulation	VLOAD		2		%	@ VIN=48V
4	Output Ripple and Noise	VRN		200		mVp-p	@ Max load
5	Minimum Load	RLOAD	200			mA	
6	Short-Circuit Duration <sup>3</sup>	TSC			∞	sec	
7	Efficiency @ 80% Load	EFF		88		%	@ 3A load
8	Isolation Voltage (I/O)	VISO		1500		V <sub>PK</sub>	Impulse Test
9	Temperature Coefficient	TC		0.02		%	Per °C

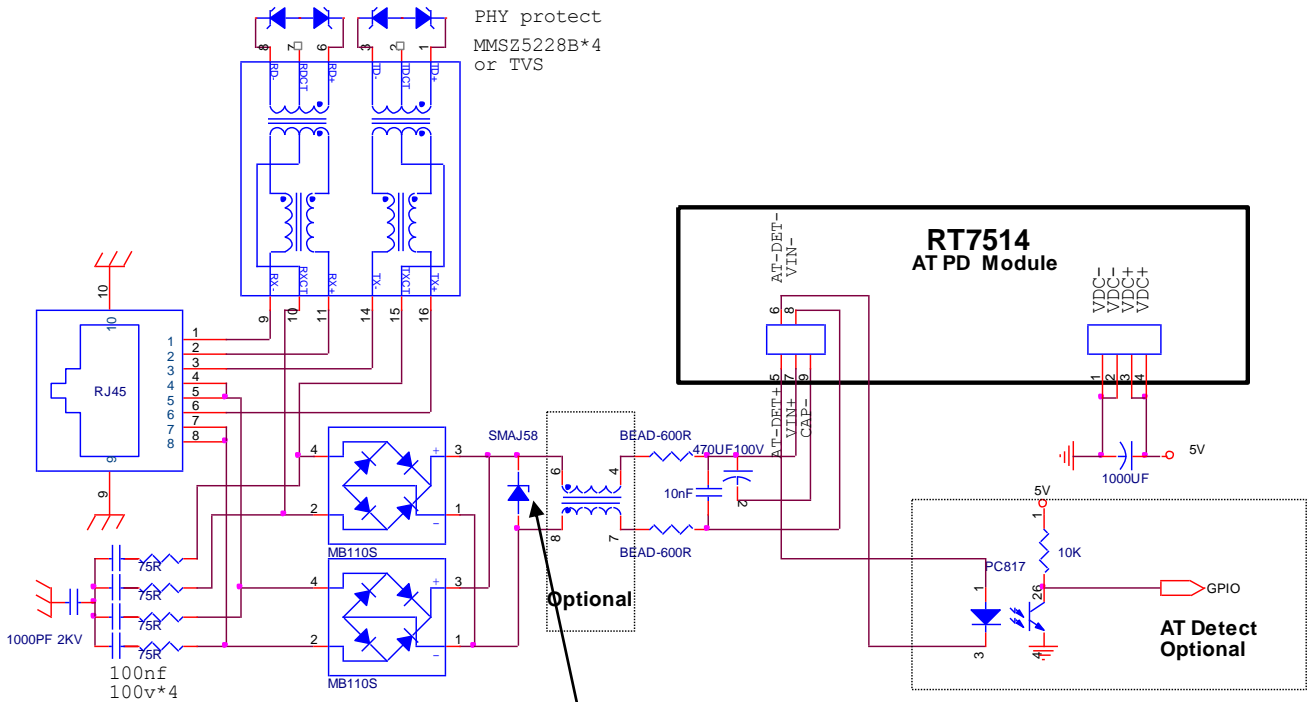
Note 1: Typical figures are at 25°C with a nominal 48V supply and are for design aid only. Not Guaranteed

2: The output ripple and noise can be reduced with an external filter, see application note.

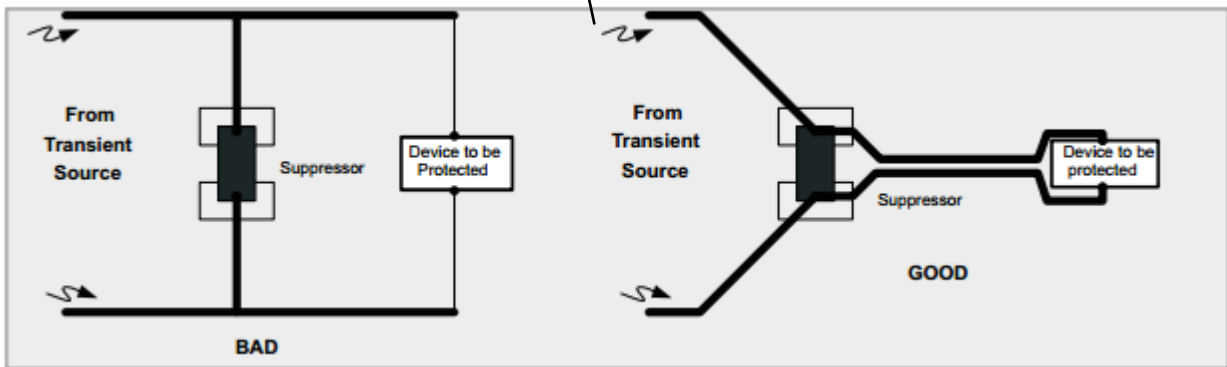
3: Continuous short circuit duration is applicable at 25°C ambient temperature in free air. At higher temperatures or with restricted

airflow (e.g. in a sealed enclosure) the duration will need to be limited to avoid overheating.

## ● RT7514 Typical Connection Diagram:



TVS Layout description



## ● RT7514 Product Selector

Part Number	Nominal Output	Maximum Output Power	AT-DET putout	Marking	Package
RT7514-5V	5V	24W	YES	RT7514	DIP

## ● Power Classification

The RT7514 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

The RT7514 has an 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.

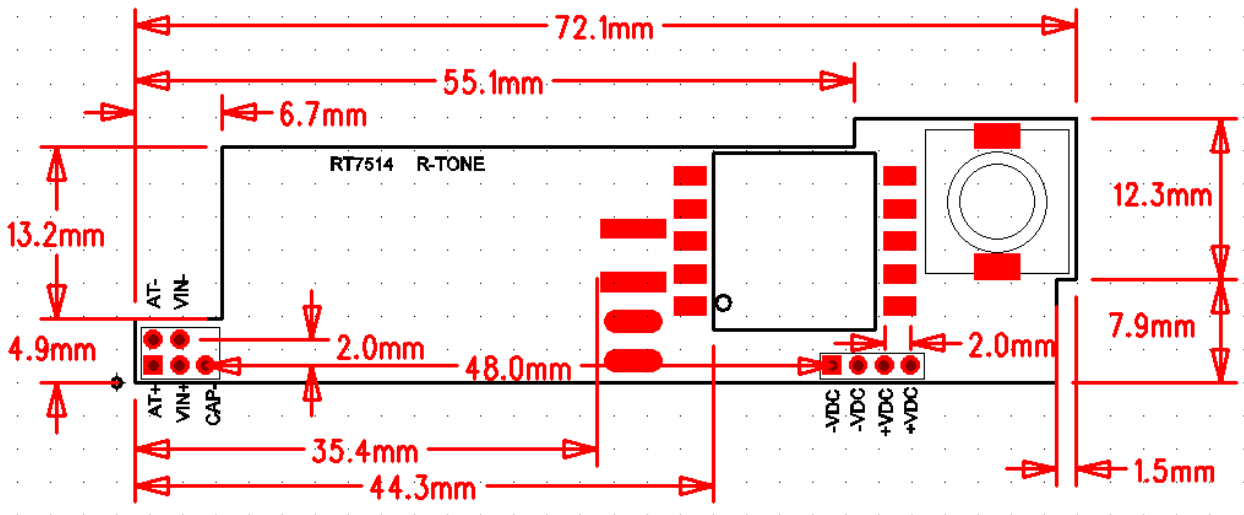
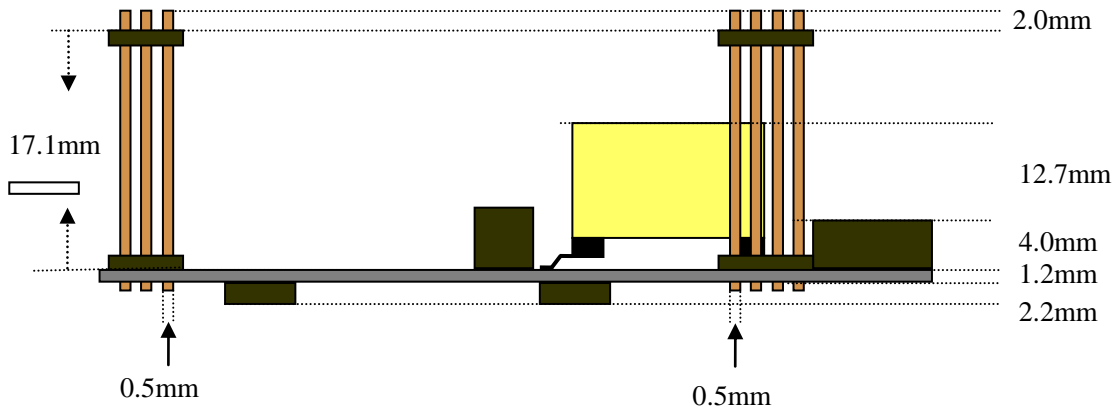
If the RT7514 detects a Two Event Physical Layer classification, the (AT True) switch will close and Opto1 will turn ON. Opto1 will be connected across the isolation barrier and the output collector can be connected to a controller (with a pull-up resistor connected to the controller's power rail). When 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 RT7514 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 RT7514 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.

- Package Size: (mm ±0.3mm)



Recommended PCB hole diameter PTH = 0.8 ±0.05

## ● Pin Description:

Pin	Name	Description
1	-VDC	DC Return. This pin is the return path for the +VDC output.
2	-VDC	DC Return. This pin is the return path for the +VDC output.
3	+VDC	DC Output. This pin provides the regulated output from the DC/DC converter.
4	+VDC	DC Output. This pin provides the regulated output from the DC/DC converter.
5	AT-DET+	AT Detect Output+ 10V voltage.
6	AT-DET-	AT Detect Output-. Integrated series 10 K resistance ,This pin indicates if an IEEE802.3at PSE is supplying power
7	VIN+	POE Direct Input +. This pin connects to the positive (+) output of the POE input bridge rectifiers.
8	VIN-	POE Direct Input -. This pin connects to the negative (-) output of the POE input bridge rectifiers.
9	CAP-	This pin connects to the capacitance negative.

## ● Reliability MTBF:

About the life time ,we design according to the following:

- 1) life time of RT7514 : 100,000 hours @ 25°C

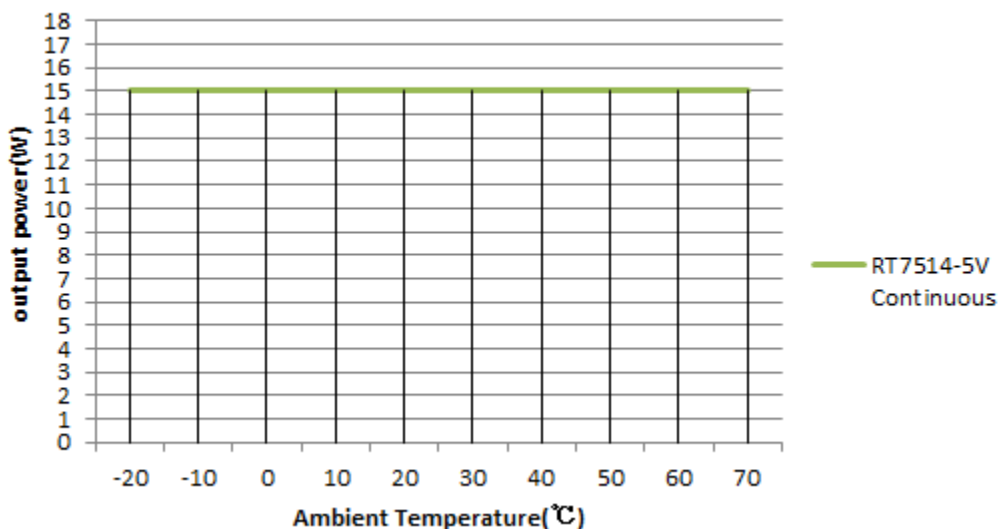
## ● Isolation (Safety test items) & test report

This electrical isolation shall withstand at least one of the following electrical strength tests:

RT7514 Test Requested	Test result
a) 1500Vrms at 50Hz to 60Hz for 60s, applied as specified in subclause5.2.2 of IEC60950-1:2001.	Pass
b) 2250Vdc for 60s, applied as specified in subclause5.2.2 of IEC60950-1:2001.	Pass
c) An impulse test consisting of a 1500V, 10/700µs waveform, applied 10 times, with a 60s interval between pulses. The shape of the impulses shall be 10/700µs (10µs virtual front time, 700µsvirtual time of half value), as defined in IEC60950-1:2001 Annex N.	Pass

● **Operating temp profile**

**RT7514 Operating Profile**



● **Mechanical / Environmental Performance data**

Mechanical / Environmental Performance data		
	Item	Requirement and Standard
1	Resistance to Wave Soldering Heat	max Preheat Temp range & time 120 °C / 180S max soldering temp &time:265 °C / 4S
2	Solder ability	Solder able area shall have minimum of 95% solder coverage. And then into solder bath, Temperature at 245 ±5 °C , for 4-5sec.
3	Hand Soldering Temperature Resistance	T > =350 °C , 3sec at least.
4	Thermal Shock	subject to follow condition for 5 cycles.1 cycles: -55 °C , 30 minutes +85 °C , 30 minutes
5	Humidity(Temp Cycling)	less than 95% (non-condensing) ( -20 to 70 °C)
6	Temperature Life	temperature life at 85°C for 96 hours.
7	Salt Spray	connectors to 5% salt-solution concentration, 35 °C Gold flash for 8 hours there will be no change in the gold layer

● **Packaging type & Quantity**

1.EPE Packaging,

2.Blister Packaging,

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