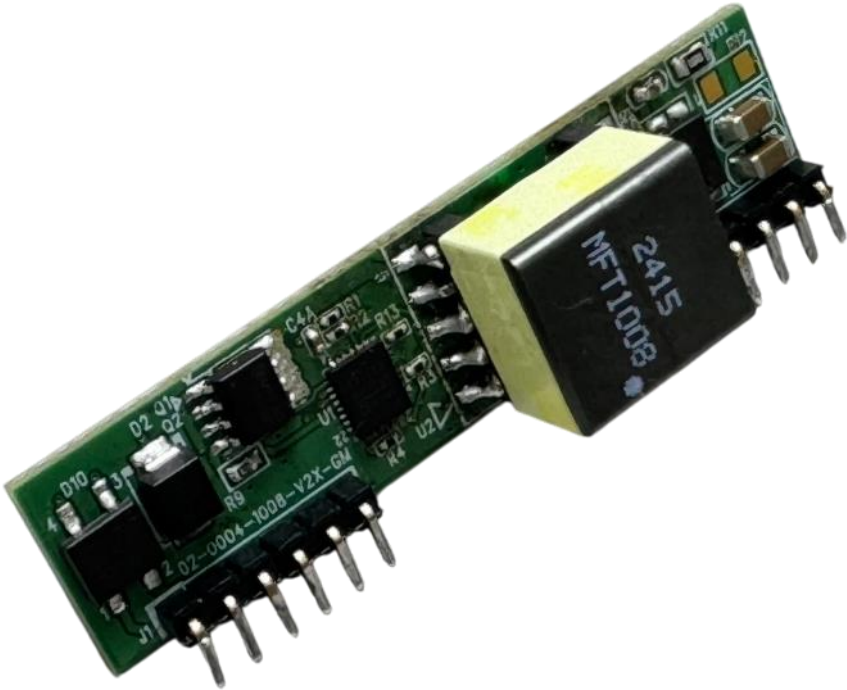




POE-PD-AT12-B

25W High-Efficiency POE PD Module

User Manual



rev: 250225
Made in Taiwan



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INTRODUCTION

The **POE-PD-AT12-B 25W High-Efficiency POE PD Module** Power-over-Ethernet (PoE+) module is designed to extract power from a standard twisted-pair Category 5 Ethernet cable, in compliance with the IEEE802.3 PoE standard. It is fully backward compatible with the IEEE802.3at, and IEEE802.3af specifications.

Configured as a Type 2 Class 4 device, the POE-PD-AT12-B draws up to 25W of power from the Power Sourcing Equipment (PSE) and delivers a nominal output of 12V.

Featuring a high-efficiency DC/DC converter, it achieves over 93.80% efficiency and operates across a wide input voltage range, providing low ripple and noise output. The DC/DC converter also includes built-in protection against output overload, short-circuit, and over-temperature, with a 1500Vdc isolation barrier between input and output.

PACKAGE CONTENTS

- 1x POE-PD-AT12-B

FEATURES

- Compliant with IEEE802.3at and IEEE802.3af standards
- 25W output power
- Input voltage range: 36V to 57V
- Integrated high-efficiency DC/DC converter(93.80% efficiency)
- Low output ripple and noise
- Cost-effective with high performance
- Short-circuit protection built-in
- 1500V transformer isolation (input to output)
- Simple to use with minimal external components required

PRODUCT SELECTOR

Part Name	Output	Maximum Output Power	Integrated bridge	Power Structure	Package
POE-PD-AT12-B	12V/2.1A	25W	YES	Flyback	DIP
POE-PD-AF12-B	12V/1.1A	13W	YES	Flyback	DIP
POE-PD-AT5-B	5V/4A	20W	YES	Flyback	DIP
POE-PD-AF5-B	5V/2.6A	13W	YES	Flyback	DIP

PIN DESCRIPTION

Pin #	Name	Description
1	VA1	RX Input (1). This input pin is used in conjunction with VA2 and connects to the center tap of the transformer connected to pins 1 & 2 of the RJ45 connector (RX) – it is not polarity sensitive.
2	VA2	TX Input (1). This input pin is used in conjunction with VA1 and connects to the center 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	CAP+	Reserved.
6	CAP-	Reserved.
7	-VDC	DC Return. This pin is the return path for the +VDC output.
8	+VDC	DC Output. This pin is provides the regulated output from the DC/DC converter.
9	ADJ	Reserved.
10	-VDC	DC Return. This pin is the return path for the +VDC output.

ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings¹

	Parameter	Symbol	Min	Max	Units
1	DC Supply Voltage	V_{CC}	-0.3	60	V
2	DC Supply Voltage Surge for 50us	V_{SURGE}	-1.6	+1.6	KV
3	Storage Temperature	T_S	-55	+150	°C

Note 1: Exceeding the above ratings may cause permanent damage to the product. Function 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	V_{IN}	36	48	57	V
2	Under Voltage Lockout Rising	V_{UVLO-R}	35	37.5	40	V
3	Under Voltage Lockout Falling	V_{UVLO-F}	29	31	33	V
4	Operating Temperature ²	T_{OP}	-40		+125	°C

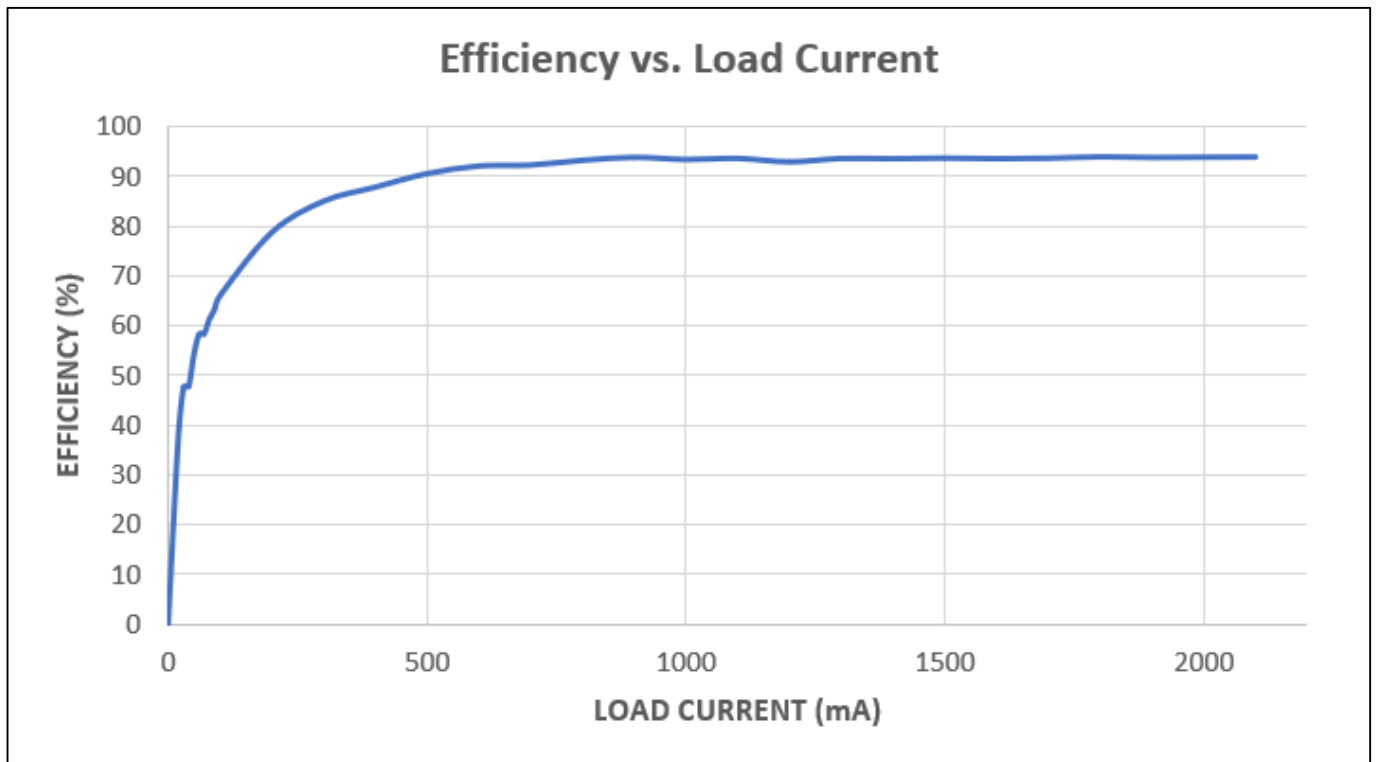
DC Electrical Characteristics

	Parameter	Symbol	Min	Typ	Max	Units	Test Condition
1	Nominal output voltage	+VDC	11.9	12.0	12.1	V	
2	Output Current	I_{DC}			2.1	A	$V_{IN} = 48V$
3	Line Regulation	V_{LINE}		TBD		%	Full Load
4	Load Regulation	V_{LOAD}		TBD		%	$V_{IN} = 48V$
5	Output Ripple	V_{RIPPLE}		TBD		mV _{P-P}	Full Load
6	Minimum Load ¹	I_{LOAD}	100			mA	
7	Short-Circuit Duration	T_{SC}			∞	sec	
8	Efficiency	EFF		93		%	Full Load
9	Isolation Voltage	V_{ISO}			1.5	KV	Impulse Test

Note 1: The module can emit an audible noise, if operated at less than the specified minimum I_{LOAD} and cause the PSE to fail its MPS.

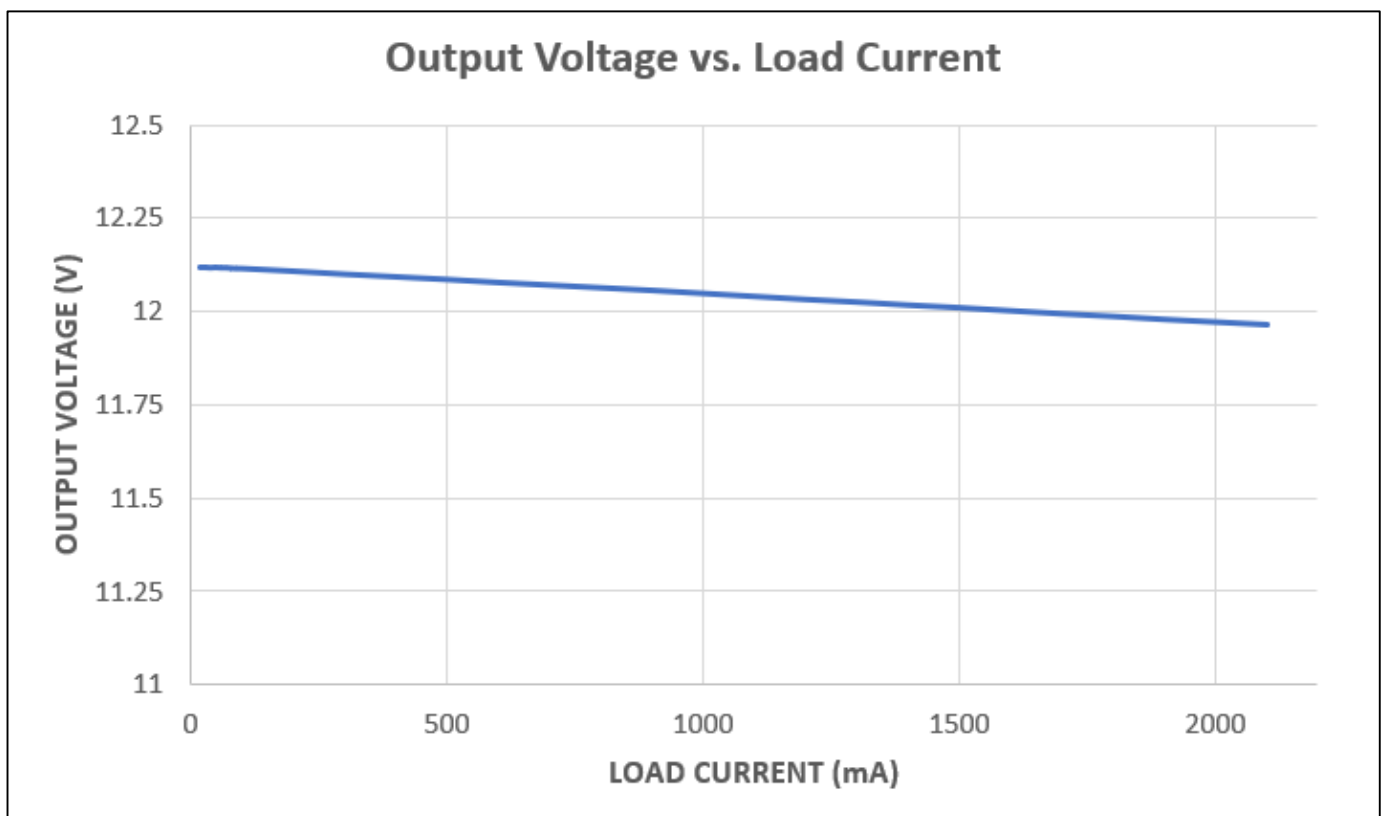
Efficiency

$V_{IN} = 48V$



Load Regulation

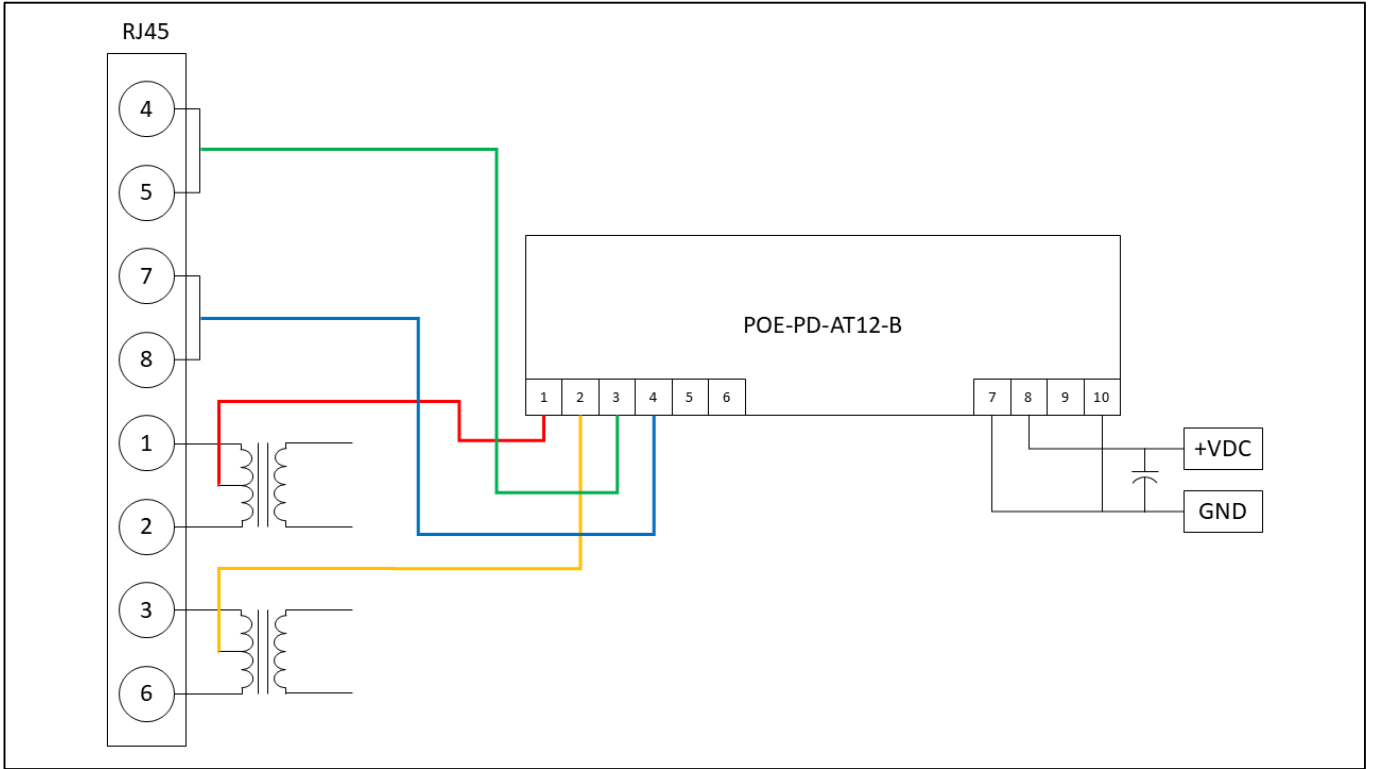
$V_{IN} = 48V$



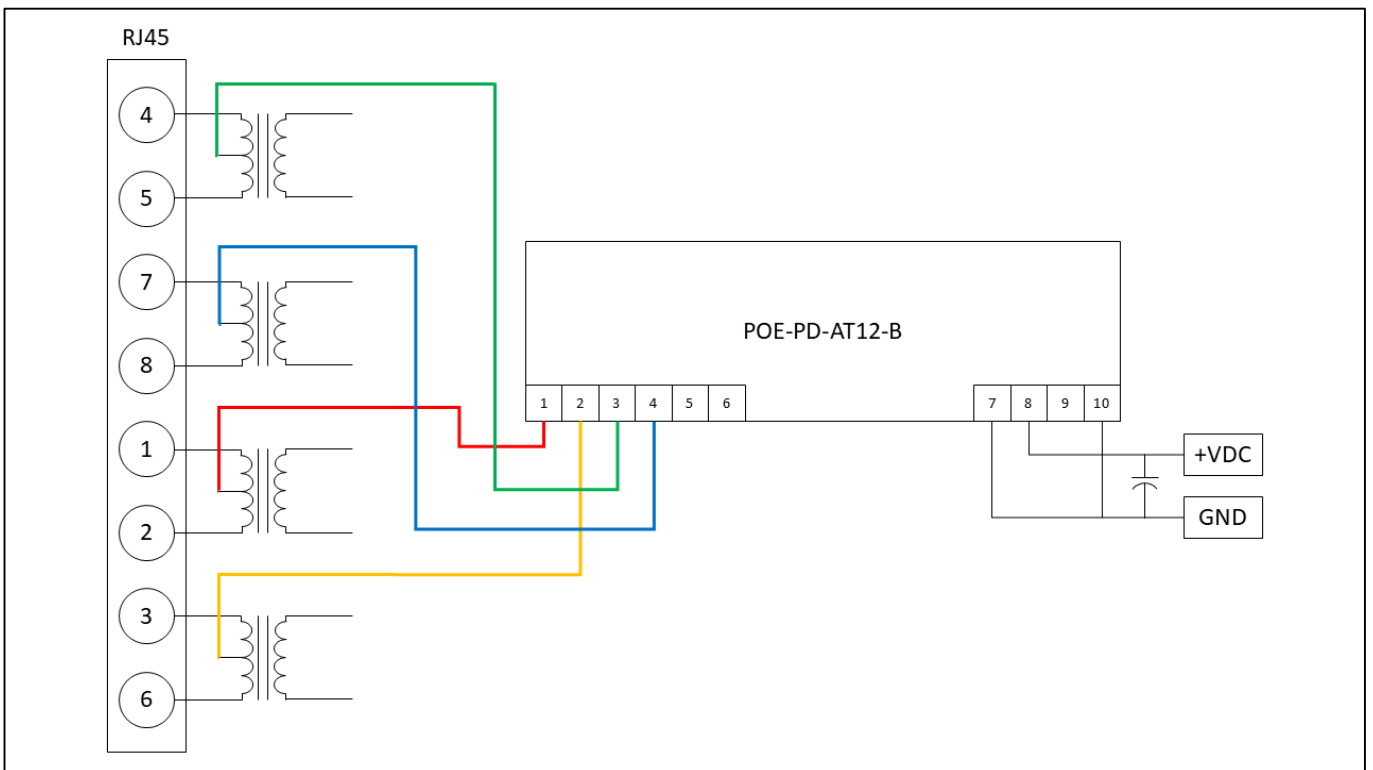
FUNCTION DESCRIPTION

Typical Connections

The POE-PD-AT12-B is compatible with equipment that uses alternative A or alternative B options. It is specified that the PSE does not apply power to both outputs at the same time (Refer to IEEE802.3af for more information).



Typical System Diagram(10/100M)



Typical System Diagram(1000M)

PD Signature

When the POE-PD-AT12-B is connected to the Cat-5E/6 cable, it will automatically present a Powered Device (PD) signature to the Power Sourcing Equipment (PSE) or Midspan Equipment, when requested. The equipment will then recognize that a powered device is connected to that line and supply power.

Isolation

To meet the safety isolation requirements of IEEE802.3af section 33.4.1 a Power Device (PD) must pass the electrical strength test of IEC 60950 sub clause 6.2. This calls for either a. 1500Vac test or b. 1500V impulse test. The POE-PD-AT12-B is specified to meet the 1500Vdc impulse test.

Power Classification

The POE-PD-AT12-B classification is fixed at Type 2 – Class 4. This means the POE-PD-AT12-B will request 30W of power from a compliant IEEE802.3 Type 2 or greater PSE. If the POE-PD-AT12-B is connected to a Type 1 PSE, the PSE will not recognize the Class 4 request from the POE-PD-AT12-B and default to a Class 3 power level device and supply 15.4W.

Start-up Power

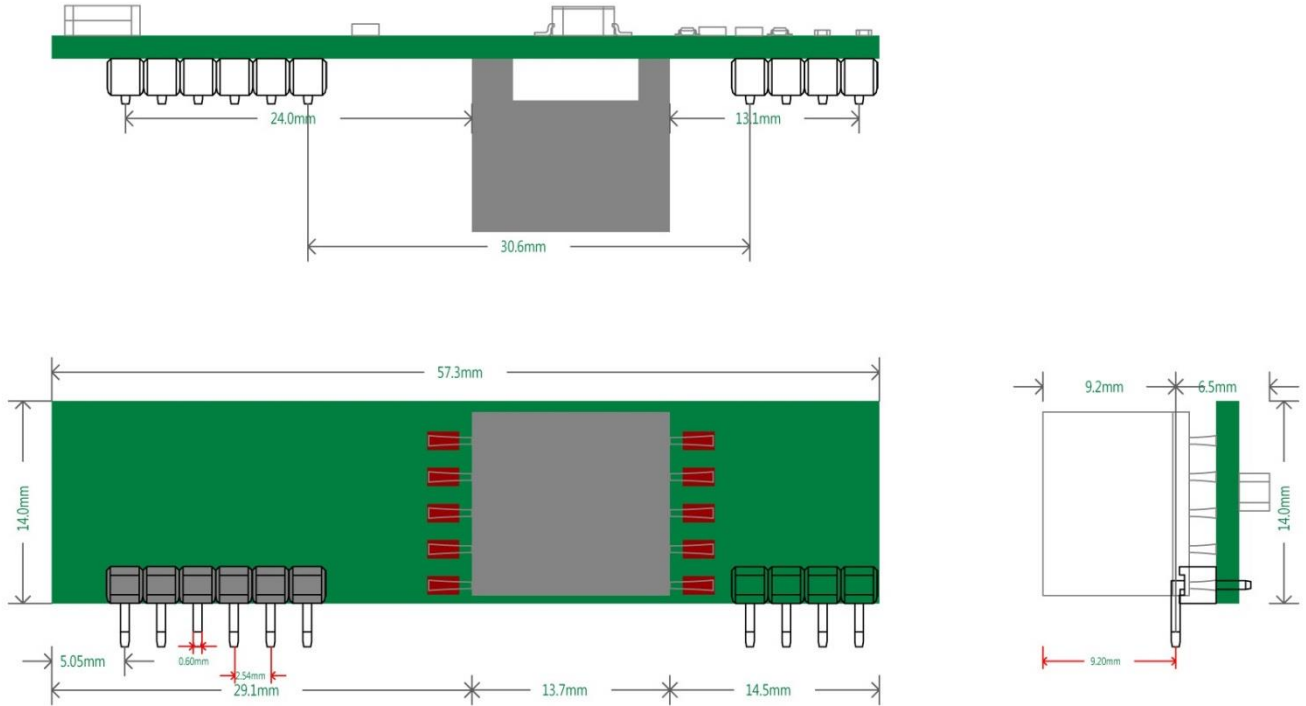
It is important that during start-up the POE-PD-AT12-B input voltage is $\geq 37.5V$, this will ensure that the module powers up correctly. Once the DC/DC converter is up and running the module will work normally even if the input voltage is reduced to its minimum level of 36V. When using an IEEE802.3af compliant PSE this will not be an issue, as the minimum output voltage of the PSE must be $\geq 44V$.

Additional Output Filtering

(TBD)

PACKAGE

Package Size 6+4PIN: (mm±0.3mm)



WARRANTY

The SELLER warrants the **POE-PD-AT12-B 25W High-Efficiency POE PD Module** to be free from defects in the material and workmanship for 1 year from the date of purchase from the SELLER or an authorized dealer. Should this product fail to be in good working order within 1 year warranty period, The SELLER, at its option, repair or replace the unit, provided that the unit has not been subjected to accident, disaster, abuse or any unauthorized modifications including static discharge and power surges.

Unit that fails under conditions other than those covered will be repaired at the current price of parts and labor in effect at the time of repair. Such repairs are warranted for 90 days from the day of reshipment to the BUYER. If the unit is delivered by mail, customers agree to insure the unit or assume the risk of loss or damage in transit. Under no circumstances will a unit be accepted without a return authorization number.

The warranty is in lieu of all other warranties expressed or implied, including without limitations, any other implied warranty or fitness or merchantability for any particular purpose, all of which are expressly disclaimed.

Proof of sale may be required in order to claim warranty. Customers outside Taiwan are responsible for shipping charges to and from the SELLER. Cables are limited to a 30 day warranty and cable must be free from any markings, scratches, and neatly coiled.

The content of this manual has been carefully checked and is believed to be accurate. However, The SELLER assumes no responsibility for any inaccuracies that may be contained in this manual. The SELLER will NOT be liable for direct, indirect, incidental, special, or consequential damages resulting from any defect or omission in this manual, even if advised of the possibility of such damages. **Also, the technical information contained herein regarding the POE-PD-AT12-B features and specifications is subject to change without further notice.**