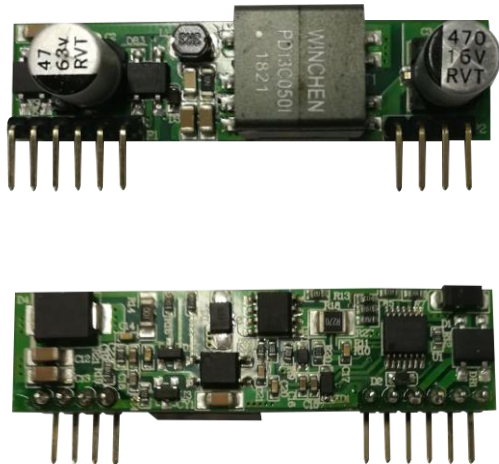


Power-Over-Ethernet Module

1. Features

- IEEE802.3af compliant
- Small SIL package size - 56mm (L) x 14mm (H)
- Low cost
- Input voltage range 42V to 57V
- Power 5V 2.0A 10W
- The output end adds a 470UF/16V electrolytic capacitor.
- Minimal (low cost) external components required
- Short-circuit protection
- Adjustable Output
- 1500V isolation (input to output)
- Winchen “design-in” assistance

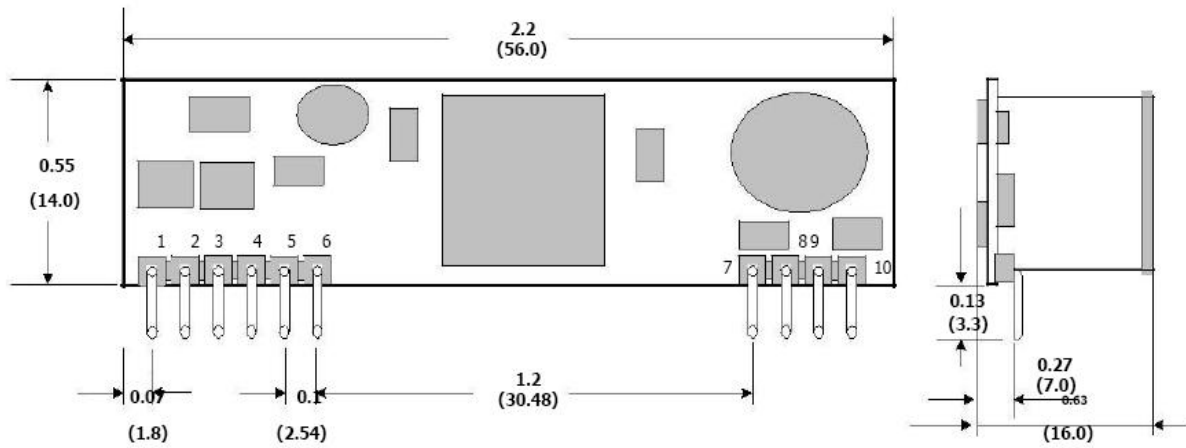
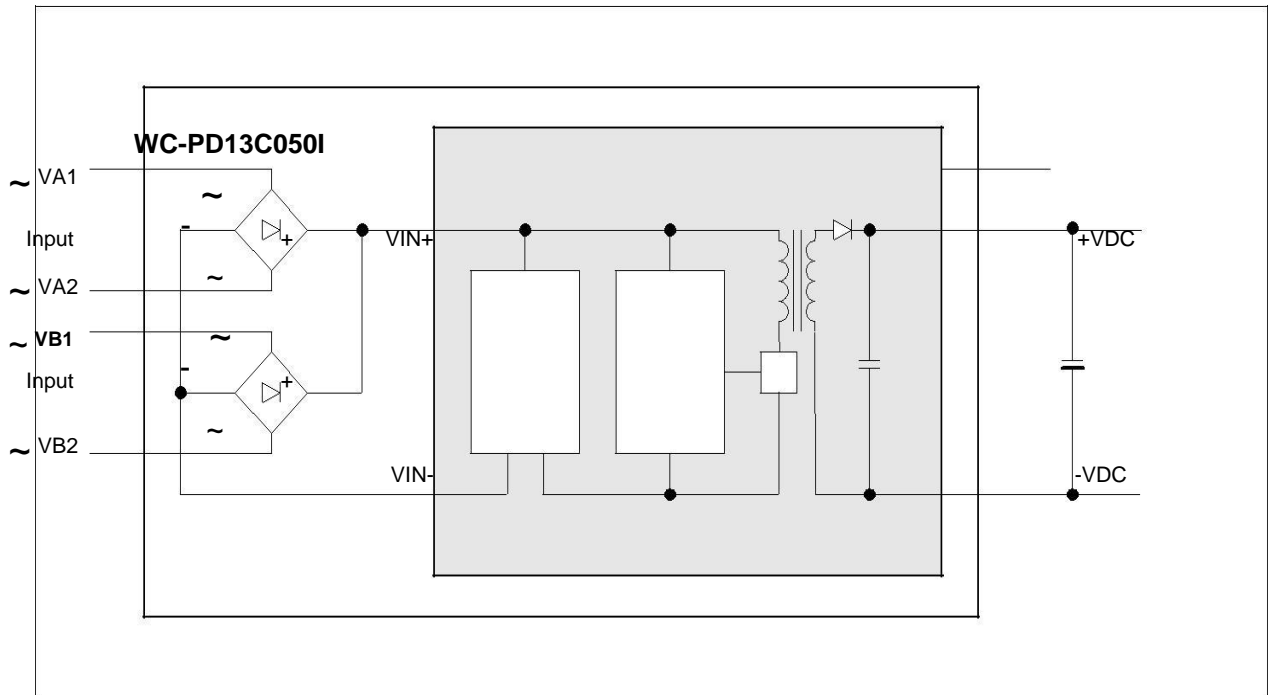


2. Description

- ✓ The WC-PD13C050I series of modules are designed to extract power from a conventional twisted pair
- ✓ Category 5 Ethernet cable, conforming to the IEEE 802.3af Power-over-Ethernet (PoE) standard.
- ✓ The WC-PD13C050I signature and control circuit provides the PoE compatibility signature and power classification required by the Power Sourcing Equipment (PSE) before applying up to 10W power to the port. The WC-PD13C050I provides a Class 0 signature.
- ✓ 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.

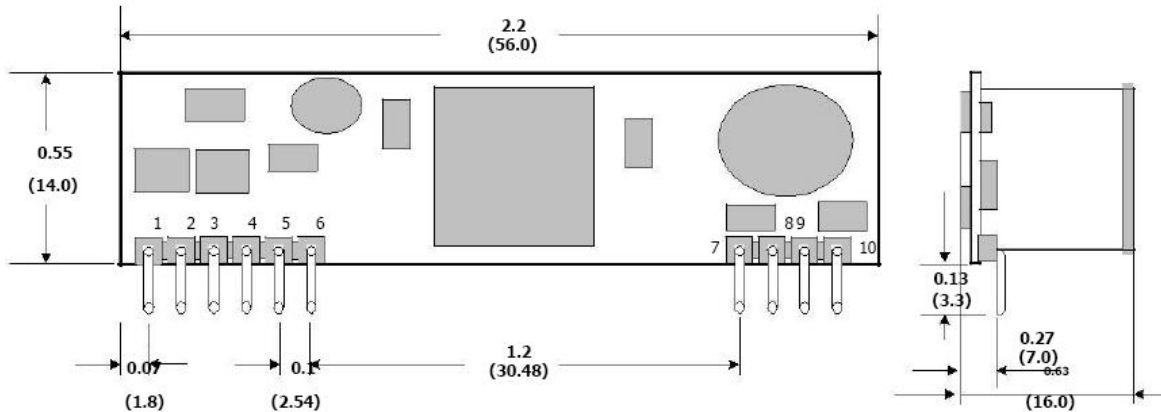
- ✓ *At 25°C with $V_{IN} = 48V$
The WC-PD13C050I fully meets the requirements of the RoHS directive 2002/95/EC on the restriction of hazardous substances in electronic equipment.

Ordering Information



Block Diagram

3. Pin Description

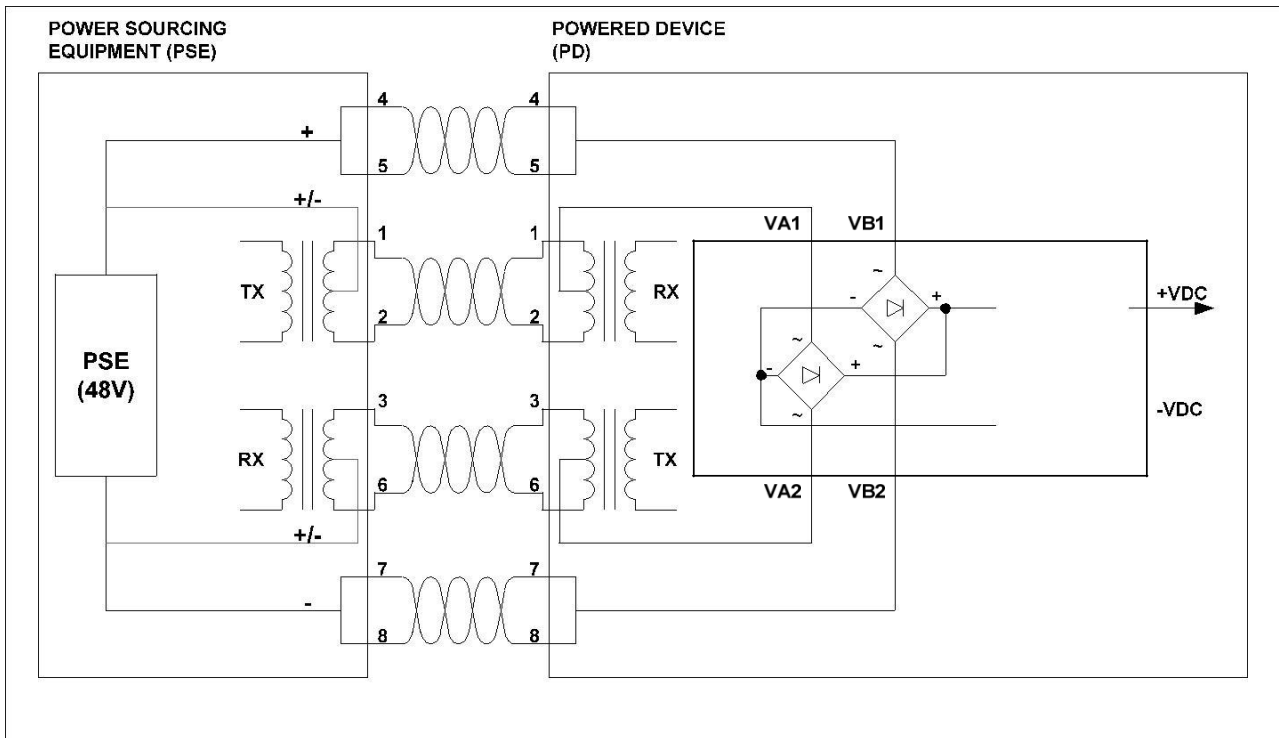


| Pin | Name | Description |
|-----|--------|--|
| 1 | VA1 | This input pin is used in conjunction with VA2 and connects to the centre tap of the transformer connected to pins 1& 2 of the RJ45 connector (RX) - it is not polarity sensitive. |
| 2 | VA2 | This input pin is used in conjunction with VA1 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 | 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 | 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 | Input | External voltage input.ac12v/dc24-57v |
| 6 | Input | |
| 7 | Output | 0V dc- |
| 8 | Output | 5V dc+ |
| 9 | NC | NC |
| 10 | NC | NC |

4. Functional Description

4.1. Inputs

The WC-PD13C050I is compatible with equipment that uses the different power options, see Figure 3: Typical System Diagram. 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

4.2. PD Signature

When the WC-PD13C050I is connected to the Cat 5e 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 recognise that a powered device is connected to that line and supply power.

4.3. Isolation

To meet the safety isolation requirements of IEEE802.3af section 33.4.1 a Powered

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 WC-PD13C050I is specified to meet the 1500Vdc impulse test. It is also important that the tracks on either side of the isolation barrier have at least a 3mm clearance, see Figures 7 & 8 and Section 11 for more information.

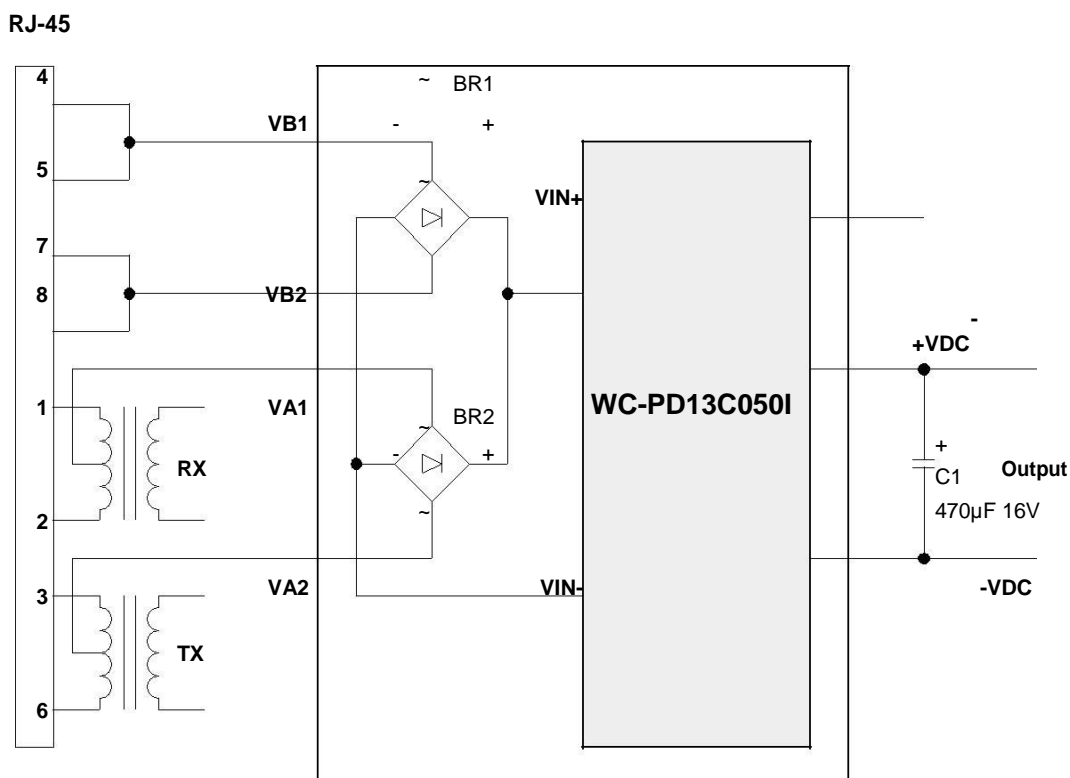
4.4. Power Classification

The WC-PD13C050I is fixed for Class 0 (0.44 Watts to 12.95 Watts) operation. Should Class programming be required refer to other Silver Telecom PoE products.

4.5. DC/DC Converter

The WC-PD13C050I DC/DC converter provides a regulated low ripple and low noise output that has built-in short-circuit output protection.

4.6. Typical Connections



Typical Connection Diagram

5. Operating Temperature Range

- Because the WC-PD13C050I is a power component, it will generate heat, so it is important that this be taken into consideration at the design stage.
- The heart of the WC-PD13C050I is a DC/DC converter, which like any other power supply will generate heat. The amount of heat generated by the module will depend on the load it is required to drive and the input voltage supplied by the PSE. The information shown within this section of datasheet is referenced to a nominal 48Vdc input voltage supplied by thePSE.
- The WC-PD13C050I has a maximum ambient operating temperature of 70 °C. These results are in still air without any heatsinking, the performance of the WC-PD13C050I can be improved by forcing the airflow over the part or by using a heatsink.
- The output stage of the WC-PD13C050I has no built-in thermal protection, to prevent the module from being damaged it is recommended that the module be powered by an IEEE 802.3af compliant PSE or Midspan equipment. However the WC-PD13C050I may be powered by a user designed power supply which should include thermal and over current protection.
- Because each application is different it is impossible to give fixed and absolute thermal recommendations. However it is important that any enclosure used has sufficient ventilation for the WC-PD13C050I and a direct airflow if possible.

6. Electrical Characteristics

6.1. Absolute Maximum Ratings¹

| | Parameter | Symbol | Min | Max | Units |
|---|---------------------------------|--------------------|------|------|-------|
| 1 | DC Supply Voltage | V _{CC} | -0.3 | 60 | V |
| 2 | DC Supply Voltage Surge for 1ms | V _{SURGE} | -0.6 | 80 | V |
| 3 | Storage Temperature | T _S | -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.

6.2. Recommended Operating Conditions

| | Parameter | Symbol | Min | Typ | Max | Units |
|---|------------------------------------|-------------------|-----|-----|-----|---------|
| 1 | Input Supply Voltage ¹ | V _{IN} | 42 | 48 | 57 | V |
| 2 | Under Voltage Lockout | V _{LOCK} | 32 | | 36 | V |
| 3 | Operating Temperature ² | T _{OP} | -40 | 60 | 80 | Ta / °C |

Note 1: With minimum load

2: See Section 8. Operating Temperature Rang

6.3. DC Electrical Characteristics

| | DC Characteristic | Sym | Min | Typ ¹ | Max | Units | Test Comments |
|----|--|-------------------|------|------------------|------|-----------------|---------------------------|
| 1 | Nominal Output Voltage | +VDC | 4.85 | 5.0 | 5.2 | V | |
| 2 | Output Current (V _{IN} = 48V) | PWR | 1.8 | 2 | 2.1 | A | Wide voltage input 38-57V |
| 3 | Line Regulation | V _{LINE} | | 0.1 | | % | @ 50% Load |
| 4 | Load Regulation | V _{LOAD} | | 1 | | % | @ V _{IN} =48V |
| 5 | Output Ripple and Noise | V _{RN} | 80 | 100 | 200 | mVp-p | @ Max load ² |
| 6 | Minimum Load | R _{LOAD} | 50 | 100 | | mA | |
| 7 | Short-Circuit Duration ³ | T _{SC} | | | | sec | |
| 8 | Efficiency @ 80% Load | EFF | | 82 | | % | |
| 9 | Isolation Voltage (I/O) | V _{ISO} | | | 1500 | V _{PK} | Impulse Test |
| 10 | 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

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

2. 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.