

PRODUCT OVERVIEW

The PEB6100 series of Power over Ethernet (POE) board, offers a **completely ready to use Ultra High POE** solution, offering up to 57 watts¹ of output power.

It has full functional compliance with the IEEE 802.3af / 802.3at Power over Ethernet (PoE) standard, and is designed to extract power from CAT5e and better Ethernet cable when sourced by an IEEE 802.3af or an IEEE 802.3at compliant POE PSEs, and is compatible with both, the 4 pair and the 2 pair injection method.

The PEB6100 series provide full two event PoE+ and single event POE signature for layer 1 (physical layer) classification. Its high efficiency DC-DC converter provides a well-regulated low noise and low ripple output with in-built in-rush current, overload and output short-circuit protections.

PEB6100 series are compatible with both standard (24.9KΩ) and non-standard (12.5KΩ) signature detection PSEs².

The PEB6100 series provides a quick, easy, and low cost method for manufacturers of Ethernet equipment like PTZ cameras with housing, WiMAX[®] tower and access points, Thin client terminals, AV displays, Network monitors, Access control systems etc., to “PoE enable” their equipment, and removes the need for a local Equipment power source, significantly reducing installation costs. Various choices in input and output connectors, offering flexibility in interfacing with target devices.

PRODUCT FEATURES

<ul style="list-style-type: none"> ▪ Complete package including data connections. No external components required. 	<ul style="list-style-type: none"> ▪ Output overload and permanent short circuit protection. 	<ul style="list-style-type: none"> ▪ Low output ripple and noise.
<ul style="list-style-type: none"> ▪ Up to 57Watt output¹. 	<ul style="list-style-type: none"> ▪ Input over-current protection; under voltage lock out. 	<ul style="list-style-type: none"> ▪ Input ESD protection included.
<ul style="list-style-type: none"> ▪ 1500 Volt isolation (Input to Output). 	<ul style="list-style-type: none"> ▪ Input voltage 45V to 57V DC. 	<ul style="list-style-type: none"> ▪ Cost Effective & Easy to retrofit.
<ul style="list-style-type: none"> ▪ 12V, 15V, 18V & 24V DC O/P voltage models. 	<ul style="list-style-type: none"> ▪ RoHS compliant. 	<ul style="list-style-type: none"> ▪ Supports Data Pair, Spare Pair and 4-Pair injection.
<ul style="list-style-type: none"> ▪ Choice of I/P connectors³. 		

¹ PEB6100 can deliver up to 57Watt when powered from a POE PSE of adequate capacity. Depending on the available input power from the PSE, voltage drop due to cable loss, and the ambient temperature, the corresponding max power output will vary. Please refer to Maximum Power Output and to Thermal profile.

² Please refer Functional Description 7–12.5K Ohm Signature PSEs.

³ Please refer Functional Description 6 Connector Variants

PRODUCT SELECTOR ⁴				
Part Number	Marking	Output Voltage ⁵	Efficiency ⁶	Maximum Output Power ¹
		(Volts DC)	(%)	(Amps DC)
PEB6112	12	12	85	4.75
PEB6115	15	15	TBD	3.80
PEB6118	18	18	TBD	3.16
PEB6124	24	24	TBD	2.37

* Custom voltages are available as special and make-to-order products. 48V model available on request.

INPUT CHARACTERISTICS ⁴					
Parameter	Symbol	Min.	Typ ⁴	Max.	Units
Input Voltage	V _{IN}	45	51	57	Volts
Input Current (DC) ⁷	I _{IN}	0.1 ⁸		1.20 ⁹	A
Maximum Inrush Current	I _{PK}			1.25 ¹⁰	A
Under Voltage Lockout ¹¹	V _{UVLO}	40		45	Volts
Operating Temperature	T _{OP}	-10		70	°C
802.3af / at Power Classification				Class 4	

DC OUTPUT CHARACTERISTICS ⁴					
Parameter	Symbol	Min.	Typ ⁴	Max.	Units
Line Regulation	V _{LNRG}		0.2%		
Load Regulation	V _{LDRG}		0.5%		
Output Ripple and Noise	V _{RIP}		80		mV p-p
Isolation Voltage	V _{ISOL}			1500	V DC
Temperature Coefficient (Slope)	TC		100	300	ppm °C
Output Short Circuit Duration				∞	Sec

ABSOLUTE MAXIMUM RATINGS ¹²	
Supply Voltage (V _{CC})	0V ~ 57V DC
Storage Temperature (T _S)	-25 °C ~ 100 °C
Output Voltage (V _{OUT})	0V to controlled output voltage (operating or non-operating)

⁴ All specifications typical are at T_A of 25°C with a nominal input voltage and rated output current unless otherwise noted. These are meant as a design aid only and are indicative, and not guaranteed.

⁵ Output typical ±3% at T_A of 25°C; with a nominal input voltage.

⁶ End to end efficiency including bridge rectifier diodes, at nominal V_{IN} with >75% output load, at 25°C ambient. Refer Functional Description 9. Typical end to end system efficiency across output loads

⁷ Please refer to IEEE802.3af / 802.3at standards document. Maximum input and inrush current are dependent on power class.

⁸ Ensure minimum output load of 3 Watt or 100mA input current whichever is higher.

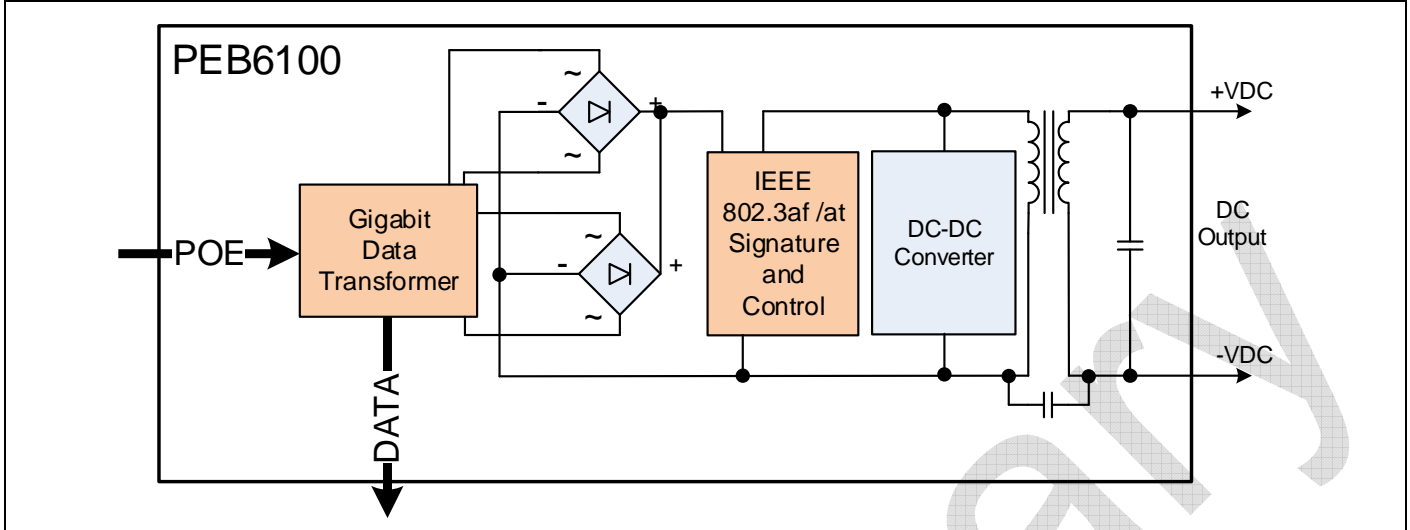
⁹ Maximum input current 600mA each on data pair and spare pair.

¹⁰ Maximum inrush current 650mA each on data pair and spare pair

¹¹ Under Voltage Lock Out in no load condition

¹² Exceeding the absolute maximum ratings may cause permanent damage to the product. We do not imply functional operation under these conditions.

Figure 1 - BLOCK DIAGRAM and TYPICAL CONNECTIONS



FUNCTIONAL DESCRIPTION

1. Inputs

The PEB6100 is compatible with all IEEE 802.3af / 802.3at compliant Power Sourcing Equipment (PSE) and supports the different power injection options of 4 - Pair or Data/Signal Pair (Mode A) or Spare Pair (Mode B). See Figure 2 – Typical System Configuration. For power requirements exceeding limits of Data Pair or Spare Pair, need to use 4 - Pair injection PSEs. The PEB6100 series comes with Class 4 configuration and featured to support two event layer1 classification.

2. – Typical System Configuration

In Mode A – Signal Pair injection, the signal lines carry both data and power. In Mode B – Spare Pair injection, the Signal Pair carries only data, and the Spare Pair carries power. In 4 - Pair injection, both Signal and Spare Pair carries power

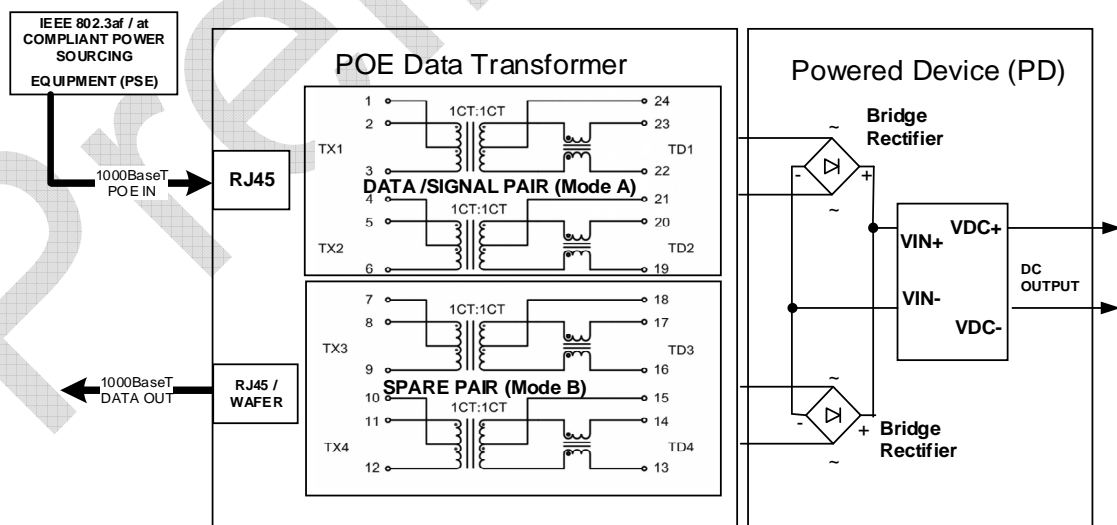


Figure 2

3. Powered Device (PD) Signature

When the PEB6100 is connected to a Cat 5e or greater Ethernet cable from an IEEE 802.3af / 802.3at compliant Power Sourcing Equipment (PSE), Endspan or Midspan, it will automatically present a Powered Device (PD) signature to the PSE, as and when requested. The PSE will then recognise that a PD is connected to that line and supply power. The PEB6100 will always present a Class 4 signature to the PSE. Provision for jumper provided in PEB6100 in case using with PSEs which seeks 12.5 K Ohms signature resistance.

4. Isolation

IEEE 802.3af / 802.3at section 33.4.1 calls for a Powered Device (PD) to meet safety isolation requirement by meeting the electrical strength test of IEC 60950 sub clause 6.2. Infomart's® PoweredEthernet™ PEB6100 modules meet or exceed 1500V impulse test. This is also referred to as 'Hi Pot Test', 'Flash Tested', 'Withstand Voltage', 'Proof Voltage', 'Dielectric Withstand Voltage' & 'Isolation Test Voltage'. PEB6100 is provided with 3No's of M3 Mounting holes with 6mm diameter pads around. MH1 and MH3 are having 1500V isolation with the surrounding circuit. The isolation area is highlighted with a 2mm white boundary. Ensure the head of the mounting screws does not extend in to the white band. MH2 is internally connected to the metal body of POE IN and DATA OUT connectors. Provide minimum of 2mm clearance on all the sides between chassis and the PEB6100 Board

5. Maximum Power Output

PEB6100 can deliver up to 57Watt. The maximum output current from an IEEE802.3at POE PSE being 600 mA, and input voltage can drop down depending on the length of the input cable from PSE to PEB6100. Hence the maximum out power from PEB6100 is dependent on available input power. Below figure is an example to indicate maximum power expected from PEB6112 at different input voltage.

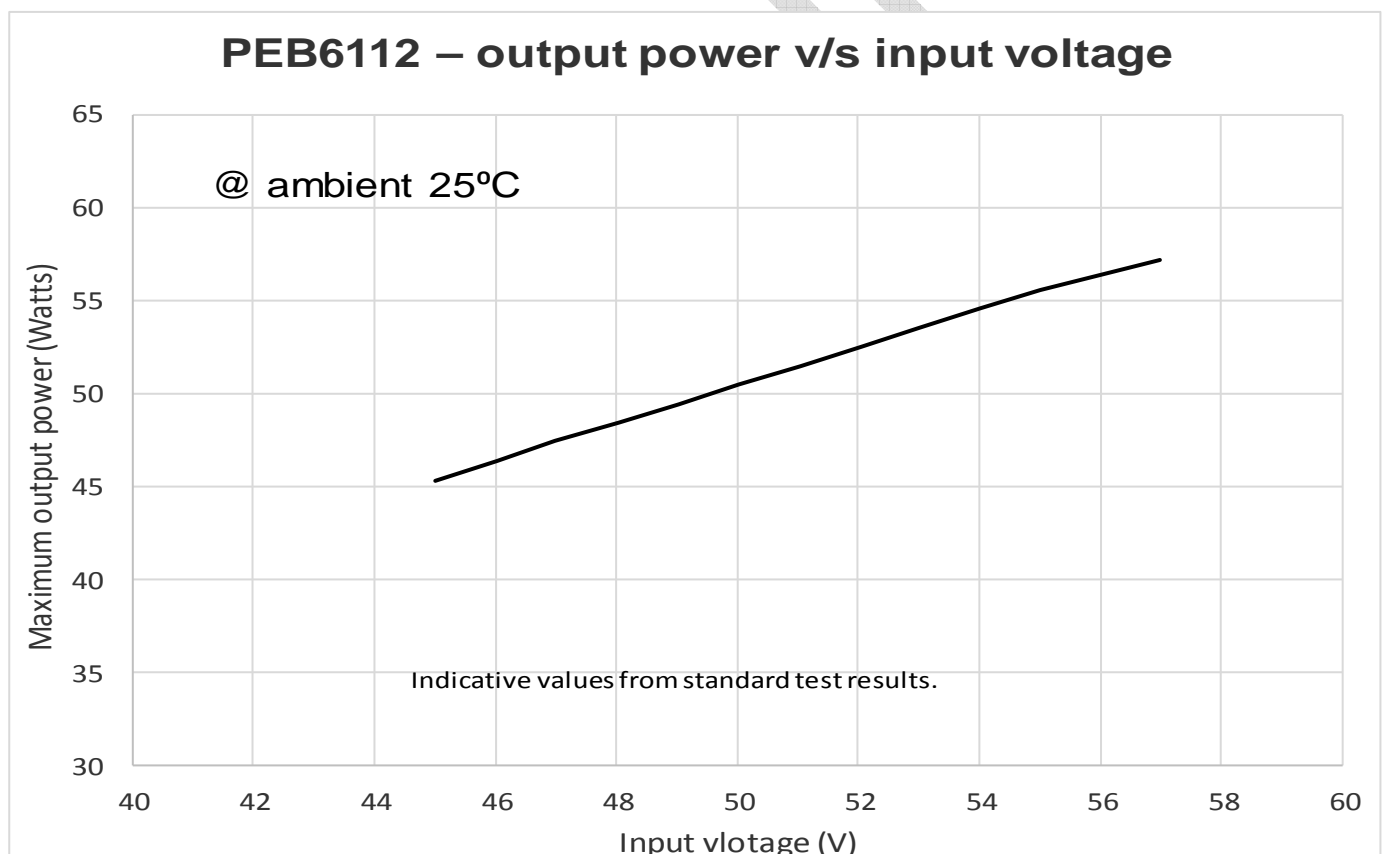


Figure 3

6. Connector Variants

PEB61XX YYY*	RRW	RRT	WRT	RWT	WWT
POE IN	RJ45 JACK	RJ45 JACK	9 PIN WAFER	RJ45 JACK	9 PIN WAFER
DATA OUT	RJ45 JACK	RJ45 JACK	RJ45 JACK	9 PIN WAFER	9 PIN WAFER
OUT PUT (DC Out)	2 PIN WAFER	TERMINAL BLOCK	TERMINAL BLOCK	TERMINAL BLOCK	TERMINAL BLOCK
* XX = Voltage variant; YYY = Connector variant.					
<p>The RJ45 Jack is horizontal entry tab-up full metal shield connector. Contact Infomart for the optional top entry RJ45 connectors.</p> <p>The 9Pin Wafer connector is standard relay-mate-connectors (CCX-W125-09-SMT series wafer or equivalent). The matching header or cable housing is the CX-H125-09 fitted with CX-T125-F terminal pins or any equivalents.</p> <p>Pin 9 of Input and Output wafer connector is tied common to the Ground. In turn the Ground connects to the metal body or Immunity Ground (Chassis).</p> <p>DC Out connector is 2 pin 3.96mm Wafer (eg. Wurth 645002114822. Matching Female Terminal housing and crimps: 645002113322 + 64500113722) or Terminal Block. Customers should use cables of adequate current rating.</p> <p>The designers should ensure not to bypass the 1500V isolation provided in PEB6100 board, during any of the external connections.</p>					

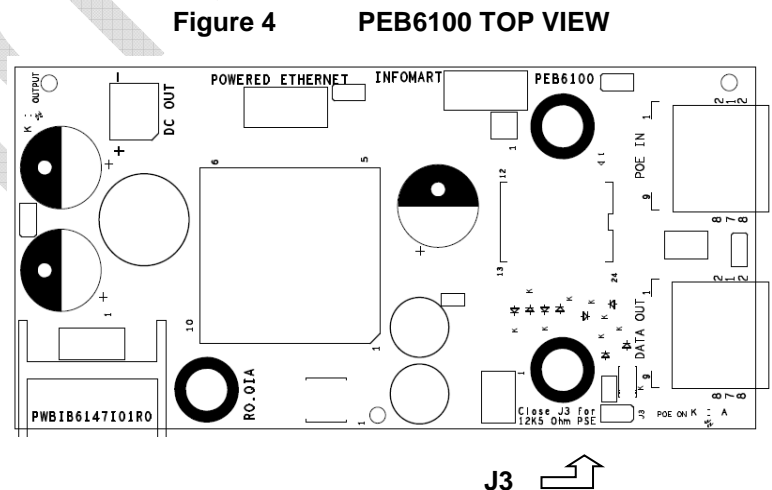
7. 12.5K Ohm Signature PSEs

The PEB6100 series provides the IEEE standard signature detection by default. Certain PSE's like Pihong, use a non-standard resistance of 12.5KΩ for 60W signature detection. For using with 12.5k ohms signature PSE's, a jumper (2pin header) is provided on PEB6100 at location **J3** as shown in the figure.

When the two pins of J3 are shorted, PEB6100 offers 12.5k Ohms signature detection. Example of shunt header MPN: 382811-6 or 2-382811-1(TE Connectivity)

Users are required to verify the PSE's variant and decide to keep J3 open or short.

CAUTION: For 24.9K ohms signature PSE's keep J3 open



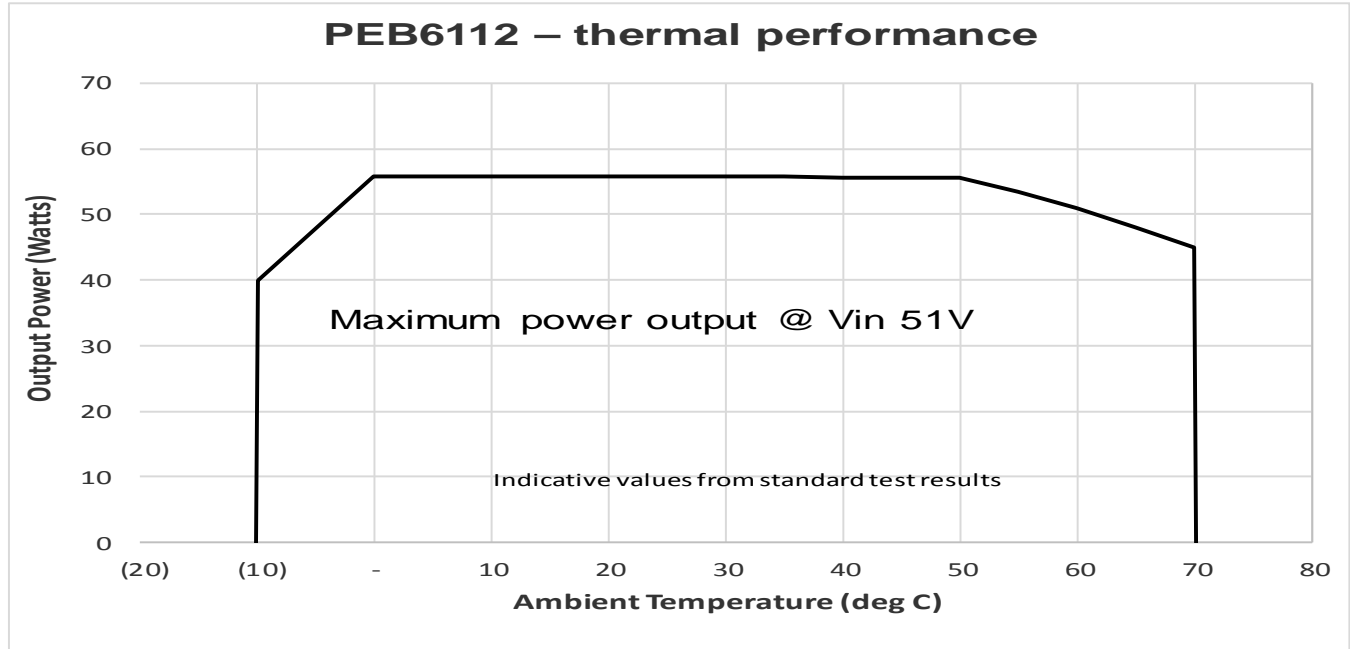
Place Shunt here for using with 12.5K Ohms signature PSEs

8. Thermal Management

As with any power component, the PEB6100 boards generate heat. It is important that adequate ventilation and airflow be taken into consideration at the design stage. The quantum of heat generated by the PEB6100 will depend on the output load it is required to drive. The maximum ambient operating temperature is 70°C. Figure 5 below, shows

the thermal performance of the PEB6100 with a 51VDC input. The PEB6100 thermal performance can be improved by forced airflow cooling over the module.

Figure 5 – Thermal Performance profile at nominal V_{in}



9. Typical end to end system efficiency across output loads

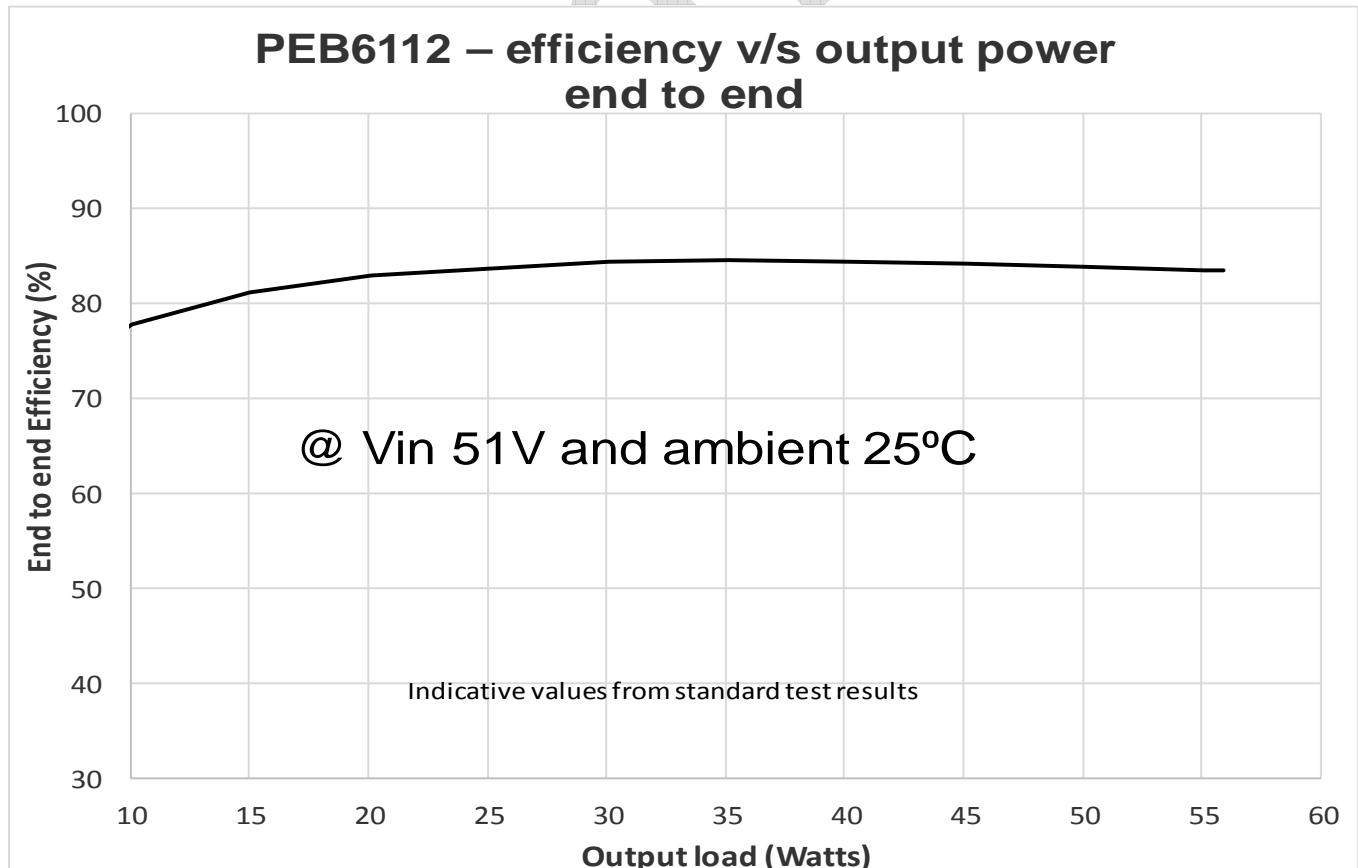


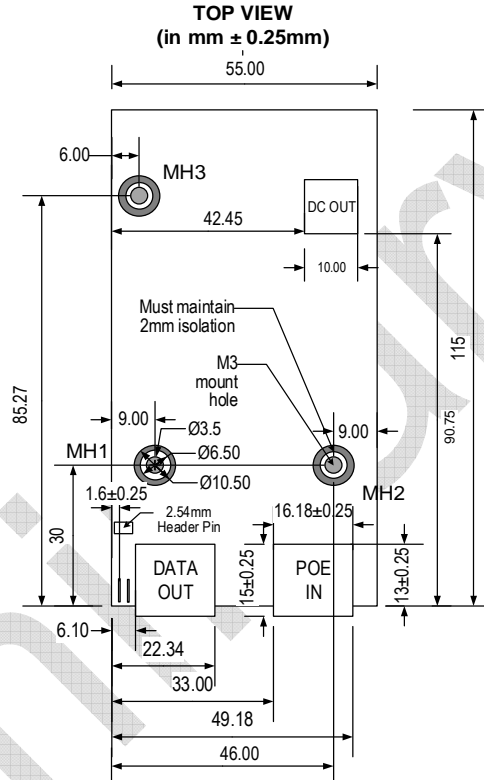
Figure 6

Figure 7 – PHYSICAL PACKAGE

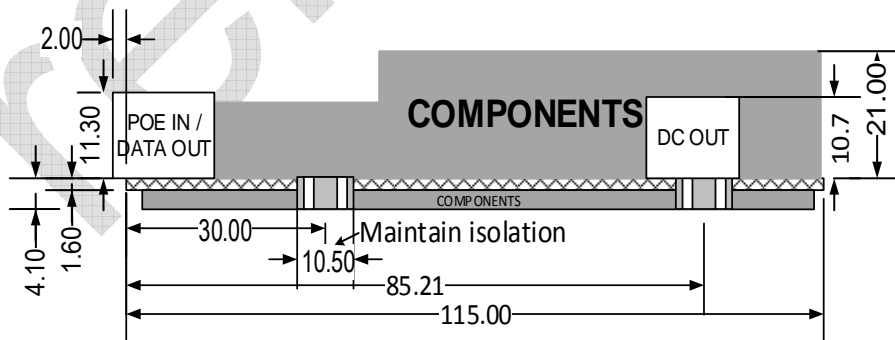
All dimensions in mm and nominal unless stated otherwise

Note:

- 5mm clearance from bottom of PCB is recommended. Additional clearance may be required for thermal performance.
- M3 screw recommended for MH1, MH2 and MH3.
- Mounting hole MH2 is internally connected to the metal shield of the POE IN and DATA OUT connectors.
- Mounting holes MH1 and MH3 are non-conductive and free from bottom side component encumbrances.



SIDE VIEW
(in mm ± 0.25mm)



APPLICATION NOTES

Power Over Ethernet (PoE) is a technology for wired Ethernet, the most widely installed local area network technology in use today. PoE allows the electrical power necessary for the operation of each end-device to be carried by data cables along with the data, rather than by separate power cords. Thus, it minimizes the number of wires used to install the network, resulting in lower cost, less downtime, easier maintenance and greater installation flexibility. The IEEE

standard governing PoE is IEEE 802.3af / 802.3at. Compliance with this standard ensures inter-operability between devices.

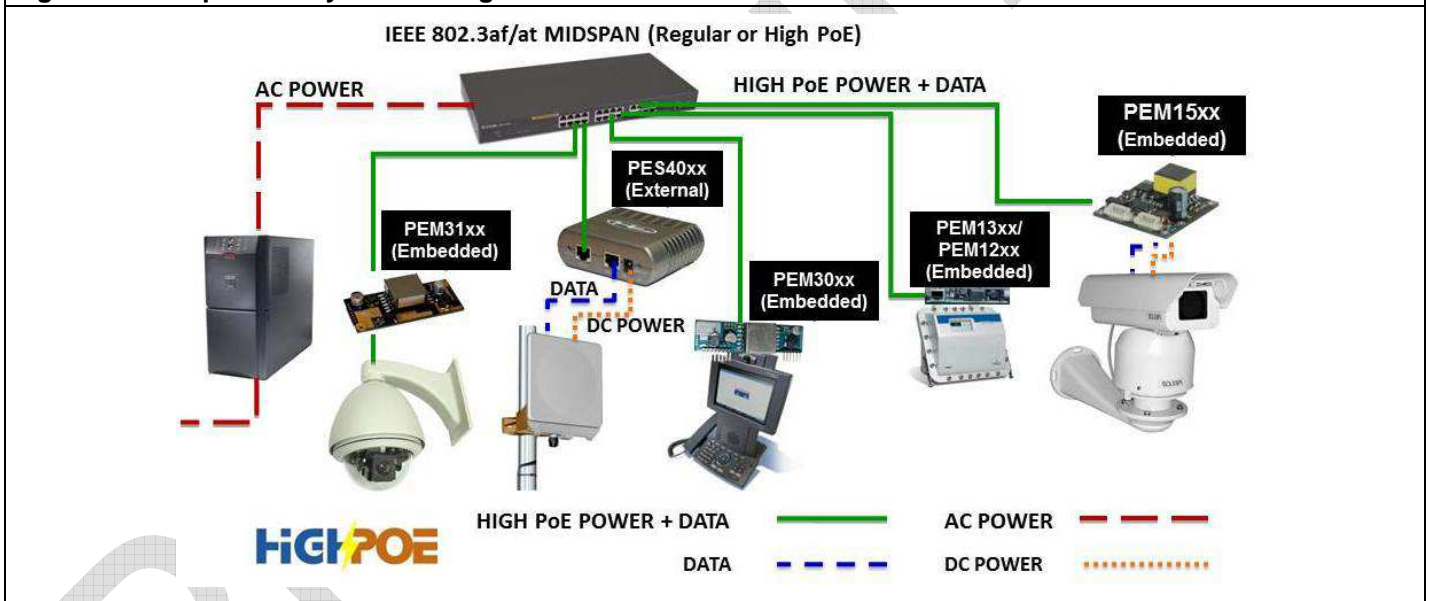
Ultra Power PoE enables output power up to 57 watts when used with an adequate power capacity PSE. PEB6100 compatible midspans are Phihong POE60U, Phihong POE75U, Microsemi-PowerDsine PD9501, or any IEEE802.3at midspan with 4 - Pair injection. PEB6100 are compatible to IEEE 802.3af / 802.3at midspans of 2-pair injection as well, with the output power being dependent on the PSE output.

The PEB6100 series modules offering a modular solution, incorporating full IEEE802.3af / at compatibility signature to the PSE and isolated on-board DC/DC converter. The PEB6100 series are ideal modular system blocks allowing manufacturers of Ethernet equipment to “PoE enable” their equipment with minimal effort and cost. The PEB6100 series offer simple and quicker product development, maximising return on investment.

APPLICATION AREAS

- Security and alarm systems,
- Access and physical control systems
- Thin clients and Single board computers
- High power Pan-Tilt-Zoom (PTZ) IP video surveillance cameras
- LCD displays, video panels, kiosks, Network monitors
- Public address systems
- 802.11n wireless, mesh networks, Bluetooth access points
- Environmental control, sensors, transducers and telemetry
- Industrial control and automation

Figure 8 – Sample PoE System Configuration



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