

High Power *in small packages*

PoE - Power over Ethernet

Ethernet is a very popular industry standard and a lot of devices have been made that communicate using Ethernet / CAT 5 cables. These devices used to be powered from the mains. They either had a small external wall adapter/external switched mode power supply or a complete integrated power supply. This unit powers the devices and as such the devices need to be placed close to a wall socket. In some applications that was and still is very inconvenient.

The power over Ethernet Standard (official name IEEE802.3af) replaces this power source. A standard 44V-57V voltage is available through the RJ45 connector. By allowing the PoE device (PD) to draw some current from the original hub/ Ethernet Power Sourcing Equipment (PSE), devices of up to 12W-14W can be powered via the RJ45 connector and no longer need a separate power supply. This is a great advantage for designers. Recently, new standards are evolving to expand PoE even to 26W.

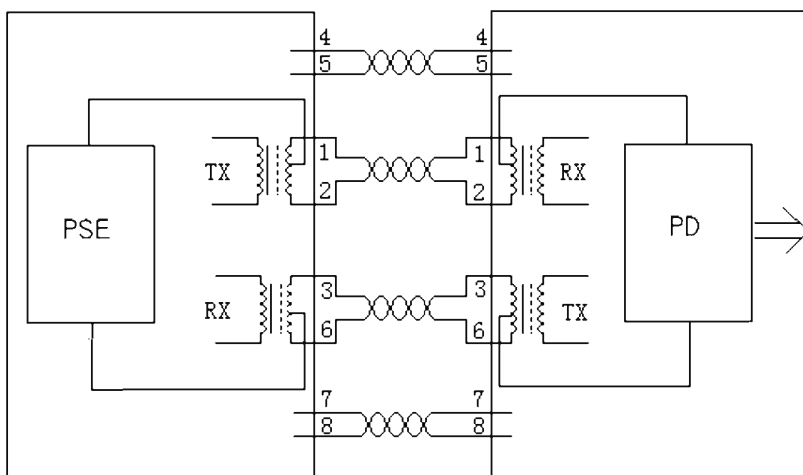


Fig. 1: Typical Power over Ethernet connection

Fig. 1 shows a typical schematic for a PoE connection. There are 2 different ways to transfer the power. A number of Rectifiers are used in a Power over Ethernet application; they are described in the following.

First and for all, there are either one or two bridge rectifiers. The current through the rectifiers is very low (<300mA) and the voltage environment is also low. The standard bridge for this application will be the MS80 from Diotec Semiconductor

which has an industry standard pin pitch of 2.5mm. Diotec further does have the advantage of the MYS80 bridge rectifiers. These provide full power rectification in a 1.27mm pitch package. As there are no creepage and clearance requirements, these products are ideally suited for these applications.

Since two bridges are used, the space saving could be important (e. g. in PoE webcams). There is no significant thermal or current stress in this application so the MYS bridge is the right choice.

On the input, in general also a 58V TVS is used. Whenever a cable is plugged and unplugged it is wise to use a TVS rectifier. Select a part with 58V minimum stand-off voltage such as the P4SMAJ58 with 400W peak pulse power.

A transient voltage protection diode is ideal when the protection needed is against ESD (IEC61000-4-2) and EFT (IEC61000-4-5). Most PoE applications are indoors and as such Lightning protection only needs to be up to level 2 in IEC61000-4-5. A 400W TVS like the P4SMAJ series can easily handle this also because the lightning pulse waveforms should be short (8/20 – 1.2/50).

