

Application Note

Low Capacitance Rectifier for Telecommunication Systems

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Rectifiers and Rectifier Bridges are commonly used in telecommunication applications such as line cards, modems and residential gateways.

Typical applications include:

- ◆ They can be a huge cost saving as steering diodes. Multiple lines are all connected to a single protection element such as a Thyristor.
- ◆ In other circuits, they clamp the Telecom line to either ground or the Vcc rail
- ◆ TVS diodes and Thyristors have a very high capacitance. Rectifiers stand in series with these protection elements to reduce capacitance.

In recent years, Telecom standards have become increasingly high speed and demand a very large bandwidth. We went from POTS to VDSL and Ethernet systems. Capacitance of the rectifiers has become a serious issue. Essentially they are low pass filters and their insertion loss becomes visible at the 3MHz and 30MHz measurement points – impacting ADSL2+, VDSL and higher speed standards.

Very expensive protection ICs are available on the market based upon multilayer IC technology to reduce capacitance. Diodec Semiconductor however avoids this high cost technology by finding the right trade-off between surge capability and Capacitance in the small MYS Bridge Rectifiers.

The typical Capacitance of the MYS bridge series is 3pF at 4V / 1MHz – the traditional method of characterizing rectifiers. Especially at the zero voltage crossing, the capacitance of TVS Diodes and Thyristors disturbs the bandwidth of high speed telecommunication systems. The MYS series has a typical capacitance of 6pF at zero V, see Fig. 1.

This makes the product highly suitable as steering diodes for VDSL, ADSL and Ethernet systems.

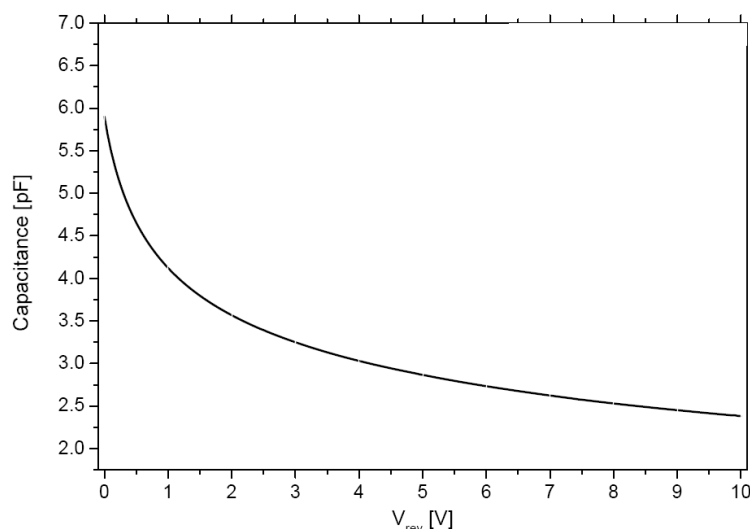


Fig. 1: Typical Junction Capacitance of MYS series

From an energy perspective it can easily handle all ESD and EFT pulses. Because the bridge has a solid soldered construction the surge capability is higher and the bridge can easily handle surges

due to the capacitive discharge of the isolation transformer on the secondary side. The product is characterized using 10ms half wave rectifier pulses rather than short 8/20 μ s telecom pulses. The absence of internal wire bonds reduces inductance.

The bridge has a 1.27mm pitch which makes it quite small. The height of 1.9mm means that it can be mounted on the wave soldering side of densely populated telecom boards.

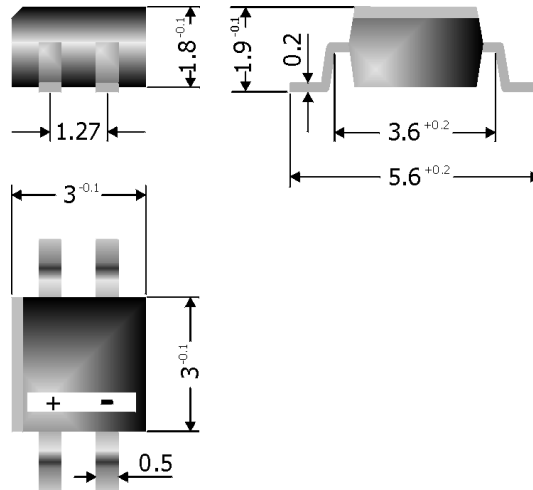


Fig. 2: Case Outline of MYS Series

The MYS125 version would suit most telecom systems. Further electrical data from this and other versions can be found in the datasheet.