

HIGH EFFICIENCY REVERSE POLARITY PROTECTOR

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After reading PA3BHK's item in SPRAT 83 I thought it was worth sharing this circuit. It offers the best of both worlds in that it has a low volts drop and virtually zero operating current.

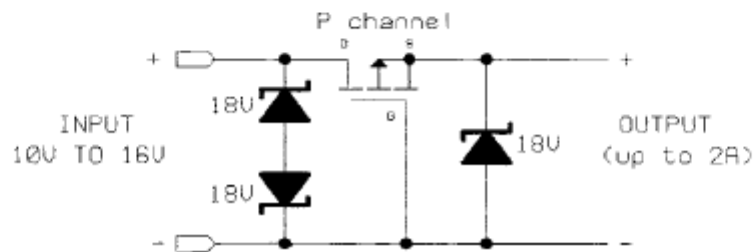
When a supply with the correct polarity is applied the MOSFET is switched on giving a low resistance between the drain and source. If the supply is reversed then there will be no gate-source bias and the MOSFET will be switched off. The parasitic diode between the drain and source will be reverse biased.

The volts drop across the circuit is dependant on the on-resistance of the MOSFET used. Suitable devices along with their maximum on-resistances are listed below.

| Device | Ron (max.) |
|----------|---------------|
| BUZ171 | 0.40 Ω |
| RFP8P05 | 0.30 Ω |
| RFP15P05 | 0.15 Ω |

The voltage drop increases linearly with load current up until the drain-source diode becomes forward biased at around 0.8V.

The zener diodes protect the MOSFET from damage due to electrostatic discharge.



SPIRITUS TRANSISTOR BASTA

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According to Peter, PE1MHO, this was the diagnosis of classical Roman engineers when checking a transistorised PA that went dead after accidentally reversing the polarity of its supply.

Apart from being annoying this can be an embarrassing experience as well. Especially when you are just about ready to switch your transmitter on from an ever so nice hole as happened to me one day in a 2 metre "foxhunt" DF-game!

The easiest remedy is a simple power diode (fig.1). Although fail safe it introduces a voltage drop of about 0.6 V (Sil-diode) which means loss of power and lower efficiency of the circuit. Much better is the circuit of figure 2. Reversing polarity blows the fuse (which hopefully, is faster than the PA-transistor). But what to do if you forgot to stick a spare fuse in your pocket?

The most elegant solution is shown in figure 3. Reverse polarity - nothing happens. Correct polarity? The relay allows the full supply voltage to feed the circuit. There is one minor disadvantage: most relays take an extra 10 to 20mA. The relay contacts must be capable of switching the desired current.

