

# 1kW LDMOSFET power amplifier for shortwave

## 65 Volt version

Since August 2017, there are LDMOS transistors that have a higher voltage and higher power than the well-known BLF188XR. This is the MRFX1K80 from NPX.

Here are the advantages and disadvantages of this new transistor compared to the well known BLF188XR:

| BLF188XR   | MRFX1K80        |                 |
|--|-----------------|-----------------|
| operating voltage                                  | 50 Volt         | 65 Volt         |
| drain-source breakdown voltage                     | 135 volts       | 179 volts       |
| gate-source breakdown voltage                      | -6 to +11 volts | -6 to +12 volts |
| 65V output power (compression 1dB) in 10m band     | —               | 1150            |
| 65V output power (saturated) in 10m band           | —               | 1900            |
| 50V output power (compression 1dB) in the 10m band | 830             | 825             |
| 50V output power (saturated) in 10m band           | 1270            | 1250            |
| frequency range                                    | 1.8 to 600 MHz  | 1.8 to 400 MHz  |
| Gain   | 29 dB           | 27.8 dB         |
| efficiency   | 75 %            | 75.6 %          |

The biggest advantage of the new 65V transistor is the significantly higher drain-source breakdown voltage. This helps a lot when building power amplifiers which should run reliably over many years on different antennas.

Furthermore, of course, the higher output power stands out, which is rewarded at lower levels with better linearity, since one is further away from the compression kink. The usable output power, which is realistic in radio practice, is slightly above the 1dB power. At 50 volts it is pretty much 1kW and at 65 volts about 1.4 kW.

Unfortunately there is also a small problem: power supplies with 65 volts and >30A are really expensive. The popular 50V server power supplies for around 50 Eur are already a fine thing. For 65V you easily spend 10 times the amount. But still, you can use this transistor at 50V, which is good for the lifetime, and it still has good performance at 50V.

## Circuit design:

the circuit board for the 50 Volt version (source) is also fully compatible with the 65 Volt transistors. Only a few components have to be assembled differently, compare with the parts list

|          |              |
|----------|--------------|
| C20, C21 | 100uF / 100V |
| C40, C41 | 470uF / 100V |
| R13, R24 | 100 Ohm      |

that's it, with these parts the board is ready for the MRFX1K80 and the 65 Volt supply.

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