

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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