Voltage Regulator Options + Gate Drive Monitor Circuit

LM7812, is a good +12-volt linear regulator, but the maximum input voltage is 35vdc. This regulator works OK for the 100-200 watt amps, but sometimes you need 36 or 37v to reach 200 watts.

LM7815, is used with the SiC-MOSFETS like the G3R40MT12D. The +15v is needed when using the TIP120 driver. The 15v is needed to get (+30dbm, 1watt) drive required for the SiC-MOSFET.

LM317, is an adjustable regulator with a maximum input voltage of +40vdc. This would be a better choice over the LM78xx when a little more input voltage is required. It takes a few more components to build the circuit, but there are LM317 regulator modules available at a very low price. See EBay or Amazon. Amazon link below.

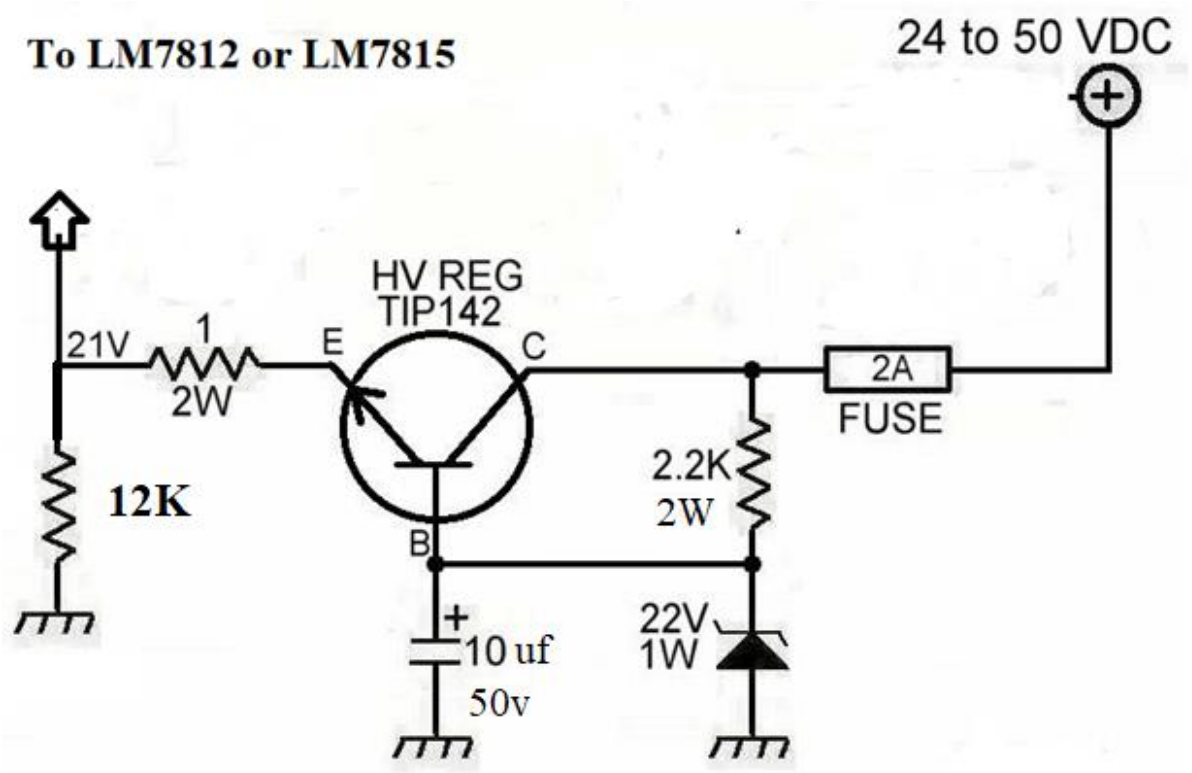
https://www.amazon.com/DEVMO-Converter-Step-Down-Regulator-Adjustable/dp/B07R5RP2NG/ref=sr_1_1

DC to DC converters, there are many DC to DC converters on the market that will also work. I have used them in the past but not lately. If looking at them be sure to verify the maximum input voltage.

LM317HV, is a high voltage adjustable regulator +60-volt maximum input. I have not used them with my 40-60 volt amplifiers, but they should work well. The LM317HV would allow you to operate the amplifier from +18-59vdc input.

TIP142 Darlington used as a regulator. The schematic below is the voltage regulator I use with my amplifiers when the supply voltage above 35vdc. You could replace the Zener diode with a 13v for 12-volt output, or 16v Zener for 15-volt output. You could then eliminate the LM7812 or LM7815 linear regulator, but the LM78xx regulators provides (short circuit protection, and output safe operating protection), so I continue to use them in the circuit after the TIP142-21v regulator.

With all the work I have done with the 40-60 volt amplifiers I favor the TIP142 regulator circuit above all other options.



The TIP142 is rated at 100V, 10A, 125-watt dissipation. This makes it a very rugged device for a regulator.

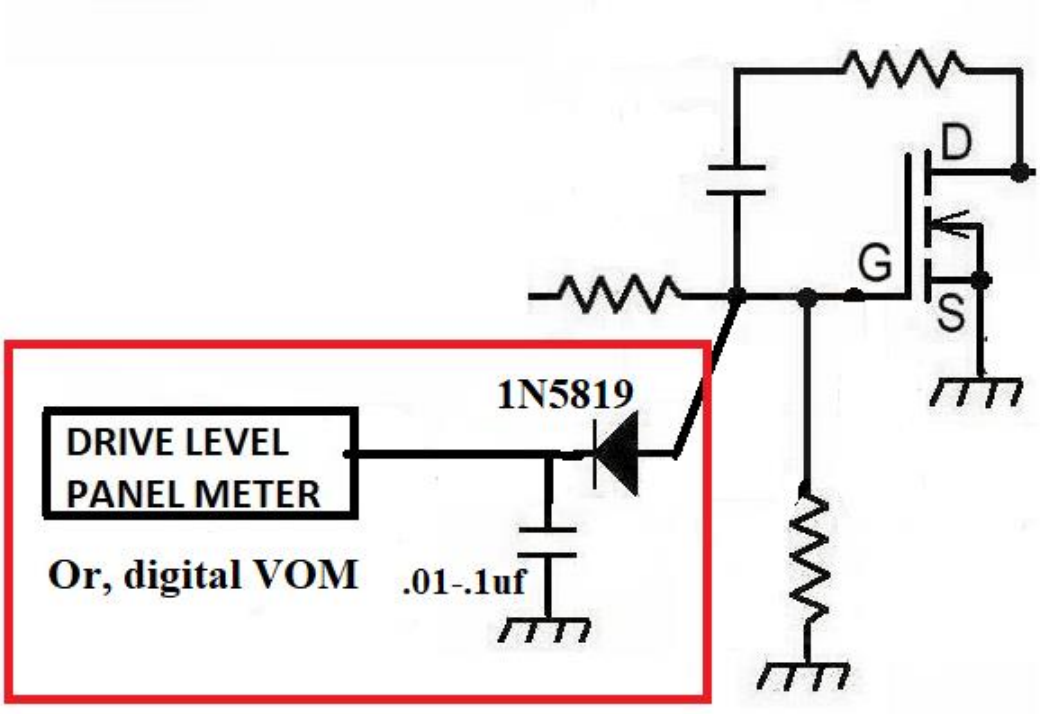
The input voltage on the schematic is showing 24-50vdc, but I have used this regulator circuit up too +70vdc.

I have found it's easier to build the regulator on a small PC board or Prototyping Board, and mount the transistor on the metal cabinet or heatsink. (insulator pad is needed).

See picture.

TIP142 regulator with the components mounted on a PC board. All components are mounted on the board with the exception of the 2-amp fuse.

DRIVE LEVEL METER CIRCUIT



The Drive Level circuit consist of a 1N5819 connected to the MOSFET Gate. The circuit does not load down the gate drive, so it can be connected to the gate to monitor the drive in real time or during testing and setup.

The levels your looking for are the maximum drive for the MOSFET that your using.

IRFP250 the drive level should be between **9-11vdc +10 ideals**.

G3R40MT12D, level should be between **14-16vdc +15 ideals**.

When running digital modes like FTS, FST4, WSPR, and others, the drive needs to be around the ideal maximum gate levels for the MOSFET you using. If you underdrive the MOSFET it will dissipate more power (efficiency will go down).

Two methods I use to monitor the drive level.

1. Use a digital VOM connected the test point (diode capacitor junction).
2. Mount a panel meter on your amplifier. The best low-cost way of doing this is the three-digit panel meters' found on EBay or Amazon. **Three-Wire DC 0~30V see link.**

https://www.amazon.com/bayite-Digital-Voltmeter-Display-Motorcycle/dp/B00YALUXH0/ref=sr_1_6


Overall Dimension:
0.9"(23mm)
0.59"(15mm)
0.39"(10mm)
0.2"(5mm)
0.2"(5mm)