

# Q5 SIGNAL 23cm 30W Linear Amplifier

A Down East Microwave Product Manufactured by Q5 SIGNAL, LLC

## Part Number 2330PA & 2330PATV

### Specifications

Frequency range:	2330PA - 1270 to 1300 MHz. 2330PATV –1240 to1270 MHz
Power Out (linear):	30 Watts minimum
Power Out (saturated):	>40 Watts typical
Power Input for rated power out:	50 mW typical, 75 mW saturated without
Optional Attenuator:	
Power requirements:	13.8 volts dc @ 10.0 amperes MAX.
Connectors:	Type-N female
Size with connectors:	5.5" L x 5.5" W x 4.2" H with Fan
Active device: Hybrid	RA18H1213G

### Description:

The 2330PA and 2330PATV are broadband linear power amplifiers optimized for their specified frequency range in the 23cm amateur band. They have a linear power output of 30W minimum with 50mW of drive or a saturated output of over 40 Watts. Each design may be used out of its optimized frequency range with reduced specifications. Type "N" connectors are used on both RF input and output. There is a common DC connector with the + DC and ground supply voltage, PTT-L, and a RF power output monitor. The 2330PA's require a well-regulated 13.8 VDC at 10A for full power output. Keying is done by connecting the PTT-L circuit to ground (activates the Bias circuit). The RF power monitor supplies a relative DC voltage to RF power.

This amplifier design utilizes the Mitsubishi RA18H1213G MOSFET hybrid power module. All regulated voltages and biasing that are required for proper operation are self-contained.

### Initial Testing and Instructions for Use:

After testing all coaxial components that will be utilized in the installation, make all RF connections to the 2330PA. Caution, at 1300 MHz, VSWR and insertion loss becomes factors even in the shortest lengths of coax. Never use UHF connectors at 23 cm and keep all coaxial lengths as short as possible. Make the DC connections next to a 13.8 VDC, 15A Power supply with the large red and black wires. Apply the DC power to the 2330PA and observe the fan becoming active. It may be slow at first.

With proper loads connected to both input and output RF connectors, and **No RF drive applied**, activate the PTT-L circuit by connecting the **small black wire** to any ground connection on the amplifier or DC supply. The amplifier will now have a quiescent current of between 3 to 6 amps. At this time, the RF monitor voltage (**small red wire**) should be checked for zero volts referenced to ground. If not 0.00 VDC, disconnect the PTT-L circuit immediately. If voltage rises

with PTT-L connected and without drive applied, there may be an oscillation in the amplifier. Re-check all coaxial connections, loads and antennas. If voltage is zero, RF drive may be applied.

Apply the drive gradually if possible while monitoring the voltmeter connected to the Red wire RF monitor. During the initial testing, do not exceed the specified drive level for linear operation listed on the specifications above. If you have a power meter in line, you may now calibrate your system. If not, the voltage will vary with the output power and saturate before the maximum drive level is obtained. Set output power by adjusting the input drive level.

**IMPORTANT:** This amplifier design assumes a clean filtered signal will be used as a drive source but will require a Low pass filter on its output to eliminate 2<sup>nd</sup> and higher harmonics that exist or may be amplified by excessive drive.

**Caution:**

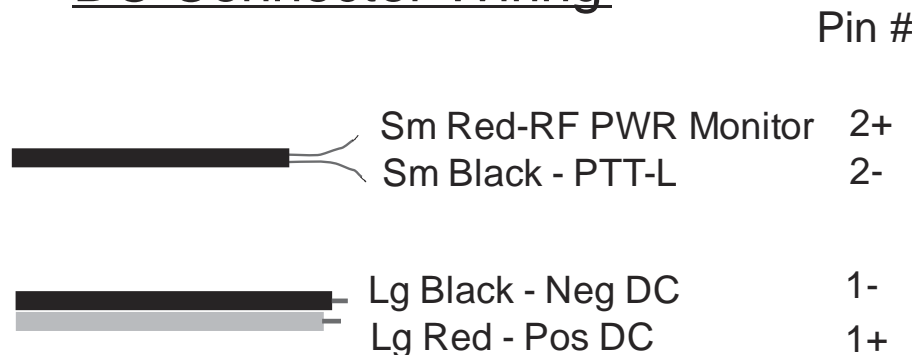
Do not exceed 15 volts on the DC line. When in operation, utilize over voltage protection and any voltage sensing circuits that the power supply in use may offer. With high current drain, voltage sag will inhibit the amplifiers output power performance and with lower quality power supplies, the voltage may soar beyond the amplifiers specified limits when un-keyed.

Use the highest quality coaxial cables possible on both RF connections. Test all coaxial components at low levels before installing into the final system. Bad coaxial components, improper connections, or antennas that are not matched may cause amplifier oscillations.

Install the amplifier with the heat sink up and fan on top so the amplifier will convection-cool. A fan is supplied to pull air through the heat sink fins and will cool the amplifier in any mode of operation including continuous duty applications. It is recommended not to keep the amplifier continuously keyed in the transmit mode without applying RF drive.

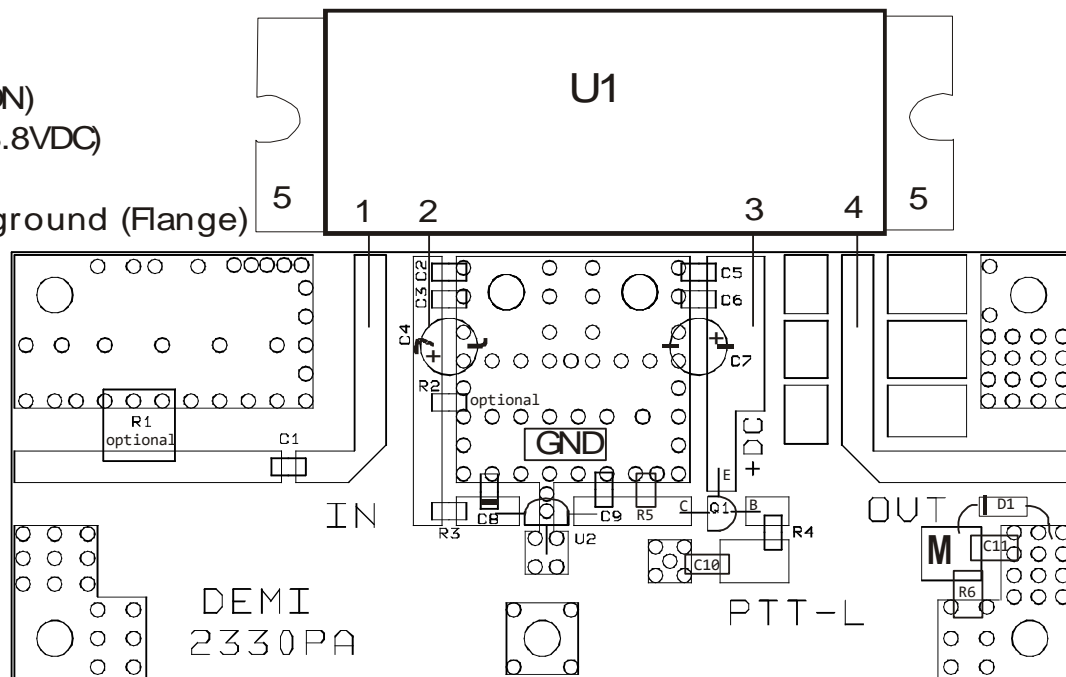
The RF power monitor is designed to produce a relative voltage output that is capable of driving a digital volt meter up to +6 VDC for full output power. This meter may be calibrated to meet your systems requirements.

## DC Connector Wiring

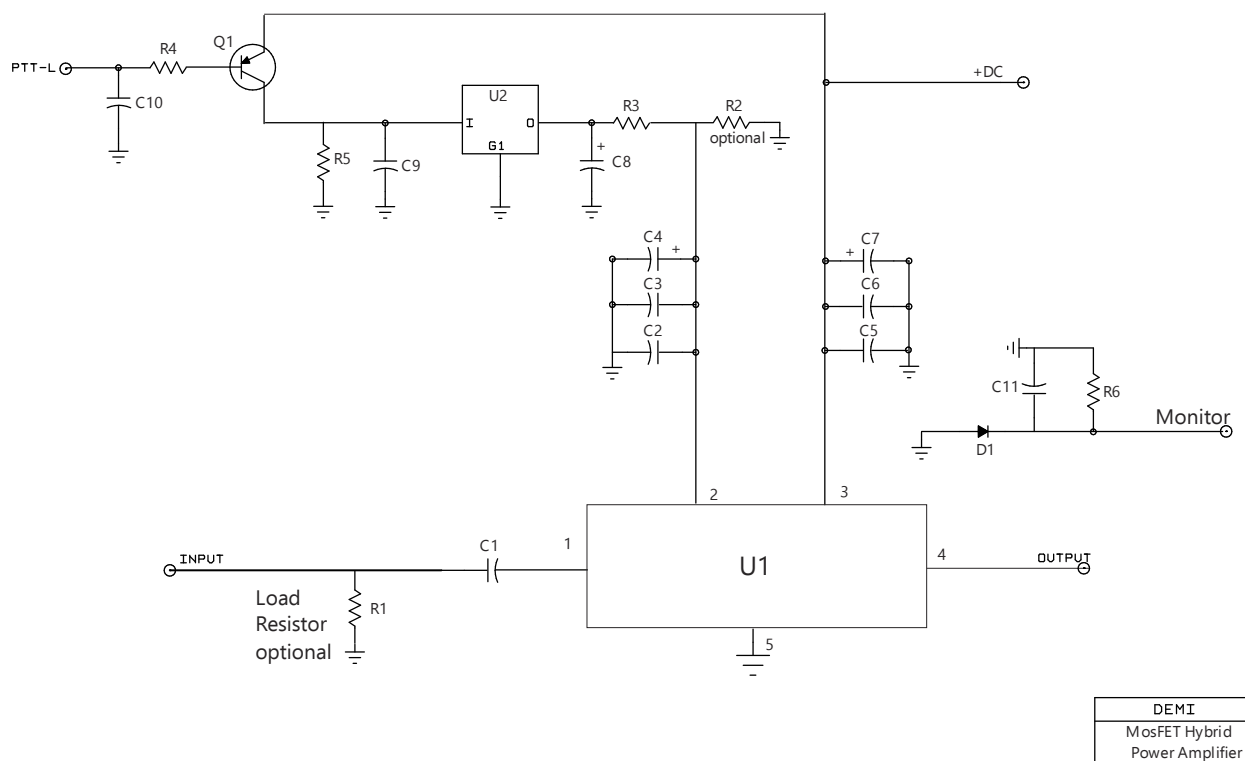


## Pin Out

- 1 RF In
- 2 Bias (TXON)
- 3 Vcc (+ 13.8VDC)
- 4 RF Out
- 5 RF & DCground (Flange)



## 2330PA and 2330PATV Component Placement



## 2330PA Schematic Diagram