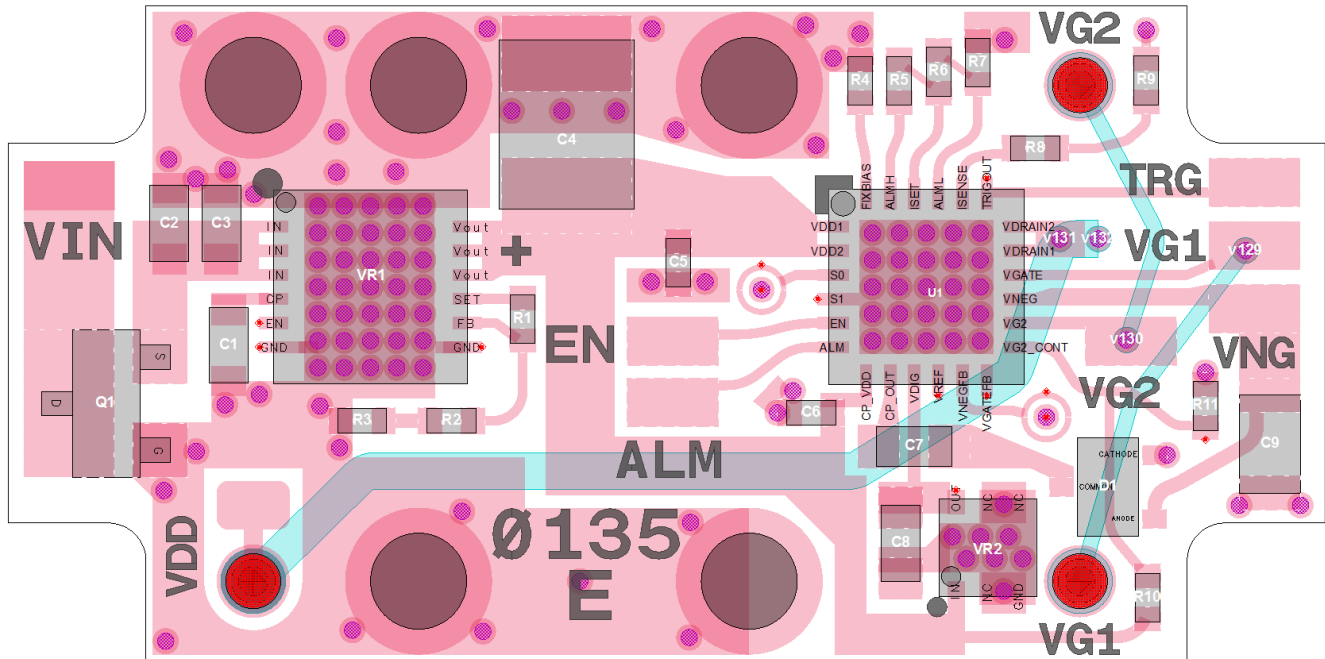


HMC980

General purpose bias controller for multiple amplifier configurations.

Data sheet link: <http://www.analog.com/media/en/technical-documentation/data-sheets/hmc980chips.pdf>

1.1 X-Microwave PCB 135 features the HMC980



C1 => 0.01uF 0603	R1 =>	R6 => 300	R11 =>	U1 => HMC980LP4E
C2, C3, C7, C8 => 1uF/25V 0603	R2 =>	R7 => 4.7K		VR1 => LP38798SD
C4 => 10uF/16V 1210 Tant	R3 =>	R8 =>		VR2 => TPS715A33
C5, C6 => 0.1uF P Plus 0402	R4 => 10K	R9 =>		Q1 => SI2347DS
C9 => 4.7uF/25V 0805	R5 => 300	R10 =>		D1 => BAT54

Operation

Required: The bias controller is designed to operate with a single supply. The user must solder a single wire to the VIN pad and supply the correct voltage. $VIN = (\text{Desired } VDD + 1.5V)$. For example, if the desired VDD output voltage is 10V (derived from the amplifier data sheet), the supplied VIN voltage should be between 11.5V and 15V DC. Providing the lowest possible voltage in the range should reduce heat generated by the voltage regulator chip. X-Microwave pre-configures resistors on the board to set the voltage and current setpoints. Each unique configuration of this PCB receives its own unique X-Microwave Part Number.

Optional: When using multiple HMC980 or HMC981 devices the TRG (Trigger, output) pad of one board may be soldered to the EN (Enable, input) pad of the next allowing sequenced power-up for the purpose of limit system inrush current at start-up. ALM is an alarm signal that transitions from low to high when an under/over current state is detected.

Note: Typically, in prototyping applications, spring pins come pre-soldered into the holes labeled VDD, VG1 and VG2 and the pads next to the spring pins are unused. For production, the spring pins are removed and 30ga wire is used in their place. The solid core wire inserts from the bottom of the board through the hole in the bias controller and the via in the RF board. A dot of solder is

applied from the top. The bottom side of the wire is bent over the edge of the bias board for strain relief and soldered to the nearby pad.

Configuration

In most cases the bias controller comes pre-configured for use with the amplifier you ordered with it. The following information is provided in the event you need to configure or re-configure the bias controller.

1. U1 is the HMC980 configured as recommended by the datasheet:
 - 1.1 S0 is configured for (VDIG) by default, but can also be tied to Ground (GND) by dropping a bead of solder on the center of the bullseye.
 - 1.2 R8+R9 together make up ISENSE. Two resistors allow finer tuning of resistance.
2. Part VR1, part LP38798SD, supplies the HMC980 (U1) VDD input.
 - 2.1 The LP38798SD voltage level is set by R1 and R2 + R3
3. The VG2 voltage is set by voltage divider using R10 and R11, dividing between the VDD input voltage and ground. R10 should be less than 5k Ohm. $V_{G2} = \frac{V_{REG} * R_{11}}{R_{10} + R_{11}} - 1.3V$
4. The VREG output should be configured to provide the right Voltage for the HMC980 which in turn provides the amplifier's required VDD
5. VREG input should be 0.5V more than its desired output

Example

1. Configuration for supporting the HMC5805ALS6 distributed amplifier
 - a. **Target Values:**
 - i. VDD (HMC980 VDRAIN) = 10V
 - ii. VG2 (HMC980 VG2) = 3.5V,
 - iii. IDD (HMC980 ISENSE) = 175mA
 - iv. VREG (VR1 Out) = 10.44, (VDD + 0.44V)
 - b. **Calculated Values to Set VR1 to 10.44:**
 - i. R1 = 100k;
 - ii. R2 = 9.09k;
 - iii. R3 = 3.9k
 - c. **Calculated Values for Setting ISENSE to 175mA:**
 - i. R8 = 750
 - ii. R9 = 105
 - d. **Calculated Values for Regulating VG2_CONT:**
 - i. R10 = 4.7K;
 - ii. R11 = 3.9k
 - e. **S0 Settings:** Solder the bullseye to the center ground Via
2. Operation of the HMC5805ALS6 distributed amplifier
 - a. Solder a wire to VIN
 - b. Connect the wire to the feedthrough capacitor A-1 on the prototyping plate and attach a power supply lead to the other side of the feedthrough capacitor.
 - c. Supply between 11.5V and 18V DC from an external power supply
Note: Keep the voltage as low as possible to reduce heat from the VREG