Typical Bias Sequence Circuit for MMICs

Background

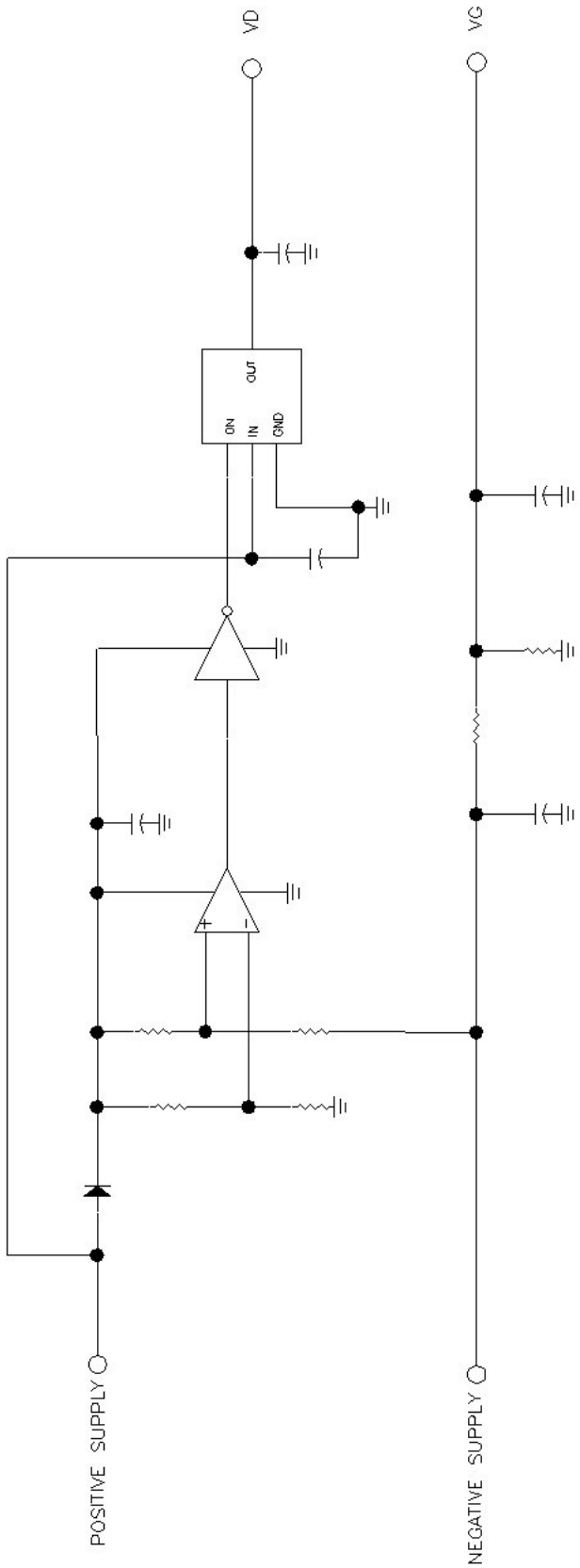
GaAs devices require a negative gate voltage and a positive drain voltage to operate at a specified quiescent operating point. The negative gate voltage is required to adjust the drain current. The proper bias sequence for a GaAs device is to pinch off the device with a negative voltage of between –1.5V and –5V. Following this, the drain voltage should be applied. Finally, the gate voltage is brought more positive to set the proper quiescent current. If the drain voltage is applied prior to the gate voltage, this can potentially damage the device.

Method

In the following figure, a typical circuit is shown for sequencing the bias voltages for a MMIC in the proper order. This will help avoid damage to the device due to excessive current or potential oscillations. This circuit is designed for a static gate voltage. There is no current sensing to adjust for variations in Idss from device to device.

Recommended Approach

The voltage regulator at the output should be selected in order to source a proper amount of current for the device in use. The voltage dividers at the inputs of the comparator should be sized to provide a larger voltage at the positive input when the negative source is at its operating voltage. The circuit shown is only meant as a starting point. For additional information, please contact TriQuint Semiconductor Texas Applications Engineering Department at 972-994-3647.


VD
VG
OUT
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POSITIVE SUPPLY
NEGATIVE SUPPLY