

## Application Note #003 Thermopad<sup>®</sup> Amplifier Temperature Compensation

The Thermopad is an absorptive microwave attenuator which provides power dissipation that varies with temperature. It is extremely useful as a temperature compensating element. For example, a very common problem with GaAs amplifiers is that the gain of the amplifier varies by  $-0.001 \text{ dB}/^\circ\text{C}$  for every dB of gain. So a 30 dB amplifier would have a gain coefficient of  $-0.03 \text{ dB}/^\circ\text{C}$ . The gain of the amplifier can be stabilized over temperature by cascading it with a 6 dB Thermopad with a  $-0.03 \text{ dB}/^\circ\text{C}$  temperature coefficient (see **Figure 1**). Also shown in the figure is the amplifier response using the conventional compensation of a PIN diode variable attenuator with DC coupling for bias application, a driver circuit with linear compensation, and a temperature probe. The latter method is more costly, in terms of material, board space, and assembly time; it is less reliable and can produce RF distortion.

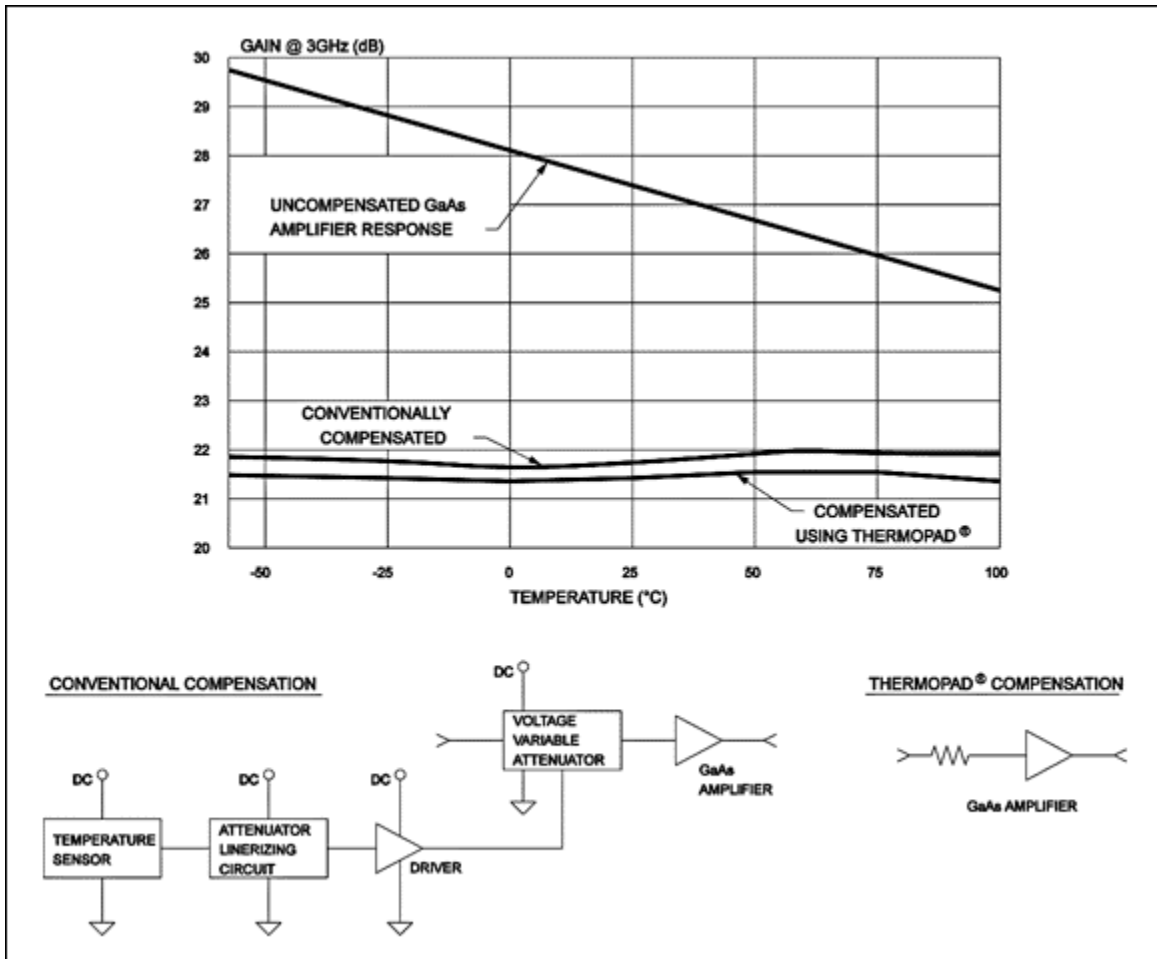


Figure 1