



Power amplifier with inbuilt thermal sensor

BACKGROUND

The performance and reliability of power amplifiers are strongly dependent on the internal temperature of the transistor. Without a system to monitor the temperature changes in real-time, the current practice is to determine a safe operating bias and pulse characteristic (for pulsed amplifiers such as those used in radar applications) based on prior thermal measurement (e.g. using a thermal camera) of a test sample.

A large safety margin has to be applied to counter part-to-part variation and differences in the thermal conductivity of die attach (e.g. differences in epoxy thickness or conductivity). This large safety margin leads to lower amplifier performance and doubts about the reliability.

A common practice to measure the power amplifier temperature is to embed a thermocouple within a few centimetres of the power amplifier. The physical separation between the power amplifier and the thermocouple creates a thermal network that delays and degrades the ability to accurately determine the temperature of the power amplifier.

OUR SOLUTION

This electronic real-time monitoring system enables accurate measurement of transistor temperature with time constants on the order of microseconds.

This sensor is embedded into the hottest part of amplifier integrated circuit but has the capacity to be spread throughout the array feeding this information to a control system to adjust the bias and pulse characteristics accordingly.

APPLICATIONS

- ✓ All RF, microwave and millimetre-wave monolithic amplifiers especially pulsed power microwave/millimetre-wave monolithic (MMIC) amplifiers.

INVENTORS

Professor Simon Mahon, Professor Anthony Parker, Professor Michael Heimlich

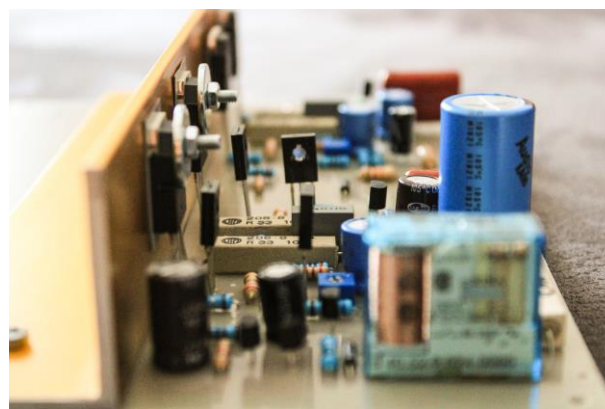
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ADVANTAGES / BENEFITS

Accurate measurement

Speed of measurement

Broad range of applications



Source: Rosy_Photo, <https://pixabay.com/photos/amplifier-electronics-transistor-4581135/>

INTELLECTUAL PROPERTY POSITION

Patent Cooperation Treaty (PCT) filed

PARTNERING OPPORTUNITY

We are seeking an industry partner for further development and commercialisation of this technology through a research collaboration or technology licence.

WOULD YOU LIKE TO KNOW MORE?

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