RFIC Measures Peak to Average Power Ratio

Hittite Microwave's HMC614LP4E RMS Power Detector is designed for RF power measurement, and control applications for frequencies up to 3.9 GHz. The detector provides a "true RMS" representation of any RF/IF input signal. The output is a temperature-compensated, monotonic representation of real signal power, measured with a differential input sensing range of 71 dB. This power detector SMT IC integrates two different power detectors to detect root-mean-square (RMS) and RF envelope power simultaneously. The device measures the instantaneous RF envelope power and the true RMS power of any RF input signal from 100 MHz to 3.90 GHz in applications requiring repeatable power measurement over temperature and where RF/IF waveshape and crest factor change over time. The power detector's IPWR output measures crest factors up to 12 dB and a power-down mode. The IC can be used to measure and control RF power in the transmit channel of a wireless base station.

The HMC614LP4E provides an indication of the instantaneous or peak input power level normalized to the average input power level (peak to average power ratio) via the IPWR output. The capability of simultaneously measuring the instantaneous power (envelope power) and the average true RMS power provides crucial information about the RF input signal (e.g. Peak Power, Average Power, Peak to Average Power and RF Waveshape).

Additionally, the device exhibits a differential input sensing range of 72 dB with ±1 dB detection accuracy up to 3.9 GHz and measurement deviation of less than ±0.10 dB at 12 dB crest factor and less than ±0.50 dB over the full operating temperature range. The component has an output voltage range from 0.40 to 3.20 V and an input range from -57 to 15 dBm. The power detector's input return loss is better than 10 dB typical with input resistance of 200Ω at a maximum input voltage of 2.25 Vrms. The RFIC provides a RSSI slope of 37 mV/dB and RF threshold level of -57 dBm.

The 4 × 4 mm leadless QFN-packaged HMC614LP4E operates from a power supply from 4.50 to 5.50 V, consumes only 75 mA of current and has an operating temperature range from -40°C to +85°C. Applications for the power detector include logarithmic to RMS conversion, received signal strength indication (RSSI), transmitter signal strength indication (TSSI), RF power amplifier efficiency control, receiver automatic gain control and transmitter power control.

The HMC614LP4E is ideally suited to wide bandwidth, wide dynamic range applications requiring repeatable measurement of real signal power.

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