XX-XXXX; Rev 0; 10/05

MAXIM

Automatic RF MESFET Amplifier Drain-Current Controllers

General Description

The MAX11014/MAX11015 set and control bias conditions for dual MESFET power devices found in point-to-point communication and other microwave base stations. The MAX11014 integrates complete dual analog closed-loop drain-current controllers for Class A MESFET amplifier operation while the MAX11015 targets Class AB operation. Both devices integrate SRAM lookup tables (LUTs) that can be used to store temperature and drain-current compensation data.

Each device includes dual high-side current-sense amplifiers to monitor the MESFET drain currents through the voltage drop across the sense resistors in the range of 0mV to 625mV. External diode-connected transistors monitor the MESFET temperatures while an internal temperature sensor measures the local die temperature of the MAX11014/MAX11015. The internal DAC sets the voltages across the current-sense resistors by controlling the GATE voltages. The internal 12-bit SAR ADC digitizes internal and external temperature, internal DAC voltages, current-sense amplifier voltages and external GATE voltages. Two of the 11 ADC channels are available as general-purpose analog inputs for analog system monitoring.

The MAX11014's gate-drive amplifier functions as an integrator for the Class A drain-current control loop while the MAX11015's gate-drive amplifier functions with a gain of -2 for Class AB applications. The current-limited gate-drive amplifier can be fast clamped to an external voltage independent of the digital input from the serial interface. Both the MAX11014 and the MAX11015 include selfcalibration modes to minimize error over time, temperature, and supply voltage.

The MAX11014/MAX11015 feature an internal reference and can operate from separate ADC and DAC external references. The internal reference provides a well-regulated, low-noise +2.5V reference for the ADC, DAC, and temperature sensors. These integrated circuits operate from a 4-wire 20MHz SPI™-/MICROWIRE™-compatible or 3.4MHz I²C*-compatible serial interface (pin-selectable). Both devices operate from a +4.75V to +5.25V analog supply (2.8mA typical supply current), a +2.7V to +5.25V digital supply (1.5mA typical supply current), and -4.5V to -5.5V negative supplies (1.1mA supply current). The MAX11014/MAX11015 are available in a 48-pin thin QFN package specified over the -40°C to +105°C temperature range.

Purchase of I²C components from Maxim Integrated Products, Inc. or one of its sublicensed Associated Companies, conveys a license under the Phillips I²C Patent Rights to use these components in an I²C system, provided that the system conforms to the I²C Standard Specification as defined by Phillips.

Features

- **Dual Drain-Current-Sense Gain Amplifier**
  - **Preset Gain of 4**
  - **±0.5% Accuracy for Sense Voltages Between 75mV and 625mV (MAX11014)**
- **Common-Mode Sense-Resistor Voltage Range**
  - **0.5V to 11V (MAX11014)**
  - **5V to 32V (MAX11015)**
- **Low-Noise Output GATE Bias with ±10mA GATE Drive**
- **Fast Clamp and Power-On Reset**
- **12-Bit DAC Controls MESFET GATE Voltage**
- **Internal Temperature Sensor/Dual Remote Diode Temperature Sensors**
- **Internal 12-Bit ADC Measures Temperature and Voltage**
- **Pin-Selectable Serial Interface**
  - **3.4MHz I²C-Compatible Interface**
  - **20MHz SPI-Compatible Interface**

Ordering Information

PART	TEMP RANGE	PIN-PACKAGE	PKG CODE	AMPLIFIER
MAX11014 BGTM+	-40°C to +105°C	48 Thin QFN	T4877-6	Class A
MAX11015 BGTM+*	-40°C to +105°C	48 Thin QFN	T4877-6	Class AB

+ Denotes a lead-free package.
**Future product—contact factory for availability.*

Pin Configuration and Typical Operating Circuit appear at end of data sheet.

Applications

Cellular Base-Station RF MESFET Bias Controllers
Point-to-Point or Point-to-Multipoint Links
Industrial Process Control

SPI is a trademark of Motorola, Inc.
MICROWIRE is a trademark of National Semiconductor Corp.