



MOTOROLA

Semiconductor Products Sector

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Information Brief



RF Power Amplifiers with On-Chip GaAs Negative Voltage Generator for 900 MHz and 1.8/1.9 GHz GSM/PCS Phones

Eliminates the need for a negative voltage power supply

The MRFIC1819 and MRFIC0919 are single supply, RF Integrated Power Amplifiers (IPAs) that are designed for use in 900 MHz, and 1.8 to 1.9 GHz cellular phones respectively. These Gallium Arsenide three-stage IPAs both have an integrated on-chip negative voltage generator, with Gate-Drain priority switching that protects the GaAs power amplifier. These second generation features are implemented using RF rectification, which prevents the generation of any spurious signals.

Both devices are packaged in a new high power surface mount package, a special 16-pin TSSOP with a backside metal contact. The package provides excellent thermal and electrical performance through this solderable metal contact. This large contact area is physically connected to ground of the MRFIC0919 or MRFIC1819, and is soldered to the pc board using the same standard reflow process used for other surface mount components, simplifying the system design and production processes. The high thermal conductivity of this special TSSOP-16EP package allows these devices to provide RF output power of at least 32 dBm, without consuming excessive board space.

FEATURES

COMMON FEATURES/SPECIFICATIONS

- On-chip negative voltage generator is free of spurious outputs (–60 dBc)
- Integrated Gate-Drain priority switching protects GaAs power amplifier
- Packaged in a new high power TSSOP-16EP surface mount package
- Single positive supply voltage of 3.6 V

SPECIFICATION DIFFERENCES

	MRFIC0919	MRFIC1819
• Usable Frequency Range	800 to 1000 MHz	1700 to 1900 MHz
• Output Power	35.3 dBm	33 dBm
• Power Added Efficiency	53 %	40 %
• Noise Power	–90 dBm	–85 dBm
• Output Power at Low Voltage (3.0 V)	33.7 dBm	31 dBm
• Harmonic Output		
• $2F_O$	40 dBc	40 dBc
• $3F_O$	45 dBc	40 dBc

TYPES OF APPLICATIONS

These integrated power amplifiers with on-chip GaAs negative voltage generators are ideal for use in GSM or PCS cellular phones that operate in the 900 MHz or 1.8 and 1.9 GHz bands.

- The MRFIC0919 3.6 V, GaAs 900 MHz Integrated RF Power Amplifier is capable of providing a peak output power of 3.0 W, and is designed for use in 2.0 W GSM900 cellular phones.
- The MRFIC1819 3.6 V, GaAs 1.8/1.9 GHz Integrated RF Power Amplifier is capable of providing a peak output power of 2.0 W, and is designed specifically for use in 1.0 W DCS1800 and PCS1900 cellular phones.

BENEFITS TO YOU

- Lowers system cost and manufacturing costs due to integrated, on-chip negative voltage generator and Gate-Drain priority switching.
- Simplifies certification of cellular phone equipment because the integrated GaAs negative voltage generator is free of spurious outputs.
- Improves phone quality with RF power amplifier having excellent low noise performance.
- Reduces battery size and weight for cellular phones with 3.6 V operation and high power added efficiency of the power amplifier.
- Improves phone reliability with on-chip Gate-Drain priority switching protection of GaAs power amplifier.
- Reduces parts count and pc board space due to low input power requirements, with high gain performance of the power amplifier function.
- Improves system performance with excellent output power, power added efficiency, noise power, and low harmonic output specifications.
- Provides higher circuit and system density with the new high power TSSOP-16EP surface mount package.

A SOLUTION TO THESE QUESTIONS

- Do you want to reduce the parts count and lower your manufacturing costs by using an IPA with an on-chip negative voltage generator and integrated Gate-Drain priority switching?
- Do you need to improve the receiver sensitivity of your GSM or PCS cellular phone by improving the receive band noise performance?
- Does your design require that the battery size and weight be reduced with a supply voltage as low as 3.6 V and low power consumption?
- Would you like to improve the reliability of your cellular phone by having on-chip Gate-Drain priority switching protection for the GaAs power amplifier?
- Do you need to improve the performance of your GSM or PCS cellular phone by designing in an IPA that has excellent output power, power added efficiency, noise power, and low harmonic output specifications?
- Do you want to reduce the pc board area of your cellular phone with a space-efficient power amplifier in a high power surface mount package?


LITERATURE

Complete data sheets containing full specifications, characteristic curves, and application circuit configurations are available through Motorola's LDC as MRFIC1819/D and MRFIC0919/D. Alternately, call Mfax at 602/244-6609 and key-in MRFIC1819 and/or MRFIC0919.

ORDERING INFORMATION

Device	Operating Temperature Range	Package in Tape & Reel
MRFIC0919R2 MRFIC1819R2	$T_A = -40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	TSSOP-16EP* TSSOP-16EP*

* 2,500 units per 16 mm, 13 inch reel

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