Technical Data

MRFIC0970/D
Rev. 0, 07/2002

3.2 V GSM GaAs Integrated Power Amplifier

MOTOROLA intelligence everywhere™ | digital dna™

MRFIC0970

(Scale 2:1)

Package Information
Plastic Package
Case 1308
(QFN-20)

Ordering Information

Device	Marking	Package
MRFIC0970	0970	QFN-20

The MRFIC0970 is a single supply, RF power amplifier designed for the 2.0 W GSM900 handheld radios. The device is packaged in the QFN-20 package, with exposed backside pad, which allows excellent electrical and thermal performance through a solderable contact.

- Target 3.2 V Characteristics:
  RF Output Power: 34.5 dBm Typical
  Efficiency: 50% Typical
- Single Positive Supply Solution
- Available in Tape and Reel only. R2 Suffix = 2500 Units per 12 mm, 13 inch Reel

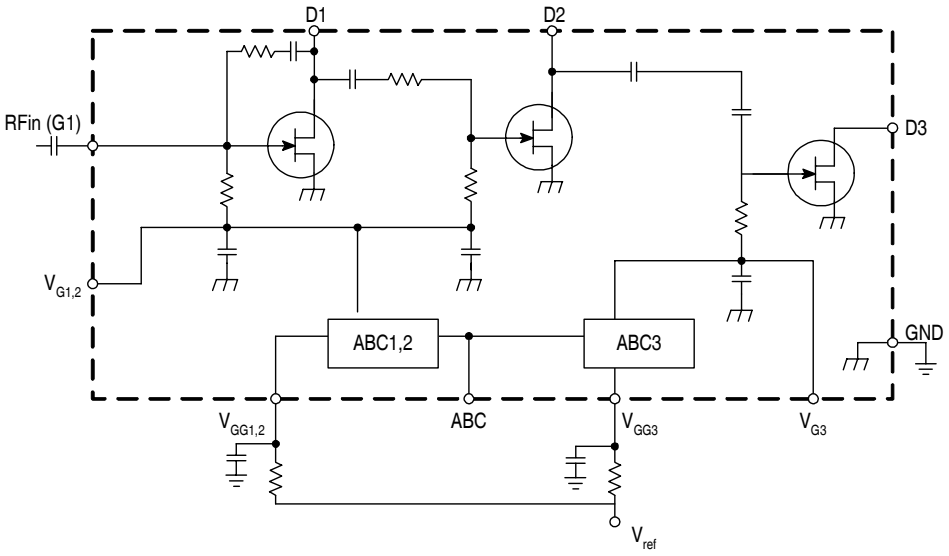


Figure 1. Functional Block Diagram

1 Electrical Characteristics

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Supply Voltage	$V_{D1,2,3}$, V_{abc} V_{ref}	8.0 5.0	V V
RF Input Power	P_{in}	15	dBm
RF Output Power	P_{out}	38	dBm
Operating Case Temperature Range	T_C	-40 to 85	°C
Storage Temperature Range	T_{stg}	-40 to 85	°C
Junction Temperature	T_J	150	°C

NOTES: 1. Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the limits in the Electrical Characteristics or Recommended Operating Conditions tables.
2 ESD (electrostatic discharge) immunity meets Human Body Model (HBM) ≤250 V and Machine Model (MM) ≤60 V. This device is rated Moisture Sensitivity Level (MSL) 1. Additional ESD data available upon request.

Table 2. Recommended Operating Conditions

Characteristic	Symbol	Min	Typ	Max	Unit
Supply Voltage	$V_{D1,2,3}$ V_{abc} V_{ref}	2.8 0 0.04	- - -	5.5 5.5 1.8	Vdc V V
Input Power	P_{in}	5.0	-	10	dBm

Table 3. Electrical Specifications

($V_{D1,2,3}$ = 3.2 V, V_{abc} = 2.6 V, P_{in} = 5.0 dBm, Peak measurement at 12.5% duty cycle, 4.6 ms period, T_A = 25°C, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	880	-	915	MHz
Output Power	P_{out}	34.5	-	-	dBm
Power Added Efficiency	PAE	50	-	-	%
Minimum Output Power (V_{ref} = 0.04, V_{abc} = 2.6 V)		-	-	-17	dBm
Power Control Slope (V_{ref} = 0.1 to 1.8 V, ΔV_{ref} = 0.01 V)		-	-	50:1	RFVrms /V_{ref}
Bleed thru Power ($P_{in(fo)} \leq$ -12dBm, V_{ref} = 0.04, V_{abc} = 10 k load)		-	-	-36	dBm
RF Leakage Current (I_{DD1} + I_{DD2} +$I_{DD3,}$ Pin (f_o) ≤5.0 dBm) (V_{abc} = 10 k load, V_{ref} = 0.04 V)		-	-	35	mA
Output Power Switching Speed (± step input of V_{ref} RF Pout within 1.0 dB of final value)		-	-	1.0	µs
Input Return Loss	|S11|	-	-	6.0	dB
Noise Power in Rx band 925 to 935 MHz 935 to 960 MHz	NP	 - -	 - -	 -73 -85	dBm
Stability-Spurious Output (Load VSWR 6:1 all phase angles, Adjust $V_{D1, 2\&3}$ for specified power)	P_{spur}	-	-	-30	dBc
Load Mismatch Stress (Load VSWR = 10:1 all phase angles, 5 seconds, Adjust $V_{D1, 2\&3}$ for specified power)	No Degradation in Output Power Before & After Test				

2 Pin Connections

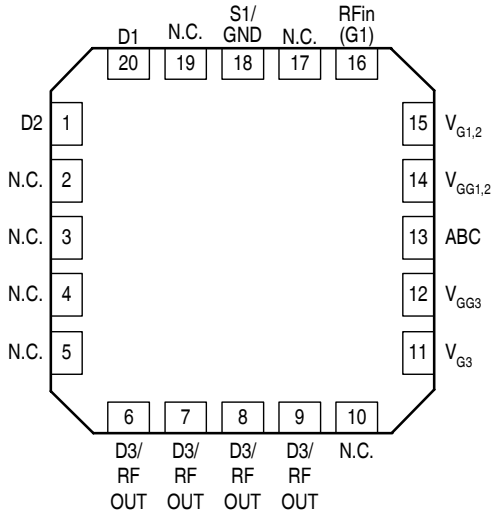


Figure 2. Pin Connections

3 Typical Performance Characteristics

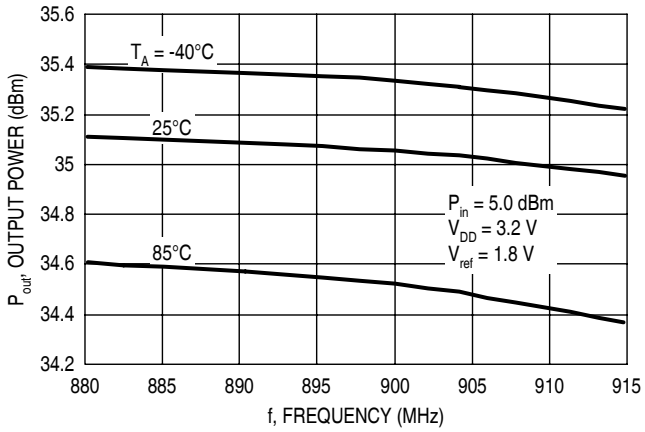


Figure 3. Output Power versus Frequency

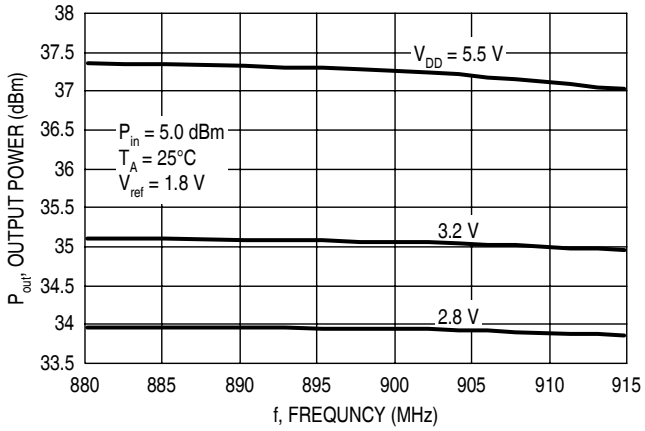


Figure 4. Output Power versus Frequency

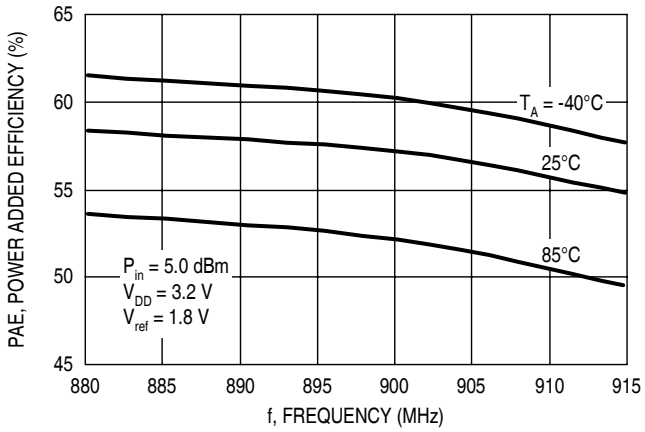


Figure 5. Power Added Efficiency versus Frequency

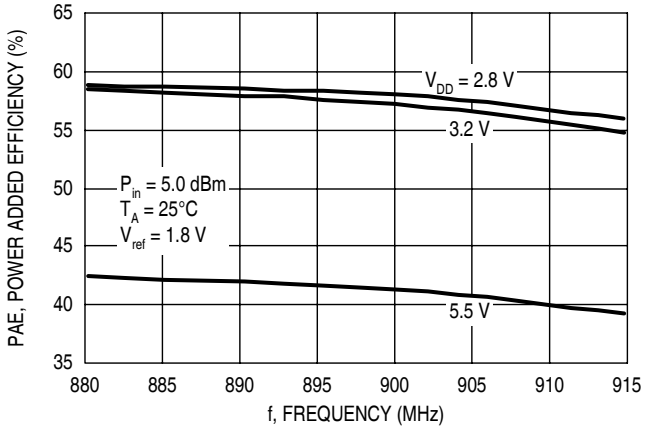


Figure 6. Power Added Efficiency versus Frequency

4 Application Schematic

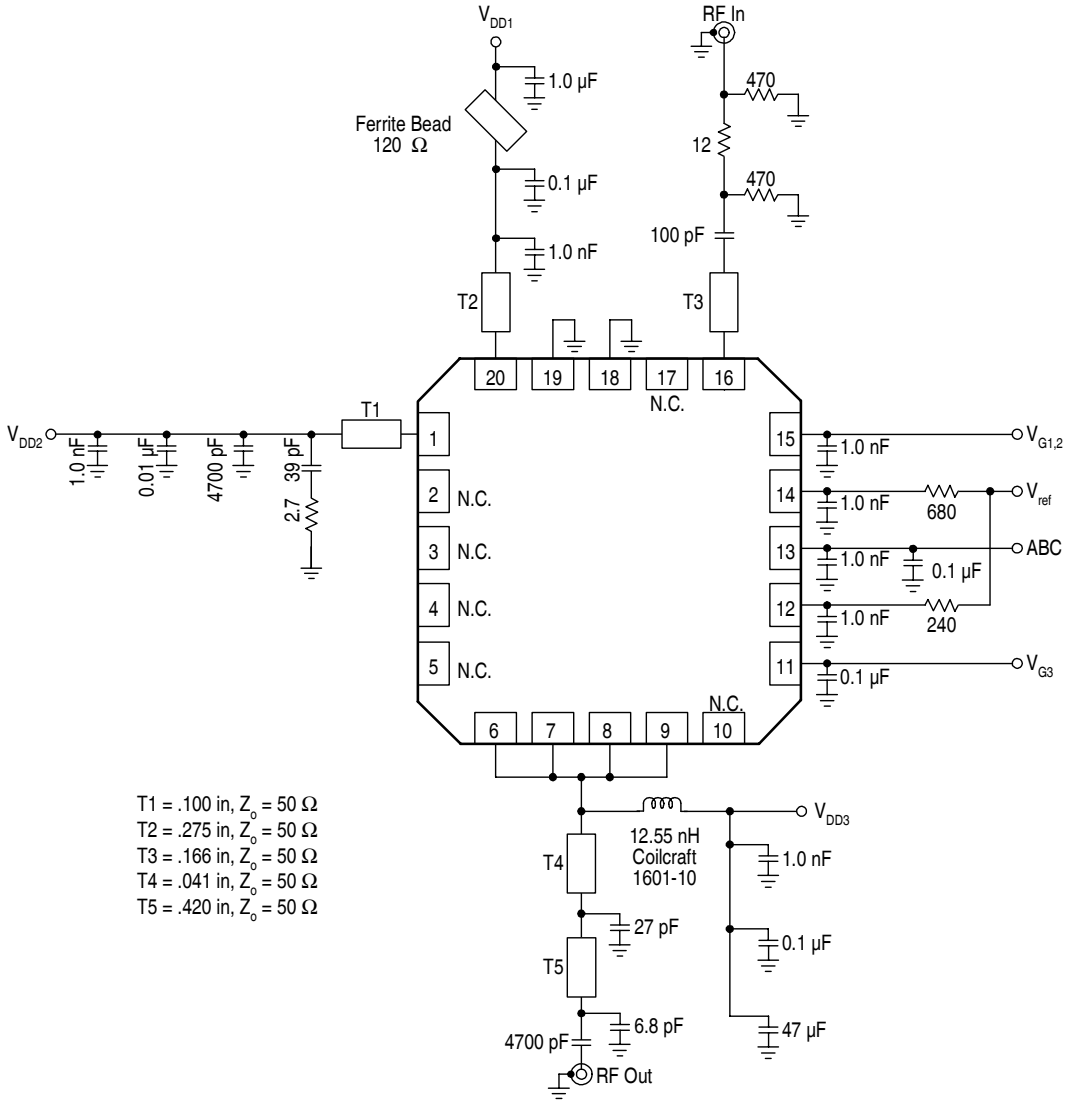
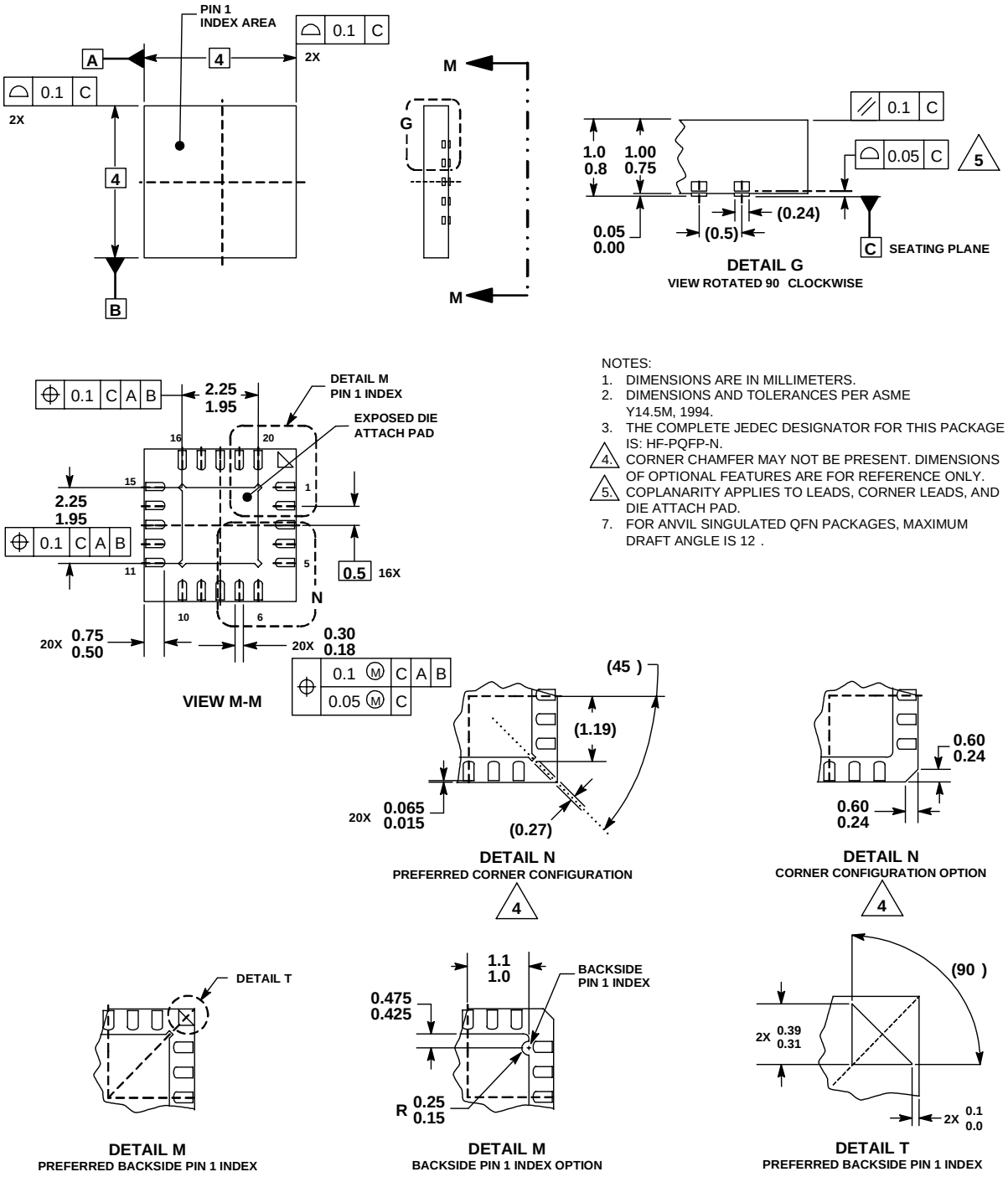


Figure 7. Application Schematic

5 Packaging



NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. THE COMPLETE JEDEC DESIGNATOR FOR THIS PACKAGE IS: HF-PQFP-N.
4. CORNER CHAMFER MAY NOT BE PRESENT. DIMENSIONS OF OPTIONAL FEATURES ARE FOR REFERENCE ONLY.
5. COPLANARITY APPLIES TO LEADS, CORNER LEADS, AND DIE ATTACH PAD.
7. FOR ANVIL SINGULATED QFN PACKAGES, MAXIMUM DRAFT ANGLE IS 12 .

Figure 8. Outline Dimensions for QFN-20
(Case 1308-02, Issue C)

HOW TO REACH US:

USA/EUROPE/LOCATIONS NOT LISTED:

Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217
1-303-675-2140 or 1-800-441-2447

JAPAN:

Motorola Japan Ltd.; SPS, Technical Information Center,
3-20-1, Minami-Azabu Minato-ku, Tokyo 106-8573 Japan
81-3-3440-3569

ASIA/PACIFIC:

Motorola Semiconductors H.K. Ltd.; Silicon Harbour Centre, 2 Dai King Street, Tai Po Industrial Estate,
Tai Po, N.T., Hong Kong
852-26668334

TECHNICAL INFORMATION CENTER:

1-800-521-6274

HOME PAGE:

http://www.motorola.com/semiconductors

MRFIC0970/D