

Technical Data

MRFIC0970/D
Rev. 0, 07/2002

3.2 V GSM GaAs
Integrated Power
Amplifier



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

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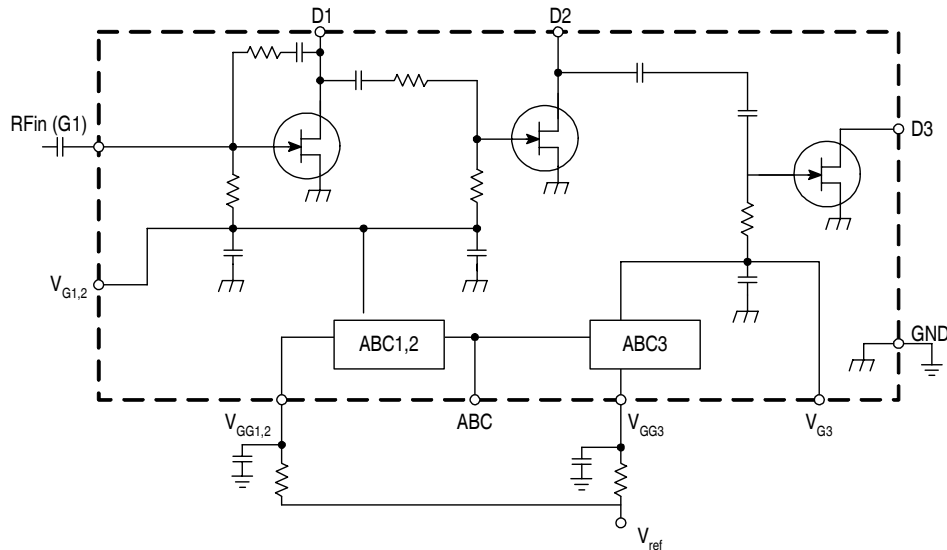


Figure 1. Functional Block Diagram

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

($V_{D1,2,3} = 3.2\text{ V}$, $V_{abc} = 2.6\text{ V}$, $P_{in} = 5.0\text{ dBm}$, Peak measurement at 12.5% duty cycle, 4.6 ms period, $T_A = 25^\circ\text{C}$, 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 ($V_{ref} = 0.04$, $V_{abc} = 2.6\text{ V}$)		-	-	-17	dBm
Power Control Slope ($V_{ref} = 0.1$ to 1.8 V , $\Delta V_{ref} = 0.01\text{ V}$)		-	-	50:1	$\frac{RFV_{rms}}{V_{ref}}$
Bleed thru Power ($P_{in(f_0)} \leq -12\text{ dBm}$, $V_{ref} = 0.04$, $V_{abc} = 10\text{ k load}$)		-	-	-36	dBm
RF Leakage Current ($I_{DD1} + I_{DD2} + I_{DD3}$, $P_{in}(f_0) \leq 5.0\text{ dBm}$) ($V_{abc} = 10\text{ k load}$, $V_{ref} = 0.04\text{ V}$)		-	-	35	mA
Output Power Switching Speed (\pm step input of V_{ref} RF P_{out} 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

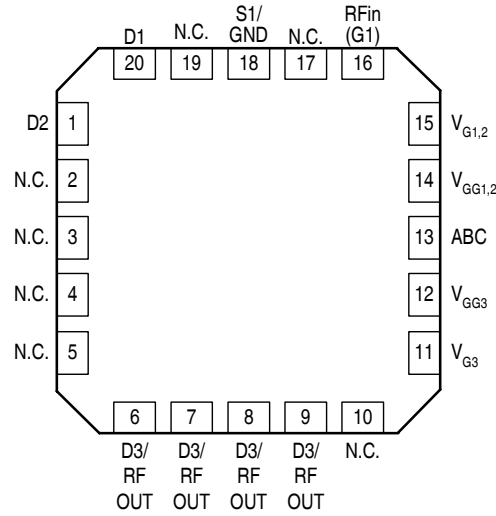


Figure 2. Pin Connections

3 Typical Performance Characteristics

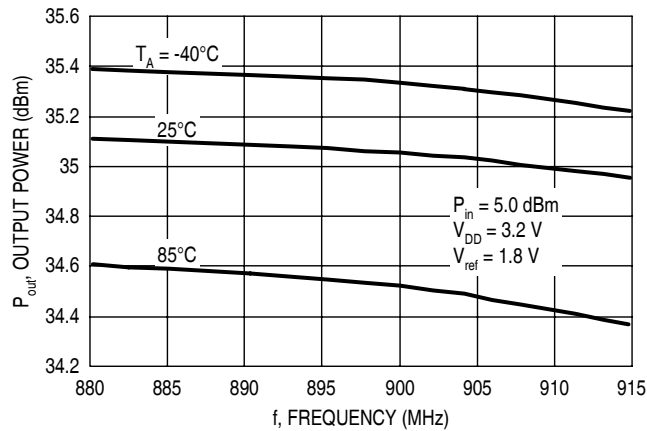


Figure 3. Output Power versus Frequency

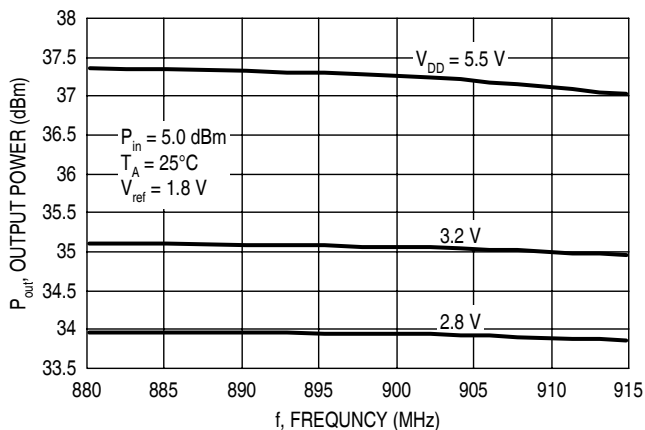


Figure 4. Output Power versus Frequency

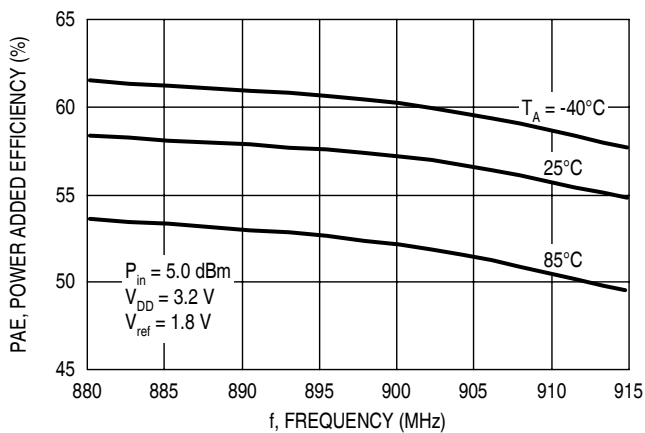


Figure 5. Power Added Efficiency versus Frequency

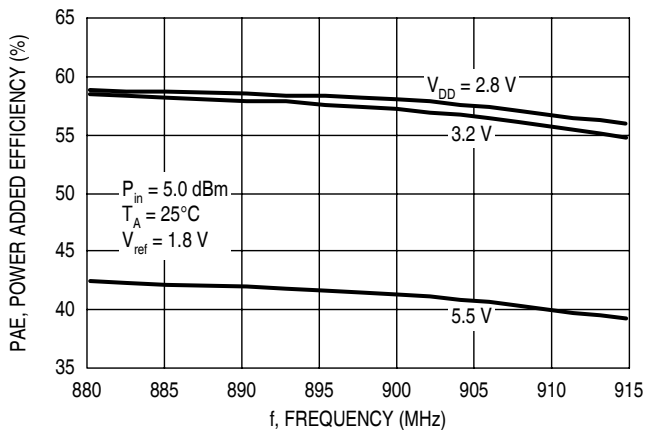


Figure 6. Power Added Efficiency versus Frequency

4 Application Schematic

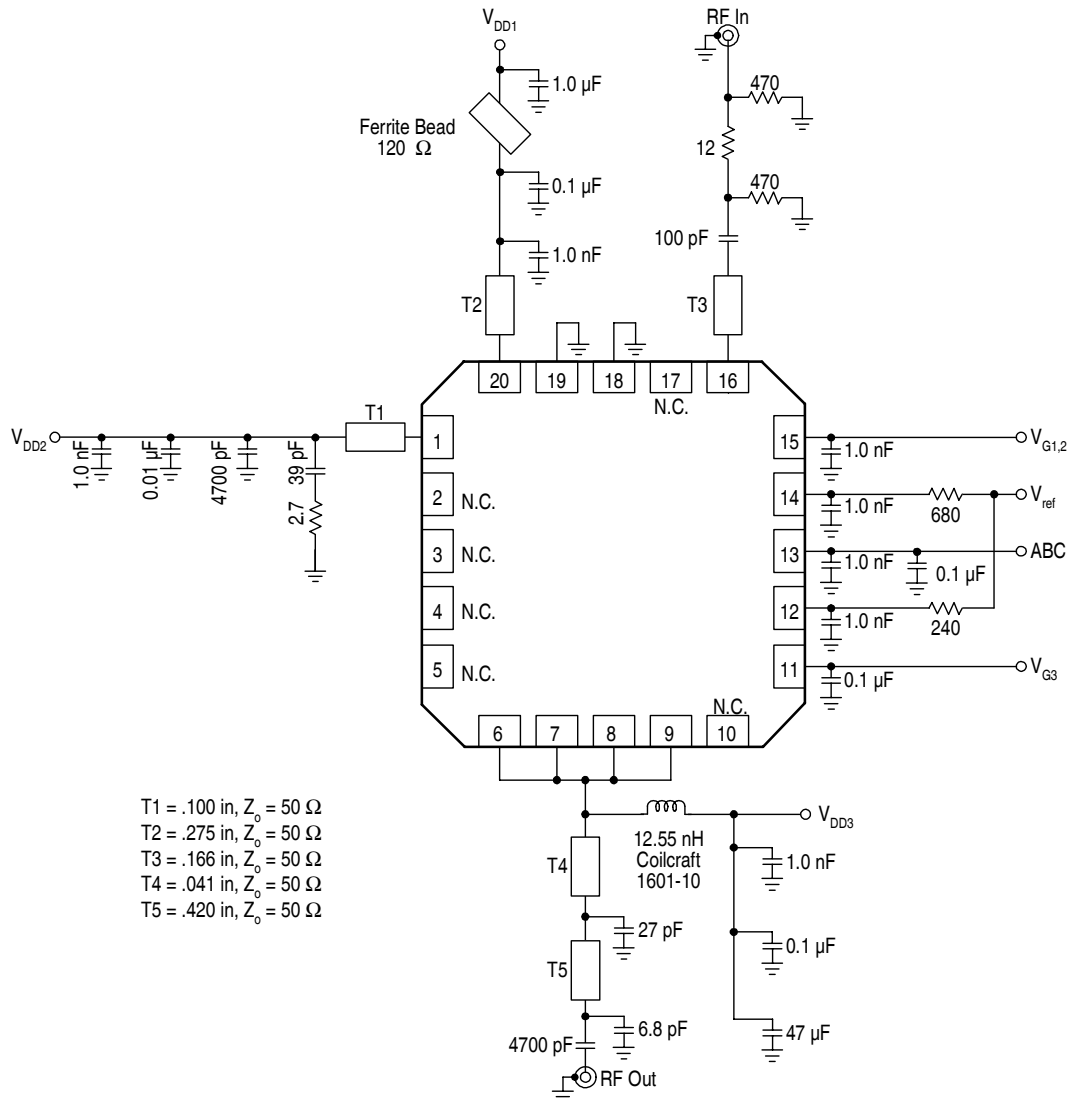
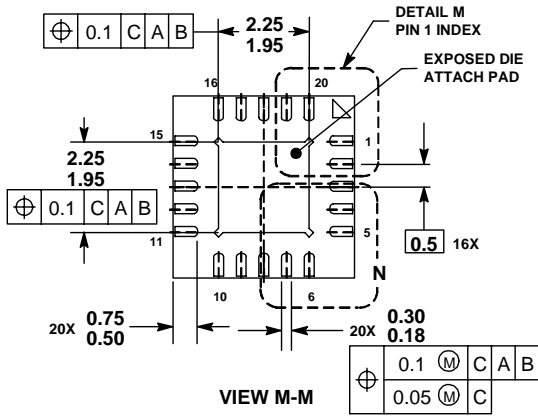
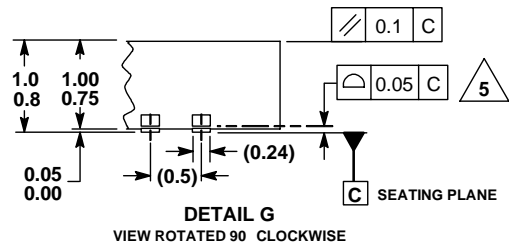
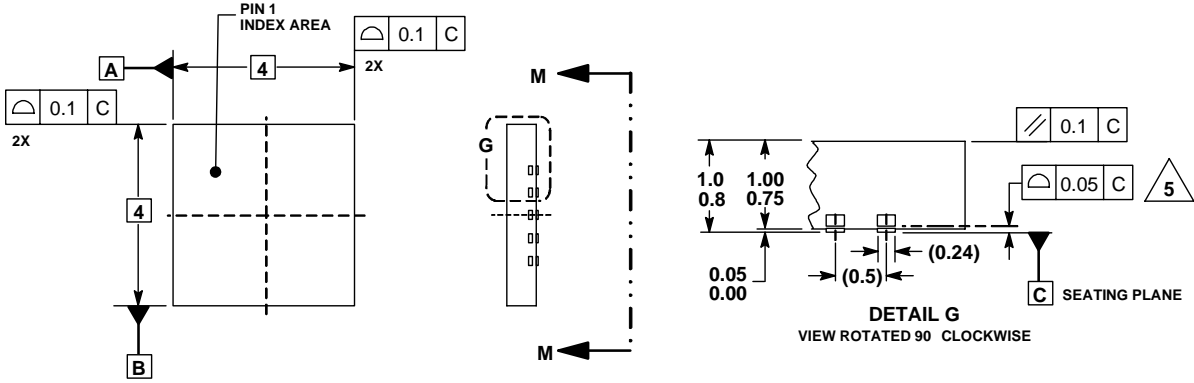


Figure 7. Application Schematic

5 Packaging



- NOTES:
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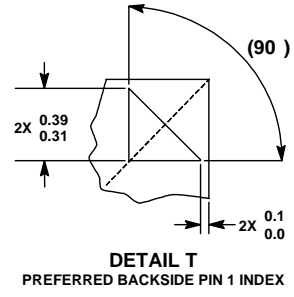
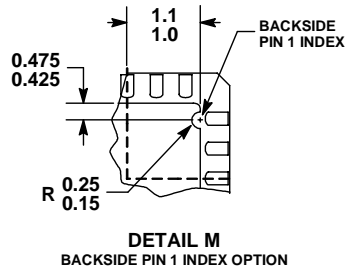
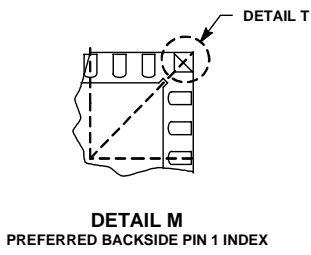
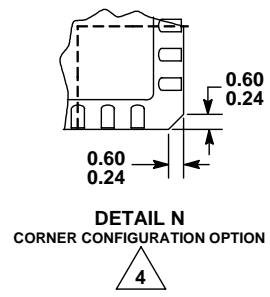
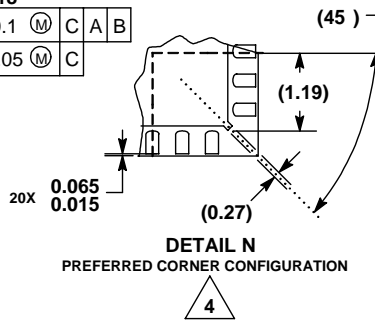


Figure 8. Outline Dimensions for QFN-20 (Case 1308-02, Issue C)

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