Advance Information

The RF Small Signal Line **GaAs MESFET AGC Amplifier**

The MRF9820T1 is a high performance GaAs AGC amplifier suitable for use in low noise front end amplifier or downconverter applications. The device contains two enhancement mode MESFETs connected in cascode to allow access to both gates for gain control or injection of LO signals. This device is well suited for low voltage, low current front—end applications such as paging, cellular, GSM, DECT, and other portable wireless systems.

- Low Noise Figure: 1.5 dB @ 940 MHz, 1 mA
- · Built In ESD Protection
- Does Not Require a Negative Supply Voltage
- RF Power Gain 16 dB @ 940 MHz, 1 mA
- High Third Order Intercept Point
- Industry Standard SOT–143 Surface Mount Package
- Order MRF9820T1 for Tape and Reel Packaging.
 T1 Suffix = 3,000 Units per 8 mm, 7 inch Reel.

MRF9820T1

SURFACE MOUNT LOW NOISE ENHANCEMENT MODE GaAs CASCODE



CASE 318A-05, STYLE 11 (SOT-143)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	6	Vdc
Gate 1–Source Voltage	V _{G1S}	-4	Vdc
Gate 2–Source Voltage	V _{G2S}	-4	Vdc
Drain Current — Continuous	ID	IDSS	_
Total Device Dissipation @ T _C = 75°C Derate above 75°C	PD	231 4.3	mW mW/°C
Storage Temperature Range	T _{stg}	-55 to +150	°C
Operating Channel Temperature	T _{ch}	150	°C

THERMAL CHARACTERISTICS

Rating		Max	Unit
Thermal Resistance, Channel to Case		325	°C/W

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Value	Unit
Gate 1 Leakage Current ($V_{DS} = 2 \text{ V}, V_{G1S} = 0.425 \text{ V}, V_{G2S} = 1 \text{ V}$)	l _{G1S}	4	μΑ
Gate 2 Leakage Current ($V_{DS} = 2 \text{ V}, V_{G1S} = 0.5 \text{ V}, V_{G2S} = 0.425 \text{ V}$)	I _{G2S}	4	μА
Threshold Voltage ($V_{DS} = 3 \text{ V}, V_{G2S} = 1 \text{ V}, I_D = 1 \text{ mA}$)	V _{th}	275 (min) 425 (max)	mV
Gate 1–to–Source Cutoff Voltage (V_{DS} = 2 V, V_{G2S} = 1 V, I_D = 200 μ A)	V _{G1S} (off)	100 (min) 360 (max)	mV
Gate 2–to–Source Cutoff Voltage (VDS = 2 V, VG1S = 0.5 V, ID = 200 μ A)	VG2S(off)	10 (min) 370 (max)	mV
Forward Transconductance (V _{DS} = 2 V, V _{G2S} = 1 V, I _D = 1 mA)	9m	9 (min)	mS
Drain-to-Source Leakage Current (V _{DS} = 2 V, V _{G1S} = 0 V, V _{G2S} = 0 V)	I _{DS(off)}	2 (max)	μΑ

 $NOTE - \underline{\textbf{CAUTION}} - MOS$ devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.



$\textbf{PERFORMANCE CHARACTERISTICS} \ (T_{C} = 25^{\circ}\text{C unless otherwise noted})$

Characteristic	Symbol	Value	Unit
RF Power Gain ($V_{DS} = 3 \text{ V}, V_{G2} = 1.7 \text{ V}, I_{D} = 1 \text{ mA}, f = 940 \text{ MHz}$)	G _{ps}	14 (min)	dB
Noise Figure ($V_{DS} = 3 \text{ V}, V_{G2} = 1.7 \text{ V}, I_D = 1 \text{ mA}, f = 940 \text{ MHz}$)	NF	1.5 (typ) 2.0 (max)	dB
Input Third Order Intercept Point	IIP3	−3 (typ) −8 (min)	dBm

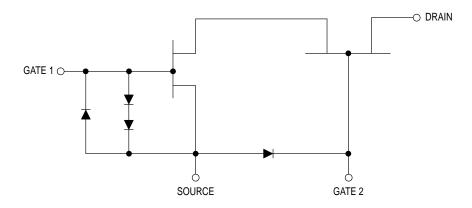


Figure 1. Electrical Schematic of GaAs AGC Amplifier

TYPICAL CHARACTERISTICS

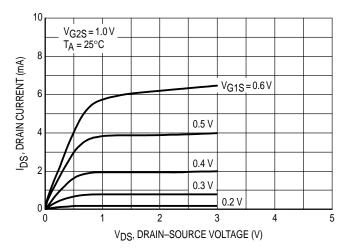


Figure 2. Drain Current versus V_{DS}; Stepping V_{G1S}

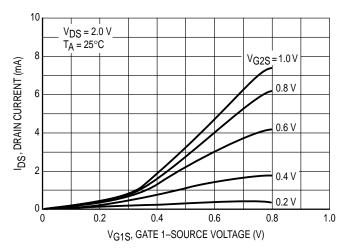


Figure 3. Drain Current versus VG1S; Stepping VG2S

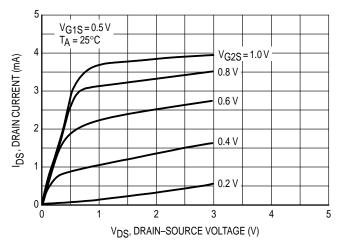


Figure 4. Drain Current versus V_{DS}; Stepping V_{G2S}

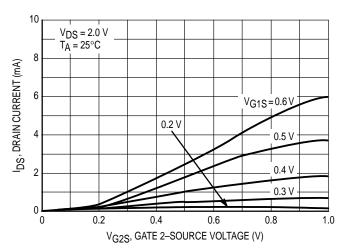
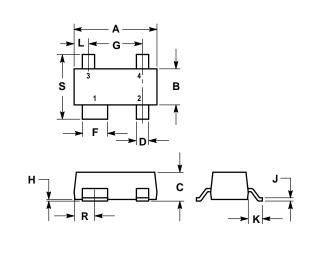


Figure 5. Drain Current versus VG2S; Stepping VG1S

PACKAGE DIMENSIONS



NOTES:

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M. 1982.
- 2. CONTROLLING DIMENSION: MILLIMETER.

	MILLIMETERS		INC	HES
DIM	MIN	MAX	MIN	MAX
Α	2.80	3.04	0.110	0.120
В	1.20	1.39	0.047	0.055
С	0.84	1.14	0.033	0.045
D	0.39	0.50	0.015	0.020
F	0.79	0.93	0.031	0.037
G	1.78	2.03	0.070	0.080
Н	0.013	0.10	0.0005	0.004
J	0.08	0.15	0.003	0.006
K	0.46	0.60	0.018	0.024
L	0.445	0.60	0.0175	0.024
R	0.72	0.83	0.028	0.033
9	2 11	2 /18	0.083	0.008

STYLE 11:

PIN 1. SOURCE

2. GATE 1 3. GATE 2

J. GATE Z

CASE 318A-05 ISSUE R

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