MAGX-011086

GaN Wideband Transistor 28 V, 5 W
DC - 6 GHz

Advance **- Rev. V1A**

Features

- GaN on Si HEMT D-Mode Transistor
- Suitable for linear and saturated applications
- Tunable from DC - 6 GHz
- 28 V Operation
- >10 dB Gain at 5.3 GHz
- >50 % Drain Efficiency at 5.3 GHz
- 100 % RF Tested
- Lead-Free 4 mm 24-Lead PQFN Package
- ROHS* Compliant and 260°C reflow compatible

Description

The MAGX-011086 GaN HEMT is a wideband transistor optimized for DC - 6 GHz operation in a user friendly package ideal for high bandwidth applications. The device has been designed for saturated and linear operation with output power levels of 5 W (37 dBm) in an industry standard, low inductance, lead-free 4 mm 24-lead PQFN plastic package. The pads of the package form a coplanar launch that naturally absorbs lead parasitics and features a small PCB outline for space constrained applications.

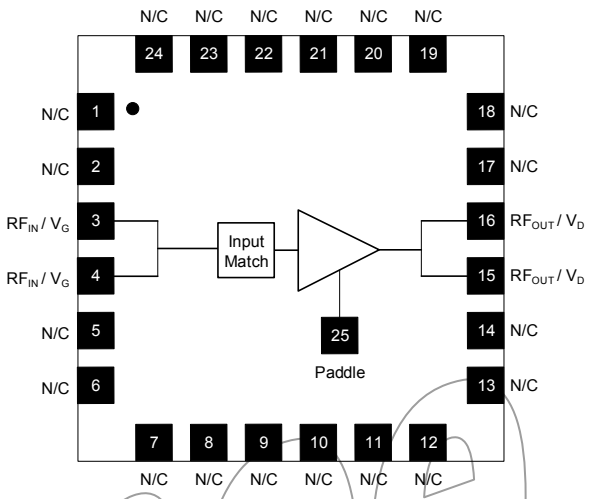
The MAGX-011086 is ideally suited for Wireless LAN, High Dynamic Range LNA's, broadband general purpose, land mobile radio, defense communications, wireless infrastructure, and ISM applications.

Built using the SIGANTIC® process - a proprietary GaN-on-Silicon technology.

Ordering Information

Part Number	Package
MAGX-011086	bulk quantity

Functional Schematic



Pin Configuration

Pin No.	Pin Name	Function
1	N/C	No Connection
2	N/C	No Connection
3	RF_{OUT} / V_D	RF Output / Drain
4	RF_{OUT} / V_D	RF Output / Drain
5 - 14	N/C	No Connection
15	RF_{IN} / V_G	RF Input / Gate
16	RF_{IN} / V_G	RF Input / Gate
17 - 24	N/C	No Connection
25	Pad[1]	Ground / Source

1. The exposed pad centered on the package bottom must be connected to RF and DC ground and provide a low thermal resistance heat path.

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

Electrical RF Specifications: V_{DS} = +28 V, I_{DQ} = 50 mA, T_C = +25°C (unless Noted)

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Units
Small Signal Gain	CW, 2.5 GHz CW, 5.3 GHz	G_{SS}	—	16.0 10.5	—	dB
Power Gain	5.3 GHz, P_{OUT} = 4 W	G_P	—	9.5	—	dB
Saturated Output Power	CW, 2.5 GHz CW, 5.3 GHz	P_{SAT}	—	37 37	—	dBm
Drain Efficiency at Saturation	CW, 2.5 GHz CW, 5.3 GHz	η_{DSAT}	—	63 52	—	%
Drain Efficiency	5.3 GHz, P_{OUT} = 4 W	η	—	45	—	%
Ruggedness	Output Mismatch, all phase angles	Ψ	15:1, No Device Damage			VSWR

Electrical DC Specifications: T_A = +25°C

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Units
Off Characteristics						
Leakage Current - Drain Source	V_{GS} = -8 V, V_{DS} = 100 V	I_{DLK}	—	2	—	mA
Leakage Current - Gate Source	V_{GS} = -8 V, V_{DS} = 0 V	I_{GLK}	—	1	—	V
On Characteristics						
Gate Threshold Voltage	V_{DS} = 48 V, I_D = 2 mA	V_T	-	-1.5	-	V
Gate Quiescent Voltage	V_{DS} = 48 V, I_D = 50 mA	V_{GSQ}	-	-1.2	-	V
On Resistance	V_{DS} = 2 V, I_D = 15 mA	R_{ON}	-	2.0	-	Ω
Maximum Drain Current	V_{DS} = 7 V, Pulse Width 300 µS, 0.2% Duty Cycle	$I_{D,\ MAX.}$	-	1.4	-	A

Thermal Characteristics[2]:

Parameter	Test Conditions	Typical	Units
Thermal Resistance (R_{qJC})	V_{DS} = 48 V, T_J = 200°C	17	°C/W

2. Junction temperature (T_J) measured using IR Microscopy. Case temperature measured using thermocouple embedded in heat-sink.

Absolute Maximum Ratings[3,4,5]

Parameter	Absolute Max.
Drain Source Voltage, V_{DS}	100 V
Gate Source Voltage, V_{GS}	-10 to 3 V
Gate Current, I_G	4 mA
Power Dissipation, P_T	10.3 W
Junction Case Temperature	+200°C
Operating Temperature	-40°C to +100°C
Storage Temperature	-65°C to +150°C

3. Exceeding any one or combination of these limits may cause permanent damage to this device.
4. MACOM does not recommend sustained operation near these survivability limits.
5. Operating at nominal conditions with $T_J \leq 200°C$ will ensure MTTF > 1×10^6 hours.

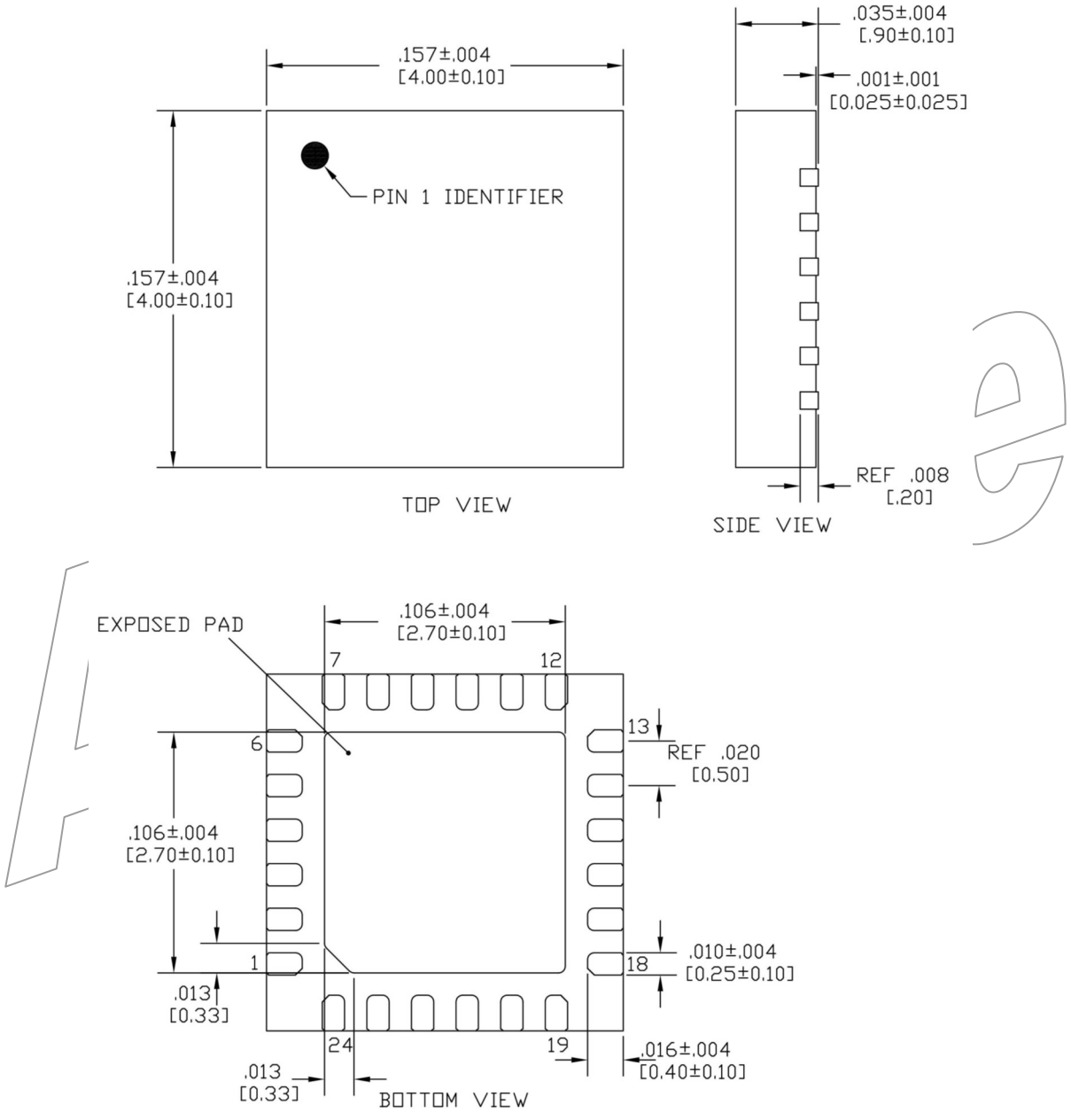
Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

Gallium Nitride Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these Class 1B devices.

Lead-Free 4 mm 24-Lead PQFN†



All dimensions shown as inches [millimeters]

† Meets JEDEC moisture sensitivity level 3 requirements.
Plating is 100% matte tin over copper.