Advanced Product Specifications
October 2003 *(1 of 4)*

13.50 to 14.50 GHz 1.5 Watt Power Amplifier

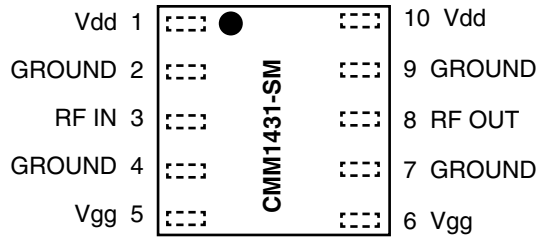
Features

- ❑ **32.2 dBm** (Typ.) **Saturated Output Power**
- ❑ **30.5 dB** (Typ.) **Linear Gain**
- ❑ **Fully Matched**
- ❑ **Unconditionally Stable**
- ❑ **Low-Cost, Surface Mount Package**
- ❑ **Optimum Thermal Dissipation**

Applications

- ❑ **Ku-Band VSAT Transmit Subsystems**

Pin Functional Diagram



Description

The CMM1431-SM is a four-stage pHEMT GaAs MMIC power amplifier that is ideally suited for transmit subsystems designed for Ku-Band VSAT applications. The CMM1431-SM provides 30.5 dB linear gain and delivers 1.5 watts of output power at saturation operating from 13.50 to 14.50 GHz frequency.

The unconditional stability and internal matching provides for reduction of external components making this product a simple and low-cost solution. The low-cost, 6mm x 6mm x 1.6mm surface mount package, offers the same excellent RF and thermal properties as a typical flange package.

Electrical Characteristics (T = +25°C, Vd = 7V, Idq = 770mA)

Parameter	Condition	Min	Typ	Max	Units
Frequency Range		13.50		14.50	GHz
Output Power	@ 1dB compression	30.5	31.5		dBm
Saturated Output Power	Pin = 5.0 dBm	31.2	32.2		dBm
Saturated Output Power Variation	Over operating frequency		0.5	1.0	dBm
Linear Gain		27.0	30.5	34.0	dB
Linear Gain Variation	Over operating frequency		1.0	3.0	dB
Input Reflection Coefficient			-10.0		dB
Output Reflection Coefficient			-7.0		dB
Gate Supply Voltage	Idq = 770 mA	-1.1	-0.9	-0.7	Volts
Drain Current	At Saturation		900	980	mA
Power Added Efficiency	At Saturation	22	26		%

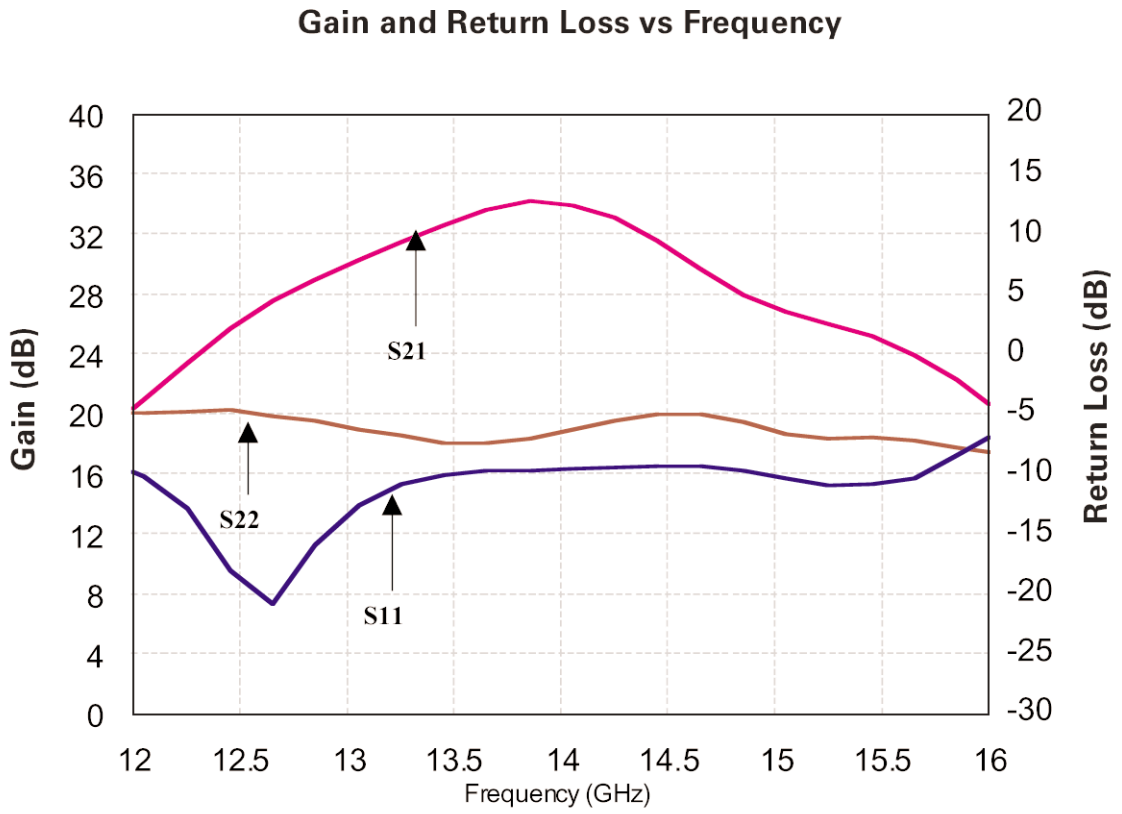
Electrical Specifications (TA = -40°C to +75°C)

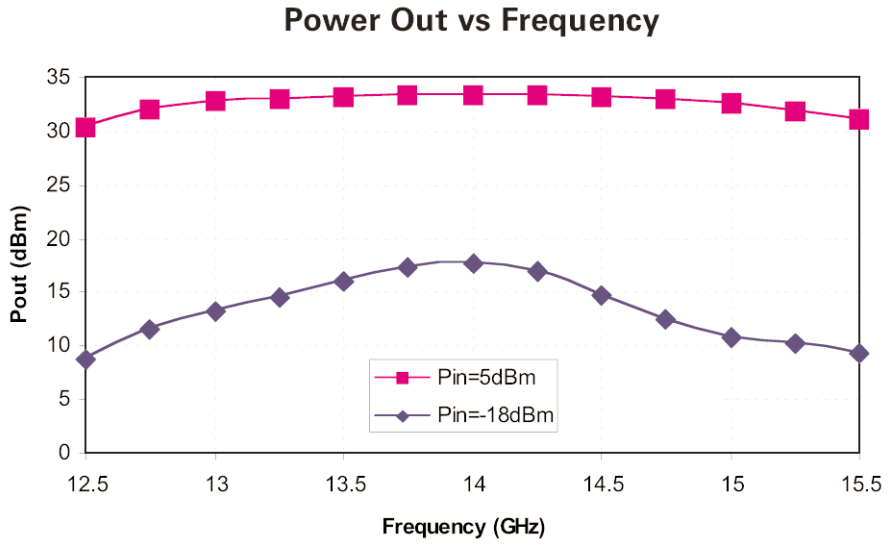
Parameter	Condition	Min	Typ	Max	Units
Saturated Output Power	Variation from Room Temperature	-0.5			dBm
Linear Gain	Variation from Room Temperature	-2.5		3.5	dB
Stability		Unconditionally stable			

Maximum Ratings (TA = -40°C to +75°C) Operation outside these limits can cause permanent damage.

Parameter	Typ	Units	Parameter	Typ	Units
Drain Voltage (+V_{dd})	8.5	Volts	RF Input Power (P_{in})	7.0	dBm
Gate Voltage (V_{gg})	-3.0	Volts	Dissipated Power (P_{diss})	7.2	Watts
Quiescent Current (I_{dq})	1000	mA	Storage Temperature	-50 to +150	°C
Gate Current (I_g)	5	mA	Operating Backside Temperature	-40 to +75	°C

Typical Performance (Vdd = 7V, Idq = 770 mA)





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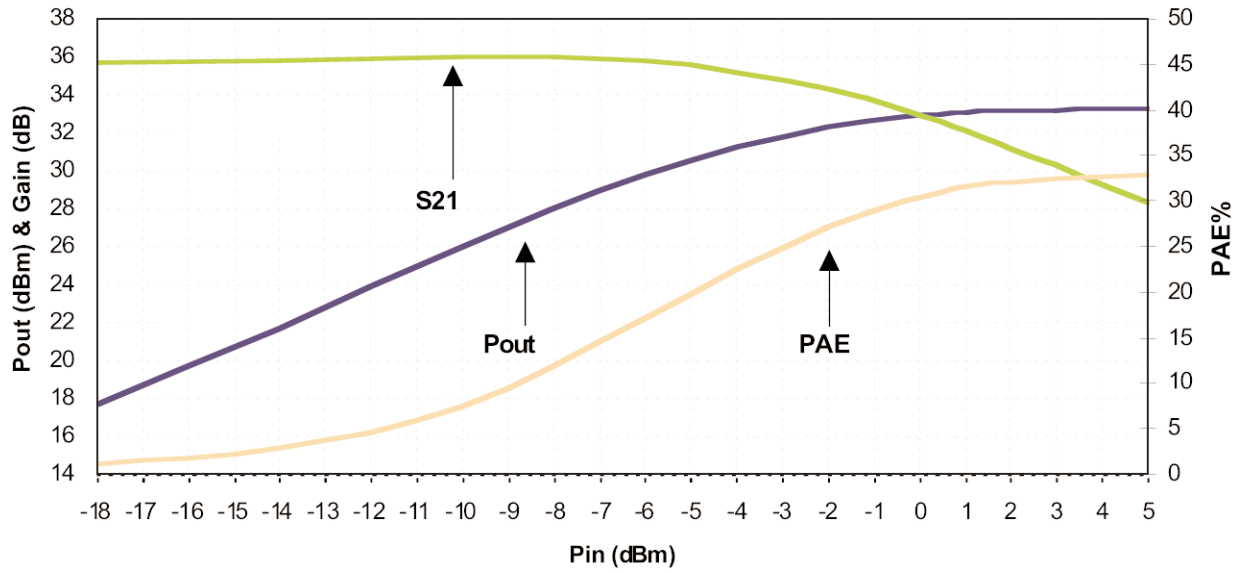
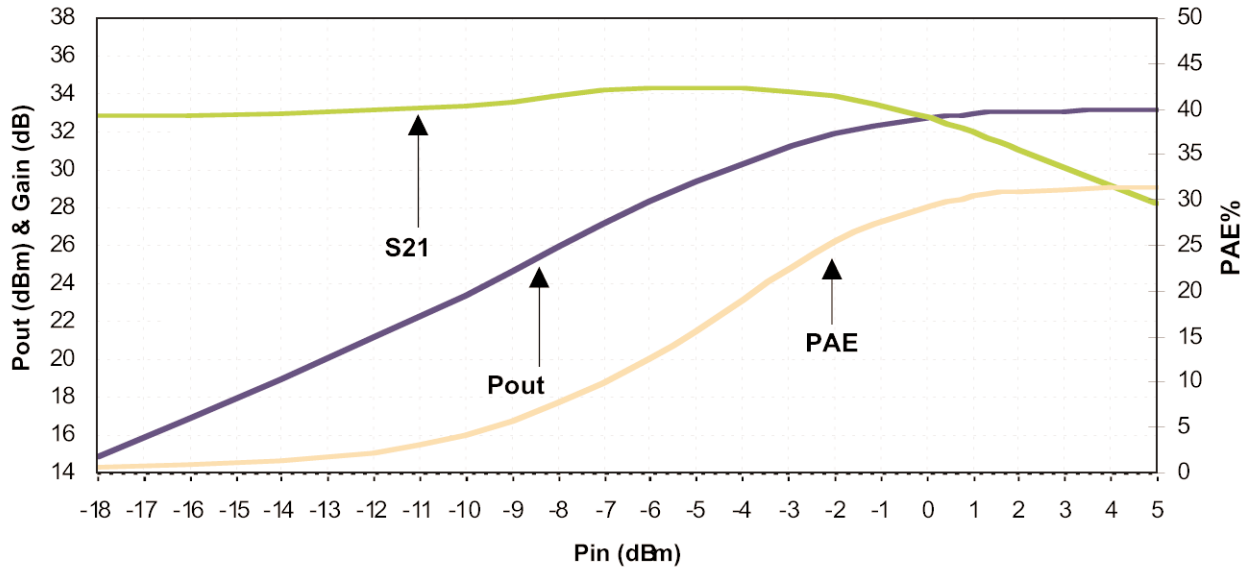
Typical Performance (Vdd = 7V, Idq = 770 mA)

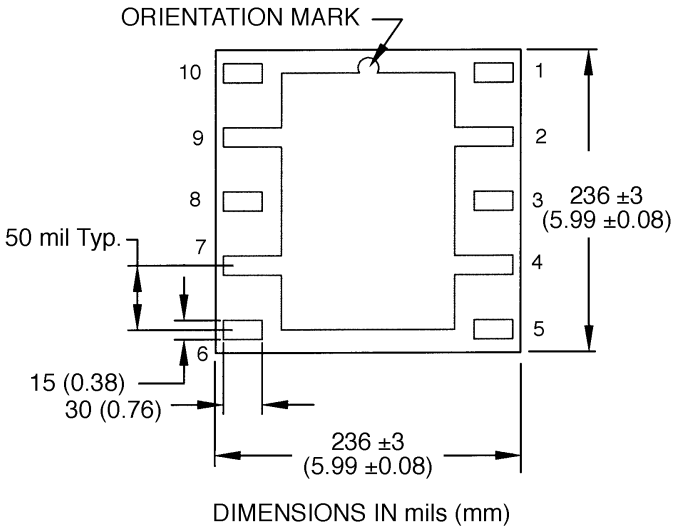
Power Out, Gain and PAE vs Power In
@14 GHz



Power Out, Gain and PAE vs Power In
@14.5 GHz



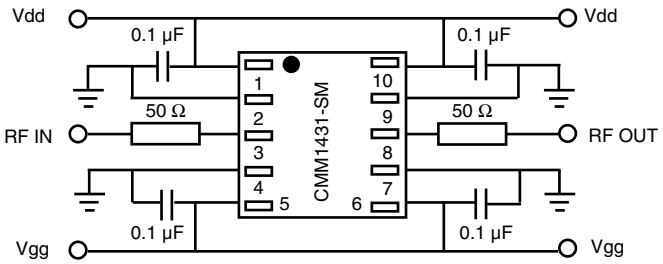
Physical Dimensions (Bottom View)



DIMENSIONS IN mils (mm)

Recommended Application Circuit

Note: This schematic represents the topology of the application circuit recommended by Celeritek.



Note: Due to the high gain of this device it is highly recommended to maintain the reverse isolation (S12) above 50 dB.

Biasing Notes

1. Dual bias is required
2. 0.1µF bypass capacitors are needed on PC board as close as possible to pins 1, 5, 6 and 10.
3. Positive (+) bias can be applied either at pin 1 or pin 6.
4. Negative (-) bias can be applied either at pin 5 or pin 6.
5. No DC block is required at RF IN/OUT.
6. Negative (-) bias must be applied before applying positive (+) bias.

Ordering Information

The CMM1431-SM is available in available in tube or tape and reel.

Part Number for Ordering	Package
CMM1431-SM	**Surface mount package**

CELERITEK

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