

16.0-18.0 GHz 1.5-Watt Power Amplifier

Mimix
BROADBAND™

August 2006 - Rev 26-Aug-06

CMM1631-SM
RoHS

Features

- ✕ 32 dBm (Typ.) Saturated output power
- ✕ 26.5 dB (Typ) Linear Gain
- ✕ Fully Matched
- ✕ Unconditionally Stable
- ✕ Low Cost, Surface Mount Package
- ✕ 6x6x1.6 mm
- ✕ Optimum Thermal Dissipation
- ✕ 7V, 770mA

General Description

The CMM1631-SM is a four stage pHEMT GaAs MMIC power amplifier packaged in a 6x6 mm surface mount package. The CMM1631-SM provides 26 dB of linear gain and delivers 1.5 watts of output power at saturation operating between 16 to 18 GHz. The unconditional stability and internal matching provides for a reduction in external components making this product a simple and low cost solution. The true surface mount package makes it an ideal solution in all manufacturing environments. The power amplifier is intended for use in the extended Ku-Band satellite applications.



Applications

- ✕ Military Ku Band
- ✕ VSAT
- ✕ Point to Point Radio
- ✕ Ku-Band Space

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

Parameter	Condition	Min	Typ	Max	Units
Frequency Range		16.0		18.0	GHz
Output Power	@ 1dB compression		31.5		dBm
Saturated Output Power	Pin = 10 dBm		32.0		dBm
Saturated Output Power Variation	Over operating frequency		0.5	1.0	dBm
Linear Gain			26.5		dB
Linear Gain Variation	Over operating frequency		1.0	3.0	dB
Input Reflection Coefficient			-7.0		dB
Output Reflection Coefficient			-7.0		dB
Gate Supply Voltage	Idq = 800 mA	-1.1	-0.9	-0.7	Volts
Drain Current	At Saturation		770 mA		A
Power Added Efficiency	At Saturation		23		%

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		2.5	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 (+Vdd)	8.5	Volts	RF Input Power (Pin)	13	dBm
Gate Voltage (Vgg)	-3.0	Volts	Dissipated Power (Pdiss)	5.6	Watts
Quiescent Current (Idq)	1	A	Storage Temperature	-50 to +150	°C
Gate Current (Ig)	5	mA	Operating Backside Temperature	-40 to +75	°C

Mimix Broadband, Inc., 10795 Rockley Rd., Houston, Texas 77099
Tel: 281.988.4600 Fax: 281.988.4615 mimixbroadband.com

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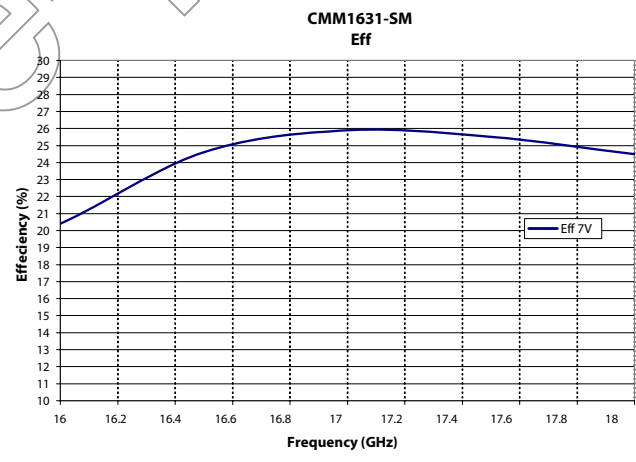
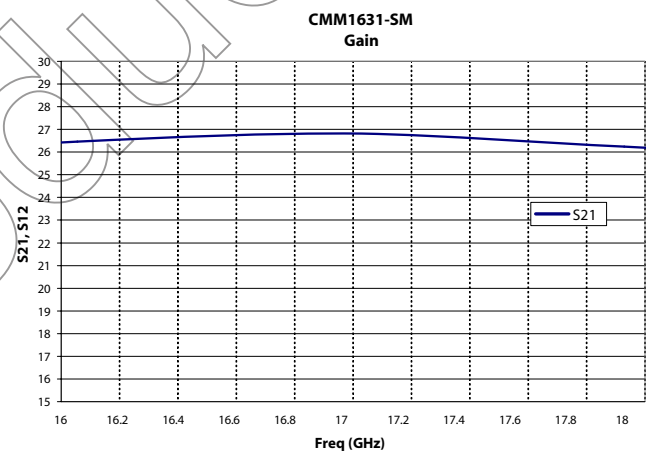
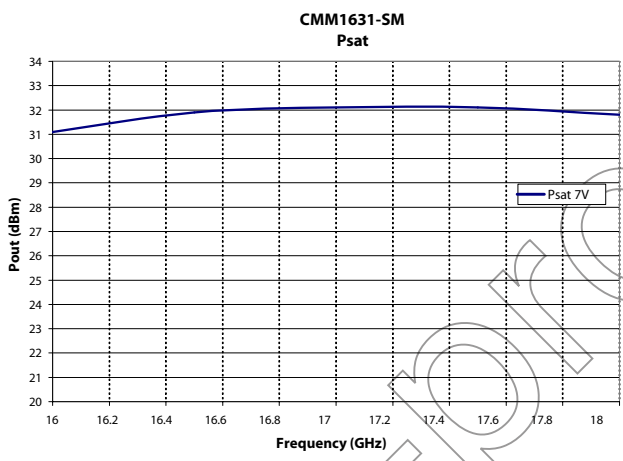
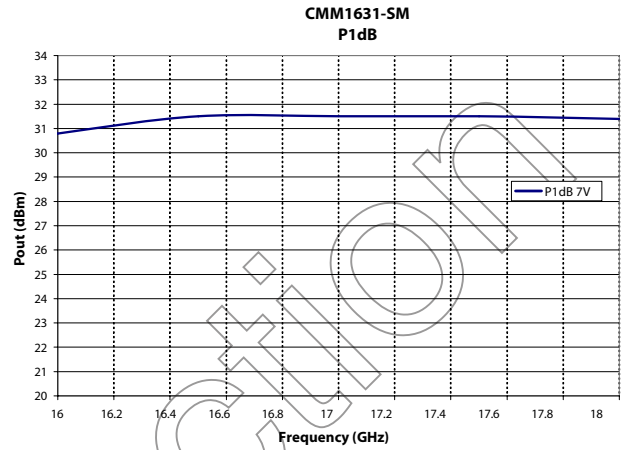
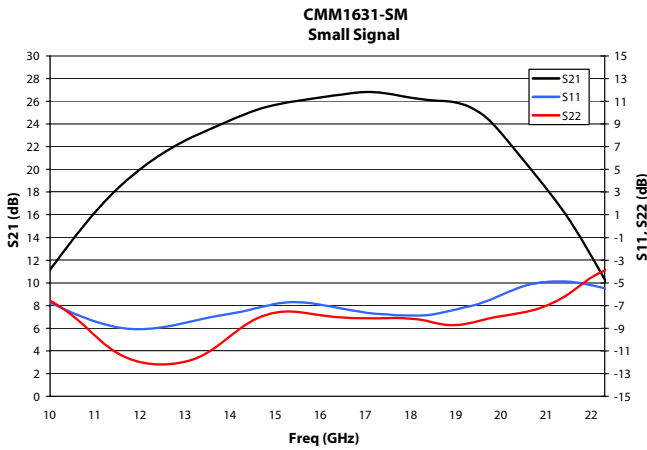
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Power Amplifier Measurements (7V, 770 mA)



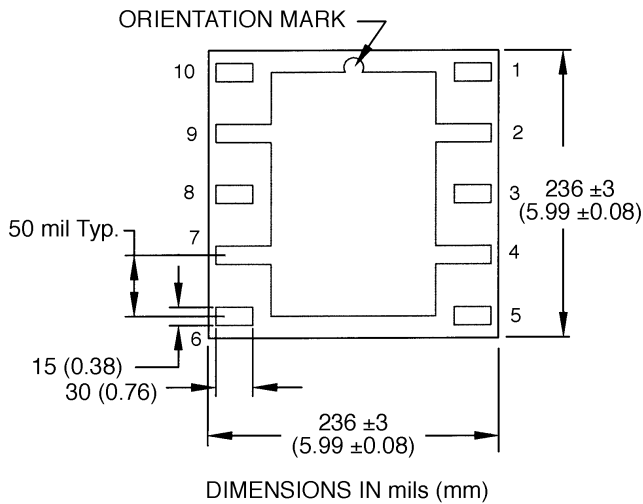
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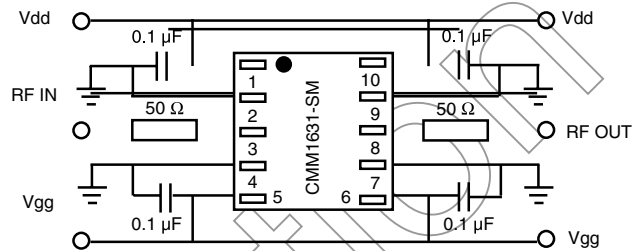
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Physical Dimensions (Bottom View)



Recommended Application Circuit

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

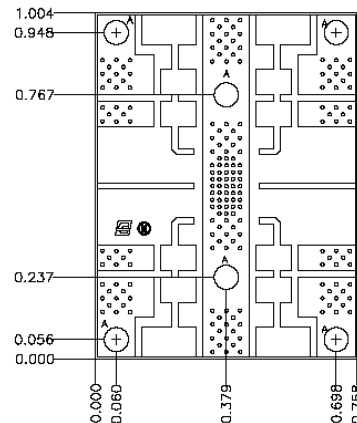
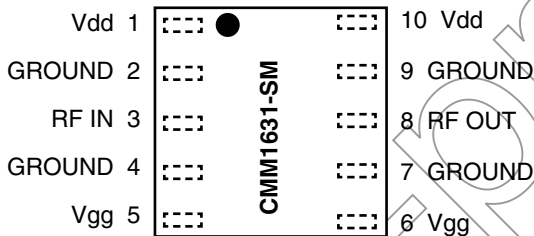


Note: Due to the high gain of this device it is highly recommended to maintain the reverse isolation (S12) above 50 dB.

Biasing Notes

1. Dual bias is required
2. 0.1 μF 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 10.
5. No DC block is required at RF IN/OUT.
6. Negative (-) bias must be applied before applying positive (+) bias.

Pin Functional Diagram



HOLE TABLE				
REF.	DIA.	TOL.	QTY.	PLATING
A	.070	+/- .0003	6	THRU
NONE	.010	+/- .0003	187	THRU

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Handling and Assembly Information

CAUTION! - Mimix Broadband MMIC Products contain gallium arsenide (GaAs) which can be hazardous to the human body and the environment. For safety, observe the following procedures:

- Do not ingest.
- Do not alter the form of this product into a gas, powder, or liquid through burning, crushing, or chemical processing as these by-products are dangerous to the human body if inhaled, ingested, or swallowed.
- Observe government laws and company regulations when discarding this product. This product must be discarded in accordance with methods specified by applicable hazardous waste procedures.

Life Support Policy - Mimix Broadband's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President and General Counsel of Mimix Broadband. As used herein: (1) Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user. (2) A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Package Attachment - This packaged product from Mimix Broadband is provided as a rugged surface mount package compatible with high volume solder installation. Care should be taken not to apply heavy pressure to the top or base material to avoid package damage. Vacuum tools or other suitable pick and place equipment may be used to pick and place this part. Care should be taken to ensure that there are no voids or gaps in the solder connection so that good RF, DC and ground connections are maintained. Voids or gaps can eventually lead not only to RF performance degradation, but reduced reliability and life of the product due to thermal stress.

Mimix Lead-Free RoHS Compliant Program - Mimix has an active program in place to meet customer and governmental requirements for eliminating lead (Pb) and other environmentally hazardous materials from our products. All Mimix RoHS compliant components are form, fit and functional replacements for their non-RoHS equivalents. Lead plating of our RoHS compliant parts is 100% matt tin (Sn) over copper alloy and is backwards compatible with current standard SnPb low-temperature reflow processes as well as higher temperature (260°C reflow) "Pb Free" processes.

Ordering Information

The CMM1631-SM is available in available in tube or tape and reel.

<u>Part Number for Ordering</u>	<u>Package</u>
CMM1631-SM-0G00	Matte Tin plated RoHS compliant SOT-89 surface mount package in bulk quantity
CMM1631-SM-0G0T	Matte Tin plated RoHS compliant SOT-89 surface mount package in tape and reel
PB-CMM1631-SM-0000	Evaluation Board