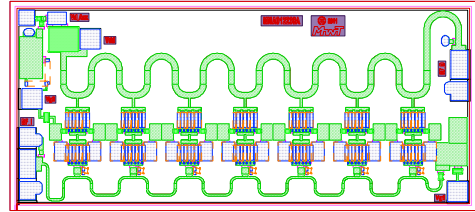


Features:

- Frequency Range: 0.1 – 20 GHz
- P3dB: +29 dBm
- Gain: 12.5 dB
- Vdd =12 V
- Ids =500 mA
- Input and Output Fully Matched to 50 Ω



Die size: 2350 x 1050 x 50 μm

Applications:

- Fiber optics communication systems
- Microwave and wireless communication systems
- Microwave and optical instrumentations
- Military and EW equipments

Description:

The MMA-012030 is a broadband GaAs MMIC Traveling Wave Amplifier (TWA) with high output power and high gain over 0.1 to 20GHz frequency range. This amplifier is optimally designed for broadband high power applications requiring flat gain and high output power with excellent input and output matches over a 0.1 to 20GHz frequency range.

Absolute Maximum Ratings: ($T_a = 25\text{ }^\circ\text{C}$)*

SYMBOL	PARAMETERS	UNITS	Min.	Max.
Vds	Drain-Source Voltage	V		12.5
Vg1	First Gate-Source Voltage	V	-2	0
Ig1	First Gate Current	mA	-10	1
Vg2	Second Gate-Source Voltage	V	-3.5	7
Ig2	Second Gate-Source Current	mA	-20	
Pdiss	Maximum Power Dissipation	W		8
Pin max	RF Input Power	dBm		24
Tch	Channel Temperature	$^\circ\text{C}$		+150
Tstg	Storage Temperature	$^\circ\text{C}$		-55 to +165
Tmax	Max. Assembly Temp (60 sec max)	$^\circ\text{C}$		+300

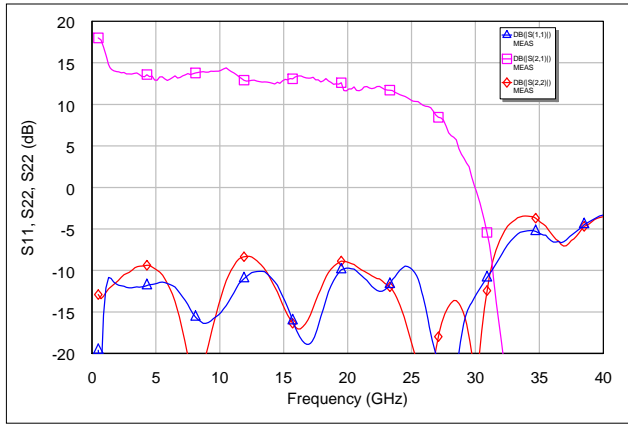
*Operation of this device above any one of these parameters may cause permanent damage.

Electrical Specifications: *V_{ds}=12V, V_{g1}=-0.8V, V_{g2}=open, I_{ds}=500mA, T_a=25 °C Z₀=50 ohm*

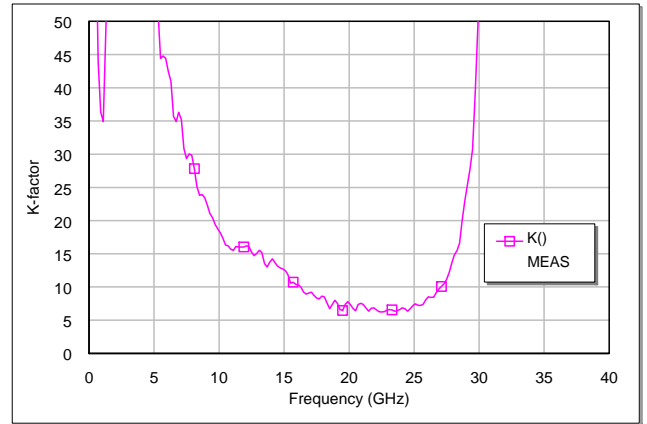
Parameter	Units	Min.	Typ.	Max.
Frequency Range	MHz	0.1		20,000
Gain (Typ / Min)	dB	11.5	12.5	
Gain Flatness (Typ / Max)	+/- dB		0.5	0.8
Input RL(Typ/ Max)	dB	9	10	
Output RL(Typ/ Max)	dB	8	10	
Output P1dB(Typ/ Min)	dBm	26.5	27	
Output IP3 ⁽¹⁾	dBm		37	
Output P3dB(Typ/ Min)	dBm	28.5	29	
Operating Current at P1dB (Typ/ Max)	mA		500	550
Thermal Resistance	°C / W		8	

(1) Output IP3 is measured with two tones at output power of 10 dBm/tone separated by 20 MHz.

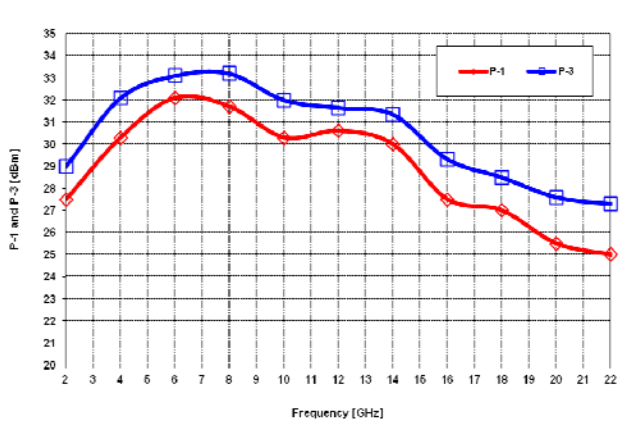
Typical RF Performance: $V_{ds}=12V$, $V_{g1}=-0.75V$, $V_{g2}=2V$, $I_{ds}=500mA$, $Z_0=50\text{ ohm}$, $T_a=25\text{ }^\circ\text{C}$



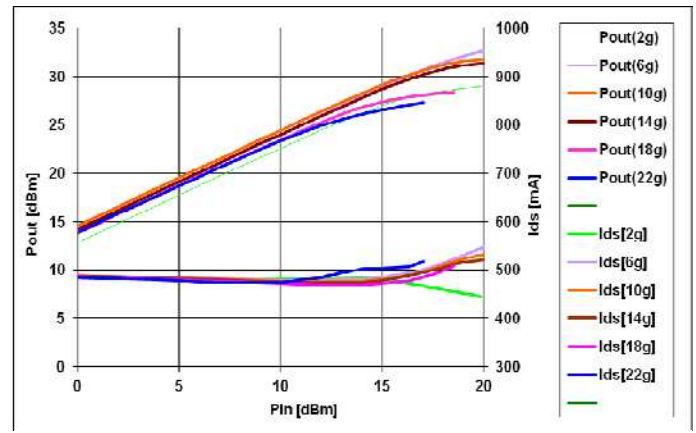
S11, S21, and S22 vs. Frequency



K-factor vs. Frequency

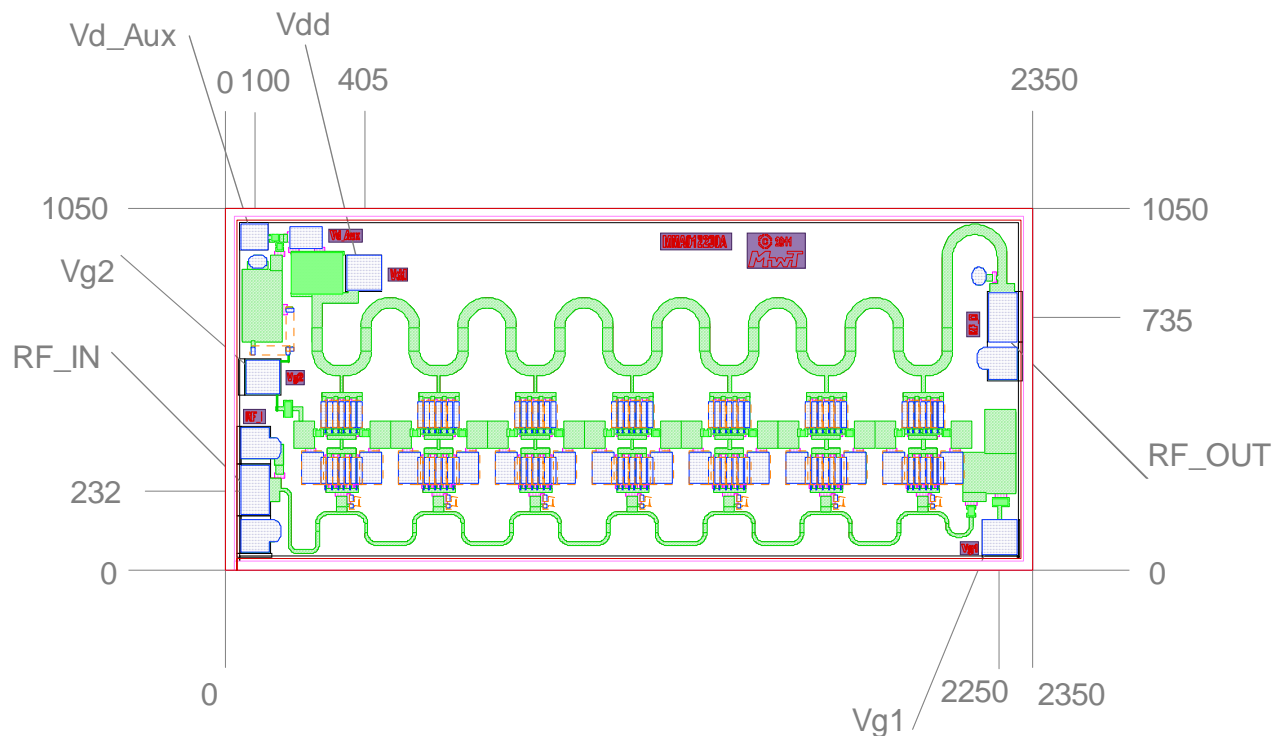


P-1 and P-3 vs. Frequency



Pout, and Ids vs. Pin

Mechanical Information: *Top view*



The units are In [um].

Applications

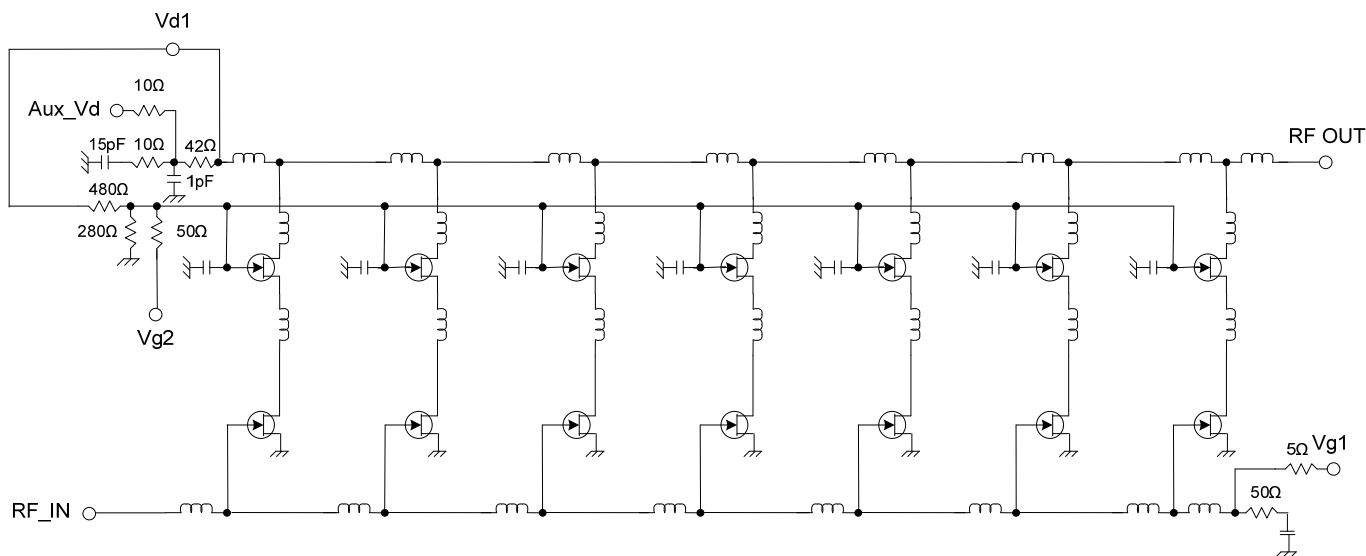
The MMA012030 traveling wave amplifier is designed for use as a general purpose wideband power stage in microwave communication systems, and test equipments. It is ideally suited for broadband applications requiring a flat gain response and excellent port matches over a 0.1 to 20 GHz frequency range.

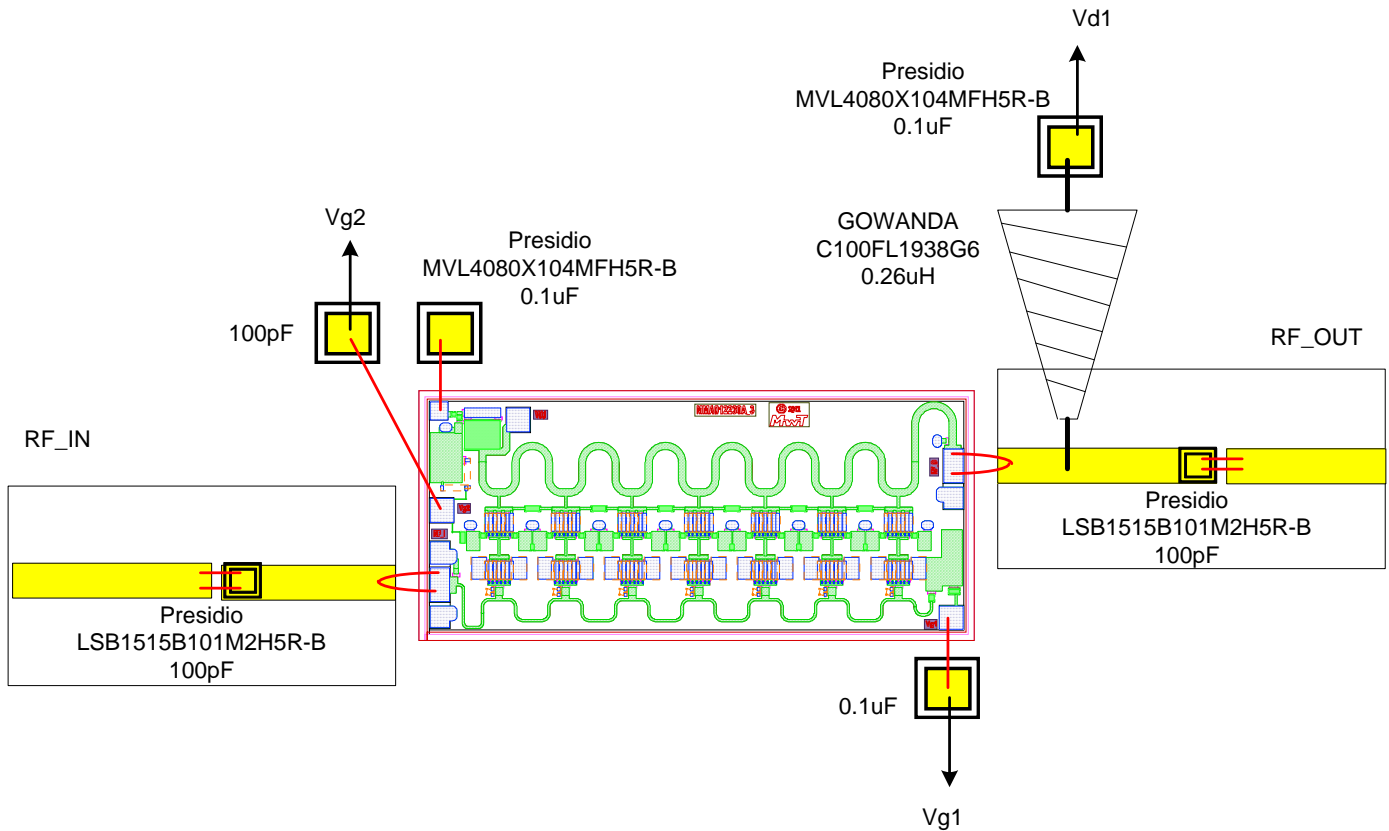
Biasing and Operation

The recommended bias conditions for best performance for the MMA012030 are $V_{DD} = 12V$, $I_{DD} = 500mA$. To achieve these drain current levels, V_{g1} is typically $-0.8V$, and V_{g2} is $+2V$. No other bias supplies or connections to the device are required for 0.1 to 20 GHz operation. The gate voltage (V_{g1}) should be applied prior to the drain voltage (V_{d1}) during power up and removed after the drain voltage during power down. The MMA012030 is a DC coupled amplifier. External coupling capacitors are needed on RF_{IN} and RF_{OUT} ports. The drain bias pad is connected to RF and must be decoupled to the lowest operating frequency. An auxiliary drain contacts is provided when performance below 0.1 GHz is required. Connect external capacitors to ground to maintain input and output VSWR at low frequencies (see additional application note). Do not apply bias to these pads. The second gate (V_{g2}) can be used to obtain 30 dB (typical) dynamic gain control. For highest gain operation, V_{g2} voltage must be set at $+2V$.

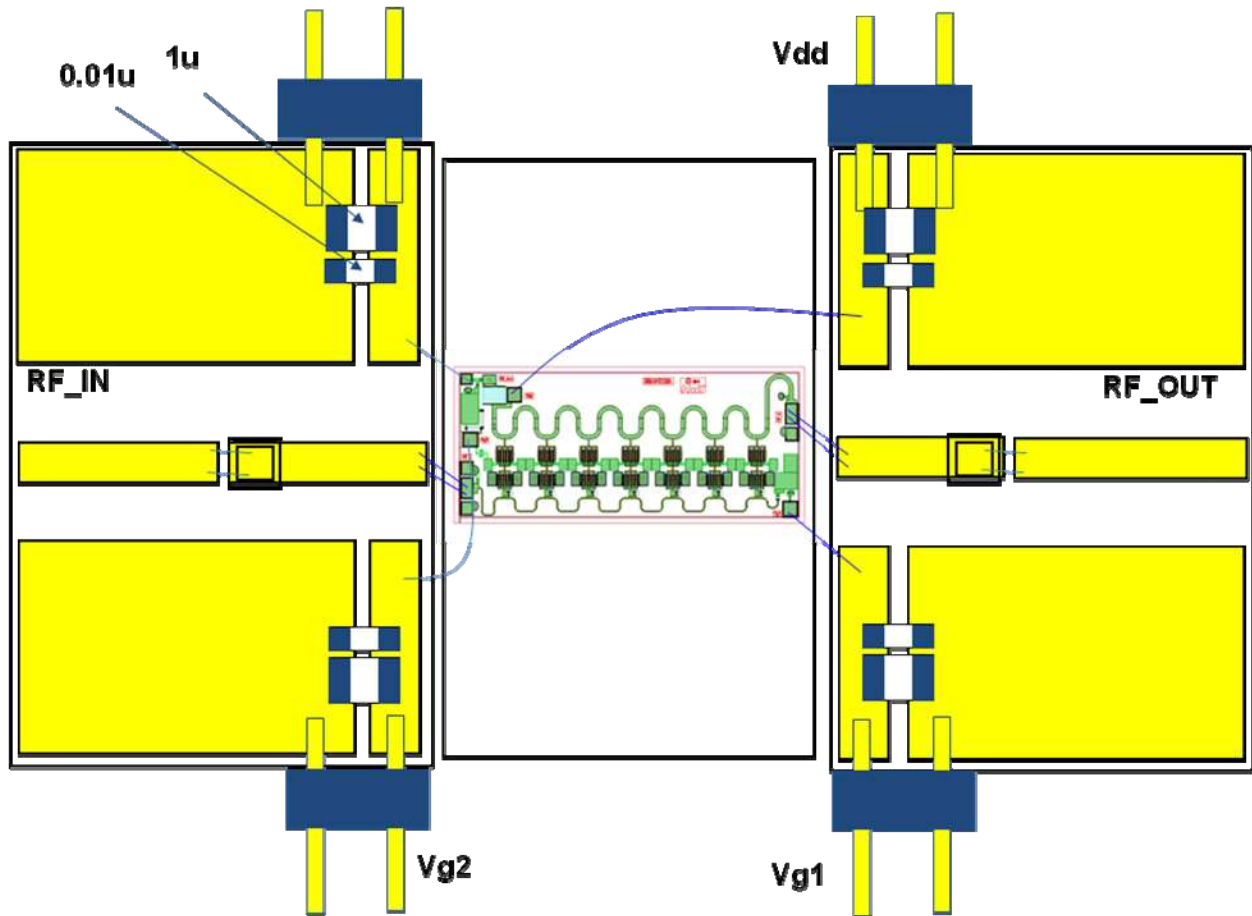
Assembly Techniques

GaAs MMICs are ESD sensitive. ESD preventive measures must be employed in all aspects of storage, handling, and assembly. MMIC ESD precautions, handling considerations, die attach and bonding methods are critical factors in successful GaAs MMIC performance and reliability.





Assembly Diagram



Demo module DC and RF pin assignment