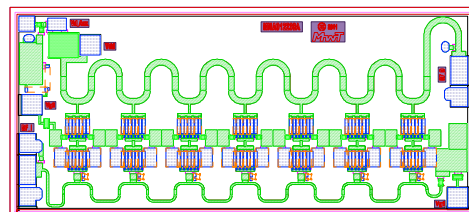


MMA-012727 0.1 - 26.5 GHz 0.5 W Traveling Wave Amplifier

Features:

- Frequency Range: 0.1 – 26.5 GHz
- P3dB: +27 dBm
- Gain: 12.5 dB
- Vdd = 8 to 12 V
- Ids = 250 to 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

Description:

The MMA-012727 is a broadband GaAs MMIC Traveling Wave Amplifier (TWA) with medium output power and high gain over 0.1 to 26.5 GHz frequency range. This amplifier is optimally designed for broadband applications requiring flat gain and high power with excellent input and output matches over a 0.1 to 26.5 GHz frequency range.

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

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	6
Ig2	Second Gate-Source Current	mA	-20	
Pdiss	Maximum Power dissipation	W		4.65
Pin max	RF Input Power	dBm		23
Toper	Operating Temperature	$^\circ\text{C}$		-40 to +85
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: $V_{ds} = 10\text{ V}$, $V_{g1} = -0.75\text{ V}$, $V_{g2} = 1\text{ V}$, $I_{ds} = 350\text{ mA}$, $T_a = 25\text{ }^{\circ}\text{C}$, $Z_0 = 50\text{ }\Omega$

Parameter	Units	Min.	Typ.	Max.
Frequency Range	MHz	0.1		26,500
Gain	dB	11.5	12.5	
Gain Flatness	$\pm$ dB		0.5	0.7
Input RL	dB	9	11	
Output RL	dB	9	11	
Output P1dB	dBm	22	26	
Output IP3 ⁽¹⁾	dBm		35	
Output P3dB	dBm	23	27	
Operating Current at P1dB	mA		350	380
Thermal Resistance	$^{\circ}\text{C} / \text{W}$		14	

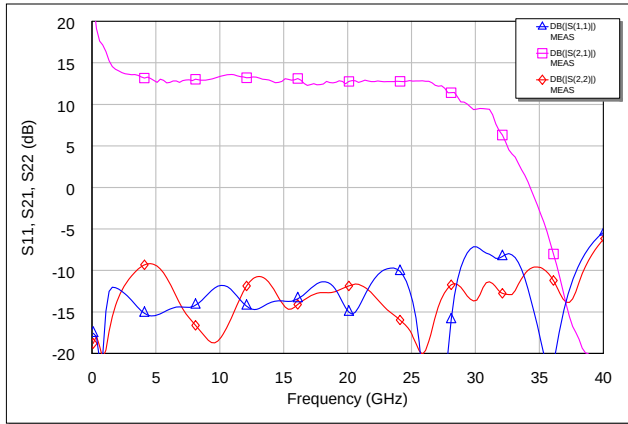
(1) Output IP3 is measured with two tones at output power of 10 dBm / tone separated by 20 MHz.

ESD Caution

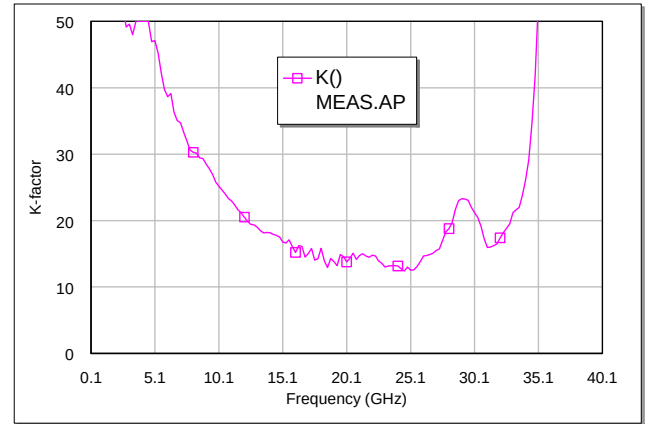


High-performance RF integrated circuits are highly sensitive to electrostatic discharge (ESD) and may contain unprotected inputs and outputs. Handling and assembly should be conducted in an ESD-controlled environment. It is recommended that ESD precautions and protocols are adopted to minimise the risk of electrostatic discharge and protect product integrity.

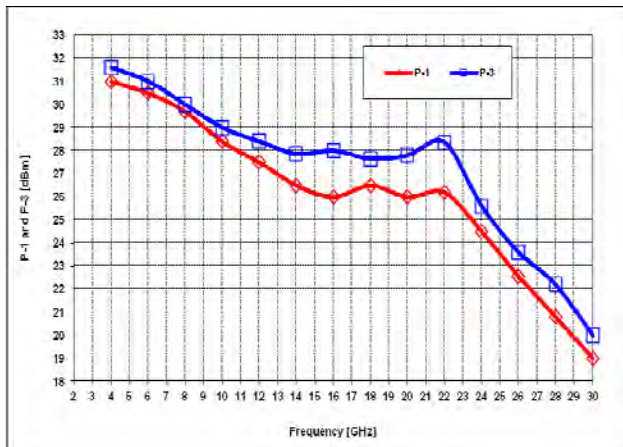
Typical RF Performance: $V_{ds} = 10\text{ V}$, $V_{g1} = -0.75\text{ V}$, $V_{g2} = 1\text{ V}$, $I_{ds} = 350\text{ mA}$, $Z_0 = 50\ \Omega$, $T_a = 25\text{ }^\circ\text{C}$



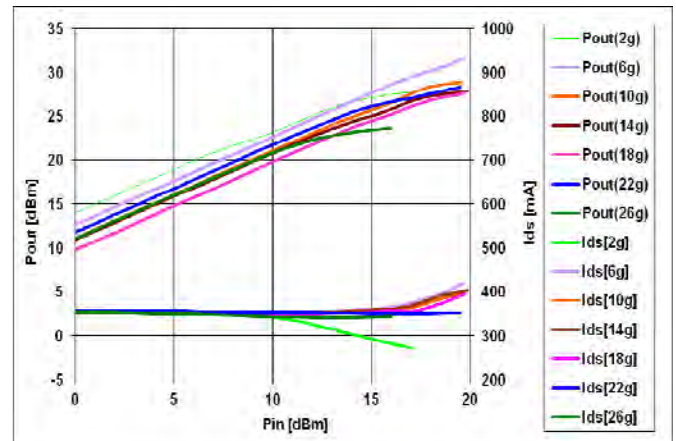
S11, S21, and S22 vs. Frequency



K-factor vs. Frequency



P-1 and P-3 vs. Frequency

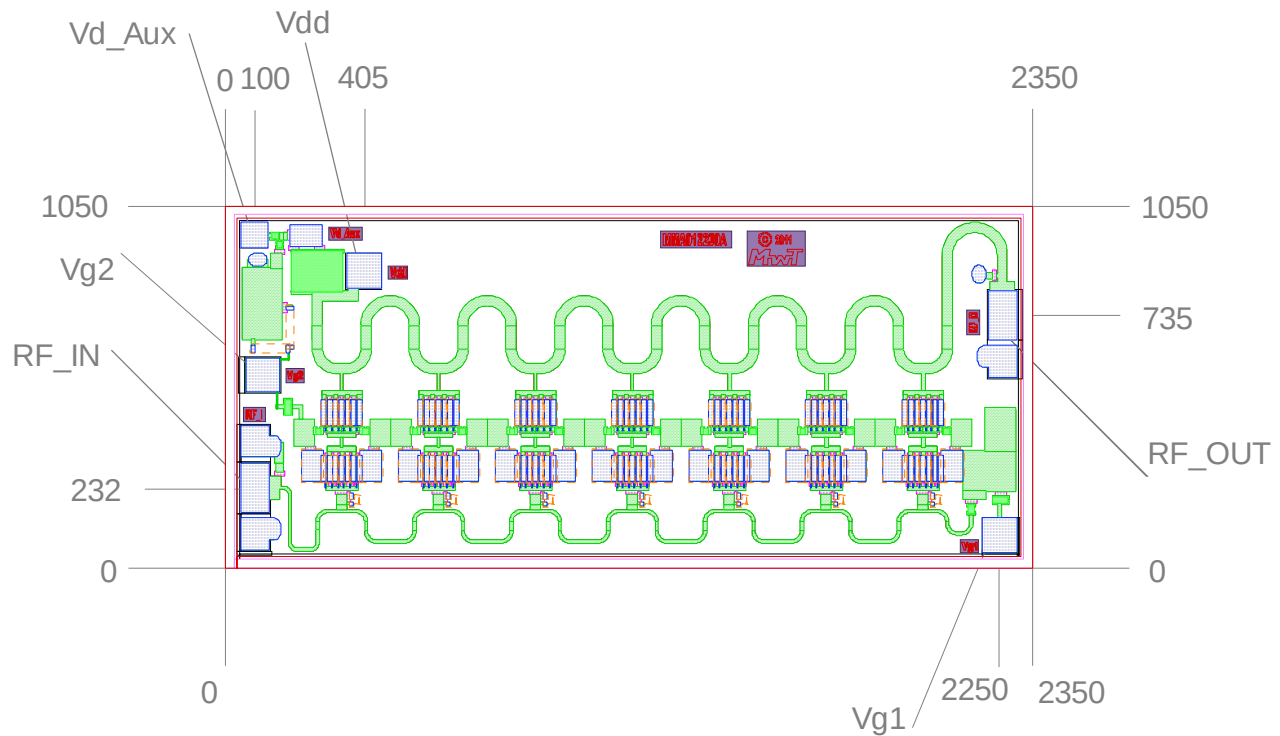


Pout and Ids vs. Pin

MMA-012727

0.1 - 26.5 GHz 0.5 W Traveling Wave Amplifier

Mechanical Information: *Top view*



The units are in [μm].

MMA-012727

0.1 - 26.5 GHz 0.5 W Traveling Wave Amplifier

Applications

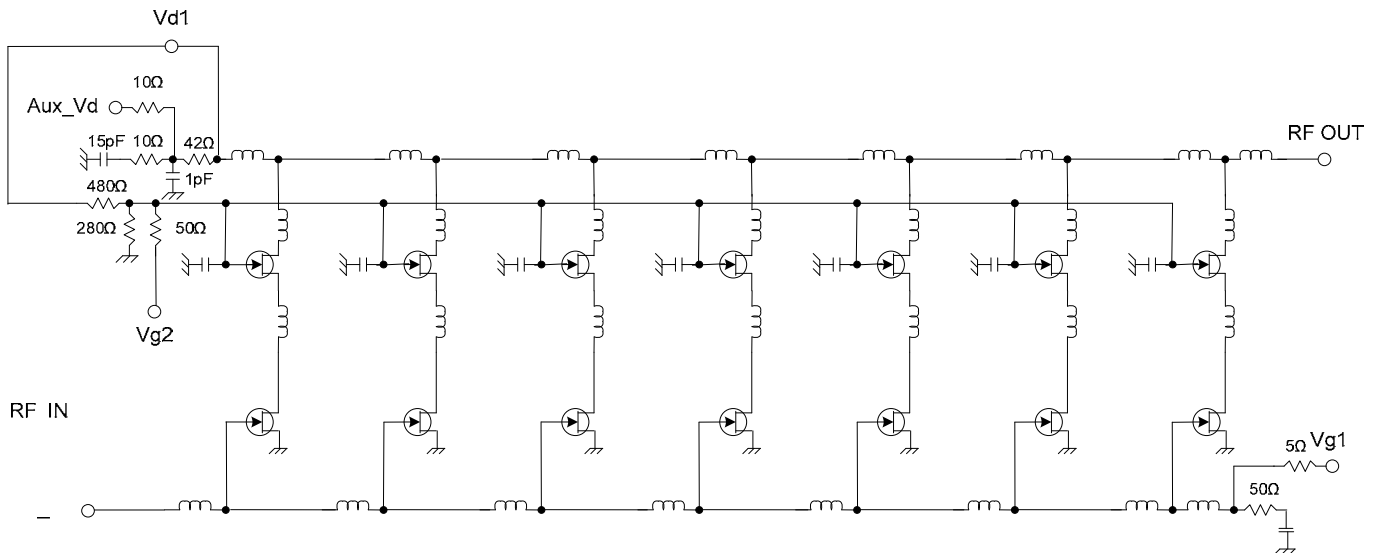
The **MMA-012727** traveling wave amplifier is designed for use as a general purpose wideband power stage in microwave communication systems, and test equipments. It is ideally suited for broadband applications requiring a flat gain response and excellent port matches over a 0.1 to 26.5 GHz frequency range. Dynamic gain control and low-frequency extension capabilities are designed into these devices.

Biasing and Operation

The recommended bias conditions for best performance for the **MMA-012727** are $V_{DD} = 10$ V, $I_{DD} = 350$ mA. To achieve these drain current levels, V_{g1} is typically -0.75 V, and V_{g2} is typically $+1$ V. No other bias supplies or connections to the device are required for 0.1 to 26.5 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. Performance improvements are possible depending on applications. The drain bias voltage range is 8 to 12V and the quiescent drain current biasing range is 250 mA to 500 mA. The **MMA-012727** is a DC coupled amplifier. External decoupling capacitors are needed on RFIN and RFOUT 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 2 GHz is required. The second gate (V_{g2}) can be used to obtain 30 dB (typical) dynamic gain control. For maximum gain operation, typical V_{g2} is $+1$ V.

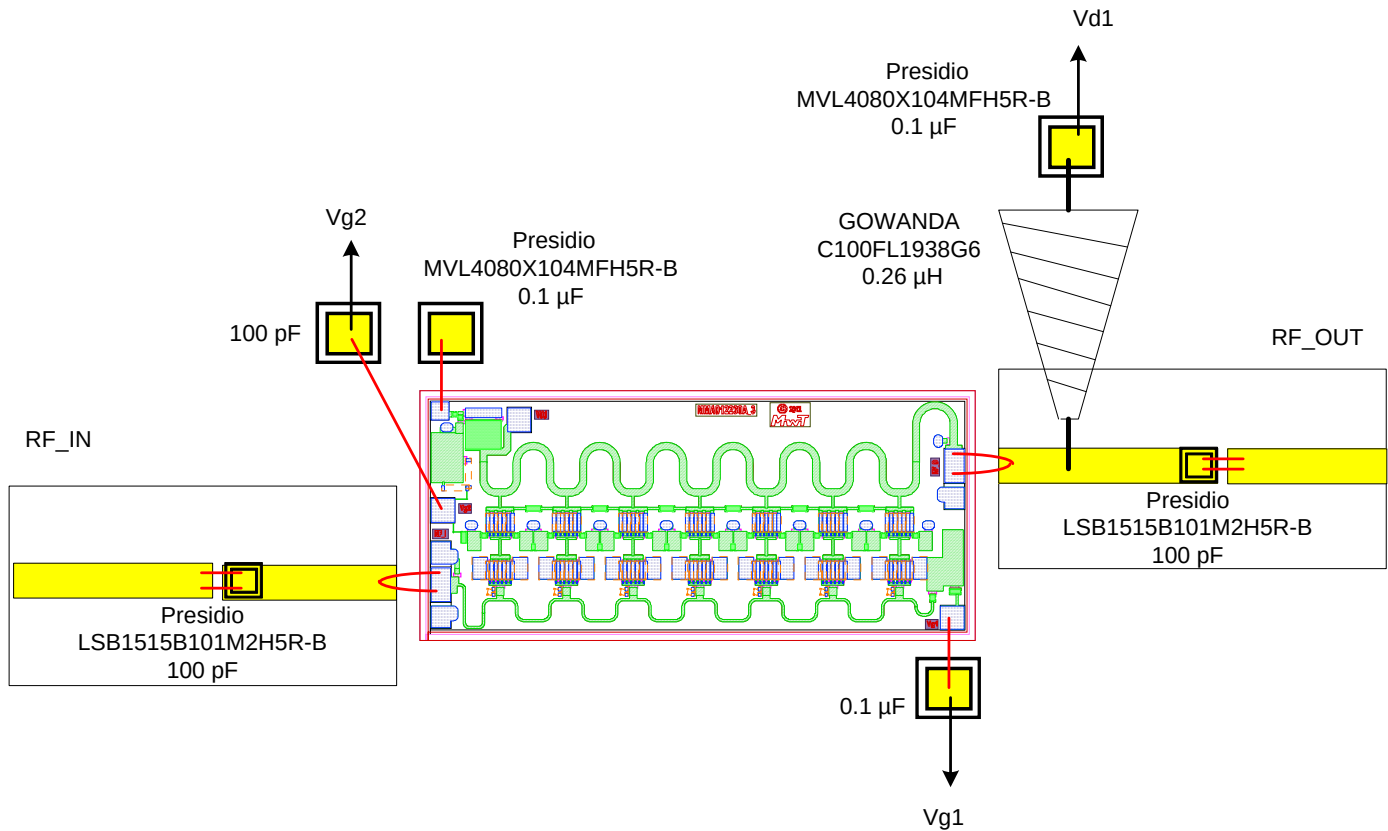
Assembly Techniques

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.



MMA-012727

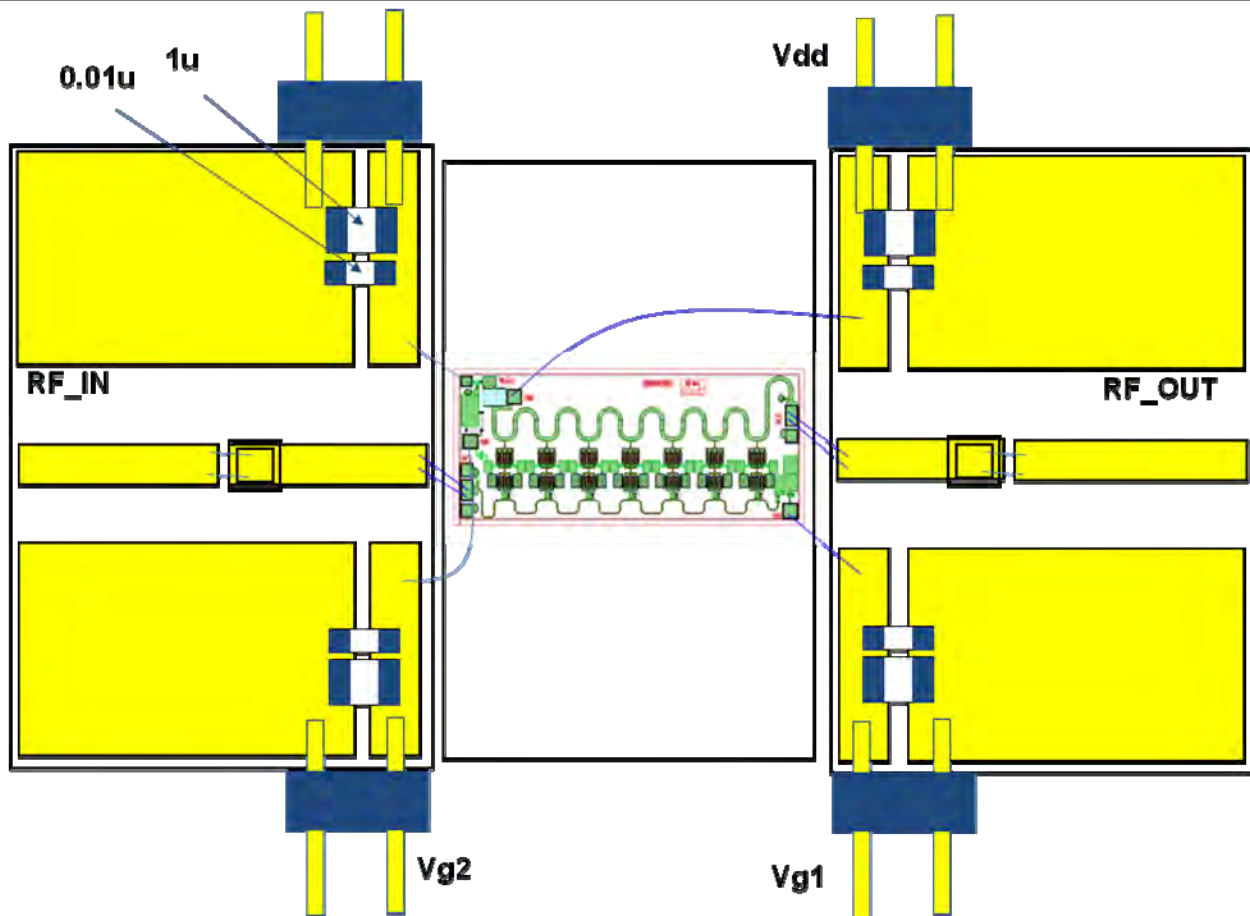
0.1 - 26.5 GHz 0.5 W Traveling Wave Amplifier



Assembly Diagram

MMA-012727

0.1 - 26.5 GHz 0.5 W Traveling Wave Amplifier



Demo module DC and RF pin assignment for 2 - 27 GHz applications

RoHS Compliance



CML Micro certifies, to the best of our knowledge, that its products comply with RoHS directive (2011/65/EU), as amended by Directive (EU) 2015/863.

REACH Compliance



CML Micro certifies, to the best of our knowledge, that its products do not contain any of the banned substances specified in the SVHC list at <https://echa.europa.eu/candidate-list-table>. CML Micro are committed to ensuring the safety of products and the compliance with regulations. Publications will be updated in the event that REACH control is compromised.

Contact Information

For further information please contact your local CML sales representative.
Contact details can be found at www.cmlmicro.com.

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