

AMMC-5620

6-20 GHz High Gain Amplifier

Description

AMMC-5620 MMIC is a GaAs wide-band amplifier designed for medium output power and high gain over the 6-20 GHz frequency range. The 3 cascaded stages provide high gain while the single bias supply offers ease of use.

It is fabricated using a PHEMT integrated circuit process.



Lifecycle status: **Active**

Features

High Gain: 19 dB typical

Output Power: 15 dBm typical

Input and Output Return Loss: < -10 dB

Positive Gain Slope: 0.21 dB/GHz typical

Single Supply Bias: 5 V @ 95 mA

Applications

General purpose, wide-band amplifier in communication systems or microwave instrumentation

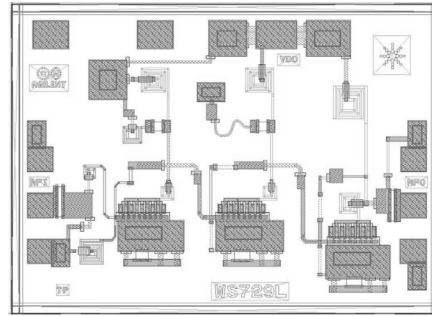
High gain amplifier

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Data Sheet



Chip Size: 1410 x 1010 μm (55.5 x 39.7 mils)

Chip Size Tolerance: $\pm 10 \mu\text{m}$ (± 0.4 mils)

Chip Thickness: $100 \pm 10 \mu\text{m}$ (4 ± 0.4 mils)

Pad Dimensions: $80 \times 80 \mu\text{m}$ (3.1 x 3.1 mils or larger)

Description

Avago Technologies' AMMC-5620 MMIC is a GaAs wide-band amplifier designed for medium output power and high gain over the 6 - 20 GHz frequency range. The 3 cascaded stages provide high gain while the single bias supply offers ease of use. It is fabricated using a PHEMT integrated circuit process. The RF input and output ports have matching circuitry for use in 50- Ω environments. The backside of the chip is both RF and DC ground. This helps simplify the assembly process and reduces assembly related performance variations and costs. For improved reliability and moisture protection, the die is passivated at the active areas. The MMIC is a cost effective alternative to hybrid (discrete FET) amplifiers that require complex tuning and assembly processes.

Features

- Frequency Range: 6 - 20 GHz
- High Gain: 19 dB Typical
- Output Power: 15dBm Typical
- Input and Output Return Loss: < -10 dB
- Positive Gain Slope: $+0.21$ dB/GHz Typical
- Single Supply Bias: 5 V @ 95 mA Typical

Applications

- General purpose, wide-band amplifier in communication systems or microwave instrumentation
- High gain amplifier

AMMC-5620 Absolute Maximum Ratings^[1]

Symbol	Parameters/Conditions	Units	Min.	Max.
V _{DD}	Drain Supply Voltage	V		7.5
I _{DD}	Total Drain Current	mA		135
P _{DC}	DC Power Dissipation	W		1.0
P _{in}	RF CW Input Power	dBm		20
T _{ch}	Channel Temp.	$^{\circ}\text{C}$		+150
T _b	Operating Backside Temp.	$^{\circ}\text{C}$	- 55	
T _{stg}	Storage Temp.	$^{\circ}\text{C}$	- 65	+165
T _{max}	Maximum Assembly Temp. (60 sec max)	$^{\circ}\text{C}$		+300

Note:

1. Operation in excess of any one of these conditions may result in permanent damage to this device.



Note: These devices are ESD sensitive. The following precautions are strongly recommended. Ensure that an ESD approved carrier is used when dice are transported from one destination to another. Personal grounding is to be worn at all times when handling these devices

AMMC-5620 DC Specifications/Physical Properties [1]

Symbol	Parameters and Test Conditions	Units	Min.	Typical	Max.
V_{DD}	Recommended Drain Supply Current	V		5	
I_{DD}	Total Drain Supply Current ($V_{DD} = 5V$)	mA	70	95	130
I_{DD}	Total Drain Supply Current ($V_{DD} = 7V$)	mA		105	
θ_{ch-b}	Thermal Resistance [3] (Backside temperature (T_b) = 25 °C)	°C/W		33	

Notes:

1. Backside temperature $T_b = 25^\circ\text{C}$ unless otherwise noted
2. Channel-to-backside Thermal Resistance (θ_{ch-b}) = 47°C/W at $T_{channel}$ (T_c) = 150°C as measured using infrared microscopy. Thermal Resistance at backside temperature (T_b) = 25°C calculated from measured data.

AMMC-5620 RF Specifications [3]

$T_b = 25^\circ\text{C}$, $V_{DD} = 5V$, $I_{DD} = 95\text{ mA}$, $Z_o = 50\ \Omega$

Symbol	Parameters and Test Conditions	Units	Min.	Typical	Max.
$ S_{21} ^2$	Small-signal Gain	dB	16	19	22
Gain Slope	Positive Small-signal Gain Slope	dB/GHz		+0.21	
RL_{in}	Input Return Loss	dB	10	13	
RL_{out}	Output Return Loss	dB	10	14	
$ S_{12} ^2$	Reverse Isolation	dB		- 55	
P_{-1dB}	Output Power at 1 dB Gain Compression @ 20 GHz	dBm	12.5	15	
P_{sat}	Saturated Output Power (3dB Gain Compression) @ 20 GHz	dBm	14.5	17	
OIP3	Output 3rd Order Intercept Point @ 20 GHz	dBm		23.5	
NF	Noise Figure @ 20 GHz	dB		4.2	5.0

Notes:

3. 100% on-wafer RF test is done at frequency = 6, 13 and 20 GHz, except as noted.

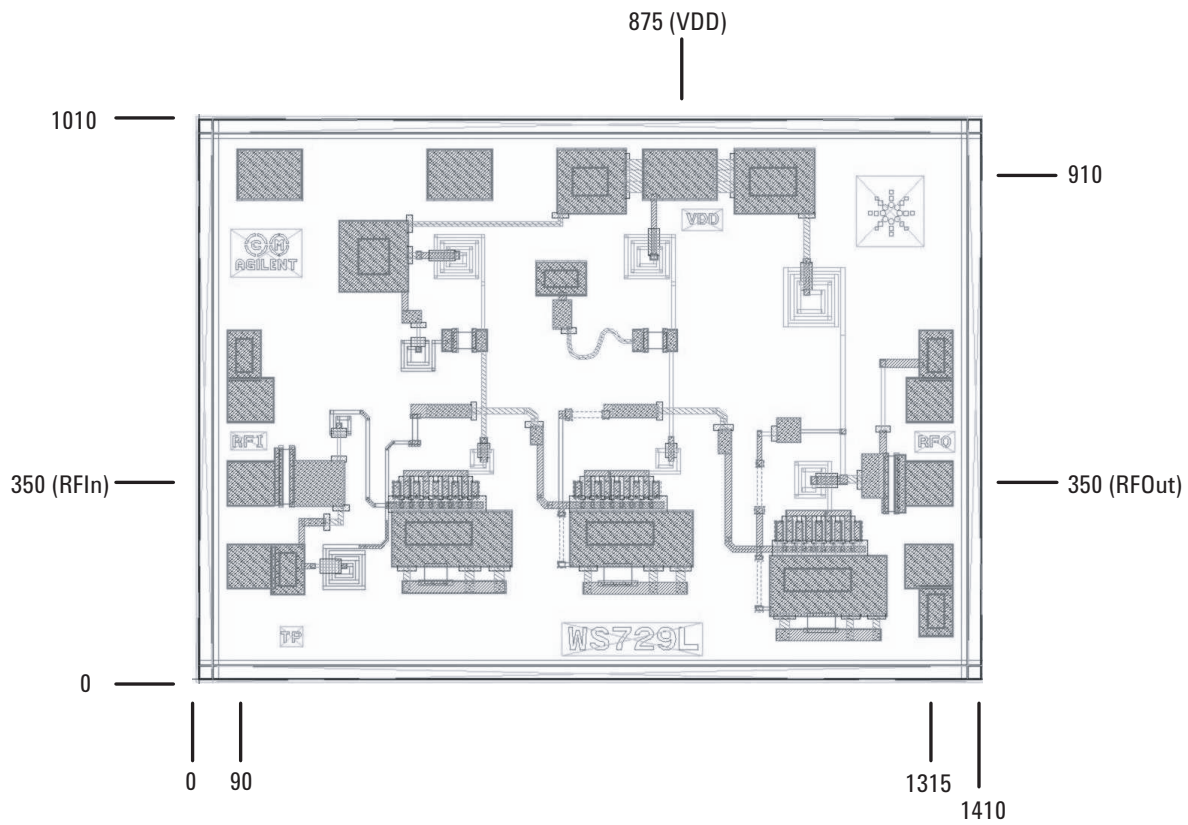


Figure 20. AMMC-5620 Bond Pad Locations.
(dimensions in microns)

Ordering Information:

AMMC-5620-W10 = 10 devices per tray

AMMC-5620-W50 = 50 devices per tray