AMMC-6222

7-21GHz GaAs High Linearity Low Noise Amplifier

Description

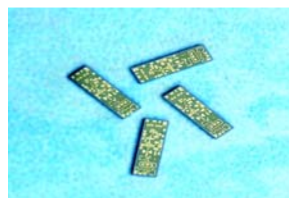
Avago Technologies AMMC-6222 is an easy-to-use broadband, high gain, high linearity Low Noise Amplifier that operates from 7 GHz to 21GHz.

The wide band and unconditionally stable performance makes this MMIC ideal as a primary or sub-sequential low noise block or a transmitter or LO driver.

The MMIC is fabricated using PHEMT technology to provide exceptional low noise, gain and power performance.

Lead (PB) Free RoHS 6 fully compliant

Lifecycle status: **Active**



Features

- 2000µm x 800µm Die Size
- Single Positive Bias Supply
- Selectable Output Power / Linearity
- No Negative Gate Bias

Applications

- Microwave Radio systems
- Satellite VSAT, DBS Up/Down Link
- LMDS & Pt-Pt mmW Long Haul
- Broadband Wireless Access (including 802.16 and 802.20 WiMax)
- WLL and MMDS loops
- Commercial grade military

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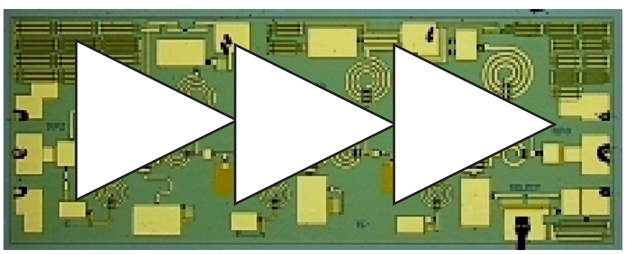
7 to 21 GHz GaAs High Linearity Low Noise Amplifier

Data Sheet

Description

Avago Technologies AMMC-6222 is an easy-to-use broadband, high gain, high linearity Low Noise Amplifier that operates from 7 GHz to 21GHz. The wide band and unconditionally stable performance makes this MMIC ideal as a primary or sub-sequential low noise block or a transmitter or LO driver. The MMIC has 3 gain stages and requires a 4V, 120mA power supply for optimal performance. It has a selectable pin to switch between low and high current, corresponding with low and high output power and linearity. DC-block capacitors are integrated at the input and output stages. Since this MMIC covers several bands, it can reduce part inventory and increase volume purchase options The MMIC is fabricated using PHEMT technology to provide exceptional low noise, gain and power performance. The backside of the chip is both RF and DC ground which helps simplify the assembly process and reduce assembly related performance variations and cost.



Chip Size: 800 µm x 2000µm (31.5 x 78.74 mils)

Chip Size Tolerance: ±10 µm (±0.4 mils)

Chip Thickness: 100 ± 10 µm (4 ±0.4 mils)

Pad Dimensions: 100 x 100 µm (4 x 4 mils)

Features

- 2000µm x 800µm Die Size
- Single Positive Bias Supply
- Selectable Output Power / Linearity
- No Negative Gate Bias

Specifications (Vdd = 4.0V, Idd = 120mA)

- RF Frequencies: 7 - 21 GHz
- High Output IP3: 29dBm
- High Small-Signal Gain: 25dB
- Typical Noise Figure: 2.4dB
- Input, Output Match: -10dB

Applications

- Microwave Radio systems
- Satellite VSAT, DBS Up/Down Link
- LMDS & Pt-Pt mmW Long Haul
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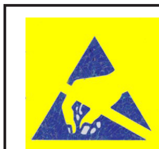
Note:
1. This MMIC uses depletion mode pHEMT devices.



Attention:
Observe precautions for handling electrostatic sensitive devices.

ESD Machine Model (60V)
ESD Human Body Model (150V)
Refer to Avago Application Note A004R: Electrostatic Discharge Damage and Control

Absolute Maximum Ratings (1)

Parameters/Condition	Symbol	Unit	Max
Drain to Ground Voltage	Vdd	V	5.5
Gate-Drain Voltage	Vgd	V	-10
Drain Current	Idd	mA	170
RF CW Input Power Max	Pin	dBm	10
Max channel temperature	Tch	C	+150
Storage temperature	Tstg	C	-65 +150
Maximum Assembly Temp	Tmax	C	260 for 20s

(1) Operation in excess of any of these conditions may result in permanent damage to this device. The absolute maximum ratings for Vdd, Vgd, Idd and Pin were determined at an ambient temperature of 25°C unless noted otherwise.

DC Specifications/ Physical Properties (2)

Parameter and Test Condition	Symbol	Unit	Min	Typ	Max
Drain Supply Current under any RF power drive and temp. (Vd=4.0 V)	Idd	mA	80	120	160
Drain Supply Voltage	Vd	V	3	4	5
Thermal Resistance(3)	θjc	°C/W		31.4	

(2) Ambient operational temperature TA=25°C unless noted
(3) Channel-to-backside Thermal Resistance (Tchannel = 34°C) as measured using infrared microscopy. Thermal Resistance at backside temp. (Tb) = 25°C calculated from measured data.

AMMC-6222 RF Specifications

T_A= 25°C, Vdd = 4.0 V, Idd=120mA, Zo=50 Ω

			Freq	High Output Power Configuration			Low Output Power Configuration		
Parameters and Test Conditions	Symbol	Unit	(GHz)	Min	Typical	Max	Min	Typical	Max
Drain Current	Idd	mA			120			95	
Small-Signal Gain[4]	Gain	dB	9, 12, 17	20	26			24	
Noise Figure into 50Ω [4]	NF	dB	9		2.7	2.8		2.4	
			12		2.5	2.8		2.4	
			17		2.7	2.8		2.4	
Output Power at 1dB Gain Compression	P-1dB	dBm		13	15.5			15	
Output Third Order Intercept Point	OIP3	dBm	9, 12, 17	26	28			27	
Isolation	Iso	dB			-50			-50	
Input Return Loss	RLin	dB			-10			-10	
Output Return Loss	RLout	dB			-10			-10	

(4) All tested parameters guaranteed with measurement accuracy ± 2dB for gain and P1dB, ±0.8dB for NF and ±5dBm for OPI3 in the high output power configuration.

Assembly Techniques

The backside of the MMIC chip is RF ground. For microstrip applications the chip should be attached directly to the ground plane (e.g. circuit carrier or heatsink) using electrically conductive epoxy [1]

For best performance, the topside of the MMIC should be brought up to the same height as the circuit surrounding it. This can be accomplished by mounting a gold plated metal shim (same length as the MMIC) under the chip which is of correct thickness to make the chip and adjacent circuit the same height. The amount of epoxy used for the chip or shim attachment should be just enough to provide a thin fillet around the bottom perimeter of the chip. The ground plane should be free of any residue that may jeopardize electrical or mechanical attachment.

RF connections should be kept as short as reasonable to minimize performance degradation due to undesirable series inductance. A single bond wire is normally sufficient for signal connections, however double bonding with 0.7mil gold wire will reduce series inductance. Gold thermo-sonic wedge bonding is the preferred method for wire attachment to the bond pads. The recommended wire bond stage temperature is 150°c ± 2°c.

Caution should be taken to not exceed the Absolute Maximum Rating for assembly temperature and time.

The chip is 100um thick and should be handled with care. This MMIC has exposed air bridges on the top surface and should be handled by the edges or with a custom collet (do not pick up the die with a vacuum on die center). Bonding pads and chip backside metallization are gold.

This MMIC is also static sensitive and ESD precautions should be taken

For more detailed information see Avago Technolgies' application note #54 "GaAs MMIC assembly and handling guidelines"

Notes:

[1] Ablebond 84-1 LMI silver epoxy is recommended

Ordering Information:

AMMC-6222-W10 = 10 devices per tray

AMMC-6222-W50 = 50 devices per tray

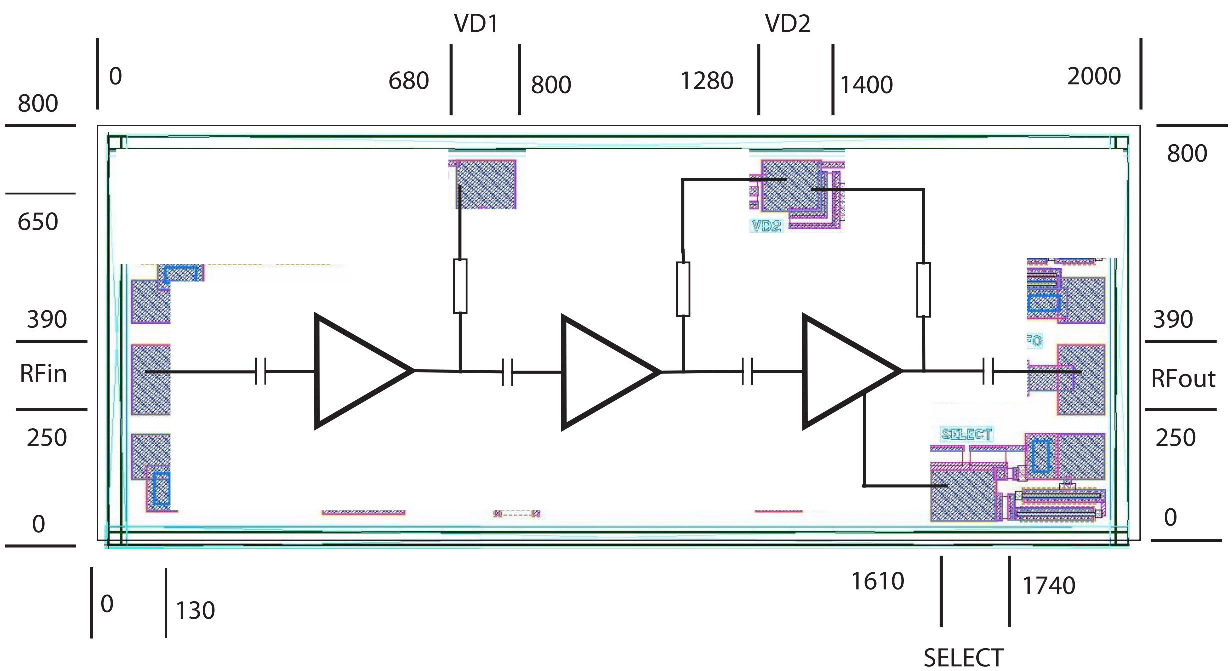


Figure 22. Bond Pad Locations

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