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Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

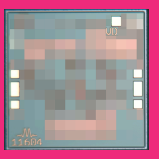
ADM-11604CH

6 to 18 GHz, Low Noise Amplifier

DEVICE OVERVIEW

General Description

The ADM-11604CH is a GaAs MMIC low noise amplifier with 24.5 dB typical gain and 1 dB typical noise figure from 6 to 18 GHz. It operates from a single +5 V supply and consumes only 180 mW, making it ideal for receivers where noise, power and size are tightly constrained. The amplifier is offered as a 1.38x1.38 mm bare die with integrated DC blocking capacitors on the RF input and output, and delivers flat gain and +28 dBm typical OIP3 across the band.



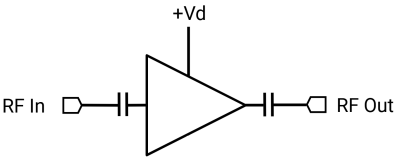
Features

- Broadband 6 to 18 GHz Operation
- Low Noise Figure, 1 dB Typical
- High Gain, 24.5 dB Typical
- Positive Gain Slope
- Single +5V Supply Voltage
- Low DC Power Consumption, 180 mW
- Small Die Size, 1.38x1.38mm

Applications

- Mobile test and measurement equipment
- Radar and satellite communications
- 5G Transceivers

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
ADM-11604CH	6 to 18 GHz, Low Noise Amplifier	CH	REACH RoHS	Released	EAR99

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Revision History

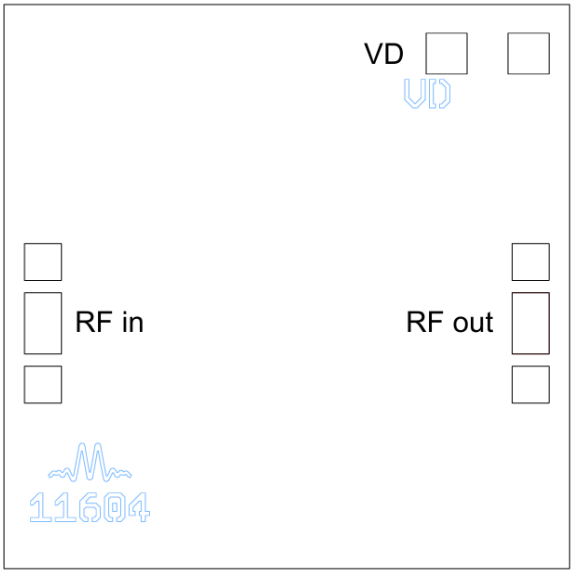
Revision Code	Revision Date	Comment
-	2026-11-10	Initial Release

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Port Configuration and Functions

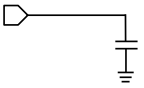
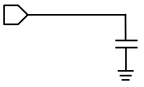
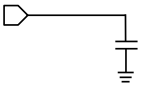
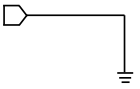
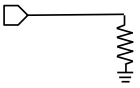
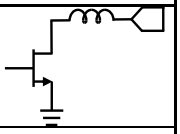
Port Diagram

A port diagram of the ADM-11604CH is shown below.



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Port Functions

Port	Function	Description	DC Equivalent Circuit
ACG1	External Chip Capacitor	The ACG1 pad provides additional off chip bypass capacitance. A 100pF chip capacitor is recommended.	
ACG2	External Chip Capacitor	The ACG2 pad provides additional off chip bypass capacitance. A 0.1uF chip capacitor is recommended.	
ACG3	External Chip Capacitor	The ACG3 pad provides additional off chip bypass capacitance. A 0.1uF chip capacitor is recommended.	
ACG4	External Chip Capacitor	The ACG4 pad provides additional off chip bypass capacitance. A 100pF chip capacitor is recommended.	
GND	Ground	Housing or ground lug must be connected to a DC/RF ground potential with high thermal and electrical conductivity.	
RF In	RF Input	This is the amplifier's RF Input port. It is RF matched to 50 Ω and requires an DC blocking capacitors	
Vd/RF Out	Drain Supply / RF Output	The VD pin supplies DC voltage to the drain of the amplifier IC. This pin is nominally set at +6V.	
Vg	Gate Bias Pin	The VG pad provides a required positive bias which supplies the current mirror. A higher voltage results in a higher current draw through the VD / RF Out port. This port should be set to +3V for normal operation.	

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Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may become inoperable or have a reduced lifetime. This amplifier is designed and characterized in a 50Ω system, and operation in a reflective environment can cause performance degradation.

Parameter	Maximum Rating	Unit
Minimum Storage Temperature	-65	°C
Positive Drain Supply Voltage (Vd)	6	V
RF Input Power	20	dBm
Maximum Storage Temperature	150	°C
Minimum Operating Temperature	-40	°C
Max Junction Temperature for MTTF > 1E6 Hours	175	°C
Maximum Operating Temperature	85	°C

Package Information

Parameter	Details	Rating
Dimensions	-	1.38 x 1.38 mm

Recommended Operating Conditions

The Recommended Operating Conditions indicate the limits, inside which the device should be operated, to guarantee the performance given in Electrical Specifications Operating outside these limits may not necessarily cause damage to the device, but the performance may degrade outside the limits of the electrical specifications. For limits, above which damage may occur, see Absolute Maximum Ratings.

Parameter	Min	Nominal	Max	Unit
Current Draw	-	36	-	mA
Ambient Temperature	-	25	-	°C
Drain Supply Voltage (Vd) (Amp)	-	5	-	V

Sequencing Requirements

Turn-on Procedure:
1. Apply Vd
Turn-off Procedure:
1. Turn off Vd
Note: RF input power can be injected at any moment in the bias sequencing procedure.

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Electrical Specifications

The electrical specifications apply at TA=+25°C in a 50Ω system.

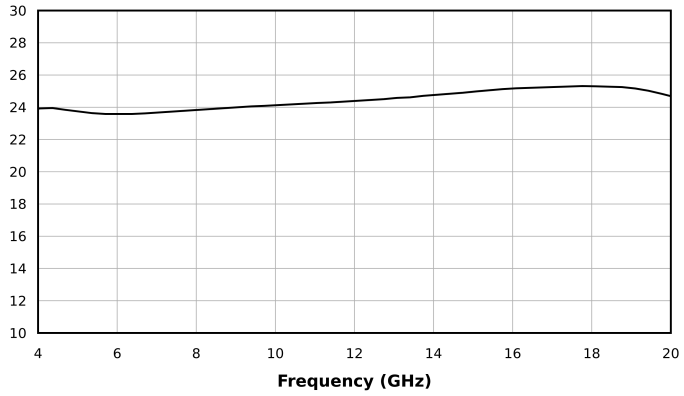
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Output P1dB	VD = 5V	6	18	-	15	-	dBm
Output Return Loss	VD = 5V	6	18	-	16	-	dB
Input Return Loss	VD = 5V	6	18	-	12	-	dB
Current Consumption [1]	VD = 5V	-	-	-	36	-	mA
Small Signal Gain	VD = 5V	6	18	-	24.5	-	dB
Reverse Isolation	VD = 5V	6	18	-	55	-	dB
Noise Figure	VD = 5V	6	18	-	1	-	dB
Output IP3	VD = 5V	6	18	-	28	-	dBm

[1] Bias conditions tested with no RF input power.

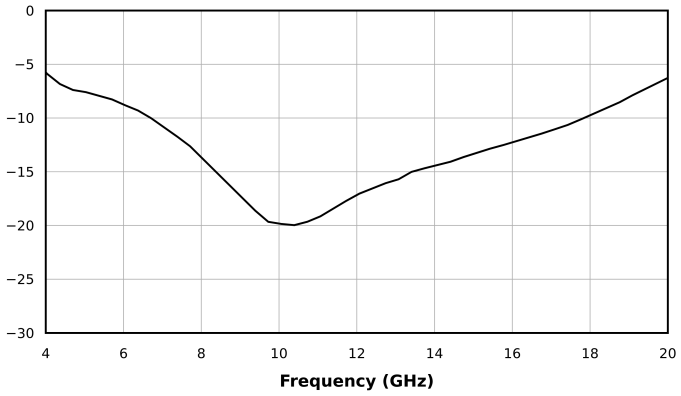
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Typical Performance

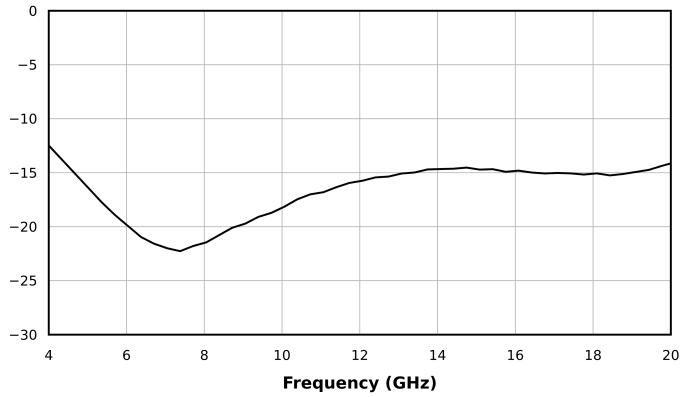
Small Signal Gain (dB)



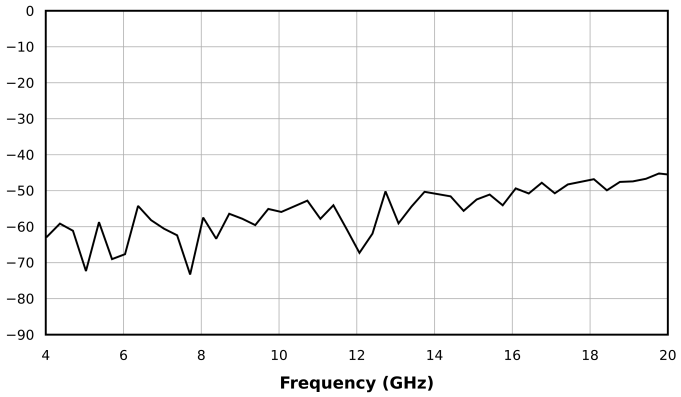
Input Return Loss (dB)



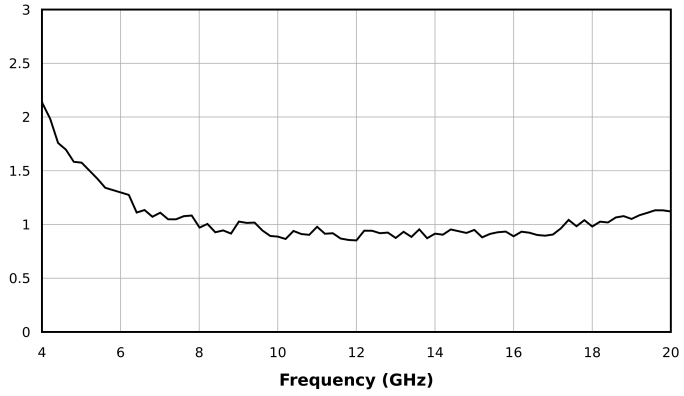
Output Return Loss (dB)



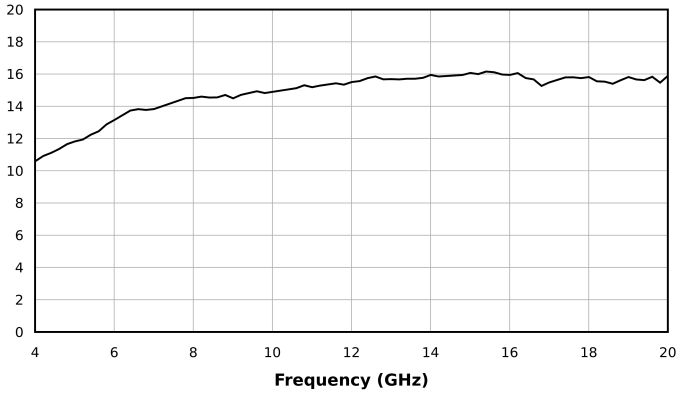
Reverse Isolation (dB)



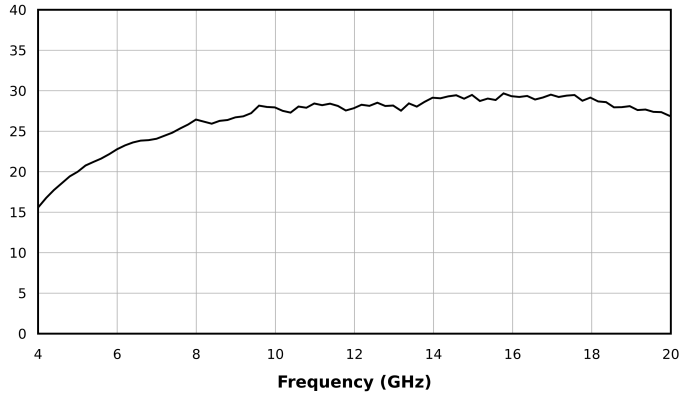
Noise Figure (dB)



Output P1dB (dBm)



Output IP3 (dBm)



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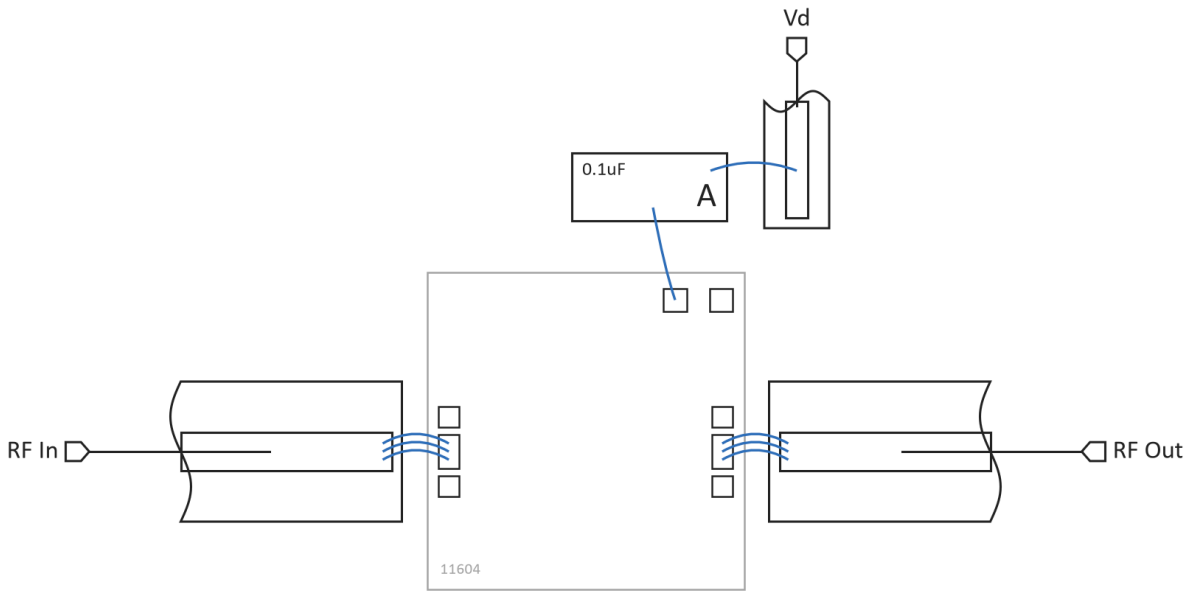
Application Information

ADM-11604CH Application Circuits

Below are the recommended application circuits for the ADM-11604CH. This application circuit is used for the performance plots shown in this datasheet. However, each PCB layout and environment are different which may require minor modifications of the biasing network. Please contact support@markimicrowave.com for more information.

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Application Circuit



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Application Circuit Description

Designator	Description	Sample Part Number
A	Presidio 0.1 µF Capacitor	MVB4080X104ZGH5C1B

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Die Mounting Recommendations

Mounting and Bonding Recommendations

Marki MMICs should be attached directly to a ground plane with conductive epoxy. The ground plane electrical impedance should be as low as practically possible. This will prevent resonances and permit the best possible electrical performance. Datasheet performance is only guaranteed in an environment with a low electrical impedance ground.

Mounting - To epoxy the chip, apply a minimum amount of conductive epoxy to the mounting surface so that a thin epoxy fillet is observed around the perimeter of the chip. Cure epoxy according to manufacturer instructions.

Wire Bonding - Ball or wedge bond with 0.025 mm (1 mil) diameter pure gold wire. Thermosonic wirebonding with a nominal stage temperature of 150 °C and a ball bonding force of 40 to 50 grams or wedge bonding force of 18 to 22 grams is recommended. Use the minimum level of ultrasonic energy to achieve reliable wirebonds. Wirebonds should be started on the chip and terminated on the package or substrate. Bond wire inductance will improve return loss. Bondwire inductance in the range of 30pH to 200pH will improve performance.

Circuit Considerations – 50 Ω transmission lines should be used for all high frequency connections in and out of the chip. Wirebonds should be kept as short as possible, with multiple wirebonds recommended for higher frequency connections to reduce parasitic inductance. In circumstances where the chip more than .001” thinner than the substrate, a heat spreading spacer tab is optional to further reduce bondwire length and parasitic inductance.

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Handling Precautions

General Handling

Chips should be handled with care using tweezers or a vacuum collet. Users should take precautions to protect chips from direct human contact that can deposit contaminants, like perspiration and skin oils on any of the chip's surfaces.

Static Sensitivity

GaAs MMIC devices are sensitive to ESD and should be handled, assembled, tested, and transported only in static protected environments.

Cleaning and Storage: Do not attempt to clean the chip with a liquid cleaning system or expose the bare chips to liquid. Once the ESD sensitive bags the chips are stored in are opened, chips should be stored in a dry nitrogen atmosphere.

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