

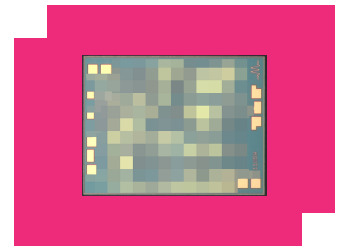
# AMM-11059CH

## 0.01 to 50 GHz, High Frequency Distributed Power Amplifier

### DEVICE OVERVIEW

#### General Description

The AMM-11059CH is a wideband GaAs distributed amplifier covering 0.01 to 50 GHz, delivering 12 dB small-signal gain with high output power and linearity. It provides up to +27 dBm saturated output power, with output IP3 up to +35 dBm. Operating from a 12 V supply at 220 mA typical current, the amplifier is internally matched to 50 Ω at both the RF input and output ports. These features make it well-suited for wideband driver stages in RF/mmWave front ends, test and measurement instrumentation, electronic warfare, and general-purpose broadband gain block applications.



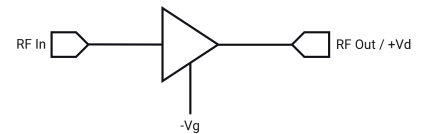
#### Features

- High Frequency Wideband Operating Range
- High Saturated Output Power, Up to +27 dBm Typical
- Positive Gain Slope

#### Applications

- Test and Measurement Equipment
- Satellite Communications
- Electronic Warfare
- Wireless Backhaul
- Radar

#### Functional Block Diagram



#### Part Ordering Options

Part Number	Description	Package	Green Status	Product Lifecycle	Export Classification
AMM-11059CH	0.01 to 50 GHz, High Frequency Distributed Power Amplifier	CH	RoHS REACH	Released	3A001.b.2.f

## AMM-11059CH

### 0.01 to 50 GHz, High Frequency Distributed Power Amplifier

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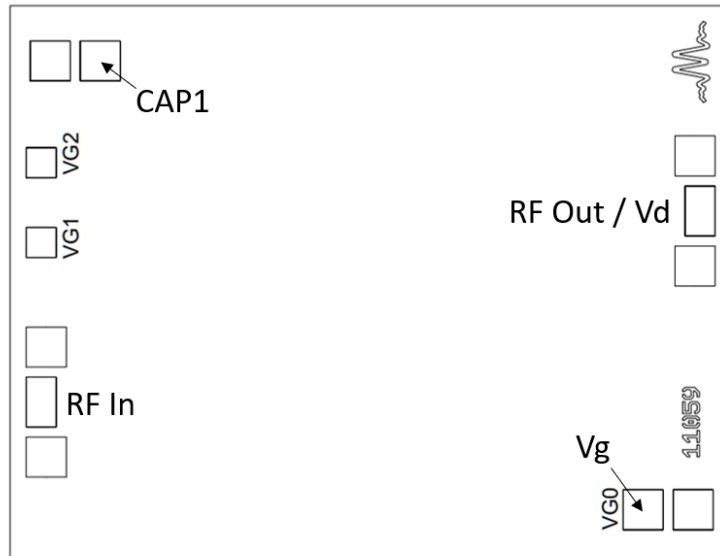
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#### Revision History

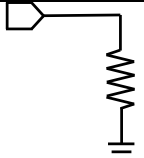
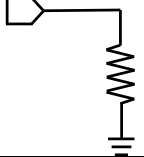
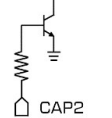
Revision Code	Revision Date	Comment
-	2026-04-10	Initial Release

### Port Configuration and Functions

#### Port Diagram



#### Port Functions

Port	Function	Description	DC Equivalent Circuit
CAP1	External Chip Capacitor	For normal operation an external bypass capacitor should be used at this port. See application circuit section.	-
RF In	RF Input	This is the RF Input port of the amplifier die. Port is internally matched to 50 Ω. External blocking capacitor is required for operation.	
RF Out / Vd	RF Output and Positive Device Voltage Supply Port	This is the RF Output port and positive supply port of the amplifier die. Port is internally matched to 50 Ω. External bias tee is required for operation.	
Vg	Gate Bias Voltage Pad	Vg provides gate bias to the amplifier. For normal operation an external bypass capacitor should be used at this port. See application circuit section.	

### Specifications

#### Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If any one of these limits are exceeded, the device may become inoperable or have a reduced lifetime. Reliability limits are individual, instantaneous catastrophic limits only. Functional operation limits are indicated below. Operation of the device at multiple absolute maximum limits or for extended periods at a single limit can cause degradation and damage to the device.

Parameter	Maximum Rating	Unit
Drain Current (Id)	260	mA
Drain Supply Voltage (Vd)	14	V
Maximum Input Power	27	dBm
Maximum Operating Temperature <sup>1</sup>	85	°C
Minimum Operating Temperature	-40	°C
Thermal Resistance, $\theta_{JC}$	10	°C/W
Maximum Storage Temperature	150	°C
Minimum Storage Temperature	-65	°C
Negative Bias Voltage (Vg)	-2	V

<sup>[1]</sup> Low thermal resistance die attach to thermal ground is necessary for MTTF > 1x10<sup>6</sup> hours.

#### Package Information

Parameter	Details	Rating
ESD	< 250 Volts	HBM Class 0
Dimensions	-	1.8 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
Drain Supply Voltage (Vd) (Amp)	6	12	12	V
Ambient Temperature	-40	25	85	°C
Gate Bias DC Voltage (Vg)	-	-0.4	-0.2	V
Positive DC Current (Id) (No RF Input)	148	220	230	mA

Sequencing Requirements Turn-on Procedure: Apply negative bias to Vg Apply Vd Turn-off Procedure: Turn off Vd Turn off Vg

#### Sequencing Requirements

Turn-on Procedure:

1. Apply negative bias to Vg
2. Apply Vd

Turn-off Procedure:

1. Turn off Vd
2. Turn off Vg

**Note:** RF input power can be injected at any moment in the bias sequencing procedure.

#### Electrical Specifications

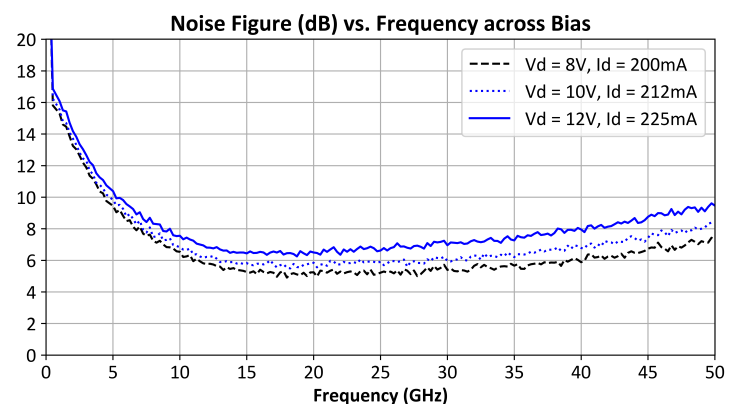
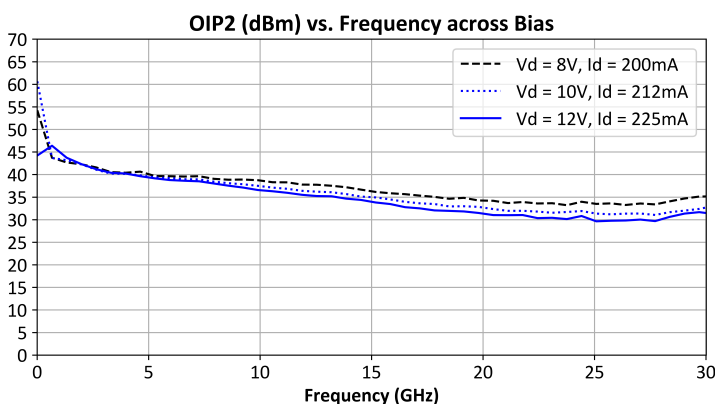
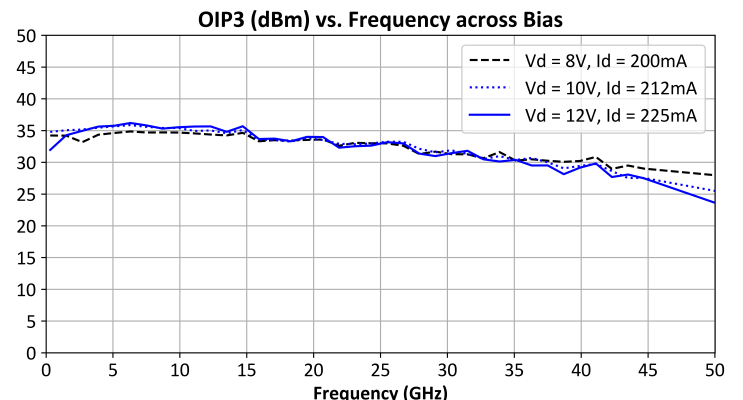
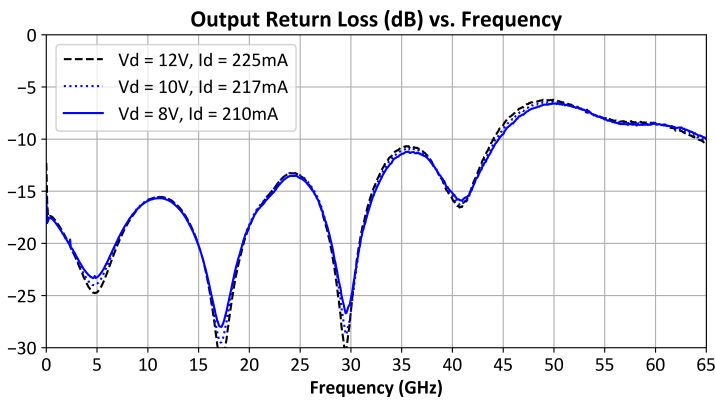
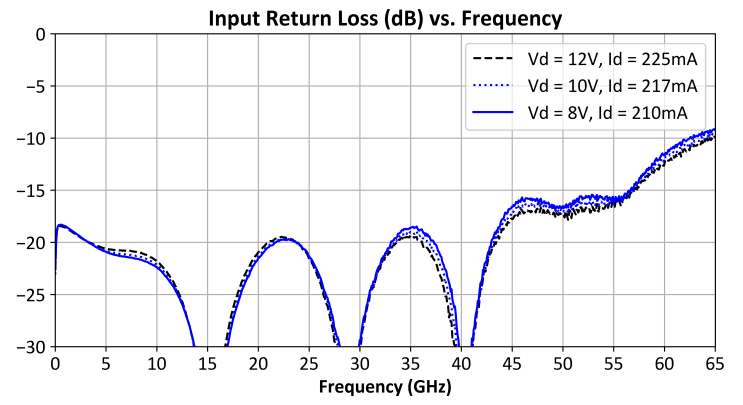
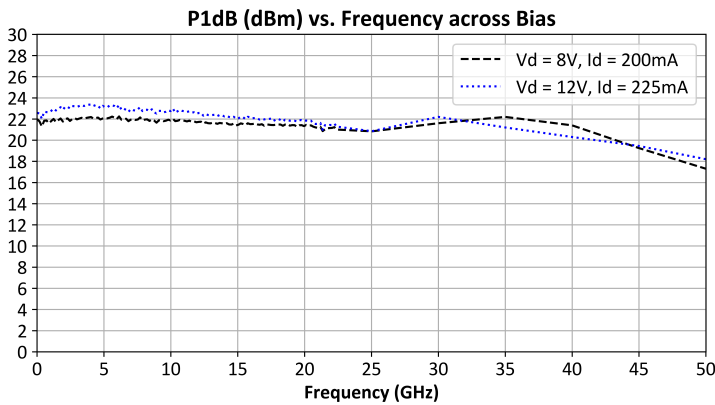
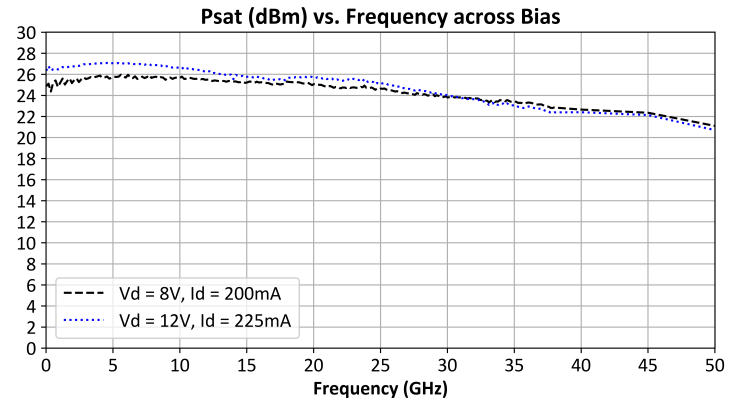
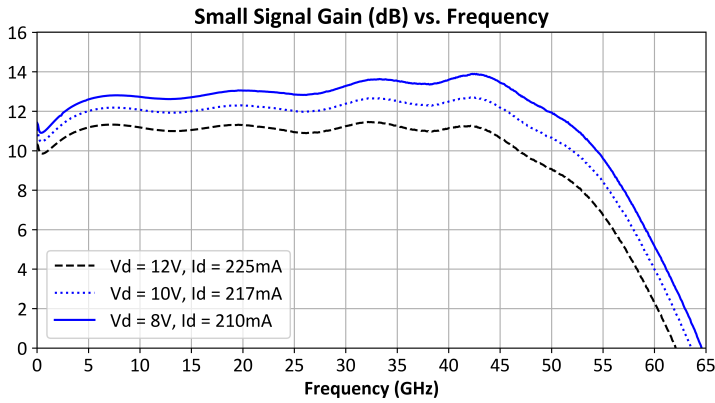
Unless otherwise specified, electrical specifications apply at ambient temperature of 25°C

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Small Signal Gain	Vd = 12V, Id = 225mA	0.01	50	-	12	-	dB
Saturated Output Power	Vd = 12V, Id = 225mA	0.01	10	-	27	-	dBm
Saturated Output Power	Vd = 12V, Id = 225mA	10	30	-	25	-	dBm
Saturated Output Power	Vd = 12V, Id = 225mA	30	50	-	22	-	dBm
Output IP3	Vd = 12V, Id = 225mA	0.01	15	-	35	-	dBm
Output IP3	Vd = 12V, Id = 225mA	15	50	-	30	-	dBm
Output IP2	Vd = 12V, Id = 225mA	0.01	50	-	35	-	dBm
Input Return Loss	Vd = 12V, Id = 225mA	0.01	50	-	20	-	dB
Noise Figure	Vd = 12V, Id = 225mA	0.01	50	-	7	-	dB
Output Return Loss	Vd = 12V, Id = 225mA	0.01	50	-	10	-	dB
Reverse Isolation	Vd = 12V, Id = 225mA	0.01	50	-	50	-	dB
Current Consumption	-	-	-	-	220	-	mA

Low frequency performance dependent on application circuit. For operation under 10MHz see application circuit notes.

Unless otherwise noted performance plots are taken at  $V_d = 12V$ ,  $V_g = -0.45V$

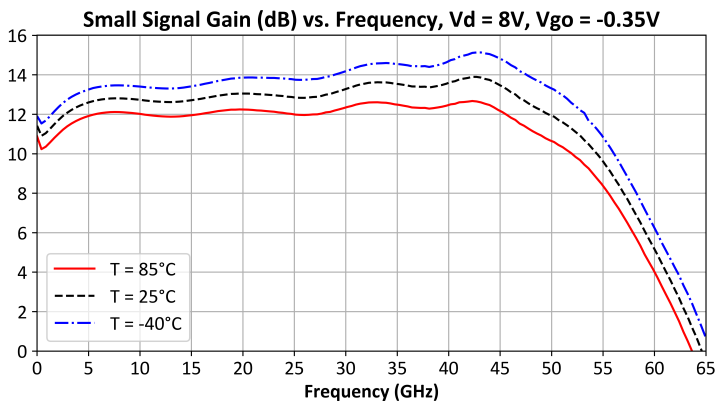
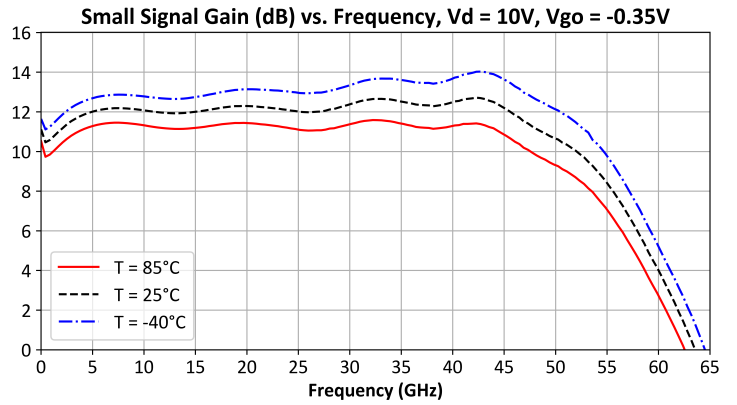
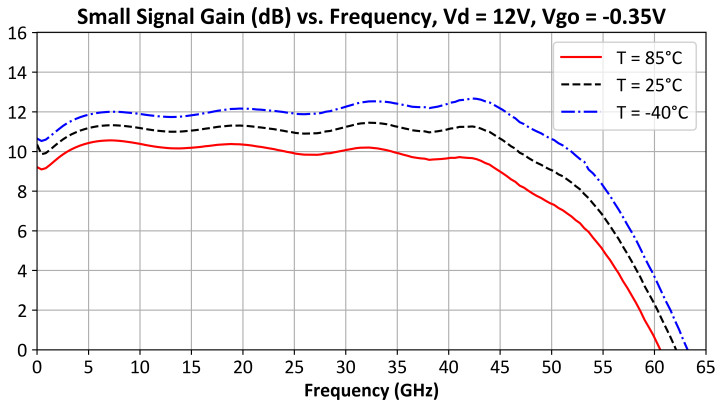
### Typical Performance



## AMM-11059CH

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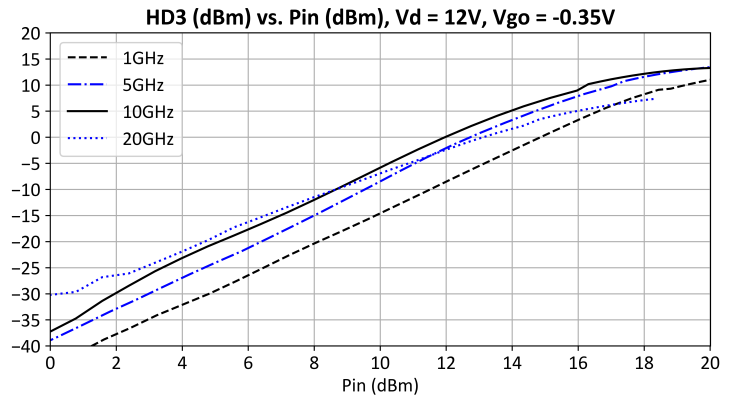
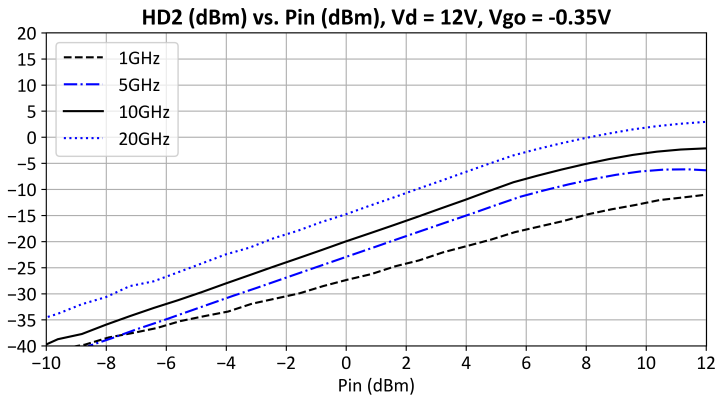
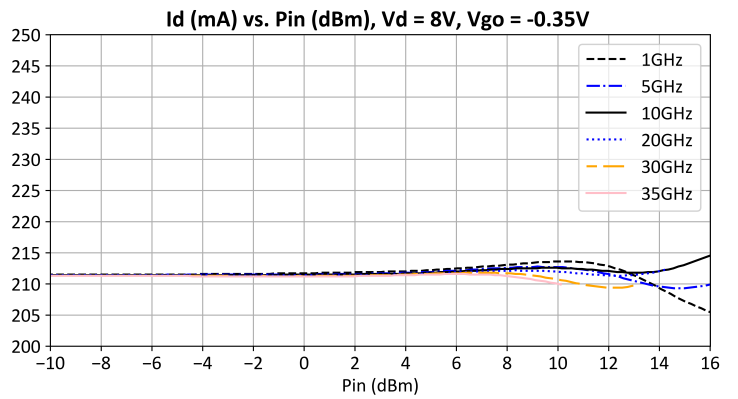
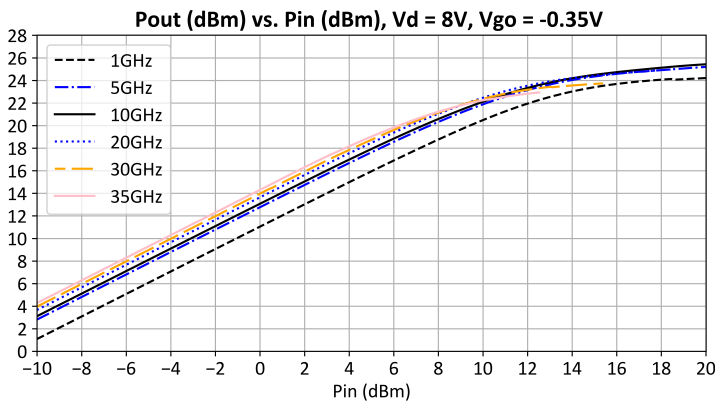
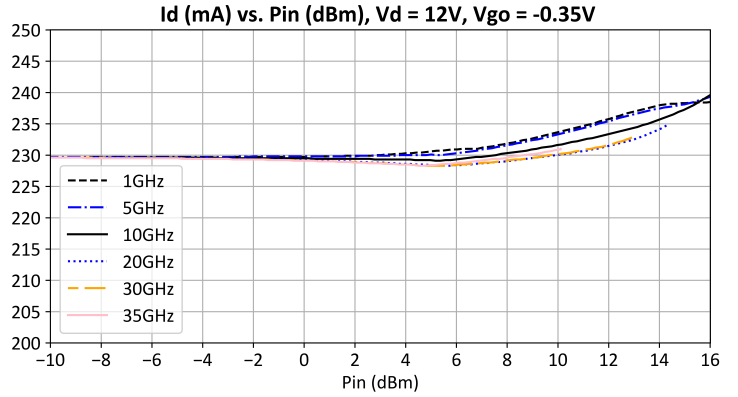
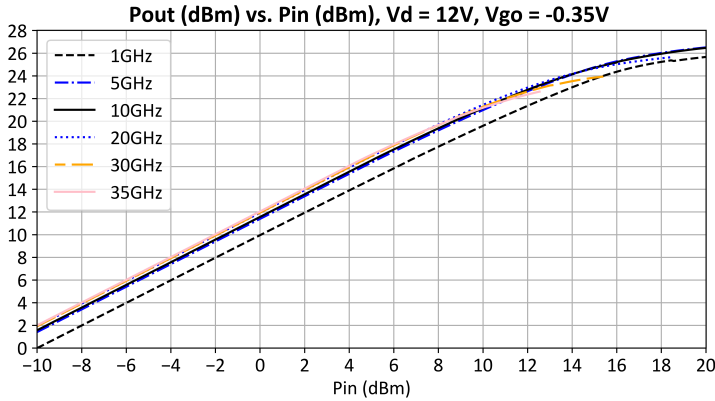
#### Typical Performance across Temperature



# AMM-11059CH

## 0.01 to 50 GHz, High Frequency Distributed Power Amplifier

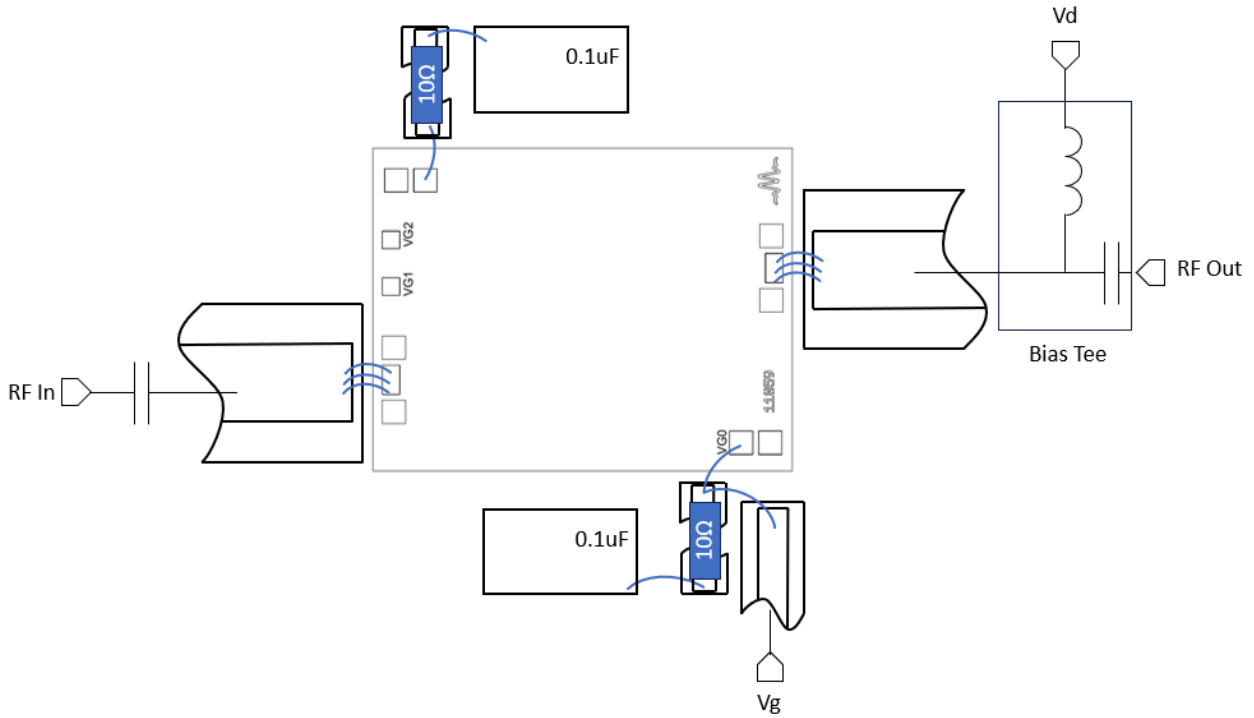
### Typical Performance, Swept Input Power



## AMM-11059CH

0.01 to 50 GHz, High Frequency Distributed Power Amplifier

### Application Circuit



## AMM-11059CH

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### Application Circuit Description

Designator	Description	Sample Part Number
A	Presidio 0.1 $\mu$ F + 1800 pF Capacitor	MVB408DX104ZGH5R3
B	PPI 10 $\Omega$ Wire-bondable series resistor	PRT135-14x12x10A10R00FQE

## AMM-11059CH

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### Low Frequency Operation

The AMM-11059 can be used at low frequency approaching DC. Operation below 10MHz requires using larger bypass capacitors to provide AC ground across the frequency range of interest. It is recommended to place additional bypass capacitance in parallel with designator **A**. For example, if operation is desired to 100KHz at least 10uF of bypass capacitance is necessary.

#### Constant Drain Current vs. Constant Gate Voltage Operation

The AMM-11059 pHEMT amplifier can be biased with a constant gate and drain voltage, or with a constant drain current by regulating the gate voltage. Using a constant gate and drain voltage reduces circuit complexity, but has variable current consumption during operation. However, regulating the gate voltage using feedback circuitry which controls the drain current to a constant value minimizes unit-to-unit variation in gain, output power, and compression points.

Under small signal excitation at a fixed temperature, these two approaches are equivalent because the current draw versus frequency is relatively constant in small signal. However, they will diverge in large signal conditions, where the drain current is affected the input signal's frequency and power. The output power in saturation is relatively unchanged, as it is more strongly dependent on the drain voltage. However, output referred 1 dB compression point will decrease by 2-3 dB when operated with a constant drain current.

## 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. Bond wire 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.

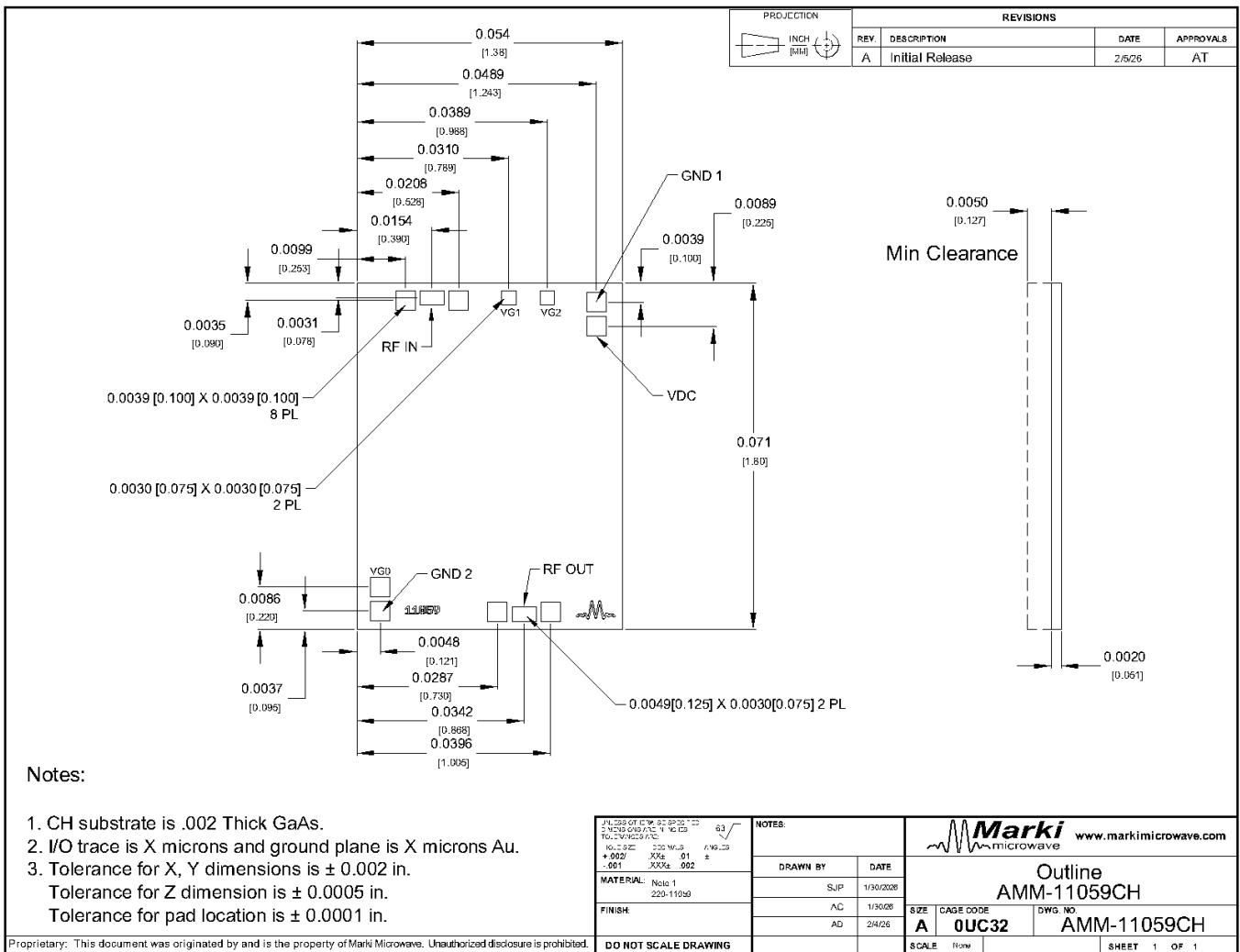
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## Mechanical Data

### Outline Drawing

Download : [Outline 2D Drawing](#)



It is recommended to handle this die from the perimeter. Handling keep out zone is 100um inset from die perimeter.

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### 0.01 to 50 GHz, High Frequency Distributed Power Amplifier

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