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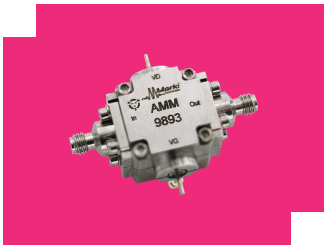
AMM-9893M

50 – 90 GHz mmWave LO Driver Amplifier

DEVICE OVERVIEW

General Description

The AMM-9893M is a wideband mmWave amplifier in our M-package enabling operation up to 90 GHz in a connectorized form. This amplifier provides typical +XX dBm output power, 20 dB gain making it suitable for driving mmWave mixers. It also features excellent reverse isolation.



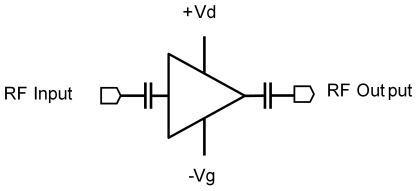
Features

- 20 dB gain typical
- +XX dBm saturated output power

Applications

- Mobile test and measurement equipment
- Radar
- SATCOM
- LO signal chain for mmWave mixers

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification

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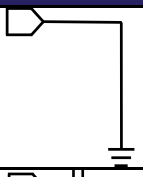
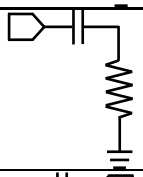
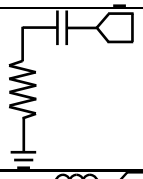
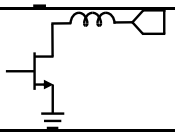
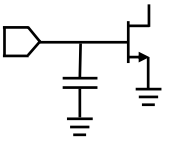
Revision History

Revision Code	Revision Date	Comment
G1	2024-07-23	Pre

Port Configuration and Functions

Port Functions

Port	Function	Connector Type	Description	Equivalent Circuit for Package
GND	Ground	-	Housing or ground lug must be connected to a DC/RF ground potential with high thermal and electrical conductivity. Ground lug is located below VD and VG pins.	
RF In	RF Input	-	The amplifier's RF Input port is RF matched to 50 Ω and has built-in DC blocking capacitors.	
RF Out	RF Output	-	The amplifier's RF Output port is RF matched to 50 Ω and has built-in DC blocking capacitors.	
Vd	Drain Supply Pin	-	The VD pin supplies DC voltage to the drain of the amplifier IC. Apply gate bias voltage VG before apply drain power supply.	
Vg	Gate Bias Pin	-	The VG pin provides a required negative bias which controls the drain power supply current to the amplifier. More negative voltage decreases the supply current. Apply gate bias voltage VG before apply drain power supply.	

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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. 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 (RF Applied)	400	mA
Drain Supply Voltage (Vd)	4.5	V
Gate Bias Voltage	0	V
Maximum Operating Temperature for MTTF > 1E6 hours	85	°C
Maximum Storage Temperature	150	°C
Max Junction Temperature for MTTF of > 1E6 hours	175	°C
Max Power Dissipation for MTTF of > 1E6 hours	2.4	W
Minimum Operating Temperature for MTTF > 1E6 hours	-55	°C
Minimum Storage Temperature	-65	°C
RF Input Power	17	dBm
θJC, Junction to Case Thermal Resistance	37.1	ºC/W

Package Information

Parameter	Details	Rating
ESD	125 to < 250 Volts	HBM Class 0B
Dimensions	-	17.78 x 18.80 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
Input Power for Saturation	-	10	16	dBm
Power Supply DC Voltage (Vd)	1.5	3.5	1	V
Power Supply DC Current (Id) (No RF Input) [1]	-	350	400	mA
T<Sub>A Ambient Temperature	-55	25	82	°C

[1] Recommended operating current conditions without RF input applied

Sequencing Requirements

Turn-on procedure:
1) Apply -1.5V to Vg.
2) Apply desired Vd.
3) Increase Vg towards 0V until nominal Id = 350mA.
4) Apply RF input power.

Turn-off procedure:
1) Turn off RF input power.
2) Decrease gate bias voltage to -1.5V.
3) Decrease Vd to 0V.
4) Increase Vg to 0V.

Electrical Specifications

Unless otherwise specified, electrical specifications apply at TA=+25°C, Vd = 3.5V, Id = 350mA (where Id is the drain current with no RF input applied).

Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Small Signal Gain	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	45	65	10	11.5	-	dB
Small Signal Gain	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	65	80	8	10.5	-	dB
Small Signal Gain	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	80	95	9	11	-	dB
Output Power	Vd = 3.5V, Id = 350mA	45	65	17	18	-	dBm
Output Power	Vd = 3.5V, Id = 350mA	65	80	15	17.5	-	dBm
Output Power	Vd = 3.5V, Id = 350mA	80	95	17	19	-	dBm
Input Return Loss	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	45	65	-	14	-	dB
Input Return Loss	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	65	80	-	12	-	dB
Input Return Loss	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	80	95	-	12.5	-	dB
Output Return Loss	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	45	65	-	10	-	dB
Output Return Loss	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	65	80	-	9	-	dB
Output Return Loss	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	80	95	-	8.5	-	dB
Reverse Isolation	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	45	65	-	58	-	dB
Reverse Isolation	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	65	80	-	55	-	dB
Reverse Isolation	Vd = 3.5V, Id = 350mA, Pin = -25 dBm	80	95	-	54	-	dB
DC Supply Quiescent Current (Idq)	Vd = 3.5V, Id = 350mA, no RF input	-	-	-	350	400	mA

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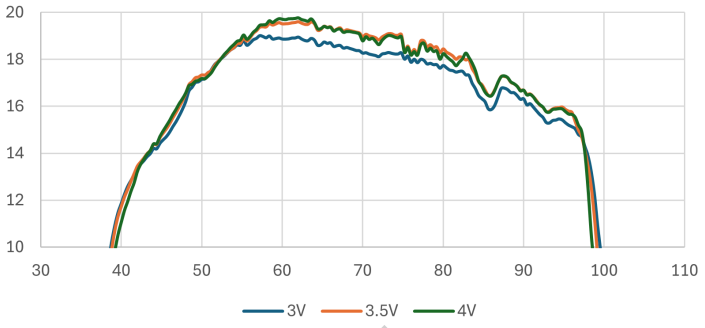
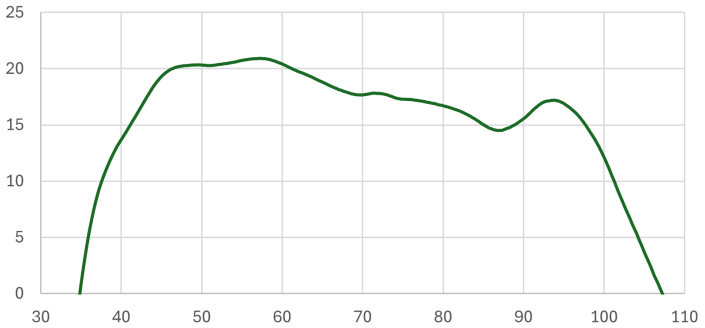
Typical Performance Plots

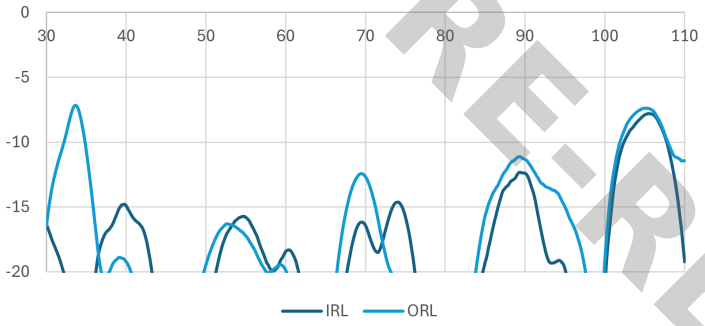
PSat (Module) Idq = 360mA
Varying Vd



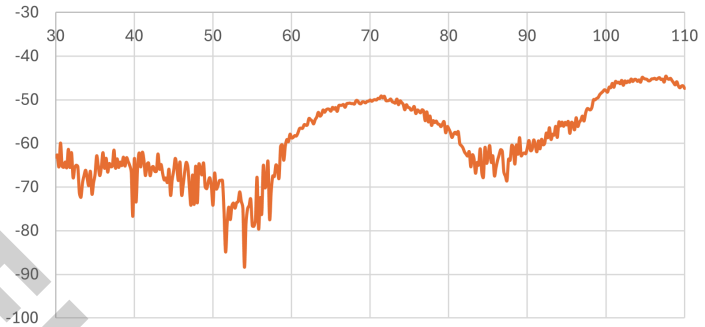
Small Signal Gain (Module)
3.5V 360mA



Return Losses (Module)
3.5V 360mA



Reverse Isolation (Module)
3.5V 360mA



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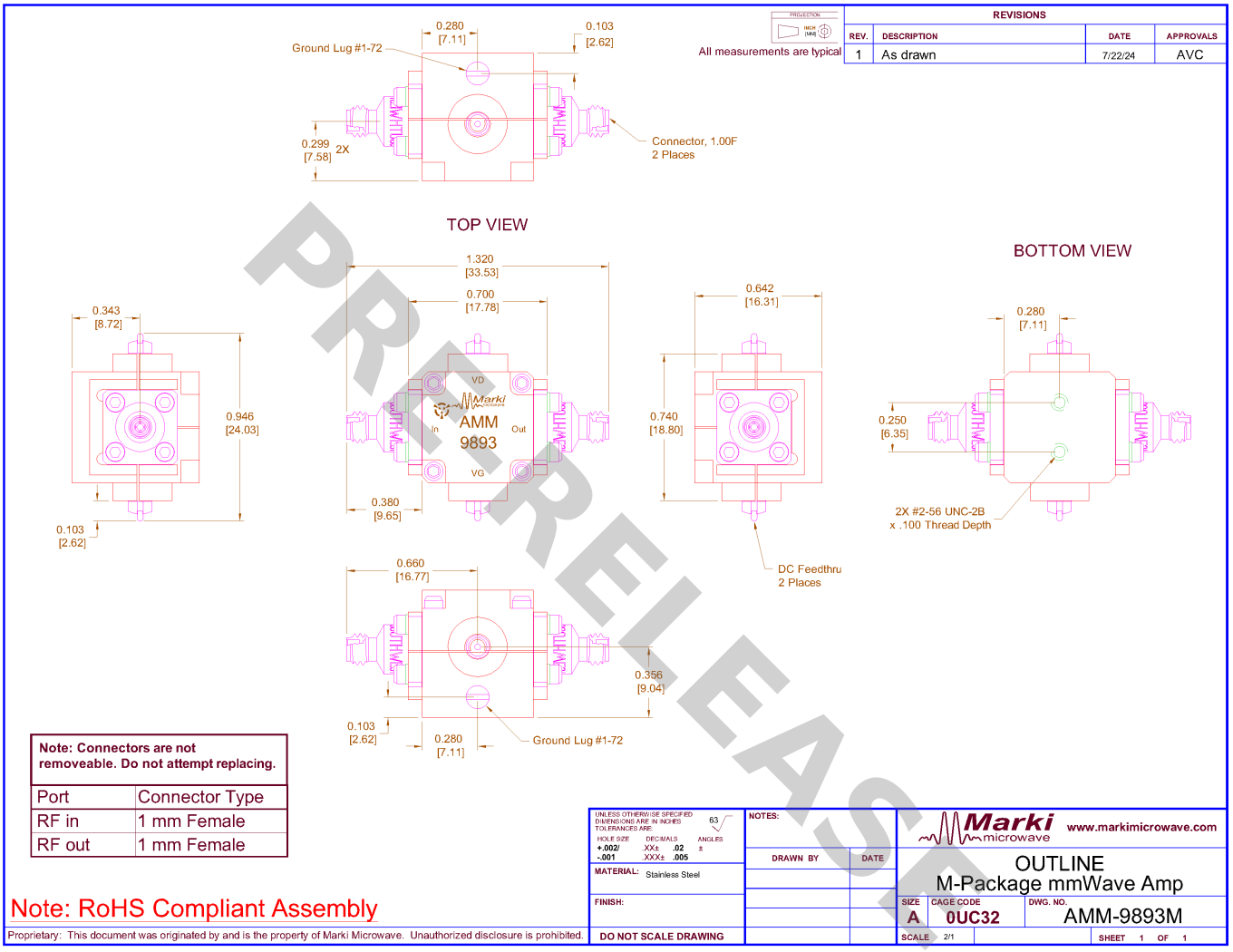
Mechanical Data

Outline Drawing

Download : Outline 2D Drawing | Outline 3D Drawing



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