



MMIC SURFACE MOUNT

Monolithic Amplifier

ERA-9SM+

50Ω DC to 8 GHz

FEATURES

- DC to 8 GHz
- Gain, 8.4 dB typ. at 2 GHz
- Good Gain Flatness, ±0.9 dB Typ.
- Output Power, +13.8 dBm Typ. at 2 GHz
- Internally Matched to 50Ω
- Aqueous Washable
- Protected By US Patent 6,943,629



Generic photo used for illustration purposes only

CASE STYLE: WW107

+RoHS Compliant
 The +Suffix identifies RoHS Compliance.
 See our website for methodologies and qualifications

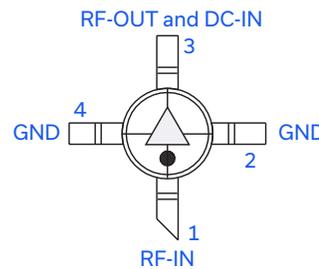
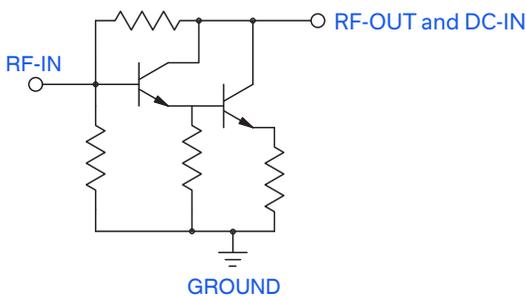
APPLICATIONS

- Cellular
- PCS
- Communication Receivers & Transmitters
- Satellite Communications

PRODUCT OVERVIEW

ERA-9SM+ (RoHS compliant) is a wideband current driven low gain, amplifier offering medium dynamic range. It has repeatable performance from lot to lot. It is enclosed in a 0.085" diameter micro-x package.

SIMPLIFIED SCHEMATIC AND PIN DESCRIPTION



Function	Pin Number	Description
RF-IN	1	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.
RF-OUT and DC-IN	3	RF output and bias pin. DC voltage is present on this pin; therefore a DC blocking capacitor is necessary for proper operation. An RF choke is needed to feed DC bias without loss of RF signal due to the bias connection, as shown in "Recommended Application Circuit".
GND	2,4	Connections to ground. Use via holes as shown in "Suggested Layout for PCB Design" to reduce ground path inductance for best performance.

REV. D
 ECO-024491
 ERA-9SM+
 MCL NY
 250211





MMIC SURFACE MOUNT

Monolithic Amplifier

ERA-9SM+

50Ω DC to 8 GHz

ELECTRICAL SPECIFICATIONS AT +25°C AND 50 mA UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range ¹		DC		8	GHz
Gain	0.1	7.4	8.6	9.0	dB
	1.0		8.5		
	2.0		8.3		
	4.0		7.8		
	5.0		7.4		
Input Return Loss	0.1		24.0		dB
	1.0		24.4		
	2.0		25.0		
	4.0		24.0		
	5.0		21.9		
Output Return Loss	0.1		37.3		dB
	1.0		32.4		
	2.0		23.8		
	4.0		17.8		
	5.0		15.5		
Output Power @ 1 dB Compression	0.1	+12.8	+14.3		dBm
	1.0		+14.1		
	2.0		+14.1		
	4.0		+12.5		
	5.0		+10.9		
Output IP3	0.1		+31.1		dBm
	1.0		+31.3		
	2.0		+30.1		
	4.0		+25.4		
	5.0		+23.4		
Noise Figure	0.1		5.1	3	dB
	1.0		5.3		
	2.0		5.3		
	4.0		5.3		
	5.0		5.3		
Additive Phase Noise	2.0 GHz, 10 kHz Offset		-173	3.8	dBc/Hz
				4	
Recommended Device Operating Current (I_d)			50		mA
Device Operating Voltage (V_d)		+3.6	+4.0	+4.4	V
Device Voltage Variation vs. Temperature at 50 mA			-2.6		mV/°C
Device Voltage Variation vs. Current at +25°C			17.5		mV/mA
Thermal Resistance, Junction-to-Case ²			138		°C/W

1. Low frequency cut off determined by external coupling capacitors.

2. Case is defined as ground leads.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-45°C to +85°C
Storage Temperature	-65°C to +150°C
Operating Current	74 mA
Input Power	+26 dBm (5 min max.) +15 dBm (continuous)

Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation.





CHARACTERIZATION TEST CIRCUIT

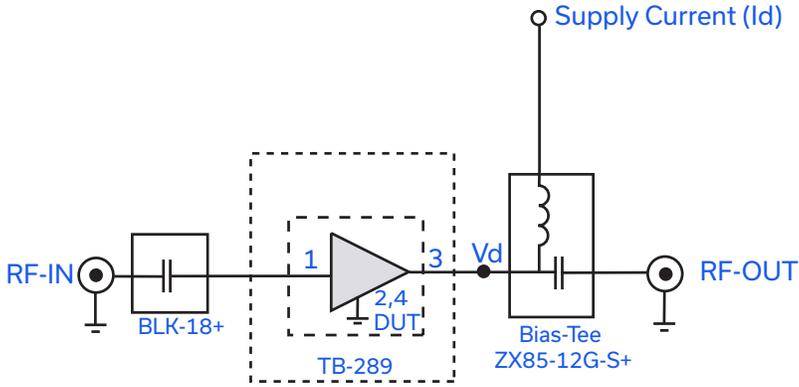
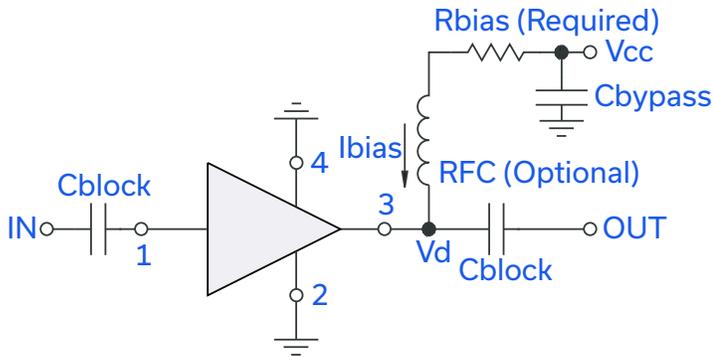


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-289) Gain, Return Loss, Output Power at 1 dB Compression (P1dB), Output IP3 (OIP3) and Noise Figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

1. Gain and Return loss: $P_{IN} = -25$ dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5 dBm/tone at output.

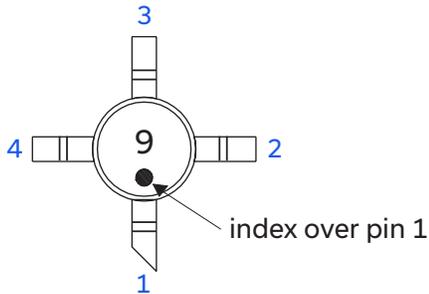
RECOMMENDED APPLICATION CIRCUIT



Test Board includes case, connectors, and components (in bold) soldered to PCB

R BIAS	
Vcc	"1%" Res. Values (Ohms) for Optimum Biasing
7	61.9
8	80.6
9	100
10	121
11	140
12	165
13	182
14	200
15	221
16	237
17	261
18	274
19	301
20	316

PRODUCT MARKING



Markings in addition to model number designation may appear for internal quality control purposes.



ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASHBOARD. [CLICK HERE](#)

Performance Data & Graphs	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
Case Style	WW107 Plastic micro-x package, lead finish: Matte-tin
Tape & Reel Standard Quantities Available on Reel	F4 7" Reels with 20, 50, 100, 200, 500 or 1K devices
Suggested Layout for PCB Design	PL075
Evaluation Board	TB-408-9SM+
Environmental Ratings	ENV08T1

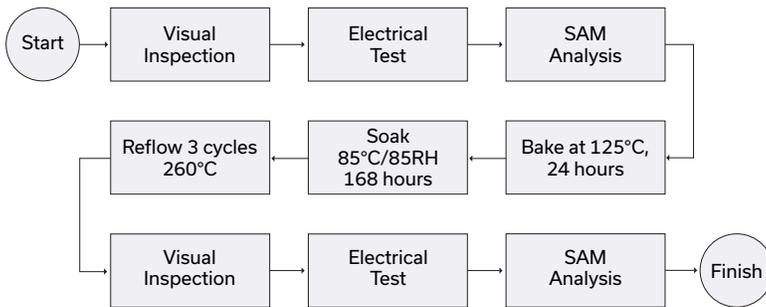
ESD RATING

Human Body Model (HBM): Class 1B (500 V to < 1000 V) in accordance with ANSI/ESD STM 5.1 - 2001
Machine Model (MM): Class M1 (25 V) in accordance with ANSI/ESD STM 5.2 - 1999

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDECJ-STD-020C

MSL TEST FLOW CHART



NOTES

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html