

Surface Mount

Monolithic Amplifier

DC-4 GHz

Product Features

- DC-4 GHz
- Single Voltage Supply
- Internally Matched to 50 Ohms
- Low Performance Variation Over Temperature
- Transient Protected
- Aqueous washable
- Protected By US Patent 6,943,629

Typical Applications

- Cellular/ PCS/ 3G Base Station
- CATV, Cable Modem & DBS
- Fixed Wireless & WLAN
- Microwave Radio & Test Equipment

General Description

ERA-4SM+ (RoHS compliant) is a wideband amplifier offering high dynamic range. It has repeatable performance from lot to lot. It is enclosed in a Micro-X package. ERA-4SM+ uses Darlington configuration and is fabricated using InGaP HBT technology. Expected MTBF is 150 years at 85°C case temperature.



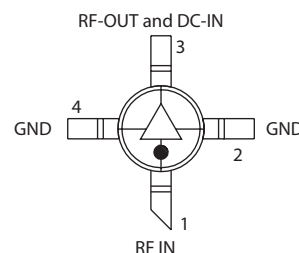
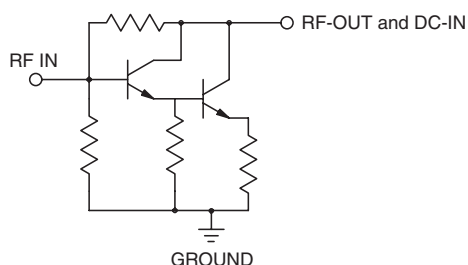
ERA-4SM+

CASE STYLE: WW107
PRICE: \$3.90 ea. QTY. (30)

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

The +Suffix has been added in order to identify RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications.

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.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine Provides ACTUAL Data Instantly at minicircuits.com

IF/RF MICROWAVE COMPONENTS

For detailed performance specs & shopping online see web site

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ERA-4SM+
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Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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/MCLStore/terms.jsp.

Electrical Specifications⁽¹⁾ at 25°C and 65mA, unless noted

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range*		DC		4	GHz
Gain	0.1	13.7	14.4	15	dB
	1.0		14.2		
	2.0	12.5	13.0	13.6	
	3.0		12.0		
	4.0	10.8	11.3	12.2	
Magnitude of Gain Variation versus Temperature (values are negative)	0.1		.003	.006	dB/°C
	1.0		.0025	.006	
	2.0		.0031	.006	
	3.0		.0042	.008	
	4.0		.0051	.01	
Input Return Loss	0.1		35		dB
	2.0		30		
	3.0		21		
	4.0		21		
Output Return Loss	0.1		35		dB
	2.0		21		
	3.0		21		
	4.0		16		
Reverse Isolation	2.0	18	23		dB
Output Power @ 1 dB compression	0.1		17.5		dBm
	1.0	15	17.3		
	2.0		16.1		
	3.0		14		
	4.0		11.7		
Saturated Output Power (at 3dB compression)	0.1		17.8		dBm
	2.0		16.5		
Output IP3	0.1	32	36.1		dBm
	1.0	31	35		
	2.0	27	30.4		
	4.0		25		
Noise Figure	0.1		4	5	dB
	1.0		4.2	5.2	
	2.0		4.2	5.2	
	4.0		4.5	5.5	
Group Delay	2.0		80		psec
Recommended Device Operating Current			65		mA
Device Operating Voltage		4.3	4.6	4.9	V
Device Voltage Variation vs. Temperature at 65mA			-2.9		mV/°C
Device Voltage Variation vs. Current at 25°C			10.4		mV/mA
Thermal Resistance, junction-to-case ⁽²⁾			196		°C/W

*Guaranteed specification DC-4 GHz. Low frequency cut off determined by external coupling capacitors.

Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature ⁽³⁾	-45°C to 85°C
Storage Temperature	-65°C to 150°C
Operating Current	85mA
Power Dissipation	451mW
Input Power	20 dBm

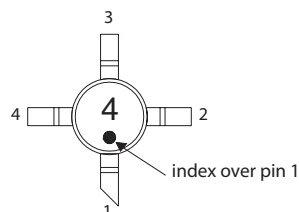
Note: Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation.

⁽¹⁾Measured on Mini-Circuits characterization test board TB-289

⁽²⁾Case is defined as ground leads.

⁽³⁾Based on typical case temperature rise 5°C above ambient.

Product Marking



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

Additional Detailed Technical Information

Additional information is available on our web site. To access this information enter the model number on our web site home page.

Performance data, graphs, s-parameter data set (.zip file)

Case Style: WW107

Plastic micro-x, .085 body diameter, lead finish: tin/silver/nickel

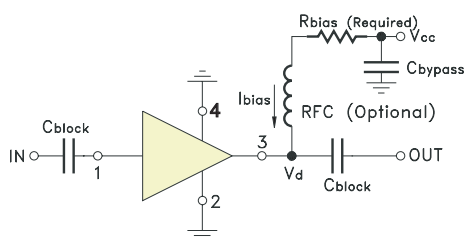
Tape & Reel: F4

Suggested Layout for PCB Design: PL-075

Evaluation Board: TB-408-4+

Environmental Ratings: ENV08T2

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	38.3
8	52.3
9	66.5
10	80.6
11	95.3
12	115
13	127
14	143
15	158
16	174
17	187
18	205
19	221
20	237

ESD Rating

Human Body Model (HBM): Class 1A (250 v to < 500 v) in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): Class M1 (< 100 v) in accordance with ANSI/ESD STM 5.2 - 1999

MSL Rating

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

MSL Test Flow Chart

