

Surface Mount

# Monolithic Amplifier

DC-8 GHz

## Product Features

- DC-8 GHz
- Single Voltage Supply
- Internally Matched to 50 Ohm
- Unconditionally Stable
- 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



## ERA-21SM+

CASE STYLE: WW107  
PRICE: \$1.62 ea. QTY. (30)

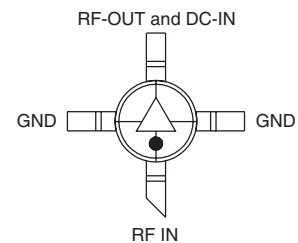
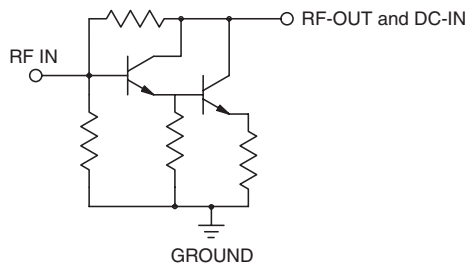
**+ RoHS compliant in accordance with EU Directive (2002/95/EC)**

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

## General Description

ERA-21SM+ (RoHS compliant) is a wideband amplifier offering high dynamic range. It has repeatable performance from lot to lot. It is enclosed in an Micro-X package. ERA-21SM+ uses Darlington configuration and is fabricated using InGaP HBT technology. Expected MTBF is 3,700 years at 85°C case temperature.

## 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.

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The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS

REV. L  
M108520  
ERA-21SM+  
081014  
Page 1 of 5

Electrical Specifications at 25°C and 40mA, unless noted

Parameter		Min.	Typ.	Max.	Units	Cpk
Frequency Range*		DC		8	GHz	
Gain	f=0.1 GHz	13.5	14.2	15	dB	≥ 1.5
	f=1 GHz		13.9			
	f=2 GHz	11.2	13.2	13.9		
	f=3 GHz		12.2			
	f=4 GHz	9.9	10.8	11.5		
	f=6 GHz		8.7			
	f=8 GHz		8.9			
Magnitude of Gain Variation versus Temperature (values are negative)	f=0.1 GHz		.0005	.002	dB/°C	
	f=1 GHz		.0011	.003		
	f=2 GHz		.0015	.003		
	f=3 GHz		.0022	.005		
	f=4 GHz		.0029	.006		
	f=6 GHz		.0043	.01		
	f=8 GHz		.0056	.012		
Input Return Loss	f=0.1 GHz		31		dB	
	f=1 GHz		31			
	f=2 GHz		23			
	f=3 GHz		20			
	f=4 GHz		18			
	f=6 GHz		13			
	f=8 GHz		8.5			
Output Return Loss	f=0.1 GHz		33		dB	
	f=1 GHz		23			
	f=2 GHz		20			
	f=3 GHz		20			
	f=4 GHz		19			
	f=6 GHz		16			
	f=8 GHz		12			
Reverse Isolation	f=1.0 GHz	15	19		dB	
Output Power @ 1 dB compression	f=0.1 GHz		12.8		dBm	≥ 1.33
	f=1 GHz		12.6			
	f=2 GHz	10.6	12.6			
	f=3 GHz		12.6			
	f=4 GHz		12.1			
	f=6 GHz		10			
	f=8 GHz		8			
Saturated Output Power (at 3dB compression)	f=0.1 GHz		13.2		dBm	
	f=1 GHz		12.8			
	f=2 GHz		13.1			
	f=3 GHz		12.9			
	f=4 GHz		13.2			
	f=6 GHz		12.6			
	f=8 GHz		11.1			

**Electrical Specifications at 25°C and 40mA, unless noted**

Parameter		Min.	Typ.	Max.	Units	Cpk
Output IP3	f=0.1 GHz	27	29		dBm	≥ 1.33
	f=1 GHz		29			
	f=2 GHz	25	28			
	f=3 GHz		27			
	f=4 GHz	22	25			
	f=6 GHz		23			
	f=8 GHz		20			
Noise Figure	f=0.1 GHz		3.4	4.4	dB	≥ 1.33
	f=1GHz		3.4			
	f=2 GHz		3.3	4.3		
	f=3 GHz		3.4			
	f=4 GHz		3.7	4.7		
	f=6 GHz		4.3			
	f=8 GHz		5.0			
Group Delay	f=2 GHz		80		psec	
Recommended Device Operating Current			40		mA	
Device Operating Voltage		3.2	3.5	3.8	V	≥ 1.5
Device Voltage Variation vs. Temperature at 40mA			-2.3		mV/°C	
Device Voltage Variation vs. Current at 25°C			8.8		mV/mA	
Thermal Resistance, junction-to-case <sup>1</sup>			194		°C/W	

\*Guaranteed specification DC-8 GHz. Low frequency cut off determined by external coupling capacitors.

**Absolute Maximum Ratings**

Parameter	Ratings
Operating Temperature*	-45°C to 85°C
Storage Temperature	-65°C to 150°C
Operating Current	75mA
Power Dissipation	330mW
Input Power	15dBm

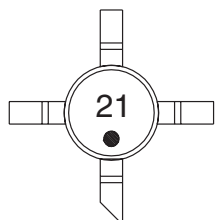
Note: Permanent damage may occur if any of these limits are exceeded.

These ratings are not intended for continuous normal operation.

<sup>1</sup>Case is defined as ground leads.

\*Based on typical case temperature rise 5°C above ambient.

Product Marking



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

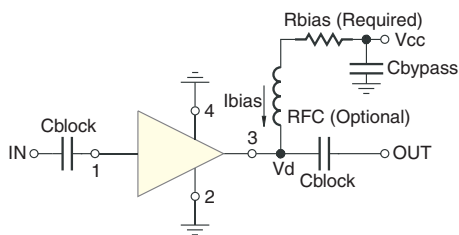
Tape & Reel: F4

Suggested Layout for PCB Design: PL-075

Evaluation Board: TB-408-21+

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	88.7
8	113
9	137
10	162
11	187
12	210
13	237
14	261
15	287
16	316
17	340
18	365
19	392
20	412

**ESD Rating**

Human Body Model (HBM): Class 1B (500 v to < 1000 v) in accordance with ANSI/ESD STM 5.1 - 2001

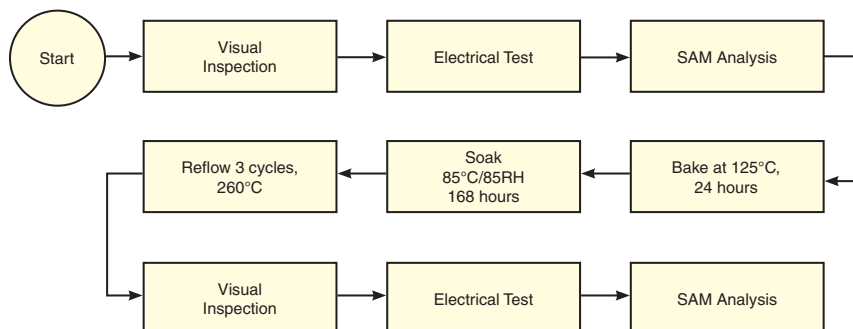
Machine Model (MM): Class M1 (< 100 v) in accordance with ANSI/ESD STM 5.2 - 1999

**MSL Rating**

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

No.	Test Required	Condition	Standard	Quantity
1	Visual Inspection	Low Power Microscope Magnification 40x	MIP-IN-0003 (MCT spec)	45 units
2	Electrical Test	Room Temperature	SCD (MCL spec)	45 units
3	SAM Analysis	Less than 10% growth in term of delamination	J-Std-020C (Jedec Standard)	45 units
4	Moisture Sensitivity Level 1	Bake at 125°C for 24 hours Soak at 85°C/85%RH for 168 hours Reflow 3 cycles at 260°C peak	J-Std-020C (Jedec Standard)	45 units

**MSL Test Flow Chart**



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RF/IF MICROWAVE COMPONENTS