

## Features

- Exact foot print substitute for MAR-8 and MSA-0885<sup>a,b</sup>

Benefits:

- lower device voltage, 3.7 typ.
- lower power dissipation in the MMIC
- may eliminate need for choke (RFC)

- High gain, 31.5 dB at 0.1 GHz, reduces component count
- Internally Matched to 50 Ohms
- High power output, +12.5 dBm typ.
- Low noise
- Improved stability
- Protection against power supply transients
- Patent pending
- Aqueous washable

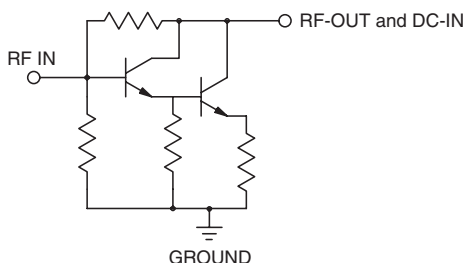
## Applications

- Cellular
- PCN & instrumentation

## General Description

MAR-8A+ (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. MAR-8A+ uses Darlington configuration and is fabricated using InGaP HBT technology.

### simplified schematic and pin description



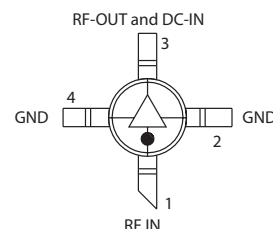
Generic photo used for illustration purposes only

# MAR-8A+

CASE STYLE: VV105

### +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



| 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.                                                                                                                                  |

#### Notes:

- Suitability for model replacement within a particular system must be determined by and is solely the responsibility of the customer based on, among other things, electrical performance criteria, stimulus conditions, application, compatibility with other components and environmental conditions and stresses.
- The Avago MSA-0885 part number is used for identification and comparison purposes only.

#### Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



## Electrical Specifications at 25°C and 36mA, unless noted

| Parameter                                         |                      | Min.                 | Typ. <sup>3</sup> | Max.   | Units |
|---------------------------------------------------|----------------------|----------------------|-------------------|--------|-------|
| Frequency Range*                                  |                      | DC                   |                   | 1      | GHz   |
| Gain                                              | f=0.1 GHz<br>f=1 GHz | —<br>20 <sup>2</sup> | 31.5<br>25        | —<br>— | dB    |
| Input Return Loss                                 | f=DC to 1 GHz        |                      | 15.5              |        | dB    |
| Output Return Loss                                | f=DC to 1 GHz        |                      | 11                |        | dB    |
| Output Power @ 1 dB compression                   | f=1 GHz              |                      | +12.5             |        | dBm   |
| Output IP3                                        | f=1 GHz              |                      | +25               |        | dBm   |
| Noise Figure                                      | f=1 GHz              |                      | 3.1               |        | dB    |
| Recommended Device Operating Current              |                      |                      | 36                |        | mA    |
| Device Operating Voltage                          |                      | 3.2                  | 3.7               | 4.2    | V     |
| Device Voltage Variation vs. Temperature at 36 mA |                      |                      | +1.2              |        | mV/°C |
| Device Voltage Variation vs. Current at 25°C      |                      |                      | 11.3              |        | mV/mA |
| Thermal Resistance, junction-to-case <sup>1</sup> |                      |                      | 119               |        | °C/W  |

\*Guaranteed specification DC-1 GHz. Low frequency cut off determined by external coupling capacitors.

## Absolute Maximum Ratings

| Parameter             | Ratings        |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| Operating Current     | 65mA           |
| Power Dissipation     | 250mW          |
| Input Power           | 13dBm          |

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.

<sup>2</sup>Full temperature range.

<sup>3</sup>Based on test data of Model MAR-8ASM+ (Case Style WW107).

## Notes

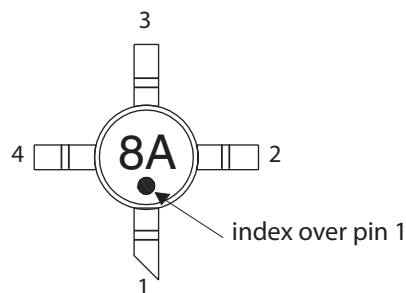
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.

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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



## 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: VV105

Plastic micro-x, .085 body diameter, lead finish: matte-tin

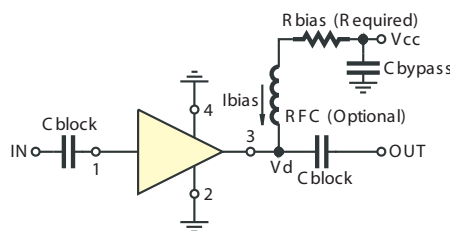
### Tape & Reel: F20

### Suggested Layout for PCB Design: PL-262

### Evaluation Board: TB-432-8A+

### Environmental Ratings: ENV08T3

## Recommended Application Circuit



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

| R BIAS <sup>1</sup> |                                  |
|---------------------|----------------------------------|
| Vcc                 | Bias Resistor Value <sup>2</sup> |
| 7                   | 88.7                             |
| 8                   | 118                              |
| 9                   | 143                              |
| 10                  | 174                              |
| 11                  | 200                              |
| 12                  | 226                              |
| 13                  | 255                              |
| 14                  | 280                              |
| 15                  | 309                              |

<sup>1</sup> When being used as a substitute for MAR-8SM or MSA-0866, the bias resistor values must be changed to the values in this table.

<sup>2</sup> 1% Resistor values (ohms) for optimum bias.

### 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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



**ESD Rating**

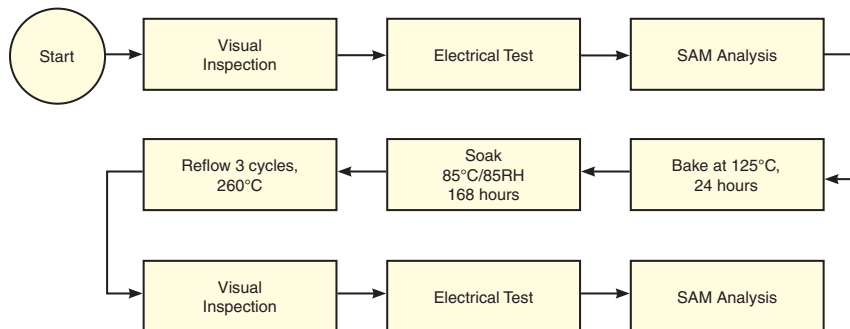
Human Body Model (HBM): Class 2 (2000v to < 4000v) in accordance with ANSI/ESD STM 5.1 - 2001

Charged Device Model (CDM): Class C4 ( 500v to <=1000v) in accordance with ESD STM 5.3.1 - 1999

**MSL Rating**

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

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

**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/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

