

Drop-In

# Monolithic Amplifier

DC-2 GHz

## Product Features

- Wideband, DC to 2 GHz
- High gain, 22 dB typ. at 0.1 GHz
- Low noise figure, 3.0 dB typ.
- Cascadable
- Aqueous washable

## Typical Applications

- Cellular
- PCN instrumentation



**MAR-6+**

CASE STYLE: VV105  
PRICE: \$1.16 ea. QTY. (30)

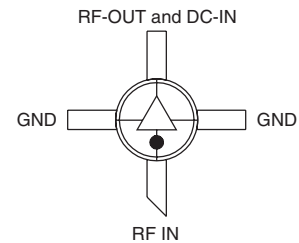
*+ RoHS compliant in accordance with EU Directive (2002/95/EC)*

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

## General Description

MAR-6+ (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-6+ uses Darlington configuration and is fabricated using silicon technology. Expected MTBF is 2,200 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.

**Mini-Circuits®**  
ISO 9001 ISO 14001 AS 9100 CERTIFIED

[minicircuits.com](http://minicircuits.com)

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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

IF/RF MICROWAVE COMPONENTS

REV. B  
M120653  
MAR-6+  
081216  
Page 1 of 4

Electrical Specifications at 25°C and 16mA, unless noted

Parameter	Min.	Typ. <sup>3</sup>	Max.	Units
Frequency Range*	DC		2	GHz
Gain	f=0.1 GHz f=1 GHz f=2 GHz	22 20 15 <sup>2</sup>		dB
Input Return Loss	f=DC to 2 GHz		21	dB
Output Return Loss	f=DC to 2 GHz		17.5	dB
Output Power @ 1 dB compression	f=0.5 GHz		+3.0	dBm
Output IP3	f=0.5 GHz		+14.5	dBm
Noise Figure	f=0.5 GHz		3.0	dB
Recommended Device Operating Current			16	mA
Device Operating Voltage			3.5	V
Device Voltage Variation vs. Temperature at 16 mA			-5.6	mV/°C
Device Voltage Variation vs. Current at 25°C			8.4	mV/mA
Thermal Resistance, junction-to-case <sup>1</sup>			241	°C/W

\*Guaranteed specification DC-2 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	50mA
Power Dissipation	200mW
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-6SM+ (Case Style WW107).

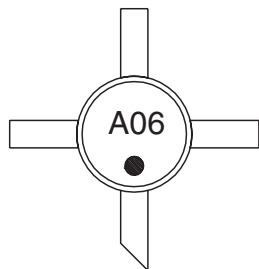


P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

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

IF/RF MICROWAVE COMPONENTS

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: VV105

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

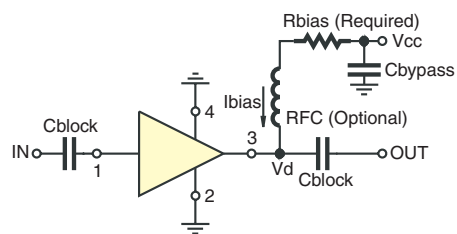
Tape & Reel: F20

Suggested Layout for PCB Design: PL-262

Evaluation Board: TB-432-6+

Environmental Ratings: ENV08T3

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
6	154
7	215
8	280
9	340
10	402
11	464
12	536
13	590
14	665

**ESD Rating**

Human Body Model (HBM): Class 1C (1000v to < 2000v) 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/JEDEC J-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**

