

**Features**

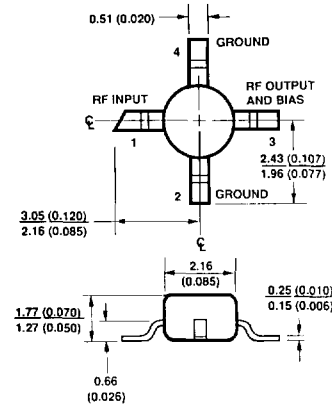
- **Cascadable 50 Ω Gain Block**
- **3 dB Bandwidth: DC to 3.2 GHz**
- **12.5 dBm typical P<sub>1dB</sub> at 1.0 GHz**
- **8 dB typical Gain at 1.0 GHz**
- **Unconditionally Stable (k>1)**
- **Surface Mount Plastic Package**
- **Tape-and-Reel Packaging Option Available<sup>1</sup>**

**Description**

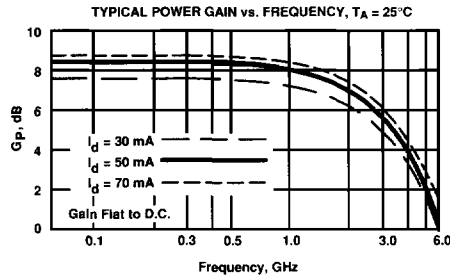
The MSA-0486 is a high performance silicon bipolar Monolithic Microwave Integrated Circuit (MMIC) housed in a low cost, surface mount plastic package. This MODAMP™ MMIC is designed for use as a general purpose 50 Ω gain block. Applications include narrow and broad band IF and RF amplifiers in commercial and industrial applications.

The MODAMP MSA-series is fabricated using a 10 GHz f<sub>r</sub>, 25 GHz f<sub>MAX</sub> silicon bipolar MMIC process which utilizes nitride self-alignment, ion implantation and gold metallization to achieve excellent uniformity, performance, and reliability. The use of an external bias resistor for temperature and current stability also allows bias flexibility.

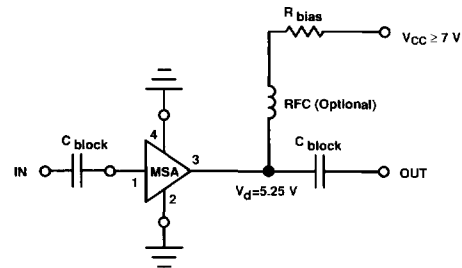
**86 Plastic Package**



DIMENSIONS ARE IN MILLIMETERS (INCHES)



**Typical Biasing Configuration**



**Electrical Specifications<sup>2</sup>, T<sub>A</sub> = 25°C**

Symbol	Parameters and Test Conditions: I <sub>d</sub> = 50 mA, Z <sub>0</sub> = 50 Ω	Units	Min.	Typ.	Max.
G <sub>P</sub>	Power Gain ( S <sub>21</sub>   <sup>2</sup> ) f = 0.1 GHz f = 1.0 GHz	dB	7.0	8.3 8.0	
ΔG <sub>P</sub>	Gain Flatness f = 0.1 to 2.0 GHz	dB		±0.6	
f <sub>3dB</sub>	3 dB Bandwidth	GHz		3.2	
VSWR	Input VSWR f = 0.1 to 2.0 GHz			1.5:1	
	Output VSWR f = 0.1 to 2.0 GHz			1.9:1	
P <sub>1dB</sub>	Output Power @ 1 dB Gain Compression f = 1.0 GHz	dBm		12.5	
NF	50 Ω Noise Figure f = 1.0 GHz	dB		7.0	
IP <sub>3</sub>	Third Order Intercept Point f = 1.0 GHz	dBm		25.5	
t <sub>p</sub>	Group Delay f = 1.0 GHz	psec.		140	
V <sub>d</sub>	Device Voltage	V	4.2	5.25	6.3
dV/dT	Device Voltage Temperature Coefficient	mV/°C		-8.0	

Notes: 1. Refer to PACKAGING section "Tape-and-Reel Packaging for Surface Mount Semiconductors".  
 2. The recommended operating current range for this device is 30 mA to 70 mA. Typical performance as a function of current is on the following page.

# MSA-0486 MODAMP™ Cascadable Silicon Bipolar Monolithic Microwave Integrated Circuit Amplifiers

## Absolute Maximum Ratings

Parameter	Absolute Maximum <sup>1</sup>
Device Current	85 mA
Power Dissipation <sup>2,3</sup>	500 mW
RF Input Power	+13 dBm
Junction Temperature	150°C
Storage Temperature	-65°C to 150°C
Thermal Resistance <sup>2,4</sup> : $\theta_{JC} = 100^\circ\text{C}/\text{W}$	

### Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2. TCASE = 25°C
3. Derate at 10 mW/°C for TC > 100°C.
4. See MEASUREMENTS section "Thermal Resistance" for more information.

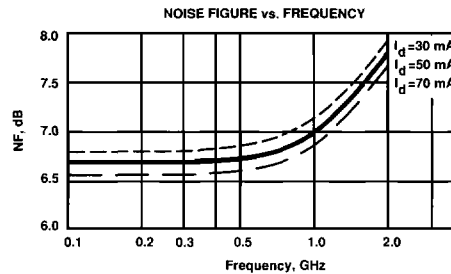
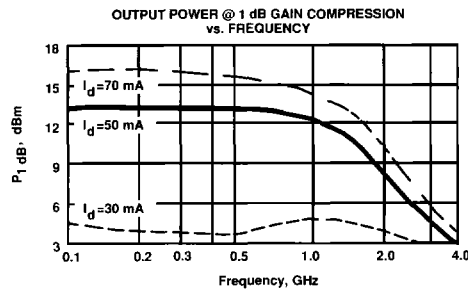
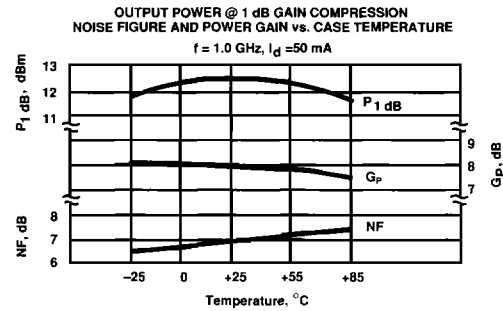
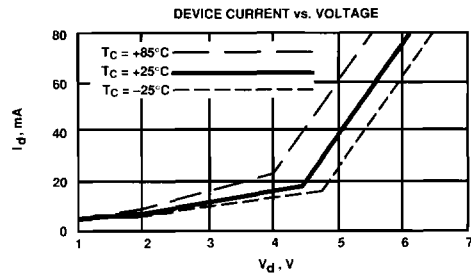
## Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
MSA-0486-TR1	1000	7"
MSA-0486-TR2	4000	13"

For more information, see "Tape and Reel Packaging for Semiconductor Devices", page 14-14.

## Typical Performance, TA = 25°C

(unless otherwise noted)



## Typical Scattering Parameters: ZO = 50 Ω

TA = 25°C, Id = 50 mA

Freq. GHz	S11		dB	S21		dB	S12		S22	
	Mag	Ang		Mag	Ang		Mag	Ang	Mag	Ang
0.1	.14	178	8.4	2.62	175	-16.2	.154	1	.16	-10
0.2	.14	175	8.3	2.61	170	-16.3	.153	2	.16	-20
0.4	.14	171	8.2	2.57	161	-16.3	.154	3	.17	-39
0.6	.13	168	8.1	2.54	151	-16.0	.158	4	.18	-57
0.8	.13	166	8.0	2.52	141	-15.9	.161	5	.20	-74
1.0	.13	165	7.9	2.48	131	-15.7	.165	6	.21	-88
1.5	.15	168	7.7	2.42	108	-14.8	.182	8	.27	-121
2.0	.21	168	7.3	2.32	84	-14.0	.199	7	.32	-149
2.5	.29	165	6.8	2.18	65	-13.1	.222	4	.38	-168
3.0	.37	153	5.9	1.97	43	-12.7	.231	-1	.40	173
3.5	.44	142	4.8	1.74	24	-12.5	.238	-5	.41	157
4.0	.50	130	3.6	1.52	7	-12.5	.238	-10	.41	145
5.0	.61	109	1.3	1.16	-21	-12.7	.231	-17	.43	132

A model for this device is available in the DEVICE MODELS section.