

Features

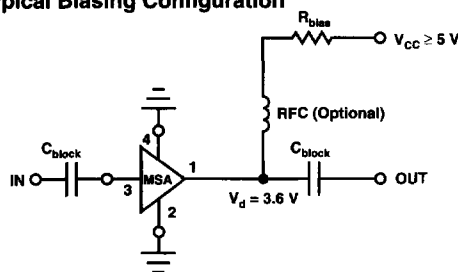
- Cascadable 50 Ω Gain Block
- Medium Power: 10 dBm at 900 MHz
- High Gain: 16.5 dB Typical at 900 MHz
- Low Noise Figure: 3.3 dB Typical at 900 MHz
- Low Cost Surface Mount Plastic Package
- Tape-and-Reel Packaging Option Available¹

Description

The MSA-2111 is a low cost silicon bipolar Monolithic Microwave Integrated Circuit (MMIC) housed in a surface mount plastic SOT-143 package. This MODAMP™ MMIC is designed for use as a general purpose 50 Ω gain block. Typical 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_T , 25 GHz f_{MAX} , 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.

Typical Biasing Configuration



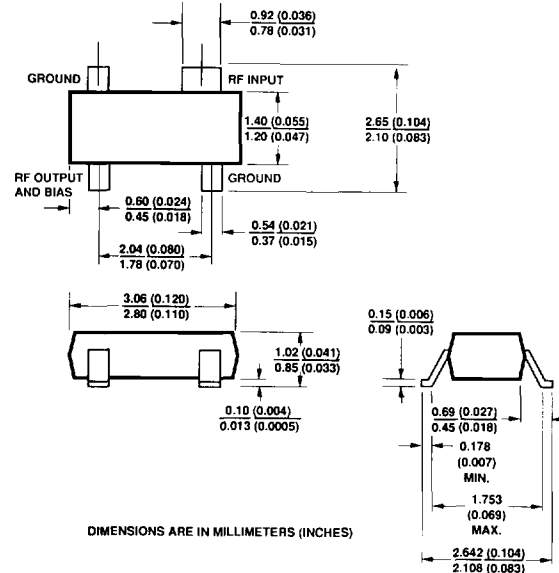
Electrical Specifications², T_A = 25°C

Symbol	Parameters and Test Conditions: I _d = 29 mA, Z _O = 50 Ω	Units	Min.	Typ.	Max.
G _P	Power Gain (S ₂₁ ²) f = 900 MHz	dB	16.0	16.5	
ΔG _P	Gain Flatness f = 0.1 to 0.3 GHz	dB		±0.5	
f _{3 dB}	3 dB Bandwidth	GHz		0.5	
VSWR	Input VSWR f = 0.1 to 2.5 GHz			1.8:1	
	Output VSWR f = 0.1 to 2.5 GHz			1.8:1	
P _{1 dB}	Output Power @ 1 dB Gain Compression f = 900 MHz	dBm		10	
NF	50 Ω Noise Figure f = 900 MHz	dB		3.3	
IP ₃	Third Order Intercept Point f = 900 MHz	dBm		20	
t _D	Group Delay f = 900 MHz	psec.		158	
V _d	Device Voltage T _C = 25°C	V	2.9	3.6	4.3
dV/dT	Device Voltage Temperature Coefficient	mV/°C		-8.0	

Notes: 1. Refer to PACKAGING section "Tape-and-Reel Packaging for Semiconductor Devices."

2. The recommended operating current range for this device is 12 mA to 35 mA. Typical gain performance as a function of current is on the following page.

SOT-143 Package



DIMENSIONS ARE IN MILLIMETERS (INCHES)

MSA-2111 MODAMP™ Cascadable Silicon Bipolar Monolithic Microwave Integrated Circuit Amplifiers

Absolute Maximum Ratings

Parameter	Absolute Maximum ¹
Device Current	35 mA
Power Dissipation ^{2,3}	125 mW
RF Input Power	+13 dBm
Junction Temperature	150°C
Storage Temperature	-65 to 150°C
Thermal Resistance ² : $\theta_{jc} = 505^\circ\text{C/W}$	

Notes:

- Permanent damage may occur if any of these limits are exceeded.
- $T_{\text{CASE}} = 25^\circ\text{C}$.
- Derate at 2.0 mW/°C for $T_C > 85^\circ\text{C}$.

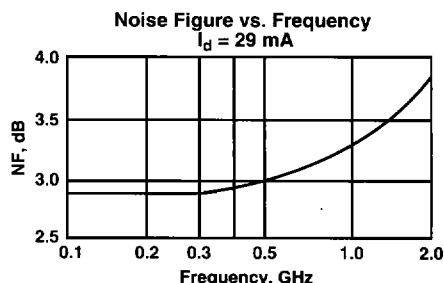
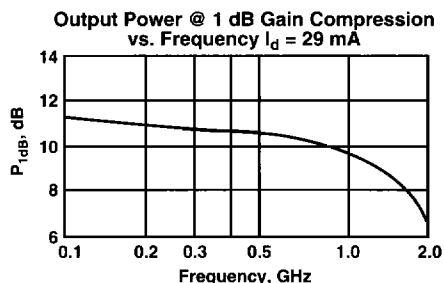
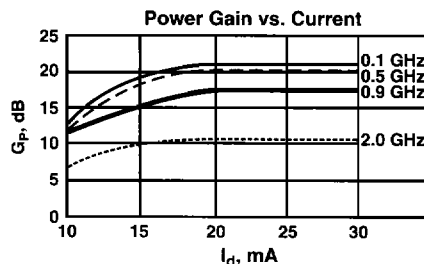
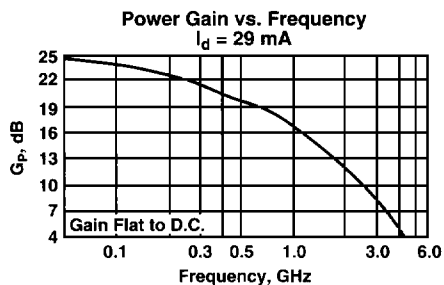
Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
MSA-2111-TR1	3000	7"
MSA-2111-TR2	10000	13"

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

Typical Performance, $T_A = 25^\circ\text{C}$

(Unless otherwise noted)



Typical Scattering Parameters: $Z_0 = 50 \Omega$

$T_A = 25^\circ\text{C}$, $I_d = 29 \text{ mA}$

Freq. GHz	S_{11}		S_{21}			S_{12}			S_{22}		k
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang	
0.1	.28	171	23.0	14.1	167	-26.0	.050	9	.27	177	1.03
0.2	.26	163	22.5	13.4	156	-25.5	.053	18	.27	175	1.03
0.3	.24	156	21.9	12.5	145	-24.9	.057	25	.26	173	1.03
0.4	.21	152	21.2	11.5	136	-24.0	.063	30	.26	171	1.03
0.5	.18	149	20.5	10.6	128	-23.4	.068	35	.24	170	1.03
0.6	.15	148	19.7	9.7	120	-22.6	.074	38	.24	169	1.03
0.7	.13	148	19.0	8.9	114	-21.8	.081	40	.22	169	1.04
0.8	.11	152	18.3	8.2	108	-21.1	.088	42	.21	169	1.04
0.9	.09	158	17.6	7.6	102	-20.4	.095	43	.20	168	1.04
1.0	.07	169	16.9	7.0	98	-19.9	.101	44	.19	169	1.06
1.5	.08	-123	14.0	5.0	79	-17.3	.136	45	.10	179	1.06
2.0	.11	-124	11.8	3.9	63	-15.5	.167	42	.06	-147	1.08
2.5	.15	-167	10.1	3.2	56	-14.3	.193	43	.06	-177	1.10
3.0	.27	158	8.3	2.6	43	-13.5	.211	38	.12	149	1.13
3.5	.38	145	6.8	2.2	32	-13.1	.222	34	.16	145	1.14
4.0	.46	135	5.6	1.9	21	-12.6	.234	30	.17	144	1.14