

Features

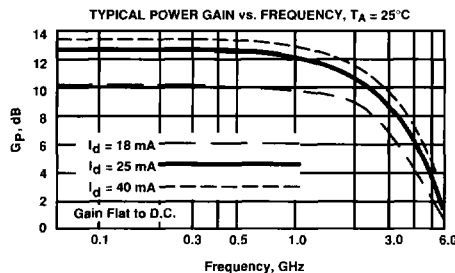
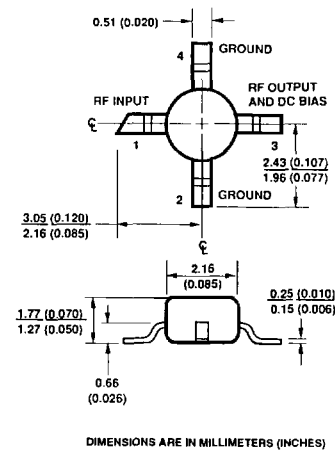
- Cascadable 50 Ω Gain Block
- 3 dB Bandwidth: DC to 2.5 GHz
- 12.0 dB typical Gain at 1.0 GHz
- Unconditionally Stable ($k > 1$)
- Surface Mount Plastic Package
- Tape-and-Reel Packaging Option Available¹

Description

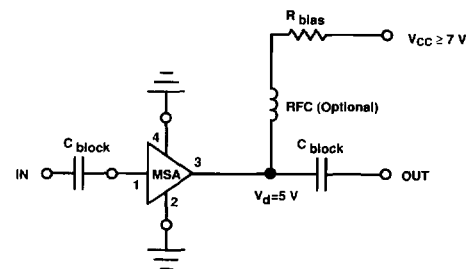
The MSA-0286 is a high performance silicon bipolar Monolithic Microwave Integrated Circuit (MMIC) housed in a low cost, surface mount plastic package. This MODAMP™ MMIC is designed for use as a general purpose 50 Ω gain block. Applications include narrow and broad band IF and RF amplifiers in commercial and industrial applications.

The MODAMP MSA-series is fabricated using a 10 GHz f_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.

86 Plastic Package



Typical Biasing Configuration



Electrical Specifications², $T_A = 25^\circ\text{C}$

Symbol	Parameters and Test Conditions: $I_d = 25\text{ mA}$, $Z_0 = 50\ \Omega$	Units	Min.	Typ.	Max.
G_P	Power Gain ($ S_{21} ^2$) $f = 0.1\text{ GHz}$ $f = 1.0\text{ GHz}$	dB	10.0	12.5 12.0	
ΔG_P	Gain Flatness $f = 0.1\text{ to }1.6\text{ GHz}$	dB		± 0.6	
$f_3\text{ dB}$	3 dB Bandwidth	GHz		2.5	
VSWR	Input VSWR $f = 0.1\text{ to }3.0\text{ GHz}$			1.5:1	
	Output VSWR $f = 0.1\text{ to }3.0\text{ GHz}$			1.4:1	
$P_{1\text{ dB}}$	Output Power @ 1 dB Gain Compression $f = 1.0\text{ GHz}$	dBm		4.5	
NF	50 Ω Noise Figure $f = 1.0\text{ GHz}$	dB		6.5	
IP_3	Third Order Intercept Point $f = 1.0\text{ GHz}$	dBm		17.0	
t_D	Group Delay $f = 1.0\text{ GHz}$	psec.		140	
V_d	Device Voltage	V	4.0	5.0	6.0
dV/dT	Device Voltage Temperature Coefficient	$\text{mV}/^\circ\text{C}$		-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 18 mA to 40 mA. Typical performance as a function of current is on the following page.

Absolute Maximum Ratings

Parameter	Absolute Maximum ¹
Device Current	60 mA
Power Dissipation ^{2,3}	325 mW
RF Input Power	+13 dBm
Junction Temperature	150°C
Storage Temperature	-65°C to 150°C

Thermal Resistance^{2,4}: $\theta_{jc} = 105^\circ\text{C}/\text{W}$

Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2. $T_{\text{CASE}} = 25^\circ\text{C}$
3. Derate at 9.5 mW/°C for $T_{\text{C}} > 116^\circ\text{C}$.
4. See MEASUREMENTS section "Thermal Resistance" for more information.

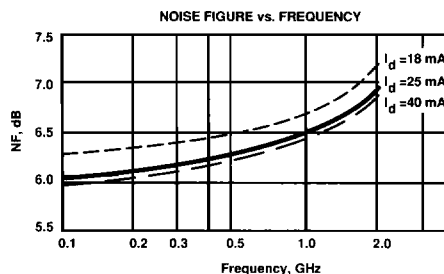
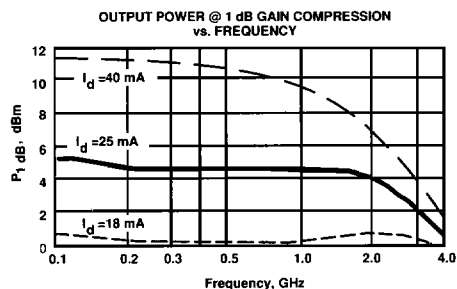
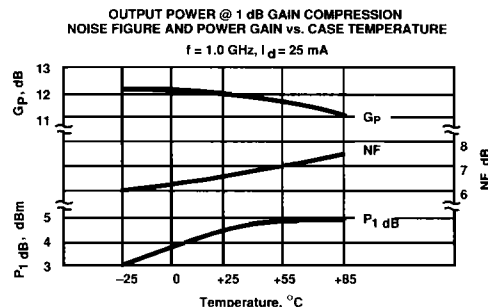
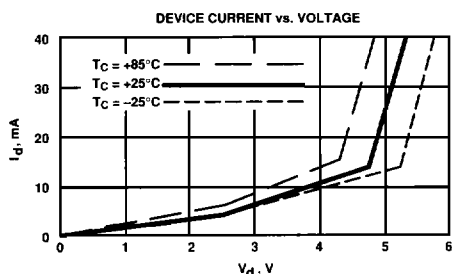
Part Number Ordering Information

Part Number	Devices Per Reel	Reel Size
MSA-0286-TR1	1000	7"
MSA-0286-TR2	4000	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: $Z_0 = 50 \Omega$

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

Freq. GHz	S_{11}		S_{21}			S_{12}			S_{22}	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang
0.1	.10	171	12.5	4.22	175	-18.5	.119	1	.16	-5
0.2	.10	161	12.5	4.20	170	-18.3	.121	3	.16	-11
0.4	.10	144	12.4	4.16	159	-18.2	.122	6	.15	-24
0.6	.09	129	12.2	4.09	149	-18.0	.126	6	.15	-36
0.8	.08	119	12.1	4.01	139	-18.0	.127	9	.14	-48
1.0	.08	108	11.9	3.91	129	-17.4	.135	8	.14	-62
1.5	.06	111	11.3	3.67	106	-16.5	.149	12	.11	-99
2.0	.08	141	10.5	3.35	84	-15.7	.164	11	.11	-141
2.5	.14	150	9.6	3.01	67	-14.8	.182	9	.12	-176
3.0	.21	142	8.6	2.68	48	-14.3	.194	5	.13	155
3.5	.29	132	7.5	2.37	30	-14.0	.200	1	.14	140
4.0	.36	121	6.4	2.09	15	-13.5	.211	-3	.16	134
5.0	.50	101	4.1	1.61	-12	-13.3	.216	-12	.20	132

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