

Features

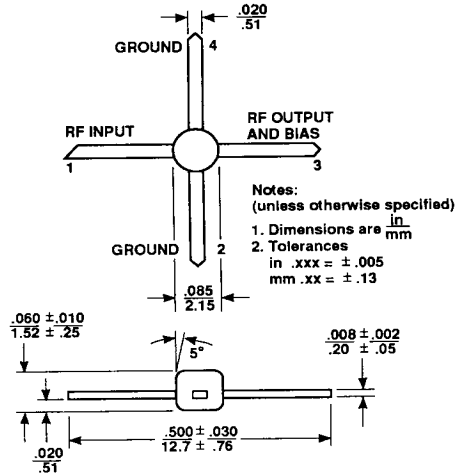
- Cascadable 50 Ω Gain Block
- 3 dB Bandwidth: DC to 3.6 GHz
- 12.5 dBm typical P_{1 dB} at 1.0 GHz
- 8 dB typical Gain at 1.0 GHz
- Unconditionally Stable (k>1)
- Low Cost Plastic Package

Description

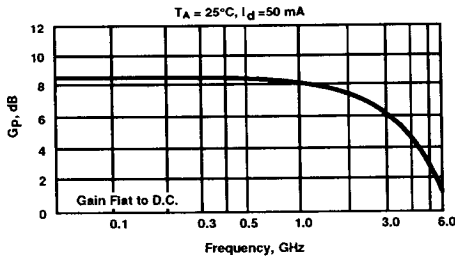
Avantek's MSA-0485 is a high performance silicon bipolar Monolithic Microwave Integrated Circuit (MMIC) housed in a low cost plastic package. This MODAMP™ MMIC is designed for use as a general purpose 50 Ω gain block. Typical applications include narrow and broad band IF and RF amplifiers in commercial and industrial applications.

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

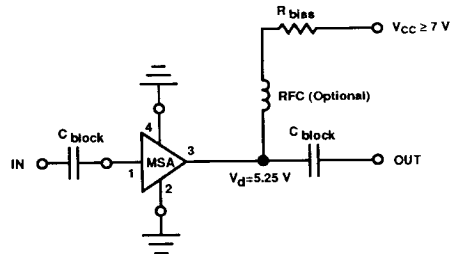
Avantek 85 Plastic Package



TYPICAL POWER GAIN vs. FREQUENCY



Typical Biasing Configuration



Electrical Specifications¹, TA = 25°C

Symbol	Parameters and Test Conditions: Id = 50 mA, Z0 = 50 Ω	Units	Min.	Typ.	Max.
Gp	Power Gain (S21 ²) f = 0.1 GHz f = 1.0 GHz	dB	7.0	8.3 8.0	
ΔGp	Gain Flatness f = 0.1 to 2.5 GHz	dB		±0.7	
f3 dB	3 dB Bandwidth	GHz		3.6	
VSWR	Input VSWR f = 0.1 to 2.5 GHz			1.6:1	
	Output VSWR f = 0.1 to 2.5 GHz			2.0:1	
P1 dB	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	
IP3	Third Order Intercept Point f = 1.0 GHz	dBm		25.5	
td	Group Delay f = 1.0 GHz	psec		125	
Vd	Device Voltage	V	4.2	5.25	6.3
dV/dT	Device Voltage Temperature Coefficient	mV/°C		-8.0	

Note: 1. 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-0485 MODAMP™ Cascadable Silicon Bipolar Monolithic Microwave Integrated Circuit Amplifiers

Absolute Maximum Ratings

Parameter	Absolute Maximum ¹
Device Current	85 mA
Power Dissipation ^{2,3}	500 mW
RF Input Power	+20 dBm
Junction Temperature	150°C
Storage Temperature	-65°C to 150°C

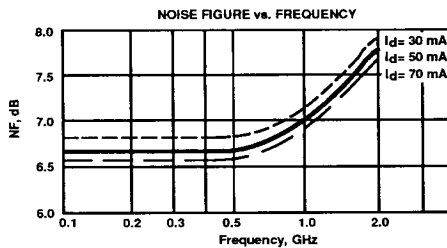
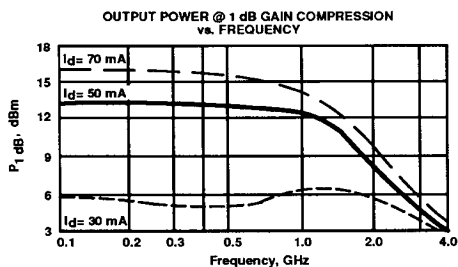
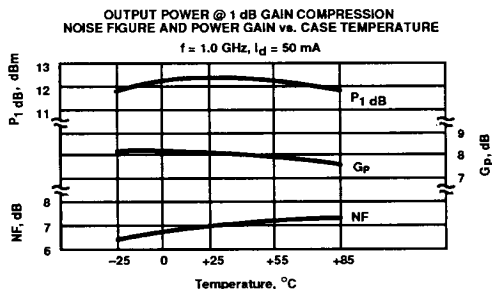
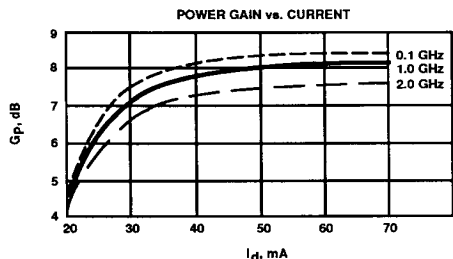
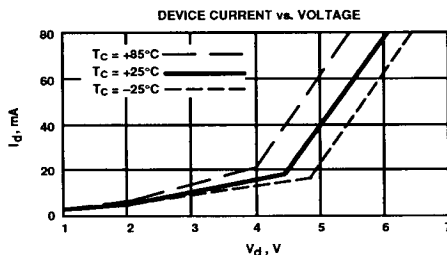
Thermal Resistance^{2,4}: $\theta_{JC} = 90^\circ\text{C/W}$

Notes:

- Permanent damage may occur if any of these limits are exceeded.
- TCASE = 25°C
- Derate at 11.1 mW/°C for $T_C > 105^\circ\text{C}$.
- See MEASUREMENTS section "Thermal Resistance" for more information.

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

(unless otherwise noted)



Typical Scattering Parameters: $Z_0 = 50 \Omega$

$T_A = 25^\circ\text{C}, I_d = 50 \text{ mA}$

Freq. GHz	S_{11}		S_{21}			S_{12}			S_{22}	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang
0.1	.21	177	8.4	2.63	175	-16.1	.156	2	.08	-16
0.2	.20	176	8.3	2.60	171	-16.2	.155	2	.08	-30
0.4	.20	172	8.2	2.57	163	-16.1	.156	3	.10	-54
0.6	.19	171	8.1	2.55	155	-16.2	.155	5	.13	-71
0.8	.19	168	8.1	2.54	146	-16.0	.158	6	.16	-83
1.0	.18	166	8.0	2.52	138	-15.7	.164	9	.18	-93
1.5	.16	167	7.8	2.46	117	-15.3	.171	11	.25	-116
2.0	.18	168	7.4	2.34	97	-14.6	.187	12	.29	-135
2.5	.21	173	6.9	2.21	83	-13.8	.204	16	.34	-150
3.0	.27	169	6.3	2.07	65	-13.4	.213	13	.38	-161
3.5	.33	161	5.7	1.92	48	-12.6	.234	9	.39	-172
4.0	.38	154	4.8	1.74	33	-12.3	.242	6	.37	-179
4.5	.42	145	4.1	1.59	18	-12.1	.249	3	.36	-174
5.0	.44	131	3.3	1.46	4	-11.7	.259	-3	.34	-165

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