Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

MSA-0505
Cascadable Silicon Bipolar MMIC Amplifier

Data Sheet

Description

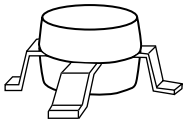
The MSA-0505 is a high performance medium power silicon bipolar Monolithic Microwave Integrated Circuit (MMIC) housed in a low cost, surface mount package. This MMIC is designed for use as a general purpose 50Ω gain block. Typical applications include narrow and broad band IF and RF amplifiers in commercial systems.

The MSA-series is fabricated using Avago's 10 GHz f_T, 25 GHz f_{MAX}, silicon bipolar MMIC process which uses nitride self-alignment, ion implantation, and gold metallization to achieve excellent performance, uniformity and reliability. The use of an external bias resistor for temperature and current stability also allows bias flexibility.

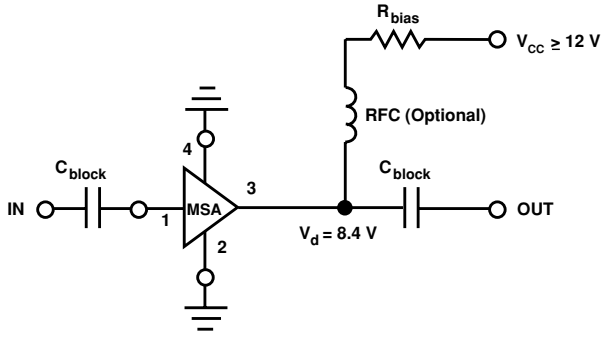
Features

- Cascadable 50 Ω Gain Block
- High Output Power:
  18.0 dBm Typical $P_{1\ dB}$ at 1.0 GHz
- Low Distortion:
  29.0 dBm Typical IP_3 at 1.0 GHz
- 7.0 dB Typical Gain at 1.0 GHz
- Surface Mount Plastic Package
- Tape-and-Reel Packaging Option Available
- Lead-free Option Available

05 Plastic Package



Typical Biasing Configuration



MSA-0505 Absolute Maximum Ratings

Parameter	Absolute Maximum[1]
Device Current	135 mA
Power Dissipation[2,3]	1.5 W
RF Input Power	+25 dBm
Junction Temperature	200°C
Storage Temperature	–65 to 150°C

Thermal Resistance[2]:

$\theta_{jc} = 85°C/W$

Notes:
1. Permanent damage may occur if any of these limits are exceeded.
2. $T_{CASE} = 25°C$.
3. Derate at 11.8 mW/°C for $T_C > 73°C$.

Electrical Specifications[1], $T_A = 25°C$

Symbol	Parameters and Test Conditions: $I_d = 80$ mA, $Z_O = 50\ \Omega$		Units	Min.	Typ.	Max.
$P_{1\ dB}$	Output Power at 1 dB Gain Compression	f = 0.5 GHz	dBm		19.0	
		f = 1.0 GHz	dBm	16.0	18.0	
G_P	Power Gain ($\|S_{21}\|^2$)	f = 0.5 GHz	dB		7.5	
		f = 1.0 GHz		6.0	7.0	
ΔG_P	Gain Flatness	f = 0.1 to 1.5 GHz	dB		±0.75	
$f_{3\ dB}$	3 dB Bandwidth[2]		GHz		2.3	
VSWR	Input VSWR	f = 0.1 to 1.5 GHz			1.6:1	
	Output VSWR	f = 0.1 to 1.5 GHz			2.0:1	
IP_3	Third Order Intercept Point	f = 1.0 GHz	dBm		29.0	
NF	50 Ω Noise Figure	f = 1.0 GHz	dB		6.5	
t_D	Group Delay	f = 1.0 GHz	psec		190	
V_d	Device Voltage		V	6.7	8.4	10.1
dV/dT	Device Voltage Temperature Coefficient		mV/°C		–16.0	

Notes:
1. The recommended operating current range for this device is 60 to 100 mA. Typical performance as a function of current is on the following page.
2. Referenced from 0.1 GHz Gain (GP).

Ordering Information

Part Numbers	No. of Devices	Comments
MSA-0505-STR	10	Bulk
MSA-0505-STRG	100	Bulk
MSA-0505-TR1	500	7" Reel
MSA-0505-TR1G	500	7" Reel

Note: Order part number with a "G" suffix if lead-free option is desired.

MSA-0505 Typical Scattering Parameters ($T_A = 25°C$, $I_d = 80$ mA)

Freq.	S_{11}			S_{21}			S_1		S_{22}		
MHz	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang	k
5	.56	−39	14.9	5.56	161	−18.5	.120	39	.65	−36	0.60
25	.24	−103	9.7	3.05	156	−13.9	.202	12	.25	−90	0.97
50	.15	−130	8.2	2.57	163	−13.7	.207	7	.15	−116	1.15
100	.13	−155	7.8	2.45	165	−13.7	.207	3	.11	−132	1.21
200	.12	−170	7.7	3.43	161	−13.5	.211	1	.11	−145	1.21
400	.12	178	7.5	2.37	148	−13.6	.209	−1	.14	−146	1.23
600	.13	172	7.4	2.34	134	−13.6	.209	−2	.17	−151	1.23
800	.13	168	7.2	2.29	119	−13.6	.209	−3	.21	−157	1.23
1000	.14	166	7.0	2.24	105	−13.4	.213	−4	.25	−164	1.21
1500	.21	159	6.4	2.09	72	−13.3	.217	−6	.34	176	1.16
2000	.30	148	5.2	1.82	42	−13.1	.222	−9	.42	159	1.12
2500	.40	136	4.1	1.60	17	−12.9	.227	−11	.48	146	1.05
3000	.52	121	2.7	1.36	−7	−12.6	.234	−16	.55	133	0.92

Typical Performance, $T_A = 25°C$

(unless otherwise noted)

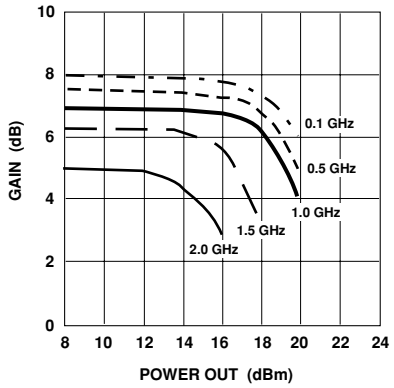


Figure 1. Typical Gain vs. Power Out, $T_A = 25°C$, $I_d = 80$ mA.

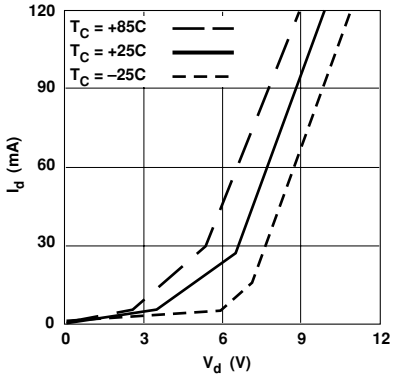


Figure 2. Device Current vs. Voltage.

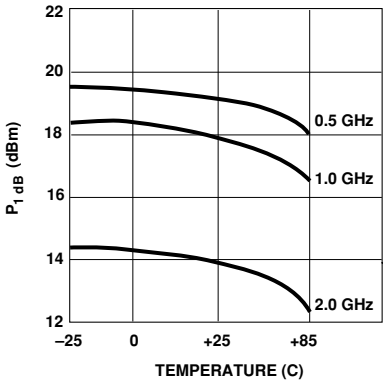


Figure 3. Output Power at 1 dB Gain Compression, vs. Case Temperature, $I_d = 80$ mA.

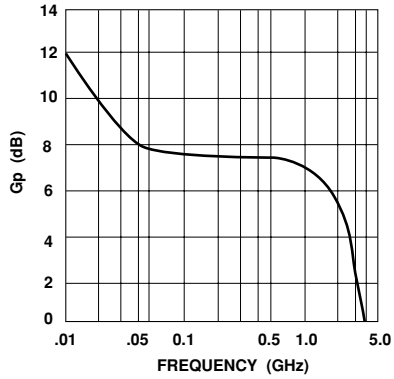


Figure 4. Gain vs. Frequency, $I_d = 80$ to 100 mA.

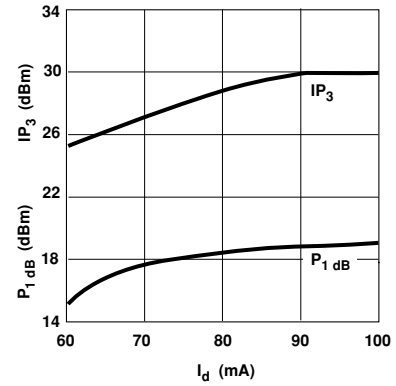
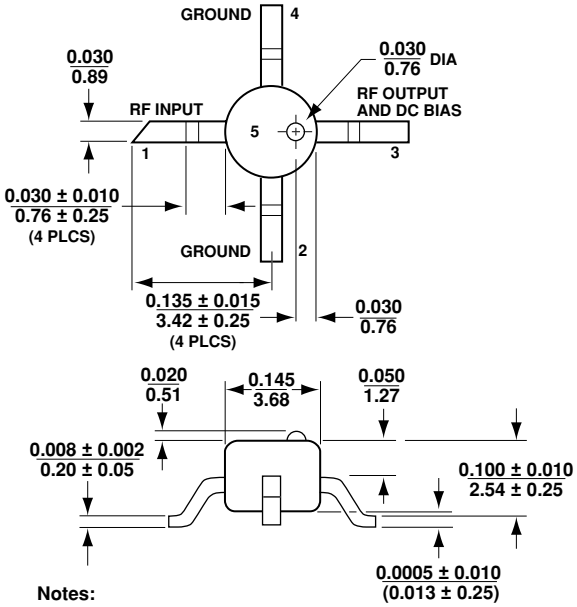


Figure 5. Output Power at 1 dB Gain Compression, Third Order Intercept vs. Case Temperature, f = 1.0 GHz.

05 Plastic Package Dimensions



Notes:
(unless otherwise specified)
1. Dimensions are in / mm
2. Tolerances
in .xxx = 0.005
mm .xx = 0.13

For product information and a complete list of distributors, please go to our web site: **www.avagotech.com**

AV02-1227EN May 14, 2008