

Silicon Bipolar MMIC Cascadable Amplifiers

MA4TD1135, MA4TD1136

Features

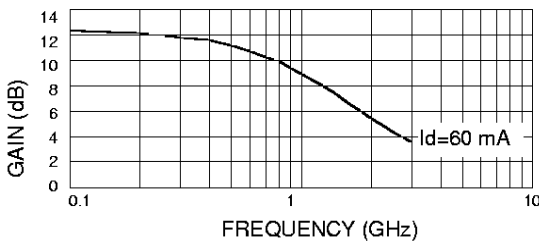
- High Dynamic Range Cascadable 50Ω/75Ω Gain Block
- 3 dB Bandwidth: 50 MHz to 1.0 GHz
- 17 dBm Typical P_{1dB} @ 1.0 GHz
- 11 dB Typical Gain @ 0.5 GHz
- 4.0 dB Typical Noise Figure @ 0.7 GHz
- Cost Effective Ceramic Microstrip Packages
- Tape and Reel Packaging Available

Description

M/A-COM's MA4TD1135 and MA4TD1136 are high performance silicon bipolar MMICs housed in cost-effective ceramic microstrip packages. The MA4TD1135 and MA4TD1136 are designed for use in 50Ω or 75Ω systems where a high dynamic range gain block is required. Typical applications include narrow and wide band IF and RF amplifiers in industrial and military applications.

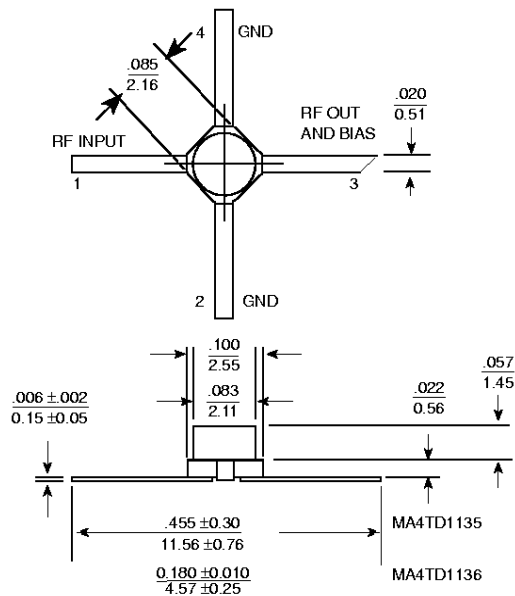
The MA4TD1135 and MA4TD1136 are fabricated using a 10 GHz f_T silicon bipolar technology that features gold metalization and IC passivation for increased performance and reliability.

TYPICAL POWER GAIN vs FREQUENCY



Ceramic Microstrip Case Style Outlines ^{1, 2, 3}

Available in short lead version as MA4TD1136.



Notes: (unless otherwise specified)

1. Dimensions are in/mm

2. Tolerance: in .xxx = ±.005; mm .xx = ±.13

3. See last page of data sheet for short lead Micro-X

Pin Configuration

Pin Number	Pin Description
1	RF Input
2 & 4	AC/DC Ground
3	RF Output and DC Bias

Electrical Specifications @ $T_A = +25^\circ\text{C}$, $I_b = 60\text{ mA}$, $Z_0 = 50\Omega$

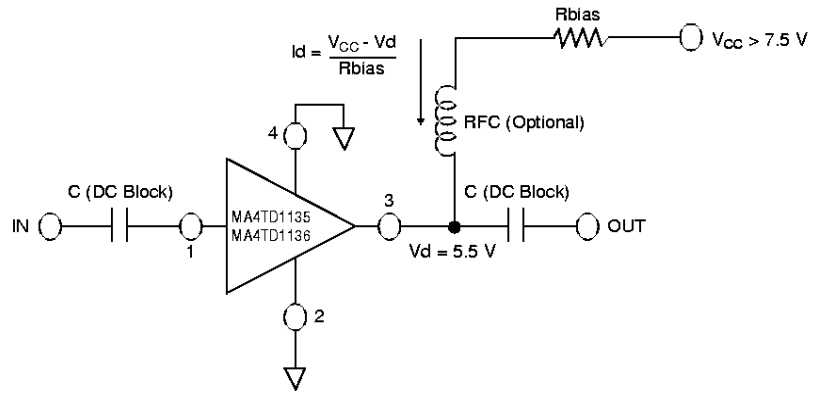
Symbol	Parameters	Test Conditions	Units	Min.	Typical	Max.
Gp	Power Gain ($ S_{21} ^2$)	f = 0.1 GHz	dB	11.5	12.5	13.5
ΔG_p	Gain Flatness	f = 0.1 to 0.7 GHz	dB	-	±0.9	±1.1
f_{3dB}	3 dB Bandwidth	ref 50 MHz Gain	GHz	-	1.0	-
SWRin	Input SWR	f = 0.1 to 2.0 GHz	-	-	2.0	-
SWRout	Output SWR	f = 0.1 to 2.0 GHz	-	-	1.9	-
P_{1dB}	Output Power @ 1 dB Gain Compression	f = 0.7 GHz	dBm	16.0	17.0	-
NF	50Ω Noise Figure	f = 0.7 GHz	dB	-	4.0	4.5
IP3	Third Order Intercept Point	f = 1.0 GHz	dBm	-	30.0	-
t_D	Group Delay	f = 1.0 GHz	pS	-	160	-
Vd	Device Voltage	-	V	4.5	5.5	6.5
dV/dT	Device Voltage Temperature Coefficient	-	mV/°C	-	-8.0	-

Absolute Maximum Ratings¹

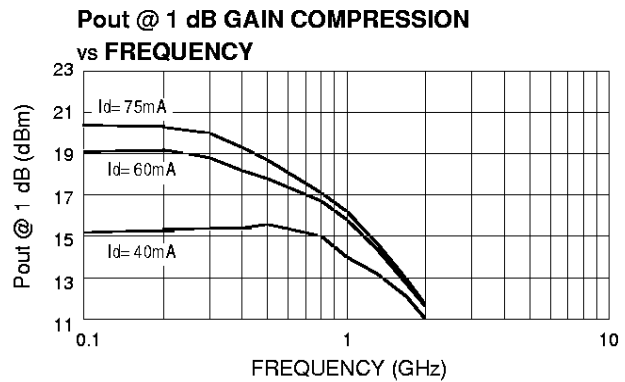
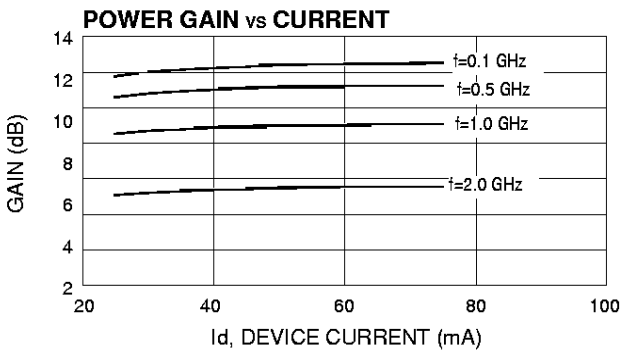
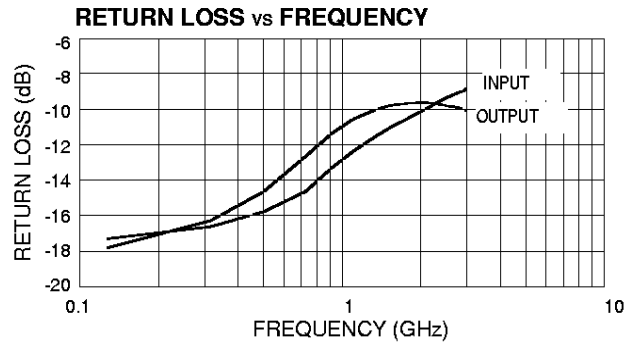
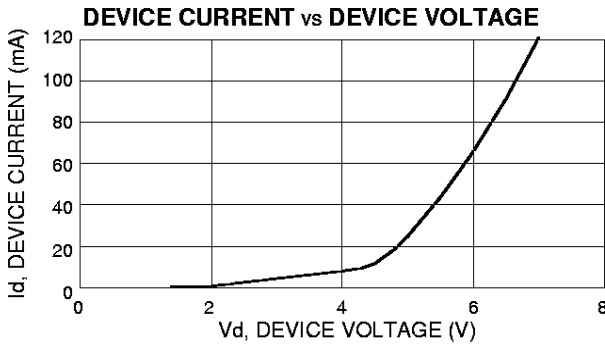
Parameter	Ratings
Device Current	90 mA
Power Dissipation ^{2,3}	560 mW
RF Input Power	+20 dBm
Junction Temperature	200 °C
Storage Temperature	-65 °C to +200 °C
Thermal Resistance: $\theta_{jc} = 135^\circ\text{C/W}$	

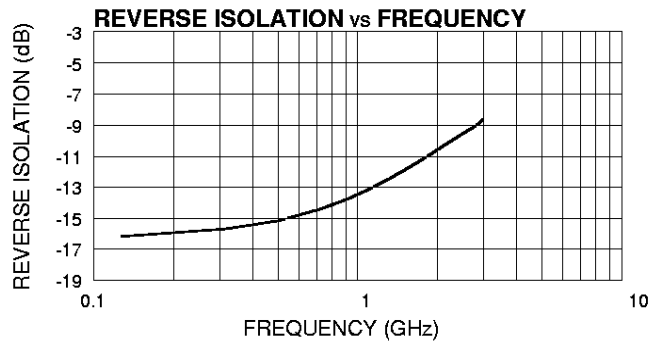
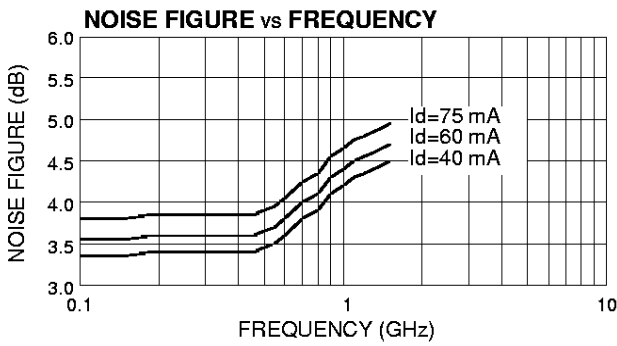
1. Exceeding these limits may cause permanent damage.
2. Case Temperature (T_C) = 25 °C.
3. Derate at 6.9 mW/°C for $T_C > 124^\circ\text{C}$.

Typical Bias Configuration



Typical Performance Curves - $I_d = 60\text{ mA}$, $T_A = +25^\circ\text{C}$ (unless otherwise noted)





Typical Scattering Parameters

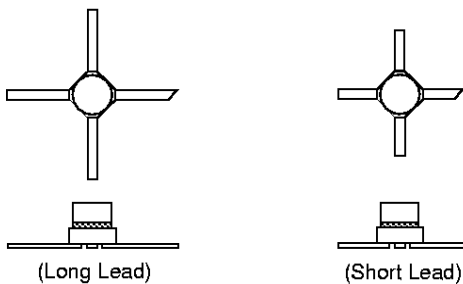
$Z_0 = 50\Omega$, $T_A = +25^\circ C$, $I_D = 60\text{ mA}$

Frequency (GHz)	S_{11}		S_{21}		S_{12}		S_{22}	
	Mag.	Angle	Mag.	Angle	Mag.	Angle	Mag.	Angle
0.05	0.133	-104.9	4.23	157.5	0.152	14.4	0.120	-98.7
0.1	0.134	-106.7	4.19	156.2	0.154	14.8	0.124	-100.6
0.2	0.140	-112.4	4.05	151.7	0.158	16.2	0.137	-106.6
0.3	0.148	-118.6	3.90	146.8	0.164	17.7	0.153	-113.1
0.4	0.153	-123.0	3.79	143.2	0.168	18.8	0.165	-120.2
0.5	0.162	-129.9	3.62	137.8	0.174	20.5	0.185	-125.1
0.6	0.172	-137.3	3.44	131.2	0.182	22.4	0.208	-132.8
0.7	0.185	-144.4	3.25	124.7	0.190	24.6	0.233	-140.8
0.8	0.198	-148.7	3.12	120.4	0.196	26.3	0.249	-145.3
0.9	0.216	-154.6	2.95	114.4	0.205	28.4	0.271	-151.4
1.0	0.232	-159.8	2.79	108.8	0.214	30.3	0.287	-156.8
1.5	0.279	-179.0	2.23	89.4	0.254	35.8	0.323	-175.4
2.0	0.314	164.8	1.88	74.3	0.294	38.7	0.331	169.7

Ordering Information

Long Lead Model No.	Short Lead Model No.	Package
MA4TD1135 PIN	MA4TD1136 PIN	Ceramic
MA4TD1135 TR	MA4TD1136 TR	Forward Tape and Reel
MA4TD1135 RTR	MA4TD1136 RTR	Reverse Tape and Reel

Micro-X Case Styles



Specifications Subject to Change Without Notice.

V2.00