

M-Pulse Microwave

Silicon Bipolar MMIC Cascadable Amplifier

MP4TD1170

Features

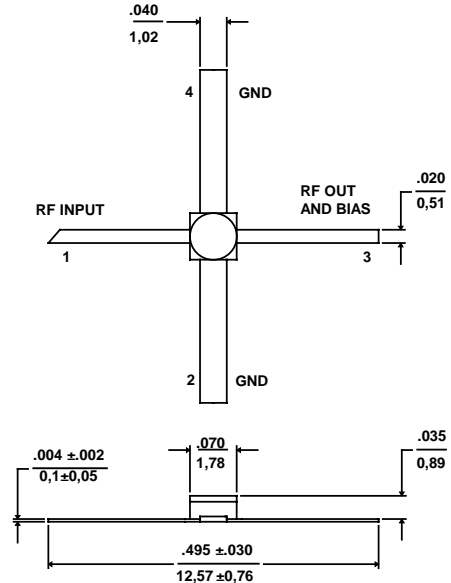
- High Dynamic Range Cascadable 50Ω/75Ω Gain Block
- 3dB Bandwidth: 50 MHz to 1.0 GHz
- 17.0 dBm Typical P_{1dB} @ 1.0 GHz
- 12 dB Typical Gain @ 0.5 GHz
- 4.0 dB Typical Noise Figure @ 1.0 GHz
- Hermetic Gold-Ceramic Microstrip Package
- Tape and Reel Packaging Available

Description

M-Pulse's MP4TD1170 is a high performance silicon bipolar MMIC housed in a hermetic high reliability package. The MP4TD1170 is designed for use in 50Ω or 75Ω systems where a high dynamic range and low distortion gain block is required. Typical applications include narrow and wide band IF and RF amplifiers in industrial and military applications.

The MP4TD1170 is fabricated using a 10 GHz f_T silicon bipolar technology that features gold metalization and IC passivation for increased performance and reliability.

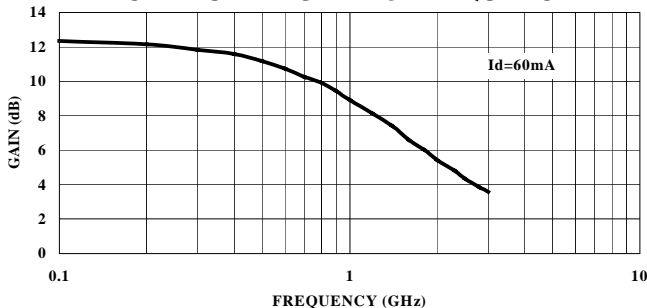
Gold-Ceramic Microstrip Package Outline^{1,2}



Notes: (unless otherwise specified)

1. Dimensions are in / mm
2. Tolerance: in .xxx = ±.005; mm .xx = ±.13

TYPICAL POWER GAIN vs FREQUENCY



Pin Configuration

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

Ordering Information

Model No.	Package
MP4TD1170	Hermetic Ceramic
MP4TD1170T	Tape and Reel

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

Symbol	Parameters	Test Conditions	Units	Min.	Typ.	Max.
G_p	Power Gain ($ S_{21} ^2$)	$f = 0.1\text{ GHz}$	dB	11.5	12.5	13.5
ΔG_p	Gain Flatness	$f = 0.1\text{ to }0.7\text{ GHz}$	dB	-	±0.9	±1.1
f_{3dB}	3 dB Bandwidth	ref 50 MHz Gain	GHz	-	1.0	-
SWR_{in}	Input SWR	$f = 0.1\text{ to }2.0\text{ GHz}$	-	-	1.8	-
SWR_{out}	Output SWR	$f = 0.1\text{ to }2.0\text{ GHz}$	-	-	1.9	-
P_{1dB}	Output Power @ 1 dB Gain Compression	$f = 0.7\text{ GHz}$	dBm	16.0	17.0	-
NF	50 Ω Noise Figure	$f = 0.7\text{ GHz}$	dB	-	4.0	4.5
IP_3	Third Order Intercept Point	$f = 1.0\text{ GHz}$	dBm	-	30.0	-
t_D	Group Delay	$f = 1.0\text{ GHz}$	ps	-	160	-
V_d	Device Voltage	-	V	4.5	5.5	6.5
dV/dT	Device Voltage Temperature Coefficient	-	mV/°C	-	-8.0	-

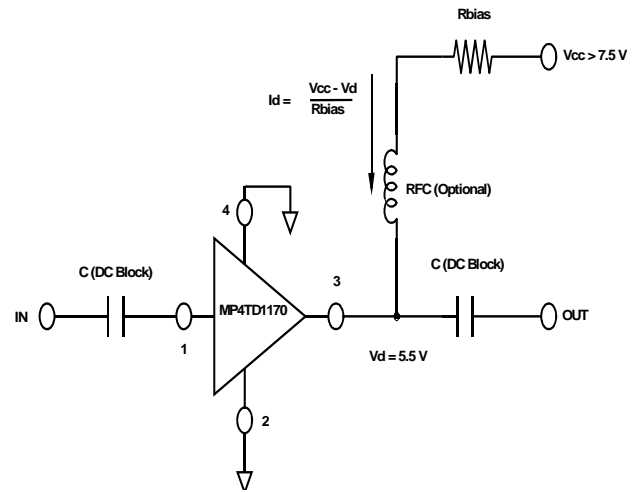
Specification Subject to Change Without Notice

Absolute Maximum Ratings¹

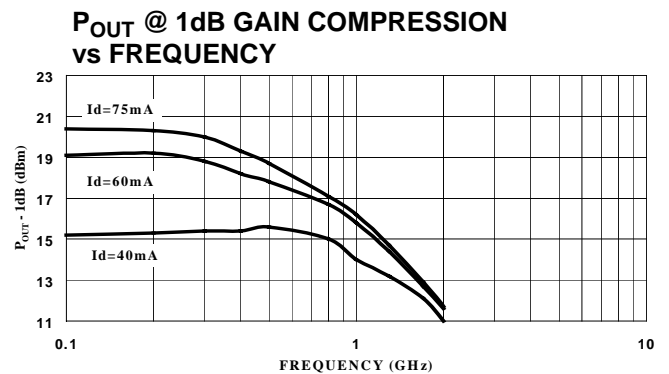
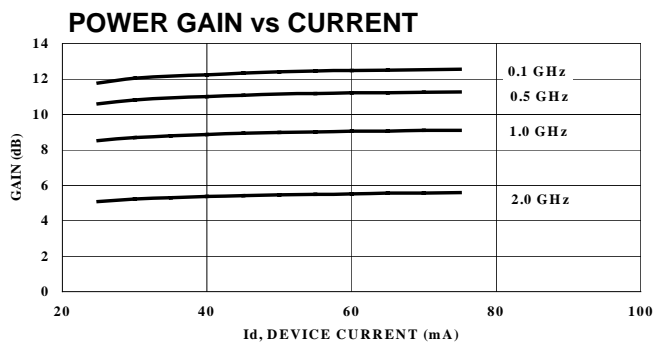
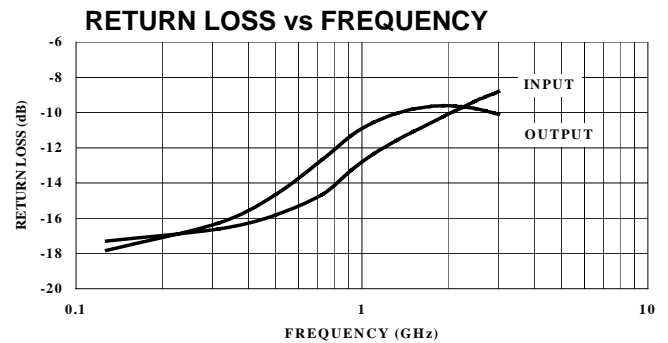
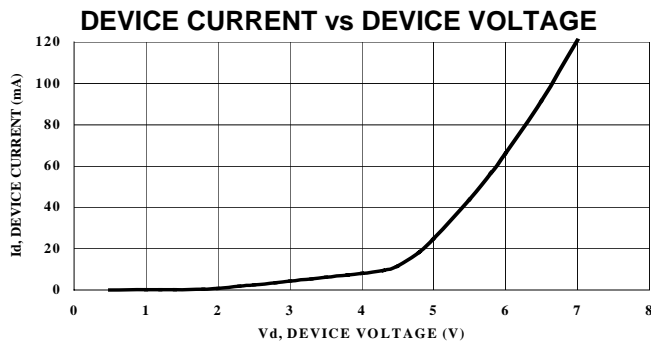
Parameter	Absolute Maximum
Device Current	90 mA
Power Dissipation ^{2,3}	560 mW
RF Input Power	+20 dBm
Junction Temperature	200°C
Storage Temperature	-65°C to +200°C
Thermal Resistance: $\theta_{jC} = 135^{\circ}\text{C/W}$	

1. Exceeding these limits may cause permanent damage.
2. Case Temperature (T_c) = 25 °C.
3. Derate at 7.4 mW/°C for $T_c > 124^{\circ}\text{C}$.

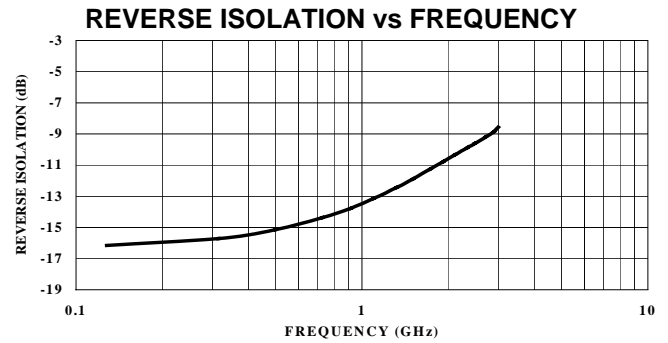
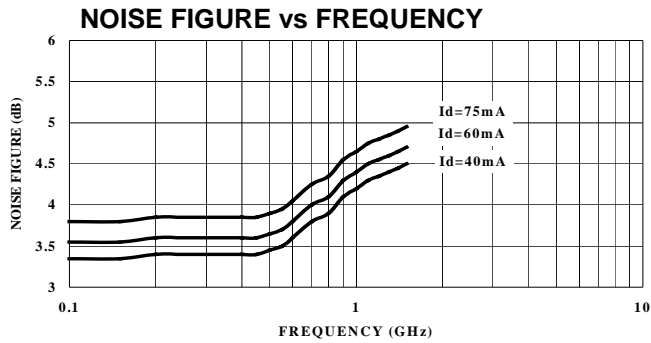
Typical Bias Configuration



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



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Typical Scattering Parameters

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

Frequency (GHz)	S11		S21		S12		S22	
	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

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