

M-Pulse Microwave

Silicon Bipolar MMIC Cascadable Amplifier

MP4TD0310

Features

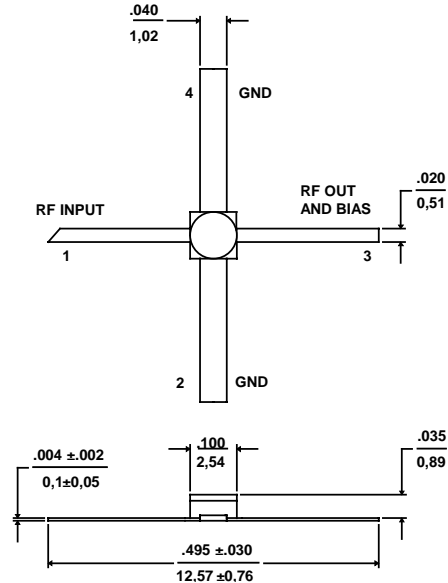
- Cascadable 50Ω Gain Block
- 3dB Bandwidth: DC to 2.0 GHz
- 12.1 dB Typical Gain @ 1.0 GHz
- Unconditionally Stable ($k > 1$)
- Hermetic Gold-Ceramic Microstrip Package
- Tape and Reel Packaging Available

Description

M-Pulse's MP4TD0310 is a high performance silicon bipolar MMIC housed in a hermetic high reliability package. The MP4TD0310 is designed for use where a general purpose 50Ω gain block is required. Typical applications include narrow and wide band IF and RF amplifiers in industrial and military applications.

The MP4TD0310 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}



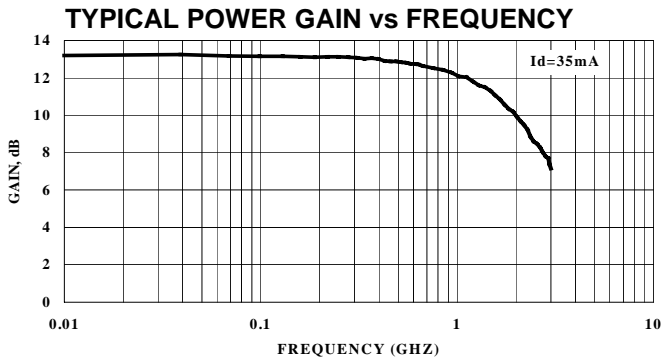
- Notes: (unless otherwise specified)
 1. Dimensions are in / mm
 2. Tolerance: in .xxx = ±.005; mm .xx = ±.13

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
MP4TD0310	Hermetic Ceramic



Electrical Specifications @ $T_A = +25^\circ\text{C}$, $I_d = 35 \text{ mA}$, $Z_0 = 50\Omega$

Symbol	Parameters	Test Conditions	Units	Min.	Typ.	Max.
G_p	Power Gain ($ S_{21} ^2$)	$f = 0.1 \text{ GHz}$	dB	11.5	13.0	14.0
ΔG_p	Gain Flatness	$f = 0.1 \text{ to } 1.5 \text{ GHz}$	dB	-	± 0.8	± 1.1
f_{3dB}	3 dB Bandwidth	-	GHz	-	2.0	-
SWR_{in}	Input SWR	$f = 0.1 \text{ to } 3.0 \text{ GHz}$	-	-	1.9	-
SWR_{out}	Output SWR	$f = 0.1 \text{ to } 3.0 \text{ GHz}$	-	-	1.6	-
P_{1dB}	Output Power @ 1dB Gain Compression	$f = 1.0 \text{ GHz}$	dBm	-	10.0	-
NF	50 Ω Noise Figure	$f = 1.0 \text{ GHz}$	dB	-	5.7	-
IP_3	Third Order Intercept Point	$f = 1.0 \text{ GHz}$	dBm	-	23.0	-
t_d	Group Delay	$f = 1.0 \text{ GHz}$	ps	-	125	-
V_d	Device Voltage	-	V	4.5	5.0	6.0
dV/dT	Device Voltage Temperature Coefficient	-	mV/°C	-	-8.0	-

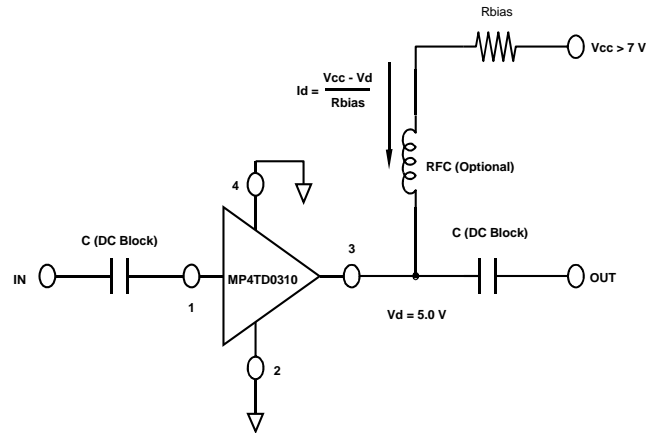
Specification Subject to Change Without Notice

Absolute Maximum Ratings¹

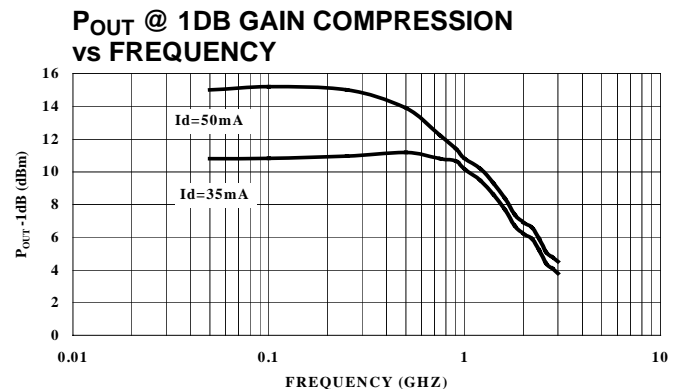
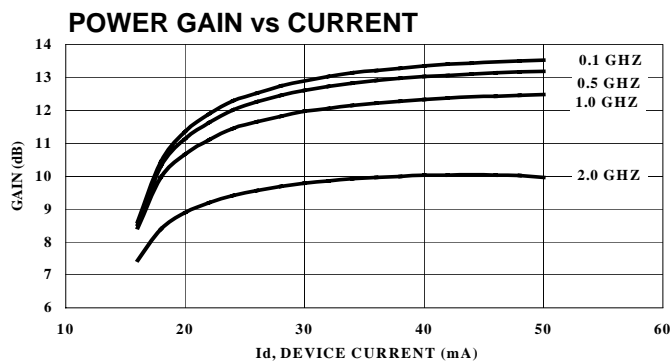
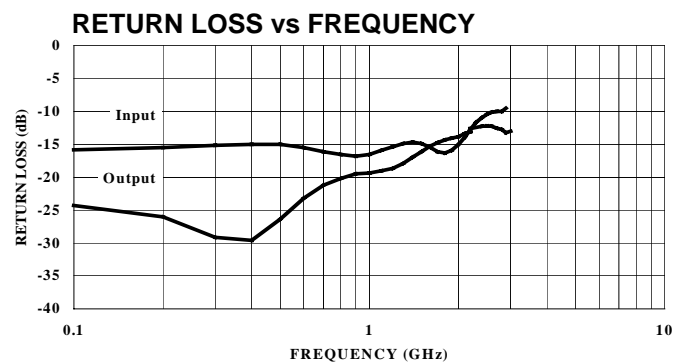
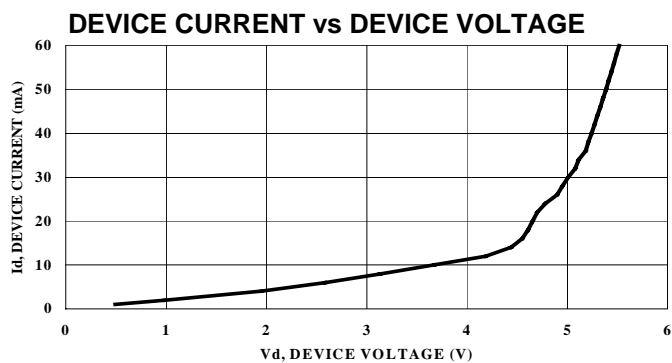
Parameter	Absolute Maximum
Device Current	80 mA
Power Dissipation ^{2,3}	425 mW
RF Input Power	+13 dBm
Junction Temperature	200°C
Storage Temperature	-65°C to +200°C
Thermal Resistance: $\theta_{jC} = 150^{\circ}\text{C/W}$	

1. Exceeding these limits may cause permanent damage.
2. Case Temperature (T_c) = 25 °C.
3. Derate at 6.7 mW/°C for $T_c > 136^{\circ}\text{C}$.

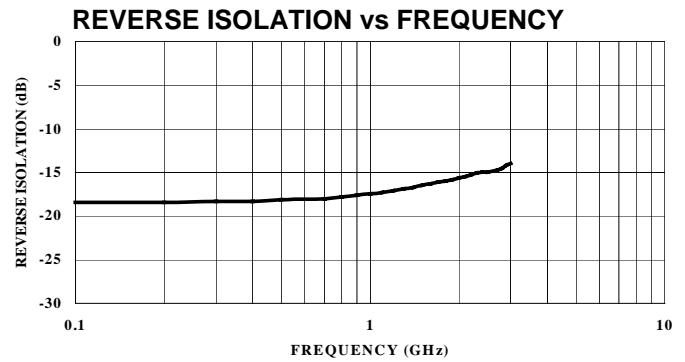
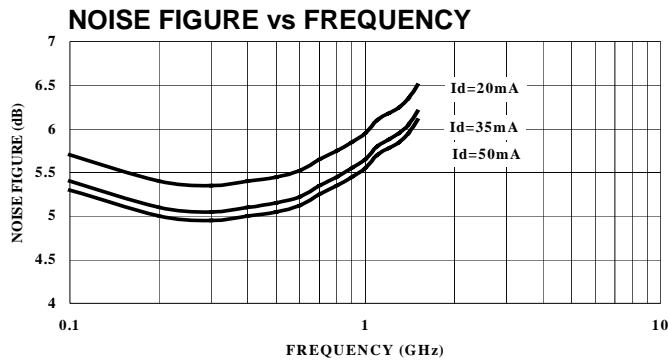
Typical Bias Configuration



Typical Performance Curves @ $I_d = 35\text{ mA}$, $T_A = +25^{\circ}\text{C}$ (unless otherwise noted)



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Typical Scattering Parameters

$Z_0 = 50\Omega$, $T_A = +25^\circ\text{C}$, $I_d = 35\text{ mA}$

Frequency (GHz)	S11		S21		S12		S22	
	Mag.	Angle	Mag.	Angle	Mag.	Angle	Mag	Angle
0.1	0.162	172.4	4.58	175.8	0.120	2.7	0.061	-0.1
0.2	0.168	167.1	4.56	171.5	0.120	5.2	0.050	-7.5
0.3	0.175	163.2	4.54	167.4	0.121	7.7	0.035	-26.7
0.4	0.178	159.1	4.51	163.2	0.121	9.9	0.033	-68.4
0.5	0.177	155.7	4.47	159.0	0.124	12.3	0.048	-101.2
0.6	0.168	151.4	4.43	154.9	0.125	14.2	0.069	-112.4
0.7	0.157	146.4	4.39	150.9	0.126	16.4	0.087	-118.0
0.8	0.149	139.8	4.35	147.2	0.129	18.2	0.098	-121.5
0.9	0.144	135.2	4.30	143.4	0.132	20.5	0.106	-124.9
1.0	0.149	132.6	4.25	139.4	0.134	22.2	0.108	-129.4
1.5	0.180	142.4	3.81	120.2	0.150	30.8	0.156	-168.8
2.0	0.177	149.3	3.43	104.5	0.166	35.1	0.204	174.7
2.5	0.302	163.5	2.80	89.0	0.179	36.9	0.245	176.4
3.0	0.334	168.8	2.70	79.6	0.201	38.8	0.223	179.4

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