AP4

Medium Power High Dynamic Range FET

The Communications Edge™

Advanced Product Information

Product Features

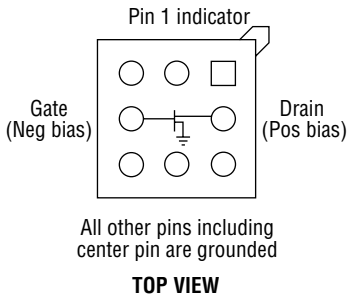
- **100-6000 MHz**
- **+40 dBm Output IP3**
- **1.5 dB Noise Figure**
- **16 dB Gain**
- **+27 dBm P1dB**
- **MTBF >100 Years**
- **3 X 3 LGA SMT Package**

Actual Size

Product Description

The AP4 is a medium power FET packaged in a high frequency surface mount package. The combination of high output power and high output IP3 at the same bias point makes it ideal for receiver and transmitter applications. The AP4 achieves +40 dBm OIP3 at a mounting temperature of 80°C with an associated MTBF of >100 years[3]. The package is a 3 X 3 Land Grid Array (LGA). All devices are 100% RF and DC tested. The product is targeted for fixed wireless and W-LAN applications where high linearity, medium power and high frequency are required.

Functional Diagram



Specifications

DC Electrical Parameter	Units	Min.	Typical	Max.
Saturated Drain Current, Idss	mA	440	580	760
Transconductance, Gm	mS		280	
Pinch Off Voltage, Vp	V	-5.0	-3.2	

RF Parameter	Units	Min.	Typical	Max.
Small Signal Gain, Gss	dB	14	16	
Max Stable Gain, Gmsg	dB		22	
Output IP3	dBm	36	40	
Output P1dB	dBm	26	27	
Noise Figure, NF	dB		1.5	

Notes:
1. DC and RF parameters measured under the following conditions unless otherwise noted: 22°C with Vds = 8.0 volts, Ids = 200 mA, Test frequency = 800 MHz, 50 Ω system.
2. OIP3 measured with two tones at an output power of 5 dBm/tone separated by 10 MHz. The suppression on the largest IM3 product is used to calculate the OIP3 using a 2:1 slope rule.
3. MTBF calculated with channel temperature at 155°C.

Typical Parameters

Parameter	Units	Typical
Frequency	GHz	5.8
S21	dB	9.3
S11	dB	-15.5
S22	dB	-16.2
Output IP3	dBm	+38.5
Output P1dB	dBm	+21.2
Noise Figure	dB	5.6

Typical parameters reflect performance in an application circuit.

Absolute Maximum Ratings

Parameter	Rating
Drain to Source Voltage	10 V
Gate to Source Voltage	-6.0 V
Operating Case Temperature	-40 to +80°C
Storage Temperature	-55 to +125°C
Input RF Power (continuous)	+15 dBm
Gate Current	12 mA
Maximum DC Power	1.8 W

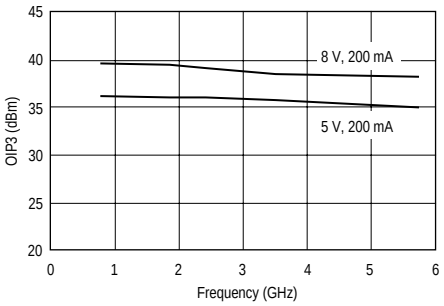
Operation of this device above any of these parameters may cause permanent damage.

Ordering Information

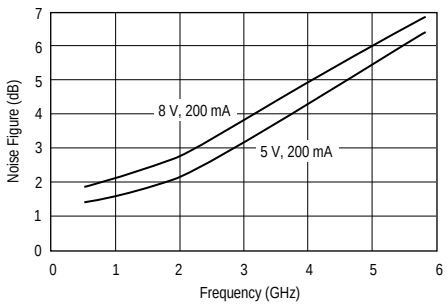
Part No.	Description
AP4	Medium Power High Dynamic Range FET (Available in tape and reel)

Performance Charts (Vds = 8 V, Ids = 200 mA, T = 22°C, unmatched 50 ohm system) unless noted

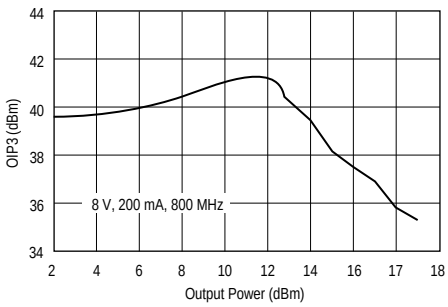
OIP3 vs. Frequency



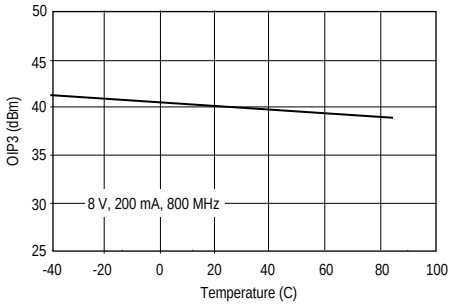
Noise Figure vs. Frequency



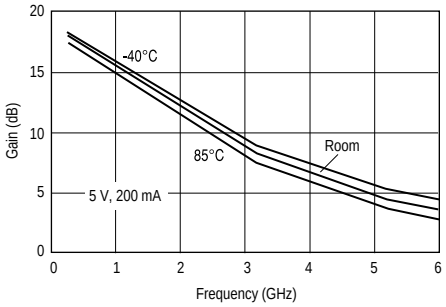
OIP3 vs. Power Out



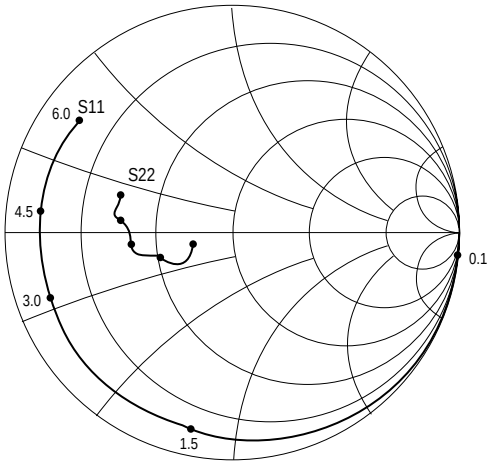
OIP3 vs. Temperature



Gain vs. Frequency over Temperture

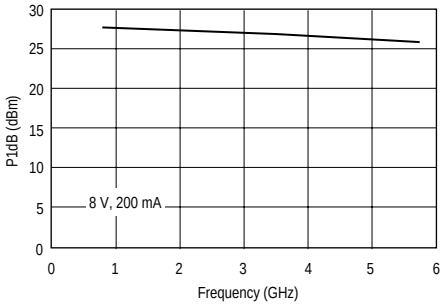


S-Parameters

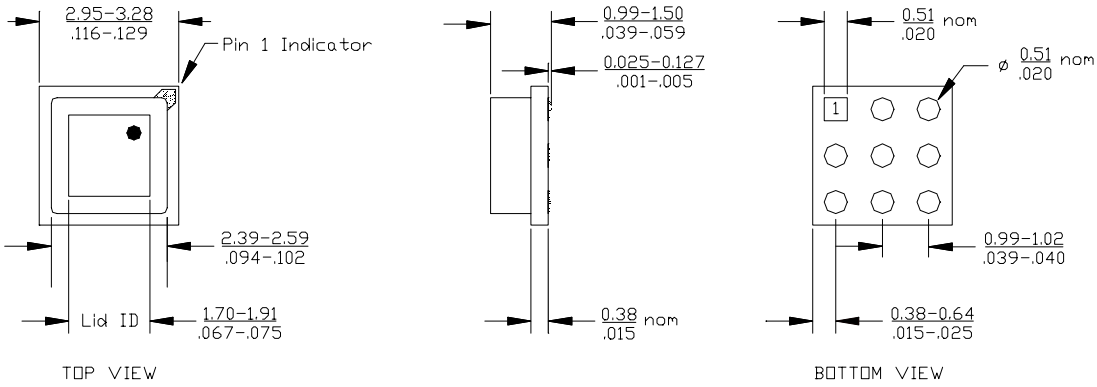


Frequency (GHz)
Start 0.1; Stop 6.0

P1dB vs. Frequency

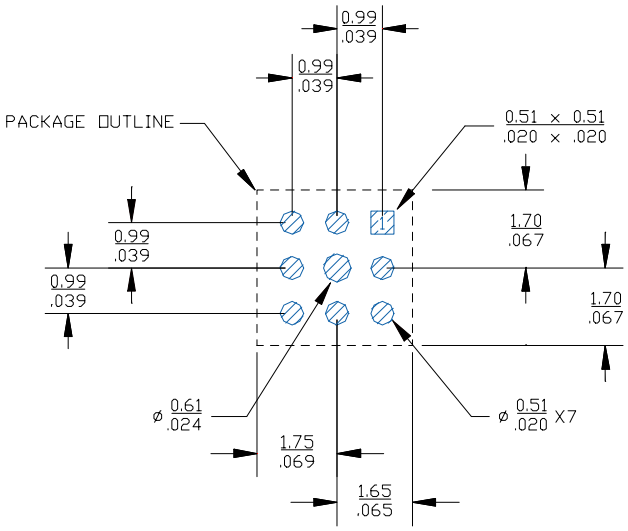


Outline Drawing



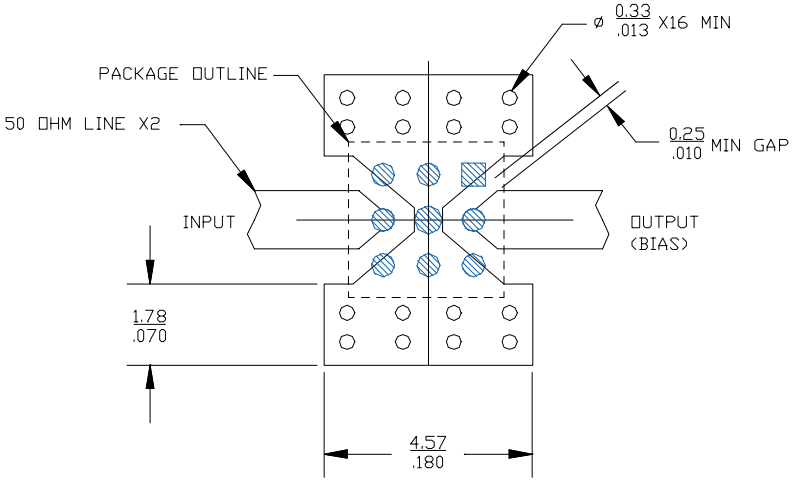
Note: Solder pads are coplanar to within +/- 1 mil.

Land Pattern



mm
inch

Mounting Configuration



Notes: 1. Ground vias are critical for thermal and RF grounding considerations.
2. A minimum of 16 ground vias are required.
3. If your PCB design rules allow, ground vias should be placed under the land pattern for better RF and thermal performance. Otherwise ground vias should be placed as close to land pattern as possible.
4. Trace width depends on PC board.

This document contains information on a new product.
Specifications and information are subject to change without notice.

Caution! ESD sensitive device.

Typical Test Data

S-Parameters (Vds = 5 V, Ids = 200 mA, T = 22°C, unmatched device in a 50 ohm system)

Freq (GHz)	S11 (Mag)	S11 (Ang)	S21 (Mag)	S21 (Ang)	S12 (Mag)	S12 (Ang)	S22 (Mag)	S22 (Ang)	K Value
0.1	0.99801	-10.3811	8.07450	170.403	0.00456	79.6613	0.13492	-168.620	0.02331
0.5	0.96339	-49.4003	7.17940	132.874	0.02053	48.7451	0.20902	-148.710	0.11733
1.0	0.90886	-83.9907	5.75670	94.4589	0.03227	16.8979	0.27496	-149.949	0.28402
1.5	0.89175	-109.240	4.78100	56.2702	0.04079	-16.6748	0.33150	-161.090	0.37512
2.0	0.86016	-131.690	3.91800	23.8905	0.04477	-43.5835	0.38311	-165.520	0.67725
2.5	0.86089	-150.780	3.30039	-7.47313	0.04608	-69.6070	0.41553	-168.810	0.94530
3.0	0.85917	-161.910	2.79300	-34.7887	0.04638	-91.9101	0.42161	-172.110	1.21756
3.5	0.85811	-167.210	2.44490	-59.1073	0.04771	-110.693	0.42820	-177.820	1.34740
4.0	0.85315	-173.210	2.24950	-82.7060	0.04679	-128.585	0.45317	176.720	1.39737
4.5	0.85101	173.170	2.00650	-111.820	0.04760	-147.703	0.48948	172.620	1.31957
5.0	0.85460	161.200	1.77579	-139.072	0.04666	-166.040	0.51517	170.590	1.18388
5.5	0.86116	157.600	1.60100	-162.425	0.04607	-178.070	0.51445	167.850	1.06491
6.0	0.86120	156.080	1.51950	176.275	0.05108	167.650	0.51416	163.390	0.85998

S-Parameters (Vds = 8 V, Ids = 200 mA, T = 22°C, unmatched device in a 50 ohm system)

Freq (GHz)	S11 (Mag)	S11 (Ang)	S21 (Mag)	S21 (Ang)	S12 (Mag)	S12 (Ang)	S22 (Mag)	S22 (Ang)	K Value
0.1	0.99865	-10.4941	7.87860	170.113	0.00488	82.5263	0.03709	-107.830	0.01790
0.5	0.96028	-49.8203	6.97750	131.907	0.02188	47.9372	0.14989	-116.160	0.18606
1.0	0.90635	-84.5307	5.55660	92.7519	0.03406	14.3179	0.22555	-127.534	0.38769
1.5	0.88885	-110.200	4.60240	54.0702	0.04134	-19.2438	0.27682	-143.250	0.52742
2.0	0.85810	-132.520	3.75770	21.0645	0.04478	-47.0383	0.33371	-150.750	0.84332
2.5	0.86043	-151.390	3.15139	-10.7541	0.04526	-72.7378	0.37731	-155.180	1.08911
3.0	0.86024	-162.400	2.64710	-38.4177	0.04538	-95.0153	0.39073	-158.230	1.31047
3.5	0.85897	-167.640	2.31010	-63.0773	0.04554	-114.566	0.40287	-164.050	1.40755
4.0	0.85589	-173.580	2.12140	-87.1170	0.04350	-133.239	0.43079	-170.370	1.43034
4.5	0.85348	172.810	1.88510	-116.720	0.04450	-150.476	0.47755	-175.980	1.33390
5.0	0.85893	161.060	1.65310	-144.401	0.04286	-167.515	0.51505	-178.710	1.21331
5.5	0.86587	157.440	1.48280	-167.915	0.04133	-177.966	0.52301	178.150	1.15972
6.0	0.86712	155.840	1.40710	170.725	0.04632	169.160	0.52497	173.720	0.96351