



AP3

High Dynamic Range FET

Product Features

- 100-6000 MHz
- +39 dBm Output IP3
- 2 dB Noise Figure
- 15 dB Gain
- +25 dBm P1dB
- MTBF >100 Years
- 3 X 3 LGA SMT Package

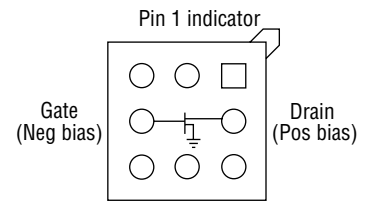


Actual Size

Product Description

The AP3 is a high dynamic range FET packaged in a high frequency surface mount package. The combination of low noise figure and high output IP3 at the same bias point makes it ideal for receiver and transmitter applications. The AP3 achieves +39 dBm OIP3 at a mounting temperature of 80°C with an associated MTBF of >100 years⁴. The package is a 3 X 3 Land Grid Array (LGA). All devices are 100% RF and DC tested. The product is targeted for applications where high linearity is required.

Functional Diagram



All other pins including center pin are grounded

TOP VIEW

Specifications

DC Electrical Parameter	Units	Minimum	Typical	Maximum	Condition
Saturated Drain Current, Idss	mA	220	340	380	Vgs = 0V
Transconductance, Gm	mS		120		
Pinch Off Voltage, Vp	V	-5.0	-3.7		Ids = 1.2 mA

RF Parameter	Units	Minimum	Typical	Maximum	Condition
Small Signal Gain, Gss	dB	13	15		
Maximum Stable Gain, Gmsg	dB		22.5		
Output IP3	dBm	36	39		
Output P1dB	dBm	23.5	25		
Noise Figure, NF	dB		2		

- Notes:
1. DC and RF parameters measured under the following conditions unless otherwise noted. 22°C with Vds = 8.0 volts, Ids = 100 mA, Test frequency = 800 MHz, 50 Ω system.
 2. Idss is measured with Vgs = 0 V.
 3. Pinch off voltage is measured when Ids = 0.6 mA.
 4. MTBF calculated with channel temperature at 155°C.

Absolute Maximum Ratings

Parameter	Rating
Drain to Source Voltage	9 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)	+12 dBm
Gate Current	6 mA
Maximum DC Power	0.9 W

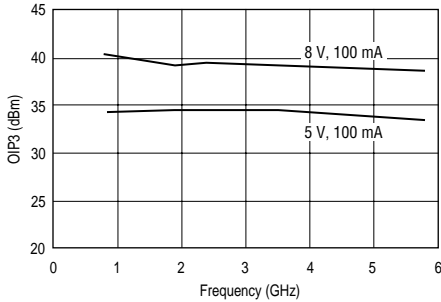
Operation of this device above any of these parameters may cause permanent damage.

Ordering Information

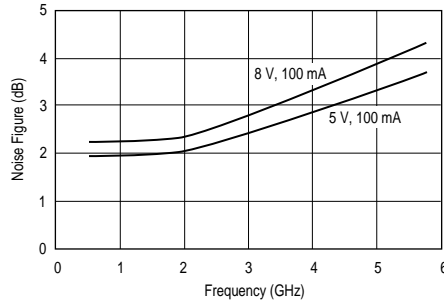
Part No.	Description
AP3	High Dynamic Range FET (Available in tape and reel)

Performance Charts (V_{ds} = 8 V, I_{ds} = 100 mA, T = 22°C, unmatched 50 ohm system) unless noted

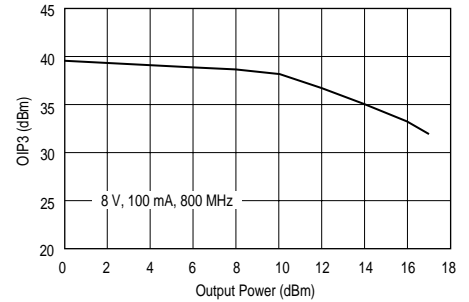
OIP3 vs. Frequency



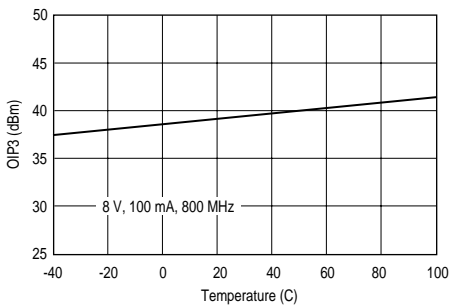
Noise Figure vs. Frequency



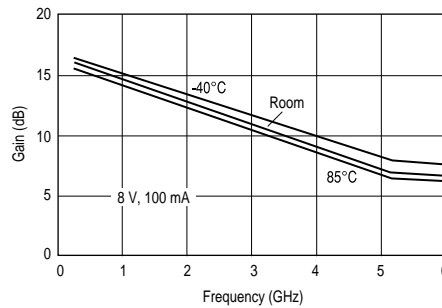
OIP3 vs. Power Out



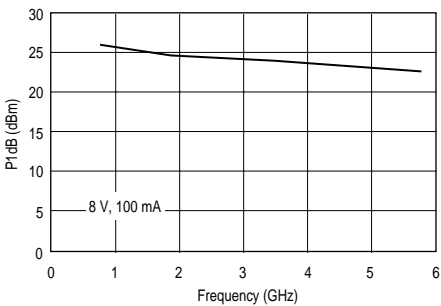
OIP3 vs. Temperature



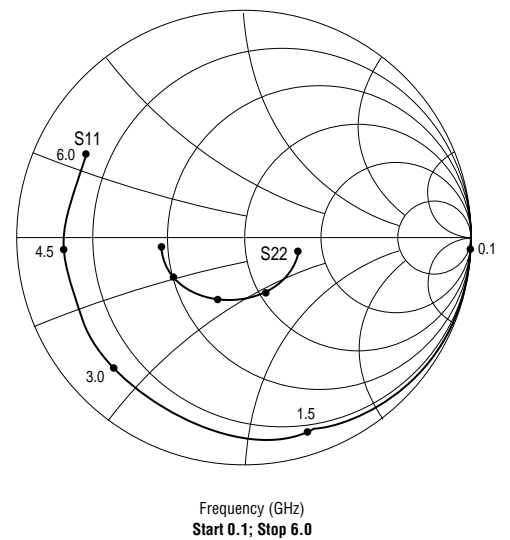
Gain vs. Frequency over Temperature



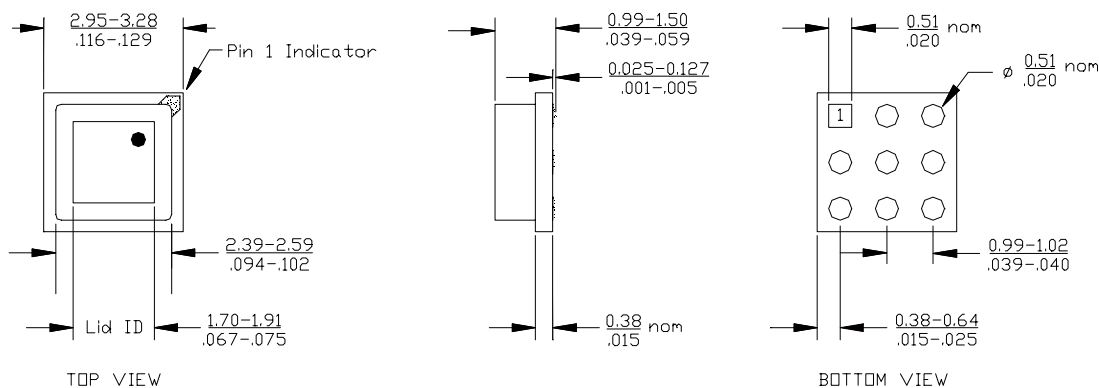
P1dB vs. Frequency



S-Parameters

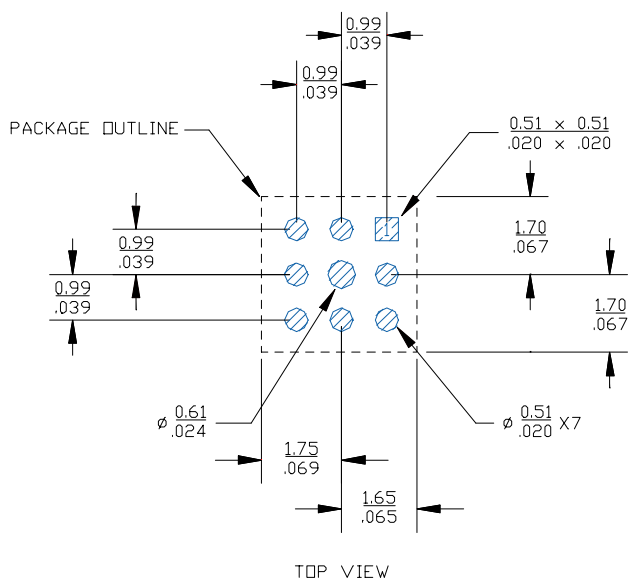


Outline Drawing



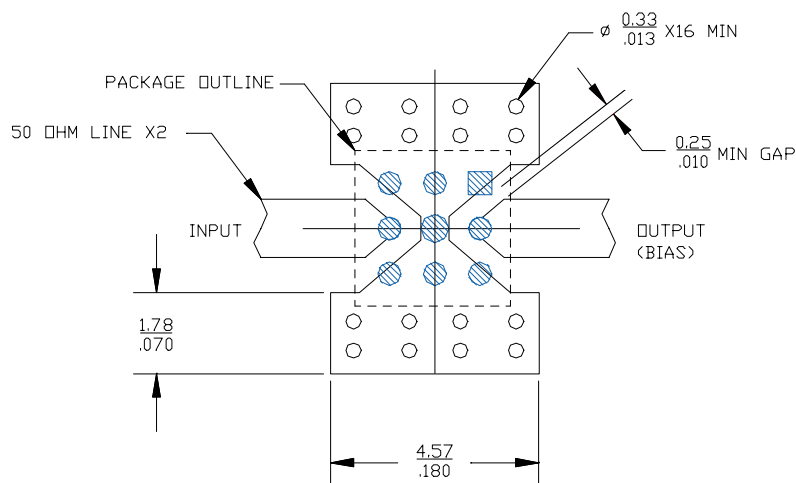
Note: Solder pads are coplanar to within +/- 1 mil.

Land Pattern




mm
inch

Mounting Configuration



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 (V_{ds} = 5 V, I_{ds} = 100 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	0.99965	-6.50407	6.44820	172.363	0.00380	79.4633	0.16645	-9.02007	0.0338
0.5	0.97741	-30.3703	6.00960	143.029	0.01908	57.0606	0.17642	-38.6303	0.2499
1.0	0.93840	-51.4107	5.39510	111.092	0.03281	28.1409	0.19838	-61.7507	0.4688
1.5	0.90982	-74.9390	5.22060	72.9401	0.04667	-5.67977	0.18747	-92.2131	0.5621
2.0	0.87125	-100.670	4.71260	38.6735	0.05538	-35.4865	0.24343	-116.930	0.7253
2.5	0.83724	-121.380	4.08080	7.94187	0.05966	-62.7289	0.30376	-126.030	0.9274
3.0	0.81879	-134.090	3.67820	-19.6747	0.06451	-87.2985	0.31343	-130.290	0.9819
3.5	0.80262	-147.010	3.41240	-48.0444	0.07048	-111.269	0.28259	-143.110	0.9491
4.0	0.79049	-163.730	3.04350	-77.1640	0.06845	-139.450	0.28898	-161.400	1.0019
4.5	0.80381	-177.160	2.62769	-104.632	0.06470	-158.872	0.35652	-164.760	0.9360
5.0	0.79493	176.260	2.37730	-128.416	0.06261	-177.019	0.38736	-160.340	0.8849
5.5	0.77739	170.650	2.36900	-152.963	0.06648	166.323	0.33766	-161.460	0.9299
6.0	0.77053	157.220	2.30970	178.884	0.06938	145.067	0.29808	-179.171	1.0124

S-Parameters (V_{ds} = 8 V, I_{ds} = 100 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	0.99997	-6.50607	6.13330	172.243	0.00420	82.9643	0.26433	-6.39707	0.0227
0.5	0.97747	-30.3603	5.71250	142.645	0.01878	56.6910	0.26392	-27.9603	0.3020
1.0	0.93820	-51.3707	5.11860	110.330	0.03311	28.3369	0.27280	-47.0407	0.5509
1.5	0.90978	-74.7510	4.97080	72.2901	0.04651	-6.17482	0.24395	-70.7840	0.6550
2.0	0.87271	-100.450	4.49270	37.5335	0.05442	-36.3184	0.27286	-96.3961	0.7998
2.5	0.83960	-120.960	3.88590	6.32887	0.05895	-64.3282	0.32398	-109.200	0.9605
3.0	0.82069	-133.800	3.49200	-21.5137	0.06254	-88.1869	0.33718	-114.270	0.9785
3.5	0.80499	-146.770	3.24230	-49.8954	0.06791	-113.262	0.30385	-124.920	0.9134
4.0	0.79343	-163.340	2.89680	-79.2840	0.06684	-140.253	0.29517	-142.450	0.9134
4.5	0.80655	-176.850	2.49519	-107.370	0.06142	-160.677	0.36664	-150.130	0.9548
5.0	0.80028	176.550	2.24440	-131.481	0.05933	-177.572	0.41133	-147.830	0.9109
5.5	0.78276	170.820	2.23290	-155.797	0.06176	164.915	0.37316	-147.530	0.9944
6.0	0.77528	157.310	2.18810	176.064	0.06490	145.070	0.32381	-162.310	1.1199