TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

Rev. 5/10

AP2009

10 TO 2000 MHz
TO-8 CASCADABLE AMPLIFIER

Typical Values	AP2009
Medium Gain	11.0 dB
High Output Power	+28 dBm
High Third Order	+40 dBm
Low Noise Figure	3.5 dB
High Performance Thin Film Standard Size TO-8 Package	

SPECIFICATIONS*

Parameter	Typical	Guaranteed 0 to 50 °C	Guaranteed -55 to +85 °C
Frequency (Min.)	10-2000 MHz	10-2000 MHz	10-2000 MHz
Small Signal Gain (Min.)	11.0 dB	10.5 dB	10.0 dB
Gain Flatness (Max.)	±0.4 dB	±0.5 dB	±0.8 dB
Noise Figure (Max.) 100-2000 MHz	3.5 dB	4.5 dB	5.5 dB
SWR (Max.)	< 1.7:1	2.0:1	2.0:1
Power Output (Min.) @ 1dB comp.	+28.0 dBm	+26.5 dBm	+26.0 dBm
Reverse Isolation	19.0 dB	—	—
DC Current (Max.)	188 mA	195 mA	200 mA

* Measured in a 50-ohm system at +15 Vdc unless otherwise specified.

INTERMODULATION PERFORMANCE

Typical @ 25 °C	Vcc = +12.0 V	Vcc = +15.0 V
Second Order Harmonic Intercept Point	+62 dBm	+56 dBm
Second Order Two Tone Intercept Point	+56 dBm	+50 dBm
Third Order Two Tone Intercept Point	+38 dBm	+40 dBm

ABSOLUTE MAXIMUM RATINGS

Storage Temperature	-62 to +125 °C
Maximum Case Temperature	+105 °C
Maximum DC Voltage	+17 Volts
Maximum Continuous RF Input Power	+20 dBm
Maximum Short Term Input Power (1 Minute Max.)	100 Milliwatts
Maximum Peak Power (3 µsec Max.)	0.5 Watt
Burn-in Temperature	+85 °C
Thermal Resistance[1] (θjc)	+24 °C/Watt
Junction Temperature Rise Above Case (Tjc)	+69.3 °C

[1] Thermal resistance is based on total power dissipation.

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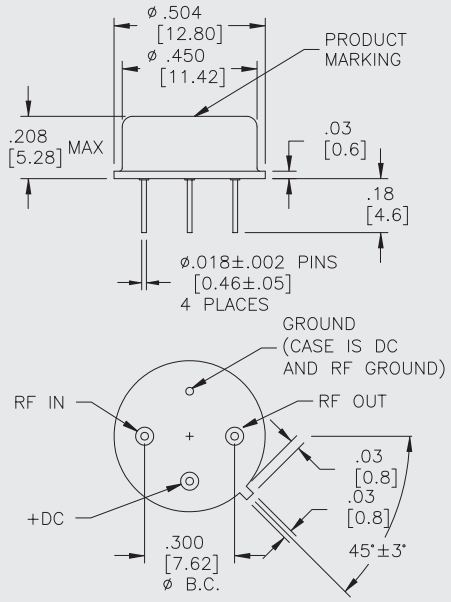
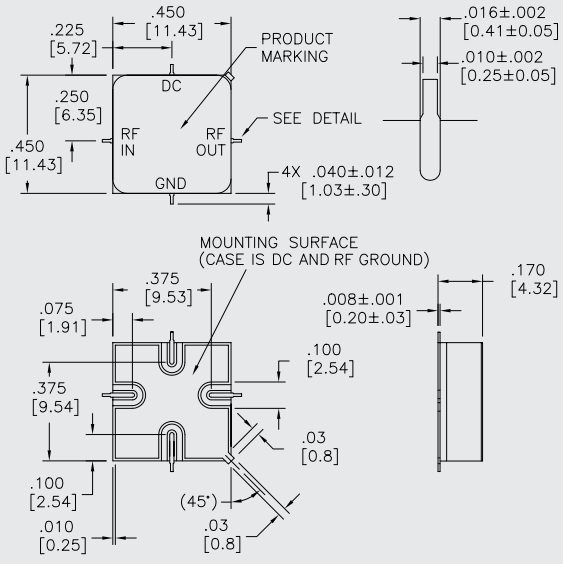
TO-8 Package for Amplifiers



APS2009

SMTO-8 Package for Amplifiers



DIMENSIONS ARE IN INCHES [MILLIMETERS]

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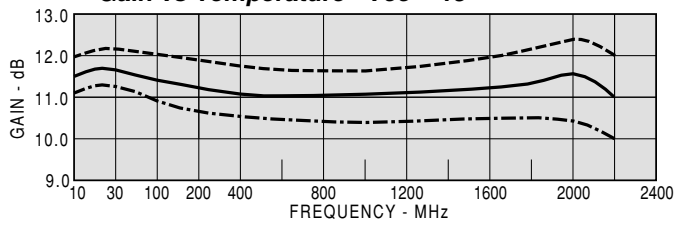
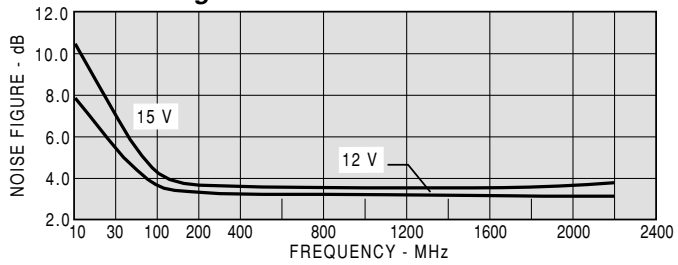
TYPICAL PERFORMANCE

KEY: +25 °C ——
+85 °C -·-·-
-55 °C - - -

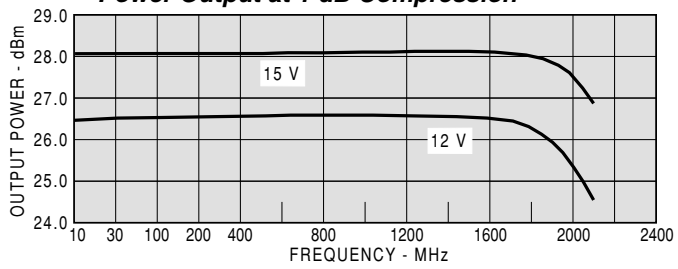
Gain vs Temperature Vcc = 15



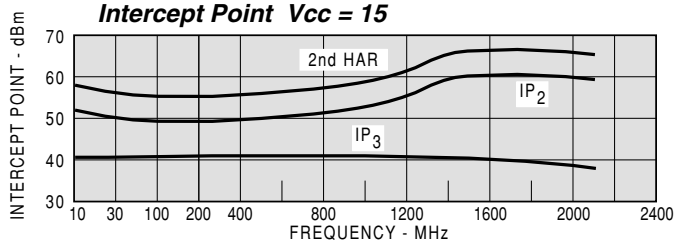
Noise Figure



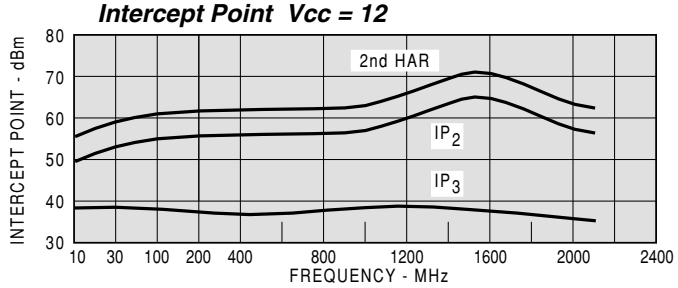
Power Output at 1 dB Compression



Intercept Point Vcc = 15



Intercept Point Vcc = 12



TYPICAL AUTOMATIC TEST DATA

MODEL: AP2009 Vcc = +15V Icc = 188.63 mA

FREQ MHZ	SWR IN	SWR OUT	GAIN DB	DELAY NSEC	REV/ISO DB
10	1.77	1.79	11.6		-18.7
20	1.33	1.77	11.7		-18.8
50	1.14	1.82	11.5	1.136	-19.0
100	1.11	1.81	11.5	0.518	-19.0
200	1.08	1.70	11.2	0.334	-18.7
400	1.13	1.68	11.1	0.289	-18.8
600	1.17	1.70	11.1	0.295	-19.0
800	1.17	1.69	11.0	0.294	-19.1
1000	1.15	1.65	11.0	0.303	-19.3
1200	1.17	1.60	11.0	0.300	-19.3
1400	1.17	1.52	11.2	0.306	-19.5
1600	1.15	1.48	11.3	0.345	-19.7
1800	1.15	1.47	11.5	0.357	-20.0
2000	1.35	1.46	11.6	0.422	-20.9
2200	2.12	1.48	11.0	0.478	-23.1

LINEAR S-PARAMETERS

MODEL: AP2009 Vcc: +15v Icc = 188.63 mA

FREQ.	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
10	0.28	-90.2	3.79	-151.2	0.116	19	0.28	-173.7
20	0.14	-112.6	3.82	-168.3	0.115	7	0.28	-176.9
50	0.06	-132.9	3.77	179.5	0.112	1	0.29	175.0
100	0.05	-157.3	3.76	170.3	0.113	-3	0.29	164.5
200	0.04	-164.1	3.63	158.2	0.117	-10	0.26	149.5
400	0.06	-149.4	3.59	137.3	0.114	-24	0.25	129.1
600	0.08	-170.6	3.59	116.3	0.112	-37	0.26	104.8
800	0.08	-176.9	3.56	95.1	0.110	-49	0.26	82.3
1000	0.07	165.9	3.55	73.4	0.108	-62	0.25	60.4
1200	0.08	150.6	3.56	51.8	0.108	-75	0.23	38.5
1400	0.08	146.3	3.62	29.7	0.106	-90	0.21	15.3
1600	0.07	126.8	3.68	5.0	0.104	-107	0.19	-9.1
1800	0.07	79.8	3.77	-20.7	0.100	-125	0.19	-35.8
2000	0.15	14.1	3.80	-51.0	0.090	-146	0.19	-68.9
2200	0.36	-36.0	3.55	-85.2	0.070	-169	0.19	-113.4

MODEL: AP2009 Vcc = +12V Icc = 173.61 mA

FREQ MHZ	SWR IN	SWR OUT	GAIN DB	DELAY NSEC	REV/ISO DB
10	1.74	1.88	11.5		-19.1
20	1.32	1.88	11.6		-19.2
50	1.14	1.92	11.5	1.103	-19.3
100	1.11	1.91	11.5	0.511	-19.3
200	1.07	1.79	11.2	0.337	-19.0
400	1.13	1.77	11.1	0.285	-19.1
600	1.15	1.79	11.1	0.293	-19.2
800	1.17	1.77	11.0	0.295	-19.2
1000	1.15	1.73	11.0	0.300	-19.3
1200	1.16	1.67	11.0	0.299	-19.2
1400	1.17	1.58	11.2	0.306	-19.3
1600	1.15	1.54	11.3	0.341	-19.3
1800	1.16	1.51	11.6	0.359	-19.5
2000	1.34	1.48	11.7	0.420	-20.2
2200	2.08	1.44	11.1	0.485	-21.9

LINEAR S-PARAMETERS

MODEL: AP2009 Vcc: +12V Icc = 173.61 mA

FREQ.	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
10	0.27	-90.0	3.76	-151.8	0.111	18	0.31	-170.4
20	0.14	-110.1	3.80	-168.5	0.110	7	0.31	-175.4
50	0.07	-131.4	3.76	179.6	0.108	1	0.32	175.6
100	0.05	-156.5	3.75	170.4	0.108	-3	0.31	165.6
200	0.04	-163.5	3.62	158.3	0.112	-9	0.28	151.4
400	0.06	-152.7	3.58	137.7	0.111	-23	0.28	132.5
600	0.07	-169.5	3.58	116.6	0.110	-35	0.28	109.5
800	0.08	-171.8	3.56	95.6	0.109	-47	0.28	88.3
1000	0.07	179.0	3.55	73.9	0.108	-59	0.27	67.9
1200	0.07	161.5	3.57	52.4	0.109	-72	0.25	48.0
1400	0.08	156.8	3.62	30.4	0.109	-86	0.22	27.0
1600	0.07	137.9	3.69	5.8	0.109	-102	0.21	5.1
1800	0.08	89.0	3.80	-20.0	0.106	-120	0.20	-18.8
2000	0.15	25.2	3.86	-50.1	0.098	-142	0.19	-48.7
2200	0.35	-32.9	3.60	-85.1	0.080	-164	0.18	-92.0