TELEDYNE
MICROWAVE SOLUTIONS
Everywhereyoulook™

Rev. 5/10

AC2038
AC2039

10 TO 2000 MHz
TO-8 CASCADABLE AMPLIFIERS

Typical Values	AC2038	AC2039
High Output Power	+18.0 dBm	+20.5 dBm
High Third Order I.P.	+32.0 dBm	+34.0 dBm

High Performance Thin Film
Standard Size TO-8 Package
Available in Surface Mount

SPECIFICATIONS*

Parameter		Typical	Guaranteed 0 to 50 °C	Guaranteed -55 to +85 °C
Frequency (Min.)		10-2100 MHz	10-2000 MHz	10-2000 MHz
Small Signal Gain (Min.)		9.0 dB	8.0 dB	7.5 dB
Gain Flatness (Max.)		±0.25 dB	±0.7 dB	±1.0 dB
Noise Figure (Max.)	AC2038	5.5 dB	6.5 dB	7.0 dB
	AC2039	6.0 dB	7.5 dB	8.0 dB
SWR (Max.)	Input/Output	< 1.6:1	2.0:1	2.0:1
Power Output (Min.) @ 1dB comp.	AC2038	+18.0 dBm	+17.0 dBm	+17.0 dBm
	AC2039	+20.5^ dBm	+19.5^ dBm	+19.0^ dBm
Reverse Isolation		14.0 dB	—	—
DC Current (Max.)	AC2038	65.0 mA	69.0 mA	72.0 mA
	AC2039	90.0 mA	94.0 mA	97.0 mA

* Measured in a 50-ohm system at +15 Vdc unless otherwise specified.
^ 0.5 dBm lower above 1800 MHz.

INTERMODULATION PERFORMANCE

(Typical @ 25 °C)	AC2038	AC2039
Second Order Harmonic Intercept Point	+53 dBm	+50 dBm
Second Order Two Tone Intercept Point	+47 dBm	+44 dBm
Third Order Two Tone Intercept Point	+32 dBm	+34 dBm

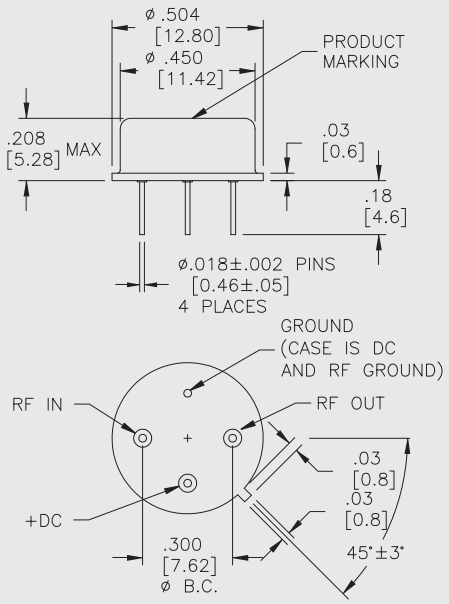
ABSOLUTE MAXIMUM RATINGS

Storage Temperature	-62 to +125 °C
Maximum Case Temperature	+125 °C
Maximum DC Voltage	+19 Volts
Maximum Continuous RF Input Power	+13 dBm
Maximum Short Term Input Power (1 Minute Max.)	100 Milliwatts
Maximum Peak Power (3 µsec Max.)	0.5 Watt
Burn-in Temperature	+105 °C
Thermal Resistance[1] (θjc; AC2038)	+25 °C/Watt
Thermal Resistance[1] (θjc; AC2039)	+26 °C/Watt
Junction Temperature Rise Above Case (Tjc; AC2038)	+25.5 °C
Junction Temperature Rise Above Case (Tjc; AC2039)	+36.6 °C

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

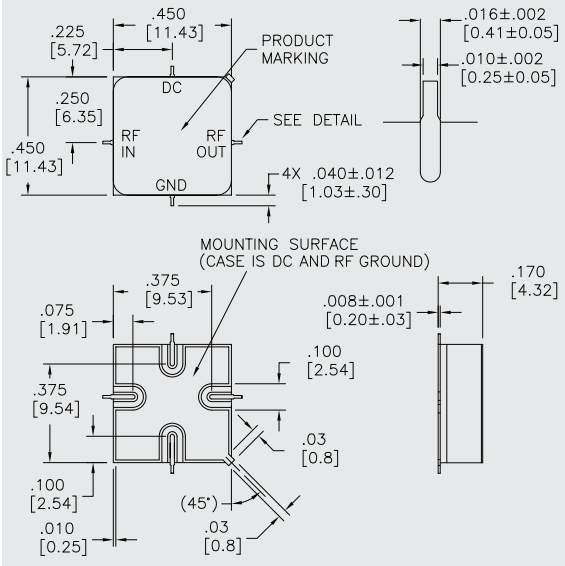
AC2038/AC2039

TO-8 Package for Amplifiers



AS2038/AS2039

SMTO-8 Package for Amplifiers



DIMENSIONS ARE IN INCHES [MILLIMETERS]

TELEDYNE
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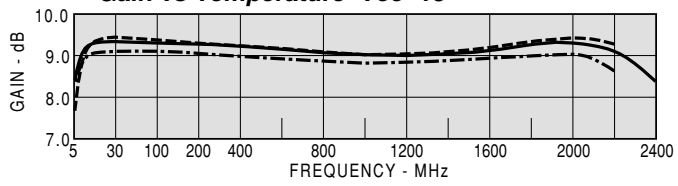
AC2038/AC2039

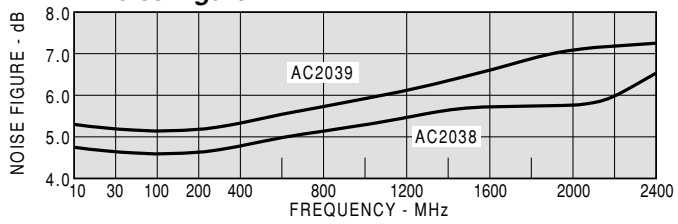
TYPICAL PERFORMANCE

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

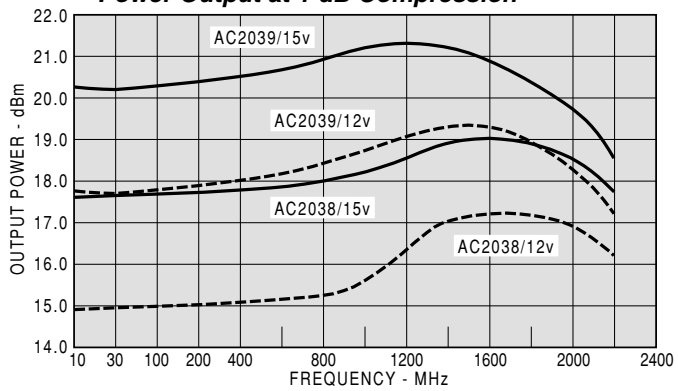
Gain vs Temperature Vcc=15



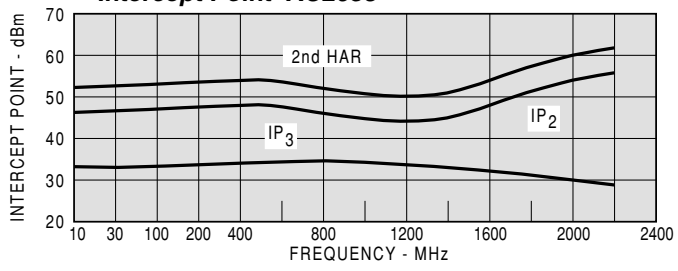
Noise Figure



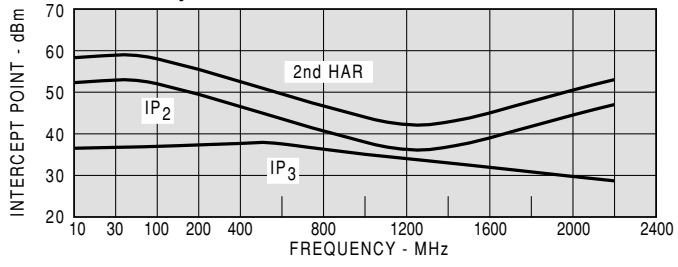
Power Output at 1 dB Compression



Intercept Point AC2038



Intercept Point AC2039



TYPICAL AUTOMATIC TEST DATA

Model: AC2039 Vcc=+15V Icc=90.92

FREQ MHZ	SWR IN	SWR OUT	GAIN DB	PHASE DEG	GROUP DELAY NSEC	REV/ISO DB
5	2.25	2.13	8.28	-139		-15.4
10	1.54	1.45	9.00	-161		-14.6
20	1.29	1.25	9.06	-173	3.4	-14.5
50	1.21	1.22	9.01	178	0.84	-14.6
100	1.22	1.22	9.01	170	0.44	-14.6
200	1.24	1.21	9.03	157	0.37	-14.5
400	1.31	1.25	8.97	132	0.34	-14.4
600	1.39	1.30	8.92	108	0.33	-14.3
800	1.46	1.31	8.90	84	0.34	-14.1
1000	1.54	1.31	8.88	60	0.33	-13.9
1200	1.56	1.29	8.97	36	0.34	-13.6
1400	1.55	1.20	9.09	11	0.36	-13.1
1600	1.49	1.06	9.25	-14	0.36	-12.7
1800	1.43	1.16	9.32	-41	0.37	-12.3
2000	1.41	1.53	9.26	-71	0.42	-11.8
2200	1.59	2.12	8.67	-102	0.45	-11.8

LINEAR S-PARAMETERS

Model: AC2039 Vcc=+15V Icc=90.92

FREQ.	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
5	0.39	-82.6	2.59	-139.0	0.169	47.1	0.36	166.7
10	0.21	-107.8	2.82	-161.0	0.186	22.7	0.18	145.7
20	0.13	-131.5	2.84	-173.2	0.187	9.8	0.11	152.6
50	0.10	-150.5	2.82	177.7	0.186	1.6	0.10	159.4
100	0.10	-155.9	2.82	169.9	0.187	-3.2	0.10	151.5
200	0.11	-154.5	2.83	156.7	0.187	-9.8	0.10	133.1
400	0.13	-151.1	2.81	131.9	0.190	-21.7	0.11	101.8
600	0.16	-152.0	2.79	107.9	0.193	-33.2	0.13	77.5
800	0.19	-154.5	2.79	83.8	0.197	-45.3	0.13	55.7
1000	0.21	-159.1	2.78	59.9	0.202	-57.3	0.14	32.6
1200	0.22	-168.2	2.81	35.9	0.209	-70.2	0.13	13.4
1400	0.21	177.3	2.85	11.0	0.221	-83.2	0.09	-0.2
1600	0.20	157.5	2.90	-14.5	0.231	-98.1	0.03	11.4
1800	0.18	124.6	2.92	-41.4	0.244	-114.5	0.08	104.4
2000	0.17	75.3	2.90	-71.1	0.256	-132.8	0.21	89.6
2200	0.23	27.9	2.71	-101.8	0.257	-152.2	0.36	68.7

Model: AC2038 Vcc=+15V Icc=65.41

FREQ MHZ	SWR IN	SWR OUT	GAIN DB	PHASE DEG	GROUP DELAY NSEC	REV/ISO DB
5	2.27	2.13	8.42	-135		-15.5
10	1.48	1.39	9.28	-159		-14.7
20	1.21	1.15	9.39	-172	3.7	-14.6
50	1.10	1.08	9.31	178	0.91	-14.7
100	1.10	1.07	9.30	170	0.45	-14.6
200	1.14	1.08	9.30	157	0.37	-14.6
400	1.24	1.12	9.23	132	0.34	-14.5
600	1.35	1.16	9.16	108	0.33	-14.3
800	1.47	1.19	9.08	84	0.33	-14.1
1000	1.59	1.24	9.03	61	0.32	-13.9
1200	1.67	1.28	9.02	37	0.33	-13.7
1400	1.70	1.26	9.06	13	0.34	-13.2
1600	1.69	1.20	9.16	-12	0.35	-12.8
1800	1.65	1.10	9.29	-38	0.37	-12.3
2000	1.59	1.16	9.35	-66	0.40	-11.6
2200	1.69	1.54	9.06	-97	0.44	-11.3

LINEAR S-PARAMETERS

Model: AC2038 Vcc=+15V Icc=65.41

FREQ.	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
5	0.39	-70.7	2.64	-134.9	0.168	48.9	0.36	160.6
10	0.19	-86.4	2.91	-158.9	0.185	23.2	0.16	124.6
20	0.09	-96.5	2.95	-172.1	0.186	9.8	0.07	113.5
50	0.05	-100.0	2.92	178.0	0.185	1.8	0.04	123.5
100	0.05	-104.1	2.92	169.9	0.185	-3.2	0.04	113.1
200	0.06	-108.6	2.92	156.7	0.187	-9.8	0.04	86.0
400	0.11	-115.9	2.89	132.1	0.188	-21.7	0.06	55.6
600	0.15	-124.1	2.87	108.1	0.192	-33.1	0.07	34.1
800	0.19	-130.8	2.84	84.4	0.196	-45.1	0.09	8.5
1000	0.23	-138.5	2.83	60.7	0.202	-57.3	0.11	-15.5
1200	0.25	-149.2	2.82	36.9	0.207	-70.0	0.12	-35.0
1400	0.26	-163.3	2.84	12.7	0.218	-82.7	0.11	-55.7
1600	0.26	179.5	2.87	-12.1	0.228	-97.1	0.09	-83.1
1800	0.25	152.2	2.91	-38.2	0.244	-113.4	0.05	-129.4
2000	0.23	112.8	2.94	-66.2	0.263	-131.2	0.08	100.1
2200	0.26	63.1	2.84	-96.7	0.271	-151.6	0.21	61.3