

Dual Matched MMIC Amplifiers

MERA-7456+
MERA-7456

50Ω High Dynamic Range DC to 1 GHz

Features

- Two matched amplifiers in one package
- InGaP HBT IF and RF amplifier
- frequency range DC to 1GHz, usable to 4 GHz
- high gain, 25.1 dB typ. at 100 MHz
- up to +19 dBm typ. output power at 100 MHz
- high IP3, +36 dBm at 100 MHz
- low noise figure, 2.7 dB typ.
- low thermal resistance
- transient protected
- useable as balanced and push pull amplifier
- protected by US Patent 6,943,629

Applications

- cellular
- catv
- UHF/VHF communications
- receivers & transmitters



CASE STYLE: DL1020

PRICE: \$4.70 ea. QTY. (25)

+ RoHS compliant in accordance
with EU Directive (2002/95/EC)

The +Suffix identifies RoHS Compliance. See our web site
for RoHS Compliance methodologies and qualifications.

Electrical Specifications¹ @ 25°C

FREQ.* (GHz)	GAIN, dB TYPICAL							MAXIMUM POWER (dBm)				DYNAMIC RANGE				VSWR (:1) Typ.	MAXIMUM RATING**	DC OPERATING POWER Pin 5, Pin 8	THERMAL RESISTANCE A1 or A2	MATCHING ²											
	over frequency, GHz							Output (1dB Comp) Typ.	IP3 (dBm) Typ.			Amplitude Unbalance between 2 amps (dB)		Phase Unbalance between 2 amps (deg.)																	
f _L	f _U	0.1	1	2	3	4	Min@ 1GHz	0.1 GHz	1.0 GHz	2.0 GHz	Min @ 0.1GHz	Input (no dmg)	NF (dB) Typ.	0.1 GHz	0.5 GHz	1.0 GHz	In	Out	I (mA)	P (mW)	Current (mA)	Volt Typ.	Min.	Max.	°C/W	Typ.	Max.	Typ.	Max.	Typ.	Max.
DC	1	25.1	22.5	18.6	14.2	9.4	20	19	18.2	14.4	18	10	2.7	36	35	32	1.3	2.0	130	700	80	4.8	4.3	5.3	120	0.1	0.3	0.1	—	0.6	1.0

* Guaranteed specification DC-1GHz. Low frequency cut off determined by external coupling capacitors.

** Permanent damage may occur if any of these limits are exceeded.

These ratings are not intended for continuous normal operation. Reliability predictions and normal operating conditions are applicable at current specified.

1. Specifications (other than Matching) are for each of the two matched amplifiers in the package.
2. For test method, see application note AN-60-032

Maximum Ratings³

Operating Temperature -45°C to 85°C

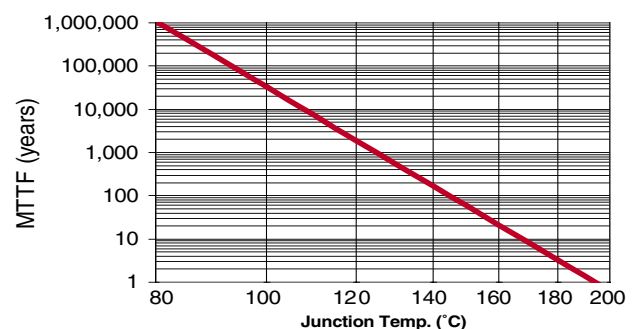
Storage Temperature -55°C to 100°C

3. See application note AN-60-032 for adequate heat sinking of paddle.

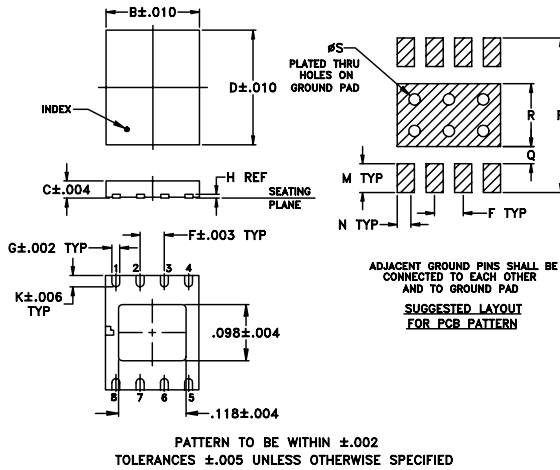
Pin Connections

RF IN 1	1
RF OUT1	8
RF IN 2	4
RF OUT2	5
DC 1	8
DC 2	5
GROUND	2,3,6,7 & paddle

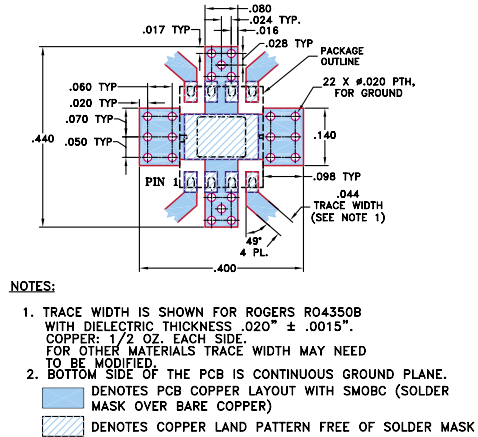
MTTF vs. Junction Temp. for A1 or A2



Outline Drawing



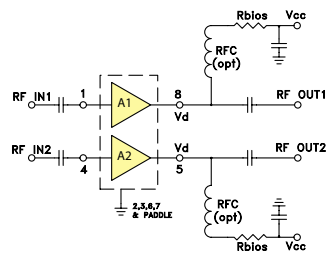
Demo Board MCL P/N: TB-293 Suggested PCB Layout (PL-164)



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J	K
--	.193	.035	.236	--	.050	.017	.008	--	.024
--	4.90	0.90	6.00	--	1.27	0.43	0.20	--	0.60
L	M	N	P	Q	R	S	T	wt	
--	.050	.030	.270	.030	.110	.020	--	grams	
--	1.27	0.76	6.86	0.76	2.79	0.51	--	0.08	

Typical Biasing Configuration



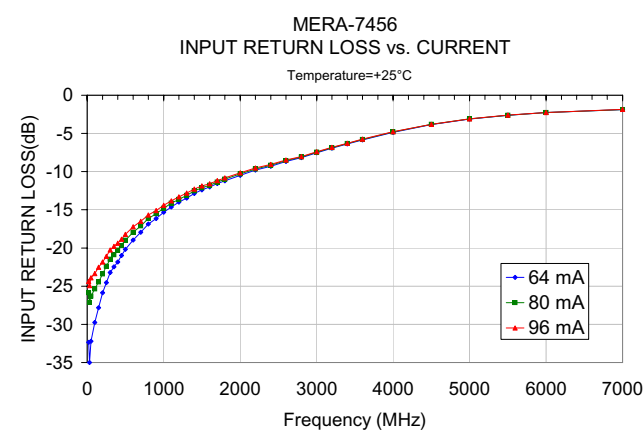
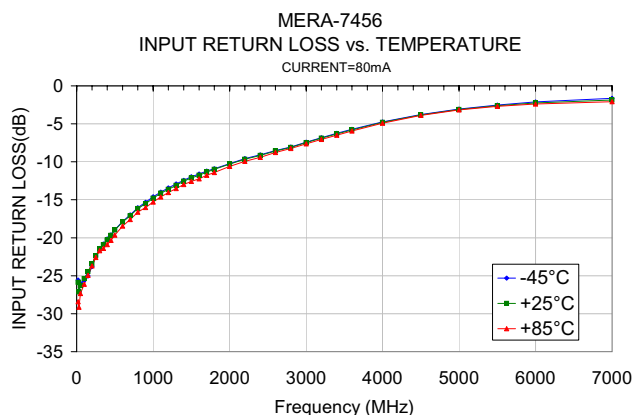
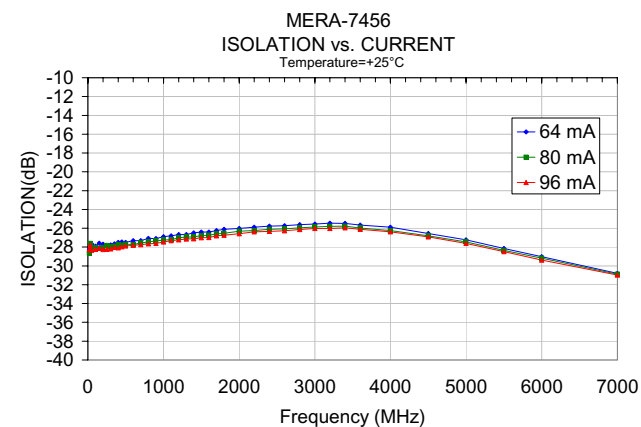
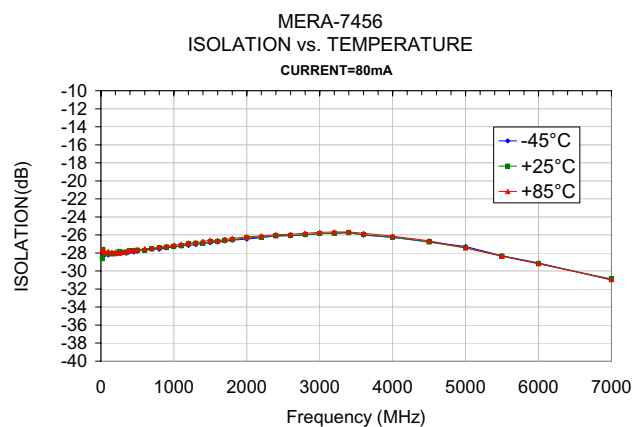
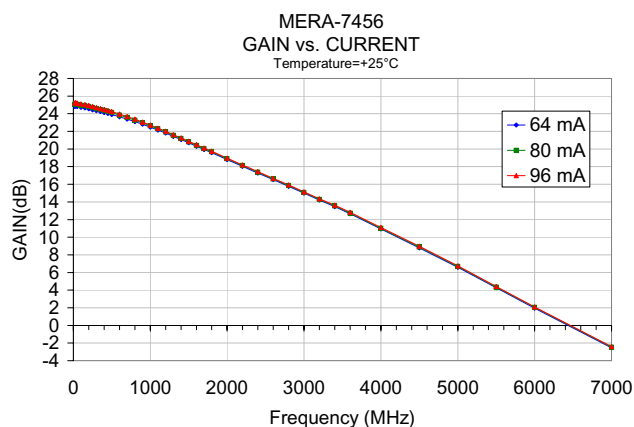
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GAIN vs. TEMPERATURE
 CURRENT=80mA

Y-axis: GAIN(dB)
 X-axis: Frequency (MHz)

Legend:
 -45°C (Blue line with diamond markers)
 +25°C (Green line with square markers)
 +85°C (Red line with triangle markers)

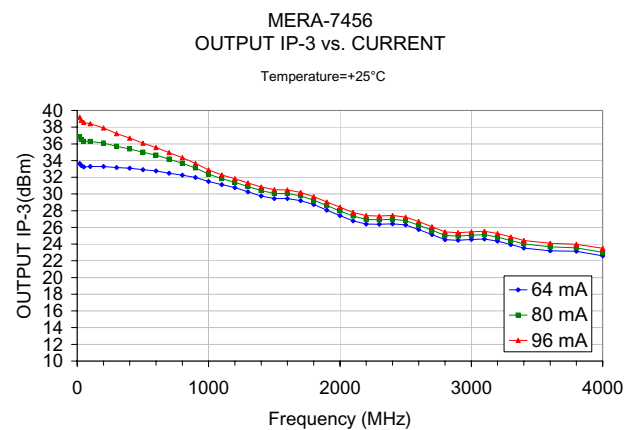
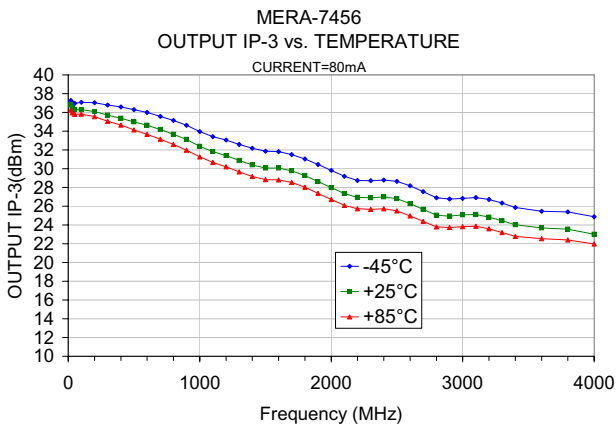
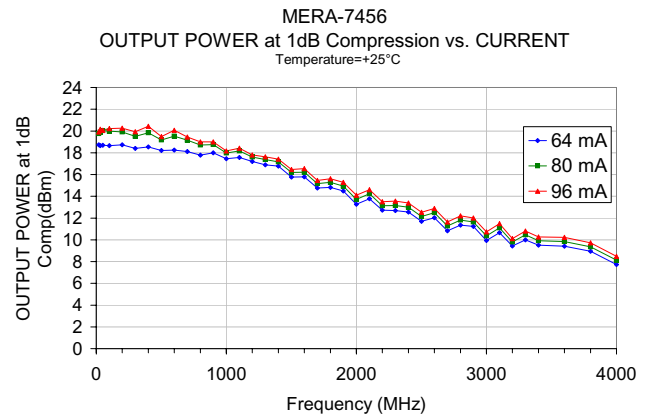
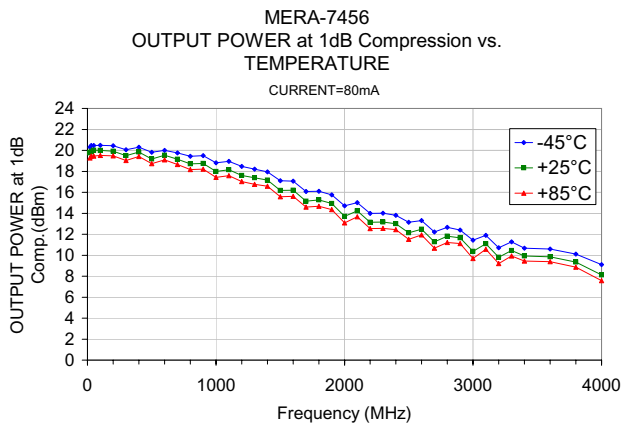
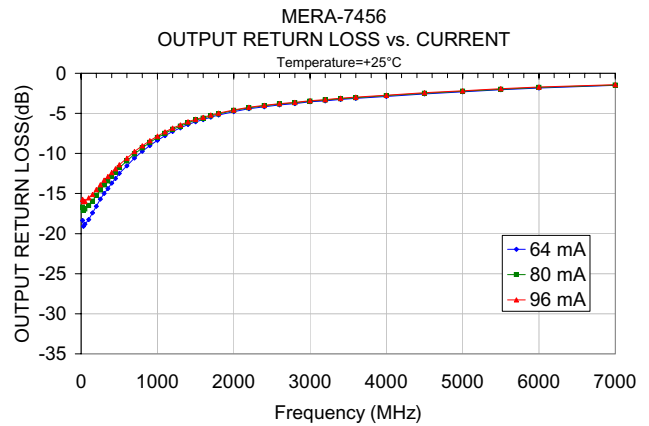
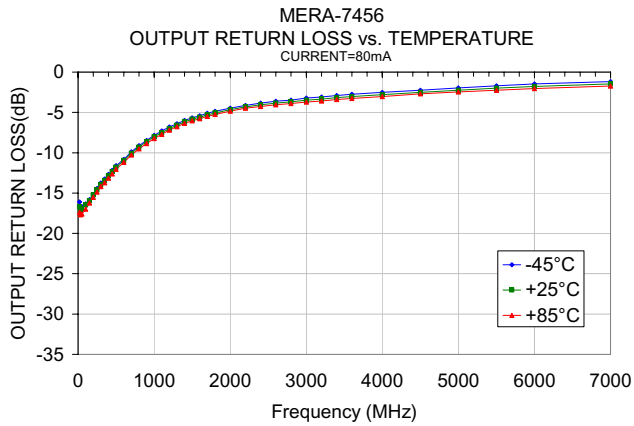
Frequency (MHz)	-45°C Gain (dB)	+25°C Gain (dB)	+85°C Gain (dB)
0	25.5	25.0	24.5
1000	23.5	23.0	22.5
2000	21.5	21.0	20.5
3000	17.5	17.0	16.5
4000	13.5	13.0	12.5
5000	9.5	9.0	8.5
6000	5.5	5.0	4.5
7000	1.5	1.0	0.5



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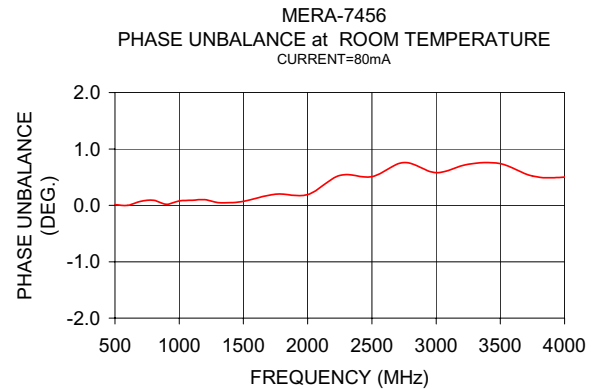
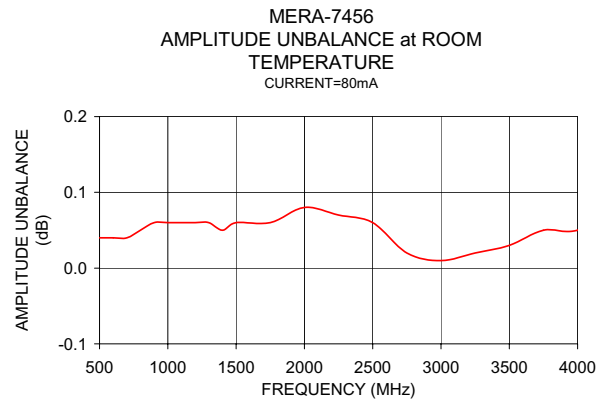
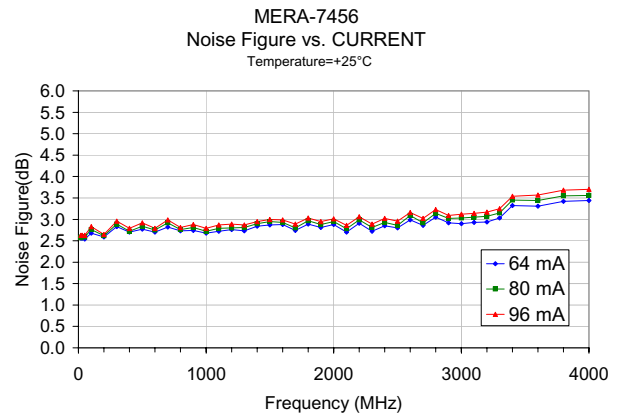
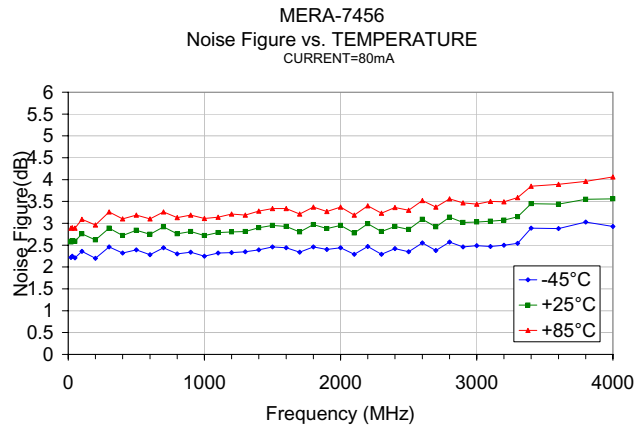
Typical Performance Curves

Performances are for each of the two matched amplifiers.



Typical Performance Curves

Noise Figure is for each of the two matched amplifiers.



S-Parameters

S-Parameters are for each of the two matched amplifiers.

Freq. MHz	S11 (Input Return Loss)			S21 (Power Gain)			S12 (Isolation Out-in)			S22 (Output Return Loss)			K
	dB	Mag	Angle	dB	Mag	Angle	dB	Mag	Angle	dB	Mag	Angle	
20.00	-36.68	0.01	-152.95	24.91	17.60	175.49	-27.81	0.04	-2.57	-20.02	0.10	177.43	1.05
30.00	-38.06	0.01	-171.41	24.97	17.72	174.47	-27.68	0.04	-3.21	-19.27	0.11	-179.27	1.04
50.00	-35.29	0.02	-155.23	24.92	17.62	171.16	-27.87	0.04	-5.30	-19.58	0.10	-175.29	1.05
100.00	-32.12	0.02	-139.13	24.87	17.52	163.20	-27.85	0.04	-8.52	-18.70	0.12	-173.03	1.05
150.00	-30.48	0.03	-142.13	24.81	17.40	155.36	-27.71	0.04	-11.74	-17.89	0.13	-171.49	1.04
200.00	-27.36	0.04	-149.92	24.72	17.22	147.16	-27.81	0.04	-16.69	-16.84	0.14	-172.36	1.05
250.00	-25.79	0.05	-151.71	24.61	17.00	139.23	-27.92	0.04	-19.66	-15.81	0.16	-174.89	1.05
300.00	-23.89	0.06	-162.37	24.51	16.81	131.32	-27.63	0.04	-24.08	-15.09	0.18	-177.83	1.04
350.00	-23.36	0.07	-169.13	24.42	16.63	123.64	-27.64	0.04	-28.35	-14.33	0.19	177.66	1.04
400.00	-22.50	0.07	-174.56	24.31	16.42	115.94	-27.65	0.04	-32.62	-13.61	0.21	172.88	1.04
450.00	-21.75	0.08	178.30	24.20	16.22	108.25	-27.50	0.04	-36.85	-13.00	0.22	167.83	1.03
500.00	-21.03	0.09	169.99	24.08	16.00	100.62	-27.58	0.04	-41.51	-12.34	0.24	161.47	1.03
600.00	-19.61	0.10	153.97	23.81	15.51	85.48	-27.37	0.04	-49.92	-11.22	0.27	149.48	1.02
700.00	-18.47	0.12	139.35	23.51	14.98	70.47	-27.27	0.04	-59.20	-10.23	0.31	136.84	1.02
800.00	-17.42	0.13	124.90	23.24	14.52	55.61	-27.07	0.04	-67.91	-9.47	0.34	124.59	1.00
900.00	-16.41	0.15	111.53	22.93	14.01	40.94	-26.91	0.05	-77.38	-8.74	0.37	111.78	1.00
1000.00	-15.65	0.17	97.34	22.60	13.49	26.53	-26.84	0.05	-86.39	-8.14	0.39	98.87	0.99
1100.00	-14.82	0.18	84.36	22.26	12.97	12.01	-26.78	0.05	-95.91	-7.59	0.42	86.02	0.99
1200.00	-14.12	0.20	71.15	21.90	12.45	-2.07	-26.65	0.05	-104.89	-7.09	0.44	73.40	0.99
1300.00	-13.42	0.21	58.45	21.53	11.93	-16.16	-26.51	0.05	-114.31	-6.66	0.46	60.91	0.98
1400.00	-12.79	0.23	45.29	21.17	11.44	-29.99	-26.39	0.05	-123.88	-6.28	0.49	48.28	0.98
1500.00	-12.28	0.24	33.16	20.79	10.95	-43.78	-26.30	0.05	-133.56	-5.93	0.51	35.74	0.98
1600.00	-11.82	0.26	20.77	20.41	10.48	-57.28	-26.21	0.05	-143.41	-5.62	0.52	23.12	0.98
1700.00	-11.28	0.27	8.42	20.01	10.01	-70.87	-26.18	0.05	-153.08	-5.36	0.54	10.83	0.98
1800.00	-10.84	0.29	-4.59	19.61	9.56	-84.32	-26.03	0.05	-162.56	-5.10	0.56	-1.66	0.98
2000.00	-10.00	0.32	-28.82	18.82	8.73	-110.79	-25.93	0.05	177.04	-4.69	0.58	-26.23	0.99
2200.00	-9.17	0.35	-52.88	18.01	7.95	-136.87	-25.79	0.05	157.35	-4.33	0.61	-50.89	1.00
2400.00	-8.32	0.38	-76.83	17.19	7.24	-162.79	-25.76	0.05	136.84	-4.02	0.63	-75.36	1.02
2600.00	-7.53	0.42	-100.64	16.35	6.57	171.56	-25.73	0.05	116.63	-3.71	0.65	-99.83	1.04
2800.00	-6.83	0.46	-123.98	15.47	5.94	146.25	-25.84	0.05	96.02	-3.45	0.67	-123.97	1.07
3000.00	-6.20	0.49	-146.78	14.54	5.33	121.08	-25.89	0.05	75.94	-3.18	0.69	-147.89	1.09
3200.00	-5.61	0.52	-169.30	13.59	4.78	96.45	-25.97	0.05	55.46	-2.93	0.71	-171.19	1.11
3400.00	-5.06	0.56	168.41	12.63	4.28	72.21	-26.27	0.05	33.64	-2.67	0.74	165.76	1.14
3600.00	-4.57	0.59	146.57	11.60	3.80	48.42	-26.64	0.05	14.08	-2.49	0.75	143.55	1.19
4000.00	-3.76	0.65	104.60	9.59	3.02	2.32	-27.35	0.04	-25.01	-2.13	0.78	101.70	1.27
4500.00	-3.10	0.70	54.97	7.08	2.26	-52.72	-28.44	0.04	-72.83	-1.85	0.81	53.15	1.41
5000.00	-2.67	0.74	7.34	4.79	1.74	-104.83	-29.44	0.03	-115.98	-1.68	0.82	7.97	1.63
5500.00	-2.36	0.76	-38.87	2.70	1.36	-155.57	-30.04	0.03	-157.21	-1.62	0.83	-35.72	1.87
6000.00	-2.20	0.78	-83.99	0.73	1.09	154.94	-30.19	0.03	160.62	-1.65	0.83	-78.60	2.19
7000.00	-1.91	0.80	-171.06	-2.83	0.72	57.91	-30.41	0.03	68.06	-1.72	0.82	-164.43	2.81