

Dual Matched MMIC Amplifiers

AMERA-533+
AMERA-533

50Ω High Dynamic Range DC to 4 GHz

Features

- Two matched amplifiers in one package
- InGaP HBT IF and RF amplifier
- frequency range DC to 4 GHz
- high gain, 20.5 dB typ. at 100 MHz
- up to +17dBm typ. output power at 100 MHz
- high IP3, +3 dBm at 100 MHz
- low noise figure, 3.5 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: DL805

PRICE: \$3.40 ea. QTY. (25)

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

The +Suffix has been added in order to identify 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.							Current Typ. Volt Min. Max.					Amplitude Unbalance between 2 amps (dB)			Phase Unbalance between 2 amps (deg.)					
																								DC-2.2 GHz			DC-2.2 GHz			DC-2.2 GHz		
																								Typ. Max. Typ. Max.			Typ. Max. Typ. Max.			Typ. Typ. Typ.		
f _i	f _u	0.1	1	2	3	4	Min@ 2GHz	0.1 GHz	1.0 GHz	2.0 GHz	Min @ 1GHz	Input (no dmg)	NF (dB) Typ.	0.1 GHz	0.5 GHz	1.0 GHz	In	Out	I (mA)	P (mW)	65	4.9	4.2	5.5	133	.05	0.3	0.1	0.5	0.7	2.0	
DC	4	20.5	20	18.8	17.5	16	16	17.9	17.5	16.7	16.5	13	3.5	35	34	33	1.4	1.5	120	650	65	4.9	4.2	5.5	133	.05	0.3	0.1	0.5	0.7	2.0	

* Guaranteed specification DC-4GHz. 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

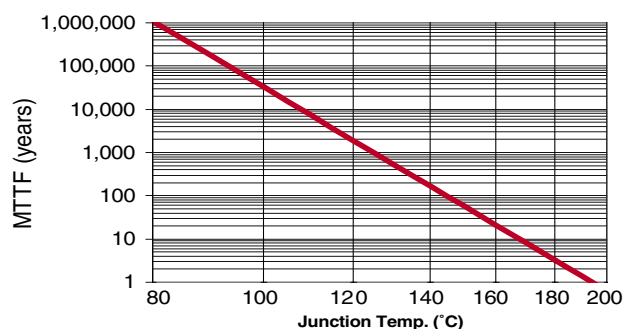
Storage Temperature -55°C to 100°C

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

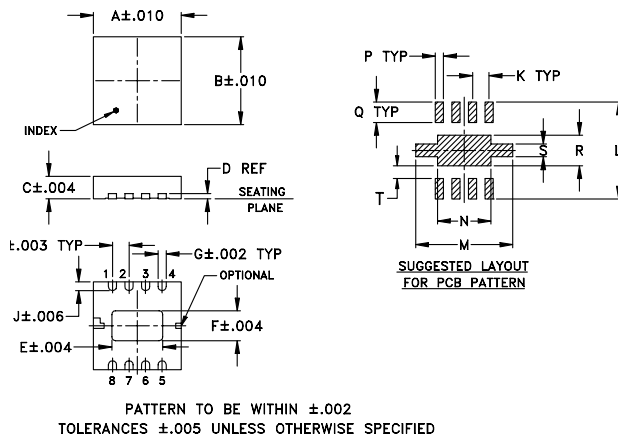
Pin Connections

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

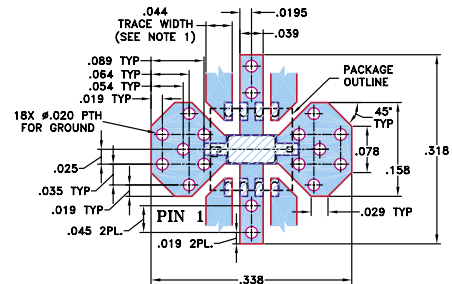
MTTF vs. Junction Temp. for A1 or A2



Outline Drawing



Demo Board MCL P/N: TB-294 Suggested PCB Layout (PL-165)



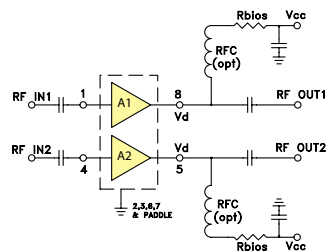
NOTES:

- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS $.020" \pm .0015"$. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
 - DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
 - DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Outline Dimensions (inch/mm)

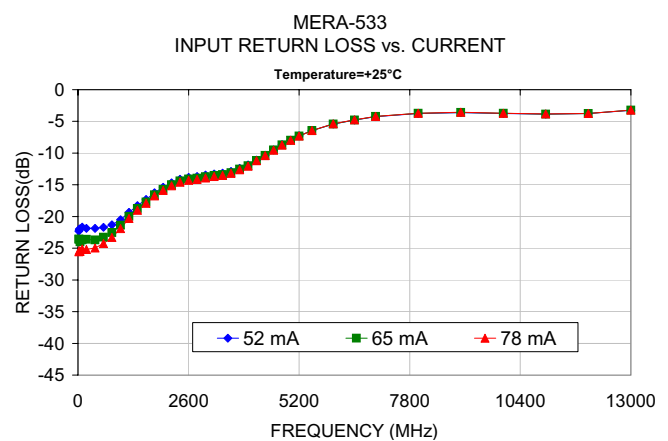
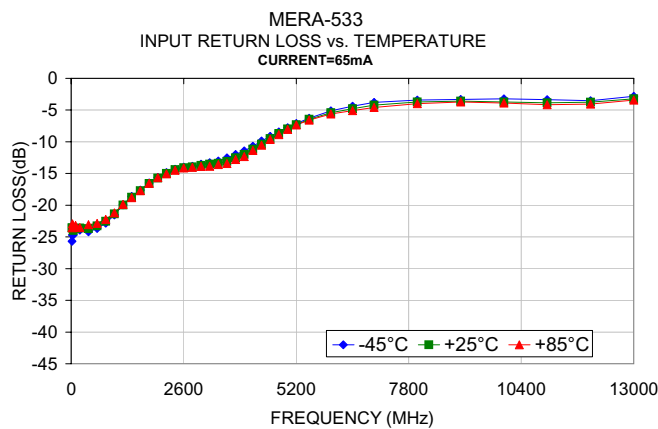
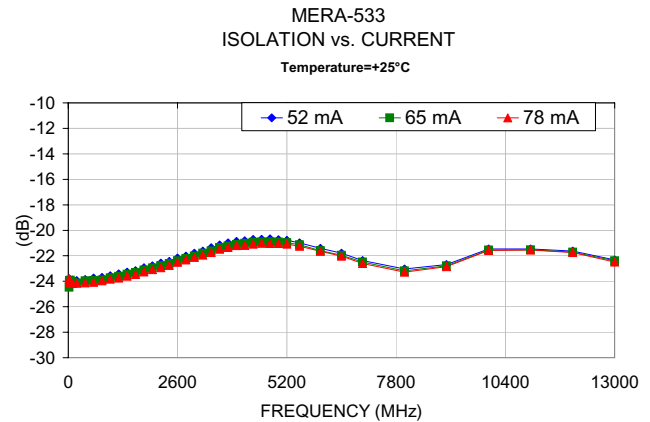
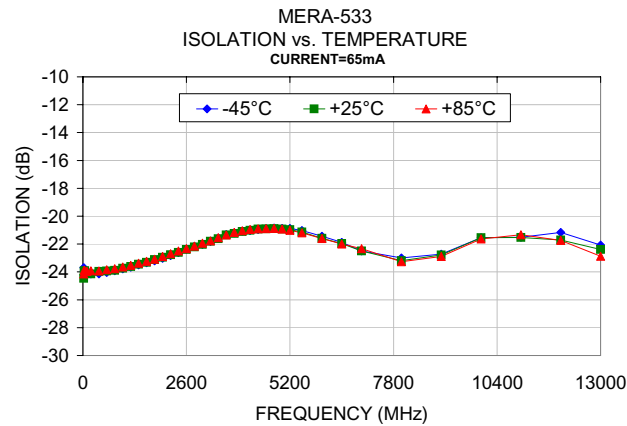
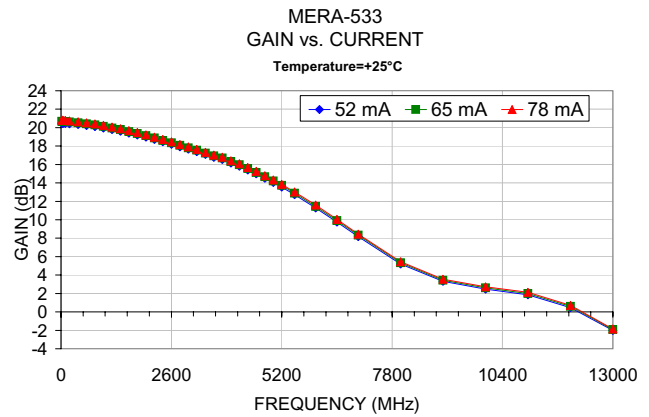
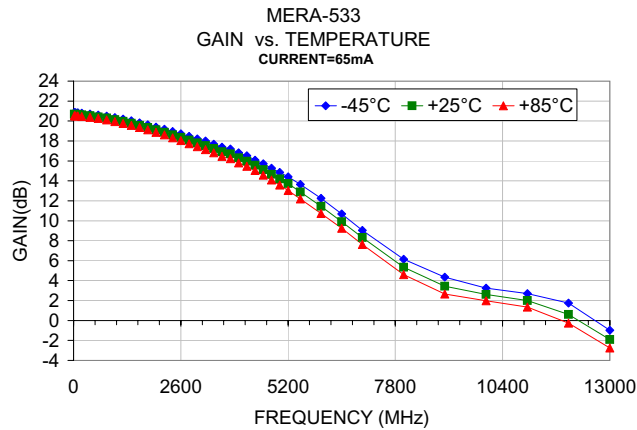
A	B	C	D	E	F	G	H	J	K
0.128	0.128	0.035	0.008	0.080	0.047	0.013	--	0.014	0.025
3.25	3.25	0.89	0.20	2.03	1.19	0.33	--	0.36	0.64
L	M	N	P	Q	R	S	T	wt	
0.158	0.158	0.084	0.013	0.030	0.048	0.020	0.025	grams	
4.01	4.01	2.13	0.33	0.76	1.22	0.51	0.64	0.02	

Typical Biasing Configuration



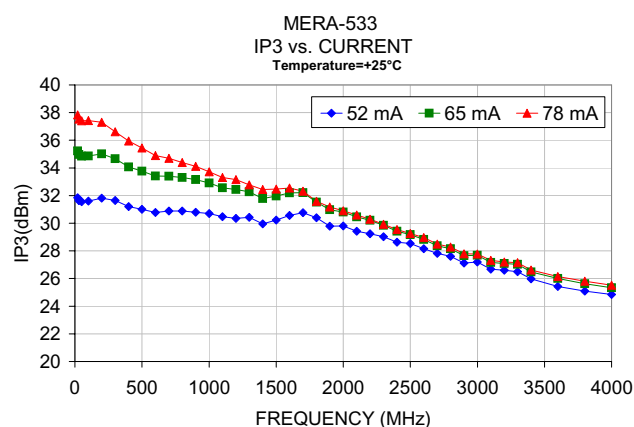
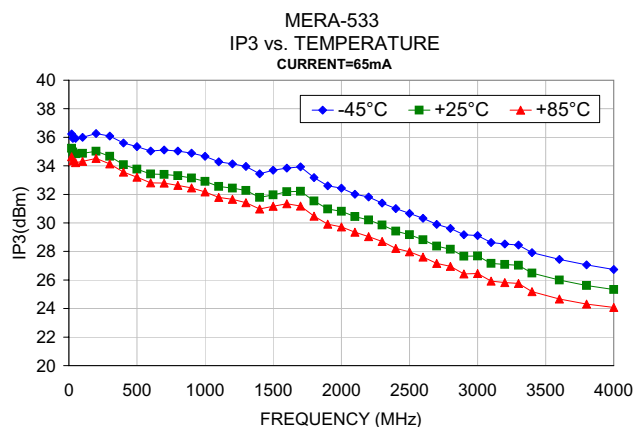
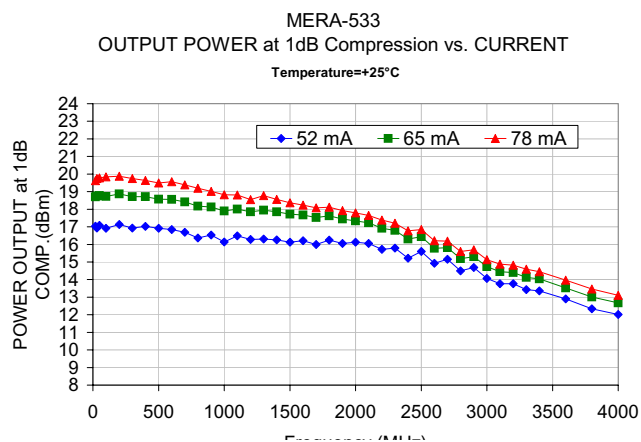
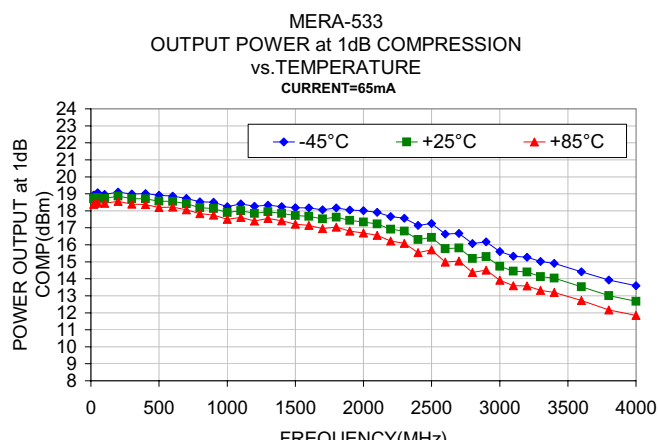
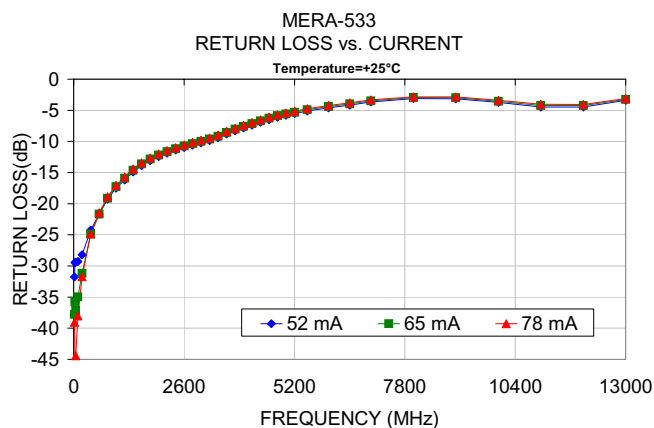
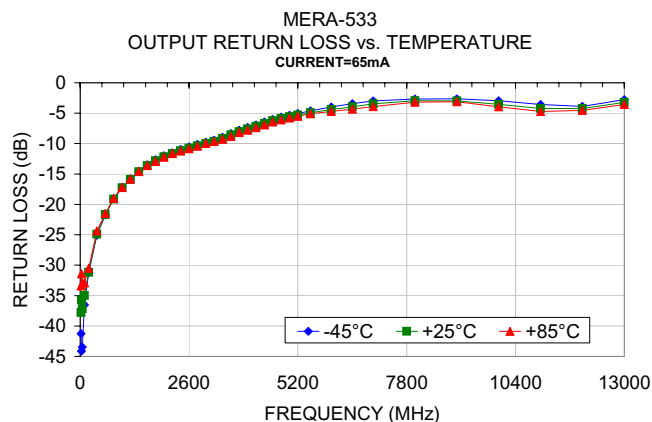
Typical Performance Curves

Performances are for each of the two matched amplifiers.



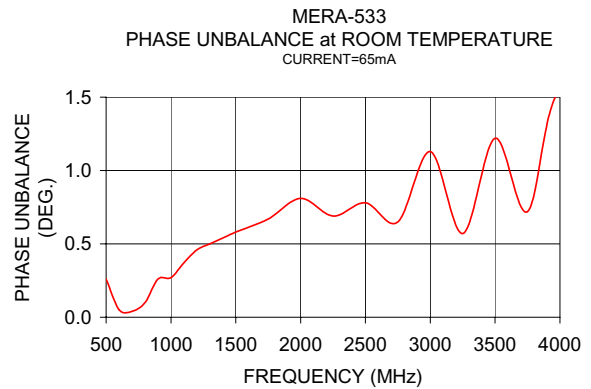
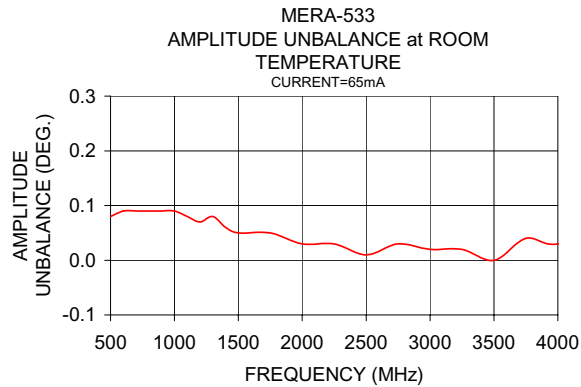
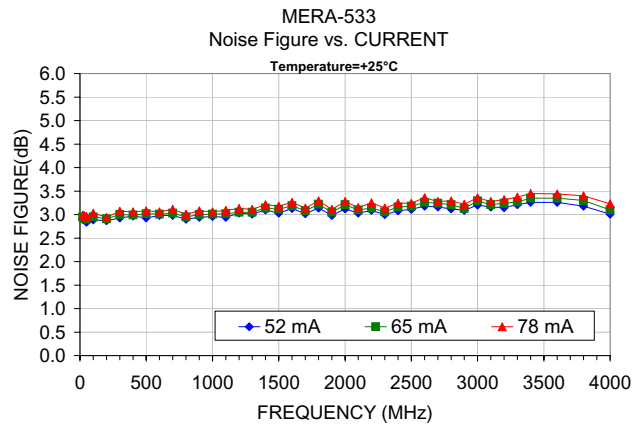
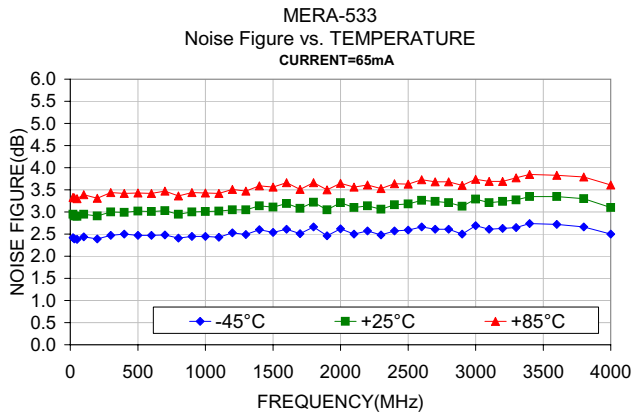
Typical Performance Curves

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(deg)	dB	Mag	Angle	dB	Mag	Angle	dB	Mag	Angle	
20.00	-21.16	0.09	11.49	20.39	10.46	176.61	-23.75	0.06	-5.55	-28.74	0.04	-13.18	1.07
30.00	-21.55	0.08	-2.66	20.41	10.48	175.52	-23.75	0.06	-4.46	-28.15	0.04	-1.26	1.07
50.00	-21.25	0.09	-7.43	20.39	10.46	173.29	-23.93	0.06	-4.51	-28.89	0.04	-8.52	1.08
100.00	-21.54	0.08	-16.53	20.36	10.42	167.04	-23.88	0.06	-8.48	-28.54	0.04	-26.43	1.08
200.00	-21.15	0.09	-32.89	20.30	10.35	154.60	-24.02	0.06	-16.66	-27.57	0.04	-54.61	1.09
400.00	-20.59	0.09	-65.12	20.23	10.27	129.76	-23.72	0.07	-33.76	-24.78	0.06	-98.81	1.07
600.00	-20.20	0.10	-93.87	20.06	10.07	105.40	-23.77	0.06	-50.35	-22.50	0.07	-134.64	1.08
800.00	-19.45	0.11	-122.66	19.97	9.97	80.73	-23.73	0.07	-67.52	-20.35	0.10	-163.79	1.07
1000.00	-18.87	0.11	-148.55	19.77	9.74	56.54	-23.57	0.07	-84.42	-18.89	0.11	170.26	1.07
1200.00	-18.19	0.12	-172.47	19.58	9.53	32.27	-23.45	0.07	-101.19	-17.52	0.13	144.44	1.06
1400.00	-17.53	0.13	163.59	19.38	9.31	8.13	-23.30	0.07	-118.57	-16.33	0.15	120.24	1.05
1600.00	-17.08	0.14	139.88	19.17	9.09	-15.81	-23.12	0.07	-136.17	-15.27	0.17	95.73	1.05
1800.00	-16.71	0.15	116.55	18.93	8.84	-39.79	-22.96	0.07	-153.31	-14.38	0.19	72.51	1.04
2000.00	-16.44	0.15	94.11	18.69	8.60	-63.44	-22.77	0.07	-171.43	-13.49	0.21	48.50	1.03
2200.00	-16.25	0.15	69.20	18.46	8.38	-87.09	-22.52	0.07	170.66	-12.91	0.23	25.80	1.02
2400.00	-16.30	0.15	46.22	18.24	8.17	-110.76	-22.27	0.08	152.49	-12.21	0.25	2.16	1.01
2600.00	-16.46	0.15	21.04	17.98	7.93	-134.31	-22.04	0.08	134.76	-11.76	0.26	-21.68	1.00
2800.00	-16.24	0.15	-5.42	17.75	7.72	-157.99	-21.80	0.08	115.94	-11.27	0.27	-46.23	0.99
3000.00	-16.25	0.15	-34.28	17.47	7.47	178.29	-21.61	0.08	96.71	-10.88	0.29	-70.98	0.99
3200.00	-16.49	0.15	-63.23	17.21	7.25	154.88	-21.36	0.09	77.86	-10.61	0.29	-96.55	0.99
3400.00	-16.06	0.16	-94.09	16.88	6.98	131.65	-21.14	0.09	58.98	-10.20	0.31	-121.33	0.99
3600.00	-15.33	0.17	-123.78	16.61	6.77	108.16	-20.82	0.09	39.03	-9.59	0.33	-146.63	0.98
3800.00	-14.40	0.19	-158.33	16.31	6.54	84.12	-20.79	0.09	18.79	-8.98	0.36	-174.38	0.99
4000.00	-13.49	0.21	171.80	15.97	6.29	60.40	-20.67	0.09	-0.87	-8.47	0.38	160.09	0.99
4200.00	-12.38	0.24	142.81	15.57	6.00	36.72	-20.59	0.09	-20.68	-7.93	0.40	134.76	1.00
4400.00	-11.30	0.27	115.56	15.14	5.71	13.03	-20.51	0.09	-40.76	-7.32	0.43	110.11	1.00
4600.00	-10.19	0.31	89.96	14.71	5.44	-10.37	-20.49	0.09	-60.65	-6.77	0.46	85.45	1.01
4800.00	-9.19	0.35	64.93	14.26	5.16	-33.90	-20.53	0.09	-80.93	-6.31	0.48	61.79	1.02
5000.00	-8.29	0.39	41.22	13.75	4.87	-57.01	-20.56	0.09	-101.04	-5.87	0.51	38.09	1.03
5200.00	-7.47	0.42	18.45	13.19	4.57	-80.13	-20.68	0.09	-120.75	-5.45	0.53	14.49	1.04
5500.00	-6.48	0.47	-14.58	12.33	4.14	-114.23	-20.86	0.09	-150.35	-4.96	0.56	-19.54	1.06
6000.00	-5.27	0.55	-66.80	10.81	3.47	-169.66	-21.27	0.09	161.54	-4.32	0.61	-73.97	1.11
6500.00	-4.52	0.59	-116.54	9.28	2.91	136.91	-21.69	0.08	113.95	-3.85	0.64	-124.50	1.17
7000.00	-4.00	0.63	-165.34	7.79	2.45	84.52	-21.91	0.08	68.30	-3.67	0.66	-172.89	1.24
8000.00	-3.61	0.66	103.54	5.34	1.85	-15.69	-22.16	0.08	-21.06	-3.66	0.66	92.35	1.45
9000.00	-3.52	0.67	11.13	3.60	1.51	-115.08	-22.00	0.08	-114.03	-3.44	0.67	0.67	1.54
10000.00	-3.60	0.66	-88.19	2.37	1.31	143.16	-21.65	0.08	147.44	-3.47	0.67	-91.35	1.63
11000.00	-3.61	0.66	166.21	1.05	1.13	35.59	-22.05	0.08	44.56	-3.57	0.66	169.40	1.93
12000.00	-3.30	0.68	60.70	-1.13	0.88	-73.87	-22.37	0.08	-74.32	-3.58	0.66	67.37	2.22
13000.00	-2.68	0.73	-43.04	-4.14	0.62	176.67	-24.29	0.06	148.78	-2.86	0.72	-44.87	2.64