Surface Mount

Dual Matched MMIC Amplifiers

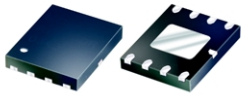
NEW!

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 1 GHz, 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
- patent pending
- useable as balanced and push pull amplifier



CASE STYLE: DL1020
PRICE: $ 4.70 ea. QTY (25)

Applications

- cellular
- catv
- VHF & UHF communication receivers & transmitters

Electrical Specifications @25°C

Freq.* (GHz)	Gain, dB Typical A1, A2						Maximum Power (dBm)					Dynamic Range				VSWR (:1) Typ.		Maximum Rating**		DC Operating Power Pin 5, Pin 8				Thermal Resistance	matching[1]			
	over frequency, GHz						Output (1 dB Comp.) Typ.				Input		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	(no dmg.)	NF (dB) Typ.	0.1 GHz	0.5 GHz	1.0 GHz	In	Out	I mA	P mW	Current (mA)	Volt Typ	Volt Min	Volt Max	θjc, typ. °C/W	DC-1 GHz Typ.	DC-1 GHz Max.	1-4 GHz Typ.	1-4 GHz Max.	DC-1 GHz Typ.	1-4 GHz Typ.
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

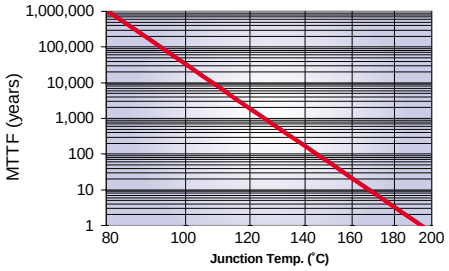
* Guaranteed specification DC-1GHz. Low frequency cutoff determined by external coupling capacitors.
** Permanent damage may occur if any of these limits are exceeded. These ratings are not intended for continuous normal operation. Reliability predictions and normal operating conditions are applicable at current specified.

1. For test method, see application note AN-60-032

Pin Connections

PORT	
RF IN 1	1
RF OUT 1	8
RF IN 2	4
RF OUT 2	5
DC 1	8
DC 2	5
GROUND	2,3,6,7 and paddle

MTTF vs. Junction Temperature

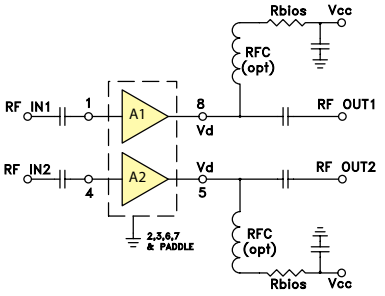


Maximum Ratings[2]

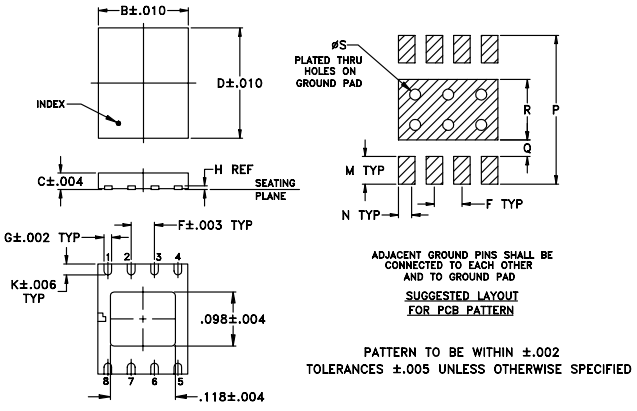
Operating Case Temperature	-45°C to 85°C
Storage Temperature	-55°C to 100°C

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

typical biasing configuration



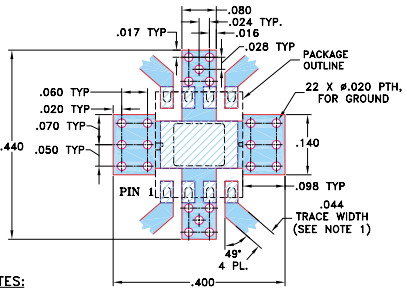
Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	wt.
—	.193	.035	.236	—	.050	.017	.008	—	.024	—	.050	.030	.270	.030	.110	.020	grams
—	4.90	0.90	6.00	—	1.27	0.43	0.20	—	0.60	—	1.27	0.76	6.86	0.76	2.79	0.51	.08

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



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350 WITH DIELECTRIC THICKNESS .020 ± .0015. COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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M94145
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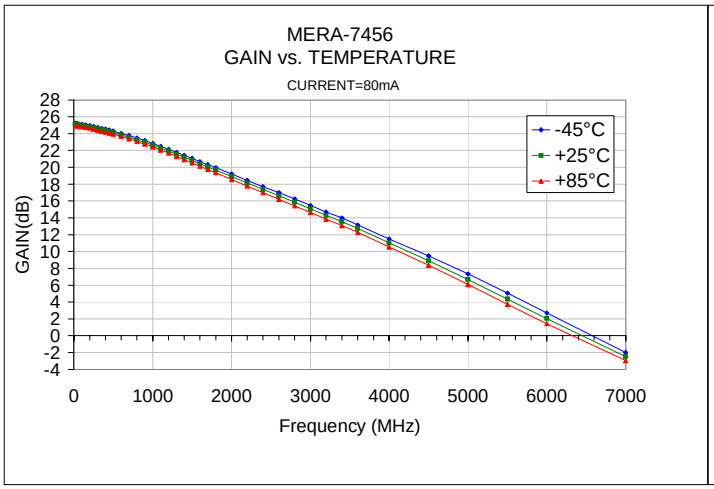
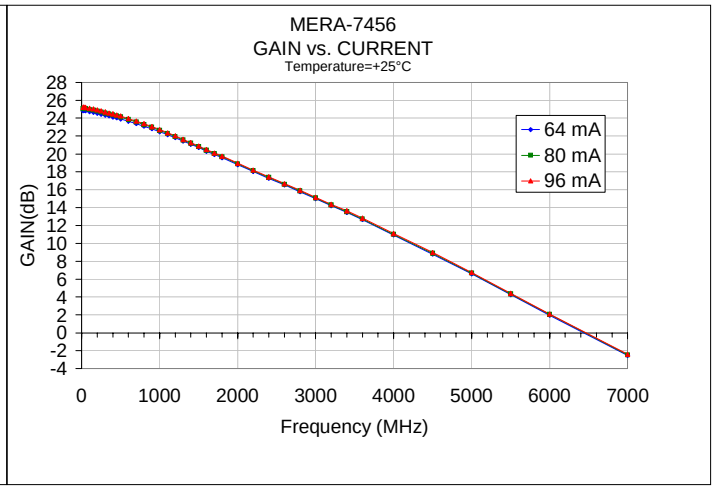
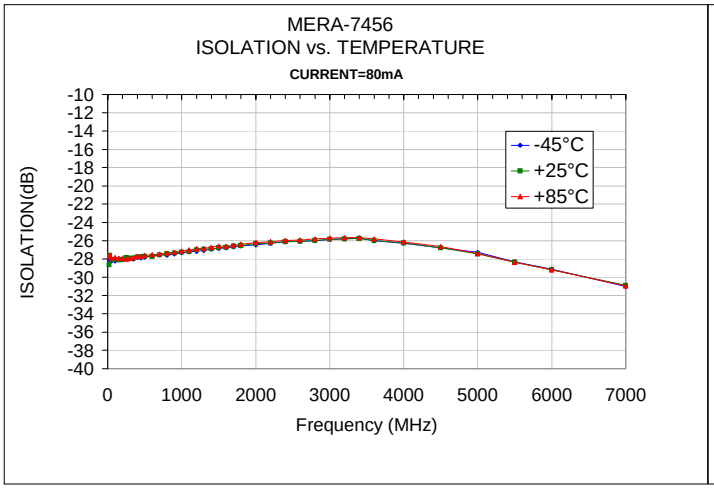
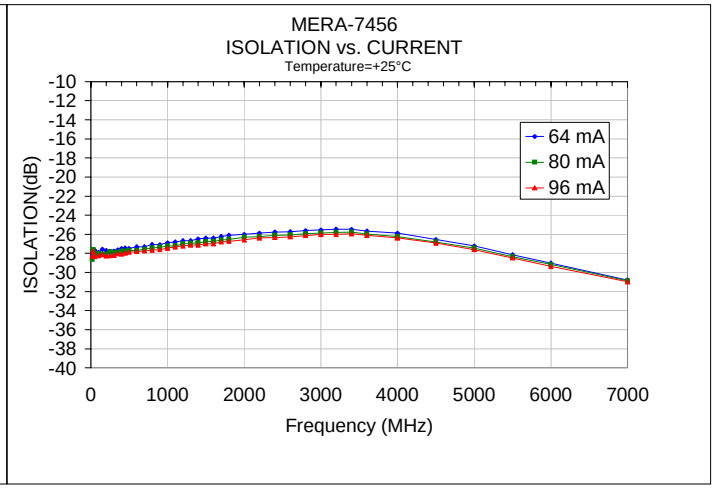
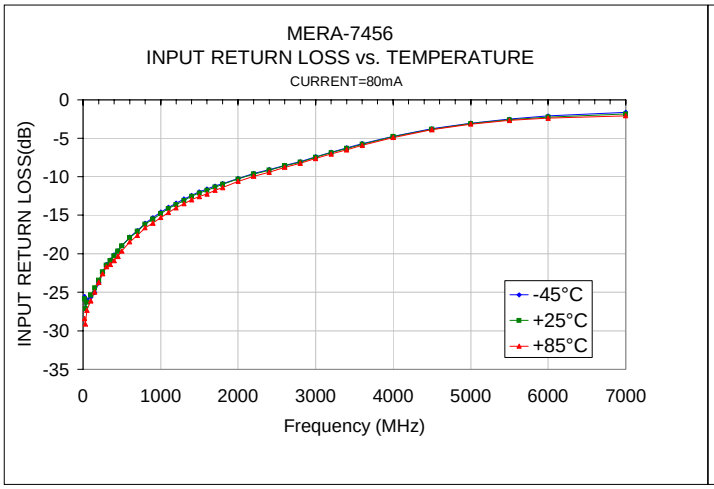
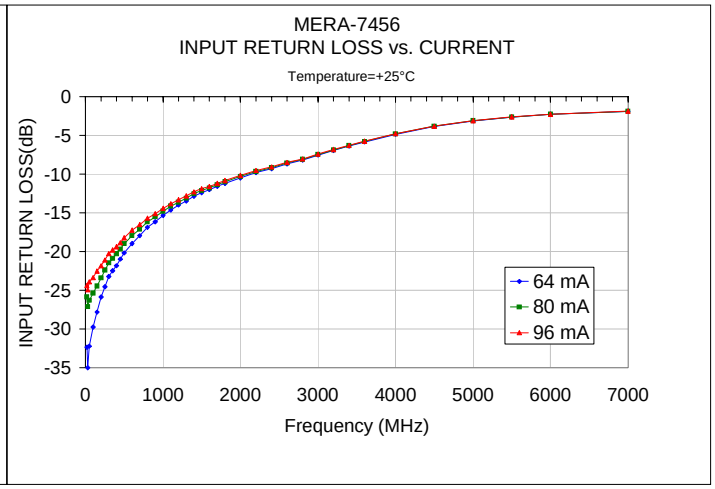

MERA-7456
GAIN vs. TEMPERATURE
CURRENT=80mA
GAIN(dB)
Frequency (MHz)
-45°C
+25°C
+85°C

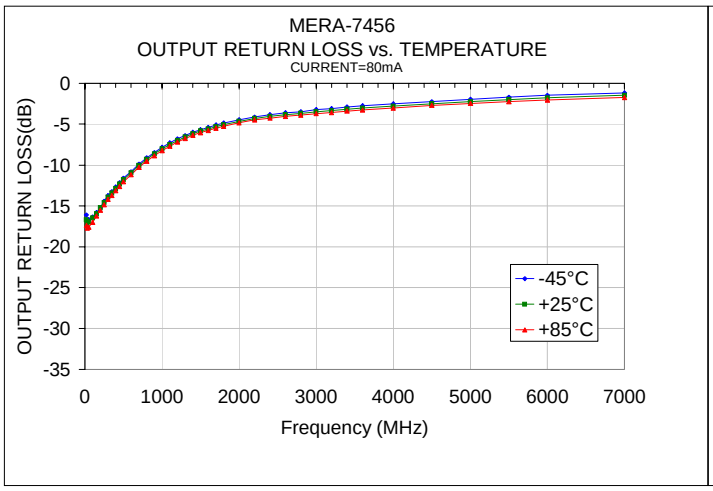

MERA-7456
GAIN vs. CURRENT
Temperature=+25°C
GAIN(dB)
Frequency (MHz)
64 mA
80 mA
96 mA

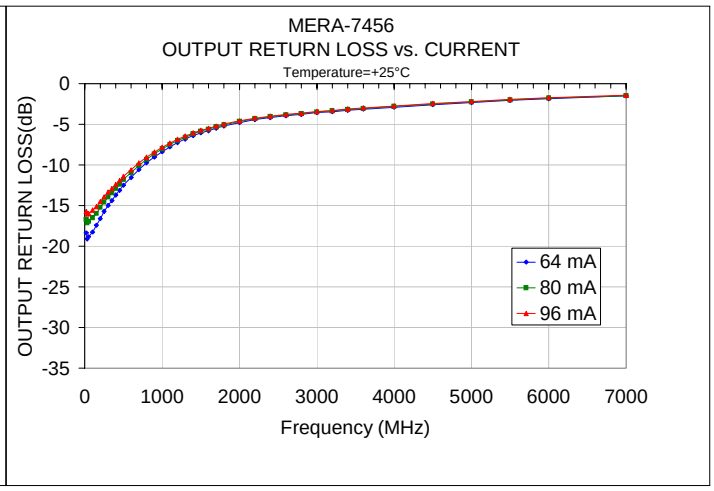

MERA-7456
ISOLATION vs. TEMPERATURE
CURRENT=80mA
ISOLATION(dB)
Frequency (MHz)
-45°C
+25°C
+85°C

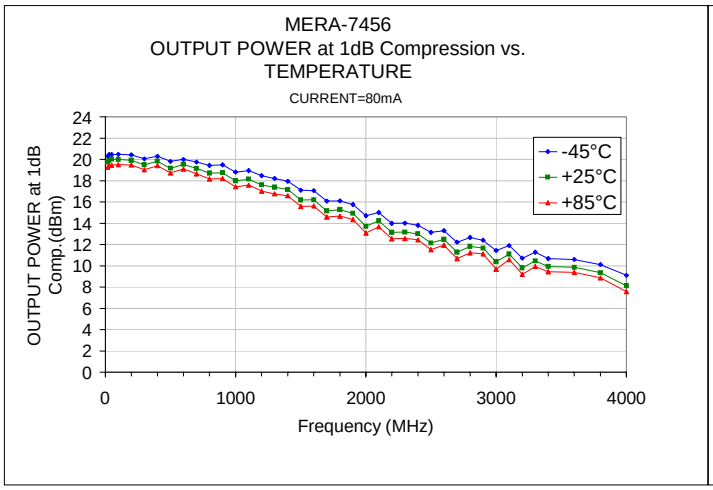

MERA-7456
ISOLATION vs. CURRENT
Temperature=+25°C
ISOLATION(dB)
Frequency (MHz)
64 mA
80 mA
96 mA

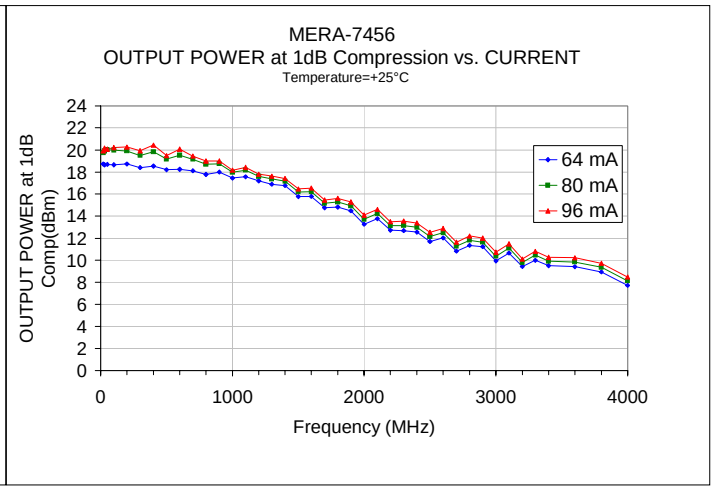

MERA-7456
INPUT RETURN LOSS vs. TEMPERATURE
CURRENT=80mA
INPUT RETURN LOSS(dB)
Frequency (MHz)
-45°C
+25°C
+85°C

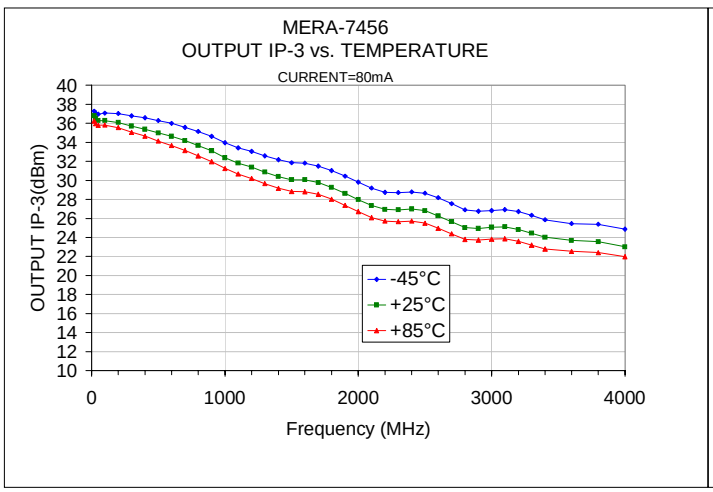

MERA-7456
INPUT RETURN LOSS vs. CURRENT
Temperature=+25°C
INPUT RETURN LOSS(dB)
Frequency (MHz)
64 mA
80 mA
96 mA

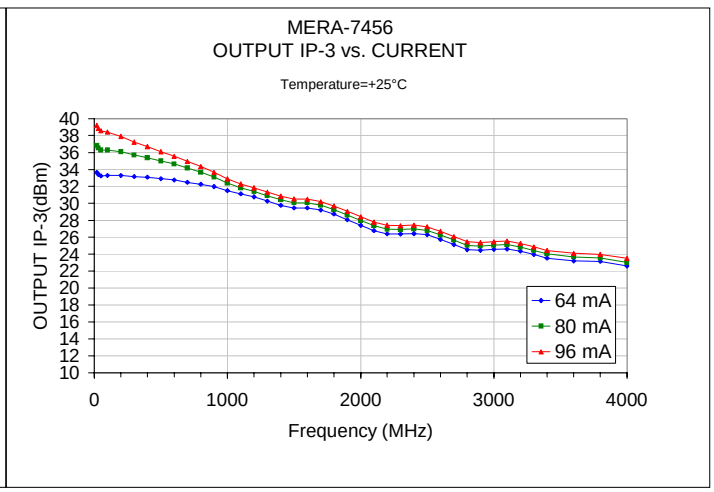

MERA-7456
OUTPUT RETURN LOSS vs. TEMPERATURE
CURRENT=80mA
OUTPUT RETURN LOSS(dB)
0
-5
-10
-15
-20
-25
-30
-35
0
1000
2000
3000
4000
5000
6000
7000
Frequency (MHz)
-45°C
+25°C
+85°C

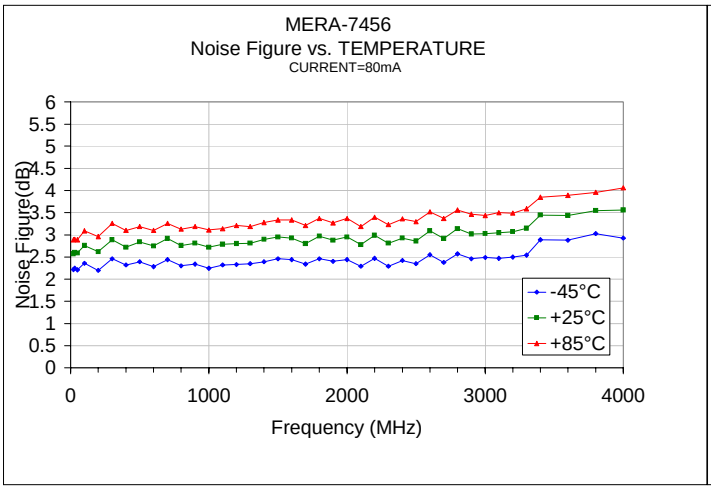

MERA-7456
OUTPUT RETURN LOSS vs. CURRENT
Temperature=+25°C
OUTPUT RETURN LOSS(dB)
0
-5
-10
-15
-20
-25
-30
-35
0
1000
2000
3000
4000
5000
6000
7000
Frequency (MHz)
64 mA
80 mA
96 mA

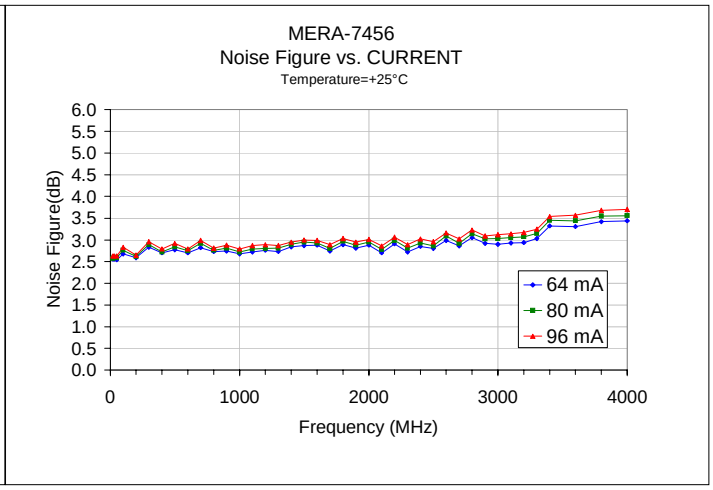

MERA-7456
OUTPUT POWER at 1dB Compression vs.
TEMPERATURE
CURRENT=80mA
OUTPUT POWER at 1dB
Comp.(dBm)
24
22
20
18
16
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
Frequency (MHz)
-45°C
+25°C
+85°C

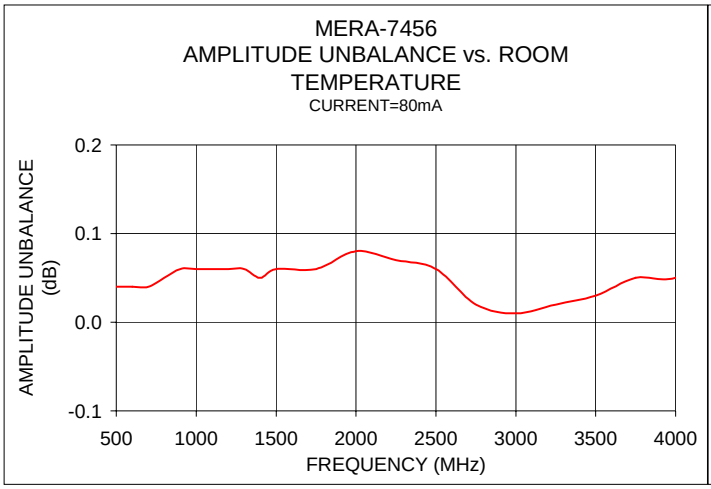

MERA-7456
OUTPUT POWER at 1dB Compression vs. CURRENT
Temperature=+25°C
OUTPUT POWER at 1dB
Comp(dBm)
24
22
20
18
16
14
12
10
8
6
4
2
0
0
1000
2000
3000
4000
Frequency (MHz)
64 mA
80 mA
96 mA

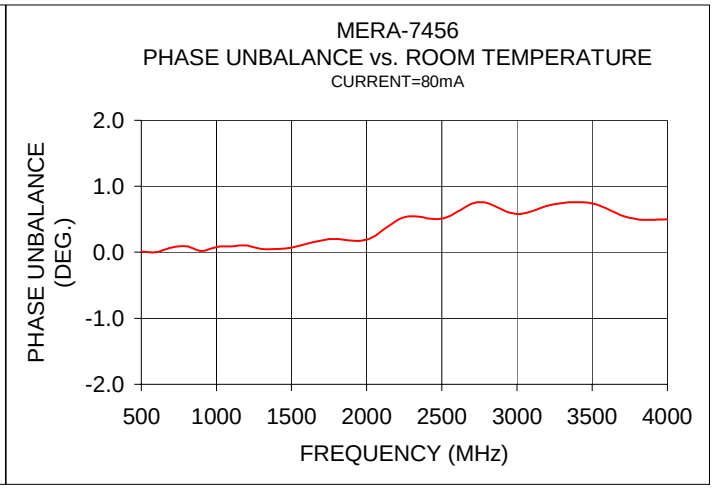

MERA-7456
OUTPUT IP-3 vs. TEMPERATURE
CURRENT=80mA
OUTPUT IP-3(dBm)
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
0
1000
2000
3000
4000
Frequency (MHz)
-45°C
+25°C
+85°C


MERA-7456
OUTPUT IP-3 vs. CURRENT
Temperature=+25°C
OUTPUT IP-3(dBm)
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
0
1000
2000
3000
4000
Frequency (MHz)
64 mA
80 mA
96 mA


MERA-7456
Noise Figure vs. TEMPERATURE
CURRENT=80mA
Noise Figure(dB)
Frequency (MHz)
-45°C
+25°C
+85°C


MERA-7456
Noise Figure vs. CURRENT
Temperature=+25°C
Noise Figure(dB)
Frequency (MHz)
64 mA
80 mA
96 mA


MERA-7456
AMPLITUDE UNBALANCE vs. ROOM TEMPERATURE
CURRENT=80mA
AMPLITUDE UNBALANCE (dB)
FREQUENCY (MHz)


MERA-7456
PHASE UNBALANCE vs. ROOM TEMPERATURE
CURRENT=80mA
PHASE UNBALANCE (DEG.)
FREQUENCY (MHz)

S-PARAMETERS MERA-7456

Freq.	S11 (Input Return Loss)			S21 (Power Gain)			S12 (Isolation Out-in)			S22 (Output Return Loss)			K
MHz	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