Surface Mount

Dual Matched MMIC Amplifier DC-2.2 GHz

Product Features

- Two matched 50-ohm amplifiers in one package
- InGaP HBT IF and RF amplifier
- Frequency range DC to 2.2 GHz
- High gain, 20.5 dB typ. at 0.1 GHz
- Very good flatness response at 50-1000 MHz
- Up to +18 dBm typ. output power at 0.1 GHz
- High IP3, +35 dBm at 0.1 GHz
- 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

Generic photo used for illustration purposes only

MERA-556+

CASE STYLE: DL1020

+RoHS Compliant

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

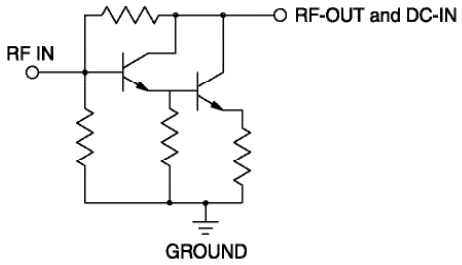
Typical Applications

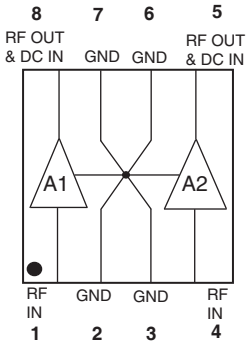
- Cellular
- CATV
- UHF/VHF communications
- Receivers & transmitters
- FTTH

General Description

MERA-556+ is a dual matched wideband amplifier offering high dynamic range. It has repeatable performance from lot to lot. It is enclosed in a 6.0 x 4.9 mm MCLP plastic package. MERA-556+ uses Darlington configuration and is fabricated using InGaP HBT technology. Expected MTBF at 85°C case temperature is 420 years for the entire device (A1 and A2).

simplified schematic (each of A1, A2) and pin description





Function	Pin Number	Description
RF IN, A1	1	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.
RF-OUT and DC-IN, A1	8	RF output and bias pin. DC voltage is present on this pin; therefore a DC blocking capacitor is necessary for proper operation. An RF choke is needed to feed DC bias without loss of RF signal due to the bias connection, as shown in "Recommended Application Circuit".
RF IN, A2	4	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.
RF-OUT and DC-IN, A2	5	RF output and bias pin. DC voltage is present on this pin; therefore a DC blocking capacitor is necessary for proper operation. An RF choke is needed to feed DC bias without loss of RF signal due to the bias connection, as shown in "Recommended Application Circuit".
GND	2,3,6,7 & paddle	Connections to ground. Use via holes as shown in "Suggested Layout for PCB Design" to reduce ground path inductance for best performance.

Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

Electrical Specifications at 25°C and 65mA, unless noted

(Specifications (other than Matching) are for each of the two matched amplifiers in the package)

Parameter		Min.	Typ.	Max.	Units
Frequency Range*		DC		2.2	GHz
Gain	f=0.1 GHz	—	20.5	—	dB
	f=1 GHz	—	20.2	—	
	f=2 GHz	16	19	—	
	f=3 GHz	—	16.7	—	
	f=4 GHz	—	13	—	
Input Return Loss	f=DC to 2.2 GHz		21		dB
Output Return Loss	f=DC to 2.2 GHz		15.5		dB
Output Power @ 1 dB compression	f=0.1 GHz	—	18	—	dBm
	f=1 GHz	16.5	17.6	—	
	f=2 GHz	—	16.6	—	
Output IP3	f=0.1 GHz		35		dBm
	f=0.5 GHz		35.5		
	f=1 GHz		34		
Noise Figure	f=DC to 4 GHz		3.5		dB
Matching between A1, A2[2]					
Amplitude Unbalance	f=DC to 2.2 GHz	—	0.1	0.3	dB
	f=2.2 to 4 GHz	—	0.1	—	
Phase Unbalance	f=DC to 2.2 GHz		0.6		deg.
	f=2.2 to 4 GHz		1.5		
Recommended Device Operating Current			65		mA
Device Operating Voltage		4.2	4.9	5.5	V
Device Voltage Variation vs. Temperature at 65 mA			-3.2		mV/°C
Device Voltage Variation vs. Current at 25°C			6.9		mV/mA
Thermal Resistance, junction-to-case[1], A1 or A2			133		°C/W

*Guaranteed specification DC-2.2 GHz. Low frequency cut off determined by external coupling capacitors.

Absolute Maximum Ratings for each Amplifier

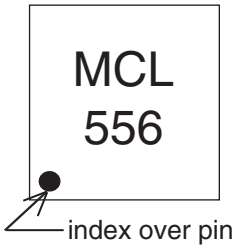
Parameter	Ratings
Operating Temperature	-45°C to 85°C
Storage Temperature	-55°C to 100°C
Operating Current	120mA
Power Dissipation	650mW
Input Power	13dBm

Note: Permanent damage may occur if any of these limits are exceeded.
These ratings are not intended for continuous normal operation.

[1]Case is defined as ground paddle. See application note AN-60-032 for adequate heat sinking of paddle.

[2]For test method, see application note AN-60-032.

Product Marking



Markings in addition to model number designation may appear for internal quality control purposes.

Additional Detailed Technical Information

Additional information is available on our web site. To access this information enter the model number on our web site home page.

Performance data, graphs, s-parameter data set (.zip file)

Case Style: DL1020

Plastic package, exposed paddle, lead finish: tin-silver over nickel

Tape & Reel: F68

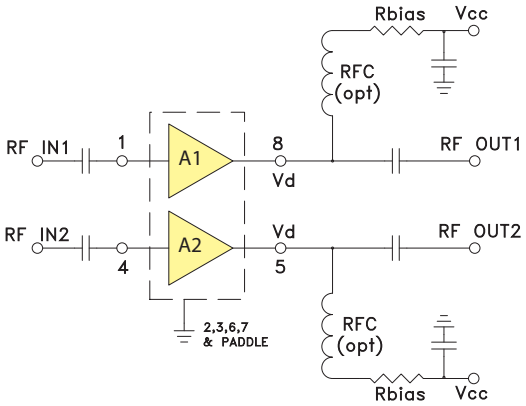
Standard quantities available on reel *7" reels with 20, 50, 100, 200, 500 or 1K devices.*
13" reels with 2000, 3000, 4000 devices.

Suggested Layout for PCB Design: PL-164

Evaluation Board: TB-293+

Environmental Ratings: ENV08T2

Recommended Application and Biasing Circuit



R BIAS	
Vcc	**"1%" Res. Values (ohms) for Optimum Biasing**
7	33.2
8	48.7
9	63.4
10	78.7
11	95.3
12	110
13	124
14	140
15	158
16	174
17	187
18	205
19	221
20	232

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ESD Rating

Human Body Model (HBM): Class 1B (500 v to < 1000 v) in accordance with ANSI/ESD STM 5.1 - 2001

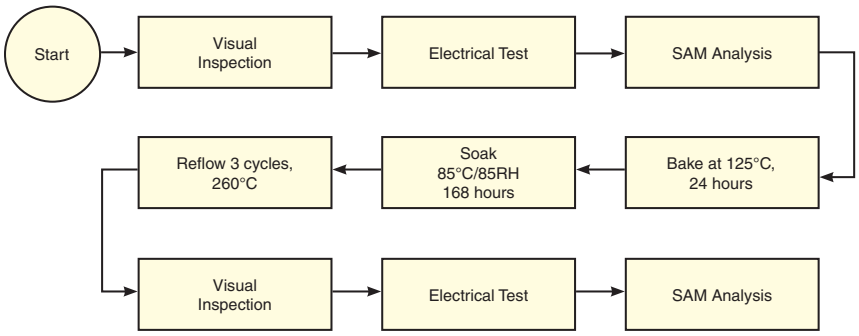
Machine Model (MM): Class MI (< 100 v) in accordance with ESD STM 5.2-1999

MSL Rating

Moisture Sensitivity: MSL1 in accordance with IPC/JEDECJ-STD-020C

No.	Test Required	Condition	Standard	Quantity
1	Visual Inspection	Low Power Microscope Magnification 40x	MIP-IN-0003 (MCT spec)	114 units
2	Electrical Test	Room Temperature	SCD (MCL spec)	114 units
3	SAM Analysis	Less than 10% growth in term of delamination	J-Std-020C (Jedec Standard)	114 units
4	Moisture Sensitivity Level 1	Bake at 125°C for 24 hours Soak at 85°C/85%RH for 168 hours Reflow 3 cycles at 250°C peak	J-Std-020C (Jedec Standard)	114 units

MSL Test Flow Chart



MMIC Amplifier MERA-556+

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions or to view GRAPHS.

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS:Icc = 65mA, Vd=4.83V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	20.76	24.16	21.91	30.20	1.07	0.68	20	35.67	18.55	2.97
30	20.76	24.44	21.35	30.36	1.09	0.66	30	35.34	18.39	2.96
50	20.76	24.16	21.45	30.78	1.07	0.68	50	35.12	18.44	3.00
100	20.72	24.19	21.80	30.60	1.08	0.67	100	35.25	18.40	3.01
200	20.67	24.11	22.12	29.85	1.08	0.67	200	35.55	18.70	2.95
400	20.60	24.17	22.72	26.41	1.08	0.66	300	35.14	18.49	3.06
600	20.51	24.08	24.35	23.07	1.08	0.66	400	34.91	18.41	3.06
800	20.40	23.92	25.52	20.10	1.07	0.66	500	34.61	18.40	3.08
1000	20.27	23.76	25.52	17.64	1.06	0.66	600	34.47	18.17	3.04
1200	20.10	23.59	23.94	15.49	1.05	0.66	700	34.23	18.27	3.07
1400	19.92	23.44	21.52	13.66	1.04	0.66	800	34.08	17.95	2.96
1600	19.71	23.25	19.14	12.07	1.03	0.66	900	33.94	17.95	3.01
1800	19.46	23.07	16.96	10.69	1.02	0.67	1000	33.54	17.83	3.00
2000	19.19	22.90	15.03	9.46	1.00	0.67	1100	33.26	17.64	3.04
2200	18.85	22.83	13.49	8.41	0.99	0.67	1200	33.13	17.69	3.05
2400	18.47	22.72	11.90	7.48	0.98	0.67	1300	32.80	17.56	3.10
2600	18.05	22.68	10.65	6.68	0.98	0.67	1400	32.54	17.74	3.19
2800	17.56	22.64	9.54	5.94	0.97	0.67	1500	32.22	17.41	3.16
3000	17.03	22.71	8.46	5.28	0.97	0.67	1600	32.40	17.34	3.25
3200	16.43	22.81	7.62	4.71	0.97	0.66	1700	31.85	17.06	3.12
3400	15.82	22.94	6.82	4.19	0.97	0.66	1800	31.28	16.90	3.25
3600	15.12	23.01	6.03	3.71	0.96	0.67	1900	30.83	16.83	3.12
3800	14.43	23.37	5.42	3.32	0.97	0.67	2000	30.27	16.20	3.21
4000	13.67	23.66	4.88	3.04	0.98	0.66	2100	29.68	16.34	3.00
4200	12.91	23.91	4.43	2.78	0.98	0.67	2200	29.20	15.80	3.21
4400	12.15	24.20	4.08	2.57	0.99	0.66	2300	28.94	15.57	2.98
4600	11.42	24.49	3.74	2.41	1.01	0.67	2400	28.79	15.49	3.18
4800	10.68	24.79	3.50	2.25	1.02	0.67	2500	28.47	14.89	3.09
5000	9.96	25.10	3.28	2.14	1.03	0.67	2600	28.17	15.04	3.26
5200	9.20	25.42	3.07	2.06	1.06	0.67	2700	27.62	14.25	3.14
5500	8.12	25.84	2.83	1.95	1.10	0.67	2800	27.01	14.38	3.25
6000	6.31	26.68	2.54	1.85	1.22	0.67	2900	26.73	14.26	3.04
6500	4.47	27.45	2.32	1.80	1.40	0.67	3000	26.53	13.06	3.15
7000	2.74	27.75	2.17	1.80	1.58	0.67	3100	26.38	13.56	3.09
7500	1.18	27.97	2.05	1.81	1.77	0.67	3200	25.99	12.55	3.29
8000	-0.14	27.65	1.97	1.82	1.88	0.67	3300	25.64	12.91	3.30
8500	-1.18	27.35	1.96	1.84	2.00	0.66	3400	25.31	12.38	3.53
9000	-2.04	26.63	1.94	1.85	1.95	0.66	3600	24.78	12.19	3.64
9500	-2.64	25.60	1.97	1.89	1.81	0.65	3800	24.30	11.70	3.59
10000	-3.10	25.67	2.01	1.97	1.91	0.64	4000	23.76	10.15	3.61

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Icc = 52mA, Vd=4.75V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	20.56	24.24	19.85	26.26	1.09	0.66	20	32.10	16.83	2.93
30	20.55	24.19	19.95	26.19	1.08	0.66	30	31.85	16.67	2.92
50	20.56	23.99	19.82	26.37	1.07	0.68	50	31.65	16.60	2.94
100	20.52	24.00	20.17	26.38	1.08	0.67	100	31.76	16.56	2.95
200	20.48	24.00	20.45	26.38	1.08	0.67	200	32.01	17.02	2.93
400	20.41	23.95	20.92	25.00	1.08	0.67	300	31.78	16.77	3.03
600	20.31	23.86	22.38	23.00	1.07	0.66	400	31.68	16.55	3.01
800	20.22	23.70	23.63	20.46	1.07	0.66	500	31.49	16.75	3.01
1000	20.09	23.58	24.22	18.15	1.06	0.66	600	31.45	16.35	3.00
1200	19.94	23.42	23.67	16.00	1.05	0.66	700	31.31	16.71	3.03
1400	19.77	23.22	21.82	14.09	1.04	0.66	800	31.32	16.25	2.91
1600	19.58	23.02	19.56	12.47	1.02	0.67	900	31.49	16.21	2.96
1800	19.34	22.87	17.35	11.04	1.01	0.67	1000	31.51	16.16	2.94
2000	19.06	22.73	15.37	9.72	1.00	0.67	1100	31.59	15.88	2.97
2200	18.73	22.61	13.76	8.67	0.99	0.67	1200	31.61	16.02	3.00
2400	18.36	22.51	12.14	7.69	0.98	0.67	1300	31.35	15.95	3.03
2600	17.94	22.47	10.84	6.87	0.97	0.67	1400	31.06	16.22	3.15
2800	17.45	22.44	9.68	6.09	0.97	0.67	1500	31.03	16.13	3.10
3000	16.92	22.46	8.59	5.41	0.96	0.67	1600	31.44	16.08	3.18
3200	16.33	22.55	7.69	4.84	0.96	0.66	1700	31.38	16.14	3.08
3400	15.71	22.73	6.90	4.30	0.96	0.66	1800	30.92	16.01	3.20
3600	15.01	22.79	6.08	3.82	0.95	0.66	1900	30.51	16.15	3.08
3800	14.32	23.07	5.47	3.43	0.96	0.66	2000	29.99	15.62	3.14
4000	13.56	23.37	4.92	3.13	0.97	0.66	2100	29.43	15.79	2.94
4200	12.79	23.71	4.46	2.88	0.98	0.66	2200	28.96	15.31	3.15
4400	12.04	23.98	4.11	2.67	0.99	0.66	2300	28.73	15.01	2.93
4600	11.30	24.24	3.78	2.49	1.01	0.66	2400	28.62	15.00	3.11
4800	10.55	24.57	3.52	2.36	1.02	0.66	2500	28.27	14.35	3.00
5000	9.83	24.80	3.30	2.24	1.04	0.66	2600	27.97	14.53	3.19
5200	9.09	25.17	3.10	2.16	1.07	0.66	2700	27.40	13.75	3.07
5500	8.00	25.61	2.85	2.06	1.11	0.66	2800	26.75	13.85	3.18
6000	6.19	26.45	2.56	1.95	1.24	0.66	2900	26.49	13.77	2.96
6500	4.36	27.27	2.34	1.91	1.43	0.66	3000	26.29	12.44	3.04
7000	2.64	27.51	2.19	1.90	1.60	0.66	3100	26.15	13.05	3.02
7500	1.09	27.82	2.07	1.90	1.79	0.66	3200	25.76	12.03	3.18
8000	-0.24	27.52	2.00	1.91	1.92	0.66	3300	25.38	12.39	3.21
8500	-1.29	27.28	1.97	1.93	2.04	0.65	3400	25.01	11.90	3.43
9000	-2.15	26.62	1.96	1.97	2.04	0.65	3600	24.49	11.68	3.55
9500	-2.75	25.51	1.99	1.98	1.86	0.64	3800	24.01	11.19	3.50
10000	-3.21	25.73	2.02	2.07	2.00	0.63	4000	23.46	9.71	3.50

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Icc = 78mA, Vd=4.91V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	20.88	24.35	22.13	33.45	1.08	0.67	20	38.55	19.28	3.02
30	20.88	24.12	22.78	34.24	1.07	0.69	30	38.14	19.50	3.03
50	20.88	24.21	22.67	35.54	1.07	0.68	50	37.97	19.52	3.06
100	20.84	24.26	22.95	34.58	1.08	0.68	100	38.22	19.56	3.07
200	20.80	24.36	23.44	31.75	1.08	0.66	200	38.33	19.77	3.02
400	20.72	24.26	23.94	26.67	1.08	0.66	300	37.42	19.55	3.13
600	20.61	24.23	25.67	22.87	1.08	0.66	400	36.92	19.57	3.12
800	20.50	24.00	26.81	19.75	1.07	0.66	500	36.33	19.40	3.15
1000	20.37	23.85	26.10	17.25	1.06	0.66	600	35.96	19.25	3.08
1200	20.20	23.72	23.81	15.18	1.05	0.66	700	35.49	19.26	3.15
1400	20.03	23.57	21.19	13.37	1.04	0.66	800	35.06	18.86	3.02
1600	19.81	23.40	18.83	11.84	1.03	0.66	900	34.57	18.93	3.08
1800	19.56	23.24	16.67	10.49	1.02	0.67	1000	33.92	18.70	3.04
2000	19.27	23.13	14.77	9.26	1.01	0.67	1100	33.40	18.54	3.13
2200	18.92	23.02	13.28	8.28	1.00	0.67	1200	33.15	18.47	3.14
2400	18.56	22.94	11.74	7.36	0.99	0.67	1300	32.78	18.21	3.16
2600	18.12	22.78	10.55	6.57	0.98	0.67	1400	32.56	18.33	3.25
2800	17.64	22.83	9.43	5.83	0.97	0.67	1500	32.16	17.79	3.24
3000	17.11	22.89	8.39	5.19	0.97	0.67	1600	32.08	17.76	3.31
3200	16.52	22.97	7.56	4.63	0.97	0.67	1700	31.47	17.36	3.20
3400	15.90	23.09	6.77	4.10	0.97	0.67	1800	30.95	17.22	3.32
3600	15.20	23.24	5.98	3.63	0.96	0.67	1900	30.54	17.14	3.19
3800	14.52	23.51	5.39	3.25	0.97	0.67	2000	30.04	16.49	3.27
4000	13.76	23.77	4.85	2.96	0.97	0.67	2100	29.49	16.66	3.07
4200	13.00	24.04	4.39	2.71	0.98	0.67	2200	29.03	16.06	3.30
4400	12.25	24.36	4.04	2.50	0.99	0.67	2300	28.73	15.91	3.08
4600	11.51	24.66	3.71	2.33	1.00	0.67	2400	28.62	15.81	3.27
4800	10.77	24.96	3.47	2.18	1.01	0.67	2500	28.30	15.23	3.14
5000	10.05	25.20	3.25	2.07	1.03	0.67	2600	28.05	15.40	3.34
5200	9.31	25.53	3.05	1.99	1.05	0.67	2700	27.58	14.61	3.22
5500	8.23	26.00	2.80	1.87	1.10	0.68	2800	27.00	14.77	3.35
6000	6.40	26.80	2.52	1.78	1.21	0.67	2900	26.72	14.64	3.14
6500	4.56	27.53	2.31	1.73	1.38	0.67	3000	26.50	13.43	3.23
7000	2.83	27.84	2.16	1.73	1.55	0.67	3100	26.35	13.95	3.19
7500	1.27	28.16	2.04	1.72	1.73	0.68	3200	25.99	12.92	3.38
8000	-0.07	27.75	1.97	1.75	1.85	0.67	3300	25.67	13.30	3.42
8500	-1.10	27.43	1.94	1.76	1.95	0.67	3400	25.36	12.79	3.60
9000	-1.96	26.69	1.94	1.79	1.93	0.67	3600	24.85	12.59	3.77
9500	-2.55	25.64	1.96	1.82	1.77	0.66	3800	24.34	12.13	3.71
10000	-3.01	25.75	2.00	1.89	1.87	0.64	4000	23.84	10.61	3.71

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Icc = 65mA, Vd=5.07V @Temperature = -45degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	20.93	24.53	22.29	31.98	1.08	0.66	20	36.61	18.86	2.43
30	20.93	24.36	22.17	34.47	1.08	0.68	30	36.24	18.90	2.43
50	20.93	24.27	21.94	34.28	1.07	0.68	50	36.13	18.94	2.45
100	20.89	24.28	21.97	32.53	1.07	0.68	100	36.33	18.82	2.46
200	20.84	24.30	22.31	30.04	1.08	0.67	200	36.75	19.13	2.45
400	20.79	24.20	23.03	26.77	1.07	0.67	300	36.49	18.94	2.48
600	20.70	24.08	24.81	23.09	1.07	0.67	400	36.46	18.86	2.53
800	20.60	23.94	25.98	20.02	1.06	0.68	500	36.29	18.85	2.52
1000	20.48	23.83	25.58	17.38	1.05	0.67	600	36.35	18.63	2.46
1200	20.32	23.66	23.42	15.29	1.04	0.68	700	36.19	18.76	2.52
1400	20.16	23.49	20.68	13.52	1.03	0.68	800	36.12	18.43	2.41
1600	19.98	23.30	18.53	11.97	1.02	0.68	900	36.13	18.41	2.45
1800	19.73	23.14	16.31	10.62	1.01	0.69	1000	35.76	18.27	2.42
2000	19.48	23.01	14.48	9.28	0.99	0.69	1100	35.55	18.11	2.46
2200	19.14	22.93	13.17	8.35	0.99	0.69	1200	35.50	18.14	2.49
2400	18.81	22.78	11.51	7.36	0.97	0.70	1300	35.09	18.10	2.54
2600	18.42	22.74	10.41	6.63	0.96	0.69	1400	34.81	18.28	2.60
2800	17.95	22.72	9.26	5.85	0.96	0.70	1500	34.33	18.11	2.60
3000	17.46	22.72	8.16	5.12	0.94	0.70	1600	34.44	18.11	2.67
3200	16.86	22.84	7.34	4.55	0.95	0.70	1700	33.71	17.92	2.54
3400	16.27	22.95	6.49	3.99	0.94	0.70	1800	33.13	17.79	2.70
3600	15.56	23.06	5.70	3.52	0.93	0.71	1900	32.66	17.71	2.55
3800	14.89	23.34	5.12	3.14	0.93	0.70	2000	32.06	17.17	2.63
4000	14.16	23.60	4.59	2.84	0.93	0.71	2100	31.40	17.26	2.42
4200	13.41	23.91	4.15	2.59	0.94	0.70	2200	30.84	16.76	2.62
4400	12.68	24.22	3.81	2.37	0.94	0.70	2300	30.52	16.58	2.43
4600	11.98	24.49	3.50	2.19	0.95	0.71	2400	30.39	16.43	2.59
4800	11.28	24.71	3.28	2.06	0.95	0.71	2500	30.05	15.95	2.47
5000	10.59	25.03	3.05	1.93	0.96	0.71	2600	29.63	16.02	2.67
5200	9.88	25.32	2.86	1.86	0.98	0.71	2700	29.11	15.32	2.56
5500	8.82	25.87	2.58	1.70	0.99	0.71	2800	28.46	15.39	2.67
6000	6.99	26.71	2.26	1.58	1.09	0.72	2900	28.09	15.23	2.45
6500	5.10	27.52	1.98	1.49	1.16	0.72	3000	27.87	14.21	2.58
7000	3.29	27.93	1.87	1.48	1.31	0.72	3100	27.66	14.52	2.47
7500	1.78	27.94	1.74	1.49	1.38	0.72	3200	27.31	13.59	2.72
8000	0.54	27.51	1.73	1.57	1.51	0.71	3300	27.00	13.90	2.72
8500	-0.39	27.02	1.75	1.59	1.55	0.70	3400	26.64	13.35	2.96
9000	-1.27	26.77	1.74	1.69	1.73	0.70	3600	26.11	13.09	3.07
9500	-1.95	26.05	1.74	1.60	1.50	0.69	3800	25.55	12.65	3.05
10000	-2.53	25.98	1.69	1.57	1.45	0.70	4000	25.06	11.41	2.98

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS:Icc = 52mA, Vd=4.99V @Temperature = -45degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	20.77	24.17	20.99	27.98	1.07	0.68	20	32.82	17.23	2.40
30	20.77	24.26	20.69	29.02	1.08	0.67	30	32.59	16.94	2.40
50	20.76	24.21	20.62	28.87	1.08	0.68	50	32.44	16.99	2.40
100	20.72	24.23	20.63	28.23	1.08	0.67	100	32.55	16.91	2.41
200	20.68	24.33	20.92	27.56	1.08	0.66	200	32.81	17.36	2.41
400	20.64	24.12	21.58	26.09	1.07	0.67	300	32.68	17.12	2.43
600	20.55	23.98	23.08	23.28	1.07	0.67	400	32.67	16.90	2.47
800	20.46	23.86	24.38	20.48	1.06	0.67	500	32.57	17.09	2.46
1000	20.34	23.64	24.71	17.86	1.05	0.68	600	32.60	16.67	2.44
1200	20.18	23.46	23.45	15.73	1.04	0.68	700	32.51	17.07	2.44
1400	20.03	23.33	20.95	13.91	1.03	0.68	800	32.55	16.59	2.38
1600	19.85	23.13	18.88	12.32	1.02	0.68	900	32.83	16.53	2.40
1800	19.62	23.00	16.63	10.91	1.01	0.68	1000	32.99	16.44	2.39
2000	19.37	22.80	14.75	9.53	0.99	0.69	1100	33.23	16.14	2.41
2200	19.04	22.71	13.42	8.58	0.98	0.69	1200	33.35	16.30	2.43
2400	18.71	22.58	11.69	7.54	0.97	0.70	1300	33.10	16.28	2.48
2600	18.33	22.53	10.55	6.78	0.96	0.69	1400	32.78	16.58	2.56
2800	17.86	22.48	9.37	5.99	0.95	0.70	1500	32.74	16.53	2.53
3000	17.37	22.47	8.24	5.24	0.94	0.70	1600	33.20	16.49	2.59
3200	16.78	22.64	7.40	4.68	0.94	0.69	1700	33.16	16.61	2.50
3400	16.18	22.68	6.54	4.09	0.93	0.70	1800	32.73	16.55	2.63
3600	15.47	22.83	5.74	3.62	0.93	0.70	1900	32.35	16.78	2.48
3800	14.80	23.12	5.14	3.23	0.93	0.70	2000	31.79	16.45	2.57
4000	14.07	23.39	4.62	2.93	0.93	0.70	2100	31.11	16.62	2.37
4200	13.31	23.73	4.18	2.67	0.94	0.70	2200	30.58	16.23	2.55
4400	12.57	23.99	3.83	2.46	0.94	0.70	2300	30.28	15.96	2.35
4600	11.88	24.27	3.52	2.29	0.95	0.70	2400	30.16	15.92	2.53
4800	11.17	24.53	3.30	2.15	0.95	0.70	2500	29.84	15.37	2.42
5000	10.49	24.81	3.08	2.03	0.96	0.70	2600	29.42	15.51	2.60
5200	9.78	25.06	2.87	1.95	0.98	0.70	2700	28.83	14.78	2.49
5500	8.71	25.64	2.60	1.79	1.00	0.70	2800	28.13	14.85	2.60
6000	6.89	26.52	2.28	1.66	1.09	0.71	2900	27.78	14.72	2.38
6500	4.99	27.31	2.00	1.58	1.17	0.71	3000	27.55	13.64	2.50
7000	3.19	27.77	1.88	1.58	1.33	0.71	3100	27.38	14.00	2.41
7500	1.70	27.79	1.75	1.57	1.39	0.71	3200	27.01	13.07	2.62
8000	0.43	27.38	1.74	1.66	1.54	0.70	3300	26.66	13.39	2.65
8500	-0.48	26.89	1.76	1.68	1.58	0.69	3400	26.29	12.85	2.86
9000	-1.37	26.79	1.74	1.79	1.79	0.69	3600	25.74	12.59	3.01
9500	-2.05	25.97	1.73	1.69	1.52	0.69	3800	25.23	12.15	2.98
10000	-2.64	25.93	1.70	1.66	1.49	0.69	4000	24.70	10.96	2.91

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Icc = 78mA, Vd=5.10V @Temperature = -45degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	21.01	24.15	22.99	36.85	1.06	0.70	20	39.77	20.12	2.50
30	21.01	24.35	22.72	36.38	1.07	0.68	30	39.29	20.10	2.48
50	21.00	24.46	22.46	38.06	1.08	0.67	50	39.24	20.14	2.51
100	20.97	24.40	22.65	35.19	1.08	0.67	100	39.54	20.11	2.52
200	20.92	24.50	22.91	31.24	1.08	0.66	200	39.90	20.32	2.49
400	20.85	24.41	23.70	26.75	1.08	0.66	300	39.33	20.09	2.55
600	20.76	24.21	25.63	22.86	1.07	0.67	400	39.16	20.08	2.56
800	20.66	24.06	26.74	19.73	1.06	0.67	500	38.75	19.93	2.58
1000	20.54	23.88	25.79	17.14	1.05	0.68	600	38.54	19.76	2.53
1200	20.38	23.74	23.34	15.06	1.04	0.67	700	38.11	19.78	2.55
1400	20.22	23.56	20.46	13.33	1.03	0.68	800	37.67	19.49	2.45
1600	20.03	23.39	18.31	11.82	1.02	0.68	900	37.06	19.51	2.50
1800	19.78	23.26	16.16	10.49	1.01	0.68	1000	36.28	19.32	2.47
2000	19.52	23.07	14.35	9.16	0.99	0.69	1100	35.67	19.21	2.52
2200	19.18	22.99	13.08	8.27	0.99	0.69	1200	35.43	19.19	2.54
2400	18.86	22.86	11.42	7.26	0.97	0.70	1300	35.02	19.00	2.61
2600	18.47	22.80	10.34	6.56	0.96	0.70	1400	34.82	19.12	2.65
2800	18.00	22.81	9.23	5.80	0.96	0.70	1500	34.28	18.68	2.65
3000	17.51	22.77	8.14	5.06	0.95	0.71	1600	34.11	18.65	2.73
3200	16.92	22.91	7.30	4.51	0.95	0.70	1700	33.39	18.28	2.61
3400	16.32	23.04	6.47	3.94	0.94	0.70	1800	32.83	18.16	2.74
3600	15.62	23.18	5.67	3.48	0.93	0.71	1900	32.42	18.04	2.60
3800	14.95	23.41	5.09	3.09	0.93	0.71	2000	31.89	17.49	2.69
4000	14.23	23.71	4.57	2.80	0.93	0.71	2100	31.26	17.60	2.48
4200	13.48	24.01	4.13	2.54	0.94	0.71	2200	30.76	17.07	2.67
4400	12.75	24.30	3.79	2.33	0.94	0.71	2300	30.45	16.94	2.49
4600	12.05	24.54	3.48	2.15	0.95	0.71	2400	30.30	16.78	2.67
4800	11.35	24.82	3.26	2.01	0.95	0.71	2500	30.01	16.30	2.56
5000	10.67	25.12	3.04	1.88	0.96	0.71	2600	29.64	16.39	2.74
5200	9.95	25.37	2.84	1.81	0.97	0.71	2700	29.15	15.68	2.60
5500	8.90	25.96	2.57	1.65	0.99	0.72	2800	28.54	15.80	2.75
6000	7.07	26.83	2.25	1.52	1.08	0.72	2900	28.17	15.62	2.52
6500	5.16	27.62	1.97	1.44	1.14	0.73	3000	27.94	14.63	2.65
7000	3.35	27.99	1.86	1.44	1.29	0.72	3100	27.77	14.95	2.55
7500	1.85	28.11	1.73	1.44	1.36	0.72	3200	27.39	13.98	2.79
8000	0.60	27.57	1.72	1.51	1.49	0.72	3300	27.11	14.33	2.79
8500	-0.32	27.04	1.74	1.54	1.52	0.71	3400	26.76	13.75	3.04
9000	-1.20	26.77	1.74	1.62	1.70	0.70	3600	26.25	13.51	3.16
9500	-1.89	26.16	1.72	1.55	1.48	0.70	3800	25.71	13.09	3.15
10000	-2.48	26.08	1.68	1.52	1.43	0.70	4000	25.26	11.89	3.08

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Icc = 65mA, Vd=4.64V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	20.61	23.78	20.87	27.43	1.06	0.70	20	34.99	18.31	3.33
30	20.61	24.09	20.93	27.50	1.08	0.67	30	34.67	18.20	3.34
50	20.61	24.16	20.99	28.53	1.08	0.67	50	34.43	18.30	3.36
100	20.58	24.07	21.35	28.56	1.08	0.67	100	34.63	18.23	3.37
200	20.53	24.14	22.04	28.73	1.08	0.66	200	34.87	18.53	3.33
400	20.44	24.09	22.24	25.49	1.08	0.66	300	34.35	18.29	3.43
600	20.34	24.00	23.57	22.91	1.08	0.65	400	34.05	18.23	3.43
800	20.22	23.88	24.83	20.16	1.08	0.65	500	33.68	18.21	3.48
1000	20.08	23.72	25.14	17.74	1.07	0.65	600	33.47	17.97	3.41
1200	19.89	23.54	24.20	15.60	1.06	0.65	700	33.21	18.07	3.48
1400	19.72	23.35	22.35	13.76	1.05	0.65	800	32.99	17.69	3.36
1600	19.50	23.18	19.93	12.19	1.03	0.65	900	32.82	17.74	3.43
1800	19.22	23.05	17.63	10.86	1.03	0.65	1000	32.39	17.58	3.39
2000	18.93	22.83	15.48	9.49	1.01	0.65	1100	32.06	17.36	3.45
2200	18.56	22.77	13.95	8.50	1.00	0.65	1200	31.93	17.43	3.46
2400	18.16	22.70	12.20	7.53	1.00	0.65	1300	31.57	17.18	3.49
2600	17.70	22.66	10.86	6.73	0.99	0.64	1400	31.34	17.36	3.60
2800	17.16	22.64	9.72	5.99	0.99	0.64	1500	31.00	16.93	3.57
3000	16.61	22.68	8.69	5.31	0.99	0.64	1600	31.13	16.83	3.65
3200	15.98	22.78	7.81	4.80	0.99	0.64	1700	30.52	16.50	3.53
3400	15.35	22.89	7.00	4.28	0.99	0.64	1800	29.97	16.33	3.68
3600	14.64	23.04	6.25	3.84	0.99	0.63	1900	29.52	16.26	3.54
3800	13.92	23.32	5.64	3.46	1.00	0.63	2000	28.97	15.55	3.63
4000	13.18	23.58	5.10	3.19	1.01	0.63	2100	28.40	15.74	3.43
4200	12.38	23.83	4.62	2.94	1.03	0.63	2200	27.93	15.14	3.65
4400	11.62	24.14	4.28	2.74	1.04	0.63	2300	27.66	14.93	3.41
4600	10.89	24.41	3.95	2.57	1.06	0.64	2400	27.52	14.85	3.61
4800	10.10	24.70	3.69	2.44	1.08	0.63	2500	27.19	14.19	3.49
5000	9.35	25.01	3.46	2.34	1.11	0.63	2600	26.78	14.42	3.69
5200	8.59	25.31	3.26	2.28	1.15	0.63	2700	26.27	13.57	3.59
5500	7.48	25.86	3.03	2.16	1.21	0.63	2800	25.69	13.73	3.68
6000	5.67	26.72	2.80	2.11	1.41	0.62	2900	25.42	13.63	3.47
6500	3.85	27.39	2.61	2.09	1.67	0.62	3000	25.24	12.28	3.56
7000	2.13	27.63	2.45	2.10	1.89	0.62	3100	25.03	12.94	3.54
7500	0.54	28.26	2.29	2.05	2.18	0.63	3200	24.70	11.86	3.70
8000	-0.83	27.84	2.20	2.00	2.27	0.63	3300	24.37	12.29	3.78
8500	-1.87	27.13	2.10	1.97	2.21	0.64	3400	23.96	11.79	3.92
9000	-2.79	26.51	2.12	2.06	2.37	0.63	3600	23.50	11.62	4.07
9500	-3.33	25.55	2.13	2.09	2.14	0.62	3800	23.00	11.10	4.00
10000	-3.68	25.61	2.17	2.17	2.25	0.61	4000	22.49	9.51	4.06

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Icc = 52mA, Vd=4.56V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	20.38	23.95	19.59	23.83	1.08	0.67	20	31.71	16.83	3.28
30	20.39	23.77	19.33	24.07	1.07	0.68	30	31.43	16.58	3.29
50	20.39	23.96	19.32	24.60	1.08	0.67	50	31.26	16.71	3.29
100	20.36	23.91	19.70	24.76	1.08	0.67	100	31.35	16.50	3.30
200	20.32	24.01	20.26	25.22	1.09	0.66	200	31.62	16.99	3.30
400	20.23	23.80	20.43	23.91	1.08	0.67	300	31.35	16.73	3.35
600	20.12	23.74	21.58	22.37	1.08	0.66	400	31.17	16.52	3.38
800	20.02	23.65	22.72	20.35	1.07	0.65	500	30.97	16.70	3.41
1000	19.88	23.51	23.53	18.19	1.07	0.65	600	30.87	16.28	3.37
1200	19.72	23.28	23.52	16.07	1.05	0.65	700	30.74	16.61	3.40
1400	19.55	23.16	22.41	14.18	1.04	0.65	800	30.69	16.17	3.29
1600	19.34	22.96	20.31	12.58	1.03	0.65	900	30.82	16.14	3.34
1800	19.07	22.80	18.07	11.21	1.02	0.65	1000	30.76	16.09	3.34
2000	18.79	22.59	15.86	9.79	1.00	0.65	1100	30.75	15.76	3.36
2200	18.42	22.52	14.29	8.77	1.00	0.65	1200	30.73	15.95	3.41
2400	18.03	22.35	12.47	7.75	0.99	0.65	1300	30.47	15.85	3.43
2600	17.59	22.37	11.08	6.92	0.98	0.64	1400	30.21	16.11	3.54
2800	17.06	22.38	9.89	6.15	0.98	0.64	1500	30.14	15.95	3.51
3000	16.51	22.40	8.80	5.47	0.98	0.64	1600	30.52	15.88	3.62
3200	15.89	22.50	7.93	4.94	0.99	0.63	1700	30.31	15.84	3.45
3400	15.24	22.62	7.08	4.41	0.99	0.63	1800	29.80	15.64	3.59
3600	14.53	22.75	6.33	3.96	0.99	0.63	1900	29.37	15.72	3.47
3800	13.82	22.99	5.71	3.58	0.99	0.63	2000	28.84	15.07	3.56
4000	13.07	23.27	5.16	3.30	1.01	0.63	2100	28.27	15.26	3.36
4200	12.27	23.57	4.68	3.06	1.02	0.63	2200	27.82	14.74	3.56
4400	11.51	23.89	4.32	2.84	1.04	0.62	2300	27.58	14.41	3.32
4600	10.77	24.12	3.98	2.67	1.06	0.63	2400	27.47	14.42	3.53
4800	9.98	24.51	3.72	2.54	1.08	0.62	2500	27.12	13.69	3.42
5000	9.24	24.80	3.49	2.44	1.11	0.62	2600	26.70	13.93	3.59
5200	8.48	25.09	3.29	2.38	1.15	0.62	2700	26.14	13.06	3.50
5500	7.37	25.60	3.06	2.26	1.22	0.62	2800	25.52	13.23	3.58
6000	5.57	26.46	2.82	2.22	1.42	0.62	2900	25.25	13.17	3.40
6500	3.74	27.12	2.64	2.20	1.68	0.61	3000	25.09	11.74	3.47
7000	2.02	27.46	2.48	2.19	1.93	0.61	3100	24.91	12.44	3.45
7500	0.46	28.06	2.31	2.15	2.21	0.62	3200	24.52	11.38	3.60
8000	-0.92	27.71	2.22	2.09	2.31	0.62	3300	24.19	11.80	3.66
8500	-1.95	27.09	2.13	2.06	2.28	0.63	3400	23.75	11.32	3.82
9000	-2.88	26.49	2.13	2.16	2.44	0.62	3600	23.33	11.12	3.96
9500	-3.42	25.55	2.14	2.18	2.21	0.61	3800	22.85	10.61	3.89
10000	-3.78	25.53	2.18	2.27	2.30	0.60	4000	22.32	8.94	3.91

Typical Performance Data

Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

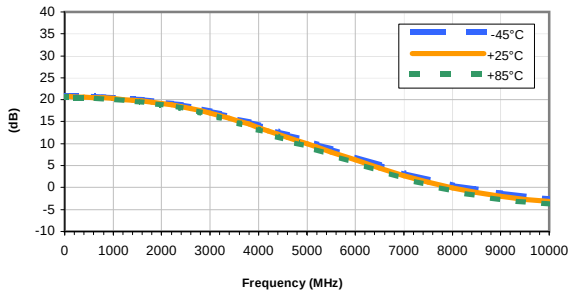
TEST CONDITIONS: Icc = 78mA, Vd=4.72V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		FREQ	IP3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(MHz)	(dBm)	(dBm)	(dB)
20	20.75	24.15	22.25	29.91	1.07	0.68	20	37.81	19.07	3.38
30	20.75	24.14	22.26	31.86	1.07	0.68	30	37.48	19.24	3.39
50	20.75	24.18	22.21	32.14	1.08	0.68	50	37.28	19.19	3.43
100	20.71	24.17	22.56	32.34	1.08	0.67	100	37.59	19.25	3.47
200	20.67	24.31	23.28	31.15	1.09	0.66	200	37.49	19.41	3.38
400	20.57	24.22	23.57	26.29	1.08	0.66	300	36.46	19.20	3.50
600	20.46	24.10	25.10	22.81	1.08	0.65	400	35.86	19.26	3.49
800	20.33	23.98	26.22	19.88	1.07	0.65	500	35.25	19.11	3.56
1000	20.19	23.85	25.93	17.44	1.07	0.65	600	34.78	18.98	3.47
1200	20.00	23.69	24.32	15.29	1.06	0.65	700	34.35	18.95	3.55
1400	19.82	23.47	22.09	13.48	1.05	0.65	800	33.88	18.45	3.39
1600	19.59	23.34	19.55	11.96	1.04	0.65	900	33.40	18.56	3.51
1800	19.30	23.25	17.27	10.66	1.03	0.64	1000	32.77	18.28	3.45
2000	19.01	23.08	15.17	9.33	1.02	0.65	1100	32.24	18.09	3.51
2200	18.63	22.98	13.69	8.37	1.01	0.64	1200	31.99	18.02	3.53
2400	18.22	22.91	12.01	7.41	1.00	0.64	1300	31.59	17.71	3.55
2600	17.77	22.83	10.72	6.63	1.00	0.64	1400	31.41	17.83	3.67
2800	17.22	22.86	9.59	5.89	1.00	0.64	1500	30.97	17.24	3.65
3000	16.67	22.91	8.57	5.24	0.99	0.64	1600	30.88	17.19	3.73
3200	16.05	22.96	7.74	4.73	1.00	0.64	1700	30.19	16.77	3.60
3400	15.40	23.07	6.93	4.23	1.00	0.64	1800	29.67	16.64	3.75
3600	14.70	23.16	6.20	3.79	0.99	0.64	1900	29.27	16.54	3.61
3800	13.99	23.51	5.59	3.41	1.01	0.64	2000	28.75	15.82	3.69
4000	13.24	23.73	5.05	3.14	1.02	0.64	2100	28.22	16.05	3.51
4200	12.46	24.00	4.58	2.90	1.03	0.64	2200	27.75	15.39	3.73
4400	11.69	24.29	4.24	2.69	1.04	0.64	2300	27.48	15.24	3.48
4600	10.96	24.54	3.92	2.53	1.06	0.64	2400	27.33	15.15	3.71
4800	10.16	24.89	3.66	2.39	1.08	0.64	2500	27.01	14.51	3.57
5000	9.42	25.22	3.42	2.29	1.11	0.64	2600	26.66	14.73	3.78
5200	8.66	25.47	3.24	2.22	1.15	0.64	2700	26.21	13.90	3.67
5500	7.55	26.06	3.01	2.11	1.21	0.64	2800	25.64	14.07	3.76
6000	5.74	26.80	2.77	2.06	1.40	0.63	2900	25.35	13.93	3.58
6500	3.91	27.48	2.60	2.04	1.65	0.63	3000	25.14	12.62	3.67
7000	2.18	27.84	2.44	2.04	1.90	0.63	3100	24.93	13.29	3.64
7500	0.60	28.33	2.28	2.00	2.15	0.63	3200	24.61	12.20	3.83
8000	-0.77	27.92	2.18	1.95	2.23	0.64	3300	24.32	12.64	3.87
8500	-1.81	27.21	2.10	1.93	2.19	0.64	3400	23.92	12.12	4.04
9000	-2.73	26.55	2.11	2.01	2.33	0.64	3600	23.47	11.96	4.18
9500	-3.26	25.64	2.12	2.04	2.12	0.63	3800	22.91	11.48	4.11
10000	-3.62	25.63	2.16	2.13	2.22	0.61	4000	22.43	9.83	4.17

Typical Performance Curves

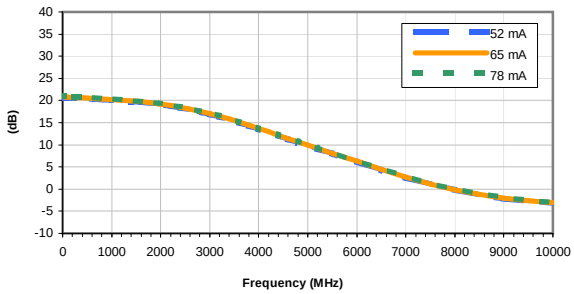
GAIN vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



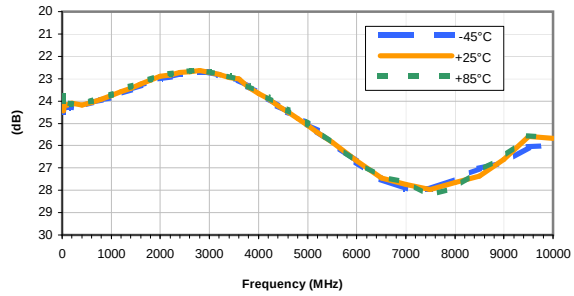
GAIN vs. CURRENT

INPUT POWER = -20dB, Temperature = +25°C



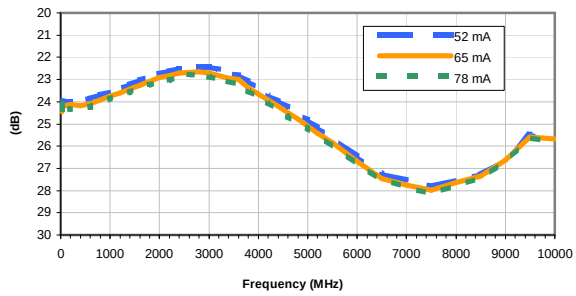
ISOLATION vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



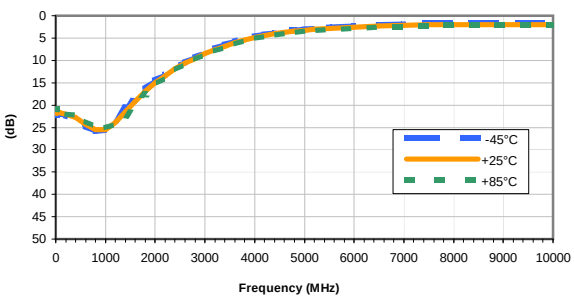
ISOLATION vs. CURRENT

INPUT POWER = -20dB, Temperature = +25°C



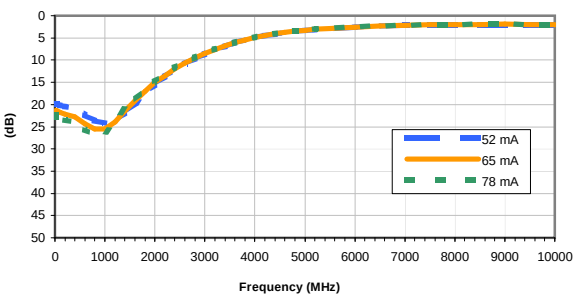
INPUT RETURN LOSS vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



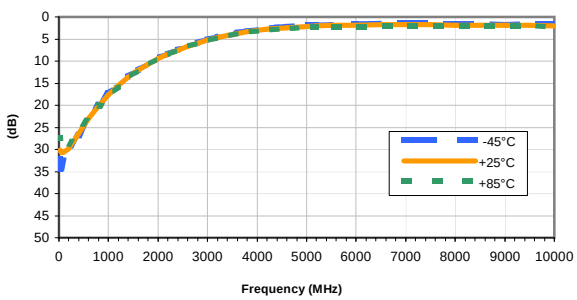
INPUT RETURN LOSS vs. CURRENT

INPUT POWER = -20dB, Temperature = +25°C



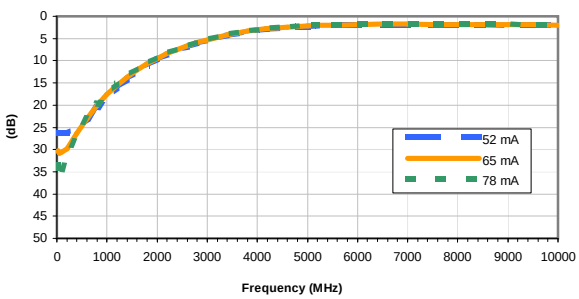
OUTPUT RETURN LOSS vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



OUTPUT RETURN LOSS vs. CURRENT

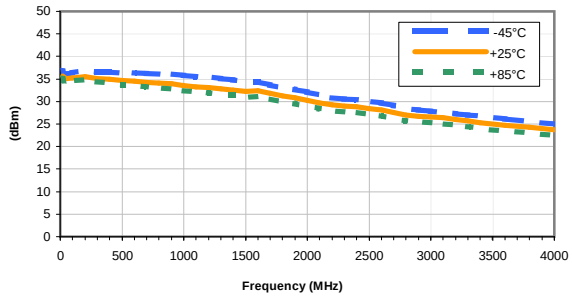
INPUT POWER = -20dB, Temperature = +25°C



Typical Performance Curves

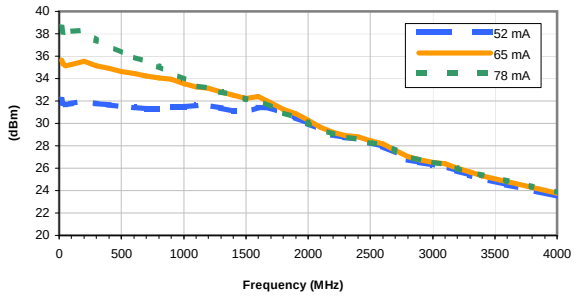
OUTPUT IP3 vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



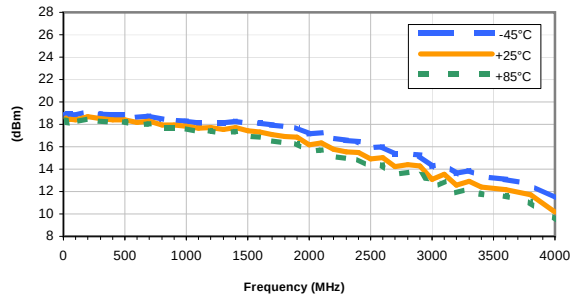
OUTPUT IP-3 vs. CURRENT

INPUT POWER = -20dB, Temperature = +25°C



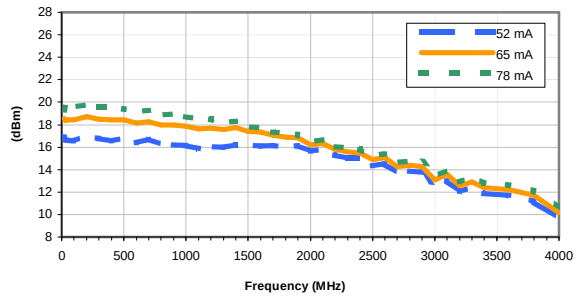
OUTPUT POWER at 1dB Compression vs. TEMPERATURE

CURRENT = 65 mA



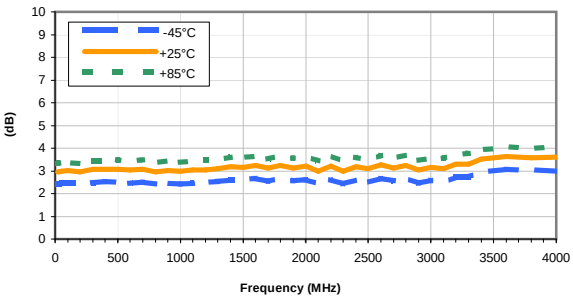
OUTPUT POWER at 1dB Compression vs. CURRENT

Temperature = +25°C



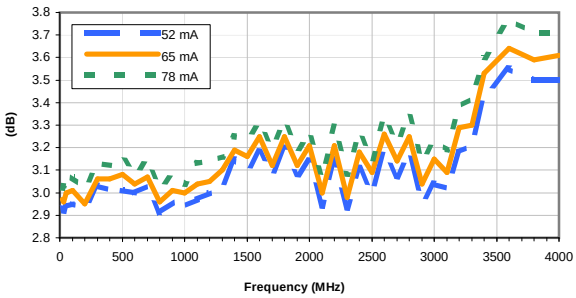
Noise Figure vs. TEMPERATURE

CURRENT = 65 mA



Noise Figure vs. CURRENT

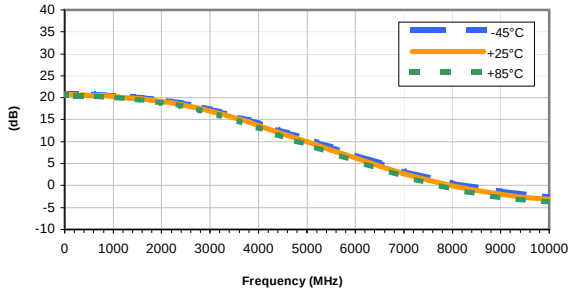
Temperature = +25°C



Typical Performance Curves

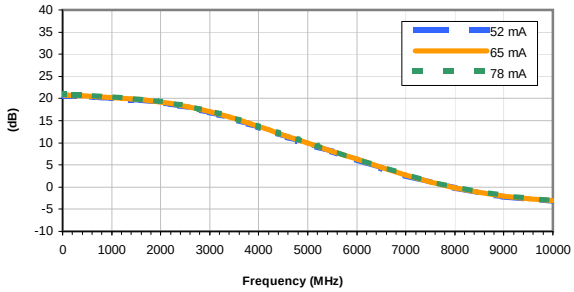
GAIN vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



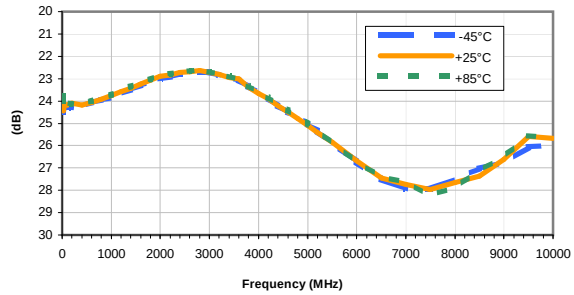
GAIN vs. CURRENT

INPUT POWER = -20dB, Temperature = +25°C



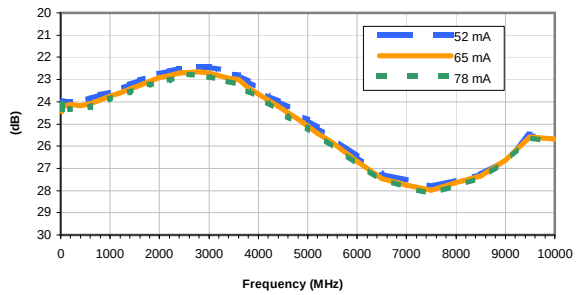
ISOLATION vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



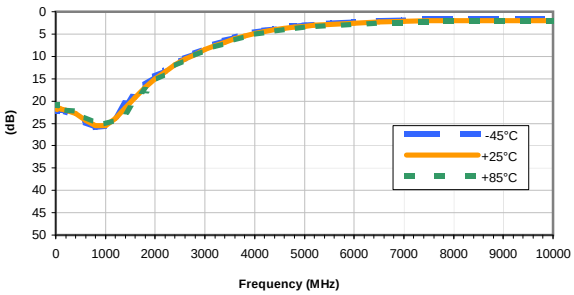
ISOLATION vs. CURRENT

INPUT POWER = -20dB, Temperature = +25°C



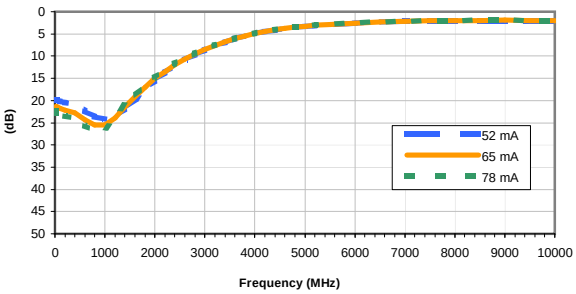
INPUT RETURN LOSS vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



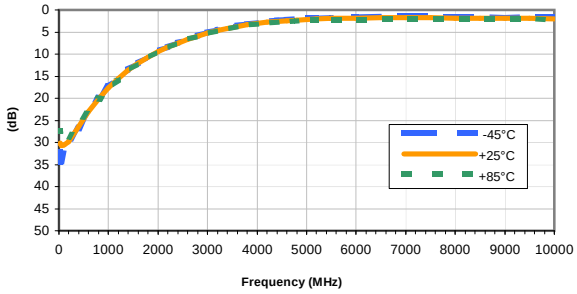
INPUT RETURN LOSS vs. CURRENT

INPUT POWER = -20dB, Temperature = +25°C



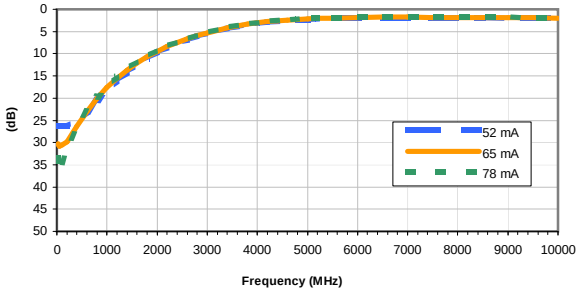
OUTPUT RETURN LOSS vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



OUTPUT RETURN LOSS vs. CURRENT

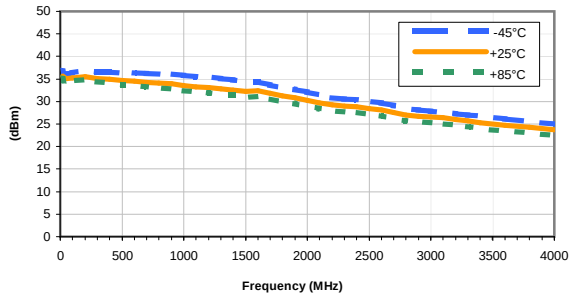
INPUT POWER = -20dB, Temperature = +25°C



Typical Performance Curves

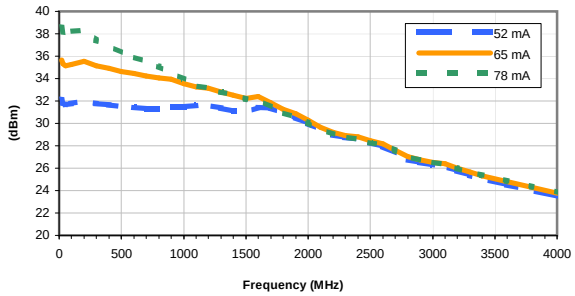
OUTPUT IP3 vs. TEMPERATURE

INPUT POWER = -20dB, CURRENT = 65 mA



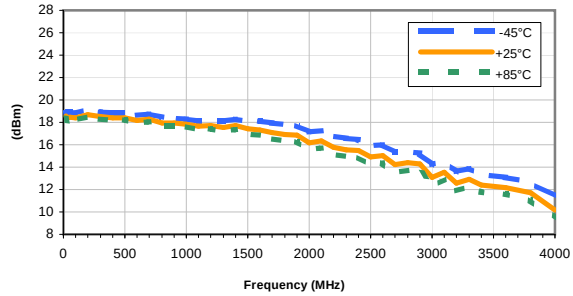
OUTPUT IP-3 vs. CURRENT

INPUT POWER = -20dB, Temperature = +25°C



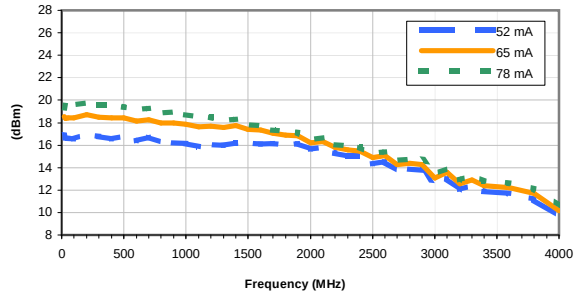
OUTPUT POWER at 1dB Compression vs. TEMPERATURE

CURRENT = 65 mA



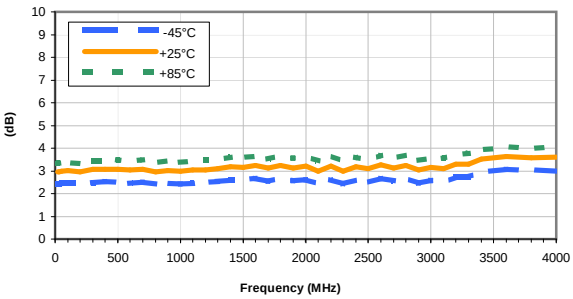
OUTPUT POWER at 1dB Compression vs. CURRENT

Temperature = +25°C



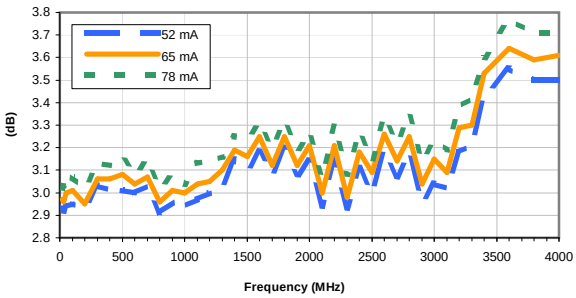
Noise Figure vs. TEMPERATURE

CURRENT = 65 mA



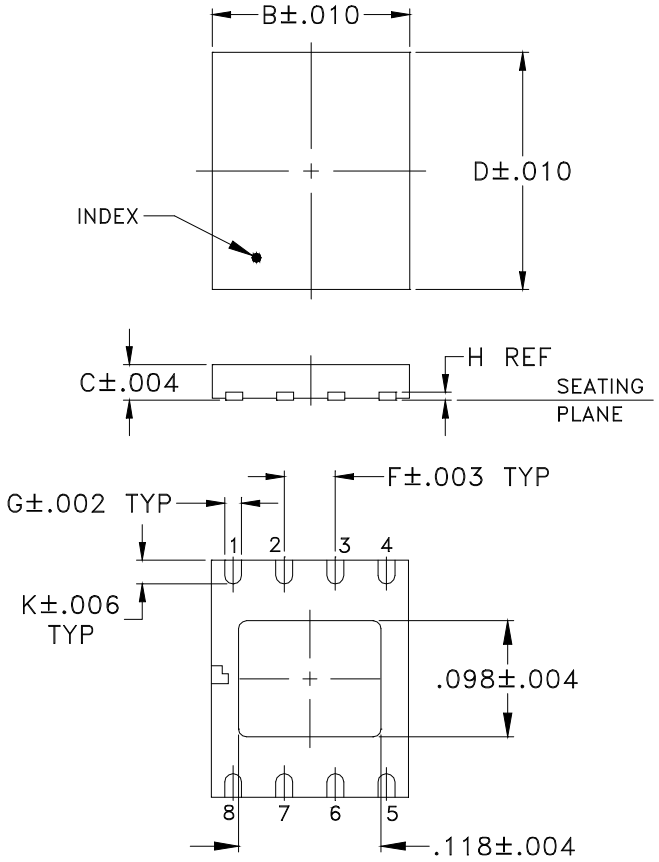
Noise Figure vs. CURRENT

Temperature = +25°C

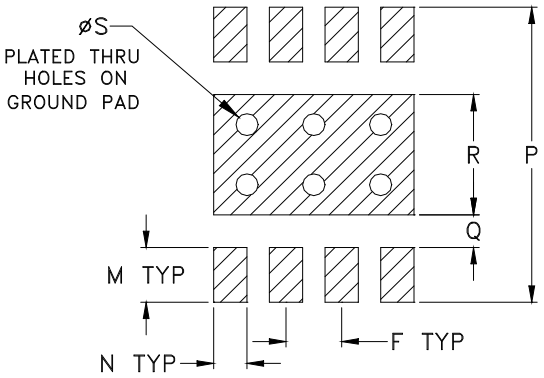


DL1020

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N
DL1020	-- --	.193 (4.90)	.035 (0.90)	.236 (6.00)	-- --	.050 (1.27)	.017 (0.42)	.008 (0.20)	-- --	.024 (0.60)	-- --	.050 (1.27)	.030 (0.76)

CASE #	P	Q	R	S	T	WT. GRAM
DL1020	.270 (6.86)	.030 (0.76)	.110 (2.79)	.020 (0.51)	-- --	.08

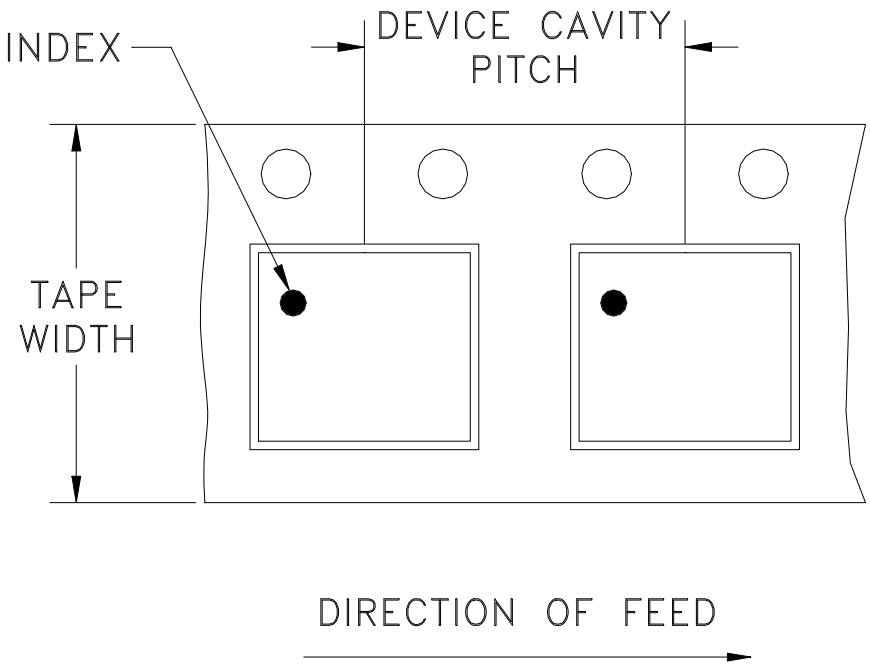
Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3Pl. ± .004

Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

Tape & Reel Packaging TR-F68

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
12	8	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000
		13	Standard	2000
				3000
				4000

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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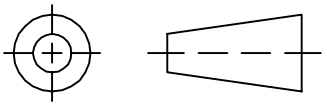
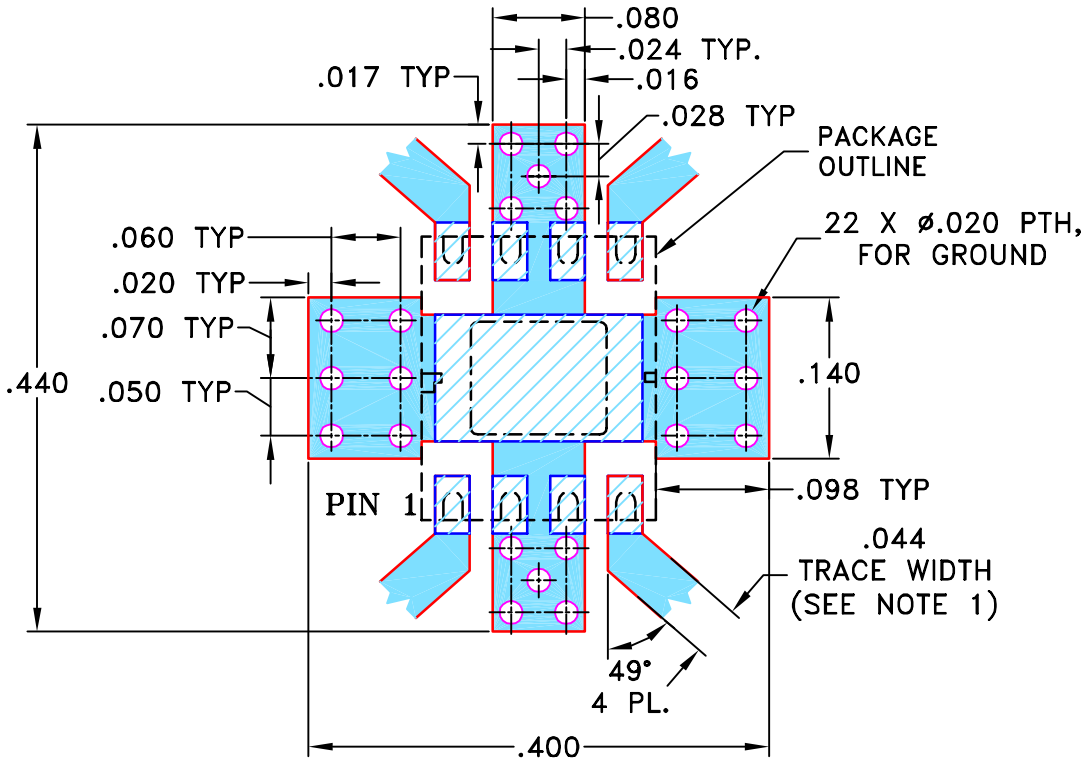
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M93927	NEW RELEASE	08/19/04	GF	WP
A	M102713	ADDED "...WITH SMOBC"	01/12/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION FOR DL1020 CASE STYLE, "qb" PIN CONNECTION



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B 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 WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	GF	08/18/04
TOLERANCES ON:	CHECKED	IL	08/19/04
2 PL DECIMALS ±	APPROVED	WP	08/19/04
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

ASHEETA1.DWG REV:A DATE:01/12/95

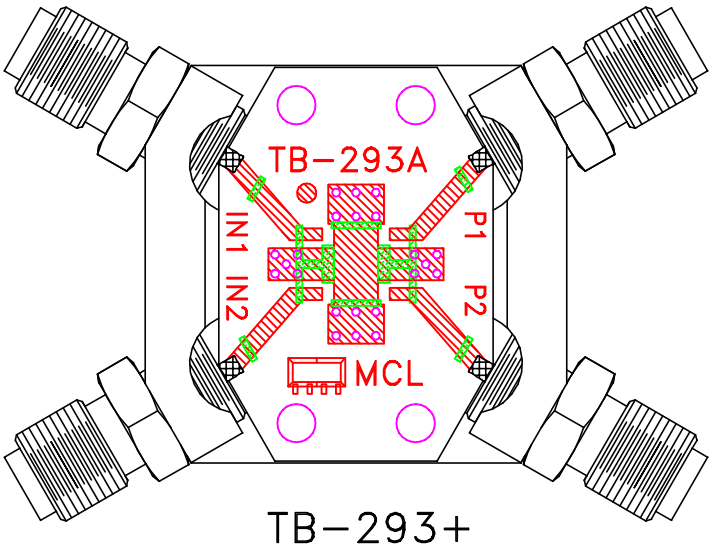
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, qb, DL1020, MERA556/7456, TB-293

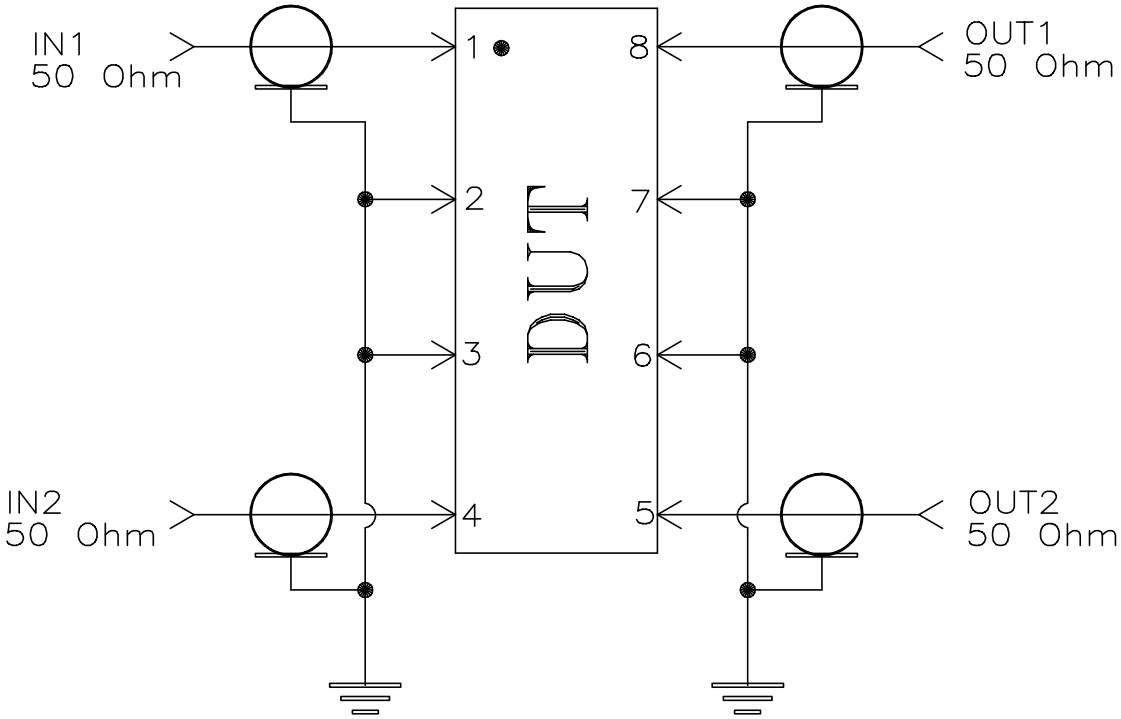
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-164	A

FILE:	SCALE:	SHEET:
98PL164	6:1	1 OF 1

Evaluation Board and Circuit



TB-293+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

Mini-Circuits®

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Environmental Specifications ENV38

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-45° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours. Soak at 85°C/85%RH for 168 hours Reflow 3 cycles at 260°C peak	J-STD-020