WIDEBAND, MICROWAVE

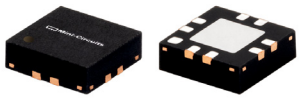
Monolithic Amplifier

AVA-24A+

50Ω 5 to 20 GHz

THE BIG DEAL

- Surface Mount Amplifier up to 20 GHz
- Integrated matching, DC Blocks and bias circuits
- High Reverse Isolation
- Gain, 12.3 dB typ. & Flatness, ±1.3 dB
- Output Power, up to +18.3 dBm typ.
- Excellent isolation, 36 dB typ.
- Single Positive Supply Voltage, +5V
- Integrated DC blocks, Bias-Tee & Microwave bypass capacitor
- Unconditionally Stable
- Aqueous washable; 3mm x 3mm SMT package



Generic photo used for illustration purposes only

CASE STYLE: DQ849

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- Military EW and Radar
- DBS
- Wideband Isolation amplifier
- Microwave point-to-point radios
- Satellite systems

PRODUCT OVERVIEW

The Mini-Circuits AVA-24A+ is a surface mount, microwave amplifier fabricated using InGaAs PHEMT technology and is fully integrated gain block up to 20 GHz. It is packaged in Mini-Circuits industry standard 3x3 mm MCLP (QFN) package, which provides excellent RF and thermal performance. The AVA-24A+ integrates the entire matching network with the majority of the bias circuit inside the package, reducing the need for complicated external circuits. This approach makes the AVA-24A+ extremely flexible and enables simple, straightforward use.

KEY FEATURES

Feature	Advantages
Wideband, 5 to 20 GHz	Broad frequency range supports a wide array of applications from microwave radio and radar , to military communications and countermeasures.
Excellent Gain Flatness	Typical ±0.8 dB gain flatness across the entire frequency range minimizes the need for external equalizer networks making it a great fit for instrumentation and EW applications.
High Isolation	With reverse isolation of 36 dB (24 dB directivity), the AVA-24A+ is an excellent choice for buffering broadband circuits. It is an ideal LO driver amplifier and provides designers system flexibility and margin when integrating cascaded RF components.
Manufacturability	MSL1 and ESD Class1A (HBM) ratings minimize special handling on production lines.

REV. B
ECO-011155
AVA-24A+
MCL NY
211227

ELECTRICAL SPECIFICATIONS[1] AT 25°C, Z_O=50Ω, (REFER TO CHARACTERIZATION CIRCUIT, FIG. 1)

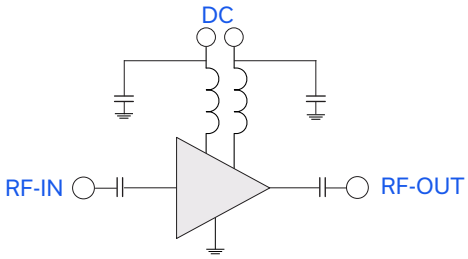
Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		5.0		20.0	GHz
DC Voltage (V_{D1}, V_{D2})			5.0		V
DC Current (I_{D1}+I_{D2})			120	147	mA
Gain	5.0	—	12.2		dB
	8.0	10.0	12.8		
	10.0	10.0	12.4		
	12.0	—	11.8		
	14.0	—	11.5		
	16.0	—	11.6		
	18.0	—	11.3		
	20.0	8.5	10.1		
Input Return Loss	5.0	—	12.2		dB
	8.0	10.0	14.5		
	10.0	10.0	19.3		
	12.0	—	15.9		
	14.0	—	15.7		
	16.0	10.0	13.8		
	18.0	—	9.2		
	20.0	—	7.0		
Output Return Loss	5.0		9.2		dB
	8.0		10.6		
	10.0		13.1		
	12.0		11.6		
	14.0		11.8		
	16.0		11.3		
	18.0		11.3		
	20.0		11.4		
Output IP3	5.0		27.2		dBm
	8.0		26.6		
	10.0		25.7		
	12.0		25.0		
	14.0		24.0		
	16.0		22.9		
	18.0		22.0		
	20.0		21.4		
Output Power @ 1 dB compression	5.0	—	18.1		dBm
	8.0	—	19.1		
	10.0	16.0	18.9		
	12.0	—	18.4		
	14.0	—	18.7		
	16.0	—	19.4		
	18.0	—	20.0		
	20.0	—	18.6		
Noise Figure	5.0		9.0		dB
	8.0		5.1		
	10.0		5.3		
	12.0		5.7		
	14.0		6.0		
	16.0		6.3		
	18.0		6.7		
	20.0		6.9		
Directivity (Isolation-Gain)			24.0		dB
DC Current Variation vs. Temperature [2]			0.050		mA/°C
DC Current Variation vs. Voltage			0.002		mA/mA
Thermal Resistance			53		°C/W

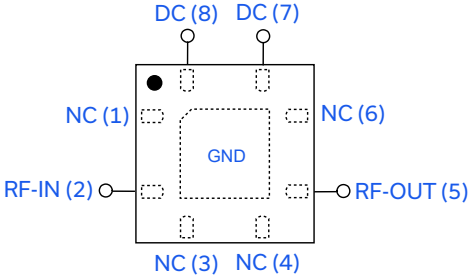
MAXIMUM RATINGS(3)

Parameter	Ratings
Operating Temperature (4)	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Channel Temperature	150°C
DC Voltage (Pad 7,8)	+5.5V
Voltage (Pads 2, 5)	+10V
Power Dissipation	860 mW
DC Current (Pad 7+8) at V_D=5V	160mA
Input Power	+20 dBm

(1) Measured on Mini-Circuits Characterization test fixture TB-547-1A+. See Characterization Test Circuit (Fig. 1)
(2) (Current at 85°C - Current at -45°C)/130
(3) Permanent damage may occur if any of these limits are exceeded. These maximum ratings are not intended for continuous normal operation.
(4) Defined with reference to ground pad temperature.

SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION

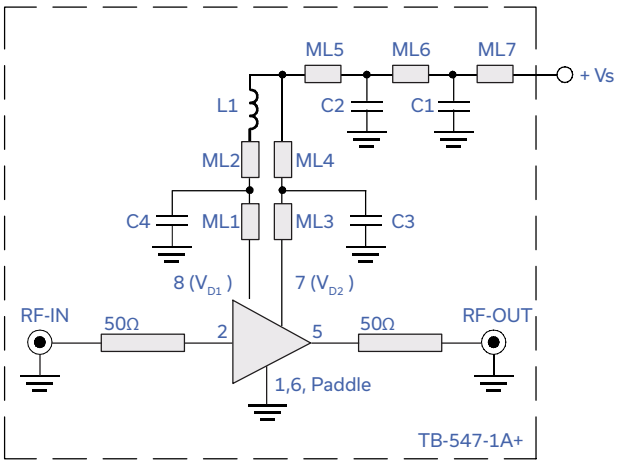




Function	Pad Number	Description (See Application Circuit, Fig. 2)
RF-IN	2	RF input pad
RF-OUT	5	RF output pad
DC	8(V_{D1}), 7 (V_{D2})	DC power supply
GND	paddle in center of bottom	Connected to ground
NOT USED	1,3,4,6	No internal connection; recommended use: per PCB Layout PL-328

*Pseudomorphic High Electron Mobility Transistor.

CHARACTERIZATION TEST CIRCUIT



C1=5.6pF, 0402 (NPO)
C2=18pF, 0402 (NPO)
C3=0.001µF, 0402 (NPO)
C4=0.1 µF, 0402 (X7R)
L1=3.3nH, 0805 (wire wound)

ML1-ML7 are short microstrip lines
Refer to 98-PL-328

Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization Test Board TB-547-1A+) Gain, Output power at 1dB compression (P1dB), Noise Figure, Output IP3 (OIP3) are measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:
1. Gain: Pin=-25 dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, +8 dBm/tone at output.
3. Vs adjusted for 5V at device (VD1 and VD2), compensating loss of bias lines.

RECOMMENDED APPLICATION CIRCUIT

(refer to evaluation board for PCB Layout and component values)

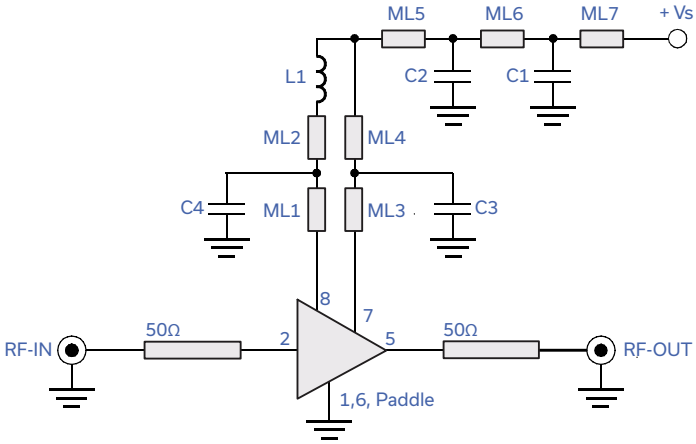
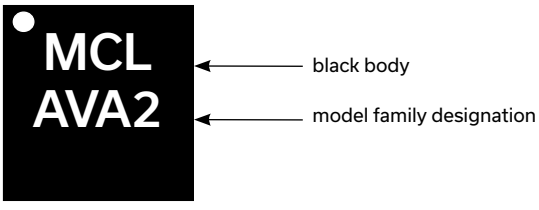


Fig 2. Recommended Application Circuit

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

Monolithic Amplifier AVA-24A+

ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS CLICK HERE

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	**DQ849** Plastic package, exposed paddle, lead finish: tin silver nickel
Tape & Reel **Standard quantities available on reel**	F104 7" reels with 10, 20, 50, 100, 200, 500,1K, 2K
Suggested Layout for PCB Design	PL-328
Evaluation Board	TB-547-1A+
Environmental Ratings	ENV08T1

ESD RATING

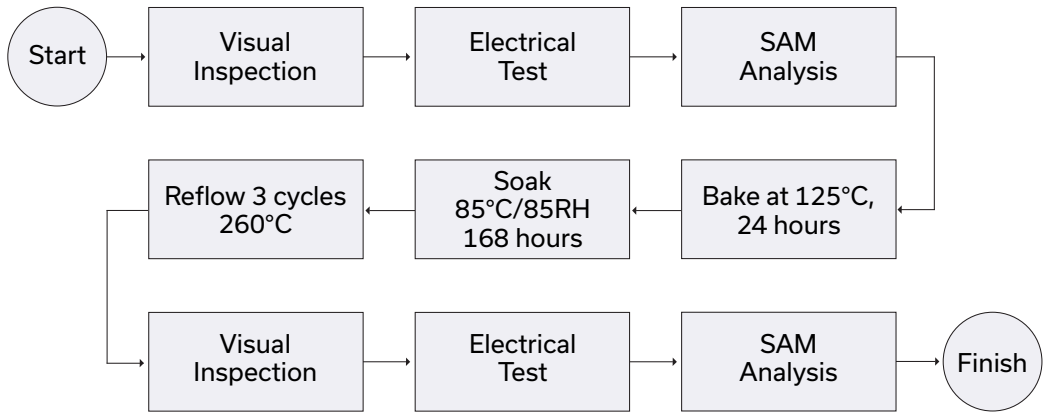
Human Body Model (HBM): 1A (250 to <500V) in accordance with ANSI/ESD STM 5.1 - 2001

Machine Model (MM): M1 (Pass 50V) in accordance with ANSI/ESD STM5.2-1999; passes 25V

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

MSL TEST FLOW CHART



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

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

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

TEST CONDITIONS: Vd = 5.00V, Idd = 127.88mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	7.57	50.79	7.47	4.20	37.02	0.73	22.76	13.65	19.25
4500	11.70	42.94	9.29	6.45	12.62	0.86	27.86	17.20	12.59
5000	12.54	40.20	11.94	9.33	10.09	0.93	28.04	17.92	9.01
5500	13.12	38.39	15.53	11.26	8.30	0.94	27.77	18.51	7.09
6000	13.38	37.23	18.25	11.33	7.15	0.94	27.80	18.73	6.01
6500	13.41	36.59	18.23	10.63	6.50	0.93	27.70	19.35	5.56
7000	13.34	36.33	17.16	10.27	6.27	0.92	27.41	19.18	5.31
7500	13.24	36.14	16.33	10.38	6.20	0.93	27.36	19.95	5.12
8000	13.12	36.05	16.47	10.50	6.24	0.93	27.08	19.45	5.08
8500	12.98	36.03	17.34	10.70	6.39	0.93	26.90	19.37	4.98
9000	12.88	35.91	18.50	11.01	6.45	0.93	26.86	19.48	5.10
9500	12.75	35.98	21.04	11.72	6.74	0.94	26.43	18.46	5.20
10000	12.75	36.02	23.63	12.36	6.86	0.94	26.24	19.07	5.26
10500	12.68	35.83	25.11	12.62	6.81	0.94	26.33	20.11	5.37
11000	12.59	35.62	25.96	12.89	6.74	0.95	25.96	19.25	5.41
11500	12.56	35.47	23.81	13.23	6.68	0.95	25.44	19.40	5.46
12000	12.54	35.14	20.16	14.58	6.50	0.97	25.35	18.80	5.54
12500	12.49	34.60	17.27	17.13	6.19	0.99	25.25	18.29	5.59
13000	12.26	34.87	14.75	19.02	6.50	1.01	24.77	18.19	5.71
13500	12.17	34.40	14.17	15.98	6.13	1.00	24.39	19.21	5.84
14000	12.03	33.88	12.76	12.62	5.63	0.98	24.19	19.04	5.99
14500	11.85	33.04	12.63	10.92	5.09	0.95	23.84	19.83	6.12
15000	11.98	32.43	12.83	10.39	4.63	0.94	23.73	19.41	6.12
15500	12.22	32.41	12.40	10.40	4.46	0.94	23.43	19.45	6.17
16000	12.37	32.41	12.02	10.63	4.39	0.95	23.17	19.93	6.17
16500	12.35	32.17	11.61	10.76	4.26	0.96	23.05	19.74	6.33
17000	12.20	31.86	10.45	9.80	4.03	0.95	22.89	20.61	6.28
17500	11.73	31.71	9.53	8.45	3.90	0.93	22.93	20.11	6.34
18000	11.41	31.63	9.49	8.11	3.89	0.93	22.23	20.39	6.35
18500	11.31	31.39	10.05	8.95	3.95	0.96	21.85	19.90	6.37
19000	11.34	31.14	10.76	11.28	4.12	1.01	21.95	18.47	6.31
19500	11.60	32.82	11.39	15.14	5.19	1.04	23.64	16.92	6.10
20000	11.03	33.57	12.42	11.85	5.96	0.98	25.06	15.23	6.17
20500	9.53	34.69	11.58	9.06	7.40	0.93	24.07	14.26	6.35
21000	6.72	32.55	9.23	8.80	7.45	0.98	20.26	12.56	6.65

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: Vd = 4.75V, Idd = 127.36mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	7.71	50.88	7.50	4.25	37.11	0.73	22.33	13.37	19.24
4500	11.87	42.85	9.29	6.49	12.28	0.86	30.42	16.74	12.59
5000	12.66	40.16	11.93	9.36	9.92	0.93	30.20	17.28	9.00
5500	13.24	38.36	15.63	11.38	8.19	0.95	29.02	17.91	7.06
6000	13.48	37.22	18.33	11.49	7.08	0.94	28.72	18.11	6.02
6500	13.51	36.59	18.26	10.77	6.45	0.93	28.33	18.75	5.55
7000	13.43	36.34	17.18	10.37	6.23	0.92	27.97	18.57	5.30
7500	13.33	36.15	16.37	10.47	6.15	0.93	27.73	19.42	5.11
8000	13.22	36.05	16.62	10.64	6.19	0.93	27.45	18.91	5.04
8500	13.08	36.02	17.32	10.90	6.34	0.93	27.29	18.76	4.95
9000	12.98	35.91	18.66	11.22	6.41	0.93	27.24	18.82	5.10
9500	12.83	35.98	20.84	11.86	6.68	0.94	26.99	17.85	5.20
10000	12.84	36.02	23.39	12.45	6.80	0.94	26.81	18.46	5.30
10500	12.77	35.81	24.63	12.79	6.73	0.95	26.71	19.51	5.38
11000	12.71	35.57	25.81	13.14	6.64	0.95	26.34	18.63	5.41
11500	12.68	35.43	23.32	13.54	6.57	0.95	25.83	18.78	5.41
12000	12.67	35.09	20.29	14.81	6.39	0.97	25.91	18.09	5.55
12500	12.62	34.54	17.69	17.10	6.07	0.99	25.79	17.59	5.56
13000	12.40	34.80	15.08	18.77	6.36	1.01	25.30	17.53	5.72
13500	12.31	34.33	14.71	16.23	6.01	1.00	24.74	18.62	5.81
14000	12.20	33.79	13.05	13.00	5.51	0.98	24.49	18.49	5.99
14500	12.03	32.97	13.17	11.24	5.01	0.95	24.13	19.33	6.11
15000	12.13	32.40	12.66	10.56	4.55	0.94	24.09	18.90	6.15
15500	12.34	32.40	12.56	10.27	4.40	0.94	23.87	18.87	6.25
16000	12.51	32.39	12.06	10.31	4.28	0.95	23.62	19.46	6.18
16500	12.48	32.16	12.15	10.37	4.19	0.95	23.63	19.12	6.39
17000	12.47	31.72	11.00	9.88	3.89	0.95	23.30	20.22	6.28
17500	12.08	31.48	10.52	8.80	3.78	0.93	23.26	19.70	6.36
18000	11.84	31.32	10.24	8.56	3.72	0.93	22.50	20.04	6.31
18500	11.73	31.12	10.66	9.49	3.78	0.96	22.21	19.45	6.35
19000	11.72	30.90	11.25	11.97	3.93	1.01	22.75	17.93	6.30
19500	11.93	32.64	11.16	16.37	4.92	1.05	25.99	16.40	6.15
20000	11.32	33.49	11.59	12.37	5.69	1.00	28.24	14.65	6.23
20500	9.89	34.74	11.26	9.16	7.15	0.94	22.36	13.63	6.29
21000	6.97	32.66	9.75	8.46	7.36	0.95	19.71	11.97	6.56

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: Vd = 5.25V, Idd = 128.47mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	7.44	50.68	7.43	4.19	37.01	0.73	22.67	13.83	19.34
4500	11.50	43.04	9.22	6.45	13.02	0.86	26.90	17.56	12.68
5000	12.38	40.25	11.92	9.27	10.31	0.93	27.22	18.33	9.08
5500	13.00	38.39	15.67	11.21	8.43	0.94	27.36	18.96	7.13
6000	13.25	37.23	18.26	11.25	7.23	0.93	27.51	19.17	6.07
6500	13.28	36.59	17.96	10.51	6.57	0.92	27.54	19.78	5.61
7000	13.20	36.33	16.86	10.08	6.33	0.92	27.25	19.65	5.37
7500	13.10	36.14	16.15	10.13	6.25	0.93	27.29	20.47	5.14
8000	12.99	36.04	16.48	10.37	6.31	0.93	27.00	20.04	5.14
8500	12.85	36.02	17.26	10.69	6.46	0.93	26.82	19.87	5.06
9000	12.75	35.89	18.78	10.99	6.53	0.93	26.79	19.86	5.15
9500	12.60	35.99	20.85	11.54	6.84	0.93	26.31	18.97	5.27
10000	12.59	36.05	23.75	12.05	6.97	0.94	26.13	19.56	5.36
10500	12.52	35.85	25.86	12.41	6.93	0.94	26.26	20.61	5.44
11000	12.45	35.64	27.78	12.85	6.87	0.94	25.89	19.78	5.47
11500	12.41	35.49	24.66	13.34	6.82	0.95	25.44	19.90	5.53
12000	12.38	35.16	21.03	14.49	6.64	0.96	25.28	19.16	5.66
12500	12.32	34.64	18.03	16.36	6.34	0.98	25.08	18.70	5.65
13000	12.08	34.91	15.44	17.91	6.67	1.00	24.57	18.68	5.79
13500	11.97	34.43	14.46	16.11	6.31	1.00	24.32	19.77	5.92
14000	11.86	33.88	13.09	13.19	5.80	0.98	24.10	19.66	6.11
14500	11.68	33.07	12.76	11.54	5.27	0.96	23.76	20.33	6.20
15000	11.71	32.54	11.96	10.65	4.81	0.95	23.65	19.98	6.25
15500	11.85	32.60	11.88	10.12	4.69	0.95	23.20	19.85	6.34
16000	11.97	32.64	11.39	9.93	4.58	0.95	22.93	20.38	6.31
16500	11.93	32.44	11.35	10.00	4.50	0.95	22.68	19.95	6.50
17000	11.87	32.02	11.06	9.76	4.28	0.95	22.58	20.94	6.41
17500	11.57	31.71	10.78	9.16	4.16	0.94	22.86	20.62	6.43
18000	11.34	31.54	10.46	9.04	4.12	0.95	22.14	20.95	6.39
18500	11.16	31.42	11.51	9.92	4.30	0.96	21.83	20.55	6.51
19000	11.16	31.18	11.19	12.06	4.33	1.01	21.71	19.14	6.40
19500	11.38	32.89	11.61	16.51	5.43	1.04	22.57	17.63	6.31
20000	10.75	33.60	11.27	13.25	6.16	1.02	23.48	15.95	6.42
20500	9.30	34.64	10.72	9.75	7.59	0.97	25.04	14.88	6.43
21000	6.51	32.42	9.78	8.54	7.56	0.95	21.58	13.12	6.69

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: Vd = 5.00V, Idd = 121.81mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	8.94	53.06	7.40	4.23	40.84	0.74	21.52	12.66	18.55
4500	14.21	42.05	9.30	6.13	8.42	0.83	25.87	16.68	11.54
5000	14.36	39.92	11.56	8.92	7.80	0.92	28.81	17.73	7.97
5500	14.73	38.33	14.59	11.05	6.80	0.94	32.01	18.24	6.08
6000	14.94	37.25	18.10	11.51	6.02	0.94	32.86	18.48	5.01
6500	14.95	36.64	19.49	10.83	5.54	0.92	32.55	18.99	4.53
7000	14.89	36.40	18.66	10.48	5.36	0.92	32.89	19.01	4.31
7500	14.78	36.20	16.94	10.51	5.26	0.93	31.88	19.50	4.12
8000	14.65	36.13	16.71	10.40	5.28	0.93	32.89	19.16	4.09
8500	14.53	36.04	17.43	10.47	5.33	0.92	32.99	19.13	4.01
9000	14.45	35.91	17.66	10.89	5.36	0.93	33.21	19.25	4.10
9500	14.32	36.01	19.95	11.79	5.65	0.94	33.84	18.24	4.17
10000	14.40	36.00	21.65	12.34	5.66	0.94	33.67	18.73	4.28
10500	14.32	35.81	20.18	12.42	5.58	0.95	32.50	19.86	4.37
11000	14.27	35.58	18.55	12.55	5.46	0.95	32.87	19.37	4.37
11500	14.27	35.40	17.81	12.63	5.35	0.95	32.29	19.37	4.37
12000	14.29	35.09	14.64	14.62	5.19	0.98	33.31	18.91	4.51
12500	14.38	34.41	13.88	18.30	4.82	1.01	34.36	18.23	4.52
13000	14.25	34.58	13.11	21.29	4.97	1.03	33.60	17.94	4.64
13500	14.24	34.05	13.78	15.86	4.63	1.00	32.74	18.72	4.72
14000	14.21	33.53	13.49	11.80	4.23	0.95	32.63	18.43	4.90
14500	14.13	32.64	15.39	10.21	3.81	0.90	31.19	19.12	4.95
15000	14.36	32.06	16.55	9.97	3.49	0.89	31.62	18.60	4.95
15500	14.80	31.79	15.62	10.25	3.23	0.90	31.31	18.72	5.00
16000	15.19	31.59	13.56	10.54	3.01	0.91	30.52	18.52	5.02
16500	15.23	31.25	12.50	9.61	2.81	0.89	32.17	18.87	5.25
17000	14.89	31.16	9.87	7.18	2.56	0.83	31.04	19.36	5.40
17500	14.33	31.10	8.62	5.57	2.35	0.77	31.68	18.95	5.40
18000	14.03	30.90	8.99	5.47	2.29	0.78	30.41	19.36	5.42
18500	14.24	30.26	10.78	6.66	2.26	0.85	29.84	19.16	5.20
19000	14.66	29.46	11.44	9.38	2.26	0.95	29.29	18.28	5.01
19500	15.26	30.35	10.70	15.15	2.62	1.02	29.17	16.72	4.74
20000	15.07	31.32	14.00	12.12	3.05	0.94	26.76	14.77	4.94
20500	13.45	33.19	12.39	8.01	3.96	0.87	25.52	13.55	5.01
21000	11.04	33.26	8.49	8.46	4.81	0.97	21.28	12.39	5.37

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: Vd = 4.75V, Idd = 120.76mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	9.30	53.59	7.44	4.32	42.31	0.74	20.61	12.26	18.55
4500	14.82	41.79	9.31	6.15	7.64	0.83	24.54	15.86	11.57
5000	14.81	39.86	11.52	8.93	7.37	0.92	26.12	16.87	7.97
5500	15.13	38.33	14.54	11.08	6.51	0.94	28.61	17.39	6.08
6000	15.31	37.29	18.06	11.56	5.80	0.94	29.20	17.65	5.03
6500	15.32	36.69	19.65	10.88	5.35	0.92	29.10	18.14	4.53
7000	15.26	36.44	19.01	10.54	5.18	0.92	29.11	18.17	4.32
7500	15.14	36.24	17.25	10.55	5.09	0.93	28.52	18.65	4.13
8000	15.01	36.16	16.92	10.41	5.10	0.93	28.94	18.32	4.08
8500	14.89	36.07	17.54	10.46	5.14	0.92	29.03	18.30	4.00
9000	14.80	35.92	17.61	10.89	5.16	0.93	29.08	18.43	4.11
9500	14.71	36.00	19.54	11.81	5.39	0.94	29.25	17.42	4.17
10000	14.74	36.01	21.07	12.38	5.45	0.94	29.03	17.78	4.27
10500	14.67	35.82	19.59	12.44	5.37	0.95	28.70	18.89	4.36
11000	14.61	35.58	17.80	12.54	5.25	0.95	28.85	18.49	4.39
11500	14.62	35.39	16.94	12.60	5.13	0.95	28.44	18.51	4.43
12000	14.65	35.07	14.02	14.58	4.95	0.99	28.75	18.08	4.53
12500	14.75	34.38	13.37	18.37	4.58	1.01	29.06	17.41	4.52
13000	14.63	34.52	12.82	21.51	4.71	1.03	28.66	17.10	4.65
13500	14.64	33.99	13.55	15.85	4.39	1.00	28.45	17.83	4.75
14000	14.60	33.46	13.55	11.75	4.01	0.95	28.44	17.51	4.90
14500	14.51	32.55	15.67	10.17	3.62	0.90	28.08	18.38	4.94
15000	14.78	32.00	16.98	9.92	3.31	0.88	28.59	17.69	4.98
15500	15.27	31.70	16.12	10.23	3.05	0.89	28.53	17.68	5.03
16000	15.71	31.44	14.14	10.44	2.82	0.90	28.25	17.31	5.07
16500	15.79	31.04	13.29	9.38	2.60	0.87	28.39	17.88	5.29
17000	15.50	30.92	10.54	6.83	2.34	0.79	28.06	18.19	5.40
17500	14.97	30.83	9.22	5.18	2.12	0.71	28.58	17.84	5.44
18000	14.69	30.60	9.69	5.09	2.05	0.72	28.29	18.14	5.42
18500	14.97	29.89	11.68	6.33	2.00	0.82	28.02	17.83	5.21
19000	15.41	29.01	11.91	9.22	1.99	0.93	28.35	17.03	5.03
19500	16.15	29.64	9.99	16.18	2.19	1.02	26.43	15.28	4.78
20000	15.98	30.76	12.99	12.64	2.61	0.94	23.92	13.90	4.93
20500	14.50	32.89	13.18	7.85	3.43	0.84	22.54	12.51	4.99
21000	12.14	33.28	9.10	8.22	4.34	0.94	20.25	11.72	5.35

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: Vd = 5.25V, Idd = 123.78mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	8.46	52.51	7.32	4.10	39.76	0.72	22.18	13.10	18.54
4500	13.52	42.35	9.28	6.11	9.40	0.83	28.24	17.30	11.56
5000	13.86	40.01	11.61	8.89	8.34	0.92	32.75	18.45	7.99
5500	14.29	38.34	14.68	10.95	7.15	0.94	37.48	18.95	6.12
6000	14.52	37.23	18.10	11.37	6.28	0.93	35.51	19.21	5.02
6500	14.55	36.60	19.17	10.70	5.75	0.92	36.55	19.71	4.55
7000	14.49	36.32	18.18	10.37	5.54	0.92	36.12	19.76	4.34
7500	14.37	36.11	16.56	10.37	5.43	0.93	40.07	20.19	4.16
8000	14.24	36.05	16.49	10.22	5.45	0.92	36.31	19.85	4.10
8500	14.12	36.00	17.30	10.29	5.53	0.92	35.93	19.86	4.00
9000	14.03	35.86	17.79	10.72	5.58	0.93	35.34	19.98	4.12
9500	13.93	35.95	20.35	11.64	5.85	0.94	33.57	19.04	4.19
10000	13.98	35.99	22.44	12.19	5.92	0.94	33.49	19.59	4.27
10500	13.90	35.82	21.20	12.24	5.86	0.94	35.79	20.62	4.35
11000	13.84	35.62	19.81	12.34	5.76	0.94	34.93	20.07	4.42
11500	13.83	35.46	19.17	12.45	5.68	0.94	34.75	20.06	4.42
12000	13.85	35.11	15.65	14.47	5.50	0.98	33.49	19.70	4.52
12500	13.92	34.44	14.55	18.51	5.12	1.01	32.30	19.08	4.53
13000	13.76	34.65	13.41	21.06	5.30	1.03	31.79	18.78	4.68
13500	13.72	34.14	13.83	15.44	4.96	1.00	31.54	19.49	4.74
14000	13.65	33.65	13.12	11.55	4.53	0.95	30.85	19.26	4.88
14500	13.52	32.75	14.64	10.06	4.09	0.91	30.12	20.00	4.94
15000	13.77	32.18	15.70	9.92	3.74	0.90	29.45	19.53	4.93
15500	14.20	31.91	14.75	10.48	3.49	0.91	28.41	19.66	4.98
16000	14.51	31.78	12.79	10.97	3.31	0.93	27.68	19.63	5.05
16500	14.48	31.52	11.55	9.90	3.12	0.92	27.70	19.86	5.22
17000	14.02	31.56	9.10	7.30	2.89	0.86	27.74	20.24	5.36
17500	13.40	31.54	8.00	5.70	2.66	0.80	27.96	19.80	5.39
18000	13.07	31.38	8.34	5.61	2.62	0.81	27.00	20.18	5.37
18500	13.28	30.76	10.05	6.72	2.62	0.87	26.46	19.98	5.19
19000	13.70	30.01	11.00	9.16	2.62	0.95	25.96	19.27	4.99
19500	14.22	30.99	11.39	13.92	3.15	1.01	26.01	17.62	4.73
20000	13.91	32.10	14.67	11.59	3.75	0.94	27.61	15.80	4.87
20500	12.29	33.71	11.74	8.25	4.74	0.89	27.14	14.41	5.00
21000	9.89	33.06	8.01	9.23	5.36	1.02	22.29	13.34	5.40

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: Vd = 5.00V, Idd = 127.39mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	6.83	50.05	7.49	4.37	37.97	0.74	22.26	13.54	20.00
4500	10.58	43.10	9.26	6.72	14.82	0.87	30.09	16.86	13.59
5000	11.66	40.18	12.22	9.63	11.26	0.94	30.25	17.31	9.97
5500	12.36	38.27	16.36	11.76	9.05	0.95	29.56	18.12	8.04
6000	12.63	37.08	18.33	11.86	7.71	0.95	29.59	18.21	7.00
6500	12.63	36.48	17.01	10.98	7.03	0.94	29.32	18.84	6.51
7000	12.51	36.23	15.94	10.34	6.78	0.93	28.94	18.79	6.28
7500	12.39	36.05	16.20	10.15	6.72	0.93	28.81	19.73	6.04
8000	12.29	35.94	16.88	10.57	6.81	0.93	28.35	19.53	6.01
8500	12.19	35.86	17.66	11.37	6.96	0.94	28.09	18.93	5.97
9000	12.10	35.70	19.64	11.86	7.01	0.94	27.95	18.51	6.05
9500	11.90	35.90	21.37	11.84	7.37	0.94	27.37	18.37	6.17
10000	11.81	36.01	23.02	11.82	7.56	0.94	27.17	18.86	6.32
10500	11.74	35.83	27.26	12.41	7.56	0.94	27.13	19.39	6.37
11000	11.70	35.62	30.27	13.75	7.55	0.95	26.53	18.94	6.43
11500	11.68	35.31	26.66	15.71	7.41	0.97	26.04	18.62	6.48
12000	11.58	35.07	20.99	16.90	7.31	0.98	26.13	17.81	6.65
12500	11.42	34.74	19.06	15.71	7.09	0.98	25.87	17.86	6.66
13000	11.14	34.99	18.09	14.61	7.45	0.97	25.24	18.17	6.77
13500	11.08	34.43	16.76	14.00	6.98	0.97	24.96	18.68	6.89
14000	11.04	33.78	15.63	13.78	6.46	0.97	24.77	19.28	7.03
14500	11.00	32.89	15.02	14.50	5.87	0.98	24.38	19.24	7.15
15000	10.98	32.51	12.34	13.85	5.46	1.00	24.26	19.51	7.32
15500	10.86	32.62	10.67	11.27	5.28	0.99	24.21	19.08	7.47
16000	10.63	33.10	9.49	8.97	5.27	0.95	23.74	19.07	7.55
16500	10.25	33.22	9.47	7.44	5.21	0.90	23.61	18.77	7.70
17000	9.95	33.11	9.24	6.66	5.00	0.87	23.59	19.05	7.67
17500	9.84	32.66	10.31	6.93	4.96	0.88	23.43	19.81	7.58
18000	10.13	32.06	12.01	8.30	4.94	0.91	22.86	19.96	7.47
18500	10.33	31.53	14.04	10.75	5.03	0.95	22.69	19.69	7.39
19000	10.48	31.31	15.30	15.44	5.21	1.00	23.19	18.57	7.38
19500	10.20	33.24	13.40	21.74	6.76	1.03	24.95	16.68	7.45
20000	9.46	34.09	9.71	16.99	7.51	1.08	26.58	15.57	7.81
20500	7.71	35.47	7.85	15.70	9.95	1.13	23.34	13.88	8.00
21000	4.68	31.97	7.55	12.21	8.91	1.11	25.76	12.34	8.33

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: Vd = 4.75V, Idd = 127.14mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	6.99	50.08	7.51	4.42	37.73	0.75	21.93	13.25	19.96
4500	10.75	42.92	9.28	6.76	14.30	0.87	34.89	16.38	13.56
5000	11.79	40.06	12.23	9.72	10.98	0.94	33.97	16.71	9.99
5500	12.48	38.19	16.40	11.98	8.88	0.95	30.87	17.53	8.00
6000	12.74	37.02	18.42	12.17	7.61	0.95	30.57	17.64	6.95
6500	12.73	36.43	17.12	11.28	6.96	0.94	29.84	18.26	6.48
7000	12.62	36.18	16.03	10.63	6.71	0.94	29.34	18.20	6.25
7500	12.49	36.00	16.29	10.43	6.65	0.93	28.98	19.18	6.03
8000	12.39	35.89	16.96	10.87	6.73	0.94	28.54	18.96	5.97
8500	12.30	35.80	17.73	11.71	6.87	0.95	28.35	18.34	5.92
9000	12.22	35.63	19.71	12.23	6.91	0.95	28.22	17.91	6.03
9500	12.01	35.84	21.38	12.19	7.26	0.94	27.72	17.79	6.15
10000	11.94	35.93	22.82	12.17	7.42	0.94	27.47	18.26	6.23
10500	11.87	35.73	26.45	12.77	7.41	0.95	27.33	18.78	6.33
11000	11.83	35.50	29.21	14.18	7.37	0.96	26.76	18.32	6.38
11500	11.81	35.20	26.37	16.26	7.24	0.97	26.26	18.00	6.45
12000	11.72	34.95	21.09	17.45	7.11	0.98	26.53	17.20	6.62
12500	11.57	34.61	19.29	16.02	6.89	0.98	26.20	17.25	6.61
13000	11.31	34.85	18.35	14.79	7.22	0.97	25.52	17.57	6.71
13500	11.25	34.29	17.00	14.18	6.75	0.97	25.16	18.10	6.84
14000	11.22	33.65	15.93	13.98	6.25	0.97	24.91	18.73	7.01
14500	11.20	32.77	15.34	14.72	5.68	0.98	24.58	18.69	7.09
15000	11.20	32.38	12.60	13.98	5.28	1.00	24.47	19.00	7.24
15500	11.09	32.48	10.87	11.29	5.09	0.98	24.56	18.57	7.41
16000	10.88	32.93	9.63	8.97	5.05	0.95	24.04	18.59	7.50
16500	10.51	33.05	9.60	7.44	4.99	0.90	23.92	18.27	7.62
17000	10.23	32.93	9.34	6.69	4.78	0.87	23.82	18.62	7.60
17500	10.12	32.48	10.41	7.02	4.75	0.88	23.53	19.40	7.53
18000	10.41	31.88	12.08	8.49	4.72	0.92	22.95	19.50	7.40
18500	10.61	31.35	14.07	11.10	4.82	0.96	22.88	19.14	7.35
19000	10.74	31.17	15.30	16.02	5.00	1.00	23.95	17.93	7.30
19500	10.43	33.16	13.45	20.85	6.53	1.03	27.51	16.03	7.39
20000	9.66	34.13	9.70	16.10	7.34	1.07	27.87	14.89	7.71
20500	7.88	35.57	7.81	15.19	9.83	1.13	21.62	13.19	7.99
21000	4.86	32.08	7.51	12.20	8.82	1.11	22.96	11.71	8.32

Typical Performance Data

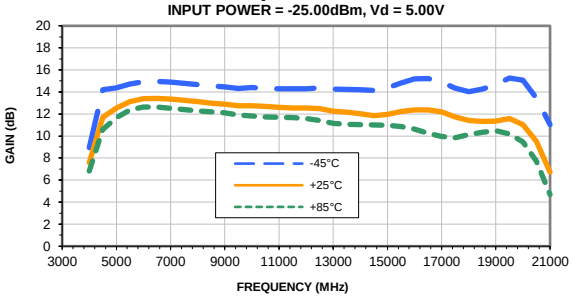
Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 5.25V, Idd = 127.61mA @ Temperature = +85°C

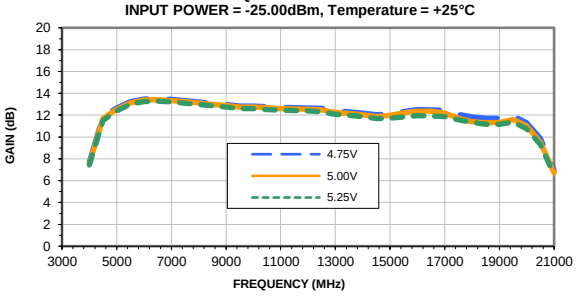
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
4000	6.67	49.97	7.46	4.33	38.12	0.74	22.27	13.74	20.08
4500	10.39	43.26	9.24	6.69	15.40	0.87	28.85	17.25	13.63
5000	11.51	40.29	12.21	9.55	11.58	0.94	29.17	17.82	10.02
5500	12.23	38.34	16.34	11.54	9.23	0.95	29.13	18.62	8.08
6000	12.50	37.13	18.20	11.56	7.83	0.94	29.30	18.72	7.02
6500	12.50	36.52	16.84	10.68	7.12	0.93	29.21	19.35	6.58
7000	12.38	36.26	15.78	10.06	6.86	0.93	28.85	19.30	6.31
7500	12.25	36.08	16.07	9.87	6.80	0.92	28.87	20.18	6.10
8000	12.15	35.97	16.77	10.28	6.89	0.93	28.37	20.01	6.06
8500	12.05	35.90	17.56	11.05	7.06	0.94	28.11	19.45	6.03
9000	11.96	35.73	19.57	11.52	7.11	0.94	27.94	19.03	6.10
9500	11.75	35.97	21.30	11.49	7.51	0.93	27.32	18.89	6.23
10000	11.66	36.07	23.10	11.47	7.69	0.93	27.11	19.37	6.34
10500	11.58	35.91	28.11	12.02	7.73	0.93	27.14	19.90	6.45
11000	11.53	35.70	31.60	13.31	7.73	0.95	26.51	19.47	6.52
11500	11.51	35.40	27.05	15.18	7.61	0.97	26.02	19.15	6.58
12000	11.39	35.16	20.82	16.38	7.52	0.98	26.01	18.36	6.68
12500	11.22	34.84	18.82	15.34	7.32	0.98	25.81	18.42	6.72
13000	10.94	35.11	17.86	14.33	7.72	0.97	25.20	18.70	6.84
13500	10.86	34.56	16.56	13.68	7.23	0.97	24.96	19.20	6.94
14000	10.80	33.91	15.39	13.46	6.69	0.97	24.79	19.76	7.11
14500	10.76	33.00	14.78	14.21	6.09	0.98	24.36	19.70	7.22
15000	10.73	32.63	12.13	13.73	5.67	1.00	24.24	19.93	7.38
15500	10.59	32.73	10.50	11.27	5.50	0.99	24.07	19.53	7.55
16000	10.34	33.25	9.36	8.97	5.51	0.96	23.62	19.49	7.62
16500	9.94	33.38	9.35	7.40	5.46	0.90	23.50	19.22	7.77
17000	9.63	33.29	9.13	6.56	5.25	0.87	23.55	19.42	7.72
17500	9.50	32.85	10.21	6.77	5.21	0.87	23.44	20.15	7.66
18000	9.79	32.24	11.95	8.02	5.17	0.90	22.87	20.33	7.56
18500	10.02	31.69	14.07	10.32	5.26	0.95	22.69	20.17	7.50
19000	10.20	31.47	15.39	14.74	5.44	0.99	22.91	19.13	7.42
19500	9.96	33.32	13.44	21.92	7.02	1.03	23.84	17.27	7.48
20000	9.23	34.06	9.70	17.66	7.70	1.08	24.70	16.16	7.85
20500	7.49	35.34	7.83	16.20	10.08	1.14	24.69	14.43	8.09
21000	4.45	31.90	7.51	12.49	9.09	1.12	23.66	12.92	8.41

Typical Performance Curves

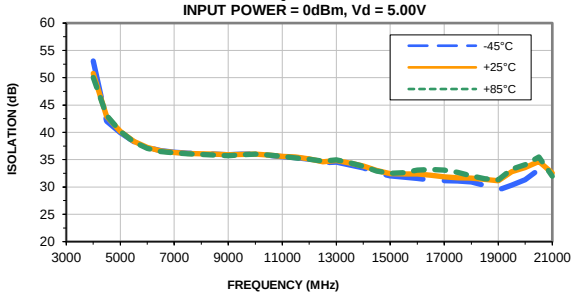
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25.00dBm, Vd = 5.00V



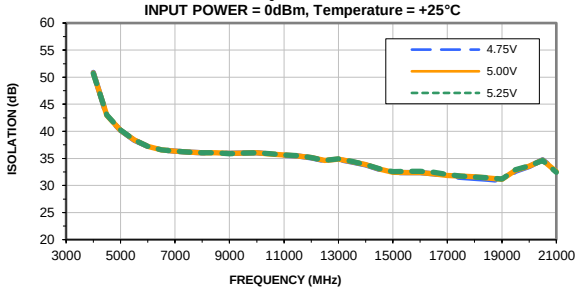
GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C



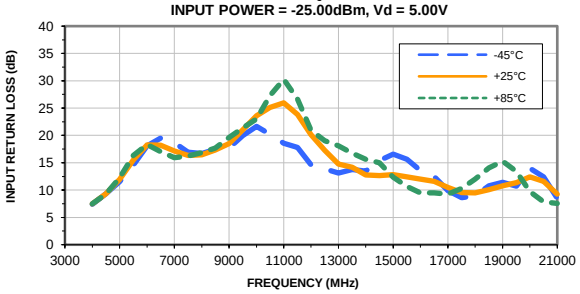
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = 0dBm, Vd = 5.00V



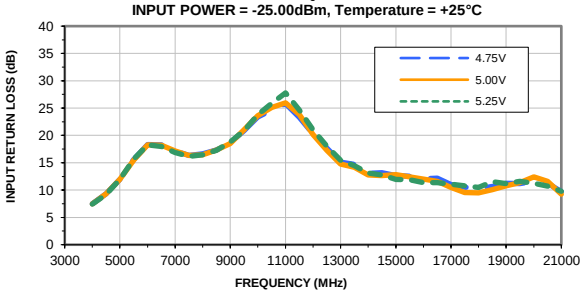
ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = 0dBm, Temperature = +25°C



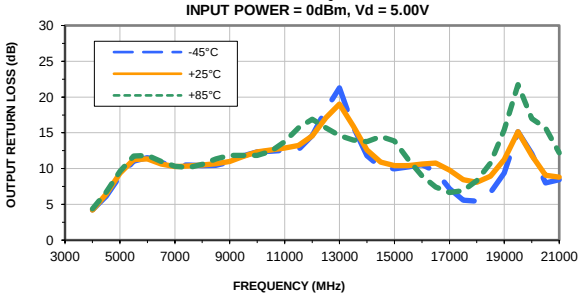
INPUT RETURN LOSS vs. FREQUENCY & TEMPEREATURE
INPUT POWER = -25.00dBm, Vd = 5.00V



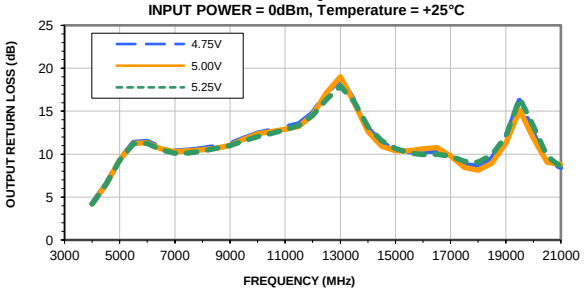
INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25.00dBm, Temperature = +25°C



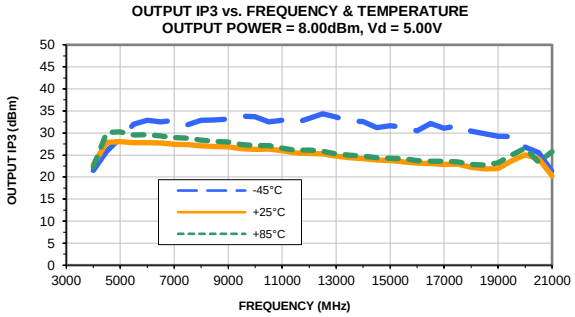
OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = 0dBm, Vd = 5.00V

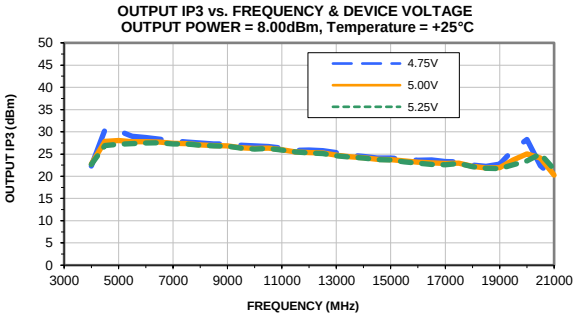


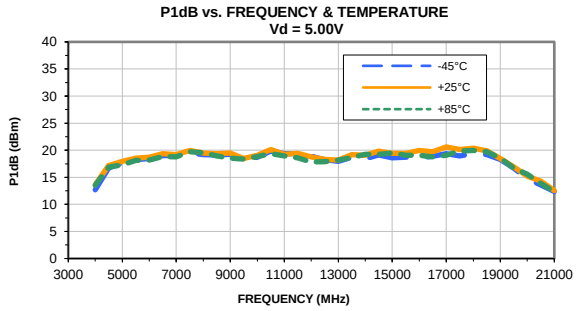
OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = 0dBm, Temperature = +25°C

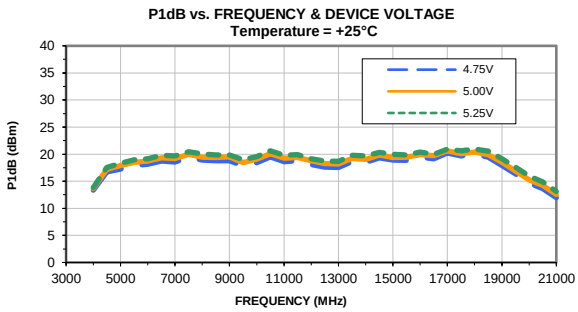


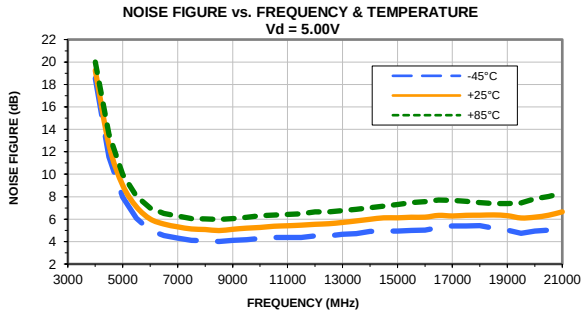
Typical Performance Curves

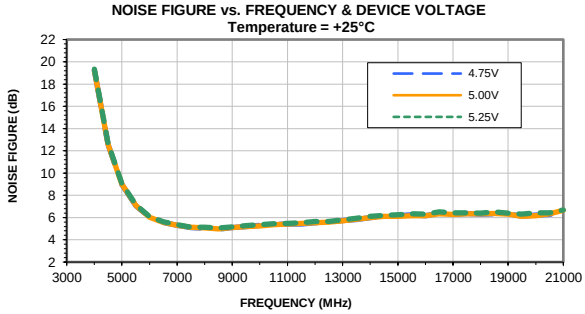


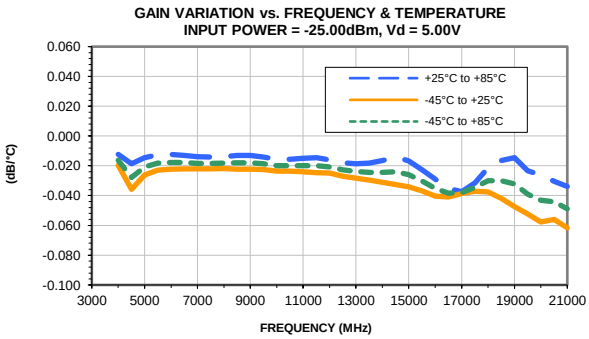








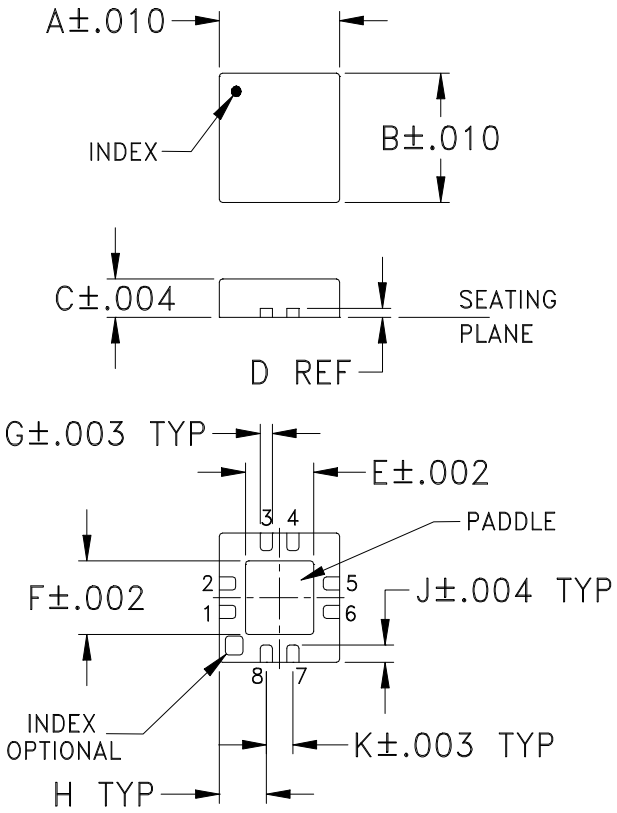




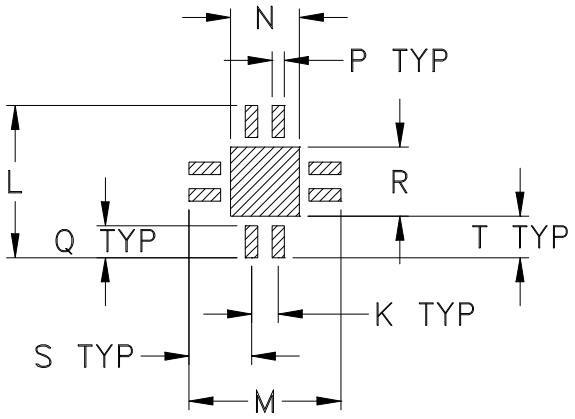
Case Style DQ

DQ849

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
DQ849	.118 (3.00)	.118 (3.00)	.035 (0.89)	.008 (0.20)	.067 (1.70)	.067 (1.70)	.012 (0.30)	.046 (1.17)	.016 (0.41)	.026 (0.66)	.148 (3.76)	.148 (3.76)	.067 (1.70)

CASE #	P	Q	R	S	T	WT. GRAM
DQ849	.012 (0.30)	.031 (0.79)	.067 (1.70)	.061 (1.55)	.041 (1.04)	.02

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

Notes:

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

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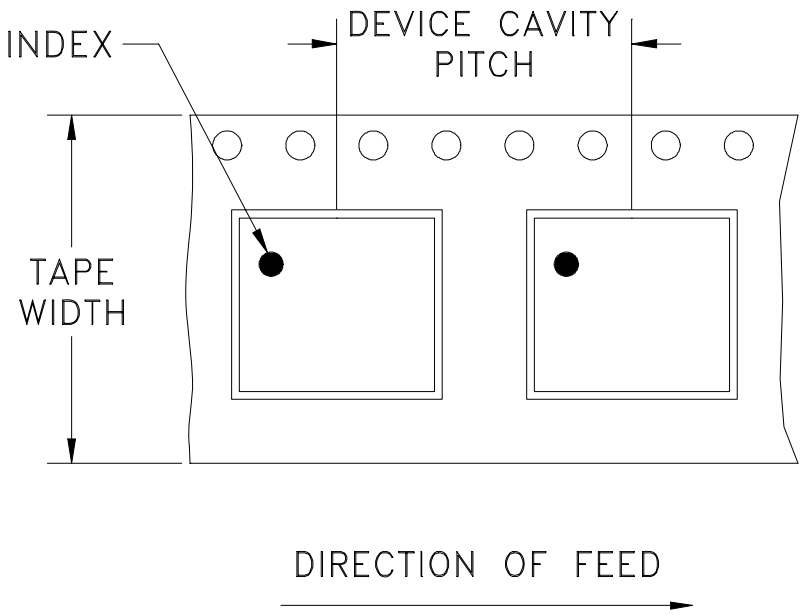
Tape & Reel Packaging TR-F104

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
		7	Standard	2000

Note: Please Consult individual model data sheet to determine device per reel availability.

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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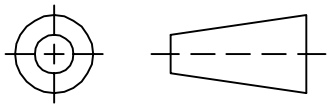
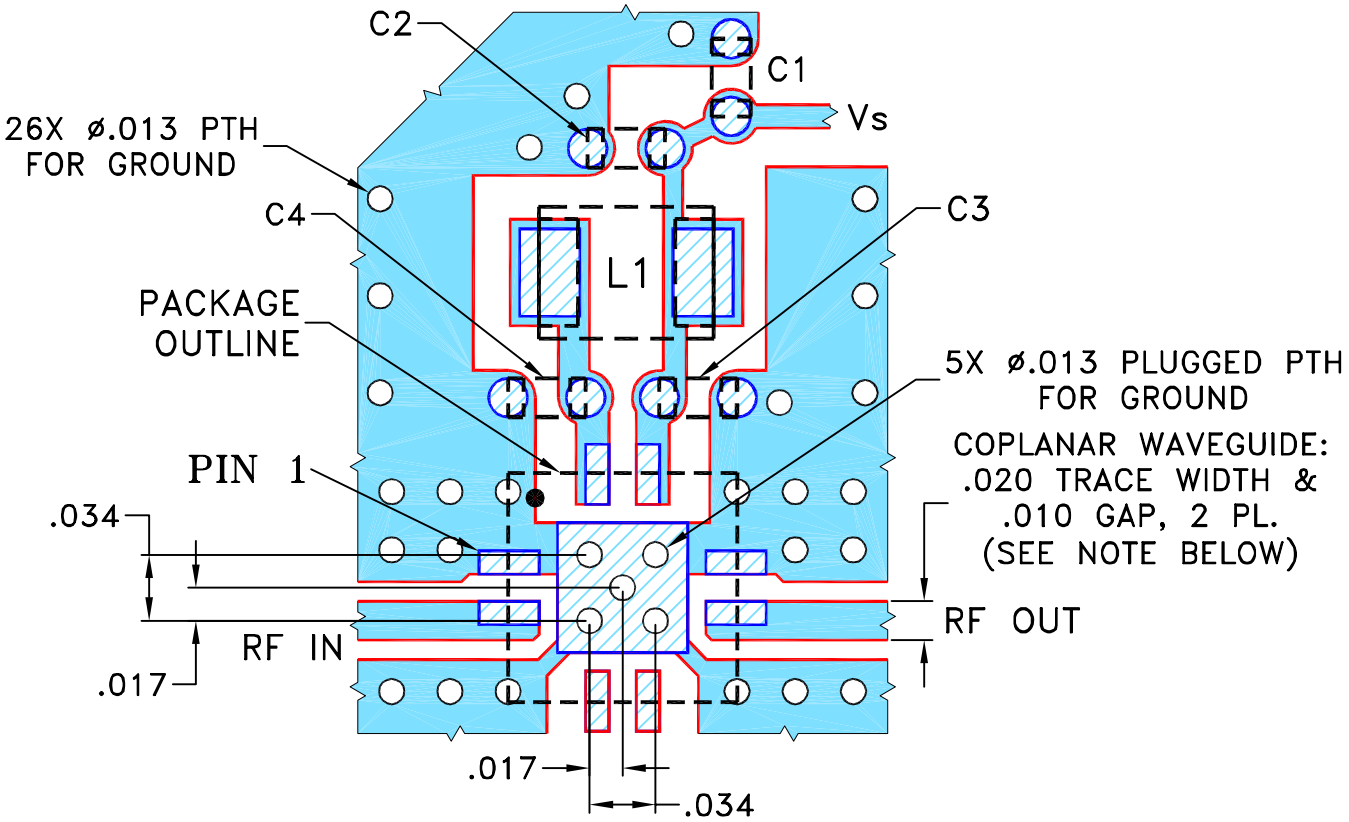
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M125952	NEW RELEASE	01/08/10	MMG	RD
A	M132664	UPDATED PATTERN & COMPONENTS	12/16/11	PW	DJ
B	M135298	UPDATED DESCRIPTION & NOTE 2	01/11/12	AV	DJ

SUGGESTED MOUNTING CONFIGURATION FOR DQ849 CASE STYLE, "08AM03" PIN CODE



NOTES:
1. COPLANAR WAVEGUIDE PARAMETERS ARE SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010" ± .001"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. 0402 AND 0805 CHIP COMPONENTS FOOTPRINTS ARE SHOWN FOR REFERENCE. VALUE OF COMPONENTS AS PER TB-547-X+.
3. 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	MMG	01/06/10
TOLERANCES ON:	CHECKED	IL	01/08/10
2 PL DECIMALS ±	APPROVED	RD	01/08/10
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

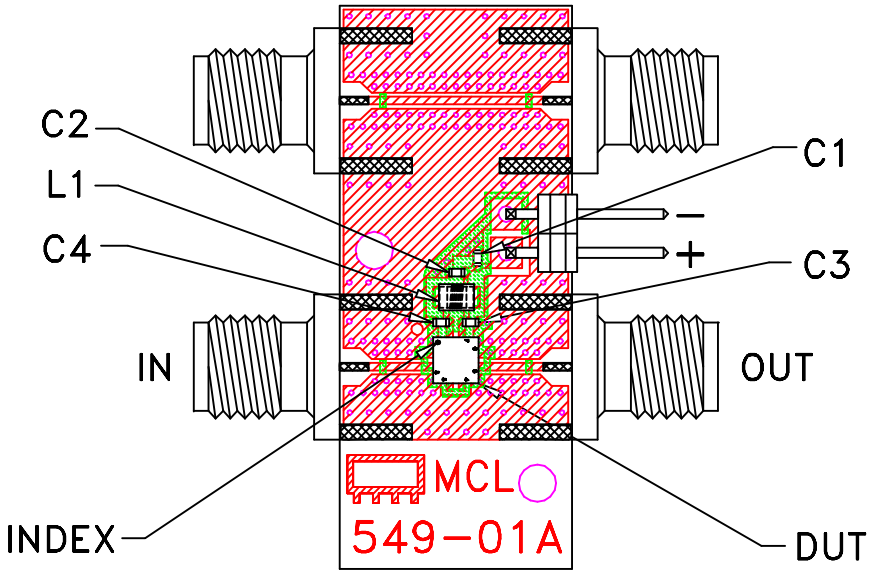
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 08AM03, DQ849, TB-547-X+

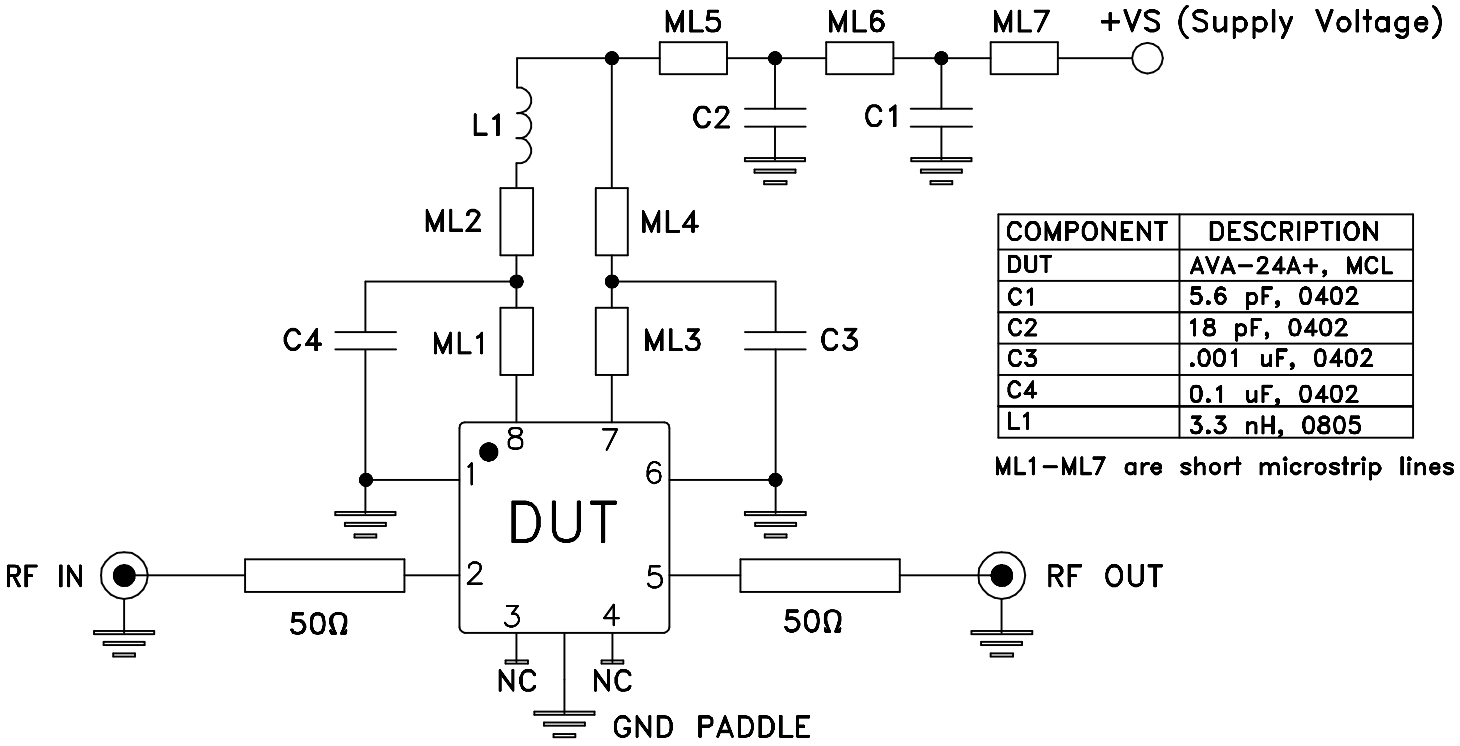
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-328	B

FILE:	SCALE:	SHEET:
98PL328	10:1	1 OF 1

Evaluation Board and Circuit



TB-547-1A+



COMPONENT	DESCRIPTION
DUT	AVA-24A+, MCL
C1	5.6 pF, 0402
C2	18 pF, 0402
C3	.001 uF, 0402
C4	0.1 uF, 0402
L1	3.3 nH, 0805

ML1-ML7 are short microstrip lines

Schematic Diagram

NOTES:

1. SMA Female connectors.
2. PCB material: Rogers RO4350 or equivalent, dielectric constant=3.5, dielectric thickness=.010 inch.

Mini-Circuits®

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Environmental Specifications ENV08T1

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	-40° to 85°C or -45° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° 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, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
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
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether +	MIL-STD-202, Method 215

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
	monoethanolamine at 63°C to 70°C	