



LOW NOISE, POSITIVE GAIN SLOPE

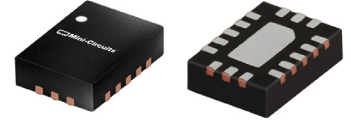
# Wideband Amplifier

## PMA-183PLN+

50Ω 6 to 18 GHz

### THE BIG DEAL

- Wideband, 6 to 18 GHz
- Excellent Noise Figure, 1.2 dB at 15 GHz
- Positive Gain Slope
- High Directivity, 33 dB typ.



Generic photo used for illustration purposes only  
CASE STYLE: JV2579

### +RoHS Compliant

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

### APPLICATIONS

- C,X & Ku-Band Radar
- Satellite Communication
- ELINT

### PRODUCT OVERVIEW

The PMA-183PLN+ is a PHEMT\* based wideband MMIC amplifier with an unique combination of high gain with positive gain slope, high directivity and low noise figure, making it ideal for receiver applications. This design operates on a single 2.6V supply, is well matched for 50Ω and comes in a tiny, low profile package (3.5 x 2.5 mm, 16-lead MCLP), accommodating dense circuit board layouts.

### KEY FEATURES

Feature	Advantages
High Directivity	With active directivity of 33 dB, the PMA-183PLN+ is an excellent choice for buffering broadband circuits, eliminating the need for an expensive isolator in most cases.
Positive Gain Slope vs. Frequency <ul style="list-style-type: none"> <li>• +0.21 dB/GHz (6-15 GHz)</li> <li>• +0.55 dB/GHz (15-18 GHz)</li> </ul>	Useful for compensating negative gain slope of most wideband microwave components and eliminating the need for equalization
Excellent Noise Figure up to 18 GHz <ul style="list-style-type: none"> <li>• 1.2dB Typ. at 18GHz</li> </ul>	Enables lower system noise figure performance.
3.5 x 2.5mm, 16-lead MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

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

REV. F  
ECO-012145  
PMA-183PLN+  
GY/RS/CP/AM  
230106





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# Wideband Amplifier

## PMA-183PLN+

### ELECTRICAL SPECIFICATIONS<sup>1</sup> AT 25°C, UNLESS NOTED OTHERWISE

Parameter	Condition (MHz)	V <sub>s</sub> =2.6V			Units
		Min.	Typ.	Max.	
Frequency Range		6		18	GHz
Gain	6000	20.7	26.3	29.1	dB
	10000	19.0	26.3	29.6	
	15000	20.8	27.5	30.3	
	18000	-	29.7	-	
Input Return Loss	6000		10.2		dB
	10000		14.8		
	15000		12.7		
	18000		9.1		
Output Return Loss	6000		11.4		dB
	10000		15.3		
	15000		16.9		
	18000		25.0		
Directivity	6000 - 18000		33		dB
Output Power at 1dB Compression <sup>2</sup>	6000		9.8		dBm
	10000		8.6		
	15000		9.6		
	18000		10.2		
Output IP3	6000		25		dBm
	10000		22		
	15000		22.4		
	18000		21.9		
Noise Figure	6000		1.4		dB
	10000		1.3		
	15000		1.2		
	18000		1.3		
Device Operating Voltage (V <sub>s</sub> )		2.3	2.6	2.9	V
Device Operating Current (I <sub>DD</sub> )		-	57.2	72	mA
Device Current Variation vs. Temperature <sup>2</sup>			7.69		µA/°C
Device Current Variation vs. Voltage <sup>3</sup>			0.04		mA/mV
Thermal Resistance, junction-to-ground lead			49.5		°C/W

1. Measured on Mini-Circuits Characterization Test Board TB-PMA-183PLN+. See Characterization Test & Application Circuit (Fig. 1)

2. Device Current Variation vs. Temperature = (Current in mA at 85°C - Current in mA at -45°C)/130°C

3. Device Current Variation vs. Voltage = (Current in mA at 2.9V - Current in mA at 2.3V) / ((2.9V - 2.3V)\*1000 mA/mV)

### MAXIMUM RATINGS<sup>4</sup>

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Junction Temperature	131°C
Total Power Dissipation	0.9W
Input Power (CW), V <sub>s</sub> =2.6V	+24 dBm (5 minutes max.) +13 dBm (continuous)
DC Voltage on V <sub>s</sub>	4V
DC Voltage on RF Ports (RF-IN & RF-OUT)	4V

4. Permanent damage may occur if any of these limits are exceeded. Electrical maximum ratings are not intended for continuous normal operation.



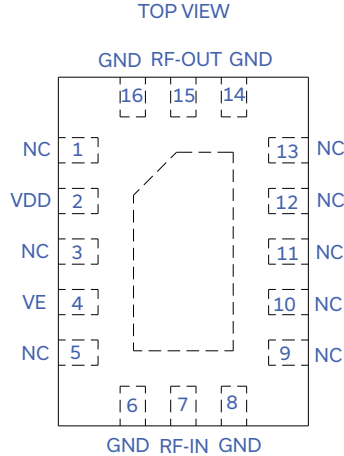
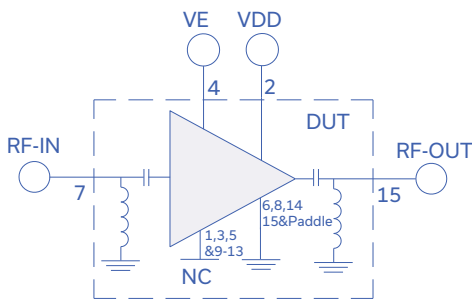


LOW NOISE, POSITIVE GAIN SLOPE

# Wideband Amplifier

**PMA-183PLN+**

## SIMPLIFIED SCHEMATIC & PAD DESCRIPTION



Function	Pad Number	Description (See Figure 1)
VDD	2	Supply Voltage Pad, Connects to Vs via R1
VE	4	Enable Voltage Pad, Connects to VDD via R2
RF-IN	7	RF Input Pad, Connects to the input port
RF-OUT	15	RF Output Pad, Connects to the output port
NC	1,3,5 & 9-13	No connection to the die, Grounded on the test board
GROUND	6,8,14,16 & Paddle	Connects to ground on Test board

## CHARACTERIZATION TEST & APPLICATION CIRCUIT

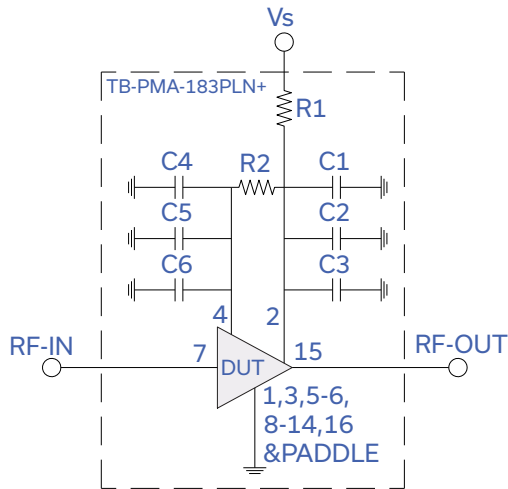


Fig 1. Application and Characterization Circuit

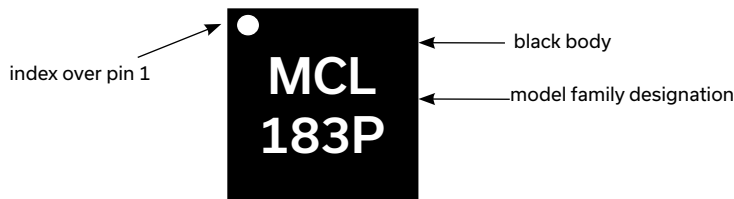
Note: This block diagram is used for characterization. (DUT soldered on Mini-Circuits Characterization test board TB-PMA-183PLN+) Gain, Return loss, Output power at 1dB compression (P1dB), output IP3 (OIP3) and noise figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:

- Gain and Return loss: Pin= -25dBm
- Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -10 dBm/tone at output.

Component	Size	Value	Part Number	Manufacturer
C1, C4	0805	0.33uF	TAJR334K035RNJ	AVX
C2, C5	0603	1000pF	GCM1885C1H102JA16D	Murata
C3, C6	0402	100pF	GRM1555C1H101JA01D	Murata
R1	0603	10 Ohm	ESR03EZPF10R0	Rohm Semiconductor
R2	0402	180 Ohm	RK73H1ETTP1800F	KOA Speer

## PRODUCT MARKING



Marking may contain other features or characters for internal lot control





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# Wideband Amplifier

## PMA-183PLN+

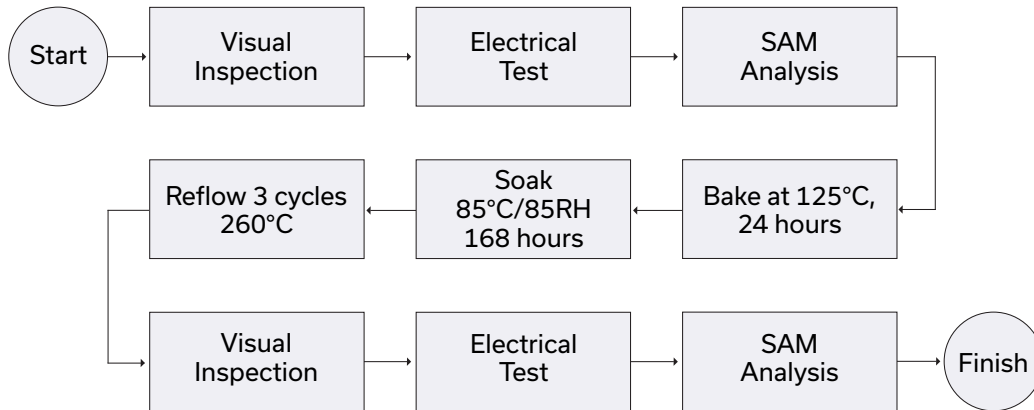
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS [CLICK HERE](#)

Performance Data	Data Table Swept Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	JV2579 Plastic package, exposed paddle, lead finish: Matte-Tin Plate
Tape & Reel	F104
Standard quantities available on reel	7" reels with 2K devices
Suggested Layout for PCB Design	PL-691
Evaluation Board	TB-PMA-183PLN+ & TB-PMA-183PLNC+
Environmental Ratings	ENV08T1

### ESD RATING

Human Body Model (HBM): Class 1C (1000 to <2000V) in accordance with ANSI/ESD STM 5.1 - 2001

### 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](http://www.minicircuits.com/MCLStore/terms.jsp)



*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 = 2.3V, Id = 48mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
6000	25.01	64.83	10.16	10.82	43.60	1.01	22.88	8.90	1.45
6200	24.91	63.72	10.26	11.18	39.32	1.01	24.28	8.84	1.45
6400	24.83	62.65	10.41	11.58	35.55	1.02	23.70	8.88	1.48
6600	24.78	61.11	10.76	11.94	30.46	1.02	23.93	8.84	1.41
6800	24.72	62.21	11.21	12.38	35.51	1.01	22.62	8.78	1.44
7000	24.67	60.35	11.85	12.82	29.44	1.01	22.89	8.75	1.43
7200	24.62	60.79	12.42	13.26	31.75	1.01	22.79	8.63	1.39
7400	24.58	59.72	13.11	13.61	28.68	1.00	22.74	8.51	1.42
7600	24.52	58.84	13.80	13.98	26.50	1.00	23.89	8.47	1.42
7800	24.45	58.45	14.42	14.27	25.91	1.00	24.08	8.43	1.40
8000	24.37	58.32	14.96	14.47	26.04	1.00	23.37	8.43	1.38
8200	24.27	58.37	15.31	14.58	26.67	0.99	22.63	8.08	1.44
8400	24.19	57.81	15.64	14.63	25.43	0.99	23.19	7.99	1.34
8600	24.08	57.72	15.72	14.62	25.57	0.99	23.13	7.74	1.41
8800	23.99	57.98	15.80	14.60	26.75	0.99	24.31	7.50	1.41
9000	23.90	57.48	15.68	14.72	25.60	0.99	26.37	7.28	1.44
9200	23.79	57.90	15.26	14.78	27.19	0.99	26.88	7.11	1.49
9400	23.71	57.18	15.08	15.00	25.34	1.00	25.73	6.81	1.50
9600	23.64	57.58	14.55	15.34	26.79	1.00	23.81	6.73	1.45
9800	23.59	57.32	14.14	15.89	26.22	1.01	22.36	6.56	1.52
10000	23.55	57.59	13.71	16.50	27.24	1.02	22.10	6.64	1.52
10200	23.52	57.25	13.24	17.34	26.32	1.03	22.95	6.68	1.55
10400	23.50	57.18	12.90	18.37	26.25	1.04	24.49	6.70	1.49
10600	23.50	57.23	12.63	19.67	26.48	1.04	23.74	6.83	1.53
10800	23.53	56.96	12.60	20.94	25.76	1.05	24.17	6.95	1.46
11000	23.56	57.43	12.52	22.43	27.23	1.05	23.58	6.99	1.45
11200	23.60	56.89	12.45	23.90	25.55	1.05	24.49	6.98	1.41
11400	23.65	57.80	12.83	24.91	28.43	1.05	24.41	7.02	1.39
11600	23.72	57.57	12.98	25.61	27.62	1.05	23.40	7.03	1.33
11800	23.79	57.47	13.40	25.90	27.31	1.04	24.33	7.10	1.34
12000	23.88	57.74	13.83	26.32	28.12	1.04	25.17	7.37	1.34
12200	23.96	58.03	14.25	26.92	28.98	1.04	24.91	7.40	1.29
12400	24.05	58.78	14.48	27.50	31.44	1.03	24.32	7.56	1.39
12600	24.14	58.35	14.62	28.15	29.72	1.03	24.50	7.68	1.26
12800	24.22	58.53	14.36	28.31	30.04	1.04	25.32	7.81	1.28
13000	24.30	58.99	14.00	27.42	31.36	1.04	26.12	7.86	1.34
13200	24.38	58.69	13.50	25.53	29.89	1.04	25.77	7.83	1.33
13400	24.46	59.34	12.99	23.70	31.76	1.05	24.71	7.90	1.32
13600	24.53	59.36	12.30	21.86	31.28	1.05	24.84	7.91	1.32
13800	24.61	59.68	11.87	20.44	31.92	1.06	23.16	7.99	1.32
14000	24.67	60.43	11.29	19.15	34.17	1.06	22.81	7.87	1.28
14200	24.76	59.97	11.14	18.12	31.94	1.06	24.24	8.01	1.31
14400	24.87	60.21	10.95	17.39	32.26	1.06	24.70	8.00	1.34
14600	25.01	59.69	10.92	16.91	29.93	1.06	24.82	8.32	1.39
14800	25.15	59.24	11.01	16.62	28.03	1.06	25.39	8.24	1.39
15000	25.31	59.48	11.12	16.50	28.40	1.05	24.23	8.44	1.35
15200	25.50	58.41	11.50	16.62	24.83	1.05	23.55	8.51	1.35
15400	25.69	58.21	11.80	16.94	23.95	1.04	23.05	8.76	1.37
15600	25.88	57.07	12.42	17.51	20.85	1.04	23.86	8.80	1.42
15800	26.09	57.31	13.17	18.10	21.20	1.03	25.34	8.77	1.38
16000	26.31	57.60	13.69	18.97	21.59	1.03	25.75	8.81	1.41
16200	26.54	57.69	14.54	19.80	21.50	1.02	23.85	8.94	1.46
16400	26.79	57.11	15.22	20.69	19.72	1.02	23.10	8.86	1.44
16600	27.06	57.14	15.96	21.54	19.36	1.02	21.94	9.05	1.38
16800	27.35	57.08	16.28	22.44	18.68	1.02	22.90	9.24	1.44
17000	27.64	57.65	15.96	23.90	19.33	1.02	22.42	9.02	1.44
17200	27.91	58.11	14.71	25.94	19.68	1.03	24.14	9.45	1.41
17400	28.14	58.29	13.13	27.49	19.37	1.05	25.17	9.60	1.45
17600	28.30	57.55	11.58	29.81	17.16	1.07	24.41	9.32	1.41
17800	28.37	58.04	9.92	26.77	17.44	1.10	25.11	9.41	1.47
18000	28.32	57.97	8.29	22.62	16.52	1.14	23.69	9.35	1.44



*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 = 2.6V, Id = 60mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
6000	26.03	65.57	11.13	10.84	43.17	0.99	25.19	9.90	1.39
6200	25.96	64.45	11.13	11.23	38.67	1.00	24.73	9.89	1.35
6400	25.91	63.33	11.20	11.65	34.59	1.00	26.35	9.89	1.35
6600	25.90	62.45	11.47	12.02	31.79	1.01	26.05	9.98	1.38
6800	25.87	62.05	11.87	12.47	30.93	1.01	26.85	9.96	1.34
7000	25.86	61.57	12.48	12.93	29.89	1.00	27.65	9.98	1.33
7200	25.85	61.40	13.01	13.38	29.83	1.00	26.71	9.92	1.34
7400	25.85	60.73	13.70	13.74	28.03	1.00	26.63	9.91	1.31
7600	25.84	59.70	14.38	14.09	25.32	1.00	25.13	9.95	1.26
7800	25.81	59.04	15.02	14.37	23.82	0.99	25.31	9.86	1.30
8000	25.77	58.78	15.60	14.56	23.46	0.99	25.28	9.91	1.33
8200	25.72	58.40	15.99	14.65	22.76	0.99	24.16	9.71	1.29
8400	25.68	57.90	16.36	14.68	21.74	0.99	23.35	9.66	1.28
8600	25.61	58.19	16.46	14.65	22.75	0.99	23.12	9.45	1.31
8800	25.55	57.92	16.56	14.61	22.28	0.99	23.49	9.24	1.26
9000	25.49	57.97	16.43	14.72	22.64	0.99	23.59	9.05	1.37
9200	25.42	57.92	15.94	14.77	22.72	0.99	23.09	8.78	1.33
9400	25.36	57.85	15.70	14.98	22.72	0.99	22.80	8.52	1.36
9600	25.31	57.76	15.04	15.31	22.64	1.00	22.70	8.45	1.35
9800	25.27	57.04	14.50	15.86	20.98	1.01	25.08	8.40	1.40
10000	25.25	57.13	13.94	16.51	21.28	1.02	24.17	8.38	1.44
10200	25.23	56.97	13.32	17.40	20.97	1.03	24.53	8.44	1.42
10400	25.23	57.38	12.85	18.52	22.02	1.04	21.77	8.45	1.40
10600	25.23	57.33	12.48	19.97	21.93	1.05	23.93	8.59	1.39
10800	25.26	57.38	12.35	21.47	22.09	1.05	23.90	8.59	1.38
11000	25.30	57.34	12.18	23.28	21.96	1.06	24.57	8.62	1.32
11200	25.34	57.30	12.04	25.12	21.79	1.06	24.06	8.63	1.27
11400	25.40	57.70	12.32	26.31	22.84	1.06	25.77	8.67	1.31
11600	25.47	57.67	12.41	26.86	22.71	1.06	24.26	8.67	1.25
11800	25.55	57.63	12.76	26.76	22.54	1.05	22.62	8.72	1.24
12000	25.64	58.07	13.12	26.80	23.65	1.05	21.85	8.89	1.25
12200	25.73	57.67	13.50	27.04	22.51	1.04	22.22	8.93	1.23
12400	25.82	58.25	13.72	27.43	23.92	1.04	23.30	9.08	1.15
12600	25.92	57.90	13.85	28.06	22.81	1.04	23.65	9.19	1.22
12800	26.01	58.39	13.61	28.61	23.90	1.04	23.89	9.33	1.22
13000	26.10	57.90	13.31	28.05	22.35	1.04	22.52	9.38	1.19
13200	26.18	59.80	12.84	26.27	27.41	1.05	22.68	9.25	1.25
13400	26.26	58.41	12.37	24.41	23.00	1.05	21.60	9.44	1.22
13600	26.34	59.40	11.72	22.42	25.32	1.06	21.64	9.45	1.20
13800	26.42	58.94	11.31	20.88	23.60	1.07	21.32	9.41	1.23
14000	26.48	59.98	10.78	19.49	26.08	1.07	22.66	9.40	1.21
14200	26.57	60.45	10.63	18.31	27.13	1.07	22.14	9.43	1.20
14400	26.67	60.32	10.46	17.50	26.27	1.07	21.84	9.54	1.25
14600	26.81	60.23	10.44	16.94	25.61	1.07	22.29	9.71	1.29
14800	26.95	60.36	10.55	16.58	25.67	1.06	23.97	9.66	1.22
15000	27.11	59.19	10.68	16.40	22.10	1.06	24.79	9.82	1.30
15200	27.29	58.42	11.07	16.47	20.05	1.05	24.32	9.92	1.26
15400	27.46	58.08	11.38	16.75	19.07	1.05	22.27	10.10	1.22
15600	27.64	57.89	12.01	17.28	18.57	1.04	22.20	10.25	1.25
15800	27.84	58.00	12.75	17.85	18.65	1.04	21.85	10.08	1.30
16000	28.04	57.69	13.28	18.71	17.79	1.03	22.23	9.98	1.27
16200	28.24	58.15	14.09	19.51	18.54	1.03	22.99	10.22	1.36
16400	28.48	57.80	14.64	20.37	17.49	1.02	22.68	10.09	1.34
16600	28.72	57.74	15.18	21.15	17.02	1.02	21.22	10.18	1.30
16800	28.98	57.96	15.17	21.97	17.01	1.02	22.86	10.43	1.36
17000	29.22	58.32	14.59	23.25	17.21	1.03	23.50	10.23	1.37
17200	29.44	58.55	13.29	24.85	17.12	1.04	23.90	10.57	1.36
17400	29.59	59.36	11.76	25.65	18.16	1.06	23.54	10.84	1.38
17600	29.67	59.24	10.37	26.79	17.40	1.09	23.63	10.47	1.37
17800	29.63	59.86	8.93	24.72	18.05	1.12	22.58	10.57	1.40
18000	29.46	60.02	7.50	21.54	17.69	1.17	21.95	10.53	1.37

## 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 = 2.9V, Icc = 73mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
6000	26.70	66.84	12.23	10.87	47.15	0.97	24.53	10.57	1.31
6200	26.66	65.35	12.13	11.26	40.30	0.98	25.67	10.60	1.30
6400	26.63	64.53	12.10	11.69	37.13	0.99	25.41	10.70	1.26
6600	26.64	62.92	12.30	12.08	31.25	0.99	26.78	10.76	1.37
6800	26.64	61.63	12.63	12.54	27.32	1.00	26.15	10.76	1.32
7000	26.66	61.74	13.21	13.02	28.09	1.00	26.38	10.80	1.32
7200	26.68	60.63	13.70	13.47	25.01	1.00	25.53	10.79	1.29
7400	26.72	60.47	14.39	13.83	24.81	0.99	25.21	10.80	1.27
7600	26.74	60.02	15.07	14.18	23.83	0.99	23.87	10.89	1.21
7800	26.75	59.59	15.72	14.45	22.91	0.99	23.28	10.81	1.22
8000	26.75	59.45	16.34	14.64	22.78	0.99	23.83	10.89	1.24
8200	26.73	58.59	16.74	14.70	20.80	0.99	23.79	10.75	1.21
8400	26.72	58.15	17.15	14.73	19.95	0.99	23.36	10.62	1.25
8600	26.68	58.15	17.27	14.69	20.08	0.98	22.77	10.53	1.21
8800	26.66	57.98	17.41	14.64	19.83	0.98	23.18	10.25	1.26
9000	26.62	57.69	17.29	14.72	19.32	0.98	22.80	10.06	1.33
9200	26.58	57.91	16.74	14.76	19.94	0.99	22.23	9.81	1.34
9400	26.55	57.66	16.44	14.95	19.49	0.99	22.83	9.69	1.38
9600	26.52	57.42	15.68	15.28	19.04	0.99	23.48	9.55	1.34
9800	26.50	57.67	15.00	15.84	19.67	1.00	24.19	9.52	1.34
10000	26.49	57.62	14.32	16.48	19.59	1.01	22.78	9.50	1.36
10200	26.49	56.87	13.56	17.40	17.98	1.02	22.61	9.58	1.34
10400	26.49	57.04	12.97	18.56	18.33	1.03	23.26	9.60	1.35
10600	26.51	57.22	12.50	20.10	18.70	1.04	23.66	9.75	1.35
10800	26.55	57.17	12.29	21.78	18.59	1.05	23.38	9.73	1.33
11000	26.59	57.46	12.04	23.85	19.16	1.06	22.01	9.76	1.32
11200	26.64	57.70	11.85	26.00	19.61	1.06	22.71	9.79	1.25
11400	26.71	57.49	12.07	27.39	19.14	1.06	23.10	9.83	1.28
11600	26.79	57.73	12.11	27.77	19.58	1.06	23.07	9.72	1.23
11800	26.87	57.89	12.41	27.25	19.87	1.06	21.36	9.78	1.17
12000	26.97	57.46	12.74	26.97	18.85	1.05	22.76	9.94	1.19
12200	27.07	58.01	13.10	26.90	19.98	1.05	22.50	10.00	1.19
12400	27.17	58.11	13.32	27.13	20.08	1.04	24.24	10.13	1.22
12600	27.28	58.16	13.45	27.70	20.03	1.04	23.55	10.24	1.18
12800	27.38	58.50	13.24	28.36	20.60	1.05	24.17	10.30	1.20
13000	27.47	58.70	12.96	28.10	20.82	1.05	24.25	10.35	1.15
13200	27.56	59.01	12.51	26.56	21.25	1.05	23.28	10.22	1.14
13400	27.65	59.37	12.06	24.73	21.79	1.06	22.17	10.42	1.16
13600	27.73	59.52	11.42	22.71	21.74	1.07	21.32	10.44	1.19
13800	27.82	60.02	11.03	21.09	22.62	1.07	20.54	10.39	1.14
14000	27.89	59.61	10.53	19.61	21.15	1.08	23.60	10.47	1.20
14200	27.98	60.18	10.40	18.38	22.25	1.08	25.10	10.49	1.18
14400	28.08	59.78	10.24	17.50	20.89	1.08	26.33	10.54	1.26
14600	28.22	59.68	10.24	16.88	20.31	1.07	25.08	10.68	1.22
14800	28.36	59.89	10.37	16.48	20.57	1.07	23.40	10.74	1.17
15000	28.52	59.27	10.53	16.27	18.90	1.06	23.65	10.78	1.24
15200	28.69	58.96	10.96	16.31	18.10	1.06	24.75	10.99	1.23
15400	28.87	58.38	11.30	16.58	16.75	1.05	25.87	10.96	1.19
15600	29.03	58.06	11.95	17.10	16.11	1.04	24.21	11.22	1.32
15800	29.21	58.18	12.72	17.67	16.24	1.04	24.35	10.92	1.28
16000	29.39	58.18	13.24	18.51	16.08	1.03	25.71	10.85	1.38
16200	29.58	57.94	14.00	19.31	15.51	1.03	25.32	11.12	1.23
16400	29.78	58.22	14.32	20.14	15.75	1.03	25.22	10.94	1.27
16600	29.99	58.25	14.53	20.90	15.51	1.03	23.67	11.09	1.29
16800	30.20	59.02	14.05	21.65	16.52	1.03	23.43	11.32	1.33
17000	30.39	59.09	13.15	22.82	16.21	1.04	23.53	11.13	1.38
17200	30.53	58.63	11.78	24.10	14.93	1.06	22.52	11.39	1.37
17400	30.59	59.81	10.32	24.53	16.57	1.09	22.71	11.68	1.38
17600	30.55	60.52	9.11	25.06	17.55	1.12	22.52	11.31	1.36
17800	30.40	62.33	7.88	23.33	21.05	1.16	21.73	11.39	1.38
18000	30.12	60.57	6.70	20.69	16.69	1.20	20.99	11.36	1.38

*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 = 2.3V, Id = 46mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
6000	26.33	66.50	9.37	10.48	43.73	1.02	25.76	8.95	0.88
6200	26.22	65.10	9.44	10.85	38.15	1.02	26.26	8.87	0.96
6400	26.14	63.36	9.57	11.29	31.98	1.03	25.65	8.83	0.92
6600	26.11	62.42	9.88	11.69	29.34	1.03	26.78	8.77	0.92
6800	26.06	62.27	10.28	12.16	29.62	1.03	26.60	8.73	0.94
7000	26.03	61.47	10.85	12.66	27.75	1.03	24.69	8.71	0.89
7200	26.00	61.45	11.37	13.13	28.32	1.02	24.01	8.57	0.86
7400	25.98	60.81	11.98	13.49	26.87	1.02	22.54	8.46	0.87
7600	25.93	59.83	12.59	13.84	24.53	1.01	21.81	8.34	0.87
7800	25.88	59.50	13.15	14.07	24.12	1.01	24.46	8.21	0.85
8000	25.81	59.68	13.68	14.24	25.11	1.00	23.98	8.19	0.82
8200	25.74	58.78	14.09	14.37	23.04	1.00	23.41	7.83	0.84
8400	25.66	58.54	14.45	14.42	22.79	1.00	21.75	7.75	0.85
8600	25.58	57.74	14.64	14.45	21.11	1.00	21.65	7.50	0.84
8800	25.50	58.33	14.81	14.55	22.91	1.00	21.52	7.16	0.84
9000	25.42	58.02	14.80	14.72	22.43	1.00	22.11	7.06	0.86
9200	25.32	58.41	14.55	14.86	23.74	1.00	21.33	6.78	0.87
9400	25.25	57.98	14.47	15.10	22.87	1.00	22.39	6.48	0.90
9600	25.17	58.23	14.07	15.45	23.76	1.01	20.55	6.29	0.86
9800	25.11	57.78	13.73	15.93	22.79	1.01	20.19	6.21	0.94
10000	25.07	57.49	13.33	16.55	22.19	1.02	19.88	6.19	0.88
10200	25.03	57.50	12.87	17.39	22.33	1.03	20.61	6.20	0.91
10400	25.01	57.77	12.55	18.45	23.15	1.04	20.06	6.31	0.89
10600	25.00	57.22	12.24	19.93	21.82	1.05	20.38	6.34	0.86
10800	25.02	58.08	12.11	21.60	24.13	1.05	21.15	6.47	0.85
11000	25.04	57.88	12.01	23.78	23.63	1.06	21.49	6.52	0.82
11200	25.08	57.71	11.94	26.19	23.14	1.06	21.26	6.49	0.87
11400	25.13	58.14	12.22	27.70	24.37	1.06	20.03	6.64	0.78
11600	25.19	57.88	12.31	28.13	23.58	1.06	19.75	6.64	0.74
11800	25.25	57.81	12.65	27.42	23.40	1.05	19.53	6.70	0.74
12000	25.33	58.26	12.97	26.88	24.58	1.05	19.78	6.86	0.73
12200	25.40	58.57	13.30	26.53	25.41	1.04	20.27	6.87	0.70
12400	25.48	58.24	13.47	26.24	24.35	1.04	21.09	7.02	0.73
12600	25.56	58.67	13.62	26.31	25.44	1.04	21.53	7.14	0.68
12800	25.64	58.89	13.49	26.75	25.87	1.04	22.00	7.29	0.72
13000	25.71	58.54	13.32	26.52	24.65	1.04	21.06	7.45	0.70
13200	25.79	58.70	12.97	25.57	24.79	1.05	20.97	7.32	0.71
13400	25.87	59.68	12.63	24.33	27.39	1.05	21.33	7.40	0.68
13600	25.94	59.71	12.06	22.75	27.08	1.06	23.27	7.50	0.74
13800	26.03	59.58	11.69	21.42	26.25	1.06	23.62	7.47	0.66
14000	26.09	59.79	11.15	20.11	26.42	1.07	23.43	7.45	0.67
14200	26.17	60.61	10.95	18.97	28.62	1.07	21.96	7.60	0.73
14400	26.26	59.56	10.67	18.21	24.93	1.07	22.91	7.55	0.76
14600	26.38	59.30	10.52	17.59	23.81	1.07	22.96	7.85	0.67
14800	26.49	58.85	10.44	17.07	22.29	1.07	22.25	7.65	0.70
15000	26.61	59.12	10.34	16.69	22.62	1.07	22.56	7.95	0.69
15200	26.76	58.37	10.50	16.44	20.50	1.07	23.22	7.99	0.70
15400	26.90	57.99	10.54	16.41	19.33	1.06	24.36	8.34	0.71
15600	27.04	57.73	10.88	16.49	18.65	1.06	23.35	8.32	0.70
15800	27.21	57.36	11.46	16.61	17.75	1.05	23.15	8.40	0.75
16000	27.41	56.79	12.03	17.12	16.45	1.04	25.52	8.46	0.77
16200	27.62	57.25	12.90	17.71	17.20	1.03	26.05	8.57	0.71
16400	27.87	57.58	13.78	18.47	17.62	1.03	23.85	8.49	0.77
16600	28.14	57.83	14.81	19.24	17.81	1.02	22.49	8.61	0.77
16800	28.44	57.75	15.80	20.25	17.25	1.02	21.79	8.87	0.80
17000	28.74	57.80	16.45	21.62	16.89	1.01	21.65	8.49	0.71
17200	29.07	58.31	16.02	23.04	17.29	1.02	22.20	9.02	0.88
17400	29.37	58.28	15.32	23.72	16.64	1.02	23.57	9.18	0.75
17600	29.66	58.18	14.34	25.69	15.89	1.03	24.72	8.96	0.76
17800	29.90	58.27	12.86	27.27	15.44	1.05	24.48	9.04	0.74
18000	30.07	57.68	10.97	24.73	13.78	1.07	24.93	9.02	0.70



*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 = 2.6V, Id = 59mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
6000	27.34	67.02	10.09	10.48	42.13	1.00	25.95	9.80	0.87
6200	27.26	66.88	10.07	10.87	42.28	1.01	25.86	9.69	0.88
6400	27.21	66.07	10.12	11.33	39.30	1.02	25.62	9.75	0.95
6600	27.20	63.70	10.35	11.75	30.36	1.02	25.29	9.85	0.86
6800	27.19	63.60	10.68	12.24	30.63	1.02	25.59	9.84	0.87
7000	27.19	62.40	11.20	12.76	27.24	1.02	26.29	9.85	0.84
7200	27.21	62.36	11.67	13.24	27.58	1.02	25.74	9.80	0.84
7400	27.23	61.23	12.24	13.60	24.55	1.01	23.78	9.73	0.81
7600	27.24	60.33	12.81	13.94	22.47	1.01	22.73	9.77	0.78
7800	27.23	59.37	13.37	14.15	20.40	1.01	23.12	9.68	0.78
8000	27.21	59.91	13.90	14.32	22.00	1.00	23.30	9.71	0.78
8200	27.19	59.30	14.32	14.42	20.74	1.00	24.02	9.44	0.83
8400	27.16	59.15	14.70	14.45	20.61	1.00	23.55	9.40	0.78
8600	27.11	58.79	14.91	14.46	19.99	1.00	22.66	9.21	0.81
8800	27.08	58.76	15.09	14.53	20.11	0.99	21.65	9.02	0.76
9000	27.03	58.30	15.10	14.67	19.26	1.00	21.31	8.85	0.80
9200	26.97	58.25	14.83	14.78	19.30	1.00	21.42	8.47	0.83
9400	26.93	58.06	14.74	15.00	19.05	1.00	21.49	8.30	0.82
9600	26.88	58.19	14.30	15.32	19.47	1.01	20.71	8.03	0.86
9800	26.84	57.82	13.88	15.77	18.79	1.01	19.92	7.97	0.83
10000	26.81	57.68	13.41	16.40	18.55	1.02	20.65	7.94	0.90
10200	26.79	57.60	12.85	17.22	18.43	1.03	20.53	7.97	0.83
10400	26.78	57.96	12.44	18.33	19.28	1.04	20.26	7.98	0.87
10600	26.78	57.59	12.04	19.89	18.50	1.05	19.92	8.13	0.85
10800	26.81	57.87	11.83	21.82	19.12	1.06	20.68	8.25	0.82
11000	26.83	57.88	11.64	24.44	19.13	1.06	21.04	8.20	0.81
11200	26.88	57.57	11.52	27.75	18.42	1.07	21.10	8.18	0.77
11400	26.93	58.03	11.72	30.49	19.43	1.07	21.07	8.31	0.76
11600	26.99	57.55	11.75	30.84	18.32	1.07	20.83	8.30	0.67
11800	27.06	58.48	12.01	28.93	20.35	1.06	21.09	8.35	0.68
12000	27.14	57.56	12.28	27.47	18.25	1.06	20.59	8.50	0.72
12200	27.21	58.48	12.54	26.53	20.22	1.05	21.16	8.53	0.74
12400	27.29	58.45	12.68	25.98	20.06	1.05	21.34	8.67	0.67
12600	27.37	58.57	12.80	25.87	20.23	1.05	22.54	8.68	0.67
12800	27.45	58.79	12.67	26.32	20.56	1.05	23.53	8.82	0.64
13000	27.53	58.79	12.52	26.34	20.38	1.05	23.72	8.88	0.72
13200	27.61	59.18	12.20	25.75	21.04	1.06	22.78	8.84	0.64
13400	27.69	59.03	11.89	24.81	20.41	1.06	22.09	8.95	0.63
13600	27.76	59.20	11.37	23.26	20.48	1.07	22.04	9.05	0.61
13800	27.85	59.55	11.01	21.89	20.96	1.07	21.86	9.00	0.62
14000	27.91	60.72	10.53	20.48	23.54	1.08	22.73	8.98	0.67
14200	27.98	60.53	10.35	19.26	22.73	1.08	23.43	9.02	0.66
14400	28.07	59.68	10.08	18.40	20.28	1.08	22.55	9.10	0.63
14600	28.18	59.94	9.94	17.71	20.53	1.08	22.11	9.25	0.69
14800	28.29	59.05	9.86	17.13	18.28	1.08	21.49	9.26	0.63
15000	28.40	58.87	9.77	16.71	17.64	1.08	23.12	9.43	0.72
15200	28.54	58.94	9.93	16.42	17.59	1.08	23.10	9.49	0.64
15400	28.66	58.00	9.97	16.35	15.58	1.08	24.52	9.68	0.74
15600	28.79	57.98	10.32	16.40	15.48	1.07	23.59	9.78	0.69
15800	28.94	58.06	10.92	16.50	15.59	1.06	24.50	9.61	0.75
16000	29.13	57.61	11.51	16.97	14.71	1.05	23.01	9.61	0.70
16200	29.33	57.57	12.39	17.51	14.56	1.04	23.79	9.75	0.68
16400	29.56	57.72	13.25	18.20	14.64	1.03	22.02	9.70	0.73
16600	29.81	58.04	14.19	18.86	14.96	1.02	24.23	9.83	0.74
16800	30.09	58.07	15.00	19.81	14.71	1.02	24.36	9.98	0.72
17000	30.37	59.06	15.42	21.04	16.08	1.02	25.51	9.82	0.78
17200	30.67	58.66	14.83	22.21	14.85	1.03	26.23	10.15	0.71
17400	30.93	58.70	14.03	22.70	14.44	1.03	25.92	10.38	0.75
17600	31.16	58.58	13.14	24.09	13.81	1.04	25.12	10.10	0.74
17800	31.34	60.27	11.80	24.59	16.20	1.06	25.30	10.18	0.73
18000	31.43	60.44	10.10	22.51	15.85	1.09	25.01	10.23	0.74

## 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 = 2.9V, Id = 72mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
6000	27.98	68.99	11.00	10.49	50.12	0.98	25.48	10.43	0.86
6200	27.92	67.01	10.89	10.90	40.58	0.99	25.48	10.44	0.89
6400	27.88	65.10	10.85	11.37	33.05	1.01	26.26	10.52	0.86
6600	27.90	63.87	11.01	11.80	29.02	1.01	27.70	10.57	0.87
6800	27.91	63.49	11.28	12.31	28.19	1.01	27.69	10.58	0.86
7000	27.94	62.44	11.75	12.84	25.38	1.01	27.41	10.62	0.81
7200	27.98	62.05	12.17	13.33	24.56	1.01	26.24	10.61	0.82
7400	28.04	61.30	12.72	13.70	22.74	1.01	25.27	10.55	0.70
7600	28.08	61.30	13.26	14.03	22.94	1.01	23.76	10.64	0.82
7800	28.11	59.82	13.81	14.24	19.51	1.00	22.79	10.58	0.75
8000	28.13	59.37	14.36	14.41	18.69	1.00	22.72	10.64	0.68
8200	28.14	59.23	14.79	14.49	18.53	1.00	23.11	10.52	0.71
8400	28.15	59.09	15.19	14.51	18.33	0.99	23.46	10.41	0.74
8600	28.14	58.67	15.42	14.51	17.57	0.99	22.94	10.26	0.80
8800	28.14	58.52	15.64	14.56	17.39	0.99	23.45	10.11	0.74
9000	28.13	58.65	15.67	14.68	17.75	0.99	23.50	9.95	0.79
9200	28.10	58.57	15.39	14.76	17.67	0.99	23.17	9.59	0.80
9400	28.08	58.50	15.28	14.95	17.62	1.00	22.32	9.36	0.81
9600	28.06	57.81	14.80	15.24	16.34	1.00	21.29	9.21	0.82
9800	28.04	57.85	14.30	15.67	16.46	1.01	21.58	9.17	0.83
10000	28.04	57.88	13.75	16.27	16.54	1.02	22.23	9.15	0.79
10200	28.03	57.85	13.06	17.09	16.48	1.03	21.74	9.10	0.82
10400	28.03	57.25	12.55	18.18	15.41	1.04	21.14	9.11	0.78
10600	28.05	57.73	12.08	19.76	16.27	1.05	21.50	9.27	0.83
10800	28.08	57.71	11.78	21.77	16.21	1.06	21.34	9.38	0.81
11000	28.11	57.95	11.50	24.56	16.61	1.07	21.32	9.34	0.79
11200	28.16	57.50	11.33	28.41	15.71	1.07	21.24	9.33	0.76
11400	28.22	57.74	11.46	32.37	16.14	1.07	22.83	9.46	0.74
11600	28.29	58.01	11.44	32.78	16.56	1.07	22.71	9.44	0.74
11800	28.36	57.80	11.64	29.70	16.12	1.07	23.00	9.39	0.67
12000	28.45	58.22	11.86	27.67	16.85	1.06	21.48	9.54	0.67
12200	28.52	58.04	12.09	26.34	16.43	1.06	23.30	9.58	0.65
12400	28.61	58.16	12.21	25.65	16.55	1.06	22.96	9.71	0.64
12600	28.70	58.34	12.32	25.45	16.80	1.05	23.87	9.73	0.60
12800	28.79	58.79	12.19	25.85	17.50	1.06	23.59	9.88	0.71
13000	28.87	58.60	12.05	25.97	16.97	1.06	24.37	9.93	0.60
13200	28.96	58.76	11.73	25.59	17.04	1.06	24.89	9.89	0.65
13400	29.05	59.39	11.43	24.82	18.06	1.07	24.64	10.01	0.64
13600	29.13	59.28	10.94	23.40	17.52	1.08	25.07	10.03	0.62
13800	29.22	59.55	10.59	22.02	17.77	1.08	24.64	10.05	0.58
14000	29.28	59.87	10.14	20.61	18.07	1.09	24.19	10.05	0.61
14200	29.36	60.67	9.97	19.33	19.53	1.09	24.18	10.08	0.62
14400	29.45	59.81	9.72	18.43	17.40	1.09	23.63	10.19	0.66
14600	29.56	59.39	9.58	17.70	16.28	1.09	22.28	10.30	0.60
14800	29.67	59.92	9.52	17.11	17.06	1.09	22.98	10.23	0.67
15000	29.78	58.41	9.44	16.66	14.12	1.09	23.62	10.38	0.67
15200	29.92	58.67	9.62	16.35	14.42	1.08	24.78	10.47	0.67
15400	30.04	58.07	9.67	16.27	13.30	1.08	24.27	10.52	0.65
15600	30.16	58.18	10.05	16.33	13.44	1.07	23.70	10.72	0.68
15800	30.30	57.25	10.71	16.43	12.09	1.06	24.08	10.53	0.70
16000	30.49	57.43	11.35	16.88	12.29	1.05	25.09	10.50	0.63
16200	30.66	57.88	12.26	17.39	12.91	1.04	25.52	10.65	0.67
16400	30.89	57.84	13.06	18.07	12.72	1.03	26.14	10.57	0.71
16600	31.12	58.35	13.86	18.69	13.28	1.03	25.52	10.68	0.72
16800	31.37	58.83	14.31	19.59	13.76	1.02	26.44	10.82	0.76
17000	31.63	58.93	14.30	20.74	13.59	1.03	26.53	10.78	0.70
17200	31.88	59.05	13.41	21.81	13.32	1.04	27.31	10.94	0.70
17400	32.08	59.90	12.44	22.18	14.24	1.05	28.65	11.28	0.79
17600	32.24	59.71	11.48	23.28	13.55	1.06	28.44	10.95	0.77
17800	32.33	60.02	10.26	23.32	13.62	1.09	27.79	11.03	0.73
18000	32.31	60.78	8.76	21.18	14.29	1.12	26.39	11.01	0.77

## 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 = 2.3V, Id = 49mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
6000	24.16	64.59	10.15	11.04	47.29	1.01	24.76	8.49	1.93
6200	24.08	63.36	10.33	11.44	42.04	1.02	23.01	8.44	1.85
6400	24.01	61.77	10.55	11.86	35.86	1.02	23.67	8.49	1.93
6600	23.96	60.84	10.95	12.23	33.00	1.02	24.42	8.45	1.91
6800	23.90	60.01	11.44	12.66	30.78	1.02	25.93	8.37	1.86
7000	23.84	60.32	12.07	13.07	32.77	1.01	25.57	8.40	1.87
7200	23.78	60.05	12.62	13.46	32.53	1.01	26.16	8.19	1.92
7400	23.72	59.29	13.24	13.77	30.45	1.00	26.13	8.14	1.87
7600	23.65	58.91	13.87	14.09	29.84	1.00	25.04	8.11	1.86
7800	23.57	58.56	14.41	14.36	29.26	1.00	24.00	7.97	1.86
8000	23.48	58.10	14.86	14.55	28.33	1.00	23.54	7.95	1.87
8200	23.38	58.26	15.14	14.64	29.39	1.00	24.70	7.69	1.81
8400	23.29	57.62	15.40	14.68	27.80	0.99	24.56	7.50	1.85
8600	23.18	57.63	15.42	14.65	28.28	0.99	23.63	7.35	1.89
8800	23.08	57.61	15.47	14.57	28.64	0.99	23.28	7.11	1.90
9000	22.97	58.08	15.29	14.64	30.66	0.99	24.09	6.89	1.94
9200	22.87	57.87	14.89	14.65	30.30	1.00	24.70	6.72	1.97
9400	22.78	57.59	14.71	14.80	29.72	1.00	24.84	6.44	1.96
9600	22.71	57.36	14.24	15.08	29.19	1.00	23.67	6.37	1.99
9800	22.66	57.28	13.90	15.57	29.22	1.01	22.92	6.32	2.03
10000	22.62	57.52	13.54	16.10	30.21	1.02	22.66	6.41	2.02
10200	22.60	57.21	13.19	16.85	29.36	1.03	25.35	6.45	2.02
10400	22.59	57.60	12.97	17.77	30.87	1.03	26.34	6.46	2.02
10600	22.59	57.56	12.79	18.90	30.87	1.04	25.62	6.48	2.03
10800	22.62	57.32	12.88	19.97	30.15	1.04	22.25	6.60	1.95
11000	22.66	57.32	12.97	21.24	30.21	1.04	21.35	6.63	1.91
11200	22.70	57.37	13.02	22.48	30.39	1.04	21.92	6.63	1.94
11400	22.76	57.54	13.57	23.44	31.12	1.04	22.43	6.67	1.88
11600	22.83	57.35	13.88	24.41	30.42	1.04	22.44	6.80	1.89
11800	22.91	57.76	14.46	25.25	31.91	1.03	22.31	6.76	1.88
12000	22.99	57.40	14.98	26.19	30.58	1.03	23.03	7.02	1.84
12200	23.07	57.98	15.42	27.40	32.60	1.03	21.62	7.05	1.83
12400	23.15	58.39	15.53	28.17	33.99	1.03	22.37	7.21	1.86
12600	23.23	58.16	15.52	28.32	32.86	1.03	23.31	7.33	1.84
12800	23.31	58.90	15.06	27.27	35.43	1.03	24.74	7.43	1.83
13000	23.38	58.79	14.48	25.58	34.58	1.03	22.83	7.47	1.88
13200	23.45	59.28	13.87	23.55	36.11	1.04	23.19	7.43	1.87
13400	23.52	59.76	13.31	21.86	37.64	1.04	22.42	7.51	1.90
13600	23.59	59.32	12.62	20.30	35.18	1.05	25.53	7.57	1.83
13800	23.66	61.25	12.21	19.14	43.27	1.05	26.09	7.54	1.78
14000	23.72	60.33	11.65	18.16	38.26	1.05	24.20	7.54	1.88
14200	23.81	60.71	11.50	17.33	39.40	1.05	23.35	7.60	1.85
14400	23.92	59.60	11.35	16.78	34.19	1.05	23.69	7.67	1.88
14600	24.06	59.74	11.36	16.43	34.21	1.05	25.03	7.87	1.87
14800	24.21	59.95	11.52	16.24	34.63	1.05	24.81	7.84	1.82
15000	24.37	59.52	11.70	16.16	32.48	1.04	23.63	8.04	1.94
15200	24.57	59.23	12.24	16.34	31.12	1.04	22.12	8.13	1.91
15400	24.76	58.43	12.68	16.75	28.00	1.03	22.77	8.36	1.84
15600	24.96	57.86	13.52	17.40	26.07	1.03	24.02	8.52	1.85
15800	25.18	57.83	14.63	18.12	25.70	1.02	24.19	8.39	1.96
16000	25.41	57.79	15.46	19.23	25.21	1.02	23.78	8.40	1.92
16200	25.64	58.06	16.60	20.45	25.63	1.01	23.89	8.56	1.94
16400	25.89	57.55	17.06	21.82	23.63	1.01	23.30	8.57	1.99
16600	26.14	57.39	17.30	23.28	22.65	1.01	23.34	8.63	2.00
16800	26.40	57.96	16.52	24.89	23.48	1.02	22.24	8.90	1.94
17000	26.64	57.78	15.36	27.14	22.29	1.03	22.39	8.74	1.96
17200	26.87	57.58	13.80	30.82	21.07	1.04	22.56	9.08	2.01
17400	27.03	57.90	12.22	33.40	21.13	1.06	22.46	9.20	1.99
17600	27.12	57.96	10.88	33.56	20.68	1.08	22.52	8.98	2.01
17800	27.12	58.72	9.50	27.13	21.85	1.11	21.96	9.01	2.09
18000	27.00	58.18	8.08	22.57	19.81	1.15	26.71	8.93	2.05

*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 = 2.6V, Id = 61mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
6000	25.20	65.14	11.03	11.11	45.66	1.00	26.60	9.52	1.81
6200	25.14	63.72	11.13	11.53	39.54	1.00	24.99	9.52	1.87
6400	25.10	63.36	11.29	11.96	38.61	1.01	24.98	9.60	1.83
6600	25.08	61.68	11.64	12.35	32.39	1.01	25.03	9.61	1.76
6800	25.06	61.14	12.09	12.78	31.09	1.01	22.85	9.64	1.83
7000	25.04	60.46	12.71	13.21	29.33	1.00	24.57	9.64	1.77
7200	25.02	60.26	13.22	13.61	29.17	1.00	24.61	9.57	1.76
7400	25.00	60.62	13.85	13.90	30.88	1.00	24.86	9.46	1.79
7600	24.97	59.88	14.48	14.21	28.85	1.00	24.68	9.49	1.78
7800	24.93	59.02	15.04	14.47	26.54	1.00	24.60	9.38	1.77
8000	24.88	59.19	15.53	14.65	27.49	0.99	24.64	9.48	1.75
8200	24.83	58.55	15.83	14.73	25.90	0.99	24.47	9.29	1.78
8400	24.77	57.89	16.13	14.76	24.33	0.99	24.43	9.13	1.73
8600	24.69	58.02	16.18	14.71	25.01	0.99	24.55	8.90	1.81
8800	24.62	57.68	16.23	14.63	24.31	0.99	25.67	8.69	1.78
9000	24.54	57.77	16.04	14.68	24.84	0.99	24.97	8.58	1.85
9200	24.46	58.00	15.56	14.68	25.76	0.99	25.73	8.32	1.82
9400	24.39	58.10	15.32	14.84	26.30	0.99	25.40	8.17	1.91
9600	24.34	57.59	14.72	15.12	24.99	1.00	24.05	8.02	1.82
9800	24.30	57.50	14.27	15.62	24.91	1.01	23.24	7.98	1.92
10000	24.27	57.76	13.78	16.19	25.76	1.02	25.14	8.07	1.96
10200	24.26	57.30	13.28	16.99	24.56	1.02	26.30	8.12	1.93
10400	24.25	57.49	12.93	17.98	25.16	1.03	25.40	8.14	1.96
10600	24.26	57.22	12.65	19.23	24.46	1.04	24.81	8.27	1.84
10800	24.29	57.32	12.64	20.44	24.79	1.04	24.11	8.27	1.88
11000	24.33	57.40	12.62	21.85	25.06	1.05	24.41	8.31	1.85
11200	24.38	57.98	12.60	23.20	26.77	1.05	23.96	8.32	1.83
11400	24.44	57.67	13.05	24.20	25.91	1.05	23.43	8.36	1.81
11600	24.52	58.20	13.28	25.06	27.49	1.04	22.64	8.37	1.74
11800	24.60	58.00	13.78	25.68	26.85	1.04	22.66	8.43	1.73
12000	24.68	57.96	14.25	26.46	26.68	1.04	23.89	8.58	1.74
12200	24.77	58.04	14.65	27.52	26.82	1.03	23.01	8.63	1.74
12400	24.85	58.21	14.78	28.29	27.21	1.03	23.33	8.78	1.69
12600	24.94	58.71	14.80	28.70	28.60	1.03	22.41	8.88	1.72
12800	25.02	59.17	14.40	27.97	29.84	1.03	22.58	8.90	1.75
13000	25.10	59.21	13.89	26.32	29.65	1.04	22.16	9.03	1.78
13200	25.17	59.43	13.32	24.19	29.97	1.04	22.34	8.89	1.73
13400	25.25	59.08	12.79	22.37	28.39	1.05	23.26	8.99	1.83
13600	25.31	59.98	12.14	20.66	30.94	1.05	22.48	9.06	1.74
13800	25.39	60.34	11.75	19.42	31.76	1.06	24.58	9.01	1.72
14000	25.44	61.19	11.22	18.33	34.42	1.06	23.08	9.01	1.77
14200	25.53	60.54	11.08	17.41	31.51	1.06	22.26	9.05	1.79
14400	25.63	60.52	10.95	16.79	30.97	1.06	21.73	9.15	1.85
14600	25.76	59.37	10.96	16.37	26.74	1.06	22.62	9.30	1.83
14800	25.90	59.56	11.12	16.12	27.01	1.05	22.77	9.38	1.77
15000	26.06	59.85	11.32	16.00	27.55	1.05	24.04	9.45	1.86
15200	26.24	59.28	11.86	16.12	25.61	1.04	23.97	9.65	1.82
15400	26.43	58.64	12.32	16.50	23.53	1.04	24.06	9.65	1.83
15600	26.61	58.67	13.17	17.12	23.51	1.03	22.90	9.82	1.89
15800	26.82	58.66	14.26	17.81	23.30	1.02	22.05	9.72	1.82
16000	27.03	58.12	15.09	18.87	21.66	1.02	20.92	9.61	1.93
16200	27.24	58.20	16.16	20.03	21.60	1.01	21.92	9.86	1.94
16400	27.46	58.80	16.38	21.34	22.68	1.02	23.34	9.75	1.93
16600	27.67	58.24	16.36	22.70	20.84	1.02	24.10	9.87	1.94
16800	27.90	58.54	15.39	24.13	20.95	1.02	23.60	10.10	1.95
17000	28.10	59.37	14.17	26.05	22.40	1.04	23.37	9.96	1.98
17200	28.26	59.00	12.71	28.75	20.84	1.05	22.98	10.23	2.00
17400	28.35	59.71	11.24	29.83	21.97	1.07	23.93	10.43	1.94
17600	28.37	60.20	10.04	30.16	22.71	1.10	22.52	10.15	1.99
17800	28.28	59.89	8.80	26.19	21.40	1.13	21.63	10.20	2.01
18000	28.07	59.82	7.54	22.28	20.64	1.17	21.90	10.12	1.97

*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

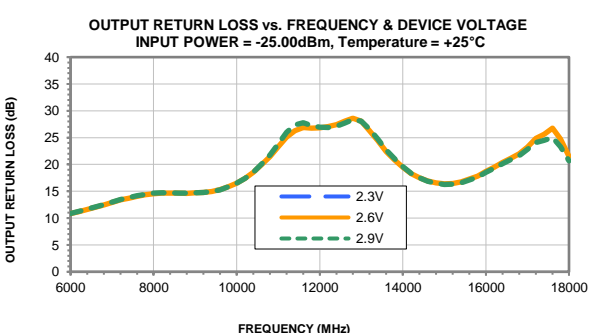
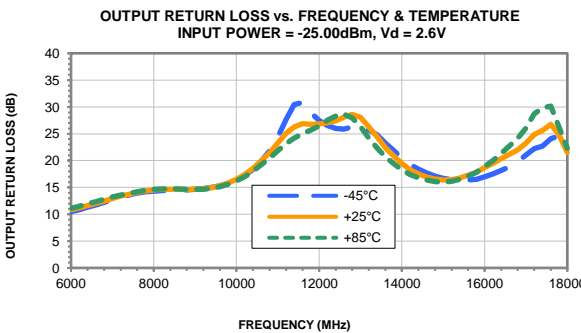
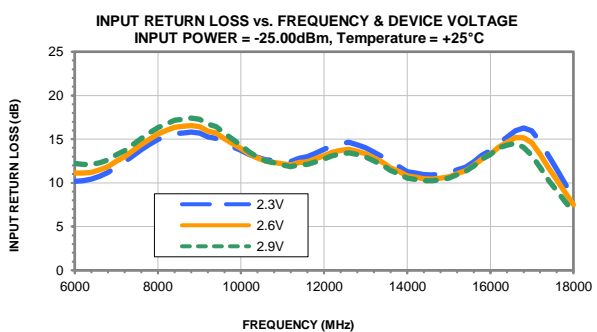
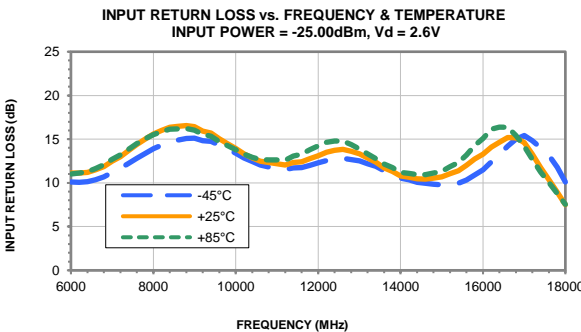
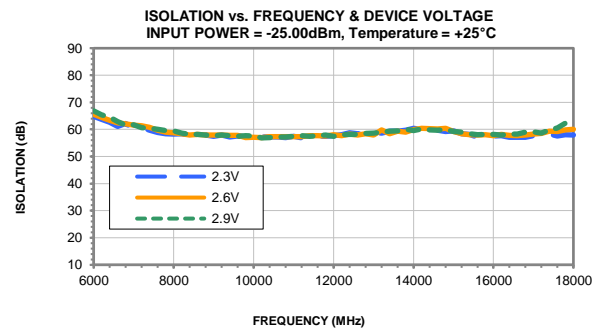
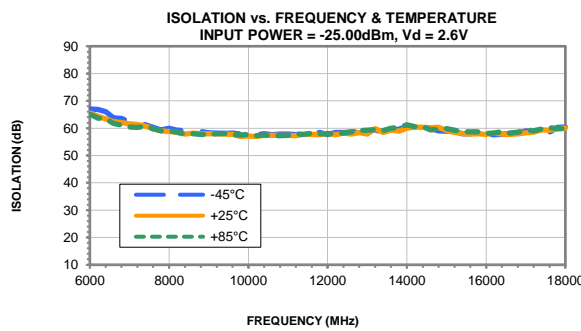
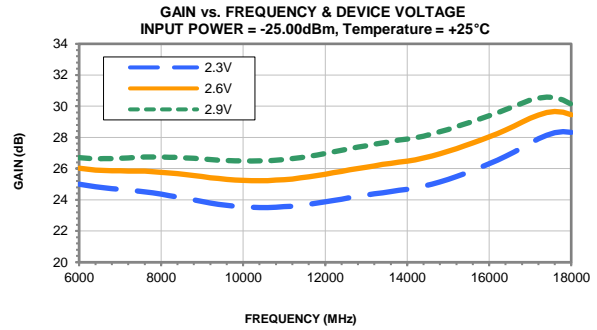
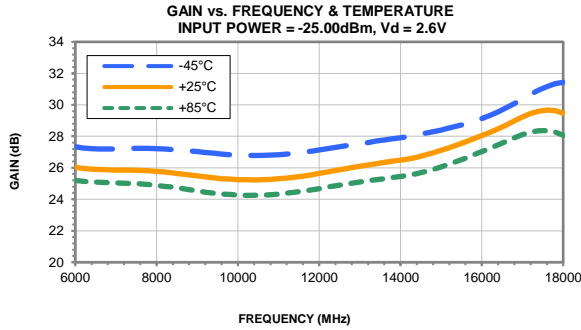
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 2.9V, Id = 73mA @ Temperature = +85°C

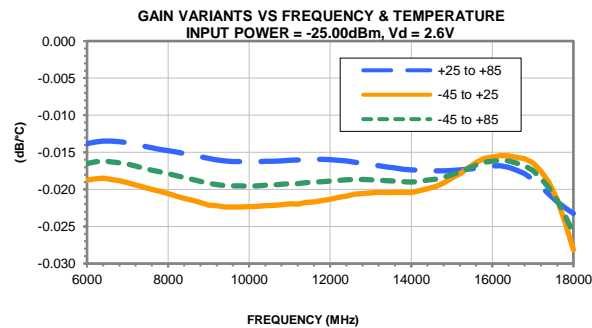
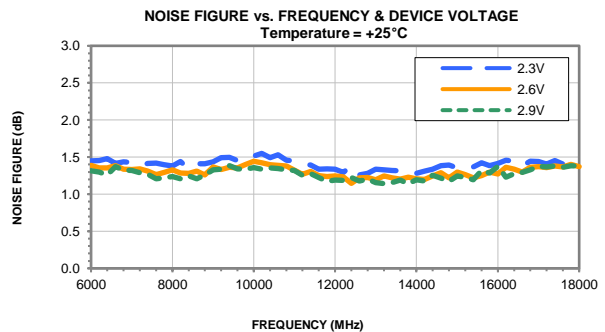
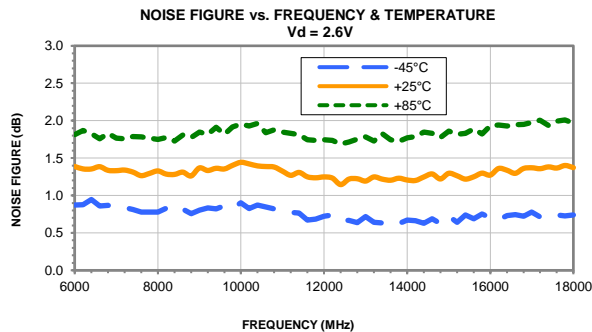
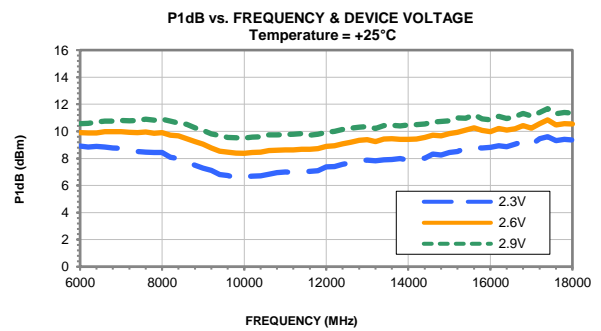
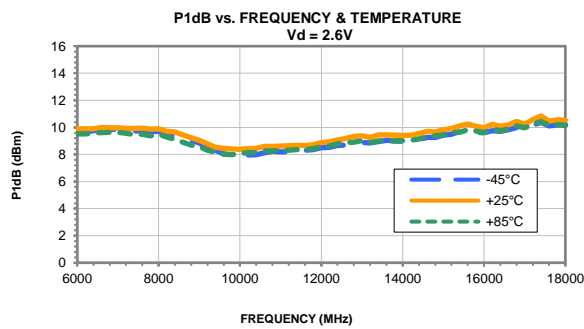
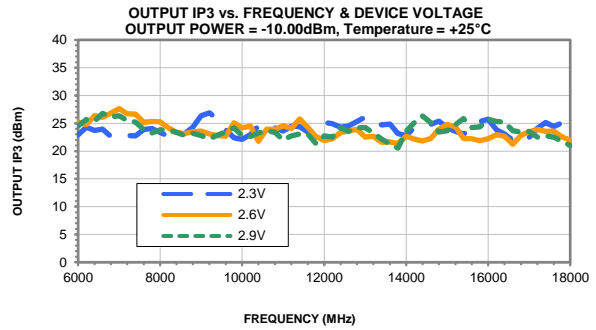
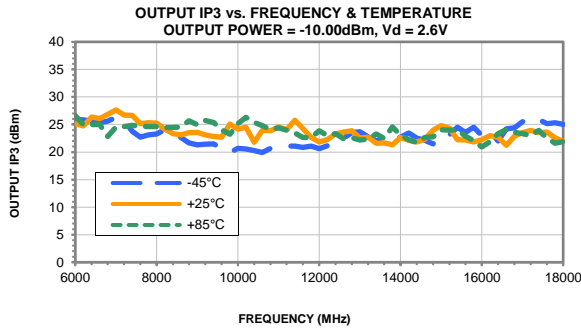
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
6000	25.92	65.74	11.94	11.16	45.81	0.98	24.88	10.24	1.78
6200	25.88	64.42	11.96	11.59	39.96	0.99	24.84	10.27	1.73
6400	25.87	63.91	12.04	12.04	38.23	1.00	25.27	10.38	1.76
6600	25.87	62.19	12.34	12.44	31.77	1.00	24.69	10.51	1.78
6800	25.87	62.45	12.76	12.88	33.26	1.00	26.06	10.48	1.75
7000	25.88	61.37	13.35	13.31	29.82	1.00	25.73	10.50	1.73
7200	25.89	61.09	13.83	13.72	29.24	1.00	24.47	10.47	1.71
7400	25.91	60.78	14.46	14.00	28.52	1.00	23.82	10.38	1.66
7600	25.91	60.41	15.08	14.31	27.68	0.99	24.37	10.54	1.71
7800	25.91	59.41	15.66	14.56	24.96	0.99	23.81	10.44	1.71
8000	25.89	59.51	16.17	14.74	25.52	0.99	22.14	10.48	1.71
8200	25.86	58.17	16.50	14.80	22.09	0.99	22.43	10.33	1.75
8400	25.83	58.24	16.83	14.83	22.50	0.99	23.41	10.18	1.74
8600	25.78	58.34	16.89	14.77	22.95	0.99	24.94	9.97	1.73
8800	25.74	58.15	16.97	14.67	22.65	0.98	24.46	9.68	1.74
9000	25.69	57.94	16.76	14.72	22.31	0.99	24.08	9.59	1.81
9200	25.63	57.91	16.22	14.70	22.37	0.99	24.57	9.35	1.77
9400	25.58	57.95	15.93	14.84	22.64	0.99	24.56	9.24	1.81
9600	25.54	57.82	15.23	15.13	22.42	1.00	23.50	9.20	1.84
9800	25.52	58.18	14.66	15.63	23.49	1.00	23.16	9.18	1.88
10000	25.51	57.47	14.06	16.22	21.71	1.01	23.58	9.17	1.86
10200	25.50	57.69	13.43	17.04	22.31	1.02	23.32	9.24	1.82
10400	25.50	57.74	12.98	18.09	22.47	1.03	24.53	9.26	1.76
10600	25.52	56.97	12.62	19.42	20.58	1.04	23.31	9.40	1.86
10800	25.55	57.44	12.52	20.74	21.73	1.05	22.65	9.40	1.82
11000	25.60	57.78	12.42	22.28	22.59	1.05	21.73	9.43	1.80
11200	25.65	57.55	12.36	23.74	21.94	1.05	22.36	9.45	1.76
11400	25.72	57.48	12.74	24.74	21.80	1.05	22.23	9.49	1.74
11600	25.80	57.71	12.92	25.50	22.34	1.05	25.12	9.49	1.74
11800	25.88	58.32	13.37	25.94	23.94	1.04	24.16	9.46	1.72
12000	25.97	57.92	13.81	26.56	22.79	1.04	25.54	9.61	1.69
12200	26.07	58.39	14.20	27.43	23.97	1.04	20.79	9.76	1.64
12400	26.16	58.18	14.34	28.13	23.25	1.03	21.28	9.81	1.61
12600	26.26	58.25	14.37	28.67	23.25	1.03	21.82	9.92	1.68
12800	26.34	59.78	14.01	28.22	27.41	1.04	21.75	10.03	1.63
13000	26.42	59.27	13.54	26.74	25.54	1.04	21.19	10.07	1.70
13200	26.50	59.34	13.00	24.56	25.38	1.05	20.98	9.93	1.67
13400	26.58	59.06	12.48	22.66	24.18	1.05	20.09	10.13	1.71
13600	26.65	60.60	11.85	20.87	28.38	1.06	21.32	10.12	1.68
13800	26.72	60.04	11.48	19.53	26.18	1.06	21.43	10.05	1.75
14000	26.78	60.71	10.98	18.40	27.81	1.06	22.32	10.06	1.74
14200	26.86	60.46	10.85	17.42	26.65	1.06	21.70	10.09	1.73
14400	26.96	61.47	10.74	16.74	29.47	1.06	20.97	10.20	1.72
14600	27.09	60.17	10.76	16.28	25.02	1.06	20.40	10.33	1.75
14800	27.23	59.99	10.95	15.99	24.24	1.05	20.40	10.41	1.77
15000	27.39	59.41	11.18	15.84	22.40	1.05	21.79	10.46	1.79
15200	27.56	59.26	11.75	15.95	21.88	1.04	23.42	10.59	1.76
15400	27.74	58.81	12.23	16.29	20.58	1.04	24.66	10.64	1.78
15600	27.91	58.30	13.12	16.91	19.39	1.03	24.19	10.83	1.73
15800	28.10	58.93	14.23	17.57	20.72	1.02	24.18	10.62	1.83
16000	28.29	58.34	15.04	18.60	19.20	1.02	23.29	10.55	1.81
16200	28.47	58.70	15.96	19.74	19.82	1.01	23.01	10.80	1.85
16400	28.66	58.69	15.87	20.98	19.43	1.02	21.89	10.65	1.87
16600	28.84	58.91	15.49	22.27	19.56	1.02	22.26	10.82	1.86
16800	29.03	59.48	14.30	23.55	20.33	1.03	21.69	10.95	1.88
17000	29.17	59.49	13.01	25.27	19.82	1.05	22.61	10.90	1.89
17200	29.27	60.02	11.61	27.38	20.53	1.07	22.75	11.11	1.92
17400	29.28	61.32	10.25	27.90	23.25	1.09	24.43	11.36	1.94
17600	29.21	62.44	9.18	28.08	26.03	1.12	23.41	11.02	1.94
17800	29.04	62.59	8.10	25.29	26.02	1.15	22.97	11.00	1.97
18000	28.75	62.36	7.00	21.89	24.85	1.19	22.25	10.93	1.95

## Typical Performance Curves



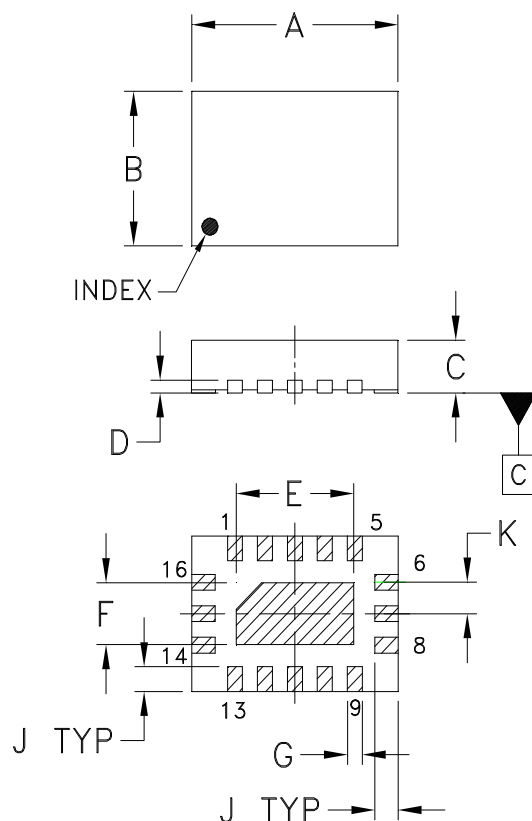


## Typical Performance Curves

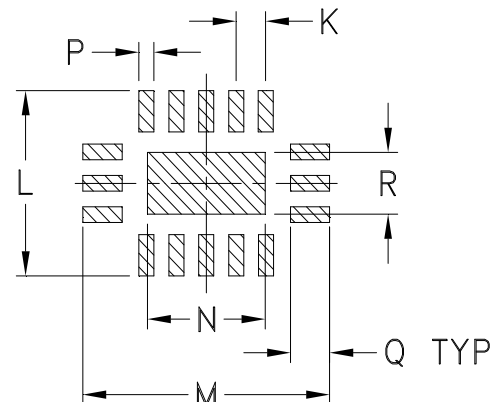


## Outline Dimensions

JV2579



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm 0.002$

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N
JV2579	.138 (3.5)	.098 (2.5)	.033 (0.85)	.008 (0.20)	.079 (2.01)	.039 (0.99)	.010 (0.25)	-	.016 (0.41)	.020 (.51)	.118 (3.00)	.157 (4.00)	.079 (2.01)

CASE #	P	Q	R	WT. GRAM
JV2579	.010 (0.25)	.026 (0.66)	.039 (0.99)	.03

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Notes:

1. Case material: Plastic.
2. Termination finish: **as shown below or indicated on Data Sheet.**  
For RoHS Case Styles: Matte-Tin plate.



P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

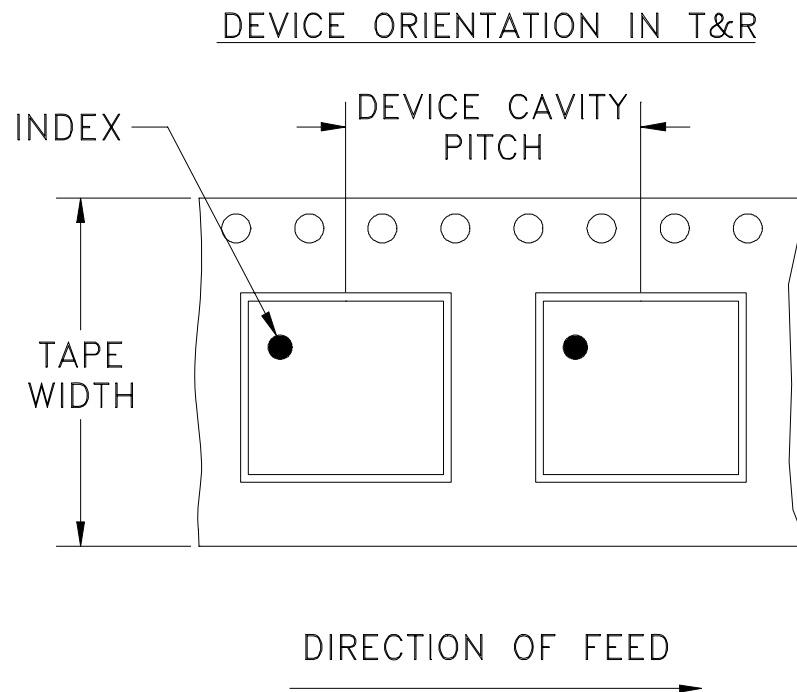


Provides ACTUAL Data Instantly From MINI-CIRCUITS At: [www.minicircuits.com](http://www.minicircuits.com)

RF/IF MICROWAVE COMPONENTS



# Tape & Reel Packaging TR-F104



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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

**Mini-Circuits®**

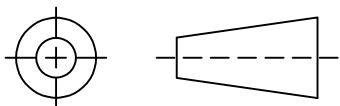
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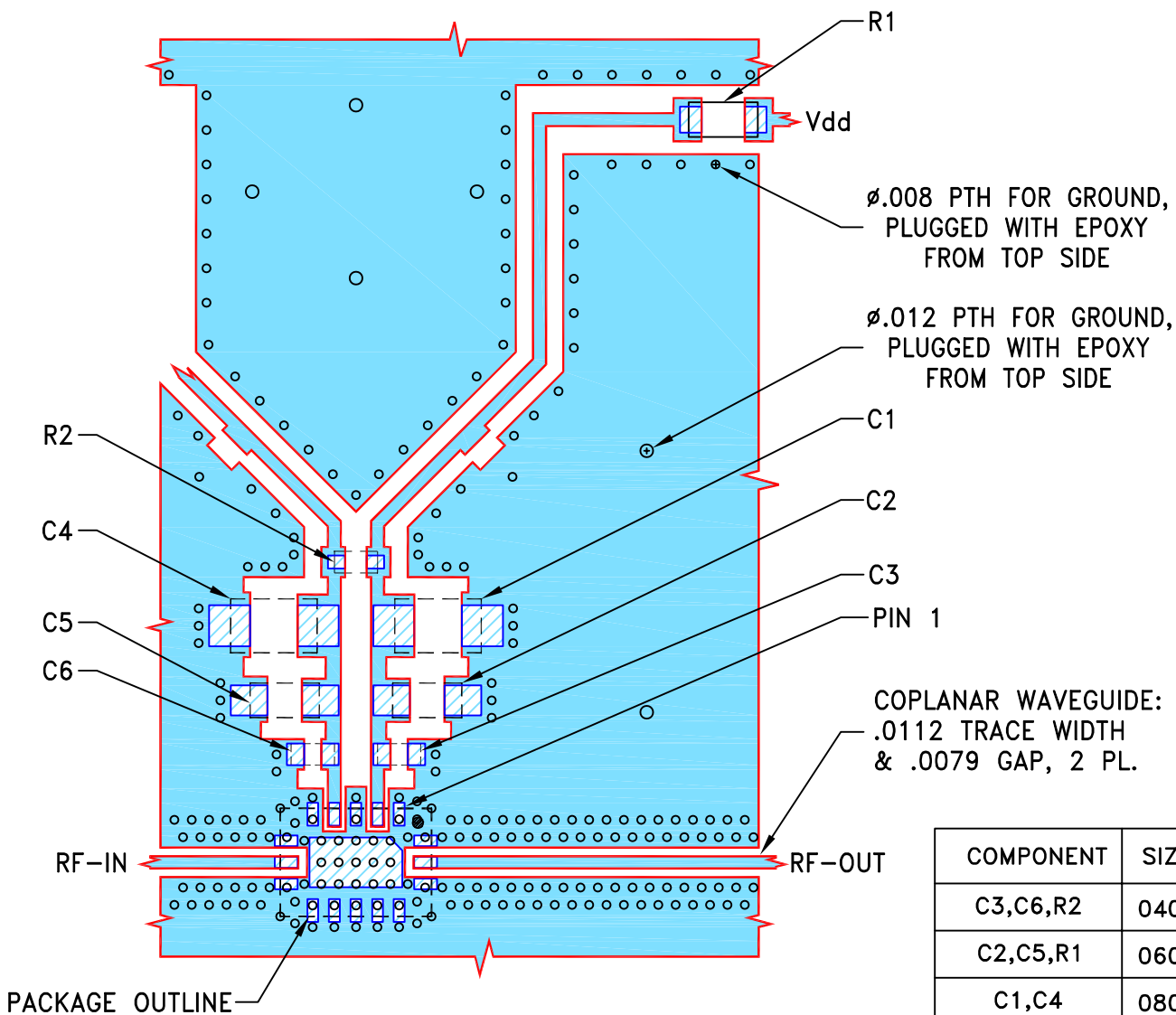
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-004039	NEW RELEASE	09/18/20	ITG	IL

SUGGESTED MOUNTING CONFIGURATION  
FOR JV2579 CASE STYLE

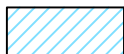


NOTES:

1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.0066 \pm .0007$ ".  
COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-PMA-183LNC+.
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	ITG	09/15/20
TOLERANCES ON:	GF	09/15/20
2 PL DECIMALS ±	IL	09/15/20
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		



Mini-Circuits®

13 Neptune Avenue  
Brooklyn NY 11235

PL, JV2579, TB-PMA-183LNC+

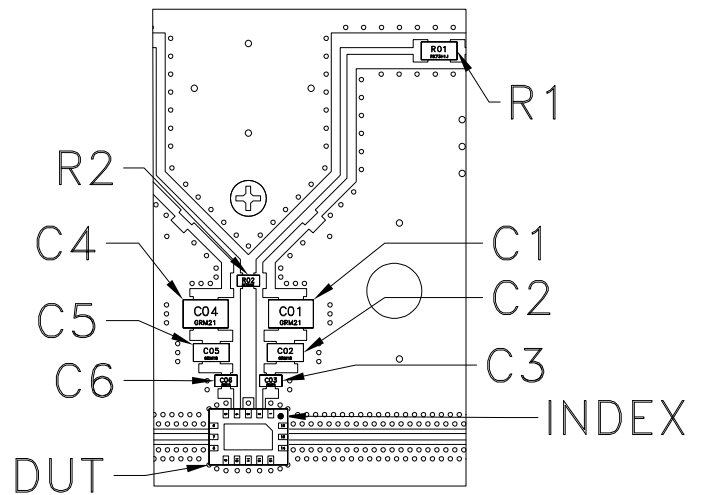
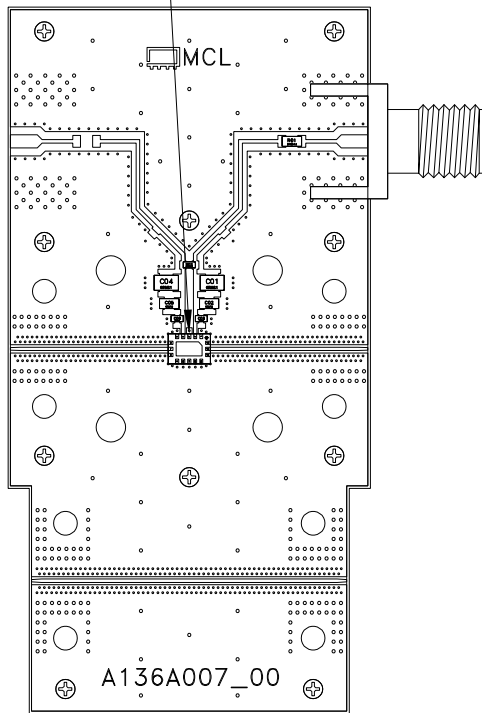
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ASHEETA1.DWG REV:A DATE:01/12/95

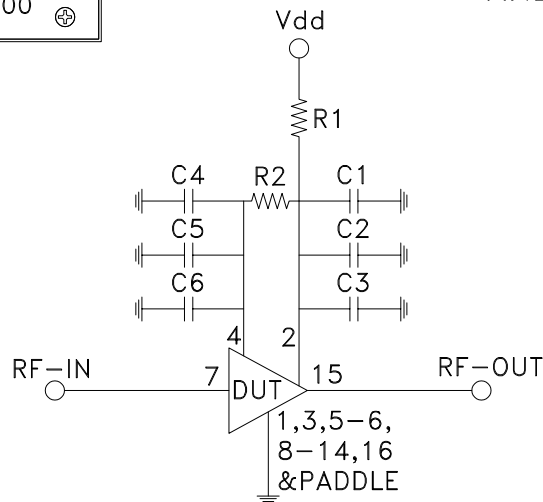
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-691	OR
FILE:	98PL691	SCALE: 6:1	SHEET: 1 OF 1

# Evaluation Board and Circuit

SEE DETAIL "A"



DETAIL "A"  
LOCATION OF INTERCONNECTOR  
AND UNITS COMPONENTS  
(SCALE 2:1)




SCHEMATIC DIAGRAM

Component	Size	Value	Part Number	Manufacturer
C1,C4	0805	0.33uF	TAJR334K035RNJ	AVX
C2,C5	0603	1000pF	GCM1885C1H102JA16D	Murata
C3,C6	0402	100pF	GRM1555C1H101JA01D	Murata
R1	0603	10 Ohm	ESR03EZPF10R0	Rohm Semiconductor
R2	0402	180 Ohm	RK73H1ETTP1800F	Koa Speer

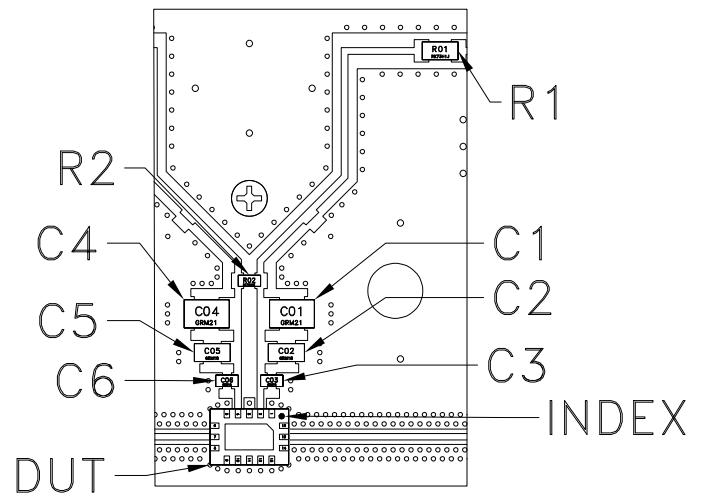
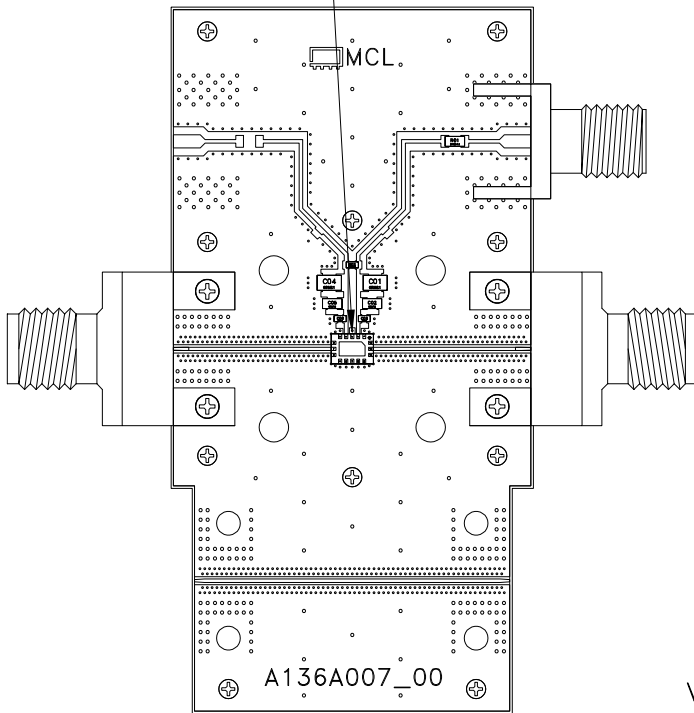
## Notes:

- 2.92mm Female Connectors.
- PCB Material: Roger RO4350B or equivalent,  
Dielectric constant=3.5, Thickness=0.0066 inch

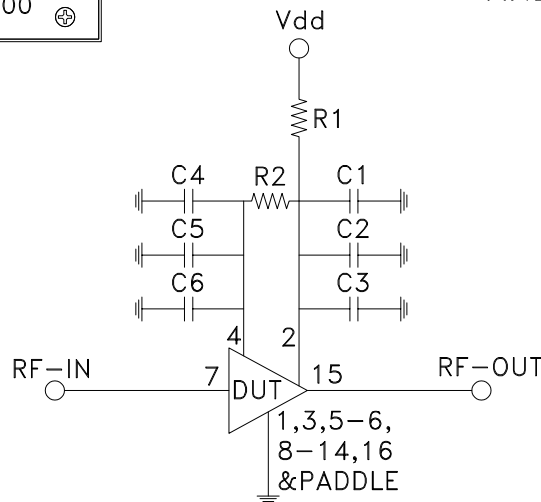
 Mini-Circuits®

# Evaluation Board and Circuit

SEE DETAIL "A"



DETAIL "A"  
LOCATION OF INTERCONNECTOR  
AND UNITS COMPONENTS  
(SCALE 2:1)




SCHEMATIC DIAGRAM

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R1	0603	10 Ohm	ESR03EZPF10R0	Rohm Semiconductor
R2	0402	180 Ohm	RK73H1ETTP1800F	Koa Speer

## Notes:

- 2.92mm Female Connectors.
- PCB Material: Roger RO4350B or equivalent,  
Dielectric constant=3.5, Thickness=0.0066 inch

 Mini-Circuits®

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 or -55° to 105° C or -40° to 105° C or -40° to 95° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
HTOL	1000 hours at 125°C	MIL-STD-883, Method 1005, Condition B
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

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.

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215