



MMIC SURFACE MOUNT

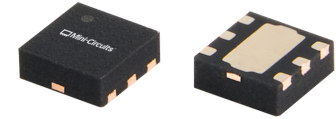
Monolithic Amplifier

LEE1-63+

50Ω DC to 6000 MHz

THE BIG DEAL

- High Gain, Typ. 19.5dB
- High OIP3, Typ. +30 dBm
- High P1dB, Typ. +16.6 dBm
- Single Supply Voltage, 69 mA at +5 V
- 1.5x1.5 mm 6-Lead QFN-Style Package

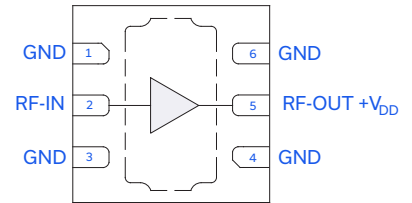


Generic photo used for illustration purposes only

APPLICATIONS

- Satellite Communications
- 5G MIMO and Backhaul MW Radio Systems
- Radar, EW and ECM Defense Systems

FUNCTIONAL DIAGRAM (TOP VIEW)



PRODUCT OVERVIEW

The LEE1-63+ is high-linearity gain block amplifier in a low-cost surface mount package fabricated using an InGaP/GaAs HBT semiconductor process. Operating from DC to 6000 MHz, this amplifier features high dynamic range with typical 3.4 dB noise figure, 19.5 dB gain, +16.6 dBm P1dB, and +30 dBm OIP3 at 3 GHz. This combination of performance makes it ideal for sensitive, high dynamic range receiver applications. The LEE1-63+ operates on a single +5 V supply and consumes 69 mA, is well matched to 50Ω, and comes in a small, low-profile 1.5x1.5 mm QFN-style package for ease of integration into dense circuit board layouts.

KEY FEATURES

Features	Advantages
Low Power Consumption, Typ. 69 mA at +5 V	At only 69 mA, this amplifier is ideal for applications with limited available power or densely packed applications where thermal and power management is critical.
High Dynamic Range <ul style="list-style-type: none"> • OIP3, Typ. +30 dBm at 3 GHz • P1dB, Typ. +16.6 dBm at 3 GHz 	The LEE1-63+ matches industry leading OIP3 performance relative to device size and power consumption. The combination of its low noise figure, high-linearity and output power features make this gain block amplifier ideal for use as secondary stage amplifier in ultra-high dynamic range receivers.
1.5x1.5 mm 6-Lead QFN-Style Package	Very small footprint saves space in dense PCB layouts while providing low inductance, repeatable transitions, and excellent thermal contact with the PCB. Industry standard packaging allows for ease of assembly in high volume manufacturing processes.
No External Matching Components Required	The LEE1-63+ features excellent input and output return loss, eliminating the need for any external matching components.





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Monolithic Amplifier

LEE1-63+

50Ω DC to 6000 MHz

ELECTRICAL SPECIFICATIONS¹ AT +25°C, I_{DD} = 69 mA, V_{DD} = +5 V, UNLESS NOTED OTHERWISE

Parameter	Frequency (MHz)	V _{DD} = +5 V			Units
		Min.	Typ.	Max.	
Frequency Range		DC ⁶		6000	MHz
Gain	10	22.5	23.4		dB
	1000	20.4	21.4		
	2000	19.8	20.8		
	3000	18.4	19.5		
	4000	16.6	17.7		
	6000	12.8	14.0		
Input Return Loss	10		14		dB
	1000		23		
	2000		43		
	3000		22		
	4000		16		
	6000		11		
Output Return Loss	10		9		dB
	1000		19		
	2000		16		
	3000		15		
	4000		15		
	6000		14		
Isolation	10 - 6000		23		dB
Output Power at 1 dB Compression (P _{1dB})	10		+18.8		dBm
	1000		+19.3		
	2000		+18.6		
	3000		+16.6		
	4000		+15.2		
	6000		+11.8		
Output Third-Order Intercept Point (P _{OUT} = 0 dBm/Tone)	10		+32.0		dBm
	1000		+34.0		
	2000		+32.5		
	3000		+30.0		
	4000		+28.4		
	6000		+26.1		
Noise Figure	10		3.5		dB
	1000		3.5		
	2000		3.4		
	3000		3.4		
	4000		3.5		
	6000		4.0		
Device Operating Voltage (V _{DD}) ²		+4.75	+5.0	+5.25	V
Device Operating Current (I _{DD}) ³			69		mA
Device Current Variation vs. Temperature ⁴			0.049		mA/°C
Device Current Variation vs. Voltage ⁵			0.037		mA/mV

1. Tested on Mini-Circuits Characterization Test Board MB-225-63C+. See Figure 2. Board loss de-embedded to the device.

2. Operating Voltage applied to device LEE1-63+.

3. Current at P_N = -25 dBm.

4. (Current at +105°C - Current at -55°C) / (+105°C - -55°C)

5. (Current at +5.25 V - Current at +4.75 V) / (5.25 V - 4.75 V)

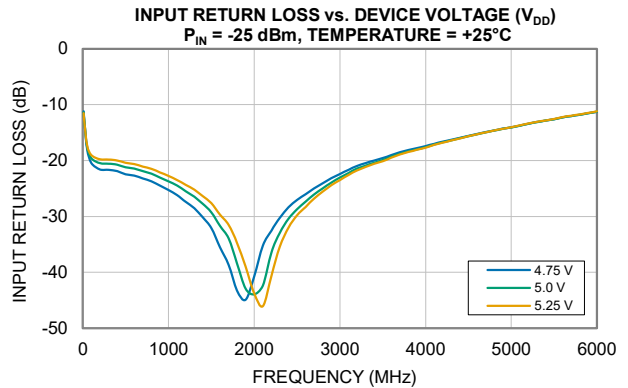
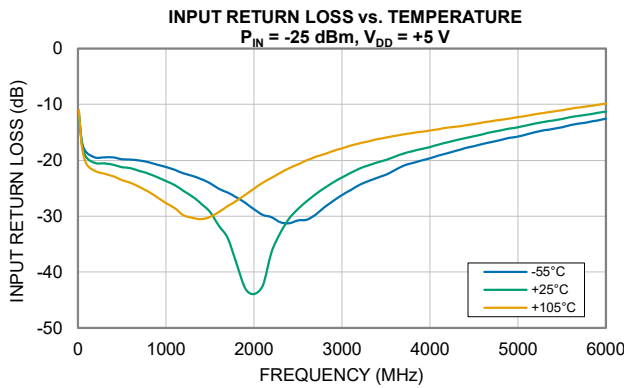
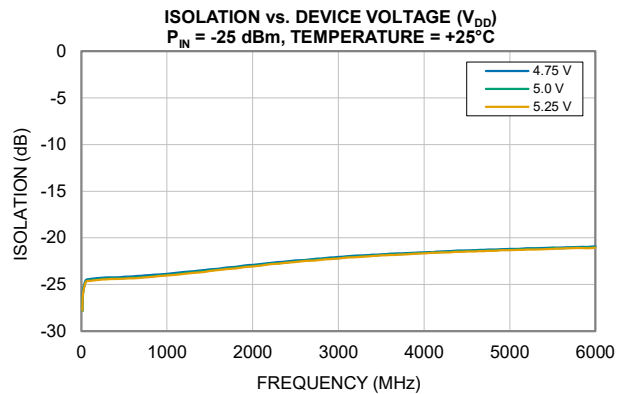
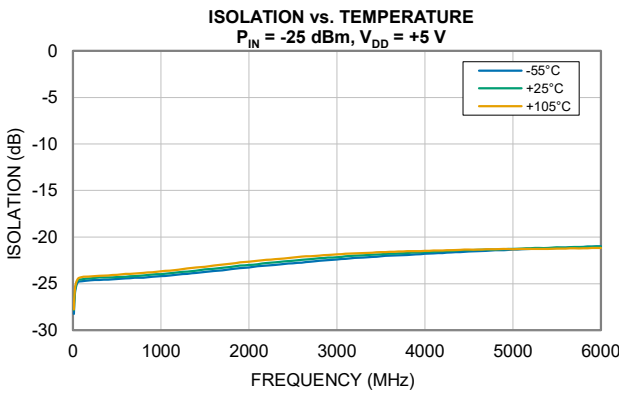
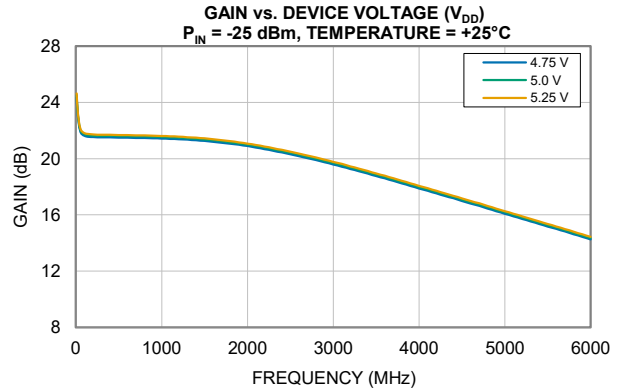
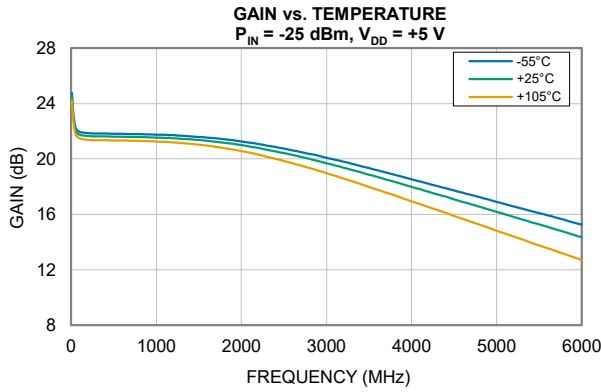
6. Low frequency cut off determined by external coupling capacitors.





TYPICAL PERFORMANCE GRAPHS

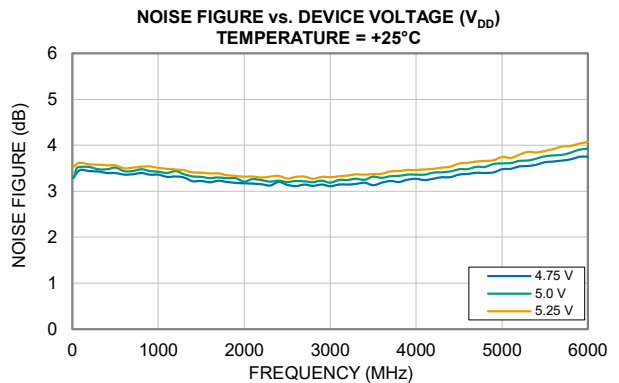
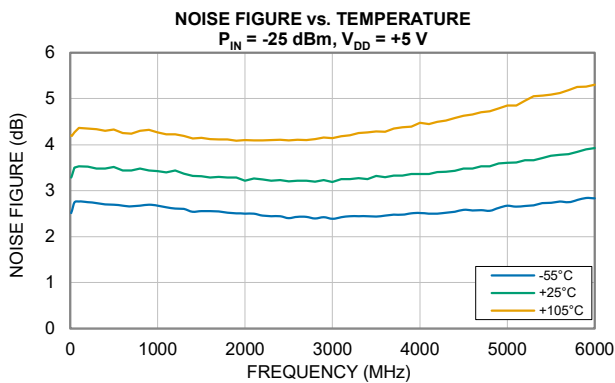
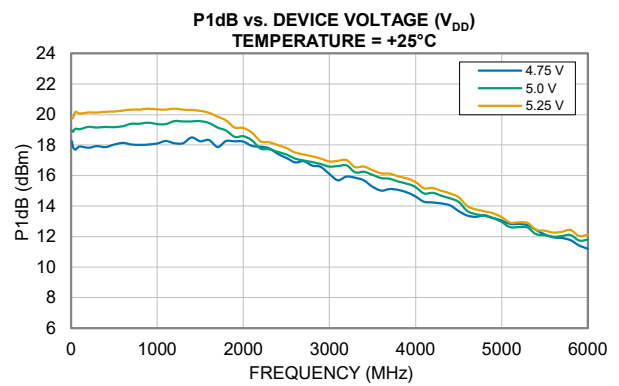
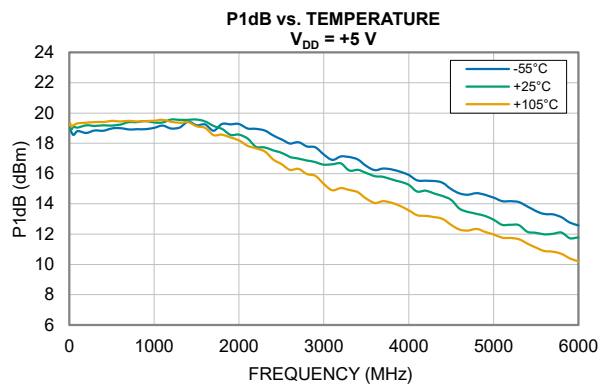
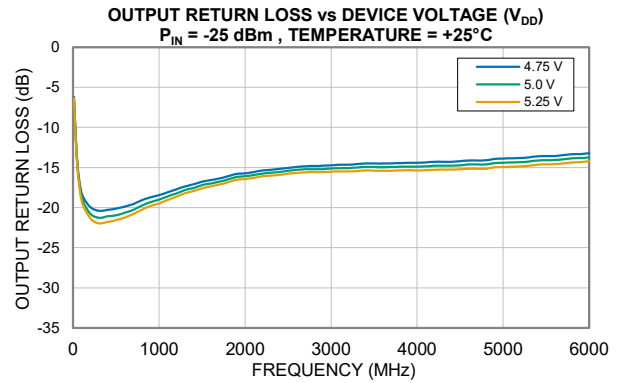
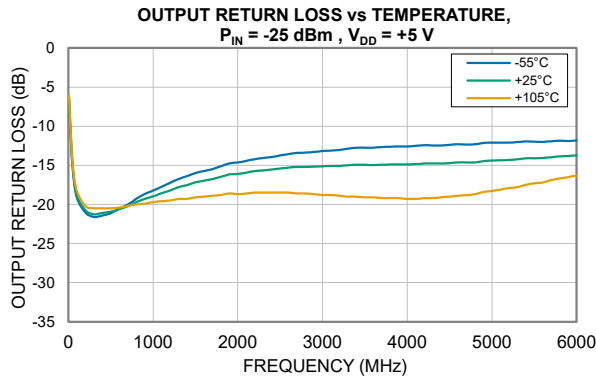
Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).





TYPICAL PERFORMANCE GRAPHS

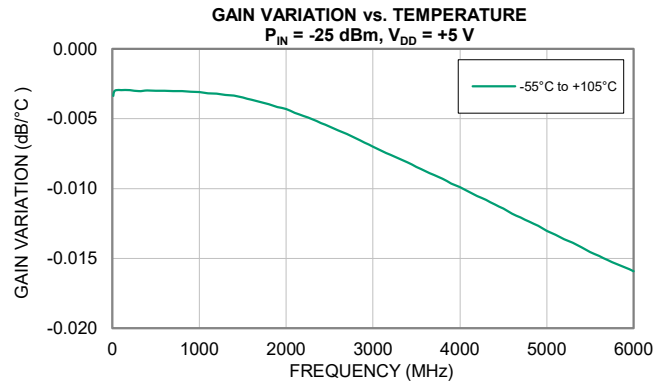
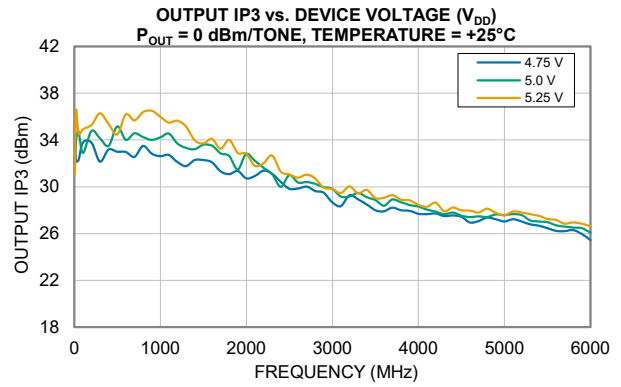
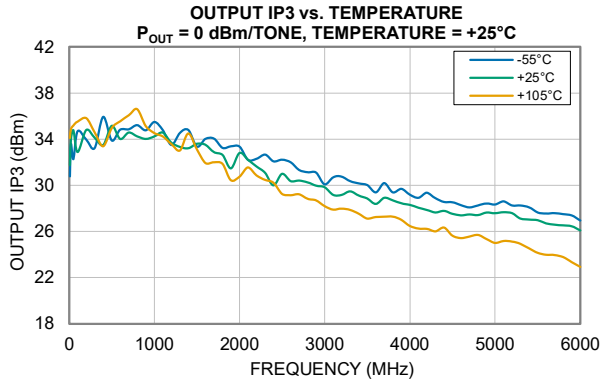
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TYPICAL PERFORMANCE GRAPHS

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LEE1-63+

Mini-Circuits

50Ω DC to 6000 MHz

ABSOLUTE MAXIMUM RATINGS⁷

Parameter	Ratings
Operating Temperature	-55°C to +105°C
Storage Temperature	-65°C to +150°C
Junction Temperature ⁸	+150°C
Total Power Dissipation	0.43 W
Input Power (CW), V _{DD} = +5 V	+13 dBm
DC Voltage at V _{DD}	+6 V
DC Current I _{DD}	110 mA

7. Permanent damage may occur if any of these limits are exceeded. Maximum ratings are not intended for continuous normal operation.

8. Peak temperature on top of Die.

THERMAL RESISTANCE

Parameter	Ratings
Thermal Resistance (Θ _{JC}) ⁹	105.2°C/W

9. Θ_{JC} = (Hot Spot Temperature on Die - Temperature at Ground Lead)/Dissipated Power

ESD RATING

	Class	Voltage Range	Reference Standard
HBM	1C	> 1000 V	ANSI/ESDA/JEDEC JS-001-2023
CDM	C3	> 1000 V	ANSI/ESDA/JEDEC JS-002-2022



ESD HANDLING PRECAUTION: This device is designed to be Class 1C for HBM. Static charges may easily produce potentials higher than this with improper handling and can discharge into DUT and damage it. As a preventive measure industry standard ESD handling precautions should be used at all times to protect the device from ESD damage.

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020E /JEDEC J-STD-033C



FUNCTIONAL DIAGRAM (TOP VIEW)

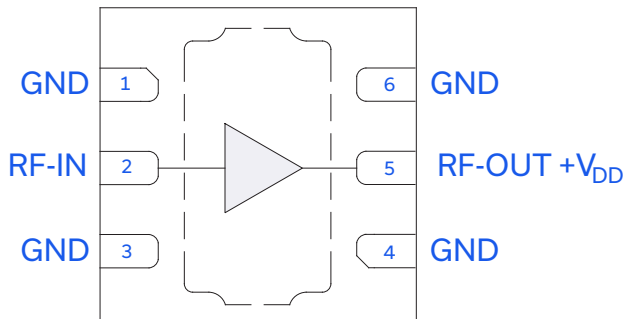


Figure 1. LEE1-63+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description (Refer to Fig 2)
RF-IN	2	RF-IN Pad connects to RF Input port.
RF-OUT+V _{DD}	5	RF-OUT Pad connects to RF Output port. V _{DD} is applied via external bias tee.
GND	1, 3, 4, 6 & Paddle	Connects to ground.

CHARACTERIZATION TEST BOARD

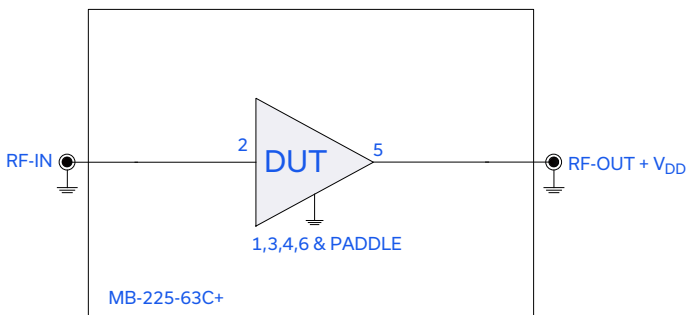


Figure 2. LEE1-63+ Characterization Circuit

Electrical Parameters and Conditions

Gain, Return Loss, Output Power at 1dB Compression (P1dB), Output IP3 (OIP3), and Noise Figure measured using N5242A PNA-X microwave network analyzer.

Conditions:

1. Gain and Return Loss: P_{IN} = -25 dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/Tone at output.
3. V_{DD} = +5 V



EVALUATION BOARD

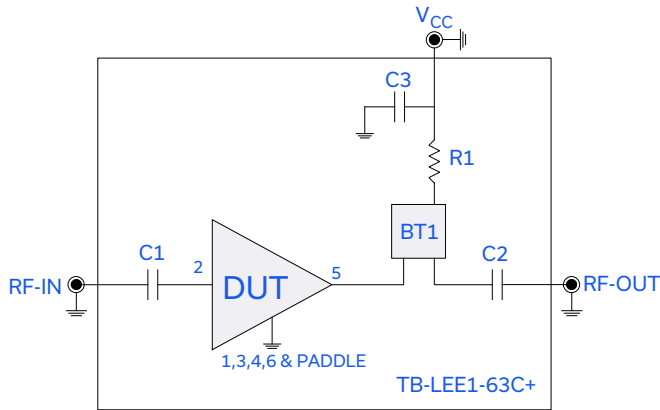


Figure 3. LEE1-63+ Evaluation Circuit

Electrical Parameters and Conditions

Gain, Return Loss, Output Power at 1dB Compression (P1dB), Output IP3 (OIP3), and Noise Figure measured using N5242A PNA-X microwave network analyzer.

Conditions:

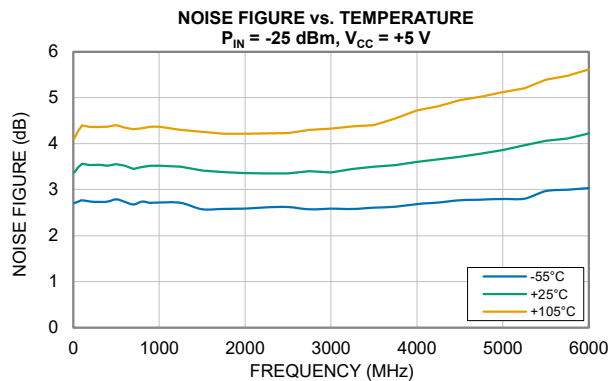
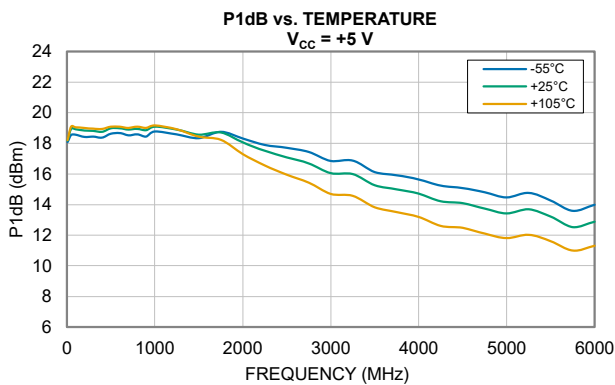
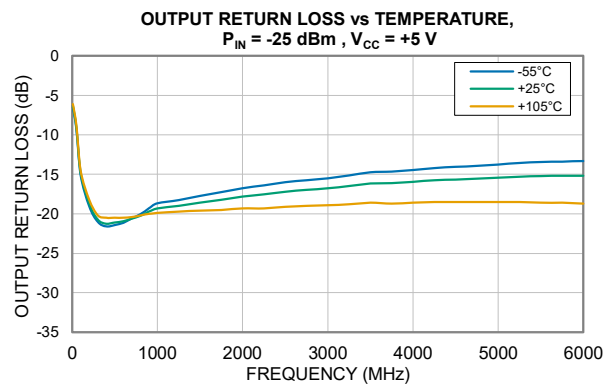
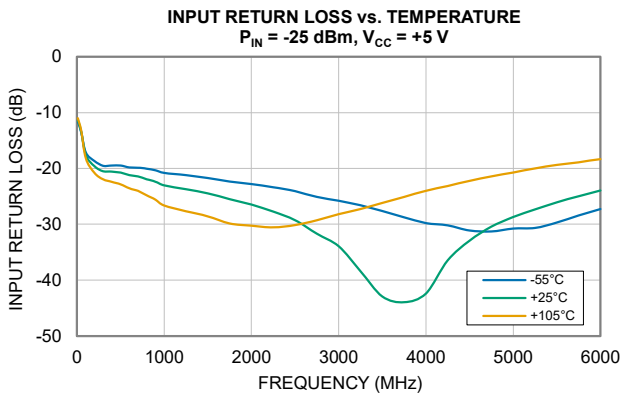
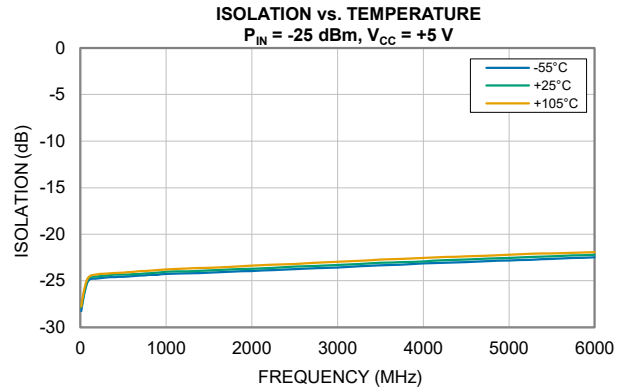
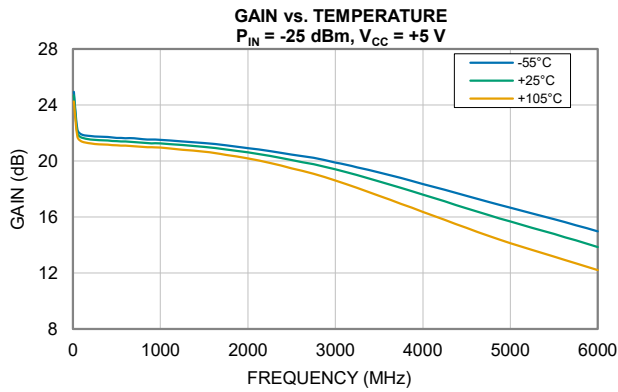
1. Gain and Return Loss: $P_{IN} = -25$ dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/Tone at output.
3. $V_{CC} = +5$ V

Component	Value	Size	Part Number	Manufacturer
C1, C2	2.4 nF	0402	GRM1557U1A242JA1D	Murata
C3	0.1 μ F	0805	GCM21BR91H104KA37L	Murata
R1	0 Ω , 0.5W	1210	RC1210FR-070RL	Yageo
BT1	-	3.8x3.8 mm	TCBT-123+	Mini-Circuits



TYPICAL PERFORMANCE GRAPHS

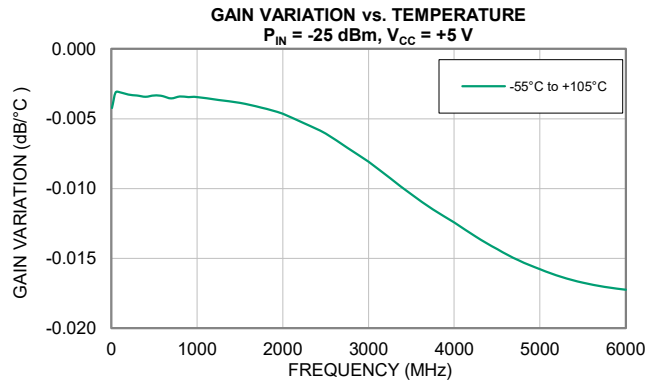
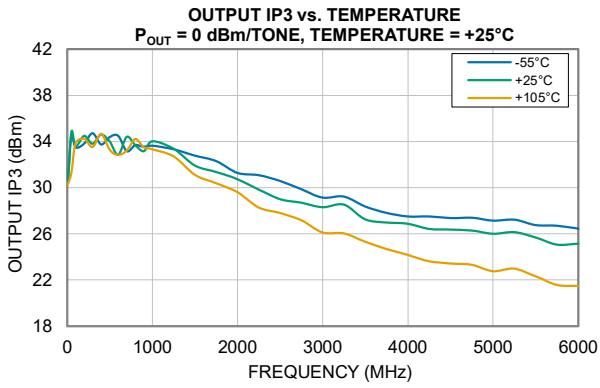
Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-63C+ (Figure 3).





TYPICAL PERFORMANCE GRAPHS

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MMIC SURFACE MOUNT

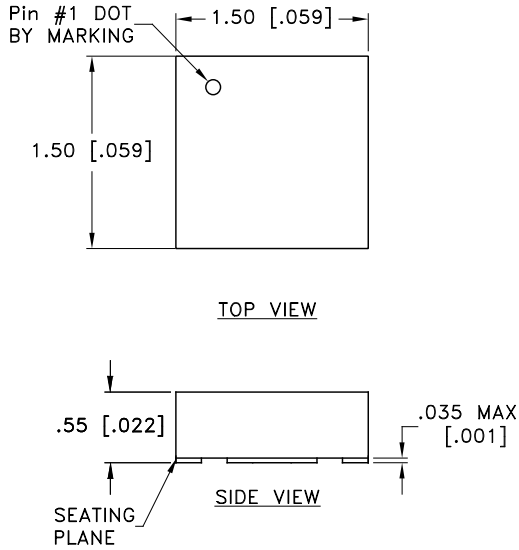
Monolithic Amplifier

LEE1-63+

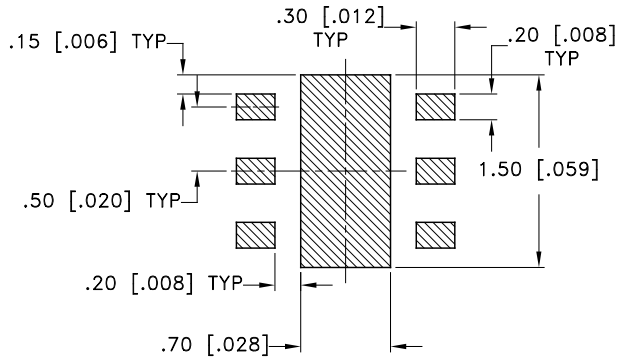
Mini-Circuits

50Ω DC to 6000 MHz

CASE STYLE DRAWING



PCB Land Pattern



Suggested Layout, Tolerance to be within ±0.050 mm

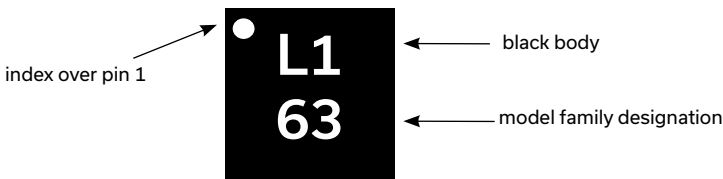
NOTES:

- 1. DENOTES METALLIZATION

Weight: 0.0036 grams

Dimensions are in mm [inches]. Tolerances: 2Pl. ±0.05 mm [0.002 inches].

PRODUCT MARKING



Marking may contain other features or characters for internal lot control



MMIC SURFACE MOUNT

Monolithic Amplifier

LEE1-63+

50Ω DC to 6000 MHz

Mini-Circuits

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD

[CLICK HERE](#)

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	KC3011 Plastic package, exposed paddle, Lead Finish: Nickel Palladium Gold
RoHS Status	Compliant
Tape & Reel Standard quantities available on reel	F66 7" reels with 20, 50, 100, 200, 500, 1000, 2000, or 3000 devices
Suggested Layout for PCB Design	PL-851
Evaluation Board	TB-LEE1-63C+ Gerber File
Environmental Ratings	ENV08T1

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/terms/viewterm.html



Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).

Definitions:

Input Return Loss = S11 (dB)

Gain = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: I_{DD} = 60.7mA, V_{DD} = 4.75V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
					K	B1			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dB)	(dBm)
10	24.38	27.83	11.16	6.20	0.87	0.35	18.23	3.31	34.38
20	23.28	25.61	13.43	8.91	0.89	0.39	17.89	3.31	32.20
50	21.97	24.58	17.97	14.49	0.99	0.47	17.71	3.40	32.28
100	21.63	24.42	20.45	18.18	1.02	0.49	17.90	3.46	33.79
200	21.53	24.31	21.59	19.92	1.03	0.48	17.82	3.44	33.76
300	21.51	24.25	21.68	20.38	1.03	0.47	17.93	3.43	32.15
400	21.52	24.23	21.92	20.29	1.03	0.47	17.87	3.39	33.18
500	21.50	24.18	22.44	20.11	1.03	0.46	18.03	3.40	33.00
600	21.49	24.13	22.68	19.86	1.03	0.45	18.13	3.36	32.97
700	21.48	24.06	23.19	19.53	1.03	0.44	18.03	3.37	32.56
800	21.47	23.98	23.71	19.07	1.03	0.43	18.00	3.40	33.50
900	21.46	23.92	24.48	18.70	1.03	0.42	18.03	3.36	32.82
1000	21.44	23.86	25.27	18.45	1.03	0.41	18.10	3.36	32.63
1100	21.42	23.77	26.17	18.06	1.03	0.40	18.26	3.31	32.72
1200	21.39	23.67	27.41	17.72	1.03	0.39	18.11	3.32	32.11
1300	21.35	23.58	28.55	17.35	1.02	0.38	18.12	3.30	31.77
1400	21.31	23.50	30.16	17.09	1.02	0.37	18.50	3.22	32.29
1500	21.26	23.38	32.07	16.75	1.02	0.36	18.24	3.22	32.29
1600	21.21	23.30	35.51	16.57	1.02	0.36	18.33	3.19	32.10
1700	21.14	23.19	38.66	16.37	1.01	0.35	17.87	3.23	31.32
1800	21.07	23.10	43.23	16.09	1.01	0.35	18.27	3.20	31.08
1900	20.99	22.97	44.90	15.78	1.01	0.34	18.24	3.18	31.36
2000	20.90	22.89	40.70	15.71	1.01	0.34	18.23	3.18	30.73
2100	20.80	22.80	35.23	15.55	1.01	0.35	17.94	3.16	30.92
2200	20.69	22.68	32.53	15.37	1.00	0.35	17.89	3.15	31.37
2300	20.57	22.60	30.27	15.28	1.00	0.35	17.78	3.12	31.11
2400	20.44	22.53	28.38	15.17	1.00	0.36	17.41	3.20	30.42
2500	20.32	22.44	27.02	15.05	1.00	0.37	17.15	3.14	29.83
2600	20.18	22.38	26.00	14.91	1.00	0.38	16.86	3.11	29.86
2700	20.04	22.28	25.00	14.83	1.00	0.39	16.94	3.14	30.02
2800	19.90	22.20	24.06	14.80	1.00	0.40	16.65	3.12	29.64
2900	19.75	22.12	23.18	14.78	1.00	0.41	16.57	3.14	29.48
3000	19.59	22.06	22.40	14.71	1.00	0.43	16.11	3.11	28.66
3100	19.44	21.99	21.66	14.66	1.00	0.44	15.69	3.14	28.34
3200	19.28	21.90	20.97	14.64	1.00	0.45	15.94	3.15	29.28
3300	19.11	21.88	20.46	14.58	1.00	0.47	15.86	3.16	28.92
3400	18.94	21.82	19.99	14.48	1.01	0.48	15.68	3.18	28.49
3500	18.76	21.78	19.57	14.49	1.01	0.50	15.26	3.13	27.99
3600	18.60	21.71	19.02	14.50	1.01	0.51	15.00	3.18	27.89
3700	18.42	21.66	18.52	14.47	1.02	0.53	15.12	3.22	28.21
3800	18.24	21.64	18.13	14.44	1.02	0.55	15.05	3.20	28.00
3900	18.07	21.59	17.78	14.40	1.02	0.56	14.89	3.25	27.95
4000	17.88	21.56	17.41	14.40	1.03	0.58	14.63	3.27	27.69
4100	17.71	21.52	17.00	14.36	1.03	0.59	14.28	3.24	27.67
4200	17.53	21.46	16.61	14.28	1.03	0.61	14.23	3.27	27.71
4300	17.35	21.42	16.29	14.27	1.04	0.62	14.17	3.30	27.50
4400	17.19	21.37	15.91	14.27	1.04	0.64	14.04	3.31	27.54
4500	16.99	21.37	15.59	14.20	1.05	0.65	13.68	3.36	27.45
4600	16.81	21.31	15.25	14.12	1.05	0.67	13.38	3.38	26.93
4700	16.64	21.28	14.91	14.11	1.06	0.68	13.29	3.40	27.06
4800	16.45	21.25	14.61	14.10	1.07	0.70	13.40	3.40	27.36
4900	16.27	21.23	14.30	13.94	1.07	0.71	13.22	3.41	27.21
5000	16.09	21.18	14.06	13.87	1.08	0.72	13.05	3.48	27.02
5100	15.91	21.18	13.74	13.84	1.08	0.74	12.83	3.49	27.22
5200	15.72	21.13	13.39	13.81	1.09	0.75	12.82	3.54	27.02
5300	15.54	21.10	13.09	13.72	1.09	0.76	12.74	3.55	26.77
5400	15.36	21.10	12.86	13.59	1.10	0.78	12.43	3.57	26.68
5500	15.18	21.05	12.60	13.57	1.11	0.79	12.15	3.63	26.46
5600	15.00	21.03	12.27	13.55	1.11	0.80	11.94	3.64	26.23
5700	14.82	21.02	12.03	13.43	1.12	0.81	11.90	3.67	26.20
5800	14.63	20.96	11.80	13.33	1.12	0.82	11.76	3.69	26.29
5900	14.44	20.97	11.55	13.31	1.13	0.84	11.41	3.75	25.96
6000	14.26	20.93	11.27	13.22	1.14	0.85	11.20	3.75	25.44

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).

Definitions:

Input Return Loss = S11 (dB)

Gain = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: I_{DD} = 70mA, V_{DD} = 5V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
					K	B1			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dB)	(dBm)
10	24.53	27.85	11.34	6.29	0.87	0.34	18.96	3.28	31.76
20	23.42	25.97	13.50	9.10	0.89	0.43	18.86	3.32	33.88
50	22.09	24.72	17.60	14.77	0.99	0.47	19.07	3.50	34.76
100	21.74	24.52	19.60	18.71	1.02	0.49	19.04	3.53	32.89
200	21.65	24.44	20.49	20.74	1.03	0.49	19.19	3.53	34.79
300	21.62	24.34	20.55	21.25	1.03	0.47	19.14	3.48	34.14
400	21.63	24.34	20.76	21.09	1.03	0.47	19.19	3.48	33.49
500	21.60	24.30	21.21	20.95	1.03	0.47	19.17	3.52	35.17
600	21.60	24.24	21.44	20.62	1.03	0.46	19.24	3.44	34.02
700	21.59	24.19	21.91	20.26	1.03	0.45	19.40	3.44	34.58
800	21.58	24.13	22.37	19.73	1.03	0.44	19.40	3.48	34.24
900	21.56	24.03	23.04	19.30	1.03	0.42	19.47	3.44	34.02
1000	21.54	23.97	23.71	19.00	1.03	0.42	19.37	3.43	34.23
1100	21.52	23.90	24.46	18.57	1.03	0.41	19.37	3.40	34.56
1200	21.50	23.77	25.50	18.23	1.03	0.39	19.57	3.44	33.69
1300	21.45	23.70	26.49	17.81	1.03	0.38	19.55	3.37	33.34
1400	21.41	23.60	27.74	17.54	1.02	0.37	19.55	3.32	33.20
1500	21.37	23.48	29.25	17.19	1.02	0.36	19.57	3.31	33.59
1600	21.31	23.40	31.69	16.98	1.02	0.36	19.45	3.29	33.51
1700	21.24	23.29	33.92	16.76	1.02	0.35	19.14	3.30	32.87
1800	21.17	23.19	38.39	16.48	1.01	0.35	18.95	3.28	32.63
1900	21.09	23.07	42.92	16.17	1.01	0.34	18.54	3.28	31.46
2000	21.00	23.00	43.95	16.09	1.01	0.35	18.57	3.21	32.81
2100	20.90	22.91	42.36	15.93	1.01	0.35	18.31	3.27	32.22
2200	20.79	22.78	36.43	15.75	1.01	0.34	17.76	3.24	31.63
2300	20.66	22.72	32.93	15.65	1.01	0.36	17.72	3.21	31.09
2400	20.54	22.61	30.43	15.55	1.01	0.36	17.54	3.23	29.99
2500	20.42	22.53	28.68	15.41	1.00	0.37	17.37	3.20	30.99
2600	20.28	22.44	27.33	15.29	1.00	0.38	17.10	3.22	30.37
2700	20.14	22.37	26.07	15.21	1.00	0.39	16.99	3.22	30.40
2800	20.00	22.28	24.98	15.19	1.00	0.40	16.87	3.20	30.25
2900	19.85	22.21	23.93	15.18	1.00	0.41	16.75	3.23	29.96
3000	19.69	22.17	23.06	15.12	1.01	0.43	16.59	3.19	29.83
3100	19.53	22.06	22.23	15.07	1.01	0.43	16.62	3.25	29.16
3200	19.37	22.00	21.45	15.07	1.01	0.45	16.67	3.25	29.17
3300	19.21	21.95	20.91	14.99	1.01	0.46	16.20	3.27	29.47
3400	19.04	21.89	20.38	14.92	1.01	0.48	16.25	3.25	29.10
3500	18.86	21.84	19.92	14.94	1.01	0.50	16.04	3.32	28.85
3600	18.70	21.79	19.33	14.96	1.02	0.51	15.83	3.29	28.38
3700	18.51	21.76	18.78	14.93	1.02	0.53	15.79	3.33	28.91
3800	18.34	21.70	18.36	14.89	1.02	0.54	15.61	3.33	28.68
3900	18.16	21.65	17.99	14.88	1.03	0.56	15.46	3.36	28.43
4000	17.98	21.61	17.61	14.88	1.03	0.58	15.25	3.36	28.30
4100	17.81	21.57	17.15	14.84	1.04	0.59	14.82	3.36	28.06
4200	17.63	21.53	16.75	14.78	1.04	0.61	14.87	3.41	27.87
4300	17.45	21.49	16.40	14.77	1.04	0.62	14.68	3.41	27.65
4400	17.28	21.43	16.01	14.76	1.05	0.63	14.51	3.43	27.79
4500	17.08	21.41	15.67	14.72	1.05	0.65	14.27	3.48	27.53
4600	16.91	21.37	15.32	14.62	1.06	0.67	13.67	3.48	27.40
4700	16.73	21.34	14.96	14.62	1.06	0.68	13.47	3.53	27.47
4800	16.55	21.33	14.65	14.62	1.07	0.70	13.34	3.53	27.42
4900	16.36	21.29	14.34	14.46	1.08	0.71	13.21	3.59	27.63
5000	16.18	21.26	14.09	14.39	1.08	0.72	12.95	3.61	27.57
5100	16.00	21.23	13.75	14.36	1.09	0.74	12.62	3.61	27.67
5200	15.82	21.20	13.40	14.32	1.09	0.75	12.62	3.66	27.57
5300	15.63	21.16	13.11	14.24	1.10	0.76	12.59	3.67	27.11
5400	15.45	21.17	12.86	14.11	1.11	0.78	12.15	3.71	27.04
5500	15.27	21.09	12.59	14.10	1.11	0.79	12.09	3.76	26.97
5600	15.09	21.12	12.27	14.06	1.12	0.80	11.98	3.78	26.71
5700	14.91	21.06	12.02	13.96	1.12	0.81	12.03	3.79	26.59
5800	14.72	21.05	11.79	13.84	1.13	0.83	12.10	3.84	26.52
5900	14.53	21.02	11.53	13.81	1.14	0.84	11.74	3.90	26.45
6000	14.35	21.02	11.25	13.72	1.14	0.85	11.79	3.93	26.08

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).

Definitions:

Input Return Loss = S11 (dB)

Gain = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: I_{DD} = 79.4mA, V_{DD} = 5.25V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
					K	B1			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dB)	(dBm)
10	24.63	27.81	11.51	6.34	0.86	0.34	19.76	3.54	31.02
20	23.51	25.99	13.60	9.18	0.89	0.42	19.75	3.54	36.52
50	22.18	24.78	17.32	15.00	0.99	0.47	20.17	3.60	34.54
100	21.82	24.61	19.02	19.15	1.02	0.49	20.06	3.62	34.91
200	21.73	24.51	19.77	21.31	1.03	0.49	20.13	3.58	35.28
300	21.70	24.44	19.81	21.95	1.03	0.48	20.12	3.58	36.28
400	21.71	24.41	19.98	21.77	1.03	0.47	20.18	3.56	35.38
500	21.68	24.36	20.40	21.55	1.03	0.47	20.20	3.56	34.48
600	21.68	24.34	20.64	21.21	1.03	0.46	20.25	3.50	36.19
700	21.66	24.27	21.07	20.78	1.03	0.45	20.32	3.51	35.68
800	21.65	24.20	21.49	20.25	1.03	0.44	20.32	3.53	36.38
900	21.64	24.10	22.11	19.78	1.03	0.43	20.37	3.54	36.50
1000	21.61	24.03	22.74	19.46	1.03	0.42	20.33	3.51	35.99
1100	21.60	23.96	23.47	19.01	1.03	0.41	20.33	3.49	35.48
1200	21.57	23.85	24.36	18.65	1.03	0.39	20.39	3.47	35.66
1300	21.53	23.76	25.21	18.20	1.03	0.38	20.32	3.45	35.15
1400	21.49	23.68	26.34	17.93	1.02	0.37	20.29	3.41	33.99
1500	21.44	23.57	27.64	17.58	1.02	0.36	20.24	3.40	33.70
1600	21.39	23.45	29.67	17.36	1.02	0.35	20.12	3.38	34.10
1700	21.32	23.35	31.50	17.12	1.02	0.35	19.85	3.39	33.25
1800	21.25	23.27	34.70	16.85	1.02	0.35	19.61	3.35	34.01
1900	21.17	23.14	38.96	16.51	1.01	0.34	19.15	3.33	32.89
2000	21.07	23.06	43.77	16.45	1.01	0.34	19.12	3.31	32.84
2100	20.98	22.96	46.05	16.28	1.01	0.34	18.82	3.32	31.79
2200	20.87	22.84	40.63	16.09	1.01	0.34	18.25	3.30	32.00
2300	20.75	22.75	35.41	16.00	1.01	0.35	18.18	3.32	32.68
2400	20.62	22.67	32.00	15.92	1.01	0.36	18.00	3.33	31.29
2500	20.50	22.60	29.81	15.77	1.01	0.37	17.80	3.27	31.05
2600	20.37	22.49	28.28	15.66	1.01	0.37	17.50	3.31	30.79
2700	20.23	22.44	26.79	15.59	1.01	0.39	17.39	3.32	31.04
2800	20.08	22.34	25.57	15.57	1.01	0.39	17.25	3.27	30.72
2900	19.93	22.27	24.44	15.58	1.01	0.41	17.12	3.31	29.92
3000	19.77	22.21	23.47	15.52	1.01	0.42	16.92	3.30	29.83
3100	19.62	22.13	22.56	15.48	1.01	0.43	16.97	3.32	29.46
3200	19.46	22.07	21.75	15.49	1.01	0.45	17.01	3.34	30.03
3300	19.29	22.02	21.16	15.43	1.01	0.46	16.54	3.37	29.45
3400	19.12	21.95	20.60	15.35	1.01	0.48	16.59	3.36	29.73
3500	18.94	21.89	20.11	15.39	1.02	0.49	16.35	3.37	29.03
3600	18.78	21.85	19.49	15.40	1.02	0.51	16.14	3.38	29.06
3700	18.60	21.81	18.91	15.39	1.02	0.53	16.12	3.43	29.28
3800	18.43	21.76	18.47	15.36	1.03	0.54	15.94	3.44	28.89
3900	18.25	21.72	18.08	15.33	1.03	0.56	15.80	3.46	28.83
4000	18.07	21.65	17.69	15.36	1.03	0.57	15.57	3.46	28.46
4100	17.89	21.61	17.22	15.33	1.04	0.59	15.16	3.47	28.29
4200	17.71	21.58	16.79	15.28	1.04	0.60	15.19	3.49	28.64
4300	17.54	21.55	16.42	15.26	1.05	0.62	15.00	3.51	27.89
4400	17.36	21.50	16.03	15.26	1.05	0.63	14.83	3.53	28.22
4500	17.17	21.47	15.68	15.22	1.06	0.65	14.58	3.61	27.97
4600	16.99	21.45	15.31	15.15	1.06	0.67	14.00	3.62	27.97
4700	16.82	21.41	14.94	15.14	1.07	0.68	13.78	3.65	27.79
4800	16.64	21.39	14.63	15.14	1.08	0.70	13.66	3.66	28.13
4900	16.45	21.33	14.32	14.98	1.08	0.71	13.52	3.67	27.77
5000	16.27	21.32	14.06	14.93	1.09	0.72	13.26	3.75	27.55
5100	16.08	21.28	13.71	14.89	1.09	0.74	12.92	3.72	27.88
5200	15.90	21.27	13.37	14.86	1.10	0.75	12.93	3.79	27.80
5300	15.71	21.24	13.07	14.78	1.10	0.76	12.90	3.86	27.65
5400	15.53	21.24	12.82	14.64	1.11	0.78	12.44	3.84	27.52
5500	15.36	21.18	12.55	14.61	1.12	0.79	12.39	3.88	27.25
5600	15.18	21.14	12.22	14.58	1.12	0.80	12.26	3.92	27.16
5700	14.99	21.11	11.97	14.49	1.13	0.82	12.32	3.97	26.85
5800	14.80	21.09	11.75	14.36	1.13	0.83	12.43	3.98	26.94
5900	14.61	21.12	11.48	14.32	1.14	0.84	12.03	4.03	26.84
6000	14.44	21.05	11.21	14.22	1.15	0.85	12.12	4.07	26.63

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).

Definitions:

Input Return Loss = S11 (dB)

Gain = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: I_{DD} = 65.5mA, V_{DD} = 5V @Temperature = -55degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
					K	B1			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.76	28.25	11.64	6.50	0.88	0.38	19.06	2.52	30.79
20	23.63	26.16	13.64	9.30	0.89	0.43	18.81	2.56	33.57
50	22.29	24.92	17.14	15.05	0.99	0.48	18.56	2.74	32.28
100	21.95	24.75	18.67	19.05	1.02	0.49	18.80	2.77	34.67
200	21.86	24.65	19.51	21.02	1.03	0.49	18.69	2.75	33.95
300	21.83	24.59	19.48	21.60	1.03	0.48	18.84	2.73	33.23
400	21.84	24.57	19.49	21.42	1.03	0.48	18.83	2.70	35.93
500	21.81	24.49	19.83	21.13	1.03	0.47	18.98	2.70	33.88
600	21.81	24.44	19.86	20.57	1.03	0.46	19.00	2.67	34.81
700	21.80	24.38	20.02	20.03	1.03	0.45	18.92	2.66	34.86
800	21.79	24.35	20.34	19.31	1.03	0.44	18.92	2.68	35.22
900	21.77	24.25	20.80	18.68	1.03	0.43	18.93	2.69	34.76
1000	21.75	24.21	21.19	18.26	1.03	0.42	19.01	2.68	35.49
1100	21.74	24.11	21.72	17.74	1.03	0.40	19.17	2.64	34.80
1200	21.71	24.01	22.34	17.26	1.02	0.39	18.98	2.61	33.51
1300	21.67	23.94	22.78	16.76	1.02	0.38	19.04	2.60	34.54
1400	21.63	23.83	23.34	16.39	1.02	0.37	19.43	2.54	34.80
1500	21.59	23.76	24.09	15.99	1.02	0.36	19.19	2.56	33.35
1600	21.54	23.64	25.08	15.74	1.02	0.35	19.24	2.55	34.01
1700	21.48	23.57	25.79	15.49	1.01	0.35	18.84	2.55	34.06
1800	21.41	23.45	26.60	15.12	1.01	0.34	19.28	2.52	33.24
1900	21.35	23.35	27.62	14.75	1.01	0.33	19.26	2.51	33.37
2000	21.25	23.26	28.76	14.64	1.01	0.33	19.28	2.50	33.37
2100	21.18	23.13	29.76	14.44	1.01	0.32	18.98	2.50	32.21
2200	21.08	23.06	30.18	14.21	1.00	0.33	18.95	2.46	32.29
2300	20.96	22.99	31.11	14.05	1.00	0.33	18.85	2.45	32.66
2400	20.86	22.88	31.28	13.94	1.00	0.33	18.53	2.44	32.08
2500	20.74	22.81	30.75	13.75	1.00	0.34	18.26	2.40	32.22
2600	20.62	22.73	30.62	13.56	1.00	0.34	17.98	2.43	32.00
2700	20.49	22.63	29.70	13.42	1.00	0.35	18.08	2.43	31.34
2800	20.37	22.56	28.41	13.39	1.00	0.36	17.79	2.40	31.12
2900	20.23	22.46	27.28	13.30	1.00	0.36	17.73	2.42	31.10
3000	20.09	22.41	26.20	13.18	1.00	0.37	17.26	2.39	30.08
3100	19.95	22.32	25.30	13.11	1.00	0.38	16.91	2.42	30.70
3200	19.80	22.24	24.37	13.04	1.00	0.39	17.13	2.45	30.76
3300	19.65	22.19	23.72	12.88	1.00	0.40	17.09	2.44	30.35
3400	19.49	22.14	23.12	12.74	1.00	0.42	16.94	2.45	30.16
3500	19.33	22.06	22.58	12.74	1.00	0.43	16.49	2.44	30.01
3600	19.18	21.99	21.75	12.73	1.00	0.44	16.22	2.46	29.38
3700	19.02	21.97	20.96	12.67	1.01	0.46	16.33	2.48	30.19
3800	18.86	21.92	20.47	12.61	1.01	0.47	16.27	2.48	29.38
3900	18.70	21.86	20.07	12.59	1.01	0.48	16.12	2.51	29.69
4000	18.53	21.80	19.63	12.59	1.01	0.50	15.91	2.52	29.19
4100	18.38	21.74	19.14	12.52	1.02	0.51	15.55	2.50	28.92
4200	18.21	21.70	18.71	12.43	1.02	0.52	15.52	2.50	29.35
4300	18.04	21.65	18.29	12.45	1.02	0.54	15.50	2.52	28.88
4400	17.89	21.61	17.81	12.45	1.02	0.55	15.39	2.54	28.57
4500	17.72	21.55	17.45	12.39	1.03	0.56	14.98	2.58	28.54
4600	17.56	21.51	17.07	12.31	1.03	0.58	14.69	2.57	28.28
4700	17.40	21.47	16.70	12.33	1.03	0.59	14.61	2.58	28.08
4800	17.23	21.42	16.35	12.32	1.04	0.60	14.71	2.56	28.26
4900	17.07	21.39	16.00	12.15	1.04	0.61	14.60	2.63	28.43
5000	16.91	21.35	15.75	12.11	1.04	0.62	14.41	2.67	28.34
5100	16.74	21.31	15.36	12.11	1.05	0.64	14.19	2.65	28.61
5200	16.57	21.26	14.95	12.10	1.05	0.65	14.18	2.67	28.24
5300	16.41	21.23	14.61	12.03	1.05	0.66	14.11	2.68	28.25
5400	16.25	21.20	14.36	11.95	1.06	0.68	13.82	2.73	28.09
5500	16.08	21.16	14.06	11.99	1.06	0.69	13.53	2.74	27.65
5600	15.93	21.13	13.68	12.00	1.07	0.70	13.33	2.76	27.55
5700	15.77	21.10	13.40	11.93	1.07	0.71	13.30	2.75	27.60
5800	15.59	21.05	13.17	11.86	1.07	0.72	13.12	2.80	27.50
5900	15.42	21.02	12.86	11.88	1.08	0.74	12.76	2.84	27.39
6000	15.26	20.99	12.56	11.83	1.08	0.75	12.58	2.83	26.95

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).

Definitions:

Input Return Loss = S11 (dB)

Gain = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: I_{DD} = 73.7mA, V_{DD} = 5V @Temperature = +105degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
					K	B1			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dB)	(dBm)
10	24.22	27.76	11.00	6.10	0.87	0.34	19.32	4.20	34.10
20	23.14	25.67	13.36	8.80	0.89	0.41	19.11	4.19	34.86
50	21.82	24.57	18.17	14.50	0.99	0.48	19.19	4.27	35.19
100	21.48	24.29	20.80	18.20	1.03	0.49	19.31	4.36	35.52
200	21.38	24.23	21.95	20.20	1.04	0.49	19.36	4.35	35.82
300	21.35	24.16	22.39	20.50	1.04	0.48	19.40	4.33	34.61
400	21.36	24.11	22.85	20.50	1.04	0.47	19.40	4.30	33.39
500	21.33	24.04	23.56	20.50	1.04	0.46	19.47	4.33	34.95
600	21.33	23.97	24.03	20.40	1.04	0.45	19.44	4.25	35.55
700	21.31	23.92	24.82	20.20	1.04	0.45	19.48	4.24	36.08
800	21.30	23.85	25.59	20.00	1.04	0.44	19.45	4.30	36.60
900	21.28	23.77	26.65	19.90	1.03	0.43	19.46	4.32	35.13
1000	21.25	23.68	27.65	19.70	1.03	0.42	19.49	4.27	34.53
1100	21.23	23.59	28.57	19.60	1.03	0.41	19.55	4.23	34.23
1200	21.20	23.50	29.86	19.50	1.03	0.40	19.43	4.22	33.58
1300	21.14	23.38	30.26	19.30	1.03	0.39	19.35	4.19	33.02
1400	21.09	23.27	30.54	19.30	1.03	0.38	19.39	4.13	34.50
1500	21.03	23.18	30.12	19.10	1.02	0.38	19.12	4.15	33.10
1600	20.96	23.06	29.27	19.00	1.02	0.37	19.03	4.12	31.94
1700	20.87	22.97	28.20	18.90	1.02	0.37	18.53	4.12	32.00
1800	20.78	22.86	27.26	18.80	1.02	0.37	18.56	4.12	31.85
1900	20.68	22.73	26.17	18.60	1.02	0.37	18.38	4.09	30.43
2000	20.56	22.65	25.07	18.70	1.01	0.38	18.19	4.10	30.76
2100	20.44	22.54	23.99	18.60	1.01	0.38	17.83	4.09	31.54
2200	20.31	22.45	23.11	18.50	1.01	0.39	17.67	4.09	30.87
2300	20.16	22.37	22.22	18.50	1.01	0.40	17.46	4.10	30.46
2400	20.01	22.30	21.40	18.50	1.01	0.42	16.95	4.11	30.23
2500	19.85	22.20	20.71	18.50	1.01	0.43	16.63	4.09	29.26
2600	19.69	22.10	20.01	18.50	1.01	0.44	16.24	4.11	29.15
2700	19.52	22.05	19.37	18.60	1.01	0.46	16.31	4.10	29.21
2800	19.34	21.99	18.87	18.60	1.02	0.47	15.97	4.12	28.82
2900	19.16	21.92	18.33	18.70	1.02	0.49	15.85	4.16	28.70
3000	18.97	21.86	17.84	18.80	1.02	0.51	15.32	4.14	28.19
3100	18.78	21.79	17.37	18.80	1.02	0.53	14.90	4.18	27.88
3200	18.59	21.75	16.94	18.90	1.03	0.55	15.05	4.20	27.99
3300	18.39	21.71	16.58	19.00	1.03	0.57	14.92	4.25	27.87
3400	18.19	21.68	16.23	19.00	1.04	0.59	14.77	4.27	27.53
3500	17.98	21.61	15.93	19.10	1.04	0.60	14.34	4.29	27.12
3600	17.78	21.60	15.61	19.10	1.05	0.62	14.06	4.28	27.24
3700	17.57	21.56	15.36	19.20	1.06	0.64	14.19	4.35	27.27
3800	17.37	21.53	15.10	19.20	1.06	0.66	14.07	4.38	27.28
3900	17.16	21.51	14.90	19.20	1.07	0.68	13.85	4.39	27.01
4000	16.94	21.49	14.68	19.30	1.08	0.69	13.57	4.48	26.48
4100	16.74	21.45	14.40	19.30	1.09	0.71	13.25	4.45	26.25
4200	16.52	21.43	14.14	19.20	1.10	0.73	13.20	4.50	26.23
4300	16.31	21.40	13.96	19.20	1.11	0.74	13.13	4.53	26.01
4400	16.11	21.36	13.75	19.10	1.12	0.76	13.01	4.58	26.34
4500	15.89	21.34	13.50	19.00	1.13	0.77	12.61	4.63	25.63
4600	15.67	21.36	13.24	18.90	1.14	0.79	12.29	4.66	25.43
4700	15.47	21.32	12.98	18.80	1.15	0.80	12.24	4.71	25.56
4800	15.25	21.30	12.77	18.70	1.16	0.82	12.35	4.73	25.70
4900	15.04	21.29	12.51	18.40	1.17	0.83	12.16	4.79	25.34
5000	14.82	21.29	12.28	18.30	1.19	0.84	11.99	4.86	25.00
5100	14.61	21.27	12.02	18.10	1.20	0.86	11.77	4.86	25.16
5200	14.39	21.27	11.75	17.90	1.21	0.87	11.74	4.96	25.12
5300	14.19	21.26	11.50	17.80	1.22	0.89	11.66	5.06	24.92
5400	13.97	21.28	11.25	17.50	1.24	0.90	11.37	5.07	24.53
5500	13.76	21.24	11.02	17.30	1.24	0.91	11.11	5.09	24.15
5600	13.56	21.22	10.74	17.20	1.25	0.92	10.88	5.13	23.98
5700	13.35	21.21	10.53	16.90	1.27	0.93	10.85	5.18	23.96
5800	13.13	21.22	10.31	16.70	1.28	0.95	10.70	5.26	23.78
5900	12.92	21.18	10.08	16.50	1.29	0.96	10.40	5.26	23.35
6000	12.71	21.18	9.84	16.30	1.30	0.97	10.21	5.31	22.92

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-63C+ (Figure 3).

Definitions:

Input Return Loss = S11 (dB)

Gain = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: I_{CC} = 70mA, V_{CC} = 5V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
					K	B1			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dB)	(dBm)
10	24.69	27.73	9.44	9.17	0.89	0.51	18.19	3.37	30.40
50	22.00	24.80	16.81	15.64	1.00	0.50	18.94	3.48	34.85
100	21.68	24.52	19.29	19.09	1.03	0.50	18.92	3.57	33.58
200	21.54	24.43	20.22	20.65	1.04	0.50	18.83	3.53	34.48
300	21.49	24.53	20.14	20.33	1.04	0.51	18.82	3.54	33.80
400	21.46	24.43	20.10	19.65	1.04	0.50	18.75	3.52	34.59
500	21.41	24.44	19.89	19.00	1.05	0.50	18.98	3.55	33.99
600	21.38	24.44	19.95	18.17	1.05	0.50	18.99	3.52	32.85
700	21.35	24.37	19.43	17.43	1.05	0.48	18.90	3.45	34.40
800	21.30	24.32	19.21	16.65	1.05	0.48	18.95	3.49	33.69
900	21.27	24.26	19.16	15.94	1.05	0.47	18.86	3.52	33.17
1000	21.26	24.21	19.06	15.45	1.04	0.46	19.09	3.52	34.01
1250	21.13	24.00	19.20	14.37	1.04	0.43	18.91	3.50	33.38
1500	21.01	23.76	19.70	13.74	1.04	0.41	18.57	3.42	31.91
1750	20.82	23.52	20.92	13.37	1.03	0.40	18.71	3.38	31.36
2000	20.61	23.28	22.77	13.55	1.03	0.40	18.06	3.36	30.73
2250	20.36	23.01	24.28	13.95	1.02	0.41	17.51	3.35	29.84
2500	20.06	22.79	24.58	14.76	1.02	0.44	17.09	3.35	28.99
2750	19.76	22.55	21.28	16.15	1.02	0.47	16.69	3.40	28.68
3000	19.40	22.34	18.17	17.90	1.03	0.51	16.05	3.37	28.31
3250	18.98	22.19	15.67	20.13	1.03	0.55	15.99	3.45	28.52
3500	18.54	22.06	13.72	22.99	1.04	0.60	15.27	3.50	27.25
3750	18.09	21.99	12.25	25.46	1.05	0.65	15.00	3.53	26.98
4000	17.60	21.92	11.06	26.14	1.07	0.70	14.71	3.60	26.87
4250	17.11	21.89	10.14	24.52	1.08	0.74	14.22	3.66	26.43
4500	16.63	21.84	9.41	22.94	1.10	0.78	14.09	3.71	26.37
4750	16.14	21.76	8.91	21.51	1.12	0.81	13.74	3.78	26.28
5000	15.68	21.75	8.46	20.36	1.14	0.85	13.42	3.86	26.00
5250	15.23	21.68	8.16	19.63	1.16	0.88	13.69	3.97	26.13
5500	14.78	21.61	7.94	18.99	1.18	0.90	13.22	4.06	25.68
5750	14.33	21.56	7.81	18.38	1.20	0.92	12.53	4.11	25.05
6000	13.86	21.52	7.70	17.82	1.23	0.95	12.89	4.22	25.15

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-63C+ (Figure 3).

Definitions:

Input Return Loss = S11 (dB)

Gain = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: $I_{CC} = 65.5\text{mA}$, $V_{CC} = 5\text{V}$ @Temperature = -55degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
					K	B1			
(MHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dB)	(dBm)
10	24.94	28.02	9.34	9.46	0.89	0.53	18.09	2.70	30.66
50	22.24	24.96	16.32	16.00	0.99	0.50	18.54	2.73	34.58
100	21.89	24.77	18.35	19.49	1.03	0.50	18.57	2.76	33.49
200	21.78	24.66	19.18	21.00	1.04	0.50	18.42	2.74	33.82
300	21.73	24.61	19.08	20.61	1.04	0.49	18.44	2.73	34.73
400	21.71	24.59	18.98	19.76	1.04	0.49	18.38	2.74	33.75
500	21.65	24.59	18.74	19.08	1.04	0.49	18.63	2.79	34.39
600	21.63	24.62	18.77	18.14	1.04	0.49	18.68	2.73	34.50
700	21.62	24.57	18.36	17.15	1.04	0.48	18.52	2.67	33.17
800	21.55	24.52	18.21	16.35	1.04	0.47	18.59	2.74	33.68
900	21.53	24.47	18.21	15.49	1.04	0.46	18.45	2.71	33.55
1000	21.51	24.44	18.12	14.93	1.04	0.45	18.78	2.72	33.63
1250	21.40	24.21	18.40	13.75	1.04	0.42	18.58	2.72	33.32
1500	21.29	24.01	19.01	13.01	1.03	0.39	18.34	2.57	32.77
1750	21.12	23.74	20.40	12.47	1.02	0.37	18.75	2.58	32.30
2000	20.93	23.51	22.79	12.49	1.02	0.37	18.32	2.58	31.28
2250	20.71	23.22	25.74	12.70	1.02	0.37	17.89	2.61	31.09
2500	20.45	23.01	31.25	13.19	1.01	0.39	17.71	2.62	30.58
2750	20.22	22.74	29.99	14.19	1.01	0.41	17.43	2.57	29.86
3000	19.90	22.50	23.42	15.39	1.01	0.44	16.85	2.58	29.13
3250	19.56	22.30	19.34	17.07	1.01	0.48	16.88	2.58	29.22
3500	19.18	22.14	16.35	19.66	1.02	0.53	16.13	2.61	28.37
3750	18.79	22.02	14.32	22.95	1.03	0.58	15.92	2.63	27.81
4000	18.36	21.89	12.67	28.74	1.03	0.62	15.65	2.69	27.50
4250	17.94	21.80	11.41	41.85	1.04	0.66	15.23	2.72	27.50
4500	17.51	21.71	10.49	32.45	1.05	0.70	15.08	2.77	27.37
4750	17.08	21.64	9.87	25.63	1.07	0.73	14.81	2.78	27.39
5000	16.66	21.57	9.25	22.09	1.08	0.76	14.47	2.80	27.14
5250	16.25	21.49	8.91	20.21	1.09	0.79	14.77	2.80	27.23
5500	15.84	21.45	8.63	18.47	1.11	0.81	14.27	2.97	26.76
5750	15.42	21.34	8.45	17.19	1.12	0.83	13.60	3.00	26.70
6000	14.98	21.31	8.28	16.17	1.14	0.85	14.00	3.03	26.43

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-63C+ (Figure 3).

Definitions:

Input Return Loss = S11 (dB)

Gain = S21 (dB)

Isolation = S12 (dB)

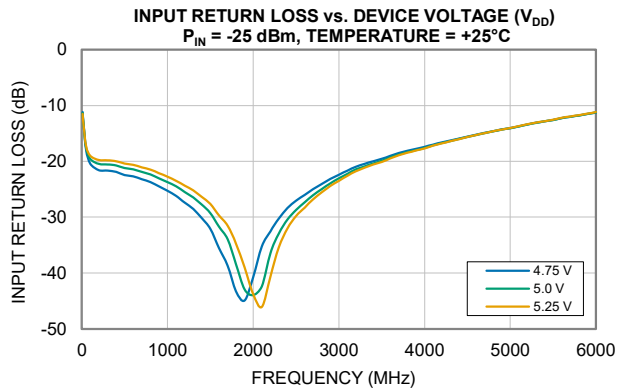
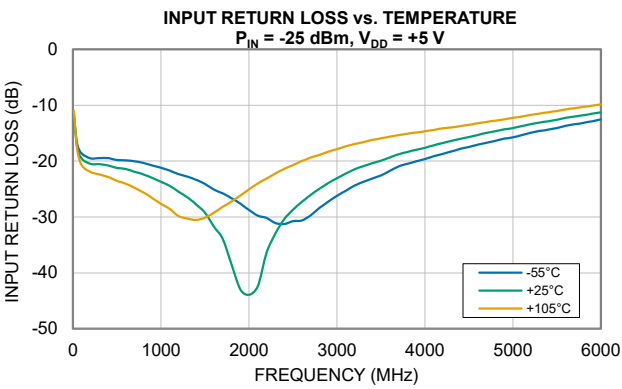
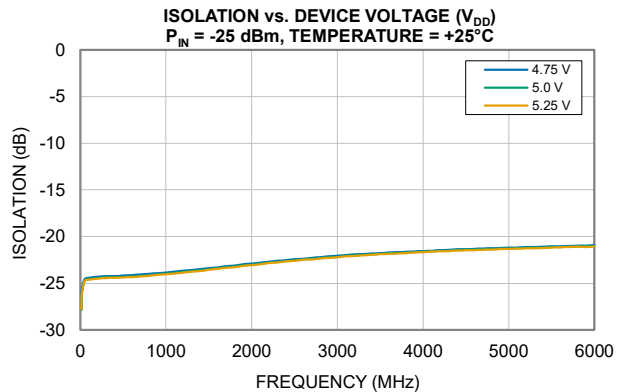
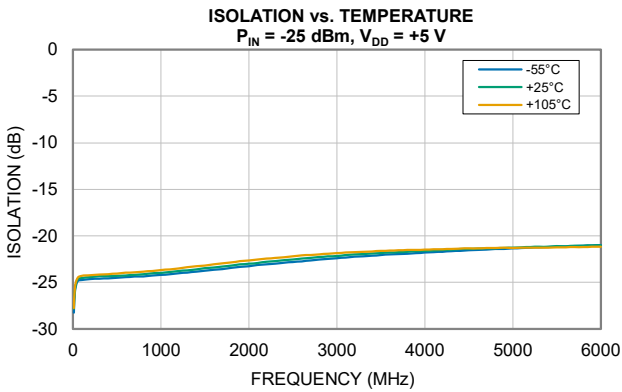
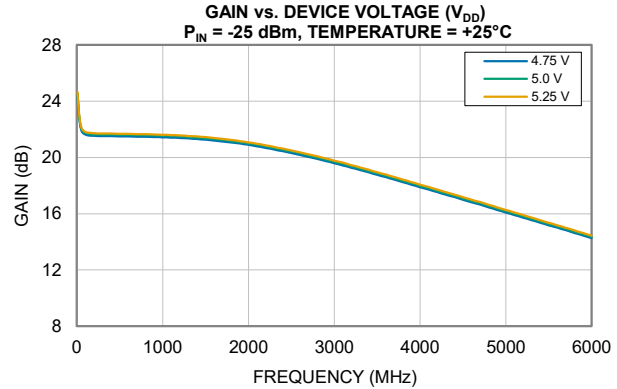
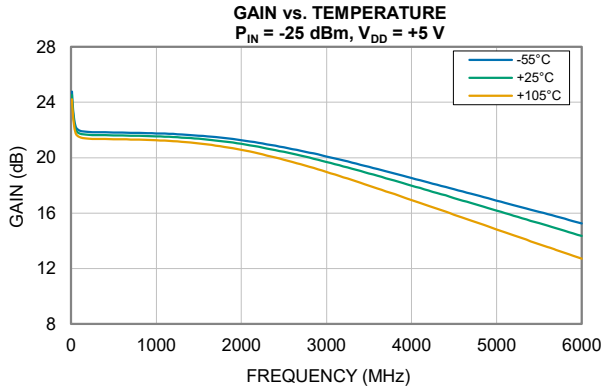
Output Return Loss = S22 (dB)

TEST CONDITIONS: I_{CC} = 73.7mA, V_{CC} = 5V @Temperature = +105degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
					K	B1			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.26	27.82	9.38	9.00	0.90	0.55	18.21	4.11	30.28
50	21.74	24.61	17.35	15.21	1.00	0.50	19.09	4.26	31.29
100	21.40	24.31	20.60	18.46	1.03	0.50	19.05	4.39	33.85
200	21.25	24.31	21.91	20.06	1.04	0.51	19.00	4.36	34.23
300	21.20	24.22	21.90	19.77	1.04	0.50	18.96	4.36	33.52
400	21.16	24.21	21.79	19.33	1.05	0.50	18.93	4.37	34.64
500	21.12	24.21	21.49	18.84	1.05	0.50	19.10	4.41	33.27
600	21.09	24.17	21.41	18.13	1.05	0.50	19.08	4.35	32.85
700	21.05	24.13	20.75	17.59	1.05	0.49	19.02	4.32	33.20
800	21.01	24.09	20.43	16.92	1.05	0.48	19.08	4.33	34.22
900	20.98	24.00	20.19	16.38	1.05	0.47	19.01	4.37	33.50
1000	20.95	23.93	19.95	16.02	1.05	0.46	19.16	4.37	33.32
1250	20.81	23.73	19.70	15.23	1.05	0.44	18.92	4.30	32.71
1500	20.67	23.47	19.70	14.87	1.04	0.43	18.44	4.26	31.12
1750	20.45	23.14	20.15	14.76	1.03	0.42	18.23	4.22	30.38
2000	20.18	22.93	20.45	15.27	1.03	0.44	17.30	4.22	29.60
2250	19.86	22.70	19.72	16.04	1.03	0.46	16.56	4.22	28.28
2500	19.48	22.49	18.45	17.38	1.04	0.50	15.95	4.23	27.80
2750	19.09	22.28	16.22	19.15	1.04	0.54	15.43	4.30	27.17
3000	18.60	22.13	14.24	20.74	1.05	0.59	14.69	4.33	26.10
3250	18.07	22.07	12.65	21.31	1.06	0.64	14.58	4.38	26.04
3500	17.51	22.01	11.42	20.89	1.08	0.69	13.82	4.40	25.30
3750	16.95	22.01	10.43	19.83	1.11	0.74	13.51	4.55	24.68
4000	16.37	22.00	9.61	18.75	1.13	0.79	13.20	4.73	24.17
4250	15.79	22.04	8.94	17.89	1.16	0.84	12.61	4.81	23.62
4500	15.21	22.01	8.37	17.38	1.19	0.88	12.47	4.94	23.43
4750	14.66	21.99	7.92	17.02	1.22	0.91	12.10	5.02	23.32
5000	14.13	21.97	7.53	16.96	1.25	0.94	11.81	5.12	22.75
5250	13.64	21.92	7.24	17.13	1.28	0.97	12.03	5.20	22.98
5500	13.16	21.86	7.07	17.64	1.32	1.00	11.62	5.40	22.31
5750	12.69	21.75	6.99	18.31	1.35	1.02	10.99	5.48	21.57
6000	12.22	21.75	6.96	19.04	1.40	1.04	11.31	5.62	21.48

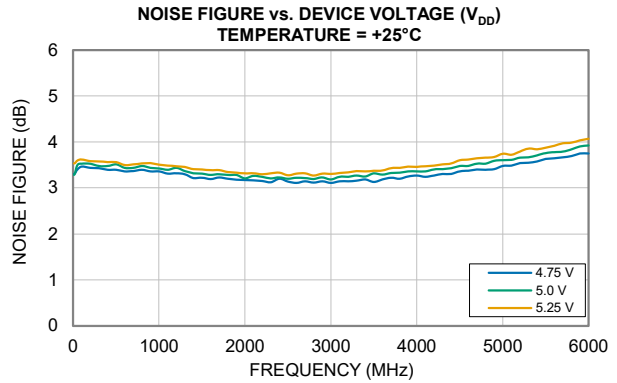
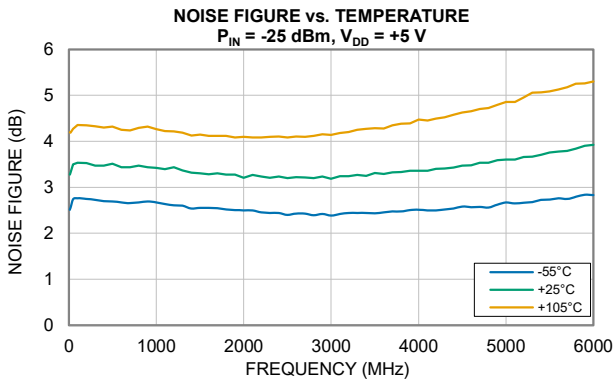
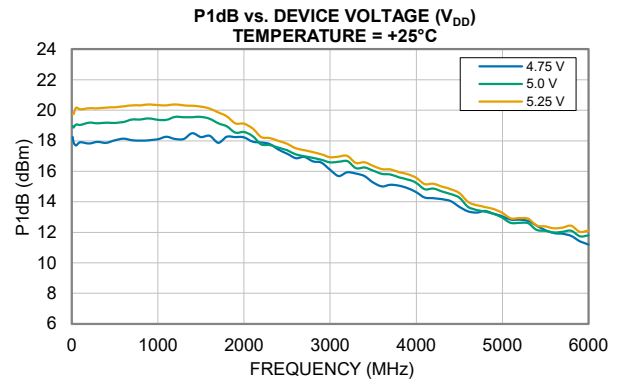
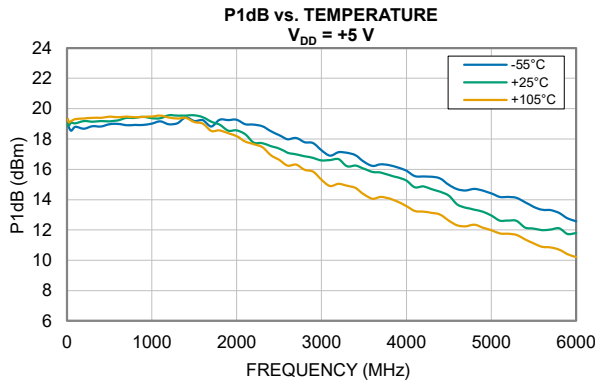
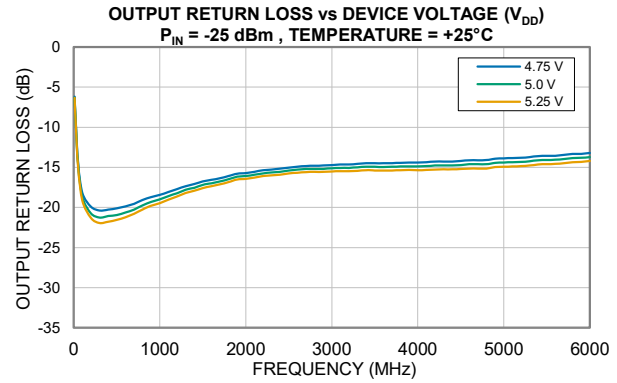
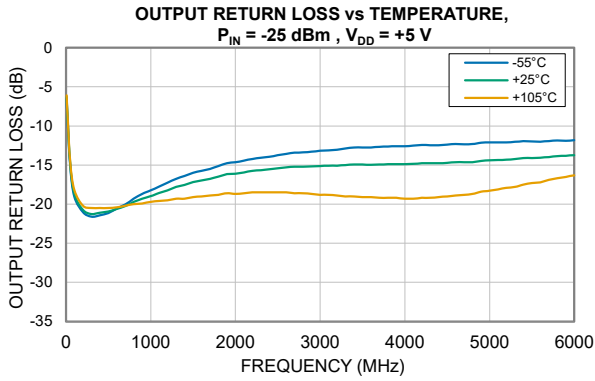
Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).



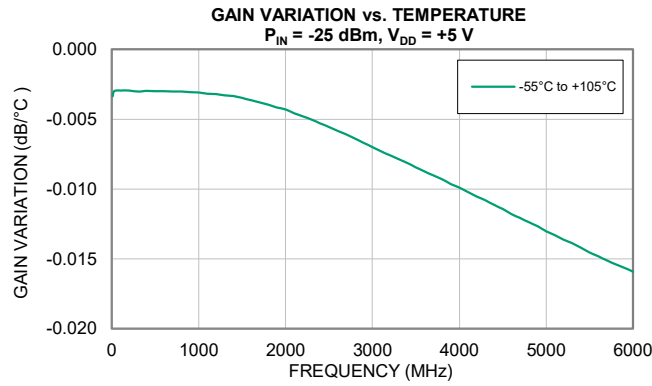
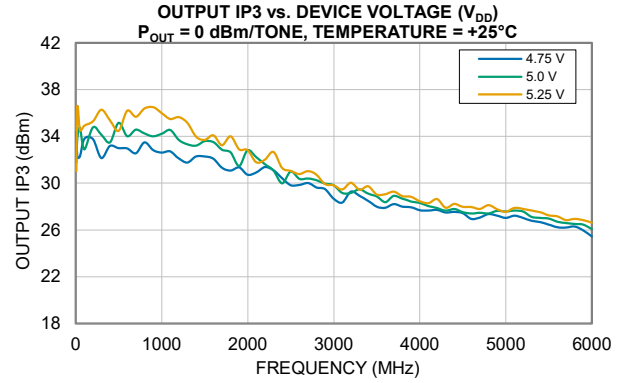
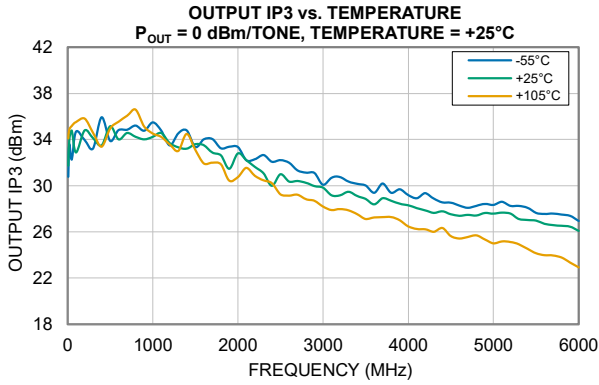
Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).



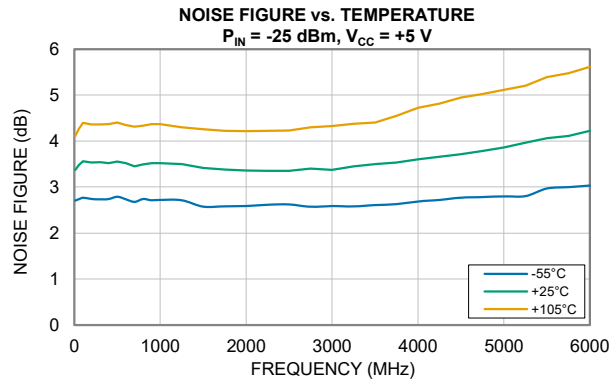
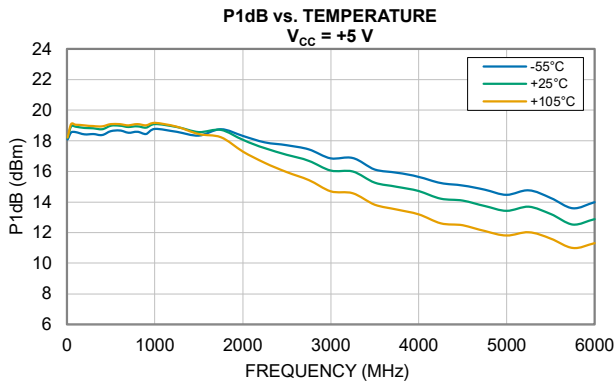
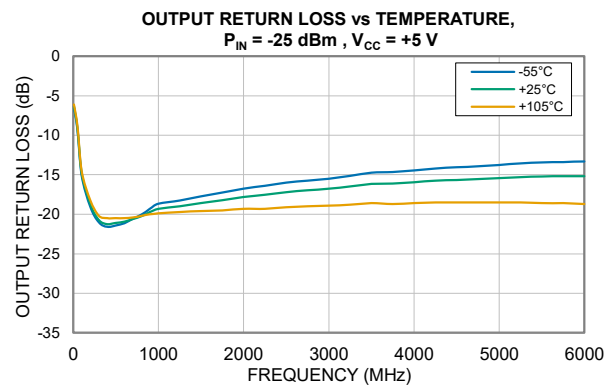
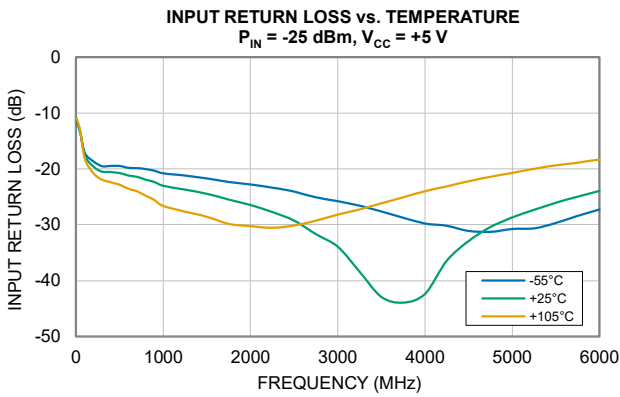
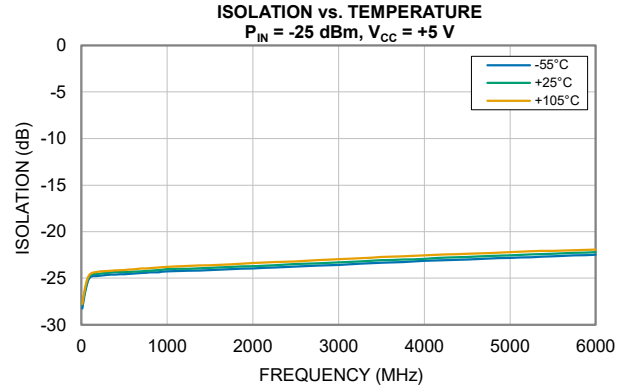
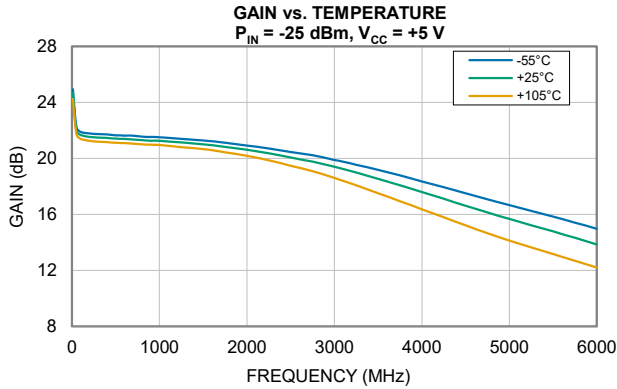
Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-63C+ (Figure 2).



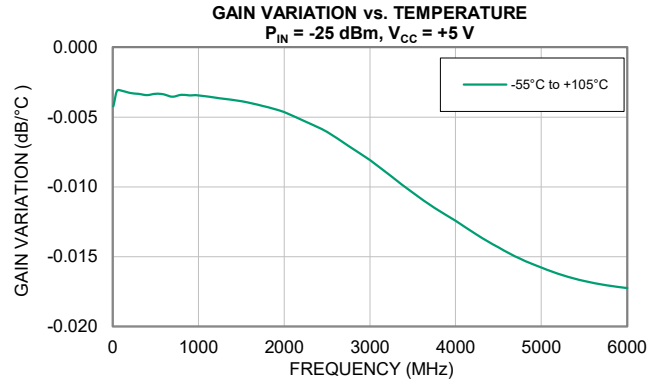
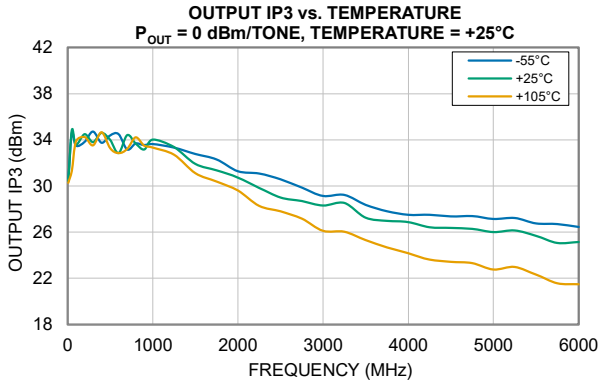
Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-63C+ (Figure 3).



Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-63C+ (Figure 3).

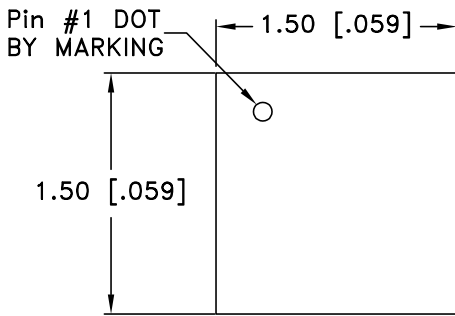


Case Style

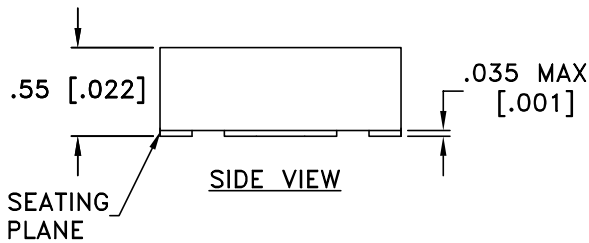
KC

Outline Dimensions

KC3011

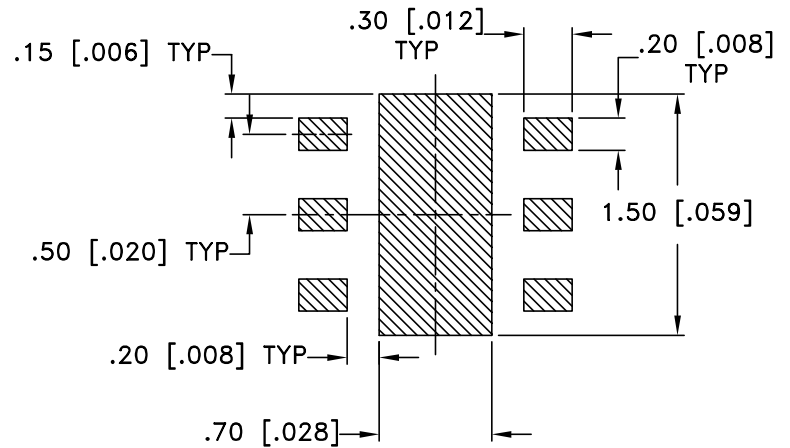


TOP VIEW

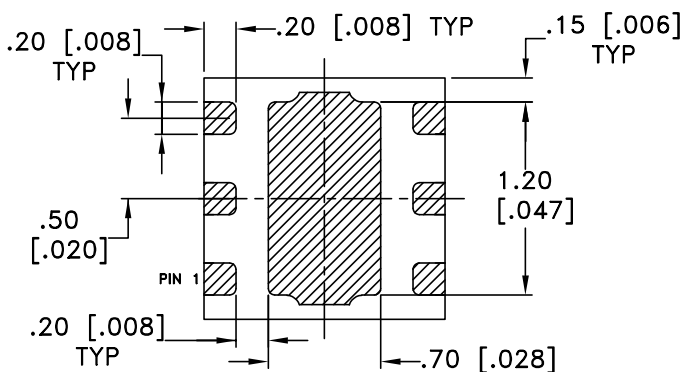


SIDE VIEW

PCB Land Pattern



Suggested Layout,
Tolerance to be within ± 0.050 mm



BOTTOM VIEW

NOTES:

1.  DENOTES METALLIZATION

Weight: .0036 grams

Dimensions are in mm [inches]. Tolerances: 2 Pl. ± 0.05 mm

Notes:

1. Case material: Plastic.
2. Termination finish: NiPdAu ($3\mu\text{m}/0.080\mu\text{m}/0.080\mu\text{m}$).

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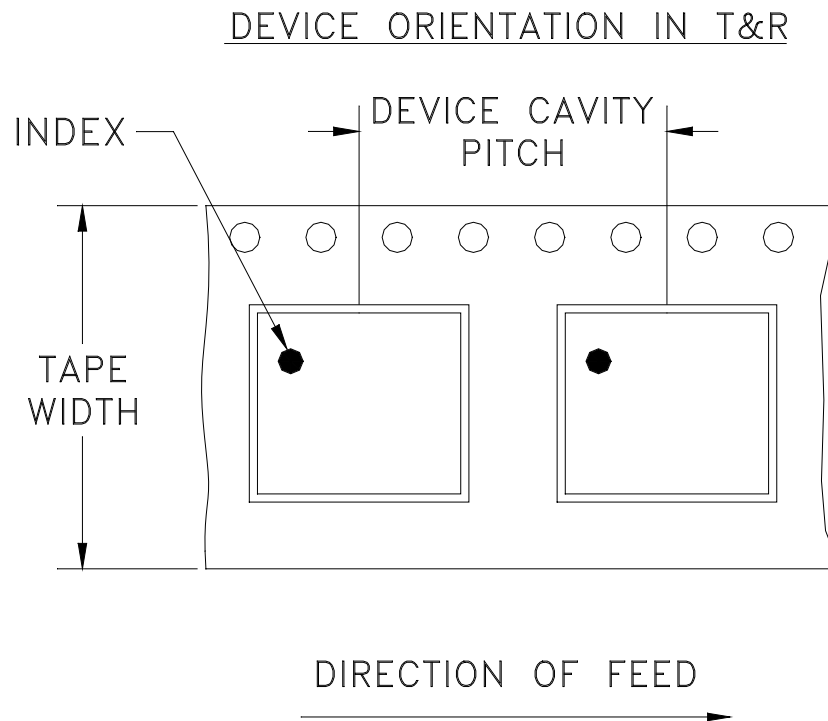
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F66



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
8	4	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000, 2000, 3000

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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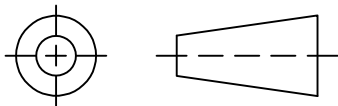
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THIRD ANGLE PROJECTION

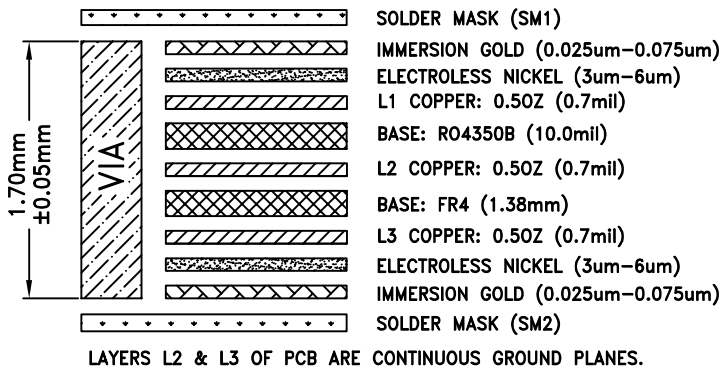


REVISIONS

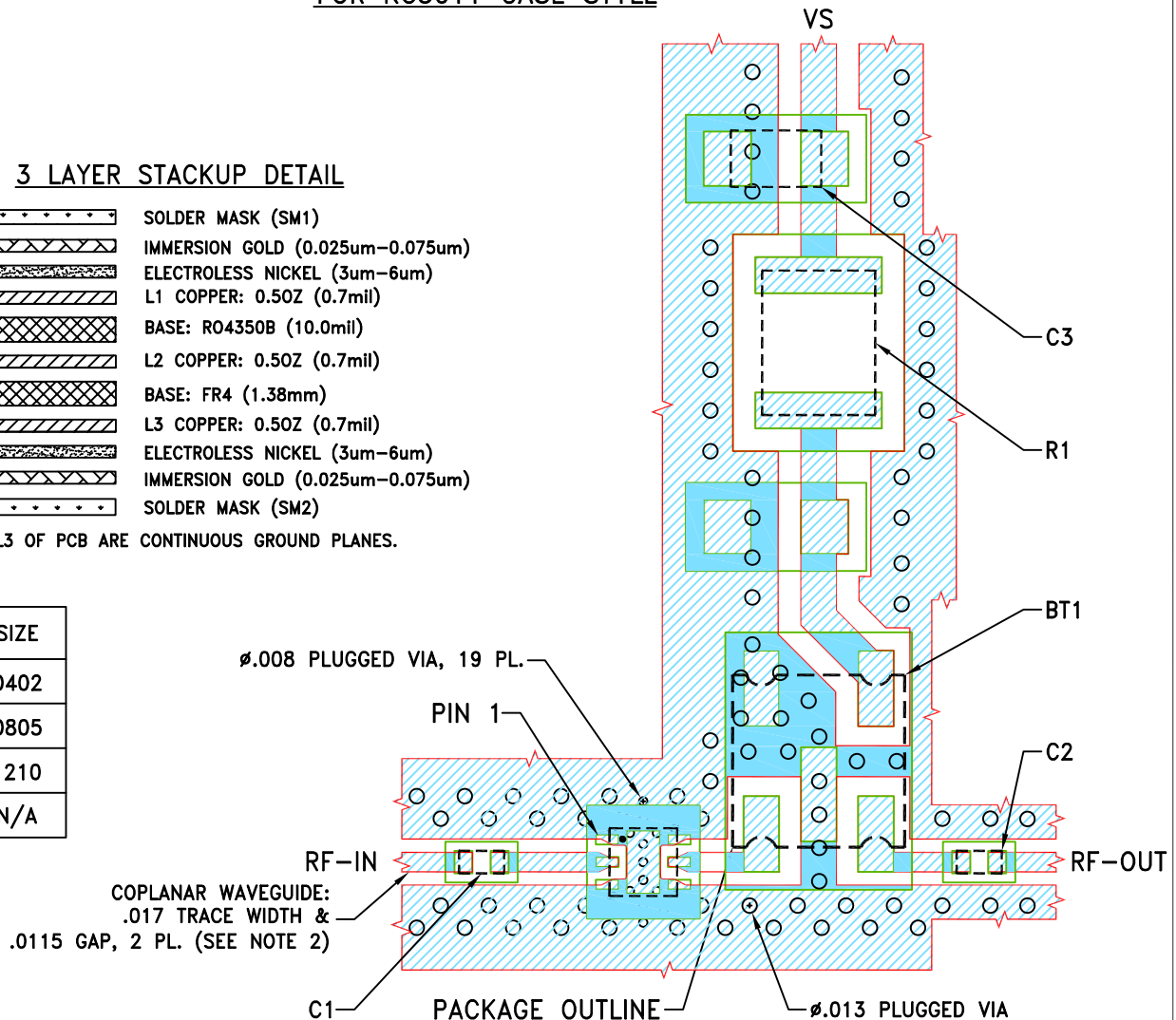
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-028458	NEW RELEASE	02/09/26	ITG	IL

SUGGESTED MOUNTING CONFIGURATION FOR KC3011 CASE STYLE

3 LAYER STACKUP DETAIL



COMPONENT	SIZE
C1, C2	0402
C3	0805
R1	1210
BT1	N/A



NOTES:

1. PCB IS MULTILAYER PCB, SEE STACK-UP DIAGRAM.
2. TRACE WIDTH & GAP ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .010", COPPER: .5 OZ. EACH LAYER. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
3. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-LEE1-XX+, WHERE XX=6, 39 & 63.



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	02/09/26
TOLERANCES ON:	NP	02/09/26
2 PL DECIMALS ±	IL	02/09/26
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

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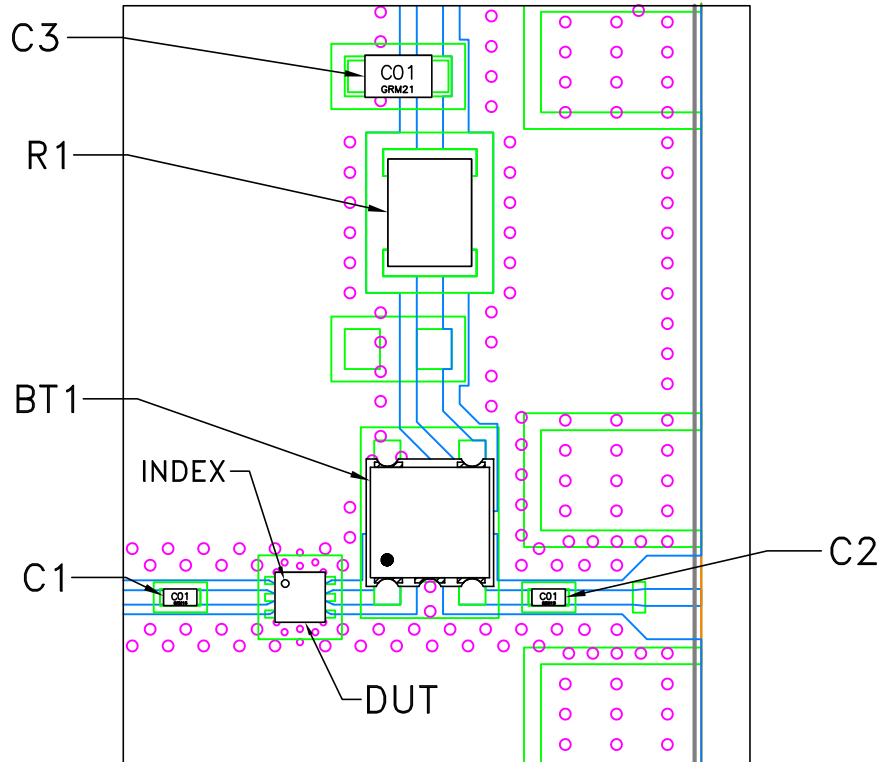
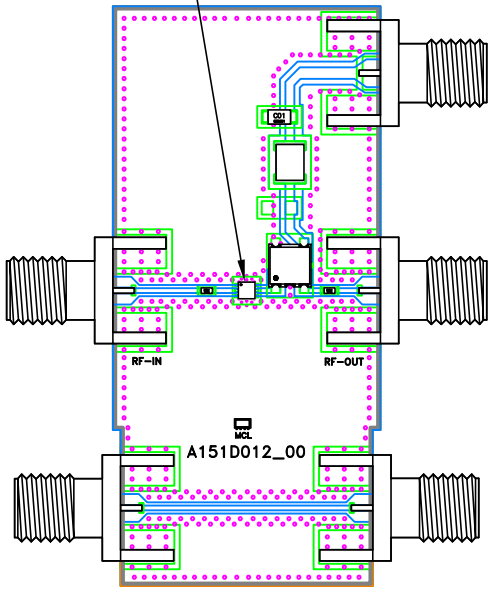
13 Neptune Avenue
Brooklyn NY 11235

PL, KC3011, TB-LEE1-XXC+

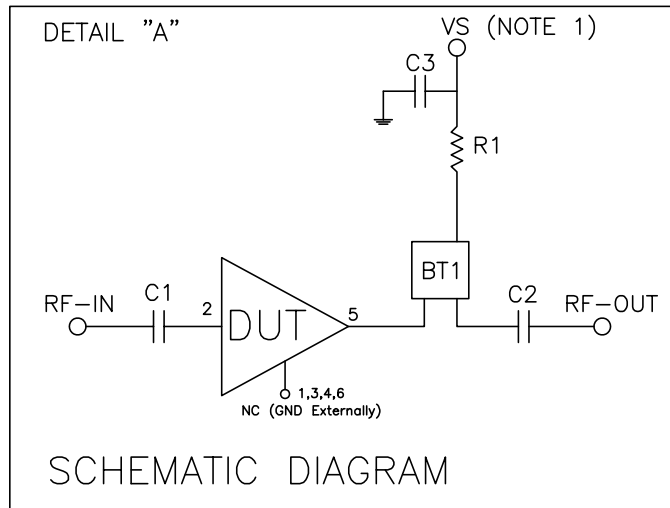
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-851	OR
FILE:	98PL851	SCALE: 6:1	SHEET: 1 OF 1

Evaluation Board and Circuit

SEE DETAIL "A"




DETAIL "A"
LOCATION OF COMPONENTS
ON THE PCB
(SCALE 3:1)



Components	Size	Value	Part Numbers	Manufacturer
C1,C2	0402	2.4nF	GRM1557U1A242JA1D	Murata
C3	0805	0.1uF	GCM21BR91H104KA37L	Murata
R1	1210	0Ω	RC1210JR-070RL	Yageo
BT1	N/A	N/A	TCBT-123+	Mini Circuits

NOTES:

1. VS Voltage=+5V
2. 50 Ohm SMA Female Connectors.
3. PCB Material: Roger R04350B or equivalent, Dielectric constant=3.5, Thickness=0.010 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.

Specification	Test/Inspection Condition	Reference/Spec
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