MMIC SURFACE MOUNT

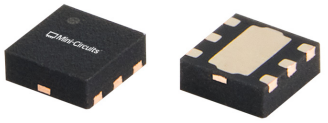
Monolithic Amplifier

LEE1-84+

50Ω DC to 4000 MHz

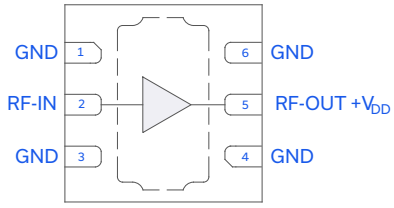
THE BIG DEAL

- High Gain, Typ. 19.1 dB
- High OIP3, Typ. +35 dBm
- High P1dB, Typ. +20.9 dBm
- Single Supply Voltage, 108 mA at +5 V
- 1.5×1.5 mm 6-Lead QFN-Style Package



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM (TOP VIEW)



APPLICATIONS

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

PRODUCT OVERVIEW

The LEE1-84+ is a high-linearity gain block amplifier in a low-cost surface mount package, fabricated using an InGaP/GaAs HBT semiconductor process. Operating from DC to 4000 MHz, this amplifier features high dynamic range with typical 5 dB noise figure, 19.1 dB gain, +20.9 dBm P1dB, and +35 dBm OIP3 at 2 GHz. This combination of performance makes it ideal for sensitive, high dynamic range receiver applications. The LEE1-84+ operates on a single +5 V supply and consumes 108 mA, is well matched to 50Ω, and comes in a small, low-profile 1.5×1.5 mm QFN-style package for ease of integration into dense circuit board layouts.

KEY FEATURES

Features	Advantages
Low Power Consumption, Typ. 108 mA at +5 V	At only 108 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 • OIP3, Typ. +35 dBm at 2 GHz • P1dB, Typ. +20.9 dBm at 2 GHz	The LEE1-84+ matches industry leading OIP3 performance relative to device size and power consumption. The combination of high linearity and output power make this gain block amplifier ideal for use as a second stage in ultra-high dynamic range receivers.
1.5×1.5 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.

Monolithic Amplifier

LEE1-84+

50Ω DC to 4000 MHz

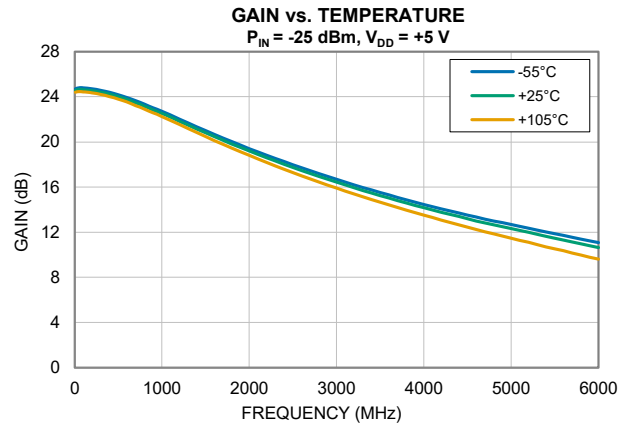
ELECTRICAL SPECIFICATIONS[1] AT +25 °C, I_{DD} = 108 mA, V_{DD} = +5 V, UNLESS NOTED OTHERWISE

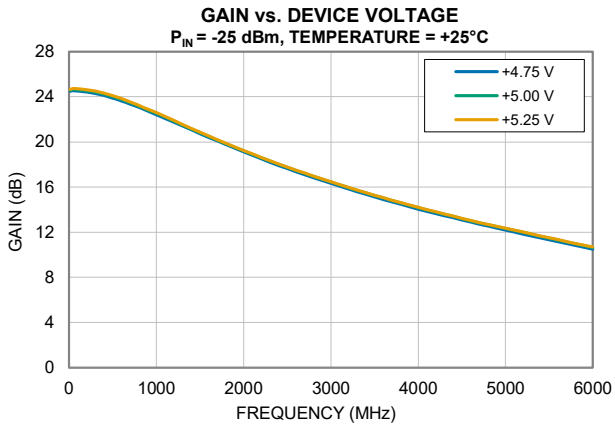
Parameter	Frequency (MHz)	Min.	Typ.	Max.	
Frequency Range		DC[6]		4000	MHz
Gain	10	23.8	24.6		dB
	1000	21.4	22.5		
	2000	18.0	19.1		
	3000	15.2	16.3		
	4000	12.8	14.0		
Input Return Loss	10		26		dB
	1000		23		
	2000		20		
	3000		17		
	4000		15		
Output Return Loss	10		22		dB
	1000		11		
	2000		8		
	3000		7		
	4000		7		
Isolation	10–4000		24.2		dB
Output Power at 1 dB Compression (P1dB)	10		+20.9		dBm
	1000		+21.0		
	2000		+20.9		
	3000		+19.8		
	4000		+19.2		
Output Third-Order Intercept Point (P_{OUT} = 0 dBm/Tone)	10		+33		dBm
	1000		+34		
	2000		+35		
	3000		+32		
	4000		+31.5		
Noise Figure	10		4.9		dB
	1000		4.9		
	2000		5.0		
	3000		5.1		
	4000		5.3		
Device Operating Voltage (V_{DD})[2]		+4.75	+5	+5.25	V
Device Operating Current (I_{DD})[3]			108		mA
Device Current Variation vs. Temperature[4]			0.075		mA/°C
Device Current Variation vs. Voltage[5]			0.052		mA/mV

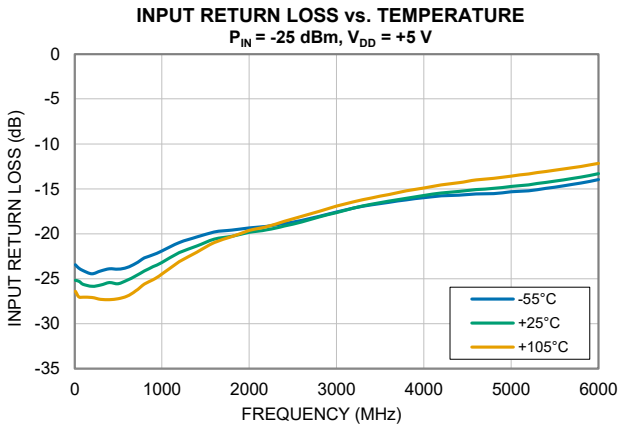
1. Tested on Mini-Circuits Characterization Test Board MB-225-84C+. See Figure 2. Board loss de-embedded to the device.
2. Operating voltage applied to device LEE1-84+.
3. Current at P_{IN} = -25 dBm.
4. (Current at +105 °C - Current at -55 °C) / (+105 °C - -55 °C)
5. (Current at +5.25 V - Current at +4.75 V) / (+5.25 V - +4.75 V)
6. Low frequency cut off determined by external coupling capacitor.

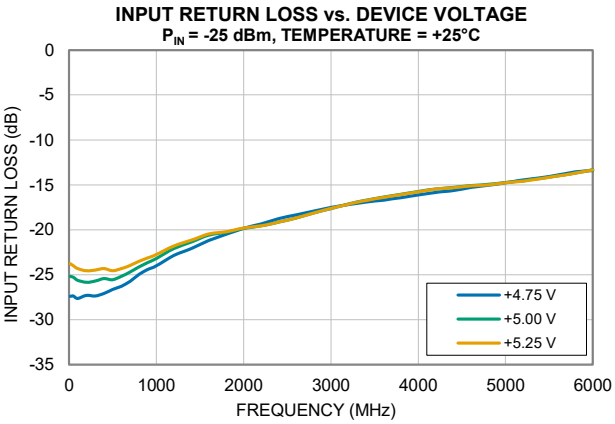
TYPICAL PERFORMANCE GRAPHS

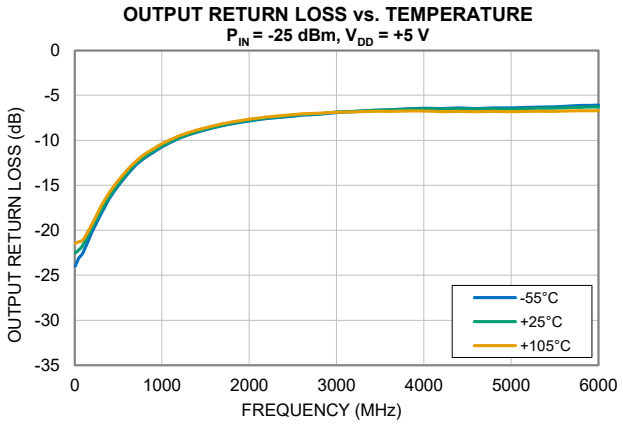
Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

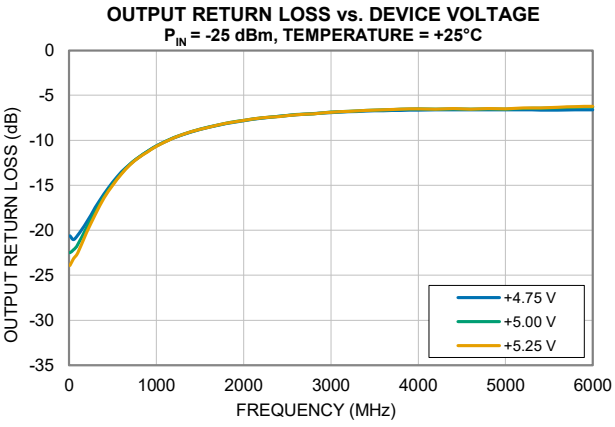








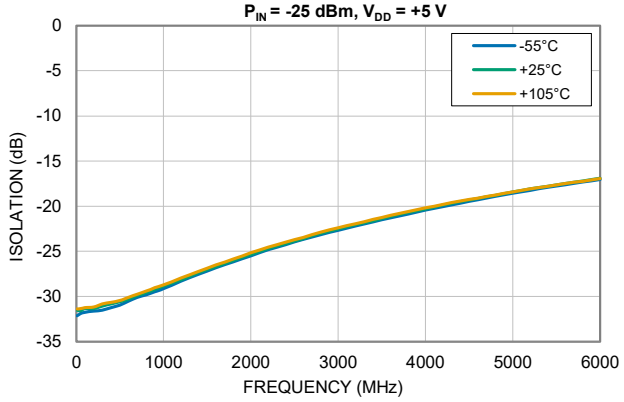




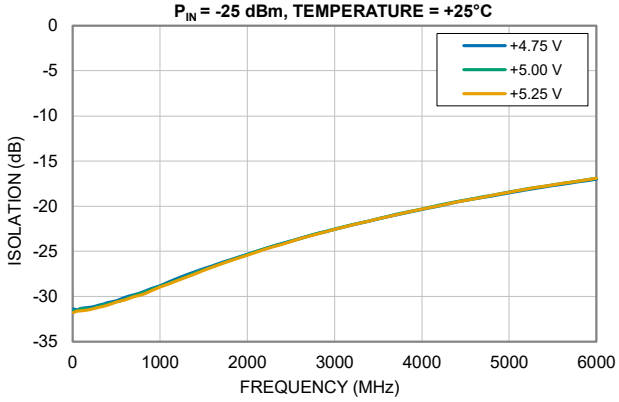
TYPICAL PERFORMANCE GRAPHS

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

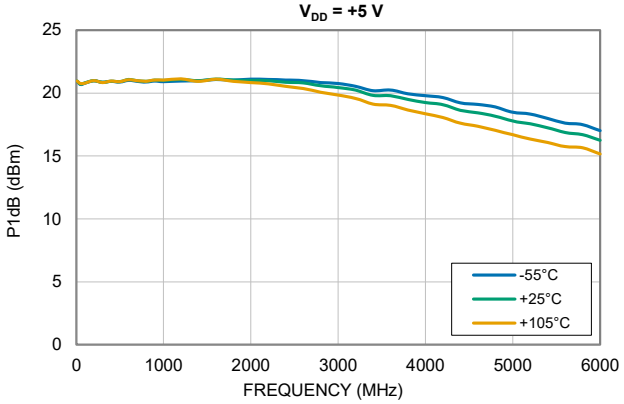
ISOLATION vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



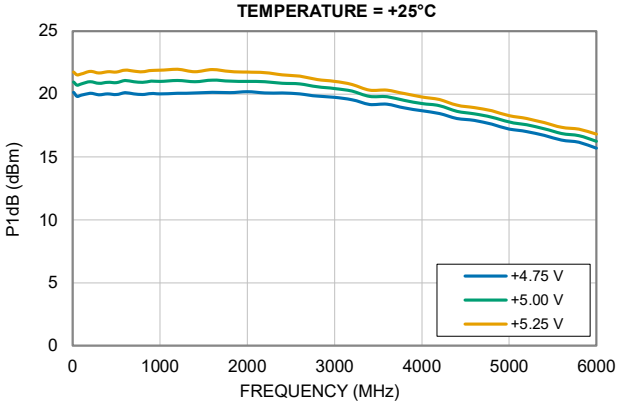
ISOLATION vs. DEVICE VOLTAGE
P_{IN} = -25 dBm, TEMPERATURE = +25°C



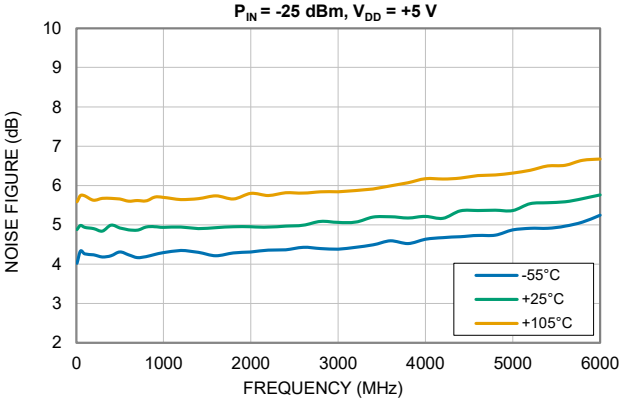
P1dB vs. TEMPERATURE
V_{DD} = +5 V



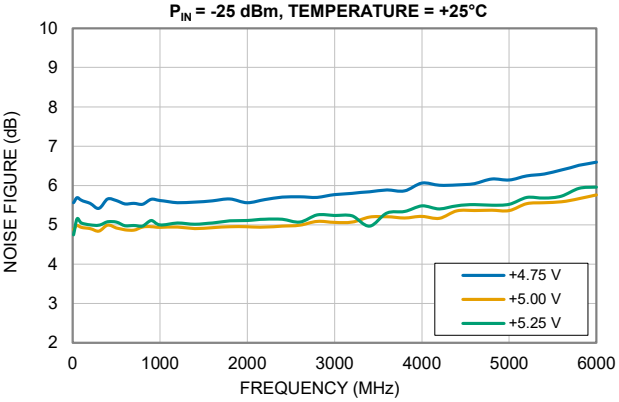
P1dB vs. DEVICE VOLTAGE
TEMPERATURE = +25°C



NOISE FIGURE vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



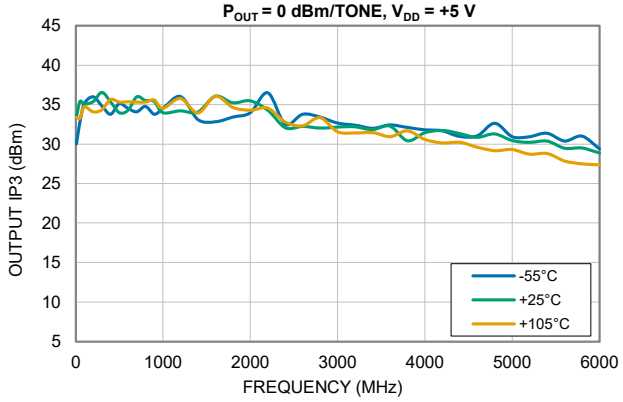
NOISE FIGURE vs. DEVICE VOLTAGE
P_{IN} = -25 dBm, TEMPERATURE = +25°C



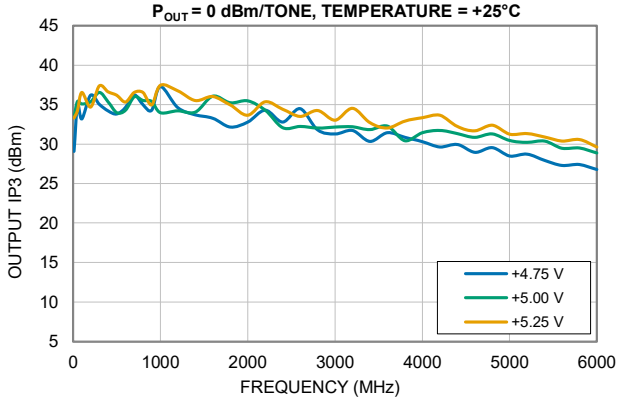
TYPICAL PERFORMANCE GRAPHS

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

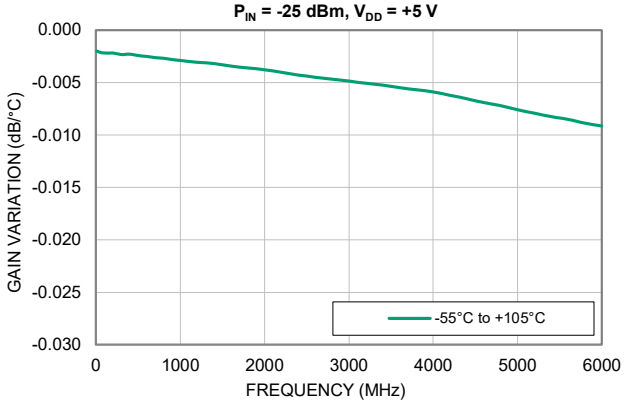
OUTPUT IP3 vs. TEMPERATURE
P_{OUT} = 0 dBm/TONE, V_{DD} = +5 V



OUTPUT IP3 vs. DEVICE VOLTAGE
P_{OUT} = 0 dBm/TONE, TEMPERATURE = +25°C



GAIN VARIATION vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



ABSOLUTE MAXIMUM RATINGS[7]

Parameter	Ratings
Operating Temperature	-55 °C to +105 °C
Storage Temperature	-65 °C to +150 °C
Junction Temperature[8]	+150 °C
Total Power Dissipation	0.88 W
Input Power (CW), V_{DD} = 108 mA	+13 dBm
DC Voltage at V_{DD}	+5.8 V
DC Current I_{DD}	160 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]	50.9 °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 to < 2000 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)

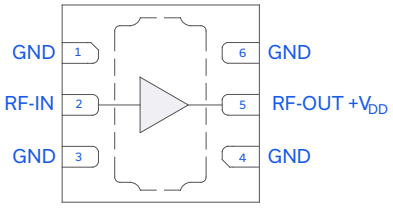


Figure 1. LEE1-84+ Functional Diagram

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

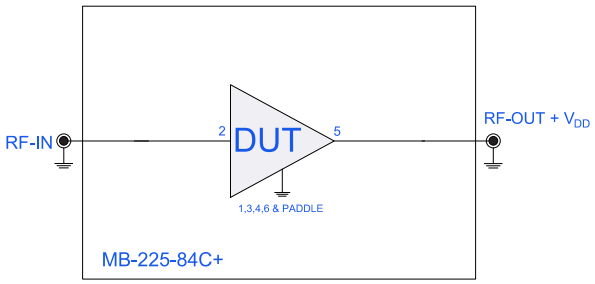


Figure 2. LEE1-84+ Characterization Circuit

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. I_{DD} = 108 mA at V_{DD} = +5 V Typ

EVALUATION BOARD

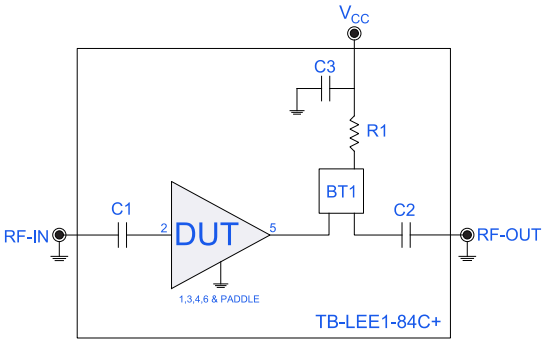


Figure 3. LEE1-84+ Evaluation Circuit

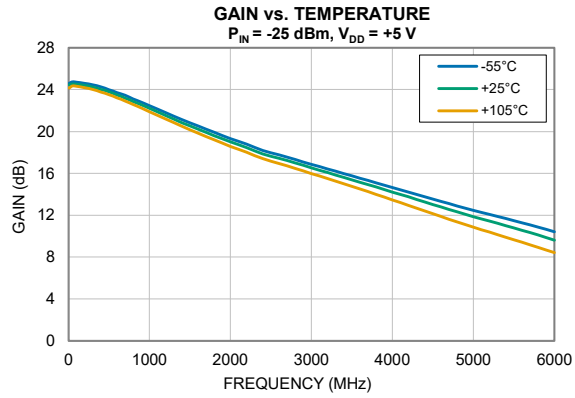
Electrical Parameters and Conditions
Gain, Return Loss, Output Power at 1dB Compression (P1dB), Output IP3 (OIP3), and Noise Figure measured using N5242A PNA-X microwave network analyzer.

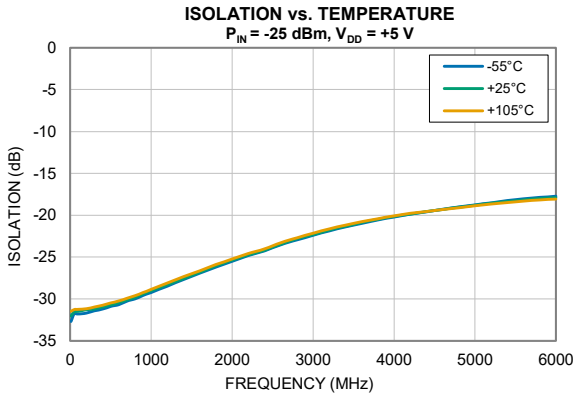
Conditions:
1. Gain and Return Loss: P_{IN} = -25 dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/Tone at output.
3. V_{CC} = V_{DD} = +5 V

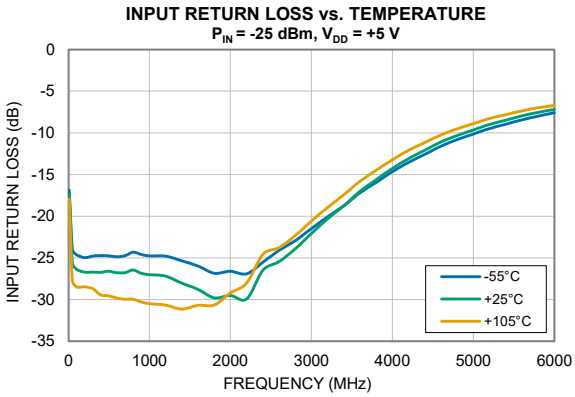
Component	Value	Size	Part Number	Manufacturer
C1, C2	2.4 nF	0402	GRM1557U1A242JA1D	Murata
C3	0.1 µF	0805	GCM21BR91H104KA37L	Murata
R1	0Ω, 0.5W	1210	RC1210FR-070RL	Yageo
BT1	-	3.8×3.8 mm	TCBT-14+	Mini-Circuits

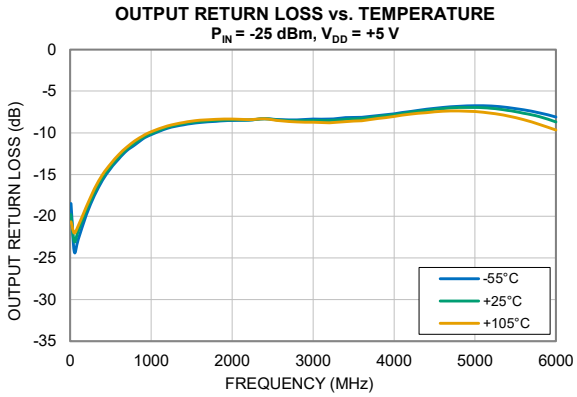
TYPICAL PERFORMANCE GRAPHS

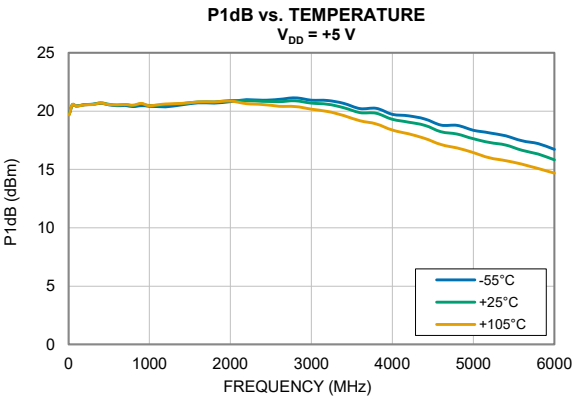
Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-84C+ (Figure 3).

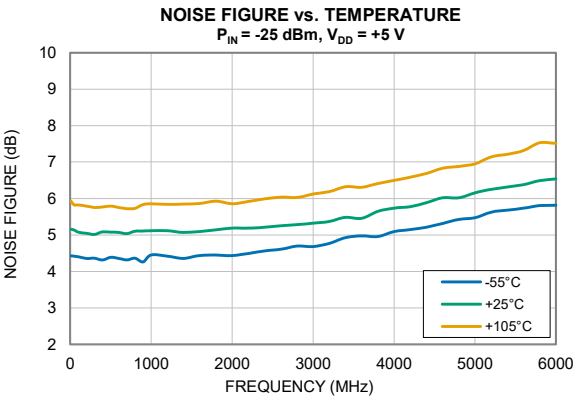








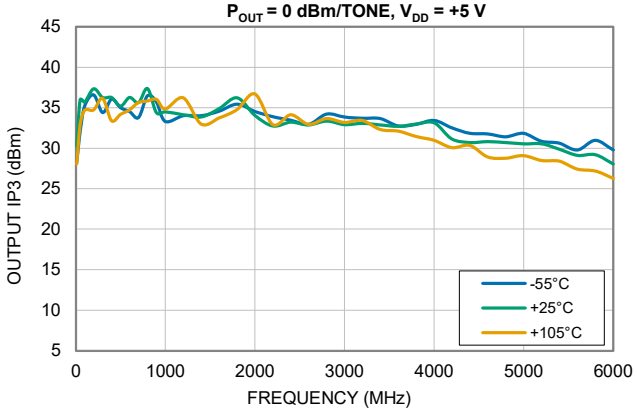




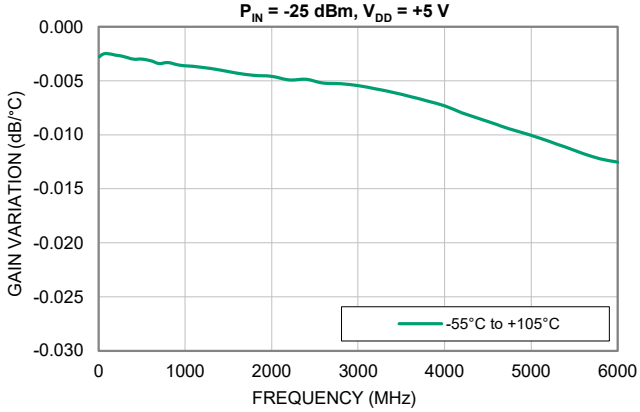
TYPICAL PERFORMANCE GRAPHS

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-84C+ (Figure 3).

OUTPUT IP3 vs. TEMPERATURE
P_{OUT} = 0 dBm/TONE, V_{DD} = +5 V



GAIN VARIATION vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V

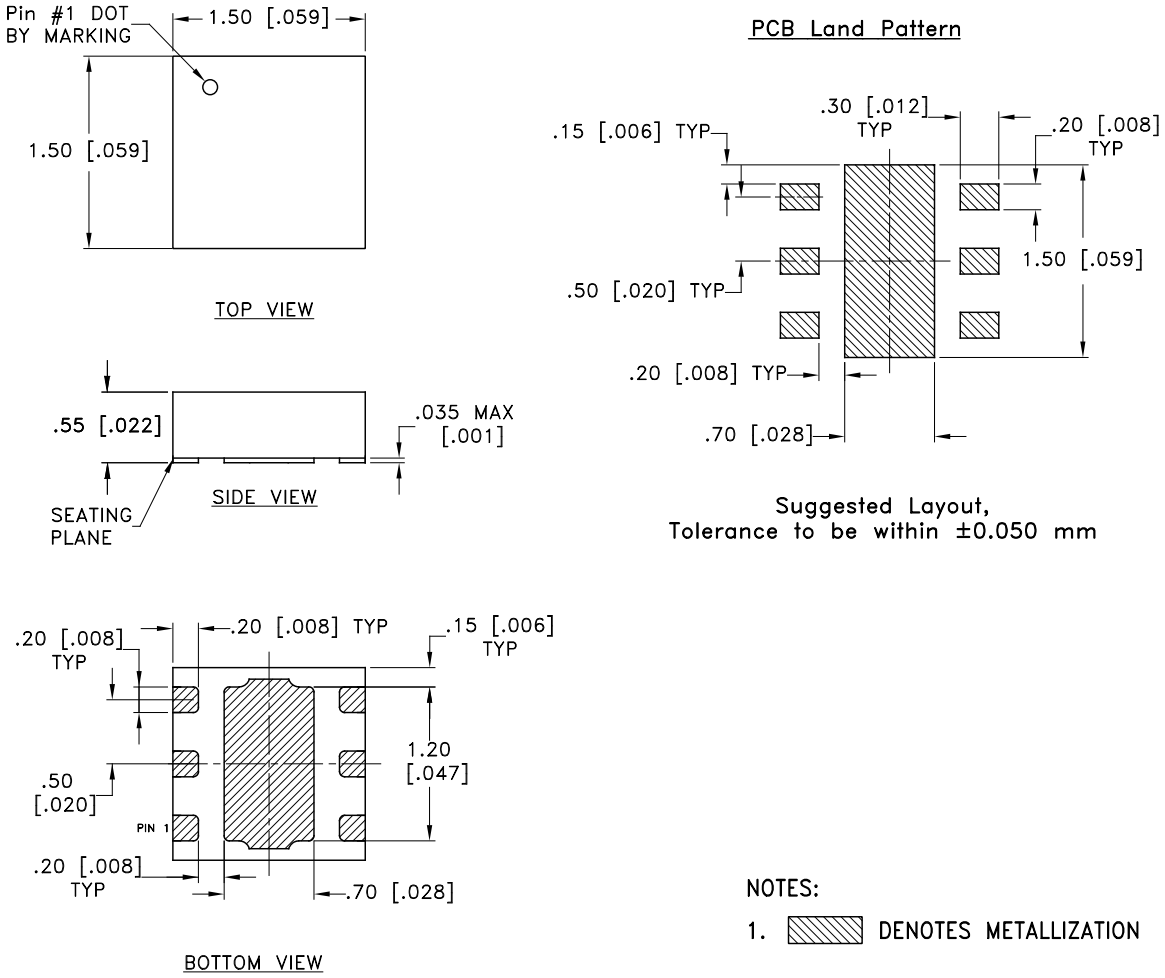


Monolithic Amplifier

LEE1-84+

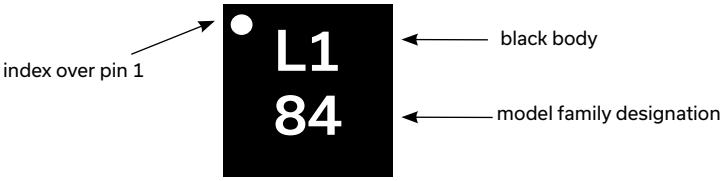
50Ω DC to 4000 MHz

CASE STYLE DRAWING



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

Monolithic Amplifier

LEE1-84+

50Ω DC to 4000 MHz

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-LEE1-84C+ 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-225-84C+ (Figure 2).

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

TEST CONDITIONS: V_{DD} = +4.75 V I_{DD} = 95.6 mA @ Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.50	31.37	27.39	20.63	1.31	0.79	20.13	5.56	29.09
50	24.54	31.50	27.37	21.03	1.33	0.80	19.82	5.69	34.97
100	24.51	31.32	27.62	20.55	1.32	0.79	19.90	5.62	33.18
200	24.42	31.20	27.29	19.12	1.31	0.78	20.05	5.54	36.20
300	24.30	30.98	27.36	17.47	1.30	0.77	19.94	5.42	35.03
400	24.12	30.70	27.07	15.96	1.29	0.76	20.00	5.66	34.20
500	23.89	30.47	26.62	14.66	1.28	0.75	19.96	5.62	33.81
600	23.65	30.11	26.27	13.52	1.26	0.74	20.10	5.54	34.64
700	23.37	29.81	25.71	12.63	1.25	0.72	20.00	5.55	36.23
800	23.07	29.53	24.97	11.87	1.24	0.71	19.96	5.53	34.99
900	22.76	29.13	24.42	11.21	1.22	0.70	20.05	5.65	34.29
1000	22.42	28.82	24.00	10.61	1.22	0.69	20.01	5.62	37.30
1200	21.76	27.99	22.86	9.73	1.18	0.66	20.05	5.57	34.61
1400	21.08	27.28	22.08	9.06	1.17	0.64	20.08	5.58	33.72
1600	20.41	26.60	21.18	8.55	1.15	0.62	20.13	5.61	33.27
1800	19.76	25.95	20.50	8.13	1.15	0.61	20.11	5.66	32.18
2000	19.13	25.34	19.83	7.82	1.14	0.60	20.18	5.56	32.80
2200	18.51	24.71	19.33	7.54	1.13	0.58	20.09	5.64	34.30
2400	17.92	24.13	18.75	7.33	1.12	0.57	20.07	5.70	32.81
2600	17.37	23.59	18.34	7.16	1.12	0.57	20.01	5.71	34.49
2800	16.83	23.07	17.90	7.02	1.12	0.56	19.83	5.70	31.80
3000	16.32	22.56	17.52	6.91	1.11	0.56	19.73	5.77	31.29
3200	15.83	22.09	17.20	6.82	1.11	0.55	19.55	5.80	31.73
3400	15.36	21.64	16.90	6.74	1.11	0.55	19.17	5.85	30.34
3600	14.91	21.19	16.69	6.69	1.11	0.55	19.18	5.89	31.46
3800	14.47	20.78	16.41	6.65	1.11	0.55	18.89	5.86	30.87
4000	14.05	20.36	16.12	6.64	1.11	0.55	18.67	6.06	30.32
4200	13.65	19.99	15.83	6.60	1.11	0.55	18.45	6.01	29.64
4400	13.29	19.54	15.64	6.61	1.10	0.55	18.06	6.01	29.97
4600	12.89	19.19	15.28	6.61	1.10	0.55	17.89	6.05	28.96
4800	12.54	18.86	15.05	6.59	1.11	0.55	17.60	6.17	29.57
5000	12.19	18.52	14.78	6.61	1.11	0.56	17.22	6.14	28.50
5200	11.84	18.18	14.43	6.60	1.11	0.56	17.02	6.25	28.75
5400	11.50	17.87	14.21	6.62	1.11	0.56	16.71	6.30	27.92
5600	11.17	17.58	13.89	6.62	1.12	0.57	16.34	6.39	27.31
5800	10.84	17.29	13.56	6.60	1.12	0.57	16.16	6.51	27.41
6000	10.51	17.02	13.39	6.61	1.12	0.57	15.70	6.59	26.79

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

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

TEST CONDITIONS: V_{DD} = +5 V, I_{DD} = 107.9 mA @ Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.58	31.53	25.16	22.51	1.33	0.80	20.96	4.89	33.46
50	24.65	31.60	25.27	22.19	1.33	0.80	20.71	4.99	35.39
100	24.63	31.36	25.60	21.60	1.31	0.79	20.80	4.94	35.08
200	24.54	31.35	25.83	19.71	1.32	0.79	20.98	4.90	35.36
300	24.42	31.06	25.70	17.91	1.30	0.77	20.84	4.84	36.54
400	24.24	30.82	25.43	16.24	1.29	0.76	20.93	5.00	35.37
500	24.02	30.60	25.53	14.86	1.28	0.75	20.91	4.92	33.99
600	23.76	30.30	25.17	13.68	1.27	0.74	21.06	4.88	34.29
700	23.47	29.90	24.69	12.64	1.25	0.72	20.98	4.87	35.99
800	23.17	29.60	24.12	11.86	1.24	0.71	20.93	4.94	35.54
900	22.84	29.26	23.65	11.23	1.23	0.70	21.02	4.96	35.42
1000	22.54	28.86	23.18	10.64	1.21	0.68	21.00	4.94	33.98
1200	21.85	28.18	22.09	9.70	1.20	0.66	21.07	4.95	34.22
1400	21.15	27.39	21.34	9.02	1.17	0.64	20.98	4.91	34.06
1600	20.48	26.71	20.60	8.52	1.16	0.62	21.11	4.93	36.07
1800	19.83	26.02	20.26	8.09	1.15	0.60	21.02	4.95	35.23
2000	19.21	25.35	19.84	7.77	1.13	0.59	21.00	4.95	35.48
2200	18.60	24.72	19.56	7.50	1.12	0.57	20.97	4.94	34.30
2400	18.02	24.14	19.15	7.33	1.12	0.57	20.86	4.97	32.08
2600	17.48	23.59	18.69	7.13	1.11	0.56	20.79	4.99	32.24
2800	16.94	23.03	18.13	7.04	1.11	0.55	20.57	5.09	32.04
3000	16.44	22.53	17.63	6.86	1.10	0.54	20.44	5.06	32.16
3200	15.94	22.06	17.12	6.78	1.10	0.54	20.22	5.07	32.20
3400	15.47	21.62	16.69	6.66	1.10	0.54	19.80	5.20	31.84
3600	15.02	21.14	16.37	6.61	1.10	0.53	19.77	5.21	32.29
3800	14.59	20.71	16.04	6.54	1.09	0.53	19.49	5.18	30.43
4000	14.16	20.31	15.73	6.51	1.09	0.53	19.25	5.22	31.44
4200	13.77	19.89	15.46	6.54	1.09	0.53	19.08	5.17	31.73
4400	13.39	19.50	15.28	6.50	1.09	0.53	18.62	5.36	31.34
4600	13.00	19.14	15.08	6.55	1.09	0.54	18.43	5.37	30.87
4800	12.65	18.79	14.94	6.50	1.09	0.54	18.16	5.37	31.30
5000	12.31	18.43	14.72	6.52	1.09	0.54	17.77	5.36	30.45
5200	11.98	18.09	14.54	6.45	1.08	0.54	17.55	5.54	30.23
5400	11.62	17.79	14.27	6.43	1.09	0.54	17.24	5.56	30.39
5600	11.29	17.48	13.99	6.38	1.09	0.54	16.86	5.59	29.50
5800	10.95	17.22	13.68	6.31	1.09	0.54	16.68	5.67	29.50
6000	10.64	16.91	13.31	6.29	1.09	0.54	16.24	5.76	28.87

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

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

TEST CONDITIONS: V_{DD} = +5.25 V, I_{DD} = 122.4 mA @ Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.66	31.80	23.76	23.92	1.34	0.81	21.74	4.75	33.32
50	24.73	31.63	23.99	23.18	1.32	0.80	21.52	5.15	34.24
100	24.72	31.60	24.31	22.52	1.32	0.80	21.58	5.05	36.54
200	24.63	31.45	24.55	20.26	1.32	0.79	21.80	5.00	34.70
300	24.51	31.21	24.46	18.25	1.31	0.78	21.66	4.99	37.38
400	24.32	30.97	24.31	16.40	1.30	0.77	21.77	5.08	36.63
500	24.10	30.63	24.55	14.99	1.28	0.75	21.75	5.07	36.18
600	23.84	30.38	24.31	13.76	1.27	0.74	21.90	4.98	35.34
700	23.55	30.05	23.96	12.71	1.26	0.73	21.82	4.99	36.54
800	23.24	29.80	23.50	11.90	1.25	0.72	21.76	4.97	36.54
900	22.90	29.38	23.12	11.27	1.24	0.70	21.88	5.11	34.96
1000	22.60	28.98	22.75	10.67	1.22	0.68	21.88	5.00	37.46
1200	21.91	28.25	21.79	9.72	1.20	0.66	21.95	5.05	36.75
1400	21.20	27.50	21.14	9.05	1.18	0.64	21.77	5.02	35.53
1600	20.52	26.75	20.46	8.54	1.16	0.62	21.94	5.05	36.03
1800	19.87	26.07	20.21	8.11	1.15	0.60	21.79	5.10	34.95
2000	19.24	25.43	19.78	7.79	1.14	0.59	21.74	5.11	33.67
2200	18.64	24.79	19.55	7.52	1.13	0.57	21.70	5.15	35.37
2400	18.06	24.22	19.15	7.35	1.13	0.57	21.52	5.14	34.43
2600	17.51	23.61	18.68	7.14	1.12	0.55	21.42	5.07	33.52
2800	16.98	23.10	18.13	7.04	1.12	0.55	21.15	5.25	34.26
3000	16.47	22.56	17.62	6.87	1.11	0.54	21.01	5.24	33.04
3200	15.97	22.10	17.14	6.79	1.11	0.54	20.75	5.23	34.55
3400	15.50	21.62	16.73	6.66	1.10	0.53	20.31	4.97	32.70
3600	15.05	21.18	16.39	6.61	1.10	0.53	20.30	5.31	32.04
3800	14.62	20.74	16.06	6.53	1.09	0.53	20.03	5.34	32.92
4000	14.19	20.34	15.77	6.51	1.09	0.53	19.77	5.48	33.34
4200	13.81	19.94	15.46	6.52	1.09	0.53	19.56	5.41	33.65
4400	13.42	19.53	15.31	6.48	1.09	0.53	19.11	5.49	32.23
4600	13.03	19.19	15.11	6.52	1.09	0.54	18.91	5.52	31.69
4800	12.68	18.81	14.99	6.47	1.09	0.53	18.66	5.50	32.39
5000	12.35	18.45	14.77	6.48	1.09	0.54	18.27	5.53	31.27
5200	12.02	18.09	14.57	6.41	1.08	0.53	18.05	5.70	31.35
5400	11.67	17.78	14.30	6.38	1.09	0.53	17.72	5.68	30.89
5600	11.34	17.48	14.01	6.32	1.09	0.53	17.35	5.73	30.40
5800	11.00	17.21	13.70	6.25	1.09	0.53	17.20	5.93	30.59
6000	10.69	16.91	13.33	6.21	1.09	0.53	16.81	5.96	29.64

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

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

TEST CONDITIONS: V_{DD} = +5 V, I_{DD} = 102.5 mA @ Temperature = -55degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.73	32.14	23.44	23.98	1.37	0.82	20.92	4.03	30.05
50	24.80	31.91	23.81	23.09	1.34	0.81	20.68	4.33	32.81
100	24.80	31.75	24.10	22.45	1.33	0.80	20.77	4.26	35.13
200	24.71	31.63	24.43	20.20	1.32	0.79	20.96	4.24	35.99
300	24.58	31.53	24.11	18.25	1.32	0.79	20.86	4.19	34.87
400	24.40	31.23	23.89	16.47	1.31	0.78	20.92	4.21	33.78
500	24.19	30.97	23.93	15.05	1.29	0.76	20.87	4.31	35.13
600	23.94	30.52	23.74	13.85	1.27	0.74	21.01	4.24	34.52
700	23.65	30.09	23.28	12.78	1.24	0.72	20.92	4.17	34.10
800	23.35	29.82	22.68	11.97	1.24	0.71	20.87	4.19	34.78
900	23.02	29.47	22.34	11.36	1.23	0.70	20.95	4.25	33.80
1000	22.73	29.15	21.89	10.74	1.22	0.69	20.91	4.30	34.52
1200	22.04	28.31	20.96	9.77	1.19	0.66	20.95	4.35	36.05
1400	21.35	27.55	20.35	9.10	1.17	0.63	20.97	4.30	33.13
1600	20.68	26.83	19.79	8.59	1.15	0.61	21.07	4.22	32.82
1800	20.03	26.16	19.58	8.15	1.14	0.60	21.03	4.29	33.43
2000	19.41	25.50	19.34	7.84	1.13	0.58	21.09	4.31	33.99
2200	18.83	24.83	19.15	7.57	1.12	0.56	21.08	4.36	36.51
2400	18.26	24.26	18.86	7.41	1.11	0.55	21.03	4.37	32.53
2600	17.72	23.68	18.51	7.20	1.10	0.54	20.98	4.43	33.79
2800	17.19	23.17	18.04	7.09	1.10	0.53	20.83	4.40	33.43
3000	16.69	22.66	17.58	6.91	1.10	0.52	20.76	4.39	32.67
3200	16.20	22.20	17.13	6.80	1.10	0.52	20.54	4.43	32.41
3400	15.74	21.73	16.77	6.67	1.09	0.51	20.17	4.49	32.02
3600	15.30	21.28	16.50	6.59	1.09	0.51	20.24	4.59	32.42
3800	14.87	20.87	16.22	6.49	1.08	0.51	19.94	4.53	32.12
4000	14.46	20.42	15.98	6.44	1.07	0.50	19.79	4.63	31.82
4200	14.08	20.04	15.77	6.46	1.08	0.51	19.64	4.68	31.68
4400	13.70	19.66	15.69	6.40	1.07	0.50	19.22	4.70	30.97
4600	13.34	19.28	15.55	6.45	1.07	0.51	19.09	4.74	31.05
4800	13.00	18.92	15.52	6.39	1.07	0.50	18.88	4.74	32.65
5000	12.68	18.56	15.33	6.39	1.07	0.50	18.47	4.87	30.96
5200	12.36	18.23	15.20	6.32	1.06	0.50	18.33	4.91	30.95
5400	12.02	17.90	14.94	6.30	1.06	0.50	17.98	4.92	31.39
5600	11.71	17.62	14.66	6.22	1.06	0.49	17.61	4.97	30.41
5800	11.38	17.33	14.34	6.13	1.06	0.49	17.49	5.07	31.01
6000	11.09	17.04	13.97	6.09	1.06	0.49	17.00	5.24	29.40

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

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

TEST CONDITIONS: V_{DD} = +5 V, I_{DD} = 114.9 mA @ Temperature = +105degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.41	31.38	26.40	21.44	1.33	0.80	20.95	5.58	33.40
50	24.46	31.35	27.00	21.29	1.32	0.79	20.75	5.75	33.29
100	24.45	31.25	27.04	21.03	1.32	0.79	20.78	5.74	34.73
200	24.36	31.16	27.08	19.32	1.32	0.78	20.98	5.63	34.08
300	24.21	30.84	27.28	17.39	1.30	0.77	20.84	5.68	34.34
400	24.03	30.64	27.30	15.80	1.30	0.76	20.94	5.67	35.64
500	23.80	30.46	27.22	14.49	1.29	0.75	20.91	5.66	35.34
600	23.54	30.10	26.94	13.32	1.27	0.74	21.06	5.61	35.36
700	23.23	29.75	26.35	12.35	1.26	0.72	20.98	5.62	35.34
800	22.92	29.42	25.58	11.56	1.25	0.71	20.93	5.61	35.34
900	22.57	29.04	25.09	10.97	1.23	0.70	21.04	5.70	35.59
1000	22.26	28.71	24.48	10.40	1.22	0.69	21.03	5.70	34.52
1200	21.55	27.98	23.10	9.50	1.20	0.67	21.11	5.65	35.79
1400	20.83	27.25	22.03	8.86	1.18	0.65	20.93	5.67	33.95
1600	20.13	26.52	20.97	8.37	1.17	0.63	21.09	5.74	36.09
1800	19.46	25.87	20.31	7.96	1.16	0.62	20.94	5.66	34.66
2000	18.81	25.18	19.63	7.65	1.14	0.61	20.82	5.80	34.29
2200	18.18	24.56	19.19	7.39	1.13	0.59	20.74	5.75	34.56
2400	17.57	23.98	18.62	7.23	1.13	0.59	20.52	5.82	32.81
2600	17.00	23.46	18.05	7.06	1.13	0.58	20.36	5.81	32.34
2800	16.44	22.89	17.51	6.99	1.13	0.58	20.06	5.84	33.34
3000	15.91	22.38	16.91	6.87	1.12	0.58	19.84	5.85	31.55
3200	15.39	21.95	16.43	6.84	1.13	0.58	19.57	5.88	31.43
3400	14.90	21.47	15.99	6.77	1.13	0.58	19.11	5.92	31.47
3600	14.42	21.03	15.61	6.76	1.13	0.58	19.01	5.99	30.96
3800	13.96	20.60	15.21	6.73	1.13	0.59	18.65	6.07	31.68
4000	13.51	20.20	14.89	6.74	1.14	0.59	18.34	6.17	30.60
4200	13.08	19.81	14.55	6.79	1.14	0.60	18.06	6.17	30.15
4400	12.65	19.41	14.32	6.76	1.14	0.60	17.60	6.19	30.23
4600	12.23	19.10	14.00	6.82	1.15	0.61	17.36	6.25	29.61
4800	11.85	18.76	13.82	6.78	1.16	0.61	17.02	6.27	29.18
5000	11.47	18.42	13.57	6.81	1.17	0.62	16.68	6.32	29.31
5200	11.09	18.09	13.33	6.76	1.17	0.62	16.35	6.39	28.72
5400	10.70	17.79	13.05	6.77	1.18	0.62	16.06	6.50	28.82
5600	10.35	17.48	12.78	6.75	1.19	0.62	15.74	6.51	27.87
5800	9.96	17.23	12.52	6.72	1.19	0.63	15.65	6.64	27.50
6000	9.62	16.93	12.15	6.71	1.20	0.63	15.16	6.67	27.39

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-84C+ (Figure 3).

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

TEST CONDITIONS: V_{DD} = +5 V, I_{DD} = 101.1 mA @ Temperature = -55degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.61	32.69	16.85	18.47	1.43	0.84	19.73	4.43	28.14
50	24.75	31.81	24.00	24.21	1.34	0.81	20.51	4.42	32.13
100	24.71	31.81	24.60	22.76	1.34	0.81	20.43	4.41	35.21
200	24.61	31.69	24.97	19.81	1.33	0.80	20.53	4.36	36.60
300	24.47	31.42	24.78	17.49	1.31	0.79	20.57	4.36	34.41
400	24.27	31.23	24.71	15.67	1.30	0.78	20.66	4.32	36.07
500	24.01	30.90	24.75	14.26	1.29	0.76	20.54	4.39	35.03
600	23.73	30.70	24.85	13.11	1.28	0.75	20.44	4.36	34.53
700	23.46	30.26	24.73	12.11	1.26	0.73	20.48	4.32	33.79
800	23.11	30.00	24.31	11.44	1.25	0.72	20.37	4.37	36.45
900	22.81	29.59	24.59	10.71	1.23	0.70	20.46	4.26	35.71
1000	22.47	29.23	24.75	10.23	1.22	0.69	20.41	4.46	33.33
1200	21.80	28.47	24.77	9.45	1.20	0.66	20.37	4.42	34.03
1400	21.14	27.67	25.35	9.02	1.17	0.64	20.52	4.36	34.03
1600	20.53	26.94	25.97	8.74	1.16	0.63	20.69	4.44	34.57
1800	19.92	26.21	26.84	8.60	1.14	0.62	20.69	4.45	35.43
2000	19.31	25.52	26.61	8.51	1.13	0.61	20.81	4.44	34.54
2200	18.79	24.83	26.91	8.49	1.12	0.60	20.96	4.50	33.90
2400	18.18	24.25	25.52	8.31	1.12	0.60	20.92	4.57	33.47
2600	17.78	23.52	24.10	8.42	1.10	0.58	20.99	4.61	32.95
2800	17.33	22.95	22.94	8.43	1.09	0.57	21.13	4.70	34.23
3000	16.86	22.41	21.48	8.35	1.09	0.56	20.93	4.69	33.84
3200	16.43	21.86	20.08	8.35	1.08	0.55	20.90	4.77	33.70
3400	15.98	21.39	18.73	8.18	1.08	0.54	20.65	4.93	33.68
3600	15.54	20.98	17.19	8.12	1.08	0.54	20.21	4.98	32.76
3800	15.09	20.57	15.94	7.92	1.07	0.54	20.23	4.96	32.97
4000	14.64	20.21	14.65	7.71	1.07	0.53	19.72	5.10	33.45
4200	14.22	19.88	13.53	7.43	1.07	0.53	19.59	5.15	32.51
4400	13.76	19.59	12.57	7.18	1.07	0.53	19.32	5.22	31.84
4600	13.32	19.28	11.60	6.95	1.06	0.53	18.80	5.32	31.77
4800	12.89	19.01	10.80	6.80	1.06	0.53	18.77	5.43	31.43
5000	12.47	18.76	10.13	6.74	1.06	0.55	18.36	5.48	31.84
5200	12.07	18.51	9.48	6.79	1.06	0.57	18.13	5.63	30.87
5400	11.68	18.26	8.96	6.97	1.07	0.60	17.87	5.68	30.62
5600	11.28	18.04	8.44	7.23	1.07	0.64	17.45	5.73	29.79
5800	10.87	17.88	7.98	7.61	1.09	0.68	17.20	5.81	30.97
6000	10.42	17.73	7.58	8.08	1.11	0.73	16.71	5.82	29.80

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-84C+ (Figure 3).

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

TEST CONDITIONS: V_{DD} = +5 V, I_{DD} = 105.4 mA @ Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.46	32.04	17.39	19.78	1.38	0.82	19.70	5.16	30.28
50	24.54	31.56	25.65	23.03	1.33	0.80	20.54	5.14	35.99
100	24.53	31.49	26.34	21.77	1.33	0.80	20.43	5.08	35.67
200	24.41	31.29	26.71	19.30	1.31	0.79	20.55	5.05	37.35
300	24.25	31.21	26.68	17.16	1.31	0.78	20.57	5.02	36.27
400	24.03	30.97	26.71	15.39	1.30	0.77	20.70	5.09	36.27
500	23.79	30.74	26.60	14.06	1.29	0.76	20.58	5.08	35.22
600	23.50	30.46	26.77	12.92	1.28	0.75	20.51	5.07	36.27
700	23.20	30.13	26.75	11.96	1.27	0.73	20.56	5.04	35.63
800	22.86	29.81	26.44	11.22	1.26	0.72	20.47	5.11	37.39
900	22.54	29.42	26.85	10.57	1.24	0.70	20.61	5.11	34.40
1000	22.22	29.04	27.00	10.10	1.22	0.69	20.48	5.12	34.49
1200	21.53	28.32	27.18	9.35	1.20	0.67	20.53	5.12	34.15
1400	20.85	27.59	28.02	8.90	1.18	0.65	20.63	5.07	33.88
1600	20.23	26.82	28.77	8.64	1.16	0.64	20.77	5.10	34.88
1800	19.61	26.08	29.80	8.50	1.15	0.63	20.79	5.15	36.23
2000	19.01	25.38	29.50	8.43	1.14	0.62	20.89	5.19	34.05
2200	18.47	24.74	29.92	8.45	1.13	0.62	20.88	5.19	32.75
2400	17.86	24.18	26.49	8.30	1.13	0.62	20.83	5.21	33.22
2600	17.44	23.46	25.45	8.49	1.11	0.60	20.80	5.26	32.88
2800	17.00	22.83	23.92	8.54	1.10	0.59	20.88	5.28	33.37
3000	16.52	22.33	22.07	8.50	1.10	0.59	20.67	5.32	32.91
3200	16.08	21.78	20.30	8.53	1.09	0.59	20.58	5.37	33.08
3400	15.61	21.32	18.73	8.36	1.09	0.58	20.28	5.49	32.89
3600	15.15	20.89	17.01	8.28	1.09	0.58	19.87	5.46	32.71
3800	14.69	20.48	15.61	8.04	1.08	0.57	19.82	5.65	32.99
4000	14.21	20.16	14.27	7.82	1.09	0.57	19.29	5.74	33.14
4200	13.75	19.86	13.08	7.52	1.09	0.57	19.04	5.78	31.14
4400	13.25	19.57	12.08	7.29	1.09	0.57	18.77	5.89	30.72
4600	12.78	19.31	11.09	7.08	1.09	0.58	18.22	6.02	30.83
4800	12.31	19.05	10.31	6.97	1.09	0.59	18.02	6.02	30.70
5000	11.86	18.81	9.65	6.95	1.09	0.61	17.62	6.16	30.55
5200	11.43	18.57	8.99	7.05	1.10	0.64	17.30	6.25	30.56
5400	11.01	18.37	8.48	7.29	1.11	0.68	17.09	6.32	29.88
5600	10.56	18.18	7.97	7.63	1.12	0.72	16.63	6.38	29.13
5800	10.11	17.99	7.53	8.08	1.14	0.77	16.31	6.49	29.22
6000	9.62	17.90	7.19	8.67	1.17	0.82	15.83	6.54	28.05

Typical Performance Data

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-84C+ (Figure 3).

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

TEST CONDITIONS: V_{DD} = +5 V, I_{DD} = 110.9 mA @ Temperature = +105degC

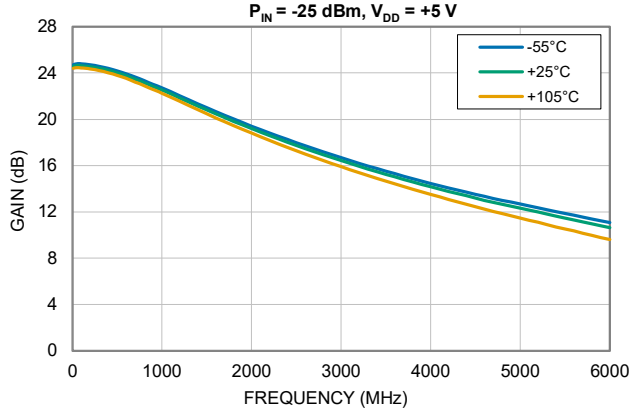
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	IP3 - Min
(MHz)	(dB)	(dB)	(dB)	(dB)	K	B1	(dBm)	(dB)	(dBm)
10	24.17	31.48	17.91	20.67	1.36	0.81	19.66	5.92	28.05
50	24.34	31.26	27.74	22.02	1.32	0.80	20.55	5.83	32.94
100	24.31	31.25	28.47	21.13	1.32	0.79	20.42	5.82	34.71
200	24.19	31.18	28.48	18.86	1.32	0.79	20.53	5.79	34.75
300	24.03	30.96	28.68	16.69	1.31	0.78	20.54	5.75	36.15
400	23.79	30.77	29.45	15.00	1.30	0.77	20.68	5.77	33.40
500	23.53	30.49	29.53	13.70	1.29	0.76	20.56	5.79	34.20
600	23.23	30.26	29.81	12.61	1.28	0.75	20.52	5.75	34.75
700	22.92	29.92	29.94	11.69	1.27	0.73	20.56	5.72	35.66
800	22.58	29.61	29.96	10.95	1.26	0.72	20.50	5.73	35.83
900	22.25	29.25	30.27	10.34	1.24	0.71	20.65	5.84	36.05
1000	21.89	28.88	30.48	9.88	1.23	0.70	20.47	5.85	34.84
1200	21.20	28.10	30.66	9.17	1.20	0.67	20.61	5.84	36.24
1400	20.50	27.35	31.13	8.75	1.18	0.66	20.65	5.85	32.97
1600	19.84	26.64	30.67	8.49	1.17	0.65	20.78	5.87	33.73
1800	19.20	25.90	30.65	8.37	1.15	0.64	20.78	5.93	34.78
2000	18.58	25.24	29.18	8.34	1.15	0.64	20.86	5.86	36.69
2200	18.01	24.58	28.01	8.40	1.14	0.64	20.64	5.92	32.91
2400	17.40	24.04	24.59	8.32	1.14	0.65	20.55	5.99	34.13
2600	16.94	23.29	23.77	8.56	1.13	0.64	20.42	6.04	32.97
2800	16.48	22.69	22.33	8.69	1.12	0.63	20.39	6.03	33.67
3000	15.99	22.16	20.57	8.72	1.12	0.63	20.15	6.12	33.20
3200	15.51	21.63	18.95	8.78	1.11	0.63	19.97	6.19	33.43
3400	15.01	21.19	17.44	8.64	1.12	0.63	19.60	6.32	32.30
3600	14.51	20.78	15.81	8.54	1.12	0.63	19.17	6.31	32.11
3800	13.99	20.42	14.49	8.27	1.12	0.63	18.90	6.42	31.46
4000	13.47	20.07	13.23	8.03	1.12	0.63	18.36	6.50	30.98
4200	12.94	19.77	12.09	7.75	1.13	0.64	18.04	6.58	30.09
4400	12.40	19.56	11.15	7.56	1.14	0.65	17.65	6.69	30.33
4600	11.87	19.33	10.24	7.41	1.15	0.67	17.13	6.83	28.92
4800	11.36	19.11	9.51	7.38	1.16	0.69	16.83	6.88	28.78
5000	10.86	18.88	8.89	7.45	1.16	0.71	16.44	6.95	29.10
5200	10.38	18.67	8.29	7.64	1.18	0.75	15.98	7.14	28.50
5400	9.90	18.49	7.82	7.96	1.19	0.79	15.75	7.21	28.39
5600	9.41	18.32	7.37	8.42	1.22	0.84	15.44	7.32	27.43
5800	8.91	18.17	7.00	9.00	1.25	0.89	15.07	7.53	27.20
6000	8.41	18.08	6.72	9.67	1.29	0.94	14.67	7.51	26.30

Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

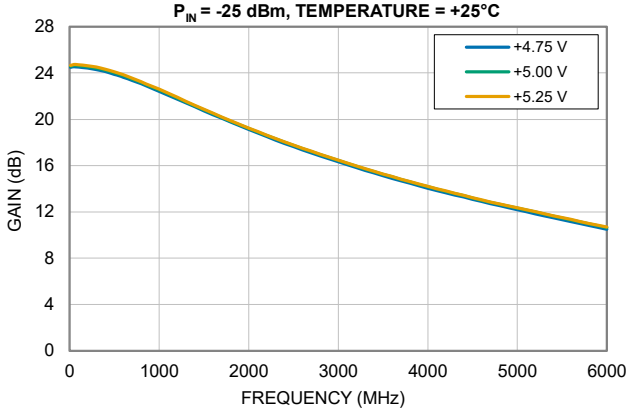
GAIN vs. TEMPERATURE

P_{IN} = -25 dBm, V_{DD} = +5 V



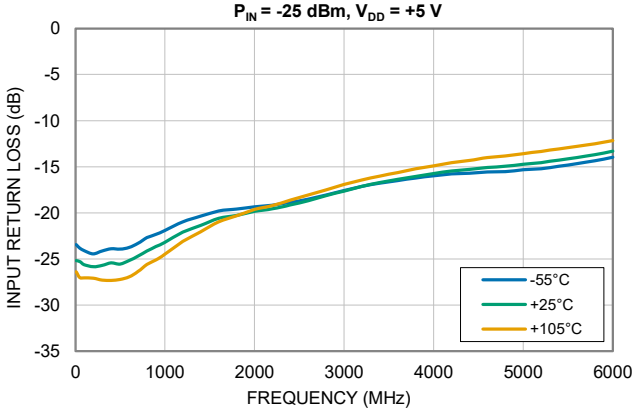
GAIN vs. DEVICE VOLTAGE

P_{IN} = -25 dBm, TEMPERATURE = +25°C



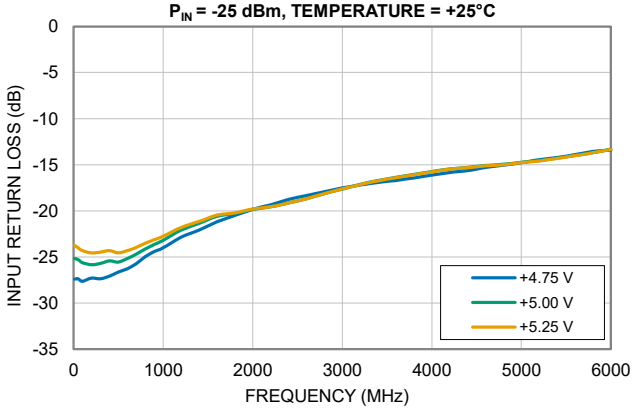
INPUT RETURN LOSS vs. TEMPERATURE

P_{IN} = -25 dBm, V_{DD} = +5 V



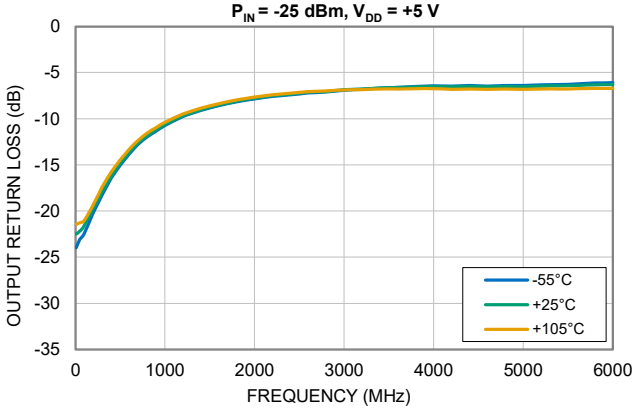
INPUT RETURN LOSS vs. DEVICE VOLTAGE

P_{IN} = -25 dBm, TEMPERATURE = +25°C



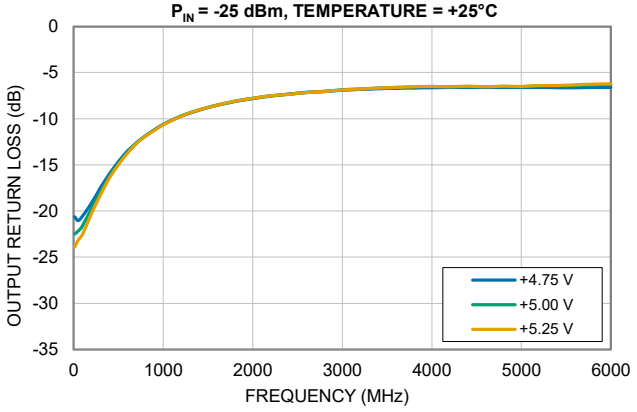
OUTPUT RETURN LOSS vs. TEMPERATURE

P_{IN} = -25 dBm, V_{DD} = +5 V



OUTPUT RETURN LOSS vs. DEVICE VOLTAGE

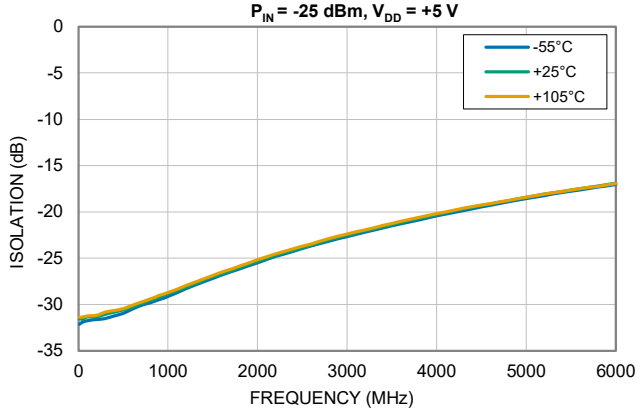
P_{IN} = -25 dBm, TEMPERATURE = +25°C



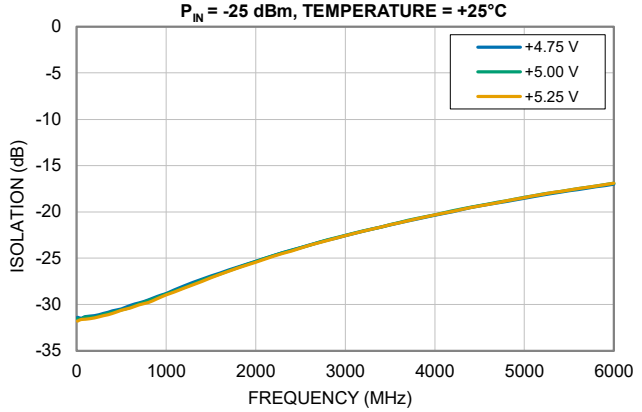
Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

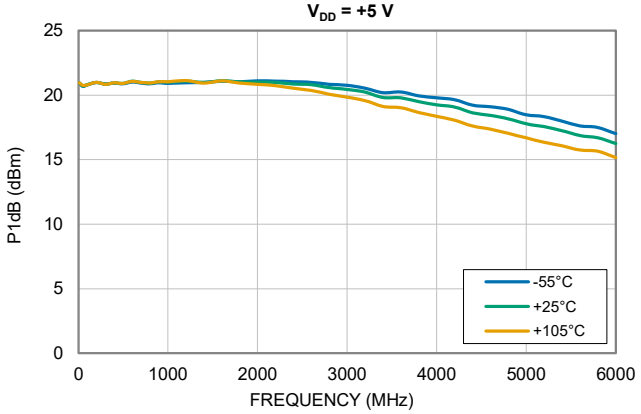
ISOLATION vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



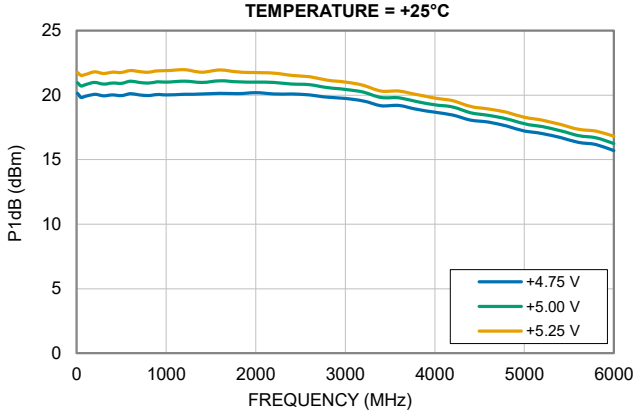
ISOLATION vs. DEVICE VOLTAGE
P_{IN} = -25 dBm, TEMPERATURE = +25°C



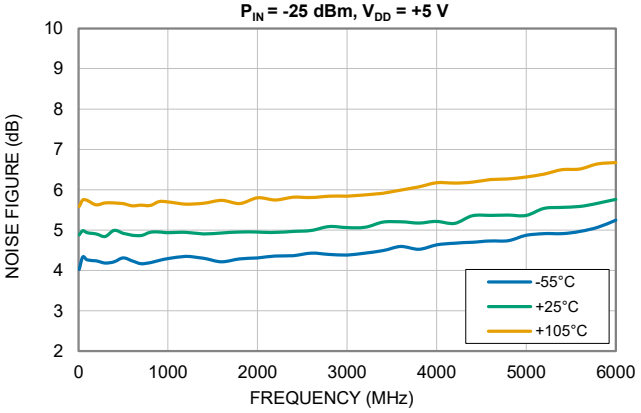
P1dB vs. TEMPERATURE
V_{DD} = +5 V



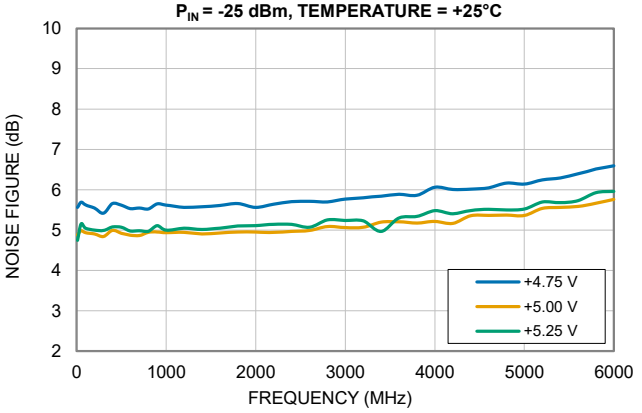
P1dB vs. DEVICE VOLTAGE
TEMPERATURE = +25°C



NOISE FIGURE vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



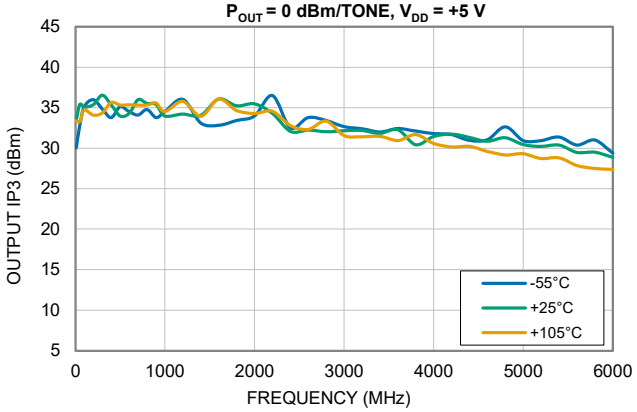
NOISE FIGURE vs. DEVICE VOLTAGE
P_{IN} = -25 dBm, TEMPERATURE = +25°C



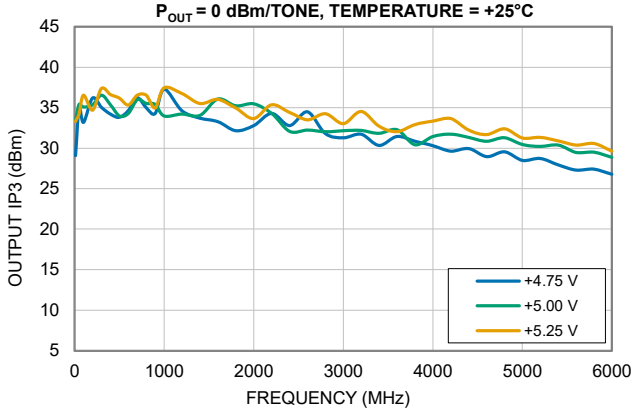
Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Characterization Test Board MB-225-84C+ (Figure 2).

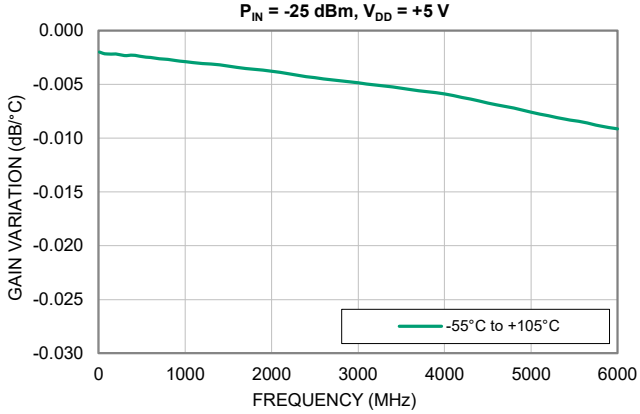
OUTPUT IP3 vs. TEMPERATURE
P_{OUT} = 0 dBm/TONE, V_{DD} = +5 V



OUTPUT IP3 vs. DEVICE VOLTAGE
P_{OUT} = 0 dBm/TONE, TEMPERATURE = +25°C



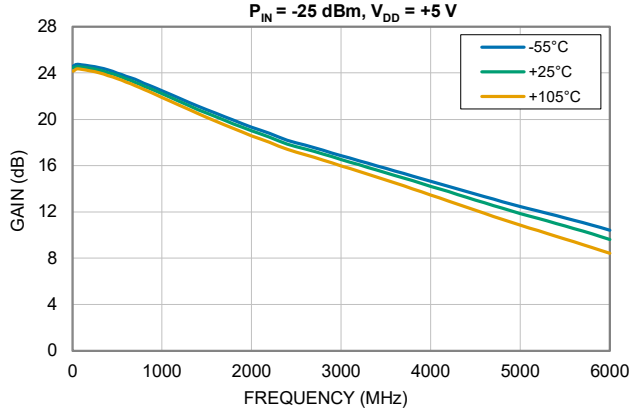
GAIN VARIATION vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



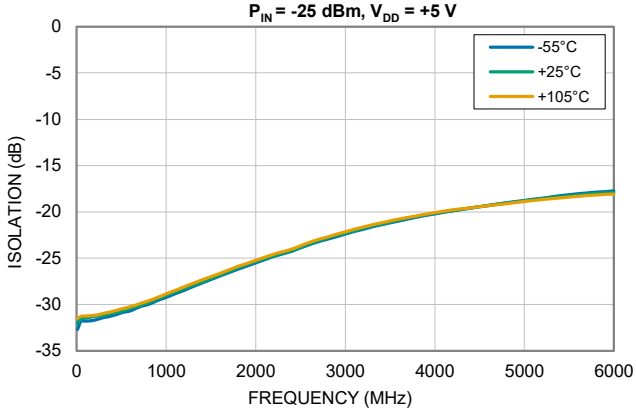
Typical Performance Curves

Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-84C+ (Figure 3).

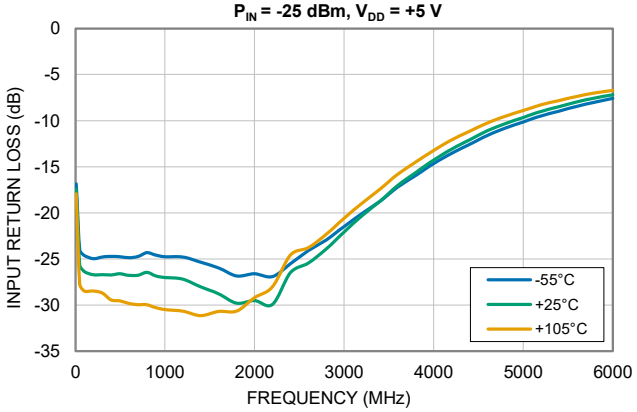
GAIN vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



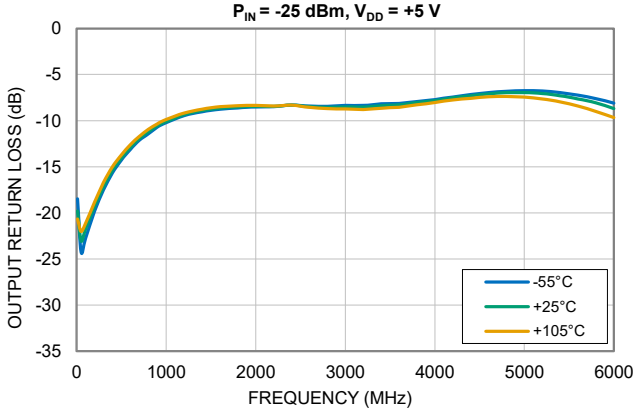
ISOLATION vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



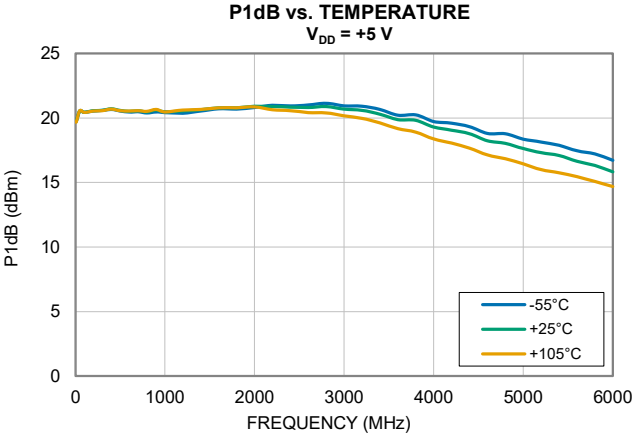
INPUT RETURN LOSS vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



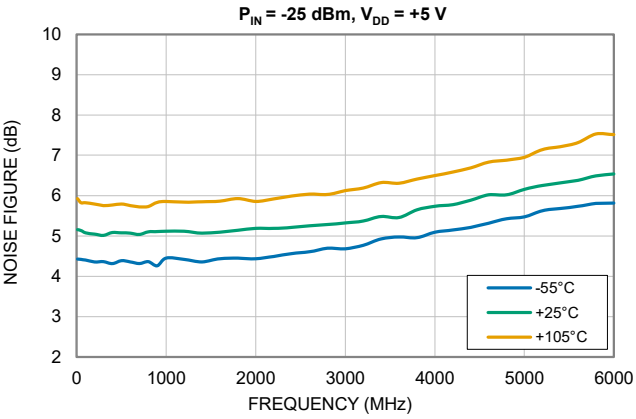
OUTPUT RETURN LOSS vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



P1dB vs. TEMPERATURE
V_{DD} = +5 V

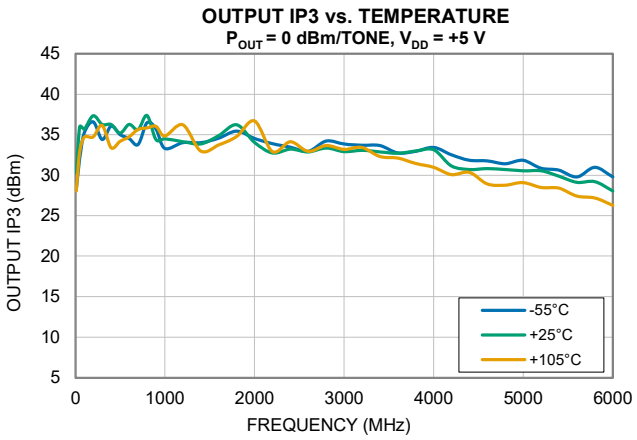


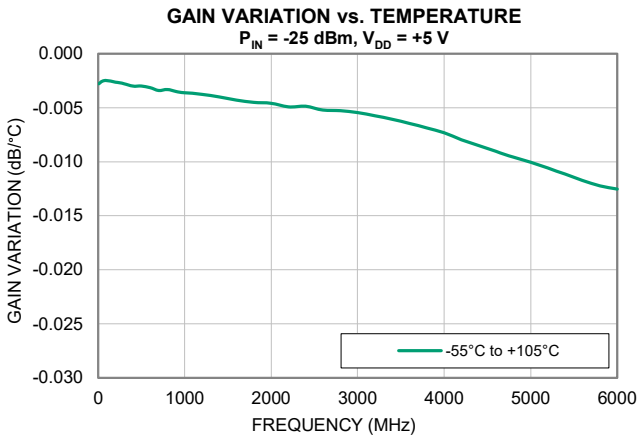
NOISE FIGURE vs. TEMPERATURE
P_{IN} = -25 dBm, V_{DD} = +5 V



Typical Performance Curves

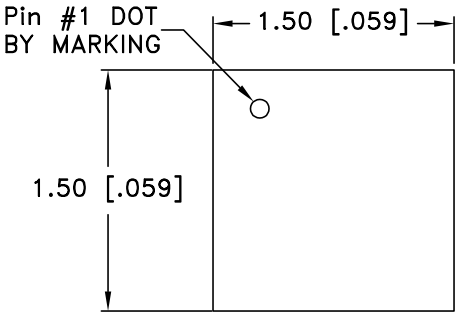
Note: The following data was taken on the Mini-Circuits Evaluation Board TB-LEE1-84C+ (Figure 3).



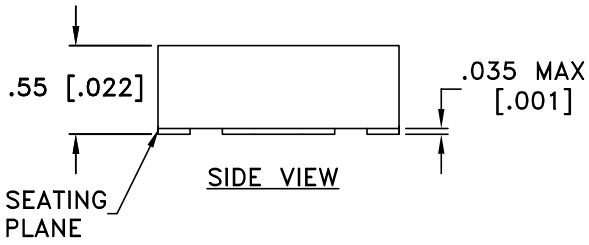


Case Style KC

Outline Dimensions KC3011

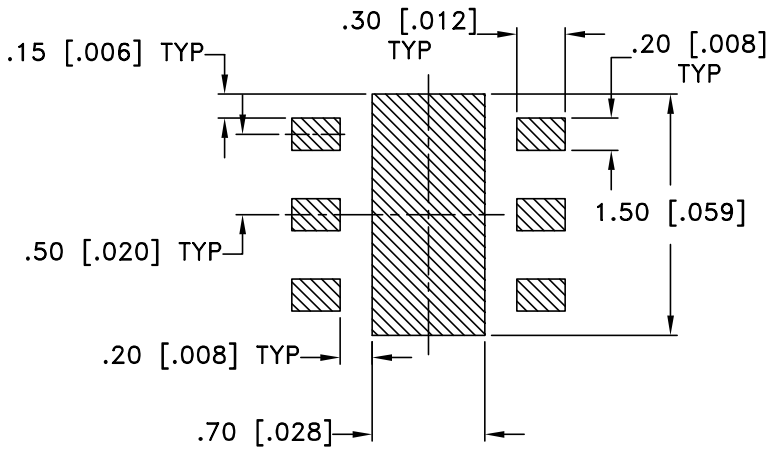


TOP VIEW

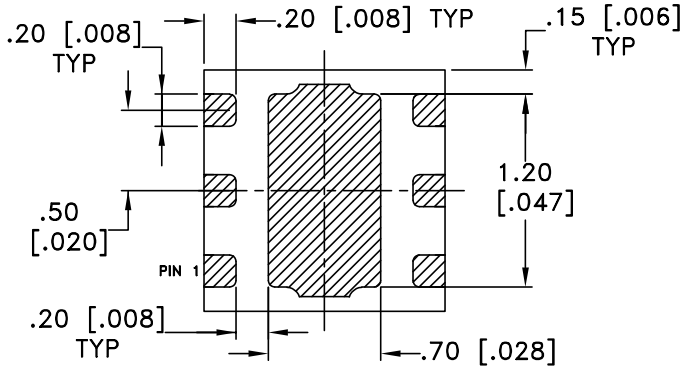


SIDE VIEW

PCB Land Pattern



Suggested Layout,
Tolerance to be within ±0.050 mm



BOTTOM VIEW

NOTES:

1. ▨ DENOTES METALLIZATION

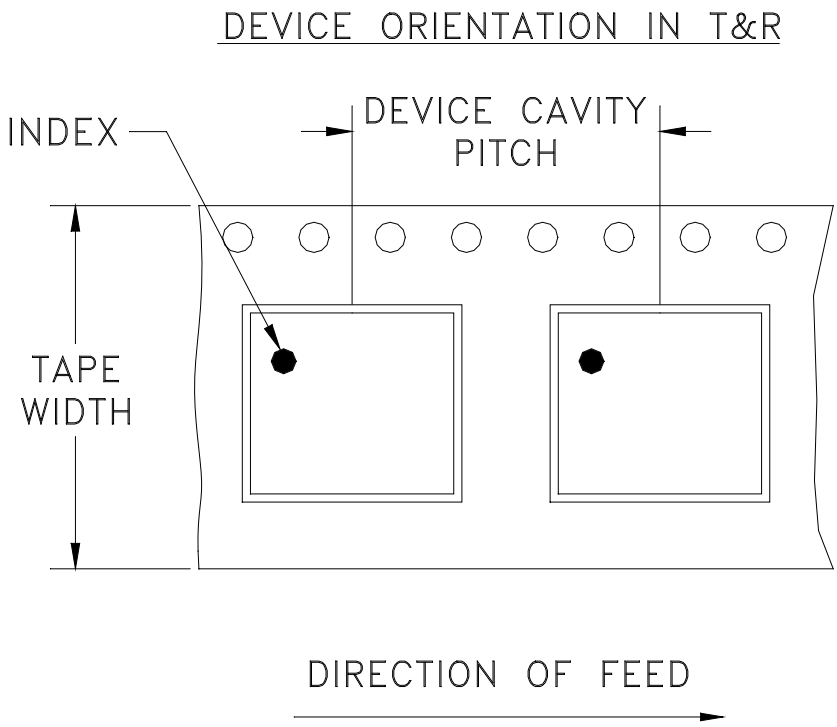
Weight: .0036 grams

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

Notes:

1. Case material: Plastic.
2. Termination finish: NiPdAu (3µm/0.080µm/0.080µm) .

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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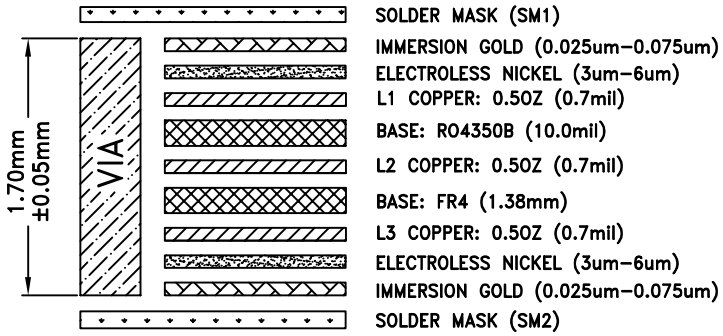
THIRD ANGLE PROJECTION

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



LAYERS L2 & L3 OF PCB ARE CONTINUOUS GROUND PLANES.

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 RO4350B 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	DRAWN	ITG	02/09/26
TOLERANCES ON:	CHECKED	NP	02/09/26
2 PL DECIMALS ±	APPROVED	IL	02/09/26
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®

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

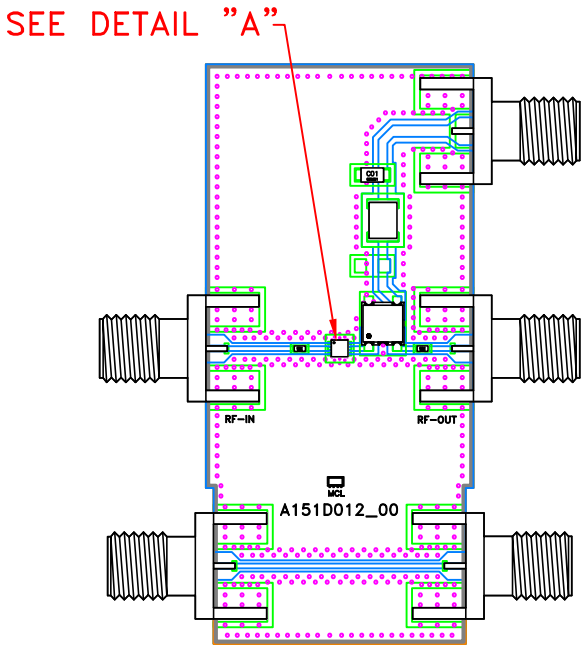
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

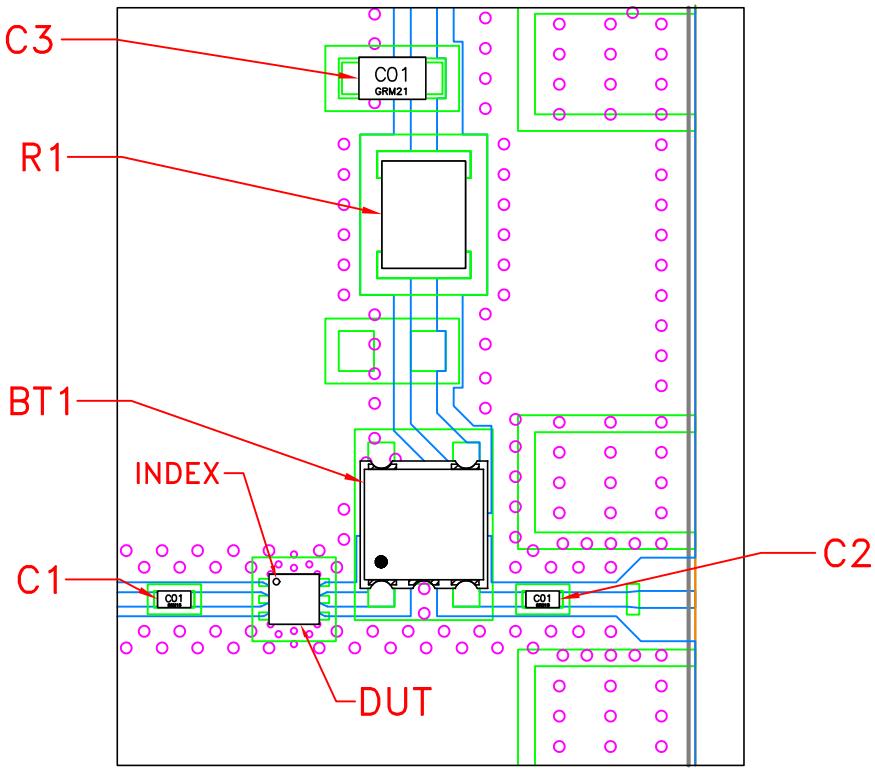
PL, KC3011, TB-LEE1-XXC+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-851	OR

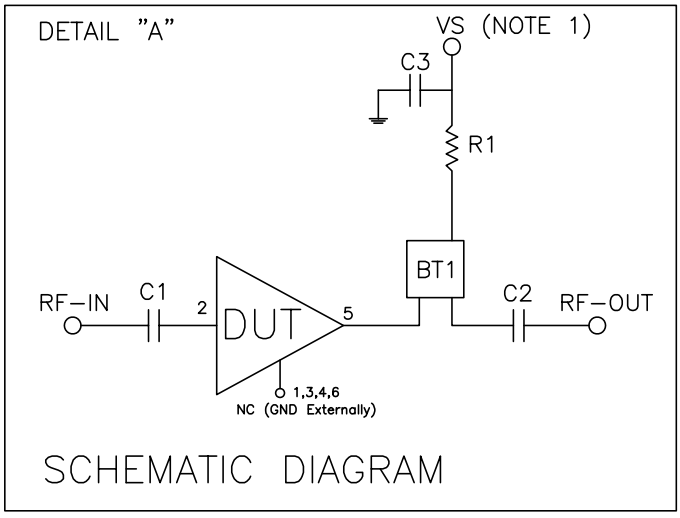
FILE:	SCALE:	SHEET:
98PL851	6:1	1 OF 1

Evaluation Board and Circuit





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-14+	Mini Circuits

NOTES:

1. VS Voltage=+5V
2. 50 Ohm SMA Female Connectors.
3. PCB Material: Roger RO4350B or equivalent, Dielectric constant=3.5, Thickness=0.010 inch

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Environmental Specifications **ENV08T1**

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

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C or -45° to 85° C 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