



MMIC SURFACE MOUNT

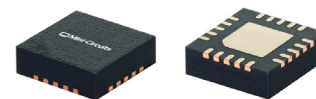
Wideband Amplifier

AVA-2183+

50Ω 2 to 20 GHz Excellent Gain Flatness

THE BIG DEAL

- Wideband 2 to 20 GHz
- Flat Gain, Typ. 16 ±1 dB
- P1dB, Typ. +19 dBm
- OIP3, Typ. +25 dBm
- 4x4mm 20 Lead QFN-Style Package

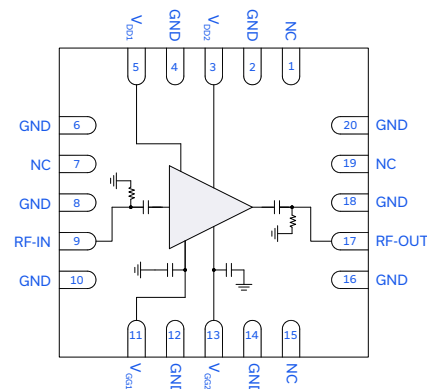


Generic photo used for illustration purposes only

APPLICATIONS

- 5G MIMO and Back Haul Radio Systems
- Satellite Communications
- Test and Measurement Equipment
- Radar, EW, and ECM Defense Systems

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

The AVA-2183+ is a GaAs pHEMT MMIC Amplifier that operates from 2 to 20 GHz. At 10 GHz the amplifier provides typical performance of 16.4 dB Gain, 5.2 dB Noise Figure, +19.3 dBm P1dB, and +24.7 dBm OIP3 from a +4V supply drawing 210 mA. The AVA-2183+ MMIC amplifier is housed in an industry standard 4x4mm 20-lead QFN-style package. With the RF ports internally matched to 50Ω this amplifier enables easy integration into microwave systems.

KEY FEATURES

Features	Advantages
Wideband: 2 to 20 GHz • Gain, Typ. 16 dB	Suitable for a variety of applications from wideband test and measurement equipment, and defense systems as well as narrowband telecommunications and satellite communications.
Good P1dB & OIP3 • P1dB, Typ. +19 dBm • OIP3, Typ. +25 dBm	Suitable as a linear gain block or as a LO driver for mixers in transmitter or receiver lineups.
Good Input and Output Return Loss	Internally matched to 50Ω, this eliminates the need for external matching components making the device easy to integrate.
4x4mm 20-Lead QFN-style package	Small footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.





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Mini-Circuits

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ELECTRICAL SPECIFICATIONS¹ AT 25°C, Z₀ = 50Ω, V_{DD} = +4V, I_{DD} = 210mA, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		2		20	GHz
Gain	2	12.9	15.0		dB
	5	14.2	15.6		
	10	15.7	16.4		
	15	15.1	16.2		
	20	13.7	15.9		
Input Return Loss	2		11.4		dB
	5		15.6		
	10		14.8		
	15		14.6		
	20		16.4		
Output Return Loss	2		18.9		dB
	5		20		
	10		20		
	15		19.8		
	20		16.3		
Isolation	2-20		60.8		dB
Output Power at 1 dB Compression (P1dB)	2		+18.4		dBm
	5		+18.9		
	10		+19.3		
	15		+18.4		
	20		+16.9		
Output Third-Order Intercept Point (P _{OUT} = 0dBm/Tone)	2		+27.9		dBm
	5		+26.3		
	10		+24.7		
	15		+22.9		
	20		+20.0		
Noise Figure	2		6.7		dB
	5		6.3		
	10		5.2		
	15		4.5		
	20		5.1		
Device Operating Voltage (V _{DD})		+3.75	+4	+4.25	V
Device Operating Current (I _{DD}) ²			210		mA
Gate Voltage (V _{GG}) ³			-0.52		V
Gate Current (I _{GG})			-0.2		μA
Device Current Variation Vs. Temperature ⁴			0.48		μA/°C
Device Current Variation Vs. Voltage ⁵			0.005		mA/mV

1. Tested in Mini-Circuits Characterization Test/Evaluation Board TB-AVA-2183C+. See Figure 2. De-embedded to the device reference plane.

2. Current at P_{1N} = -25 dBm. Increases to 230 mA at P1dB.3. Typical Gate Voltage for when I_{DD} = 210 mA. V_{GG} must be adjusted so that I_{DD} = 210 mA.4. ((Current at T_{max}°C - Current at T_{min}°C)/(T_{max}°C - T_{min}°C)

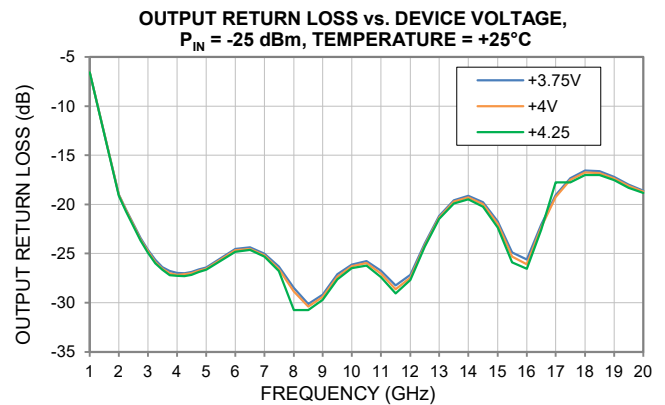
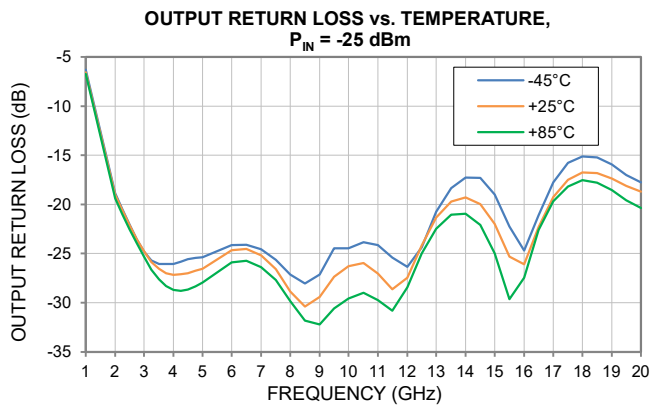
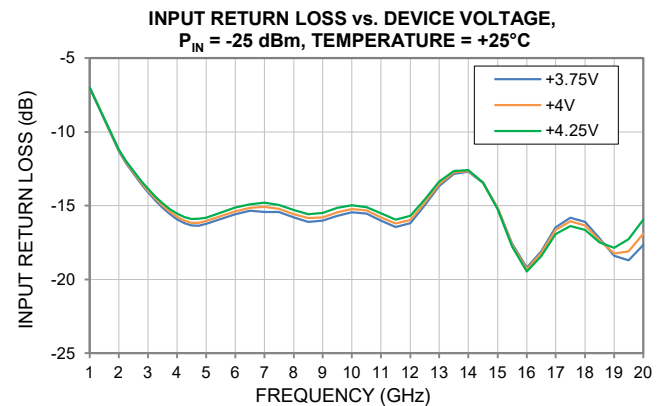
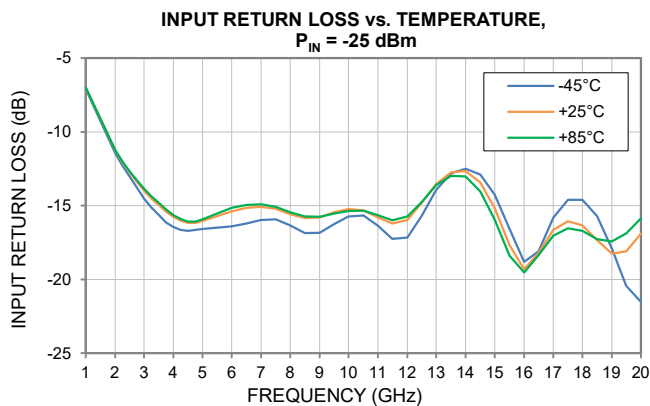
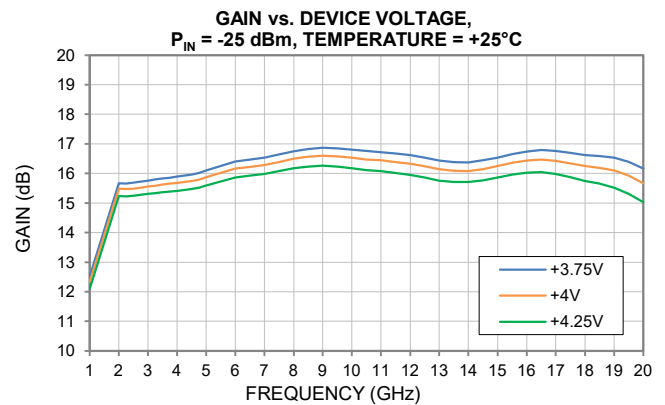
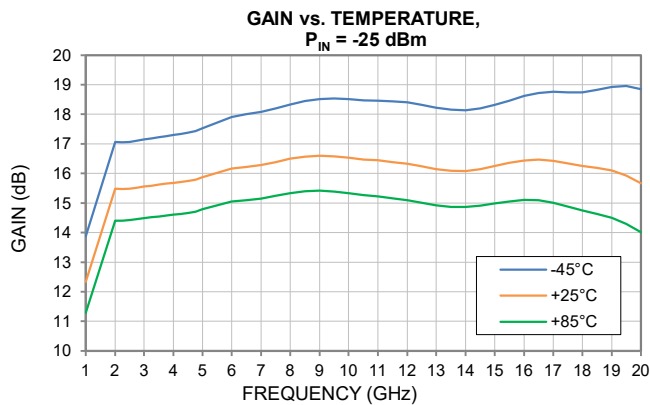
5. (Current at Nominal V + ΔV in mA) - (Current at Nominal V - ΔV mA)/(2ΔV mV)





TYPICAL PERFORMANCE GRAPHS

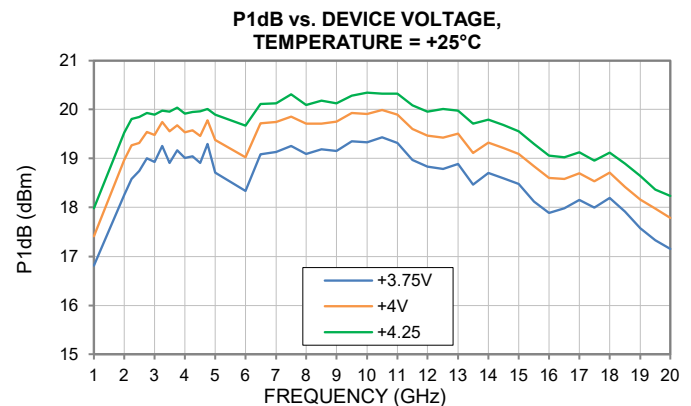
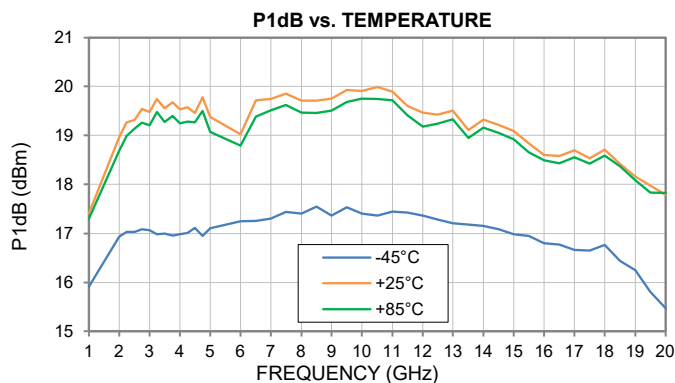
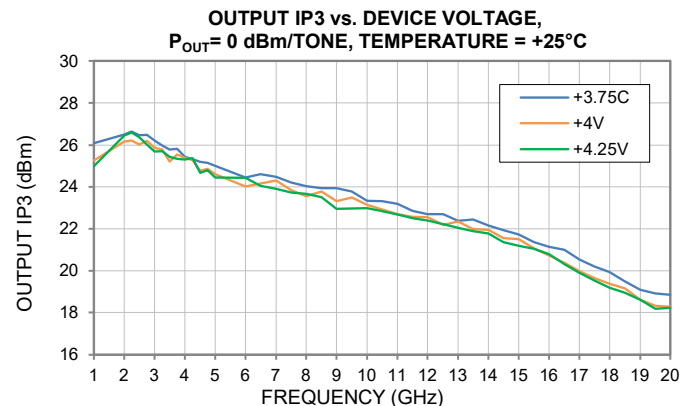
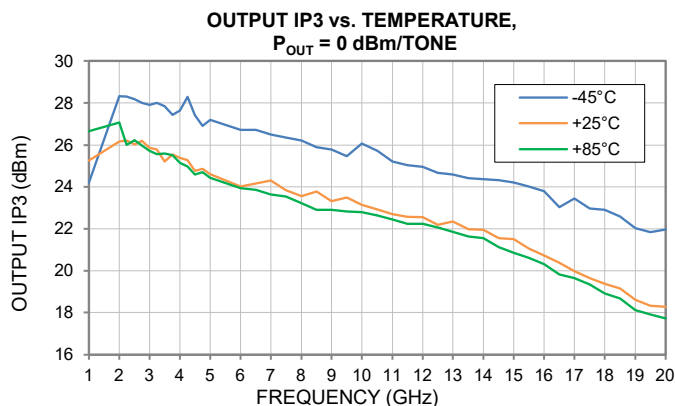
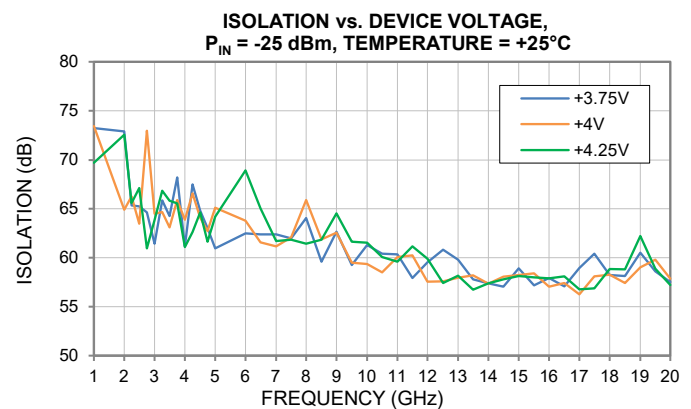
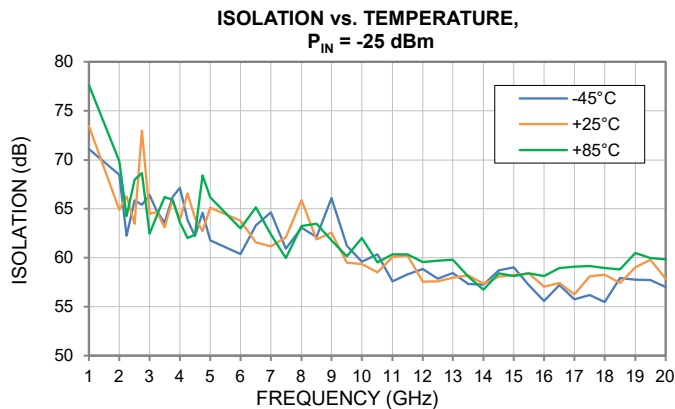
All data taken was at nominal conditions $V_{DD} = +4V$ and $I_{DD} = 210$ mA unless noted otherwise. For over temperature data, V_{GG} is adjusted to achieve $I_{DD} = 210$ mA at each temperature specified. For over voltage data, V_{GG} is adjusted to achieve $I_{DD} = 210$ mA at each voltage specified.





TYPICAL PERFORMANCE GRAPHS

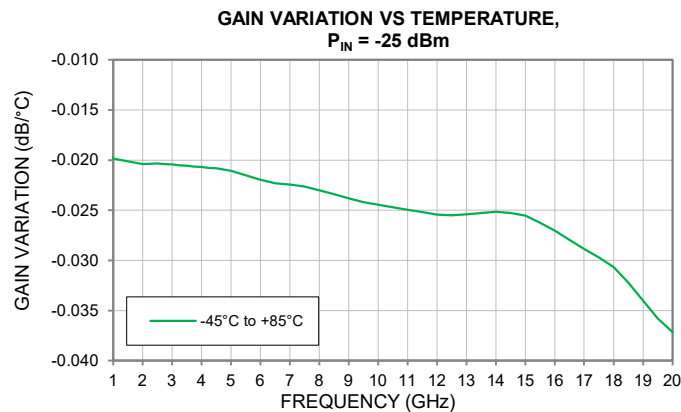
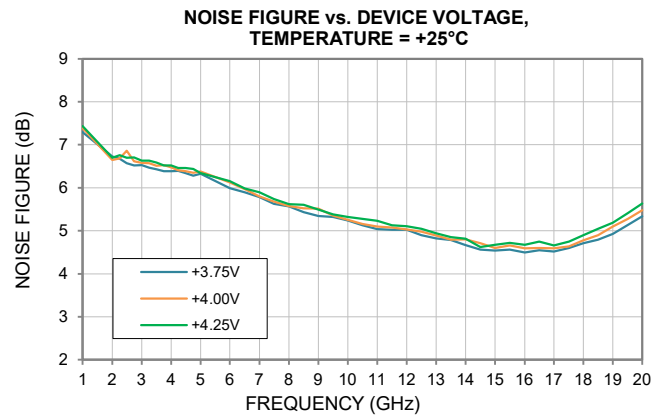
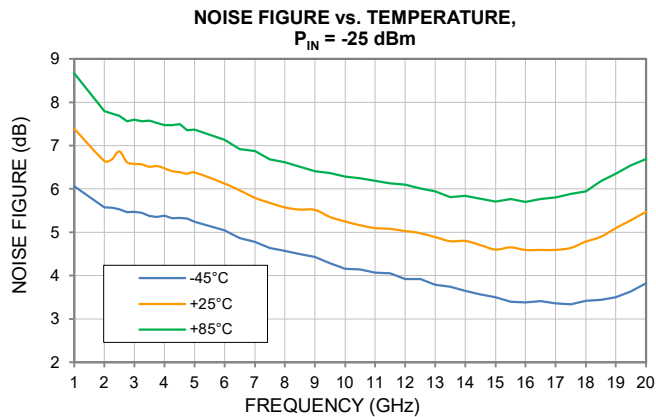
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TYPICAL PERFORMANCE GRAPHS

All data taken was at nominal conditions $V_{DD} = +4V$ and $I_{DD} = 210$ mA unless noted otherwise. For over temperature data, V_{GG} is adjusted to achieve $I_{DD} = 210$ mA at each temperature specified. For over voltage data, V_{GG} is adjusted to achieve $I_{DD} = 210$ mA at each voltage specified.





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ABSOLUTE MAXIMUM RATINGS⁶

Parameter	Ratings
Operating Temperature	-45°C to +85°C
Storage Temperature	-65°C to +150°C
Total Power Dissipation	1.7 W
Junction Temperature ⁷	+175°C
RF Input Power (CW)	+23 dBm (5 minute max) +14 dBm (continuous)
DC Voltage on RF-OUT	+7V
Current I_{GG}	-5mA to 0mA
Current I_{DD}	320mA
DC Voltage on V_{DD} (V_{DD1} & V_{DD2})	+7V
DC Voltage on V_{GG} (V_{GG1} & V_{GG2})	-1.5 V to -0.2 V

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

7. Peak temperature on top of the die.

THERMAL RESISTANCE

Parameter	Ratings
Thermal Resistance (Θ_{jc}) ⁸	38.8 °C/W

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

ESD RATING

	Class	Voltage Range	Reference Standard
Human Body Model (HBM)	1B	500 to <1000V	ANSI/ESDA/JEDEC JS-001-2017
Charged Device Model (CDM)	C3	1000V	JESD22-C101F



ESD HANDLING PRECAUTION: This device is designed to be Class 1B 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: MSL3 in accordance with IPC/JEDEC J-STD-020E/JEDEC J-STD-033C





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FUNCTIONAL DIAGRAM

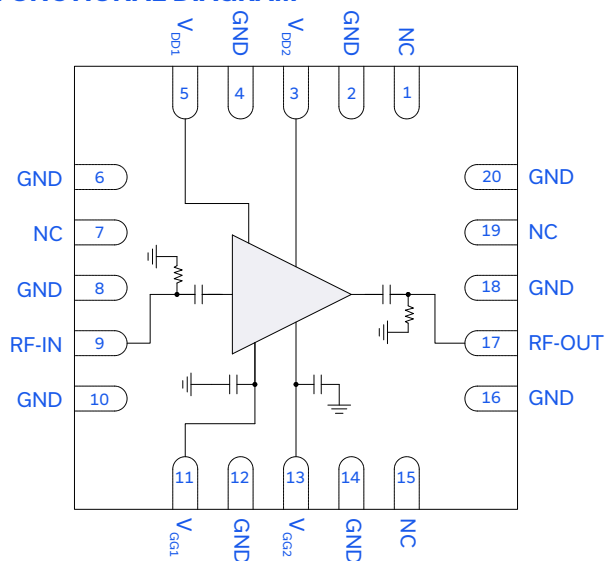


Figure 1. AVA-2183+ Functional Diagram

PAD DESCRIPTION

Function	Pad Number	Description (Refer to Figure 2)
RF-IN	9	RF-IN Pad connects to RF-Input port. DUT includes an integrated shunt resistor for ESD protection and a DC blocking capacitor.
RF-OUT	17	RF-OUT Pad connects to RF-Output port. DUT includes an integrated shunt resistor for ESD protection and a DC blocking capacitor.
V _{DD1}	5	DC Input Pad connects to voltage input port V _{DD1} .
V _{DD2}	3	DC Input Pad connects to voltage input port V _{DD2} .
V _{GG1}	11	DC Input Pad connects to voltage input port V _{GG1} . DUT includes an integrated shunt capacitor.
V _{GG2}	13	DC Input Pad connects to voltage input port V _{GG2} . DUT includes an integrated shunt capacitor.
GND	2,4,6,8,10, 12,14,16,18, 20, & Paddle	Connects to ground.
NC	1,7,15, &19	Not used internally. Connected to ground on test board.

CHARACTERIZATION TEST BOARD

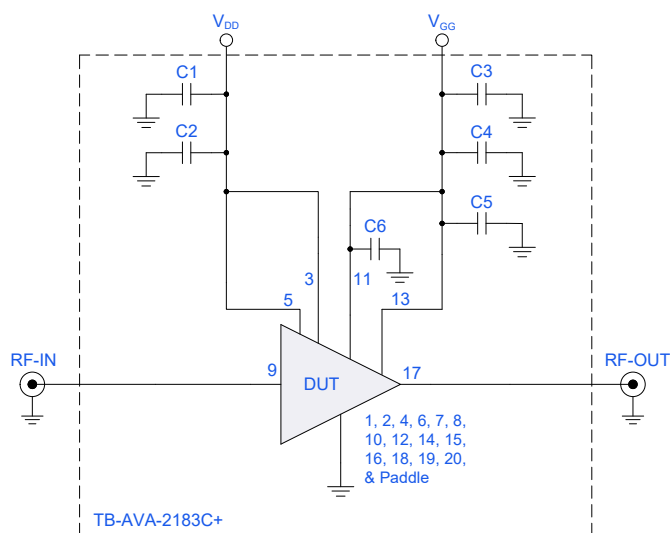


Figure 2. DUT soldered on Mini-Circuits Characterization Test Board: TB-AVA-2183C+

Gain, Return Loss, Output Power at 1dB Compression (P1dB), Output IP3 (OIP3) and Noise Figure measured using PNA-X N5247B 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} = +4V, I_{DD} = 210 mA

Caution: Permanent damage to the device will occur if the Power ON and Power OFF Sequences are not followed.

Power ON Sequence:

- 1) Set V_{GG} = -1.3V. Apply V_{GG}.
- 2) Set V_{DD} = +4V. Apply V_{DD}.
- 3) Increase V_{GG} to obtain desired I_{DD} as shown in specification table.
- 4) Apply RF Signal.

Power OFF Sequence:

- 1) Turn off RF Signal.
- 2) Adjust V_{GG} down to -1.3V.
- 3) Turn off V_{DD}.
- 4) Turn off V_{GG}.

Component	Vendor	Vendor P/N	Value	Size
C1, C3	Samsung	CL31B106KBHNNNE	10μF	1206
C2, C4	AVX	06035C104KAT2A	0.1μF	0603
C5, C6	Murata	GRM1885C1H101GA01D	100pF	0603

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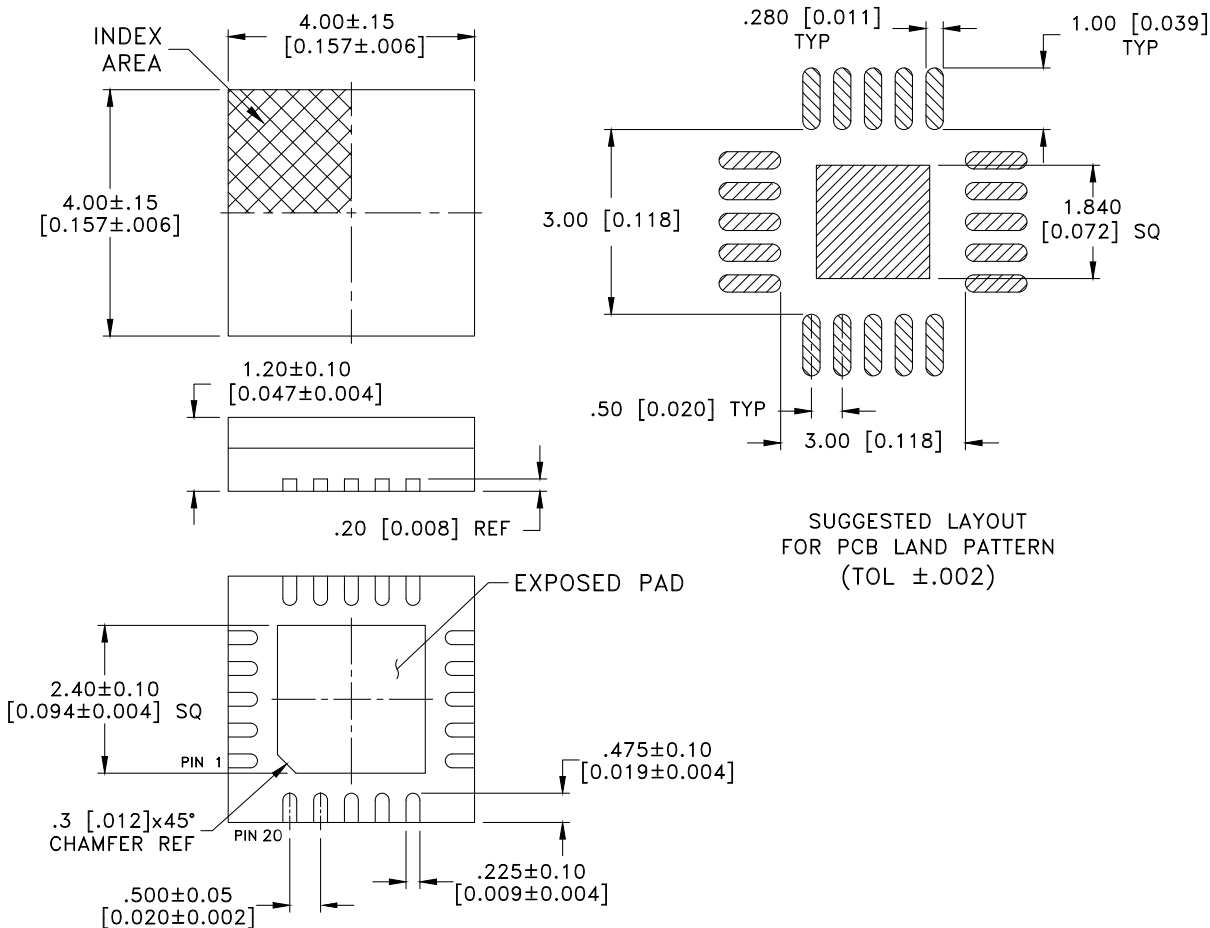
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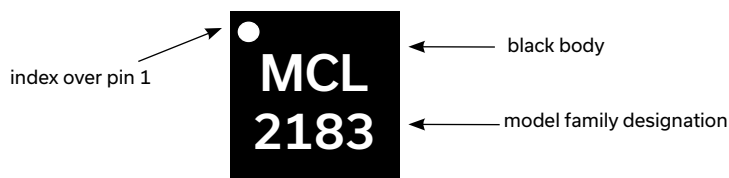
CASE STYLE DRAWING



Weight: 0.1 grams
Dimensions are in inches [mm].

Figure 3. DG1847-1 Case Style Drawing

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

Figure 4. AVA-2183+ Product Marking





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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD

[CLICK HERE](#)

Performance Data	Data
	Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DG1847-1. QFN-style package, exposed paddle, Lead Finish: PPF
RoHs Status	Compliant
Tape & Reel Standard quantities available on reel	F66 7" reels with 20, 50, 100, 200, 500, or 1000 devices
Suggested Layout for PCB Design	PL-742
Evaluation Board	TB-AVA-2183C+
	Gerber File
Environmental Ratings	ENV08T10
Product Handling	The use of no-clean solder is recommended. This package cannot be subjected to aqueous wash.

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: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +3.75V, IDD = 210mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	12.5	73.2	-7.0	-6.5	346.9	0.9	26.1	16.8	7.3
2.00	15.7	72.9	-11.3	-19.0	344.8	1.1	26.5	18.3	6.7
2.25	15.7	65.4	-12.1	-20.5	148.0	1.1	26.6	18.6	6.7
2.50	15.7	65.2	-12.8	-22.0	147.6	1.0	26.5	18.8	6.6
2.75	15.7	64.6	-13.5	-23.4	138.6	1.0	26.5	19.0	6.5
3.00	15.8	61.4	-14.1	-24.7	96.2	1.0	26.2	18.9	6.5
3.25	15.8	65.8	-14.6	-25.6	160.9	1.0	26.0	19.3	6.5
3.50	15.8	64.3	-15.1	-26.4	134.5	1.0	25.8	18.9	6.4
3.75	15.9	68.2	-15.6	-26.8	211.7	1.0	25.8	19.2	6.4
4.00	15.9	61.1	-15.9	-26.9	94.1	1.0	25.4	19.0	6.4
4.25	15.9	67.5	-16.2	-27.0	195.8	1.0	25.3	19.0	6.4
4.50	16.0	64.8	-16.3	-26.9	143.6	1.0	25.2	18.9	6.3
4.75	16.0	63.0	-16.4	-26.6	116.7	1.0	25.1	19.3	6.3
5.00	16.1	61.0	-16.2	-26.4	91.2	1.0	25.0	18.7	6.3
6.00	16.4	62.5	-15.6	-24.5	105.4	1.0	24.4	18.3	6.0
6.50	16.5	62.4	-15.4	-24.4	103.6	1.0	24.6	19.1	5.9
7.00	16.5	62.4	-15.4	-25.0	103.4	1.0	24.5	19.1	5.8
7.50	16.6	62.0	-15.4	-26.3	98.0	1.0	24.2	19.3	5.6
8.00	16.8	64.1	-15.8	-28.5	123.8	1.0	24.0	19.1	5.6
8.50	16.8	59.6	-16.1	-30.1	74.0	1.0	23.9	19.2	5.4
9.00	16.9	62.7	-16.0	-29.2	105.1	1.0	23.9	19.2	5.3
9.50	16.9	59.3	-15.7	-27.1	71.2	1.0	23.8	19.4	5.3
10.00	16.8	61.3	-15.5	-26.1	90.7	1.0	23.3	19.3	5.2
10.50	16.8	60.4	-15.5	-25.8	82.8	1.0	23.3	19.4	5.1
11.00	16.7	60.3	-16.0	-26.7	82.9	1.0	23.2	19.3	5.0
11.50	16.7	57.9	-16.5	-28.2	63.6	1.0	22.9	19.0	5.0
12.00	16.6	59.5	-16.2	-27.1	77.0	1.0	22.7	18.8	5.0
12.50	16.5	60.8	-15.0	-24.0	89.6	1.0	22.7	18.8	4.9
13.00	16.4	59.8	-13.7	-21.2	79.9	1.0	22.4	18.9	4.8
13.50	16.4	57.8	-12.9	-19.6	63.0	1.0	22.4	18.5	4.8
14.00	16.4	57.4	-12.7	-19.1	60.5	1.0	22.2	18.7	4.7
14.50	16.4	57.0	-13.5	-19.8	58.5	1.0	21.9	18.6	4.6
15.00	16.5	58.9	-15.2	-21.7	73.0	1.0	21.7	18.5	4.5
15.50	16.7	57.2	-17.6	-24.9	60.2	1.0	21.4	18.1	4.6
16.00	16.7	57.9	-19.2	-25.6	65.8	1.0	21.1	17.9	4.5
16.50	16.8	57.1	-18.1	-22.1	59.3	1.0	21.0	18.0	4.5
17.00	16.8	59.0	-16.5	-19.0	73.3	1.0	20.5	18.2	4.5
17.50	16.7	60.4	-15.8	-17.3	86.5	1.0	20.2	18.0	4.6
18.00	16.6	58.3	-16.1	-16.6	67.9	1.0	19.9	18.2	4.7
18.50	16.6	58.1	-17.2	-16.6	67.8	1.0	19.5	17.9	4.8
19.00	16.5	60.5	-18.4	-17.2	90.7	1.0	19.1	17.6	4.9
19.50	16.4	58.6	-18.7	-18.0	74.7	1.0	18.9	17.3	5.1
20.00	16.2	57.5	-17.7	-18.6	67.8	1.0	18.8	17.2	5.3

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +4.00V, IDD = 210mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	12.3	73.4	-7.0	-6.5	363.2	0.9	25.3	17.4	7.4
2.00	15.5	64.9	-11.2	-19.0	140.4	1.1	26.2	19.0	6.6
2.25	15.5	66.3	-12.0	-20.6	167.8	1.1	26.2	19.3	6.7
2.50	15.5	63.5	-12.7	-22.1	123.0	1.0	26.0	19.3	6.9
2.75	15.5	73.0	-13.4	-23.6	369.9	1.0	26.2	19.5	6.6
3.00	15.6	64.5	-14.0	-24.8	140.4	1.0	25.9	19.5	6.6
3.25	15.6	64.6	-14.5	-25.8	143.5	1.0	25.8	19.7	6.6
3.50	15.6	63.1	-15.0	-26.6	120.7	1.0	25.2	19.6	6.5
3.75	15.6	65.9	-15.4	-27.0	166.6	1.0	25.5	19.7	6.5
4.00	15.7	63.9	-15.8	-27.2	132.2	1.0	25.4	19.5	6.5
4.25	15.7	66.6	-16.0	-27.1	180.1	1.0	25.3	19.6	6.4
4.50	15.7	64.1	-16.2	-27.0	135.7	1.0	24.8	19.5	6.4
4.75	15.8	62.7	-16.2	-26.7	115.5	1.0	24.9	19.8	6.4
5.00	15.9	65.1	-16.0	-26.5	151.0	1.0	24.6	19.4	6.4
6.00	16.2	63.8	-15.4	-24.7	125.5	1.0	24.0	19.0	6.1
6.50	16.2	61.6	-15.2	-24.5	96.8	1.0	24.2	19.7	6.0
7.00	16.3	61.2	-15.1	-25.2	92.1	1.0	24.3	19.7	5.8
7.50	16.4	62.1	-15.2	-26.6	101.8	1.0	23.8	19.9	5.7
8.00	16.5	65.9	-15.6	-28.8	157.1	1.0	23.6	19.7	5.6
8.50	16.6	61.9	-15.9	-30.4	98.8	1.0	23.8	19.7	5.5
9.00	16.6	62.6	-15.8	-29.4	107.0	1.0	23.3	19.8	5.5
9.50	16.6	59.5	-15.4	-27.4	75.1	1.0	23.5	19.9	5.4
10.00	16.5	59.3	-15.2	-26.3	74.6	1.0	23.1	19.9	5.3
10.50	16.5	58.5	-15.3	-26.0	68.6	1.0	22.9	20.0	5.2
11.00	16.4	60.1	-15.8	-27.0	82.8	1.0	22.7	19.9	5.1
11.50	16.4	60.2	-16.2	-28.6	85.6	1.0	22.6	19.6	5.1
12.00	16.3	57.5	-16.0	-27.4	63.3	1.0	22.6	19.5	5.0
12.50	16.2	57.6	-14.8	-24.2	63.9	1.0	22.2	19.4	5.0
13.00	16.1	58.0	-13.5	-21.4	66.7	1.0	22.3	19.5	4.9
13.50	16.1	58.2	-12.8	-19.7	68.4	1.0	22.0	19.1	4.8
14.00	16.1	57.4	-12.6	-19.3	62.4	1.0	21.9	19.3	4.8
14.50	16.1	58.1	-13.4	-20.0	68.0	1.0	21.6	19.2	4.7
15.00	16.2	58.2	-15.2	-22.0	70.0	1.0	21.5	19.1	4.6
15.50	16.4	58.4	-17.7	-25.3	71.9	1.0	21.1	18.8	4.7
16.00	16.4	57.0	-19.3	-26.1	61.4	1.0	20.7	18.6	4.6
16.50	16.5	57.4	-18.2	-22.3	64.0	1.0	20.4	18.6	4.6
17.00	16.4	56.3	-16.6	-19.3	55.9	1.0	20.0	18.7	4.6
17.50	16.3	58.1	-16.1	-17.5	69.0	1.0	19.6	18.5	4.6
18.00	16.2	58.3	-16.3	-16.7	71.2	1.0	19.4	18.7	4.8
18.50	16.2	57.4	-17.3	-16.8	65.5	1.0	19.1	18.4	4.9
19.00	16.1	59.0	-18.2	-17.4	80.6	1.0	18.6	18.2	5.1
19.50	15.9	59.8	-18.1	-18.1	90.0	1.0	18.3	18.0	5.3
20.00	15.7	57.9	-16.9	-18.7	74.4	1.0	18.3	17.8	5.5

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +4.25V, IDD = 210mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	12.1	69.7	-7.0	-6.5	242.5	0.9	25.0	18.0	7.4
2.00	15.2	72.6	-11.2	-19.1	348.4	1.1	26.4	19.5	6.7
2.25	15.2	65.6	-12.0	-20.7	159.7	1.1	26.6	19.8	6.8
2.50	15.2	67.1	-12.6	-22.2	192.1	1.0	26.4	19.8	6.7
2.75	15.3	61.0	-13.3	-23.7	95.5	1.0	26.0	19.9	6.7
3.00	15.3	63.8	-13.9	-24.9	134.0	1.0	25.7	19.9	6.6
3.25	15.3	66.8	-14.4	-26.0	189.9	1.0	25.7	20.0	6.6
3.50	15.4	65.8	-14.8	-26.6	169.2	1.0	25.4	20.0	6.6
3.75	15.4	65.6	-15.2	-27.2	164.9	1.0	25.3	20.0	6.5
4.00	15.4	61.1	-15.6	-27.3	98.8	1.0	25.3	19.9	6.5
4.25	15.4	62.6	-15.8	-27.3	118.1	1.0	25.4	19.9	6.5
4.50	15.5	64.6	-15.9	-27.2	148.9	1.0	24.7	20.0	6.5
4.75	15.5	61.6	-15.9	-26.9	104.9	1.0	24.8	20.0	6.4
5.00	15.6	64.2	-15.8	-26.6	139.7	1.0	24.4	19.9	6.3
6.00	15.9	68.9	-15.1	-24.8	234.5	1.0	24.4	19.7	6.2
6.50	15.9	65.0	-14.9	-24.6	149.4	1.0	24.0	20.1	6.0
7.00	16.0	61.7	-14.8	-25.3	101.6	1.0	23.9	20.1	5.9
7.50	16.1	61.8	-14.9	-26.8	102.7	1.0	23.7	20.3	5.7
8.00	16.2	61.5	-15.3	-30.7	97.8	1.0	23.7	20.1	5.6
8.50	16.2	61.8	-15.6	-30.7	102.1	1.0	23.5	20.2	5.6
9.00	16.3	64.5	-15.5	-29.7	139.4	1.0	23.0	20.1	5.5
9.50	16.2	61.6	-15.2	-27.6	100.0	1.0	23.0	20.3	5.4
10.00	16.2	61.5	-15.0	-26.5	100.0	1.0	23.0	20.3	5.3
10.50	16.1	60.0	-15.1	-26.2	85.1	1.0	22.8	20.3	5.3
11.00	16.1	59.6	-15.5	-27.4	81.8	1.0	22.7	20.3	5.2
11.50	16.0	61.2	-16.0	-29.0	99.2	1.0	22.5	20.1	5.1
12.00	16.0	59.9	-15.7	-27.7	86.7	1.0	22.4	20.0	5.1
12.50	15.9	57.4	-14.6	-24.3	65.3	1.0	22.2	20.0	5.0
13.00	15.8	58.2	-13.4	-21.5	71.4	1.0	22.1	20.0	4.9
13.50	15.7	56.7	-12.6	-19.9	60.4	1.0	21.9	19.7	4.9
14.00	15.7	57.4	-12.6	-19.5	65.4	1.0	21.8	19.8	4.8
14.50	15.8	57.8	-13.4	-20.2	68.8	1.0	21.4	19.7	4.6
15.00	15.9	58.1	-15.2	-22.4	72.5	1.0	21.2	19.6	4.7
15.50	16.0	58.0	-17.8	-25.9	72.0	1.0	21.0	19.3	4.7
16.00	16.0	57.9	-19.5	-26.5	71.3	1.0	20.8	19.1	4.7
16.50	16.0	58.1	-18.4	-22.6	72.8	1.0	20.3	19.0	4.7
17.00	16.0	56.8	-16.9	-17.7	62.4	1.0	19.9	19.1	4.7
17.50	15.9	56.9	-16.4	-17.7	63.5	1.0	19.5	19.0	4.7
18.00	15.8	58.8	-16.7	-17.0	80.7	1.0	19.2	19.1	4.9
18.50	15.7	58.8	-17.5	-17.0	82.1	1.0	19.0	18.9	5.0
19.00	15.5	62.2	-17.9	-17.5	123.9	1.0	18.6	18.6	5.2
19.50	15.3	58.9	-17.3	-18.3	86.9	1.0	18.2	18.4	5.4
20.00	15.0	57.2	-16.0	-18.8	74.1	1.0	18.2	18.2	5.6

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = + 3.75V, IDD = 210mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	14.2	69.3	-11.5	-6.3	179.7	0.9	21.2	15.0	6.0
2.00	17.4	72.5	-11.5	-18.9	267.6	1.1	26.1	16.1	5.5
2.25	17.4	62.4	-12.4	-20.5	85.7	1.0	26.5	16.2	5.6
2.50	17.4	64.6	-13.2	-22.1	111.3	1.0	25.9	16.2	4.9
2.75	17.5	70.0	-14.0	-23.6	210.4	1.0	25.8	16.1	5.4
3.00	17.5	66.7	-14.8	-24.9	143.7	1.0	26.0	16.1	5.4
3.25	17.6	64.1	-15.4	-25.9	107.0	1.0	26.2	16.1	5.4
3.50	17.6	64.1	-16.0	-26.2	107.7	1.0	25.6	16.1	5.4
3.75	17.7	65.7	-16.5	-26.3	128.6	1.0	25.8	16.1	5.4
4.00	17.7	63.8	-16.9	-26.1	103.9	1.0	25.4	16.0	5.4
4.25	17.8	63.3	-17.1	-26.0	97.3	1.0	25.8	16.0	5.3
4.50	17.8	78.3	-17.1	-25.5	547.4	1.0	25.8	16.1	5.3
4.75	17.9	63.4	-17.1	-25.5	98.0	1.0	25.7	16.1	5.3
5.00	18.0	62.1	-17.1	-25.5	84.0	1.0	25.7	16.1	5.2
6.00	18.4	60.7	-16.9	-24.2	68.2	1.0	25.7	16.3	5.0
6.50	18.5	62.4	-16.7	-24.2	82.2	1.0	25.1	16.3	4.9
7.00	18.6	64.8	-16.5	-24.6	108.1	1.0	25.2	16.3	4.8
7.50	18.7	61.8	-16.4	-25.6	75.7	1.0	24.8	16.5	4.7
8.00	18.8	61.8	-16.9	-27.1	74.7	1.0	24.9	16.4	4.6
8.50	18.9	62.9	-17.5	-28.0	84.1	1.0	24.5	16.4	4.5
9.00	19.0	62.4	-17.5	-27.2	78.9	1.0	24.7	16.4	4.4
9.50	19.1	62.1	-16.9	-25.7	75.8	1.0	24.3	16.4	4.3
10.00	19.1	61.9	-16.3	-24.5	74.0	1.0	24.1	16.3	4.2
10.50	19.0	63.1	-16.2	-23.7	85.4	1.0	24.2	16.3	4.2
11.00	19.0	59.0	-16.9	-24.0	53.7	1.0	23.9	16.4	4.1
11.50	19.0	60.2	-17.9	-25.3	62.3	1.0	23.5	16.3	4.0
12.00	19.0	57.2	-17.9	-26.2	44.4	1.0	23.5	16.3	4.0
12.50	18.9	57.5	-16.3	-24.4	46.1	1.0	24.7	16.2	3.9
13.00	18.8	56.5	-14.4	-20.8	40.9	1.0	24.5	16.1	3.8
13.50	18.7	58.1	-13.1	-18.3	49.2	1.0	24.5	16.1	3.8
14.00	18.7	56.8	-12.7	-17.2	42.3	1.0	24.6	16.1	3.7
14.50	18.8	59.7	-13.0	-17.1	59.3	1.0	23.2	15.8	3.6
15.00	18.9	56.7	-14.3	-18.7	42.0	1.0	23.3	16.0	3.5
15.50	19.0	57.6	-16.6	-21.8	47.1	1.0	23.4	16.0	3.5
16.00	19.2	56.2	-18.8	-24.3	40.0	1.0	23.4	15.9	3.4
16.50	19.3	58.0	-18.1	-21.0	48.5	1.0	23.3	15.8	3.4
17.00	19.3	57.9	-15.7	-17.6	47.0	1.0	23.1	15.7	3.4
17.50	19.3	56.4	-14.3	-15.6	38.6	1.0	22.7	15.7	3.3
18.00	19.4	57.1	-14.2	-14.9	41.5	1.0	23.6	15.7	3.4
18.50	19.5	57.1	-15.1	-14.9	41.0	1.0	23.3	15.4	3.4
19.00	19.6	57.7	-17.1	-15.6	44.1	1.0	23.1	15.2	3.4
19.50	19.8	59.4	-20.0	-16.6	54.0	1.0	22.6	14.7	3.5
20.00	19.7	55.7	-22.3	-17.4	36.1	1.0	22.6	14.2	3.7

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +4.00V, IDD = 210mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	13.9	71.1	-7.1	-6.3	229.3	0.9	24.2	15.9	6.1
2.00	17.1	68.5	-11.4	-18.9	175.9	1.1	28.3	16.9	5.6
2.25	17.0	62.2	-12.3	-20.5	87.9	1.1	28.3	17.0	5.6
2.50	17.1	65.8	-13.0	-22.1	134.3	1.0	28.2	17.0	5.5
2.75	17.1	65.4	-13.8	-23.6	129.1	1.0	28.0	17.1	5.5
3.00	17.1	66.4	-14.5	-24.8	145.6	1.0	27.9	17.1	5.5
3.25	17.2	64.7	-15.1	-25.7	120.4	1.0	28.0	17.0	5.4
3.50	17.2	63.6	-15.7	-26.1	105.6	1.0	27.8	17.0	5.4
3.75	17.3	66.2	-16.1	-26.1	143.0	1.0	27.4	17.0	5.4
4.00	17.3	67.1	-16.4	-26.1	159.4	1.0	27.6	17.0	5.4
4.25	17.3	63.8	-16.7	-25.8	108.9	1.0	28.3	17.0	5.3
4.50	17.4	62.2	-16.7	-25.6	89.9	1.0	27.4	17.1	5.3
4.75	17.4	64.6	-16.7	-25.4	118.1	1.0	26.9	16.9	5.3
5.00	17.5	61.8	-16.6	-25.4	84.5	1.0	27.2	17.1	5.2
6.00	17.9	60.4	-16.4	-24.1	69.1	1.0	26.7	17.2	5.0
6.50	18.0	63.3	-16.2	-24.1	96.0	1.0	26.7	17.3	4.9
7.00	18.1	64.6	-16.0	-24.6	110.9	1.0	26.5	17.3	4.8
7.50	18.2	60.9	-15.9	-25.6	72.1	1.0	26.3	17.4	4.6
8.00	18.3	63.0	-16.3	-27.1	90.9	1.0	26.2	17.4	4.6
8.50	18.4	62.1	-16.8	-28.0	81.2	1.0	25.9	17.6	4.5
9.00	18.5	66.1	-16.8	-27.1	127.5	1.0	25.8	17.4	4.4
9.50	18.5	61.2	-16.3	-24.5	72.9	1.0	25.5	17.5	4.3
10.00	18.5	59.6	-15.7	-24.5	60.5	1.0	26.1	17.4	4.2
10.50	18.5	60.3	-15.7	-23.8	66.1	1.0	25.7	17.4	4.1
11.00	18.5	57.6	-16.3	-24.1	48.6	1.0	25.2	17.4	4.1
11.50	18.4	58.3	-17.3	-25.4	53.6	1.0	25.0	17.4	4.1
12.00	18.4	58.9	-17.2	-26.4	57.5	1.0	24.9	17.4	3.9
12.50	18.3	57.8	-15.7	-24.3	51.3	1.0	24.7	17.3	3.9
13.00	18.2	58.5	-13.9	-20.8	54.8	1.0	24.6	17.2	3.8
13.50	18.2	57.3	-12.8	-18.3	47.6	1.0	24.4	17.2	3.7
14.00	18.1	57.2	-12.5	-17.3	47.3	1.0	24.4	17.2	3.6
14.50	18.2	58.7	-12.9	-17.3	56.1	1.0	24.3	17.1	3.6
15.00	18.3	59.0	-14.3	-19.0	58.7	1.0	24.2	17.0	3.5
15.50	18.5	57.2	-16.6	-22.2	47.8	1.0	24.0	16.9	3.4
16.00	18.6	55.6	-18.8	-24.7	39.6	1.0	23.8	16.8	3.4
16.50	18.7	57.2	-18.1	-21.1	47.1	1.0	23.0	16.8	3.4
17.00	18.8	55.8	-15.8	-17.8	39.1	1.0	23.4	16.7	3.4
17.50	18.7	56.2	-14.6	-15.8	40.5	1.0	23.0	16.6	3.3
18.00	18.7	55.5	-14.6	-15.1	37.1	1.0	22.9	16.8	3.4
18.50	18.8	57.9	-15.7	-15.2	49.2	1.0	22.6	16.4	3.4
19.00	18.9	57.7	-17.9	-15.9	48.6	1.0	22.0	16.2	3.5
19.50	19.0	57.7	-20.5	-17.0	49.2	1.0	21.8	15.8	3.6
20.00	18.8	57.0	-21.5	-17.7	46.3	1.0	22.0	15.5	3.8

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +4.25V, IDD = 210mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	13.5	75.7	-7.1	-6.3	405.4	0.9	24.3	16.7	6.1
2.00	16.7	70.0	-11.3	-18.9	220.6	1.1	28.3	17.9	5.6
2.25	16.6	67.0	-12.1	-20.5	158.1	1.1	27.6	17.9	5.6
2.50	16.7	62.8	-12.8	-22.1	99.4	1.0	27.9	18.0	5.8
2.75	16.7	68.9	-13.6	-23.6	201.1	1.0	27.7	17.9	5.5
3.00	16.7	62.8	-14.3	-24.9	100.7	1.0	27.3	18.0	5.5
3.25	16.8	67.5	-14.9	-25.8	174.3	1.0	27.8	18.0	5.5
3.50	16.8	68.7	-15.3	-26.1	200.0	1.0	27.0	18.0	5.5
3.75	16.8	64.4	-15.8	-26.2	121.6	1.0	26.9	17.9	5.4
4.00	16.9	62.2	-16.1	-26.0	94.4	1.0	27.1	18.0	5.4
4.25	16.9	62.0	-16.2	-25.8	92.2	1.0	26.6	18.0	5.4
4.50	16.9	61.7	-16.3	-25.6	89.1	1.0	26.9	18.1	5.4
4.75	17.0	64.2	-16.2	-25.4	118.2	1.0	27.2	18.1	5.3
5.00	17.1	63.5	-16.1	-25.3	108.8	1.0	27.0	18.1	5.3
6.00	17.4	61.8	-15.9	-24.2	85.3	1.0	26.0	18.2	5.1
6.50	17.5	62.4	-15.7	-24.1	91.3	1.0	26.3	18.4	4.9
7.00	17.6	62.6	-15.5	-24.7	93.0	1.0	25.8	18.4	4.8
7.50	17.7	63.6	-15.4	-25.8	103.7	1.0	25.8	18.5	4.7
8.00	17.8	64.0	-15.8	-27.3	107.2	1.0	25.8	18.5	4.6
8.50	17.9	62.8	-16.2	-28.2	93.8	1.0	25.4	18.5	4.5
9.00	18.0	64.3	-16.2	-27.3	110.7	1.0	25.5	18.4	4.4
9.50	18.0	61.2	-15.6	-25.7	77.6	1.0	25.2	18.6	4.3
10.00	17.9	62.3	-15.2	-24.6	87.5	1.0	25.2	18.6	4.3
10.50	17.9	59.3	-15.2	-24.0	62.7	1.0	25.1	18.6	4.2
11.00	17.9	60.0	-15.8	-24.4	68.6	1.0	24.8	18.5	4.1
11.50	17.8	59.3	-16.7	-25.8	64.3	1.0	24.7	18.6	4.1
12.00	17.8	58.1	-16.5	-26.6	56.4	1.0	24.2	18.6	4.0
12.50	17.7	59.1	-15.1	-24.3	63.7	1.0	24.0	18.5	3.9
13.00	17.6	57.6	-13.6	-20.8	53.4	1.0	23.9	18.4	3.8
13.50	17.5	57.3	-12.5	-18.5	51.0	1.0	24.1	18.2	3.8
14.00	17.5	59.0	-12.3	-17.5	61.9	1.0	24.0	18.2	3.6
14.50	17.6	57.4	-12.8	-17.6	51.9	1.0	23.8	18.2	3.6
15.00	17.7	59.8	-14.3	-19.4	68.8	1.0	23.6	18.2	3.5
15.50	17.9	57.9	-16.7	-22.9	55.6	1.0	23.5	18.0	3.5
16.00	18.0	58.3	-18.9	-25.3	58.2	1.0	23.3	17.9	3.4
16.50	18.1	57.2	-18.2	-21.4	50.6	1.0	22.9	17.8	3.4
17.00	18.1	56.5	-16.1	-18.0	46.2	1.0	22.8	17.7	3.4
17.50	18.1	58.8	-15.0	-16.1	59.3	1.0	22.5	17.7	3.4
18.00	18.0	57.9	-15.2	-15.5	53.6	1.0	22.3	17.8	3.5
18.50	18.1	56.5	-16.5	-15.6	46.3	1.0	21.7	17.6	3.6
19.00	18.1	58.5	-18.5	-16.3	59.0	1.0	21.9	17.3	3.6
19.50	18.0	58.8	-20.1	-17.4	62.2	1.0	21.2	16.9	3.8
20.00	17.8	55.8	-19.6	-18.1	45.3	1.0	21.2	16.7	4.0

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +3.75V, IDD = 210mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	11.5	78.4	-7.0	-6.7	714.8	0.9	26.5	16.7	8.6
2.00	14.7	70.1	-11.3	-19.3	280.4	1.1	26.4	18.1	7.9
2.25	14.7	65.3	-12.0	-20.8	164.9	1.1	26.1	18.5	7.7
2.50	14.7	67.1	-12.7	-22.4	206.4	1.0	26.0	18.6	7.7
2.75	14.7	66.8	-13.4	-23.8	199.4	1.0	26.1	18.8	7.6
3.00	14.7	62.6	-13.9	-25.1	123.8	1.0	25.8	18.7	7.6
3.25	14.8	61.5	-14.5	-26.3	110.2	1.0	25.7	19.1	7.5
3.50	14.8	65.8	-14.9	-27.3	181.5	1.0	25.6	18.8	7.5
3.75	14.8	62.4	-15.4	-28.0	122.4	1.0	25.5	18.9	7.4
4.00	14.9	66.3	-15.8	-28.4	192.0	1.0	25.3	18.9	7.4
4.25	14.9	64.7	-16.0	-28.4	159.4	1.0	25.0	18.9	7.4
4.50	14.9	63.6	-16.2	-28.3	140.7	1.0	24.8	18.6	7.5
4.75	15.0	60.2	-16.2	-27.9	95.2	1.0	24.8	19.2	7.3
5.00	15.1	60.7	-16.1	-27.7	99.6	1.0	24.5	18.5	7.2
6.00	15.3	62.6	-15.3	-25.5	120.8	1.0	24.0	18.1	7.1
6.50	15.4	61.7	-15.1	-25.4	108.7	1.0	23.8	18.9	6.9
7.00	15.5	64.6	-15.1	-26.1	151.5	1.0	23.9	19.0	6.8
7.50	15.6	62.4	-15.2	-27.3	117.5	1.0	23.6	19.1	6.7
8.00	15.7	66.3	-15.6	-29.4	182.8	1.0	23.5	19.0	6.6
8.50	15.7	63.0	-15.9	-31.3	125.4	1.0	23.3	19.0	6.4
9.00	15.7	60.9	-15.9	-31.4	97.9	1.0	23.2	19.0	6.4
9.50	15.7	66.6	-15.7	-30.0	190.5	1.0	23.1	19.3	6.3
10.00	15.7	60.7	-15.5	-29.0	97.5	1.0	23.0	19.3	6.2
10.50	15.6	59.3	-15.5	-28.3	83.6	1.0	22.9	19.3	6.1
11.00	15.6	61.8	-15.8	-29.0	113.1	1.0	22.7	19.3	6.1
11.50	15.5	59.3	-16.1	-30.0	85.8	1.0	22.5	18.8	6.0
12.00	15.4	59.2	-15.9	-28.0	85.7	1.0	22.2	18.7	6.1
12.50	15.4	56.7	-14.9	-24.7	64.7	1.0	21.9	18.7	5.9
13.00	15.3	56.8	-13.7	-22.1	65.5	1.0	22.0	18.9	5.9
13.50	15.2	59.4	-13.0	-20.8	87.8	1.0	21.8	18.5	5.7
14.00	15.2	58.2	-13.0	-20.6	76.7	1.0	21.6	18.7	5.8
14.50	15.3	57.3	-14.0	-21.7	70.0	1.0	21.3	18.6	5.7
15.00	15.4	58.3	-15.9	-24.4	79.4	1.0	21.1	18.5	5.7
15.50	15.4	57.3	-18.3	-28.7	71.7	1.0	20.8	18.2	5.7
16.00	15.5	58.3	-19.4	-26.9	80.6	1.0	20.3	18.0	5.6
16.50	15.5	60.3	-18.2	-22.3	100.9	1.0	20.2	18.0	5.7
17.00	15.4	57.6	-16.8	-19.5	74.3	1.0	19.8	18.2	5.7
17.50	15.3	57.4	-16.3	-17.9	72.5	1.0	19.4	18.0	5.7
18.00	15.2	60.1	-16.6	-17.3	100.8	1.0	19.1	18.2	5.9
18.50	15.1	58.5	-17.3	-17.5	84.9	1.0	18.7	17.9	6.0
19.00	15.0	58.8	-17.8	-18.3	90.2	1.0	18.3	17.6	6.2
19.50	14.8	61.6	-17.5	-19.4	127.3	1.0	18.0	17.5	6.4
20.00	14.6	58.2	-16.5	-20.1	89.6	1.0	17.9	17.4	6.6

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +4.00V, IDD = 210mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	11.3	77.6	-7.0	-6.7	670.9	0.9	26.7	17.3	8.7
2.00	14.4	69.9	-11.2	-19.4	281.7	1.1	27.1	18.7	7.8
2.25	14.4	64.3	-12.0	-21.0	150.9	1.1	26.0	19.0	7.7
2.50	14.4	68.0	-12.7	-22.5	234.0	1.0	26.2	19.1	7.7
2.75	14.5	68.7	-13.3	-24.0	255.3	1.0	26.0	19.3	7.6
3.00	14.5	62.4	-13.8	-25.3	125.6	1.0	25.7	19.2	7.6
3.25	14.5	64.3	-14.4	-26.6	156.3	1.0	25.5	19.5	7.6
3.50	14.5	66.2	-14.8	-27.6	194.9	1.0	25.6	19.3	7.6
3.75	14.6	65.9	-15.3	-28.3	189.3	1.0	25.5	19.4	7.5
4.00	14.6	63.6	-15.6	-28.7	145.0	1.0	25.1	19.3	7.5
4.25	14.6	62.0	-15.9	-28.8	121.3	1.0	25.0	19.3	7.5
4.50	14.7	62.4	-16.1	-28.7	126.1	1.0	24.6	19.3	7.5
4.75	14.7	68.4	-16.1	-28.3	252.5	1.0	24.7	19.5	7.4
5.00	14.8	66.2	-15.9	-27.9	194.1	1.0	24.4	19.1	7.4
6.00	15.1	63.0	-15.2	-25.9	130.8	1.0	23.9	18.8	7.1
6.50	15.1	65.1	-15.0	-25.7	167.2	1.0	23.9	19.4	6.9
7.00	15.2	62.4	-14.9	-26.4	121.5	1.0	23.6	19.5	6.9
7.50	15.3	60.0	-15.1	-27.7	91.5	1.0	23.6	19.6	6.7
8.00	15.3	63.2	-15.4	-29.8	132.7	1.0	23.2	19.5	6.6
8.50	15.4	63.5	-15.7	-31.8	136.7	1.0	22.9	19.5	6.5
9.00	15.4	61.8	-15.7	-32.2	112.4	1.0	22.9	19.5	6.4
9.50	15.4	60.1	-15.5	-30.6	93.8	1.0	22.8	19.7	6.4
10.00	15.3	62.0	-15.4	-29.6	117.7	1.0	22.8	19.8	6.3
10.50	15.3	59.5	-15.4	-29.0	89.2	1.0	22.6	19.7	6.2
11.00	15.2	60.3	-15.7	-29.7	98.8	1.0	22.5	19.7	6.2
11.50	15.2	60.4	-16.0	-30.8	100.5	1.0	22.2	19.4	6.1
12.00	15.1	59.6	-15.7	-28.4	92.6	1.0	22.2	19.2	6.1
12.50	15.0	59.7	-14.8	-25.0	94.4	1.0	22.1	19.2	6.0
13.00	14.9	59.8	-13.6	-22.5	95.7	1.0	21.8	19.3	5.9
13.50	14.9	58.1	-13.0	-21.0	78.6	1.0	21.6	18.9	5.8
14.00	14.9	56.7	-13.0	-20.9	67.7	1.0	21.6	19.2	5.8
14.50	14.9	58.4	-14.0	-22.1	82.9	1.0	21.1	19.1	5.8
15.00	15.0	58.1	-16.0	-25.0	81.2	1.0	20.9	18.9	5.7
15.50	15.1	58.4	-18.4	-29.6	84.5	1.0	20.6	18.7	5.8
16.00	15.1	58.1	-19.5	-27.4	82.4	1.0	20.3	18.5	5.7
16.50	15.1	58.9	-18.4	-22.6	90.3	1.0	19.8	18.4	5.8
17.00	15.0	59.1	-17.0	-19.7	92.2	1.0	19.7	18.6	5.8
17.50	14.9	59.2	-16.6	-18.2	93.8	1.0	19.3	18.4	5.9
18.00	14.8	58.9	-16.7	-17.5	92.9	1.0	18.9	18.6	5.9
18.50	14.6	58.8	-17.3	-17.8	93.5	1.0	18.7	18.4	6.2
19.00	14.5	60.5	-17.4	-18.5	115.7	1.0	18.1	18.1	6.4
19.50	14.3	60.0	-16.9	-19.6	112.6	1.0	17.9	17.8	6.5
20.00	14.0	59.8	-15.9	-20.3	114.6	1.0	17.7	17.8	6.7

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Isolation = -S12 (dB)

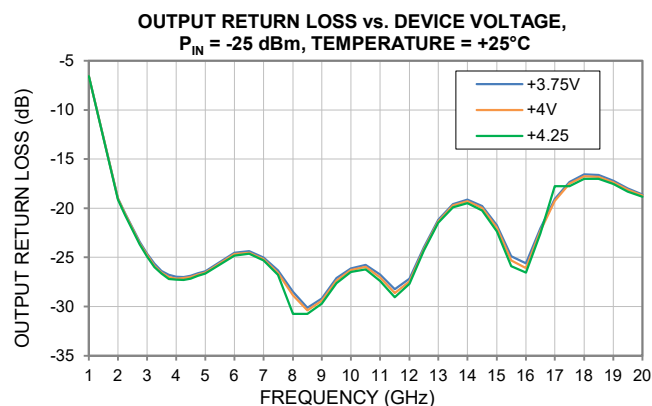
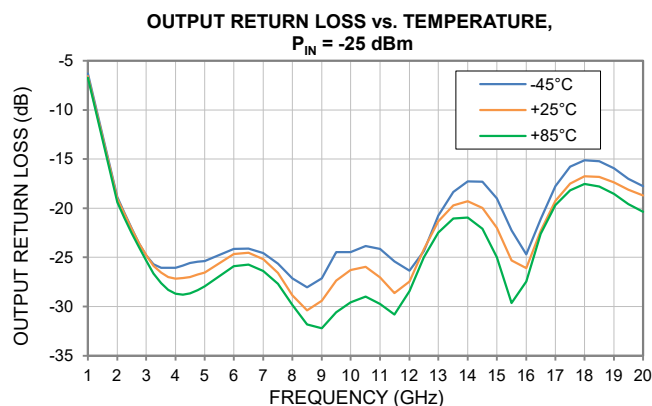
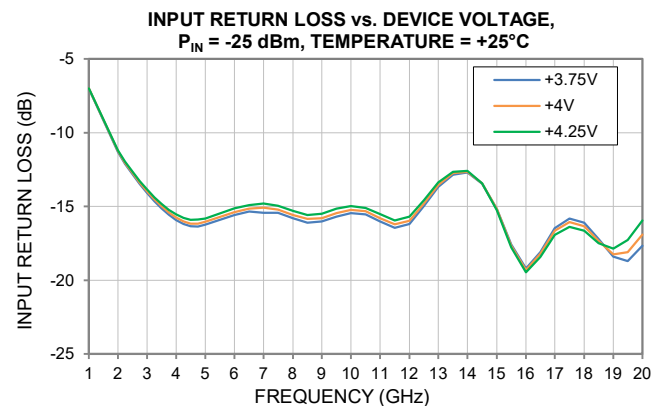
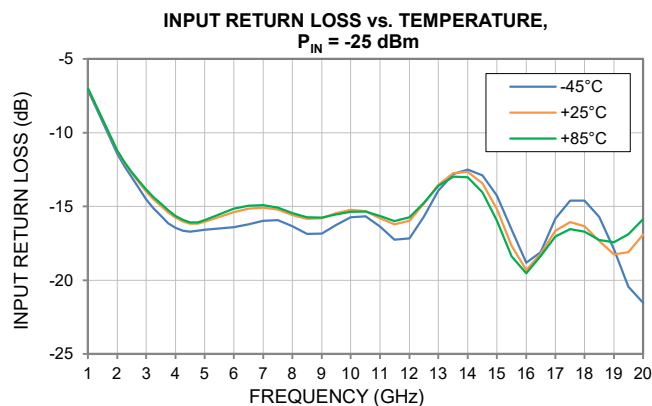
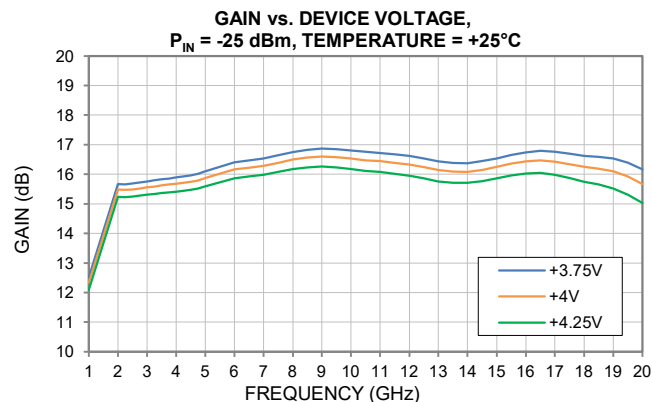
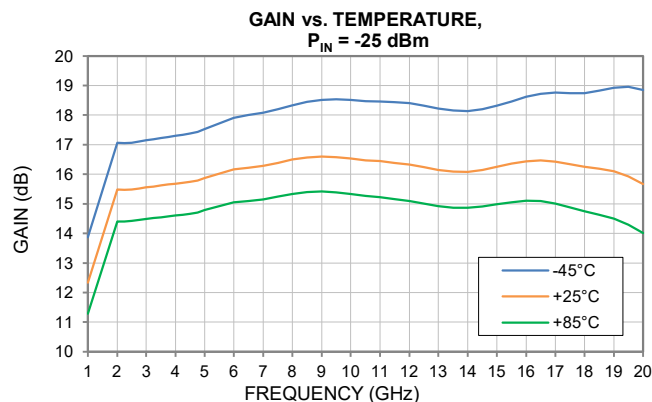
Output Return Loss = -S22 (dB)

TEST CONDITIONS: VDD = +4.25V, IDD = 210mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
1.00	11.1	66.8	-7.0	-6.7	197.8	0.9	26.6	17.7	8.7
2.00	14.2	69.7	-11.2	-19.5	285.6	1.1	26.6	19.2	7.9
2.25	14.2	67.0	-11.9	-21.1	212.5	1.1	26.5	19.4	7.8
2.50	14.2	67.9	-12.6	-22.7	238.3	1.0	26.3	19.5	7.8
2.75	14.2	72.2	-13.2	-24.2	395.1	1.0	26.1	19.6	7.7
3.00	14.2	66.5	-13.8	-25.6	206.2	1.0	25.8	19.6	7.7
3.25	14.3	64.3	-14.3	-26.9	161.1	1.0	25.6	19.8	7.7
3.50	14.3	63.7	-14.7	-27.9	150.2	1.0	25.3	19.6	7.7
3.75	14.3	64.8	-15.1	-28.6	171.5	1.0	25.5	19.7	7.6
4.00	14.4	60.9	-15.5	-29.0	109.6	1.0	24.9	19.6	7.6
4.25	14.4	71.0	-15.8	-29.1	349.9	1.0	25.2	19.6	7.5
4.50	14.4	63.2	-15.9	-29.0	143.3	1.0	24.5	19.6	7.5
4.75	14.4	62.5	-15.9	-28.6	131.9	1.0	24.2	19.8	7.5
5.00	14.5	60.6	-15.8	-28.3	104.9	1.0	24.3	19.5	7.4
6.00	14.8	60.1	-15.0	-26.1	97.0	1.0	23.9	19.3	7.2
6.50	14.8	60.8	-14.8	-26.1	104.7	1.0	23.7	19.8	7.0
7.00	14.9	64.4	-14.8	-26.7	158.2	1.0	23.4	19.9	6.9
7.50	15.0	61.3	-14.9	-28.1	109.7	1.0	23.5	20.0	6.8
8.00	15.0	63.1	-15.3	-30.3	134.8	1.0	23.1	19.8	6.7
8.50	15.1	59.4	-15.6	-32.6	88.0	1.0	23.1	19.9	6.6
9.00	15.1	60.3	-15.6	-33.0	98.9	1.0	23.0	19.9	6.5
9.50	15.1	59.9	-15.4	-31.3	95.1	1.0	22.8	20.1	6.5
10.00	15.0	61.7	-15.2	-30.2	117.2	1.0	22.7	20.1	6.4
10.50	14.9	62.2	-15.2	-29.6	126.1	1.0	22.4	20.1	6.3
11.00	14.9	60.9	-15.5	-30.3	109.4	1.0	22.5	20.0	6.2
11.50	14.8	58.3	-15.8	-31.4	82.4	1.0	22.3	19.8	6.2
12.00	14.8	58.2	-15.6	-28.9	81.8	1.0	22.1	19.6	6.1
12.50	14.7	56.8	-14.6	-25.4	70.3	1.0	21.8	19.7	6.1
13.00	14.6	58.4	-13.6	-22.8	84.6	1.0	21.7	19.7	6.0
13.50	14.5	58.2	-12.9	-21.4	83.2	1.0	21.6	19.4	6.0
14.00	14.5	58.5	-13.0	-21.3	86.2	1.0	21.5	19.6	5.9
14.50	14.6	57.8	-14.1	-22.5	80.6	1.0	21.0	19.5	5.8
15.00	14.6	59.4	-16.0	-25.7	98.5	1.0	20.9	19.3	5.8
15.50	14.7	56.8	-18.5	-30.8	73.6	1.0	20.5	19.1	5.8
16.00	14.7	58.0	-19.7	-28.0	84.2	1.0	20.2	18.8	5.8
16.50	14.7	58.2	-18.5	-22.9	86.9	1.0	19.8	18.8	5.9
17.00	14.6	59.5	-17.2	-20.0	102.0	1.0	19.6	18.9	5.9
17.50	14.5	59.2	-16.8	-18.4	98.6	1.0	19.3	18.8	6.0
18.00	14.3	56.7	-16.8	-17.8	75.2	1.0	18.8	18.9	6.1
18.50	14.2	58.0	-17.2	-18.0	90.1	1.0	18.6	18.7	6.2
19.00	14.0	61.0	-17.0	-18.7	129.5	1.0	18.2	18.4	6.5
19.50	13.8	62.8	-16.4	-19.8	165.5	1.0	17.9	18.2	6.7
20.00	13.5	58.9	-15.3	-20.6	108.7	1.0	17.8	18.1	6.9

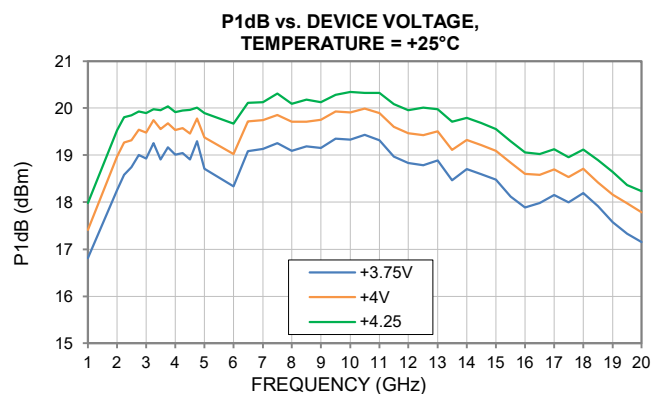
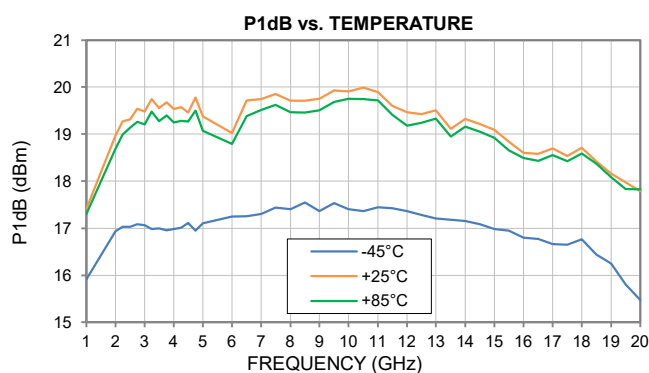
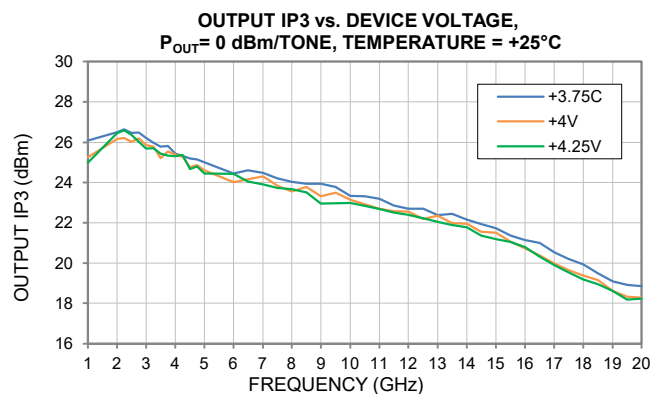
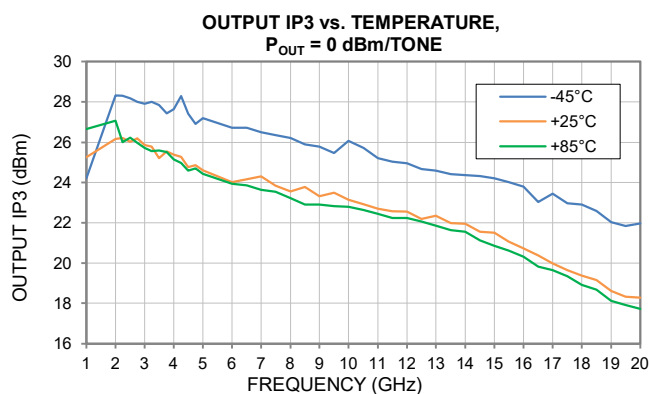
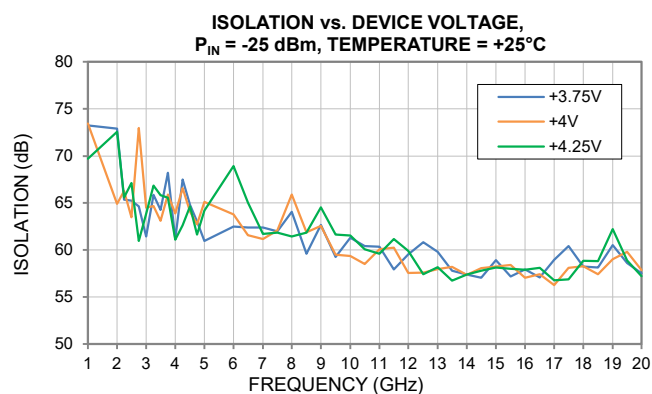
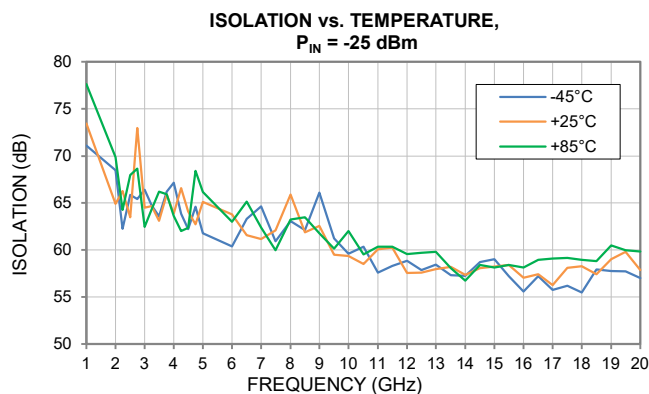
Typical Performance Curves

Note: All data taken was at nominal conditions $V_{DD} = +4V$, $I_{DD} = 210$ mA, and $V_{GG} = -0.52V$ unless noted otherwise. For over temperature data, I_{DD} is adjusted to 210 mA at each temperature specified. For over temperature data, I_{DD} is adjusted to 210 mA at each voltage specified.



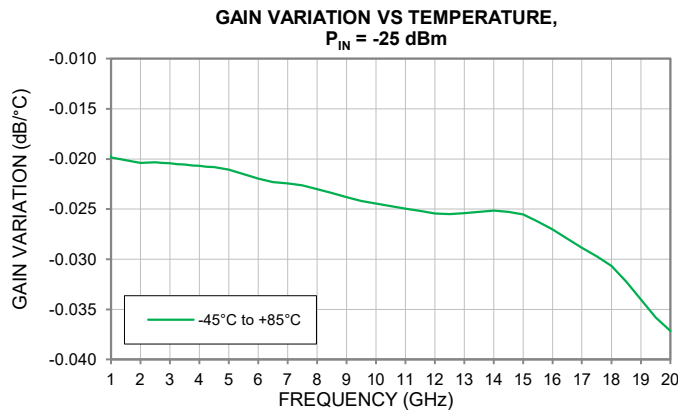
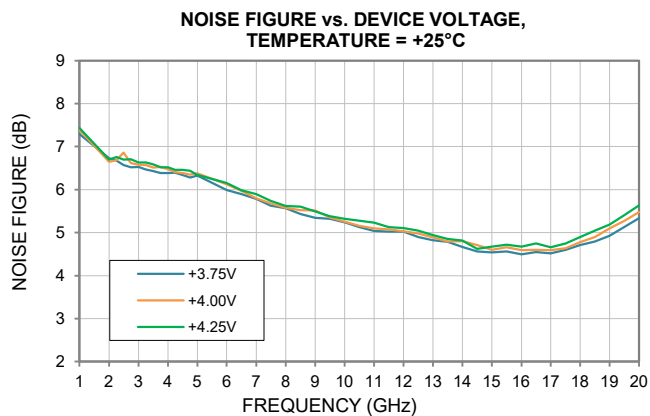
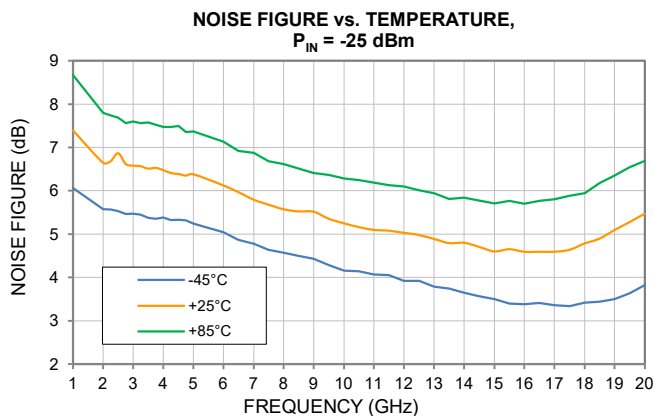
Typical Performance Curves

Note: All data taken was at nominal conditions $V_{DD} = +4V$, $I_{DD} = 210$ mA, and $V_{GG} = -0.52V$ unless noted otherwise. For over temperature data, I_{DD} is adjusted to 210 mA at each temperature specified. For over temperature data, I_{DD} is adjusted to 210 mA at each voltage specified.



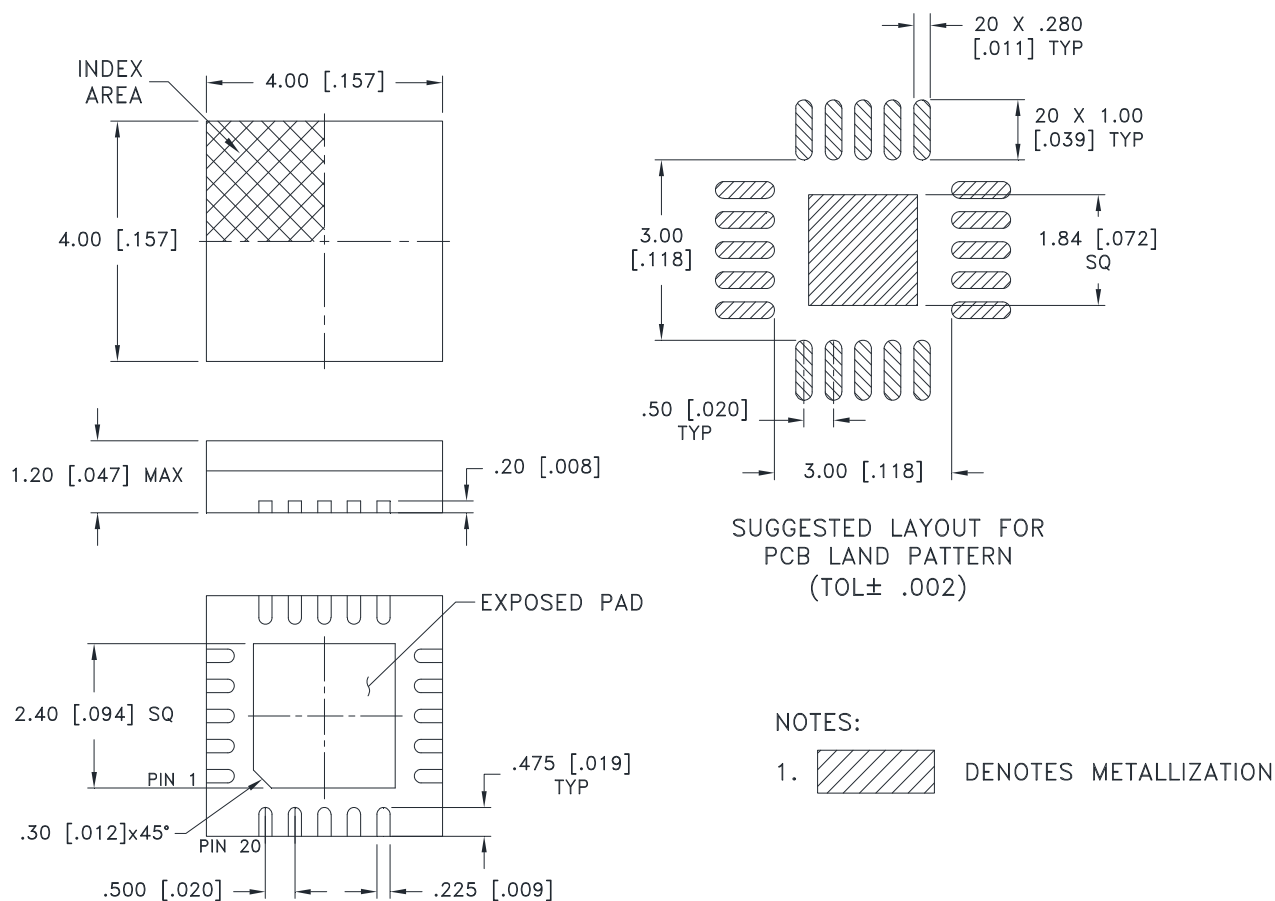
Typical Performance Curves

Note: All data taken was at nominal conditions $V_{DD} = +4V$, $I_{DD} = 210$ mA, and $V_{GG} = -0.52V$ unless noted otherwise. For over temperature data, I_{DD} is adjusted to 210 mA at each temperature specified. For over temperature data, I_{DD} is adjusted to 210 mA at each voltage specified.



Outline Dimensions

DG1847-1



Weight: 0.1 Grams

Dimensions are in mm(ounces). Tolerances: 2 Pl. $\pm .25(.01)$; 3 Pl. $\pm .127(.005)$

Notes:

1. Case material : Plastic
2. Termination finish: PPF (NiPdAu Plating 0.5 μm /0.02 μm /0.05 μm)

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ISO 9001 ISO 14001 CERTIFIED

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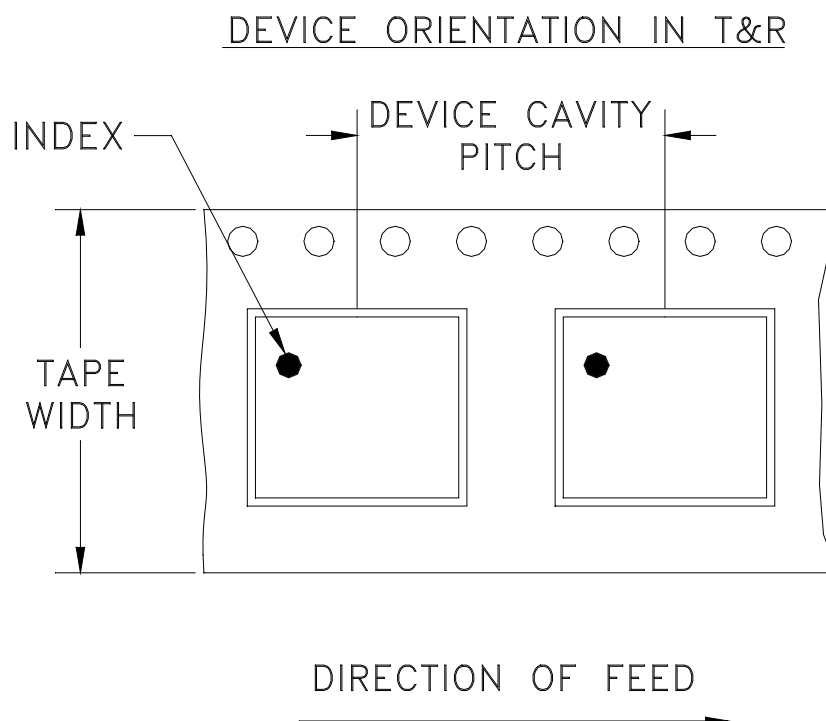
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



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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Mini-Circuits ISO 9001 & ISO 14001 Certified

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-015709	NEW RELEASE	11/10/22	ITG	IL

VDD

PACKAGE OUTLINE

PIN 1

COPLANAR WAVEGUIDE:
.0217±.002 TRACE WIDTH &
.0217±.002 GAP, 2 PL.
(SEE NOTE BELOW)

RF-IN

RF-OUT

OR GROUND

74X Ø.012 PTH, PLUGGED
FROM TOP SIDE & CAPPED
WITH COPPER ON TOP SIDE

C6

C4

C3

C5

VG

COMPONENT
C1,C3
C2,C4,C5,C6

COMPONENT	SIZE
C1,C3	1206
C2,C4,C5,C6	0603

1. TRACE WIDTH AND GAP PARAMETERS ARE SHOWN FOR ROGERS RO4003 WITH DIELECTRIC THICKNESS $.010 \pm .001$ "; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. UNIT FOOT PRINT IS OPTIMIZED FOR PERFORMANCE AND IS DIFFERENT FROM CASE STYLE DG1847-1 RECOMMENDATIONS.
3. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-AVA-2183+ OR TB-AVA-2183C+.
4. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

 DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).

 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE
DIMENSIONS ARE IN INCHES	DRAWN	ITG	11/09/22
TOLERANCES ON:	CHECKED	GF	11/09/22
2 PL DECIMALS ±	APPROVED	IL	11/09/22
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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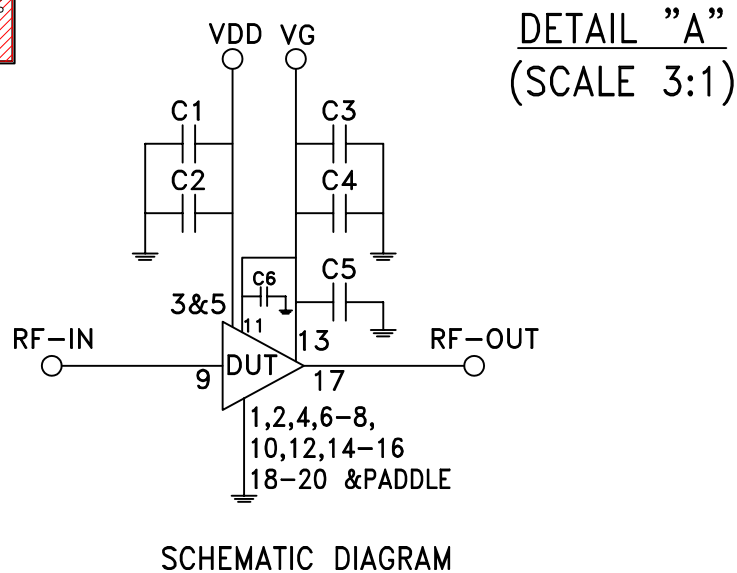
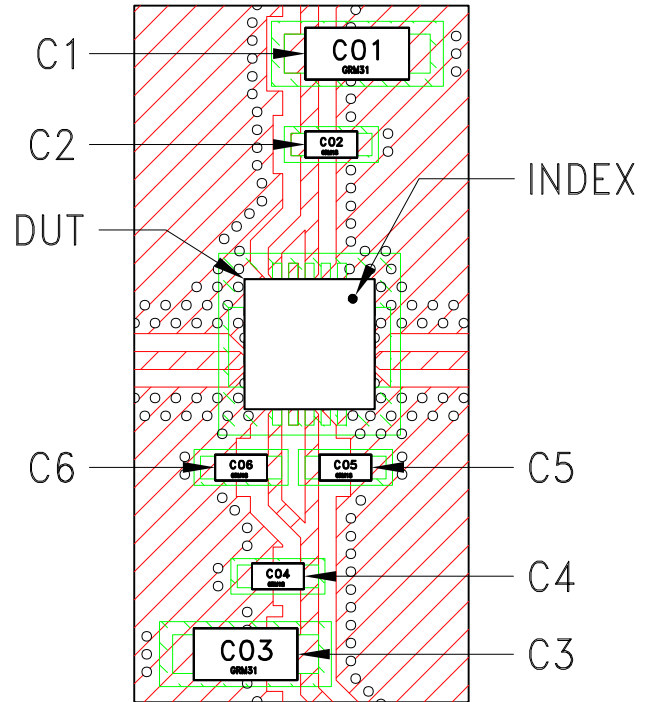
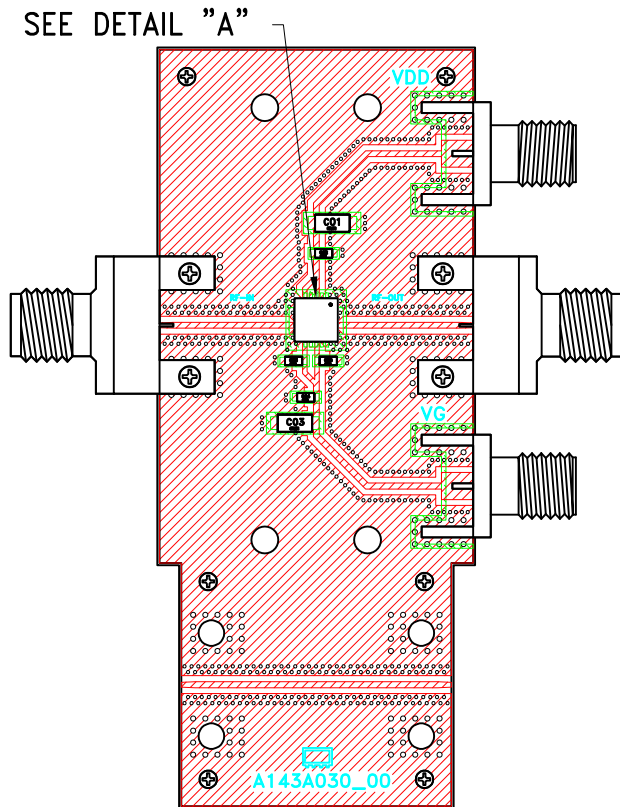
Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, DG1847-1, TB-AVA-2183(C)+

SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-742		REV: OR
FILE: 98PL742		SCALE: 5:1	SHEET: 1 OF 1	

Evaluation Board and Circuit



Component	Size	Value	Part Number	Manufacturer
C1,C3	1206	10uF	B55-109-106K+	Samsung
C2,C4	0603	0.1uF	B55-18-104+	AVX
C5,C6	0603	100pF	B55-19-101G+	Murata

Notes:

- 2.4mm Female Connectors.
- PCB Material: Roger RO4350B or equivalent,
Dielectric constant=3.5, Thickness=0.010 inch

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

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-45° to +85° C	Individual Model Data Sheet
Storage Temperature	-65° to 150°C	Individual Model Data Sheet
Moisture Sensitivity: Level 3	Bake at 125°C for 24 hours. Soak at 30°C/60%RH for 192 hours, Reflow 3 cycles at 260°C peak	J-STD-020D
Unbiased HAST	Temperature: 130°C, RH: 85%, Pressure: 33.3 psia Duration: 96 hours	JESD22-A118A, Test Condition A
Temperature Cycling	-65°C to +150°C, Dwell Time: 15 mins 500 cycles	JESD22-A104E, Condition C
HTSL	Temperature: 150°C Duration: 1000 hours	JESD22-A103E, Test Condition B
HTOL	1000 Hours at 125°C	JESD22-A108
ESD HBM	Refer datasheet for classification	JS-001
Vibration (Variable Frequency)	Sinusoidal vibration, 20 - 2000 Hz, 4 min sweeps, 16 min along each of 3 axis, amplitude limits of 20g and 0.06 in	MIL-STD-883, Method 2007, Condition A
Drop Test	1m drops onto concrete in final packed box in 6 orientations	--
Bend Test	1mm deflection for 5 seconds. Board thickness: 0.024", Span: 2.75"	--
Solderability	10x magnification	J-STD-002 Method B, B1



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
Resistance to Soldering Heat	Sn-Pb Eutectic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020