

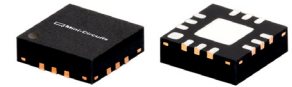


# Monolithic Amplifier PMA3-313GLN+

50Ω 26.5 to 31 GHz

## THE BIG DEAL

- High Gain 18.2 dB at 30 GHz
- Excellent Gain Flatness, ±1dB from 26.5 to 31 GHz
- Low NF, 1.8 dB at 30 GHz
- P1dB, 12.2 typ. at 30 GHz
- OIP3, 21.5dBm typ. at 30 GHz
- Built-In Bias Tee and DC Blocks
- Patent pending



Generic photo used for illustration purposes only

CASE STYLE: DQ1225

### +RoHS Compliant

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

## APPLICATIONS

- 5G
- Fixed Satellite
- Mobile

## PRODUCT OVERVIEW

The PMA3-313GLN+ is a PHEMT based high gain, low noise MMIC amplifier with a unique combination of high gain, excellent gain flatness and low noise figure, making it ideal for using as the first stage driver amplifier of receiver applications. This design operates on a single 4V supply, is matched to 50Ohm and comes in a tiny plastic package (3 x 3 x 0.89mm), accommodating dense circuit board layouts.

## KEY FEATURES

Feature	Advantages
Low noise, 1.8 dB at 30 GHz	Enables lower system noise figure performance.
High Gain, 20.1 dB at 30 GHz	Enables signal amplification without the need for multiple gain stage, minimizing the effect of subsequent stages on noise figure.
Excellent Gain Flatness	Typical ±1dB gain flatness across the entire frequency range minimizes the need for external equalizer networks, making it a great fit for instrumentation and EW applications.
Built-in Bias Tee & DC Blocks	Minimizes the external component count & PC board space, making it less expensive and user friendly for system designers.
3 x 3mm 12-lead MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

\*Electrical maximum ratings are not intended for continuous normal operation.

REV. C  
ECO-011519  
PMA3-313GLN+  
GY/RS/CP/AM  
220120



HIGH GAIN, LOW NOISE

# Monolithic Amplifier PMA3-313GLN+

Mini-Circuits

## ELECTRICAL SPECIFICATIONS<sup>1</sup> AT 25°C, VS=4V AND R1=18Ω, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Vs=4.0V			Units
		Min.	Typ.	Max.	
Frequency Range		26.5		31	GHz
Noise Figure	26.5		1.6		dB
	27.5		1.7		
	30		1.8		
	31		1.8		
Gain	26.5	17.0	21.4	25.1	dB
	27.5	16.1	20.7	23.9	
	30	14.5	20.1	23.9	
	31		19.4	—	
Input Return Loss	26.5		10		dB
	27.5		9		
	30		12		
	31		13		
Output Return Loss	26.5		7		dB
	27.5		8		
	30		12		
	31		10		
Output Power @ 1 dB compression	26.5		12.0		dBm
	27.5		12.0		
	30		12.2		
	31		12.3		
Output IP3	26.5		21.5		dBm
	27.5		21.6		
	30		21.5		
	31		21.6		
Supply Voltage (Vs)		3.75	4.0	4.25	V
Device Operating Current (IDD)			78	112	mA
Device Current Variation vs. Temperature <sup>2</sup>			-50		μA/°C
Device Current Variation vs. Voltage			0.02		mA/mV
Thermal Resistance, junction-to-ground lead			106		°C/W

1. Measured on Mini-Circuits Characterization test board TB-PMA3-313GLN+ with thru-line loss being deducted. See Characterization Test Circuit (Fig. 1)

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

## MAXIMUM RATINGS<sup>3</sup>

Parameter	Ratings
Operating Temperature (ground lead)	-40°C to 85°C
Storage Temperature	-65°C to 150°C
Junction Temperature	146°C
Total Power Dissipation	0.65W
Input Power (CW), Vs=4V	+23 dBm (5 minutes max.) +13 dBm (continuous)
DC Voltage at Port 2 & 8	2V
DC Voltage (Vs)	6V

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

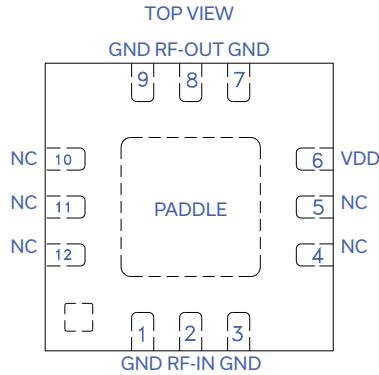
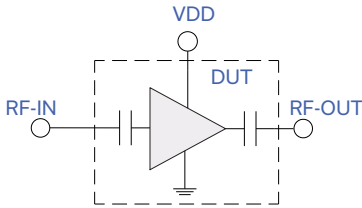




HIGH GAIN, LOW NOISE

# Monolithic Amplifier PMA3-313GLN+

## SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION



Function	Pad Number	Description (See Application Circuit, Fig. 1)
RF-IN	2	RF Input Pad. Connects to RF input
RF-OUT	8	RF Output Pad. Connects to RF output
VDD	6	DC Power Supply Pad. Connects to Voltage Source Vs via R1
Ground	1,3,7,9 & Paddle	Connects to ground
No Connection	4,5,10,11& 12	Not used internally. Connected to ground on test board

## RECOMMENDED APPLICATION AND CHARACTERIZATION TEST CIRCUIT

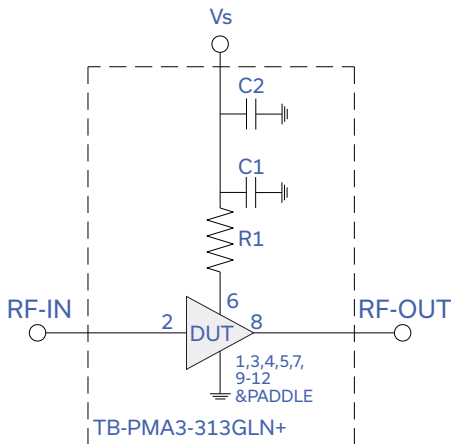


Fig 1. Application and Characterization Circuit

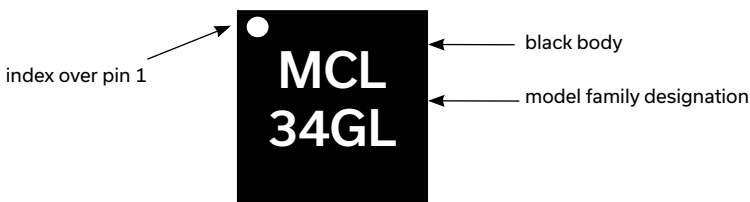
Note: This block diagram is used for characterization. (DUT is soldered on Mini-Circuits Characterization test board TB-PMA3-313GLN+) Gain, Return loss, Output power at 1dB compression (P1 dB), output IP3 (OIP3) and noise figure measured using Agilent's N5245A microwave network analyzer.

Conditions:

1. Gain and Return loss: Pin= -25dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5dBm/tone at output.

Component	Size	Value	Part Number	Manufacturer
R1	0603	18 Ohm	SG73G1JTDD18R0C	KOA
C1	0402	5 pF	GJM1555C1H5R0CB01D	Murata
C2	0402	0.1 uF	GRM155R71C104KA88D	Murata

## PRODUCT MARKING



Marking may contain other features or characters for internal lot control





HIGH GAIN, LOW NOISE

# Monolithic Amplifier PMA3-313GLN+

Mini-Circuits

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

Performance Data	Data Table graphs, s-parameter data set (.zip file)
Case Style	DQ1225 Plastic package, exposed paddle, lead finish: Matte Tin
Tape & Reel Standard quantities available on reel	F66 7" reels with 20, 50, 100, 200, 500, 1K, or 2K devices.
Suggested Layout for PCB Design	PL-674
Evaluation Board	TB-PMA3-313GLN+ (Without connectors) TB-PMA3313GLNC+ (With connectors)
Environmental Ratings	ENV08T1

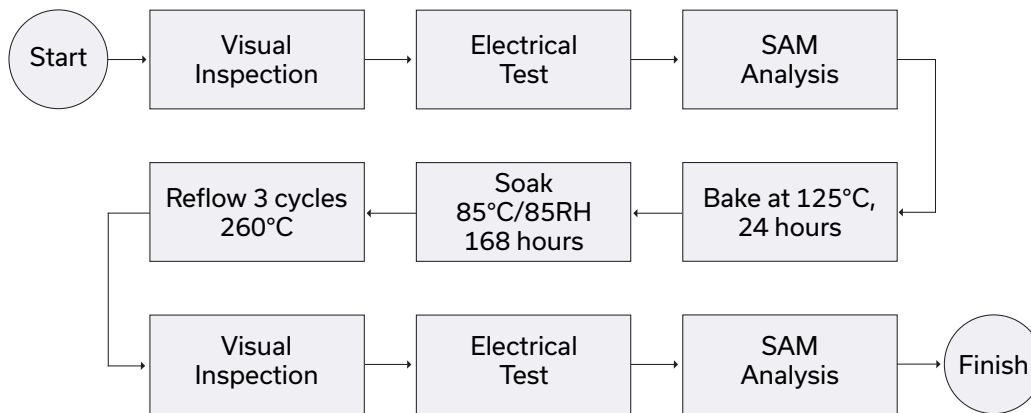
### ESD RATING

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

### MSL RATING

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

### MSL TEST FLOW CHART



- NOTES**
- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
  - B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
  - C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)



## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.00V, Id = 68mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	21.65	48.14	10.30	8.35	9.66	0.92	22.93	11.19	1.59
25200	21.52	47.53	10.14	8.27	9.09	0.92	21.56	11.10	1.69
25400	21.36	47.82	9.97	8.07	9.45	0.92	21.16	11.14	1.71
25500	21.29	47.66	9.87	8.02	9.34	0.92	22.40	11.07	1.73
25600	21.20	47.62	9.79	7.96	9.35	0.92	21.85	11.05	1.68
25800	21.03	48.82	9.60	7.82	10.78	0.92	22.46	11.12	1.73
26000	20.86	48.38	9.42	7.72	10.38	0.92	21.22	11.06	1.81
26200	20.68	48.26	9.20	7.55	10.31	0.92	22.02	11.12	1.87
26400	20.49	47.76	8.99	7.45	9.83	0.92	22.55	11.17	1.83
26500	20.41	47.88	8.93	7.40	10.01	0.92	21.31	11.14	1.83
26600	20.30	47.99	8.82	7.35	10.21	0.92	21.69	10.96	1.91
26800	20.14	47.87	8.69	7.28	10.18	0.92	22.06	11.04	1.93
27000	19.97	48.01	8.52	7.20	10.41	0.92	21.83	11.15	1.99
27200	19.79	46.78	8.37	7.17	9.18	0.92	21.38	10.68	2.00
27400	19.64	47.25	8.24	7.13	9.79	0.92	22.10	11.10	2.02
27500	19.57	47.41	8.21	7.12	10.01	0.92	20.69	10.94	2.07
27600	19.49	47.22	8.13	7.14	9.85	0.93	23.20	10.95	2.02
27800	19.41	47.09	8.04	7.23	9.81	0.94	21.20	11.18	2.09
28000	19.25	46.14	7.97	7.34	8.98	0.95	22.33	11.16	2.16
28200	19.14	47.10	7.91	7.44	10.16	0.95	21.64	10.95	2.07
28400	19.07	45.89	7.91	7.56	8.99	0.96	21.05	11.13	2.15
28500	19.02	46.31	7.90	7.67	9.50	0.97	20.96	10.91	2.18
28600	18.96	46.57	7.90	7.81	9.94	0.97	21.20	11.10	2.21
28800	18.86	46.42	7.88	7.99	9.93	0.98	21.61	10.88	2.21
29000	18.76	45.49	7.85	8.18	9.10	0.99	21.06	10.91	2.18
29200	18.68	46.22	7.93	8.40	10.09	1.00	21.77	10.64	2.27
29400	18.60	45.68	8.01	8.62	9.70	1.01	22.29	11.07	2.27
29500	18.54	45.24	8.01	8.78	9.32	1.01	22.17	10.81	2.23
29600	18.49	45.13	8.05	8.86	9.31	1.01	21.51	10.81	2.32
29800	18.41	45.54	8.11	9.08	9.96	1.02	22.98	10.99	2.39
30000	18.34	45.90	8.17	9.27	10.56	1.02	20.56	11.16	2.27
30200	18.22	44.72	8.24	9.49	9.43	1.03	23.12	10.92	2.31
30400	18.12	45.49	8.26	9.66	10.50	1.03	22.21	10.96	2.36
30500	18.07	45.60	8.28	9.74	10.72	1.03	21.62	11.10	2.42
30600	18.04	46.33	8.30	9.78	11.75	1.03	21.38	11.27	2.40
30800	17.95	45.03	8.36	9.85	10.26	1.03	22.84	10.95	2.40
31000	17.84	46.16	8.32	9.90	11.87	1.04	21.01	10.99	2.40
32000	17.21	46.83	7.76	9.49	13.33	1.04	21.75	10.56	2.70

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.75V, Id = 63mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	21.45	48.31	10.29	8.43	10.11	0.93	22.13	10.61	1.69
25200	21.31	47.96	10.14	8.34	9.81	0.93	20.78	10.53	1.72
25400	21.16	47.44	9.96	8.16	9.30	0.92	21.96	10.57	1.71
25500	21.08	48.15	9.85	8.08	10.11	0.92	21.54	10.50	1.74
25600	20.99	47.28	9.78	8.04	9.22	0.92	21.99	10.49	1.74
25800	20.83	47.51	9.59	7.89	9.53	0.92	21.46	10.45	1.76
26000	20.65	47.95	9.39	7.79	10.13	0.92	20.99	10.49	1.80
26200	20.47	47.74	9.18	7.62	9.98	0.92	21.24	10.45	1.80
26400	20.29	47.50	8.97	7.51	9.80	0.92	21.19	10.59	1.86
26500	20.21	47.15	8.90	7.45	9.45	0.92	21.77	10.57	1.87
26600	20.10	47.47	8.78	7.40	9.84	0.92	22.07	10.39	1.84
26800	19.94	47.79	8.64	7.36	10.33	0.92	21.62	10.46	1.93
27000	19.77	46.74	8.51	7.24	9.25	0.92	21.02	10.58	1.95
27200	19.59	46.63	8.33	7.22	9.23	0.93	21.86	10.20	1.96
27400	19.45	46.55	8.21	7.18	9.25	0.93	22.36	10.52	2.10
27500	19.37	46.81	8.19	7.16	9.58	0.93	21.77	10.38	2.07
27600	19.29	47.01	8.09	7.19	9.83	0.93	22.03	10.37	2.03
27800	19.20	47.27	7.99	7.27	10.23	0.94	21.61	10.59	2.11
28000	19.04	47.45	7.94	7.35	10.68	0.95	20.85	10.59	2.18
28200	18.94	47.96	7.85	7.48	11.48	0.96	21.41	10.38	2.17
28400	18.86	44.72	7.86	7.62	8.05	0.96	21.00	10.55	2.09
28500	18.81	45.90	7.85	7.72	9.30	0.97	23.86	10.34	2.17
28600	18.75	46.53	7.83	7.85	10.09	0.98	21.14	10.52	2.22
28800	18.65	45.75	7.82	8.02	9.40	0.99	21.25	10.32	2.18
29000	18.55	45.02	7.78	8.20	8.79	1.00	21.39	10.33	2.14
29200	18.47	46.11	7.85	8.44	10.20	1.00	21.88	10.16	2.27
29400	18.39	44.95	7.94	8.64	9.10	1.01	20.53	10.49	2.24
29500	18.33	45.46	7.93	8.79	9.78	1.01	21.76	10.21	2.23
29600	18.27	45.56	7.98	8.87	10.01	1.02	21.81	10.22	2.32
29800	18.19	45.18	8.03	9.08	9.76	1.02	22.05	10.42	2.30
30000	18.13	45.16	8.08	9.29	9.91	1.03	20.69	10.58	2.25
30200	18.00	45.01	8.15	9.53	9.97	1.03	21.97	10.35	2.40
30400	17.91	45.41	8.17	9.67	10.61	1.04	20.62	10.38	2.34
30500	17.86	45.76	8.19	9.73	11.15	1.04	22.07	10.53	2.28
30600	17.83	46.31	8.21	9.79	11.98	1.04	21.89	10.68	2.38
30800	17.73	46.70	8.25	9.84	12.71	1.04	21.42	10.36	2.46
31000	17.62	46.59	8.21	9.90	12.74	1.04	21.48	10.41	2.43
32000	16.98	47.12	7.69	9.49	14.10	1.04	20.92	9.99	2.65

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.25V, Id = 73mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	21.81	47.98	10.32	8.28	9.30	0.92	22.88	11.71	1.70
25200	21.68	48.44	10.16	8.20	9.88	0.92	22.57	11.62	1.69
25400	21.53	47.98	9.99	8.01	9.43	0.92	22.55	11.67	1.71
25500	21.45	48.00	9.88	7.94	9.49	0.92	23.04	11.59	1.75
25600	21.36	48.00	9.81	7.90	9.56	0.92	22.19	11.58	1.83
25800	21.19	48.37	9.63	7.76	10.05	0.92	22.53	11.64	1.86
26000	21.02	48.09	9.44	7.65	9.84	0.91	21.31	11.59	1.82
26200	20.84	48.75	9.22	7.50	10.68	0.91	22.15	11.64	1.76
26400	20.65	48.35	9.02	7.41	10.33	0.91	22.01	11.70	1.95
26500	20.57	47.97	8.94	7.34	9.92	0.91	21.23	11.66	1.84
26600	20.47	47.74	8.86	7.29	9.70	0.91	21.44	11.49	1.92
26800	20.31	47.59	8.70	7.25	9.69	0.91	21.68	11.57	1.94
27000	20.13	47.29	8.55	7.14	9.44	0.91	22.38	11.68	1.92
27200	19.95	47.17	8.38	7.12	9.41	0.92	22.33	11.20	1.97
27400	19.81	47.71	8.25	7.10	10.09	0.92	22.71	11.71	1.96
27500	19.72	46.64	8.24	7.07	9.00	0.92	22.76	11.48	2.11
27600	19.66	48.29	8.15	7.11	10.91	0.93	24.38	11.47	2.08
27800	19.57	47.90	8.07	7.17	10.61	0.93	22.30	11.70	2.11
28000	19.42	46.74	8.00	7.28	9.42	0.94	22.08	11.68	2.15
28200	19.31	46.89	7.97	7.39	9.75	0.95	22.05	11.49	2.14
28400	19.24	46.47	7.95	7.52	9.43	0.96	22.06	11.67	2.13
28500	19.18	45.80	7.95	7.64	8.83	0.96	21.36	11.54	2.24
28600	19.12	46.36	7.94	7.78	9.50	0.97	23.10	11.63	2.20
28800	19.03	46.82	7.94	7.96	10.22	0.98	22.34	11.43	2.22
29000	18.93	45.56	7.90	8.17	9.00	0.99	21.89	11.45	2.21
29200	18.86	45.50	7.97	8.39	9.13	1.00	21.94	11.16	2.23
29400	18.77	45.77	8.08	8.60	9.63	1.00	22.64	11.60	2.24
29500	18.72	45.82	8.07	8.77	9.80	1.01	22.39	11.34	2.29
29600	18.66	45.24	8.12	8.86	9.28	1.01	22.57	11.34	2.32
29800	18.58	45.17	8.19	9.07	9.38	1.02	21.24	11.53	2.29
30000	18.52	45.42	8.24	9.26	9.82	1.02	21.58	11.60	2.31
30200	18.40	46.19	8.33	9.50	11.00	1.03	21.32	11.46	2.41
30400	18.30	45.56	8.34	9.66	10.40	1.03	22.08	11.49	2.32
30500	18.25	45.47	8.35	9.75	10.37	1.03	22.90	11.63	2.28
30600	18.23	45.29	8.40	9.78	10.24	1.03	22.65	11.79	2.38
30800	18.13	46.19	8.43	9.84	11.52	1.03	21.39	11.46	2.43
31000	18.03	45.92	8.38	9.90	11.33	1.03	21.78	11.51	2.44
32000	17.40	47.07	7.84	9.53	13.47	1.04	21.35	11.10	2.68

# MMIC Amplifier

# PMA3-313GLN+

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.00V, Id = 73.00mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	23.33	47.68	10.61	7.62	7.28	0.88	23.14	11.52	1.02
25200	23.14	47.55	10.21	7.41	7.18	0.88	22.61	11.44	1.08
25400	22.94	47.55	9.62	7.17	7.17	0.88	23.18	11.40	1.11
25500	22.84	47.50	9.43	7.09	7.14	0.88	23.03	11.34	1.12
25600	22.74	47.67	9.30	7.01	7.30	0.88	22.71	11.40	1.13
25800	22.53	48.16	8.95	6.87	7.75	0.88	22.71	11.28	1.20
26000	22.38	48.14	8.65	6.88	7.80	0.89	21.96	11.30	1.18
26200	22.22	47.92	8.50	6.82	7.68	0.89	22.94	11.40	1.20
26400	22.03	47.11	8.30	6.76	7.07	0.89	23.24	11.40	1.29
26500	21.98	47.51	8.31	6.76	7.45	0.90	23.35	11.43	1.25
26600	21.91	47.71	8.22	6.78	7.66	0.90	22.90	11.37	1.23
26800	21.77	47.56	8.09	6.81	7.63	0.91	22.17	11.38	1.31
27000	21.64	48.26	8.11	6.84	8.41	0.91	21.46	11.54	1.31
27200	21.50	47.84	7.98	6.87	8.10	0.91	21.72	11.23	1.35
27400	21.38	46.75	8.17	6.78	7.25	0.90	21.88	11.53	1.30
27500	21.33	47.56	8.30	6.77	8.03	0.90	21.90	11.33	1.37
27600	21.27	46.27	8.30	6.82	7.01	0.90	22.72	11.41	1.33
27800	21.21	45.70	8.34	6.95	6.68	0.91	23.64	11.61	1.40
28000	21.06	47.02	8.46	6.91	7.90	0.91	22.06	11.54	1.37
28200	20.90	45.72	8.39	6.86	6.89	0.90	22.33	11.38	1.44
28400	20.76	45.38	8.24	6.81	6.70	0.91	21.22	11.44	1.37
28500	20.67	45.89	8.16	6.82	7.13	0.91	22.98	11.25	1.46
28600	20.59	45.93	8.08	6.85	7.18	0.92	22.05	11.40	1.51
28800	20.42	46.63	8.09	6.89	7.96	0.92	22.44	11.24	1.49
29000	20.24	45.57	7.77	6.88	7.07	0.93	22.12	11.21	1.53
29200	20.09	45.52	7.64	6.98	7.13	0.94	24.39	10.97	1.59
29400	19.95	45.77	7.65	7.23	7.55	0.96	22.26	11.26	1.62
29500	19.91	45.60	7.62	7.38	7.48	0.97	25.21	11.07	1.64
29600	19.85	45.63	7.64	7.49	7.61	0.97	22.92	11.04	1.66
29800	19.74	45.61	7.50	7.80	7.73	0.99	21.76	11.28	1.73
30000	19.73	45.30	7.57	8.25	7.66	1.01	21.93	11.47	1.69
30200	19.66	44.69	7.70	8.68	7.36	1.02	20.69	11.34	1.70
30400	19.59	45.42	7.71	9.12	8.21	1.04	22.10	11.42	1.75
30500	19.57	45.71	7.73	9.29	8.58	1.04	22.67	11.51	1.73
30600	19.56	45.51	7.76	9.44	8.47	1.04	21.29	11.66	1.75
30800	19.52	45.30	8.03	9.66	8.46	1.04	21.68	11.43	1.76
31000	19.49	45.56	8.29	9.81	8.91	1.04	22.22	11.46	1.66
32000	18.95	46.29	8.64	8.57	10.05	0.99	22.00	10.90	1.83



## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.75V, Id = 68mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	23.14	47.71	10.54	7.71	7.46	0.89	23.96	10.94	1.02
25200	22.95	46.84	10.20	7.51	6.80	0.89	21.99	10.75	1.05
25400	22.76	47.46	9.69	7.27	7.29	0.89	23.07	10.80	1.10
25500	22.66	47.59	9.51	7.18	7.41	0.89	23.16	10.74	1.14
25600	22.56	48.00	9.37	7.11	7.78	0.89	22.23	10.71	1.10
25800	22.36	47.35	9.03	6.96	7.26	0.89	22.71	10.70	1.24
26000	22.21	47.45	8.75	6.96	7.41	0.89	22.02	10.70	1.16
26200	22.05	47.89	8.57	6.89	7.84	0.90	23.31	10.81	1.20
26400	21.86	47.13	8.37	6.82	7.27	0.90	22.13	10.81	1.24
26500	21.79	47.16	8.34	6.82	7.34	0.90	22.56	10.82	1.30
26600	21.72	46.89	8.25	6.84	7.16	0.90	21.59	10.77	1.24
26800	21.57	47.23	8.13	6.87	7.56	0.91	21.81	10.79	1.29
27000	21.45	46.18	8.11	6.89	6.78	0.91	23.52	10.86	1.27
27200	21.31	46.75	7.99	6.89	7.33	0.91	21.13	10.61	1.33
27400	21.17	47.91	8.10	6.82	8.47	0.91	21.59	10.85	1.36
27500	21.13	46.14	8.21	6.79	7.00	0.90	22.36	10.76	1.34
27600	21.07	46.72	8.19	6.85	7.52	0.91	26.12	10.81	1.34
27800	21.00	45.80	8.24	7.00	6.93	0.91	22.47	11.02	1.36
28000	20.84	45.81	8.32	6.96	7.03	0.91	20.85	10.96	1.29
28200	20.69	47.20	8.26	6.91	8.33	0.91	22.45	10.78	1.38
28400	20.56	46.04	8.14	6.87	7.37	0.91	20.78	10.85	1.40
28500	20.47	45.23	8.08	6.86	6.72	0.92	22.49	10.67	1.51
28600	20.38	46.03	8.03	6.91	7.45	0.92	21.30	10.79	1.50
28800	20.22	46.55	8.02	6.94	8.05	0.93	23.29	10.65	1.49
29000	20.05	45.43	7.78	6.95	7.13	0.94	22.12	10.53	1.54
29200	19.90	45.02	7.66	7.06	6.90	0.95	22.00	10.36	1.58
29400	19.77	45.55	7.67	7.29	7.54	0.96	20.82	10.67	1.69
29500	19.73	44.42	7.63	7.43	6.67	0.97	22.44	10.48	1.63
29600	19.67	45.54	7.64	7.56	7.72	0.97	22.28	10.45	1.68
29800	19.57	44.96	7.55	7.82	7.35	0.99	21.87	10.68	1.66
30000	19.54	45.04	7.59	8.26	7.60	1.01	21.37	10.77	1.68
30200	19.47	45.20	7.70	8.68	7.98	1.02	22.72	10.63	1.83
30400	19.40	44.73	7.70	9.10	7.74	1.04	21.65	10.82	1.73
30500	19.37	45.38	7.72	9.28	8.44	1.04	23.24	10.81	1.77
30600	19.36	45.67	7.76	9.42	8.82	1.04	24.22	11.07	1.75
30800	19.31	44.83	7.98	9.65	8.18	1.04	21.27	10.84	1.75
31000	19.27	45.55	8.21	9.81	9.09	1.04	23.11	10.76	1.67
32000	18.73	46.14	8.46	8.61	10.08	0.99	22.40	10.30	1.82

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.25V, Id = 78mA @ Temperature = -45°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	23.50	48.05	10.62	7.53	7.41	0.88	23.44	12.06	1.05
25200	23.30	47.90	10.20	7.32	7.30	0.88	22.56	11.97	1.07
25400	23.10	48.19	9.56	7.10	7.53	0.88	23.01	11.94	1.14
25500	22.99	47.43	9.37	7.02	6.94	0.88	23.20	11.88	1.20
25600	22.89	47.75	9.25	6.94	7.21	0.88	23.33	11.93	1.14
25800	22.69	48.14	8.89	6.81	7.56	0.88	23.05	11.90	1.23
26000	22.54	47.91	8.61	6.82	7.43	0.89	22.55	11.93	1.21
26200	22.39	48.00	8.47	6.77	7.57	0.89	22.56	11.95	1.24
26400	22.20	48.31	8.28	6.71	7.92	0.89	22.90	11.94	1.25
26500	22.15	47.63	8.29	6.72	7.39	0.89	23.96	11.97	1.28
26600	22.07	46.78	8.20	6.72	6.75	0.89	22.67	11.92	1.25
26800	21.93	48.44	8.09	6.79	8.27	0.90	22.24	11.93	1.28
27000	21.82	47.56	8.12	6.81	7.59	0.90	24.06	12.07	1.31
27200	21.68	46.75	8.03	6.83	7.01	0.91	22.03	11.87	1.39
27400	21.56	46.06	8.25	6.70	6.60	0.89	24.02	12.06	1.35
27500	21.51	45.27	8.35	6.74	6.08	0.90	23.37	11.86	1.38
27600	21.46	46.64	8.35	6.78	7.16	0.90	21.69	11.95	1.34
27800	21.40	46.64	8.42	6.92	7.29	0.91	20.73	12.16	1.35
28000	21.24	46.60	8.54	6.88	7.38	0.90	21.35	12.08	1.37
28200	21.09	46.53	8.45	6.82	7.41	0.90	24.73	11.93	1.46
28400	20.94	45.66	8.27	6.75	6.74	0.90	21.67	12.05	1.43
28500	20.84	45.74	8.21	6.75	6.83	0.91	22.56	11.78	1.44
28600	20.76	45.01	8.12	6.78	6.33	0.91	21.39	11.96	1.48
28800	20.60	46.70	8.14	6.82	7.84	0.91	21.62	11.78	1.52
29000	20.41	46.14	7.82	6.85	7.41	0.93	21.46	11.74	1.57
29200	20.25	45.60	7.67	6.94	7.05	0.94	22.68	11.50	1.61
29400	20.12	46.15	7.65	7.18	7.72	0.95	22.52	11.79	1.60
29500	20.08	45.38	7.63	7.36	7.15	0.96	21.07	11.60	1.66
29600	20.02	45.82	7.65	7.47	7.62	0.97	23.28	11.67	1.70
29800	19.91	46.03	7.50	7.76	7.96	0.99	22.77	11.83	1.71
30000	19.91	45.36	7.59	8.26	7.57	1.01	21.55	12.03	1.70
30200	19.84	45.44	7.73	8.69	7.88	1.02	23.92	11.80	1.75
30400	19.79	45.12	7.74	9.15	7.78	1.04	22.90	11.98	1.76
30500	19.75	45.69	7.76	9.33	8.39	1.04	22.39	12.06	1.76
30600	19.75	45.68	7.79	9.45	8.46	1.04	22.94	12.21	1.78
30800	19.72	46.36	8.08	9.69	9.37	1.04	23.21	11.99	1.79
31000	19.69	45.60	8.37	9.85	8.78	1.04	22.83	12.01	1.80
32000	19.16	46.73	8.75	8.51	10.34	0.98	22.43	11.44	1.81

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 4.00V, Id = 65mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	20.38	48.17	10.77	8.73	11.66	0.93	22.23	10.67	2.28
25200	20.24	48.19	10.60	8.59	11.79	0.93	21.46	10.58	2.31
25400	20.10	48.34	10.34	8.38	12.03	0.93	22.00	10.66	2.28
25500	20.00	47.96	10.18	8.29	11.56	0.93	21.98	10.56	2.32
25600	19.90	47.87	9.98	8.22	11.50	0.93	22.88	10.54	2.32
25800	19.73	47.97	9.73	8.07	11.71	0.93	22.18	10.61	2.41
26000	19.56	47.81	9.55	7.96	11.64	0.93	20.93	10.55	2.41
26200	19.37	48.12	9.33	7.84	12.17	0.93	22.03	10.63	2.45
26400	19.20	48.15	9.10	7.77	12.33	0.93	21.88	10.68	2.45
26500	19.13	48.14	8.95	7.73	12.34	0.93	21.96	10.65	2.52
26600	19.02	46.99	8.86	7.71	10.88	0.94	22.80	10.57	2.50
26800	18.86	47.65	8.72	7.70	11.96	0.94	21.88	10.67	2.59
27000	18.70	46.85	8.46	7.63	10.94	0.94	21.61	10.66	2.58
27200	18.52	47.03	8.30	7.64	11.31	0.95	21.21	10.32	2.62
27400	18.38	47.25	8.19	7.63	11.73	0.95	22.06	10.70	2.66
27500	18.31	46.55	8.05	7.62	10.86	0.95	21.31	10.55	2.70
27600	18.25	46.78	8.14	7.65	11.26	0.96	22.25	10.45	2.66
27800	18.17	46.71	7.98	7.81	11.34	0.97	21.03	10.79	2.68
28000	18.01	46.53	7.86	7.87	11.23	0.97	20.05	10.85	2.59
28200	17.91	46.31	7.87	8.00	11.16	0.98	22.11	10.56	2.82
28400	17.82	47.03	7.82	8.13	12.32	0.99	20.42	10.71	2.77
28500	17.75	46.33	7.75	8.21	11.41	0.99	21.88	10.50	2.85
28600	17.71	46.29	7.78	8.33	11.50	1.00	22.33	10.61	2.92
28800	17.62	46.14	7.84	8.50	11.52	1.00	20.94	10.49	2.92
29000	17.55	46.11	7.87	8.72	11.68	1.01	20.28	10.40	2.83
29200	17.47	45.86	7.88	9.00	11.58	1.02	21.44	10.25	2.91
29400	17.39	45.91	7.84	9.26	11.84	1.03	21.28	10.57	2.93
29500	17.36	45.54	7.88	9.45	11.47	1.04	20.81	10.32	2.98
29600	17.33	45.72	7.95	9.54	11.85	1.04	21.14	10.33	2.96
29800	17.23	45.05	8.08	9.88	11.26	1.04	22.24	10.55	2.99
30000	17.16	45.65	8.06	10.21	12.27	1.05	21.26	10.71	3.00
30200	17.06	46.25	8.23	10.44	13.48	1.05	21.77	10.61	3.06
30400	16.99	46.45	8.25	10.73	14.03	1.06	21.04	10.55	3.02
30500	16.95	45.67	8.35	10.87	12.96	1.06	22.34	10.70	3.11
30600	16.93	46.77	8.35	10.94	14.82	1.06	22.61	10.86	3.10
30800	16.84	46.03	8.45	11.09	13.82	1.06	21.61	10.55	3.12
31000	16.76	46.09	8.55	11.18	14.17	1.06	21.29	10.70	3.15
32000	16.08	46.81	8.01	10.30	16.01	1.06	21.80	10.22	3.31

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.75V, Id = 60mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	20.20	47.98	10.75	8.83	11.68	0.94	21.96	10.13	2.31
25200	20.05	47.03	10.58	8.68	10.57	0.93	21.10	10.04	2.29
25400	19.92	47.60	10.32	8.46	11.32	0.93	20.91	10.10	2.34
25500	19.82	48.01	10.17	8.37	11.92	0.93	21.90	10.02	2.40
25600	19.72	47.75	9.97	8.31	11.63	0.93	21.99	10.10	2.32
25800	19.55	47.67	9.72	8.15	11.59	0.93	21.31	10.06	2.41
26000	19.37	48.10	9.54	8.04	12.31	0.93	20.58	10.01	2.42
26200	19.19	47.67	9.31	7.91	11.85	0.93	21.15	10.07	2.43
26400	19.02	48.30	9.09	7.83	12.83	0.93	21.12	10.13	2.50
26500	18.95	48.31	8.94	7.79	12.88	0.94	20.60	10.10	2.54
26600	18.83	46.37	8.83	7.76	10.38	0.94	21.20	9.91	2.48
26800	18.67	48.20	8.71	7.74	13.00	0.94	22.57	10.01	2.51
27000	18.52	47.54	8.46	7.67	12.11	0.94	21.61	10.21	2.57
27200	18.34	48.05	8.26	7.68	13.02	0.95	21.94	9.76	2.62
27400	18.20	47.99	8.16	7.66	13.07	0.95	20.17	10.14	2.61
27500	18.13	48.37	8.03	7.66	13.67	0.96	20.67	10.00	2.66
27600	18.07	47.15	8.09	7.68	12.01	0.96	21.22	9.91	2.70
27800	17.97	46.98	7.94	7.81	11.96	0.97	21.58	10.22	2.78
28000	17.82	46.91	7.84	7.91	12.01	0.98	22.38	10.19	2.78
28200	17.72	45.14	7.82	8.05	9.99	0.98	19.95	9.89	2.82
28400	17.63	46.05	7.76	8.16	11.21	0.99	20.67	10.15	2.77
28500	17.56	46.47	7.71	8.25	11.87	1.00	20.72	9.94	2.83
28600	17.52	45.80	7.70	8.34	11.06	1.00	20.88	10.06	2.91
28800	17.42	45.04	7.76	8.53	10.35	1.01	21.29	9.82	2.86
29000	17.35	46.67	7.81	8.76	12.74	1.02	20.48	9.85	2.90
29200	17.27	46.03	7.80	9.03	12.04	1.03	21.46	9.69	2.95
29400	17.20	45.87	7.76	9.28	12.02	1.04	21.61	9.91	2.95
29500	17.16	45.42	7.80	9.44	11.52	1.04	21.26	9.75	2.93
29600	17.13	45.30	7.85	9.57	11.49	1.04	21.39	9.78	2.98
29800	17.04	45.44	8.00	9.89	11.99	1.05	21.13	10.00	2.92
30000	16.96	46.38	7.97	10.18	13.61	1.05	20.09	10.15	2.99
30200	16.86	46.00	8.13	10.43	13.36	1.06	22.27	9.94	2.98
30400	16.78	45.39	8.17	10.72	12.66	1.06	21.98	10.11	3.07
30500	16.75	46.48	8.25	10.83	14.51	1.06	21.94	10.15	3.05
30600	16.72	46.32	8.26	10.92	14.36	1.06	20.86	10.30	3.06
30800	16.63	45.84	8.36	11.07	13.80	1.06	20.81	10.10	3.14
31000	16.55	46.88	8.44	11.12	15.81	1.06	20.55	10.13	3.10
32000	15.88	47.28	7.93	10.28	17.23	1.06	20.50	9.56	3.36

## Typical Performance Data

### Definitions:

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

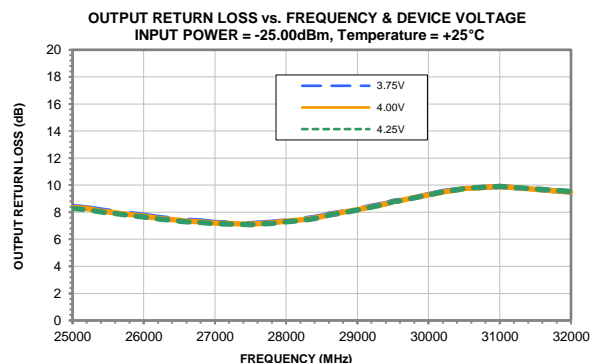
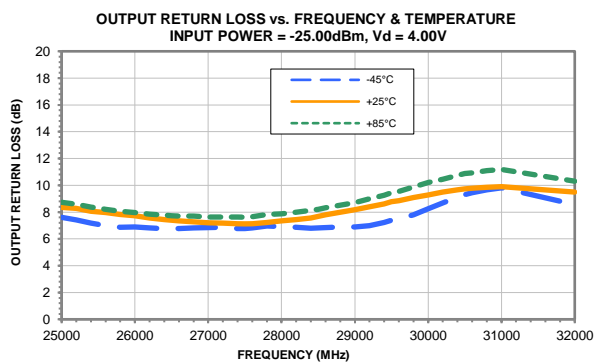
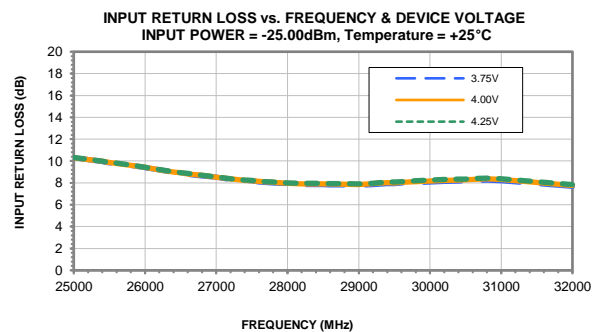
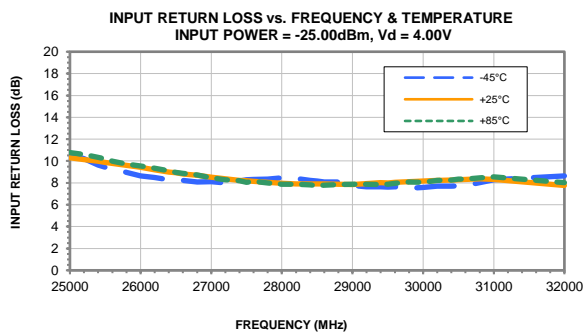
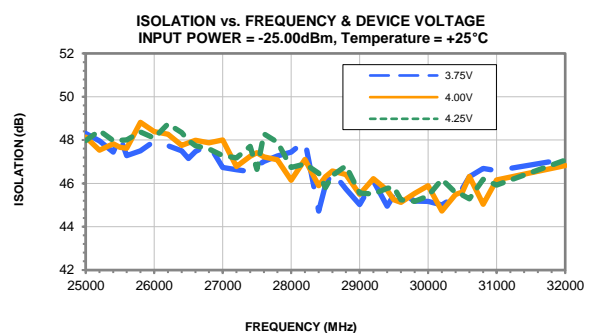
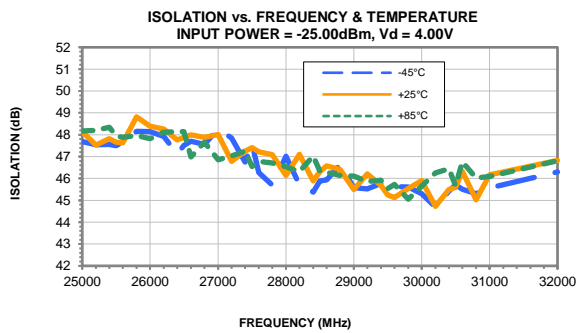
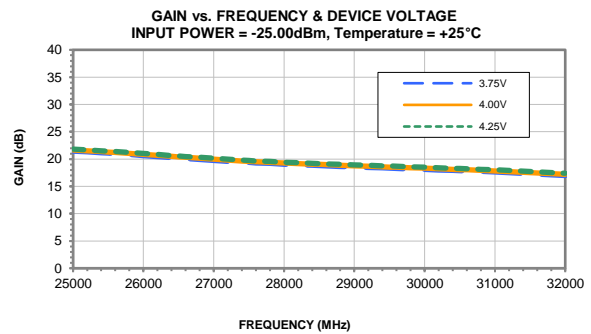
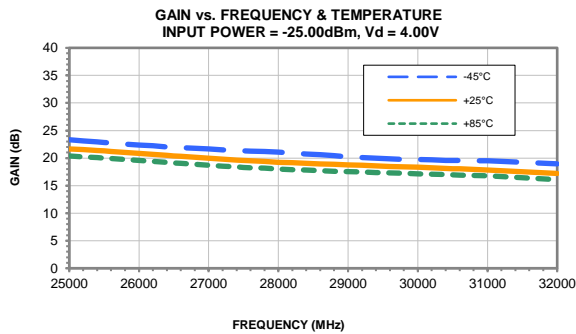
Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

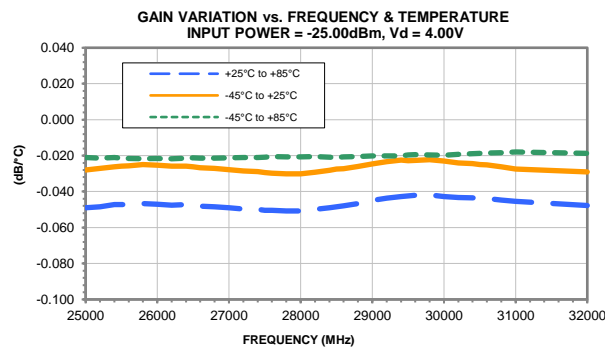
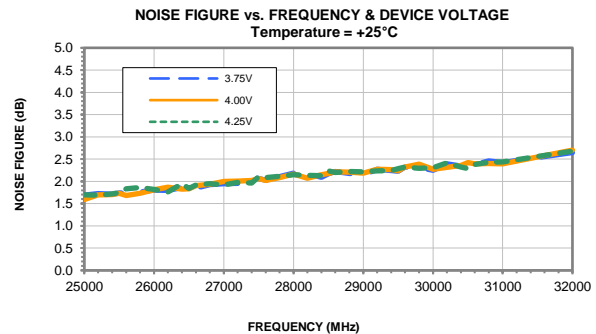
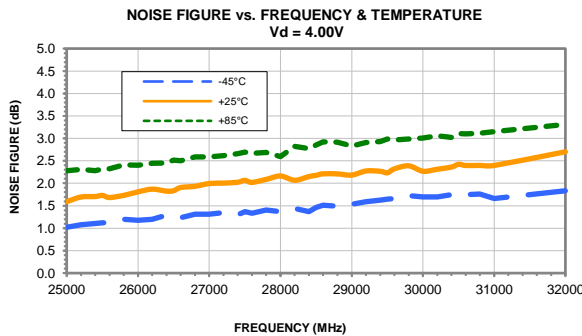
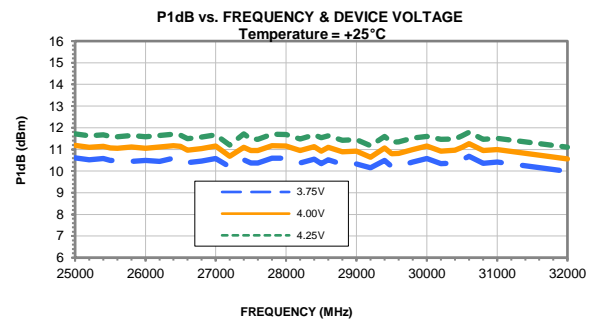
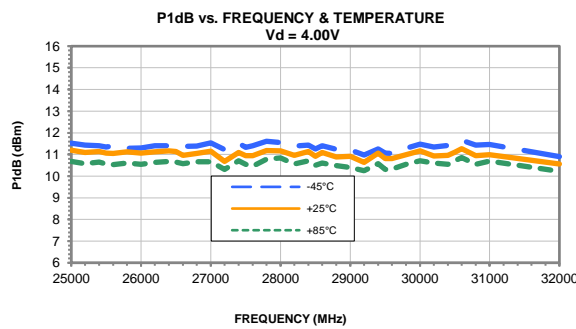
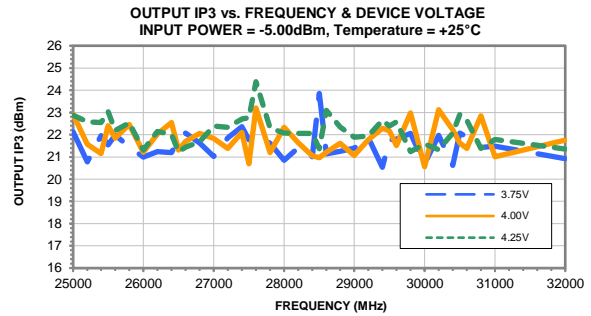
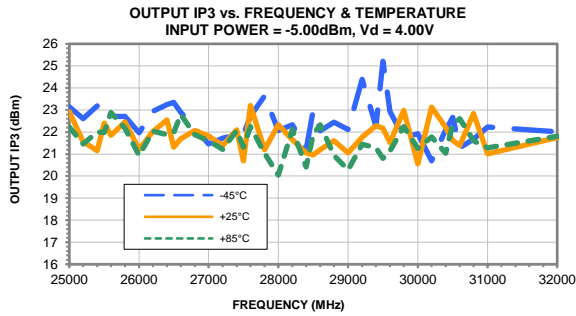
TEST CONDITIONS: Vd = 4.25V, Id = 69mA @ Temperature = +85°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
25000	20.53	48.09	10.79	8.66	11.34	0.93	22.24	11.17	2.27
25200	20.38	48.19	10.61	8.51	11.55	0.93	22.05	11.08	2.29
25400	20.25	48.41	10.36	8.31	11.91	0.92	21.65	11.15	2.34
25500	20.15	48.33	10.20	8.23	11.86	0.92	21.78	11.06	2.30
25600	20.05	48.08	9.99	8.14	11.55	0.92	22.54	11.04	2.34
25800	19.88	48.68	9.74	8.01	12.46	0.93	22.00	11.11	2.43
26000	19.71	48.71	9.57	7.90	12.66	0.92	20.98	11.06	2.44
26200	19.52	48.32	9.35	7.78	12.23	0.93	21.72	11.13	2.43
26400	19.35	48.27	9.12	7.72	12.27	0.93	22.20	11.19	2.54
26500	19.28	48.52	8.97	7.69	12.67	0.93	21.04	11.25	2.54
26600	19.17	47.39	8.86	7.66	11.19	0.93	23.06	10.97	2.55
26800	19.01	47.93	8.74	7.64	12.11	0.93	21.01	11.07	2.59
27000	18.85	47.80	8.51	7.60	11.98	0.94	22.78	11.26	2.61
27200	18.67	48.04	8.32	7.62	12.49	0.95	21.62	10.82	2.64
27400	18.53	47.43	8.22	7.58	11.77	0.95	20.83	11.22	2.69
27500	18.47	47.06	8.08	7.57	11.33	0.95	22.64	11.05	2.70
27600	18.41	47.08	8.16	7.61	11.45	0.95	21.25	10.97	2.70
27800	18.32	46.17	8.00	7.77	10.45	0.96	21.48	11.30	2.72
28000	18.17	45.80	7.88	7.83	10.11	0.97	22.39	11.26	2.91
28200	18.06	47.19	7.91	7.97	12.15	0.98	22.89	10.96	2.80
28400	17.97	46.98	7.87	8.12	12.05	0.99	22.41	11.22	2.81
28500	17.90	46.70	7.81	8.18	11.73	0.99	22.51	11.01	2.88
28600	17.87	46.47	7.83	8.30	11.54	1.00	22.38	11.12	2.88
28800	17.78	45.94	7.88	8.49	11.07	1.00	21.36	10.90	2.89
29000	17.70	46.56	7.95	8.71	12.14	1.01	20.95	10.91	2.90
29200	17.63	47.24	7.93	8.97	13.37	1.02	21.86	10.66	2.92
29400	17.55	45.24	7.91	9.24	10.78	1.03	22.47	11.08	2.89
29500	17.53	46.47	7.95	9.44	12.58	1.03	22.14	10.82	2.98
29600	17.49	46.45	8.00	9.55	12.68	1.04	21.20	10.84	2.96
29800	17.40	45.36	8.14	9.90	11.47	1.04	23.13	10.95	2.86
30000	17.32	46.93	8.13	10.21	14.01	1.05	21.13	11.21	2.93
30200	17.22	45.97	8.29	10.46	12.86	1.05	22.30	11.01	3.09
30400	17.15	45.43	8.33	10.79	12.29	1.06	21.37	11.08	3.09
30500	17.12	45.76	8.42	10.91	12.90	1.06	21.59	11.21	3.10
30600	17.09	45.71	8.43	10.99	12.93	1.06	21.17	11.37	3.09
30800	17.01	45.78	8.53	11.15	13.22	1.06	20.76	11.06	3.12
31000	16.93	47.55	8.61	11.18	16.49	1.06	21.34	11.20	2.96
32000	16.26	47.62	8.09	10.31	17.29	1.05	21.18	10.73	3.34

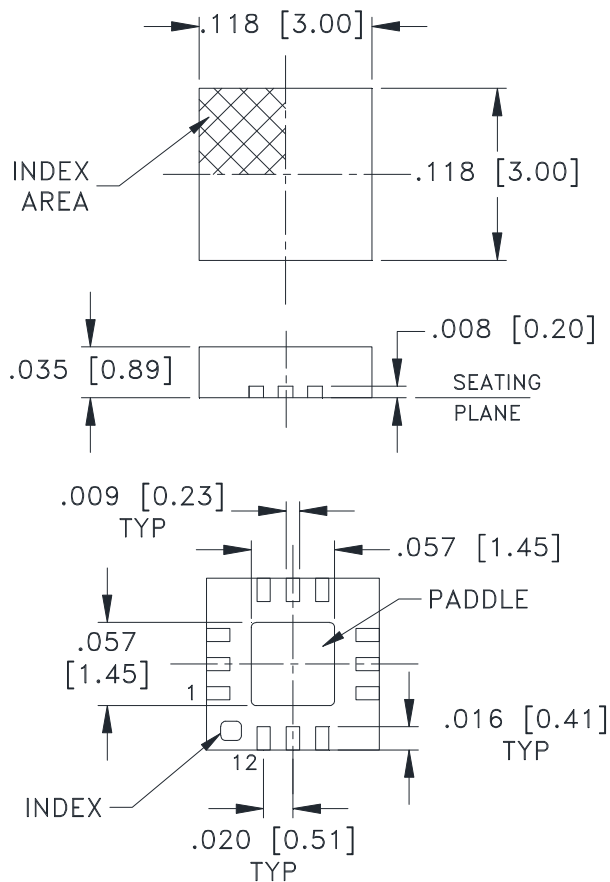
## Typical Performance Curves



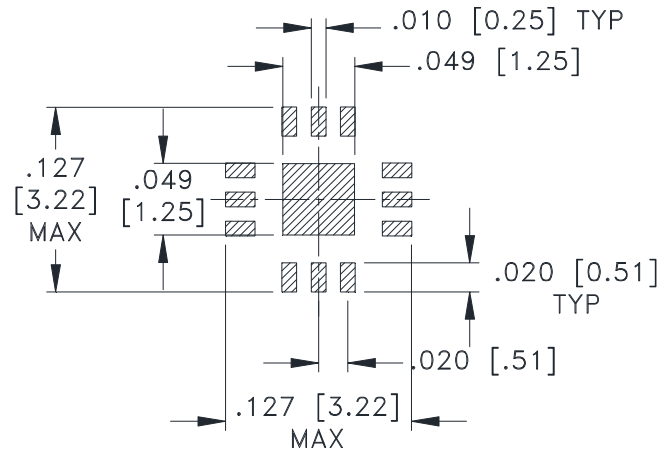
## Typical Performance Curves



### Outline Dimensions



### PCB Land Pattern



SUGGESTED LAYOUT,  
TOLERANCE TO BE WITHIN  $\pm .002$

**Weight: .02 Grams**

**Dimensions are in inches (mm). Tolerances: 2Pl.  $\pm .01$ ; 3 Pl.  $\pm .004$**

#### Notes:

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

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# Tape & Reel Packaging TR-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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

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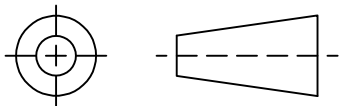
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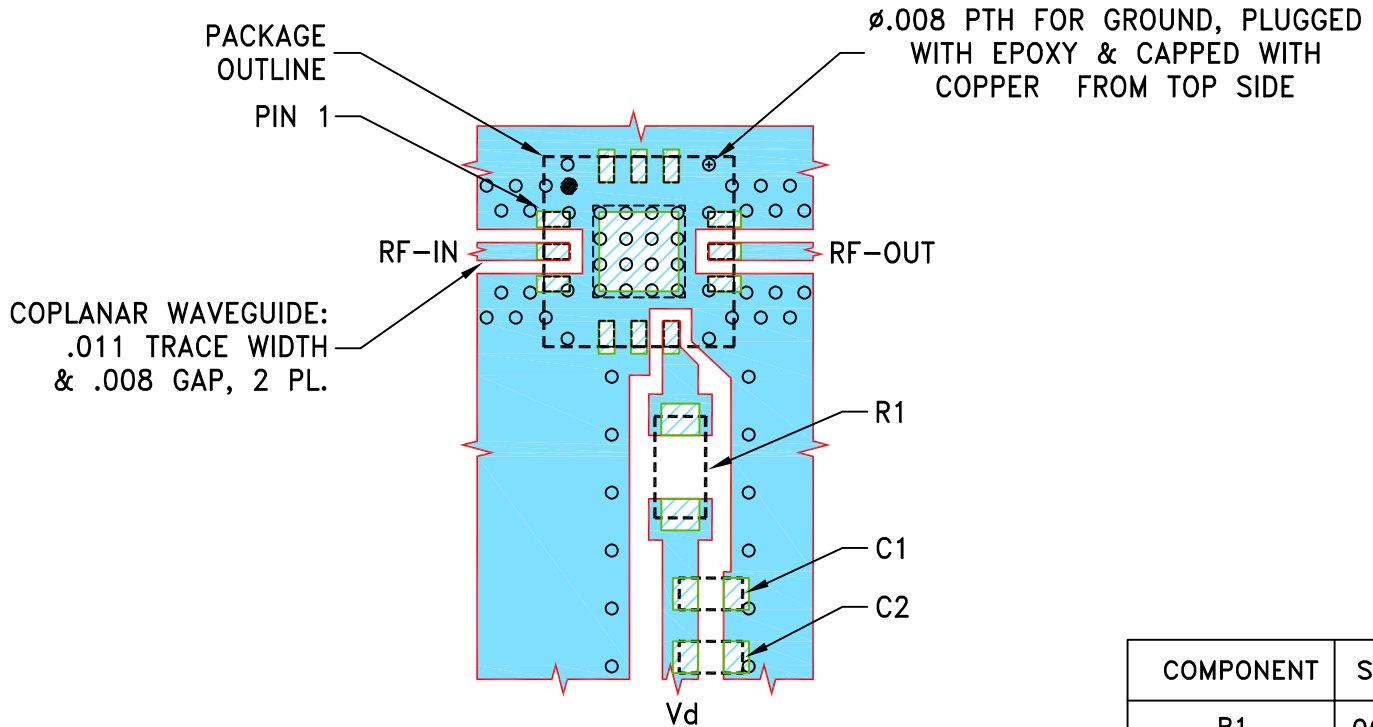
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-002696	NEW RELEASE	05/27/20	ITG	CC
A	ECO-011382	UPDATED LAYOUT AND NEW R1 SIZE	01/12/22	ITG	IL

SUGGESTED MOUNTING CONFIGURATION  
FOR DQ1225 CASE STYLE



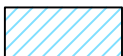
COMPONENT	SIZE
R1	0603
C2,C2	0402

NOTES:

1. TRACE WIDTH & GAP PARAMETERS ARE SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS  $.0066" \pm .0007"$ . COPPER: 1 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH & GAP MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-PMA3-223GLNC+; TB-PMA3-313GLNC+; TB-PMA3-346GLNC+.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



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



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN ITG	05/27/20
TOLERANCES ON:	CHECKED GF	05/27/20
2 PL DECIMALS $\pm$	APPROVED CC	05/27/20
3 PL DECIMALS $\pm$ .005		
ANGLES $\pm$		
FRACTIONS $\pm$		



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Brooklyn NY 11235

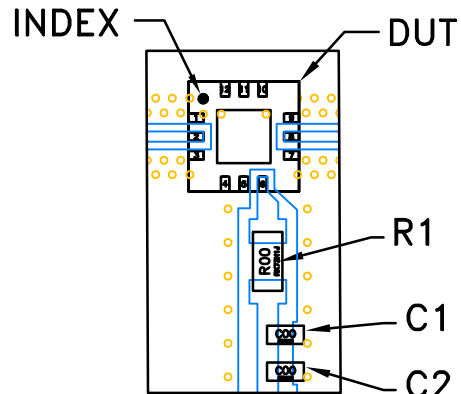
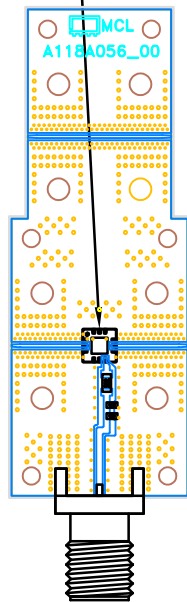
PL. DQ1225, TB-PMA3-XXXGLNC+

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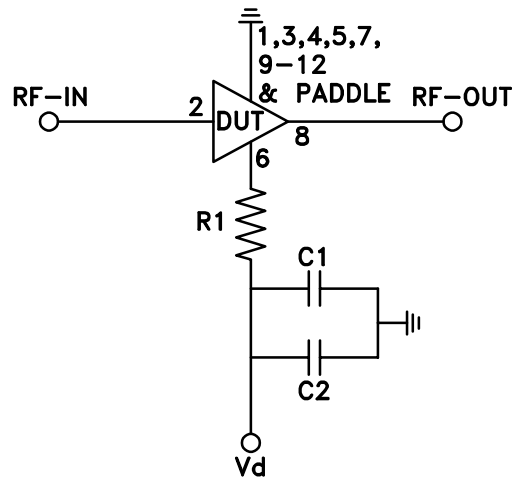
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-674	A
FILE:	98PL674	SCALE: 8:1	SHEET: 1 OF 1

# Evaluation Board and Circuit

SEE DETAIL "A"



DETAIL "A"  
(SCALE 3:1)



SCHEMATIC DIAGRAM

Component	Size	Value	Part Number	Manufacturer
R1	0603	180hm	SG73G1JTTD18R0C	Koa Speer
C1	0402	5pF	GJM1555C1H5R0CB01D	Murata
C2	0402	0.1uF	GRM155R71C104KA88D	Murata

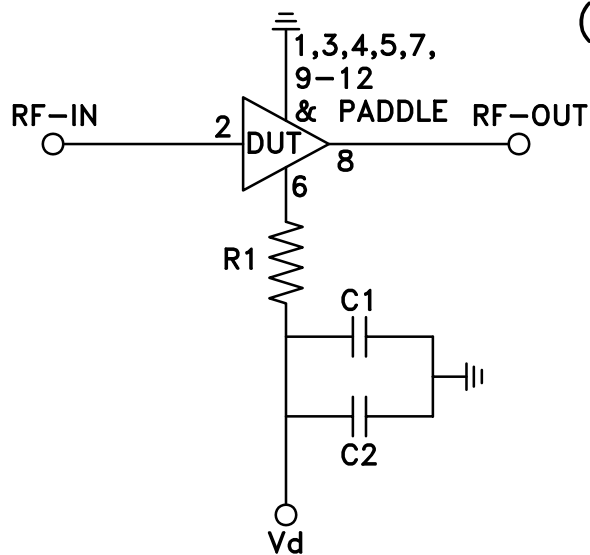
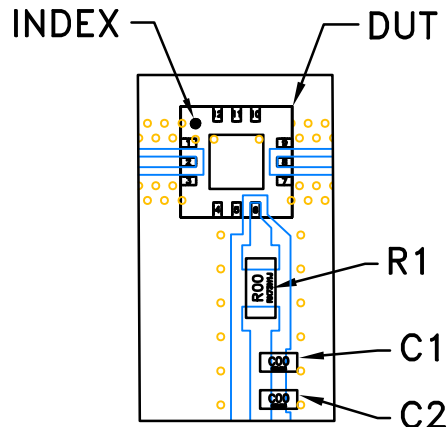
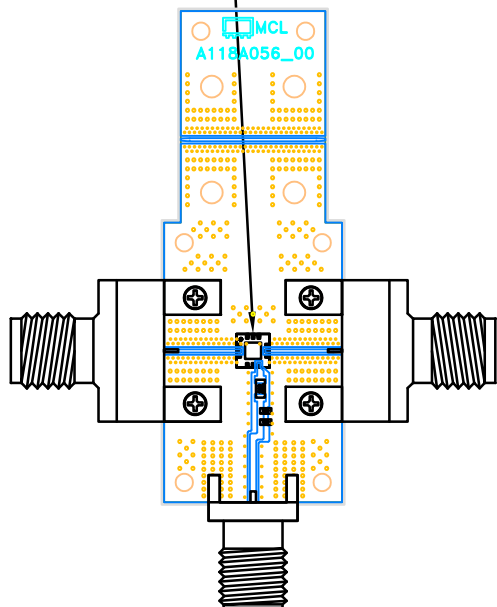
## Notes:

- 2.4mm Female Connectors,
- PCB Material: Roger R04350B or equivalent,  
Dielectric constant=3.5, Thickness=0.0066 inch.

 Mini-Circuits®

# Evaluation Board and Circuit

SEE DETAIL "A"



SCHEMATIC DIAGRAM

Component	Size	Value	Part Number	Manufacturer
R1	0603	180hm	SG73G1JTTD18R0C	Koa Speer
C1	0402	5pF	GJM1555C1H5R0CB01D	Murata
C2	0402	0.1uF	GRM155R71C104KA88D	Murata

## Notes:

- 2.4mm Female Connectors,
- PCB Material: Roger RO4350B or equivalent,  
Dielectric constant=3.5, Thickness=0.0066 inch.

 Mini-Circuits®

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

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C or -45° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether +	MIL-STD-202, Method 215



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

<b>Specification</b>	<b>Test/Inspection Condition</b>	<b>Reference/Spec</b>
	monoethanolamine at 63°C to 70°C	