Ultra Low Noise, High IP3

Monolithic Amplifier

CMA-545+

50Ω 0.05 to 6 GHz

The Big Deal

- Ceramic, Hermetically sealed, Nitrogen Filled
- Low profile case, .045" high
- Ultra Low Noise Figure, 0.8 dB typ.
- Output Power, +20dBm at 1GHz

CASE STYLE: DL1721

MIL Screening Available
Please consult Applications Dept.

Product Overview

Mini-Circuits CMA-545+ delivers a unique combination of ultra low noise and high IP3 performance, ideal for sensitive receiver applications. The E-PHEMT amplifier die is bonded to a multilayer integrated LTCC substrate, and then hermetically sealed under a controlled nitrogen atmosphere with gold-plated covers and eutectic AuSn solder. As a result, this rugged amplifier is capable of meeting MIL requirements for gross leak, fine leak, thermal shock, vibration, acceleration, mechanical shock, and HTOL. The testing can be done if requested. The CMA-545+ operates on a single 3V supply and is internally matched to 50Ω, with no external matching components required.

Key Features

Feature		Advantages
Ultra Low Noise:	0.8 dB NF at 1GHz	Industry Leading Noise Figure, measured in a 50 Ohm environment – without any external matching.
High IP3:	+35 dBm IP3 at 1GHz	Combining Low Noise and High IP3 makes this MMIC amplifier ideal for Low Noise Receiver Front End (RFE) because it gives the user advantages at both ends of the dynamic range, sensitivity & high level operation.
Output Power:	+20 dBm at 1GHz	The CMA-545+ maintains consistent output power capability over the full operating temperature range making it ideal to be used in remote applications such as LNB's as the L Band driver stage.
Broad Band:	0.05 to 6.0GHz	Broadband covering primary wireless communications bands: Cellular, PCS, LTE, WiMAX.
Internally Matched		No external matching elements required to achieve the advertized noise and output power over the full band.
Ceramic Hermetic Package		Low Inductance, repeatable performance, excellent reliability.
Max Input Power	+20 dBm	Ruggedized design operates up to input powers often seen at Receiver inputs. Can operate up to +20 dBm input without the need of an external limiter.
High Reliability		Small signal operating current of 80 mA nominal maintains junction temperatures typically below 130°C at 105°C package terminals.

Ultra Low Noise, High IP3

Monolithic Amplifier

0.05-6 GHz

Product Features

- Ultra Low Noise Figure, 0.8 dB typ. at 1GHz
- High IP3, 35 dBm typ. 1GHz
- Gain, 20dB typ. at 1 GHz
- Output Power, up to +20dBm typ.
- Single Positive Supply Voltage, 3V
- Small size - 3mm x 3mm x 1.14mm
- Ceramic, hermetic, Nitrogen filled

Generic photo used for illustration purposes only

CASE STYLE: DL1721

CMA-545+

+RoHS Compliant

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

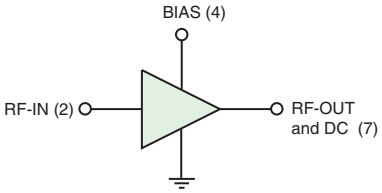
Typical Applications

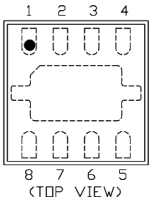
- Cellular
- ISM
- GSM
- WCDMA
- LTE
- WiMAX
- WLAN

General Description

CMA-545+ is a high dynamic range, low noise, high IP3, high output power, monolithic amplifier. Manufactured using E-PHEMT* technology enables it to work with a single positive supply voltage. Unconditionally stable over the operating frequency. Terminal finish is Ni-pd-Au and it has repeatable performance from lot to lot due to fully automated, tightly controlled semiconductor and assembly processes.

simplified schematic and pad description





Function	Pad Number	Description *(See Application Circuit, Fig. 2)*
RF-IN	2	RF input pad
RF-OUT & DC	7	RF output pad (connected to RF-OUT via blocking external cap C2, and Supply voltage Vs via RF Choke L1)
BIAS	4	Bias pad (connected to Vs via Rbias)
GND	1,3,5,6,8, Bottom Center Paddle	Connected to ground

*Enhancement mode Pseudomorphic High Electron Mobility Transistor.

Electrical Specifications[1] at 25°C, Zo=50Ω, *(refer to characterization circuit)*

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		0.05		6.0	GHz
Noise Figure	0.05	—	1.3	—	dB
	0.5	—	0.8	—	
	1.0	—	0.8	—	
	2.0	—	1.2	1.4	
	3.0	—	1.3	—	
	4.0	—	1.7	—	
	5.0	—	2.0	—	
	6.0	—	2.5	—	
Gain	0.05	—	26.2	—	dB
	0.5	—	23.4	—	
	1.0	—	19.7	—	
	2.0	12.7	14.8	15.6	
	3.0	—	12.0	—	
	4.0	—	9.7	—	
	5.0	—	8.4	—	
	6.0	—	6.6	—	
Input Return Loss	0.05-0.5		9.0		dB
	0.5-6		7.0		
Output Return Loss	0.05		13.0		dB
	0.1-3		14.0		
	3-6		12.0		
Output IP3	0.05		32.0		dBm
	0.5		34.0		
	1.0		35.0		
	2.0		37.1		
	3.0		38.0		
	4.0		37.8		
	5.0		38.4		
	6.0		36.6		
Output Power @ 1 dB compression [2]	0.05	—	19.9	—	dBm
	0.5	—	19.2	—	
	1.0	—	19.0	—	
	2.0	18.3	20.0	—	
	3.0	—	20.3	—	
	4.0	—	20.3	—	
	5.0	—	21.5	—	
	6.0	—	21.0	—	
DC Voltage (V_d)		2.8	3.0	3.2	V
DC Current (I_d)[2]		65	80	98	mA
DC Current (I_{Rbias})			5.6		mA
DC Current Variation vs. Temperature [3]			-0.121		mA/°C
Thermal Resistance			116		°C/W

Absolute Maximum Ratings[4]

Parameter	Ratings
Operating Temperature [5]	-55°C to 105°C
Storage Temperature	-65°C to 125°C
Channel Temperature	150°C
DC Voltage (Pad 7)	5V
Power Dissipation	500mW
DC Current (Pad 6)	160mA
Bias Current (Pad 4)	10mA
Input Power	20dBm

[1] Measured on Mini-Circuits Characterization test board TB-631+. See Characterization Test Circuit (Fig. 1)
[2] Current increases at P1dB
[3] (Current at 85°C - Current at -45°C)/130
[4] Permanent damage may occur if any of these limits are exceeded. These maximum ratings are not intended for continuous normal operation.
[5] Defined with reference to ground pad temperature.

Characterization Test Circuit

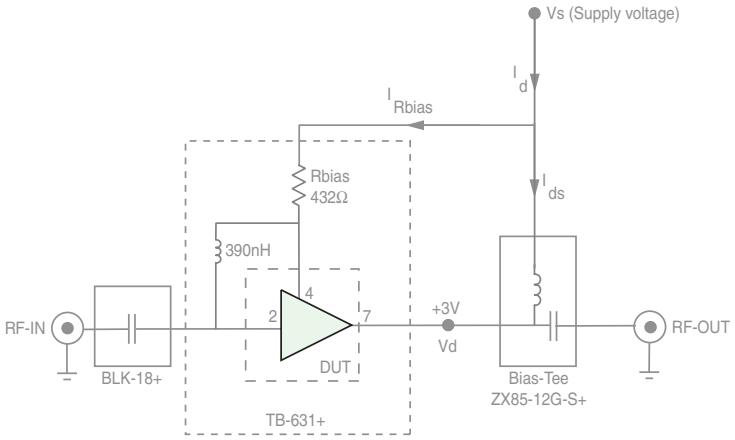


Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization Test Board TB-631+) Gain, Output power at 1dB compression (P1dB), Output IP3 (OIP3) are measured using R&S Network Analyzer ZVA-24. Noise Figure measured using Agilent's N5242A PNA-X microwave network analyzer.

Conditions:
1. Gain: Pin=-25 dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/tone at output.
3. Vs adjusted for 3V at device (Vd), compensating loss of bias tee.

Recommended Application Circuit

(refer to evaluation board for PCB Layout and component values)

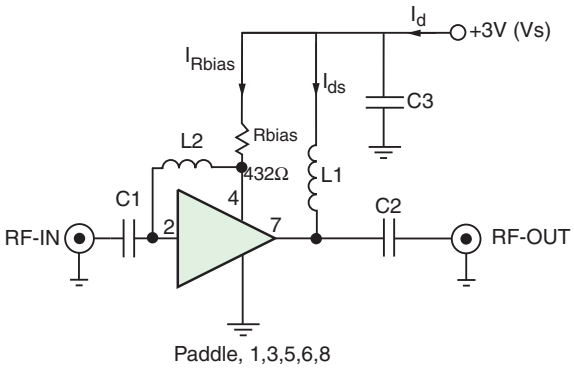
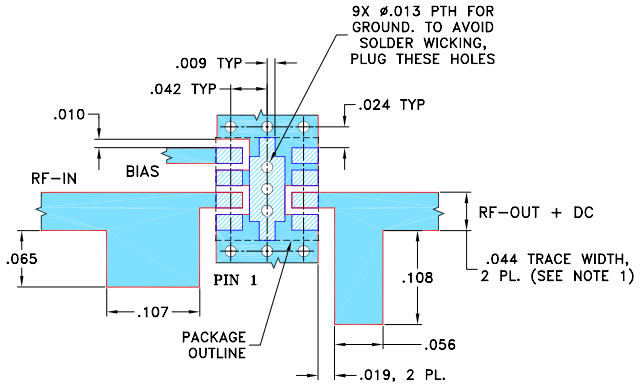


Fig 2. Recommended Application Circuit
Note: Resistance of L1, 0.1-0.2Ω typically. For component values, please see evaluation board drawing.

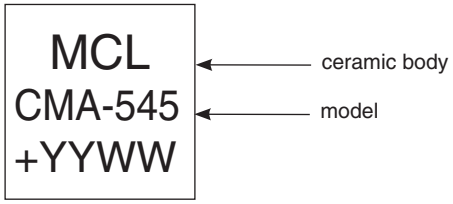
Suggested PCB Layout (PL-365)



NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. 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

Product Marking



Additional Detailed Technical Information *additional information is available on our dash board. To access this information click here*	
Performance Data	Data Table
	Swept Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DL1721 *Ceramic package, exposed paddle, Terminal finish: Ni,Pd,Au*
Tape & Reel **Standard quantities available on reel**	F66-1 *7" reels with 20, 50, 100, 200, 500 or 1K, 2K devices.*
Suggested Layout for PCB Design	PL-365
Evaluation Board	TB-631+
Environmental Ratings	ENV-68

ESD Rating

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

Machine Model (MM): Class M1 (<100V) in accordance with ANSI/ESD STM5.2-1999; passes 40V

MSL Rating

Moisture Sensitivity: MSL1 (these parts are hermetic, air cavity and therefore, MSL ratings do not strictly apply. For handling purpose, use MSL1)

Qualification Testing

The table below shows the initial qualification testing performed. If required, parts can be subjected to 100% screening and qualifications testing per MIL standard requirement.

	Test Description	Test Method/Process	Results
1	Hermeticity (fine and gross leak)	MIL-STD-202 Method 112, Cond. C & D	Pass
2	Acceleration, 30Kg, Y1 Direction	MIL-STD-883 Method 2001 Cond. E	Pass
3	Vibration , 10-2000Hz sine, 20g, 3 axis	MIL-STD-202 Method 204, Cond. D	Pass
4	Mechanical shock	MIL-STD-202 Method 213, Cond . A	Pass
5	PIND 20G's @130 Hz	MIL-STD-750 Method 2052.2	Pass
6	Temp Cycle -55C/+125C, 1000 Cycles	MIL-STD-202 Method 107	Pass
7	Autoclave, 121C, RH 100%, 15 Psig, 96 hrs	JESD22-A102C	Pass
8	HTOL, 1000hrs, 105C at rated Voltage condition	MIL-STD-202 Method 108, Cond . D	Pass
9	Bend Test	JESD22-B113	Pass
10	Resistance to soldering heat, 3x reflow, 260C peak	JESD22-B102	Pass
11	Drop Test	JESD22-B111	Pass
12	Adhesion Strength	Push Test>10 lb	Pass

Additional 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

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions

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

TEST CONDITIONS: Vd = 3V, Id = 79.04 mA @ Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	26.24	32.67	10.16	11.85	1.12	0.80	32.67	17.98	1.28
60.0	26.29	31.42	10.23	14.46	1.04	0.77	33.91	18.49	0.96
80.0	26.28	31.53	10.24	16.25	1.06	0.80	33.60	18.97	0.84
200.0	25.82	30.79	9.39	19.53	1.02	0.82	34.29	19.13	0.62
300.0	25.22	30.21	8.44	19.21	1.01	0.84	34.11	19.01	0.79
400.0	24.50	29.86	7.66	18.57	1.02	0.87	33.76	18.77	0.80
500.0	23.68	29.36	7.04	18.17	1.04	0.88	33.56	18.78	0.81
600.0	22.92	28.80	6.53	17.64	1.06	0.89	33.82	18.79	0.84
700.0	22.13	28.47	6.17	17.35	1.08	0.92	34.14	18.63	0.85
800.0	21.36	28.07	5.95	17.29	1.09	0.96	34.05	18.65	0.87
900.0	20.66	27.70	5.76	16.95	1.09	0.99	34.67	18.94	0.87
1000.0	20.00	27.31	5.60	16.74	1.08	1.03	34.22	18.97	0.93
1250.0	18.50	26.37	5.40	16.39	1.04	1.11	34.27	18.79	0.96
1500.0	17.22	25.50	5.40	16.27	1.03	1.16	34.78	18.91	1.07
1750.0	15.98	24.86	5.82	16.11	1.10	1.16	35.14	19.25	1.22
2000.0	15.19	23.80	5.76	15.76	1.08	1.14	34.67	19.23	1.12
2250.0	14.44	22.99	6.17	15.35	1.14	1.09	35.18	19.41	1.25
2500.0	13.76	22.18	6.71	14.73	1.20	1.02	36.58	19.84	1.29
2750.0	13.13	21.45	7.24	13.90	1.27	0.95	36.40	20.05	1.45
3000.0	12.61	20.74	8.02	13.13	1.30	0.88	36.85	20.24	1.32
3250.0	12.10	20.06	8.79	12.32	1.30	0.84	36.21	20.24	1.33
3500.0	11.59	19.51	9.53	11.61	1.27	0.84	36.89	20.51	1.43
3750.0	11.05	19.06	10.13	10.94	1.22	0.86	36.41	20.41	1.52
4000.0	10.48	18.71	10.49	10.27	1.18	0.90	35.92	20.27	1.48
4250.0	10.14	18.22	11.14	10.16	1.17	0.88	36.49	20.53	1.61
4500.0	9.84	17.73	11.72	10.25	1.22	0.83	36.18	20.83	1.65
4750.0	9.37	17.45	11.90	10.24	1.30	0.79	36.15	20.69	1.78
5000.0	9.00	16.99	11.04	10.93	1.33	0.78	35.33	20.72	1.96
5250.0	8.62	16.59	10.39	11.20	1.33	0.79	35.60	20.75	1.96
5500.0	8.19	16.28	9.53	11.84	1.29	0.85	35.18	20.58	2.17
5750.0	7.76	16.02	8.50	13.11	1.24	0.94	34.16	20.51	2.41
6000.0	7.25	15.88	7.30	14.88	1.20	1.05	33.44	20.41	2.50
6250.0	6.69	15.82	6.18	16.50	1.17	1.13	33.05	20.10	2.79
6500.0	6.14	15.86	5.21	16.39	1.13	1.22	32.11	19.68	3.01
6750.0	5.48	16.01	4.42	14.23	1.06	1.29	31.82	19.12	3.40
7000.0	4.73	16.16	3.89	12.05	1.02	1.33	31.43	18.41	3.83

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 = 2.75V, Id =69.01 mA @ Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	26.05	32.30	10.02	11.65	1.11	0.78	33.05	17.17	1.24
60.0	26.11	31.44	10.11	14.22	1.05	0.79	33.40	17.67	0.96
80.0	26.10	31.31	10.04	16.04	1.05	0.80	33.75	18.13	0.80
200.0	25.65	30.59	9.22	19.33	1.01	0.83	33.93	18.31	0.59
300.0	25.06	30.05	8.33	19.02	1.00	0.85	34.20	18.20	0.77
400.0	24.35	29.51	7.58	18.43	1.00	0.86	34.04	17.94	0.79
500.0	23.54	29.15	6.97	18.07	1.03	0.89	33.69	17.96	0.86
600.0	22.78	28.72	6.48	17.52	1.06	0.90	34.11	17.96	0.83
700.0	22.00	28.24	6.12	17.22	1.07	0.92	34.94	17.80	0.87
800.0	21.23	27.88	5.90	17.14	1.09	0.95	34.10	17.82	0.89
900.0	20.54	27.47	5.71	16.80	1.08	0.98	34.21	18.11	0.88
1000.0	19.88	27.17	5.56	16.62	1.08	1.02	34.46	18.15	0.95
1250.0	18.38	26.23	5.37	16.22	1.04	1.11	34.48	17.98	0.91
1500.0	17.10	25.36	5.36	16.10	1.02	1.16	34.52	18.11	1.02
1750.0	15.86	24.73	5.76	15.92	1.09	1.16	35.63	18.45	1.19
2000.0	15.08	23.73	5.70	15.54	1.07	1.15	34.82	18.42	1.10
2250.0	14.33	22.91	6.11	15.16	1.13	1.09	35.29	18.59	1.22
2500.0	13.65	22.09	6.63	14.55	1.20	1.02	36.38	19.02	1.27
2750.0	13.02	21.42	7.15	13.76	1.27	0.95	36.43	19.25	1.38
3000.0	12.50	20.68	7.92	13.03	1.30	0.88	36.55	19.43	1.31
3250.0	12.00	20.05	8.67	12.25	1.31	0.85	36.39	19.42	1.28
3500.0	11.50	19.48	9.39	11.57	1.27	0.84	36.52	19.70	1.42
3750.0	10.96	19.04	9.99	10.91	1.23	0.87	36.20	19.56	1.49
4000.0	10.39	18.70	10.34	10.27	1.18	0.90	35.63	19.44	1.53
4250.0	10.05	18.22	10.99	10.15	1.18	0.89	36.10	19.73	1.55
4500.0	9.75	17.68	11.55	10.25	1.22	0.83	35.55	19.99	1.54
4750.0	9.29	17.39	11.74	10.27	1.30	0.79	35.93	19.87	1.79
5000.0	8.92	16.98	10.88	10.95	1.34	0.78	34.93	19.91	1.90
5250.0	8.54	16.58	10.24	11.24	1.34	0.79	35.39	19.98	1.95
5500.0	8.11	16.28	9.40	11.90	1.30	0.86	35.07	19.78	2.13
5750.0	7.68	16.01	8.37	13.19	1.24	0.95	33.77	19.68	2.32
6000.0	7.17	15.88	7.20	14.98	1.21	1.05	33.59	19.64	2.41
6250.0	6.61	15.82	6.10	16.59	1.18	1.14	33.23	19.28	2.73
6500.0	6.05	15.86	5.14	16.41	1.13	1.22	32.52	18.87	3.02
6750.0	5.39	16.01	4.36	14.22	1.07	1.30	31.82	18.28	3.20
7000.0	4.64	16.17	3.84	12.02	1.02	1.33	31.70	17.59	3.72

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 = 3.25V, Id = 87.92 mA @ Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	26.37	32.80	10.29	11.94	1.13	0.80	33.26	18.79	1.38
60.0	26.42	32.26	10.29	14.52	1.10	0.81	33.37	19.31	1.02
80.0	26.40	31.68	10.39	16.33	1.06	0.80	34.49	19.79	0.86
200.0	25.93	30.99	9.51	19.65	1.03	0.83	34.38	19.93	0.62
300.0	25.32	30.40	8.52	19.34	1.02	0.84	33.99	19.82	0.79
400.0	24.60	29.89	7.72	18.73	1.02	0.86	33.56	19.57	0.82
500.0	23.78	29.58	7.09	18.32	1.06	0.89	33.65	19.59	0.83
600.0	23.01	29.09	6.57	17.80	1.07	0.90	34.11	19.59	0.87
700.0	22.23	28.62	6.21	17.54	1.08	0.93	34.24	19.44	0.89
800.0	21.45	28.30	5.98	17.45	1.10	0.96	34.13	19.48	0.90
900.0	20.75	27.83	5.78	17.12	1.09	0.99	34.04	19.73	0.89
1000.0	20.08	27.47	5.62	16.92	1.09	1.03	34.49	19.78	0.95
1250.0	18.58	26.51	5.43	16.58	1.05	1.11	34.27	19.59	0.94
1500.0	17.30	25.54	5.43	16.45	1.03	1.16	34.80	19.73	1.07
1750.0	16.06	24.93	5.85	16.29	1.11	1.16	35.06	20.04	1.24
2000.0	15.27	23.85	5.79	15.91	1.08	1.14	34.46	20.03	1.17
2250.0	14.52	23.01	6.21	15.48	1.14	1.09	34.75	20.18	1.26
2500.0	13.83	22.23	6.76	14.79	1.20	1.02	36.31	20.62	1.32
2750.0	13.20	21.51	7.30	13.93	1.27	0.94	36.29	20.84	1.44
3000.0	12.68	20.79	8.09	13.14	1.30	0.88	36.59	21.01	1.37
3250.0	12.16	20.11	8.86	12.31	1.30	0.84	36.08	21.01	1.39
3500.0	11.65	19.57	9.62	11.58	1.27	0.84	36.45	21.24	1.51
3750.0	11.11	19.12	10.23	10.89	1.23	0.86	35.91	21.14	1.59
4000.0	10.53	18.73	10.58	10.23	1.18	0.89	35.82	20.99	1.56
4250.0	10.19	18.30	11.25	10.11	1.18	0.88	36.20	21.27	1.63
4500.0	9.89	17.77	11.84	10.18	1.22	0.83	36.38	21.53	1.72
4750.0	9.42	17.47	12.03	10.16	1.29	0.78	35.80	21.41	1.82
5000.0	9.05	17.01	11.14	10.82	1.33	0.77	35.63	21.44	2.02
5250.0	8.67	16.64	10.49	11.09	1.33	0.78	35.30	21.48	2.00
5500.0	8.24	16.30	9.61	11.73	1.29	0.85	34.69	21.28	2.27
5750.0	7.81	16.04	8.57	12.98	1.24	0.94	33.84	21.31	2.49
6000.0	7.30	15.92	7.37	14.70	1.20	1.04	33.55	21.22	2.57
6250.0	6.74	15.86	6.24	16.30	1.17	1.13	32.89	20.89	2.90
6500.0	6.19	15.89	5.26	16.35	1.13	1.21	32.19	20.52	3.18
6750.0	5.54	16.03	4.46	14.27	1.07	1.29	31.55	19.88	3.50
7000.0	4.80	16.18	3.92	12.11	1.03	1.32	31.49	19.30	4.00

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 = 3V, Id =92.19 mA @ Temperature = -55degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	26.51	32.32	11.17	11.91	1.07	0.77	36.02	18.17	1.03
60.0	26.37	31.28	11.69	14.23	1.04	0.74	36.48	18.64	0.69
80.0	26.27	31.19	11.69	15.76	1.05	0.76	37.30	19.18	0.64
200.0	25.80	30.68	10.77	18.63	1.05	0.77	37.11	19.34	0.42
300.0	25.26	30.38	9.75	17.75	1.07	0.78	35.82	19.25	0.60
400.0	24.60	29.85	8.62	17.13	1.08	0.79	34.55	18.78	0.62
500.0	23.83	29.53	7.78	16.79	1.10	0.82	35.12	18.81	0.70
600.0	23.12	29.05	7.10	16.49	1.10	0.85	34.76	18.77	0.65
700.0	22.40	28.67	6.65	16.41	1.10	0.89	34.87	18.67	0.65
800.0	21.65	28.32	6.33	16.54	1.09	0.94	34.68	18.64	0.63
900.0	20.98	27.86	6.14	16.51	1.08	0.98	35.16	18.90	0.66
1000.0	20.37	27.45	5.93	16.45	1.05	1.02	35.16	18.92	0.65
1250.0	18.87	26.53	5.57	15.88	1.00	1.12	34.48	18.57	0.65
1500.0	17.61	25.56	5.50	16.12	0.99	1.16	35.09	18.78	0.82
1750.0	16.43	24.81	6.11	16.04	1.09	1.12	35.72	19.08	0.83
2000.0	15.63	23.79	5.86	16.41	1.10	1.10	35.47	19.15	0.82
2250.0	14.89	22.88	6.32	16.22	1.15	1.03	35.83	19.35	0.87
2500.0	14.27	22.00	6.95	15.71	1.20	0.96	37.07	19.66	0.95
2750.0	13.64	21.27	7.58	14.67	1.24	0.90	36.95	19.99	1.09
3000.0	13.13	20.54	8.36	14.12	1.25	0.86	37.32	20.08	0.89
3250.0	12.60	19.89	9.02	13.37	1.22	0.85	37.09	20.20	0.95
3500.0	12.09	19.33	9.84	12.56	1.19	0.86	37.58	20.53	0.89
3750.0	11.55	18.86	10.45	11.71	1.15	0.88	37.59	20.43	1.08
4000.0	10.88	18.56	10.59	10.75	1.13	0.90	36.71	20.15	1.16
4250.0	10.62	18.04	11.49	10.68	1.18	0.83	37.69	20.74	1.11
4500.0	10.39	17.44	12.56	10.68	1.22	0.75	38.13	20.90	1.02
4750.0	9.94	17.11	12.81	10.44	1.27	0.71	36.87	20.80	1.19
5000.0	9.47	16.77	12.00	11.08	1.28	0.74	36.21	20.89	1.35
5250.0	9.12	16.37	11.20	11.16	1.23	0.78	36.53	20.94	1.43
5500.0	8.71	16.03	9.99	12.06	1.17	0.87	35.59	20.51	1.46
5750.0	8.23	15.80	8.67	13.53	1.13	0.97	34.75	20.50	1.70
6000.0	7.72	15.67	7.38	15.59	1.12	1.05	34.25	20.48	1.85
6250.0	7.20	15.62	6.22	17.32	1.11	1.12	34.10	20.11	2.03
6500.0	6.63	15.61	5.19	16.51	1.06	1.20	32.99	19.69	2.35
6750.0	6.01	15.70	4.41	14.11	1.02	1.25	32.52	19.22	2.39
7000.0	5.31	15.82	3.84	11.97	1.05	1.25	32.21	18.62	2.78

Typical Performance Data

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

TEST CONDITIONS: Vd = 2.75V, Id =81.69 mA @ Temperature = -55degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	26.32	32.11	11.03	11.84	1.07	0.77	36.83	18.17	0.98
60.0	26.20	31.23	11.45	14.22	1.04	0.75	36.63	18.64	0.67
80.0	26.09	31.06	11.51	15.79	1.05	0.77	38.01	19.18	0.59
200.0	25.64	30.49	10.66	18.83	1.05	0.78	36.26	19.34	0.37
300.0	25.11	30.22	9.68	17.92	1.06	0.79	35.76	19.25	0.59
400.0	24.46	29.68	8.58	17.25	1.07	0.79	35.02	18.78	0.64
500.0	23.70	29.30	7.76	16.84	1.09	0.82	35.51	18.81	0.69
600.0	23.00	28.90	7.06	16.51	1.09	0.85	35.59	18.77	0.65
700.0	22.29	28.47	6.63	16.38	1.09	0.88	34.99	18.67	0.62
800.0	21.54	28.11	6.31	16.51	1.09	0.93	34.80	18.64	0.58
900.0	20.88	27.67	6.12	16.44	1.07	0.97	35.08	18.90	0.65
1000.0	20.27	27.30	5.91	16.35	1.05	1.02	35.23	18.92	0.68
1250.0	18.77	26.39	5.55	15.78	0.99	1.12	34.77	18.57	0.65
1500.0	17.52	25.48	5.47	15.99	0.99	1.16	34.88	18.78	0.79
1750.0	16.34	24.73	6.07	15.85	1.09	1.12	36.12	19.08	0.85
2000.0	15.54	23.69	5.82	16.18	1.09	1.10	35.22	19.15	0.81
2250.0	14.80	22.86	6.28	16.01	1.15	1.04	35.96	19.35	0.85
2500.0	14.18	22.00	6.89	15.53	1.20	0.97	37.42	19.66	0.93
2750.0	13.56	21.26	7.51	14.56	1.25	0.90	37.15	19.99	1.08
3000.0	13.05	20.50	8.27	14.04	1.25	0.86	37.28	20.08	0.87
3250.0	12.53	19.85	8.92	13.35	1.22	0.85	37.39	20.20	0.88
3500.0	12.03	19.28	9.71	12.55	1.18	0.86	37.92	20.53	0.85
3750.0	11.48	18.81	10.32	11.71	1.14	0.88	37.72	20.43	1.02
4000.0	10.82	18.54	10.47	10.77	1.13	0.90	36.78	20.15	1.13
4250.0	10.56	18.00	11.36	10.68	1.18	0.83	37.12	20.74	1.05
4500.0	10.33	17.41	12.43	10.71	1.22	0.75	38.28	20.90	1.03
4750.0	9.88	17.07	12.67	10.47	1.27	0.71	36.93	20.80	1.18
5000.0	9.42	16.76	11.87	11.13	1.28	0.74	37.17	20.89	1.27
5250.0	9.07	16.35	11.08	11.22	1.23	0.79	36.85	20.94	1.37
5500.0	8.67	15.99	9.89	12.16	1.17	0.88	35.59	20.51	1.35
5750.0	8.18	15.78	8.58	13.65	1.13	0.97	35.13	20.50	1.65
6000.0	7.67	15.65	7.29	15.75	1.12	1.05	34.57	20.48	1.82
6250.0	7.14	15.58	6.15	17.48	1.11	1.13	34.24	20.11	2.01
6500.0	6.57	15.60	5.14	16.53	1.06	1.21	33.36	19.69	2.29
6750.0	5.95	15.67	4.36	14.09	1.01	1.26	32.95	19.22	2.30
7000.0	5.25	15.80	3.80	11.92	1.04	1.25	32.20	18.62	2.78

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 = 3.25V, Id = 101.39 mA @ Temperature = -55degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	26.65	32.16	11.31	11.89	1.05	0.75	35.45	19.10	1.08
60.0	26.52	32.10	11.71	14.13	1.08	0.79	35.65	19.61	0.72
80.0	26.40	31.36	11.86	15.70	1.05	0.76	36.85	20.17	0.64
200.0	25.92	30.76	10.89	18.55	1.05	0.76	36.42	20.36	0.43
300.0	25.37	30.43	9.81	17.66	1.07	0.77	36.00	20.27	0.62
400.0	24.71	30.03	8.66	17.12	1.08	0.79	34.84	19.79	0.65
500.0	23.92	29.64	7.82	16.82	1.10	0.82	34.98	19.84	0.67
600.0	23.20	29.25	7.11	16.57	1.10	0.85	34.83	19.83	0.65
700.0	22.49	28.77	6.67	16.51	1.10	0.89	34.49	19.71	0.65
800.0	21.73	28.39	6.35	16.69	1.09	0.94	34.18	19.69	0.64
900.0	21.06	27.96	6.16	16.67	1.08	0.98	35.04	19.95	0.99
1000.0	20.45	27.61	5.95	16.64	1.06	1.03	34.88	20.00	0.67
1250.0	18.94	26.58	5.59	16.07	1.00	1.12	34.36	19.64	0.69
1500.0	17.68	25.66	5.52	16.34	1.00	1.16	34.77	19.85	0.81
1750.0	16.49	24.90	6.13	16.25	1.10	1.12	35.23	20.12	0.87
2000.0	15.69	23.82	5.90	16.60	1.10	1.10	34.83	20.19	0.85
2250.0	14.95	22.94	6.36	16.37	1.16	1.03	35.70	20.39	0.90
2500.0	14.32	22.08	6.99	15.78	1.20	0.96	36.21	20.67	0.98
2750.0	13.69	21.35	7.62	14.70	1.25	0.90	36.31	20.94	1.10
3000.0	13.18	20.59	8.42	14.10	1.25	0.86	36.92	20.98	0.90
3250.0	12.65	19.93	9.10	13.33	1.22	0.85	36.36	21.08	0.96
3500.0	12.14	19.40	9.91	12.47	1.19	0.86	36.77	21.22	0.92
3750.0	11.59	18.92	10.54	11.62	1.15	0.88	37.16	21.18	1.08
4000.0	10.92	18.62	10.67	10.67	1.13	0.89	36.08	21.11	1.08
4250.0	10.66	18.08	11.57	10.59	1.18	0.82	37.84	21.32	1.14
4500.0	10.42	17.49	12.66	10.59	1.22	0.74	37.53	21.60	1.14
4750.0	9.97	17.14	12.91	10.35	1.27	0.71	36.50	21.74	1.24
5000.0	9.50	16.83	12.08	10.96	1.28	0.74	36.15	21.59	1.36
5250.0	9.15	16.42	11.27	11.03	1.23	0.78	36.71	21.59	1.44
5500.0	8.74	16.06	10.05	11.92	1.16	0.87	35.13	21.52	1.52
5750.0	8.26	15.84	8.72	13.34	1.13	0.96	34.69	21.54	1.81
6000.0	7.75	15.71	7.42	15.35	1.12	1.04	34.39	21.54	1.91
6250.0	7.23	15.64	6.26	17.11	1.11	1.12	33.88	21.21	2.19
6500.0	6.67	15.65	5.23	16.52	1.07	1.20	32.78	20.78	2.34
6750.0	6.05	15.72	4.44	14.19	1.03	1.25	32.36	20.35	2.47
7000.0	5.36	15.84	3.87	12.05	1.06	1.24	31.85	19.67	2.99

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 = 3V, Id = 69.21 mA @ Temperature = +105degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	25.61	32.76	9.28	10.81	1.18	0.80	31.07	18.77	1.98
60.0	25.83	31.67	9.09	13.09	1.08	0.80	30.75	18.26	1.39
80.0	25.88	31.64	8.95	14.56	1.07	0.82	31.25	18.55	1.08
200.0	25.49	30.72	8.39	17.25	0.99	0.87	32.07	18.58	0.81
300.0	24.80	30.14	7.56	17.18	0.96	0.92	31.87	18.60	0.87
400.0	24.06	29.48	6.90	17.03	0.95	0.94	32.18	18.41	1.01
500.0	23.25	29.04	6.44	16.94	0.98	0.95	32.36	18.42	1.17
600.0	22.46	28.46	6.09	16.66	1.01	0.95	32.84	18.48	1.08
700.0	21.66	28.17	5.85	16.59	1.05	0.96	33.22	18.35	1.09
800.0	20.89	27.77	5.69	16.51	1.08	0.97	32.87	18.34	0.99
900.0	20.19	27.42	5.62	16.43	1.11	0.99	33.44	18.71	0.06
1000.0	19.52	27.11	5.53	16.30	1.13	1.01	34.02	18.75	1.24
1250.0	18.01	26.40	5.41	16.08	1.14	1.09	33.97	18.60	1.26
1500.0	16.72	25.49	5.40	15.92	1.11	1.14	34.62	18.64	1.37
1750.0	15.48	24.87	5.65	15.54	1.14	1.17	34.99	18.94	1.50
2000.0	14.62	24.04	5.58	14.96	1.11	1.18	34.39	19.01	1.44
2250.0	13.75	23.49	6.07	14.55	1.21	1.14	35.16	19.17	1.61
2500.0	13.09	22.81	6.58	13.77	1.27	1.09	35.43	19.25	1.68
2750.0	12.46	22.12	7.12	12.82	1.35	1.01	35.63	19.34	1.85
3000.0	12.02	21.43	7.88	11.91	1.40	0.93	35.76	19.43	1.72
3250.0	11.55	20.82	8.68	11.12	1.43	0.86	35.37	19.52	1.91
3500.0	11.11	20.26	9.49	10.48	1.42	0.83	35.69	19.68	1.97
3750.0	10.62	19.77	10.15	10.01	1.38	0.84	35.25	19.54	1.86
4000.0	10.17	19.35	10.53	9.64	1.31	0.87	34.99	19.49	1.98
4250.0	9.76	18.97	10.78	9.48	1.26	0.90	35.04	19.87	2.02
4500.0	9.44	18.50	11.05	9.56	1.25	0.89	35.47	19.95	2.08
4750.0	8.96	18.18	11.10	9.68	1.33	0.87	35.26	19.91	2.34
5000.0	8.53	17.80	10.35	10.30	1.40	0.85	34.15	19.88	2.35
5250.0	8.14	17.39	9.83	10.56	1.44	0.83	35.05	20.08	2.61
5500.0	7.68	17.09	9.18	11.21	1.46	0.86	34.68	19.88	2.62
5750.0	7.23	16.85	8.33	12.30	1.45	0.92	33.73	20.05	2.90
6000.0	6.75	16.66	7.32	13.74	1.41	1.02	33.49	20.13	3.25
6250.0	6.18	16.62	6.24	15.30	1.38	1.11	33.15	19.81	3.45
6500.0	5.64	16.59	5.24	15.80	1.32	1.20	32.59	19.42	3.74
6750.0	4.95	16.75	4.40	14.50	1.27	1.28	32.54	19.25	4.10
7000.0	4.18	17.05	3.81	12.51	1.21	1.34	31.83	18.39	4.68

Typical Performance Data

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

TEST CONDITIONS: Vd = 2.75V, Id = 61.46 mA @ Temperature = +105degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	25.43	32.53	9.05	10.59	1.16	0.80	30.47	18.01	1.83
60.0	25.67	32.15	8.84	12.76	1.12	0.84	30.68	17.53	1.33
80.0	25.72	31.56	8.68	14.19	1.07	0.83	30.98	17.82	1.02
200.0	25.35	30.60	8.15	16.81	0.99	0.88	31.71	17.88	0.73
300.0	24.66	29.96	7.39	16.82	0.95	0.93	31.33	17.88	0.91
400.0	23.93	29.45	6.78	16.65	0.94	0.96	32.19	17.71	0.98
500.0	23.12	28.91	6.33	16.64	0.97	0.96	32.19	17.72	1.12
600.0	22.34	28.40	6.01	16.39	1.00	0.96	32.55	17.77	1.06
700.0	21.54	27.97	5.78	16.32	1.04	0.96	33.38	17.65	1.04
800.0	20.77	27.58	5.62	16.28	1.07	0.97	33.03	17.64	1.02
900.0	20.07	27.20	5.55	16.18	1.10	0.98	33.17	18.01	13.08
1000.0	19.41	26.90	5.47	16.07	1.12	1.01	33.98	18.05	1.17
1250.0	17.90	26.25	5.37	15.89	1.13	1.08	33.88	17.87	1.24
1500.0	16.62	25.35	5.35	15.70	1.10	1.14	34.59	17.92	1.36
1750.0	15.37	24.79	5.59	15.35	1.13	1.17	34.54	18.21	1.47
2000.0	14.52	23.95	5.52	14.76	1.10	1.19	34.23	18.26	1.40
2250.0	13.64	23.42	6.00	14.37	1.20	1.15	35.33	18.43	1.58
2500.0	12.98	22.75	6.49	13.60	1.27	1.09	35.21	18.48	1.66
2750.0	12.36	22.10	7.03	12.67	1.35	1.01	35.53	18.55	1.83
3000.0	11.92	21.39	7.77	11.79	1.40	0.93	35.46	18.64	1.68
3250.0	11.46	20.81	8.58	11.02	1.44	0.86	34.94	18.75	1.86
3500.0	11.02	20.23	9.36	10.42	1.43	0.83	34.77	18.88	1.93
3750.0	10.54	19.74	10.02	9.95	1.38	0.84	34.85	18.76	1.86
4000.0	10.09	19.31	10.39	9.61	1.31	0.88	34.41	18.66	1.94
4250.0	9.68	18.94	10.63	9.46	1.26	0.91	34.22	19.09	1.96
4500.0	9.36	18.47	10.90	9.57	1.25	0.90	34.65	19.14	2.01
4750.0	8.88	18.16	10.91	9.71	1.33	0.87	34.71	19.08	2.26
5000.0	8.46	17.79	10.18	10.34	1.40	0.86	33.82	19.11	2.42
5250.0	8.06	17.38	9.67	10.62	1.44	0.84	34.35	19.33	2.47
5500.0	7.60	17.07	9.04	11.28	1.47	0.86	34.39	19.16	2.53
5750.0	7.15	16.81	8.22	12.36	1.45	0.93	33.54	19.30	2.80
6000.0	6.67	16.63	7.22	13.82	1.41	1.02	33.74	19.32	3.18
6250.0	6.11	16.58	6.16	15.40	1.38	1.12	32.99	19.11	3.34
6500.0	5.56	16.58	5.19	15.88	1.33	1.20	32.24	18.69	3.68
6750.0	4.88	16.74	4.35	14.55	1.27	1.28	32.38	18.55	3.94
7000.0	4.11	17.04	3.77	12.56	1.21	1.34	31.83	17.61	4.38

Typical Performance Data

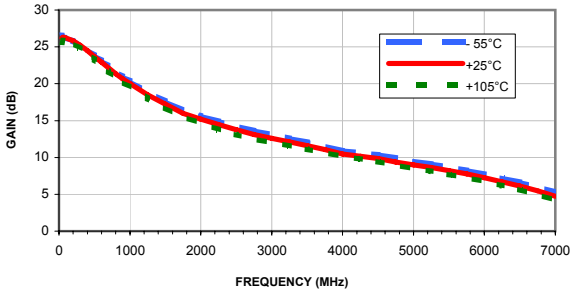
Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Vd = 3.25V, Id = 77.02 mA @ Temperature = +105degC

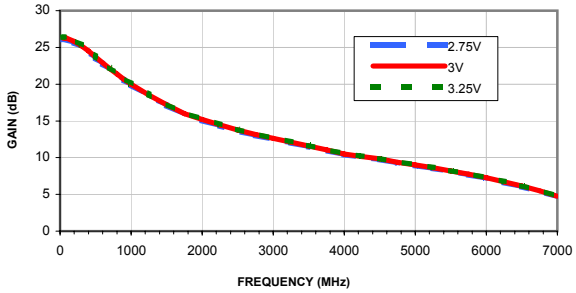
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
40.0	25.73	32.94	9.51	10.91	1.19	0.80	30.65	19.50	2.20
60.0	25.94	31.92	9.34	13.29	1.10	0.80	30.89	18.98	1.54
80.0	25.98	31.74	9.24	14.74	1.08	0.82	31.23	19.27	1.19
200.0	25.58	30.87	8.63	17.50	1.01	0.87	32.12	19.26	0.89
300.0	24.89	30.24	7.74	17.45	0.97	0.91	32.38	19.27	0.97
400.0	24.14	29.68	7.03	17.26	0.97	0.94	32.22	19.08	1.08
500.0	23.33	29.22	6.54	17.19	0.99	0.95	32.27	19.10	1.18
600.0	22.53	28.70	6.18	16.88	1.02	0.95	32.98	19.17	1.14
700.0	21.74	28.27	5.92	16.77	1.06	0.96	33.09	19.04	1.12
800.0	20.96	27.96	5.75	16.72	1.10	0.98	32.94	19.04	1.07
900.0	20.26	27.62	5.67	16.63	1.12	0.99	33.17	19.42	1.20
1000.0	19.59	27.22	5.57	16.49	1.13	1.01	33.86	19.47	1.25
1250.0	18.08	26.56	5.45	16.26	1.14	1.09	33.89	19.29	1.33
1500.0	16.80	25.61	5.43	16.08	1.11	1.14	34.63	19.34	1.42
1750.0	15.55	25.01	5.68	15.70	1.15	1.17	34.82	19.66	1.53
2000.0	14.69	24.10	5.62	15.08	1.12	1.18	34.59	19.72	1.51
2250.0	13.82	23.52	6.11	14.66	1.21	1.14	35.35	19.89	1.66
2500.0	13.15	22.83	6.62	13.84	1.27	1.08	36.32	19.98	1.73
2750.0	12.53	22.14	7.18	12.85	1.35	1.00	35.86	20.06	1.89
3000.0	12.08	21.47	7.95	11.93	1.40	0.92	35.99	20.16	1.77
3250.0	11.62	20.86	8.78	11.12	1.43	0.86	35.76	20.26	1.95
3500.0	11.16	20.30	9.59	10.46	1.42	0.83	36.37	20.37	2.02
3750.0	10.67	19.82	10.25	9.98	1.38	0.84	35.93	20.27	1.95
4000.0	10.22	19.39	10.64	9.61	1.31	0.87	35.16	20.20	2.02
4250.0	9.81	19.01	10.88	9.45	1.26	0.90	35.69	20.56	2.03
4500.0	9.48	18.52	11.16	9.52	1.25	0.89	35.67	20.65	2.16
4750.0	9.00	18.20	11.18	9.64	1.33	0.86	35.45	20.55	2.33
5000.0	8.57	17.83	10.43	10.24	1.40	0.85	35.01	20.55	2.50
5250.0	8.18	17.44	9.90	10.51	1.44	0.83	35.32	20.71	2.67
5500.0	7.71	17.12	9.24	11.14	1.47	0.85	34.58	20.63	2.68
5750.0	7.27	16.86	8.40	12.19	1.45	0.92	33.97	20.74	3.01
6000.0	6.79	16.67	7.37	13.63	1.40	1.01	33.90	20.84	3.26
6250.0	6.22	16.62	6.28	15.17	1.37	1.11	33.31	20.58	3.55
6500.0	5.68	16.58	5.29	15.71	1.32	1.20	32.57	20.17	3.93
6750.0	5.00	16.75	4.44	14.52	1.27	1.28	32.52	19.93	4.19
7000.0	4.24	17.04	3.84	12.56	1.20	1.34	31.91	18.98	4.60

Typical Performance Curves

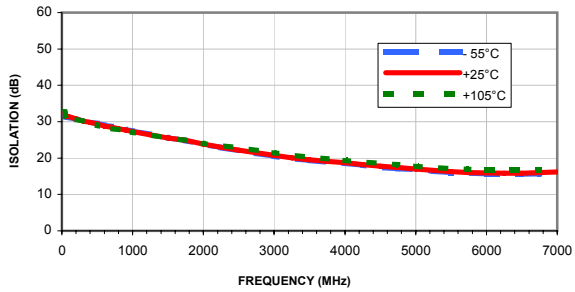
GAIN vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V



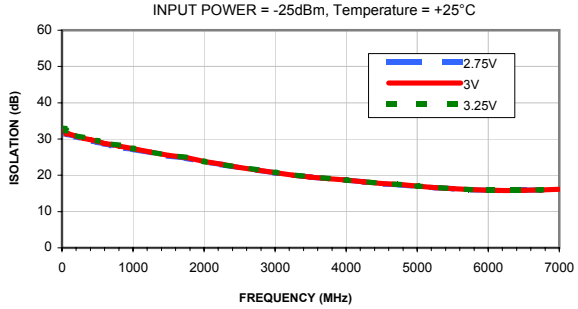
GAIN vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



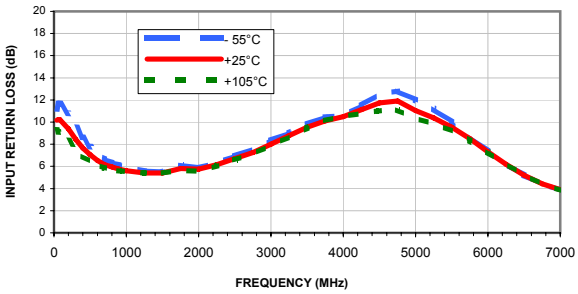
ISOLATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V



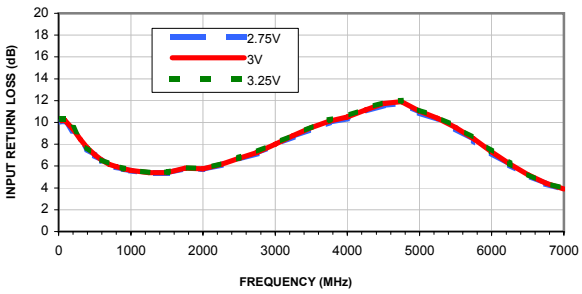
ISOLATION vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



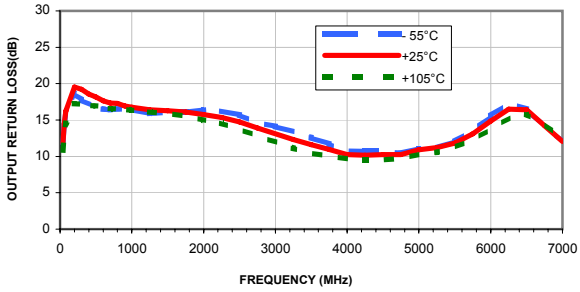
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V



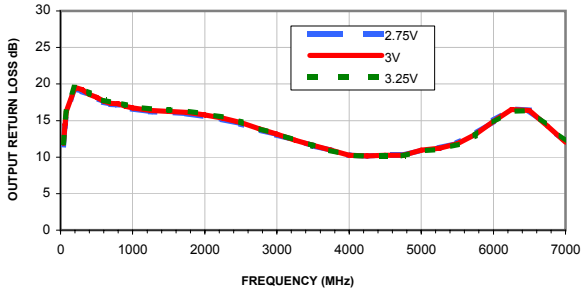
INPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V

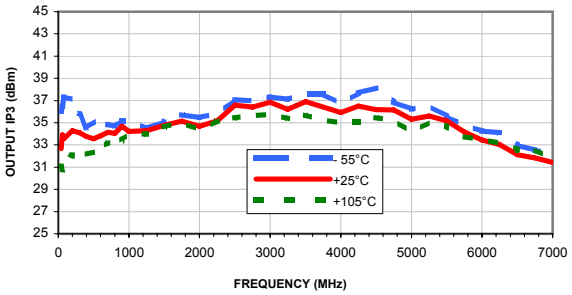


OUTPUT RETURN LOSS vs. FREQUENCY & DEVICE VOLTAGE
INPUT POWER = -25dBm, Temperature = +25°C

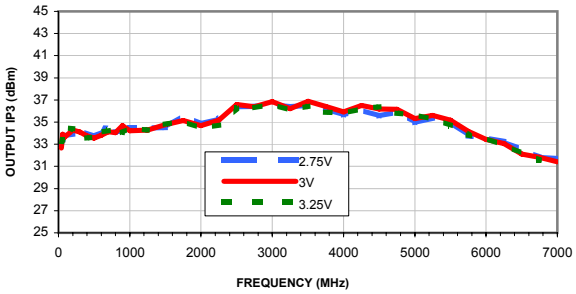


Typical Performance Curves

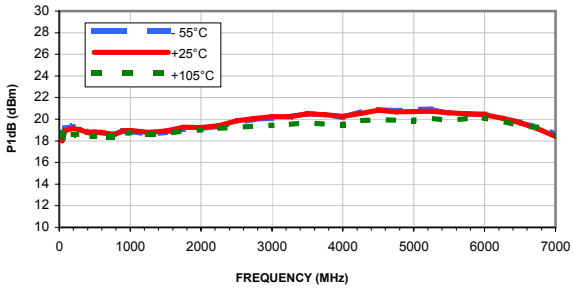
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE
OUTPUT POWER = 0 dBm/tone, Vd = 3V



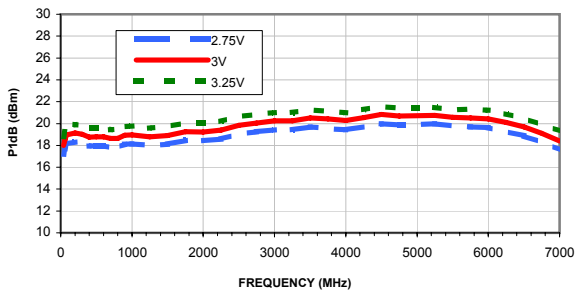
OUTPUT IP3 vs. FREQUENCY & DEVICE VOLTAGE
OUTPUT POWER = 0 dBm/tone, Temperature = +25°C



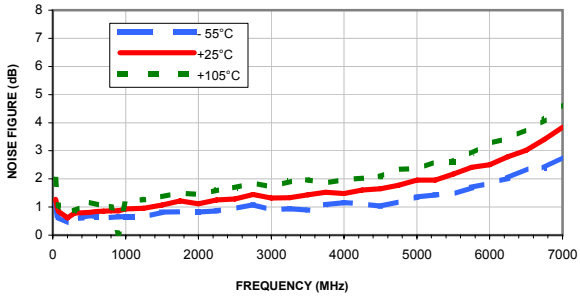
P1dB vs. FREQUENCY & TEMPERATURE
Vd = 3V



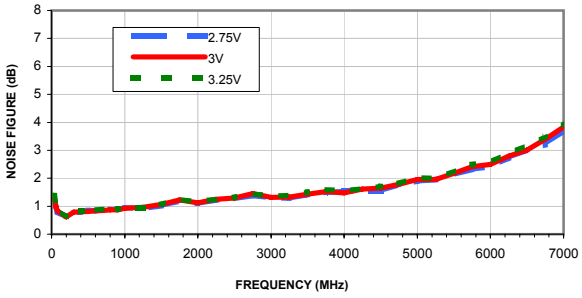
P1dB vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C



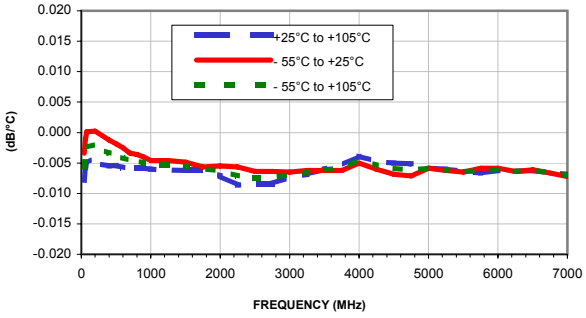
NOISE FIGURE vs. FREQUENCY & TEMPERATURE
Vd = 3V



NOISE FIGURE vs. FREQUENCY & DEVICE VOLTAGE
Temperature = +25°C

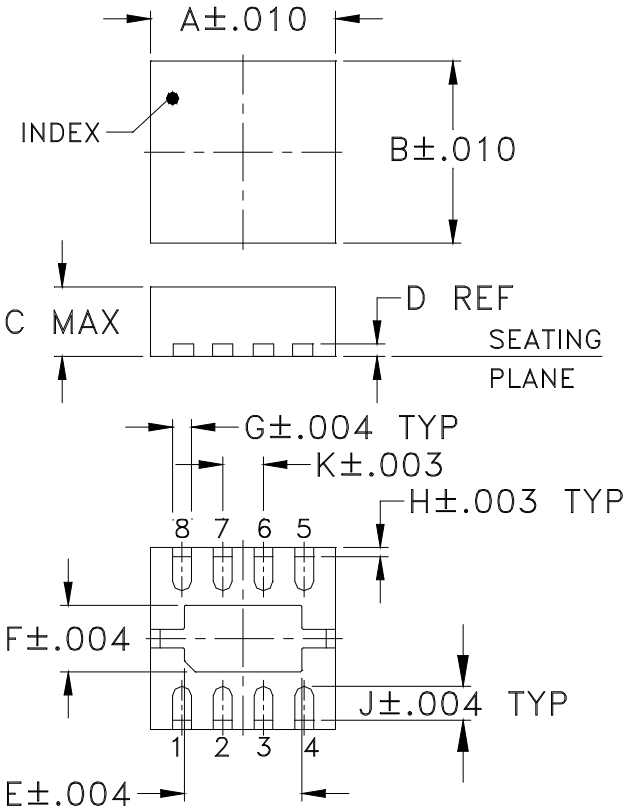


GAIN VARIATION vs. FREQUENCY & TEMPERATURE
INPUT POWER = -25dBm, Vd = 3V

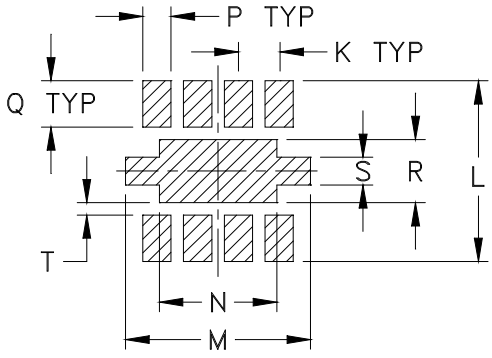


DL1721

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N
DL1721	.118 (3.00)	.118 (3.00)	.045 (1.14)	.008 (0.20)	.075 (1.91)	.043 (1.09)	.012 (0.30)	.006 (0.15)	.022 (0.56)	.026 (0.66)	.117 (2.97)	.118 (3.00)	.075 (1.91)

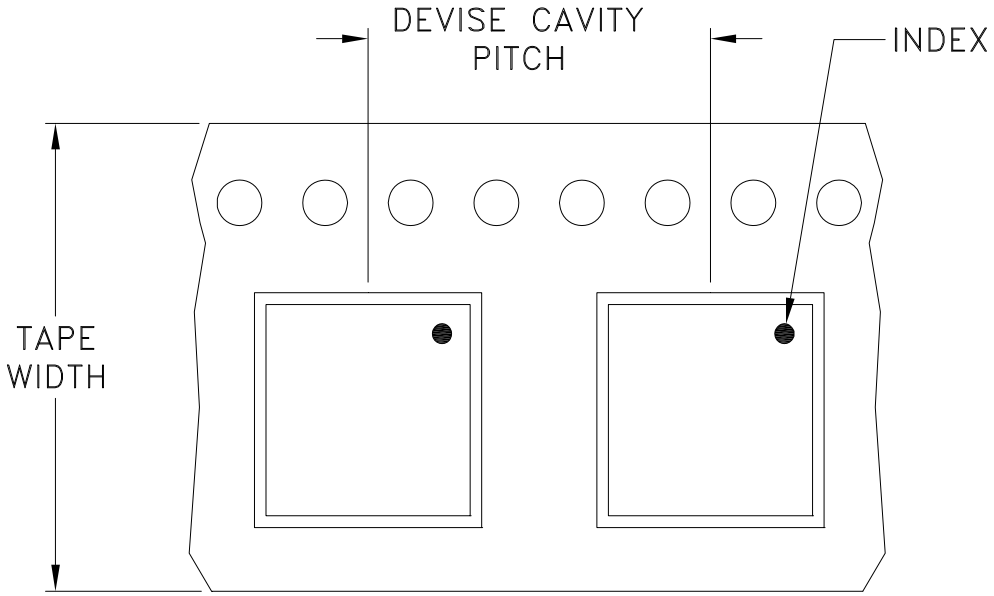
CASE #	P	Q	R	S	T	WT. GRAM
DL1721	.018 (0.46)	.030 (0.76)	.041 (1.04)	.018 (0.46)	.008 (0.20)	.02

Dimensions are in inches (mm). Tolerances: 3Pl. ± .004, unless otherwise specified.

Notes:

1. Case material: LTCC.
2. Termination finish: Nickel-Palladium-Gold plating.

Tape & Reel Packaging TR-F66-1



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

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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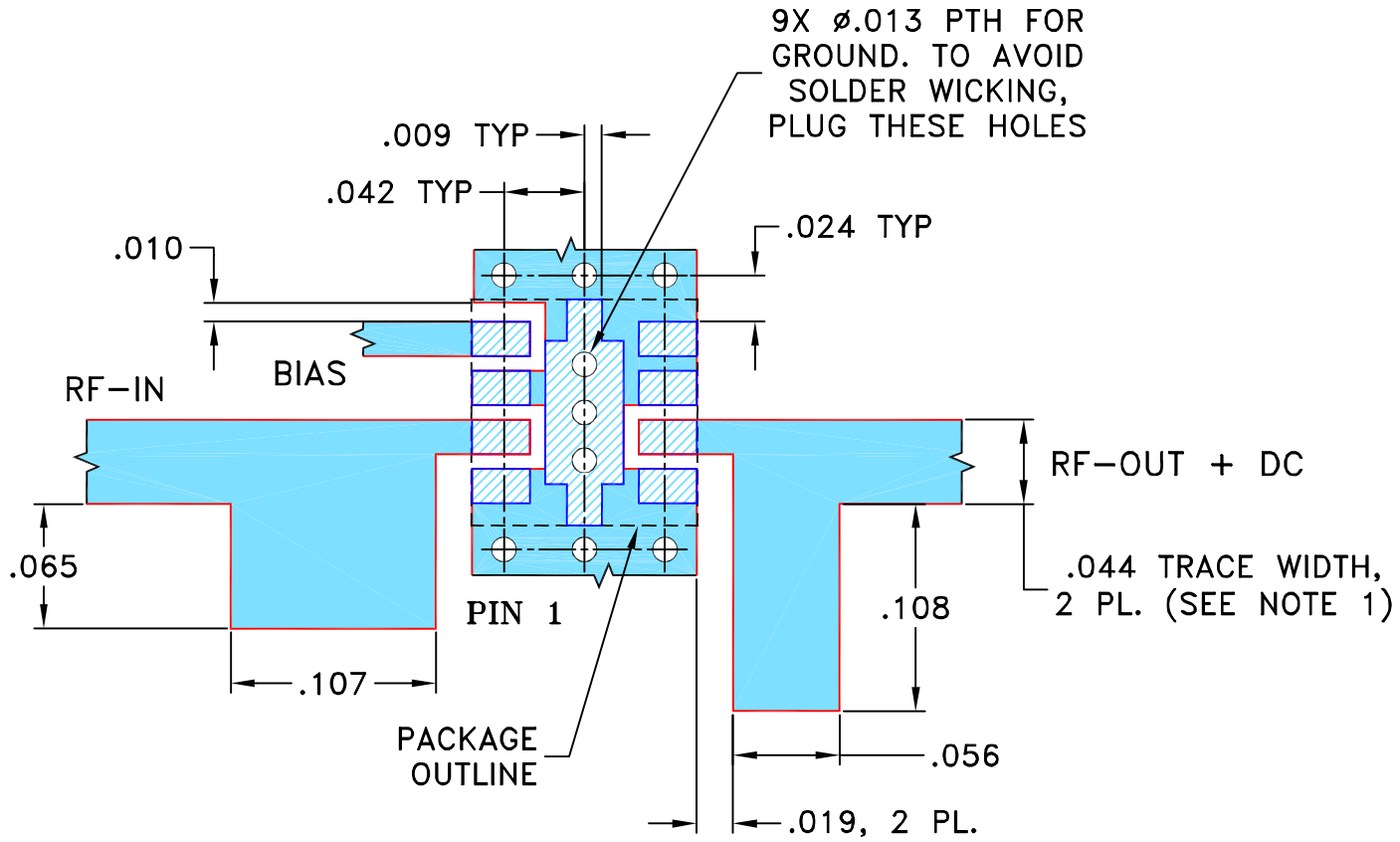
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M136376	NEW RELEASE	06/12/12	PW	DJ

SUGGESTED MOUNTING CONFIGURATION FOR DL1721 CASE STYLE, "08AM10" PIN CONNECTION



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" ± .0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. 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	PW	05/18/12
TOLERANCES ON:	CHECKED	IL	06/05/12
2 PL DECIMALS ±	APPROVED	DJ	06/12/12
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

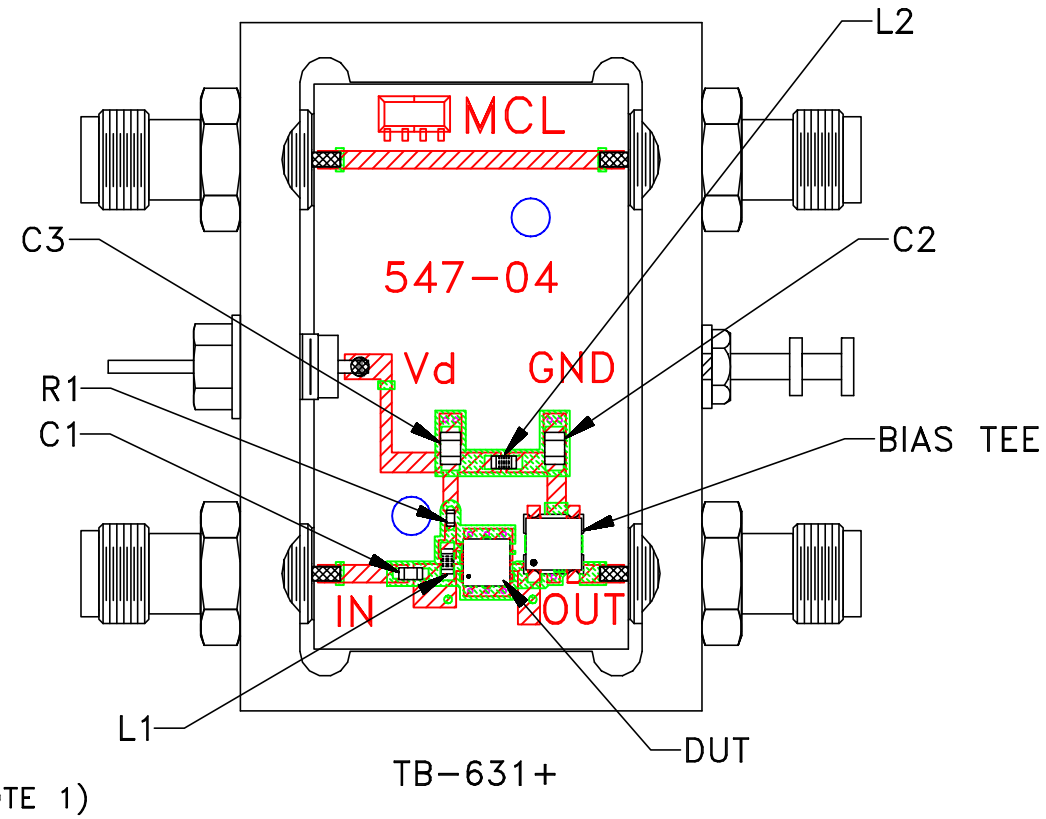
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 08AM10, DL1721, CMA TB-631+

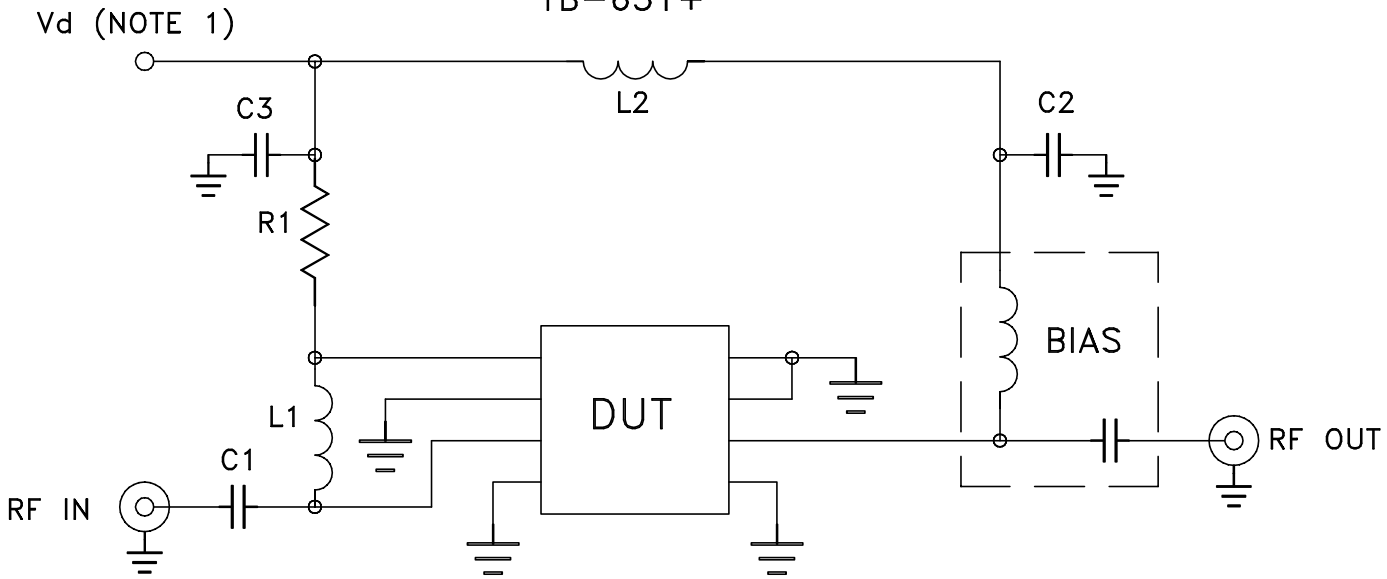
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-365	OR

FILE:	SCALE:	SHEET:
98PL365	10:1	1 OF 1

Evaluation Board and Circuit



TB-631+



COMPONENT	DESCRIPTION
DUT	CMA-545+ (NIKKO)
C1	2.2 nF
C2,C3	0.1 uF
L1	390 nH
L2	30 nH
R1	432 Ohms
BIAS TEE	Mini-Circuits TCBT-14+

Schematic Diagram

NOTES:

1. Vd voltage: +3V.
2. SMA Female connectors.
3. PCB material: Rogers RO4350 or equivalent, dielectric constant=3.5, dielectric thickness=.020 inch.

Mini-Circuits®

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Environmental Specifications ENV68

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	-55° to 105°C	Individual Model Data Sheet
Storage Temperature	-65° to 125° C	Individual Model Data Sheet
Thermal Shock (device level)	-55° to 125°C, 100 cycles	MIL-STD-202, Method 107
Thermal Shock (board level)	-55° to 125°C, 1000 cycles	MIL-STD-202, Method 107
Constant Acceleration	Y1 plane only, 30 Kg	MIL-STD-883, Method 2001, Cond. E
Vibration	10-2000MHz sine, 20g, 3 axis	MIL-STD-202, Method 204, Cond. D
Mechanical Shock	Y1 plane, 5 pulses, .5ms, 1.5 Kg	MIL-STD-202, Method 213, Cond. A
PIND	20G's @130 Hz	MIL-STD-750, Method 2052.2
Resistance to Soldering Heat	3X Reflow, Peak Temperature 260°C, electrical End points	JESD22-B102
Resistance to Solvent	15 pieces, 5 pieces each solvent, marking permanency	MIL-STD-202, Method 215
Moisture Sensitivity Level	Hermetic device, MSL-1 by construction	JESD22-A113, MSL1/260
Hermeticity	Fine Leak, Gross Leak	MIL-STD-202, Method 112, Cond. C&D

Environmental Specifications ENV68

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
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JEDEC-STD-22-B, Method A102