Low Noise Amplifier TAMP-242LN+

50Ω 1710 to 2400 MHz

The Big Deal

- Ultra Low Noise Figure, 0.65 dB typ.
- High IP3, 33.5dBm typ.
- Low Current, 40mA at +5V
- Integrated Bias Matching and Stabilization Circuits

CASE STYLE: JQ1382

Product Overview

The TAMP-242LN+ (RoHS compliant) utilizes advanced E-PHEMT technology in a single stage low noise amplifier design built into a shielded case (size: .591”x.394”x.118”). The drop-in module offers ultra low noise figure and high output IP3 with good input and output return loss over the entire frequency range and without the need of external matching components.

Key Features

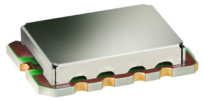
Feature	Advantages
Ultra Low NF	With only 0.65 dB NF, the TAMP-242LN+ enables greater sensitivity for receiver applications. It includes all matching and stability circuits making this Drop-in LNA module a turn-key solution for ensuring low system sensitivity in demanding applications.
High Output IP3, 33.5dBm typ.	At +33.5 dBm IP3, in combination with its low noise performance, the TAMP-242LN+ can improve a systems’ spur-free dynamic range which is often the critical driver in many receiver applications.
High P1dB: 17dBm typ.	High P1dB enables the amplifier to operate in linear region in the presence of strong interfering signals.
Low Current, 40mA typ.	At only 40mA, the TAMP-242LN+ is ideal for applications with limited available power or densely packed applications where termal and power management is critical.
Well Matched input/ output ports	With typical input & output VSWR of 1.4:1, the TAMP-242LN+ can be used in cascade with many 50 Ohm components and maintain minimal interaction or reflections.
Drop-in Module	Eliminates the need for designers to optimize low noise transistor bias and matching circuitry. The TAMP-242LN+ provides the outstanding combined performance and does not require any external elements. The case PCB area is smaller than most LNA transistor designs with external circuitry.
Metal Case	Provides a protective enclosure improving handling robustness in addition to shielding the sensitive high gain devices from close by circuitry.
Unconditionally stable	No adverse effects due to reactive loads at the input and output ports avoiding potential instability which can be a critical requirement when integrating high gain, high frequency devices on an open PCB assembly.

Surface Mount

Low Noise Amplifier

TAMP-242LN+

50Ω 1710 to 2400 MHz



CASE STYLE: JQ1382

Features

- Ultra low noise figure, 0.65 dB typ.
- Output power, up to +17 dBm typ.
- Good output IP3, 33.5 dBm typ.
- Low current consumption
- Good VSWR, 1.4:1 typ.
- Unconditionally stable

Applications

- Base station transceiver, tower mounted amplifier, repeater
- WCDMA
- TD SCDMA
- PCS Rx / PCS Tx
- General purpose low noise amplifier

+RoHS Compliant

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

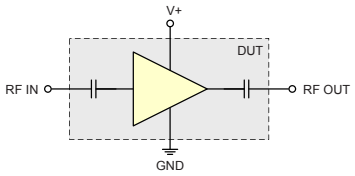
Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		1710		2400	MHz
Noise Figure	1710 - 1880		0.60	0.85	dB
	1850 - 1990		0.60	0.85	
	1990 - 2200		0.65	0.85	
	2200 - 2400		0.65	0.90	
Gain	1710 - 1880	12.0	14.0		dB
	1850 - 1990	11.5	13.5		
	1990 - 2200	10.5	12.5		
	2200 - 2400	10.0	11.5		
Gain Flatness	1710 - 1880		± 0.5	± 1.0	dB
	1850 - 1990		± 0.3	± 0.7	
	1990 - 2200		± 0.5	± 1.0	
	2200 - 2400		± 0.4	± 0.8	
Output Power at 1dB compression	1710 - 1880	15.5	17.0		dBm
	1850 - 1990	15.5	17.0		
	1990 - 2200	15.5	17.0		
	2200 - 2400	15.5	17.0		
Output third order intercept point (OIP3)	1710 - 1880		32.5		dBm
	1850 - 1990		33.5		
	1990 - 2200		34.5		
	2200 - 2400		34.5		
Input VSWR	1710 - 1880		1.4		:1
	1850 - 1990		1.5		
	1990 - 2200		1.6		
	2200 - 2400		1.7		
Output VSWR	1710 - 1880		1.2		:1
	1850 - 1990		1.2		
	1990 - 2200		1.2		
	2200 - 2400		1.2		
DC Supply Voltage			5.0		V
DC Supply Current			40	46	mA

Pin Connections

RF IN	10
RF OUT	5
V+	7
GROUND	1,2,3,4,6,8,9,11

Simplified Schematic



Maximum Ratings

Parameter	Ratings
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Operating Voltage	5.5 V
Input RF Power (no damage)	+10 dBm
Power Consumption	250 mW

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

ESD Rating

Human Body Model (HBM): Class 1A (250 V to < 500 V) in accordance with ANSI/ESD STM 5.1 - 2001
Machine Model (MM): Class M1 (40 V) in accordance with ANSI/ESD STM 5.2 - 1999

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.
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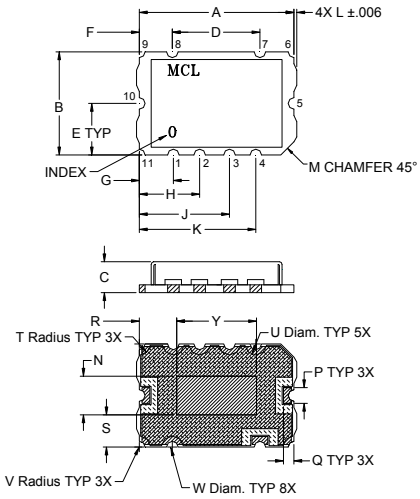
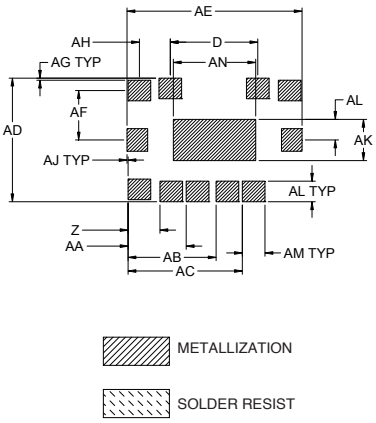
Outline Drawing



PCB Land Pattern

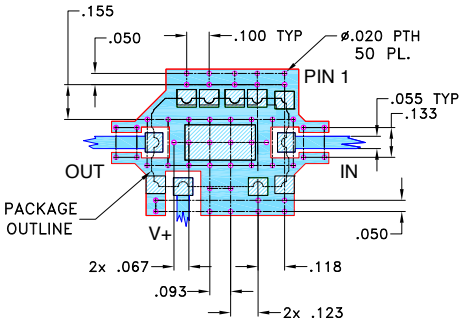


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U
.591	.394	.118	.335	.197	.126	.130	.230	.344	.445	.011	.050	.148	.060	.040	.143	.123	.042	.084
15.0	10.0	3.0	8.5	5.0	3.2	3.3	5.85	8.75	11.3	.28	1.27	3.75	1.52	1.02	3.63	3.13	1.07	2.13

V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	AN	wt.
.022	.044	.305	.122	.222	.337	.437	.472	.669	.189	.008	.118	.004	.158	.079	.087	.315	grams
.56	1.12	7.75	3.1	5.65	8.55	11.1	12.0	17.0	4.8	.20	3.0	.10	4.0	2.0	2.2	8.0	0.8

Demo Board MCL P/N: TB-468+
Suggested PCB Layout (PL-293)

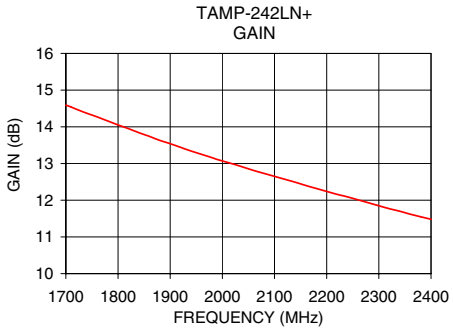


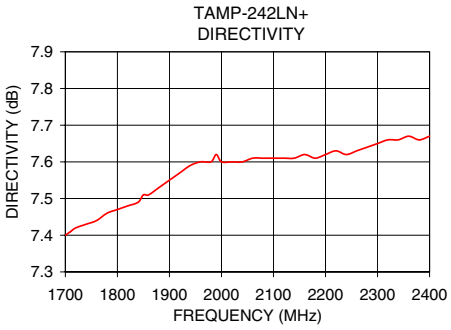
NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002; COPPER 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

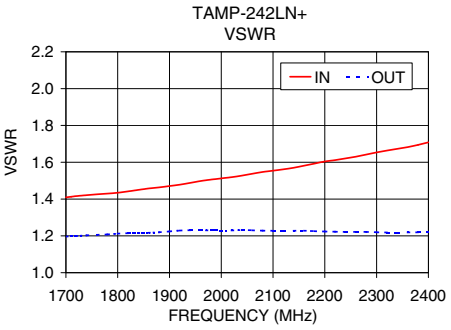
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

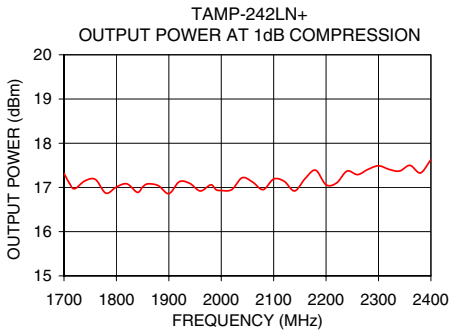
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

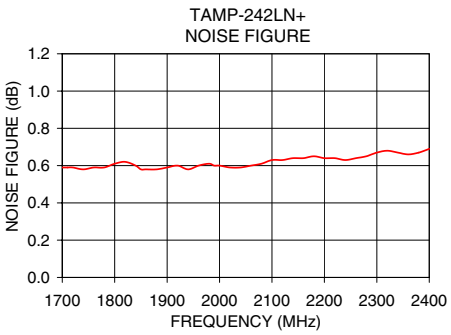
FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR IN (:1)	VSWR OUT (:1)	NOISE FIGURE (dB)	P. OUT @ 1dB COMPR. (dBm)	OUTPUT IP3 (dBm)
1710.00	14.54	7.41	1.41	1.19	0.59	17.10	31.29
1740.00	14.37	7.43	1.42	1.19	0.58	17.15	31.77
1760.00	14.27	7.44	1.42	1.20	0.59	17.18	31.59
1785.00	14.13	7.47	1.43	1.20	0.60	16.87	32.06
1800.00	14.05	7.47	1.43	1.20	0.61	17.01	32.29
1850.00	13.79	7.51	1.45	1.21	0.58	17.01	32.54
1880.00	13.63	7.53	1.46	1.21	0.58	17.04	32.81
1900.00	13.54	7.55	1.46	1.21	0.59	16.86	33.07
1940.00	13.34	7.59	1.48	1.22	0.58	17.09	33.32
1960.00	13.25	7.60	1.49	1.22	0.60	16.92	33.44
1990.00	13.11	7.62	1.50	1.22	0.60	16.95	33.75
2000.00	13.07	7.60	1.51	1.22	0.60	16.93	33.57
2050.00	12.86	7.60	1.53	1.22	0.59	17.12	34.05
2100.00	12.65	7.61	1.55	1.22	0.63	17.19	34.33
2150.00	12.46	7.62	1.56	1.22	0.64	16.92	34.80
2200.00	12.24	7.62	1.59	1.22	0.64	17.06	34.56
2250.00	12.05	7.62	1.61	1.21	0.63	17.34	34.83
2300.00	11.85	7.65	1.64	1.21	0.67	17.49	34.53
2350.00	11.68	7.66	1.66	1.21	0.67	17.37	33.62
2400.00	11.48	7.67	1.69	1.21	0.69	17.63	34.55

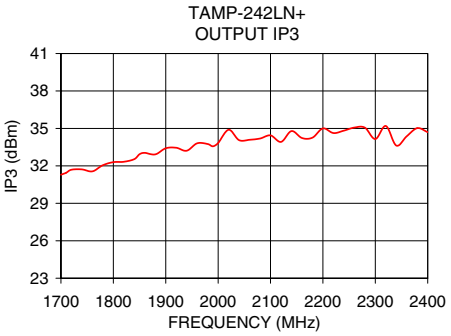












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Amplifier TAMP-242LN+

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required conditions or to view GRAPHS.

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

TEST CONDITIONS: I = 40mA, Vd = 5V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise* Figure
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
1710	14.54	21.95	15.39	21.21	1.34	0.42	31.43	17.10	0.59
1750	14.32	21.76	15.20	20.98	1.34	0.42	32.03	17.12	0.58
1760	14.27	21.71	15.17	20.94	1.34	0.42	31.90	17.18	0.59
1780	14.16	21.62	15.11	20.85	1.34	0.42	32.34	16.87	0.59
1800	14.05	21.52	15.04	20.68	1.34	0.42	32.42	17.01	0.61
1810	14.00	21.48	14.98	20.63	1.34	0.42	32.66	17.01	0.61
1820	13.95	21.43	14.93	20.59	1.34	0.41	32.56	17.08	0.62
1850	13.79	21.30	14.74	20.53	1.34	0.41	33.46	17.01	0.58
1860	13.74	21.25	14.68	20.50	1.34	0.41	33.51	17.08	0.58
1880	13.63	21.16	14.60	20.43	1.34	0.41	33.56	17.04	0.58
1900	13.54	21.09	14.50	20.31	1.34	0.41	33.62	16.86	0.59
1910	13.49	21.05	14.44	20.21	1.34	0.41	34.13	16.97	0.59
1920	13.44	21.01	14.39	20.14	1.34	0.41	34.08	17.13	0.60
1950	13.30	20.89	14.19	20.07	1.34	0.41	34.46	17.00	0.59
1960	13.25	20.85	14.11	20.06	1.34	0.41	34.48	16.92	0.60
1980	13.16	20.76	14.00	20.07	1.34	0.41	33.88	17.06	0.61
2000	13.07	20.67	13.91	20.06	1.34	0.41	34.23	16.93	0.60
2010	13.03	20.64	13.87	20.04	1.34	0.41	33.75	16.93	0.60
2050	12.86	20.46	13.64	19.97	1.34	0.41	34.03	17.12	0.59
2060	12.81	20.42	13.59	20.01	1.34	0.41	34.29	17.12	0.60
2080	12.73	20.34	13.48	20.08	1.33	0.41	34.15	16.95	0.61
2100	12.65	20.26	13.37	20.11	1.33	0.41	33.59	17.19	0.63
2110	12.61	20.22	13.33	20.10	1.33	0.41	33.49	17.19	0.63
2120	12.57	20.18	13.29	20.11	1.33	0.41	34.17	17.14	0.63
2150	12.44	20.05	13.14	20.08	1.33	0.41	34.80	17.05	0.64
2160	12.40	20.02	13.07	20.09	1.33	0.41	34.01	17.20	0.64
2180	12.32	19.93	12.93	20.16	1.33	0.41	33.79	17.39	0.65
2200	12.24	19.86	12.81	20.24	1.33	0.41	34.96	17.06	0.64
2220	12.16	19.79	12.73	20.26	1.33	0.41	34.28	17.10	0.64
2250	12.05	19.67	12.59	20.27	1.32	0.41	34.13	17.34	0.63
2260	12.01	19.64	12.53	20.27	1.32	0.41	34.84	17.29	0.64
2280	11.93	19.57	12.42	20.27	1.32	0.41	34.33	17.41	0.65
2300	11.85	19.50	12.29	20.35	1.32	0.41	33.54	17.49	0.67
2350	11.66	19.32	12.07	20.35	1.32	0.40	33.96	17.44	0.67
2360	11.62	19.29	12.01	20.31	1.32	0.40	33.16	17.50	0.66
2380	11.55	19.21	11.91	20.29	1.32	0.40	33.87	17.33	0.67
2400	11.48	19.15	11.78	20.30	1.32	0.40	35.05	17.63	0.69

*The Noise Figure measurement preformed in shielded box.

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: I = 40mA, Vd = 5V @Temperature = -45degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)
1710	14.80	21.78	15.99	21.64	1.30	0.44	31.28	16.81
1750	14.59	21.61	15.89	21.25	1.30	0.44	31.53	16.90
1760	14.53	21.56	15.84	21.25	1.30	0.44	31.41	16.93
1780	14.42	21.47	15.69	21.15	1.30	0.44	31.99	16.62
1800	14.31	21.37	15.51	21.09	1.30	0.44	31.96	16.76
1810	14.25	21.34	15.42	21.08	1.30	0.44	32.22	16.79
1820	14.20	21.29	15.34	21.05	1.30	0.43	32.21	16.83
1850	14.04	21.18	15.30	20.70	1.31	0.43	33.08	16.78
1860	13.98	21.13	15.24	20.63	1.31	0.43	33.07	16.83
1880	13.89	21.03	15.16	20.48	1.31	0.43	32.62	16.76
1900	13.79	20.96	14.97	20.41	1.31	0.43	32.99	16.63
1910	13.75	20.91	14.88	20.39	1.30	0.43	33.32	16.76
1920	13.70	20.86	14.81	20.39	1.30	0.43	33.34	16.91
1950	13.56	20.71	14.68	20.43	1.30	0.43	33.57	16.73
1960	13.52	20.67	14.64	20.35	1.30	0.43	33.44	16.66
1980	13.43	20.61	14.55	20.43	1.30	0.43	33.84	16.79
2000	13.34	20.50	14.44	20.43	1.30	0.43	33.82	16.70
2010	13.30	20.46	14.35	20.43	1.30	0.43	33.16	16.69
2050	13.11	20.29	14.05	20.39	1.30	0.43	33.69	16.85
2060	13.07	20.24	14.06	20.37	1.30	0.43	33.81	16.86
2080	12.99	20.15	14.04	20.39	1.30	0.43	33.86	16.71
2100	12.91	20.08	13.91	20.48	1.30	0.43	33.26	16.98
2110	12.86	20.05	13.85	20.57	1.30	0.43	33.31	16.95
2120	12.82	20.02	13.79	20.52	1.30	0.43	33.98	16.88
2150	12.70	19.87	13.56	20.41	1.29	0.43	34.05	16.86
2160	12.67	19.84	13.49	20.42	1.29	0.43	33.69	17.00
2180	12.59	19.75	13.39	20.45	1.29	0.43	33.62	17.18
2200	12.51	19.67	13.33	20.49	1.29	0.43	34.44	16.77
2220	12.42	19.62	13.22	20.59	1.29	0.43	33.69	16.92
2250	12.31	19.49	12.95	20.59	1.29	0.43	34.01	17.14
2260	12.27	19.44	12.88	20.55	1.28	0.43	34.16	17.07
2280	12.19	19.37	12.80	20.48	1.28	0.43	33.72	17.18
2300	12.12	19.30	12.75	20.52	1.28	0.43	33.25	17.30
2350	11.93	19.14	12.41	20.68	1.28	0.43	33.73	17.25
2360	11.89	19.11	12.32	20.71	1.28	0.43	32.89	17.30
2380	11.82	19.03	12.20	20.56	1.28	0.43	33.32	17.19
2400	11.75	18.95	12.12	20.42	1.27	0.43	34.88	17.43

Typical Performance Data

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

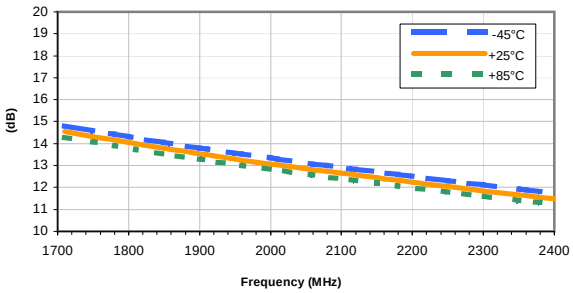
TEST CONDITIONS: I = 40mA, Vd = 5V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)
1710	14.28	22.09	15.07	21.41	1.38	0.40	31.62	17.31
1750	14.07	21.91	15.03	21.09	1.38	0.40	32.34	17.31
1760	14.02	21.87	14.98	21.07	1.38	0.40	32.18	17.39
1780	13.91	21.76	14.82	21.03	1.38	0.40	32.79	17.09
1800	13.80	21.68	14.61	20.94	1.38	0.39	32.65	17.21
1810	13.74	21.64	14.52	20.88	1.38	0.39	33.23	17.20
1820	13.68	21.60	14.47	20.86	1.38	0.39	33.26	17.27
1850	13.53	21.49	14.44	20.69	1.39	0.39	34.17	17.21
1860	13.48	21.45	14.41	20.66	1.39	0.39	34.41	17.29
1880	13.39	21.35	14.31	20.55	1.38	0.39	33.96	17.26
1900	13.29	21.25	14.12	20.54	1.38	0.39	34.08	17.09
1910	13.24	21.22	14.03	20.53	1.38	0.39	34.95	17.19
1920	13.19	21.17	13.96	20.48	1.38	0.39	34.16	17.34
1950	13.06	21.02	13.88	20.52	1.38	0.39	34.77	17.24
1960	13.01	20.99	13.86	20.52	1.38	0.39	34.72	17.16
1980	12.92	20.91	13.75	20.60	1.38	0.39	35.35	17.30
2000	12.83	20.82	13.60	20.52	1.38	0.39	34.69	17.18
2010	12.79	20.79	13.50	20.54	1.38	0.39	33.96	17.19
2050	12.60	20.60	13.23	20.45	1.37	0.39	34.75	17.39
2060	12.56	20.56	13.24	20.47	1.38	0.39	34.51	17.36
2080	12.48	20.50	13.24	20.56	1.38	0.39	34.76	17.19
2100	12.40	20.42	13.10	20.56	1.38	0.39	33.92	17.41
2110	12.35	20.38	13.03	20.61	1.38	0.39	33.61	17.45
2120	12.31	20.34	12.96	20.58	1.38	0.39	34.42	17.39
2150	12.19	20.22	12.74	20.47	1.37	0.39	34.83	17.27
2160	12.15	20.18	12.68	20.44	1.37	0.39	34.38	17.42
2180	12.08	20.10	12.63	20.45	1.37	0.39	34.63	17.60
2200	11.99	20.01	12.59	20.51	1.37	0.39	34.83	17.33
2220	11.91	19.95	12.49	20.56	1.37	0.39	35.00	17.33
2250	11.79	19.84	12.26	20.50	1.37	0.39	34.71	17.53
2260	11.75	19.80	12.21	20.45	1.36	0.39	35.81	17.49
2280	11.67	19.71	12.14	20.37	1.36	0.39	35.03	17.62
2300	11.60	19.66	12.12	20.35	1.36	0.39	34.09	17.64
2350	11.41	19.50	11.81	20.27	1.36	0.38	34.01	17.65
2360	11.37	19.48	11.73	20.29	1.36	0.38	33.16	17.54
2380	11.30	19.40	11.64	20.23	1.36	0.38	34.33	17.32
2400	11.23	19.32	11.56	20.16	1.36	0.39	36.18	17.66

Typical Performance Curves

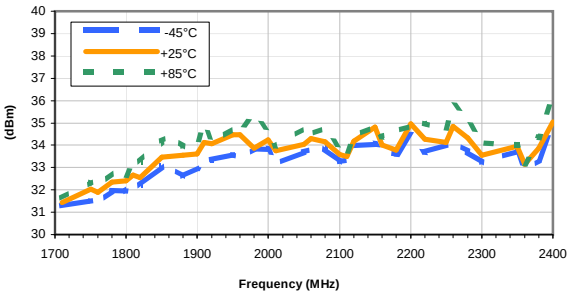
GAIN vs. FREQUENCY & TEMPERATURE

INPUT POWER = -15, VOLTAGE = 5V



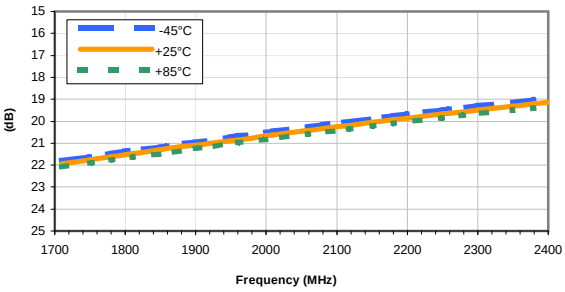
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE

INPUT POWER = -15, VOLTAGE = 5V



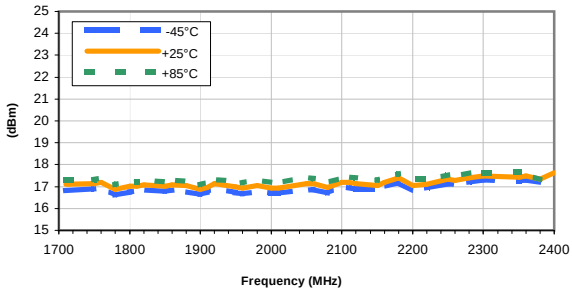
ISOLATION vs. FREQUENCY & TEMPERATURE

INPUT POWER = -15, VOLTAGE = 5V



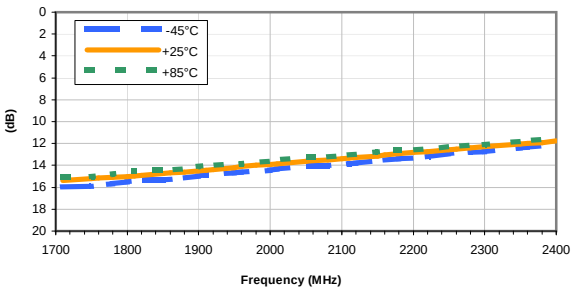
OUTPUT POWER at 1dB COMPRESSION vs. FREQUENCY & TEMPERATURE

VOLTAGE = 5V



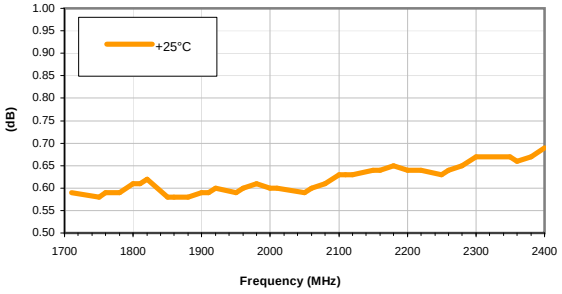
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE

INPUT POWER = -15, VOLTAGE = 5V



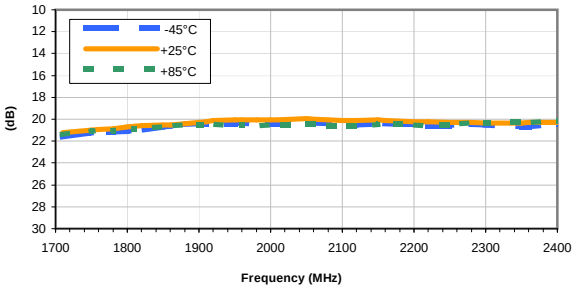
NOISE FIGURE vs. FREQUENCY

VOLTAGE = 5V



OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE

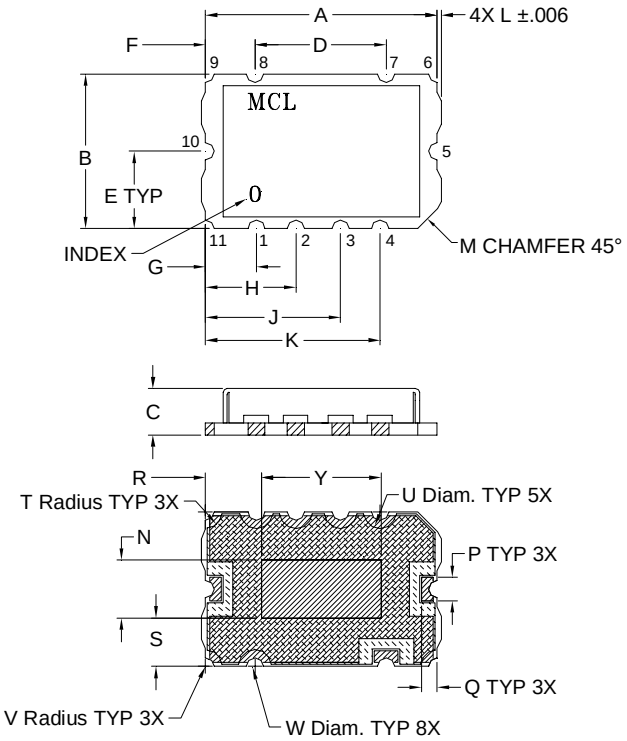
INPUT POWER = -15, VOLTAGE = 5V



Case Style JQ

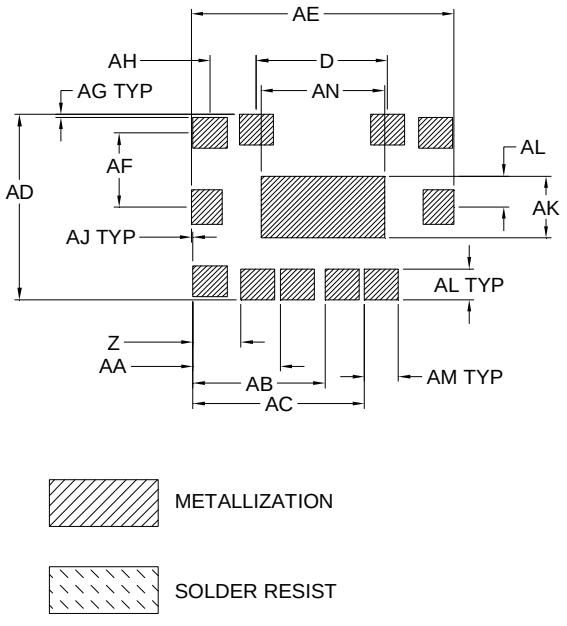
JQ1382

Outline Dimensions



PCB Land Pattern

Suggested Layout



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N	P
JQ1382	.591 (15.0)	.394 (10.0)	.118 (3.0)	.335 (8.5)	.197 (5.0)	.126 (3.2)	.130 (3.3)	.230 (5.85)	.344 (8.75)	.445 (11.3)	.011 (.28)	.050 (1.27)	.148 (3.75)	.060 (1.52)

CASE#	Q	R	S	T	U	V	W	Y	Z	AA	AB	AC	AD	AE
JQ1382	.040 (1.02)	.143 (3.63)	.123 (3.13)	.042 (1.07)	.084 (2.13)	.022 (.56)	.044 (1.12)	.305 (7.75)	.122 (3.1)	.222 (5.65)	.337 (8.55)	.437 (11.1)	.472 (12.0)	.669 (17.0)

CASE#	AF	AG	AH	AJ	AK	AL	AM	AN	WT. GRAMS
JQ1382	.189 (4.8)	.008 (.20)	.118 (3.0)	.004 (.10)	.158 (4.0)	.079 (2.0)	.087 (2.2)	.315 (8.0)	.8

Dimensions are in inches (mm). Tolerances: 2 Pl. ± .03; 3 Pl. ± .015

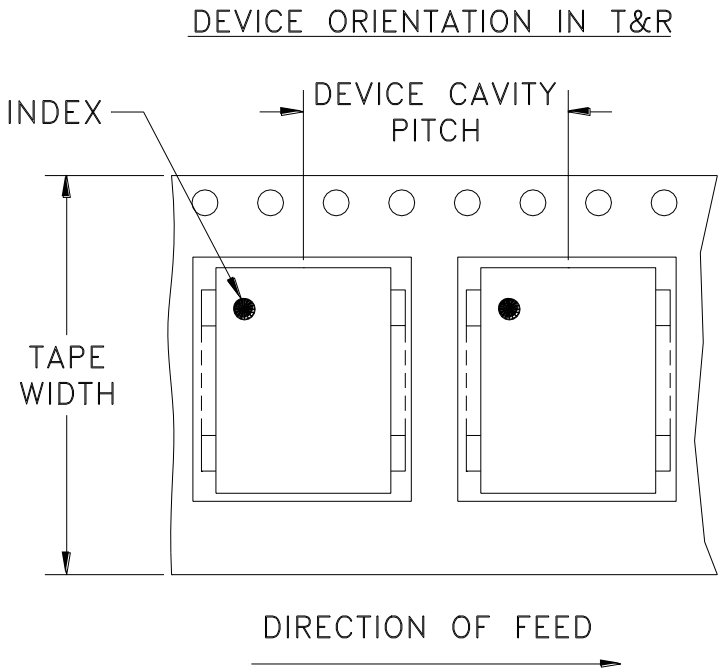
Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:

   For RoHS Case Styles: 3-5 µ inch (.08-.13 microns) Gold over 120-240 µ inch (3.05-6.10 microns) Nickel plate

   For RoHS-5 Case Styles: Tin-Lead plate.

Tape & Reel Packaging TR-F10



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	16	7	10,20,50,100,200
		13	500

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

Note: Please consult individual model data sheet to determine device per reel availability.

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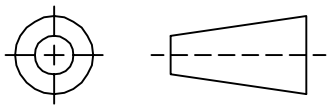
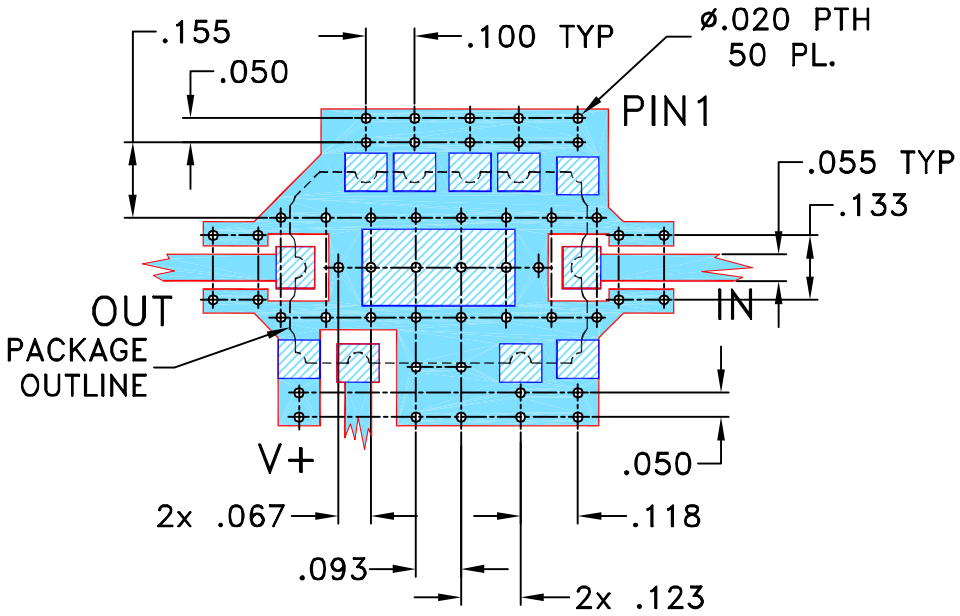
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M119697	NEW RELEASE	10/08	HB	HH
A	M120556	UPDATE GROUND PLANE DIM.	12/08	HB	HH
A	R75063	UPDATE GROUND PLANE DIM.	12/08	HB	HH

SUGGESTED MOUNTING CONFIGURATION FOR JQ1382 CASE STYLE, "11AM01" PIN CODE



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002; COPPER 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINOUS 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	HB	05.10.08
TOLERANCES ON:	CHECKED	DH	28.10.08
2 PL DECIMALS ±	APPROVED	HH	29.10.08
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

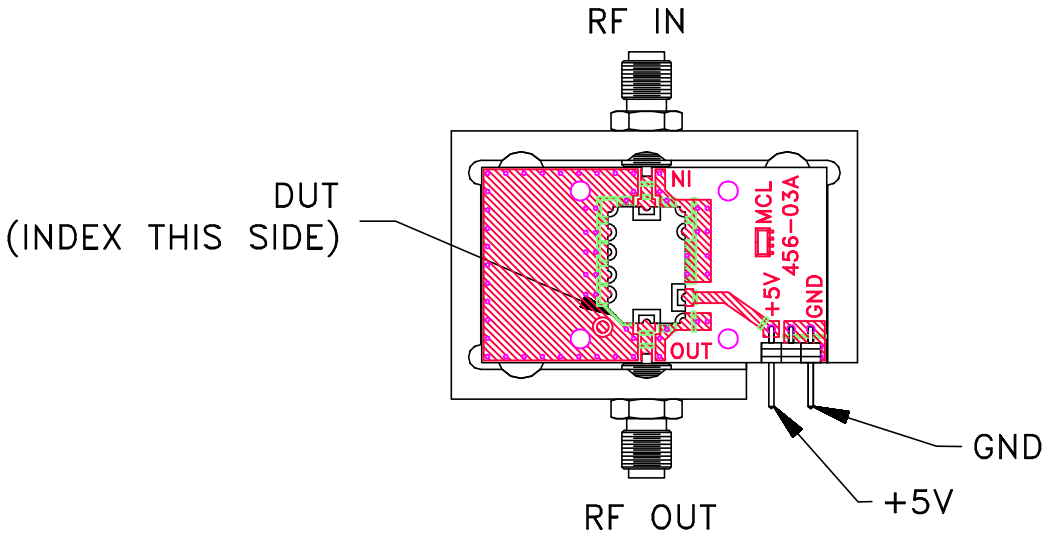
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 11AM01, JQ1382, TAMP, TB-468

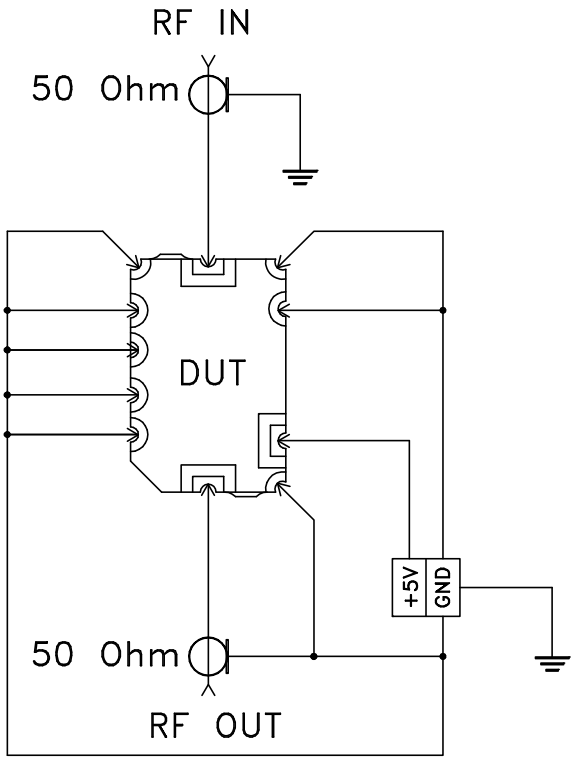
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-293	A

FILE:	SCALE:	SHEET:
98PL293	2.5:1	1 OF 1

Evaluation Board and Circuit



TB-468+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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Environmental Specifications ENV44

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 Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215