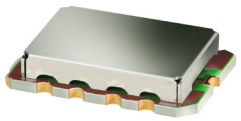
Low Noise Amplifier TAMP-72LN+

50Ω 400 to 700 MHz

The Big Deal

- High IP3, 36 dBm typ.
- Low Noise Figure, 1.0 dB typ.
- Integrated Bias Matching and Stabilty Circuits



CASE STYLE: JQ1382

Product Overview

The TAMP-72LN+ (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 low noise figure and moderate gain with good input and output return loss over the entire frequency range and without the need of external matching components.

Key Features

Feature	Advantages
High Output IP3	At +36 dBm IP3, in combination with its low noise performance, the TAMP-72LN+ can improve a systems’ spur-free dynamic range which is often the critical driver in many receiver applications.
Low NF	With only 1.0 dB NF, the TAMP-72LN+ 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.
Output Power, +21.5 dBm	Provides a good safety margin against damage or saturation from unwanted high power RF signals present at the input to a receiver.
Well Matched input/ output ports	With typical input VSWR of 1.35:1 and output VSWR of 1.15:1, the TAMP-72LN+ 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-72LN+ 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

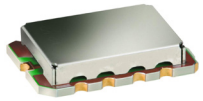
Low Noise Amplifier

TAMP-72LN+

50Ω 400 to 700 MHz

Features

- Ultra low noise figure, 1 dB typ.
- Output power, up to +21.5 dBm typ.
- Good output IP3, 36 dBm typ.
- Good VSWR, 1.2 dB typ.
- Unconditionally stable



CASE STYLE: JQ1382

Applications

- PSR (Public Safety Radio)
- Front-end amplifier
- Cellular
- Base station transceiver, tower mounted amplifier, repeater
- 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		400		700	MHz
Noise Figure	400 - 700		1.0	1.2	dB
Gain	400 - 700	16.5	20.0		dB
Gain Flatness	400 - 700		± 1.3	± 2.0	dB
Output Power at 1dB compression	400 - 700	18.5	21.5		dBm
Output third order intercept point (OIP3)	400 - 700		36		dBm
Input VSWR	400 - 700		1.35		:1
Output VSWR	400 - 700		1.15		:1
DC Supply Voltage			5.0		V
DC Supply Current			90	120	mA

Pin Connections

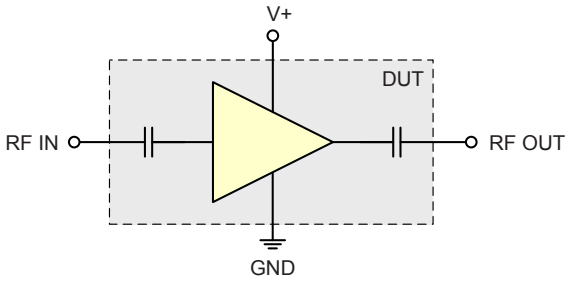
RF IN	10
RF OUT	5
V+	7
GROUND	1,2,3,4,6,8,9,11

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)	+27 dBm
Power Consumption	660 mW

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

Simplified Schematic



ESD Rating

Human Body Model (HBM): Class 1B (500 v to < 1000 v) in accordance with ANSI/ESD STM 5.1 - 2001

Notes

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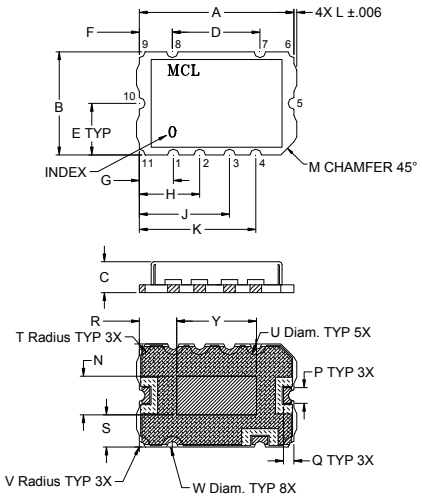
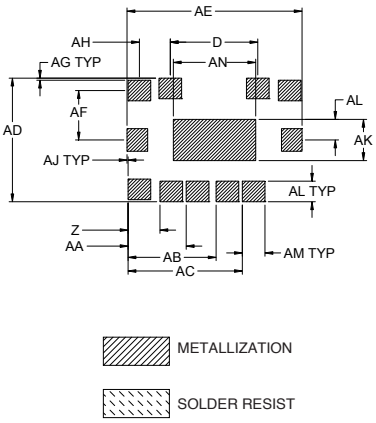
Outline Drawing



PCB Land Pattern

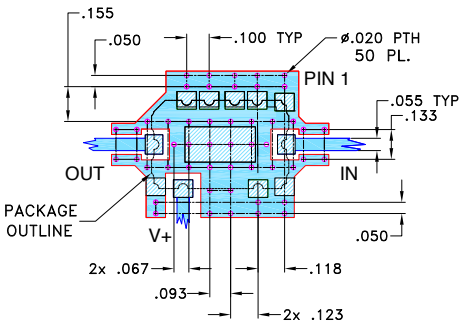


Outline Dimensions (inch / mm)

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)

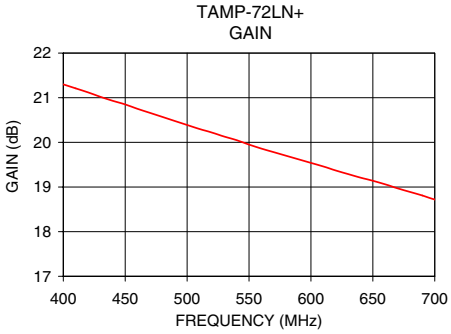


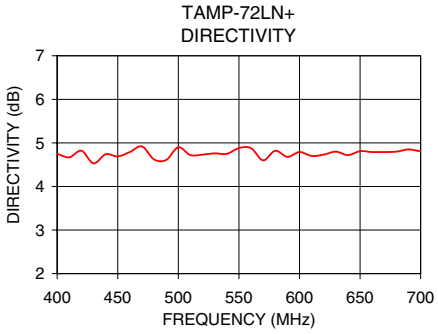
NOTES:
1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002; COPPER 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

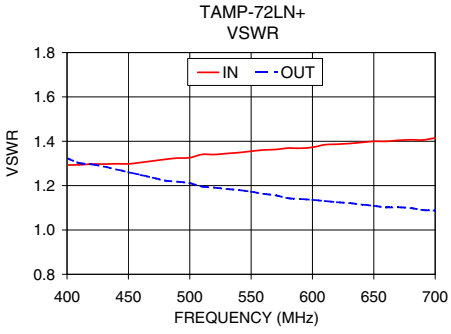
DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

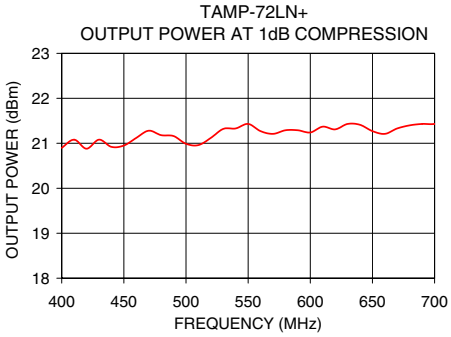
DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

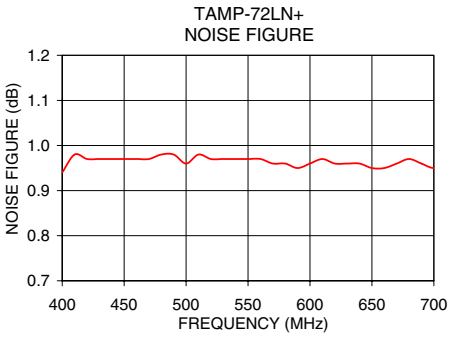
FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR IN (:1)	VSWR OUT (:1)	NOISE FIGURE (dB)	P. OUT @ 1dB COMPR. (dBm)	OUTPUT IP3 (dBm)
400.00	21.30	4.75	1.29	1.32	0.94	20.90	35.56
420.00	21.12	4.82	1.30	1.30	0.97	20.88	35.59
440.00	20.93	4.74	1.30	1.27	0.97	20.92	35.92
460.00	20.75	4.79	1.30	1.25	0.97	21.12	35.71
480.00	20.57	4.62	1.32	1.22	0.98	21.18	35.65
500.00	20.39	4.90	1.33	1.21	0.96	20.99	36.00
520.00	20.22	4.73	1.34	1.19	0.97	21.12	35.71
540.00	20.05	4.75	1.35	1.18	0.97	21.33	35.87
560.00	19.86	4.88	1.36	1.16	0.97	21.27	36.13
570.00	19.78	4.60	1.36	1.16	0.96	21.21	35.86
580.00	19.70	4.82	1.37	1.14	0.96	21.29	35.64
590.00	19.62	4.68	1.37	1.14	0.95	21.29	35.82
600.00	19.54	4.79	1.37	1.14	0.96	21.24	35.67
610.00	19.46	4.70	1.38	1.13	0.97	21.37	36.22
620.00	19.37	4.73	1.39	1.12	0.96	21.31	36.73
630.00	19.29	4.80	1.39	1.12	0.96	21.43	36.53
640.00	19.21	4.72	1.39	1.11	0.96	21.41	36.48
660.00	19.06	4.79	1.40	1.10	0.95	21.21	36.43
680.00	18.89	4.80	1.41	1.10	0.97	21.40	36.71
700.00	18.72	4.81	1.41	1.09	0.95	21.43	36.20

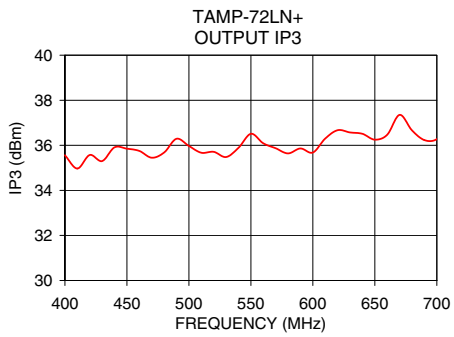












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Amplifier TAMP-72LN+

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: Supply Current = 85mA, DC Supply Voltage = 5V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	FREQ	IP3 Output
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dB)	(MHz)	(dBm)
300	22.25	27.34	15.61	14.97	1.15	0.58	22.77	1.01	400	35.76
320	22.08	27.06	16.37	15.53	1.15	0.59	22.72	0.98	420	35.47
340	21.92	26.85	16.98	16.29	1.15	0.59	22.79	0.94	430	35.59
350	21.84	26.73	17.29	16.60	1.15	0.59	22.88	0.93	440	34.95
360	21.76	26.65	17.56	17.03	1.15	0.59	22.84	0.91	450	35.39
370	21.67	26.54	17.78	17.40	1.15	0.59	22.93	0.90	460	34.96
380	21.58	26.39	17.94	17.71	1.14	0.59	22.84	0.89	470	35.45
400	21.42	26.23	18.17	18.30	1.15	0.59	22.84	0.87	480	35.40
420	21.24	26.08	18.26	19.01	1.15	0.59	22.91	0.88	490	35.53
440	21.07	25.91	18.21	19.62	1.15	0.59	22.92	0.87	500	36.08
450	20.98	25.80	18.13	19.98	1.15	0.59	22.98	0.86	510	35.31
460	20.90	25.66	18.08	20.17	1.14	0.59	22.87	0.86	520	35.15
470	20.82	25.62	18.06	20.56	1.15	0.59	22.90	0.86	530	36.32
480	20.74	25.54	18.05	20.86	1.15	0.59	22.99	0.85	540	35.57
500	20.57	25.38	17.95	21.56	1.15	0.58	23.02	0.85	550	35.64
520	20.41	25.19	17.87	22.17	1.15	0.59	23.08	0.85	560	36.26
540	20.24	25.04	17.74	22.65	1.15	0.58	23.03	0.85	570	35.94
550	20.17	24.94	17.64	22.94	1.14	0.59	22.92	0.86	580	36.47
560	20.08	24.84	17.50	23.14	1.14	0.59	23.00	0.86	590	35.76
570	20.01	24.76	17.43	23.48	1.14	0.59	22.99	0.86	600	35.80
580	19.93	24.66	17.39	23.79	1.14	0.59	23.09	0.86	610	36.13
600	19.77	24.53	17.29	24.45	1.14	0.59	23.04	0.86	620	35.31
620	19.61	24.34	17.24	25.08	1.14	0.59	23.05	0.86	630	35.48
640	19.45	24.15	17.19	25.74	1.14	0.59	23.03	0.87	640	36.17
650	19.38	24.07	17.18	26.10	1.14	0.59	23.05	0.87	650	36.28
660	19.30	24.03	17.06	26.43	1.14	0.59	23.00	0.86	660	36.09
670	19.23	23.95	17.04	26.70	1.14	0.59	23.03	0.85	670	35.38
680	19.15	23.85	16.92	26.66	1.14	0.59	23.07	0.85	680	35.78
700	19.01	23.71	16.84	27.66	1.14	0.59	23.12	0.86	690	37.06
720	18.86	23.57	16.77	28.43	1.14	0.59	23.07	0.86	700	35.58
740	18.70	23.44	16.67	28.64	1.14	0.58	22.95	0.86	720	36.54
750	18.64	23.32	16.68	29.12	1.13	0.59	22.93	0.87	730	37.09
760	18.56	23.27	16.65	29.33	1.13	0.59	22.94	0.88	740	36.66
770	18.49	23.18	16.63	29.61	1.13	0.59	22.88	0.88	750	35.53
780	18.41	23.09	16.57	29.99	1.13	0.59	22.86	0.87	760	35.69
800	18.27	23.01	16.49	30.56	1.14	0.58	22.8	0.85	770	37.22
820	18.13	22.81	16.41	30.99	1.13	0.59	22.72	0.84	780	35.42
840	18.00	22.70	16.35	31.71	1.13	0.58	22.57	0.86	790	36.22
850	17.92	22.62	16.36	31.90	1.13	0.58	22.53	0.86	800	36.74

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: Supply Current = 95mA, DC Supply Voltage = 5V @Temperature = -40degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	FREQ	IP3 Output
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dB)	(MHz)	(dBm)
300	22.67	27.69	14.58	16.06	1.14	0.59	23.02	0.70	400	37.42
320	22.48	27.42	15.04	16.80	1.14	0.59	22.92	0.69	420	36.92
340	22.32	27.16	15.46	17.61	1.14	0.59	22.99	0.66	430	37.53
350	22.23	27.15	15.65	17.99	1.14	0.59	23.09	0.65	440	36.76
360	22.14	26.92	15.79	18.26	1.14	0.59	23.07	0.64	450	37.17
370	22.05	26.78	15.95	18.63	1.13	0.60	23.15	0.63	460	37.35
380	21.95	26.76	16.00	18.91	1.14	0.59	23.05	0.62	470	37.58
400	21.78	26.58	16.11	19.40	1.14	0.59	23.00	0.61	480	38.08
420	21.60	26.32	16.09	20.02	1.13	0.59	23.10	0.64	490	37.12
440	21.43	26.15	16.06	20.49	1.13	0.59	23.12	0.64	500	37.20
450	21.34	25.99	16.04	20.78	1.13	0.60	23.17	0.64	510	37.00
460	21.25	25.99	15.99	20.88	1.14	0.59	23.05	0.64	520	37.88
470	21.17	25.91	15.96	21.15	1.14	0.59	23.06	0.64	530	36.66
480	21.08	25.81	15.93	21.25	1.13	0.59	23.16	0.64	540	37.52
500	20.91	25.65	15.85	21.76	1.13	0.59	23.22	0.64	550	38.71
520	20.76	25.46	15.77	22.06	1.13	0.59	23.24	0.63	560	38.66
540	20.59	25.26	15.72	22.52	1.13	0.59	23.19	0.63	570	37.30
550	20.51	25.12	15.64	22.68	1.12	0.60	23.08	0.68	580	37.50
560	20.42	25.15	15.62	22.84	1.13	0.59	23.17	0.67	590	38.32
570	20.35	25.02	15.59	22.99	1.13	0.59	23.16	0.67	600	38.02
580	20.27	24.95	15.56	23.20	1.13	0.59	23.27	0.67	610	38.31
600	20.11	24.76	15.55	23.59	1.13	0.59	23.21	0.67	620	39.17
620	19.96	24.60	15.58	23.99	1.13	0.59	23.21	0.68	630	38.06
640	19.81	24.44	15.59	24.45	1.12	0.59	23.16	0.68	640	38.56
650	19.74	24.33	15.67	24.59	1.12	0.59	23.21	0.67	650	39.34
660	19.66	24.24	15.69	24.96	1.12	0.59	23.14	0.67	660	38.40
670	19.59	24.16	15.69	25.02	1.12	0.60	23.20	0.65	670	38.85
680	19.51	24.06	15.67	24.95	1.12	0.60	23.24	0.65	680	38.84
700	19.37	23.93	15.74	25.48	1.12	0.59	23.36	0.65	690	38.82
720	19.23	23.78	15.78	25.70	1.12	0.59	23.28	0.65	700	38.30
740	19.07	23.64	15.77	26.00	1.12	0.59	23.19	0.65	720	39.61
750	19.01	23.50	15.84	26.02	1.11	0.6	23.19	0.65	730	37.03
760	18.94	23.47	15.90	26.06	1.12	0.59	23.2	0.65	740	38.13
770	18.86	23.39	15.94	26.03	1.12	0.59	23.16	0.65	750	39.27
780	18.79	23.32	15.94	26.24	1.12	0.59	23.17	0.65	760	38.34
800	18.65	23.18	15.98	26.27	1.12	0.59	23.12	0.6	770	37.46
820	18.52	23.03	16.04	26.11	1.11	0.59	23.02	0.6	780	38.91
840	18.38	22.86	16.08	26.22	1.11	0.6	22.9	0.61	790	40.11
850	18.32	22.81	16.14	26.25	1.11	0.59	22.88	0.61	800	37.56

Typical Performance Data

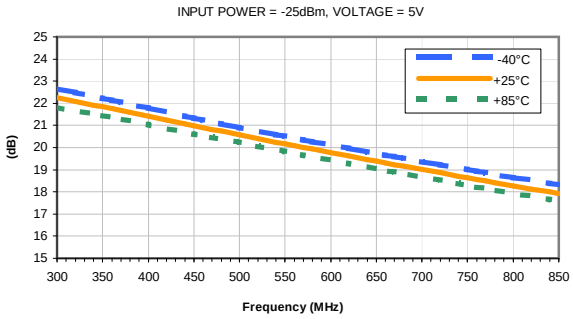
Definitions:
Input Return Loss = -S11 (dB)
Gain(Power Gain) = S21 (dB)
Reverse Isolation = -S12 (dB)
Output Return Loss = -S22 (dB)

TEST CONDITIONS: Supply Current = 78mA, DC Supply Voltage = 5V @Temperature = +85degC

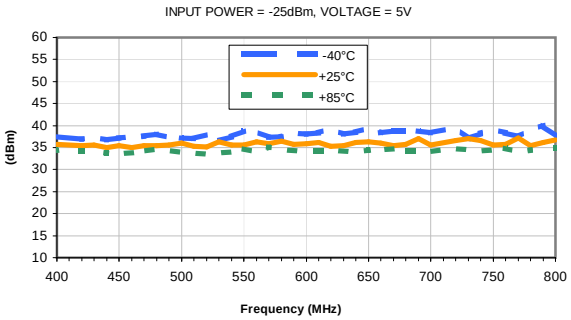
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		1dB Comp. Output	Noise Figure	FREQ	IP3 Output
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dB)	(MHz)	(dBm)
300	21.82	26.97	16.35	14.20	1.15	0.58	21.16	1.22	400	34.15
320	21.66	26.82	17.46	14.75	1.16	0.57	21.38	1.19	420	33.87
340	21.52	26.60	18.55	15.47	1.16	0.57	21.45	1.13	430	33.68
350	21.44	26.46	19.07	15.74	1.15	0.58	21.40	1.11	440	33.99
360	21.36	26.32	19.47	16.14	1.15	0.58	21.40	1.09	450	33.44
370	21.28	26.27	19.94	16.48	1.15	0.58	21.44	1.07	460	33.82
380	21.20	26.17	20.19	16.76	1.16	0.58	21.46	1.05	470	33.82
400	21.04	25.97	20.68	17.33	1.15	0.58	21.55	1.03	480	34.39
420	20.87	25.86	20.88	18.16	1.16	0.57	21.53	1.03	490	34.31
440	20.71	25.63	20.96	18.78	1.16	0.58	21.58	1.02	500	33.70
450	20.62	25.57	20.99	19.03	1.16	0.58	21.67	1.01	510	33.59
460	20.55	25.49	20.94	19.33	1.16	0.58	21.69	1.00	520	33.84
470	20.47	25.41	20.91	19.74	1.16	0.58	21.70	1.00	530	34.15
480	20.38	25.30	20.81	20.16	1.16	0.58	21.74	0.99	540	34.74
500	20.22	25.17	20.70	20.91	1.16	0.57	21.69	0.99	550	33.88
520	20.07	24.99	20.46	21.64	1.16	0.57	21.71	0.98	560	33.48
540	19.90	24.84	20.20	22.42	1.16	0.57	21.79	0.98	570	33.93
550	19.82	24.79	20.07	22.90	1.16	0.57	21.80	0.99	580	34.78
560	19.74	24.67	20.01	23.27	1.16	0.57	21.80	0.98	590	34.00
570	19.66	24.57	19.86	23.74	1.16	0.57	21.81	0.98	600	35.14
580	19.59	24.50	19.77	24.17	1.16	0.57	21.79	0.98	610	34.53
600	19.43	24.37	19.54	25.09	1.16	0.57	21.81	0.97	620	33.98
620	19.28	24.20	19.34	25.95	1.16	0.57	21.84	0.97	630	34.26
640	19.12	24.05	19.20	27.03	1.16	0.57	21.89	0.97	640	34.07
650	19.05	23.99	19.16	27.66	1.16	0.57	21.89	0.96	650	34.40
660	18.97	23.92	19.06	28.14	1.16	0.57	21.92	0.96	660	34.48
670	18.90	23.86	18.99	28.99	1.16	0.57	21.83	0.94	670	34.69
680	18.82	23.78	18.84	29.12	1.16	0.57	21.87	0.94	680	34.11
700	18.67	23.60	18.69	30.56	1.16	0.57	21.87	0.95	690	33.93
720	18.52	23.52	18.49	32.03	1.16	0.56	21.96	0.95	700	34.82
740	18.37	23.36	18.21	32.82	1.16	0.57	21.94	0.95	720	34.08
750	18.3	23.27	18.24	33.77	1.16	0.57	21.94	0.96	730	34.61
760	18.22	23.18	18.16	34.74	1.16	0.57	21.99	0.96	740	34.89
770	18.15	23.10	18.08	35.51	1.15	0.57	21.87	0.96	750	34.12
780	18.08	23.06	18.00	36.64	1.16	0.56	21.97	0.96	760	34.35
800	17.93	22.92	17.86	37.78	1.16	0.56	22.00	0.95	770	34.89
820	17.8	22.79	17.74	40.34	1.16	0.56	21.97	0.95	780	34.81
840	17.65	22.65	17.60	42.16	1.15	0.56	21.85	0.96	790	33.84
850	17.59	22.57	17.56	42.65	1.15	0.56	21.77	0.96	800	35.86

Typical Performance Curves

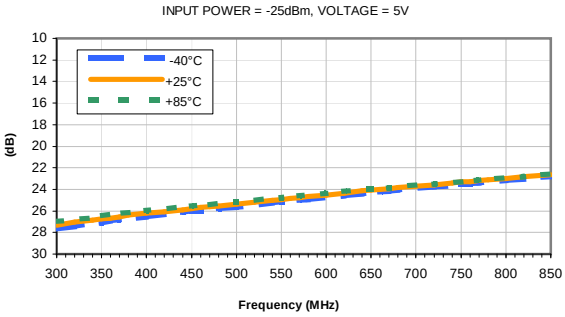
GAIN vs. FREQUENCY & TEMPERATURE



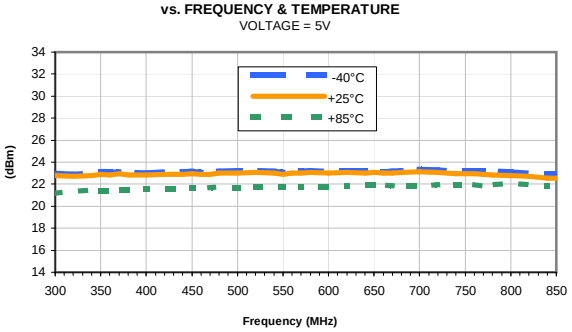
OUTPUT IP3 vs. FREQUENCY & TEMPERATURE



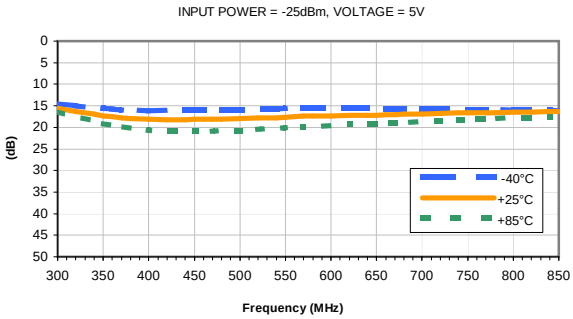
ISOLATION vs. FREQUENCY & TEMPERATURE



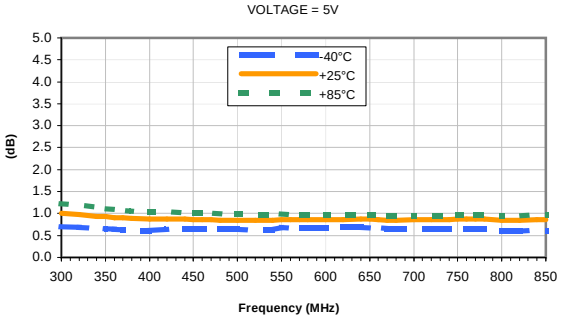
OUTPUT POWER at 1dB COMPRESSION vs. FREQUENCY & TEMPERATURE



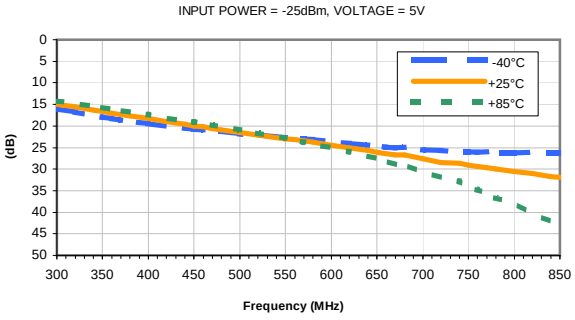
INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE



NOISE FIGURE vs. FREQUENCY & TEMPERATURE



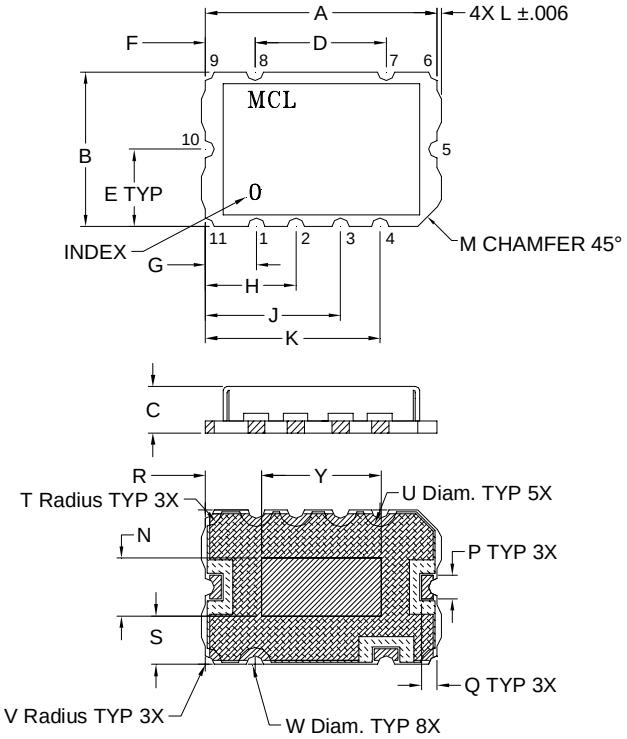
OUTPUT RETURN LOSS vs. FREQUENCY &TEMPERATURE



Case Style JQ

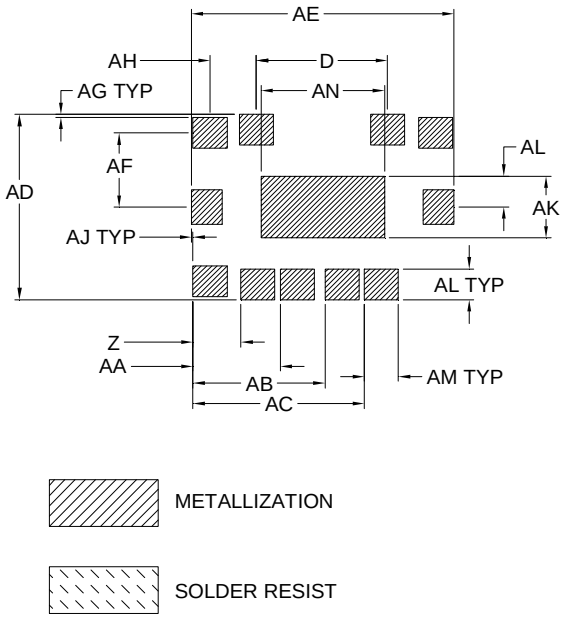
JQ1382

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

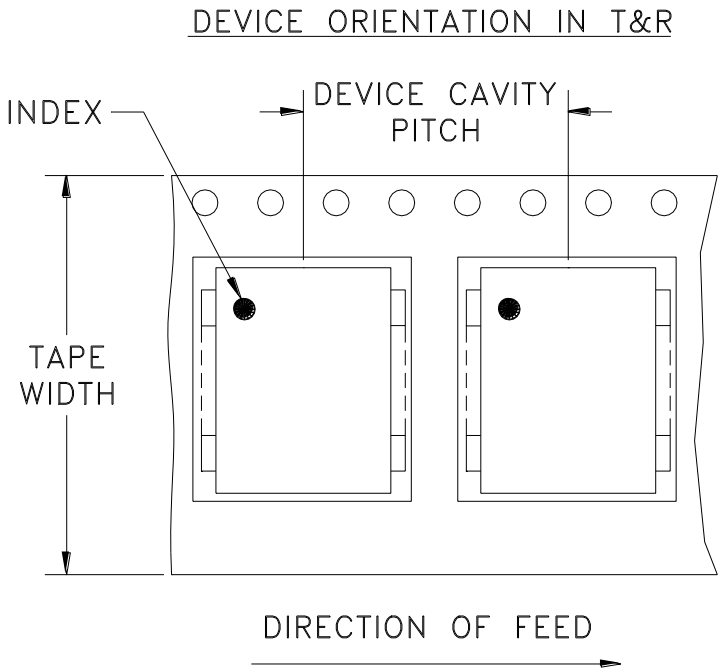
Notes:

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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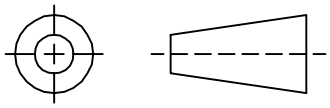
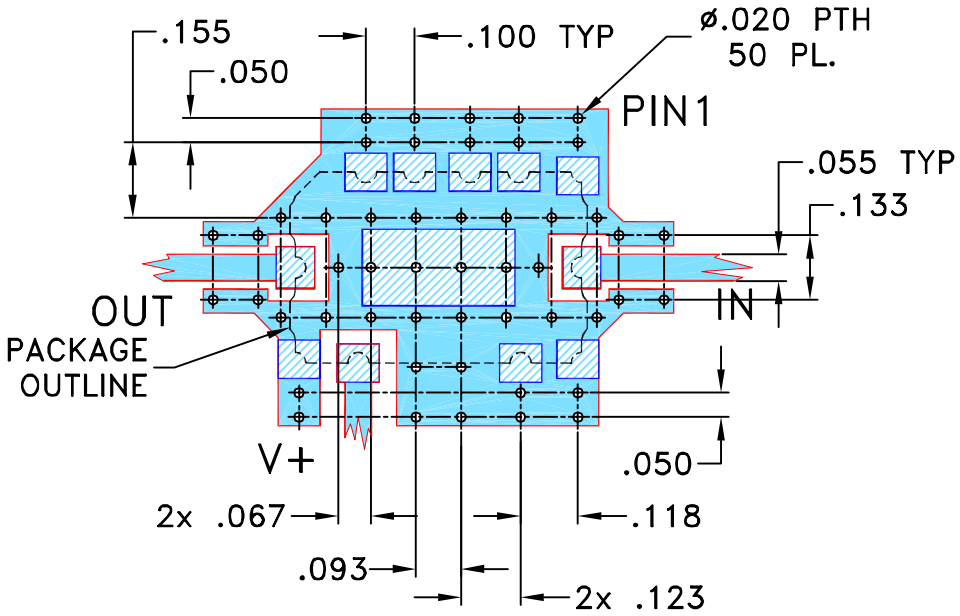
THIRD ANGLE PROJECTION



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

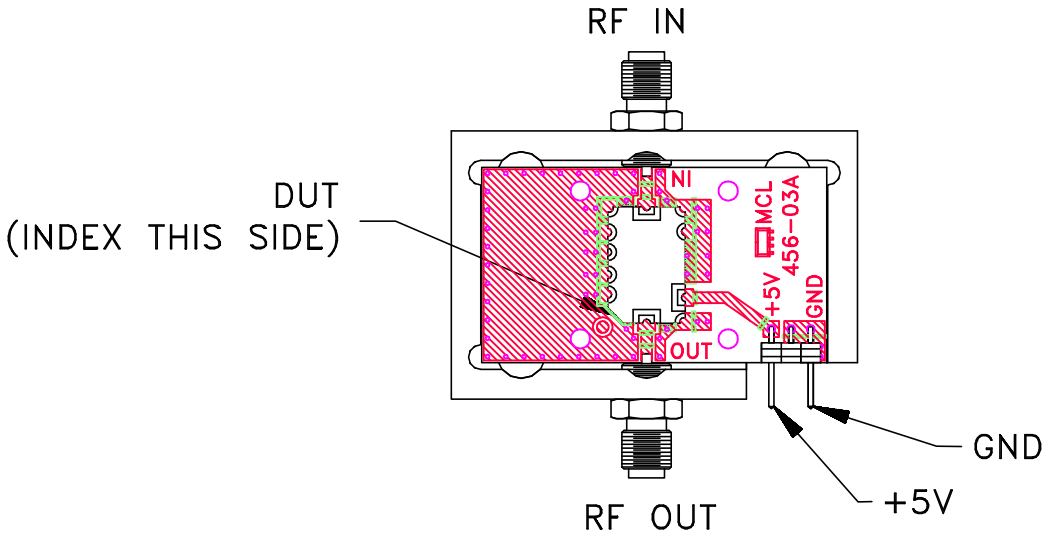
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

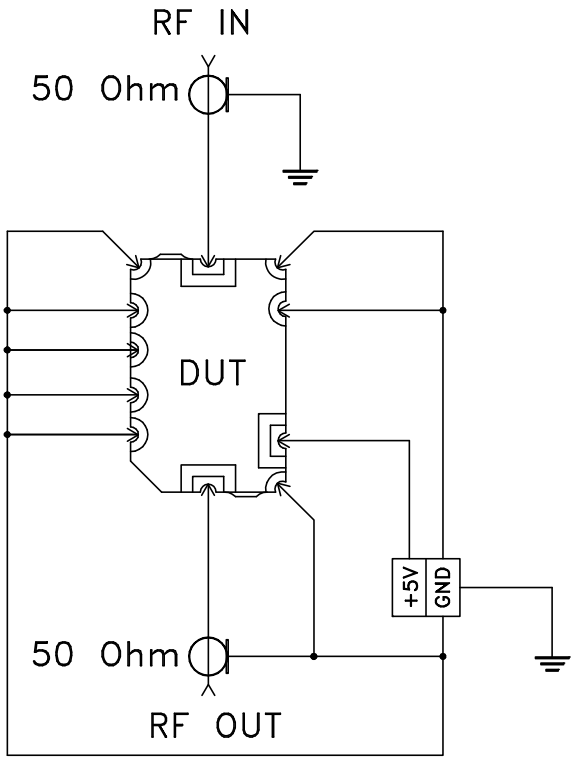
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-293	A

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.

Mini-Circuits®

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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