

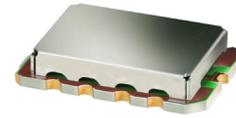
# Low Noise Amplifier

## TAMP-960LN+

50Ω 824 to 960 MHz

### The Big Deal

- Ultra Low Noise Figure, 0.55 dB typ.
- High IP3, 30 dBm typ.
- Good VSWR, 1.2:1 typ.
- Low Current, 40mA at +5V
- Integrated Bias Matching and Stabilization Circuits



CASE STYLE: JQ1382

### Product Overview

The TAMP-960LN+ (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 0.55 dB NF, the TAMP-960LN+ 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	At +30 dBm IP3, in combination with its low noise performance, the TAMP-960LN+ can improve a systems' spur-free dynamic range which is often the critical driver in many receiver applications.
Low Current, 40mA typ.	At only 40mA, the TAMP-960LN+ is ideal for applications with limited available power or densely packed applications where thermal and power management is critical.
High P1dB: 16.5dBm typ.	High P1dB enables the amplifier to operate in linear region in the presence of strong interfering signals.
Well Matched input/ output ports	With typical input VSWR of 1.1:1 and output VSWR of 1.35:1, the TAMP-960LN+ 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-960LN+ 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.

#### Notes

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Surface Mount

# Low Noise Amplifier

## TAMP-960LN+

50Ω

824 to 960 MHz

### Features

- Ultra low noise figure, 0.55 dB typ.
- High Output IP3, 30 dBm typ.
- Output power, up to +16.5 dBm typ.
- Low current consumption
- Good VSWR, 1.2:1 typ.
- Unconditionally stable

### Applications

- Base station transceiver, tower mounted amplifier, repeater
- CDMA: 824 to 894 MHz
- GSM Rx: 880 to 915 MHz
- GSM Tx: 925 to 960 MHz
- General purpose low noise amplifier



CASE STYLE: JQ1382

**+RoHS Compliant**

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

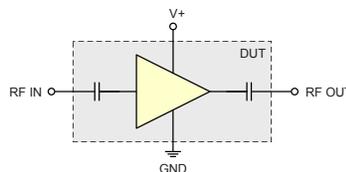
### Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range		824		960	MHz
Noise Figure	824 - 960		0.55	0.80	dB
	824 - 894		0.60	0.80	
	880 - 915		0.55	0.70	
	925 - 960		0.55	0.70	
Gain	824 - 960	16.5	18.0		dB
	824 - 894	16.5	18.0		
	880 - 915	16.5	18.0		
	925 - 960	16.5	17.5		
Gain Flatness	824 - 960		± 0.6	± 1.2	dB
	824 - 894		± 0.4	± 0.8	
	880 - 915		± 0.2	± 0.4	
	925 - 960		± 0.2	± 0.4	
Output Power at 1dB compression	824 - 960	15.5	16.5		dBm
	824 - 894	15.5	16.5		
	880 - 915	15.5	16.5		
	925 - 960	15.5	16.5		
Output third order intercept point (OIP3)	824 - 960		30		dBm
	824 - 894		30		
	880 - 915		30		
	925 - 960		30		
Input VSWR	824 - 960		1.1		:1
	824 - 894		1.1		
	880 - 915		1.1		
	925 - 960		1.1		
Output VSWR	824 - 960		1.4		:1
	824 - 894		1.3		
	880 - 915		1.4		
	925 - 960		1.5		
DC Supply Voltage			5.0		V
DC Supply Current			40	45	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

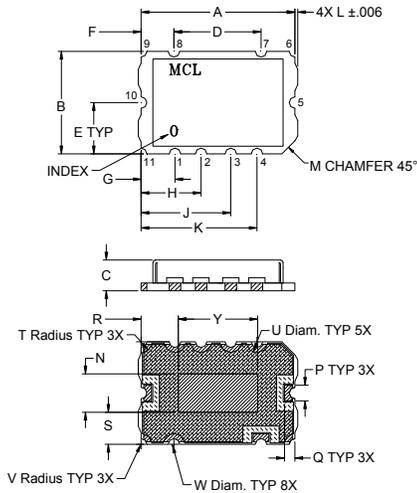
Human Body Model (HBM): Class 1A (250 V to < 500 V) in accordance with ANSI/ESD STM 5.1 - 2001  
 Machine Model (MM): Class M1 (40 V) in accordance with ANSI/ESD STM 5.2 - 1999

#### Notes

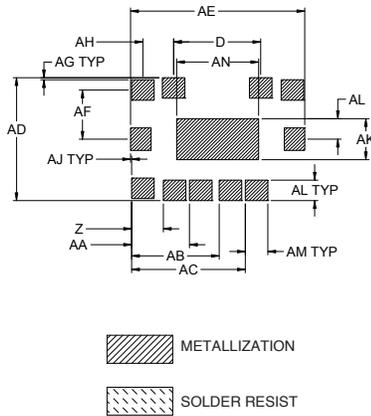
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## Outline Drawing



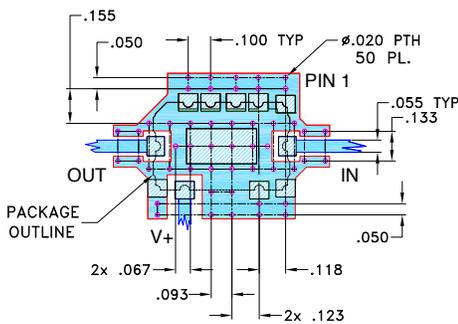
## PCB Land Pattern



## Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	wt.
.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			grams
.022	.044	.305	.122	.222	.337	.437	.472	.669	.189	.008	.118	.004	.158	.079	.087	.315			0.8
.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			

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



### NOTES:

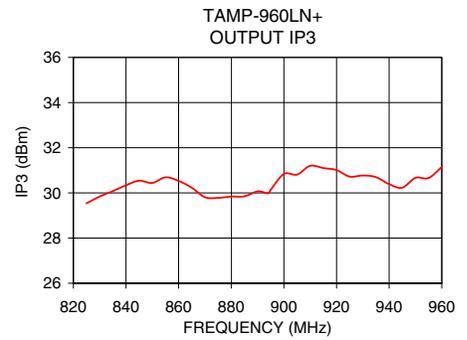
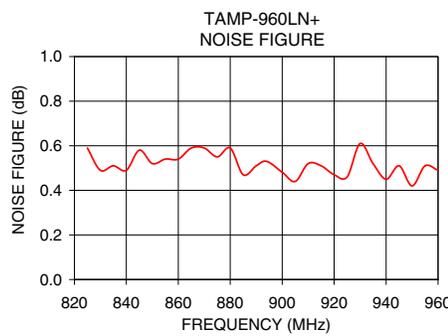
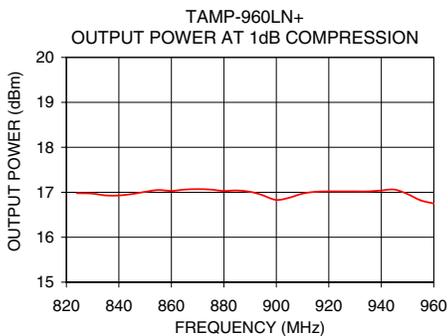
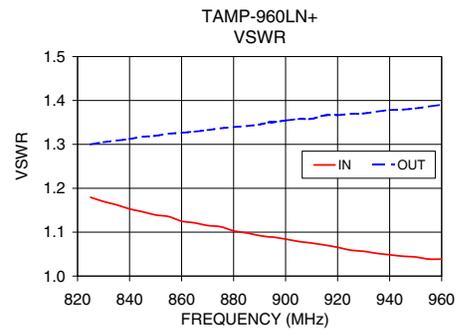
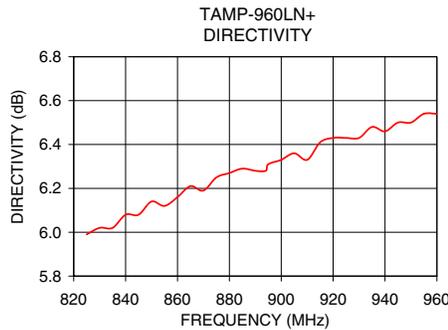
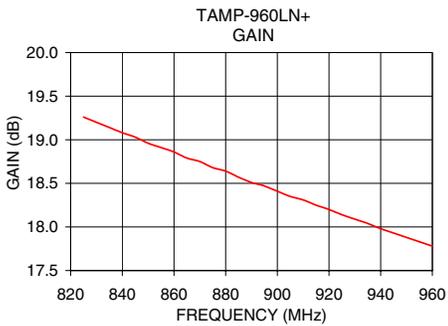
- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002; COPPER 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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FREQUENCY (MHz)	GAIN (dB)	DIRECTIVITY (dB)	VSWR IN (:1)	VSWR OUT (:1)	NOISE FIGURE (dB)	P. OUT @ 1dB COMPR. (dBm)	OUTPUT IP3 (dBm)
824.00	19.26	6.03	1.18	1.30	0.67	16.98	29.63
830.00	19.20	6.02	1.17	1.30	0.49	16.97	29.84
835.00	19.14	6.02	1.16	1.31	0.51	16.93	30.08
845.00	19.03	6.08	1.15	1.32	0.58	16.96	30.54
850.00	18.96	6.14	1.14	1.32	0.52	17.01	30.44
855.00	18.91	6.12	1.14	1.32	0.54	17.05	30.69
860.00	18.86	6.16	1.13	1.33	0.54	17.03	30.53
870.00	18.75	6.19	1.12	1.33	0.59	17.07	29.81
875.00	18.68	6.25	1.11	1.34	0.55	17.06	29.78
880.00	18.64	6.27	1.10	1.34	0.59	17.03	29.84
885.00	18.57	6.29	1.10	1.34	0.47	17.04	29.85
894.00	18.48	6.28	1.09	1.35	0.53	16.95	29.98
900.00	18.41	6.33	1.08	1.35	0.48	16.83	30.84
905.00	18.35	6.36	1.08	1.36	0.44	16.88	30.81
915.00	18.25	6.41	1.07	1.37	0.51	17.01	31.10
925.00	18.14	6.43	1.06	1.37	0.46	17.02	30.72
930.00	18.09	6.43	1.06	1.37	0.61	17.02	30.77
935.00	18.04	6.48	1.05	1.37	0.52	17.02	30.70
945.00	17.93	6.50	1.05	1.38	0.51	17.06	30.23
960.00	17.78	6.54	1.04	1.39	0.49	16.75	31.15



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## 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 = 45mA, Vd = 5V @Temperature = +25degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output	Noise* Figure
					K	Delta			
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)	(dB)
650	20.96	27.21	10.56	14.39	1.19	0.53	30.86	15.70	0.66
680	20.75	26.72	12.10	16.10	1.19	0.53	30.64	16.00	0.69
700	20.59	26.45	13.29	17.05	1.19	0.52	31.72	16.17	0.68
740	20.19	26.01	15.62	18.03	1.19	0.52	32.96	16.52	0.59
760	19.96	25.82	16.73	18.14	1.20	0.51	33.19	16.59	0.52
780	19.74	25.63	18.11	18.00	1.21	0.51	33.55	16.60	0.53
800	19.51	25.46	19.32	17.77	1.21	0.50	32.86	16.68	0.49
810	19.41	25.37	19.99	17.62	1.21	0.50	32.77	16.68	0.52
824	19.24	25.28	20.87	17.43	1.22	0.49	31.86	16.68	0.49
830	19.17	25.23	21.35	17.33	1.22	0.49	31.61	16.70	0.54
840	19.07	25.17	22.37	17.23	1.23	0.49	32.25	16.78	0.49
850	18.95	25.09	22.84	17.05	1.23	0.49	31.81	16.76	0.47
860	18.83	25.02	23.67	16.93	1.24	0.49	32.30	16.79	0.50
870	18.72	24.94	24.50	16.78	1.24	0.48	31.94	16.73	0.53
880	18.61	24.87	25.02	16.65	1.24	0.48	32.79	16.73	0.49
885	18.56	24.83	25.87	16.57	1.24	0.48	33.39	16.75	0.48
890	18.49	24.80	25.97	16.52	1.25	0.48	30.67	16.70	0.47
894	18.46	24.78	26.32	16.48	1.25	0.48	30.92	16.68	0.48
900	18.40	24.74	27.11	16.43	1.25	0.48	30.52	16.79	0.52
905	18.34	24.69	27.18	16.36	1.25	0.48	30.80	16.64	0.51
910	18.29	24.67	28.05	16.27	1.25	0.48	31.19	16.65	0.42
915	18.22	24.63	28.41	16.22	1.25	0.47	30.58	16.69	0.51
920	18.18	24.60	28.95	16.17	1.26	0.47	30.89	16.64	0.47
925	18.12	24.56	29.17	16.10	1.26	0.47	30.90	16.59	0.47
930	18.07	24.53	30.15	16.08	1.26	0.47	32.25	16.65	0.49
935	18.02	24.49	30.30	16.00	1.26	0.47	31.22	16.67	0.44
940	17.98	24.46	30.41	15.95	1.26	0.47	30.96	16.59	0.44
945	17.93	24.43	31.23	15.90	1.26	0.47	30.93	16.68	0.44
950	17.87	24.39	31.94	15.89	1.26	0.47	31.08	16.61	0.44
955	17.81	24.36	32.37	15.81	1.27	0.47	31.82	16.55	0.47
960	17.76	24.33	33.05	15.78	1.27	0.47	31.61	16.59	0.47
980	17.55	24.20	35.48	15.66	1.28	0.46	31.56	16.62	0.45
1000	17.36	24.07	36.68	15.46	1.28	0.46	32.24	16.58	0.46
1040	16.97	23.81	36.75	15.20	1.29	0.45	29.51	16.45	0.52
1060	16.81	23.69	35.23	15.12	1.29	0.45	30.05	16.50	0.52
1080	16.62	23.57	33.68	15.06	1.30	0.45	29.57	16.53	0.55
1100	16.44	23.44	32.52	15.01	1.31	0.45	30.10	16.38	0.48
1160	15.95	23.07	28.67	14.84	1.32	0.44	31.52	16.39	0.43

\*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 = 45mA, Vd = 5V @Temperature = -40degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output
					K	Delta		
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)
650	21.22	27.20	10.77	13.92	1.17	0.55	31.25	15.93
680	21.02	26.72	12.40	15.61	1.17	0.55	32.95	16.22
700	20.85	26.44	13.66	16.57	1.17	0.54	32.54	16.34
740	20.44	25.98	16.16	17.65	1.18	0.53	34.44	16.67
760	20.21	25.80	17.44	17.81	1.18	0.53	34.80	16.70
780	19.99	25.62	18.81	17.74	1.19	0.52	35.07	16.69
800	19.77	25.45	20.21	17.61	1.19	0.52	34.94	16.73
810	19.65	25.34	21.02	17.46	1.19	0.52	34.78	16.73
824	19.50	25.24	22.01	17.32	1.20	0.51	35.03	16.72
830	19.41	25.20	22.41	17.23	1.20	0.51	35.14	16.74
840	19.31	25.14	23.90	17.14	1.21	0.51	33.71	16.81
850	19.20	25.06	24.51	16.98	1.21	0.51	33.78	16.78
860	19.08	24.98	25.25	16.86	1.21	0.50	34.08	16.79
870	18.96	24.90	26.26	16.72	1.22	0.50	33.99	16.73
880	18.85	24.83	26.91	16.61	1.22	0.50	33.37	16.72
885	18.79	24.80	27.87	16.54	1.22	0.50	33.99	16.74
890	18.75	24.76	28.21	16.50	1.22	0.50	33.20	16.69
894	18.71	24.75	28.46	16.45	1.22	0.50	33.64	16.65
900	18.64	24.70	29.60	16.41	1.23	0.49	33.01	16.70
905	18.58	24.65	29.71	16.34	1.23	0.49	33.03	16.63
910	18.53	24.63	30.78	16.24	1.23	0.49	33.04	16.64
915	18.47	24.59	31.47	16.21	1.23	0.49	32.97	16.61
920	18.42	24.56	31.99	16.16	1.23	0.49	33.25	16.58
925	18.37	24.52	32.80	16.08	1.23	0.49	34.16	16.53
930	18.32	24.49	34.00	16.04	1.24	0.49	32.51	16.61
935	18.26	24.45	34.50	15.96	1.24	0.49	33.51	16.62
940	18.21	24.42	34.72	15.90	1.24	0.49	32.85	16.51
945	18.16	24.39	36.12	15.84	1.24	0.49	31.99	16.61
950	18.11	24.35	37.83	15.83	1.24	0.49	32.71	16.54
955	18.06	24.32	38.80	15.73	1.24	0.48	32.87	16.48
960	18.00	24.29	40.19	15.69	1.24	0.48	32.13	16.51
980	17.79	24.15	45.32	15.52	1.25	0.48	32.89	16.55
1000	17.60	24.02	43.17	15.29	1.25	0.48	31.96	16.49
1020	17.40	23.89	40.20	15.20	1.26	0.47	31.11	16.38
1040	17.21	23.77	35.69	15.04	1.27	0.47	32.28	16.38
1060	17.04	23.64	34.26	14.97	1.27	0.47	31.37	16.37
1080	16.85	23.52	32.27	14.93	1.28	0.46	31.21	16.44
1100	16.67	23.39	31.29	14.91	1.28	0.46	30.29	16.27
1110	16.59	23.33	30.10	14.92	1.28	0.46	30.15	16.34
1140	16.34	23.14	28.72	14.92	1.29	0.46	30.84	16.31
1160	16.18	23.02	27.72	14.94	1.29	0.46	31.56	16.29

REV. X2

TAMP-960LN+

110309

Page 2 of 3



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## 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 = 45mA, Vd = 5V @Temperature = +85degC

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP3 Output	1dB Comp. Output
					K	Delta		
(MHz)	(dB)	(dB)	(dB)	(dB)	K	Delta	(dBm)	(dBm)
650	20.77	27.17	10.31	14.76	1.20	0.52	30.10	14.99
680	20.57	26.70	11.79	16.68	1.20	0.52	31.07	15.39
700	20.42	26.42	12.87	17.77	1.19	0.52	32.13	15.51
740	20.02	25.99	15.12	18.80	1.20	0.51	32.73	16.39
760	19.78	25.81	16.18	18.78	1.21	0.50	33.19	16.47
780	19.57	25.63	17.47	18.48	1.22	0.49	34.91	16.52
800	19.34	25.47	18.68	18.11	1.23	0.49	32.77	16.60
810	19.23	25.38	19.29	17.84	1.23	0.49	31.98	16.60
824	19.08	25.28	20.07	17.56	1.23	0.48	32.02	16.62
830	19.00	25.23	20.48	17.42	1.23	0.48	32.49	16.65
840	18.89	25.17	21.60	17.25	1.24	0.48	33.79	16.75
850	18.78	25.09	22.07	17.01	1.24	0.48	33.44	16.74
860	18.66	25.02	22.67	16.82	1.25	0.47	30.36	16.77
870	18.55	24.95	23.46	16.64	1.25	0.47	30.84	16.76
880	18.44	24.88	23.97	16.48	1.25	0.47	31.60	16.71
885	18.38	24.85	24.77	16.37	1.26	0.47	30.80	16.75
890	18.32	24.81	24.79	16.31	1.26	0.47	31.03	16.67
894	18.29	24.79	25.09	16.26	1.26	0.47	31.86	16.61
900	18.22	24.75	25.79	16.19	1.26	0.47	32.28	16.71
905	18.17	24.71	25.95	16.10	1.26	0.47	31.98	16.58
910	18.11	24.68	26.60	16.00	1.27	0.46	32.19	16.56
915	18.05	24.65	27.03	15.94	1.27	0.46	32.30	16.60
920	18.01	24.62	27.33	15.88	1.27	0.46	32.60	16.50
925	17.96	24.59	27.78	15.80	1.27	0.46	32.64	16.52
930	17.90	24.56	28.51	15.77	1.27	0.46	31.30	16.59
935	17.84	24.51	28.86	15.68	1.27	0.46	32.70	16.59
940	17.80	24.48	28.89	15.61	1.27	0.46	32.92	16.51
945	17.75	24.45	29.57	15.56	1.28	0.46	33.84	16.51
950	17.70	24.42	30.29	15.53	1.28	0.46	33.65	16.59
955	17.64	24.39	30.61	15.45	1.28	0.46	33.93	16.54
960	17.59	24.35	31.29	15.40	1.28	0.46	34.84	16.56
980	17.38	24.23	33.51	15.24	1.29	0.45	34.03	16.60
1000	17.19	24.10	35.09	15.01	1.29	0.45	29.68	16.57
1020	16.99	23.97	37.40	14.90	1.30	0.44	29.21	16.46
1040	16.80	23.85	37.57	14.73	1.31	0.44	29.79	16.45
1060	16.64	23.72	36.07	14.64	1.31	0.44	30.50	16.51
1080	16.46	23.61	34.76	14.57	1.32	0.44	30.67	16.54
1100	16.27	23.48	33.55	14.49	1.32	0.43	31.66	16.41
1110	16.20	23.42	32.25	14.46	1.32	0.43	32.36	16.41
1140	15.95	23.24	30.43	14.37	1.33	0.43	31.84	16.38
1160	15.78	23.12	29.34	14.31	1.33	0.43	32.83	16.35

REV. X2

TAMP-960LN+

110309

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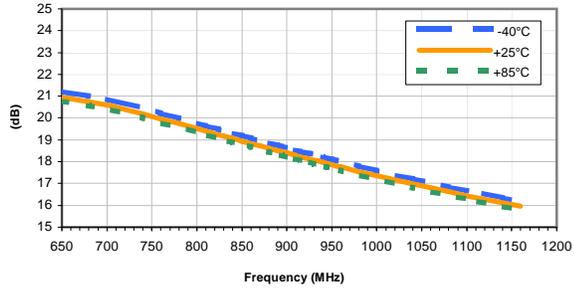
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## Typical Performance Curves

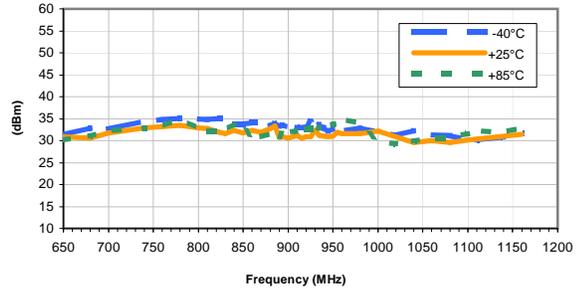
**GAIN vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -30, VOLTAGE = 5V



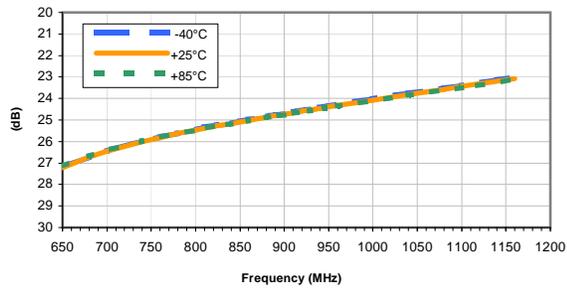
**OUTPUT IP3 vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -30, VOLTAGE = 5V



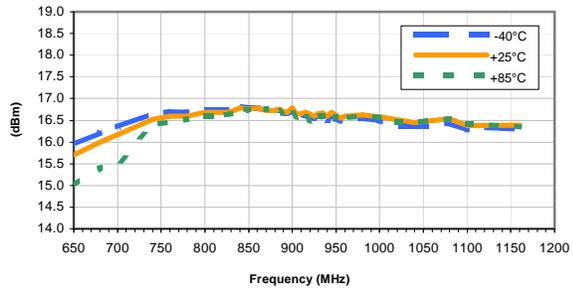
**ISOLATION vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -30, VOLTAGE = 5V



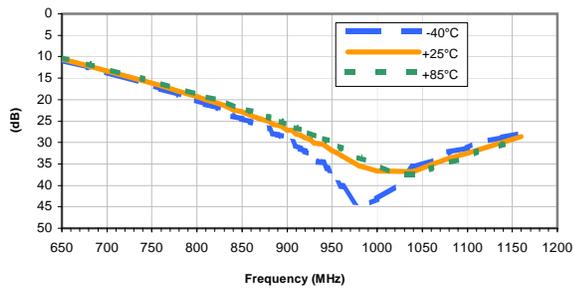
**OUTPUT POWER at 1dB COMPRESSION vs. FREQUENCY & TEMPERATURE**

VOLTAGE = 5V



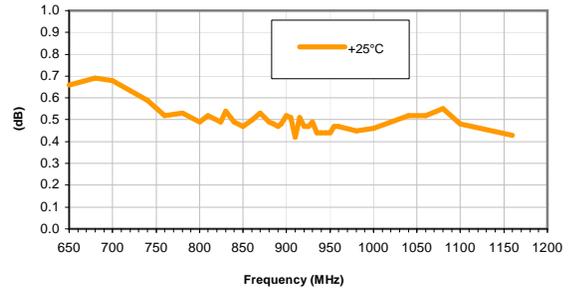
**INPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -30, VOLTAGE = 5V



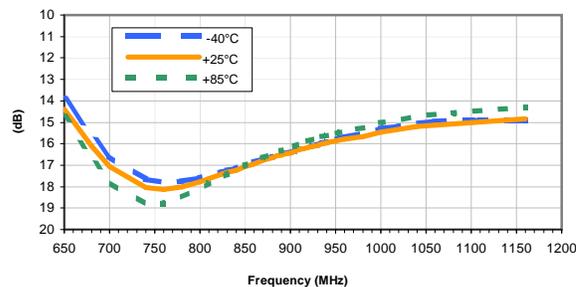
**NOISE FIGURE vs. FREQUENCY**

VOLTAGE = 5V

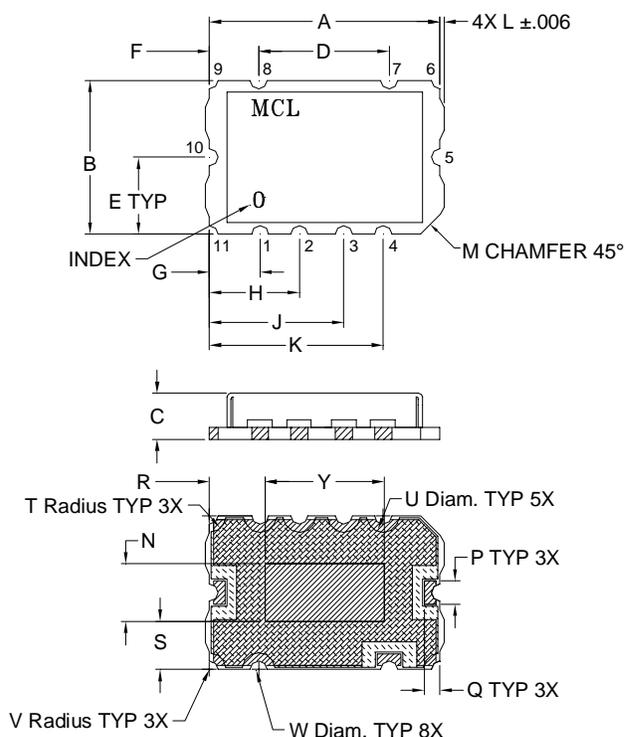


**OUTPUT RETURN LOSS vs. FREQUENCY & TEMPERATURE**

INPUT POWER = -30, VOLTAGE = 5V

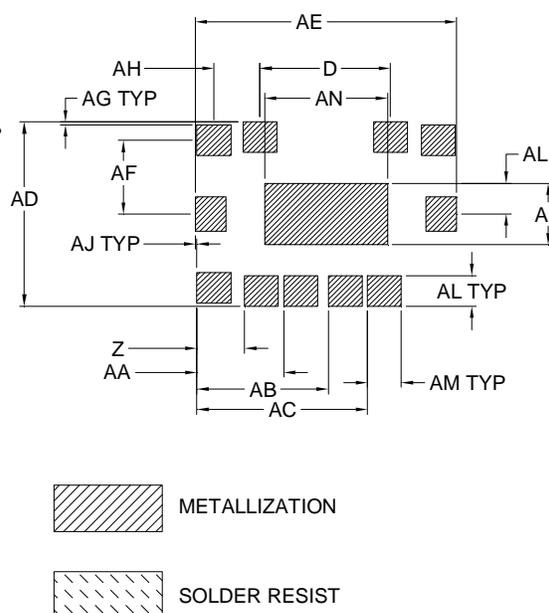


### Outline Dimensions



### 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.  $\pm .03$ ; 3 Pl.  $\pm .015$

#### Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:  
For RoHS Case Styles: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate  
For RoHS-5 Case Styles: Tin-Lead plate.



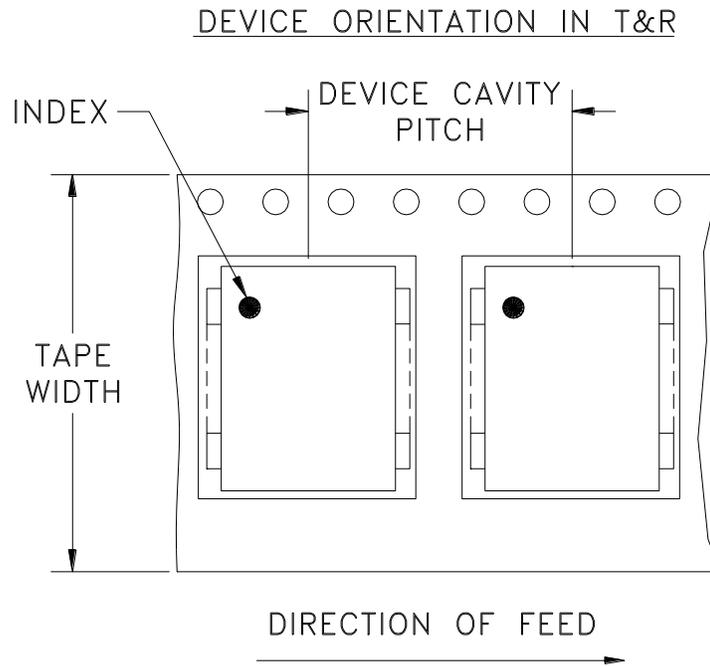
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RF/IF MICROWAVE COMPONENTS

# 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
		13	200,500

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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

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



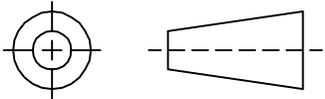
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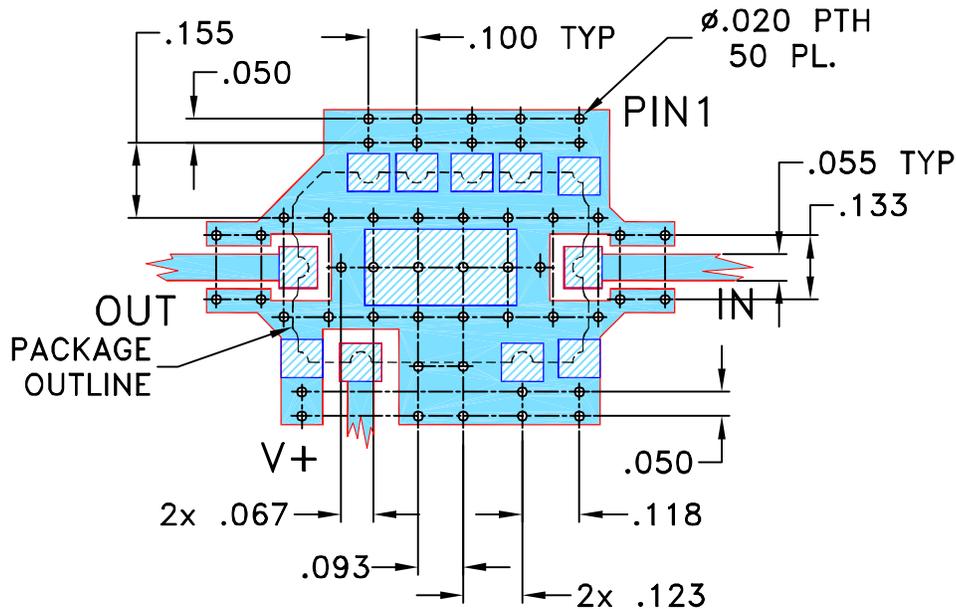
THIRD ANGLE PROJECTION



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 R04350B 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

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± .005 ANGLES ± FRACTIONS ±	DRAWN	HB 05.10.08
	CHECKED	DH 28.10.08
	APPROVED	HH 29.10.08



Mini-Circuits®

13 Neptune Avenue  
Brooklyn NY 11235

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

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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-293	REV: A
FILE: 98PL293	SCALE: 2.5:1	SHEET: 1 OF 1	

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