Surface Mount

Voltage Controlled Oscillator

JCOS-175LN

Low Noise 125 to 175 MHz

Generic photo used for illustration purposes only

CASE STYLE: BG419

Features

- very low phase noise, -118 dBc/Hz at 10 kHz offset, typ.
- excellent tuning sensitivity, 3-5 MHz/V typ.
- aqueous washable

Applications

- aircraft radios
- VHF/UHF transmitters

Electrical Specifications

FREQUENCY (MHz)		POWER OUTPUT (dBm)	TUNING VOLTAGE (V)		PHASE NOISE (dBc/Hz) SSB at offset frequencies: Typ.					PULLING pk-pk @ 12 dBr (MHz)	PUSHING (MHz/V)	TUNING SENSITIVITY (MHz/V)	HARMONICS (dBc)		3 dB MODULATION BANDWIDTH (MHz)	DC OPERATING POWER	
																Vcc (volts)	Current (mA)
Min.	Max.	Typ.	Min.	Max.	100 Hz	1 KHz	10 KHz	100 KHz	1 MHz	Typ.	Typ.	Typ.	Typ.	Max.	Typ.		Max.
125	175	+3.7	1	17	—	-95	-118	-138	-158	0.08	0.05	3-5	-25	-20	2.9	12	20

Pin Connections

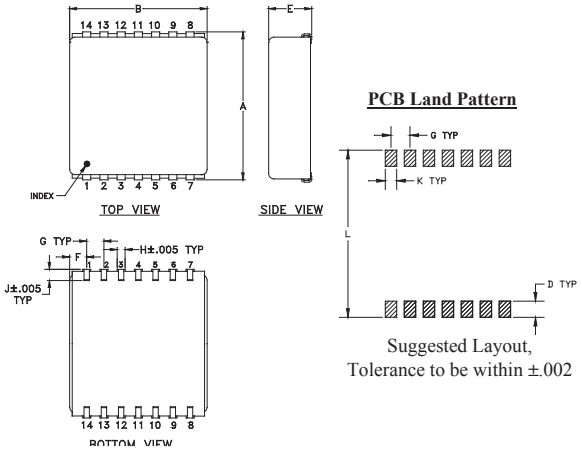
RF OUT	7
VCC	8
V-TUNE	1
GROUND	2,3,4,5,6,9,10,11,12,13,14

Maximum Ratings

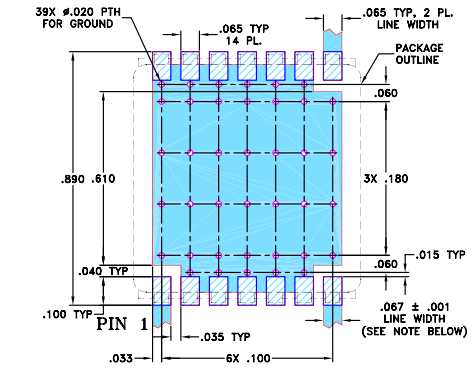
Operating Temperature	-55°C to 85°C
Storage Temperature	-55°C to 100°C
Absolute Max. Supply Voltage (Vcc)	+15V
Absolute Max. Tuning Voltage (Vtune)	+18V

all specifications: 50 ohm system
Permanent damage may occur if any of these limits are exceeded.

Outline Drawing



Demo Board MCL P/N: TB-62
Suggested PCB Layout (PL-011)



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; 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

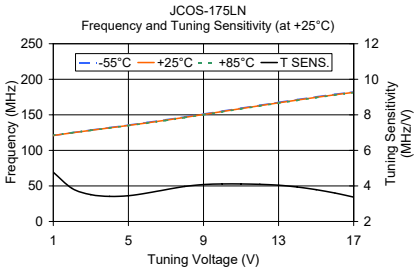
Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J	K	L	wt
.870	.800	--	.100	.400	.100	.100	.047	.065	.065	.890	grams
22.10	20.32	--	2.54	10.16	2.54	2.54	1.19	1.65	1.65	22.61	6.4

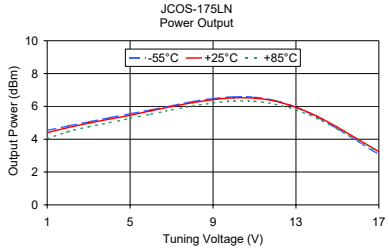
Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's 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

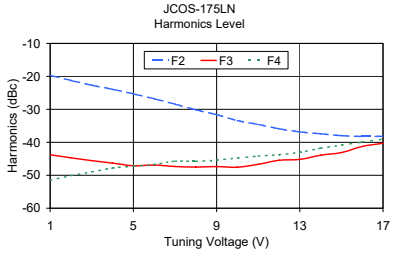
Performance Curves

JCOS-175LN

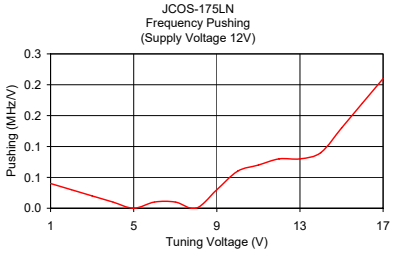


V TUNE	TUNING SENS. (MHz/V)	FREQUENCY (MHz)			POWER OUTPUT (dBm)		
		-55°C	+25°C	+85°C	-55°C	+25°C	+85°C
1.00	4.77	120.86	120.86	121.38	4.54	4.40	4.04
2.00	3.86	124.92	124.72	124.90	4.81	4.71	4.46
3.00	3.51	128.55	128.23	128.24	5.06	4.98	4.76
4.00	3.41	132.06	131.64	131.52	5.31	5.22	5.01
5.00	3.45	135.60	135.09	134.87	5.55	5.46	5.27
6.00	3.60	139.27	138.69	138.39	5.79	5.73	5.53
7.00	3.79	143.11	142.48	142.13	6.04	5.99	5.79
8.00	3.97	147.09	146.45	146.06	6.29	6.22	6.02
9.00	4.08	151.17	150.53	150.13	6.47	6.41	6.21
10.00	4.11	155.29	154.64	154.24	6.58	6.52	6.32
11.00	4.11	159.39	158.74	158.34	6.56	6.50	6.31
12.00	4.09	163.50	162.84	162.42	6.35	6.32	6.13
13.00	4.04	167.57	166.88	166.43	5.95	5.94	5.79
14.00	3.94	171.51	170.81	170.37	5.36	5.41	5.28
15.00	3.79	175.30	174.61	174.17	4.64	4.73	4.63
16.00	3.60	178.90	178.20	177.78	3.87	3.99	3.92
17.00	3.37	182.28	181.58	181.15	3.06	3.24	3.20





V TUNE	HARMONICS (dBc)			FREQ. PUSHING (MHz/V)
	F2	F3	F4	
1.00	-19.69	-43.77	-51.50	0.04
2.00	-21.24	-44.70	-50.08	0.03
3.00	-22.68	-45.56	-48.98	0.02
4.00	-23.91	-46.31	-47.81	0.01
5.00	-25.29	-47.11	-47.24	0.00
6.00	-26.78	-46.91	-46.74	0.01
7.00	-28.43	-47.35	-45.73	0.01
8.00	-30.13	-47.51	-45.74	0.00
9.00	-31.61	-47.36	-45.40	0.03
10.00	-33.40	-47.55	-44.74	0.06
11.00	-34.55	-46.68	-44.18	0.07
12.00	-35.89	-45.46	-43.74	0.08
13.00	-36.83	-45.18	-43.04	0.08
14.00	-37.41	-43.92	-41.80	0.09
15.00	-37.98	-43.11	-40.84	0.13
16.00	-38.20	-41.26	-39.93	0.17
17.00	-38.17	-40.28	-38.99	0.21



Voltage Controlled Oscillator JCOS-175LN

Typical Performance Data

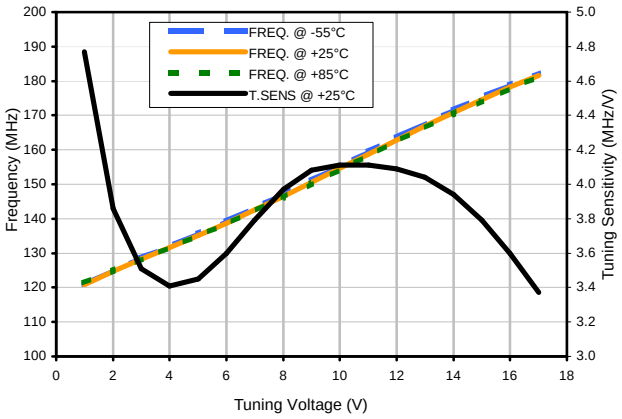
V TUNE	TUNE SENS (MHz/V)	FREQUENCY (MHz)			POWER OUTPUT (dBm)			HARMONICS (dBc)			FREQ. PUSH (MHz/V)
		-55ºC	+25ºC	+85ºC	-55ºC	+25ºC	+85ºC	F2	F3	F4	
1.0	4.77	120.9	120.9	121.4	4.54	4.40	4.04	-19.7	-43.8	-51.5	0.04
2.0	3.86	124.9	124.7	124.9	4.81	4.71	4.46	-21.2	-44.7	-50.1	0.03
3.0	3.51	128.6	128.2	128.2	5.06	4.98	4.76	-22.7	-45.6	-49.0	0.02
4.0	3.41	132.1	131.6	131.5	5.31	5.22	5.01	-23.9	-46.3	-47.8	0.01
5.0	3.45	135.6	135.1	134.9	5.55	5.46	5.27	-25.3	-47.1	-47.2	0.00
6.0	3.60	139.3	138.7	138.4	5.79	5.73	5.53	-26.8	-46.9	-46.7	0.01
7.0	3.79	143.1	142.5	142.1	6.04	5.99	5.79	-28.4	-47.4	-45.7	0.01
8.0	3.97	147.1	146.5	146.1	6.29	6.22	6.02	-30.1	-47.5	-45.7	0.00
9.0	4.08	151.2	150.5	150.1	6.47	6.41	6.21	-31.6	-47.4	-45.4	0.03
10.0	4.11	155.3	154.6	154.2	6.58	6.52	6.32	-33.4	-47.6	-44.7	0.06
11.0	4.11	159.4	158.7	158.3	6.56	6.50	6.31	-34.6	-46.7	-44.2	0.07
12.0	4.09	163.5	162.8	162.4	6.35	6.32	6.13	-35.9	-45.5	-43.7	0.08
13.0	4.04	167.6	166.9	166.4	5.95	5.94	5.79	-36.8	-45.2	-43.0	0.08
14.0	3.94	171.5	170.8	170.4	5.36	5.41	5.28	-37.4	-43.9	-41.8	0.09
15.0	3.79	175.3	174.6	174.2	4.64	4.73	4.63	-38.0	-43.1	-40.8	0.13
16.0	3.60	178.9	178.2	177.8	3.87	3.99	3.92	-38.2	-41.3	-39.9	0.17
17.0	3.37	182.3	181.6	181.2	3.06	3.24	3.20	-38.2	-40.3	-39.0	0.21

FREQ OFFSET (KHz)	PHASE NOISE (dBc/Hz)
1	-95
10	-118
100	-138
1000	-158

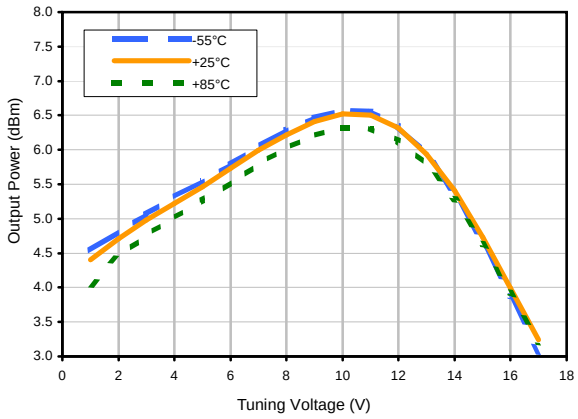
Voltage Controlled Oscillator JCOS-175LN

Typical Performance Data

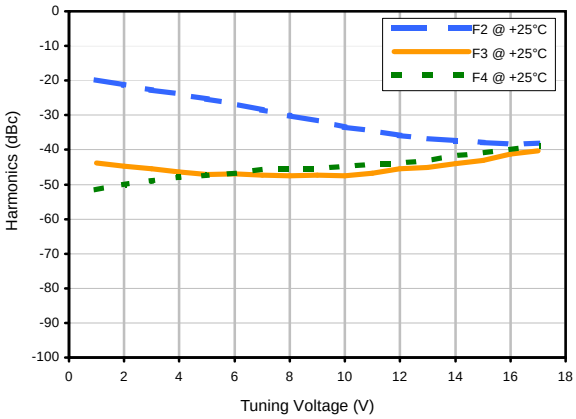
Frequency and Tuning Sensitivity



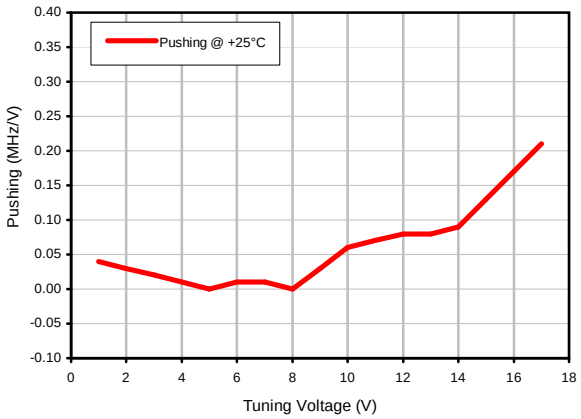
Power Output



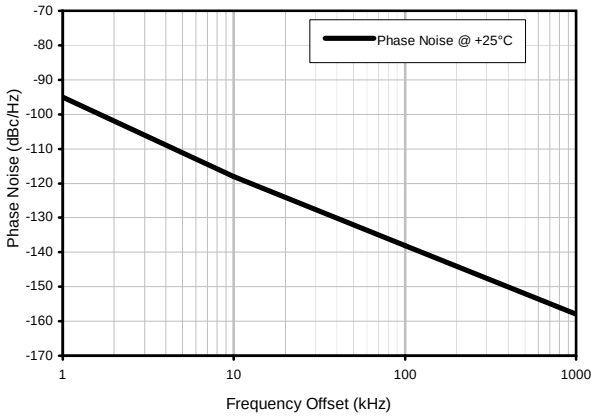
Harmonics Level



Frequency Pushing

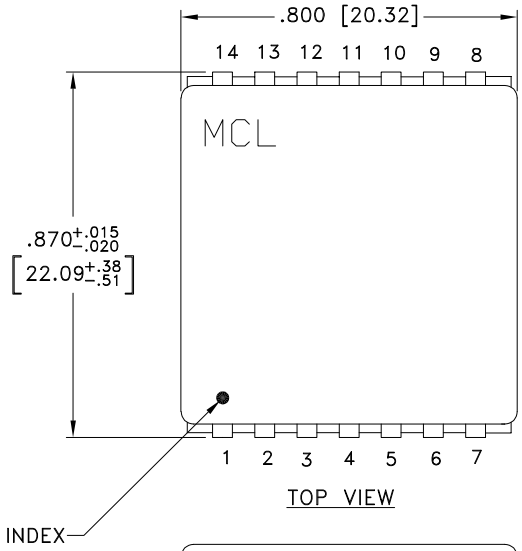


Phase Noise

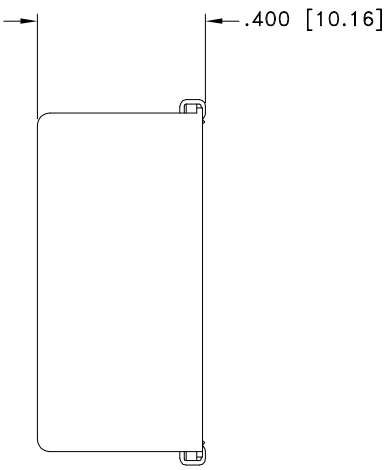


Case Style BG

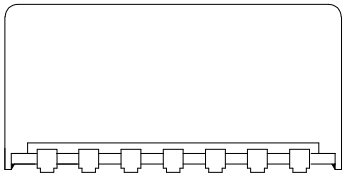
Outline Dimensions BG419



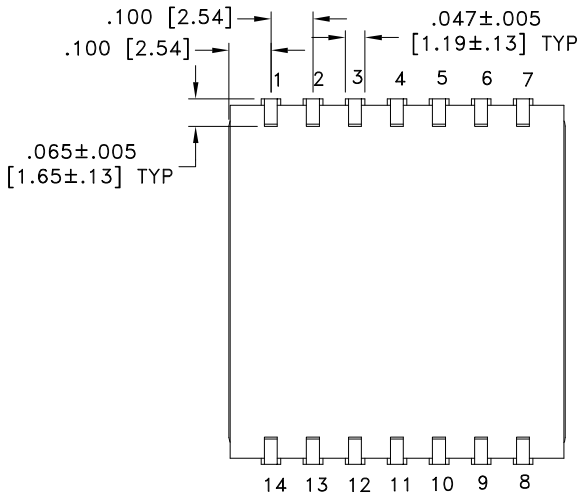
TOP VIEW



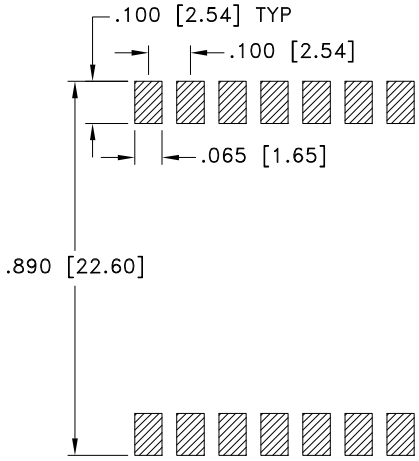
SIDE VIEW



SIDE VIEW



BOTTOM VIEW



SUGGESTED LAYOUT
FOR PCB LAND PATTERN
(TOL ±.002)

DENOTES METALLIZATION

Weight: 4 gram

Dimensions are in inches[mm]. Tolerances: 2PL.±0.03[0.76]; 3 Pl.± 0.015 [0.381] inches[mm], unless otherwise specified

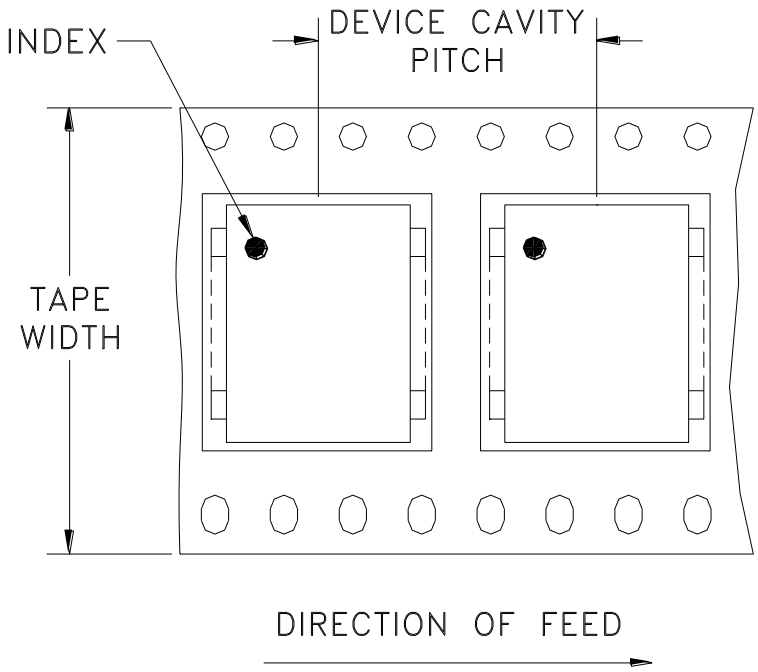
Notes:

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

   For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
   For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

Tape & Reel Packaging TR-F25

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
44	32	13	Small quantity standards (see note)	20
				50
				100
			Standard	125

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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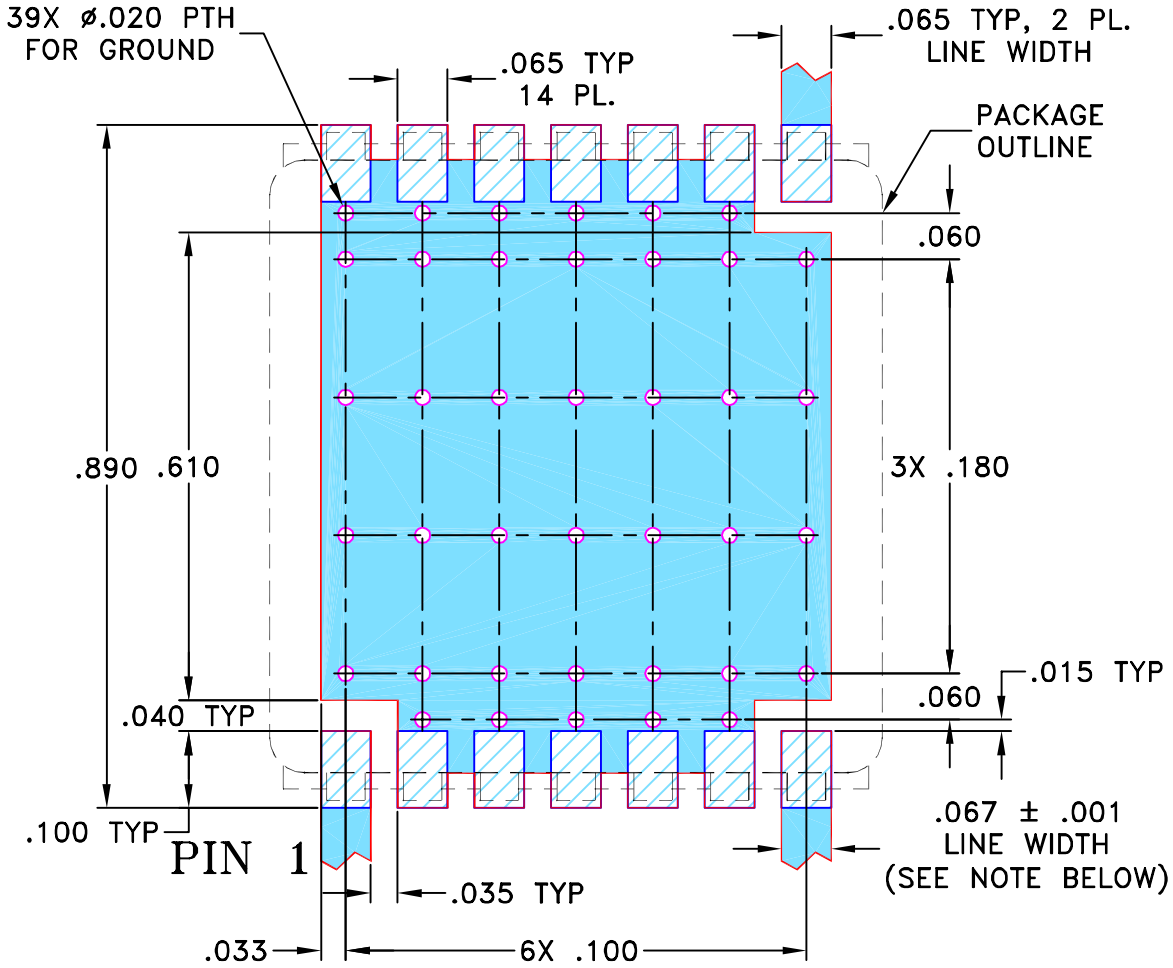
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M75893	REDRAWN	03/01	GF	DB
B	M76077	UPDATED DRAWING	04/01	GF	MM
C	M82575	UPDATED DRAWING	08/08/02	AV	MM
D	M102713	UPDATED NOTES	01/12/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION FOR BG419 CASE STYLE, "jd" PIN CONNECTION



NOTES:
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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	AV	08/07/00
TOLERANCES ON:	CHECKED	SK	08/08/00
2 PL DECIMALS ±	APPROVED	DB	08/08/00
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

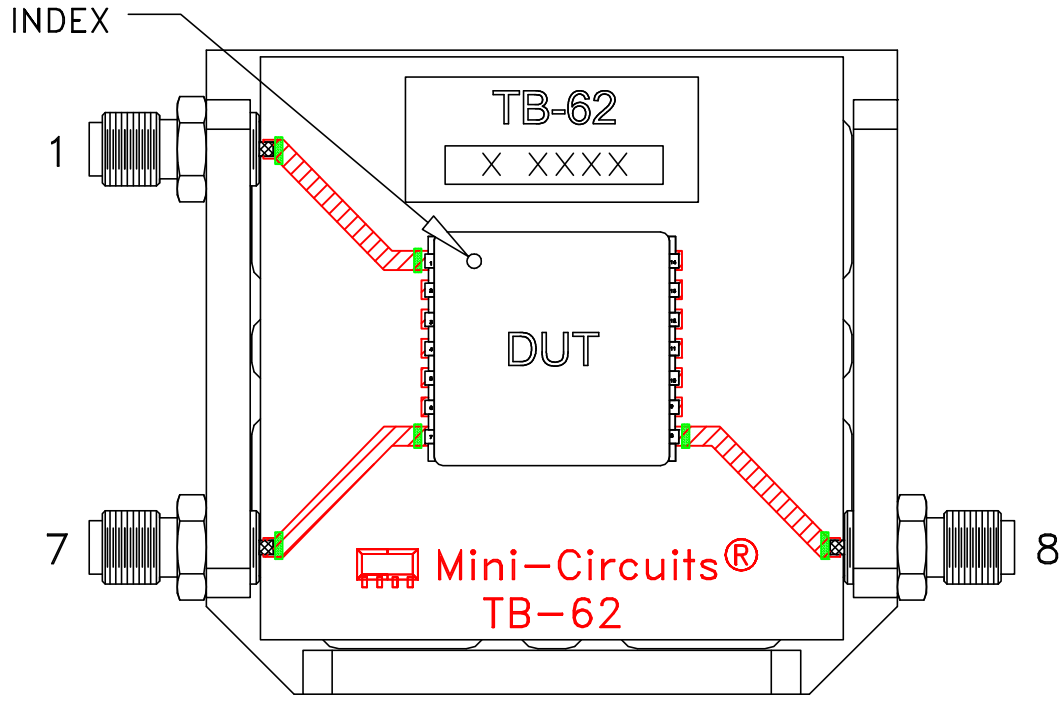
PL, jd, BG419, JCOS, TB-62

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-011	D

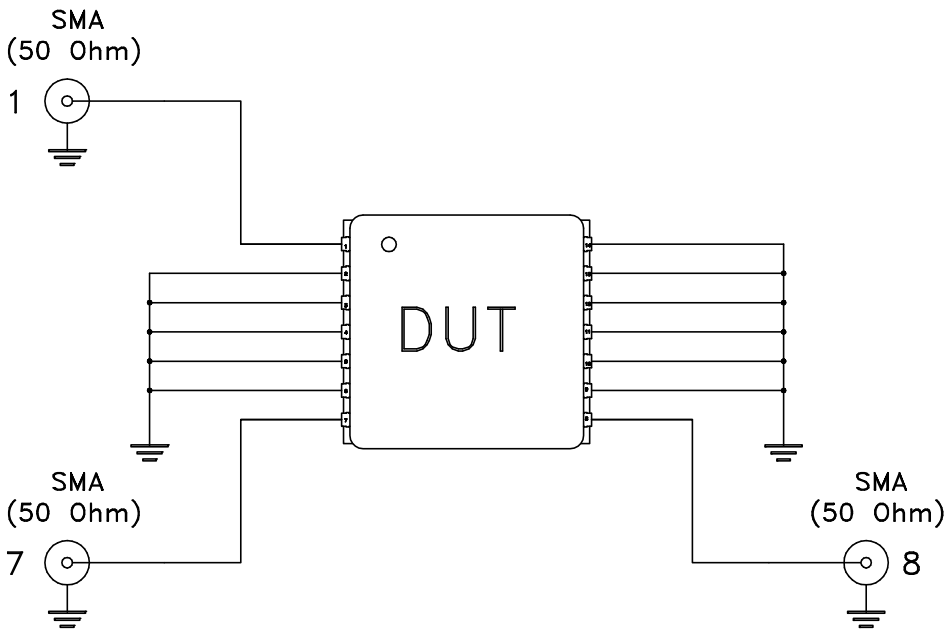
FILE:	SCALE:	SHEET:
98PL011	4:1	1 OF 1

Evaluation Board and Circuit

For Pin Connection Refer to Data Sheet of the DUT



TB-62



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 ENV03

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 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