

Surface Mount Frequency Mixer

Level 7 (LO Power +7 dBm) 1 to 600 MHz

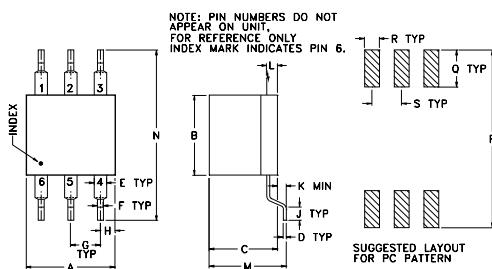
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

LO	1
RF	4
IF	5
GROUND	2,3,6

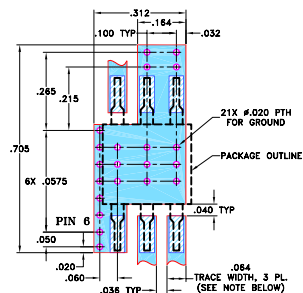
Outline Drawing



Outline Dimensions (inch)

A	B	C	D	E	F	G	H	J
.30	.27	.23	.010	.042	.100	.100	.05	.05
7.62	6.86	5.84	0.25	1.07	0.51	2.54	1.27	1.27
K	L	M	N	P	Q	R	S	wt
.020	.036	.26	.575	.600	.125	.050	.100	grams
0.51	0.91	6.60	14.61	15.24	3.18	1.27	2.54	0.50

Demo Board MCL P/N: TB-174 Suggested PCB Layout (PL-082)



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

Features

- low conversion loss, 5.58 dB typ.
- good L-R isolation, 35 dB typ.

Applications

- HF/VHF/UHF
- FM radio
- federal & defense communications

ASK-1-KK81+ ASK-1-KK81



CASE STYLE: KK81

+RoHS Compliant

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

Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)						IP3 at center band (dBm)
LO/RF	IF	Mid-Band m			Total Range Max.	L	M		U		L	M		U				
		$\overline{X}$	σ	Max.			Typ.	Min.	Typ.	Min.		Typ.	Min.	Typ.	Min.			
f_L - f_U						Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.		
1-600	DC-600	5.58	.06	7.0	8.5	50	30	35	25	30	20	45	35	30	20	25	15	14

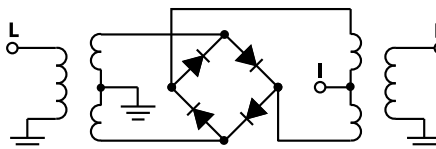
1 dB COMPR.: +1 dBm typ.

L = low range [f_L to 10 f_L]
M = mid range [10 f_L to $f_U/2$]
U = upper range [$f_U/2$ to f_U]

Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
1.00	31.00	5.34	41.73	40.78	1.15	3.01
5.00	35.00	5.14	43.83	48.03	1.12	2.92
10.00	40.00	5.10	44.31	49.23	1.10	2.87
20.00	50.00	5.10	43.27	47.31	1.09	2.86
50.00	80.00	5.07	41.89	43.53	1.08	2.67
100.00	70.00	4.98	41.22	41.32	1.08	2.75
124.93	94.93	5.07	40.40	38.91	1.06	2.68
166.24	136.24	5.14	40.04	37.11	1.04	2.68
207.55	177.55	5.19	39.72	36.06	1.03	2.64
228.21	198.21	5.11	39.43	34.77	1.01	2.61
269.52	239.52	5.17	39.11	33.40	1.03	2.72
310.83	280.83	5.34	38.68	32.44	1.06	2.70
352.14	322.14	5.31	36.90	31.98	1.10	2.84
372.79	342.79	5.36	34.94	31.09	1.15	3.08
414.10	384.10	5.33	33.57	31.83	1.20	3.20
455.41	425.41	5.57	32.53	31.14	1.26	3.16
496.72	466.72	5.67	30.97	29.46	1.31	3.29
538.03	508.03	5.75	30.78	28.57	1.34	3.28
558.69	528.69	5.72	29.47	27.11	1.40	3.48
600.00	570.00	5.82	28.98	25.59	1.47	3.57

Electrical Schematic



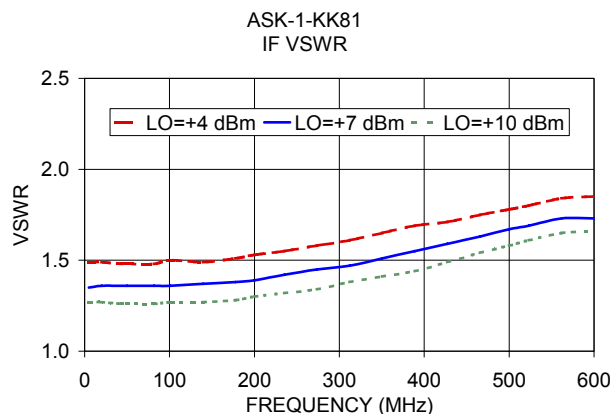
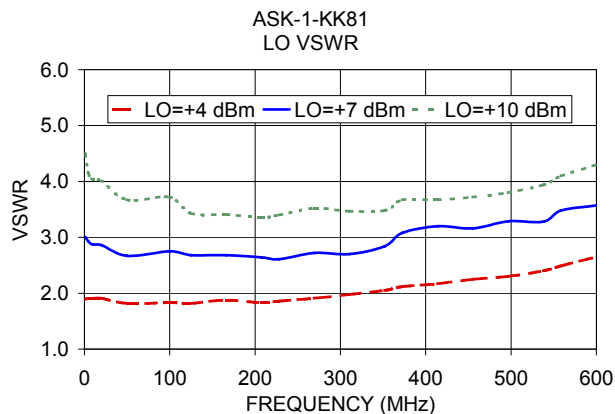
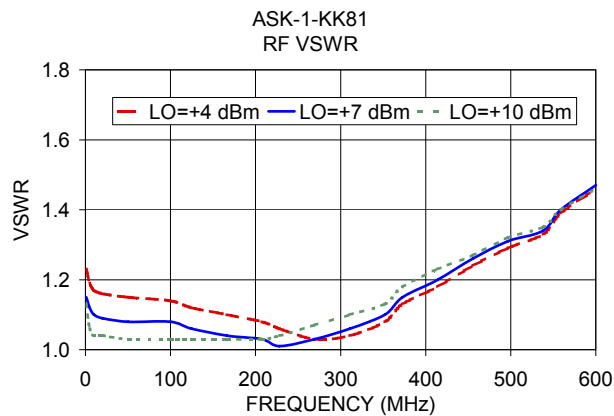
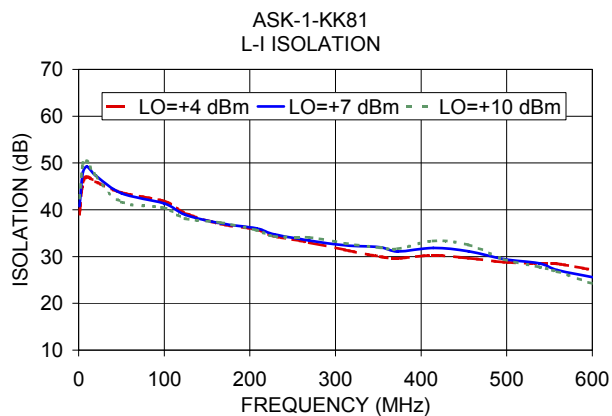
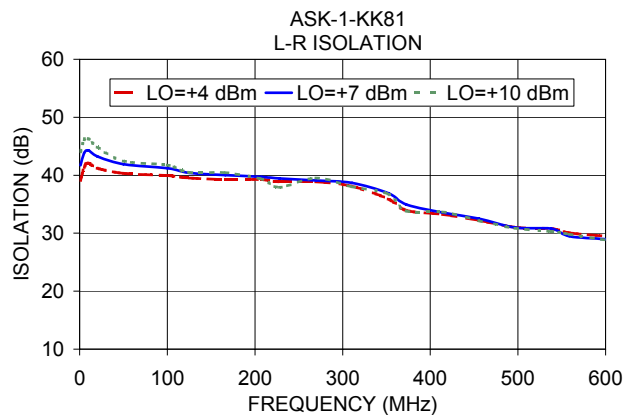
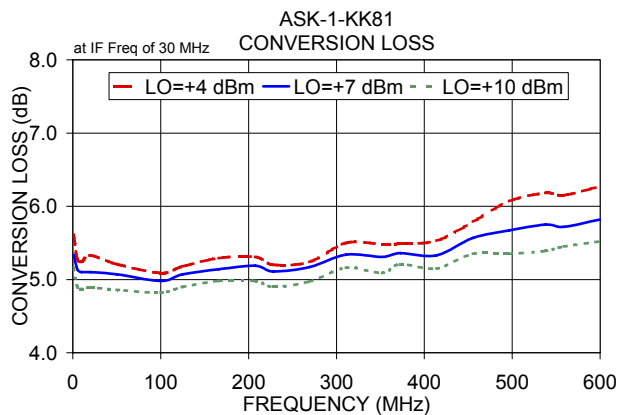
Notes

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Performance Charts

ASK-1-KK81+ ASK-1-KK81



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Frequency Mixer

ASK-1-KK81+

Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB)			LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
		@LO (dBm)				@LO (dBm)			@LO (dBm)		
		+4	+7	+10		+4	+7	+10	+4	+7	+10
1.0	31.0	5.61	5.34	5.16	1.0	39.10	41.73	44.04	39.04	40.78	42.48
5.0	35.0	5.28	5.14	4.90	5.0	41.35	43.83	46.14	45.93	48.03	49.94
10.0	40.0	5.24	5.10	4.87	10.0	42.10	44.31	46.27	47.06	49.23	50.33
20.0	50.0	5.33	5.10	4.89	20.0	41.21	43.27	44.87	46.03	47.31	47.18
50.0	80.0	5.21	5.07	4.86	50.0	40.33	41.89	42.46	43.68	43.53	41.68
100.0	70.0	5.09	4.98	4.82	100.0	39.93	41.22	41.75	41.82	41.32	40.36
124.9	94.9	5.18	5.07	4.90	124.9	39.54	40.40	40.49	39.25	38.91	38.11
166.2	136.2	5.29	5.14	4.98	166.2	39.26	40.04	40.44	36.95	37.11	37.23
207.6	177.6	5.31	5.19	4.98	207.6	39.26	39.72	39.36	35.80	36.06	35.67
228.2	198.2	5.20	5.11	4.90	228.2	38.88	39.43	37.92	34.36	34.77	34.32
269.5	239.5	5.24	5.17	4.97	269.5	38.87	39.11	39.52	32.97	33.40	34.08
310.8	280.8	5.50	5.34	5.16	310.8	38.11	38.68	38.01	31.41	32.44	32.86
352.1	322.1	5.48	5.31	5.09	352.1	35.92	36.90	36.78	29.97	31.98	31.89
372.8	342.8	5.49	5.36	5.21	372.8	33.94	34.94	33.83	29.59	31.09	31.65
414.1	384.1	5.53	5.33	5.15	414.1	33.25	33.57	33.66	30.29	31.83	33.34
455.4	425.4	5.79	5.57	5.35	455.4	32.21	32.53	32.17	29.66	31.14	32.51
496.7	466.7	6.07	5.67	5.35	496.7	31.01	30.97	30.86	28.78	29.46	29.39
538.0	508.0	6.18	5.75	5.39	538.0	30.80	30.78	30.29	28.51	28.57	27.79
558.7	528.7	6.15	5.72	5.45	558.7	30.06	29.47	29.81	28.45	27.11	26.81
600.0	570.0	6.27	5.82	5.52	600.0	29.46	28.98	28.82	27.11	25.59	24.20

REV. X1
ASK-1-KK81+
060611
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Frequency Mixer

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Typical Performance Data

RF/LO (MHz)	RF VSWR (:1)			LO VSWR (:1)			IF (MHz)	IF VSWR (:1)			LO/RF (MHz)	max. DC output (mV)	DC Offset (mV)
	@LO (dBm)			@LO (dBm)				@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10		+4	+7	+10	+7		
5.0	1.23	1.15	1.13	1.89	3.01	4.50	5.0	1.49	1.35	1.27	1.0	-228.0	4.07
20.0	1.19	1.12	1.06	1.91	2.92	4.12	20.0	1.49	1.36	1.27	5.0	-228.8	2.52
43.4	1.17	1.10	1.04	1.91	2.87	4.04	43.4	1.48	1.36	1.26	20.0	-227.1	2.57
50.0	1.16	1.09	1.04	1.91	2.86	4.01	50.0	1.48	1.36	1.26	39.6	-225.4	2.80
81.8	1.15	1.08	1.03	1.82	2.67	3.67	81.8	1.48	1.36	1.26	78.3	-227.0	2.99
101.0	1.14	1.08	1.03	1.83	2.75	3.72	101.0	1.50	1.36	1.27	100.0	-226.1	2.96
139.4	1.12	1.06	1.03	1.82	2.68	3.43	139.4	1.49	1.37	1.27	136.3	-227.7	2.86
177.8	1.10	1.04	1.03	1.88	2.68	3.41	177.8	1.51	1.38	1.28	174.9	-225.4	2.47
200.0	1.08	1.03	1.03	1.83	2.64	3.36	200.0	1.53	1.39	1.30	200.0	-228.1	2.24
235.3	1.06	1.01	1.04	1.86	2.61	3.40	235.3	1.55	1.42	1.32	232.9	-226.7	1.73
273.7	1.03	1.03	1.07	1.91	2.72	3.52	273.7	1.58	1.45	1.34	271.5	-218.9	1.15
312.1	1.04	1.06	1.10	1.98	2.70	3.47	312.1	1.61	1.47	1.38	310.2	-210.9	0.58
350.5	1.08	1.10	1.13	2.05	2.84	3.48	350.5	1.65	1.51	1.41	348.8	-207.5	0.21
388.9	1.13	1.15	1.18	2.12	3.08	3.67	388.9	1.69	1.55	1.44	387.5	-206.2	-0.11
427.3	1.18	1.20	1.23	2.17	3.20	3.67	427.3	1.71	1.59	1.49	426.1	-212.5	-1.04
465.7	1.24	1.26	1.27	2.25	3.16	3.72	465.7	1.75	1.63	1.54	464.8	-213.7	-1.82
500.0	1.29	1.31	1.32	2.30	3.29	3.80	500.0	1.78	1.67	1.58	500.0	-201.7	-1.83
523.2	1.33	1.34	1.35	2.40	3.28	3.94	523.2	1.80	1.69	1.61	522.7	-197.7	2.55
561.6	1.39	1.40	1.40	2.49	3.48	4.10	561.6	1.84	1.73	1.65	561.4	-189.5	-2.83
600.0	1.46	1.47	1.46	2.65	3.57	4.30	600.0	1.85	1.73	1.66	600.0	-187.3	-3.58

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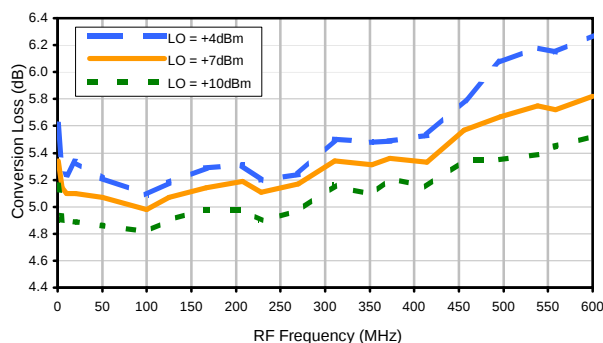


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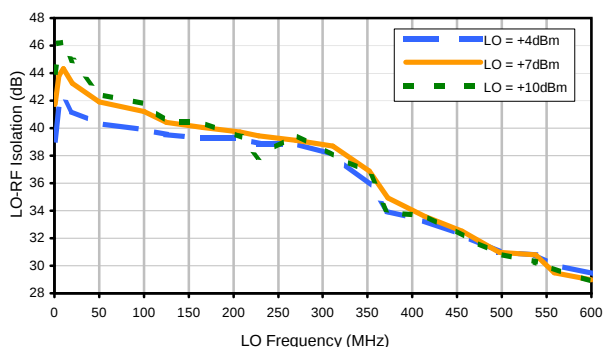


Typical Performance Curves

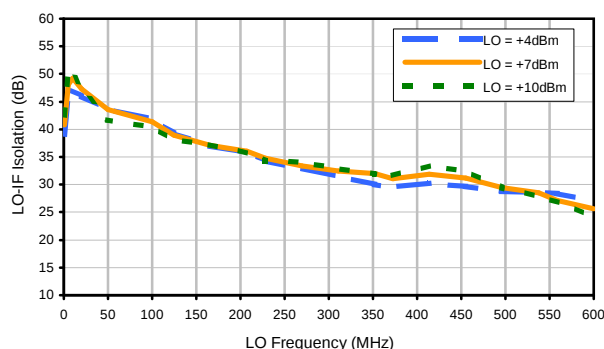
Conversion Loss



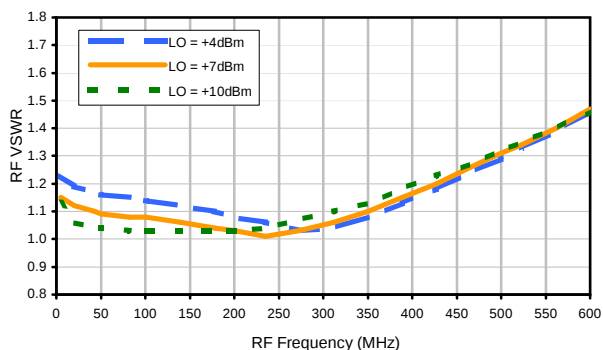
LO-RF Isolation



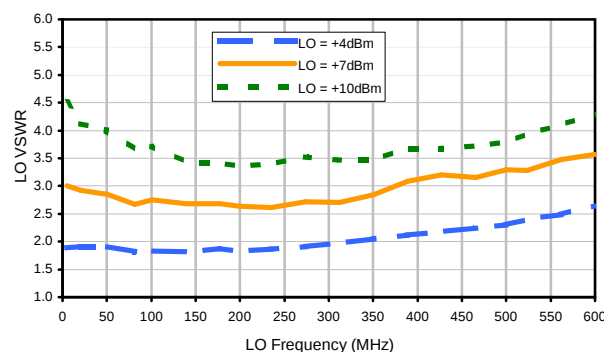
LO-IF Isolation



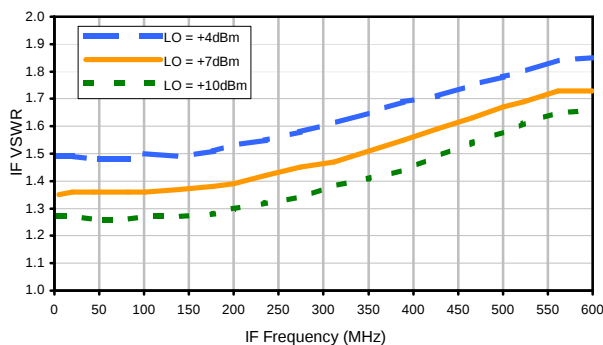
RF VSWR



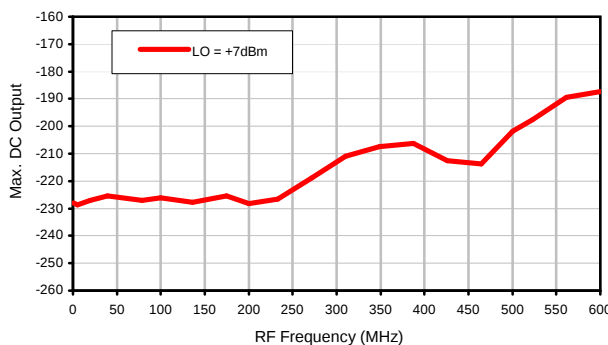
LO VSWR



IF VSWR



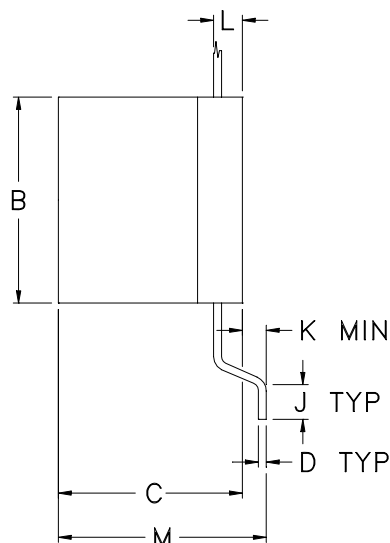
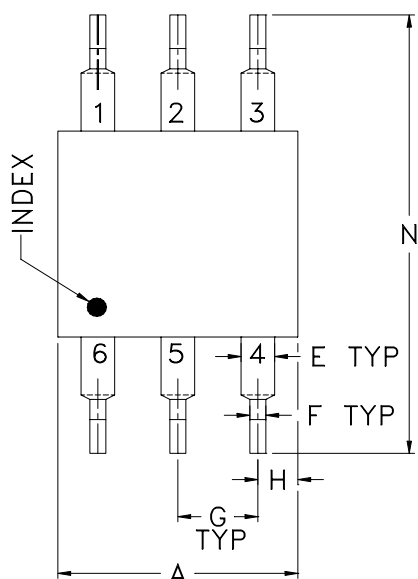
Max. DC Output



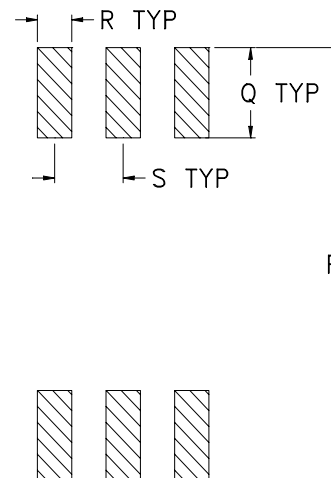
Outline Dimensions

KK81
KK265

NOTE: PIN NUMBERS DO NOT
APPEAR ON UNIT,
FOR REFERENCE ONLY
INDEX MARK INDICATES PIN 6.



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	L	M	N	P
KK81	.30 (7.62)	.27 (6.86)	.23 (5.84)	.010 (0.25)	0.42 (1.07)	.020 (0.51)	.100 (2.54)	.05 (1.27)	.05 (1.27)	.020 (0.51)	.036 (0.91)	.26 (6.60)	.575 (14.61)	.600 (15.24)
KK265	.30 (7.62)	.27 (6.86)	.22 (5.84)	.010 (0.25)	.020 (0.50)	.020 (0.51)	.100 (2.54)	.05 (1.27)	.05 (1.27)	0.1 (2.54)	.032 (0.81)	.23 (5.84)	.450 (10.62)	.475 (12.07)

CASE #	Q	R	S	WT. GRAM
KK81	.125 (3.18)	.050 (1.27)	.100 (2.54)	.50
KK265	.125 (3.18)	.050 (1.27)	.100 (2.54)	.65

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

Notes:

- Case material: Plastic.
- Termination finish:
For RoHS Case Styles: Tin plate over Nickel plate.
For RoHS-5 Case Styles: Tin-Lead plate.
- Special Tolerances: Termination width $\pm .005$ inch, termination thickness $\pm .003$ inch.



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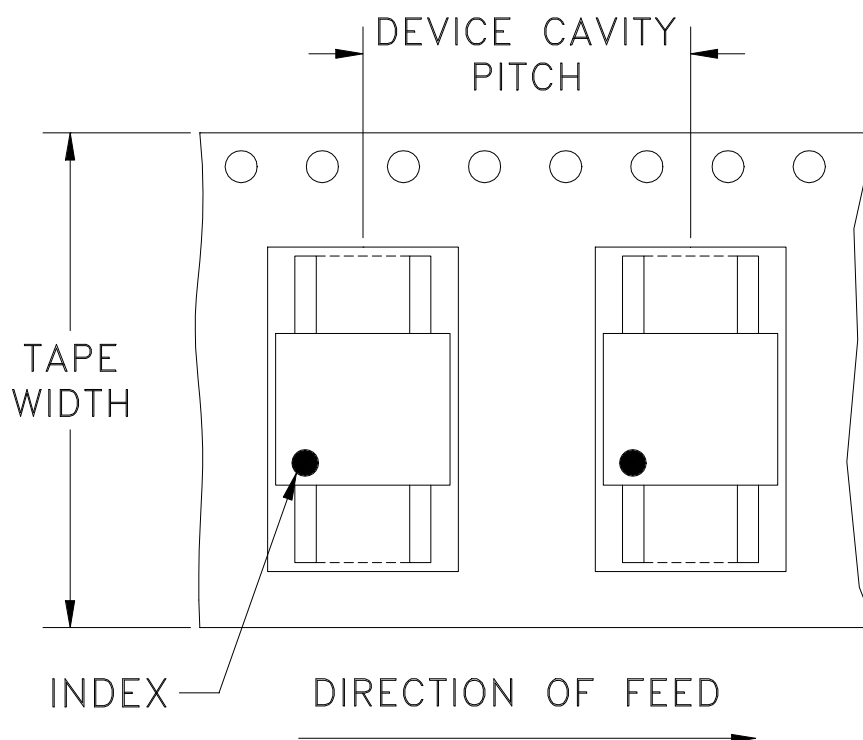
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Tape & Reel Packaging TR-F1

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	12	13	900

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.

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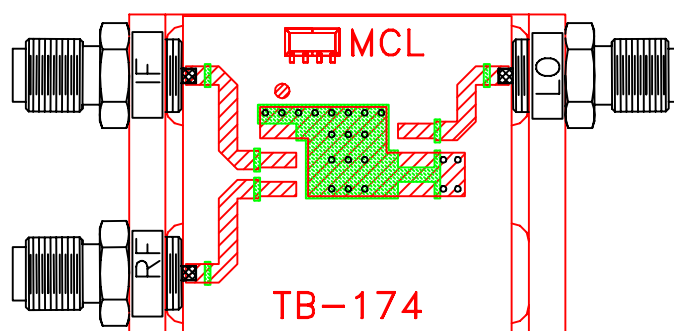
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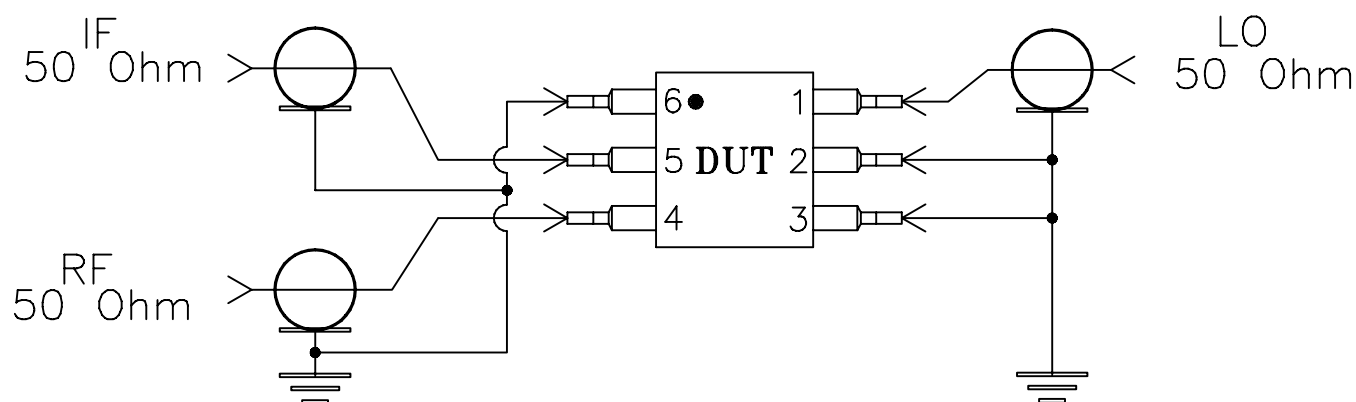
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Evaluation Board and Circuit



TB-174



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

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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
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, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Lead Integrity	2 Pound Pull, perpendicular to edge of unit	MIL-STD-202, Method 211, 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