Surface Mount

Frequency Mixer

ASK-2-KK81+
ASK-2-KK81

Level 7 (LO Power +7 dBm) 1 to 1000 MHz

CASE STYLE: KK81

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

Features

- low conversion loss, 6.79 dB typ.
- wideband, 1 to 1000 MHz

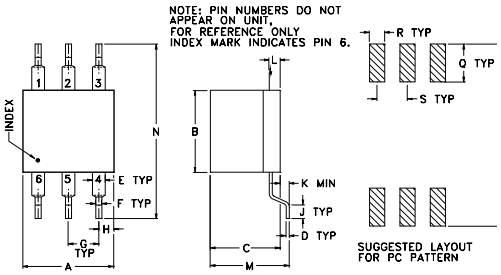
Applications

- HF/VHF/UHF
- cellular
- federal & defense communications

+RoHS Compliant

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

Outline Drawing

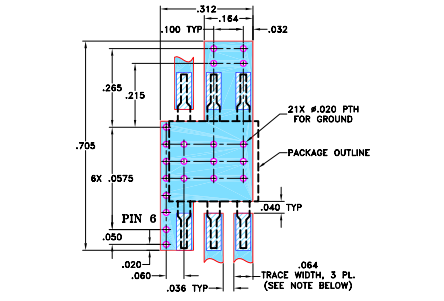


Outline Dimensions (inch / mm)

A	B	C	D	E	F	G	H	J
.30	.27	.23	.010	.042	.020	.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.

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

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

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	L		M		U		L		M		U		
f_L-f_U		$\overline{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
1-1000	DC-1000	6.79	.10	8.0	9.8	60	40	35	18	26	16	50	30	25	17	15	10	12

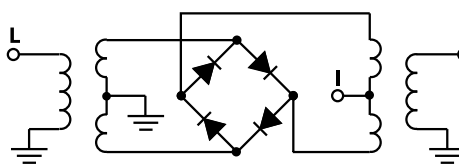
1 dB COMPR.: +1 dBm typ.
For phase detection, DC output positive polarity with in-phase LO&RF

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]
m= mid band [2f_L to f_U/2]

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	7.37	83.47	91.97	1.38	2.66
2.00	32.00	7.07	80.37	87.67	1.29	2.56
5.00	35.00	6.73	72.27	82.47	1.24	2.67
10.00	40.00	6.62	66.17	77.87	1.23	2.56
20.00	50.00	6.55	61.04	73.34	1.23	2.51
50.00	80.00	6.57	52.51	61.14	1.22	2.53
97.68	67.68	6.59	47.22	54.12	1.23	2.51
100.00	70.00	6.59	47.11	53.57	1.23	2.49
194.36	164.36	6.53	41.80	49.32	1.24	2.49
200.00	170.00	6.53	41.66	49.33	1.27	2.49
291.03	261.03	6.57	38.25	47.35	1.32	2.44
387.71	357.71	6.67	35.81	42.38	1.34	2.56
484.39	454.39	6.68	33.54	37.69	1.35	2.55
500.00	470.00	6.68	33.24	36.29	1.40	2.64
581.07	551.07	6.87	31.64	32.31	1.52	3.03
677.74	647.74	7.12	29.02	27.88	1.69	3.49
774.42	744.42	7.40	26.95	24.13	1.93	3.33
871.10	841.10	7.80	25.84	20.52	2.20	3.00
967.77	937.77	8.22	25.87	17.33	2.45	2.97
1000.00	970.00	8.38	25.95	16.29	2.58	2.98

Electrical Schematic



Notes
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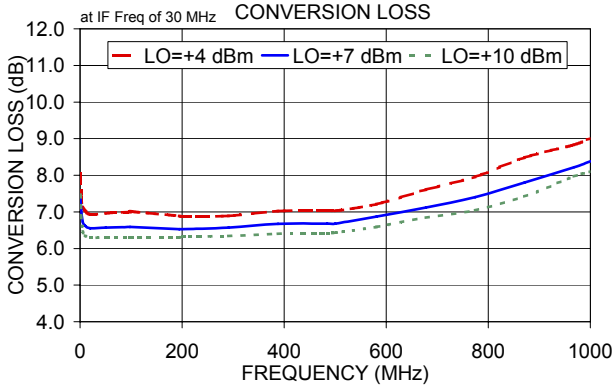
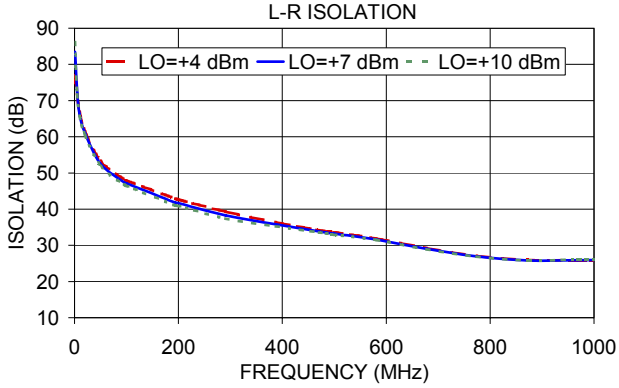
Performance Charts

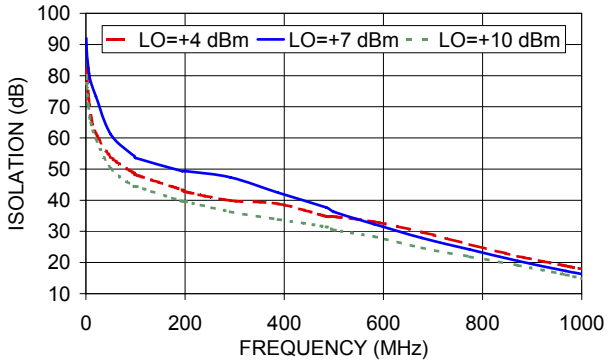
ASK-2-KK81
CONVERSION LOSS
at IF Freq of 30 MHz



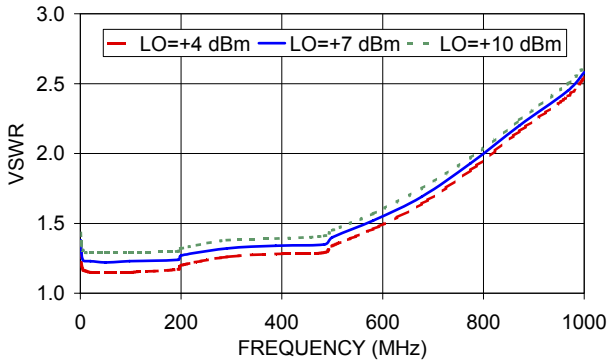
ASK-2-KK81
L-R ISOLATION



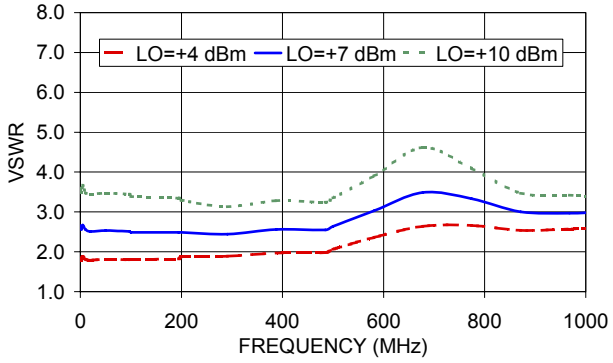
ASK-2-KK81
L-I ISOLATION



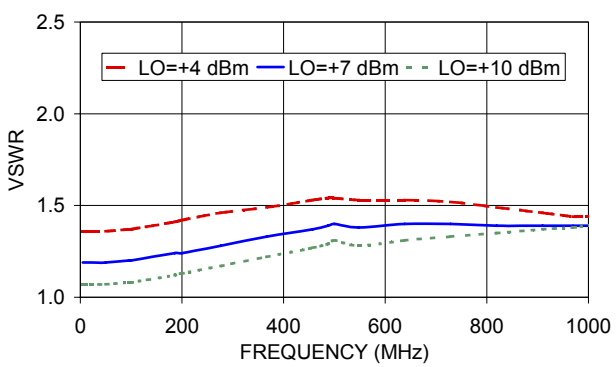
ASK-2-KK81
RF VSWR



ASK-2-KK81
LO VSWR



ASK-2-KK81
IF VSWR



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Frequency Mixer ASK-2-KK81+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+4	+7	+10
10.1	40.1	6.01	5.74	5.57
40.1	70.1	6.47	6.18	5.94
80.1	110.1	6.45	6.14	6.01
110.1	140.1	6.52	6.22	6.07
150.1	180.1	6.66	6.38	6.17
180.1	210.1	6.64	6.34	6.18
220.1	250.1	6.64	6.33	6.16
250.1	280.1	6.80	6.47	6.26
290.1	320.1	6.85	6.51	6.30
320.1	350.1	6.86	6.51	6.35
360.1	390.1	6.87	6.50	6.29
390.1	420.1	7.00	6.60	6.36
430.1	460.1	7.04	6.62	6.37
460.1	490.1	6.98	6.61	6.43
500.1	530.1	7.09	6.68	6.53
530.1	560.1	7.26	6.81	6.63
570.1	600.1	7.37	6.90	6.73
600.1	630.1	7.36	6.86	6.65
640.1	670.1	7.45	6.93	6.75
670.1	700.1	7.51	6.95	6.79
710.1	740.1	7.53	6.95	6.80
740.1	770.1	7.46	6.94	6.91
780.1	810.1	7.56	7.03	7.00
810.1	840.1	7.70	7.19	7.10
850.1	880.1	7.91	7.48	7.43
880.1	910.1	8.04	7.68	7.65
920.1	950.1	8.41	8.10	8.09
950.1	980.1	8.69	8.42	8.38
990.1	1020.1	9.06	8.88	8.86
1020.1	1050.1	9.39	9.28	9.32
1060.1	1090.1	9.74	9.68	9.74
1090.1	1120.1	9.96	9.90	9.97
1130.1	1160.1	10.22	10.14	10.18
1160.1	1190.1	10.45	10.33	10.35
1200.1	1230.1	10.67	10.48	10.44
1230.1	1260.1	10.81	10.54	10.46
1270.1	1300.1	11.24	10.86	10.73
1300.1	1330.1	11.40	10.96	10.81
1340.1	1370.1	11.73	11.18	10.99
1370.1	1400.1	12.16	11.47	11.26

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm) @LO (dBm)		
		+4	+7	+10
10.1	40.1	21.00	21.13	20.92
40.1	70.1	17.03	16.23	17.03
80.1	110.1	14.41	16.49	21.00
110.1	140.1	16.02	20.89	20.97
150.1	180.1	16.78	20.49	20.91
180.1	210.1	17.82	20.83	20.91
220.1	250.1	20.68	19.17	14.58
250.1	280.1	20.36	19.27	13.67
290.1	320.1	16.20	17.72	13.96
320.1	350.1	14.46	15.95	12.69
360.1	390.1	13.38	13.99	11.24
390.1	420.1	11.59	12.09	10.25
430.1	460.1	10.56	10.83	9.30
460.1	490.1	10.31	10.04	8.28
500.1	530.1	8.29	7.74	6.22
530.1	560.1	8.07	7.42	5.61
570.1	600.1	7.10	5.98	4.45
600.1	630.1	7.18	5.72	4.21
640.1	670.1	5.97	4.90	4.30
670.1	700.1	5.07	4.72	4.29
710.1	740.1	4.84	5.09	4.66
740.1	770.1	4.99	5.42	4.92
780.1	810.1	5.57	6.20	5.25
810.1	840.1	6.42	6.89	5.93
850.1	880.1	7.52	8.06	7.46
880.1	910.1	7.49	8.64	8.69
920.1	950.1	7.36	8.99	9.05
950.1	980.1	8.30	10.42	10.09
990.1	1020.1	9.66	11.81	11.51
1020.1	1050.1	11.40	13.34	12.83
1060.1	1090.1	13.05	16.30	15.79
1090.1	1120.1	11.34	14.98	16.06
1130.1	1160.1	9.40	12.26	15.04
1160.1	1190.1	8.64	10.78	13.67
1200.1	1230.1	7.98	9.59	12.59
1230.1	1260.1	8.25	9.15	11.49
1270.1	1300.1	8.28	9.02	10.81
1300.1	1330.1	8.25	9.31	11.08
1340.1	1370.1	8.12	9.99	11.07
1370.1	1400.1	7.39	10.18	11.93

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB) @LO (dBm)		
		+4	+7	+10
10.1	40.1	0.82	0.31	0.21
40.1	70.1	0.77	0.47	0.40
80.1	110.1	0.96	0.67	0.50
110.1	140.1	0.78	0.54	0.43
150.1	180.1	0.79	0.60	0.48
180.1	210.1	0.97	0.76	0.63
220.1	250.1	0.89	0.73	0.64
250.1	280.1	0.93	0.76	0.69
290.1	320.1	1.03	0.86	0.81
320.1	350.1	1.06	0.91	0.96
360.1	390.1	1.28	1.14	1.11
390.1	420.1	1.28	1.15	1.12
430.1	460.1	1.47	1.34	1.31
460.1	490.1	1.65	1.50	1.47
500.1	530.1	1.81	1.67	1.59
530.1	560.1	1.85	1.73	1.68
570.1	600.1	1.90	1.84	1.81
600.1	630.1	2.02	1.95	1.94
640.1	670.1	2.11	2.06	2.06
670.1	700.1	2.11	2.09	2.09
710.1	740.1	2.18	2.12	2.11
740.1	770.1	2.27	2.16	2.04
780.1	810.1	2.26	2.13	2.01
810.1	840.1	2.17	2.05	1.97
850.1	880.1	2.01	1.87	1.78
880.1	910.1	1.93	1.76	1.65
920.1	950.1	1.73	1.55	1.48
950.1	980.1	1.51	1.35	1.36
990.1	1020.1	1.33	1.12	1.19
1020.1	1050.1	1.19	0.95	1.05
1060.1	1090.1	1.07	0.78	0.87
1090.1	1120.1	1.06	0.73	0.80
1130.1	1160.1	1.05	0.68	0.72
1160.1	1190.1	1.06	0.65	0.64
1200.1	1230.1	1.06	0.64	0.59
1230.1	1260.1	1.14	0.68	0.56
1270.1	1300.1	1.18	0.69	0.50
1300.1	1330.1	1.26	0.72	0.49
1340.1	1370.1	1.43	0.84	0.52
1370.1	1400.1	1.57	0.95	0.57

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB) @LO (dBm) +7
490.0	10.1	6.60
479.8	20.3	6.57
469.6	30.5	6.56
459.4	40.7	6.50
449.1	51.0	6.56
438.9	61.2	6.56
428.7	71.4	6.56
418.5	81.6	6.55
408.3	91.8	6.47
398.1	102.0	6.50
387.9	112.2	6.49
377.7	122.4	6.52
367.4	132.7	6.44
357.2	142.9	6.46
347.0	153.1	6.44
336.8	163.3	6.47
326.6	173.5	6.46
316.4	183.7	6.37
306.2	193.9	6.41
296.0	204.1	6.38
285.7	214.4	6.45
275.5	224.6	6.40
265.3	234.8	6.37
255.1	245.0	6.36
234.7	265.4	6.28
224.5	275.6	6.19
204.0	296.1	6.31
193.8	306.3	6.40
173.4	326.7	6.33
163.2	336.9	6.20
142.8	357.3	6.33
132.6	367.5	6.28
112.1	388.0	6.31
101.9	398.2	6.37
81.5	418.6	6.41
71.3	428.8	6.37
50.9	449.2	6.47
40.6	459.5	6.49
20.2	479.9	6.56
10.0	490.1	6.98

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB) @LO (dBm) +7
10.0	20.1	6.24
30.0	40.1	5.88
50.0	60.1	5.52
70.0	80.1	5.70
90.0	100.1	5.53
110.0	120.1	5.46
130.0	140.1	5.85
150.0	160.1	5.74
170.0	180.1	5.81
190.0	200.1	5.92
210.0	220.1	5.84
230.0	240.1	5.72
250.0	260.1	5.96
270.0	280.1	6.02
310.0	320.1	6.18
330.0	340.1	6.04
370.0	380.1	6.08
390.0	400.1	6.29
430.0	440.1	6.29
450.0	460.1	6.17
490.0	500.1	6.39
510.0	520.1	6.23
550.0	560.1	6.35
570.0	580.1	6.50
610.0	620.1	6.40
630.0	640.1	6.73
670.0	680.1	6.73
690.0	700.1	6.91
730.0	740.1	7.14
750.0	760.1	7.08
790.0	800.1	7.40
810.0	820.1	7.67
850.0	860.1	7.82
870.0	880.1	7.95
910.0	920.1	8.32
930.0	940.1	9.11
970.0	980.1	9.25
990.0	1000.1	9.15
1030.0	1040.1	10.15
1050.0	1060.1	9.71

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=1000.1MHz (dB) @LO (dBm) +7
990.0	10.1	8.45
970.0	30.1	8.55
950.0	50.1	8.43
930.0	70.1	8.58
910.0	90.1	8.37
890.0	110.1	8.30
870.0	130.1	8.26
850.0	150.1	8.08
830.0	170.1	8.19
810.0	190.1	8.03
790.0	210.1	8.09
770.0	230.1	7.99
750.0	250.1	7.78
730.0	270.1	7.92
710.0	290.1	7.74
690.0	310.1	7.82
670.0	330.1	7.68
650.0	350.1	7.70
630.0	370.1	7.66
610.0	390.1	7.50
570.0	430.1	7.36
550.0	450.1	7.35
510.0	490.1	7.30
490.0	510.1	7.21
450.0	550.1	7.30
430.0	570.1	7.33
390.0	610.1	7.45
370.0	630.1	7.43
330.0	670.1	7.35
310.0	690.1	7.35
270.0	730.1	7.49
250.0	750.1	7.58
210.0	790.1	7.72
190.0	810.1	7.75
150.0	850.1	7.93
130.0	870.1	8.05
90.0	910.1	8.27
70.0	930.1	8.38
30.0	970.1	8.65
10.0	990.1	9.13

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+4	+7	+10	+4	+7	+10
40.1	48.87	47.37	46.89	50.24	43.99	41.13
70.1	44.57	43.71	43.06	46.15	39.99	37.17
110.1	41.30	40.39	39.66	42.99	37.07	34.24
140.1	39.53	38.54	37.68	40.12	34.44	31.65
180.1	38.30	37.23	36.36	40.27	33.80	30.64
210.1	37.22	36.23	35.42	39.75	32.86	29.58
250.1	35.62	34.62	33.84	38.69	31.51	28.17
280.1	34.92	34.00	33.18	37.81	30.62	27.21
320.1	33.28	32.51	31.81	36.59	30.14	26.73
350.1	32.04	31.38	30.83	33.95	28.38	25.24
390.1	30.84	30.32	29.88	32.45	27.58	24.49
420.1	30.13	29.65	29.21	31.49	26.88	23.78
460.1	29.15	28.73	28.27	29.57	25.84	23.01
490.1	28.02	27.57	27.06	27.16	23.72	21.29
530.1	26.59	26.10	25.55	25.71	22.58	20.31
560.1	25.49	25.02	24.49	24.71	21.77	19.47
600.1	24.09	23.76	23.25	22.97	20.55	18.42
630.1	23.30	22.94	22.51	21.79	19.67	17.69
670.1	22.39	22.11	21.82	20.36	18.58	16.87
700.1	21.74	21.53	21.44	18.97	17.35	15.87
740.1	21.30	21.21	21.36	17.86	16.24	14.88
770.1	21.02	21.06	21.40	16.89	15.34	13.93
810.1	21.07	21.16	21.67	15.83	14.13	12.86
840.1	21.16	21.41	21.93	15.21	13.57	12.27
880.1	21.52	21.99	22.59	14.23	12.69	11.30
910.1	21.84	22.44	23.13	13.62	12.21	10.90
950.1	22.36	23.04	23.74	12.56	11.30	10.07
980.1	22.82	23.54	24.23	11.87	10.77	9.70
1020.1	23.28	23.99	24.58	10.94	10.54	9.11
1050.1	23.41	24.08	24.50	10.16	9.38	8.51
1090.1	23.30	23.83	24.16	9.52	8.85	8.13
1120.1	22.82	23.22	23.49	8.85	8.29	7.63
1160.1	22.00	22.32	22.54	8.23	7.76	7.22
1190.1	21.31	21.58	21.78	7.86	7.46	7.00
1230.1	20.18	20.42	20.62	7.22	6.91	6.52
1260.1	19.33	19.57	19.80	6.88	6.63	6.29
1300.1	18.36	18.56	18.90	6.39	6.19	5.99
1330.1	17.53	17.78	18.09	6.04	5.86	5.69
1370.1	16.63	16.93	17.23	5.83	5.70	5.51
1400.1	15.90	16.20	16.46	5.50	5.34	5.18

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+4	+7	+10
10.1	40.1	48.05	47.14	46.42
40.1	70.1	39.09	38.47	38.01
80.1	110.1	34.02	33.37	33.11
110.1	140.1	32.05	31.55	31.27
150.1	180.1	30.50	29.99	29.72
180.1	210.1	30.24	29.73	29.37
220.1	250.1	29.90	29.26	28.85
250.1	280.1	30.24	29.64	29.27
290.1	320.1	31.30	30.33	29.50
320.1	350.1	32.08	30.70	29.62
360.1	390.1	32.69	31.39	30.12
390.1	420.1	34.58	33.66	32.19
430.1	460.1	32.51	31.22	28.48
460.1	490.1	28.92	27.35	24.49
500.1	530.1	23.49	22.23	20.15
530.1	560.1	21.29	20.19	18.66
570.1	600.1	18.44	17.62	16.80
600.1	630.1	17.02	16.58	16.43
640.1	670.1	15.63	15.53	16.26
670.1	700.1	14.92	15.13	16.32
710.1	740.1	14.52	15.20	16.81
740.1	770.1	15.07	16.15	18.35
780.1	810.1	15.38	16.70	18.82
810.1	840.1	15.88	17.33	19.27
850.1	880.1	17.23	18.65	20.48
880.1	910.1	18.27	19.59	21.17
920.1	950.1	19.55	20.59	21.57
950.1	980.1	20.44	21.11	21.61
990.1	1020.1	21.43	21.93	21.72
1020.1	1050.1	21.70	22.02	21.67
1060.1	1090.1	20.49	20.62	20.31
1090.1	1120.1	19.37	19.26	18.96
1130.1	1160.1	17.84	17.64	17.28
1160.1	1190.1	16.52	16.32	16.09
1200.1	1230.1	15.05	14.80	14.58
1230.1	1260.1	14.22	13.88	13.62
1270.1	1300.1	13.10	12.85	12.64
1300.1	1330.1	12.15	11.84	11.69
1340.1	1370.1	11.21	10.87	10.70
1370.1	1400.1	11.05	10.70	10.51

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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+4	+7	+10
10.1	40.1	1.08	1.31	1.28
40.1	70.1	1.10	1.11	1.16
80.1	110.1	1.07	1.11	1.15
110.1	140.1	1.11	1.12	1.15
150.1	180.1	1.08	1.10	1.14
180.1	210.1	1.10	1.11	1.13
220.1	250.1	1.13	1.15	1.18
250.1	280.1	1.11	1.13	1.16
290.1	320.1	1.14	1.14	1.17
320.1	350.1	1.13	1.14	1.18
360.1	390.1	1.09	1.12	1.17
390.1	420.1	1.10	1.13	1.18
430.1	460.1	1.08	1.14	1.21
460.1	490.1	1.09	1.16	1.25
500.1	530.1	1.10	1.19	1.31
530.1	560.1	1.09	1.19	1.31
570.1	600.1	1.09	1.20	1.33
600.1	630.1	1.15	1.25	1.40
640.1	670.1	1.22	1.32	1.49
670.1	700.1	1.30	1.41	1.62
710.1	740.1	1.47	1.60	1.84
740.1	770.1	1.60	1.73	2.01
780.1	810.1	1.81	1.96	2.27
810.1	840.1	1.99	2.14	2.41
850.1	880.1	2.20	2.31	2.53
880.1	910.1	2.41	2.51	2.68
920.1	950.1	2.72	2.80	2.91
950.1	980.1	2.87	2.95	3.03
990.1	1020.1	3.25	3.35	3.42
1020.1	1050.1	3.44	3.58	3.64
1060.1	1090.1	3.60	3.79	3.88
1090.1	1120.1	3.84	4.05	4.18
1130.1	1160.1	3.82	4.03	4.16
1160.1	1190.1	3.98	4.21	4.36
1200.1	1230.1	4.14	4.36	4.51
1230.1	1260.1	4.13	4.33	4.47
1270.1	1300.1	4.27	4.43	4.57
1300.1	1330.1	4.40	4.55	4.69
1340.1	1370.1	4.34	4.44	4.57
1370.1	1400.1	4.57	4.67	4.80

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+4	+7	+10
40.1	1.79	2.71	3.97
70.1	1.68	2.41	3.36
110.1	1.71	2.44	3.38
140.1	1.81	2.65	3.69
180.1	1.78	2.51	3.44
210.1	1.76	2.47	3.34
250.1	1.89	2.68	3.64
280.1	1.88	2.63	3.55
320.1	1.90	2.60	3.45
350.1	2.01	2.77	3.68
390.1	2.07	2.84	3.76
420.1	2.06	2.78	3.65
460.1	2.12	2.83	3.67
490.1	2.29	3.06	3.95
530.1	2.36	3.15	4.06
560.1	2.40	3.17	4.05
600.1	2.53	3.32	4.21
630.1	2.59	3.37	4.24
670.1	2.67	3.42	4.27
700.1	2.78	3.53	4.35
740.1	2.84	3.56	4.34
770.1	2.92	3.61	4.37
810.1	3.03	3.72	4.42
840.1	3.08	3.73	4.40
880.1	3.16	3.79	4.42
910.1	3.21	3.82	4.42
950.1	3.25	3.82	4.38
980.1	3.29	3.82	4.34
1020.1	3.31	3.80	4.29
1050.1	3.30	3.75	4.18
1090.1	3.32	3.70	4.11
1120.1	3.30	3.67	4.03
1160.1	3.28	3.58	3.90
1190.1	3.29	3.52	3.81
1230.1	3.28	3.47	3.73
1260.1	3.22	3.41	3.67
1300.1	3.23	3.38	3.56
1330.1	3.22	3.31	3.45
1370.1	3.19	3.25	3.42
1400.1	3.27	3.26	3.31

IF (OUT) (MHz)	IF VSWR @LO=1000.1MHz (:1) @LO (dBm)		
	+4	+7	+10
10.1	1.42	1.13	1.07
40.1	1.46	1.16	1.05
60.1	1.43	1.14	1.08
90.1	1.44	1.15	1.06
110.1	1.39	1.11	1.10
140.1	1.43	1.14	1.07
160.1	1.38	1.10	1.11
190.1	1.38	1.11	1.11
210.1	1.33	1.07	1.14
240.1	1.34	1.09	1.13
260.1	1.29	1.06	1.18
290.1	1.27	1.07	1.20
310.1	1.25	1.04	1.20
340.1	1.22	1.08	1.24
360.1	1.20	1.07	1.25
390.1	1.15	1.13	1.32
410.1	1.15	1.10	1.30
440.1	1.11	1.18	1.38
460.1	1.10	1.19	1.40
490.1	1.07	1.24	1.46
510.1	1.08	1.24	1.45
540.1	1.10	1.31	1.53
560.1	1.13	1.35	1.58
590.1	1.14	1.38	1.62
610.1	1.18	1.41	1.65
640.1	1.22	1.48	1.73
660.1	1.27	1.54	1.80
690.1	1.28	1.55	1.81
710.1	1.35	1.64	1.91
740.1	1.37	1.66	1.92
760.1	1.45	1.77	2.05
790.1	1.46	1.77	2.04
810.1	1.53	1.86	2.14
840.1	1.55	1.88	2.16
860.1	1.64	1.99	2.28
890.1	1.65	1.99	2.27
910.1	1.71	2.05	2.34
940.1	1.76	2.12	2.42
960.1	1.83	2.19	2.48
990.1	1.86	2.23	2.52

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Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	+8	15	10	21	15	27	21	34	34	44
1	-	9	+0	20	18	34	36	36	40	47	50	50
2	>90	41	34	39	33	48	49	46	59	51	50	56
3	>90	>69	61	60	53	55	>69	60	67	62	64	66
4	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
5	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
6	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
7	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
8	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
9	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
10	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 550.1 MHz; -14.00 dBm.
LO IN: 580.1 MHz; +7.00 dBm
IF OUT: 30 MHz; -20.82 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	+0	24	19	37	25	41	33	48	52	58
1	-	9	+0	22	21	40	38	44	39	55	51	68
2	73	39	20	36	26	46	51	45	48	54	45	61
3	>90	45	38	41	30	39	58	49	55	55	62	65
4	>90	60	58	47	39	45	43	56	62	55	64	63
5	>90	66	57	63	60	54	50	55	61	62	65	71
6	>90	72	71	66	67	78	50	60	65	62	66	68
7	>90	77	>79	>79	67	74	64	76	57	68	72	68
8	>90	>79	>79	>79	>79	77	>79	75	64	66	73	75
9	>90	>79	>79	>79	>79	>79	>79	>79	67	>79	68	73
10	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	72	>79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 550.1 MHz; -4.00 dBm.
LO IN: 580.1 MHz; +7.00 dBm
IF OUT: 30 MHz; -11.4 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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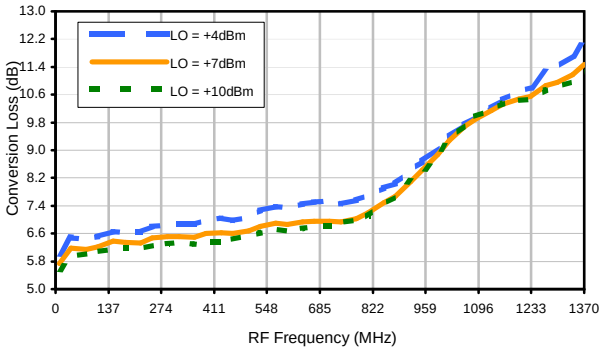
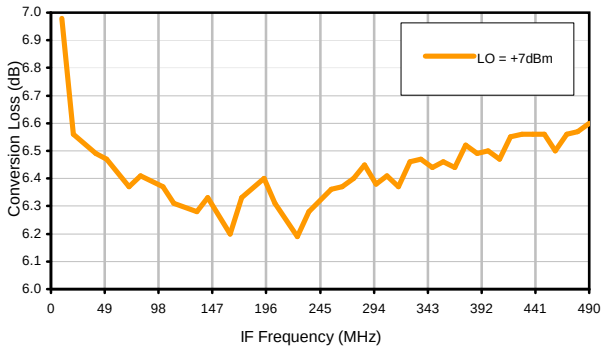
Frequency Mixer ASK-2-KK81+

Typical Performance Curves

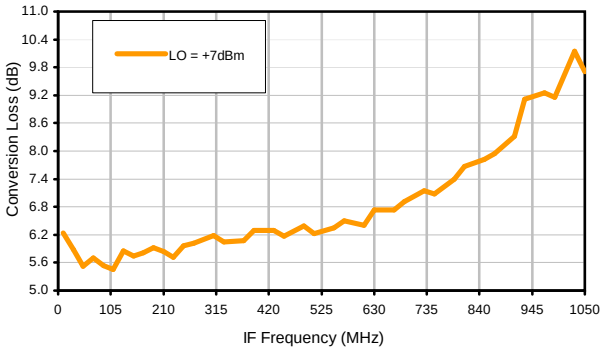
Conversion Loss @ IF=30MHz



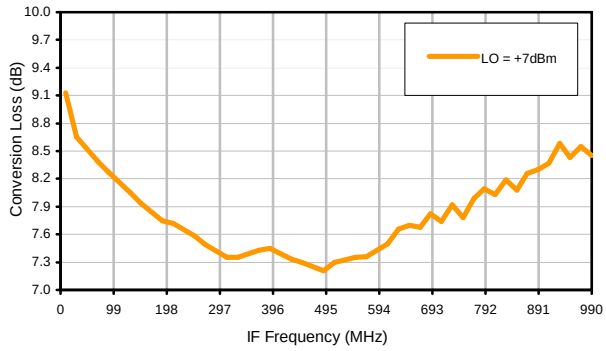
Conversion Loss vs. IF @ RF=500.1MHz



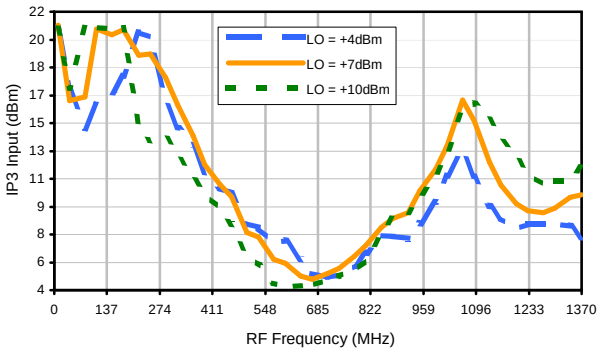
Conversion Loss vs. IF @ RF=10.1MHz



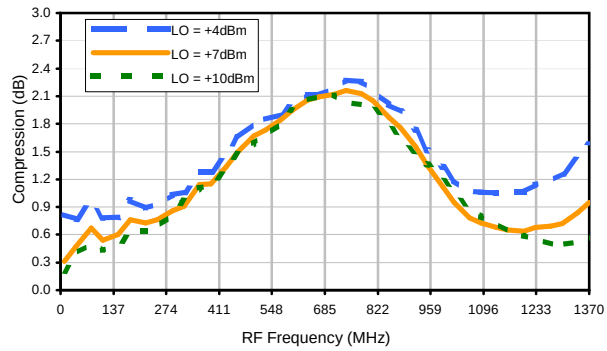
Conversion Loss vs. IF @ RF=1000.1MHz



IP3 Input



Compression @ RF IN=+1dBm



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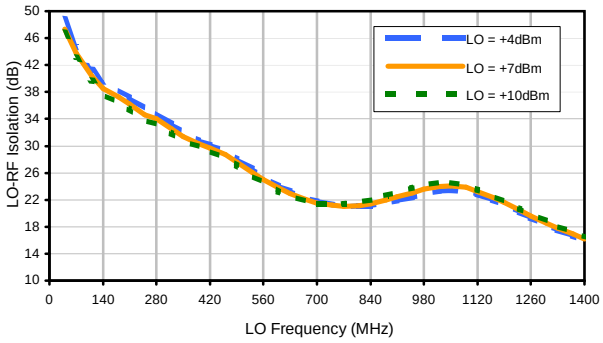
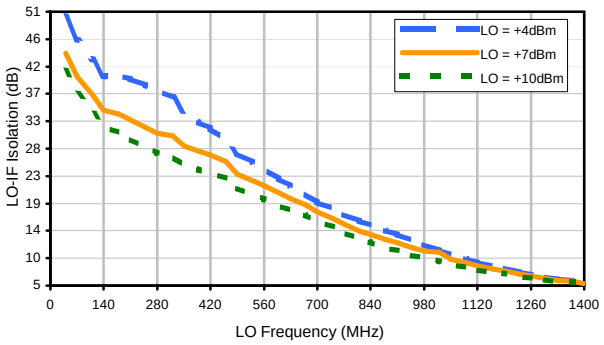
Typical Performance Curves

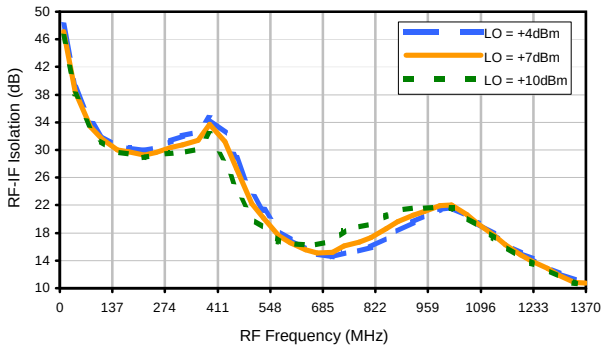
LO-RF Isolation



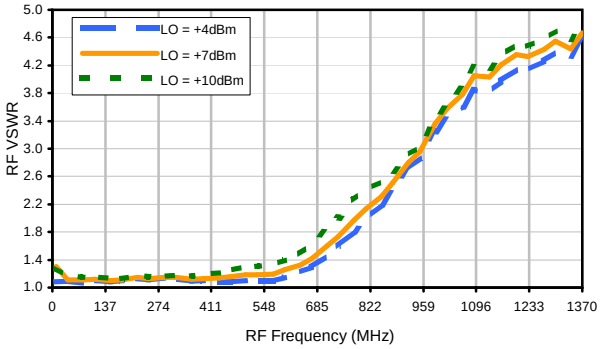
LO-IF Isolation



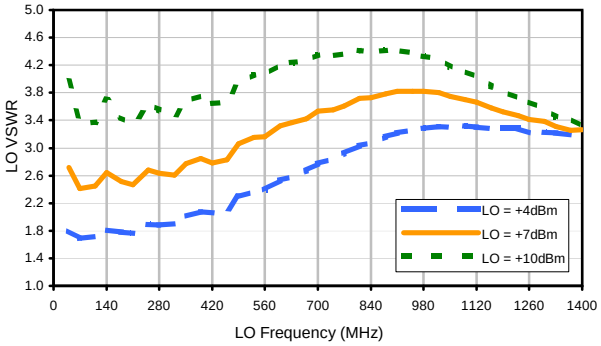
RF-IF Isolation



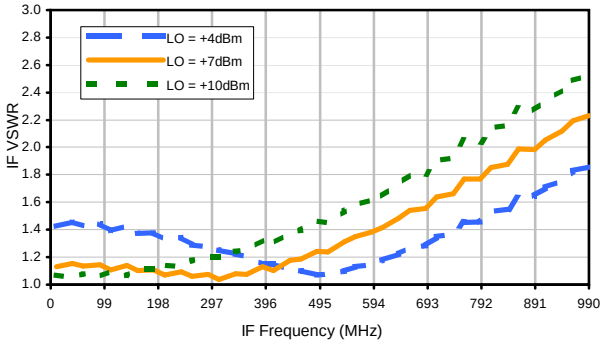
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	+8	15	10	21	15	27	21	34	34	44
1	-	9	+0	20	18	34	36	36	40	47	50	50
2	>90	41	34	39	33	48	49	46	59	51	50	56
3	>90	>69	61	60	53	55	>69	60	67	62	64	66
4	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
5	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
6	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
7	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
8	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
9	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
10	>90	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69	>69
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 550.1 MHz; -14.00 dBm.
LO IN: 580.1 MHz; +7.00 dBm
IF OUT: 30 MHz; -20.82 dBm

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	-	-	+0	24	19	37	25	41	33	48	52	58
1	-	9	+0	22	21	40	38	44	39	55	51	68
2	73	39	20	36	26	46	51	45	48	54	45	61
3	>90	45	38	41	30	39	58	49	55	55	62	65
4	>90	60	58	47	39	45	43	56	62	55	64	63
5	>90	66	57	63	60	54	50	55	61	62	65	71
6	>90	72	71	66	67	78	50	60	65	62	66	68
7	>90	77	>79	>79	67	74	64	76	57	68	72	68
8	>90	>79	>79	>79	>79	77	>79	75	64	66	73	75
9	>90	>79	>79	>79	>79	>79	>79	>79	67	>79	68	73
10	>90	>79	>79	>79	>79	>79	>79	>79	>79	>79	72	>79
	RF CAL	0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions:
RF IN: 550.1 MHz; -4.00 dBm.
LO IN: 580.1 MHz; +7.00 dBm
IF OUT: 30 MHz; -11.4 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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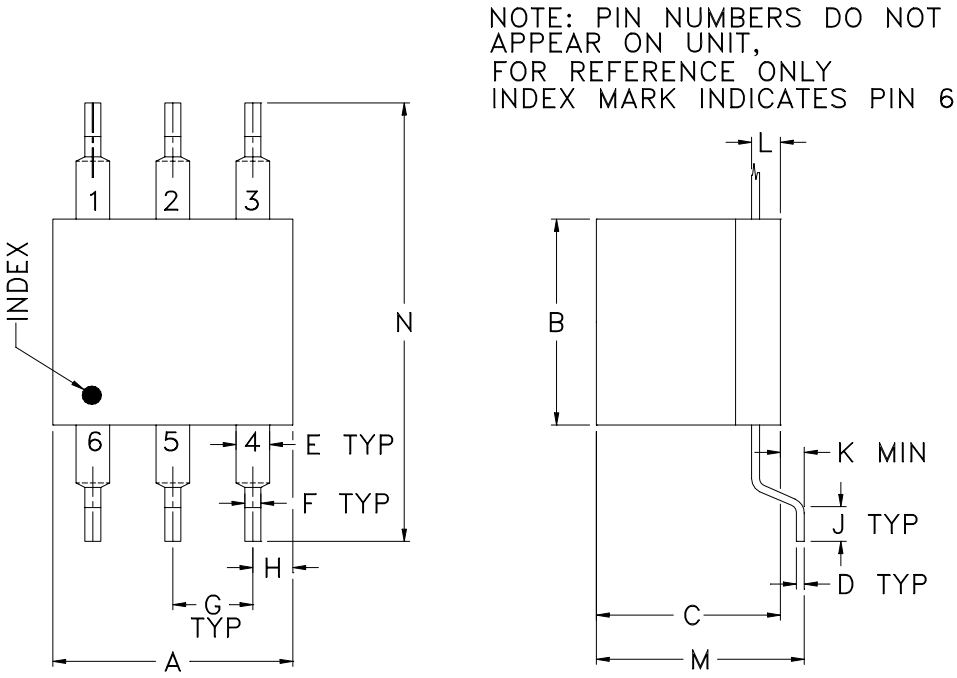
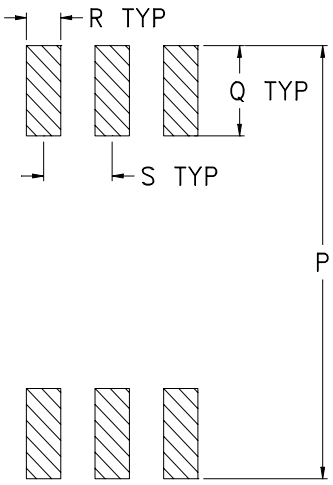
Case Style KK

KK81
KK265

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.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 (0.25)	.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. ± .03; 3 Pl. ± .015

Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.
3. Special Tolerances: Termination width ± .005 inch, termination thickness ± .003 inch.

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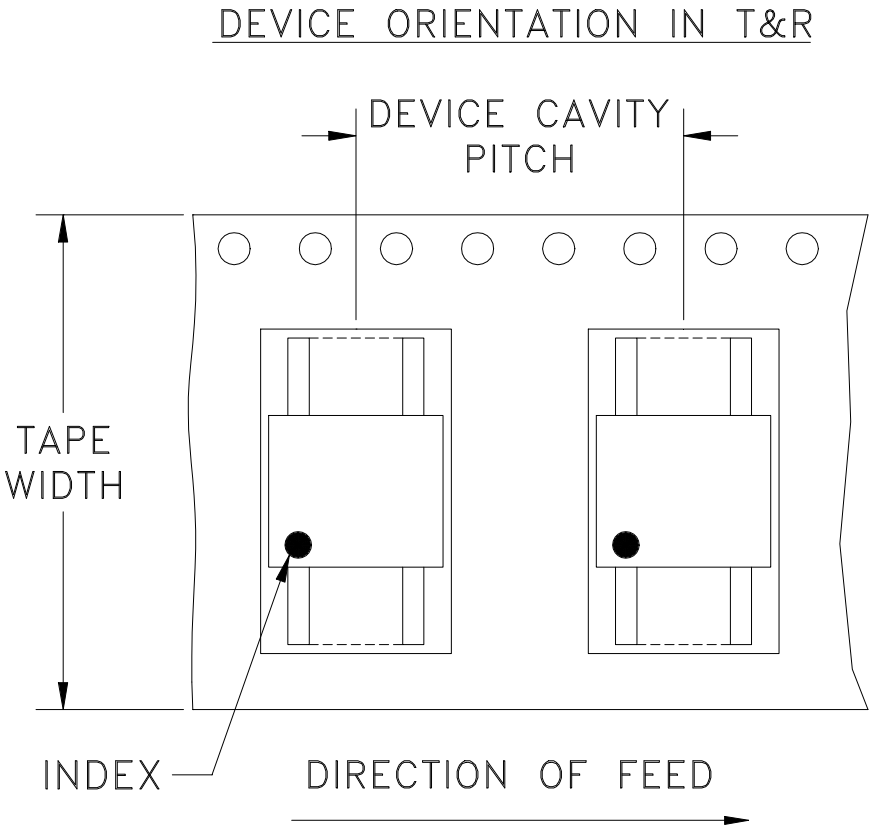
Tape & Reel Packaging TR-F1



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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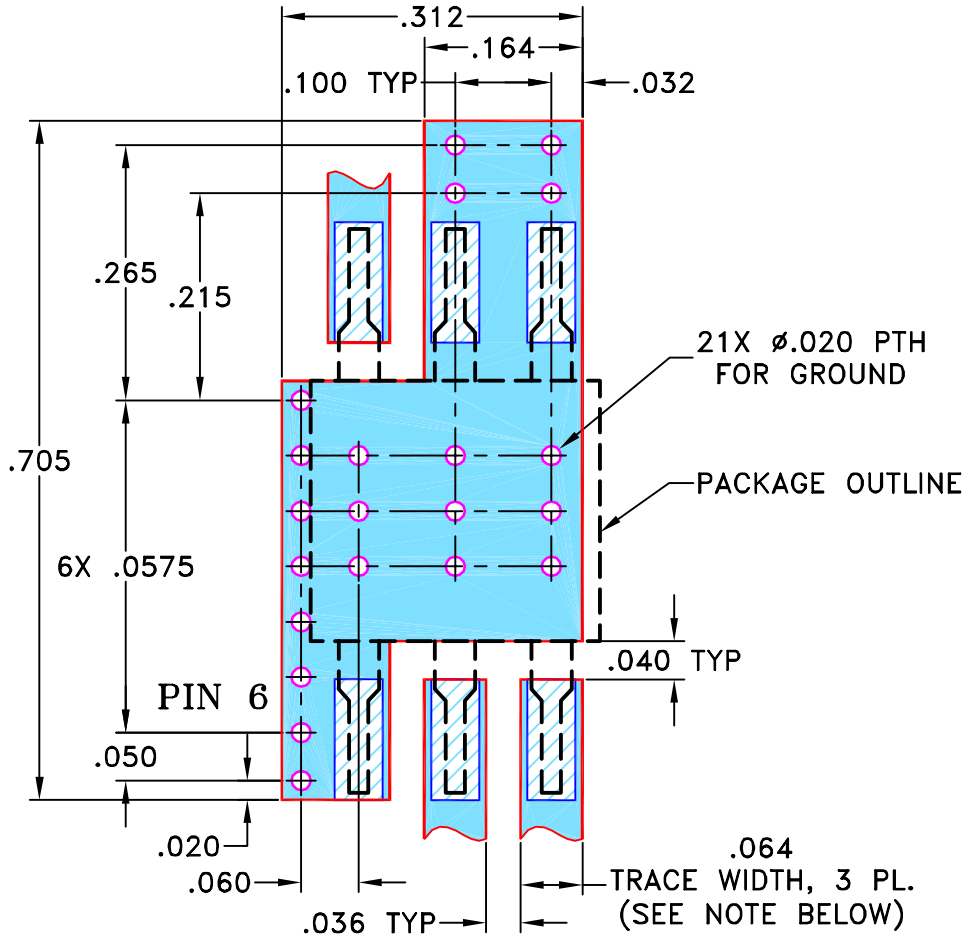
THIRD ANGLE PROJECTION

REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/02/02	AV	DJ
A	M102713	UPDATED NOTES	01/14/06	GF	IL

SUGGESTED MOUNTING CONFIGURATION FOR KK81 CASE STYLE, "w" PIN CONNECTION



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

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	AV	07/23/02
TOLERANCES ON:	CHECKED	WL	08/02/02
2 PL DECIMALS ±	APPROVED	DJ	08/02/02
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

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

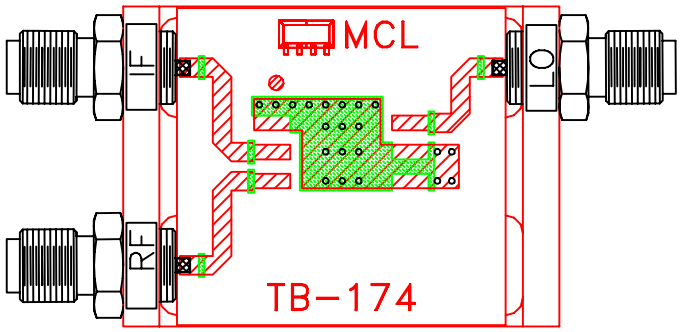
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, w, KK81, ASK, TB-174

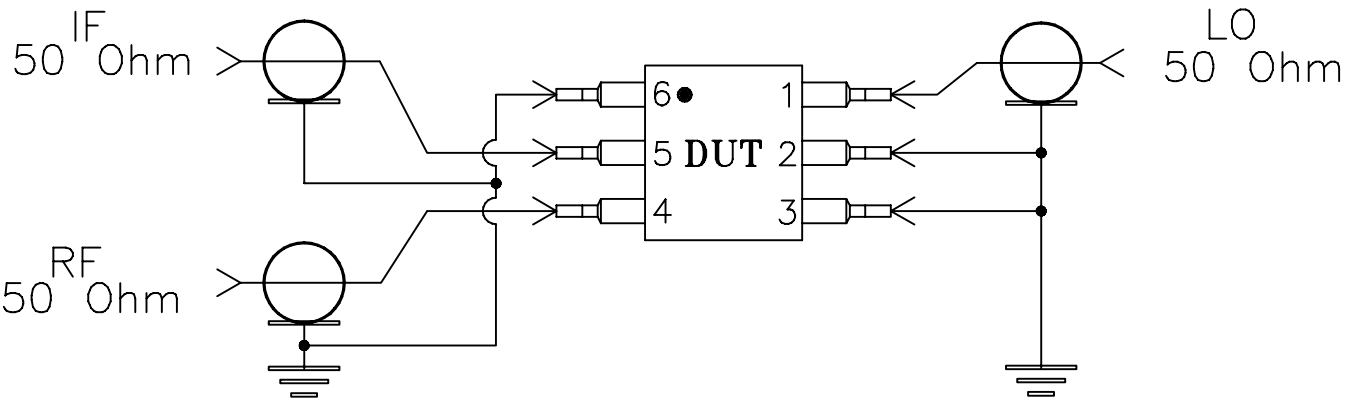
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-082	A

FILE:	SCALE:	SHEET:
98PL082	5:1	1 OF 1

Evaluation Board and Circuit



TB-174



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 ENV21

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

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