Coaxial, Wideband

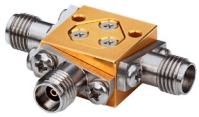
Frequency Mixer

ZMDB-24H-K+

Level 15 (LO Power +15 dBm) 5000 to 21000 MHz

The Big Deal

- Low conversion loss, 8.5 dB
- Excellent IF bandwidth, DC to 5 GHz
- High L-R isolation, 30 dB



CASE STYLE: UK2938

Product Overview

Mini-Circuits' ZMDB-24H-K+ coaxial frequency mixer provides an RF and LO frequency range from 5 to 21 GHz and an IF frequency range from DC to 5 GHz, ideal for applications including defense radar and communication, VSAT, line of sight links, WiFi, ISM, Satellite up and down converters and more. This model handles input power up to +21 dBm and provides low conversion loss with high L-R isolation. The mixer comes housed in a rugged, 2.92mm connectorized housing (0.56 x 0.56 x 0.34") suitable for assembled systems and lab use.

Key Features

Feature	Advantages
Wide bandwidth, 5 to 21 GHz	Useful in wideband systems and several narrowband systems, reducing inventory.
Wide IF bandwidth, DC to 5 GHz	Usable in first and second down converter applications. IF down to DC enables use in phase detector applications.
Low conversion loss, 8.5 dB	Enables lower NF front ends, improving system sensitivity.
High isolation • L-R, 30 dB • L-I, 40 dB	Preserves signal integrity from input to output and reduces undesired signal responses that can interfere with system performance.
High IP3, 22 dBm	Minimizes third order intermodulation distortion and enables high-dynamic range.
2.92mm-F connectorized housing, (0.56 x 0.56 x 0.34"	Ideal for assembled systems and lab use. High-frequency connector mates with 2.92mm and SMA connectors.

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ZMDB-24H-K+

Level 15 (LO Power +15 dBm) 5000 to 21000 MHz

Generic photo used for illustration purposes only

CASE STYLE: UK2938

Connectors	Model
2.92mm-Female	ZMDB-24H-K+

+RoHS Compliant

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

Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	125mW

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

Coaxial Connections

LO	2
RF	1
IF	3

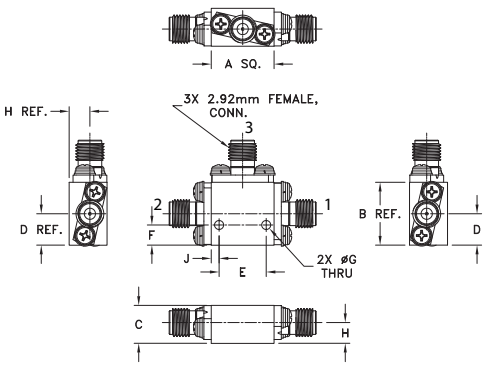
Features

- wide bandwidth, 5000 to 21000 MHz
- low conversion loss, 8.5 dB typ.
- high L-R isolation, 30 dB typ.
- excellent IF BW, DC to 5000 MHz
- rugged construction
- small size
- useable as up and down converter

Applications

- defense radar and communications
- VSAT
- ISM
- line of sight links
- WiFi
- satellite up and down connectors

Outline Drawing



Outline Dimensions (inch / mm)

A	B	C	D	E
.56	.56	.34	.28	.420
14.22	14.22	8.64	7.11	10.67

F	G	H	J	wt
.18	.081	.19	.07	grams
4.57	2.06	4.83	1.78	23

Electrical Specifications at 25°C

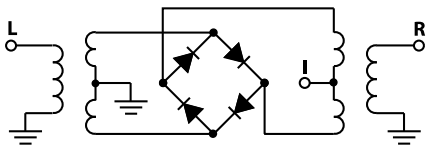
Parameter	Min.	Typ.	Max.	Unit
Frequency Range, RF	5000	—	21000	MHz
Frequency Range, LO	5000	—	21000	MHz
Frequency Range, IF	DC	—	5000	MHz
Conversion Loss*	—	8.5	10.8	dB
LO to RF Isolation	15	30	—	dB
LO to IF Isolation	20	40	—	dB
IP3	—	22	—	dBm
RF Input at 1 dB Compression	—	+10	—	dBm

* Conversion loss at 30 MHz IF. Increases with IF frequency.

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 +15dBm	LO +15dBm	LO +15dBm	LO +15dBm	LO +15dBm
5000.10	5030.10	7.09	29.14	29.50	1.44	3.25
5500.10	5530.10	6.66	34.55	31.42	1.20	2.67
6000.10	6030.10	6.91	39.86	35.48	1.82	2.82
6500.10	6530.10	7.16	39.02	40.18	2.73	4.00
7000.10	7030.10	7.61	36.04	45.62	3.09	3.31
7500.10	7530.10	8.19	33.87	43.49	2.33	2.22
8000.10	8030.10	8.45	33.75	41.25	4.21	3.29
9000.10	9030.10	8.36	34.33	40.33	5.04	2.85
10000.10	10030.10	9.63	34.87	41.02	3.28	3.15
11000.10	11030.10	8.71	30.98	37.18	5.68	3.53
12000.10	12030.10	7.99	25.57	26.86	3.34	2.28
13000.10	13030.10	7.52	26.74	41.57	2.72	2.55
14000.10	14030.10	7.21	25.63	54.46	1.60	1.49
15000.10	15030.10	7.04	29.61	51.98	2.62	2.78
16000.10	16030.10	7.53	24.89	41.60	1.22	1.62
17000.10	17030.10	7.48	23.42	38.76	3.74	6.63
18000.10	18030.10	8.01	22.13	36.72	1.95	1.70
19000.10	19030.10	8.25	19.46	34.57	3.77	3.82
19800.10	19830.10	8.51	20.21	36.90	5.51	2.80
21000.10	21030.10	9.31	20.66	39.86	1.09	2.40

Electrical Schematic



Notes

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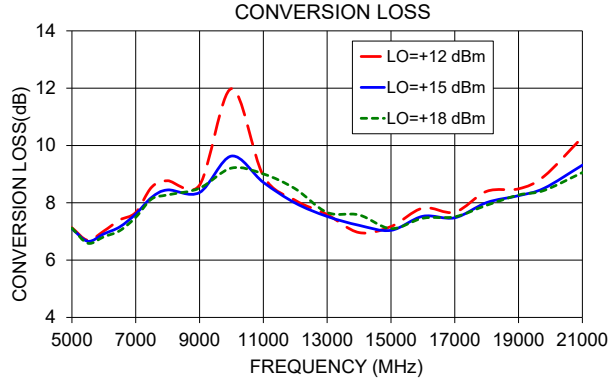
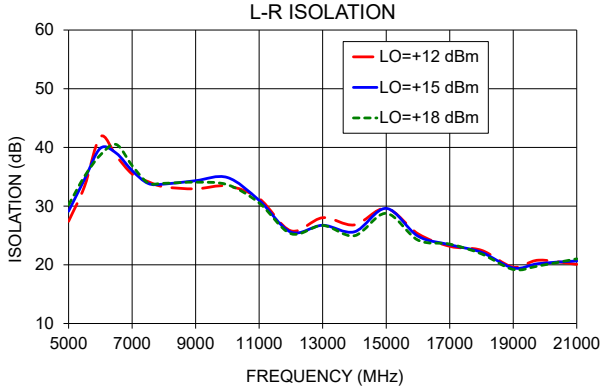
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty 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

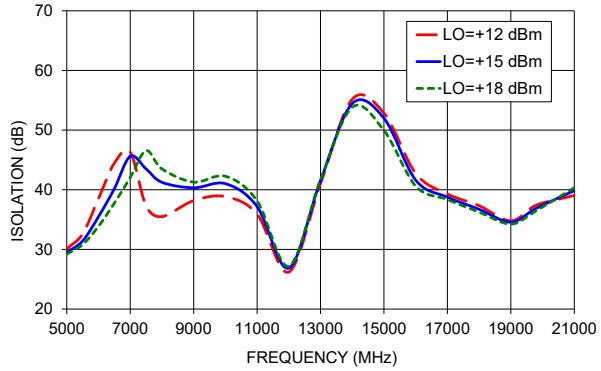
ZMDB-24H-K+
CONVERSION LOSS



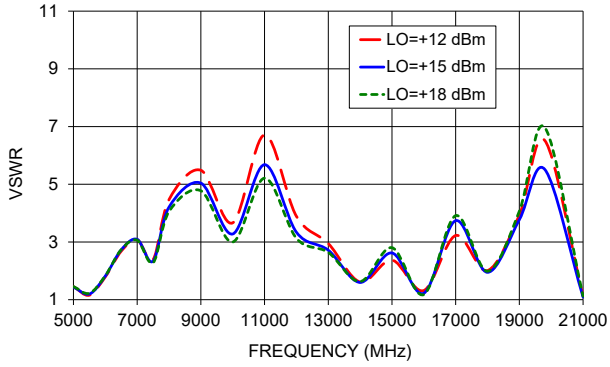
ZMDB-24H-K+
L-R ISOLATION



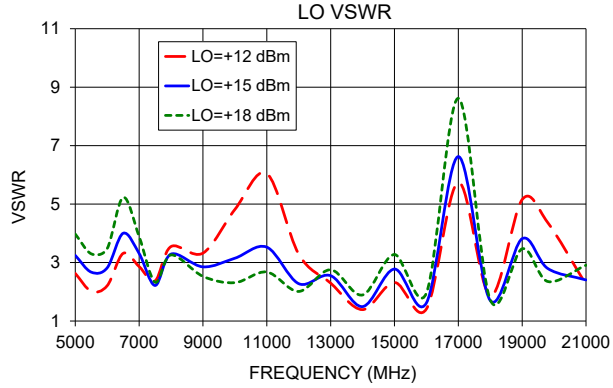
ZMDB-24H-K+
L-I ISOLATION



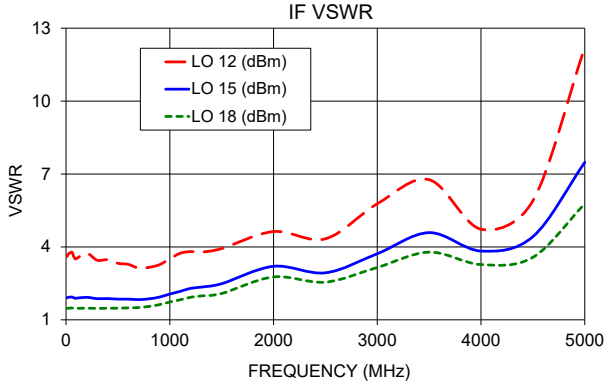
ZMDB-24H-K+
RF VSWR



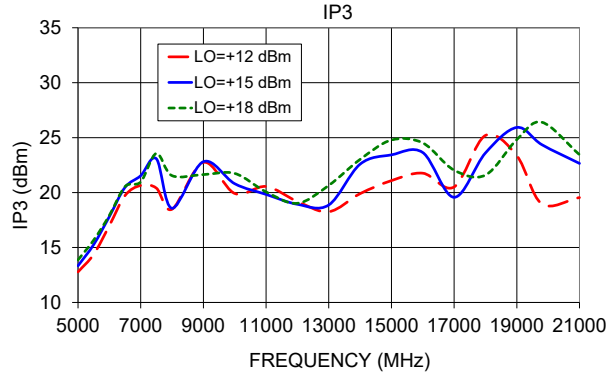
ZMDB-24H-K+
LO VSWR



ZMDB-24H-K+
IF VSWR



ZMDB-24H-K+
IP3



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Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB) @LO (dBm)		
		+12	+15	+18
4000.1	4030.1	13.92	12.45	11.79
4400.1	4430.1	10.38	9.67	9.61
4800.1	4830.1	7.55	7.52	7.56
5000.1	5030.1	7.13	7.09	7.12
5500.1	5530.1	6.69	6.66	6.59
6000.1	6030.1	7.02	6.92	6.81
6500.1	6530.1	7.40	7.16	7.03
7000.1	7030.1	7.66	7.61	7.50
7500.1	7530.1	8.55	8.19	8.13
8000.1	8030.1	8.77	8.45	8.28
8500.1	8530.1	9.23	8.62	8.45
9000.1	9030.1	8.62	8.36	8.51
9500.1	9530.1	8.84	8.15	8.20
10000.1	10030.1	11.98	9.63	9.21
10500.1	10530.1	9.54	9.03	9.00
11000.1	11030.1	8.94	8.71	9.01
11500.1	11530.1	8.86	8.71	9.03
12000.1	12030.1	8.09	7.99	8.49
12500.1	12530.1	7.99	7.86	8.13
13000.1	13030.1	7.59	7.52	7.66
13500.1	13530.1	7.28	7.33	7.52
14000.1	14030.1	6.96	7.21	7.58
14500.1	14530.1	6.90	7.03	7.28
15000.1	15030.1	7.17	7.04	7.10
15500.1	15530.1	7.83	7.70	7.76
16000.1	16030.1	7.82	7.53	7.46
16500.1	16530.1	6.99	6.92	6.98
17000.1	17030.1	7.67	7.48	7.51
17500.1	17530.1	8.39	7.92	7.79
18000.1	18030.1	8.40	8.01	7.92
18500.1	18530.1	8.74	8.34	8.22
19000.1	19030.1	8.49	8.25	8.27
19500.1	19530.1	8.56	8.33	8.26
19800.1	19830.1	8.93	8.51	8.43
20000.1	20030.1	9.43	8.77	8.65
20500.1	20530.1	9.10	8.68	8.68
21000.1	21030.1	10.29	9.31	9.06
21500.1	21530.1	16.46	11.40	10.57
21800.1	21830.1	22.89	12.48	11.22

RF (IN) (MHz)	LO (MHz)	IP-3 INPUT (dBm) @LO (dBm)		
		+12	+15	+18
4000.1	4030.1	11.37	13.20	14.41
4400.1	4430.1	13.64	14.16	15.27
4800.1	4830.1	12.89	13.77	14.61
5000.1	5030.1	12.86	13.44	13.87
5500.1	5530.1	14.31	15.09	15.59
6000.1	6030.1	17.03	17.75	17.93
6500.1	6530.1	19.77	20.46	20.55
7000.1	7030.1	20.51	20.97	20.71
7500.1	7530.1	20.59	22.79	23.56
8000.1	8030.1	18.14	18.57	21.24
8500.1	8530.1	21.20	21.20	21.20
9000.1	9030.1	21.64	21.64	21.55
9500.1	9530.1	19.74	19.75	21.85
10000.1	10030.1	19.94	21.37	21.74
10500.1	10530.1	21.31	19.70	21.31
11000.1	11030.1	20.06	19.62	20.06
11500.1	11530.1	19.84	19.84	19.84
12000.1	12030.1	19.02	18.89	19.02
12500.1	12530.1	17.79	18.49	19.27
13000.1	13030.1	17.98	18.81	20.44
13500.1	13530.1	20.50	23.31	24.68
14000.1	14030.1	20.27	22.86	23.02
14500.1	14530.1	20.68	22.50	22.84
15000.1	15030.1	21.17	23.51	24.78
15500.1	15530.1	20.31	23.26	25.47
16000.1	16030.1	21.84	23.68	24.52
16500.1	16530.1	18.97	20.90	22.79
17000.1	17030.1	20.43	19.55	22.00
17500.1	17530.1	21.58	21.33	21.58
18000.1	18030.1	21.59	21.59	21.59
18500.1	18530.1	22.93	22.93	22.93
19000.1	19030.1	23.35	24.83	24.83
19500.1	19530.1	21.59	24.59	26.12
19800.1	19830.1	19.16	24.40	26.40
20000.1	20030.1	18.57	24.50	26.26
20500.1	20530.1	23.50	22.50	26.19
21000.1	21030.1	19.15	22.41	23.35
21500.1	21530.1	17.78	23.95	24.95
21800.1	21830.1	6.24	21.59	27.11

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+10dBm (dB) @LO (dBm)		
		+12	+15	+18
4000.1	4030.1	1.51	0.54	-0.12
4400.1	4430.1	-0.76	-0.82	-0.73
4800.1	4830.1	-2.28	-1.74	-1.46
5000.1	5030.1	-2.51	-1.98	-1.64
5500.1	5530.1	-2.14	-1.62	-1.37
6000.1	6030.1	-1.52	-1.07	-0.86
6500.1	6530.1	-1.15	-0.93	-0.85
7000.1	7030.1	-0.82	-0.42	-0.41
7500.1	7530.1	-0.91	-0.51	-0.54
8000.1	8030.1	-0.35	-0.01	-0.20
8500.1	8530.1	-0.23	-0.08	-0.23
9000.1	9030.1	-0.22	-0.07	-0.25
9500.1	9530.1	0.47	0.18	-0.06
10000.1	10030.1	-0.51	-0.27	-0.40
10500.1	10530.1	0.23	0.02	-0.17
11000.1	11030.1	-0.15	-0.11	-0.22
11500.1	11530.1	-0.43	-0.27	-0.29
12000.1	12030.1	-0.20	-0.19	-0.22
12500.1	12530.1	-0.76	-0.43	-0.41
13000.1	13030.1	-0.40	-0.25	-0.26
13500.1	13530.1	-0.60	-0.26	-0.30
14000.1	14030.1	-1.28	-0.51	-0.40
14500.1	14530.1	-0.97	-0.40	-0.32
15000.1	15030.1	-0.61	-0.35	-0.34
15500.1	15530.1	-1.15	-0.60	-0.47
16000.1	16030.1	-0.73	-0.38	-0.30
16500.1	16530.1	-0.75	-0.46	-0.42
17000.1	17030.1	-0.75	-0.38	-0.32
17500.1	17530.1	-0.28	-0.17	-0.19
18000.1	18030.1	-0.37	-0.22	-0.20
18500.1	18530.1	-0.21	-0.14	-0.14
19000.1	19030.1	-0.36	-0.22	-0.20
19500.1	19530.1	-0.65	-0.33	-0.24
19800.1	19830.1	-0.92	-0.38	-0.27
20000.1	20030.1	-0.69	-0.28	-0.23
20500.1	20530.1	-0.28	-0.17	-0.15
21000.1	21030.1	-0.74	-0.23	-0.22
21500.1	21530.1	2.20	-0.17	-0.02
21800.1	21830.1	6.74	-0.40	-0.14

Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @ FIXED R=13250 MHz (dB) @LO (dBm) +15
50	13300	7.23
100	13350	7.26
150	13400	7.28
200	13450	7.25
250	13500	7.28
300	13550	7.32
350	13600	7.34
400	13650	7.31
450	13700	7.25
500	13750	7.23
550	13800	7.31
600	13850	7.24
650	13900	7.31
700	13950	7.36
750	14000	7.36
800	14050	7.41
850	14100	7.44
900	14150	7.42
950	14200	7.51
1000	14250	7.51
1050	14300	7.55
1100	14350	7.54
1150	14400	7.61
1200	14450	7.73
1250	14500	7.80
1300	14550	7.76
1350	14600	7.90
1400	14650	8.07
1450	14700	8.10
1500	14750	8.17
1550	14800	8.17
1600	14850	8.34
1650	14900	8.42
1700	14950	8.37
1750	15000	8.35
1800	15050	8.49
1850	15100	8.52
1900	15150	8.50
1950	15200	8.43
2000	15250	8.53
2050	15300	8.69
2100	15350	8.70
2150	15400	8.55
2200	15450	8.76
2250	15500	8.87
2300	15550	8.85
2350	15600	8.75
2400	15650	8.70
2450	15700	8.97
2500	15750	8.99
2550	15800	8.93
2600	15850	8.80
2650	15900	8.95
2700	15950	9.01
2750	16000	8.98
2800	16050	8.97
2850	16100	8.85
2900	16150	8.98
2950	16200	9.12
3000	16250	9.11
3050	16300	8.98
3100	16350	8.80
3150	16400	9.15
3200	16450	8.95
3250	16500	9.25
3300	16550	9.00
3350	16600	9.19
3400	16650	9.26
3450	16700	9.35
3500	16750	9.48
3550	16800	9.40
3600	16850	9.70
3650	16900	9.80
3700	16950	9.36
3750	17000	9.55

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @ FIXED RF=5000MHz (dB) @LO (dBm) +15
100	5100	6.66
150	5150	6.76
200	5200	6.77
250	5250	6.86
300	5300	7.02
350	5350	7.04
400	5400	7.13
450	5450	7.08
500	5500	7.15
550	5550	7.26
600	5600	7.22
650	5650	7.23
700	5700	7.31
750	5750	7.30
800	5800	7.36
850	5850	7.37
900	5900	7.36
950	5950	7.47
1000	6000	7.48
1050	6050	7.52
1100	6100	7.48
1150	6150	7.49
1200	6200	7.59
1250	6250	7.72
1300	6300	7.55
1350	6350	7.70
1400	6400	7.80
1450	6450	7.86
1500	6500	7.88
1550	6550	7.86
1600	6600	7.93
1650	6650	8.07
1700	6700	8.04
1750	6750	8.01
1800	6800	8.12
1850	6850	8.15
1900	6900	8.17
1950	6950	8.11
2000	7000	8.13
2050	7050	8.30
2100	7100	8.27
2150	7150	8.13
2200	7200	8.30
2250	7250	8.39
2300	7300	8.35
2350	7350	8.38
2400	7400	8.39
2450	7450	8.63
2500	7500	8.67
2600	7600	8.49
2700	7700	8.78
2800	7800	8.69
2900	7900	8.69
3000	8000	8.83
3100	8100	8.51
3200	8200	8.66
3300	8300	8.67
3400	8400	8.80
3500	8500	9.14
3600	8600	9.16
3700	8700	8.89
3800	8800	8.92
3900	8900	8.90
4000	9000	8.84
4100	9100	8.79
4200	9200	8.69
4300	9300	8.75
4400	9400	8.77
4500	9500	8.68
4600	9600	8.70
4700	9700	8.58
4800	9800	8.96
4900	9900	9.05
5000	10000	9.24
5100	10100	9.38

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @FIXED RF=21500MHz (dB) @LO (dBm) +15
6500	15000	17.76
6400	15100	18.13
6300	15200	18.01
6200	15300	16.81
6100	15400	17.12
6000	15500	17.05
5900	15600	15.83
5800	15700	16.02
5700	15800	15.78
5600	15900	15.11
5500	16000	14.84
5400	16100	14.70
5300	16200	14.63
5200	16300	13.71
5100	16400	13.52
5000	16500	13.99
4900	16600	12.94
4800	16700	12.76
4700	16800	13.57
4600	16900	12.38
4500	17000	12.30
4400	17100	13.05
4300	17200	12.73
4200	17300	12.28
4100	17400	12.71
4000	17500	12.80
3900	17600	12.17
3800	17700	12.41
3700	17800	13.46
3600	17900	12.77
3500	18000	12.36
3400	18100	13.85
3300	18200	12.92
3200	18300	12.25
3100	18400	13.47
3000	18500	13.05
2900	18600	12.62
2800	18700	13.19
2700	18800	13.44
2600	18900	12.52
2500	19000	12.38
2400	19100	13.04
2300	19200	12.04
2200	19300	11.66
2100	19400	12.38
2000	19500	11.43
1900	19600	10.83
1800	19700	11.45
1700	19800	11.03
1600	19900	10.39
1500	20000	10.84
1400	20100	10.53
1300	20200	10.14
1200	20300	10.14
1100	20400	10.18
1000	20500	9.91
900	20600	9.87
800	20700	10.08
700	20800	9.98
600	20900	9.95
500	21000	10.00
400	21100	10.06
300	21200	9.97
200	21300	9.81
100	21400	9.73
100	21400	9.74
90	21410	9.73
80	21420	9.76
70	21430	9.79
60	21440	9.76
50	21450	9.83
40	21460	9.84
30	21470	9.83
20	21480	9.81
10	21490	9.87

Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB) @LO (dBm)			LO-IF ISOLATION (dB) @LO (dBm)		
	+12	+15	+18	+12	+15	+18
4030.1	23.73	24.66	25.60	27.44	27.45	27.70
4430.1	23.62	25.03	26.29	27.84	27.98	28.23
4830.1	25.62	27.11	28.03	28.60	28.35	28.26
5030.1	27.42	29.14	30.21	30.10	29.50	29.23
5530.1	33.34	34.55	35.06	32.61	31.42	30.80
6030.1	41.82	39.86	38.70	38.53	35.48	33.88
6530.1	38.55	39.02	40.50	44.48	40.18	37.76
7030.1	35.48	36.05	36.91	46.28	45.62	42.05
7530.1	34.18	33.87	33.96	37.27	43.50	46.56
8030.1	33.30	33.75	33.88	35.50	41.25	43.50
8530.1	32.70	34.84	34.86	36.59	40.77	42.91
9030.1	32.94	34.33	34.08	38.17	40.33	41.27
9530.1	33.28	35.61	35.82	38.13	40.07	41.19
10030.1	33.42	34.87	33.64	38.85	41.02	42.26
10530.1	33.07	33.26	32.27	38.19	39.29	40.37
11030.1	31.29	30.98	30.55	35.90	37.18	38.14
11530.1	29.14	28.94	28.57	33.22	33.96	34.56
12030.1	25.79	25.57	25.30	26.21	26.86	27.20
12530.1	35.26	31.45	29.81	32.11	32.57	32.75
13030.1	28.02	26.74	26.70	41.04	41.57	41.69
13530.1	24.02	24.13	24.78	48.86	50.39	50.84
14030.1	26.80	25.63	24.95	55.19	54.46	53.84
14530.1	30.15	28.71	27.03	57.69	55.03	51.67
15030.1	29.61	29.61	28.76	52.83	51.98	49.93
15530.1	26.61	27.02	27.10	47.13	46.64	45.71
16030.1	25.29	24.89	24.21	42.73	41.61	40.61
16530.1	23.89	23.99	23.82	40.52	39.90	39.28
17030.1	23.15	23.42	23.53	39.29	38.76	38.35
17530.1	22.90	22.74	22.62	38.02	37.38	36.95
18030.1	22.47	22.13	21.86	37.32	36.73	36.24
18530.1	21.65	21.11	20.70	36.23	35.58	35.11
19030.1	19.61	19.46	19.21	34.79	34.57	34.25
19530.1	20.35	20.31	20.30	36.35	36.25	36.20
19830.1	20.79	20.21	19.82	37.42	36.90	36.49
20030.1	21.03	20.32	19.99	37.71	37.23	36.99
20530.1	18.73	18.79	18.52	36.90	37.24	37.04
21030.1	20.08	20.66	21.02	39.04	39.86	40.33
21530.1	22.19	22.71	22.98	39.07	39.60	39.97
21830.1	23.59	23.84	24.60	37.86	38.14	38.71

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB) @LO (dBm)		
		+12	+15	+18
4000.1	4030.1	9.15	8.43	7.86
4400.1	4430.1	9.02	8.26	7.82
4800.1	4830.1	9.98	9.44	9.16
5000.1	5030.1	10.96	10.46	10.16
5500.1	5530.1	11.16	10.63	10.36
6000.1	6030.1	11.54	11.14	10.90
6500.1	6530.1	11.98	11.96	11.87
7000.1	7030.1	12.09	12.03	12.04
7500.1	7530.1	13.26	13.05	12.94
8000.1	8030.1	12.69	12.80	12.89
8500.1	8530.1	13.32	13.59	13.77
9000.1	9030.1	14.21	14.38	14.53
9500.1	9530.1	14.70	15.23	15.59
10000.1	10030.1	16.94	17.25	17.30
10500.1	10530.1	17.70	17.88	18.06
11000.1	11030.1	19.33	19.59	19.76
11500.1	11530.1	21.88	21.92	22.04
12000.1	12030.1	22.16	22.37	22.58
12500.1	12530.1	15.26	15.60	15.87
13000.1	13030.1	16.91	17.29	17.59
13500.1	13530.1	18.04	18.36	18.57
14000.1	14030.1	19.26	19.38	19.43
14500.1	14530.1	19.44	19.48	19.56
15000.1	15030.1	19.61	19.72	19.79
15500.1	15530.1	20.31	20.05	19.98
16000.1	16030.1	20.98	20.85	20.73
16500.1	16530.1	22.65	22.26	21.99
17000.1	17030.1	23.23	22.51	22.08
17500.1	17530.1	22.75	22.06	21.53
18000.1	18030.1	21.95	21.29	20.74
18500.1	18530.1	20.98	20.49	20.05
19000.1	19030.1	20.42	19.98	19.61
19500.1	19530.1	19.86	19.45	19.16
19800.1	19830.1	20.03	19.52	19.17
20000.1	20030.1	19.71	19.33	19.10
20500.1	20530.1	18.39	18.29	18.19
21000.1	21030.1	18.17	18.33	18.39
21500.1	21530.1	17.14	17.74	17.93
21800.1	21830.1	17.72	18.19	18.40

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1) @LO (dBm)		
		+12	+15	+18
4000.1	4030.1	3.25	3.09	2.85
4400.1	4430.1	2.26	2.31	2.17
4800.1	4830.1	1.54	1.55	1.53
5000.1	5030.1	1.31	1.30	1.29
5500.1	5530.1	1.12	1.21	1.25
6000.1	6030.1	1.57	1.68	1.72
6500.1	6530.1	2.15	2.37	2.23
7000.1	7030.1	2.33	2.47	2.38
7500.1	7530.1	3.19	3.37	3.14
8000.1	8030.1	7.42	15.00	10.34
8500.1	8530.1	5.52	6.79	5.72
9000.1	9030.1	3.81	4.40	4.05
9500.1	9530.1	4.50	4.45	3.73
10000.1	10030.1	4.37	4.09	3.40
10500.1	10530.1	5.18	6.14	5.21
11000.1	11030.1	11.56	11.41	8.62
11500.1	11530.1	4.12	5.00	3.92
12000.1	12030.1	2.46	2.41	2.28
12500.1	12530.1	2.83	2.58	2.36
13000.1	13030.1	2.61	2.44	2.36
13500.1	13530.1	2.22	2.12	2.13
14000.1	14030.1	2.22	2.30	2.33
14500.1	14530.1	2.21	2.57	2.70
15000.1	15030.1	2.05	2.32	2.40
15500.1	15530.1	1.55	1.73	1.83
16000.1	16030.1	1.30	1.43	1.49
16500.1	16530.1	2.05	2.20	2.10
17000.1	17030.1	2.69	2.78	2.72
17500.1	17530.1	2.95	3.02	2.92
18000.1	18030.1	3.21	3.43	3.18
18500.1	18530.1	2.49	2.51	2.47
19000.1	19030.1	2.77	2.65	2.50
19500.1	19530.1	3.40	3.25	2.85
19800.1	19830.1	2.21	2.02	1.88
20000.1	20030.1	2.12	1.98	1.86
20500.1	20530.1	1.89	1.78	1.73
21000.1	21030.1	1.85	1.72	1.63
21500.1	21530.1	1.28	1.16	1.17
21800.1	21830.1	1.69	1.69	1.76

LO (MHz)	LO VSWR (:1) @LO (dBm)		
	+12	+15	+18
4030.1	3.91	3.59	3.75
4430.1	3.30	3.34	3.81
4830.1	2.26	2.59	2.98
5030.1	2.27	2.81	3.38
5530.1	2.74	3.84	5.13
6030.1	2.49	3.15	3.97
6530.1	2.12	2.40	2.80
7030.1	2.50	2.61	2.93
7530.1	3.88	3.22	3.26
8030.1	5.68	4.76	4.57
8530.1	6.25	4.65	4.12
9030.1	5.21	3.54	2.88
9530.1	3.83	2.57	1.94
10030.1	4.83	2.99	2.20
10530.1	5.33	3.55	2.49
11030.1	4.99	3.09	2.30
11530.1	3.63	2.59	2.07
12030.1	2.79	2.31	2.24
12530.1	2.74	2.21	2.15
13030.1	2.20	2.08	2.17
13530.1	1.95	2.02	2.27
14030.1	1.76	2.22	2.71
14530.1	1.82	2.38	2.98
15030.1	1.68	2.11	2.49
15530.1	1.67	2.13	2.60
16030.1	2.23	2.95	4.20
16530.1	2.46	2.57	2.94
17030.1	2.46	2.39	2.51
17530.1	2.98	2.89	3.05
18030.1	3.64	3.49	3.65
18530.1	2.99	2.77	2.78
19030.1	1.93	1.65	1.57
19530.1	2.02	1.61	1.50
19830.1	1.75	1.49	1.51
20030.1	2.24	1.87	1.90
20530.1	1.85	1.69	1.72
21030.1	1.64	1.57	1.62
21530.1	2.92	2.99	3.36
21830.1	4.01	3.87	3.86

IF (OUT) (MHz)	IF VSWR @LO=21500.1MHz (:1) @LO (dBm)		
	+12	+15	+18
10.1	3.61	1.91	1.47
20.1	3.69	1.92	1.48
30.1	3.73	1.93	1.48
40.1	3.76	1.94	1.48
50.1	3.78	1.94	1.48
60.1	3.77	1.93	1.48
70.1	3.64	1.92	1.48
80.1	3.56	1.90	1.47
90.1	3.50	1.89	1.47
100.1	3.52	1.89	1.47
200.1	3.74	1.93	1.48
300.1	3.45	1.87	1.47
400.1	3.47	1.87	1.48
500.1	3.33	1.85	1.48
600.1	3.28	1.85	1.49
700.1	3.13	1.83	1.50
800.1	3.16	1.86	1.55
900.1	3.27	1.93	1.62
1000.1	3.51	2.06	1.73
1100.1	3.74	2.17	1.82
1200.1	3.81	2.29	1.93
1300.1	3.78	2.34	1.98
1400.1	4.03	2.46	2.07
1500.1	3.93	2.49	2.08
2000.1	4.63	3.20	2.76
2500.1	4.33	2.93	2.55
3000.1	5.77	3.72	3.15
3500.1	6.76	4.59	3.79
4000.1	4.73	3.83	3.27
4500.1	5.90	4.42	3.57
4600.1	6.15	4.61	3.71
5000.1	12.21	7.48	5.77
5400.1	9.06	7.54	6.50
5500.1	6.81	5.92	5.31
5600.1	6.83	5.78	5.16
5700.1	7.44	5.96	5.38
5800.1	8.16	6.30	5.67
5900.1	8.08	6.18	5.65
6000.1	5.24	4.53	4.33

Harmonics Tables

RF CAL

Notes: 1. All Harmonics are relative to IF OUTPUT (dBm)
2. + entry denotes harmonics above IF OUTPUT (dBm)

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	---	-	(-dBc)	30.22	16.81	---	---	---	---	---	---	---
1	---	10.43	-	41.26	54.16	38.02	---	---	---	---	---	---
2	81.68	62.18	68.61	41.42	69.55	70.26	47.69	---	---	---	---	---
3	75.26	76.68	78.19	65.73	44.48	67.11	81.33	67.42	---	---	---	---
4	---	---	75.05	83.02	81.36	61.71	84.68	81.50	69.98	---	---	---
5	---	---	---	76.48	83.55	86.49	67.55	88.86	81.56	75.76	---	---
6	---	---	---	---	75.67	81.61	87.28	76.80	88.12	81.68	4.27	---
7	---	---	---	---	---	76.51	83.94	88.19	83.66	90.05	82.53	3.97
8	---	---	---	---	---	---	76.81	81.90	88.39	88.66	87.42	84.02
9	---	---	---	---	---	---	---	75.12	82.83	87.37	94.93	87.18
10	---	---	---	---	---	---	---	---	75.67	84.70	87.20	96.96
		0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 13250.1 MHz; 0.00 dBm.
LO IN: 13280.1 MHz; +15.00 dBm
IF OUT: 30.00 MHz; -7.42 dBm

RF CAL

Notes: 1. All Harmonics are relative to IF OUTPUT (dBm)
2. + entry denotes harmonics above IF OUTPUT (dBm)

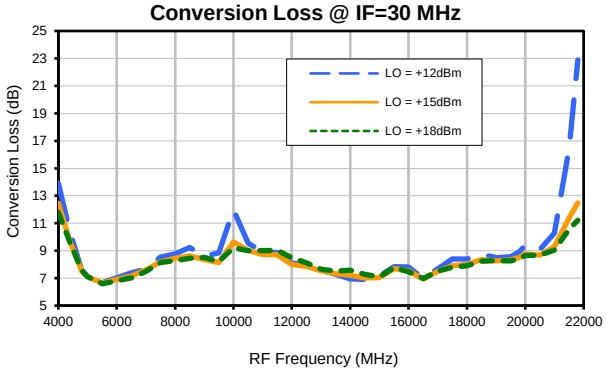
RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	---	-	33.20	39.47	29.52	---	---	---	---	---	---	---
1	---	9.62	-	36.74	55.22	40.99	---	---	---	---	---	---
2	75.43	53.63	65.96	46.40	60.27	65.98	45.78	---	---	---	---	---
3	68.02	63.92	76.39	51.11	27.32	57.87	67.33	54.35	---	---	---	---
4	---	---	70.18	66.96	76.51	52.66	71.22	72.50	54.48	---	---	---
5	---	---	---	74.32	70.69	63.65	43.11	64.31	75.69	66.61	---	---
6	---	---	---	---	73.63	76.34	77.38	61.05	82.10	76.54	-8.66	---
7	---	---	---	---	---	77.30	76.69	75.26	53.68	75.39	77.42	2.50
8	---	---	---	---	---	---	75.97	84.37	80.06	71.38	83.65	81.67
9	---	---	---	---	---	---	---	79.37	82.40	84.85	60.92	83.25
10	---	---	---	---	---	---	---	---	77.21	82.45	87.12	78.01
		0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

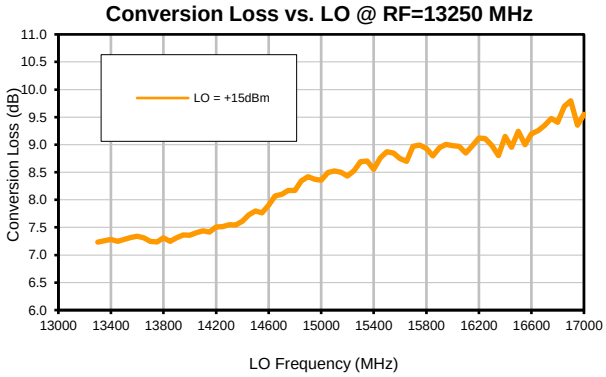
Test conditions: RF IN: 13250.1 MHz; +10.00 dBm.
LO IN: 13280.1 MHz; +15.00 dBm
IF OUT: 30.00 MHz; +2.01 dBm

Typical Performance Curves

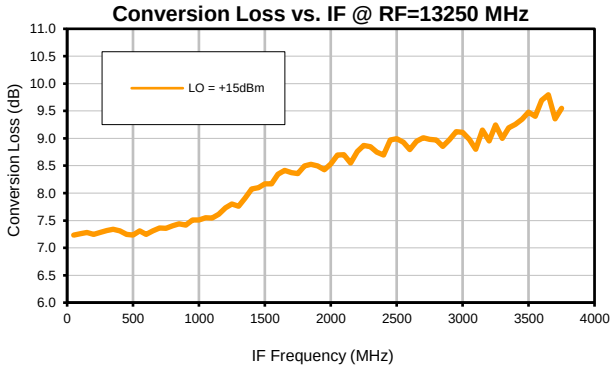
Conversion Loss @ IF=30 MHz



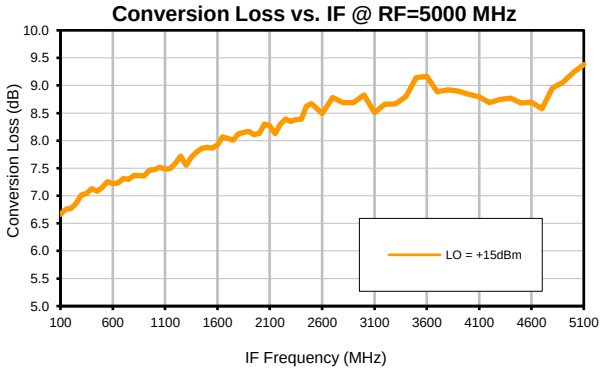
Conversion Loss vs. LO @ RF=13250 MHz



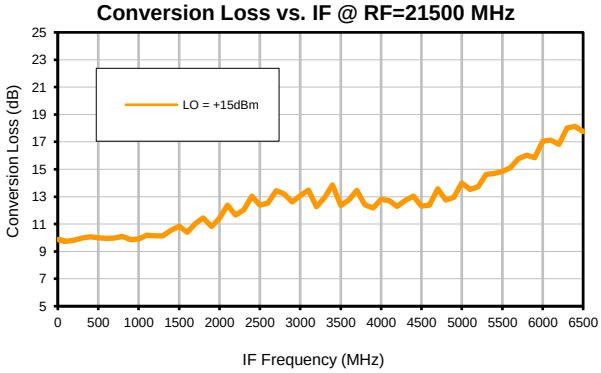
Conversion Loss vs. IF @ RF=13250 MHz



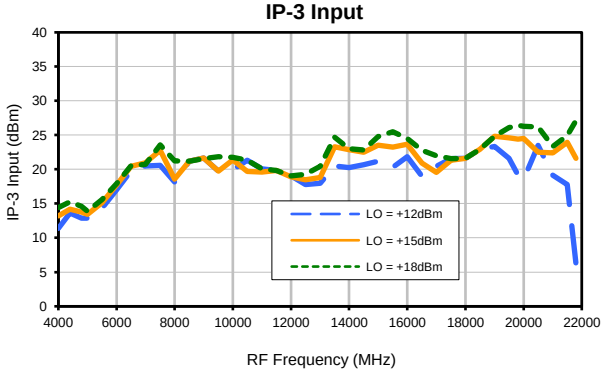
Conversion Loss vs. IF @ RF=5000 MHz



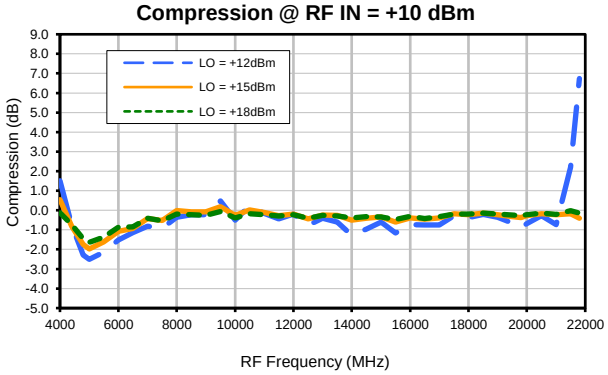
Conversion Loss vs. IF @ RF=21500 MHz



IP-3 Input

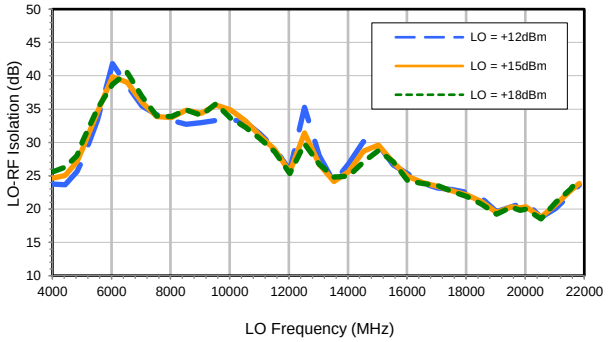


Compression @ RF IN = +10 dBm

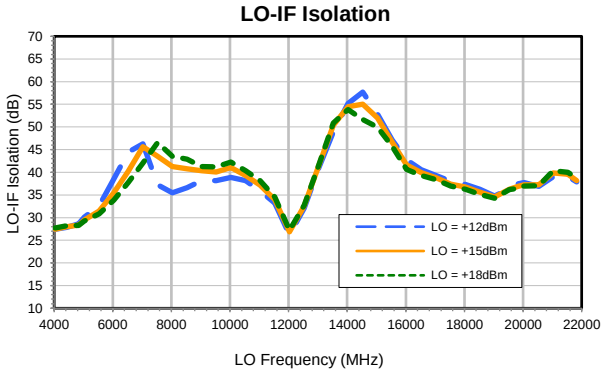


Typical Performance Curves

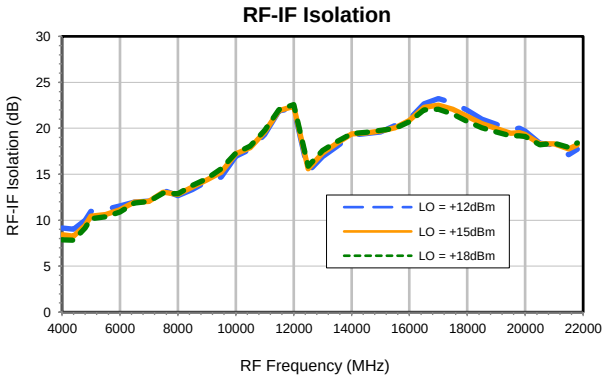
LO-RF Isolation



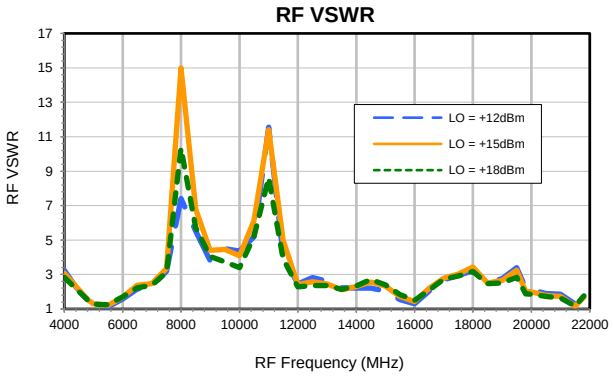
LO-IF Isolation



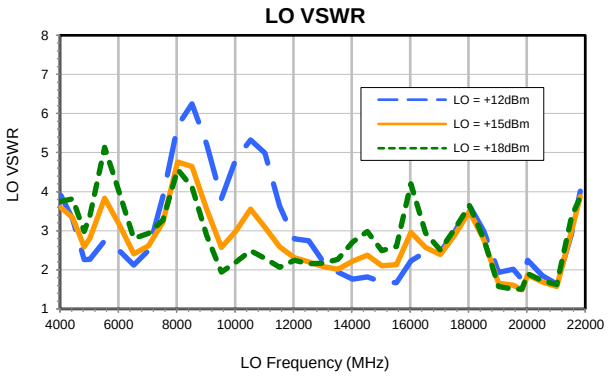
RF-IF Isolation



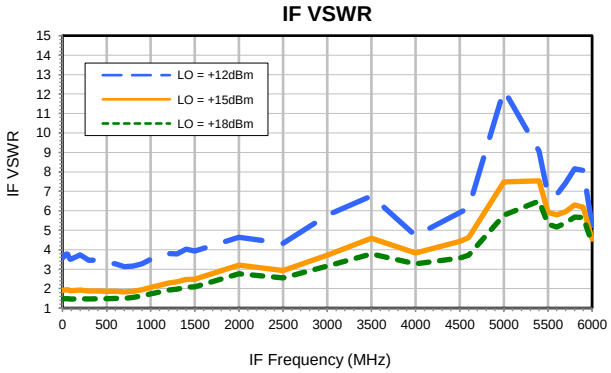
RF VSWR



LO VSWR



IF VSWR



Harmonics Tables

RF CAL

Notes: 1. All Harmonics are relative to IF OUTPUT (dBm)
2. + entry denotes harmonics above IF OUTPUT (dBm)

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	---	-	(-dBc)	30.22	16.81	---	---	---	---	---	---	---
1	---	10.43	-	41.26	54.16	38.02	---	---	---	---	---	---
2	81.68	62.18	68.61	41.42	69.55	70.26	47.69	---	---	---	---	---
3	75.26	76.68	78.19	65.73	44.48	67.11	81.33	67.42	---	---	---	---
4	---	---	75.05	83.02	81.36	61.71	84.68	81.50	69.98	---	---	---
5	---	---	---	76.48	83.55	86.49	67.55	88.86	81.56	75.76	---	---
6	---	---	---	---	75.67	81.61	87.28	76.80	88.12	81.68	4.27	---
7	---	---	---	---	---	76.51	83.94	88.19	83.66	90.05	82.53	3.97
8	---	---	---	---	---	---	76.81	81.90	88.39	88.66	87.42	84.02
9	---	---	---	---	---	---	---	75.12	82.83	87.37	94.93	87.18
10	---	---	---	---	---	---	---	---	75.67	84.70	87.20	96.96
		0	1	2	3	4	5	6	7	8	9	10

LO HARMONICS ORDER

Test conditions: RF IN: 13250.1 MHz; 0.00 dBm.
LO IN: 13280.1 MHz; +15.00 dBm
IF OUT: 30.00 MHz; -7.42 dBm

RF CAL

Notes: 1. All Harmonics are relative to IF OUTPUT (dBm)
2. + entry denotes harmonics above IF OUTPUT (dBm)

RF HARMONICS ORDER	(-dBm)	(-dBc)										
0	---	-	33.20	39.47	29.52	---	---	---	---	---	---	---
1	---	9.62	-	36.74	55.22	40.99	---	---	---	---	---	---
2	75.43	53.63	65.96	46.40	60.27	65.98	45.78	---	---	---	---	---
3	68.02	63.92	76.39	51.11	27.32	57.87	67.33	54.35	---	---	---	---
4	---	---	70.18	66.96	76.51	52.66	71.22	72.50	54.48	---	---	---
5	---	---	---	74.32	70.69	63.65	43.11	64.31	75.69	66.61	---	---
6	---	---	---	---	73.63	76.34	77.38	61.05	82.10	76.54	-8.66	---
7	---	---	---	---	---	77.30	76.69	75.26	53.68	75.39	77.42	2.50
8	---	---	---	---	---	---	75.97	84.37	80.06	71.38	83.65	81.67
9	---	---	---	---	---	---	---	79.37	82.40	84.85	60.92	83.25
10	---	---	---	---	---	---	---	---	77.21	82.45	87.12	78.01
		0	1	2	3	4	5	6	7	8	9	10

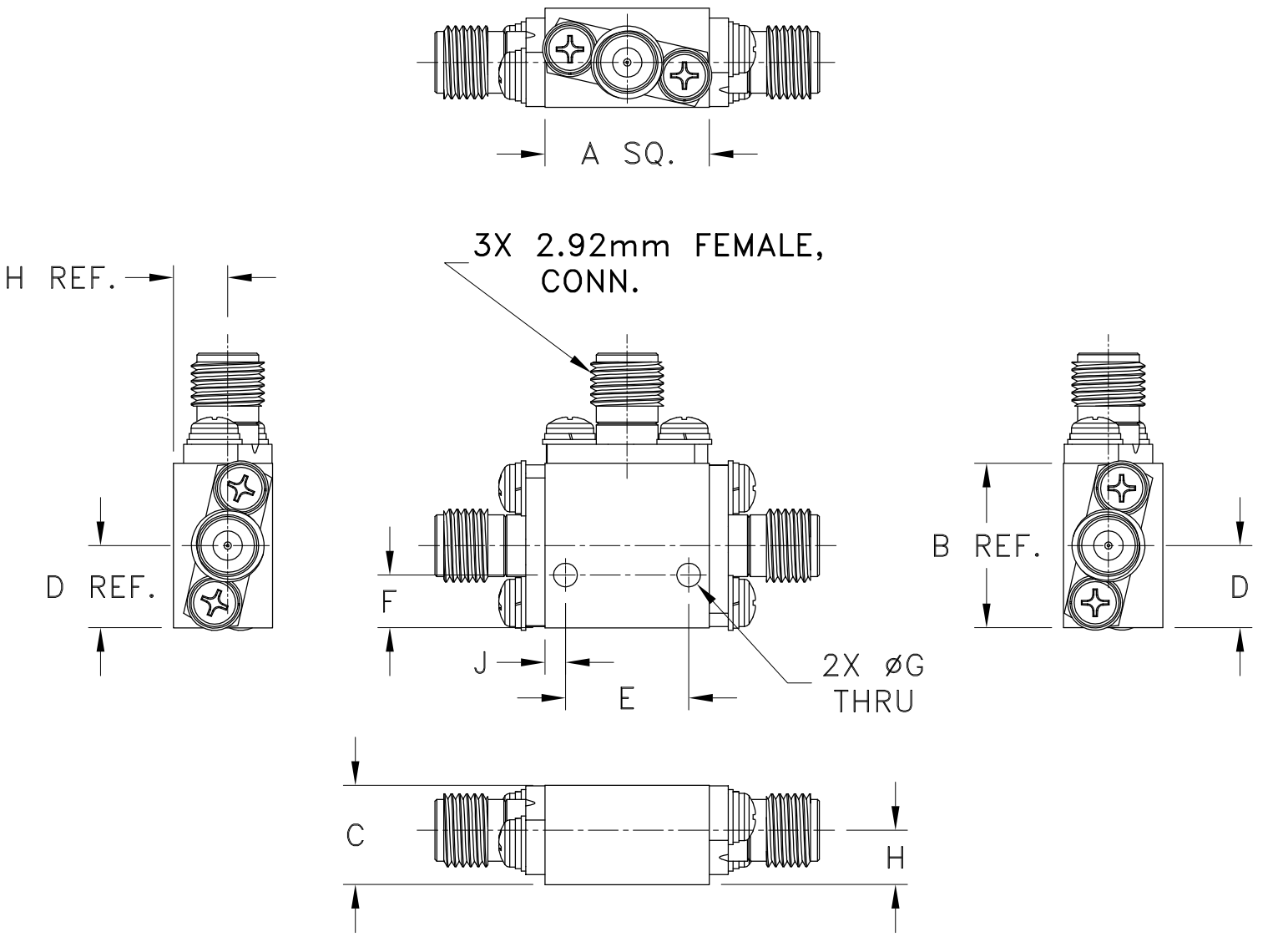
LO HARMONICS ORDER

Test conditions: RF IN: 13250.1 MHz; +10.00 dBm.
LO IN: 13280.1 MHz; +15.00 dBm
IF OUT: 30.00 MHz; +2.01 dBm

Case Style UK

Outline Dimensions

UK2938



CASE#	A	B	C	D	E	F	G	H	J	WT. GRAMS
UK2938	.56 (14.2)	.56 (14.2)	.34 (8.6)	.28 (7.1)	.420 (10.67)	.18 (4.6)	.081 (2.06)	.19 (4.7)	.07 (1.8)	23.0

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

Notes:

1. Case material: Brass.
2. Case Finish: Gold plate.

Mini-Circuits

Environmental Specifications ENV97

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 100°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Thermal Shock	-55° to 85°C, 25 cycles	MIL-STD-202F: Method 107G