

50Ω

20 to 23 MHz

Maximum Ratings

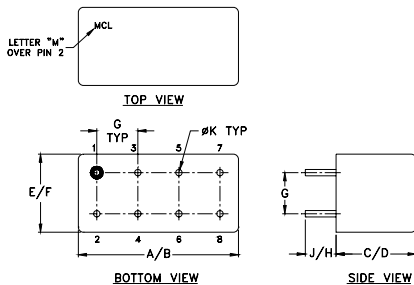
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
LO Power	50mW
I&Q Current	40mA

Pin Connections

LO (carrier)	1
RF (signal)	8
I (0°)(ref.)	7
Q (90°)*	4
NOT USED	2
GROUND	3,5,6
CASE GROUND	3,5,6

* Q = I + 90° for lower sideband suppression

Outline Drawing



Outline Dimensions (inch mm)

A	B	C	D	E	F
.770	.800	.285	.310	.370	.400
19.56	20.32	7.24	7.87	9.40	10.16
G	H	J	K		wt
.200	.20	.14	.031		grams
5.08	5.08	3.56	0.79		5.2

Features

- hermetically sealed metal case
- excellent 3rd and 5th order harmonic
- good carrier and sideband rejections

Applications

- radar
- communication system
- military, hi-rel application

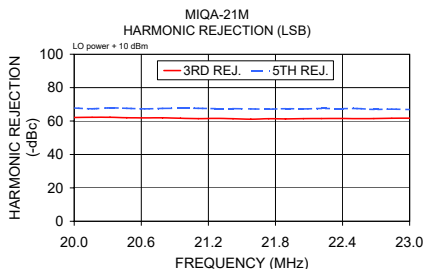
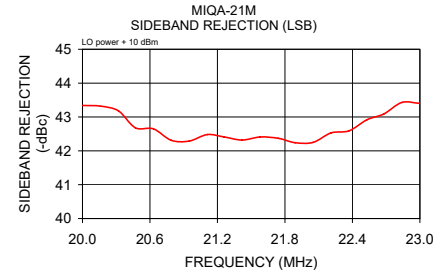
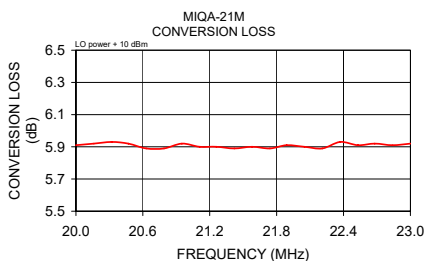
Modulator Electrical Specifications

FREQUENCY (MHz)				CONVERSION LOSS (dB)			CARRIER REJECTION (-dBc)		SIDE BAND REJECTION (-dBc)		HARMONIC SUPPRESSION (-dBc)			
RF (SIGNAL/ LO (CARRIER)		I&Q		$\bar{x}$	σ	Max.	Typ.		Typ.	Min.	3XI/Q		5XI/Q	
fL	fU	Min.	Max.								Typ.	Min.	Typ.	Min.
20	23	DC	3	6.2	0.14	7.0	50	40	40	30	48	40	65	55

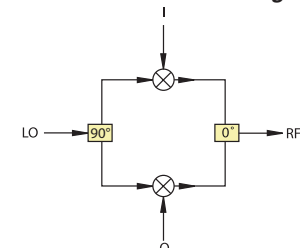
Operating LO power: 10±1dBm
 1dB Compression: 0dBm typical
 Conversion Loss: (I & Q) power, dBm - RF power, dBm
 Carrier and sideband rejections measured at -5dBm I/Q power.

Typical Performance Data

Carrier Freq. (MHz)	Conversion Loss $\bar{x}$ (dB)	σ (dB)	Sideband Rejection(x) LSB (-dBc)	USB (-dBc)	Carrier Rejection(x) LSB (-dBc)	USB (-dBc)	3rd. Harmonic Suppression (x) LSB (-dBc)	USB (-dBc)	5th. Harmonic Suppression (x) LSB (-dBc)	USB (-dBc)	DC Offset (x) (mV)
20.00	5.91	0.04	43.34	42.73	55.61	54.19	62.14	49.79	67.81	71.33	-0.21
20.16	5.92	0.04	43.32	42.65	55.18	54.49	62.28	49.76	67.35	71.99	-0.21
20.32	5.93	0.03	43.18	42.53	55.38	54.26	62.25	49.79	67.92	71.76	-0.21
20.47	5.92	0.03	42.68	43.11	55.35	55.03	62.01	50.37	67.65	72.60	-0.21
20.63	5.89	0.05	42.65	42.89	55.38	55.12	61.88	50.49	67.34	72.25	-0.21
20.79	5.89	0.04	42.31	42.86	54.99	54.89	61.93	50.56	67.59	71.96	-0.21
20.95	5.92	0.04	42.29	42.85	55.08	54.92	61.68	50.58	67.68	72.38	-0.21
21.11	5.90	0.05	42.48	42.85	55.15	54.91	61.45	50.61	67.65	72.48	-0.21
21.26	5.90	0.04	42.41	42.78	55.28	54.78	61.58	50.68	67.48	72.48	-0.21
21.42	5.89	0.04	42.32	42.93	55.24	54.67	61.41	50.67	67.44	71.97	-0.21
21.58	5.90	0.04	42.41	43.07	55.07	54.83	61.10	50.73	67.27	71.89	-0.20
21.74	5.89	0.04	42.37	43.50	54.99	54.70	61.42	50.80	67.16	72.34	-0.20
21.89	5.91	0.04	42.24	43.40	54.99	54.66	61.29	50.80	67.42	72.13	-0.20
22.05	5.90	0.04	42.25	43.58	54.97	54.70	61.43	50.83	67.27	72.27	-0.20
22.21	5.89	0.05	42.53	43.55	55.10	54.72	61.50	50.85	67.56	72.35	-0.20
22.37	5.93	0.05	42.59	44.03	54.69	54.71	61.52	50.88	67.45	72.08	-0.20
22.53	5.91	0.06	42.92	44.40	54.81	54.77	61.45	50.90	67.51	72.23	-0.20
22.68	5.92	0.05	43.09	44.65	54.91	54.67	61.51	50.90	66.98	72.20	-0.20
22.84	5.91	0.05	43.43	45.19	54.68	54.50	61.68	50.80	67.14	72.36	-0.20
23.00	5.92	0.06	43.40	45.23	54.83	54.26	61.73	50.82	66.93	72.22	-0.20



I&Q modulation block diagram



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

MIQA-21M+



Generic photo used for illustration purposes only

CASE STYLE: A06

+RoHS Compliant

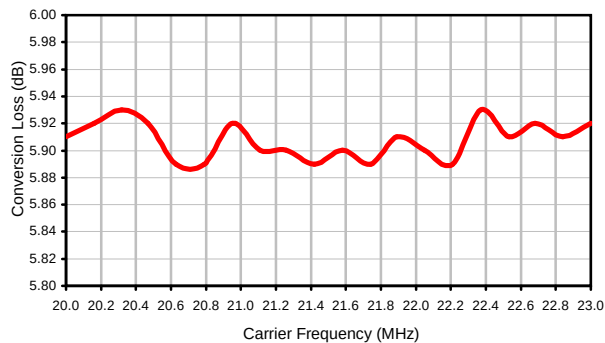
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Typical Performance Data

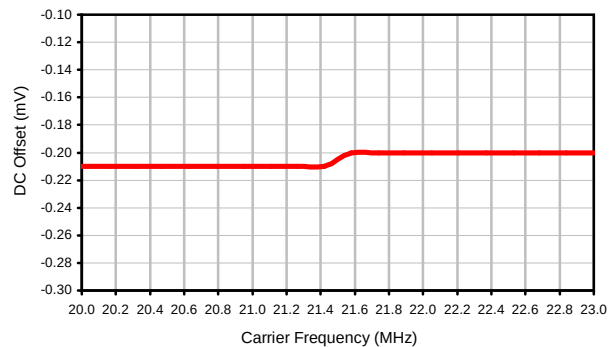
CARRIER FREQ.	CONVERSION LOSS	SIDE BAND REJECTION		CARRIER REJECTION		3rd HARMONIC SUPPRESSION		5th HARMONIC SUPPRESSION		DC OFFSET
		LSB	USB	LSB	USB	LSB	USB	LSB	USB	
(MHz)	(dB)	(-dBc)	(-dBc)	(-dBc)	(-dBc)	(-dBc)	(-dBc)	(-dBc)	(-dBc)	(mV)
20.00	5.91	43.34	42.73	55.61	54.19	62.14	49.79	67.81	71.33	-0.21
20.16	5.92	43.32	42.65	55.18	54.49	62.28	49.76	67.35	71.99	-0.21
20.32	5.93	43.18	42.53	55.38	54.26	62.25	49.79	67.92	71.76	-0.21
20.47	5.92	42.68	43.11	55.35	55.03	62.01	50.37	67.65	72.60	-0.21
20.63	5.89	42.65	42.89	55.38	55.12	61.88	50.49	67.34	72.25	-0.21
20.79	5.89	42.31	42.86	54.99	54.89	61.93	50.56	67.59	71.96	-0.21
20.95	5.92	42.29	42.85	55.08	54.92	61.68	50.58	67.68	72.38	-0.21
21.11	5.90	42.48	42.85	55.15	54.91	61.45	50.61	67.65	72.48	-0.21
21.26	5.90	42.41	42.78	55.28	54.78	61.58	50.68	67.48	72.48	-0.21
21.42	5.89	42.32	42.93	55.24	54.67	61.41	50.67	67.44	71.97	-0.21
21.58	5.90	42.41	43.07	55.07	54.83	61.10	50.73	67.27	71.89	-0.20
21.74	5.89	42.37	43.50	54.99	54.70	61.42	50.80	67.16	72.34	-0.20
21.89	5.91	42.24	43.40	54.99	54.66	61.29	50.80	67.42	72.13	-0.20
22.05	5.90	42.25	43.58	54.97	54.70	61.43	50.83	67.27	72.27	-0.20
22.21	5.89	42.53	43.55	55.10	54.72	61.50	50.85	67.56	72.35	-0.20
22.37	5.93	42.59	44.03	54.69	54.71	61.52	50.88	67.45	72.08	-0.20
22.53	5.91	42.92	44.40	54.81	54.77	61.45	50.90	67.51	72.23	-0.20
22.68	5.92	43.09	44.65	54.91	54.67	61.51	50.90	66.98	72.20	-0.20
22.84	5.91	43.43	45.19	54.68	54.50	61.68	50.80	67.14	72.36	-0.20
23.00	5.92	43.40	45.23	54.83	54.26	61.73	50.82	66.93	72.22	-0.20

Typical Performance Curves

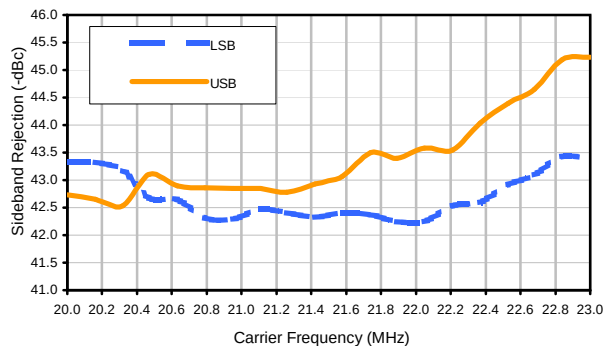
Conversion Loss



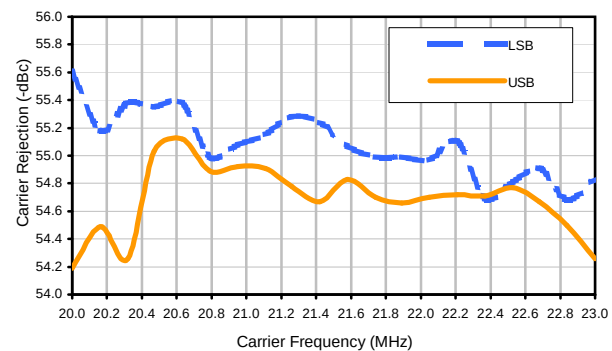
DC Offset



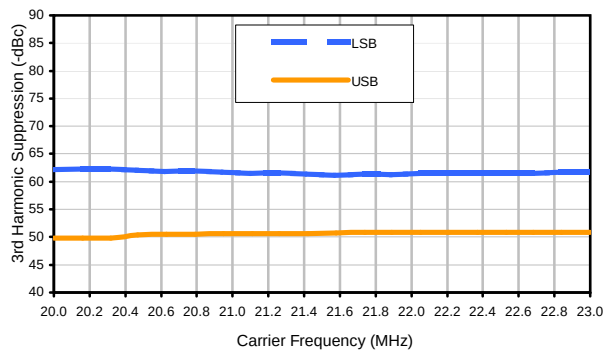
Sideband Rejection



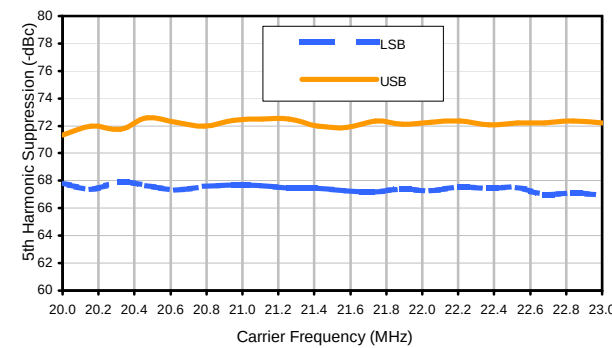
Carrier Rejection



3rd Harmonic Suppression

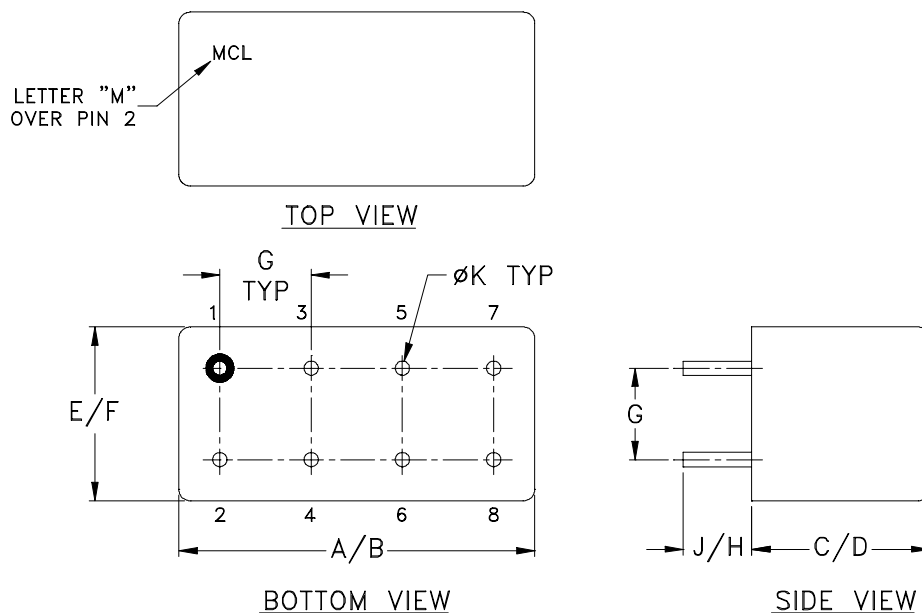


5th Harmonic Suppression



A01
A04
A05
A06

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT, GRAM
A01	.770 (19.56)	.800 (20.32)	.385 (9.78)	.400 (10.16)	.370 (9.40)	.400 (10.16)	.200 (5.08)	.20 (5.08)	.14 (3.56)	.031 (.79)	5.2
A04			.200 (5.08)	.210 (5.33)							3.7
A05			.240 (6.10)	.250 (6.35)							3.7
A06			.285 (7.24)	.310 (7.87)							5.2

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

Notes:

- Header material: C.R.S.
Pin material: #52 alloy.
Cover material: Cupro-Nickel.
- Pin finish: Electro Tin-Silver.
- Insulated spacer available. Request P/N B14-045-01.
- Tolerance on pin diameter $\pm .005$ inch.
- Glass meniscus 0.015 inch max.
- Blue bead indicates Pin 1. Pin numbers do not appear on unit, for reference only.



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Mini-Circuits ISO 9001 & ISO 14001 Certified



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 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
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
Moisture Resistance	10 cycles, 24 hours per cycle	MIL-STD-202, Method 106, Condition A, except 50°C and end point electrical test done within 12 hours
Solderability	10X Magnification	J-STD-002, 95% Coverage
Resistance to Solder Heat	260°C for 10 seconds	MIL-STD-202, Method 210, Condition B
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
Terminal Strength	4 1/2 Pound Pull	MIL-STD-202, Method 211, Condition A



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
Gross Leak	125°C Bubble Test	MIL-STD-202, Method 112, Condition D
Barometric Pressure	100,000 Feet	MIL-STD-202, Method 105, Condition D