

Surface Mount

I&Q Modulator

50Ω

104 to 176 MHz

JCIQ-176M+

JCIQ-176M



Maximum Ratings

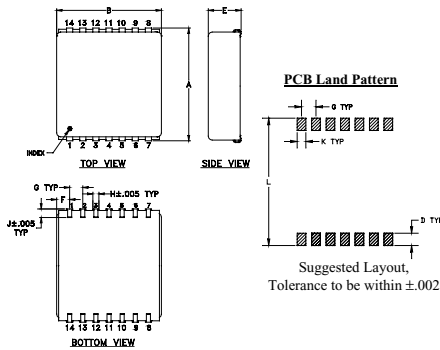
Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
LO Power	50mW
I&Q current	40mA

Pin Connections

LO (carrier)	2
RF (signal)	9
I (0°)(ref.)	4
Q (90°)*	11
GROUND	1,3,5,6,7,8,10,12,13,14

* Q = I + 90° for lower sideband suppression

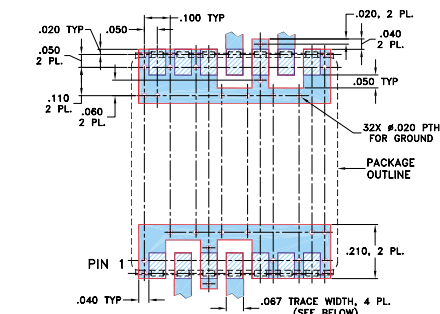
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.870	.800	--	.100	.250	.100	.100
22.10	20.32	--	2.54	6.35	2.54	2.54
H	J	K	L		wt	
.047	.065	.065	.890		grams	
1.19	1.65	1.65	22.61		4.0	

Demo Board MCL P/N: TB-21 Suggested PCB Layout (PL-209)



- NOTE:
- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - 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

Features

- shielded metal case with J-leads
- excellent 3rd and 5th order harmonic suppression
- good carrier and sideband rejection
- aqueous washable

Applications

- communications systems

CASE STYLE: BG291
PRICE: \$54.95 ea. QTY (1-9)

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

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

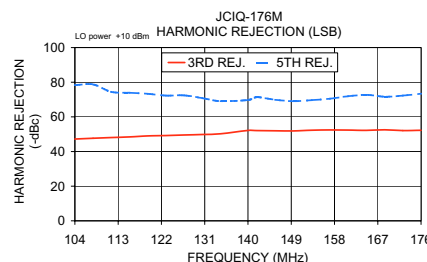
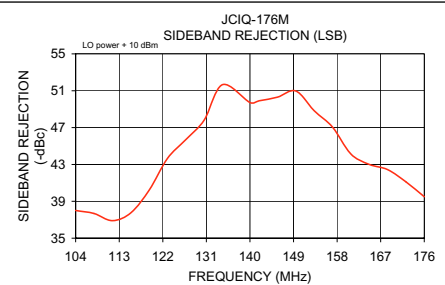
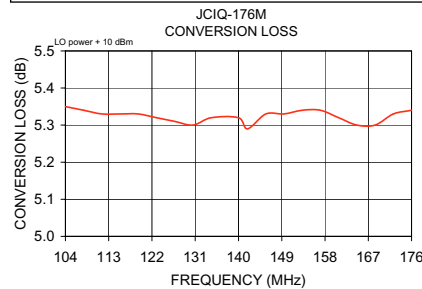
Modulator Electrical Specifications

FREQUENCY (MHz)				CONVERSION LOSS (dB)			CARRIER REJECTION (-dBc)		SIDE BAND REJECTION (-dBc)		HARMONIC SUPPRESSION (-dBc)			
RF (SIGNAL) LO (CARRIER)				I&Q							3X I/Q			
f _L	f _U	Min.	Max.	$\bar{x}$	σ	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
104	176	DC	5	5.6	0.1	7.0	35	30	35	30	45	35	65	50

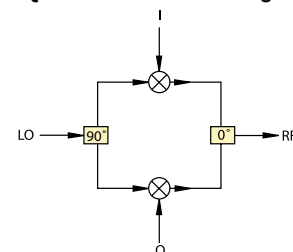
1. Operating LO power: 10±1dBm
2. 1dB Compression: 0dBm typical
3. Conversion Loss: (I & Q) power, dBm - RF power, dBm
4. Carrier and sideband rejections measured at -5dBm I/Q power.

Typical Performance Data

Carrier Freq. (MHz)	Conversion Loss		Sideband Rejection (x)		Carrier Rejection (x)		3rd Harmonic Suppression (x)		5th Harmonic Suppression (x)		DC Offset (mV)
	$\bar{x}$ (dB)	σ (dB)	LSB (-dBc)	USB (-dBc)	LSB (-dBc)	USB (-dBc)	LSB (-dBc)	USB (-dBc)	LSB (-dBc)	USB (-dBc)	
104.00	5.35	0.03	38.01	39.57	39.43	39.44	47.21	54.01	78.31	66.20	-0.13
107.79	5.34	0.06	37.68	39.13	39.25	39.27	47.65	53.60	78.75	66.59	-0.12
111.58	5.33	0.06	36.90	37.99	39.07	39.09	48.06	53.94	74.43	66.47	-0.11
115.37	5.33	0.06	37.74	38.67	38.86	38.87	48.44	54.08	73.94	66.95	-0.11
119.16	5.33	0.06	40.20	40.80	38.56	38.57	49.02	55.33	73.32	66.99	-0.11
122.95	5.32	0.07	43.65	43.66	38.30	38.39	49.21	56.84	72.28	67.13	-0.10
126.74	5.31	0.05	45.69	45.11	38.08	38.12	49.54	58.78	72.41	67.31	0.13
130.53	5.30	0.08	47.80	46.70	37.87	37.96	49.82	60.28	70.82	66.62	-0.13
134.32	5.32	0.07	51.66	51.65	37.70	37.78	50.26	61.03	69.09	66.73	-0.12
140.00	5.32	0.06	49.72	48.38	37.39	37.39	52.16	57.69	69.73	67.86	-0.11
141.89	5.29	0.07	49.91	48.01	37.30	37.32	52.10	57.53	71.40	66.80	-0.11
145.68	5.33	0.06	50.30	48.52	37.10	37.15	51.99	58.01	69.86	66.11	-0.10
149.47	5.33	0.07	50.97	45.73	37.13	37.00	51.89	58.50	69.06	65.53	-0.09
153.26	5.34	0.07	48.83	45.05	36.79	36.70	52.28	59.65	69.67	64.62	-0.10
157.05	5.34	0.05	47.06	46.56	36.56	36.64	52.45	60.22	70.48	64.39	0.09
160.84	5.32	0.05	44.14	44.76	36.39	36.45	52.40	60.72	71.94	64.02	-0.08
164.63	5.30	0.04	43.01	43.43	36.23	36.29	52.22	59.35	72.72	63.55	-0.07
168.42	5.30	0.04	42.44	42.10	36.02	36.09	52.54	57.87	71.64	63.41	-0.04
172.21	5.33	0.04	41.12	40.73	35.93	36.01	52.08	56.14	72.31	63.71	-0.02
176.00	5.34	0.04	39.50	39.70	35.75	35.83	52.25	55.12	73.41	63.55	-0.02



I&Q modulation block diagram



Mini-Circuits®
ISO 9001 ISO 14001 CERTIFIED

ALL NEW
minicircuits.com

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

REV. B
M102713
JCIQ-176M
DJ/VV/CP
070226