

I/Q Modulator/Demodulator 1800-2000 MHz

**MA4IQP190H-1291T
V1**

Features

- Excellent Carrier Suppression
- 6.0 dB Typical Modulator Conversion Loss
- + 16 to + 20 dBm LO Drive
- High 3xl and 5xl Harmonic Suppression
- NO External Matching Required
- Low Cost Miniature Plastic 6mm MLP Package

Description and Applications

M/A-COM's MA4IQP190H-1291T is a Silicon Monolithic 1800-2000 MHz, High Barrier, I/Q Modulator/Demodulator. Encapsulated in a low cost, miniature surface mount FQFP-N 6mm Square, 28 lead plastic package the die utilizes M/A-COM's unique HMIC silicon/glass process. This process enables the realization of low loss passive elements and efficient diode technology which in turn provides excellent harmonic suppression. In addition, the incorporated monolithic design techniques provide unparalleled amplitude and phase imbalance performance during demodulation thus adding to the units overall versatility.

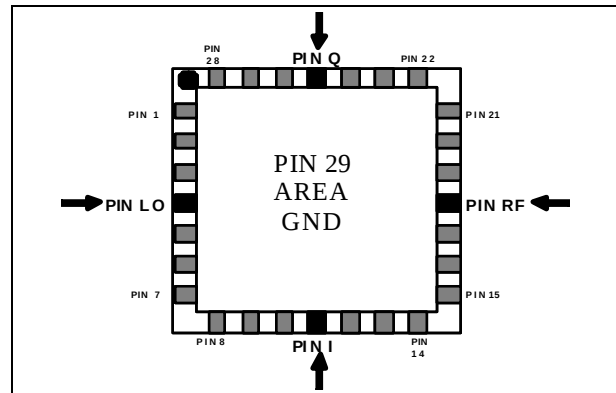
These modulators/demodulators are well suited for GSM and CDMA Cellular basestation applications where small size and high performance is required. Typical applications include upconversion and down-conversion requirements in wireless receivers and transmitters.

Absolute Maximum Ratings¹

Parameter	Maximum Ratings
Operating Temperature	-40 °C to +85 °C
Storage Temperature	-65 °C to +150 °C
Incident LO Power	+20 dBm C.W.
Incident RF Power	+20 dBm C.W.

1. Exceeding these limits may cause permanent damage.

MLP 6mm Package Circuit Side View



PIN Configuration

PIN	Function	PIN	Function
1	N/C	15	N/C
2	N/C	16	N/C
3	N/C	17	N/C
4	LO	18	RF
5	N/C	19	N/C
6	N/C	20	N/C
7	N/C	21	N/C
8	N/C	22	N/C
9	N/C	23	N/C
10	N/C	24	N/C
11	I	25	Q
12	N/C	26	N/C
13	N/C	27	N/C
14	N/C	28	N/C

PIN 29 Area = D.C. & RF Ground Area

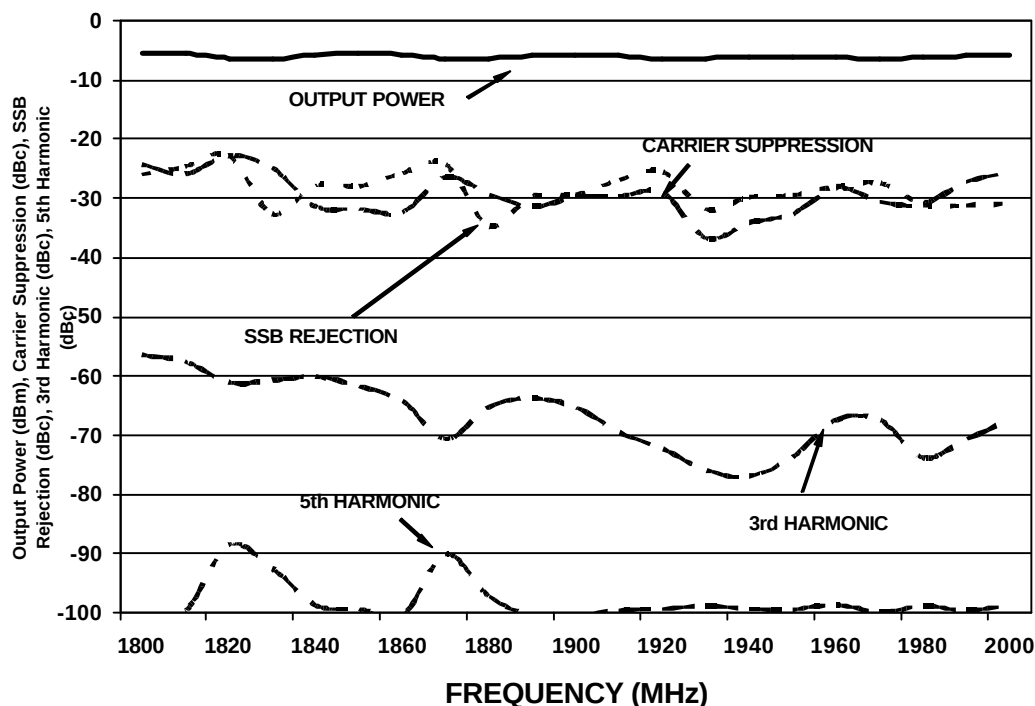
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Electrical Specifications (Modulator) @ +25 °C

Parameter	Frequency Range	Test Conditions	Units	Min.	Avg.	Max.
Output Power	1850 MHz 1800-2000 MHz	LO Drive = +18 dBm I/Q = -7 dBm, I/Q = 200 kHz	dB	-7.0 -7.5	-5.5 -6.0	- -
LO Carrier Suppression	1850 MHz 1850-1990 MHz	LO Drive = +18 dBm I/Q = -7 dBm, I/Q = 200 kHz	dBc	- -	30 30	- -
SSB Rejection	1850 MHz 1850-1990 MHz	LO Drive = +18 dBm I/Q = -7 dBm, I/Q = 200 kHz	dBc	- -	28 25	- -
3 x 1 Harmonic Suppression	1850 MHz 1850-1990 MHz	LO Drive = +18 dBm I/Q = -7 dBm, I/Q = 200 kHz	dBc	- -	66 60	- -
5 x 1 Harmonic Suppression	1850 MHz 1850-1990 MHz	LO Drive = +18 dBm I/Q = -7 dBm, I/Q = 200 kHz	dBc	- -	98 99	- -
LO Return Loss	1850 MHz 1850-1990 MHz	LO Drive = +18 dBm	dB	- -	21 21	- -
RF Return Loss	1800-2000 MHz	LO Drive = +18 dBm	dB	- -	8.1	- -

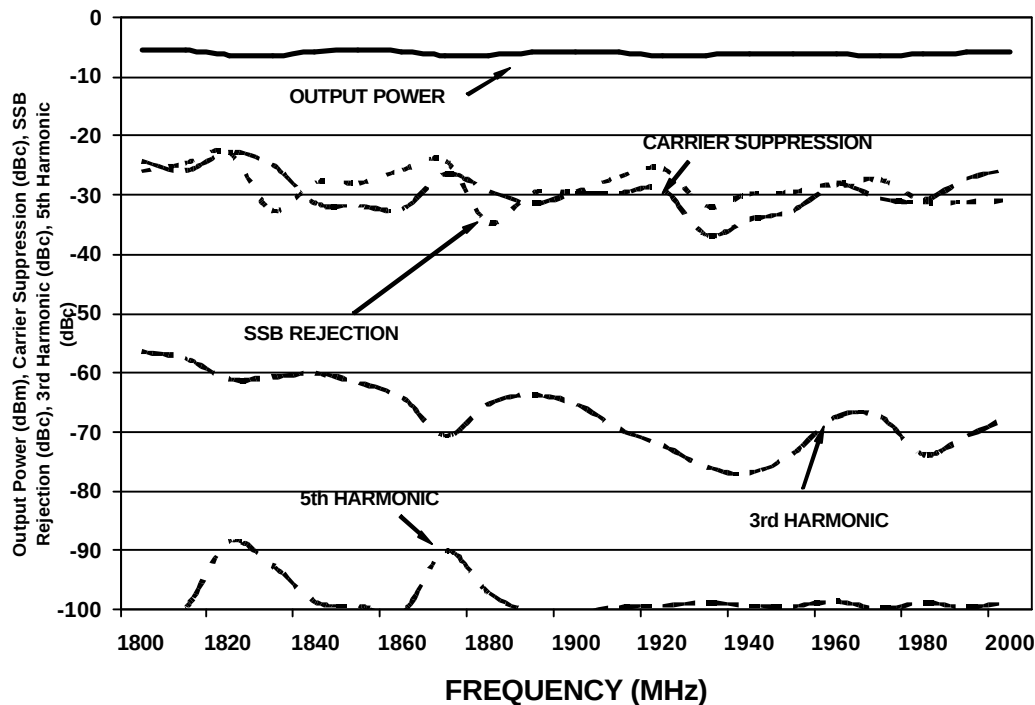
Modulator Band Performance 1800-2000 MHz



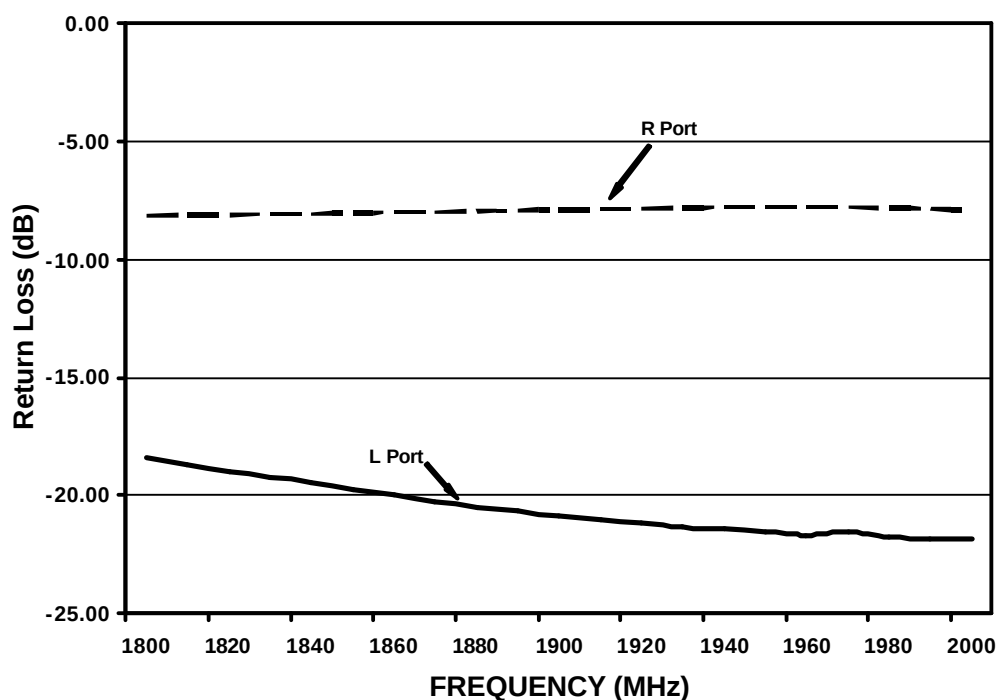
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Modulator Band Performance 1800-2000 MHz



Modulator/Demodulator Return Loss 1800-2000 MHz



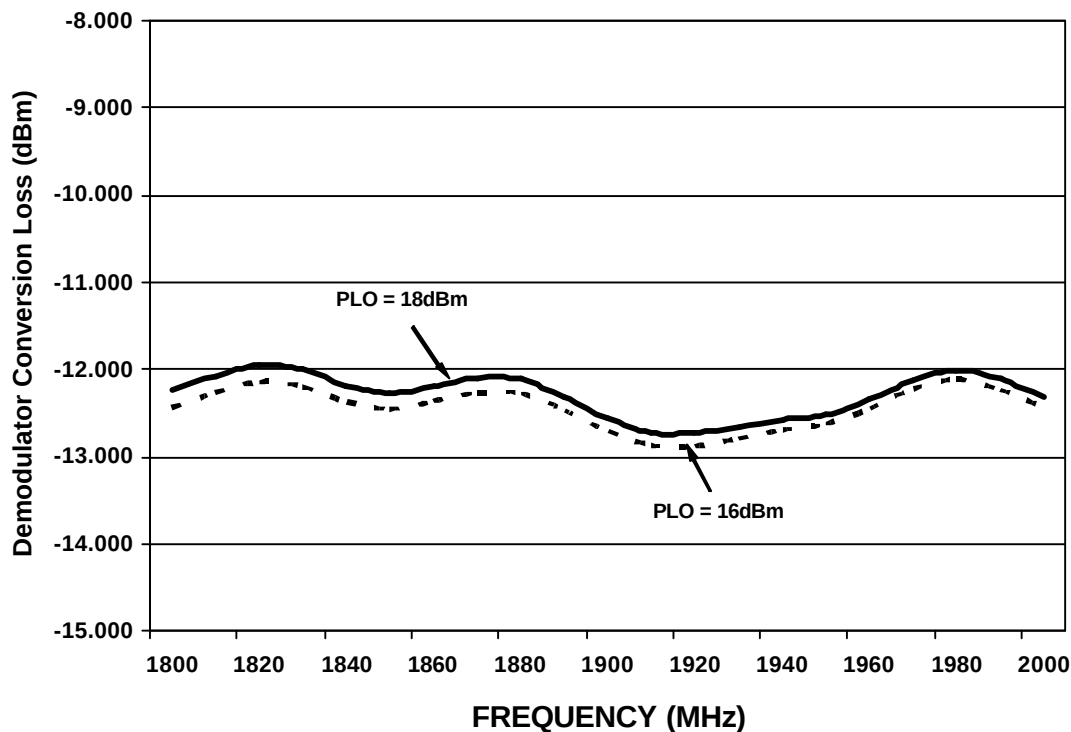
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Electrical Specifications (Demodulator) @ +25 °C

Parameter	Frequency Range	Test Conditions	Units	Min.	Avg.	Max.
Conversion Loss	1850 MHz 1850-1900 MHz	LO Drive = +18 dBm	dB	-13.5 -13.5	-12.1 -12.5	- -
Amplitude Imbalance	1850 MHz 1850-1900 MHz	LO Drive = +18 dBm Freq offset = 400 kHz	dB	-0.4 -	±0.22 ±0.2	0.4 -
Phase Imbalance	1850 MHz 1850-1900 MHz	LO Drive = +20 dBm Freq offset = 400 kHz	deg	-4 -	±0.9 ±2.0	4 -
Input IP3	1850 MHz 1850-1900 MHz	LO Drive = +18 dBm Freq offset = 400 kHz	dBm	- -	26 27	- -
Input 1 dB Compression	1850 MHz 1850-1900 MHz	LO Drive = +18 dBm	dBm	- -	15.3 15.3	- -
LO Return Loss	1850 MHz 1850-1900 MHz	LO Drive = +18 dBm	dB	- -	21 20	- -
RF Return Loss	1850 MHz 1850-1900 MHz	LO Drive = +18 dBm RF Power Level = -10 dBm	dB	- -	7.9 8	- -

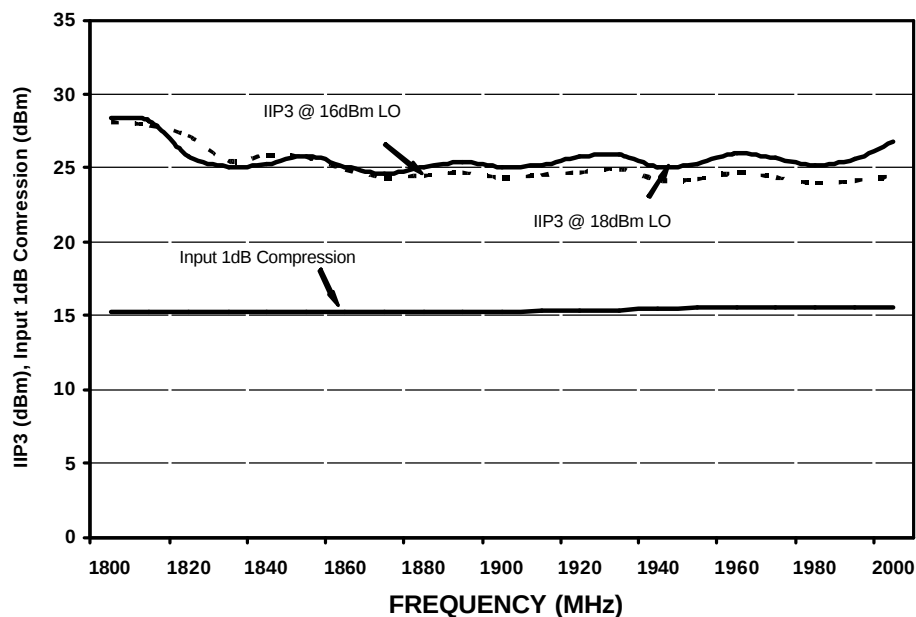
Demodulator Conversion Loss 1800-2000 MHz



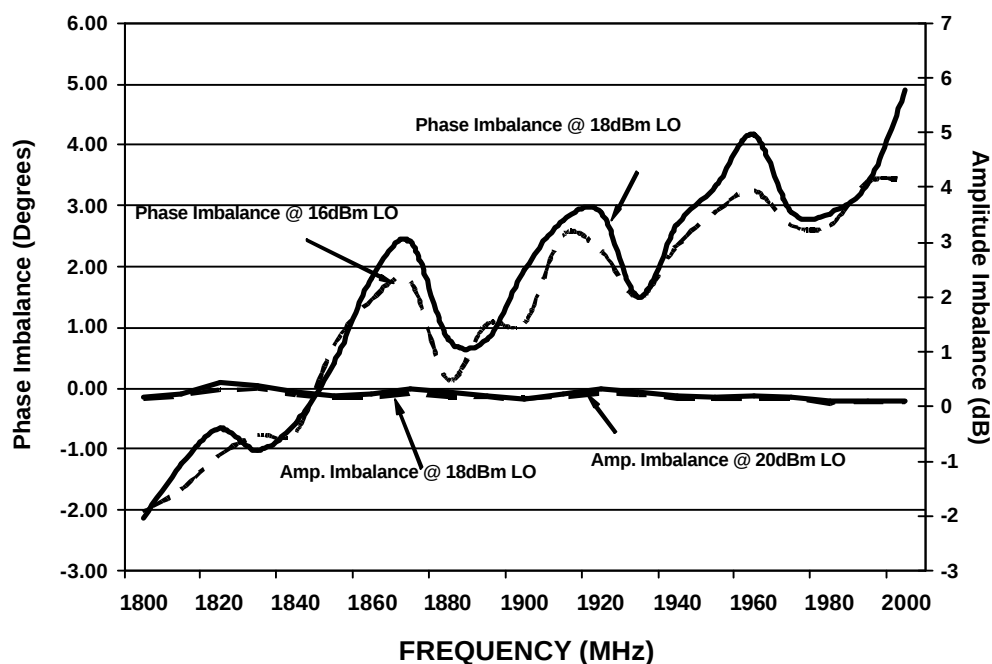
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Demodulator Input IP3 and Input 1dB Compression 1800-2000 MHz



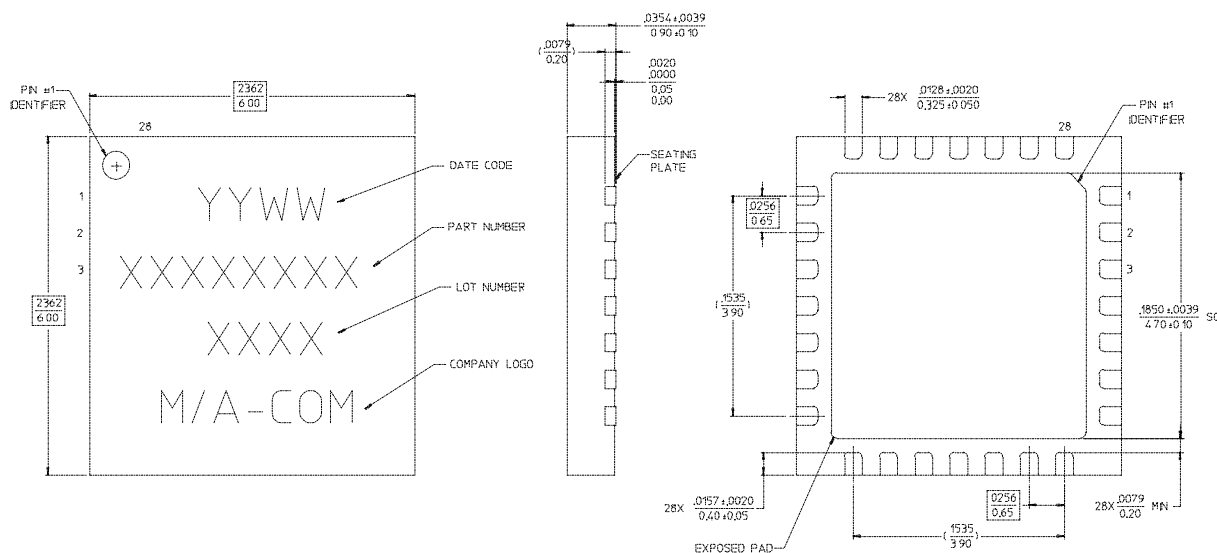
Demodulator Phase and Amplitude Imbalance 1800-2000 MHz



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MA4IQP190H-1291T Outline – 6mm FQFP-N, 28 Lead Saw Singulated



NOTES: 1. REFERENCE JEDEC MO-220, VAR VJ10-3 FOR ADDITIONAL DIMENSIONAL AND TOLERANCE INFORMATION.
2. REFERENCE S2083 APPLICATION NOTE FOR PCB FOOTPRINT INFORMATION
3. ALL DIMENSIONS SHOWN AS INCHES/MM

Ordering Information

Part Number	Package
MA4IQP190H-1291T	Tape and Reel