

**I/Q Modulator/Demodulator**  
**850-960 MHz**

**MA4IQP900M-1291T**  
**V2**

**Features**

- Excellent Carrier suppression
- 6.0 dB Typical Modulator Conversion Loss
- + 13 to + 15 dBm LO Drive
- High 3xl and 5xl Harmonic suppression
- NO External Matching Required
- Low Cost Miniature Plastic MLP Package

**Description and Applications**

M/A-COM's MA4IQP900M-1291T is a silicon monolithic 850-960 MHz, medium 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.

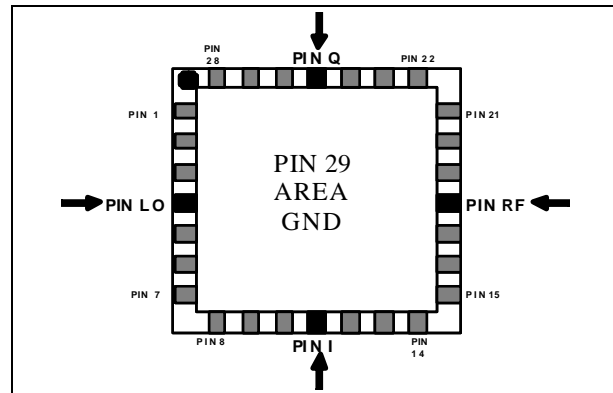
These modulators/demodulators are well suited for GSM and CDMA Cellular basestation applications where small size and high performance are required. Typical applications include upconversion and downconversion requirements in wireless receivers and transmitters.

**Absolute Maximum Ratings<sup>1</sup>**

| 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      |

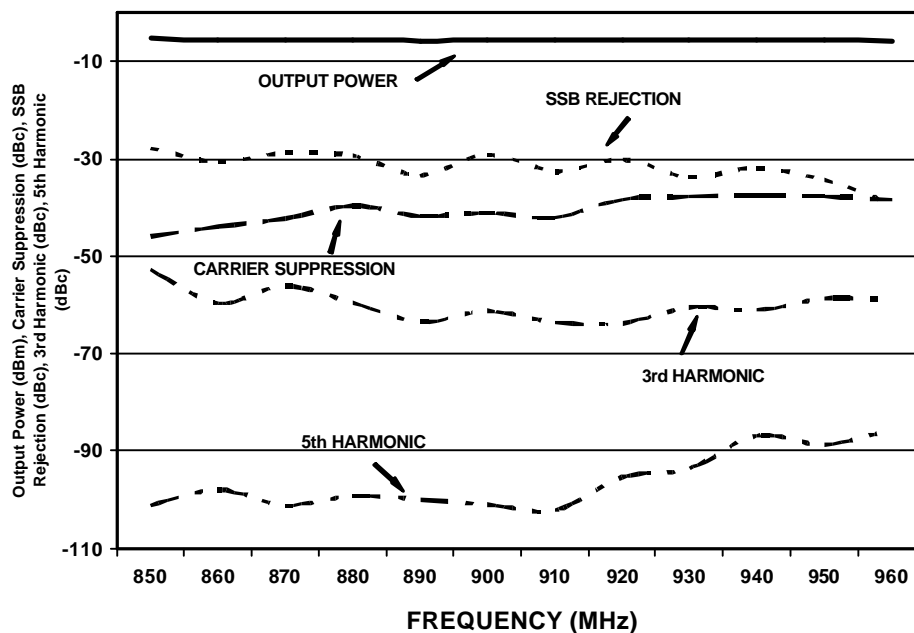
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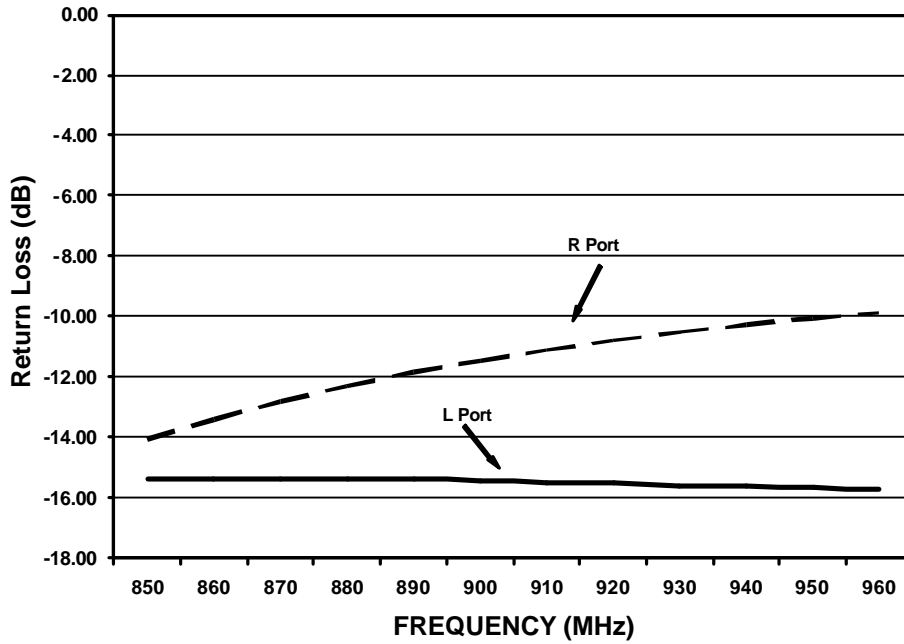
**Electrical Specifications (Modulator) @ +25 °C**

| Parameter                  | Frequency Range        | Test Conditions                                   | Units  | Min.         | Avg.         | Max.   |
|----------------------------|------------------------|---|--------|--------------|--------------|--------|
| Output Power               | 900 MHz<br>850-960 MHz | LO Drive = +13 dBm<br>I/Q = -7 dBm, I/Q = 200 kHz | dB     | -6.5<br>-7.5 | -5.5<br>-5.8 | -<br>- |
| LO Carrier Suppression     | 900 MHz<br>850-960 MHz | LO Drive = +13 dBm<br>I/Q = -7 dBm, I/Q = 200 kHz | dBc    | -<br>-       | 39<br>39     | -<br>- |
| SSB Rejection              | 900 MHz<br>850-960 MHz | LO Drive = +13 dBm<br>I/Q = -7 dBm, I/Q = 200 kHz | dBc    | -<br>-       | 32<br>32     | -<br>- |
| 3 x 1 Harmonic Suppression | 900 MHz<br>850-960 MHz | LO Drive = +13 dBm<br>I/Q = -7 dBm, I/Q = 200 kHz | dBc    | -<br>-       | 60<br>60     | -<br>- |
| 5 x 1 Harmonic Suppression | 900 MHz<br>850-960 MHz | LO Drive = +13 dBm<br>I/Q = -7 dBm, I/Q = 200 kHz | dBc    | -<br>-       | 96<br>96     | -<br>- |
| LO Return Loss             | 900 MHz<br>850-960 MHz | LO Drive = +13 dBm                                | dB     | -<br>-       | 15.5<br>15.5 | -<br>- |
| RF Return Loss             | 850-960 MHz            | LO Drive = +13 dBm                                | dB     | -<br>-       | 12           | -<br>- |
| ACPR CDMA IS-95            | 880 MHz Carrier Freq   | LO Drive = +13 dBm<br>I/Q Power level = -7 dBm    | dBc    | 60           | 68           | -<br>- |
| Output Noise Floor         | 850-960 MHz            | LO Drive = +13 dBm<br>I/Q Power level = -7 dBm    | dBm/Hz | -<br>-       | -163         | -<br>- |

**Modulator Band Performance 850-960 MHz**



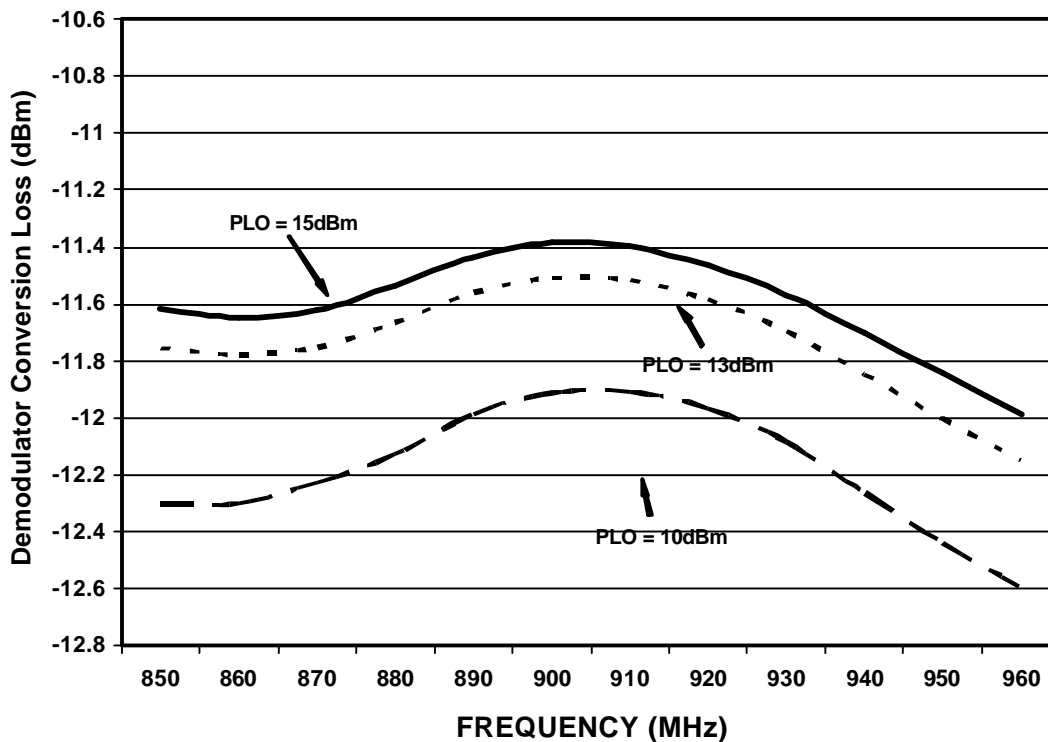
**Modulator/Demodulator Return Loss 850-960 MHz**



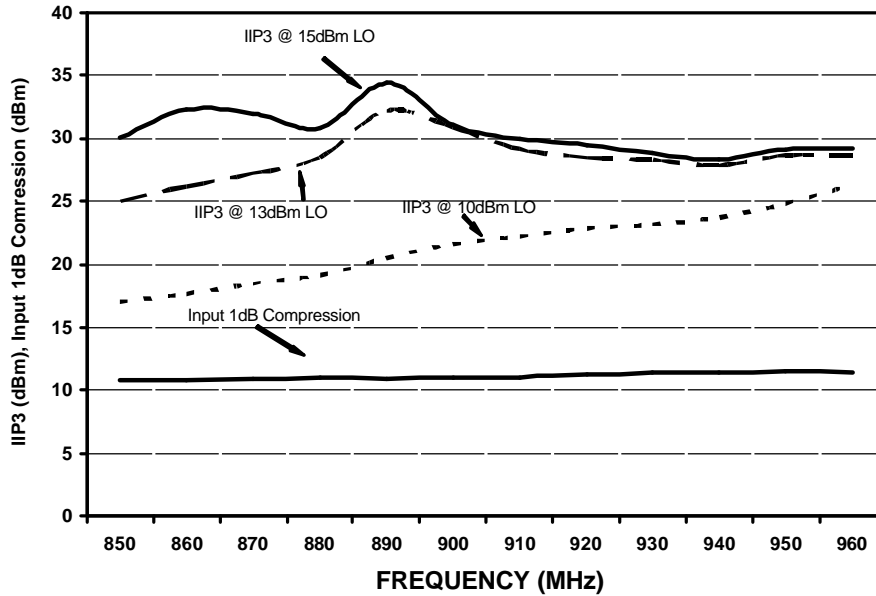
**Electrical Specifications (Demodulator) @ +25 °C**

| Parameter              | Frequency Range        | Test Conditions                                | Units | Min.           | Avg.           | Max.    |
|------------------------|------------------------|--|-------|----------------|----------------|---------|
| Conversion Loss        | 900 MHz<br>850-960 MHz | LO Drive = +15 dBm                             | dB    | -12.5<br>-12.5 | -11.4<br>-11.5 | -<br>-  |
| Amplitude Imbalance    | 900 MHz<br>850-960 MHz | LO Drive = +15 dBm<br>Freq offset = 400 kHz    | dB    | -<br>-         | 0.05<br>0.05   | .4<br>- |
| Phase Imbalance        | 900 MHz<br>850-960 MHz | LO Drive = +15 dBm<br>Freq offset = 400 kHz    | deg   | -<br>-         | 2.5<br>2.5     | 4<br>-  |
| Input IP3              | 900 MHz<br>850-960 MHz | LO Drive = +15 dBm<br>Freq offset = 400 kHz    | dBm   | -<br>-         | 32<br>30       | -<br>-  |
| Input 1 dB Compression | 900 MHz<br>850-960 MHz | LO Drive = +15 dBm                             | dBm   | -<br>-         | 11<br>11       | -<br>-  |
| LO Return Loss         | 900 MHz<br>850-960 MHz | LO Drive = +13 dBm                             | dB    | -<br>-         | 15.5<br>15.5   | -<br>-  |
| RF Return Loss         | 900 MHz<br>850-960 MHz | LO Drive = +13 dBm<br>RF Power Level = -10 dBm | dB    | -<br>-         | 12<br>12       | -<br>-  |

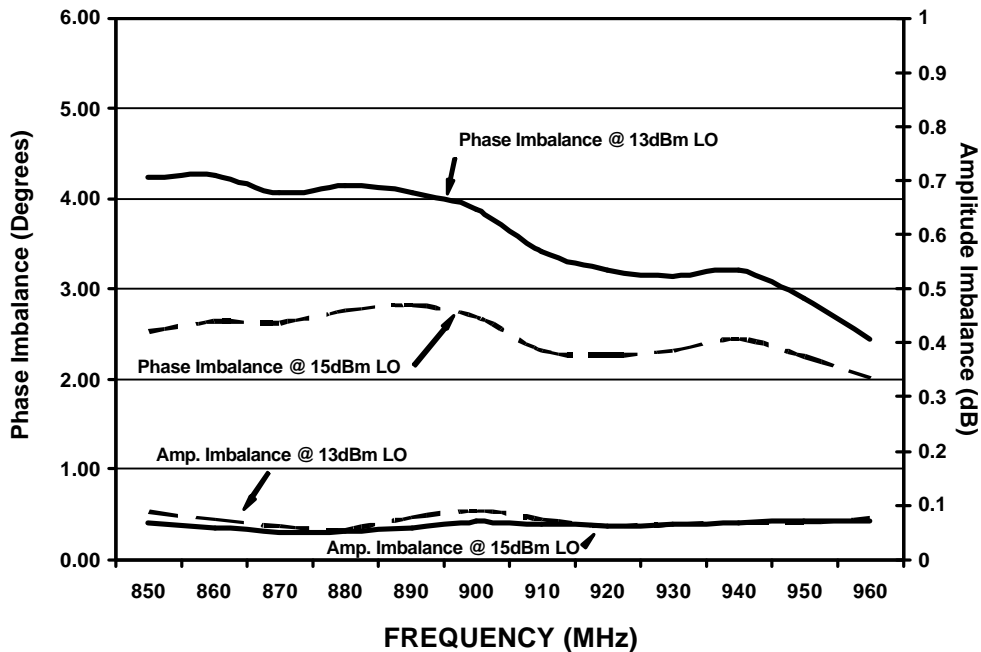
**Demodulator Conversion Loss 850-960 MHz**



**Demodulator Input IP3 and Input 1dB Compression 850-960 MHz**



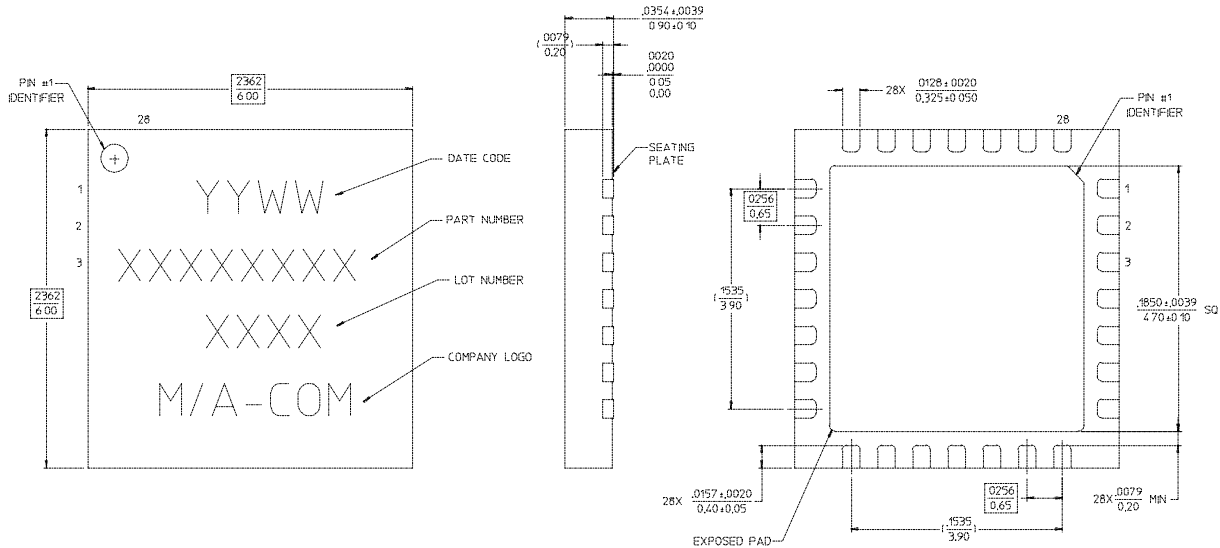
**Demodulator Phase and Amplitude Imbalance 850-960 MHz**



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**MA4IQP900H-1291T Outline – 6mm FQFP-N, 28 Lead Saw Singulated**



- NOTES 1 REFERENCE JEDEC MO-220, VAR VJIC-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       |
|------------------|---------------|
| MA4IQP900M-1291T | Tape and Reel |