

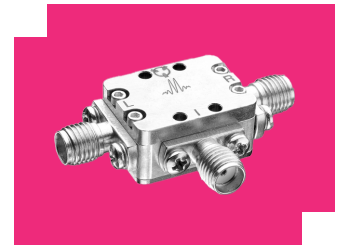
M1-0412HP

Double-Balanced Mixers

DEVICE OVERVIEW

General Description

M1 double balanced mixers are hybrid assemblies that have been hand-tuned to feature low conversion loss and high isolations and a DC IF response. M1 mixers have generally been replaced with MM1 mixers with superior performance, repeatability, and availability. M1 mixers are still used in legacy systems and are suitable for laboratory use.



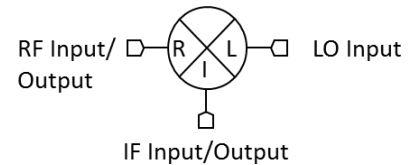
Features

- LO/RF 4.0 to 12.0 GHz
- IF DC to 4.0 GHz
- 5.0 dB Typical Conversion Loss
- 40 dB Typical LO to RF Isolation
- Very-Broadband LO and RF

Applications

N/A

Functional Block Diagram



Part Ordering Options

| Part Number | Description | Package | Connectors | Green Status | Product Lifecycle | Export Classification | Recommended Replacement |
|---------------------------|------------------------|---------|--------------------------|---------------------------------|--------------------------------|-----------------------|------------------------------------|
| M1-0412LP | Double-Balanced Mixers | P | Standard | Non-RoHS | Not Recommended for New Design | EAR99 | MM1-0222LSMM0312HS |
| M1-0412MP | Double-Balanced Mixers | P | Standard | Non-RoHS | End of Life | EAR99 | MM1-0222LSMM0312HS |
| M1-0412HP | Double-Balanced Mixers | P | Standard | Consult Factory | End of Life | EAR99 | MM1-0312HS |
| M1-0412NP | Double-Balanced Mixers | P | Standard | Non-RoHS | End of Life | EAR99 | MM1-0312HS |

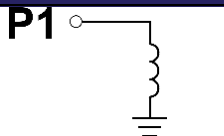
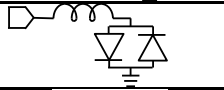
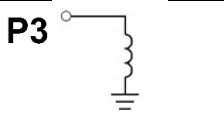
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Port Configuration and Functions

Port Functions

| Port | Function | Connector Type | Description | Equivalent Circuit for Package |
|--------|----------|----------------|--|---|
| Port 1 | LO | SMAF | Port 1 is DC short for the P package. |  |
| Port 2 | IF | SMAF | Port 2 is diode connected for the P Package. |  |
| Port 3 | RF | SMAF | Port 3 is DC short for the P Package. |  |

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Specifications

Package Information

| Parameter | Details | Rating |
|------------|-----------------|------------------|
| Weight | Package name: P | 18g |
| Dimensions | - | 20.32 x 14.99 mm |

Recommended Operating Conditions

| Parameter | Min | Nominal | Max | Unit |
|----------------|-----|---------|-----|------|
| LO Input Power | 16 | - | 19 | - |

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Electrical Specifications

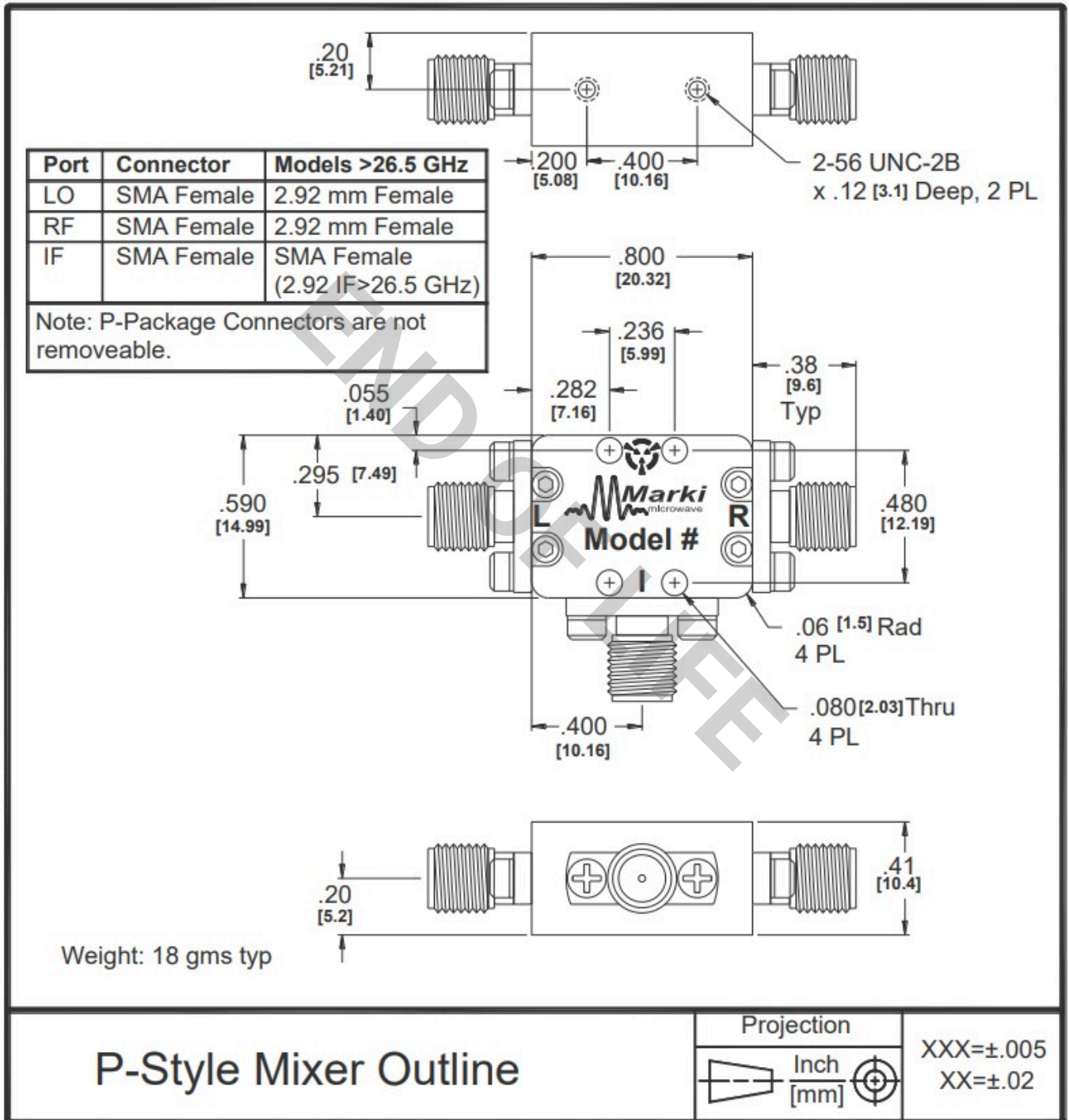
Specifications guaranteed from -55 to +100°C, measured in a 50-Ohm system.

| Parameter | Test Conditions | Min | Typ | Max | Unit |
|------------------------|--|-----|-----|-----|------|
| Conversion Loss | LO/RF=4-12 GHz IF=1-4 GHz | - | 6 | 8.5 | dB |
| Conversion Loss | LO/RF=4-12 GHz IF=DC-1 GHz | - | 5 | 8 | dB |
| Input 1 dB Compression | LO/RF=4-12 GHz LO drive level, H Diode Option=16-19 dBm | - | 11 | - | dBm |
| Input IP3 | LO/RF=4-12 GHz LO drive level, H Diode Option=16-19 dBm | - | 21 | - | dBm |
| Isolation, LO to IF | LO/RF=4-12 GHz | - | 30 | - | dB |
| Isolation, LO to RF | LO/RF=4-12 GHz | 25 | 40 | - | dB |
| Isolation, RF to IF | LO/RF=4-12 GHz | - | 25 | - | dB |
| IF Frequency Range | - | 0 | - | 4 | GHz |
| Input IP3 | - | - | 21 | - | dBm |
| Input P1dB | - | - | 11 | - | dBm |
| RF Frequency Range | - | 4 | - | 12 | GHz |

Mechanical Data

Outline Drawing

Download : [Outline 3D Drawing](#) | [Outline 3D STP](#)



Notes

1. Mixer Conversion Loss Plot IF frequency is 100 MHz.
2. Mixer Noise Figure typically measures within +0.5 dB of conversion loss for IF frequencies greater than 5 MHz.
3. Conversion Loss typically degrades less than 0.5 dB for LO drives 2 dB below the lowest and 3 dB above highest nominal LO drive levels.
4. Conversion Loss typically degrades less than 0.5 dB at +100°C and improves less than 0.5 dB at -55°C.
5. Maximum input power is +23 dBm at +25°C, derated linearly to +20 dBm at +100°C.
6. Specifications are subject to change without notice. Contact Marki Microwave for the most recent specifications and data sheets.
7. Standard configuration for A, B, and C outlines are with connectors and bottom spacer.
8. Catalog mixer circuits are continually improved. Configuration control requires custom mixer model numbers and specifications.

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