Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

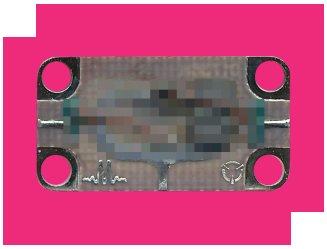
# M1-0310ME-1

## High Isolation Double-Balanced 3- 10 GHz 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.



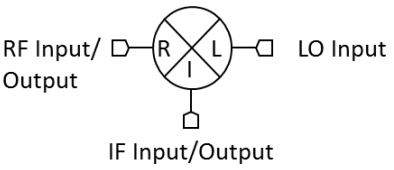
### Features

- LO/RF 3.0 to 10.0 GHz
- IF DC to 3.0 GHz
- 6.0 dB Typical Conversion Loss
- 50 dB Typical LO to RF Isolation
- Carrier and Surface Mount Outlines
- Multi-Octave Band RF and LO

### Applications

N/A

### Functional Block Diagram






### Part Ordering Options

| Part Number | Description | Package | Green Status | Product Lifecycle | Export Classification | Recommended Replacement |
|---|---|---|---|---|---|---|
| M1-0310HE-1 | High Isolation Double-Balanced 3-10 GHz Mixers | E | Consult Factory | End of Life | EAR99 | MM1-0312HSM-2 |
| M1-0310LE-1 | High Isolation Double-Balanced 3-10 GHz Mixers | E | Consult Factory | Not Recommended for New Design | EAR99 | MM1-0212LSM-2MM1-0312HSM-2 |
| M1-0310LE-2 | High Isolation Double-Balanced 3-10 GHz Mixers | E | Consult Factory | Not Recommended for New Design | EAR99 | MM1-0212LSM-2MM1-0312HSM-2 |
| M1-0310ME-1 | High Isolation Double-Balanced 3-10 GHz Mixers | E | Consult Factory | End of Life | EAR99 | MM1-0212LSM-2MM1-0312HSM-2 |

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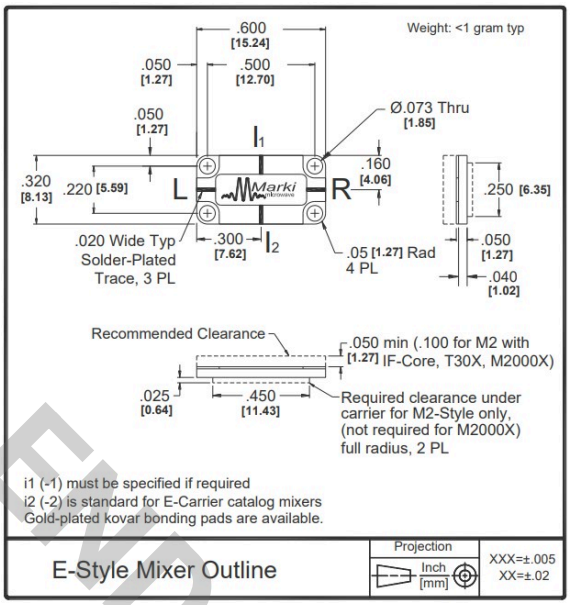
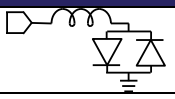
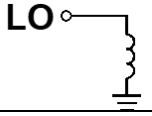
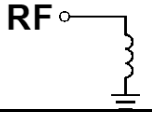
## Port Configuration and Functions

### Port Diagram






## Port Functions

| Port | Function | Description | Equivalent Circuit for Package |
|---|---|---|---|
| IF | IF | The IF port is DC coupled to the diodes and AC matched to 50 Ohms from 0 to 3 GHz. Blocking capacitor is optional. |  |
| LO | LO | The LO port is DC coupled to ground and AC matched to 50 Ohms from 3 to 10 GHz. Blocking capacitor is optional. |  |
| RF | RF | The RF port is DC coupled to ground and AC matched to 50 Ohms from 3 to 10 GHz. Blocking capacitor is optional. |  |

## Specifications

### Package Information

| Parameter | Details | Rating |
|---|---|---|
| Weight | Package name: E | 1g |
| Dimensions | - | 15.24 x 8.13 mm |

### Recommended Operating Conditions

| Parameter | Min | Nominal | Max | Unit |
|---|---|---|---|---|
| LO Input Power | 10 | - | 13 | - |

## Electrical Specifications

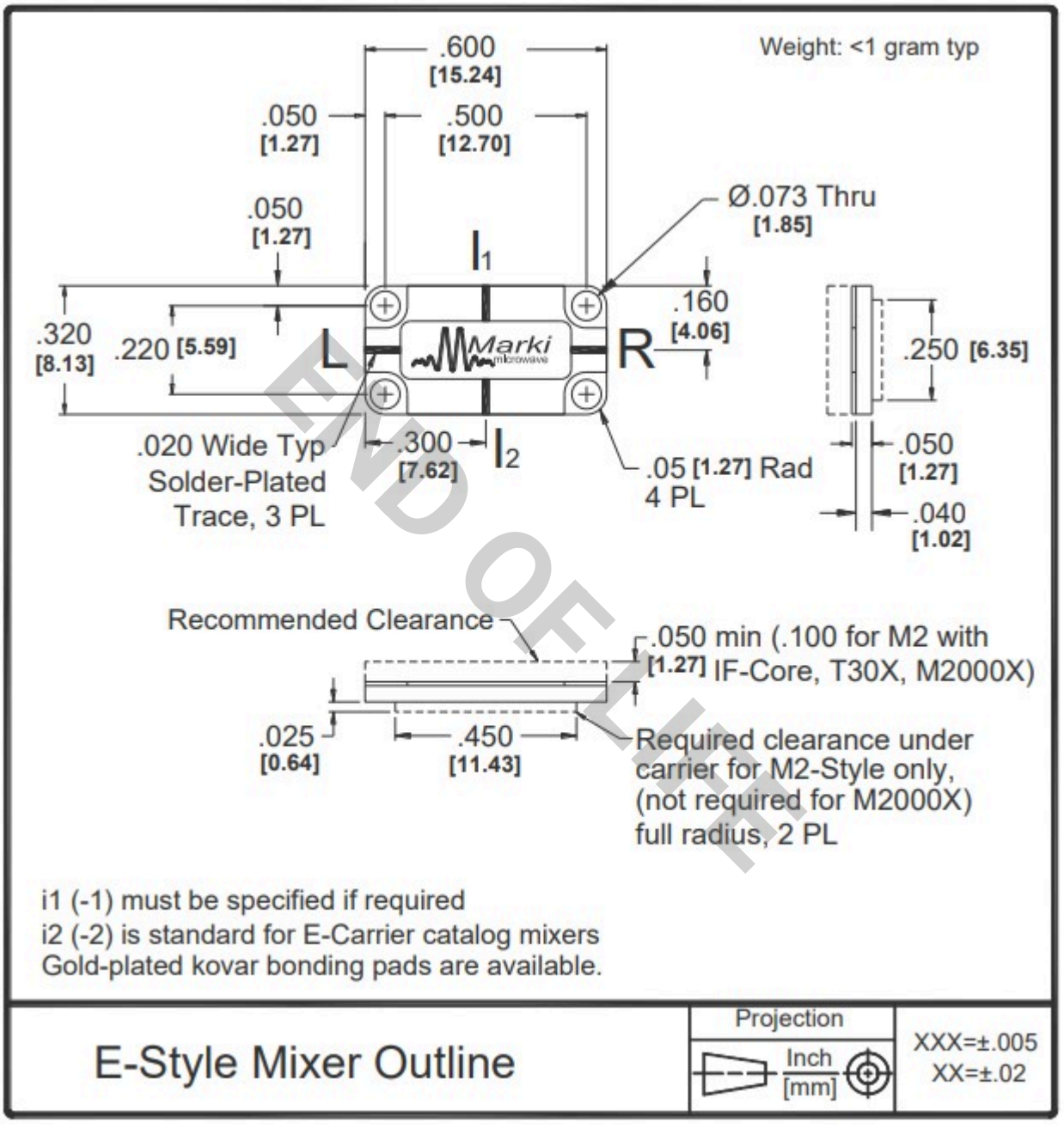
Specifications guaranteed from -55 to +100°C, measured in a 50-Ohm system.

| Parameter | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Conversion Loss | LO/RF=3-10 GHz<br>IF=1-3 GHz | - | 6.5 | 9.5 | dB |
| Conversion Loss | LO/RF=3-10 GHz<br>IF=DC-1 GHz | - | 6 | 9 | dB |
| Input 1 dB Compression | LO/RF=3-10 GHz<br>LO drive level, M Diode Option=10-13 dBm | - | 5 | - | dBm |
| Input IP3 | LO/RF=3-10 GHz<br>LO drive level, M Diode Option=10-13 dBm | - | 15 | - | dBm |
| Isolation, LO to IF [1] | LO/RF=3-10 GHz | - | 40 | - | dB |
| Isolation, LO to RF [2] | LO/RF=3-10 GHz | - | 40 | - | dB |
| Isolation, RF to IF [3] | LO/RF=3-10 GHz | - | 25 | - | dB |
| IF Frequency Range | - | 0 | - | 10 | GHz |
| Input 1 dB Compression | - | - | 5 | - | dBm |
| Input IP3 | - | - | 15 | - | dBm |
| RF Frequency Range | - | 3 | - | 12 | GHz |

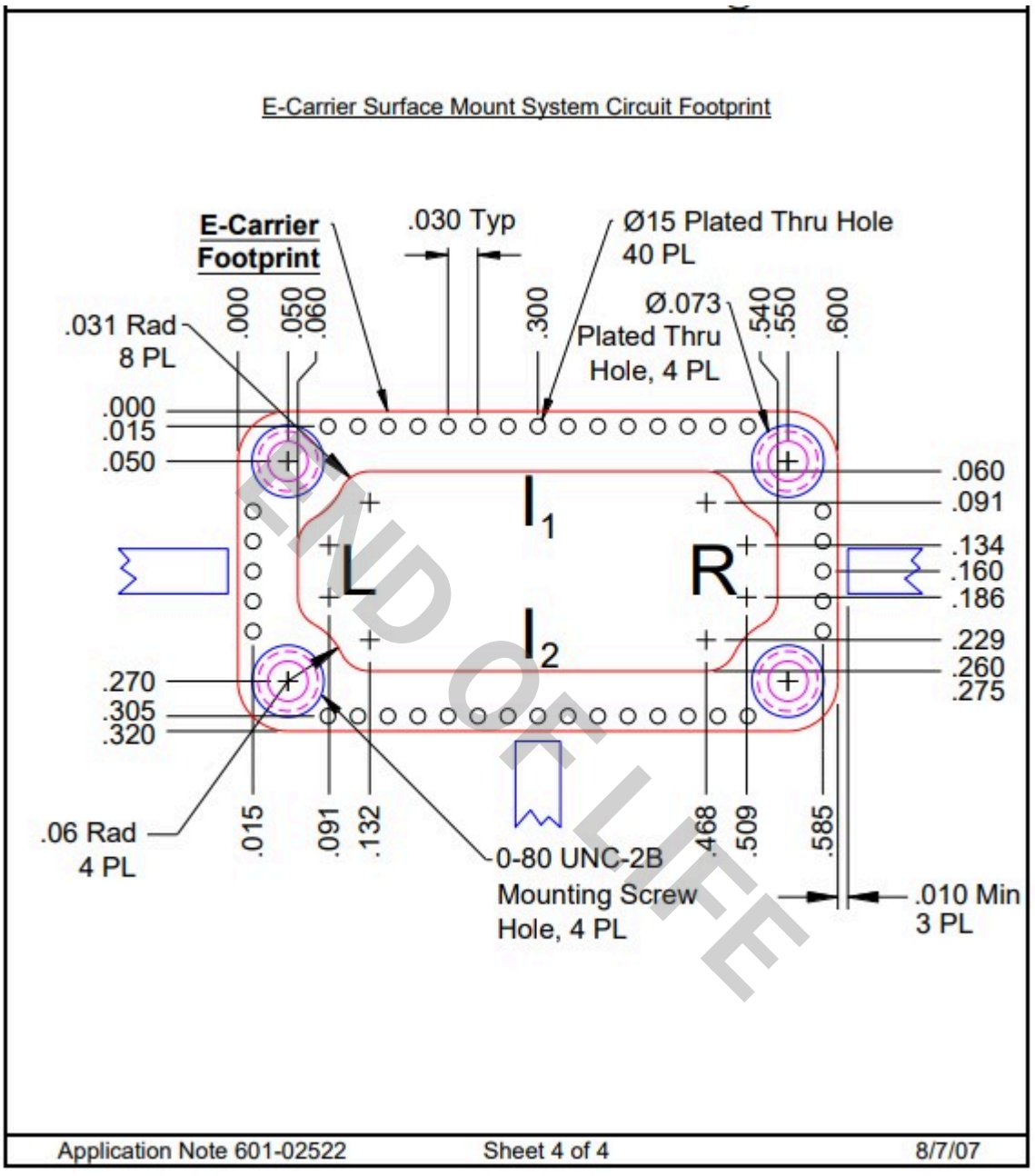
[1][2][3] High 2nd/3rd LO Harmonics can mix to produce a higher intermodulation output than the actual isolation output.

## Mechanical Data

### Outline Drawing



## Footprint Image



## 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.