

**Double-Balanced Mixer**

**M2E/M2EC/SM2E**

V4

**Features**

- LO 10 TO 1000 MHz
- RF 10 TO 1000 MHz
- F DC TO 600 MHz
- LO DRIVE: +20 dBm (nominal)
- HIGH INTERCEPT POINT: +30 dBm (TYP.)
- HERMETICALLY SEALED

**Description**

The M2E is a double balanced mixer, designed for use in military, commercial, and test equipment applications. The design utilizes Schottky ring quad diodes and broadband ferrite baluns to attain excellent performance. This mixer can also be used as a phase detector and/or bi-phase modulator since the IF port is DC coupled to the diodes. Environmental screening is available to MIL-STD-883, MIL-STD-202, or MIL-DTL-28837, consult factory.

**Ordering Information**

| Part Number | Package           |
|-------------|-------------------|
| M2E         | TO-8              |
| M2EC        | SMA Connectorized |
| SM2E        | Surface Mount     |

**Product Image**



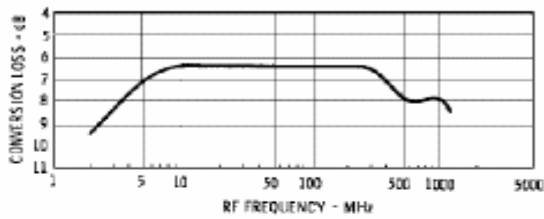
**Electrical Specifications:  $Z_0 = 50\Omega$  Lo = +20 dBm (Downconverter application only)**

| Parameter                                          | Test Conditions                                                  | Units | Typical | Guaranteed |                 |
|----------------------------------------------------|------------------------------------------------------------------|-------|---------|------------|-----------------|
|                                                    |                                                                  |       |         | +25°C      | -54° to +85°C * |
| SSB Conversion Loss (max) & SSB Noise Figure (max) | fR = 0.01 to 0.3 GHz, fL = 0.01 to 0.3 GHz, fl = 0.01 to 0.2 GHz | dB    | 7.0     | 7.5        | 7.8             |
|                                                    | fR = 0.01 to 0.3 GHz, fL = 0.01 to 0.3 GHz, fl = 0.01 to 0.6 GHz | dB    | 8.0     | 9.0        | 9.3             |
|                                                    | fR = 0.01 to 1 GHz, fL = 0.01 to 1 GHz, fl = 0.01 to 0.2 GHz     | dB    | 8.5     | 9.5        | 9.8             |
|                                                    | fR = 0.01 to 1 GHz, fL = 0.01 to 1 GHz, fl = 0.01 to 0.6 GHz     | dB    | 10.0    | 11.0       | 11.3            |
| Isolation, L to R (min)                            | fL = 0.01 to 0.1 GHz                                             | dB    | 40      | 35         | 34              |
|                                                    | fL = 0.1 to 0.4 GHz                                              | dB    | 35      | 25         | 24              |
|                                                    | fL = 0.4 to 1 GHz                                                | dB    | 25      | 18         | 17              |
| Isolation, L to I (min)                            | fL = 0.01 to 0.1 GHz                                             | dB    | 45      | 35         | 34              |
|                                                    | fL = 0.1 to 0.4 GHz                                              | dB    | 35      | 25         | 24              |
|                                                    | fL = 0.4 to 1 GHz                                                | dB    | 20      | 14         | 13              |
| 1 dB Conversion Comp.                              | fL = +25 dBm                                                     | dBm   | +20     |            |                 |
| Input IP3                                          |                                                                  | dBm   | +30     |            |                 |

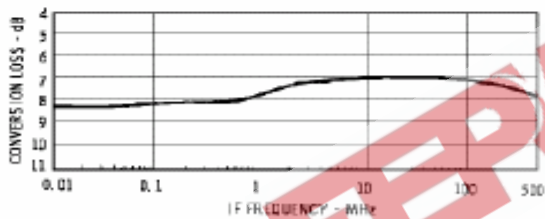
\* The M2EC specification limits apply at 0°C to +50°C.

Typical Performance Curves

Conversion Loss vs. Frequency

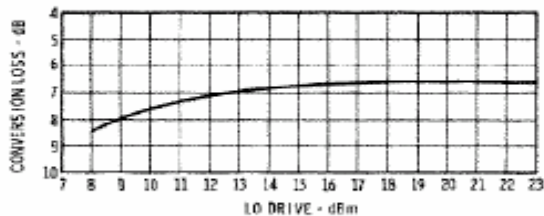


$f_{LO} = f_{RF}$   
 $P_{LO} = +20 \text{ dBm}$   
 $P_{RF} = -10 \text{ dBm}$   
 $f_{IF} = \text{BETWEEN } 1 \text{ MHz and } 100 \text{ MHz}$



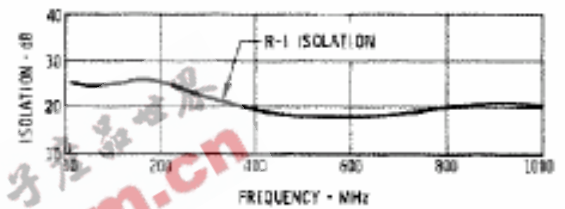
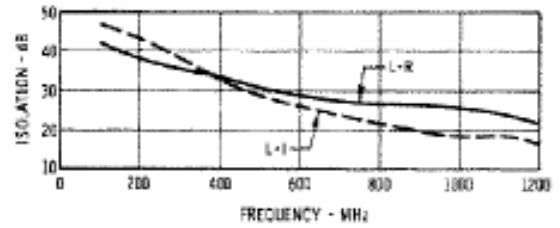
$f_{LO} > f_{RF}$   
 $P_{LO} = +20 \text{ dBm}$   
 $f_{RF} = 100 \text{ MHz @ } -10 \text{ dBm}$

Conversion Loss vs. LO Drive



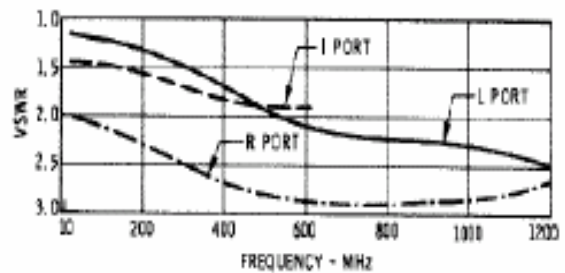
$f_{LO} = 400 \text{ MHz}$   
 $f_{RF} = 300 \text{ MHz @ } -10 \text{ dBm}$

Isolation



$f_{LO} = 700 \text{ MHz @ } +20 \text{ dBm}$   
 $P_{RF} = -10 \text{ dBm}$

VSWR



$P_{RF} = P_{IF} = -10 \text{ dBm}$   
 $P_{LO} = +20 \text{ dBm}$   
 $f_{LO} = 1000 \text{ MHz}$

**Double-Balanced Mixer**

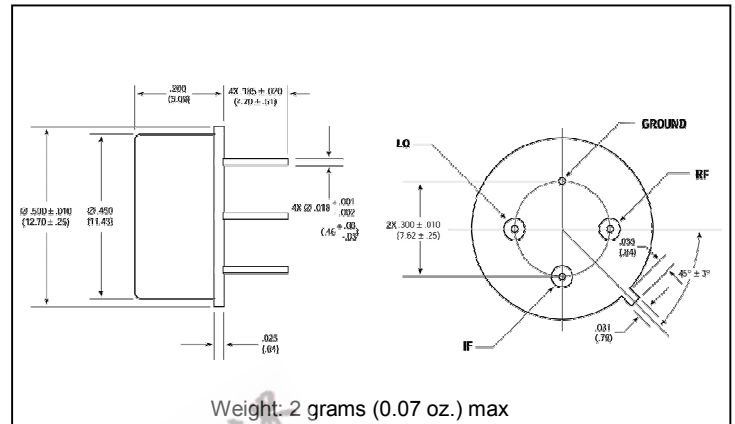
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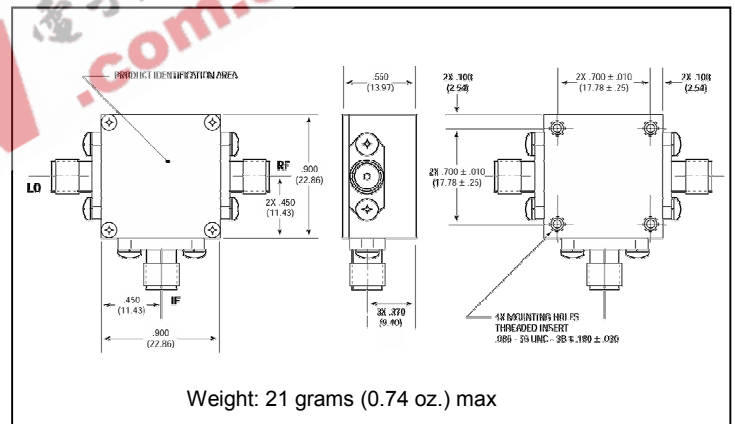
**Absolute Maximum Ratings**

| Parameter             | Absolute Maximum                        |
|-----------------------|-----------------------------------------|
| Operating Temperature | -54°C to +100°C                         |
| Storage Temperature   | -65°C to +100°C                         |
| Peak Input Power      | +27 dBm max @ +25°C<br>dBm max @ +100°C |
| Peak Input Current    | 100 mA DC                               |

**Outline Drawing: TO-8 \***



**Outline Drawing: SMA Connectorized \***



\* Dimensions are inches (millimeters) ±0.015 (0.38) unless otherwise specified.

**Outline Drawing: Surface Mount \***

