

# FREQUENCY MIXERS

Plug-In

**LEVEL 10** 50 kHz to 8 GHz



+10 dBm LO, up to +5 dBm RF

| MODEL NO.   | FREQUENCY MHz                           |         | CONVERSION LOSS dB |          |      |             | LO-RF ISOLATION, dB |      |      |      |      |      | LO-IF ISOLATION, dB |      |      |        |            |      | CASE STYLE | C O N N E C T I O N | PRICE \$ |
|-------------|-----------------------------------------|---------|--------------------|----------|------|-------------|---------------------|------|------|------|------|------|---------------------|------|------|--------|------------|------|------------|---------------------|----------|
|             | LO/RF<br>f <sub>L</sub> -f <sub>U</sub> | IF      | Mid-Band           |          |      | Total Range | L                   |      |      | M    |      |      | U                   |      |      | Note B | Qty. (1-9) |      |            |                     |          |
|             |                                         |         | $\bar{x}$          | $\sigma$ | Max. |             | Typ.                | Min. | Typ. | Min. | Typ. | Min. | Typ.                | Min. | Typ. |        |            | Min. |            |                     |          |
| TFM-15      | 10-3000                                 | 10-800  | 6.75               | .08      | 8.0  | 8.5         | 35                  | 25   | 35   | 25   | 35   | 25   | 30                  | 20   | 30   | 20     | B13        | aa   | 51.95      |                     |          |
| TFM-150**   | 10-2000                                 | DC-1000 | 6.19               | .11      | 8.0  | 8.0         | 32                  | 25   | 35   | 25   | 35   | 25   | 33                  | 20   | 30   | 20     | B13        | aa   | 47.45      |                     |          |
| ☐ TUF-1LH   | 2-600                                   | DC-600  | 6.0                | .17      | 7.0  | 8.0         | 70                  | 50   | 50   | 30   | 42   | 25   | 65                  | 45   | 50   | 30     | 41         | 22   | B02        | z                   | 7.25     |
| ☐ TUF-2LH*  | 50-1000                                 | DC-1000 | 5.2                | .30      | 7.0  | 8.5         | 58                  | 40   | 44   | 30   | 39   | 25   | 60                  | 35   | 50   | 25     | 38         | 20   | B02        | z                   | 8.20     |
| ☐ TUF-3LH   | 0.15-400                                | DC-400  | 4.8                | .37      | 7.0  | 8.0         | 67                  | 50   | 51   | 30   | 40   | 25   | 67                  | 40   | 45   | 25     | 34         | 20   | B02        | z                   | 9.10     |
| ☐ TUF-5LH   | 20-1500                                 | DC-1000 | 6.9                | .27      | 8.5  | 9.0         | 53                  | 40   | 42   | 30   | 38   | 25   | 40                  | 25   | 30   | 18     | 22         | 8    | B02        | z                   | 12.45    |
| ☐ TUF-11ALH | 1400-1900                               | 40-500  | 7.0                | .20      | 8.6  | 8.6         | 36 (Typ.) 20 (Min.) |      |      |      |      |      | 28 (Typ.) 15 (Min.) |      |      |        |            |      | B02        | z                   | 19.95    |
| ROK-2500LH  | 1-2500                                  | DC-500  | 6.4                | .20      | 8.4  | 9.0         | 55                  | 40   | 48   | 20   | 30   | 20   | 55                  | 38   | 27   | 15     | 22         | 15   | PP230      | ah                  | 34.95    |
| ☐ SBL-1LH   | 2-500                                   | DC-500  | 5.8                | .03      | 7.0  | 8.0         | 75                  | 45   | 68   | 35   | 56   | 25   | 61                  | 35   | 45   | 25     | 36         | 20   | A06        | d                   | 6.75     |
| ☐ SBL-1-1LH | .2-400                                  | DC-400  | 5.2                | .06      | 7.0  | 9.0         | 67                  | 45   | 64   | 30   | 51   | 25   | 62                  | 30   | 52   | 25     | 34         | 20   | A06        | d                   | 9.45     |
| ☐ SBL-1XLH  | 10-1000                                 | 5-500   | 6.0                | .12      | 7.5  | 8.5         | 50                  | 40   | 40   | 25   | 30   | 20   | 70                  | 45   | 55   | 40     | 45         | 30   | A06        | j                   | 8.45     |
| ☐ SBL-2LH   | 5-1000                                  | DC-1000 | 5.9                | .09      | 7.5  | 9.5         | 67                  | 45   | 61   | 30   | 57   | 30   | 68                  | 40   | 54   | 30     | 43         | 20   | A06        | h                   | 9.45     |
| ☐ SBL-11LH  | 5-2000                                  | 10-600  | 7.0                | .11      | 8.5  | 9.5         | 60                  | 45   | 45   | 30   | 30   | 20   | 50                  | 35   | 30   | 20     | 25         | 16   | A06        | m                   | 22.95    |
| SRA-2CR     | 10-1000                                 | 5-500   | 5.68               | .12      | 7.5  | 8.0         | 50                  | 40   | 40   | 30   | 30   | 20   | 40                  | 25   | 30   | 18     | 25         | 15   | A01        | s                   | 19.95    |
| SRA-215     | .05-1500                                | .05-500 | 5.20               | .08      | 7.5  | 9.0         | 25                  | 20   | 35   | 25   | 30   | 20   | 25                  | 20   | 35   | 25     | 25         | 15   | A01        | m                   | 30.95    |
| SRA-220     | .05-2000                                | .05-500 | 5.59               | .11      | 8.0  | 9.0         | 25                  | 20   | 40   | 30   | 30   | 20   | 25                  | 20   | 40   | 30     | 25         | 15   | A01        | m                   | 33.95    |

L = low range [ $f_L$  to  $10f_L$ ]

M = mid range [ $10f_L$  to  $f_U/2$ ]  
m = mid band [ $2f_L$  to  $f_U/2$ ]

U = upper range [ $f_U/2$  to  $f_U$ ]

## NOTES:

- Average of conversion loss at center of mid-band frequency ( $f_L + f_U/4$ )
- $\sigma$  Standard deviation
- Non-hermetic
- ▼ When ordering, specify BNC or SMA connectors.
- \* L=50-100 MHz; M=100-500 MHz
- \*\* Below 10 MHz IF, conversion loss increase up to 6 dB higher as frequency decreases to DC.
- A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in General Information (Section 0).
- B. Connector types and case mounted options, case finishes are given in section 0, see "Case Styles & Outline Drawings".
- C. Prices and Specifications subject to change without notice.
- 1. Absolute maximum power, voltage and current ratings:
  - 1a. RF power 50mW;
  - 1b. Peak IF current, 40mA

## NSN GUIDE

| MCL NO. | NSN              |
|---------|------------------|
| TFM-15  | 5895-01-292-2759 |
| ZFM-15  | 5895-01-412-3035 |
| ZFM-150 | 5895-01-217-6878 |



Distribution Centers NORTH AMERICA 800-654-7949 • 417 335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

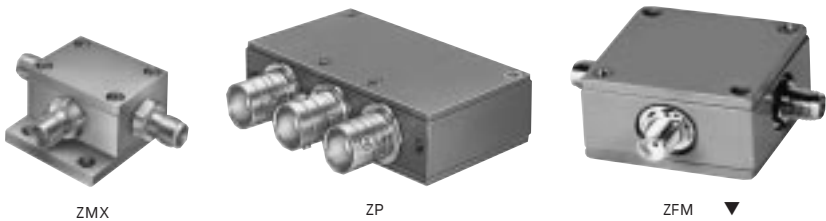
INTERNET <http://www.minicircuits.com>

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

ISO 9001 CERTIFIED

020430

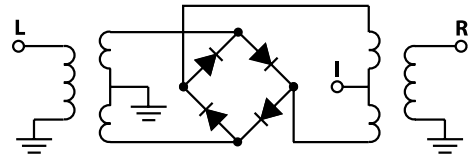
Coaxial



+10 dBm LO, up to +5 dBm RF

| MODEL NO. | FREQUENCY MHz                           |         | CONVERSION LOSS dB |          |      |                  | LO-RF ISOLATION, dB |           |           |           |           |           | LO-IF ISOLATION, dB |           |           |           |        |    | CASE STYLE | C O N N E C T I O N | PRICE \$ |
|-----------|-----------------------------------------|---------|--------------------|----------|------|------------------|---------------------|-----------|-----------|-----------|-----------|-----------|---------------------|-----------|-----------|-----------|--------|----|------------|---------------------|----------|
|           | LO/RF<br>f <sub>L</sub> -f <sub>U</sub> | IF      | Mid-Band m         |          |      | Total Range Max. | L<br>Typ.           | M<br>Min. | M<br>Typ. | U<br>Min. | U<br>Typ. | L<br>Typ. | M<br>Min.           | M<br>Typ. | U<br>Min. | U<br>Typ. | Note B |    |            |                     |          |
|           |                                         |         | $\bar{x}$          | $\sigma$ | Max. |                  |                     |           |           |           |           |           |                     |           |           |           |        |    |            |                     |          |
| ZMX-7GLHR | 3700-7000                               | DC-1500 | 5.4                | .30      | —    | 8.5              | 33 (Typ.)           | 20 (Min.) |           |           |           | 35 (Typ.) | 20 (Min.)           |           |           |           | BU413  | af | 71.95      |                     |          |
| ZMX-8GLH  | 3700-8000                               | DC-2000 | 5.5                | .20      | —    | 8.5              | 40 (Typ.)           | 20 (Min.) |           |           |           | 18 (Typ.) | 8 (Min.)            |           |           |           | BU413  | ad | 74.95      |                     |          |
| ZP-1LH    | 2-600                                   | DC-600  | 6.0                | .17      | 7.0  | 8.0              | 70                  | 50        | 50        | 30        | 42        | 25        | 65                  | 45        | 50        | 30        | 41     | 22 | GG60       | ag                  | 41.95    |
| ZP-3LH    | 0.15-400                                | DC-400  | 4.8                | .37      | 7.0  | 8.0              | 67                  | 50        | 51        | 30        | 40        | 25        | 67                  | 40        | 45        | 25        | 34     | 20 | GG60       | ag                  | 41.95    |
| ZP-5LH    | 20-1500                                 | DC-1000 | 6.9                | .27      | 8.5  | 9.0              | 53                  | 40        | 42        | 30        | 38        | 25        | 40                  | 25        | 30        | 18        | 22     | 8  | GG60       | ag                  | 45.95    |
| ZP-11ALH  | 1400-1900                               | 40-500  | 7.0                | .20      | 8.6  | 8.6              | 36 (Typ.)           | 20 (Min.) |           |           |           |           | 28 (Typ.)           | 15 (Min.) |           |           |        |    | GG60       | ag                  | 45.95    |
| ZP-860LH  | 800-1050                                | DC-250  | 6.3                | .27      | 7.9  | 7.9              | 35 (Typ.)           | 25 (Min.) |           |           |           |           | 27 (Typ.)           | 18 (Min.) |           |           |        |    | GG60       | ag                  | 45.95    |
| ZFM-15    | 10-3000                                 | 10-800  | 6.13               | .14      | 8.0  | 8.5              | 35                  | 25        | 35        | 25        | 35        | 25        | 30                  | 20        | 30        | 20        | 30     | 20 | K18        | ad                  | 89.95    |
| ZFM-150** | 10-2000                                 | DC-1000 | 6.05               | .12      | 8.0  | 8.0              | 32                  | 25        | 35        | 25        | 35        | 20        | 33                  | 20        | 30        | 20        | 25     | 20 | K18        | ad                  | 69.95    |

L = low range [ $f_L$  to  $10 f_L$ ]      M = mid range [ $10 f_L$  to  $f_U/2$ ]      U = upper range [ $f_U/2$  to  $f_U$ ]  
m = mid band [ $2f_L$  to  $f_U/2$ ]



pin and coaxial connections see case style outline drawings for pin locations

| PORT     | d       | h       | j       | m       | s       | z | aa | ad | af | ag | ah |
|----------|---------|---------|---------|---------|---------|---|----|----|----|----|----|
| LO       | 8       | 8       | 8       | 8       | 1       | 4 | 1  | 1  | 2  | L  | 4  |
| RF       | 1       | 1       | 3,4^    | 1       | 8       | 1 | 4  | 2  | 1  | R  | 2  |
| IF       | 3,4^    | 3,4^    | 1       | 3       | 3       | 2 | 2  | 3  | 3  | X  | 1  |
| GND EXT. | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 3 | 3  | —  | —  | —  | 3  |
| CASE GND | —       | 2,5,6   | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 3 | 3  | —  | —  | —  | 3  |
| NOT USED | —       | —       | —       | 4       | 4       | — | —  | —  | —  | —  | —  |

^ pins must be connected together externally

