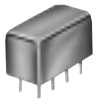
# FREQUENCY MIXERS

Plug-In

## LEVEL 17 10 kHz to 3 GHz


SBL/SIMA


SRA


TFM/TUF


TAK

### +17 dBm LO, up to +10 dBm RF

| | MODEL NO. | FREQUENCY MHz LO/RF $f_L$-$f_U$ | IF | CONVERSION LOSS dB Mid-Band m $\bar{x}$ | σ | Max. | Total Range Max. | LO-RF ISOLATION, dB L Typ. | Min. | M Typ. | Min. | U Typ. | Min. | LO-IF ISOLATION, dB L Typ. | Min. | M Typ. | Min. | U Typ. | Min. | CASE STYLE Note B | CONNECTION | PRICE $ Qty. (1-9) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ❑ | SBL-173H | 5-1200 | 1-1200 | 5.70 | .10 | 7.0 | 8.5 | 40 | 35 | 35 | 25 | 35 | 20 | 40 | 35 | 35 | 20 | 30 | 20 | A06 | u,f | 17.95 |
| | SRA-1H | .5-500 | DC-500 | 6.01 | .08 | 7.5 | 8.5 | 55 | 45 | 45 | 30 | 35 | 25 | 45 | 35 | 40 | 30 | 30 | 20 | A01 | e | 22.95 |
| | SRA-1WH | 1-750 | DC-750 | 5.85 | .11 | 7.5 | 8.5 | 50 | 40 | 45 | 25 | 35 | 25 | 45 | 35 | 40 | 30 | 30 | 20 | A01 | f | 26.95 |
| | SRA-2H | 2-1000 | DC-1000 | 6.34 | .14 | 7.5 | 10.0 | 50 | 40 | 35 | 25 | 35 | 25 | 45 | 30 | 30 | 20 | 25 | 20 | A01 | f | 40.95 |
| | SRA-3H | .05-200 | DC-200 | 5.18 | .05 | 7.0 | 7.5 | 50 | 45 | 40 | 30 | 35 | 25 | 45 | 35 | 40 | 30 | 30 | 20 | A01 | e | 24.95 |
| | SRA-11H | 10-3000 | 10-1000 | 6.83 | .09 | 10.0 | 12.0 | 27 | 20 | 25 | 18 | 23 | 16 | 27 | 20 | 25 | 18 | 23 | 16 | A01 | m | 48.95 |
| | SRA-17WH | 20-700 | 5-340 | 7.7 | .01 | 9.0 | 10.5 | 60 | 45 | 55 | 40 | 50 | 32 | 50 | 32 | 45 | 25 | 32 | 18 | A01 | f | 24.95 |
| | SRA-173H** | 5-1200 | DC-1200 | 5.38 | .05 | 7.0 | 8.5 | 40 | 35 | 35 | 25 | 35 | 20 | 40 | 35 | 35 | 20 | 30 | 20 | A01 | u,f | 33.95 |
| | SIMA-5H | 2-1500 | DC-1000 | 6.94 | .07 | 8.5 | 8.5 | 65 | 35 | 44 | 23 | 40 | 22 | 54 | 25 | 30 | 23 | 25 | 13 | A06 | m | 34.95 |
| ❑ | TUF-18DH | 100-1800 | 50-750 | 7.3 | .15 | 8.5 | 9.0 | 41 (Typ.) | | 23 (Min.) | | | | 33 (Typ.) | | 20 (Min.) | | | | B02 | z | 23.95 |

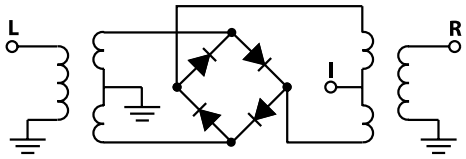
### +17 dBm LO, up to +14 dBm RF

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | TFM-1H | 2-500 | DC-500 | 6.14 | .11 | 7.5 | 8.5 | 50 | 45 | 40 | 30 | 30 | 20 | 45 | 40 | 35 | 25 | 25 | 20 | B02 | z | 27.95 |
| | TFM-2H | 5-1000 | DC-1000 | 6.12 | .12 | 7.0 | 10.0 | 50 | 45 | 40 | 30 | 30 | 20 | 45 | 40 | 35 | 25 | 25 | 17 | B02 | z | 38.95 |
| | TFM-3H | .1-250 | DC-250 | 4.58 | .11 | 7.0 | 8.5 | 50 | 45 | 40 | 30 | 28 | 23 | 45 | 40 | 35 | 25 | 26 | 20 | B02 | z | 27.95 |
| † | TFM-4H | 5-1200 | DC-1200 | 5.24 | .05 | 8.0 | 9.0 | 50 | 40 | 35 | 25 | 30 | 20 | 50 | 40 | 35 | 20 | 30 | 20 | B13 | z | 41.20 |
| ❑ | TUF-1H | 2-600 | DC-600 | 5.90 | .18 | 7.0 | 8.0 | 68 | 50 | 50 | 30 | 43 | 25 | 62 | 45 | 48 | 30 | 33 | 22 | B02 | z | 10.20 |
| ❑ | TUF-2H | 50-1000 | DC-1000 | 6.20 | .22 | 7.5 | 9.0 | 58 | 40 | 47 | 30 | 42 | 25 | 58 | 35 | 44 | 25 | 28 | 18 | B02 | z | 11.20 |
| ❑ | TUF-3H | 0.15-400 | DC-400 | 5.00 | .33 | 7.0 | 8.0 | 60 | 50 | 50 | 35 | 40 | 30 | 60 | 40 | 45 | 25 | 35 | 20 | B02 | z | 12.45 |
| ❑ | TUF-5H | 20-1500 | DC-1000 | 7.50 | .17 | 8.5 | 9.0 | 62 | 55 | 50 | 40 | 38 | 25 | 40 | 25 | 29 | 18 | 20 | 8 | B02 | z | 15.45 |
| ❑ | TUF-11AH | 1400-1900 | 40-500 | 7.30 | .28 | 9.0 | 9.0 | 35 (Typ.) | | 25 (Min.) | | | | 30 (Typ.) | | 15 (Min.) | | | | B02 | z | 23.95 |
| ❑ | TUF-860H | 800-1050 | DC-250 | 6.80 | .31 | 8.3 | 8.3 | 38 (Typ.) | | 25 (Min.) | | | | 24 (Typ.) | | 18 (Min.) | | | | B02 | z | 15.45 |
| | TAK-1H | 2-500 | DC-500 | 5.93 | .08 | 7.5 | 8.5 | 50 | 40 | 40 | 30 | 30 | 25 | 45 | 35 | 35 | 25 | 25 | 20 | A05 | e | 23.45 |
| | TAK-1WH | 5-750 | DC-750 | 5.71 | .08 | 7.5 | 9.0 | 50 | 40 | 40 | 30 | 30 | 25 | 45 | 35 | 35 | 25 | 30 | 20 | A05 | f | 27.95 |
| | TAK-3H | .05-300 | DC-300 | 4.82 | .09 | 7.0 | 8.5 | 55 | 45 | 40 | 30 | 30 | 25 | 50 | 40 | 35 | 25 | 25 | 20 | A05 | e | 25.45 |
| | SRA-2500SH | 5-2500 | 1-1000 | 5.8 | .10 | 7.5 | 10.5 | 40 | 25 | 37 | 28 | 30 | 18 | 50 | 35 | 42 | 25 | 25 | 17 | A06 | f | 37.95 |

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 [2$f_L$ to $f_U$/2]

NOTES:

$\bar{x}$ Average of conversion loss at center of mid-band frequency ($f_L$+$f_U$/4)
σ Standard deviation
❑ Non-hermetic
** Below 1 MHz IF, conversion loss increases up to 6 dB higher as frequency decreases to DC.
† Phase detection, positive polarity.
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 200mW 1b. Peak IF current, 40mA
2. Two-Tone 3rd order IM below IF, each tone at 0dBm (200 and 202 MHz), LO at +17dBm (180 MHz). All models 60dB typ., 55dB min. , except 55 dB typ., 45 dBm min. for TFM-3H, TAK-3H, ZFM-3H, ZLW-3SH, ZAD-3SH.

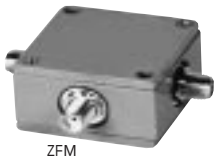



010326

# LEVEL 17 50 kHz to 8 GHz


ZLW


ZAD


ZFM


ZP


ZMX

## +17 dBm LO, up to +10 dBm RF

| MODEL NO. | FREQUENCY MHz LO/RF $f_L$-$f_U$ | IF | CONVERSION LOSS dB Mid-Band m $\bar{x}$ | σ | Max. | Total Range Max. | LO-RF ISOLATION, dB L Typ. | Min. | M Typ. | Min. | U Typ. | Min. | LO-IF ISOLATION, dB L Typ. | Min. | M Typ. | Min. | U Typ. | Min. | CASE STYLE Note B | CONNECTION | PRICE $ Qty. (1-9) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ZLW-1H | .5-500 | DC-500 | 6.13 | .08 | 7.5 | 8.5 | 55 | 45 | 45 | 30 | 35 | 25 | 45 | 35 | 40 | 30 | 30 | 20 | M21 | ae | 56.95 |
| ZLW-2H | 2-1000 | DC-1000 | 6.34 | .14 | 7.5 | 10.0 | 50 | 40 | 35 | 25 | 35 | 25 | 45 | 35 | 30 | 20 | 25 | 20 | M21 | ae | 64.95 |
| ZLW-11H | 10-3000 | 10-1000 | 6.83 | .09 | 10.0 | 12.0 | 27 | 20 | 25 | 18 | 23 | 16 | 27 | 20 | 25 | 18 | 23 | 16 | M21 | ae | 99.95 |
| ZAD-1H | .5-500 | DC-500 | 6.16 | .08 | 7.5 | 8.5 | 50 | 45 | 45 | 30 | 35 | 25 | 45 | 35 | 40 | 30 | 30 | 20 | M22 | ae | 48.95 |
| ZAD-3H | .05-200 | DC-200 | 4.89 | .09 | 7.0 | 7.5 | 55 | 45 | 45 | 30 | 35 | 25 | 45 | 35 | 40 | 30 | 30 | 20 | M22 | ae | 50.95 |
| ZAD-11H | 10-3000 | 10-1000 | 6.83 | .09 | 10.0 | 12.0 | 27 | 20 | 25 | 18 | 23 | 16 | 27 | 20 | 25 | 18 | 23 | 16 | M22 | ae | 89.95 |

## +17 dBm LO, up to +14 dBm RF

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ZFM-1H | 2-500 | DC-500 | 6.14 | .11 | 7.5 | 8.5 | 50 | 45 | 40 | 30 | 30 | 25 | 45 | 35 | 35 | 25 | 25 | 20 | K18 | ad | 64.95 |
| | ZFM-2H | 5-1000 | DC-1000 | 6.12 | .12 | 7.0 | 10.0 | 50 | 40 | 40 | 30 | 30 | 20 | 45 | 40 | 35 | 25 | 25 | 17 | K18 | ad | 71.95 |
| | ZFM-3H | .05-300 | DC-300 | 5.18 | .11 | 7.0 | 8.5 | 55 | 45 | 40 | 30 | 30 | 25 | 50 | 40 | 35 | 25 | 25 | 20 | K18 | ad | 64.95 |
| † | ZFM-4H | 5-1200 | DC-1200 | 4.97 | .11 | 8.0 | 9.0 | 50 | 40 | 35 | 25 | 30 | 20 | 50 | 40 | 35 | 20 | 30 | 20 | K18 | ad | 73.95 |
| | ZP-1H | 2-600 | DC-600 | 5.90 | .18 | 7.0 | 8.0 | 68 | 50 | 50 | 30 | 43 | 25 | 62 | 45 | 48 | 30 | 33 | 22 | GG60 | ag | 45.95 |
| | ZP-2H | 50-1000 | DC-1000 | 6.20 | .22 | 7.5 | 9.0 | 58 | 40 | 47 | 30 | 42 | 25 | 58 | 35 | 44 | 25 | 28 | 18 | GG60 | ag | 45.95 |
| | ZP-3H | 0.15-400 | DC-400 | 5.00 | .33 | 7.0 | 8.0 | 60 | 50 | 50 | 35 | 40 | 30 | 60 | 40 | 45 | 25 | 35 | 20 | GG60 | ag | 45.95 |
| | ZP-5H | 20-1500 | DC-1000 | 7.50 | .17 | 8.5 | 9.0 | 62 | 55 | 50 | 40 | 38 | 25 | 40 | 25 | 29 | 18 | 20 | 8 | GG60 | ag | 49.95 |
| | ZP-11AH | 1400-1900 | 40-500 | 7.30 | .28 | 9.0 | 9.0 | 35 (Typ.) | | 25 (Min.) | | | | 30 (Typ.) | | 15 (Min.) | | | | GG60 | ag | 49.95 |
| | ZMX-7GHR | 3700-7000 | DC-1000 | 5.3 | .30 | — | 8.5 | 33 (Typ.) | | 20 (Min.) | | | | 34 (Typ.) | | 20 (Min.) | | | | BU413 | af | 84.95 |
| | ZMX-8GH | 3700-8000 | DC-2000 | 5.8 | .30 | — | 8.5 | 40 (Typ.) | | 20 (Min.) | | | | 18 (Typ.) | | 8 (Min.) | | | | BU413 | ad | 89.95 |
| | ZLW-1SH | 2-500 | DC-500 | 5.93 | .08 | 7.5 | 8.5 | 50 | 40 | 40 | 30 | 30 | 25 | 45 | 35 | 35 | 25 | 25 | 20 | M21 | ae | 62.95 |
| | ZLW-1WSH | 5-750 | DC-750 | 5.83 | .07 | 7.5 | 9.0 | 50 | 45 | 40 | 30 | 30 | 20 | 45 | 40 | 35 | 25 | 30 | 20 | M21 | ae | 66.95 |
| | ZAD-1WSH | 5-750 | DC-750 | 5.64 | .08 | 7.5 | 9.0 | 50 | 45 | 40 | 30 | 30 | 20 | 45 | 40 | 35 | 25 | 30 | 20 | M22 | ae | 56.95 |

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 [2$f_L$ to $f_U$/2]

## pin and coaxial connections

see case style outline drawings

| PORT | e | f | m | u | x | z | ad | ae | af | ag |
|---|---|---|---|---|---|---|---|---|---|---|
| LO | 8 | 8 | 8 | 3,4 ^ | 2 | 4 | 1 | 1 | 2 | L |
| RF | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 | R |
| IF | 3,4 ^ | 3,4 ^ | 3 | 8 | 3 | 2 | 3 | 2 | 3 | X |
| GND EXT. | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 4,5,6 | 3 | — | — | — | — |
| CASE GND | 2 | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | — | 3 | — | — | — | — |
| NOT USED | — | — | 4 | — | — | — | — | — | — | — |

^ pins must be connected together externally

## NSN GUIDE

| MCL NO. | NSN | MIL-M-28837/1* |
|---|---|---|
| SRA-1H | 6625-00-594-0223 | 08 |
| SRA-1WH | 5895-00-576-0716 | |
| SRA-2H | 5895-01-063-1078 | |
| SRA-3H | 5895-01-117-4537 | |
| SRA-11H | 5895-01-192-0173 | |
| ZAD-1WH | 5895-01-045-4647 | |
| ZAD-3H | 5895-01-149-0771 | |
| ZLW-1H | 5985-01-080-7637 | |
| ZLW-1HB | 5962-01-045-7500 | |
| ZLW-1HB(SMA) | 5895-01-141-4646 | |

* units are not QPL listed

000807