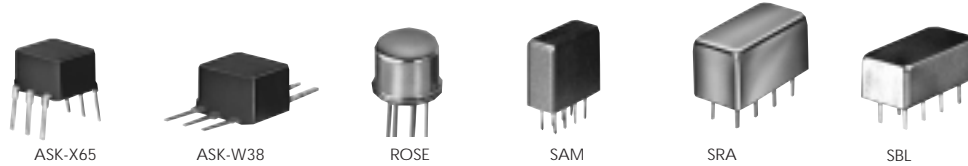


# FREQUENCY MIXERS

Plug-In & Flatpack

## LEVEL 7 500 Hz to 4.3 GHz



+7 dBm LO, up to +1 dBm RF

| MODEL NO.          | FREQUENCY MHz       |         | CONVERSION LOSS dB |          |      |                  | LO-RF ISOLATION, dB |        |        |                     |        | LO-IF ISOLATION, dB |                     |        |        |        | CASE STYLE | CONNECTOR | PRICE \$ |        |        |
|--------------------|---------------------|---------|--------------------|----------|------|------------------|---------------------|--------|--------|---------------------|--------|---------------------|---------------------|--------|--------|--------|------------|-----------|----------|--------|--------|
|                    | LO/RF $f_L$ - $f_U$ | IF      | Mid-Band $\bar{x}$ | $\sigma$ | Max. | Total Range Max. | L Typ.              | M Typ. | U Typ. | L Min.              | M Min. | U Min.              | L Typ.              | M Typ. | U Typ. | L Min. |            |           |          | M Min. | U Min. |
| ASK-1 <sup>†</sup> | 1-600               | DC-600  | 5.58               | .06      | 7.0  | 8.5              | 50                  | 30     | 35     | 25                  | 30     | 20                  | 45                  | 35     | 30     | 20     | 25         | 15        | W38      | w      | 6.95   |
| ROSE-1             | 1-600               | DC-600  | 5.08               | .03      | 6.5  | 7.5              | 40                  | 30     | 35     | 25                  | 30     | 20                  | 55                  | 40     | 40     | 20     | 25         | 18        | PP94     | ab     | 12.95  |
| ROSE-2             | 1-1000              | DC-1000 | 5.60               | .23      | 7.0  | 8.0              | 61                  | 45     | 37     | 22                  | 25     | 18                  | 55                  | 40     | 26     | 17     | 16         | 12        | PP94     | ab     | 18.95  |
| SAM-1              | 1-600               | DC-600  | 5.67               | .05      | 7.0  | 8.5              | 55                  | 45     | 45     | 30                  | 35     | 20                  | 50                  | 40     | 40     | 25     | 30         | 20        | A03      | e      | 18.95  |
| SRA-1              | .5-500              | DC-500  | 5.11               | .09      | 7.0  | 8.5              | 50                  | 45     | 45     | 30                  | 35     | 25                  | 45                  | 35     | 40     | 25     | 30         | 20        | A01      | e      | 14.45  |
| SRA-1W             | 1-750               | DC-750  | 5.80               | .04      | 7.5  | 8.5              | 50                  | 45     | 45     | 30                  | 35     | 25                  | 45                  | 30     | 40     | 25     | 30         | 20        | A01      | f      | 17.95  |
| SRA-1-1            | .1-500              | DC-500  | 4.81               | .11      | 7.5  | 8.5              | 50                  | 45     | 45     | 30                  | 35     | 25                  | 45                  | 30     | 40     | 25     | 30         | 20        | A01      | e      | 15.95  |
| SRA-2              | 1-1000              | 5-500   | 5.66               | .07      | 7.5  | 8.5              | 45                  | 30     | 35     | 20                  | 30     | 20                  | 45                  | 30     | 30     | 20     | 30         | 20        | A01      | j      | 17.95  |
| SRA-2CM            | 5-1000              | DC-1000 | 5.27               | .04      | 7.0  | 8.5              | 60                  | 50     | 35     | 30                  | 30     | 25                  | 50                  | 45     | 30     | 25     | 25         | 20        | A01      | f      | 15.95  |
| SRA-3              | .025-200            | DC-200  | 4.61               | .06      | 7.5  | 8.5              | 60                  | 50     | 45     | 35                  | 35     | 25                  | 45                  | 35     | 40     | 30     | 30         | 20        | A01      | e      | 17.95  |
| SRA-5              | 5-1500              | 10-600  | 6.69               | .07      | 8.0  | 8.5              | 50                  | 45     | 35     | 30                  | 30     | 20                  | 45                  | 40     | 30     | 25     | 25         | 15        | A06      | m      | 26.95  |
| SRA-6              | .003-100            | DC-100  | 4.58               | .05      | 7.5  | 8.5              | 60                  | 50     | 45     | 30                  | 35     | 25                  | 60                  | 45     | 40     | 25     | 30         | 20        | A01      | d      | 26.95  |
| SRA-8              | .0005-10            | DC-10   | 5.69               | .11      | 7.5  | 8.5              | 60                  | 50     | 50     | 40                  | 45     | 35                  | 60                  | 50     | 50     | 40     | 45         | 35        | A01      | d      | 31.95  |
| SRA-11             | 5-2000              | 10-600  | 6.72               | .07      | 8.5  | 9.0              | 50                  | 45     | 35     | 25                  | 30     | 20                  | 45                  | 40     | 30     | 20     | 25         | 15        | A06      | m      | 22.95  |
| SRA-12             | 800-1250            | 50-90   | 6.21               | .13      | 7.5  | 7.5              | 32                  | 25     | 35     | 25                  | 35     | 25                  | 30                  | 20     | 30     | 20     | 30         | 20        | A06      | m      | 31.95  |
| SRA-2000           | 100-2000            | DC-600  | 8.60               | .15      | 9.5  | 9.5              | 37 (Typ.) 20 (Min.) |        |        | 30 (Typ.) 20 (Min.) |        |                     | 30 (Typ.) 20 (Min.) |        |        | A06    | m          | 23.95     |          |        |        |
| SRA-2400           | 750-2400            | DC-400  | 5.95               | .26      | 9.0  | 9.0              | 30                  | 20     | 30     | 20                  | 30     | 20                  | 30                  | 8      | 30     | 8      | 30         | 8         | A06      | s      | 24.95  |
| SRA-3500**         | 500-3500            | DC-1000 | 7.28               | .31      | 9.5  | 9.5              | 30                  | 17     | 30     | 17                  | 30     | 17                  | 20                  | 8      | 20     | 8      | 20         | 8         | A06      | s      | 30.95  |
| SBL-1              | 1-500               | DC-500  | 5.60               | .09      | 7.0  | 8.0              | 60                  | 45     | 45     | 35                  | 40     | 25                  | 45                  | 35     | 40     | 25     | 30         | 20        | A06      | d      | 5.75   |
| SBL-1X             | 10-1000             | 5-500   | 5.88               | .10      | 7.5  | 8.0              | 50                  | 40     | 40     | 30                  | 30     | 20                  | 50                  | 45     | 40     | 35     | 35         | 25        | A06      | j      | 7.45   |
| SBL-1-1            | 0.1-400             | DC-400  | 4.84               | .04      | 7.0  | 8.0              | 50                  | 45     | 45     | 30                  | 35     | 25                  | 45                  | 30     | 40     | 25     | 30         | 20        | A06      | d      | 8.45   |
| SBL-3              | .025-200            | DC-200  | 4.81               | .05      | 7.5  | 8.5              | 55                  | 50     | 45     | 30                  | 35     | 25                  | 45                  | 35     | 40     | 30     | 30         | 20        | A06      | e      | 8.45   |
| SBL-11             | 5-2000              | 10-600  | 7.08               | .11      | 8.5  | 9.0              | 50                  | 45     | 35     | 25                  | 30     | 20                  | 45                  | 40     | 30     | 20     | 25         | 15        | A06      | m      | 21.95  |

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

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

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

### NOTES:

- $\bar{x}$  Average of conversion loss at center of mid-band frequency ( $f_L + f_U/4$ )
- $\sigma$  Standard deviation
- Non-hermetic
- † Phase detection, positive polarity
- ASK plug-in mounting case X65
- Below 10°C,  $f_L$  is 0.2 MHz.
- \* Conversion loss 9.5 dB maximum from 0.01 to 0.015 MHz
- \*\* Conversion loss 10dB maximum at IF=1000 MHz
- \*\*\*\* Blue bead pin 4
- A. General Quality Control Procedures, Environmental Specifications, Hi-Rel and MIL description are given in section 0, see "Mini-Circuits Guarantees Quality" article.
- 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, 50 mW
  - 1b. Peak IF current, 40 mA

### NSN GUIDE

| MCL NO. | NSN MIL-M-28837/1*  |
|---------|---------------------|
| ASK-1   | 5895-01-320-0366    |
| SAM-1   | 5895-01-117-2926    |
| SAM-2   | 5895-01-165-6621    |
| SAM-3   | 5895-01-062-9973    |
| SBL-1   | 5895-01-126-4913    |
| SBL-1X  | 5895-01-179-8084    |
| SRA-1   | 5895-00-008-8272 03 |
| SRA-1-1 | 5962-01-113-5431    |
| SRA-1W  | 5895-01-163-0433 09 |
| SRA-3   | 5895-01-021-5914    |
| SRA-6   | 5895-01-124-0117    |
| SRA-8   | 5985-01-081-0977    |
| SRA-11  | 5895-01-273-0883    |
| SBL-3   | 5895-01-326-6030    |
| TAK-5   | 5895-01-271-0842    |
| TAK-6   | 5895-01-231-2372    |
| TFM-2   | 5895-01-135-1852    |
| TFM-3   | 5895-01-112-0031    |
| TFM-4   | 5895-01-317-9388    |
| TFM-11  | 5895-01-409-1158    |
| TFM-12  | 5895-01-179-5686    |
| TSM-3   | 5895-01-373-2444    |

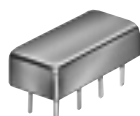


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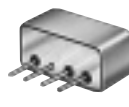
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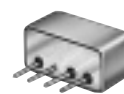
TAK



TSM



TFM



TUF

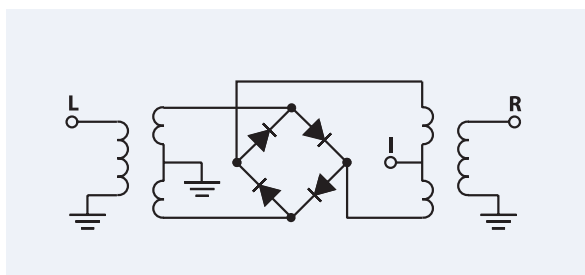
+7 dBm LO, up to +1 dBm RF

| MODEL NO. | FREQUENCY MHz   |         | CONVERSION LOSS dB |                  |     |      | LO-RF ISOLATION, dB |    |    | LO-IF ISOLATION, dB |        |            | CASE STYLE | CONSTRUCTION | PRICE \$ |    |    |    |     |    |       |
|-----------|-----------------|---------|--------------------|------------------|-----|------|---------------------|----|----|---------------------|--------|------------|------------|--------------|----------|----|----|----|-----|----|-------|
|           | LO/RF $f_L-f_U$ | IF      | Mid-Band m         | Total Range Max. | L   | M    | U                   | L  | M  | U                   | Note B | Qty. (1-9) |            |              |          |    |    |    |     |    |       |
| TAK-5*    | .01-250         | DC-250  | 4.65               | .02              | 7.0 | 8.5  | 60                  | 50 | 50 | 35                  | 40     | 35         | 55         | 45           | 45       | 30 | 35 | 25 | A04 | e  | 22.95 |
| TAK-6     | .5-600          | DC-600  | 5.58               | .04              | 7.5 | 8.5  | 60                  | 50 | 50 | 30                  | 40     | 25         | 55         | 45           | 45       | 30 | 30 | 20 | A04 | e  | 22.95 |
| TSM-3     | .1-500          | DC-500  | 4.75               | .04              | 7.5 | 8.5  | 60                  | 50 | 50 | 35                  | 35     | 25         | 55         | 45           | 45       | 30 | 35 | 25 | A11 | e  | 23.95 |
| TFM-2     | 1-1000          | DC-1000 | 5.74               | .07              | 7.5 | 8.5  | 50                  | 45 | 40 | 25                  | 30     | 25         | 45         | 40           | 35       | 25 | 25 | 18 | B02 | z  | 14.95 |
| † TFM-3•• | 0.04-400        | DC-400  | 4.70               | .06              | 7.0 | 8.0  | 60                  | 50 | 50 | 35                  | 35     | 25         | 55         | 40           | 45       | 30 | 35 | 25 | B02 | z  | 23.45 |
| † TFM-4   | 5-1250          | DC-1250 | 6.47               | .05              | 7.5 | 8.5  | 50                  | 45 | 40 | 30                  | 30     | 25         | 45         | 40           | 35       | 25 | 25 | 20 | B02 | z  | 25.45 |
| TFM-11    | 1-2000          | 5-600   | 7.16               | .07              | 8.5 | 9.0  | 50                  | 45 | 35 | 25                  | 25     | 20         | 45         | 40           | 27       | 20 | 25 | 20 | B13 | z  | 48.95 |
| TFM-12    | 800-1250        | 50-90   | 5.71               | .14              | —   | 7.5  | 35                  | 25 | 35 | 25                  | 35     | 25         | 30         | 20           | 30       | 20 | 30 | 20 | B13 | z  | 48.95 |
| TFM-2400  | 750-2400        | DC-400  | 6.65               | .20              | —   | 9.0  | 30                  | 20 | 30 | 20                  | 30     | 20         | 30         | 10           | 30       | 10 | 30 | 10 | B13 | aa | 30.95 |
| TFM-4300  | 300-4300        | DC-800  | 5.87               | .13              | —   | 10.5 | 30                  | 20 | —  | —                   | 30     | 17         | 15         | 7            | —        | —  | 10 | 7  | B13 | aa | 40.95 |
| □ TUF-1   | 2-600           | DC-600  | 5.85               | .04              | 7.0 | 8.0  | 60                  | 50 | 42 | 30                  | 37     | 25         | 60         | 45           | 47       | 30 | 36 | 22 | B02 | z  | 5.25  |
| □ TUF-2   | 50-1000         | DC-1000 | 5.85               | .07              | 7.5 | 9.0  | 58                  | 40 | 47 | 30                  | 42     | 25         | 50         | 35           | 44       | 20 | 29 | 18 | B02 | z  | 6.20  |
| □ TUF-3   | 0.15-400        | DC-400  | 4.7                | .02              | 7.0 | 8.0  | 60                  | 50 | 46 | 30                  | 35     | 25         | 60         | 40           | 47       | 25 | 35 | 20 | B02 | z  | 7.05  |
| □ TUF-5   | 20-1500         | DC-1000 | 5.7                | .04              | 9.0 | 9.0  | 54                  | 40 | 42 | 30                  | 39     | 25         | 40         | 25           | 32       | 18 | 23 | 8  | B02 | z  | 10.45 |

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

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

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



pin connections see case style outline drawings

| PORT     | d       | e       | f       | j       | m       | p       | s       | w     | z | aa | ab |
|----------|---------|---------|---------|---------|---------|---------|---------|-------|---|----|----|
| LO       | 8       | 8       | 8       | 8       | 8       | 8       | 1       | 1     | 4 | 1  | 1  |
| RF       | 1       | 1       | 1       | 3,4^    | 1       | 2       | 8       | 4     | 1 | 4  | 3  |
| IF       | 3,4^    | 3,4^    | 3,4^    | 1       | 3       | 5,6^    | 3       | 5     | 2 | 2  | 2  |
| GND EXT. | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 1,3,4,7 | 2,5,6,7 | 2,3,6 | 3 | 3  | 4  |
| CASE GND | —       | 2       | 2,5,6,7 | 2,5,6,7 | 2,5,6,7 | 3,4,7   | 2,5,6,7 | —     | 3 | 3  | 4  |
| NOT USED | —       | —       | —       | —       | 4       | —       | 4       | —     | — | —  | —  |

^ pins must be connected together externally



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