

# FREQUENCY MIXERS

Surface Mount

LEVEL 7 150 kHz to 6 GHz



ASK-KK81



†JMS



†LRMS-J



†RMS

+7 dBm LO, up to +1 dBm RF

| MODEL NO.    | FREQUENCY MHz   |         | CONVERSION LOSS dB |     |     |                  | LO-RF ISOLATION dB |        |           |        |        |        | LO-IF ISOLATION dB |        |           |        |        |        | IP3@ center band Typ. (dBm) | E factor | CASE STYLE | CONNECTION | PCB Lay-out PL | PRICE \$ Qty. (1-9) |
|--------------|-----------------|---------|--------------------|-----|-----|------------------|--------------------|--------|-----------|--------|--------|--------|--------------------|--------|-----------|--------|--------|--------|-----------------------------|----------|------------|------------|----------------|---------------------|
|              | LO/RF $f_L-f_U$ | IF      | Mid-Band $\bar{x}$ | m   | σ   | 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-KK81   | 1-600           | DC-600  | 5.58               | .06 | 7.0 | 8.5              | 50                 | 30     | 35        | 25     | 30     | 20     | 45                 | 35     | 30        | 20     | 25     | 15     | 14                          | 0.7      | KK81       | w          | 082            | 6.95                |
| † ASK-2-KK81 | 1-1000          | DC-1000 | 6.79               | .10 | 8.0 | 9.8              | 60                 | 40     | 35        | 18     | 26     | 16     | 50                 | 30     | 25        | 17     | 15     | 10     | 12                          | 0.5      | KK81       | w          | 082            | 8.25                |
| JMS-1        | 2-500           | DC-500  | 5.75               | .10 | 7.0 | 8.0              | 55                 | 50     | 45        | 30     | 40     | 25     | 55                 | 45     | 45        | 25     | 32     | 20     | 16                          | 0.9      | BH292      | ht         | 052            | 4.95                |
| JMS-2        | 20-1000         | DC-1000 | 7.0                | .15 | 8.4 | 9.5              | 63                 | 40     | 50        | 28     | 35     | 20     | 56                 | 30     | 47        | 22     | 37     | 20     | 17                          | 1.0      | BH292      | ht         | 052            | 7.45                |
| JMS-2W       | 5-1200          | DC-500  | 6.8                | .10 | 8.0 | 9.0              | 60                 | 40     | 60        | 30     | 37     | 20     | 60                 | 40     | 48        | 20     | 31     | 15     | 17                          | 1.0      | BH292      | ht         | 052            | 7.95                |
| JMS-11X      | 5-1900          | 5-1000  | 6.7                | .15 | 8.2 | 9.8              | 58                 | 45     | 35        | 20     | 27     | 18     | 56                 | 45     | 37        | 20     | 27     | 20     | 9                           | 0.2      | BH292      | hu         | 052            | 4.25***             |
| ◆ LRMS-1J    | 0.5-500         | DC-500  | 5.94               | .05 | 7.0 | 8.5              | 55                 | 50     | 33        | 25     | 27     | 20     | 55                 | 45     | 30        | 23     | 24     | 19     | 15                          | 0.8      | QQQ569     | w          | 083            | 6.25                |
| ◆ LRMS-2J    | 5-1000          | DC-1000 | 6.67               | .26 | 8.0 | 9.5              | 60                 | 40     | 40        | 20     | 25     | 18     | 55                 | 30     | 30        | 20     | 20     | 12     | 16                          | 0.9      | QQQ569     | w          | 083            | 6.95                |
| ◆ LRMS-5J    | 5-1500          | DC-1000 | 5.92               | .34 | 7.5 | 9.5              | 60                 | 40     | 40        | 20     | 30     | 18     | 55                 | 30     | 30        | 18     | 15     | 8      | 12                          | 0.5      | QQQ569     | w          | 083            | 13.95               |
| ◆ LRMS-30J   | 200-3000        | DC-1000 | 6.8                | .30 | 9.0 | 9.8              | 30 (typ.)          |        | 17 (min.) |        |        |        | 27 (typ.)          |        | 7 (min.)  |        |        |        | 14                          | 0.7      | QQQ569     | w          | 083            | 7.95***             |
| RMS-1        | 0.5-500         | DC-500  | 5.94               | .05 | 7.0 | 8.5              | 55                 | 50     | 33        | 25     | 27     | 20     | 55                 | 45     | 30        | 23     | 24     | 19     | 20                          | 1.3      | TT240      | w          | 052            | 6.25                |
| RMS-1W       | 2-750           | DC-750  | 5.83               | .21 | 7.5 | 8.5              | 70                 | 45     | 45        | 28     | 38     | 22     | 60                 | 45     | 40        | 25     | 30     | 20     | 17                          | 1.0      | TT240      | w          | 052            | 6.75                |
| RMS-2        | 5-1000          | DC-1000 | 6.67               | .26 | 8.0 | 9.5              | 60                 | 40     | 40        | 20     | 25     | 18     | 55                 | 30     | 30        | 20     | 20     | 12     | 17                          | 1.0      | TT240      | w          | 052            | 6.95                |
| RMS-2D       | 5-1000          | DC-1000 | 6.81               | .06 | 8.0 | 10.0             | 59                 | 40     | 40        | 30     | 33     | 22     | 55                 | 30     | 40        | 22     | 30     | 20     | 17                          | 1.0      | TT240      | w          | 052            | 7.25                |
| RMS-2U       | 10-1000         | 10-750  | 6.79               | .16 | 8.0 | 9.5              | 55                 | 40     | 40        | 30     | 30     | 25     | 55                 | 30     | 35        | 25     | 30     | 22     | 10                          | 0.3      | TT240      | w          | 052            | 11.45               |
| RMS-5        | 5-1500          | DC-1000 | 5.92               | .34 | 7.5 | 9.5              | 60                 | 40     | 40        | 20     | 30     | 18     | 55                 | 30     | 30        | 18     | 15     | 8      | 13                          | 0.6      | TT240      | w          | 052            | 13.95               |
| RMS-11A      | 1500-1900       | 40-400  | 7.44               | .36 | —   | 9.0              | 25 (typ.)          |        | 17 (min.) |        |        |        | 23 (typ.)          |        | 15 (min.) |        |        |        | 4                           | -0.3     | TT240      | w          | 052            | 16.95               |
| ⊕ RMS-11F    | 350-2000        | DC-400  | 5.5                | .20 | 7.0 | 9.2              | 37                 | 26     | 36        | 20     | 32     | 20     | 22                 | 14     | 29        | 20     | 28     | 20     | 12                          | 0.5      | TT240      | w          | 052            | 4.95***             |
| RMS-11X      | 5-1900          | 5-1000  | 7.1                | .10 | 8.2 | 9.8              | 58                 | 45     | 35        | 20     | 27     | 18     | 56                 | 45     | 37        | 20     | 27     | 20     | 10                          | 0.3      | TT240      | gk         | 052            | 3.95***             |
| RMS-30       | 200-3000        | DC-1000 | 6.5                | .20 | 9.0 | 9.8              | 27 (typ.)          |        | 17 (min.) |        |        |        | 20 (typ.)          |        | 7 (min.)  |        |        |        | 11                          | 0.4      | TT240      | w          | 052            | 6.95***             |

E = (IP3(dBm)-LO Power(dBm))/10

L = low range ( $f_L$  to  $10f_L$ )

M = mid range ( $10f_L$  to  $f_U/2$ )  
m = mid band ( $2f_L$  to  $f_U/2$ )

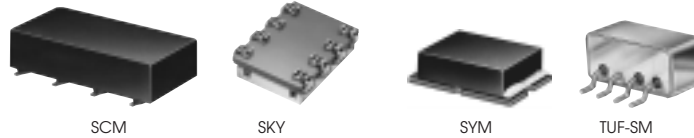
U = upper range ( $f_U/2$  to  $f_U$ )

## NOTES:

- $\bar{x}$  Average of conversion loss at center of mid-band frequency ( $f_L+f_U/4$ )
- $\sigma$  Standard deviation
- ◆ Aqueous washable. For non-aqueous requirements, LRMS units available in case style QQQ130
- † Phase detection, positive polarity
- ⊕ Frequency ranges specified: m = 350-1000 MHz, L = 350-750 MHz, M = 750-1000 MHz, U = 1000-2000 MHz
- \*\*\* Price for quantities 10-49
- A. Environmental specifications and re-flow soldering information available in General Information Section.
- B. Units are non-hermetic unless otherwise noted. For details on case dimensions & finishes 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

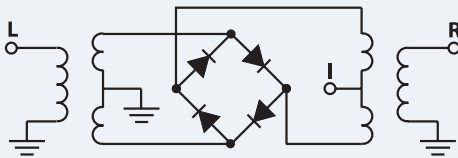
## NSN GUIDE

| MCL NO. | NSN              |
|---------|------------------|
| LRMS-1  | 5895-01-477-4173 |
| RMS-1   | 5895-01-415-6798 |
| RMS-2   | 5895-01-447-3489 |
| RMS-2TR | 5895-01-382-2092 |
| SCM-1NL | 5895-01-374-9561 |



+7 dBm LO, up to +1 dBm RF

| MODEL NO. | FREQUENCY MHz   |         | CONVERSION LOSS dB     |          |      |                  | LO-RF ISOLATION dB  |             |             |                     |             |             | LO-IF ISOLATION dB |             |             |             |             |             | IP3@ center band Typ. (dBm) | E f a c t o r | CASE STYLE | CONNECTION | PCB Lay-out PL- | PRICE \$ Qty. (1-9) |
|-----------|-----------------|---------|------------------------|----------|------|------------------|---------------------|-------------|-------------|---------------------|-------------|-------------|--------------------|-------------|-------------|-------------|-------------|-------------|-----------------------------|---------------|------------|------------|-----------------|---------------------|
|           | LO/RF $f_L-f_U$ | IF      | Mid-Band $\frac{m}{x}$ | $\sigma$ | Max. | Total Range Max. | L Typ. Min.         | M Typ. Min. | U Typ. Min. | L Typ. Min.         | M Typ. Min. | U Typ. Min. | L Typ. Min.        | M Typ. Min. | U Typ. Min. | L Typ. Min. | M Typ. Min. | U Typ. Min. |                             |               |            |            |                 |                     |
| SCM-1     | 1-500           | DC-500  | 5.72                   | .10      | 7.0  | 8.0              | 60                  | 40          | 45          | 35                  | 40          | 30          | 50                 | 40          | 45          | 35          | 40          | 25          | 10                          | 0.3           | YY101      | d          | 084             | 4.25                |
| SCM-2     | 5-1000          | DC-500  | 5.76                   | .03      | 8.3  | 9.8              | 50                  | 40          | 40          | 25                  | 35          | 20          | 55                 | 30          | 40          | 25          | 30          | 18          | 11                          | 0.4           | YY101      | k          |                 | 5.45                |
| SCM-2500  | 500-2500        | DC-500  | 5.88                   | .08      | 6.9  | 10.0             | 35                  | 22          | 35          | 22                  | 35          | 22          | 18                 | 12          | 18          | 12          | 18          | 12          | 13                          | 0.6           | YY101      | r          | 130             | 11.95               |
| SKY-7G    | 2000-7000       | DC-1000 | 7.0                    | .10      | —    | 9.8              | 28 (typ.) 15 (min.) |             |             | 20 (typ.) 7 (min.)  |             |             | 11                 |             |             | 0.4         |             |             | 11                          | 0.4           | BJ398      | je         |                 | 16.95               |
| SKY-42    | 2000-4200       | DC-1200 | 5.0                    | .30      | —    | 8.5              | 31 (typ.) 20 (min.) |             |             | 17 (typ.) 12 (min.) |             |             | 9                  |             |             | 0.2         |             |             | 9                           | 0.2           | BJ398      | je         |                 | 14.95               |
| SKY-60    | 2500-6000       | DC-1500 | 6.2                    | .20      | —    | 9.7              | 28 (typ.) 17 (min.) |             |             | 14 (typ.) 8 (min.)  |             |             | 11                 |             |             | 0.4         |             |             | 11                          | 0.4           | BJ398      | je         |                 | 14.95               |
| SYM-2     | 2-1000          | DC-1000 | 5.4                    | .10      | 7.2  | 9.5              | 70                  | 45          | 50          | 30                  | 40          | 25          | 63                 | 40          | 48          | 24          | 37          | 20          | 17                          | 1.0           | TTT166     | x          | 079             | 11.95               |
| SYM-11    | 1-2500          | 10-600  | 7.0                    | .30      | 9.0  | 10.5             | 63                  | 40          | 40          | 24                  | 34          | 20          | 61                 | 40          | 35          | 20          | 28          | 15          | 10                          | 0.3           | TTT167     | x          | 079             | 9.95                |
| SYM-12    | 5-1200          | DC-1000 | 6.5                    | .30      | 8.0  | 9.0              | 68                  | 45          | 50          | 30                  | 37          | 25          | 56                 | 40          | 46          | 25          | 29          | 18          | 16                          | 0.9           | TTT167     | x          | 079             | 9.45                |
| SYM-2500  | 1-2500          | DC-500  | 6.5                    | .10      | 8.5  | 9.8              | 70                  | 50          | 50          | 25                  | 36          | 20          | 60                 | 45          | 30          | 10          | 16          | 8           | 12                          | 0.5           | TTT167     | x          | 079             | 11.95               |
| TUF-1SM   | 2-600           | DC-600  | 5.85                   | .04      | 7.0  | 8.0              | 60                  | 50          | 42          | 30                  | 37          | 25          | 60                 | 45          | 47          | 30          | 36          | 22          | 16                          | 0.9           | NNN150     | z          | 081             | 5.25                |
| TUF-2SM   | 50-1000         | DC-1000 | 5.85                   | .07      | 7.5  | 9.0              | 58                  | 40          | 47          | 30                  | 42          | 25          | 50                 | 35          | 44          | 20          | 29          | 18          | 16                          | 0.9           | NNN150     | z          | 081             | 6.20                |
| TUF-3SM   | 0.15-400        | DC-400  | 4.7                    | .02      | 7.0  | 8.0              | 60                  | 50          | 46          | 30                  | 35          | 25          | 60                 | 40          | 47          | 25          | 35          | 20          | 11                          | 0.4           | NNN150     | z          | 081             | 7.05                |
| TUF-5SM   | 20-1500         | DC-1000 | 5.7                    | .04      | 9.0  | 9.0              | 54                  | 40          | 42          | 30                  | 39          | 25          | 40                 | 25          | 32          | 18          | 23          | 8           | 12                          | 0.5           | NNN150     | z          | 081             | 10.45               |

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 connections see case style outline drawings

| PORT       | d                | k       | r         | w     | x     | z      | gk    | ht <sup>1</sup> | hu <sup>2</sup> | hp        | je        | kv    |
|------------|------------------|---------|-----------|-------|-------|--------|-------|-----------------|-----------------|-----------|-----------|-------|
| LO         | 8                | 8       | 1         | 1     | 2     | 4      | 1     | 6               | 6               | 5         | 1         | 1     |
| RF         | 1                | 1       | 8         | 4     | 1     | 1      | 5     | 3               | 2               | 1         | 5         | 2     |
| IF         | 3,4 <sup>^</sup> | 3       | 3         | 5     | 3     | 2      | 4     | 2               | 3               | 7         | 7         | 3     |
| GND EXT.   | 2,5,6,7          | 2,5,6,7 | 2,4,5,6,7 | 2,3,6 | 4,5,6 | 3      | 2,3,6 | 1,4,5           | 1,4,5           | 2,3,4,6,8 | 2,3,4,6,8 | 4,5,6 |
| CASE GND   | —                | —       | —         | —     | —     | 3      | —     | —               | —               | —         | —         | —     |
| NOT USED   | —                | 4       | —         | —     | —     | —      | —     | —               | —               | —         | —         | —     |
| DEMO BOARD |                  |         | TB-171    | TB-03 | TB-12 | TB-201 |       | TB-03           |                 | TB-11     | TB-11     |       |

<sup>^</sup> pins must be connected together externally<sup>1</sup> pin connection physically same as w<sup>2</sup> pin connection physically same as gk

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