

## Non-Catalog Model

# Frequency Mixer

Level 7 (LO Power +7 dBm)

# SYM-42

### Important Note

This is a non-catalog model and can be manufactured on specific request.  
Pricing and delivery information can be supplied upon request.



Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : TTT167

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C |               |      |      |      |       |
|---------------------------------------|---------------|------|------|------|-------|
| Parameter                             |               | Min. | Typ. | Max. | Units |
| Frequency                             | LO (fL to fU) | 1000 |      | 4200 | MHz   |
|                                       | RF (fL to fU) | 1000 |      | 4200 | MHz   |
|                                       | IF            | 0    |      | 200  | MHz   |
| Conversion Loss                       | mid band      |      | 6.7  |      | dB    |
|                                       | Total Range   |      |      | 10.2 | dB    |
| LO-RF Isolation                       |               | 20   | 35   |      | dB    |
| LO-IF Isolation                       |               | 8    | 30   |      | dB    |
| 1 dB Comp. Input Power                |               |      | +1   |      | dBm   |

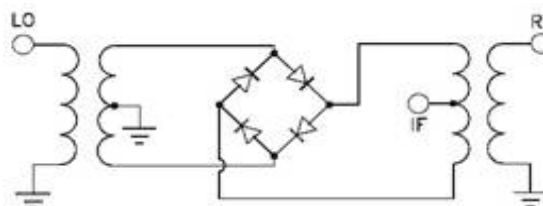
Notes: mid band =  $[2f_L \text{ to } f_U/2]$

Units are non-hermetic.

| MAXIMUM RATINGS       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 50mW           |
| IF Current            | 40mA           |

| PIN CONNECTIONS |         |
|-----------------|---------|
| LO              | 1       |
| RF              | 2       |
| IF              | 3       |
| GROUND          | 4, 5, 6 |

### Electrical Schematics



## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>IF FIXED<br>@IF(OUT)=30MHz<br>(dB) |       |      | RF<br>(IN)<br>(MHz) | LO<br>(MHz) | IP3 INPUT<br>(dBm) |       |       | RF<br>(IN)<br>(MHz) | LO<br>(MHz) | COMPRESSION<br>@RF IN=+1dBm<br>(dB) |       |       |
|---------------------|-------------|-------------------------------------------------------|-------|------|---------------------|-------------|--------------------|-------|-------|---------------------|-------------|-------------------------------------|-------|-------|
|                     |             | @LO (dBm)                                             |       |      |                     |             | @LO (dBm)          |       |       |                     |             | @LO (dBm)                           |       |       |
|                     |             | +4                                                    | +7    | +10  |                     |             | +4                 | +7    | +10   |                     |             | +4                                  | +7    | +10   |
| 300.1               | 330.1       | 11.94                                                 | 10.30 | 9.69 | 300.1               | 330.1       | 13.91              | 17.24 | 12.34 | 300.1               | 330.1       | -0.09                               | -0.01 | -0.04 |
| 400.1               | 430.1       | 10.66                                                 | 9.64  | 8.98 | 400.1               | 430.1       | 17.64              | 19.77 | 17.71 | 400.1               | 430.1       | 0.10                                | 0.05  | 0.01  |
| 500.1               | 530.1       | 10.01                                                 | 9.06  | 8.48 | 500.1               | 530.1       | 12.11              | 14.15 | 13.18 | 500.1               | 530.1       | 0.26                                | 0.21  | 0.19  |
| 600.1               | 630.1       | 9.40                                                  | 8.61  | 8.12 | 600.1               | 630.1       | 12.13              | 14.33 | 12.16 | 600.1               | 630.1       | 0.51                                | 0.43  | 0.26  |
| 700.1               | 730.1       | 8.76                                                  | 7.99  | 7.63 | 700.1               | 730.1       | 9.65               | 12.62 | 12.31 | 700.1               | 730.1       | 0.72                                | 0.63  | 0.55  |
| 800.1               | 830.1       | 8.08                                                  | 7.45  | 7.08 | 800.1               | 830.1       | 10.37              | 10.86 | 10.66 | 800.1               | 830.1       | 1.12                                | 0.95  | 0.80  |
| 900.1               | 930.1       | 7.53                                                  | 7.02  | 6.71 | 900.1               | 930.1       | 8.94               | 9.15  | 9.26  | 900.1               | 930.1       | 1.19                                | 1.00  | 0.91  |
| 1000.1              | 1030.1      | 6.78                                                  | 6.40  | 6.12 | 1000.1              | 1030.1      | 9.11               | 9.49  | 9.53  | 1000.1              | 1030.1      | 1.42                                | 1.17  | 1.00  |
| 1100.1              | 1130.1      | 6.41                                                  | 6.05  | 5.78 | 1100.1              | 1130.1      | 8.58               | 8.58  | 9.44  | 1100.1              | 1130.1      | 1.43                                | 1.20  | 1.01  |
| 1200.1              | 1230.1      | 5.92                                                  | 5.69  | 5.42 | 1200.1              | 1230.1      | 8.18               | 8.98  | 8.89  | 1200.1              | 1230.1      | 1.57                                | 1.34  | 1.12  |
| 1300.1              | 1330.1      | 5.68                                                  | 5.40  | 5.19 | 1300.1              | 1330.1      | 7.20               | 7.95  | 8.55  | 1300.1              | 1330.1      | 1.63                                | 1.39  | 1.16  |
| 1400.1              | 1430.1      | 5.45                                                  | 5.16  | 5.04 | 1400.1              | 1430.1      | 8.95               | 9.85  | 10.76 | 1400.1              | 1430.1      | 1.63                                | 1.32  | 1.14  |
| 1500.1              | 1530.1      | 5.28                                                  | 5.02  | 4.93 | 1500.1              | 1530.1      | 9.52               | 13.53 | 12.11 | 1500.1              | 1530.1      | 1.43                                | 1.15  | 0.97  |
| 1600.1              | 1630.1      | 5.33                                                  | 4.94  | 4.81 | 1600.1              | 1630.1      | 7.89               | 9.18  | 10.78 | 1600.1              | 1630.1      | 1.10                                | 0.80  | 0.65  |
| 1700.1              | 1730.1      | 5.37                                                  | 5.06  | 4.83 | 1700.1              | 1730.1      | 6.68               | 8.29  | 10.92 | 1700.1              | 1730.1      | 0.96                                | 0.66  | 0.49  |
| 1800.1              | 1830.1      | 5.88                                                  | 5.47  | 5.22 | 1800.1              | 1830.1      | 10.54              | 10.51 | 10.51 | 1800.1              | 1830.1      | 1.16                                | 0.90  | 0.71  |
| 1900.1              | 1930.1      | 5.90                                                  | 5.44  | 5.14 | 1900.1              | 1930.1      | 7.34               | 7.69  | 8.08  | 1900.1              | 1930.1      | 1.43                                | 1.19  | 1.00  |
| 2000.1              | 2030.1      | 5.45                                                  | 5.07  | 4.84 | 2000.1              | 2030.1      | 7.58               | 8.35  | 8.45  | 2000.1              | 2030.1      | 1.46                                | 1.18  | 0.96  |
| 2100.1              | 2130.1      | 5.38                                                  | 4.97  | 4.73 | 2100.1              | 2130.1      | 7.86               | 8.79  | 11.15 | 2100.1              | 2130.1      | 1.34                                | 1.03  | 0.83  |
| 2200.1              | 2230.1      | 5.36                                                  | 5.08  | 4.80 | 2200.1              | 2230.1      | 8.65               | 10.93 | 12.37 | 2200.1              | 2230.1      | 1.17                                | 0.90  | 0.72  |
| 2300.1              | 2330.1      | 5.46                                                  | 5.09  | 4.92 | 2300.1              | 2330.1      | 8.04               | 11.35 | 12.41 | 2300.1              | 2330.1      | 1.13                                | 0.84  | 0.72  |
| 2400.1              | 2430.1      | 5.54                                                  | 5.14  | 4.97 | 2400.1              | 2430.1      | 10.05              | 11.03 | 11.30 | 2400.1              | 2430.1      | 1.14                                | 0.83  | 0.69  |
| 2500.1              | 2530.1      | 5.73                                                  | 5.33  | 5.16 | 2500.1              | 2530.1      | 9.86               | 10.10 | 14.23 | 2500.1              | 2530.1      | 0.98                                | 0.76  | 0.67  |
| 2600.1              | 2630.1      | 6.00                                                  | 5.64  | 5.33 | 2600.1              | 2630.1      | 8.78               | 10.32 | 12.62 | 2600.1              | 2630.1      | 0.97                                | 0.75  | 0.69  |
| 2700.1              | 2730.1      | 5.97                                                  | 5.63  | 5.47 | 2700.1              | 2730.1      | 8.57               | 10.27 | 11.26 | 2700.1              | 2730.1      | 0.89                                | 0.71  | 0.66  |
| 2800.1              | 2830.1      | 5.94                                                  | 5.69  | 5.47 | 2800.1              | 2830.1      | 9.89               | 10.95 | 11.72 | 2800.1              | 2830.1      | 0.85                                | 0.70  | 0.72  |
| 2900.1              | 2930.1      | 6.14                                                  | 5.86  | 5.67 | 2900.1              | 2930.1      | 11.53              | 11.25 | 11.89 | 2900.1              | 2930.1      | 0.81                                | 0.70  | 0.74  |
| 3000.1              | 3030.1      | 6.39                                                  | 5.99  | 5.95 | 3000.1              | 3030.1      | 12.66              | 13.75 | 12.56 | 3000.1              | 3030.1      | 0.82                                | 0.72  | 0.81  |
| 3100.1              | 3130.1      | 6.53                                                  | 6.16  | 5.98 | 3100.1              | 3130.1      | 12.63              | 12.69 | 14.24 | 3100.1              | 3130.1      | 0.84                                | 0.78  | 0.92  |
| 3200.1              | 3230.1      | 6.65                                                  | 6.30  | 6.23 | 3200.1              | 3230.1      | 13.59              | 12.31 | 8.71  | 3200.1              | 3230.1      | 0.93                                | 0.89  | 1.08  |
| 3300.1              | 3330.1      | 7.15                                                  | 6.68  | 6.75 | 3300.1              | 3330.1      | 12.99              | 9.98  | 8.39  | 3300.1              | 3330.1      | 0.99                                | 1.01  | 1.14  |
| 3400.1              | 3430.1      | 7.21                                                  | 6.87  | 7.23 | 3400.1              | 3430.1      | 9.16               | 10.12 | 12.41 | 3400.1              | 3430.1      | 0.93                                | 0.91  | 0.96  |
| 3500.1              | 3530.1      | 7.25                                                  | 7.04  | 7.16 | 3500.1              | 3530.1      | 9.63               | 10.84 | 13.32 | 3500.1              | 3530.1      | 0.82                                | 0.75  | 0.84  |
| 3600.1              | 3630.1      | 7.36                                                  | 6.86  | 6.81 | 3600.1              | 3630.1      | 10.98              | 14.39 | 13.86 | 3600.1              | 3630.1      | 0.79                                | 0.63  | 0.72  |
| 3700.1              | 3730.1      | 7.43                                                  | 6.79  | 6.50 | 3700.1              | 3730.1      | 13.41              | 14.02 | 15.42 | 3700.1              | 3730.1      | 0.63                                | 0.47  | 0.48  |
| 3800.1              | 3830.1      | 7.57                                                  | 6.82  | 6.46 | 3800.1              | 3830.1      | 14.51              | 15.10 | 12.09 | 3800.1              | 3830.1      | 0.53                                | 0.39  | 0.36  |
| 3900.1              | 3930.1      | 7.41                                                  | 6.84  | 6.43 | 3900.1              | 3930.1      | 11.11              | 11.27 | 11.52 | 3900.1              | 3930.1      | 0.45                                | 0.32  | 0.35  |
| 4000.1              | 4030.1      | 7.29                                                  | 6.74  | 6.35 | 4000.1              | 4030.1      | 13.44              | 14.32 | 12.89 | 4000.1              | 4030.1      | 0.52                                | 0.38  | 0.40  |
| 4100.1              | 4130.1      | 7.68                                                  | 7.05  | 6.68 | 4100.1              | 4130.1      | 10.03              | 13.54 | 13.69 | 4100.1              | 4130.1      | 0.50                                | 0.41  | 0.50  |
| 4200.1              | 4230.1      | 7.54                                                  | 6.91  | 6.66 | 4200.1              | 4230.1      | 10.75              | 10.23 | 12.82 | 4200.1              | 4230.1      | 0.69                                | 0.60  | 0.75  |

# Frequency Mixer

SYM-42

## Typical Performance Data

| IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=2600.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=1000.1MHz<br>(dB) | IF<br>(OUT)<br>(MHz) | LO<br>(MHz) | CONVERSION LOSS<br>VS. IF FREQUENCY<br>@RF(IN)=4200.1MHz<br>(dB) |
|----------------------|-------------|------------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|----------------------|-------------|------------------------------------------------------------------|
|                      |             | @LO (dBm)                                                        |                      |             | @LO (dBm)                                                        |                      |             | @LO (dBm)                                                        |
|                      |             | +7                                                               |                      |             | +7                                                               |                      |             | +7                                                               |
| 700.0                | 1900.1      | 8.19                                                             | 10.0                 | 1010.1      | 6.35                                                             | 200.0                | 4000.1      | 7.96                                                             |
| 659.4                | 1940.7      | 7.89                                                             | 14.9                 | 1015.0      | 6.38                                                             | 195.1                | 4005.0      | 7.93                                                             |
| 618.8                | 1981.3      | 7.59                                                             | 19.7                 | 1019.8      | 6.37                                                             | 190.3                | 4009.8      | 7.89                                                             |
| 578.2                | 2021.9      | 7.27                                                             | 24.6                 | 1024.7      | 6.35                                                             | 185.4                | 4014.7      | 7.86                                                             |
| 537.6                | 2062.5      | 7.00                                                             | 29.5                 | 1029.6      | 6.35                                                             | 180.5                | 4019.6      | 7.84                                                             |
| 497.1                | 2103.0      | 6.77                                                             | 34.4                 | 1034.5      | 6.37                                                             | 175.6                | 4024.5      | 7.81                                                             |
| 456.5                | 2143.6      | 6.78                                                             | 39.2                 | 1039.3      | 6.36                                                             | 170.8                | 4029.3      | 7.79                                                             |
| 415.9                | 2184.2      | 6.69                                                             | 44.1                 | 1044.2      | 6.40                                                             | 165.9                | 4034.2      | 7.77                                                             |
| 375.3                | 2224.8      | 6.67                                                             | 49.0                 | 1049.1      | 6.45                                                             | 161.0                | 4039.1      | 7.72                                                             |
| 334.7                | 2265.4      | 6.62                                                             | 53.8                 | 1053.9      | 6.46                                                             | 156.2                | 4043.9      | 7.67                                                             |
| 294.1                | 2306.0      | 6.40                                                             | 58.7                 | 1058.8      | 6.45                                                             | 151.3                | 4048.8      | 7.62                                                             |
| 253.5                | 2346.6      | 6.30                                                             | 63.6                 | 1063.7      | 6.46                                                             | 146.4                | 4053.7      | 7.57                                                             |
| 212.9                | 2387.2      | 6.15                                                             | 68.5                 | 1068.6      | 6.48                                                             | 141.5                | 4058.6      | 7.54                                                             |
| 172.4                | 2427.7      | 6.00                                                             | 73.3                 | 1073.4      | 6.53                                                             | 136.7                | 4063.4      | 7.52                                                             |
| 131.8                | 2468.3      | 5.86                                                             | 78.2                 | 1078.3      | 6.58                                                             | 131.8                | 4068.3      | 7.50                                                             |
| 91.2                 | 2508.9      | 5.69                                                             | 83.1                 | 1083.2      | 6.61                                                             | 126.9                | 4073.2      | 7.49                                                             |
| 50.6                 | 2549.5      | 5.57                                                             | 87.9                 | 1088.0      | 6.60                                                             | 122.1                | 4078.0      | 7.46                                                             |
| 10.0                 | 2590.1      | 5.51                                                             | 92.8                 | 1092.9      | 6.62                                                             | 117.2                | 4082.9      | 7.41                                                             |
| 30.3                 | 2630.4      | 5.52                                                             | 97.7                 | 1097.8      | 6.62                                                             | 112.3                | 4087.8      | 7.36                                                             |
| 70.9                 | 2671.0      | 5.64                                                             | 102.6                | 1102.7      | 6.65                                                             | 107.4                | 4092.7      | 7.33                                                             |
| 111.5                | 2711.6      | 5.76                                                             | 107.4                | 1107.5      | 6.71                                                             | 102.6                | 4097.5      | 7.27                                                             |
| 152.1                | 2752.2      | 5.87                                                             | 112.3                | 1112.4      | 6.76                                                             | 97.7                 | 4102.4      | 7.25                                                             |
| 192.6                | 2792.7      | 6.02                                                             | 117.2                | 1117.3      | 6.78                                                             | 92.8                 | 4107.3      | 7.21                                                             |
| 212.9                | 2813.0      | 6.07                                                             | 122.1                | 1122.2      | 6.80                                                             | 87.9                 | 4112.2      | 7.19                                                             |
| 253.5                | 2853.6      | 6.21                                                             | 126.9                | 1127.0      | 6.79                                                             | 83.1                 | 4117.0      | 7.18                                                             |
| 273.8                | 2873.9      | 6.28                                                             | 131.8                | 1131.9      | 6.78                                                             | 78.2                 | 4121.9      | 7.14                                                             |
| 314.4                | 2914.5      | 6.41                                                             | 136.7                | 1136.8      | 6.80                                                             | 73.3                 | 4126.8      | 7.10                                                             |
| 334.7                | 2934.8      | 6.48                                                             | 141.5                | 1141.6      | 6.85                                                             | 68.5                 | 4131.6      | 7.06                                                             |
| 375.3                | 2975.4      | 6.63                                                             | 146.4                | 1146.5      | 6.87                                                             | 63.6                 | 4136.5      | 7.02                                                             |
| 395.6                | 2995.7      | 6.75                                                             | 151.3                | 1151.4      | 6.90                                                             | 58.7                 | 4141.4      | 6.99                                                             |
| 436.2                | 3036.3      | 6.86                                                             | 156.2                | 1156.3      | 6.93                                                             | 53.8                 | 4146.3      | 6.97                                                             |
| 456.5                | 3056.6      | 7.01                                                             | 161.0                | 1161.1      | 6.93                                                             | 49.0                 | 4151.1      | 6.94                                                             |
| 497.1                | 3097.2      | 7.12                                                             | 165.9                | 1166.0      | 6.97                                                             | 44.1                 | 4156.0      | 6.90                                                             |
| 517.4                | 3117.5      | 7.20                                                             | 170.8                | 1170.9      | 7.02                                                             | 39.2                 | 4160.9      | 6.87                                                             |
| 557.9                | 3158.0      | 7.49                                                             | 175.6                | 1175.7      | 7.05                                                             | 34.4                 | 4165.7      | 6.84                                                             |
| 578.2                | 3178.3      | 7.60                                                             | 180.5                | 1180.6      | 7.08                                                             | 29.5                 | 4170.6      | 6.82                                                             |
| 618.8                | 3218.9      | 7.86                                                             | 185.4                | 1185.5      | 7.10                                                             | 24.6                 | 4175.5      | 6.83                                                             |
| 639.1                | 3239.2      | 8.08                                                             | 190.3                | 1190.4      | 7.10                                                             | 19.7                 | 4180.4      | 6.79                                                             |
| 679.7                | 3279.8      | 8.39                                                             | 195.1                | 1195.2      | 7.10                                                             | 14.9                 | 4185.2      | 6.84                                                             |
| 700.0                | 3300.1      | 8.56                                                             | 200.0                | 1200.1      | 7.13                                                             | 10.0                 | 4190.1      | 6.90                                                             |

REV. X2

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IF/RF MICROWAVE COMPONENTS • ISO 9001 ISO 14001 AS 9100 CERTIFIED • RoHS compliant

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## Typical Performance Data

| LO<br>(MHz) | LO-RF ISOLATION<br>(dB) |       |       | LO-IF ISOLATION<br>(dB) |       |       |
|-------------|-------------------------|-------|-------|-------------------------|-------|-------|
|             | @LO (dBm)               |       |       | @LO (dBm)               |       |       |
|             | +4                      | +7    | +10   | +4                      | +7    | +10   |
| 300.1       | 24.84                   | 25.16 | 25.87 | 13.63                   | 14.92 | 16.33 |
| 400.1       | 24.08                   | 24.50 | 25.01 | 15.17                   | 17.32 | 19.08 |
| 500.1       | 24.13                   | 24.40 | 24.62 | 17.77                   | 20.84 | 23.31 |
| 600.1       | 24.13                   | 24.16 | 24.18 | 20.14                   | 23.96 | 26.33 |
| 700.1       | 25.04                   | 24.80 | 24.58 | 19.42                   | 20.88 | 20.88 |
| 800.1       | 26.12                   | 25.65 | 25.35 | 16.93                   | 16.92 | 16.44 |
| 900.1       | 28.50                   | 27.91 | 27.48 | 15.07                   | 14.49 | 14.02 |
| 1000.1      | 31.99                   | 31.30 | 30.86 | 14.13                   | 13.41 | 12.84 |
| 1100.1      | 36.24                   | 35.59 | 35.37 | 14.28                   | 13.46 | 12.90 |
| 1200.1      | 42.98                   | 42.29 | 41.91 | 14.86                   | 14.02 | 13.51 |
| 1300.1      | 70.04                   | 57.64 | 52.50 | 15.58                   | 14.80 | 14.35 |
| 1400.1      | 42.05                   | 42.41 | 42.34 | 16.49                   | 15.86 | 15.38 |
| 1500.1      | 39.80                   | 39.37 | 38.75 | 17.47                   | 16.98 | 16.57 |
| 1600.1      | 38.97                   | 38.33 | 37.42 | 18.18                   | 17.98 | 17.77 |
| 1700.1      | 37.71                   | 37.43 | 36.77 | 19.04                   | 19.09 | 19.04 |
| 1800.1      | 38.43                   | 38.41 | 37.95 | 20.07                   | 20.29 | 20.37 |
| 1900.1      | 37.18                   | 36.46 | 36.20 | 21.19                   | 21.66 | 22.03 |
| 2000.1      | 37.85                   | 36.24 | 34.75 | 22.35                   | 23.32 | 23.93 |
| 2100.1      | 37.36                   | 35.53 | 33.77 | 23.51                   | 24.73 | 25.73 |
| 2200.1      | 36.01                   | 34.56 | 33.35 | 24.73                   | 26.25 | 27.71 |
| 2300.0      | 35.04                   | 33.64 | 32.44 | 26.19                   | 28.10 | 29.97 |
| 2400.0      | 35.08                   | 33.51 | 32.50 | 27.81                   | 29.92 | 32.16 |
| 2500.0      | 36.11                   | 34.15 | 32.93 | 29.62                   | 31.98 | 34.44 |
| 2600.0      | 36.72                   | 34.64 | 33.23 | 31.91                   | 34.96 | 38.12 |
| 2700.0      | 36.37                   | 34.31 | 33.08 | 34.79                   | 40.31 | 47.26 |
| 2800.0      | 37.16                   | 35.14 | 33.80 | 36.73                   | 44.73 | 45.53 |
| 2900.0      | 39.74                   | 37.56 | 35.78 | 33.54                   | 35.59 | 35.01 |
| 3000.0      | 43.01                   | 40.78 | 39.31 | 29.39                   | 30.28 | 30.09 |
| 3100.0      | 45.71                   | 43.51 | 41.99 | 25.68                   | 26.29 | 26.30 |
| 3200.0      | 47.79                   | 47.53 | 44.94 | 22.39                   | 23.12 | 23.41 |
| 3300.0      | 45.05                   | 54.38 | 49.42 | 19.19                   | 20.13 | 20.54 |
| 3400.0      | 42.69                   | 57.47 | 40.31 | 18.12                   | 18.55 | 19.11 |
| 3500.0      | 40.82                   | 58.23 | 36.59 | 19.37                   | 19.78 | 19.96 |
| 3600.0      | 38.60                   | 39.48 | 34.36 | 19.25                   | 20.26 | 20.91 |
| 3700.0      | 39.13                   | 35.05 | 31.76 | 19.83                   | 21.60 | 22.85 |
| 3800.0      | 37.60                   | 33.39 | 30.71 | 20.02                   | 22.38 | 24.66 |
| 3900.0      | 34.82                   | 31.34 | 29.31 | 19.52                   | 22.26 | 25.45 |
| 4000.0      | 32.50                   | 29.54 | 27.69 | 19.06                   | 21.90 | 25.43 |
| 4100.0      | 29.96                   | 27.75 | 26.17 | 18.68                   | 21.42 | 24.55 |
| 4200.0      | 27.85                   | 26.05 | 24.94 | 18.61                   | 20.89 | 22.90 |

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF-IF ISOLATION<br>(dB) |       |       |
|---------------------|-------------|-------------------------|-------|-------|
|                     |             | @LO (dBm)               |       |       |
|                     |             | +4                      | +7    | +10   |
| 300.1               | 330.1       | 11.94                   | 10.67 | 10.24 |
| 400.4               | 430.4       | 10.76                   | 10.13 | 9.84  |
| 500.6               | 530.6       | 10.02                   | 9.67  | 9.46  |
| 600.9               | 630.9       | 9.81                    | 9.52  | 9.34  |
| 701.1               | 731.1       | 10.12                   | 9.91  | 9.79  |
| 801.4               | 831.4       | 10.77                   | 10.59 | 10.55 |
| 901.6               | 931.6       | 11.79                   | 11.77 | 11.69 |
| 1001.9              | 1031.9      | 13.89                   | 13.95 | 14.06 |
| 1102.2              | 1132.2      | 16.01                   | 16.14 | 16.35 |
| 1202.4              | 1232.4      | 18.65                   | 18.89 | 19.07 |
| 1302.7              | 1332.7      | 21.15                   | 21.32 | 21.48 |
| 1402.9              | 1432.9      | 23.81                   | 24.01 | 24.24 |
| 1503.2              | 1533.2      | 25.94                   | 26.49 | 26.82 |
| 1603.4              | 1633.4      | 27.28                   | 27.60 | 28.17 |
| 1703.7              | 1733.7      | 28.50                   | 28.83 | 29.03 |
| 1803.9              | 1833.9      | 29.80                   | 29.91 | 30.01 |
| 1904.2              | 1934.2      | 32.30                   | 32.50 | 32.77 |
| 2004.5              | 2034.5      | 34.96                   | 35.14 | 35.31 |
| 2104.7              | 2134.7      | 36.76                   | 36.75 | 36.66 |
| 2205.0              | 2235.0      | 37.32                   | 37.07 | 36.66 |
| 2305.2              | 2335.2      | 37.68                   | 37.21 | 37.16 |
| 2405.5              | 2435.5      | 39.19                   | 38.70 | 38.42 |
| 2505.7              | 2535.7      | 41.43                   | 41.20 | 40.99 |
| 2606.0              | 2636.0      | 38.19                   | 38.87 | 39.49 |
| 2706.3              | 2736.3      | 35.36                   | 35.39 | 35.48 |
| 2806.5              | 2836.5      | 35.45                   | 35.26 | 35.19 |
| 2906.8              | 2936.8      | 35.04                   | 35.03 | 34.84 |
| 3007.0              | 3037.0      | 33.67                   | 33.84 | 33.62 |
| 3107.3              | 3137.3      | 32.32                   | 32.32 | 32.10 |
| 3207.5              | 3237.5      | 31.44                   | 31.31 | 31.27 |
| 3307.8              | 3337.8      | 30.75                   | 30.46 | 31.18 |
| 3408.1              | 3438.1      | 30.18                   | 30.42 | 30.76 |
| 3508.3              | 3538.3      | 29.66                   | 29.98 | 29.79 |
| 3608.6              | 3638.6      | 28.36                   | 28.30 | 28.04 |
| 3708.8              | 3738.8      | 28.46                   | 27.97 | 27.57 |
| 3809.1              | 3839.1      | 28.73                   | 27.92 | 26.96 |
| 3889.3              | 3919.3      | 28.19                   | 27.13 | 26.24 |
| 3989.5              | 4019.5      | 27.02                   | 25.99 | 25.17 |
| 4069.7              | 4099.7      | 26.51                   | 25.64 | 24.73 |
| 4170.0              | 4200.0      | 25.16                   | 24.34 | 23.61 |

## Typical Performance Data

| RF<br>(IN)<br>(MHz) | LO<br>(MHz) | RF VSWR<br>(:1) |      |      | LO<br>(MHz) | LO VSWR<br>(:1) |      |      | IF<br>(OUT)<br>(MHz) | IF VSWR<br>@LO=4200MHz<br>(:1) |      |      |
|---------------------|-------------|-----------------|------|------|-------------|-----------------|------|------|----------------------|--------------------------------|------|------|
|                     |             | @LO (dBm)       |      |      |             | @LO (dBm)       |      |      |                      | @LO (dBm)                      |      |      |
|                     |             | +4              | +7   | +10  |             | +4              | +7   | +10  |                      | +4                             | +7   | +10  |
| 300.1               | 330.1       | 8.35            | 7.63 | 7.44 | 300.1       | 6.32            | 4.16 | 3.58 | 10.1                 | 1.67                           | 1.80 | 1.96 |
| 400.4               | 430.4       | 6.97            | 6.51 | 6.35 | 400.1       | 4.75            | 3.51 | 3.44 | 15.0                 | 1.51                           | 1.88 | 2.34 |
| 500.6               | 530.6       | 6.26            | 5.87 | 5.66 | 500.1       | 3.83            | 3.22 | 3.48 | 19.8                 | 1.32                           | 1.73 | 1.78 |
| 600.9               | 630.9       | 5.46            | 5.14 | 5.02 | 600.1       | 3.25            | 3.09 | 3.58 | 24.7                 | 1.20                           | 1.62 | 1.80 |
| 701.1               | 731.1       | 4.72            | 4.48 | 4.33 | 700.1       | 2.82            | 2.98 | 3.62 | 29.6                 | 1.32                           | 1.78 | 1.88 |
| 801.4               | 831.4       | 4.15            | 3.95 | 3.79 | 800.1       | 2.60            | 2.95 | 3.67 | 34.5                 | 1.32                           | 1.65 | 1.84 |
| 901.6               | 931.6       | 3.76            | 3.60 | 3.47 | 900.1       | 2.44            | 2.92 | 3.67 | 39.3                 | 1.34                           | 1.74 | 1.91 |
| 1001.9              | 1031.9      | 3.39            | 3.20 | 3.06 | 1000.1      | 2.25            | 2.85 | 3.65 | 44.2                 | 1.36                           | 1.78 | 2.02 |
| 1102.2              | 1132.2      | 3.16            | 2.98 | 2.83 | 1100.1      | 2.18            | 2.86 | 3.70 | 49.1                 | 1.36                           | 1.76 | 1.93 |
| 1202.4              | 1232.4      | 2.80            | 2.62 | 2.51 | 1200.1      | 2.16            | 2.90 | 3.76 | 53.9                 | 1.37                           | 1.70 | 2.01 |
| 1302.7              | 1332.7      | 2.46            | 2.29 | 2.17 | 1300.1      | 2.18            | 2.93 | 3.82 | 58.8                 | 1.42                           | 1.72 | 2.04 |
| 1402.9              | 1432.9      | 2.06            | 1.88 | 1.78 | 1400.1      | 2.20            | 2.95 | 3.82 | 63.7                 | 1.44                           | 1.75 | 1.98 |
| 1503.2              | 1533.2      | 1.76            | 1.58 | 1.46 | 1500.1      | 2.26            | 2.97 | 3.83 | 68.6                 | 1.45                           | 1.78 | 2.04 |
| 1603.4              | 1633.4      | 1.81            | 1.57 | 1.42 | 1600.1      | 2.44            | 3.07 | 3.86 | 73.4                 | 1.50                           | 1.84 | 2.04 |
| 1703.7              | 1733.7      | 1.98            | 1.73 | 1.56 | 1700.1      | 2.62            | 3.15 | 3.86 | 78.3                 | 1.47                           | 1.84 | 2.09 |
| 1803.9              | 1833.9      | 2.32            | 2.06 | 1.88 | 1800.1      | 2.73            | 3.16 | 3.80 | 83.2                 | 1.46                           | 1.78 | 2.00 |
| 1904.2              | 1934.2      | 2.32            | 2.07 | 1.89 | 1900.1      | 2.71            | 3.04 | 3.61 | 88.0                 | 1.49                           | 1.75 | 1.98 |
| 2004.5              | 2034.5      | 2.03            | 1.79 | 1.65 | 2000.1      | 2.56            | 2.76 | 3.25 | 92.9                 | 1.48                           | 1.81 | 2.00 |
| 2104.7              | 2134.7      | 1.92            | 1.69 | 1.56 | 2100.1      | 2.61            | 2.65 | 3.03 | 97.8                 | 1.46                           | 1.77 | 1.94 |
| 2205.0              | 2235.0      | 1.94            | 1.72 | 1.57 | 2200.1      | 2.58            | 2.51 | 2.80 | 102.7                | 1.51                           | 1.78 | 1.96 |
| 2305.2              | 2335.2      | 1.94            | 1.75 | 1.64 | 2300.0      | 2.41            | 2.24 | 2.48 | 107.5                | 1.49                           | 1.75 | 1.94 |
| 2405.5              | 2435.5      | 1.99            | 1.82 | 1.72 | 2400.0      | 2.31            | 2.05 | 2.21 | 112.4                | 1.51                           | 1.81 | 1.98 |
| 2505.7              | 2535.7      | 2.12            | 1.95 | 1.85 | 2500.0      | 2.19            | 1.88 | 1.98 | 117.3                | 1.54                           | 1.85 | 2.03 |
| 2606.0              | 2636.0      | 2.35            | 2.16 | 2.06 | 2600.0      | 1.98            | 1.71 | 1.82 | 122.2                | 1.52                           | 1.79 | 1.92 |
| 2706.3              | 2736.3      | 2.48            | 2.32 | 2.23 | 2700.0      | 1.75            | 1.54 | 1.70 | 127.0                | 1.55                           | 1.83 | 2.01 |
| 2806.5              | 2836.5      | 2.56            | 2.39 | 2.29 | 2800.0      | 1.60            | 1.46 | 1.69 | 131.9                | 1.57                           | 1.84 | 2.04 |
| 2906.8              | 2936.8      | 2.65            | 2.44 | 2.31 | 2900.0      | 1.49            | 1.47 | 1.75 | 136.8                | 1.61                           | 1.89 | 2.05 |
| 3007.0              | 3037.0      | 2.78            | 2.56 | 2.40 | 3000.0      | 1.44            | 1.51 | 1.84 | 141.6                | 1.63                           | 1.90 | 2.11 |
| 3107.3              | 3137.3      | 2.94            | 2.70 | 2.55 | 3100.0      | 1.45            | 1.57 | 1.91 | 146.5                | 1.66                           | 1.94 | 2.18 |
| 3207.5              | 3237.5      | 3.16            | 2.92 | 2.72 | 3200.0      | 1.47            | 1.60 | 1.94 | 151.4                | 1.67                           | 1.95 | 2.11 |
| 3307.8              | 3337.8      | 3.27            | 2.92 | 2.65 | 3300.0      | 1.51            | 1.59 | 1.90 | 156.3                | 1.66                           | 1.97 | 2.12 |
| 3408.1              | 3438.1      | 3.14            | 2.78 | 2.56 | 3400.0      | 1.38            | 1.47 | 1.73 | 161.1                | 1.68                           | 1.97 | 2.11 |
| 3508.3              | 3538.3      | 3.12            | 2.70 | 2.49 | 3500.0      | 1.51            | 1.45 | 1.63 | 166.0                | 1.70                           | 1.93 | 2.08 |
| 3608.6              | 3638.6      | 3.28            | 2.84 | 2.58 | 3600.0      | 1.74            | 1.57 | 1.66 | 170.9                | 1.68                           | 1.97 | 2.09 |
| 3708.8              | 3738.8      | 3.54            | 3.02 | 2.74 | 3700.0      | 2.00            | 1.70 | 1.69 | 175.7                | 1.68                           | 1.93 | 2.05 |
| 3809.1              | 3839.1      | 3.67            | 3.15 | 2.86 | 3800.0      | 2.14            | 1.72 | 1.60 | 180.6                | 1.68                           | 1.94 | 2.07 |
| 3889.3              | 3919.3      | 3.73            | 3.18 | 2.85 | 3900.0      | 2.13            | 1.63 | 1.43 | 185.5                | 1.70                           | 1.96 | 2.11 |
| 3989.5              | 4019.5      | 3.65            | 3.16 | 2.82 | 4000.0      | 1.94            | 1.45 | 1.21 | 190.4                | 1.73                           | 2.01 | 2.17 |
| 4069.7              | 4099.7      | 3.75            | 3.28 | 2.96 | 4100.0      | 1.70            | 1.25 | 1.03 | 195.2                | 1.76                           | 2.03 | 2.14 |
| 4170.0              | 4200.0      | 3.59            | 3.16 | 2.86 | 4200.0      | 1.42            | 1.17 | 1.31 | 200.1                | 1.83                           | 2.08 | 2.22 |

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## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 6   | 21  | 12  | 36  | 30  | 38  | 31  | 57  | 42  | --- |
| 1      | -      | 18     | +0  | 44  | 28  | 35  | 45  | 49  | 45  | 54  | 60  | 64  |
| 2      | >100   | 67     | 75  | 63  | 72  | 77  | 63  | 72  | 69  | 76  | 63  | >79 |
| 3      | >100   | 72     | >79 | >79 | 70  | >79 | >79 | 78  | >79 | >79 | >79 | >79 |
| 4      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 5      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 6      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 7      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 8      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9      | 98     | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10     | ---    | ---    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

### LO HARMONICS ORDER

Test conditions: RF IN: 2600.1 MHz; -14.00 dBm.  
LO IN: 2630.01 MHz; +7.00 dBm  
IF OUT: 29.91 MHz; -20.98 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 16  | 30  | 22  | 47  | 41  | 49  | 45  | 75  | 59  | --- |
| 1      | -      | 18     | +0  | 44  | 28  | 36  | 45  | 51  | 48  | 57  | 64  | 66  |
| 2      | 81     | 58     | 66  | 52  | 63  | 68  | 54  | 64  | 62  | 67  | 57  | 78  |
| 3      | >100   | 51     | 59  | 69  | 46  | 76  | 61  | 60  | 75  | 72  | 64  | 71  |
| 4      | >100   | >89    | 80  | 78  | >89 | 80  | 83  | 79  | 82  | 79  | 80  | 86  |
| 5      | 100    | >89    | >89 | 86  | 88  | >89 | 82  | >89 | 84  | 82  | >89 | >89 |
| 6      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 7      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 8      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 9      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 10     | ---    | ---    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

### LO HARMONICS ORDER

Test conditions: RF IN: 2600.1 MHz; -4.00 dBm.  
LO IN: 2630.01 MHz; +7.00 dBm  
IF OUT: 29.91 MHz; -11.02 dBm

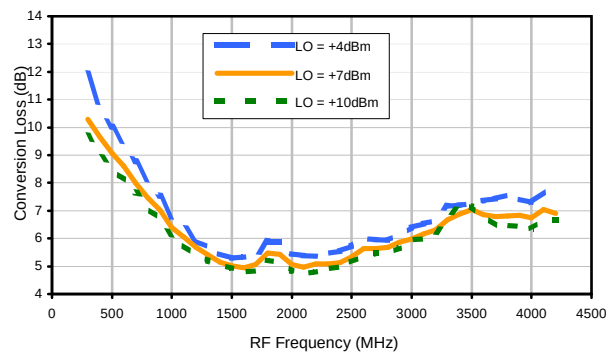
- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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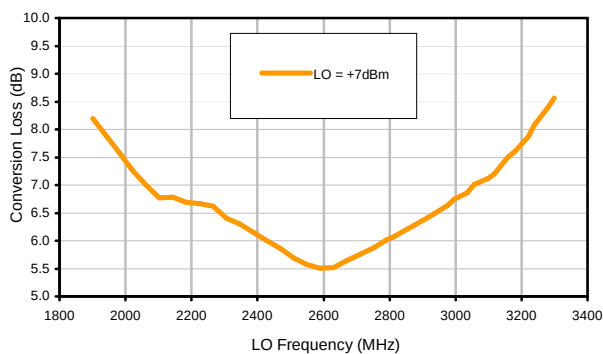


## Typical Performance Curves

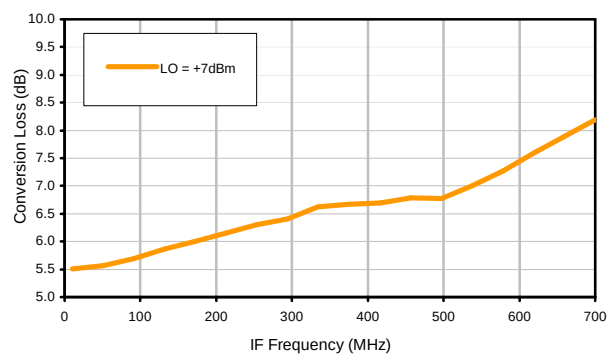
Conversion Loss @ IF=30MHz



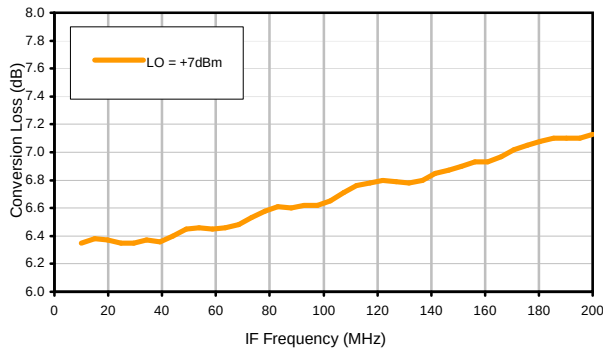
Conversion Loss vs. LO @ RF=2600.1MHz



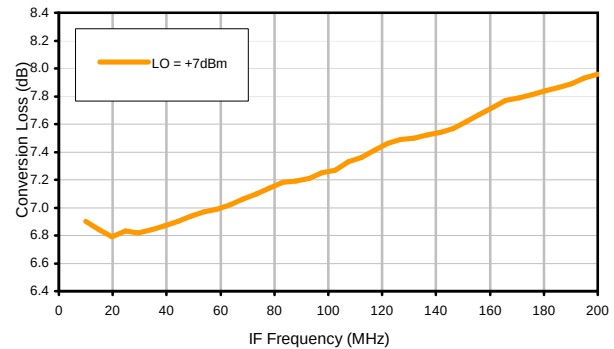
Conversion Loss vs. IF @ RF=2600.1MHz



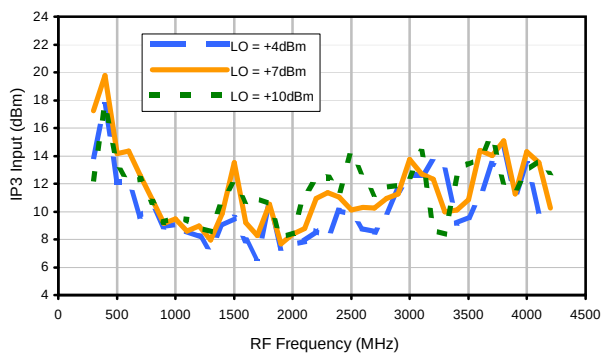
Conversion Loss vs. IF @ RF=1000.1MHz



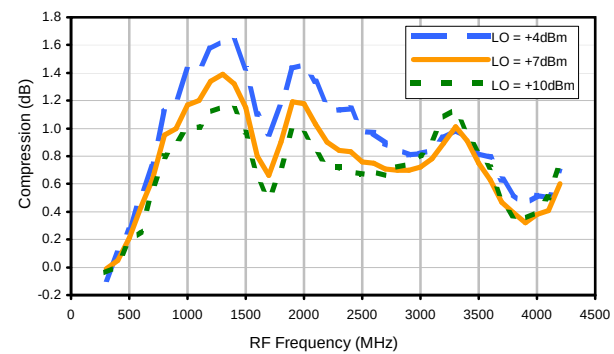
Conversion Loss vs. IF @ RF=4200.1MHz



IP3 Input



Compression @ RF IN=+1dBm



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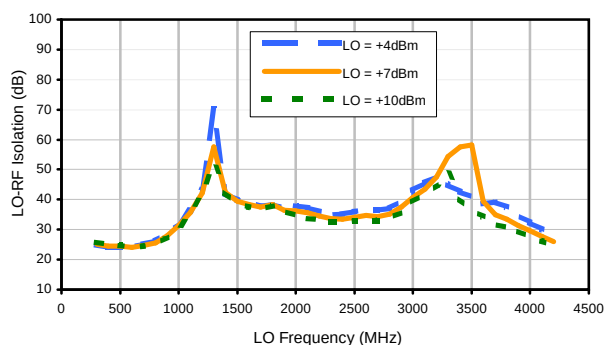


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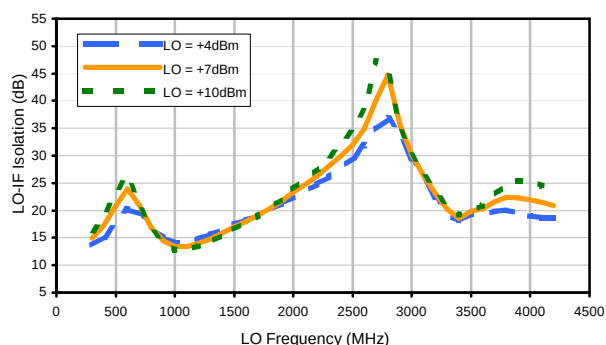


## Typical Performance Curves

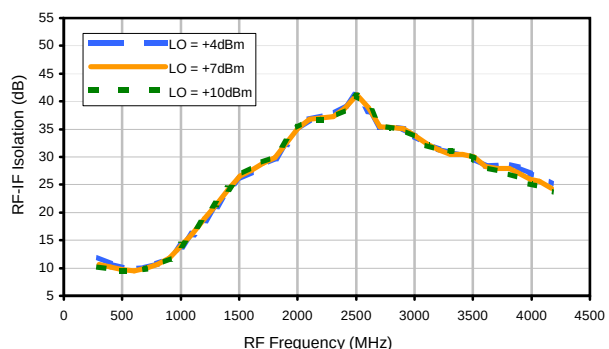
LO-RF Isolation



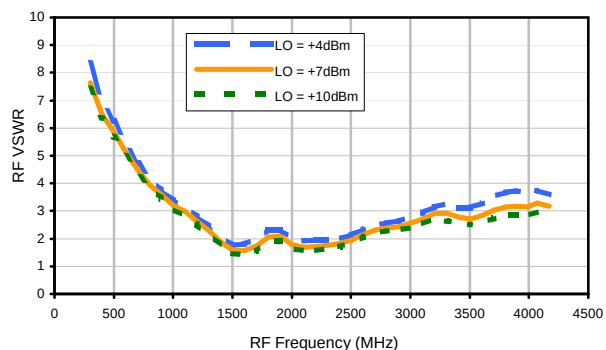
LO-IF Isolation



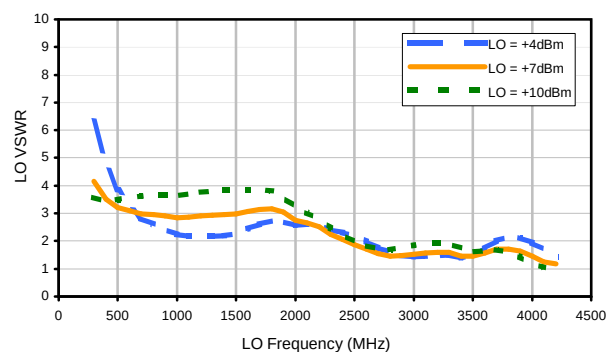
RF-IF Isolation



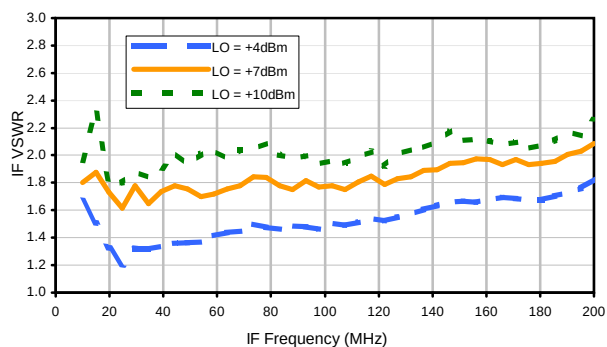
RF VSWR



LO VSWR



IF VSWR



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## Harmonics Tables

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 6   | 21  | 12  | 36  | 30  | 38  | 31  | 57  | 42  | --- |
| 1      | -      | 18     | +0  | 44  | 28  | 35  | 45  | 49  | 45  | 54  | 60  | 64  |
| 2      | >100   | 67     | 75  | 63  | 72  | 77  | 63  | 72  | 69  | 76  | 63  | >79 |
| 3      | >100   | 72     | >79 | >79 | 70  | >79 | >79 | 78  | >79 | >79 | >79 | >79 |
| 4      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 5      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 6      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 7      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 8      | >100   | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 9      | 98     | >79    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| 10     | ---    | ---    | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 | >79 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

### LO HARMONICS ORDER

Test conditions: RF IN: 2600.1 MHz; -14.00 dBm.  
LO IN: 2630.01 MHz; +7.00 dBm  
IF OUT: 29.91 MHz; -20.98 dBm

RF HARMONICS ORDER

|        | (-dBm) | (-dBc) |     |     |     |     |     |     |     |     |     |     |
|--------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0      | -      | -      | 16  | 30  | 22  | 47  | 41  | 49  | 45  | 75  | 59  | --- |
| 1      | -      | 18     | +0  | 44  | 28  | 36  | 45  | 51  | 48  | 57  | 64  | 66  |
| 2      | 81     | 58     | 66  | 52  | 63  | 68  | 54  | 64  | 62  | 67  | 57  | 78  |
| 3      | >100   | 51     | 59  | 69  | 46  | 76  | 61  | 60  | 75  | 72  | 64  | 71  |
| 4      | >100   | >89    | 80  | 78  | >89 | 80  | 83  | 79  | 82  | 79  | 80  | 86  |
| 5      | 100    | >89    | >89 | 86  | 88  | >89 | 82  | >89 | 84  | 82  | >89 | >89 |
| 6      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 7      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 8      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 9      | >100   | >89    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| 10     | ---    | ---    | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 | >89 |
| RF CAL | 0      | 1      | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  |     |

### LO HARMONICS ORDER

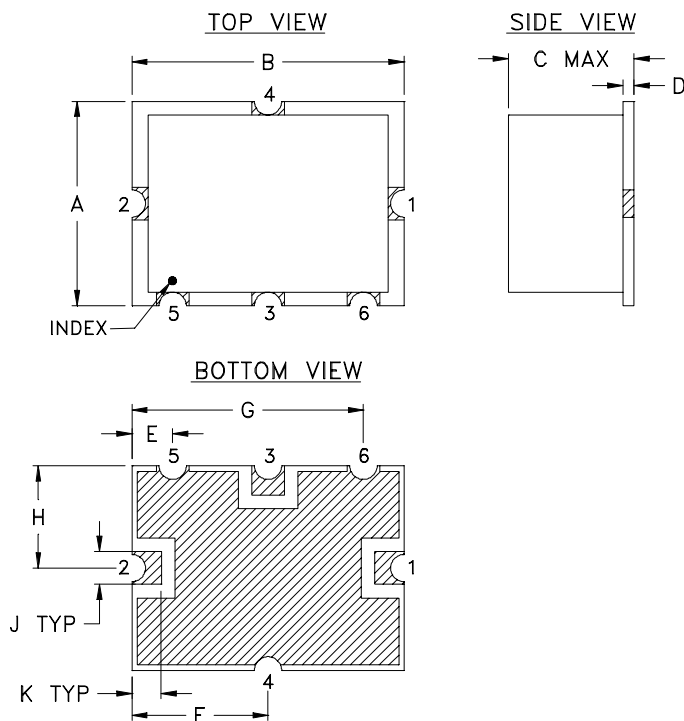
Test conditions: RF IN: 2600.1 MHz; -4.00 dBm.  
LO IN: 2630.01 MHz; +7.00 dBm  
IF OUT: 29.91 MHz; -11.02 dBm

- Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.  
2. + entry denotes harmonics are in (dBc) above IF OUTPUT.  
3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

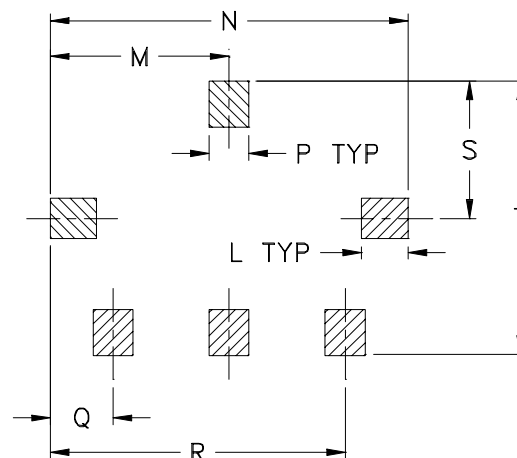
REV. X2  
SYM-42  
100818  
Page 3 of 3

## Outline Dimensions

TTT166  
TTT167



## PCB Land Pattern



Suggested Layout,  
Tolerance to be within  $\pm .002$

| CASE # | A             | B              | C             | D              | E              | F              | G               | H              | J              | K              | L              | M              | N               |
|--------|---------------|----------------|---------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|-----------------|
| TTT166 | .38<br>(9.65) | .50<br>(12.70) | .15<br>(3.81) | .020<br>(0.51) | .075<br>(1.91) | .250<br>(6.35) | .425<br>(10.80) | .187<br>(4.75) | .050<br>(1.27) | .050<br>(1.27) | .070<br>(1.78) | .270<br>(6.86) | .540<br>(13.72) |
| TTT167 |               |                | .23<br>(5.84) |                |                |                |                 |                |                |                |                |                |                 |

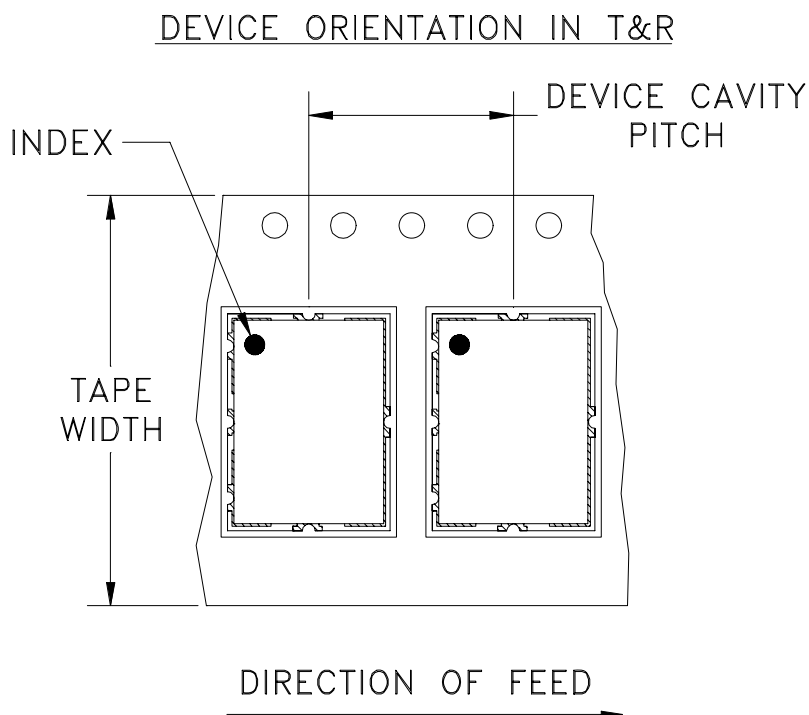
| CASE # | P              | Q              | R               | S              | T               | WT. GRAM |
|--------|----------------|----------------|-----------------|----------------|-----------------|----------|
| TTT166 | .060<br>(1.52) | .095<br>(2.41) | .445<br>(11.30) | .208<br>(5.28) | .415<br>(10.54) | .8       |
| TTT167 |                |                |                 |                |                 | .8       |

Dimensions are in inches (mm). Tolerances: 2 Pl.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Note:

- Case material: Plastic.
- Base material: Printed wiring laminate.
- Termination finish:
  - For RoHS Case Styles: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate. All models, (+) suffix.
  - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.

# Tape & Reel Packaging TR-F12



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel                    |     |
|----------------|-------------------------|-------------------|-------------------------------------|-----|
| 24             | 12                      | 7                 | Small quantity standards (see note) | 10  |
|                |                         |                   |                                     | 20  |
|                |                         |                   |                                     | 50  |
|                |                         |                   |                                     | 100 |
|                |                         |                   |                                     | 200 |
|                |                         | 13                | Standard                            | 500 |

Note: Please Consult individual model data sheet to determine device per reel availability.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: [www.minicircuits.com/pages/pdfs/tape.pdf](http://www.minicircuits.com/pages/pdfs/tape.pdf)



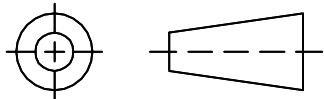
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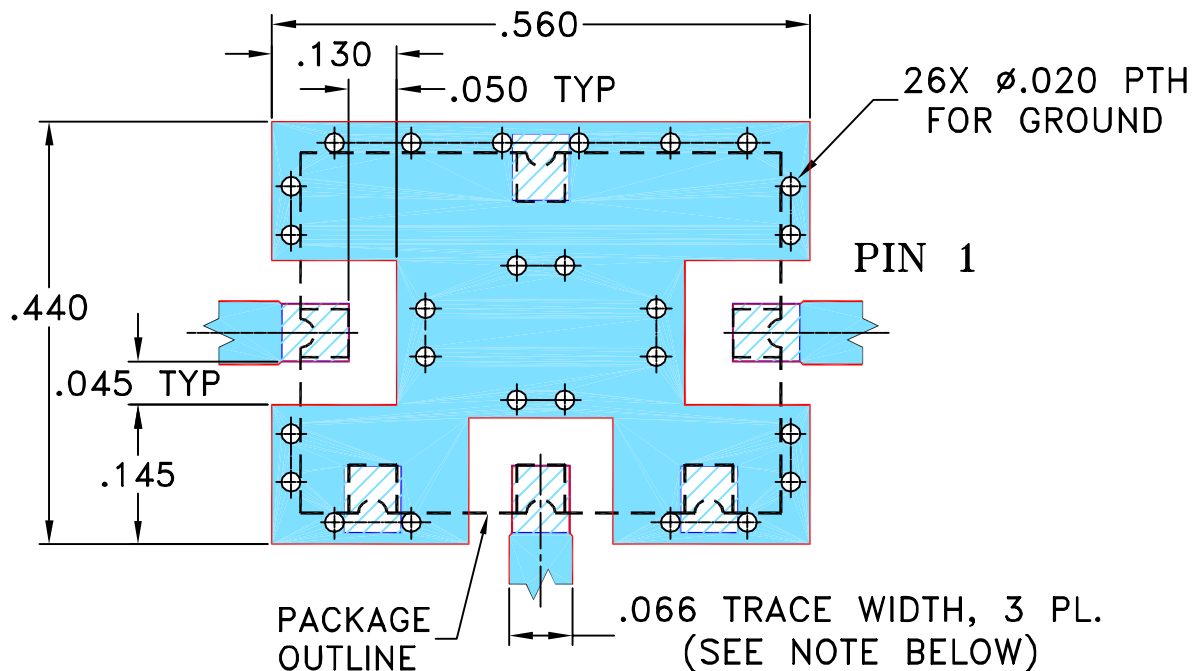
## THIRD ANGLE PROJECTION



## REVISIONS

| REV | ECN No. | DESCRIPTION                 | DATE     | DR  | AUTH |
|-----|---------|-----------------------------|----------|-----|------|
| A   | M86762  | ADDED CONNECTIONS "lp & lq" | 05/23/03 | MMG | WL   |
| B   | M94598  | ADDED CONNECTION "hk"       | 10/08/04 | MMG | HY   |
| C   | M102713 | UPDATED NOTES & DESCRIPTION | 01/14/06 | GF  | IL   |
| D   | M132989 | UPDATED NOTE 2              | 08/24/11 | GF  | DJ   |

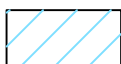
**SUGGESTED MOUNTING CONFIGURATION FOR  
TTT166/167 CASE STYLE, "hk"/"lp"/"lq"  
"x"/"ck"/"ec" PIN CONNECTIONS**

**NOTE:**

1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030"  $\pm$  .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. THE USE OF SOLDER MASK OVER THE GROUND AREA UNDER THE UNIT AS SHOWN IS RECOMMENDED TO PREVENT POTENTIAL SHORTING. IF USER CHOOSES TO EXPOSE METAL UNDER THE ENTIRE UNIT GROUND PAD FOR IMPROVED GROUNDING, IT IS RECOMMENDED A SOLDER MASK DAM BE APPLIED AROUND EACH GROUND PAD TO ENSURE FILLET AND CONNECTION AT GROUND PADS.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER), SEE NOTE 2.



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS  $\pm$ 3 PL DECIMALS  $\pm$  .005ANGLES  $\pm$ FRACTIONS  $\pm$ 

DRAWN

GF

03/18/03

CHECKED

IL

04/15/03

APPROVED

DJ

04/15/03



**Mini-Circuits®**

13 Neptune Avenue  
Brooklyn NY 11235

PL, hk/lp/lq/x/ck/ec, TTT166/167,  
SYM/HJK/SYAS/SYPD, TB-12

SIZE  
A

CODE IDENT  
15542

DRAWING NO:  
98-PL-079

REV:  
D

FILE: 98PL079

SCALE: 5:1

SHEET: 1 OF 1

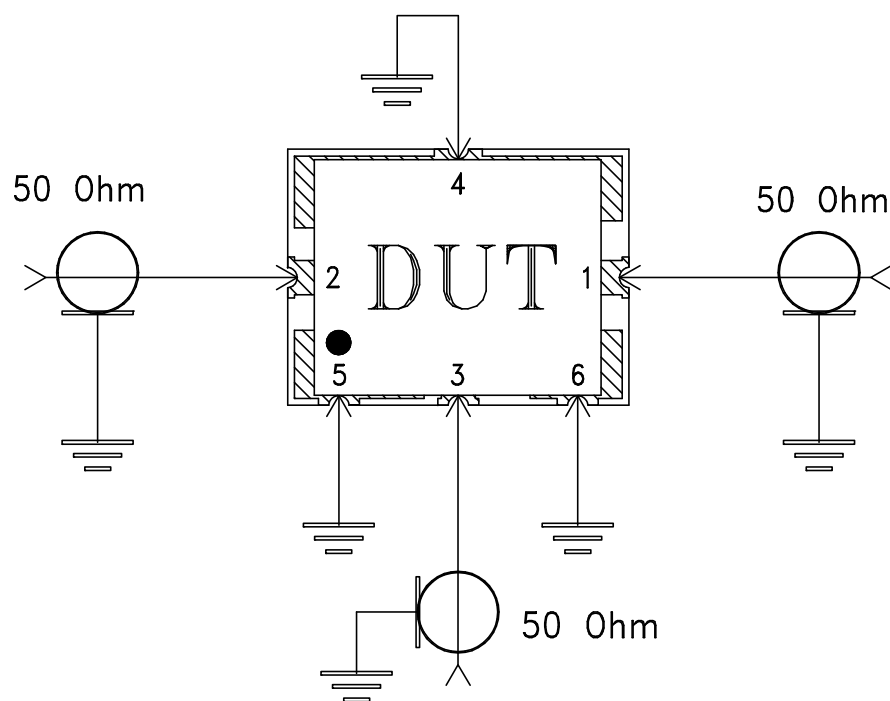
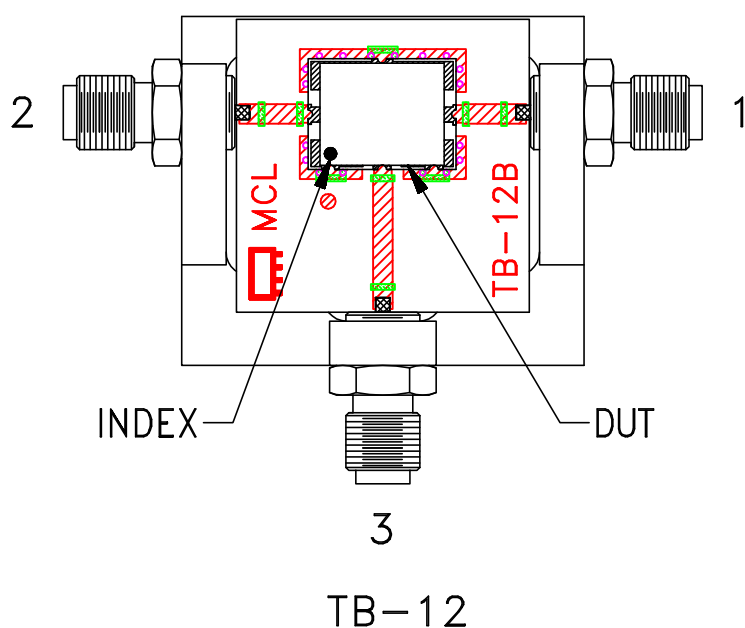
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ASHEETA1.DWG REV:A DATE:01/12/95

# Evaluation Board and Circuit

For Pin Connections Refer to Data Sheet of the DUT



Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification                  | Test/Inspection Condition                                                                                                                                       | Reference/Spec                                                                                       |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Operating Temperature          | -40° to 85°C<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                                                                          |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                                                                          |
| Humidity                       | 90 to 95% RH, 240 hours, 50°C                                                                                                                                   | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C                                                |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak                                                                                          | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1                                                        |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, 95% Coverage                                                                              |
| Vibration (High Frequency)     | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)                                                                             | MIL-STD-202, Method 204, Condition D                                                                 |
| Mechanical Shock               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                                                               | MIL-STD-202, Method 213, Condition A                                                                 |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                                                                              |