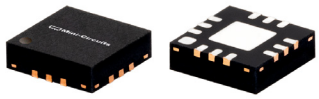
MMIC SURFACE MOUNT

# X2 Frequency Multiplier CY2-44+

50Ω Output 12.4 to 40 GHz

## THE BIG DEAL

- Wideband, output 12.4 to 40 GHz
- Low conversion loss, 14 dB typ.
- Good fundamental & harmonic suppression, F1, 26 dBc typ.; F3, 34 dBc typ.; F4, 18 dBc typ.
- Miniature size 3 x 3 x 0.89mm
- Aqueous washable



*Generic photo used for illustration purposes only*

CASE STYLE: DQ1225

**+RoHS Compliant**
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

## APPLICATIONS

- Synthesizers
- Local Oscillators
- 5G

## PRODUCT OVERVIEW

Mini-Circuits' CY2-44+ is an ultra-wideband MMIC frequency doubler, converting input frequencies from 6.2 to 20 GHz into output frequencies from 12.4 to 40 GHz. Its wide output range makes this model suitable for broadband systems as well as a wide variety of narrowband applications. Utilizing GaAs HBT technology, the multiplier comes housed in a tiny 3 x 3 x 0.89mm MCLP package and offers excellent repeatability, low inductance, and good thermal efficiency.

## KEY FEATURES

| Features | Advantages |
|---|---|
| Broadband, 12.4 to 40 GHz output | With an output frequency range spanning 12.4 to 40 GHz, this multiplier supports broadband applications such as defense and instrumentation as well as a wide range of narrowband system requirements including 5G. |
| Low conversion loss, 14 dB typ. | With a low conversion loss, CY2-44+ produces higher output power, reducing the need for post amplification. |
| Excellent fundamental and harmonic suppression:<br>• F1, 26 dBc<br>• F3, 34 dBc<br>• F4, 18 dBc | Reduces spurious signals and the need for additional filtering. |
| Wide input power range, +12 to +18 dBm | Wide input power signal range accommodates different input signal levels while still maintaining a low conversion loss. |
| 3 x 3 mm, 12 lead MCLP package | Low inductance, repeatable transitions, and excellent thermal contact to the PCB |

# X2 Frequency Multiplier CY2-44+

50Ω Output 12.4 to 40 GHz

## ELECTRICAL SPECIFICATIONS[1] AT 25°C

| Parameter | | Input Frequency (GHz) | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Multiplier Factor | | | | 2 | | |
| Frequency Range, Input (F1) | | | 6.2 | — | 16 | GHz |
| | | | 16 | — | 20 | |
| Frequency Range, Output (F2) | | | 12.4 | — | 32 | GHz |
| | | | 32 | — | 40 | |
| Input Power | | | 12 | — | 18 | dBm |
| Conversion Loss | | 6.2 - 16 | — | 14 | 20 | dB |
| | | 16 - 20 | — | 17 | 23 | |
| Harmonic Output[2] | F1 | 6.2 - 16 | — | 26 | — | dBc |
| | | 16 - 20 | — | 27 | — | |
| | F3 | 6.2 - 16 | — | 34 | — | |
| | | 16 - 16.5 | — | 36 | — | |
| | F4 | 6.2 - 12.4 | — | 18 | — | |

1. At +15 dBm input power measured on Mini-Circuits test board TB-973-CY244C+
2. Harmonics of input frequency below the power of F2. Harmonics are measured to 50 GHz.

## MAXIMUM RATINGS

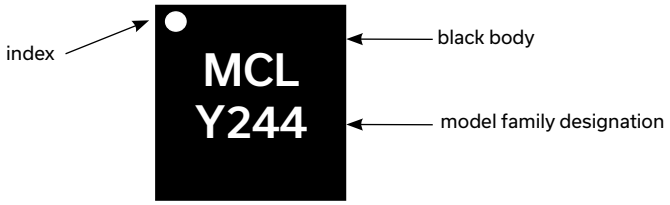
| Parameter | Ratings |
|---|---|
| Operating Temperature | -40°C to +85°C |
| Storage Temperature | -65°C to +150°C |
| RF Input Power | +21 dBm |

Permanent damage may occur if any of these limits are exceeded.

## PAD CONNECTIONS

| | |
|---|---|
| **INPUT** | 5 |
| **OUTPUT** | 11 |
| **GROUND** | 4,6,10,12 & paddle |
| **NO CONNECTIONS** | all others |

## PRODUCT MARKING



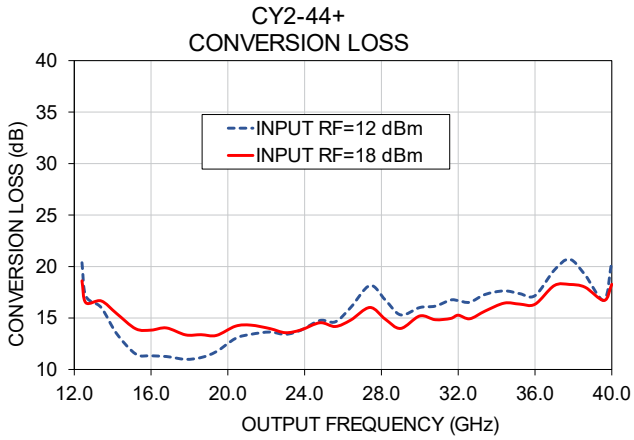

Marking may contain other features or characters for internal lot control

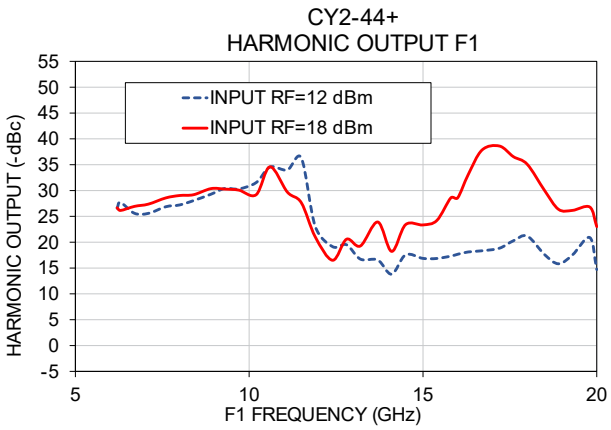
# X2 Frequency Multiplier CY2-44+

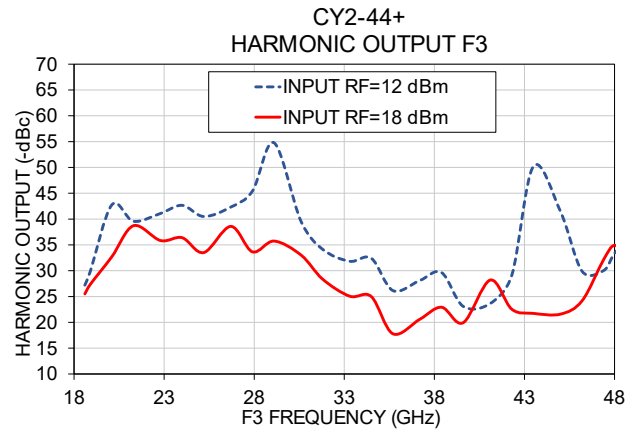
50Ω Output 12.4 to 40 GHz

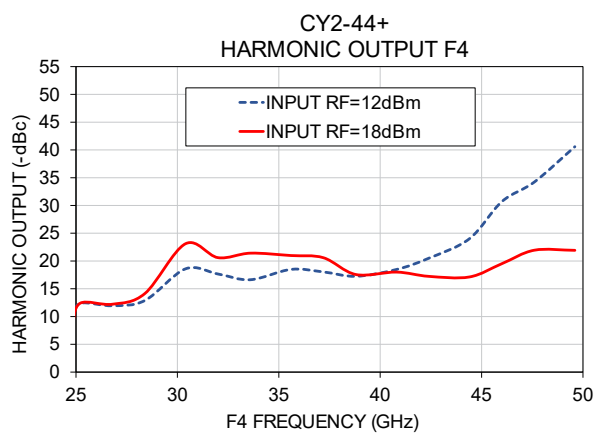
## TYPICAL PERFORMANCE DATA

| Input Frequency (MHz) | INPUT RF= +12 dBm | | | | INPUT RF= +18 dBm | | | |
|---|---|---|---|---|---|---|---|---|
| | Conversion Loss (dB) | Harmonic Output Below F2 (-dBc) | | | Conversion Loss (dB) | Harmonic Output Below F2 (dBc) | | |
| | F2 | F1 | F3 | F4 | F2 | F1 | F3 | F4 |
| 6.2 | 20.37 | 26.58 | 27.20 | 9.39 | 18.61 | 26.66 | 25.51 | 8.08 |
| 7.1 | 13.50 | 25.58 | 39.57 | 12.90 | 15.44 | 27.37 | 38.72 | 14.16 |
| 8.0 | 11.33 | 27.21 | 42.66 | 17.66 | 13.82 | 29.04 | 36.39 | 20.60 |
| 9.3 | 11.16 | 30.41 | 45.42 | 18.03 | 13.38 | 30.27 | 33.66 | 20.59 |
| 10.2 | 13.02 | 31.54 | 39.54 | 18.47 | 14.21 | 29.19 | 33.03 | 18.01 |
| 11.1 | 13.64 | 33.98 | 31.83 | 24.01 | 13.97 | 29.69 | 25.06 | 17.13 |
| 12.4 | 14.76 | 19.14 | 28.12 | 40.58 | 14.54 | 16.51 | 20.62 | 21.92 |
| 13.2 | 16.03 | 16.73 | 23.09 | -- | 14.80 | 19.28 | 19.93 | -- |
| 14.1 | 16.76 | 13.82 | 29.15 | -- | 14.89 | 18.22 | 22.54 | -- |
| 15.0 | 16.02 | 16.86 | 41.46 | -- | 15.20 | 23.34 | 21.59 | -- |
| 16.0 | 16.69 | 17.67 | 33.38 | -- | 15.27 | 28.60 | 34.91 | -- |
| 17.2 | 17.64 | 18.84 | -- | -- | 16.45 | 38.61 | -- | -- |
| 18.0 | 17.17 | 21.18 | -- | -- | 16.34 | 35.08 | -- | -- |
| 20.0 | 20.53 | 14.71 | -- | -- | 18.27 | 23.01 | -- | -- |



# X2 Frequency Multiplier CY2-44+

50Ω Output 12.4 to 40 GHz

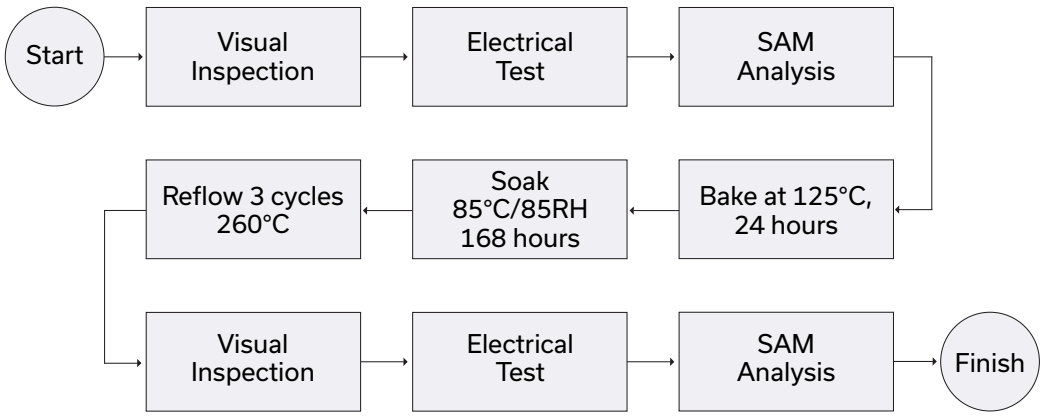
**ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS CLICK HERE**

| | |
|---|---|
| **Performance Data** | Data Table<br>Swept Graphs<br>S-Parameter (S3P Files) Data Set (.zip file) |
| **Case Style** | DQ1225 Plastic package, exposed paddle lead finish: matte-tin |
| **Tape & Reel**<br>**Standard quantities available on reel** | F66<br>7" reels with 20, 50, 100, 200, 500 or 1K devices |
| **Suggested Layout for PCB Design** | PL-541 |
| **Evaluation Board** | TB-973-CY244C+ |
| **Environmental Ratings** | ENV08T2 |

## ESD RATING

Human Body Model (HBM): Class 1C (1000 to<2000V) in accordance with ANSI/ESD 5.1-2007

## MSL TEST FLOW CHART




NOTES

A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html

# Frequency Multiplier (Doubler) CY2-44+

*Typical Performance Data*

| Frequency (GHz) | | | | RF IN = 12dBm | | | |
|---|---|---|---|---|---|---|---|
| | | | | Conversion Loss (dB) | Harmonic Output* (-dBc) | | |
| X1 Output | X2 Output | X3 Output | X4 Output | X2 Output | X1 Output | X3 Output | X4 Output |
| 5.0 | 10.0 | 15.0 | 20.0 | 41.77 | 2.59 | 13.68 | 1.79 |
| 5.4 | 10.8 | 16.2 | 21.6 | 30.49 | 18.61 | 18.04 | 5.21 |
| 5.8 | 11.6 | 17.4 | 23.2 | 24.82 | 30.10 | 19.15 | 7.83 |
| 6.2 | 12.4 | 18.6 | 24.8 | 20.37 | 26.58 | 27.20 | 9.39 |
| 6.3 | 12.6 | 18.9 | 25.2 | 17.14 | 27.70 | 29.84 | 12.36 |
| 6.7 | 13.4 | 20.1 | 26.8 | 16.02 | 25.59 | 42.76 | 11.95 |
| 7.1 | 14.2 | 21.3 | 28.4 | 13.50 | 25.58 | 39.57 | 12.90 |
| 7.6 | 15.2 | 22.8 | 30.4 | 11.50 | 26.86 | 41.09 | 18.59 |
| 8.0 | 16.0 | 24.0 | 32.0 | 11.33 | 27.21 | 42.66 | 17.66 |
| 8.4 | 16.8 | 25.2 | 33.6 | 11.26 | 28.05 | 40.50 | 16.63 |
| 8.9 | 17.8 | 26.7 | 35.6 | 10.99 | 29.29 | 42.32 | 18.49 |
| 9.3 | 18.6 | 27.9 | 37.2 | 11.16 | 30.41 | 45.42 | 18.03 |
| 9.7 | 19.4 | 29.1 | 38.8 | 11.74 | 30.31 | 54.78 | 17.25 |
| 10.2 | 20.4 | 30.6 | 40.8 | 13.02 | 31.54 | 39.54 | 18.47 |
| 10.6 | 21.2 | 31.8 | 42.4 | 13.42 | 34.55 | 34.13 | 20.51 |
| 11.1 | 22.2 | 33.3 | 44.4 | 13.64 | 33.98 | 31.83 | 24.01 |
| 11.5 | 23.0 | 34.5 | 46.0 | 13.41 | 36.30 | 32.41 | 30.69 |
| 11.9 | 23.8 | 35.7 | 47.6 | 13.82 | 23.07 | 26.15 | 34.21 |
| 12.4 | 24.8 | 37.2 | 49.6 | 14.76 | 19.14 | 28.12 | 40.58 |
| 12.8 | 25.6 | 38.4 | -- | 14.63 | 19.51 | 29.64 | -- |
| 13.2 | 26.4 | 39.6 | -- | 16.03 | 16.73 | 23.09 | -- |
| 13.7 | 27.4 | 41.1 | -- | 18.16 | 16.55 | 23.65 | -- |
| 14.1 | 28.2 | 42.3 | -- | 16.76 | 13.82 | 29.15 | -- |
| 14.5 | 29.0 | 43.5 | -- | 15.30 | 17.56 | 50.24 | -- |
| 15.0 | 30.0 | 45.0 | -- | 16.02 | 16.86 | 41.46 | -- |
| 15.4 | 30.8 | 46.2 | -- | 16.15 | 16.85 | 29.88 | -- |
| 15.8 | 31.6 | 47.4 | -- | 16.74 | 17.31 | 30.05 | -- |
| 16.0 | 32.0 | 48.0 | -- | 16.69 | 17.67 | 33.38 | -- |
| 16.3 | 32.6 | 48.9 | -- | 16.53 | 18.11 | 36.51 | -- |
| 16.7 | 33.4 | -- | -- | 17.29 | 18.34 | -- | -- |
| 17.2 | 34.4 | -- | -- | 17.64 | 18.84 | -- | -- |
| 17.6 | 35.2 | -- | -- | 17.37 | 20.27 | -- | -- |
| 18.0 | 36.0 | -- | -- | 17.17 | 21.18 | -- | -- |
| 18.5 | 37.0 | -- | -- | 19.64 | 17.60 | -- | -- |
| 18.9 | 37.8 | -- | -- | 20.71 | 15.83 | -- | -- |
| 19.3 | 38.6 | -- | -- | 19.21 | 17.53 | -- | -- |
| 19.8 | 39.6 | -- | -- | 16.73 | 20.90 | -- | -- |
| 20.0 | 40.0 | -- | -- | 20.53 | 14.71 | -- | -- |
| 20.2 | 40.4 | -- | -- | 17.83 | 18.27 | -- | -- |
| 20.6 | 41.2 | -- | -- | 22.80 | 11.05 | -- | -- |
| 21.1 | 42.2 | -- | -- | 24.30 | 9.20 | -- | -- |
| 21.5 | 43.0 | -- | -- | 20.75 | 10.54 | -- | -- |
| 22.0 | 44.0 | -- | -- | 21.53 | 9.24 | -- | -- |

*Harmonic Output below power level of X2 Output .

*Typical Performance Data*

| Frequency (GHz) | | | | RF IN = 15dBm | | | |
|---|---|---|---|---|---|---|---|
| | | | | Conversion Loss (dB) | Harmonic Output* (-dBc) | | |
| X1 Output | X2 Output | X3 Output | X4 Output | X2 Output | X1 Output | X3 Output | X4 Output |
| 5.0 | 10.0 | 15.0 | 20.0 | 30.80 | 14.92 | 21.70 | 9.94 |
| 5.4 | 10.8 | 16.2 | 21.6 | 26.46 | 28.59 | 20.94 | 11.87 |
| 5.8 | 11.6 | 17.4 | 23.2 | 21.93 | 30.24 | 23.43 | 8.36 |
| 6.2 | 11.6 | 18.6 | 23.2 | 18.96 | 27.56 | 29.24 | 9.41 |
| 6.3 | 12.6 | 18.9 | 25.2 | 16.30 | 27.71 | 31.60 | 12.66 |
| 6.7 | 13.4 | 20.1 | 26.8 | 15.70 | 26.56 | 39.66 | 11.58 |
| 7.1 | 14.2 | 21.3 | 28.4 | 14.14 | 26.59 | 44.03 | 12.59 |
| 7.6 | 15.2 | 22.8 | 30.4 | 12.59 | 27.95 | 45.16 | 24.09 |
| 8.0 | 16.0 | 24.0 | 32.0 | 12.45 | 28.43 | 44.19 | 21.18 |
| 8.4 | 16.8 | 25.2 | 33.6 | 12.57 | 28.88 | 39.14 | 17.81 |
| 8.9 | 17.8 | 26.7 | 35.6 | 12.04 | 30.23 | 46.25 | 18.92 |
| 9.3 | 18.6 | 27.9 | 37.2 | 12.10 | 30.91 | 40.59 | 18.22 |
| 9.7 | 19.4 | 29.1 | 38.8 | 12.26 | 30.80 | 44.16 | 16.00 |
| 10.2 | 20.4 | 30.6 | 40.8 | 13.33 | 30.84 | 38.43 | 16.55 |
| 10.6 | 21.2 | 31.8 | 42.4 | 13.52 | 35.66 | 33.20 | 17.14 |
| 11.1 | 22.2 | 33.3 | 44.4 | 13.30 | 33.34 | 29.80 | 18.14 |
| 11.5 | 23.0 | 34.5 | 46.0 | 12.89 | 33.55 | 29.97 | 21.15 |
| 11.9 | 23.8 | 35.7 | 47.6 | 13.20 | 22.83 | 21.96 | 23.33 |
| 12.4 | 24.8 | 37.2 | 49.6 | 13.96 | 18.51 | 25.77 | 23.83 |
| 12.8 | 25.6 | 38.4 | -- | 13.62 | 22.02 | 32.66 | -- |
| 13.2 | 26.4 | 39.6 | -- | 14.51 | 20.06 | 26.87 | -- |
| 13.7 | 27.4 | 41.1 | -- | 15.95 | 23.03 | 34.22 | -- |
| 14.1 | 28.2 | 42.3 | -- | 14.90 | 17.09 | 30.68 | -- |
| 14.5 | 29.0 | 43.5 | -- | 14.08 | 22.06 | 25.49 | -- |
| 15.0 | 30.0 | 45.0 | -- | 15.00 | 21.58 | 25.39 | -- |
| 15.4 | 30.8 | 46.2 | -- | 14.85 | 21.74 | 27.08 | -- |
| 15.8 | 31.6 | 47.4 | -- | 15.20 | 23.95 | 32.81 | -- |
| 16.0 | 31.6 | 48.0 | -- | 15.37 | 24.22 | 35.57 | -- |
| 16.3 | 32.6 | 48.9 | -- | 15.04 | 26.11 | 34.37 | -- |
| 16.7 | 33.4 | -- | -- | 15.72 | 27.48 | -- | -- |
| 17.2 | 34.4 | -- | -- | 16.40 | 27.28 | -- | -- |
| 17.6 | 35.2 | -- | -- | 16.21 | 30.02 | -- | -- |
| 18.0 | 36.0 | -- | -- | 16.00 | 31.84 | -- | -- |
| 18.5 | 37.0 | -- | -- | 17.95 | 29.49 | -- | -- |
| 18.9 | 37.8 | -- | -- | 18.51 | 29.16 | -- | -- |
| 19.3 | 38.6 | -- | -- | 17.92 | 25.76 | -- | -- |
| 19.8 | 39.6 | -- | -- | 16.22 | 29.79 | -- | -- |
| 20.0 | 40.0 | -- | -- | 18.41 | 25.42 | -- | -- |
| 20.2 | 40.4 | -- | -- | 16.75 | 23.67 | -- | -- |
| 20.6 | 41.2 | -- | -- | 20.45 | 19.56 | -- | -- |
| 21.1 | 42.2 | -- | -- | 22.20 | 16.20 | -- | -- |
| 21.5 | 43.0 | -- | -- | 20.03 | 14.08 | -- | -- |
| 22.0 | 44.0 | -- | -- | 20.96 | 12.59 | -- | -- |

*Harmonic Output below power level of X2 Output .

*Typical Performance Data*

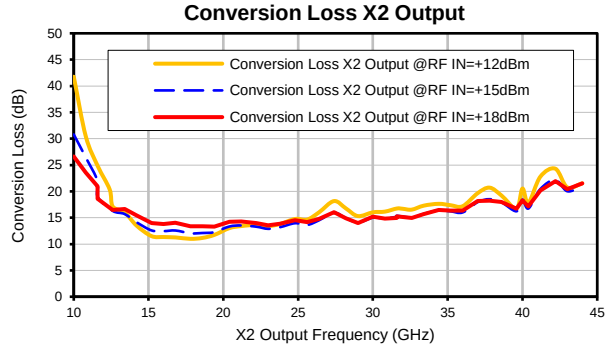
| Frequency (GHz) | | | | RF IN = 18dBm | | | |
|---|---|---|---|---|---|---|---|
| | | | | Conversion Loss (dB) | Harmonic Output* (-dBc) | | |
| X1 Output | X2 Output | X3 Output | X4 Output | X2 Output | X1 Output | X3 Output | X4 Output |
| 5.0 | 10.0 | 15.0 | 20.0 | 26.62 | 21.95 | 17.13 | 12.73 |
| 5.4 | 10.8 | 16.2 | 21.6 | 23.59 | 28.51 | 21.57 | 11.54 |
| 5.8 | 11.6 | 17.4 | 23.2 | 20.94 | 26.98 | 22.40 | 7.62 |
| 6.2 | 11.6 | 18.6 | 23.2 | 18.61 | 26.66 | 25.51 | 8.08 |
| 6.3 | 12.6 | 18.9 | 25.2 | 16.48 | 26.15 | 27.34 | 12.39 |
| 6.7 | 13.4 | 20.1 | 26.8 | 16.66 | 26.93 | 32.72 | 12.22 |
| 7.1 | 14.2 | 21.3 | 28.4 | 15.44 | 27.37 | 38.72 | 14.16 |
| 7.6 | 15.2 | 22.8 | 30.4 | 13.95 | 28.57 | 35.84 | 23.11 |
| 8.0 | 16.0 | 24.0 | 32.0 | 13.82 | 29.04 | 36.39 | 20.60 |
| 8.4 | 16.8 | 25.2 | 33.6 | 14.04 | 29.19 | 33.51 | 21.41 |
| 8.9 | 17.8 | 26.7 | 35.6 | 13.36 | 30.37 | 38.59 | 20.99 |
| 9.3 | 18.6 | 27.9 | 37.2 | 13.38 | 30.27 | 33.66 | 20.59 |
| 9.7 | 19.4 | 29.1 | 38.8 | 13.31 | 30.08 | 35.74 | 17.57 |
| 10.2 | 20.4 | 30.6 | 40.8 | 14.21 | 29.19 | 33.03 | 18.01 |
| 10.6 | 21.2 | 31.8 | 42.4 | 14.31 | 34.59 | 28.35 | 17.24 |
| 11.1 | 22.2 | 33.3 | 44.4 | 13.97 | 29.69 | 25.06 | 17.13 |
| 11.5 | 23.0 | 34.5 | 46.0 | 13.57 | 27.64 | 24.99 | 19.52 |
| 11.9 | 23.8 | 35.7 | 47.6 | 13.84 | 21.04 | 17.78 | 21.95 |
| 12.4 | 24.8 | 37.2 | 49.6 | 14.54 | 16.51 | 20.62 | 21.92 |
| 12.8 | 25.6 | 38.4 | -- | 14.17 | 20.58 | 22.93 | -- |
| 13.2 | 26.4 | 39.6 | -- | 14.80 | 19.28 | 19.93 | -- |
| 13.7 | 27.4 | 41.1 | -- | 16.02 | 23.91 | 28.19 | -- |
| 14.1 | 28.2 | 42.3 | -- | 14.89 | 18.22 | 22.54 | -- |
| 14.5 | 29.0 | 43.5 | -- | 13.99 | 23.40 | 21.74 | -- |
| 15.0 | 30.0 | 45.0 | -- | 15.20 | 23.34 | 21.59 | -- |
| 15.4 | 30.8 | 46.2 | -- | 14.84 | 24.21 | 24.18 | -- |
| 15.8 | 31.6 | 47.4 | -- | 14.95 | 28.57 | 32.19 | -- |
| 16.0 | 31.6 | 48.0 | -- | 15.27 | 28.60 | 34.91 | -- |
| 16.3 | 32.6 | 48.9 | -- | 14.93 | 33.05 | 32.46 | -- |
| 16.7 | 33.4 | -- | -- | 15.68 | 37.84 | -- | -- |
| 17.2 | 34.4 | -- | -- | 16.45 | 38.61 | -- | -- |
| 17.6 | 35.2 | -- | -- | 16.35 | 36.56 | -- | -- |
| 18.0 | 36.0 | -- | -- | 16.34 | 35.08 | -- | -- |
| 18.5 | 37.0 | -- | -- | 18.15 | 30.00 | -- | -- |
| 18.9 | 37.8 | -- | -- | 18.26 | 26.36 | -- | -- |
| 19.3 | 38.6 | -- | -- | 18.00 | 26.16 | -- | -- |
| 19.8 | 39.6 | -- | -- | 16.70 | 26.80 | -- | -- |
| 20.0 | 40.0 | -- | -- | 18.27 | 23.01 | -- | -- |
| 20.2 | 40.4 | -- | -- | 17.14 | 21.46 | -- | -- |
| 20.6 | 41.2 | -- | -- | 20.17 | 21.24 | -- | -- |
| 21.1 | 42.2 | -- | -- | 21.95 | 17.60 | -- | -- |
| 21.5 | 43.0 | -- | -- | 20.42 | 16.78 | -- | -- |
| 22.0 | 44.0 | -- | -- | 21.50 | 14.40 | -- | -- |

*Harmonic Output below power level of X2 Output .

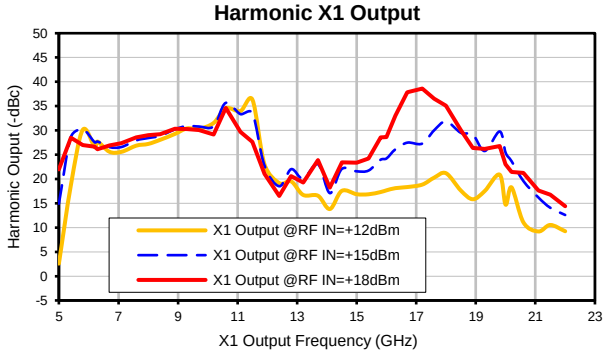
# Frequency Multiplier (Doubler) CY2-44+

## *Typical Performance Curves*

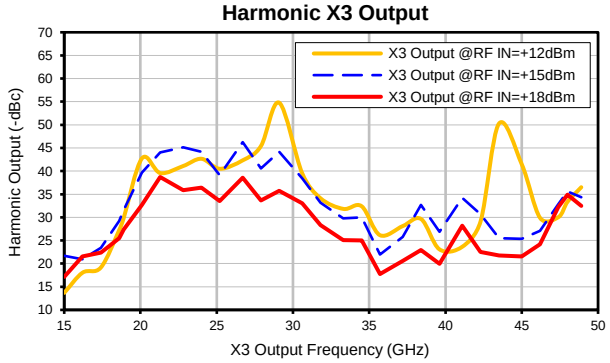
**Conversion Loss X2 Output**



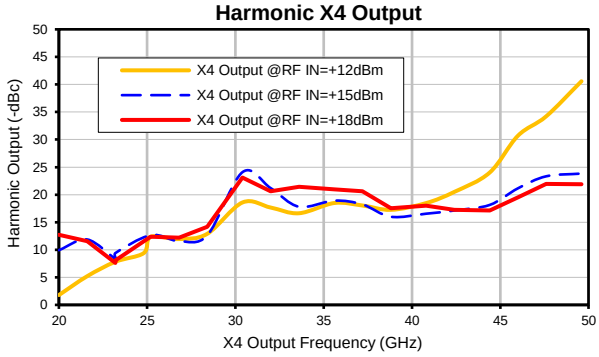

**Harmonic X1 Output**




**Harmonic X3 Output**



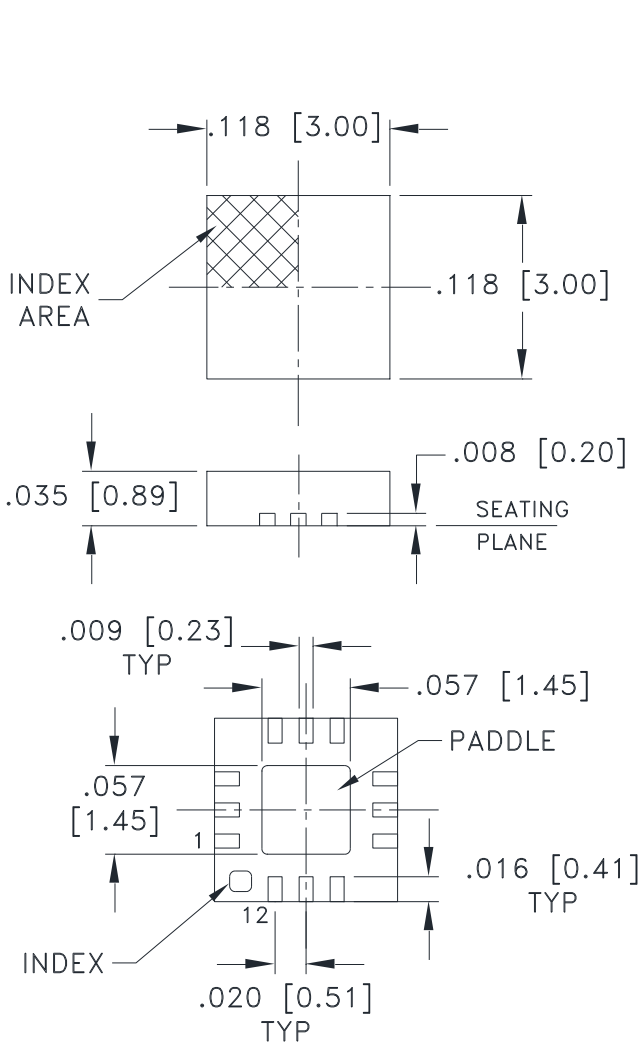

**Harmonic X4 Output**



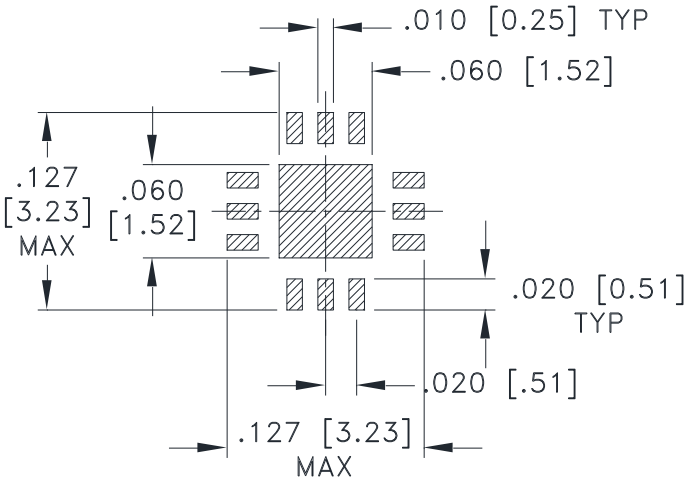
# Case Style DQ

**DQ1225**

## Outline Dimensions




PCB Land Pattern




SUGGESTED LAYOUT,
TOLERANCE TO BE WITHIN ±.002

**Weight: .02 Grams**

**Dimensions are in inches (mm). Tolerances: 2Pl. ± .01; 3 Pl. ± .004**

### Notes:

1. Case material: Plastic.
2. Termination finish:
   - For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin. All models, (+) suffix. See Data sheet.
   - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.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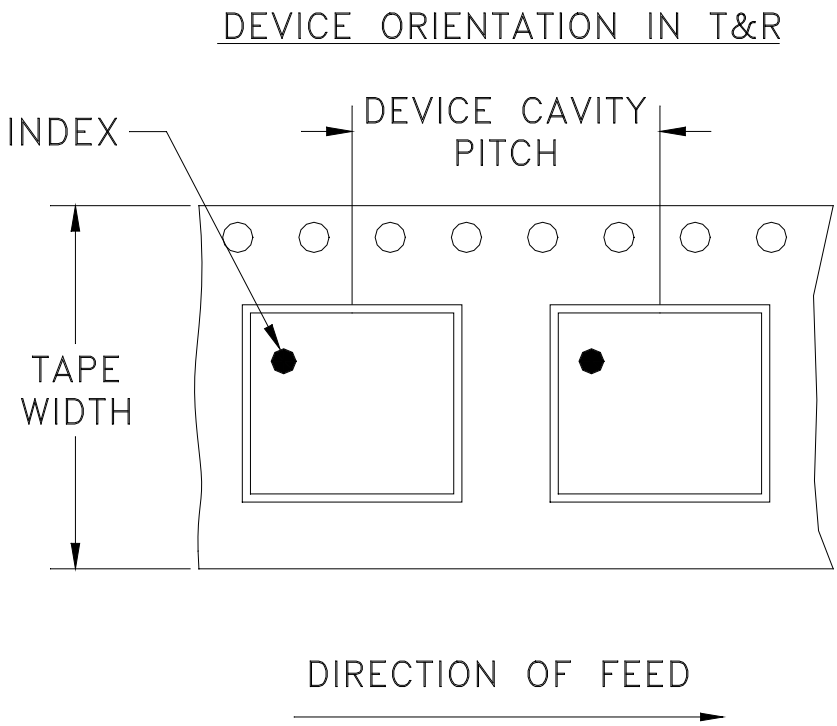
# Tape & Reel Packaging TR-F66




| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel see note | |
|---|---|---|---|---|
| 8 | 4 | 7 | Small quantity standard | 20 |
| | | | | 50 |
| | | | | 100 |
| | | | | 200 |
| | | | | 500 |
| | | 7 | Standard | 1000, 2000, 3000 |

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

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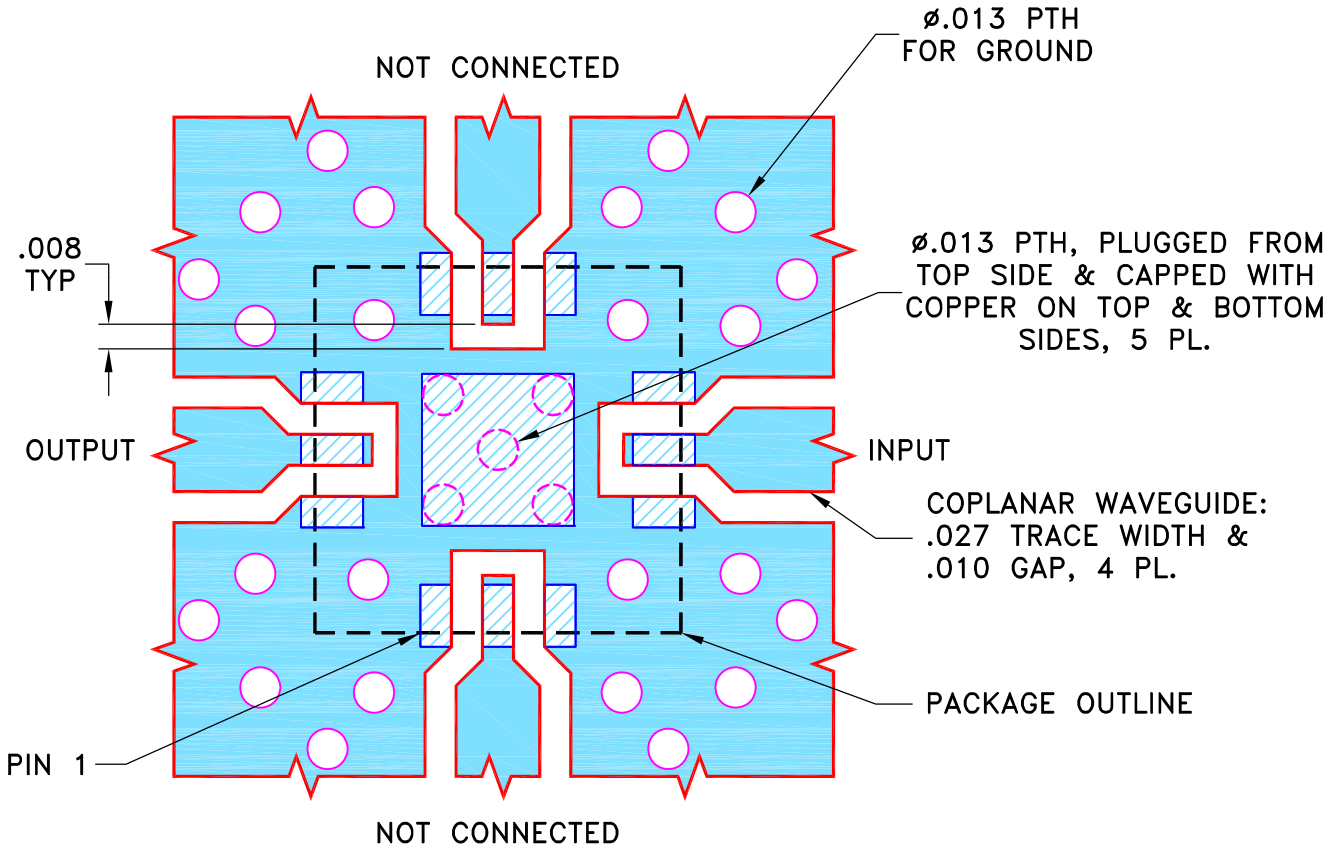
THIRD ANGLE PROJECTION

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| OR | M165191 | NEW RELEASE | 12/13/17 | ITG | JX |

# SUGGESTED MOUNTING CONFIGURATION
# FOR DQ1225 CASE STYLE, "12FM01" PIN CODE




NOTES:

1. TRACE WIDTH PARAMETERS ARE SHOWN FOR TACONIC TLY-5 WITH DIELECTRIC THICKNESS .010"±.001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

| UNLESS OTHERWISE SPECIFIED | | INITIALS | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES | DRAWN | ITG | 12/11/17 |
| TOLERANCES ON: | CHECKED | GF | 12/13/17 |
| 2 PL DECIMALS ± | APPROVED | JX | 12/13/17 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |

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

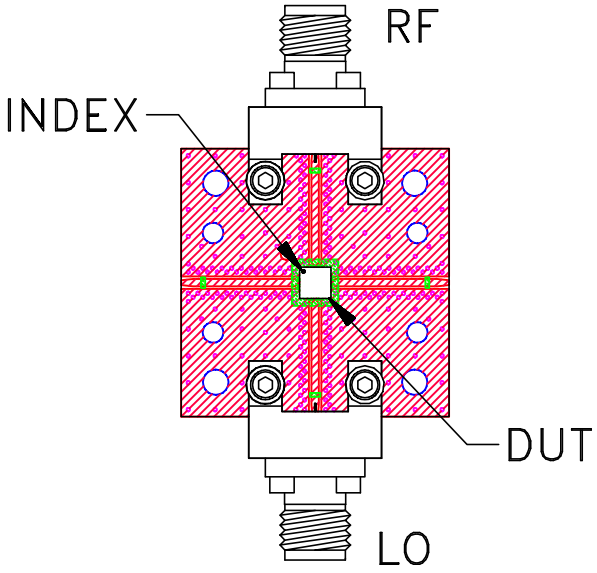
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, 12FM01, DQ1225, TB-973+

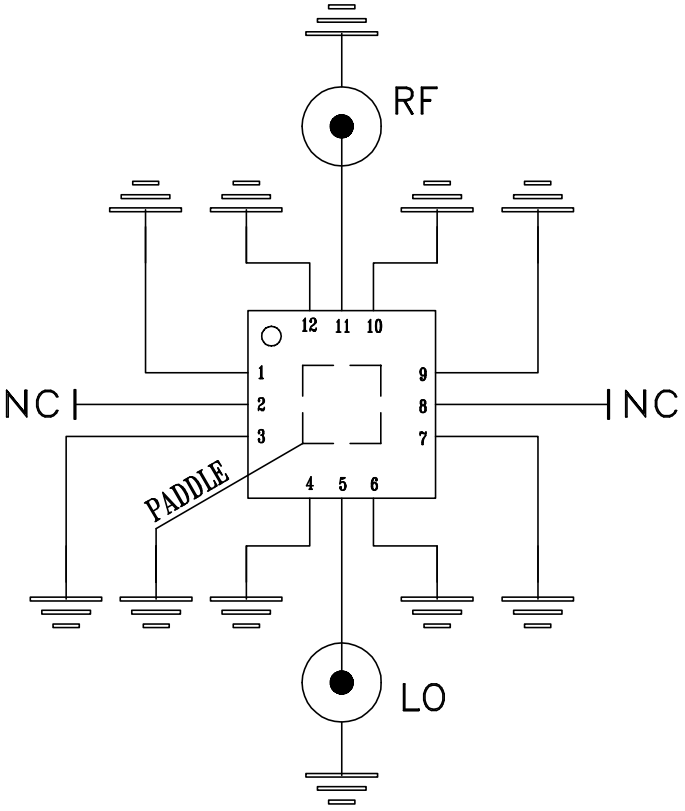
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-541 | OR |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL541 | 16:1 | 1 OF 1 |

# Evaluation Board and Circuit




TB-973-CY244C+




Schematic Diagram

Notes:

1. 50 Ohm 2.92mm Female end launch connectors.
2. PCB Material: TLY-5 or equivalent,
   Dielectric Constant=2.2, Thickness=.010 inch.

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# Environmental Specifications ENV08T1

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 or -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C or -65° to 150°<br>Ambient Environment | Individual Model Data Sheet |
| HTOL | 1000 hours at 125°C | MIL-STD-883, Method 1005, Condition B |
| Thermal Shock | -55° to 100°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Mechanical Shock | 1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only | MIL-STD-883, Method 2002, Condition B, except Y1 direction only |
| Vibration (Variable Frequency) | 50g peak | MIL-STD-883, Method 2007, Condition B |
| Autoclave | 15 psig, 100% RH, 121°C, 96 hours | JESD22-A102, Condition C |
| HAST | 130°C, 85% RH, 96 hours | JESD22-A110 |
| Solderability | 10X Magnification | J-STD-002, Para 4.2.5, Test S, 95% Coverage |
| Solder Reflow Heat | Sn-Pb Eutetic Process: 240°C peak<br>Pb-Free Process: 260°C peak | J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1 |
| Moisture Sensitivity: Level 1 | Bake at 125°C for 24 hours<br>Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak | J-STD-020 |


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| Specification | Test/Inspection Condition | Reference/Spec |
|---|---|---|
| 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 |



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