MMIC SURFACE MOUNT

X3 Frequency Multiplier

CY3-223+

50Ω Output 10 to 22 GHz

THE BIG DEAL

- Ultra-wideband, output from 10 to 22 GHz
- Wide input power range, +12 to +18 dBm
- Low Conversion Loss, 17 dB Typ.
- Good Fundamental and Harmonic Suppression: F1 > +34 dBc; F2 > +45 dBc; F4 > +50 dBc
- Tiny size, 4 x 4mm 24L

Generic photo used for illustration purposes only

CASE STYLE: DG1847

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

APPLICATIONS

- 5G MIMO and Back Haul Radio Systems
- Satellite Communications
- Test and Measurement Equipment
- Radar, EW, and ECM Defense Systems

PRODUCT OVERVIEW

Mini-Circuits' CY3-223+ is an ultra-wideband MMIC Frequency Tripler, converting input frequencies from 3.33 to 7.33 GHz into output frequencies from 10 to 22 GHz. Its wide output range makes this model suitable for broadband systems as well as a wide variety of narrow-band applications. Utilizing GaAs HBT technology, the multiplier comes housed in a tiny 4x4mm 24L MCLP package and offers excellent repeatability, low inductance, and good thermal efficiency.

KEY FEATURES

Feature	Advantages
Broadband, 10 to 22 GHz output	With an output frequency range spanning 10 to 22 GHz, this multiplier supports broadband applications such as defense and instrumentation as well as a wide range of narrowband system requirements including 5G.
Excellent fundamental and harmonic suppression: • F1 +34 dBc • F2 +45 dBc • F4 +50 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.

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ELECTRICAL SPECIFICATIONS[1] AT 25°C AND Zo = 50Ω, UNLESS NOTED OTHERWISE

Parameter		Input Frequency (GHz)	RF Input = +12 dBm Min.	Typ.	Max.	Unit
Multiplication Factor				3		
Frequency Range, Input (F1)			3.33	-	7.33	GHz
Frequency Range, Output (F3)			10	-	22	GHz
Input Power			+12	-	+18	dBm
Conversion Loss		3.33	-	22.0	26.2	dB
		4	-	18.0	22.1	
		5	-	16.4	20.4	
		6	-	18.2	23.0	
		7.33	-	22.1	27.5	
Harmonic Output[2]	F1	3.33	-	45.8	-	dBc
		4	-	49.8	-	
		5	-	46.6	-	
		6	-	44.9	-	
		7.33	-	22.1	-	
	F2	3.3	-	86.1	-	dBc
		4	-	71.9	-	
		5	-	55.1	-	
		6	-	45.0	-	
		7.33	-	39.9	-	
	F4	3.33	-	47.9	-	dBc
		4	-	48.9	-	
		5	-	56.2	-	
		6	-	51.7	-	
		7.33	-	40.9	-	

1. Measured on Mini-Circuits Characterization Test Board TB-CY3-223C+.
2. Harmonics of input frequency below the power level of F3.

MAXIMUM RATINGS[3]

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Input RF Power	+22 dBm (5 minute max) +19 dBm (Continuous)

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

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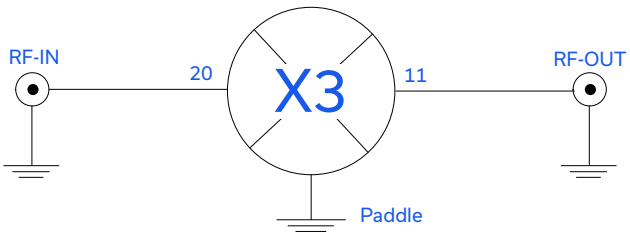
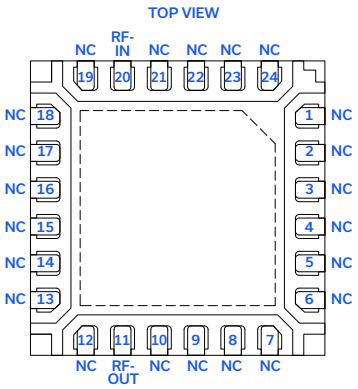
SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION





Function	Pad Number	Description
RF-IN	20	RF-Input Pad.
RF-OUT	11	RF-Output Pad.
Ground	Paddle	Connects to ground
No Connections	1-10, 12-19, 21-24	Not used internally. Connected to ground on test board.

APPLICATION AND CHARACTERIZATION CIRCUIT

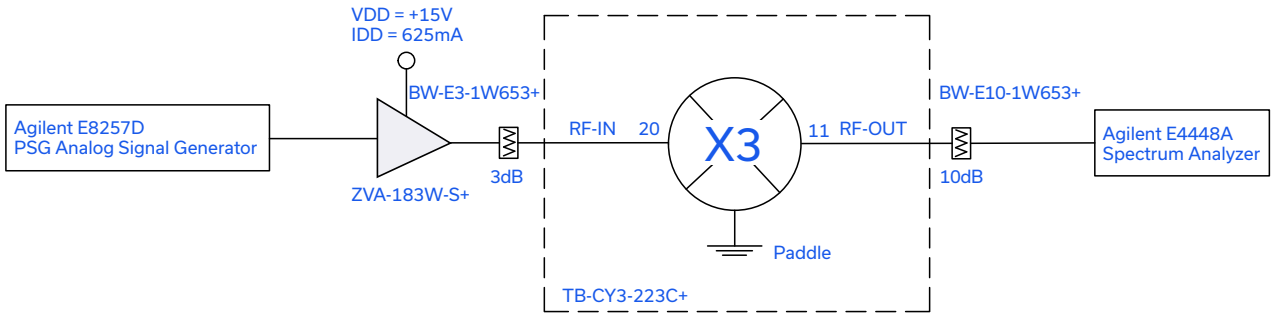
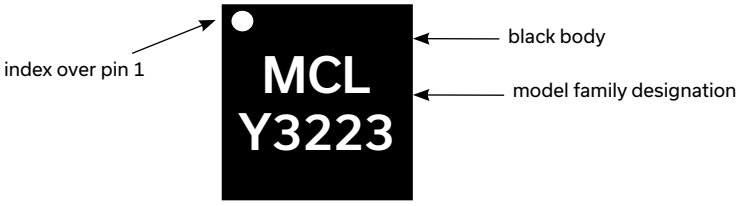


Fig 1. Application and Characterization Circuit
Note: This block diagram is used for characterization. (DUT is soldered and measured on Mini-Circuits Characterization Test Board TB-CY3-223C+) Conversion Loss and Harmonic Output are measured using Agilent E4448A PSA Spectrum Analyzer.

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

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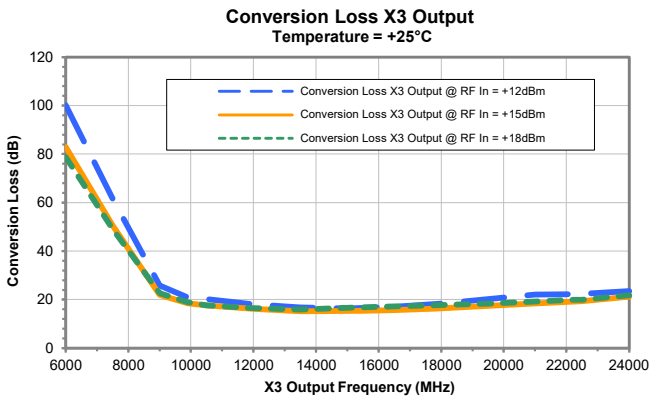
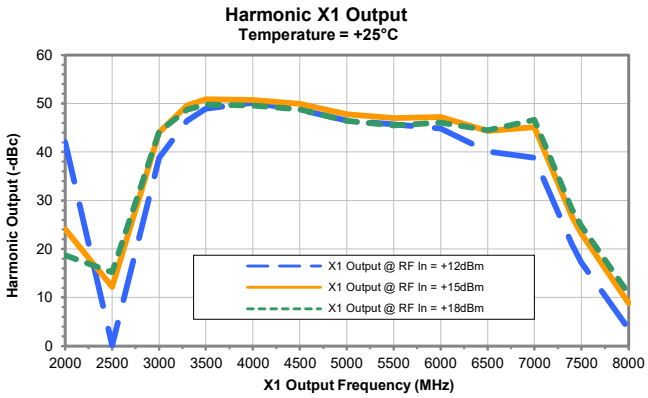
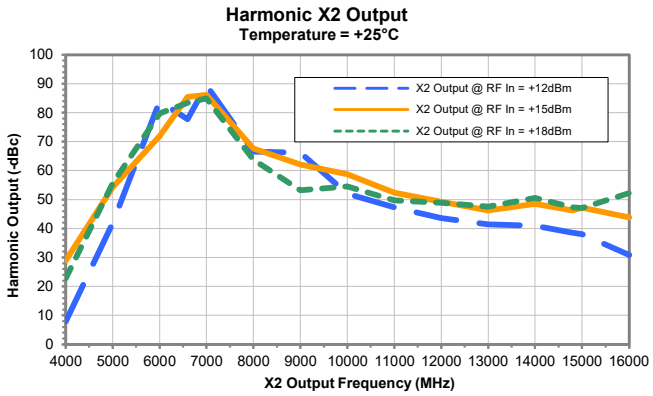
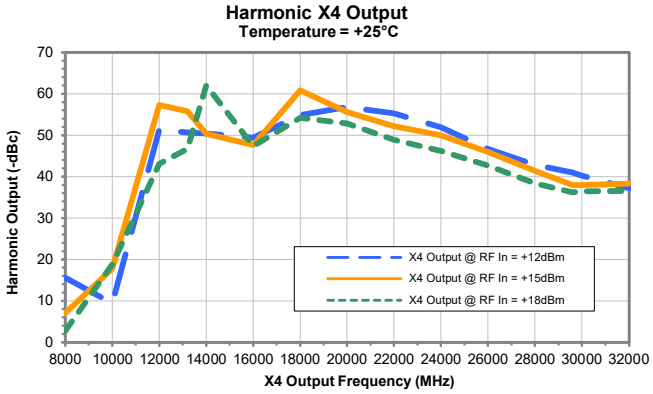
TYPICAL PERFORMANCE CURVES









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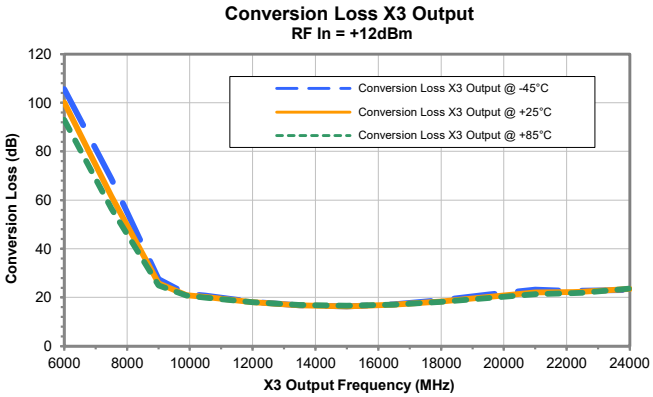

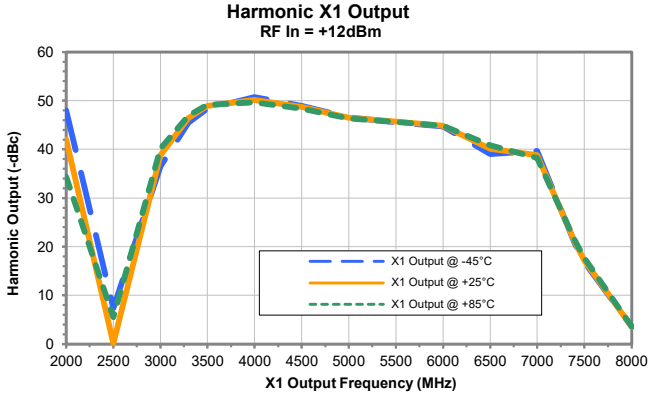

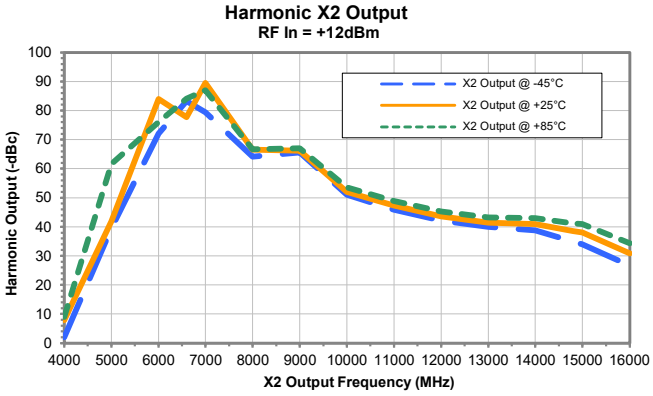

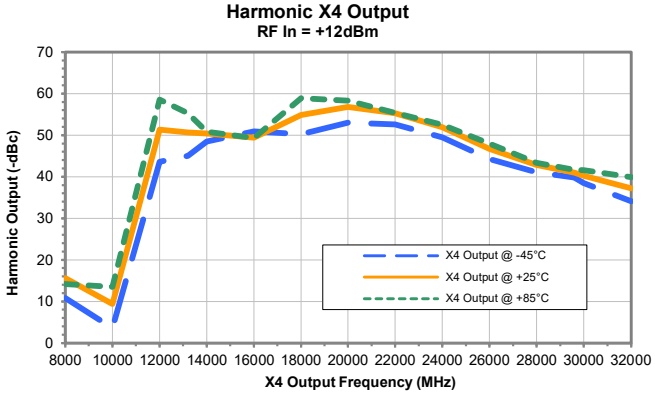

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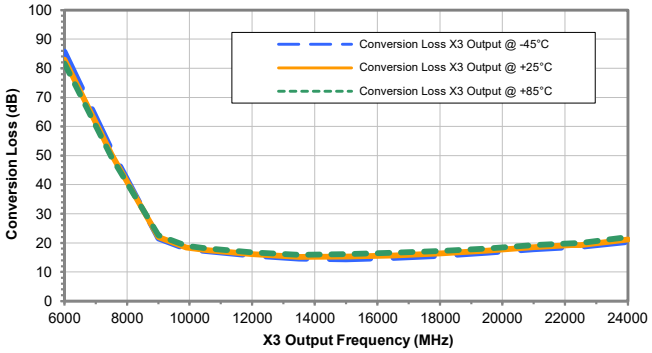
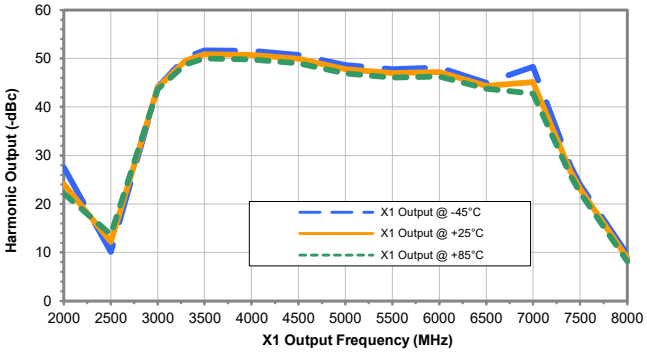
TYPICAL PERFORMANCE CURVES

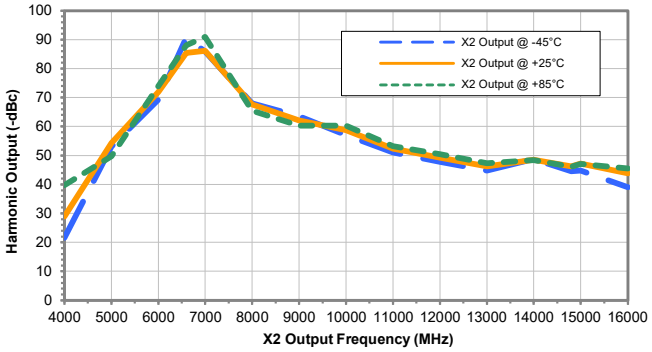
Conversion Loss X3 Output
RF In = +15dBm



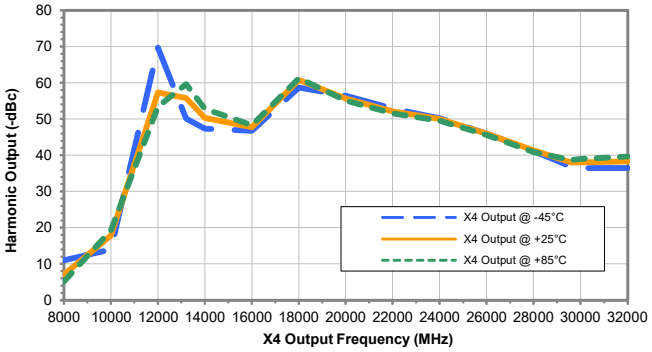
Harmonic X1 Output
RF In = +15dBm



Harmonic X2 Output
RF In = +15dBm



Harmonic X4 Output
RF In = +15dBm



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TYPICAL PERFORMANCE CURVES