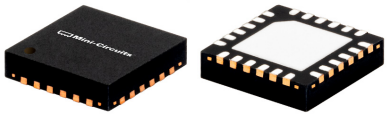
MMIC SURFACE MOUNT

X3 Frequency Multiplier CY3-6183+

50Ω Output 6.6 to 18 GHz

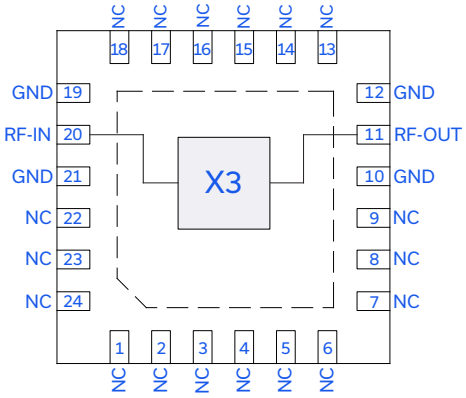
THE BIG DEAL

- Wideband Output From: 6.6 to 18 GHz
- Outstanding Fundamental and Harmonic Suppression:
  - F1: -45 dBc Typ.
  - F2: -56 dBc Typ.
  - F4: -59 dBc Typ.
- Input Drive Level: +14 to +16 dBm
- Conversion Loss: 16.0 dB Typ.
- 4×4 mm 24-Lead, QFN-Style Package



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



APPLICATIONS

- Test and Measurement Equipment
- Satelite Communications
- Radar, EW, and ECM Defense Systems

PRODUCT OVERVIEW

Mini-Circuits' CY3-6183+ is a wideband MMIC Frequency Tripler, converting input frequencies from 2.2 to 6 GHz into output frequencies from 6.6 to 18 GHz. Its wide output frequency range makes this model suitable for broadband systems as well as a variety of narrow-band applications. Utilizing GaAs HBT technology, the CY3-6183+ comes housed in a tiny 4×4 mm 24L QFN-style package and offers excellent repeatability, low inductance, and good thermal efficiency.

KEY FEATURES

Features	Advantages
Broadband, 6.6 to 18 GHz output	With an output frequency range spanning 6.6 to 18 GHz, this multiplier supports broadband applications such as defense and instrumentation as well as a wide range of narrowband system requirements.
Excellent fundamental and harmonic suppression: • F1, -45 dBc Typ. • F2, -56 dBc Typ. • F4, -59 dBc Typ.	Harmonic and fundamental filtering is made dramatically simpler by the high suppression resulting from internal cancellation within the diode configuration.
Wide input power range +14 to +16 dBm	Wide input power range accommodates different input signal levels while still maintaining low conversion loss.

X3 Frequency Multiplier CY3-6183+

50Ω Output 6.6 to 18 GHz

ELECTRICAL SPECIFICATIONS[1,3] AT +25 °C AND Z_0 = 50Ω, UNLESS NOTED OTHERWISE

Parameter		Condition (GHz)	Min.	Typ.	Max.	Unit
Multiplication Factor				3		
Frequency Range, Input (F1)			2.2		6	GHz
Frequency Range, Output (F3)			6.6		18	GHz
Input Power			+14	+15	+16	dBm
Conversion Loss (F3)		2.2		22.9	24.8	dB
		3		17.1	18.5	
		4		16.0	18.1	
		5		16.3	18.2	
		6		18.8	21.5	
Harmonic Output[2,3]	F1	2.2		70		dBc
		3		73		
		4		45		
		5		42		
		6		33		
	F2	2.2		78		dBc
		3		74		
		4		56		
		5		58		
		6		66		
	F4	2.2		50		dBc
		3		49		
		4		59		
		5		65		
		6		66		
Input Return Loss (F1)		2.2		18		dB
		3		15		
		4		18		
		5		20		
		6		17		
Output Return Loss (F3)		2.2		22		dB
		3		14		
		4		19		
		5		12		
		6		7		

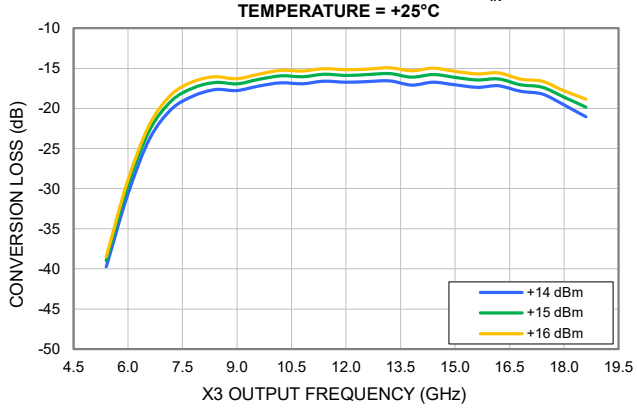
1. Measured on Mini-Circuits Characterization Test Board TB-CY3-6183C+.
2. Harmonics of input frequency below power of F3.
3. All specifications are measured with RF input power = +15 dBm.

X3 Frequency Multiplier CY3-6183+

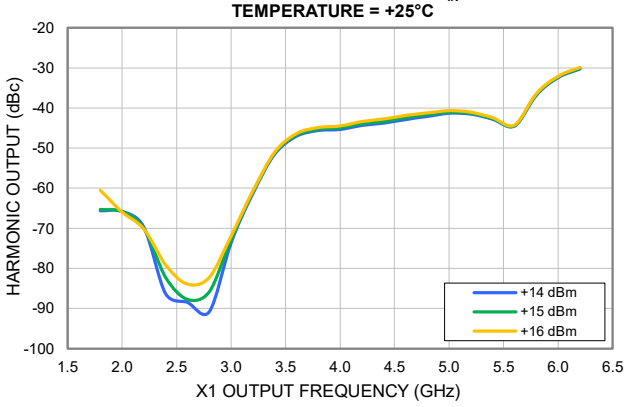
50Ω Output 6.6 to 18 GHz

TYPICAL PERFORMANCE GRAPHS

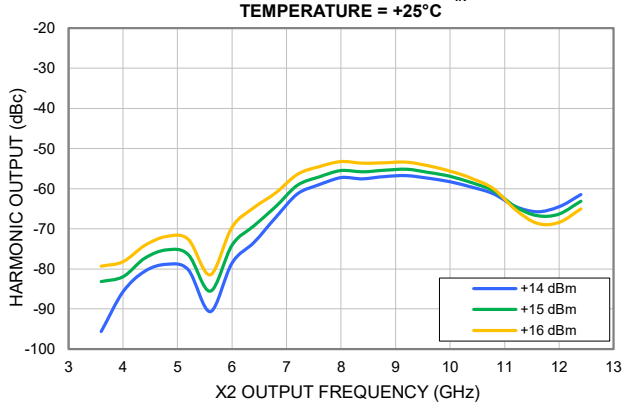
CONVERSION LOSS X3 OUTPUT vs. P_{IN}
TEMPERATURE = +25°C



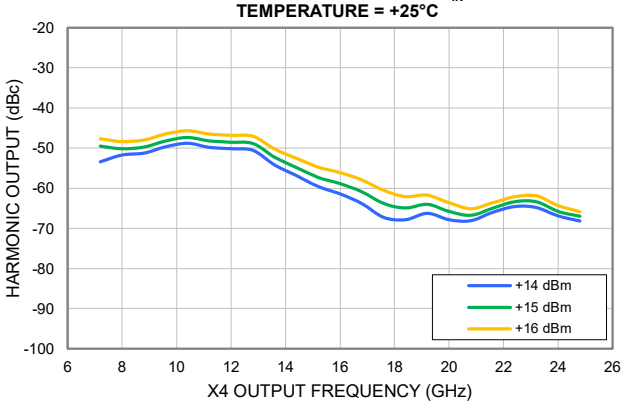
HARMONIC X1 OUTPUT vs. P_{IN}
TEMPERATURE = +25°C



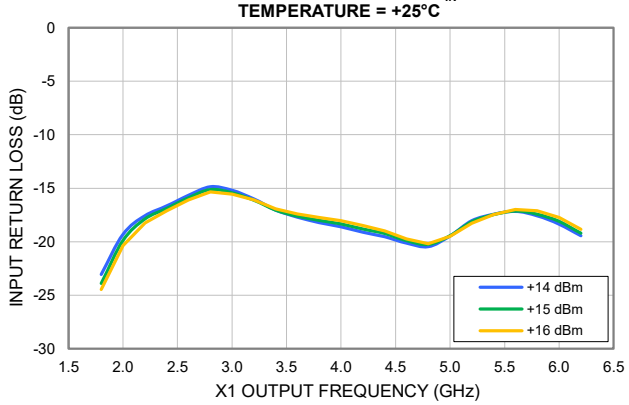
HARMONIC X2 OUTPUT vs. P_{IN}
TEMPERATURE = +25°C



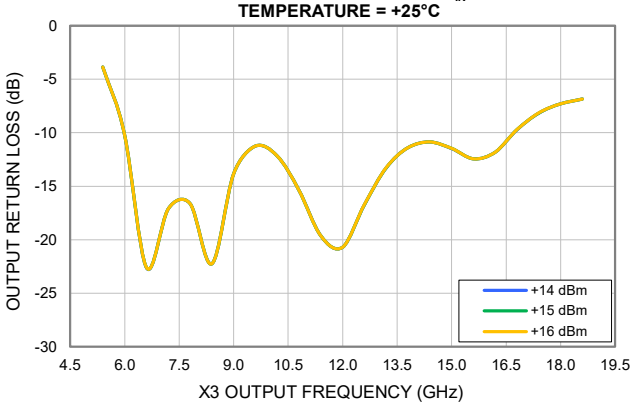
HARMONIC X4 OUTPUT vs. P_{IN}
TEMPERATURE = +25°C



INPUT RETURN LOSS vs. P_{IN}
TEMPERATURE = +25°C



OUTPUT RETURN LOSS vs. P_{IN}
TEMPERATURE = +25°C

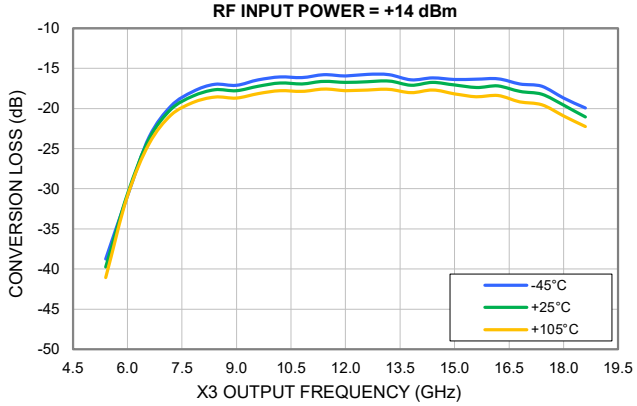


X3 Frequency Multiplier CY3-6183+

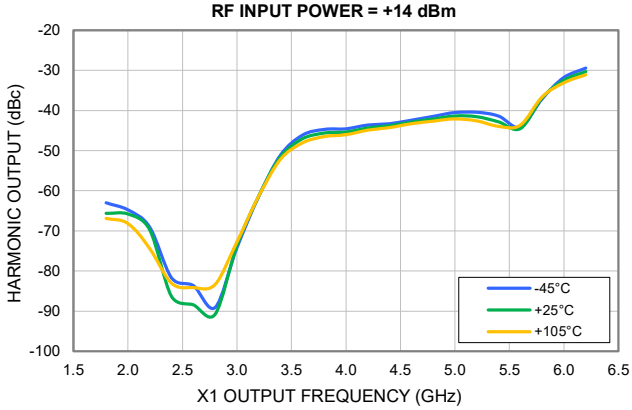
50Ω Output 6.6 to 18 GHz

TYPICAL PERFORMANCE GRAPHS

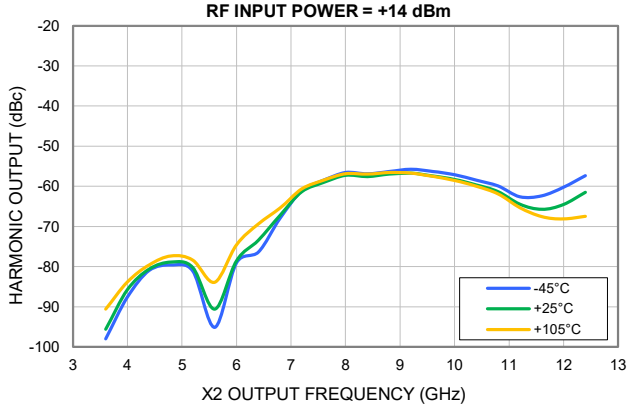
CONVERSION LOSS X3 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +14 dBm



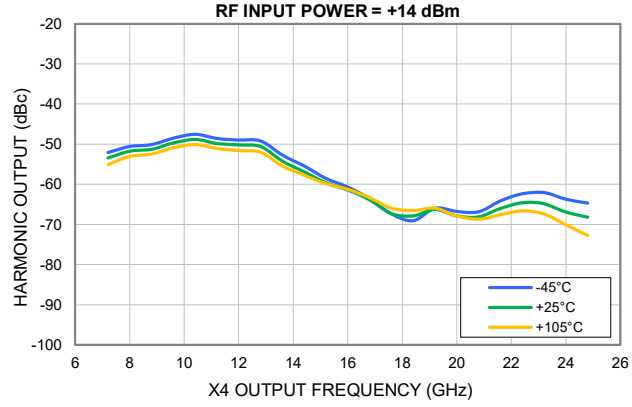
HARMONIC X1 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +14 dBm



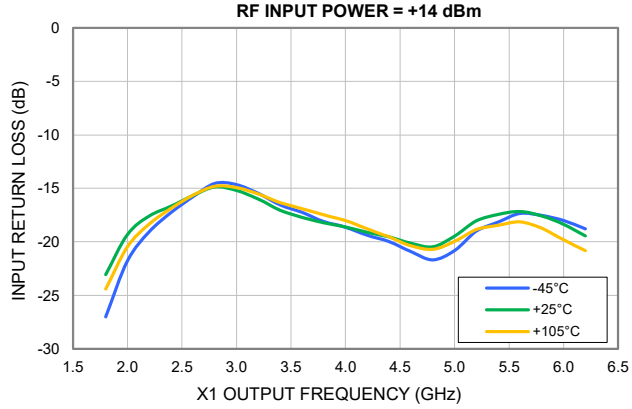
HARMONIC X2 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +14 dBm



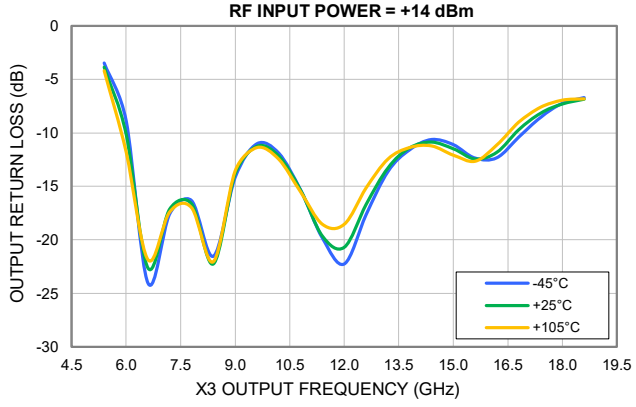
HARMONIC X4 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +14 dBm



INPUT RETURN LOSS vs. TEMPERATURE
RF INPUT POWER = +14 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
RF INPUT POWER = +14 dBm

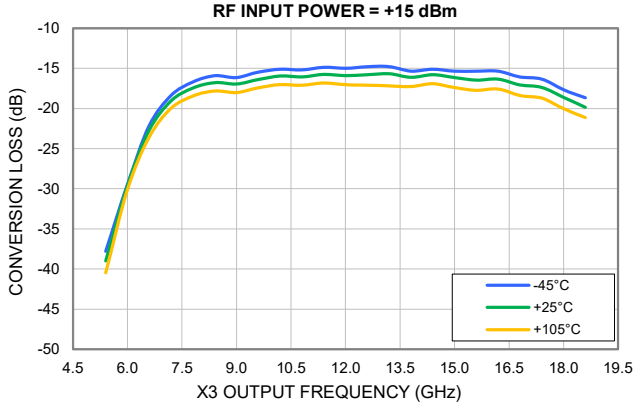


X3 Frequency Multiplier CY3-6183+

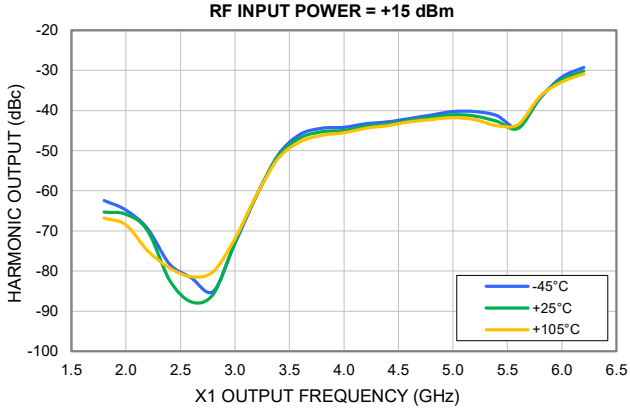
50Ω Output 6.6 to 18 GHz

TYPICAL PERFORMANCE GRAPHS

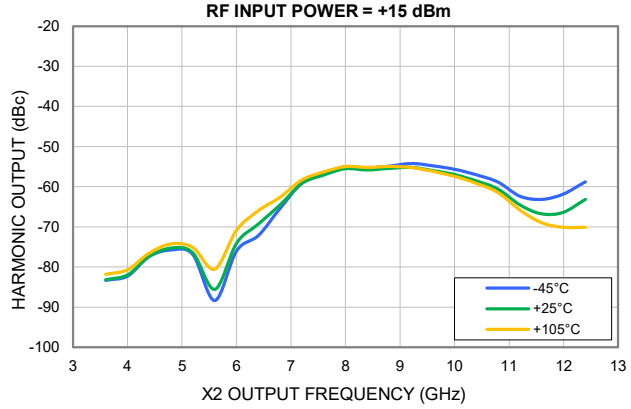
CONVERSION LOSS X3 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +15 dBm



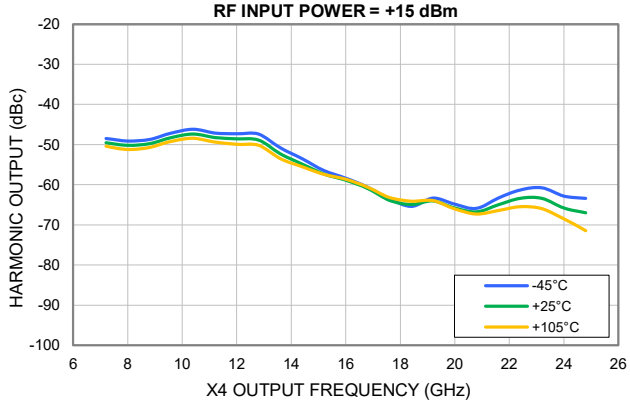
HARMONIC X1 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +15 dBm



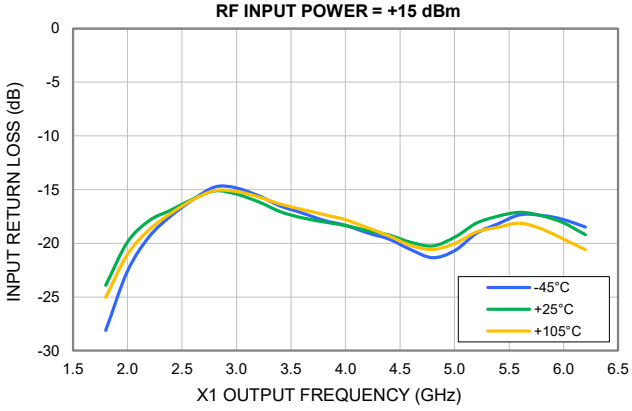
HARMONIC X2 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +15 dBm



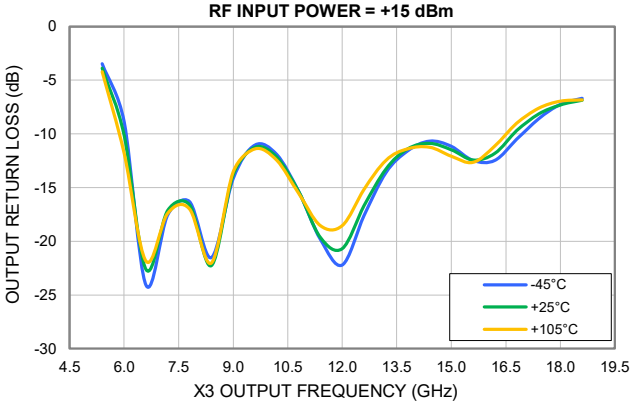
HARMONIC X4 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +15 dBm



INPUT RETURN LOSS vs. TEMPERATURE
RF INPUT POWER = +15 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
RF INPUT POWER = +15 dBm

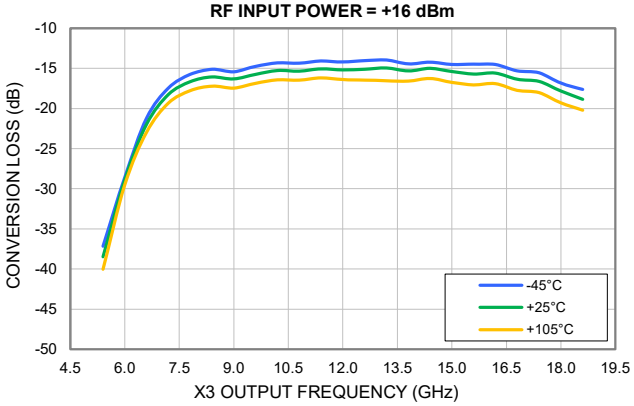


X3 Frequency Multiplier CY3-6183+

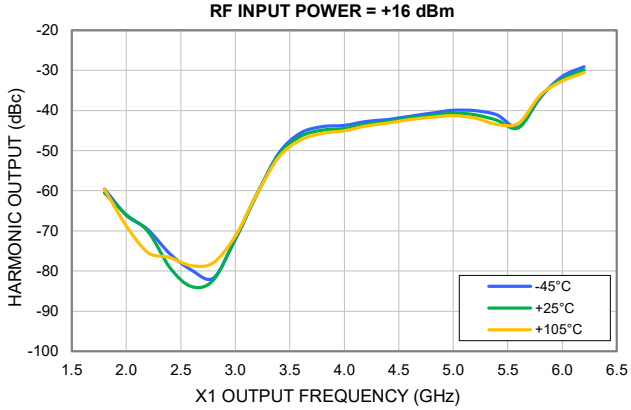
50Ω Output 6.6 to 18 GHz

TYPICAL PERFORMANCE GRAPHS

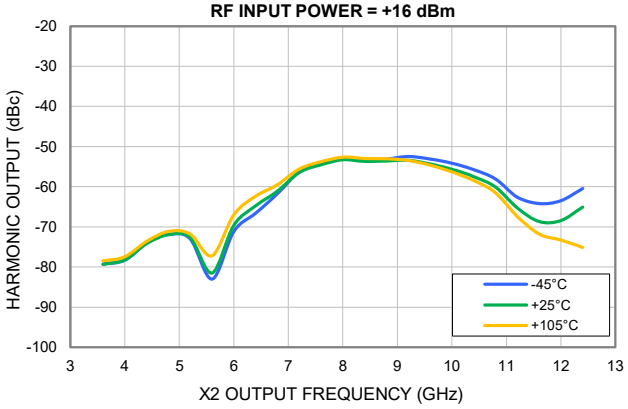
CONVERSION LOSS X3 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +16 dBm



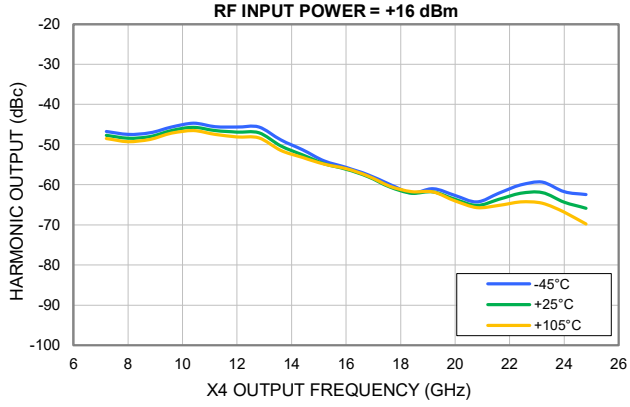
HARMONIC X1 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +16 dBm



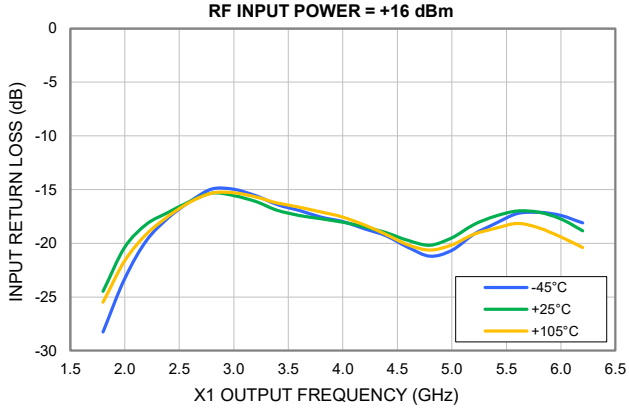
HARMONIC X2 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +16 dBm



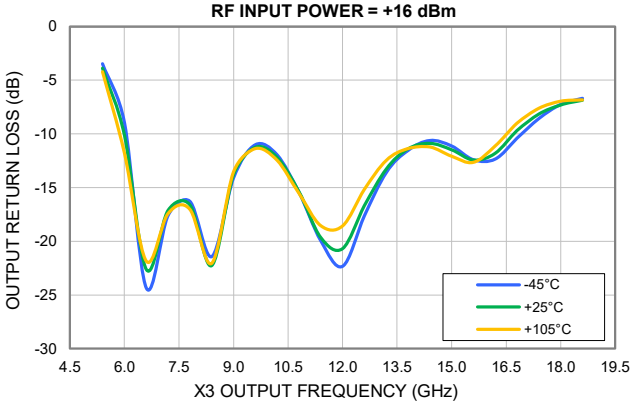
HARMONIC X4 OUTPUT vs. TEMPERATURE
RF INPUT POWER = +16 dBm



INPUT RETURN LOSS vs. TEMPERATURE
RF INPUT POWER = +16 dBm



OUTPUT RETURN LOSS vs. TEMPERATURE
RF INPUT POWER = +16 dBm



X3 Frequency Multiplier CY3-6183+

50Ω Output 6.6 to 18 GHz

ABSOLUTE MAXIMUM RATINGS[4]

Parameter	Ratings
Operating Temperature (ground lead)	-45 °C to +105 °C
Storage Temperature	-65 °C to +150 °C
RF Input Power	+31 dBm

4. Permanent damage may occur if any of these limits are exceeded. Maximum ratings are not intended for continuous normal operation.

ESD RATING

	Class	Voltage Range	Reference Standard
HBM	1A	250 V to < 500 V	ANSI/ESDA/JEDEC JS-001-2023
CDM	C2B	750 V to < 1000 V	ANSI/ESDA/JEDEC JS-002-2022



ESD HANDLING PRECAUTION: This device is designed to be Class 1A for HBM. Static charges may easily produce potentials higher than this with improper handling and can discharge into DUT and damage it. As a preventive measure Industry standard ESD handling precautions should be used at all times to protect the device from ESD damage.

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020E /JEDEC J-STD-033C

X3 Frequency Multiplier CY3-6183+

50Ω Output 6.6 to 18 GHz

FUNCTIONAL DIAGRAM

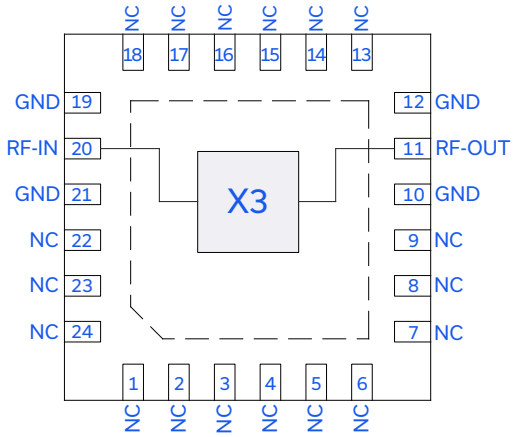


Figure 1. CY3-6183+ Functional Diagram

PAD DESCRIPTION

Function	Pad #	Description (Refer to Figure 1)
RF-IN	20	Connect to RF Input
RF-OUT	11	Connect to RF Output
GND	10,12,19,21 & Paddle	Connects to ground
NC	1-9,13-18 & 22-24	Not used internally. Connected to ground on test board

APPLICATION AND CHARACTERIZATION SETUP

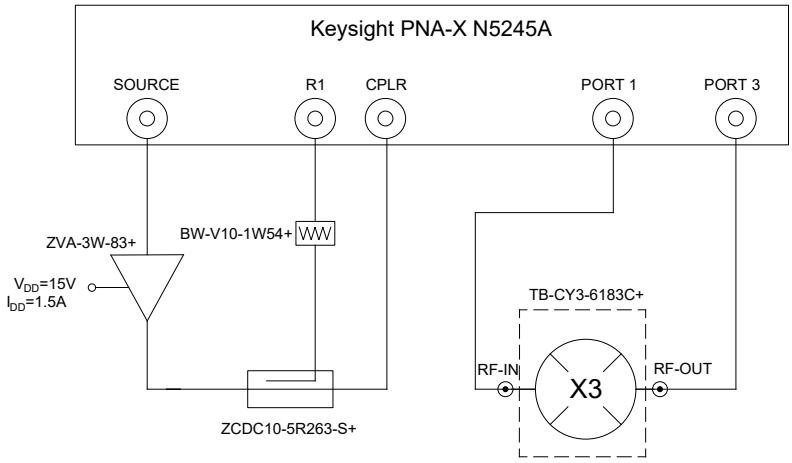


Figure 2. CY3-6183+ Characterization and Application Setup.

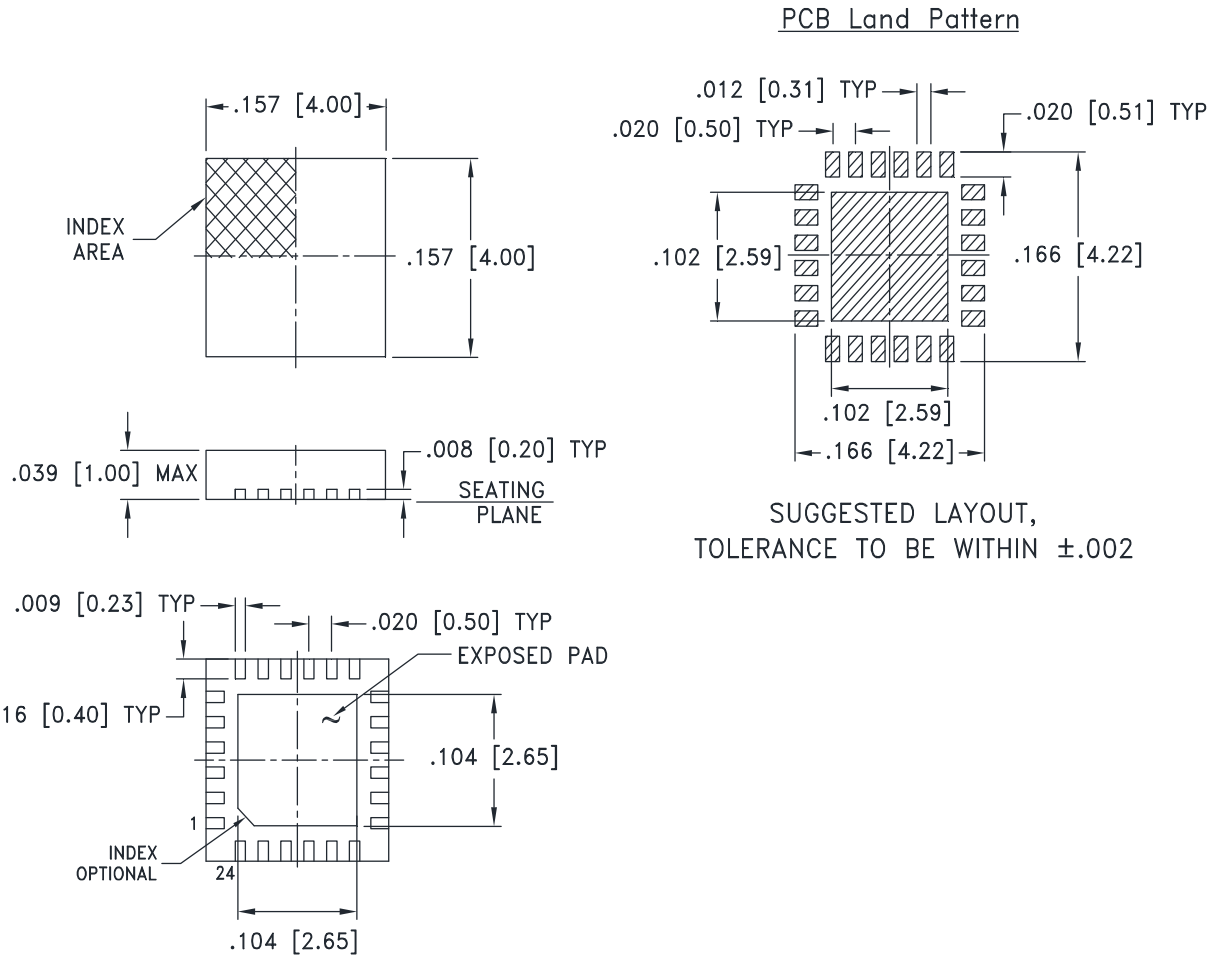
Conversion Loss and F1, F2, F4 Harmonic Rejection are measured using N5245A PNA-X microwave network analyzer.

Conditions:
Conversion Loss and Harmonic Rejection: P_{IN} = +14 to +16 dBm

X3 Frequency Multiplier CY3-6183+

50Ω Output 6.6 to 18 GHz

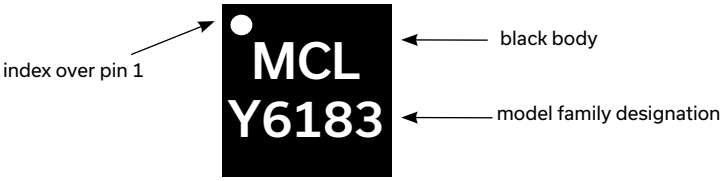
CASE STYLE DRAWING



Weight: .04 Grams

Dimensions are in inches [mm]. Tolerances in inches: 2 Pl. ± .01; 3 Pl. ± .005 inches

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

X3 Frequency Multiplier CY3-6183+

50Ω Output 6.6 to 18 GHz

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD CLICK HERE

Performance Data & Graphs	Data Graphs S-Parameter (S2P Files) Data Set (.zip file)
Case Style	DG1847. Plastic package, exposed paddle, Lead Finish: Matte-Tin
RoHS Status	Compliant
Tape & Reel **Standard quantities available on reel**	F68 7" reels with 20, 50, 100, 200, 500, or 1K devices 13" reels with 2K, 3K, or 4K devices
Suggested Layout for PCB Design	PL-816
Evaluation Board	TB-CY3-6183C+
Environmental Ratings	ENV08T1

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-Circuits' 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