



Mini-Circuits

MMIC SURFACE MOUNT

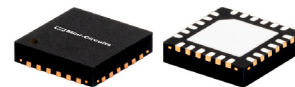
X2 Frequency Multiplier

CY2-143+

50Ω Output 4 to 14 GHz

THE BIG DEAL

- Ultra-Wideband, Output from 4 to 14 GHz
- Wide Input Power Range, +12 to +18 dBm
- Low Conversion Loss, 12 dB Typ.
- Good Fundamental and Harmonic Suppression: F1, 30 dBc; F3, 32 dBc
- Tiny Size, 4 x 4 x 1 mm
- Low Cost



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

- Synthesizers
- Local Oscillators

PRODUCT OVERVIEW

Mini-Circuits' CY2-143+ is an ultra-wideband MMIC frequency doubler, converting input frequencies from 2 to 7 GHz into output frequencies from 4 to 14 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 4 x 4 x 1 mm MCLP package and offers excellent repeatability, low inductance, good thermal efficiency, and low cost.

KEY FEATURES

Features	Advantages
Broadband, 4 to 14 GHz Output	With an output frequency range spanning 4 to 14 GHz, this multiplier supports broadband applications such as defense and instrumentation as well as a wide range of narrowband system requirements.
Low Conversion Loss, 12 dB Typ.	With a low conversion loss, CY2-143+ produces higher output power, reducing the need for amplification.
Excellent Fundamental and Harmonic Suppression: • F1, 30 dBc • F3, 32 dBc • F4, 17 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.
4 x 4 mm, 24 Lead MCLP Package	Low inductance, repeatable transitions, and excellent thermal contact to the PCB
Low Cost	Provides an easy, cost-effective solution for generating high-frequency signals from a lower frequency signal source.





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ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Input Frequency (GHz)	Min.	Typ.	Max.	Unit
Multiplier Factor		2			
Frequency Range, Input (F1)		2 4		4 7	GHz
Frequency Range, Output (F2)		4 8		8 14	GHz
Input Power		+12		+18	dBm
Conversion Loss	2 - 4 4 - 7		12 13	14.5 19.2	dB
Harmonic Output ¹	F1	2 - 4 4 - 7	19 17	30 27	dBc
	F3	2 - 4 4 - 7	20 21	32 39	
	F4	2 - 4 4 - 7	11 12	17 27	

1. Harmonics of input frequency below the power level of F2.

ABSOLUTE MAXIMUM RATINGS²

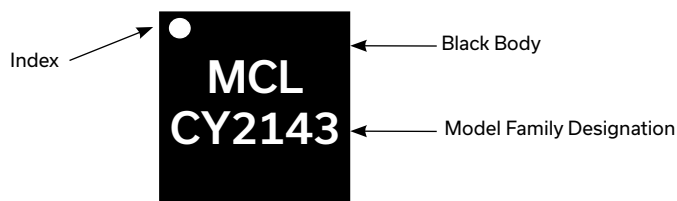
Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
RF Input Power	+21 dBm

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

PAD CONNECTIONS

INPUT	3
OUTPUT	16
GROUND	2,4,15,17, Paddle
NO CONNECTIONS	All Others

PRODUCT MARKING



Marking may contain other features or characters for internal lot control.





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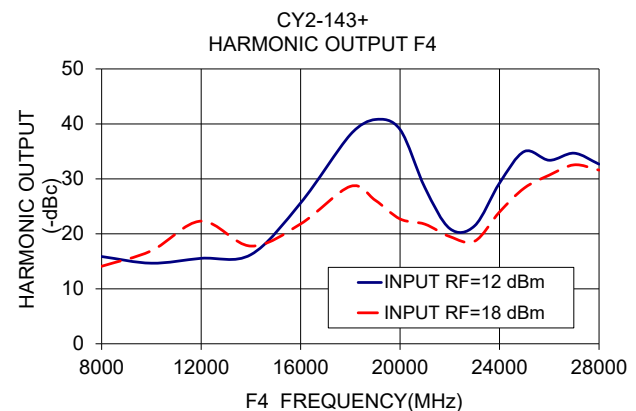
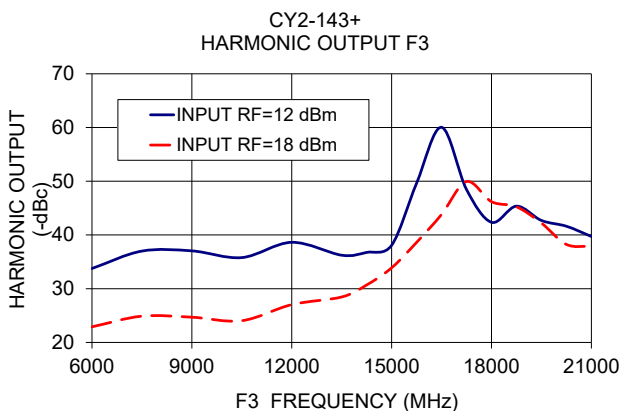
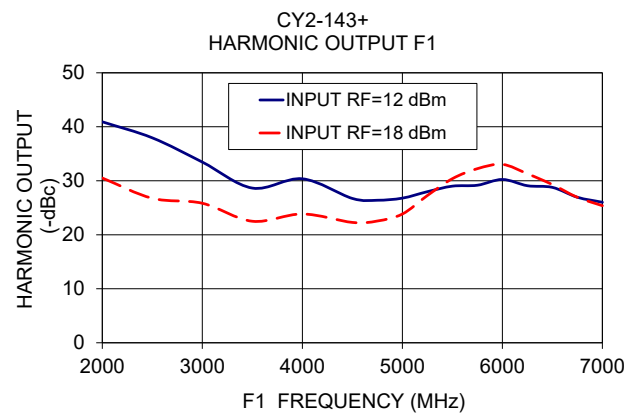
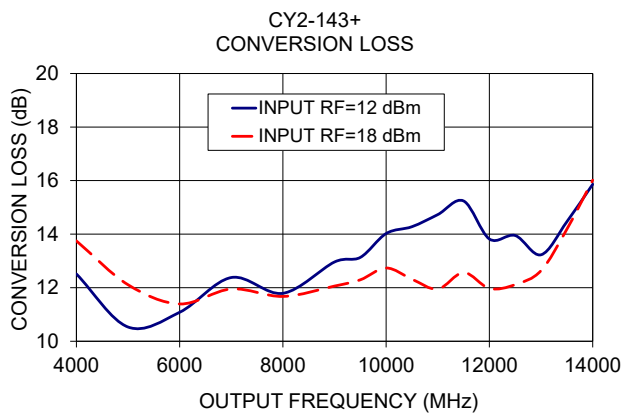
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TYPICAL PERFORMANCE DATA

INPUT RF= +12 dBm					INPUT RF= +18 dBm			
Input Frequency (MHz)	Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)			Conversion Loss (dB)	Harmonic Output Below F2 (-dBc)		
		F2	F1	F3		F4	F2	F1
2000	12.51	40.92	33.76	15.87	13.75	30.50	22.90	14.10
2500	10.53	37.94	37.00	14.66	12.11	26.75	24.89	16.92
3000	11.08	33.46	37.04	15.55	11.39	25.83	24.69	22.32
3500	12.38	28.64	35.79	16.22	11.95	22.50	24.04	17.78
4000	11.79	30.37	38.63	25.62	11.68	23.85	27.03	21.81
4500	12.96	26.72	36.23	38.06	12.06	22.28	28.45	28.64
4750	13.13	26.39	36.75	40.80	12.30	22.55	30.69	26.12
5000	14.02	26.78	38.07	38.98	12.74	23.84	33.88	22.71
5250	14.28	27.98	49.62	28.39	12.32	27.27	38.61	21.76
5500	14.73	29.00	60.05	20.95	11.95	30.39	43.81	19.50
5750	15.24	29.17	48.47	21.47	12.57	32.24	49.94	18.66
6000	13.82	30.24	42.36	29.24	11.98	33.03	46.20	23.98
6250	13.95	29.08	45.37	35.00	12.12	31.30	45.25	28.35
6500	13.23	28.77	42.70	33.39	12.64	29.29	42.22	30.69
6750	14.46	26.94	41.63	34.68	14.18	26.93	38.24	32.55
7000	15.86	26.02	39.73	32.68	16.02	25.38	37.86	31.60





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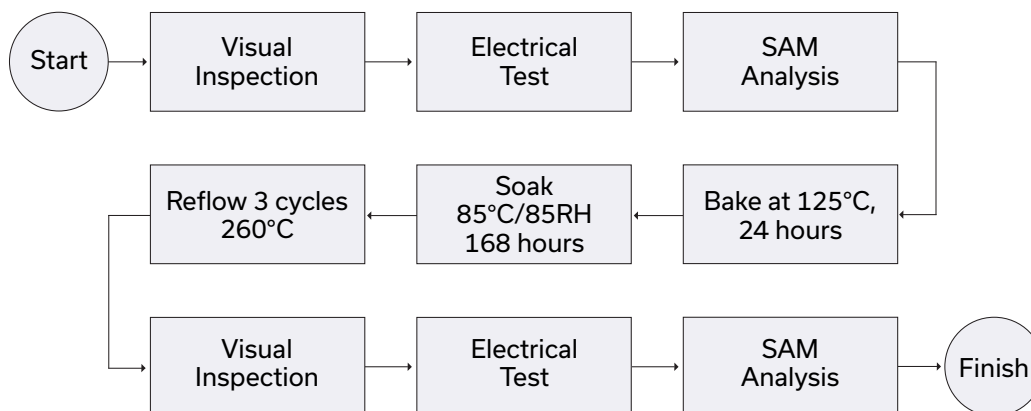
ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASHBOARD. TO ACCESS [CLICK HERE](#)

Performance Data	Data Table Swept Graphs S-Parameter (S3P Files) Data Set (.zip file)
Case Style	DG1847 Plastic package, exposed paddle lead finish: matte-tin
Tape & Reel Standard Quantities Available on Reel	F68 7" Reels with 20, 50, 100, 200, 500 or 1K devices
Suggested Layout for PCB Design	PL-476
Evaluation Board	TB-851-143+
Environmental Ratings	ENV08T1

ESD RATING

Human body model (HBM): Class 1C (1000 to <2000 V) in accordance with ANSI/ESD STM 5.1-2001

MSL TEST FLOW CHART



NOTES

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- 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

