Sales: 408-778-9952 | General: 408-778-4200 | Fax: 408-778-4300
Sales & Customer Support: sales@markimicrowave.com
Tech Support: support@markimicrowave.com

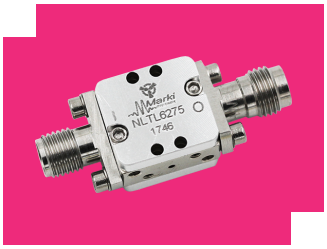
NLTL-6275U

GaAs MMIC Non-Linear Transmission Line

DEVICE OVERVIEW

General Description

NLTL-6275 is a MMIC non-linear transmission line (NLTL) based comb generator. This NLTL offers excellent phase noise performance over a 3 to 15 GHz input frequency range with output tones beyond 85 GHz. NLTL-6275 is fabricated with GaAs Schottky diode based varactors on a 2.28 mm x 3.13 mm substrate. Both wire bondable die and connectorized modules are available



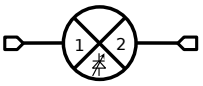
Features

- Low Phase Noise
- Broadband Input Frequencies
- No External DC Bias Required

Applications

- Comb Line Generation
- High Efficiency Multiplication
- Samplers
- Phase Locked Loops

Functional Block Diagram



Part Ordering Options

Part Number	Description	Package	Connectors	Green Status	Product Lifecycle	Export Classification
NLTL-6275U	GaAs MMIC Non-Linear Transmission Line	U	Standard	RoHS REACH	Released	EAR99
NLTL-6275U-SW	GaAs MMIC Non-Linear Transmission Line	U	Standard	RoHS REACH	Released	EAR99

Table Of Contents

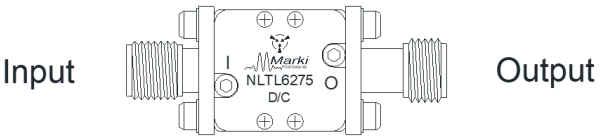
Revision History

Revision Code	Revision Date	Comment
-	2017-09-01	Datasheet Initial Release
A	2017-10-01	Corrected typos
B	2017-12-01	Added U package outline
C	2018-09-01	Corrected Signal Pad Locations
D	2025-04-16	Updated Outline Drawing

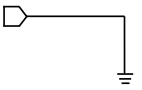
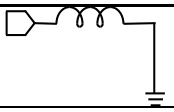
Port Configuration and Functions

Port Diagram

The NLTL should only be used in the forward direction, with the input and output ports given in Port Functions.



Port Functions

Port	Function	Connector Type	Description	DC Equivalent Circuit
GND	Ground	-	U package ground provided through metal housing and outer coax conductor.	
Port 1	Input	SMAF	Port 1 is diode connected for the CH package and DC short for the U package.	
Port 2	Output	1.85F	Port 2 is diode connected for the CH and DC open for the U package.	

Specifications

Absolute Maximum Ratings

The Absolute Maximum Ratings indicate limits beyond which damage may occur to the device. If these limits are exceeded, the device may be inoperable or have a reduced lifetime.

Parameter	Maximum Rating	Unit
Maximum Operating Temperature	100	°C
Maximum Storage Temperature	125	°C
Minimum Operating Temperature	-55	°C
Minimum Storage Temperature	-65	°C

Package Information

Parameter	Details	Rating
Weight	Package name: U	10g
Dimensions	-	14.22 x 13.21 mm

Recommended Operating Conditions

The Recommended Operating Conditions indicate the limits, inside which the device should be operated, to guarantee the performance given in Electrical Specifications Operating outside these limits may not necessarily cause damage to the device, but the performance may degrade outside the limits of the electrical specifications. For limits, above which damage may occur, see Absolute Maximum Ratings.

Parameter	Min	Nominal	Max	Unit
Ambient Temperature	-55	25	100	°C
Input Power	16	-	25	dBm

Sequencing Requirements

This is a passive NLTL that requires no external DC bias. Self-bias of the diodes is sufficient for operation. It is not required, but is recommended to provide a 50Ω termination to each port before applying RF power

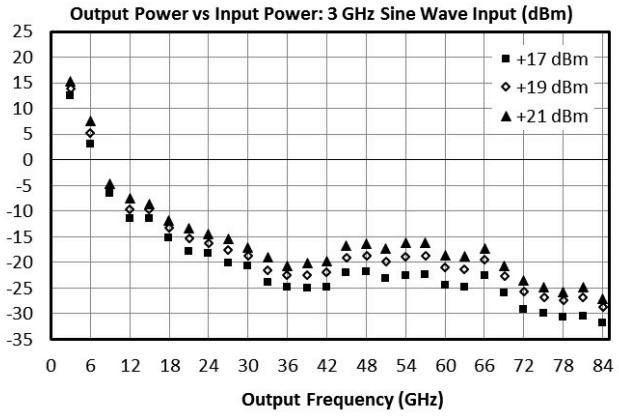
Electrical Specifications

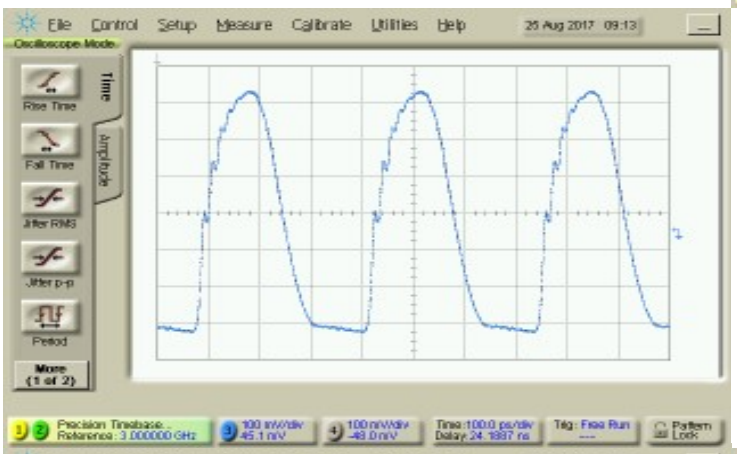
The electrical specifications apply at TA=+25°C in a 50Ω system. Typical data shown is for the NLTL used in the forward direction with a sine wave input.

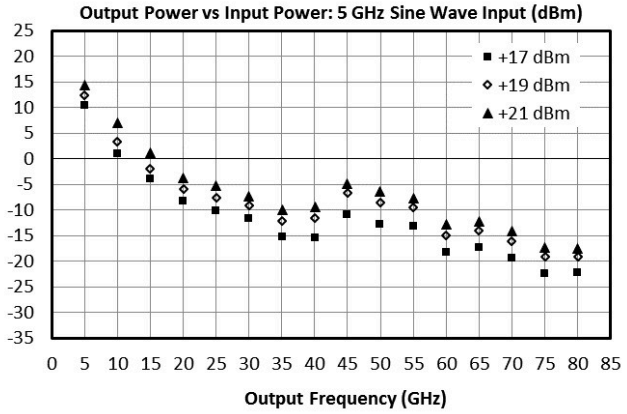
Parameter	Test Conditions	Minimum Frequency (GHz)	Maximum Frequency (GHz)	Min	Typ	Max	Unit
Input Frequency Range	-	-	-	3	-	15	GHz
Input Power	-	-	-	16	-	26	dBm
Maximum Output Harmonic for given Input [1]	Input=10 GHz	-	-	-	-	8	
Maximum Output Harmonic for given Input [2]	Input=15 Ghz	-	-	-	-	5	
Maximum Output Harmonic for given Input [3]	Input=3 GHz	-	-	-	-	28	
Maximum Output Harmonic for given Input [4]	Input=5 GHz	-	-	-	-	16	
Maximum Output Harmonic for given Input [5]	Input=7 GHz	-	-	-	-	12	
Output Frequency Range	-	-	-	3	-	85	GHz

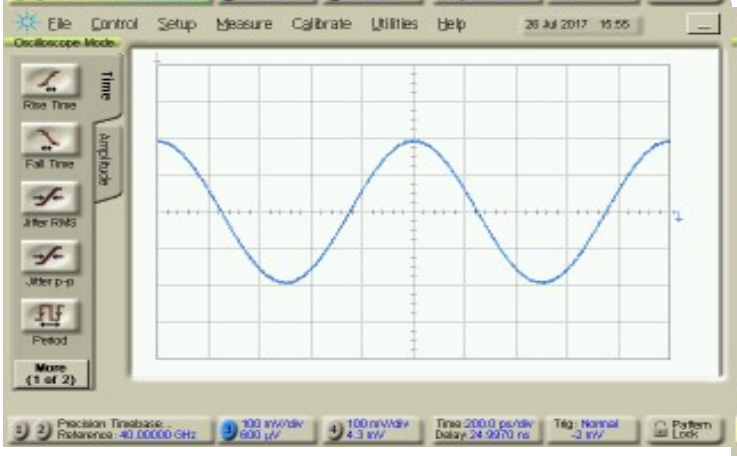
[1][2][3][4][5] Maximum Output Harmonic specification given for the harmonic with a -20 dBm output power for a +20 dBm input.

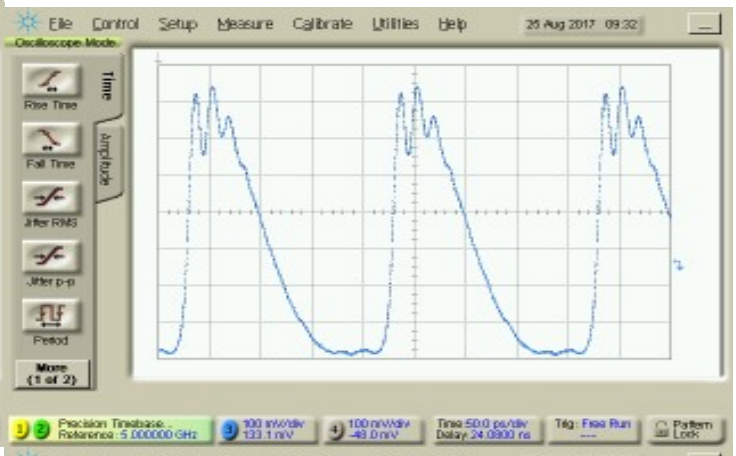
Typical Performance Plots

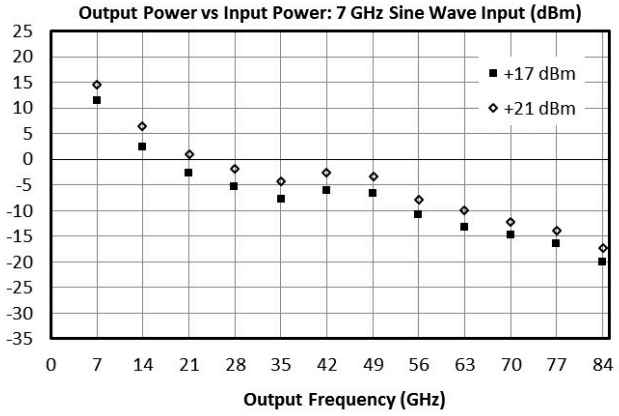


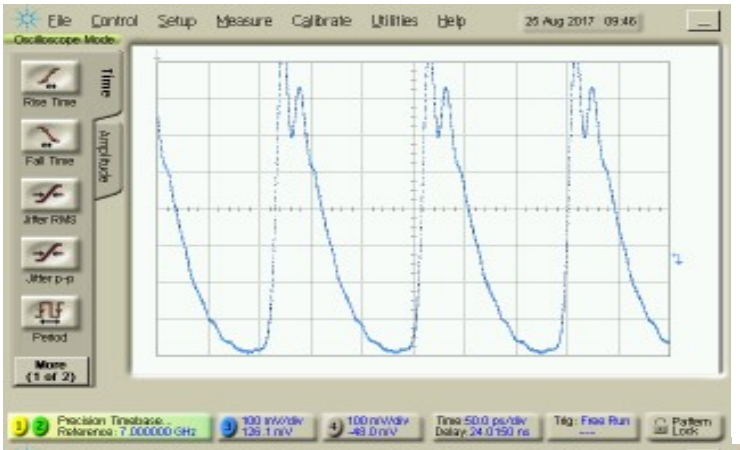


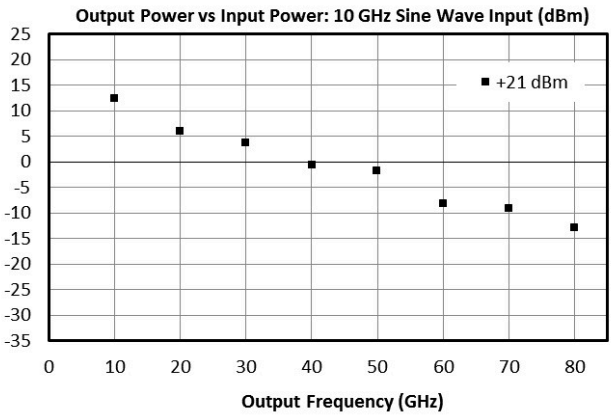


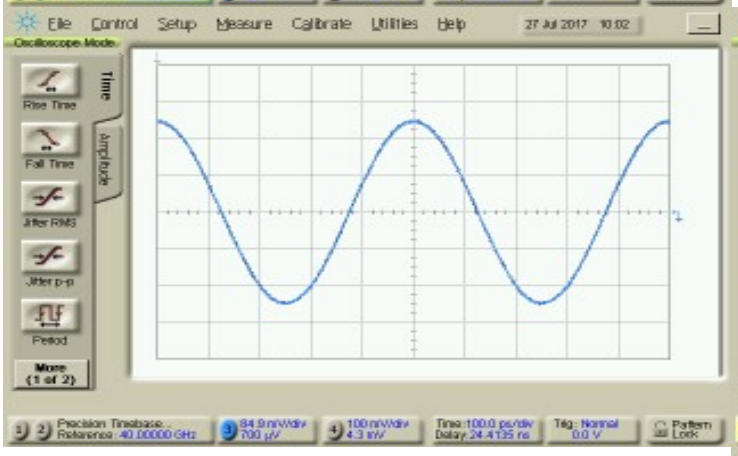


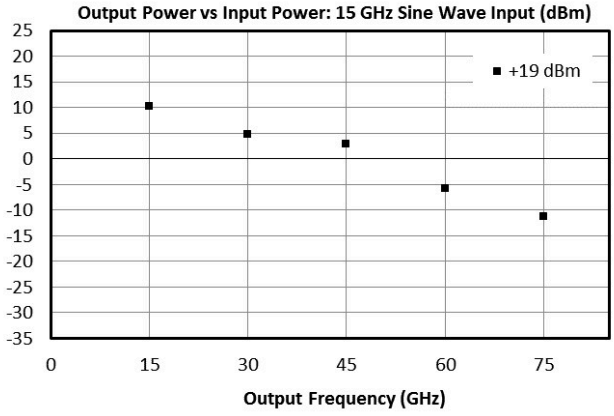


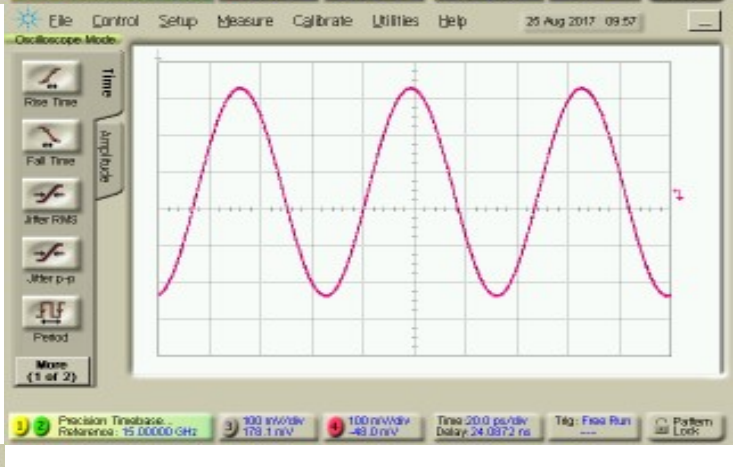


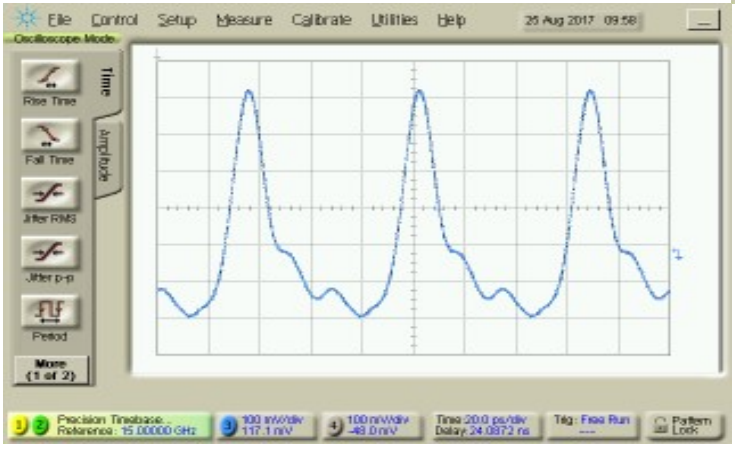












Application Information

NLTL-6275 belongs to Marki Microwave's NLTL family of multipliers and non-linear transmission lines. The NLTL product line consists of passive GaAs MMIC non-linear transmission lines designed and fabricated with GaAs Schottky diode based varactors. NLTLs take an input signal and create an impulse train of harmonics. Harmonic outputs up to and beyond 85 GHz are generated by the NLTL.

Port 1 supports S, C, and X band input signals. Port 2 will output integer multiples of the input signal (i.e., x2, x3, x4, …, x28) up to the 28th output harmonic or a maximum of 85 GHz for a typical -20 dBm output power. Higher harmonics can be generated but will be at a lower efficiency.

The operating conditions of the NLTL are extremely important to optimize performance. High power inputs will increase the output power observed; however, the conversion efficiency will decrease. This is increasingly true for higher input frequencies and at input powers above the recommended limit.

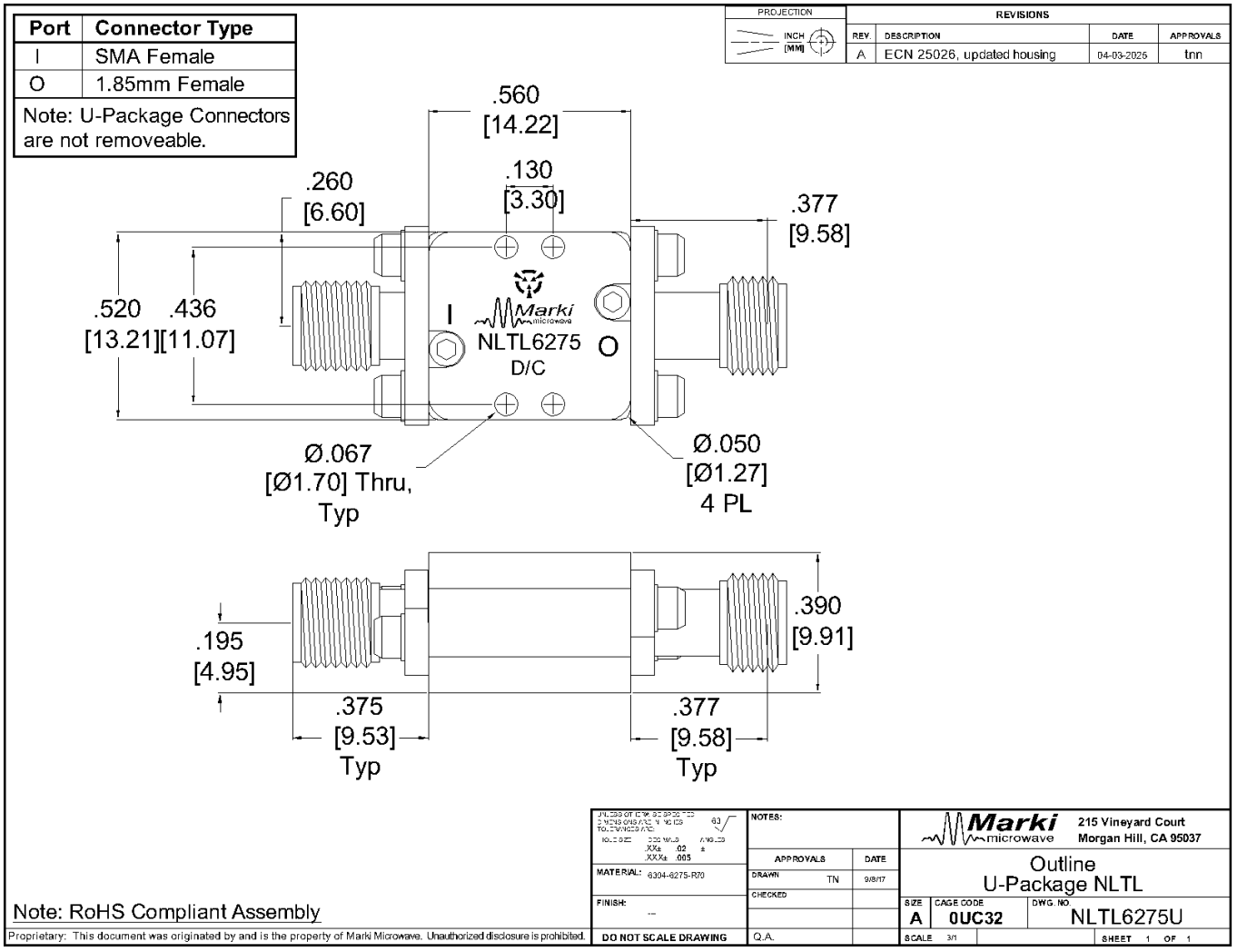
NLTL-6275 requires no external DC bias. The self-bias of the diodes caused by the rectified RF input signal is sufficient for operation. For the best performance, optimization of the DC return path is recommended for each specific application to optimize the harmonic output power distribution.

The phase noise of a non-linear transmission line is outstanding. If verification of performance is necessary, the application circuit used and input conditions are extremely important. NLTLs are AM sensitive. If there is excessive AM noise on the input of the NLTL, observing the output of the NLTL will show excessive PM/phase noise because of the high AM to PM conversion property of NLTLs.

Mechanical Data

Outline Drawing

Download : Outline 2D Drawing | Outline 3D Drawing | Outline 3D STP



DISCLAIMER

MARKI MICROWAVE, INC., (“MARKI”) PROVIDES TECHNICAL SPECIFICATIONS AND DATA (INCLUDING DATASHEETS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, AND OTHER INFORMATION AND RESOURCES “AS IS” AND WITH ALL FAULTS. MARKI DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT.

These resources are intended for developers skilled in the art designing with Marki products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards and other requirements. Marki makes no guarantee regarding the suitability of its products for any particular purpose, nor does Marki assume any liability whatsoever arising out of your use or application of any Marki product.

Marki grants you permission to use these resources only for development of an application that uses Marki products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Marki intellectual property or to any third-party intellectual property. Marki reserves the right to make changes to the product(s) or information contained herein without notice.

MARKI MICROWAVE and T3 MIXER are trademarks or registered trademarks of Marki Microwave, Inc. All other trademarks used are the property of their respective owners.