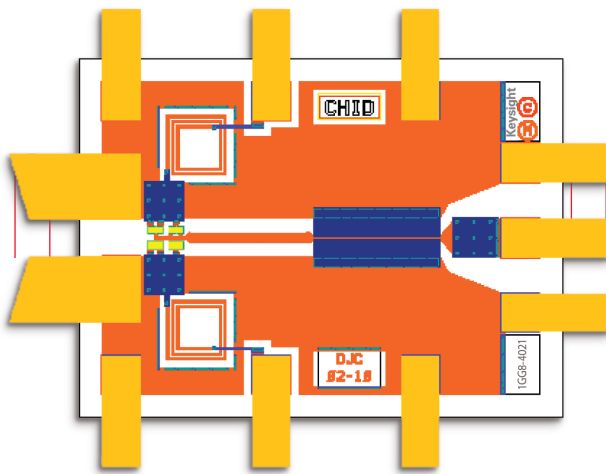


Keysight 1GG8-4021

V- and W-Band Waveguide Diode Mixer IC

Data Sheet



Features

- V-band conversion loss (x6 mixing): 26 dB, typical
- W-band conversion loss (x8 mixing): 29 dB, typical
- Beam-lead die

Description

The 1GG8-4021 is fabricated using the Keysight Technologies, Inc. Schottky diode process. It is a single-balanced mixer topology using anti-parallel diodes to enhance even-harmonic mixing. Typical use is in V-band and W-band waveguide mixers.

Absolute maximum ratings¹

Parameter	Condition	Continuous Use Min.	Continuous Use Max.	Damage Level Min.	Damage Level Max.	Units
I_{diode}^2	RMS current, any diode		30			mA
I_{peak}^2	Peak current, any diode		36			mA
P_{total}^2	Total RF+LO CW power		22	25		dBm
T_A^2	Ambient temperature		65			°C
T_{st}	Storage temperature	-55	150			°C
T_{max}^3	Assembly temperature	-65	200			°C

1. Operation in excess of any of the values may result in permanent damage to the device.

2. MTTF >5 x 10⁵ hour. Operation in excess of T_A will degrade MTTF.

3. 60 second maximum

DC specifications¹

Parameter	Condition	Min.	Typ.	Max.	Units
VIFp_1mA	IFP to IFM at 1 mA	1.28	1.48	1.68	Volts
VIFp_n1mA	IFP to IFM at -1 mA	-1.68	1.48	-1.28	Volts
VIFp_10mA	IFP to IFM at 10 mA	1.57	1.87	2.17	Volts
VIFp_n10mA	IFP to IFM at -10 mA	-2.17	1.87	-1.57	Volts

1. $T_A = 25\text{ }^{\circ}\text{C}$.

Frequency-domain RF specifications¹

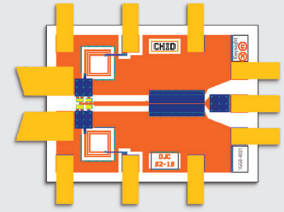
Parameter	Condition	Min.	Typ.	Max.	Units
V-band conversion loss	×6 mode		26		dB
W-band conversion loss	×8 mode		29		dB
IF bandwidth		0		1	GHz

1. $T_A = 25\text{ }^{\circ}\text{C}$, LO drive supplied by compressed AMMC-5024 amplifier, 4 V, 160 mA

ESD limits¹

Parameter	Condition	Min.	Typ.	Max.	Units
IFP-IFM	IFP to IFM	-600		+600	Volts
IF-GND	IFP or IFM to ground	-600		+600	Volts
LO-GND	LO port to ground	-2200		+2200	Volts

1. Human body model: 100 pF, 1.5 kΩ.



- Chip Size:
970 x 720 μm $\pm 10\text{ }\mu\text{m}$
(38.2 x 28.3 mils ± 0.4 mils)
- Chip Thickness:
58 $\pm 15\text{ }\mu\text{m}$ (2.3 ± 0.6 mils)

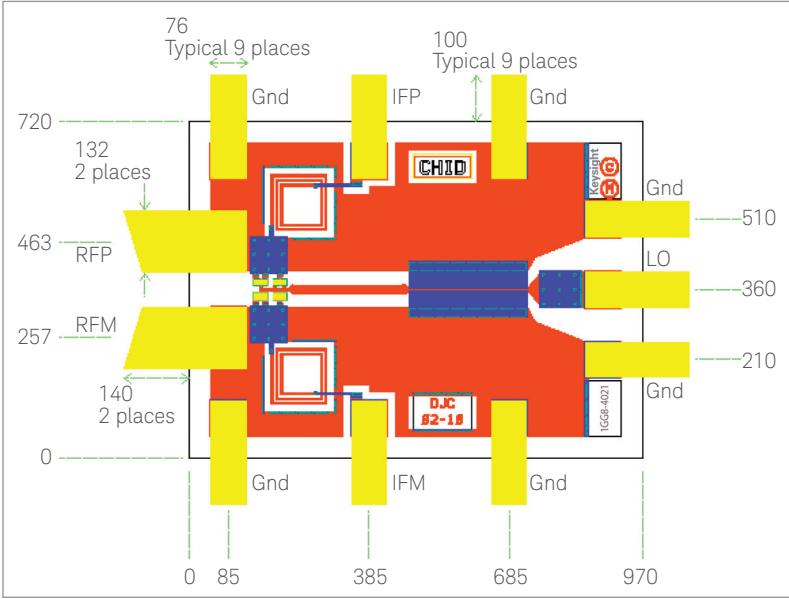


Figure 2. 1GG8-4021 beam-lead identification and location – all dimensions in microns

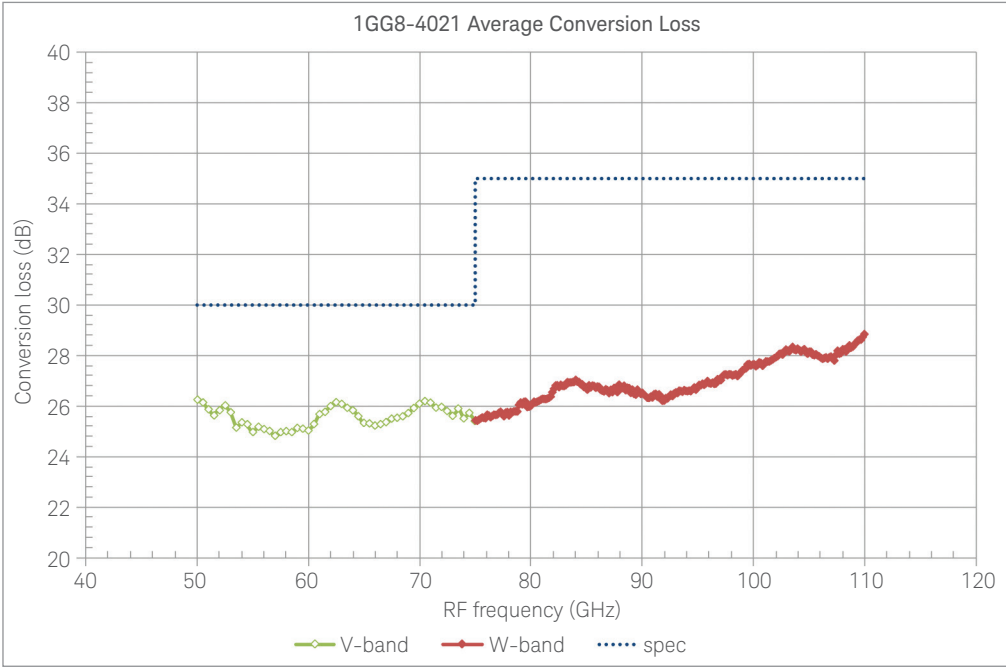


Figure 3. 1GG8-4021 operation in V- and W-band M1970 smart mixers

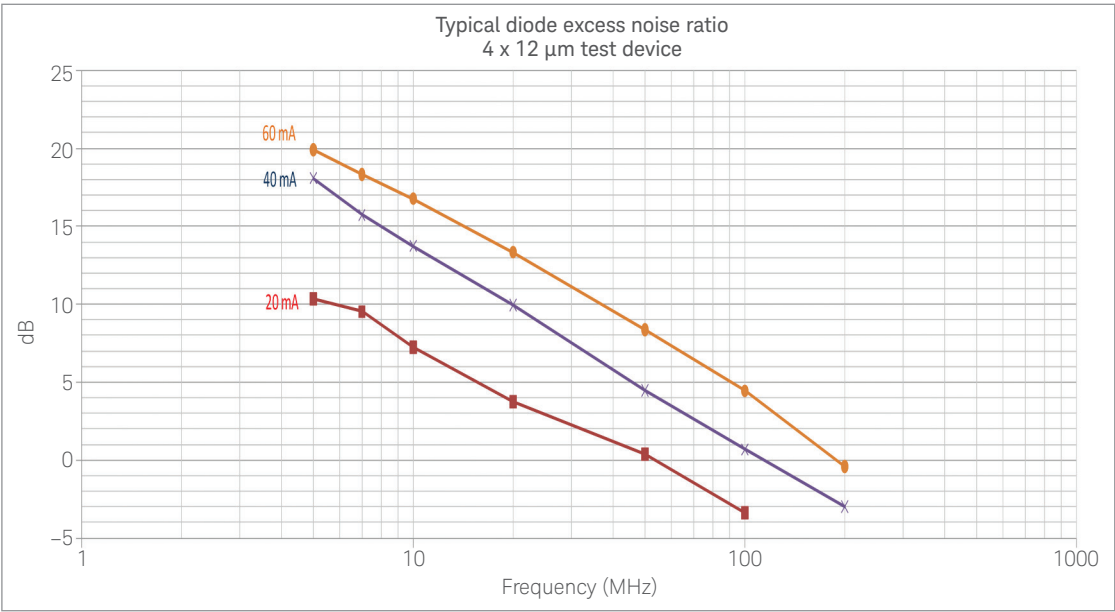
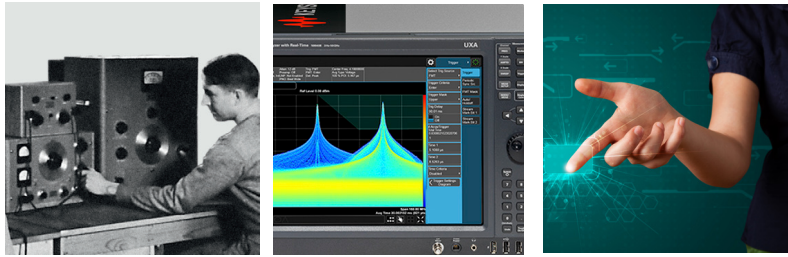


Figure 4. 1GG8-4021 typical noise of a forward-biased sampler diode. The 1GG8-4021 contains four similarly sized diodes.

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Published in USA, October 3, 2016
5992-1841EN
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