



ANADIGICS®
Your GaAs IC Source

Data Sheet

AKD12100
Ku-Band DBS MMIC Downconverter

Rev 2

FEATURES	FUNCTIONAL BLOCK DIAGRAM
• Integrated Monolithic Downconverter • 6 dB Noise Figure • 35 dB Conversion Gain • Small Size • Low Cost • High Reliability • Low Power	

The ANADIGICS Ku-Band MMIC Downconverter is the world's first low-cost, high volume GaAs MMIC which is suitable for use in the field of consumer electronics.

AKD12100 offers a high degree of functionality in a very small and user friendly configuration. The MMIC provides LNB manufacturers the ability to produce in high volume LNBs with low component count, high reliability, and exceptional price-performance ratios. The AKD12100 is specifically suited for LNBs requiring low-power consumption.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	MIN.	MAX.	UNITS
V _{DD}	0	+ 8	V
V _{SS}	0	- 8	V
V _{LO}	- 5	+ 0.5	V
V _{RF/VIF}	- 10	+ 10	V
Case Temperature	- 55	+ 85	° C
Storage Temperature	- 55	+ 100	° C
Soldering Temperature		+ 260 *	° C
Soldering Time		15	Sec.
Input Power RF		+ 10	dBm
Input Power LO		+ 17	dBm

OPERATING RANGES

PARAMETER	MIN	NOMINAL	MAX	UNITS
Frequency				
RF	10.95		11.7	GHz
IF	950		1700	MHz
LO	9.5	10	13.5	GHz
Power Supplies				
V _{DD}	5	6	7	V
V _{SS}	- 3.5	- 5	- 6	V
Case Temperature	- 55	25	85	° C
Input Power RF	- 80	- 50	- 30	dBm
Input Impedance		50		ohms
Output Impedance		75		ohms

* The device may be held at temperature of 230 °C for 3 minutes.

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Anadigics reserves the right to make changes in specifications without notice.

ELECTRICAL SPECIFICATIONS

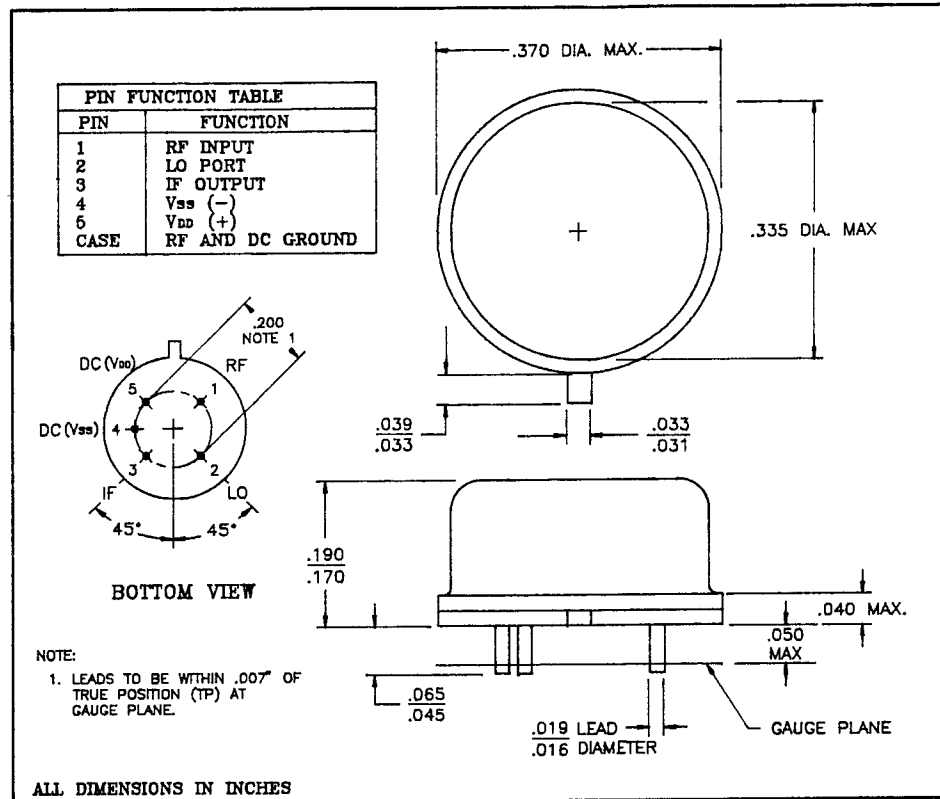
(Packaged unit, $T_A = 25^\circ\text{C}$, $V_{DD} = +6\text{V}$, $V_{SS} = -5\text{V}$) LO Port Terminated in 50 ohms.⁴

PARAMETER	MIN.	TYP.	MAX.	UNITS
Conversion Gain ¹				
$F_{RF} = 10.95\text{ GHz}$	31.75	35		dB
$F_{RF} = 11.7\text{ GHz}$	31.75	35		dB
SSB Noise Figure ¹				
$F_{RF} = 10.95\text{ GHz}$		6.0	6.75	dB
$F_{RF} = 11.7\text{ GHz}$		6.0	6.75	dB
Gain Flatness ¹		± 1.5	± 2.25	dB
Gain Ripple over any 27 MHz band		<0.25		dB
LO - RF Leakage		- 25	- 10	dBm
LO - IF Leakage		- 5	0	dBm
LO Phase Noise ²				
10 KHz Offset		- 70	- 50	dBc/Hz
100 KHz Offset		- 100	- 70	dBc/Hz
Temperature Stability ³ of LO		± 1.5		MHz
Image Rejection	0	5		dB
Output power @ 1dB Gain Compression	0	+ 6		dBm
Output Third Order IP	+ 10	+ 16		dBm
Power Supply Current				
I_{DD}			115	mA
I_{SS}	1	3.5	4	mA
Spurious Output any Band			- 60	dBm
Input VSWR with Respect to 50 ohms Over RF Band		2:1		
Output VSWR with Respect to 75 ohms over IF Band		1.5:1		

NOTES:

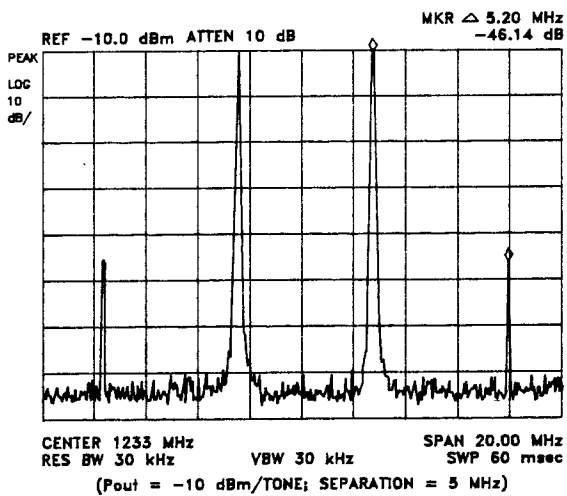
1. As measured in ANADIGICS test fixture , $F_{LO} = 10\text{ GHz}$
(Test procedure available upon request)
2. Using an appropriate dielectric resonator and spacer.
3. Variation of LO frequency with temperature is largely a function of the dielectric resonator and its coupling.
4. LO port must be terminated with 50 ohms DC coupled resistor.

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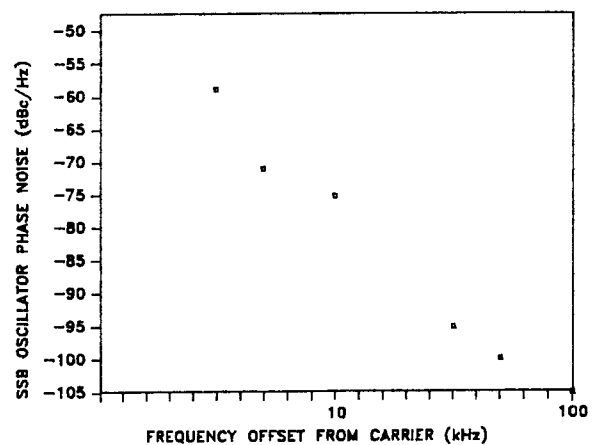
AKD12100

THIRD ORDER INTERMODULATION DISTORTION

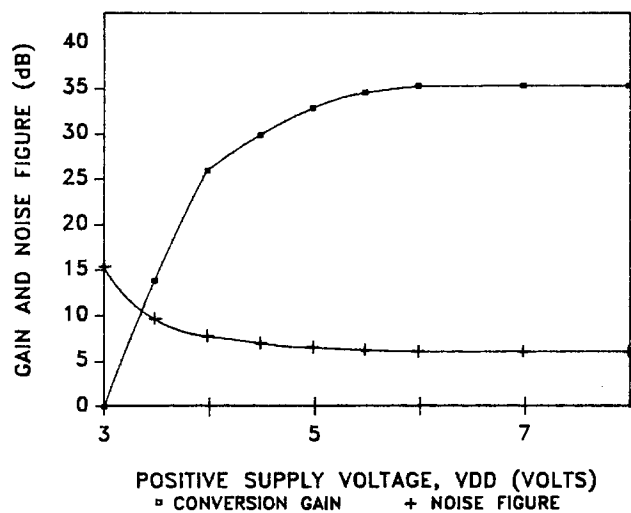


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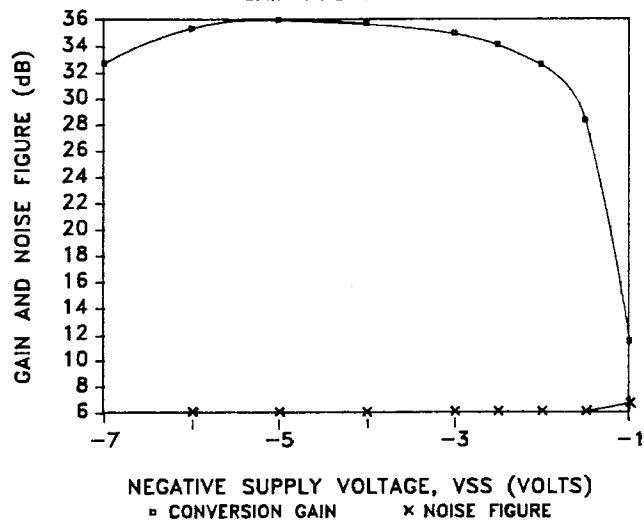
SSB LO PHASE NOISE vs FREQUENCY



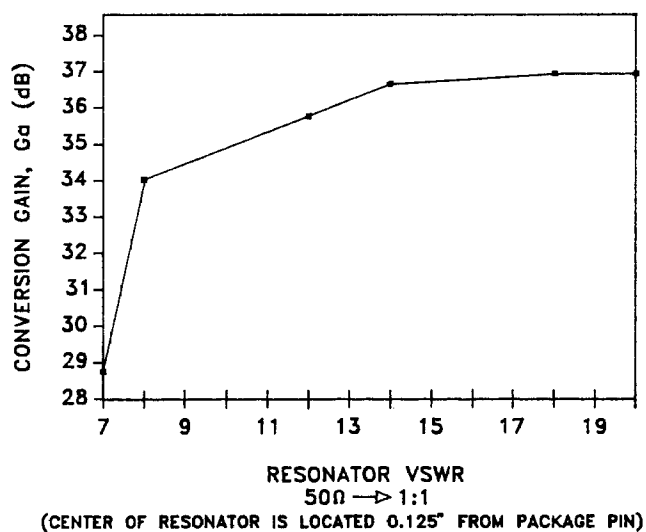
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GAIN AND NF vs VDD



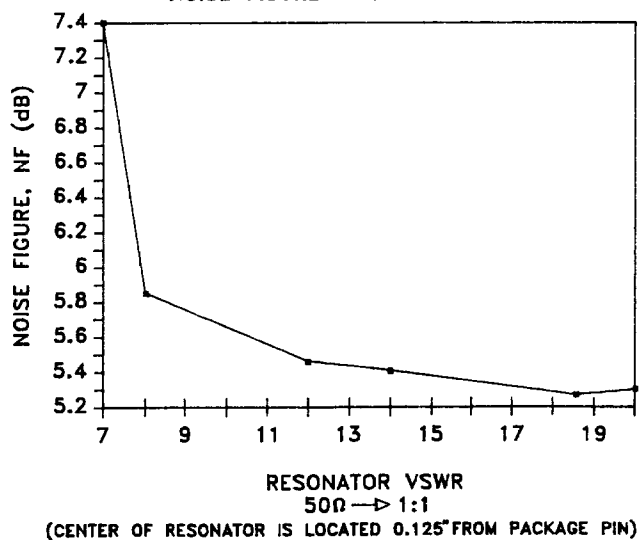
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GAIN AND NF vs VSS



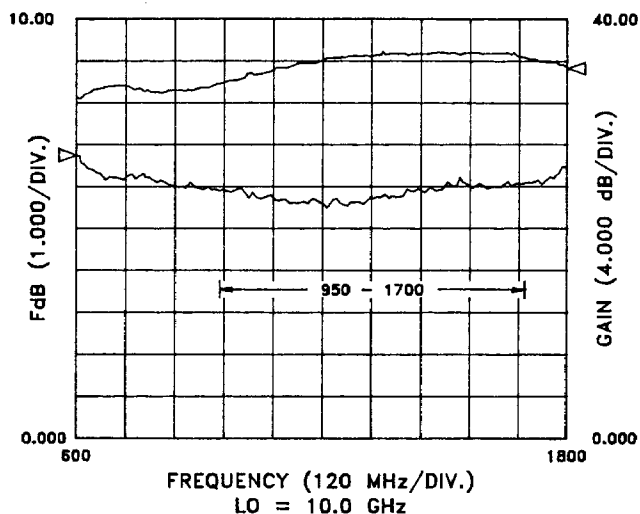
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CONVERSION GAIN vs RESONATOR VSWR



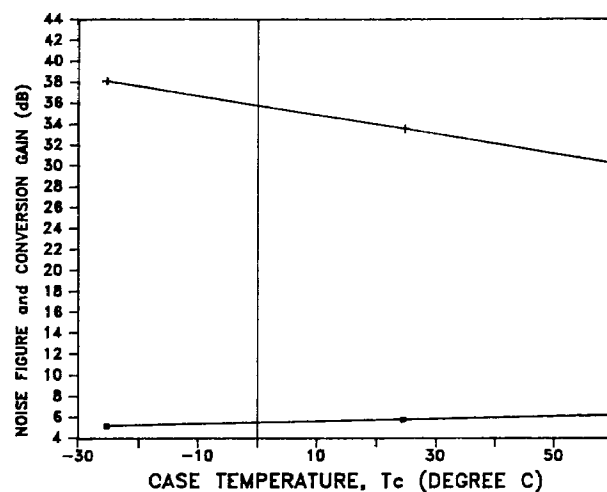
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NOISE FIGURE vs RESONATOR VSWR



NOISE FIGURE AND GAIN vs FREQUENCY

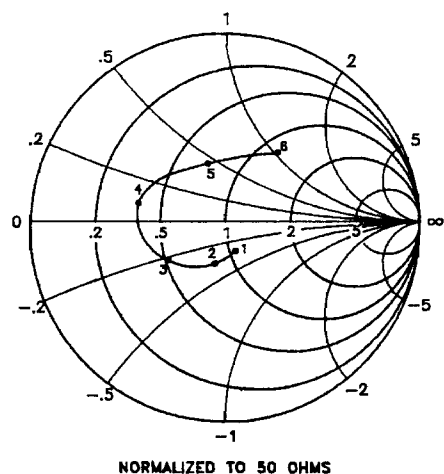


GAIN AND NOISE FIGURE vs TEMPERATURE



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611 OVER RF BAND

START: 10.95 GHz
STOP: 12.50 GHz



AKD12100
S22 OVER IF BAND

START: 0.8 GHz
STOP: 2.0 GHz

