

DPG1122 Function/Arbitrary Waveform Generator Data Sheet

函数/任意波形发生器数据手册

V1.0

产品综述

DPG1122 (台式函数信号发生器) 双通道函数/任意波形发生器, 最大带宽120MHz, 具备1.2GSa/s采样率和16bit垂直分辨率的优异采样系统指标, 在传统的DDS技术基础上, 采用了创新的VeriPoint和ZeroSurg技术, 克服了DDS技术在输出任意波和方波/脉冲时的先天缺陷, 能够为用户提供高保真、低抖动的信号, 满足更广泛的应用需求。

特性与优点

- 双通道, 最大输出频率120MHz, 最大输出幅度20Vpp, 在80dB的动态范围内提供高保真的信号
- 优异的采样系统指标: 1.2GSa/s采样率和16bit垂直分辨率, 最大限度地时间和幅度上还原波形细节
- 创新的VeriPoint技术, 逐点输出任意波, 在保证不丢失波形细节的前提下, 能够以1 μ Sa/s~300MSa/s的可变采样率输出8pts~8Mpts范围内任意长度的低抖动波形
- 创新的ZeroSurg技术, 能够输出低抖动的方波/脉冲波/三角波, 同时脉冲波可以做到脉宽、上升/下降沿精细可调, 具备极高的调节分辨率和调节范围
- 丰富的模拟和数字调制功能: AM、DSB-AM、FM、PM、FSK、ASK、PSK和PWM
- Sweep功能与Burst功能谐波输出功能
- 214种内建任意波硬件频率计功能
- 丰富的通信接口: 标配USBHost, USBDevice (USBTMC), LAN
- 7.0寸触摸屏, 分辨率800*480, 方便用户操作

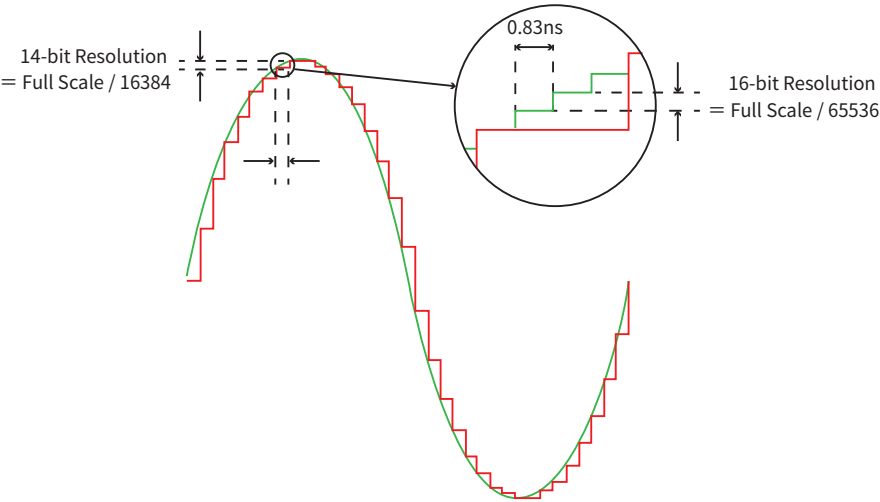
型号和主要参数

型号	DPG1122
最大输出频率	120MHz
采样率	1.2GSa/s(4X内插)
垂直分辨率	16bit
通道数	2
最大输出幅度	±10V
显示	7.0寸触摸屏, 分辨率800*480
接口	标准:USBHost,USBDevice,LAN

设计特色

■ 优异的采样系统指标

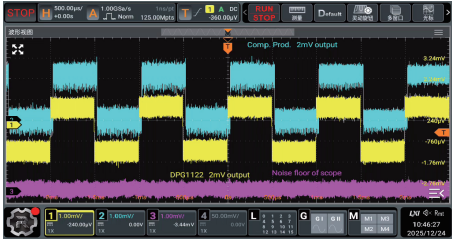
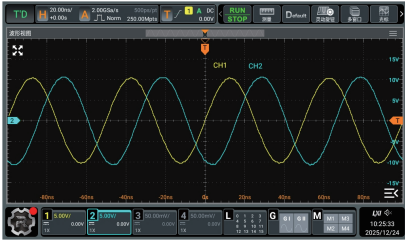
16-bit, 1.2GSa/s的采样系统, 在时间和幅度上都具备极高的分辨率, 能最大限度地还原波形细节、避免失真。



■ 卓越的通道性能

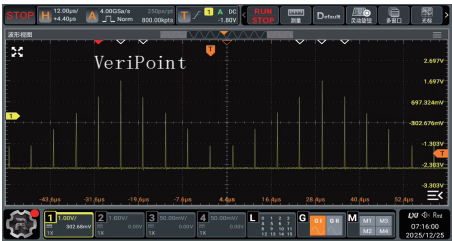
高频下的大幅度输出能力:在20MHz频率下仍然能保证双通道20Vpp满幅度输出。

超低底噪,输出信号具有更好的信噪比。



■ 创新的VeriPoint技术

VeriPoint在输出任意波时,不仅具备传统DDS技术的所有优点,而且克服了其可能增加抖动和失真的严重缺陷,因为VeriPoint技术会逐点输出存储器中任意波形的每一个波形数据点,不会遗漏或重复任何点,可精确地生成低抖动的任意波形。



VeriPoint技术实现了任意波形的逐点输出,不会错过任何波形的细节。

■ 创新的ZeroSurg技术



ZeroSurg技术有效克服了DDS产生一个采样周期抖动。

频率计功能



高精度频率计,可测试0.1Hz~200MHz的频率范围。

7英寸触摸屏显示



7英寸显示屏,可触摸操作,使仪器操控更为快捷。

参数规格

所有模拟通道输出相关的规格同时适用于通道1和通道2。除非特别说明,所有规格均需要在以下条件时才能保证满足:

- ① 信号源在校正有效期内
- ② 在环境温度18°C~28°C范围内,且仪器连续工作30分钟以上

频率特性

参数	最小值	典型值	最大值	单位	条件与注释
分辨率		1u		Hz	
时基精度	-1		+1	ppm	25°C
	-2		+2		0~40°C
时基1年老化率	-1		+1	ppm	25°C
时基10年老化率	-3.5		+3.5	ppm	25°C

正弦波特性					
参数	最小值	典型值	最大值	单位	条件与注释
频率	1u		120M	Hz	
时基精度			-65	dBc	[0,10]MHz
			-60	dBc	(10,20]MHz
			-55	dBc	(20,40]MHz
			-50	dBc	(40,60]MHz
			-45	dBc	(60,80]MHz
			-40	dBc	(80,100]MHz
			-38	dBc	(100,120]MHz
总谐波失真			0.075	%	0dBm, 10Hz~20kHz
非谐波杂散			-70	dBc	<=50MHz
			-65		>50MHz

方波特性					
参数	最小值	典型值	最大值	单位	条件与注释
频率	1u		25M	Hz	
上升/下降时间		7		ns	10%~90%,1V pp,50ohm
过冲		1.5		%	100kHz,1Vp- p,50ohm
占空比	0.01		99.99	%	该参数受频率 设置限制
抖动(rms), 周期-周期			150	ps	1Vpp,50ohm

脉冲特性

参数	最小值	典型值	最大值	单位	条件与注释
频率	1u		25M	Hz	
脉宽		12		ns	ns
脉宽精度				$\pm(0.01\%+0.3ns)$	
上升/下降时间	6n		800k	s	10%~90%,1Vpp,50ohm
过冲		1.5		%	100Khz,1Vp p,50ohm
占空比	0.01		99.99	%	该参数受频率设置限制
抖动(rms), 周期-周期			150	ps	1Vpp,10ns 沿, 50ohm

噪声特性

参数	最小值	典型值	最大值	单位	条件与注释
-3dB带宽		120		MHz	
带宽调节范围	20		120	MHz	

三角波特性

参数	最小值	典型值	最大值	单位	条件与注释
频率	1u		26M	Hz	
对称度	0		100	%	
线性度					输出峰峰值的百分比, 1KHz, 1Vpp,100% 对称度

任意波特性

参数	最小值	典型值	最大值	单位	条件与注释
DDS模式					
频率	1u		20MHz	Hz	采样率 300Msa/s
波形长度		16K		pts	
上升/下降时间		4		ns	
逐点模式					
采样率	1u		300M	Sa/s	
波形长度	8		8M	pts	
抖动			150	ps	

直流特性

参数	最小值	典型值	最大值	单位	条件与注释
范围	-10		+10	V	高阻负载
	-5		+5	V	50Ω负载
精度	$\pm(1\%+2mV)$				

谐波输出特性

参数	最小值	典型值	最大值	单位	条件与注释
谐波次数			16	次	
谐波类型	奇次, 偶次, 所有				

输出特性

参数	最小值	典型值	最大值	单位	条件与注释
范围	2m 2m		20 10	V _{pp}	≤20MHz,高阻负载 >20MHz,高阻负载 (负载为50ohm时, 该规格除以2)

精度	$\pm(1\%+1\text{mV})$				10KHz sine,0V offset
幅度平坦度	-0.3		+0.3	dB	50ohm,2.5Vpp,相 对于10KHzsine, 0~100MHz
	-0.4		+0.4	dB	50ohm,2.5Vpp,相 对于10KHzsine, 100~120MHzsine
内阻		50		ohm	10KHzsine
输出电流	-200		+200	mA	
通道隔离度		-60		dBc	

调制特性					
AM					
参数	最小值	典型值	最大值	单位	条件与注释
载波类型	Sine,Square,Ramp,Arb				
调制波源	内部/外部				
调制波类型	Sine,Square,Ramp,Arb,Noise				
调制深度	0		120	%	10KHzsine
调制波频率	1m		1M	Hz	调制波源为内部时
FM					
参数	最小值	典型值	最大值	单位	条件与注释
载波类型	Sine,Square,Ramp,Arb				
调制波源	内部/外部				
调制波类型	Sine,Square,Ramp,Arb,Noise				
频偏	0		0.5*BW		BW代表最大输出 频率； 该参数受频率设置 限制
调制波频率	1m		1M	Hz	调制波源为内部时

PM					
参数	最小值	典型值	最大值	单位	条件与注释
载波类型	Sine,Square,Ramp,Arb				
调制波源	内部/外部				
调制波类型	Sine,Square,Ramp,Arb,Noise				
相偏	0		360		
调制波频率	1m		1M	Hz	调制波源为内部时
ASK					
参数	最小值	典型值	最大值	单位	条件与注释
载波类型	Sine,Square,Ramp,Arb				
调制波源	内部/外部				
调制波类型	50%占空比的方波				
键控频率	1m		1M	Hz	调制波源为内部时
FSK					
参数	最小值	典型值	最大值	单位	条件与注释
载波类型	Sine,Square,Ramp,Arb				
调制波源	内部/外部				
调制波类型	50%占空比的方波				
键控频率	1m		1M	Hz	调制波源为内部时
PWM					
参数	最小值	典型值	最大值	单位	条件与注释
载波类型	Pulse				
调制波源	内部/外部				
调制波类型	Sine,Square,Ramp,Arb,Noise				
键控频率	1m		1M	Hz	调制波源为内部时
脉宽偏移分辨率	6.67			ns	

Burst特性					
参数	最小值	典型值	最大值	单位	条件与注释
载波类型	Sine,Square,Ramp,Arb,Noise,Pulse				
类型	计数(1~1000000个周期),无限,门控				
载波频率	20u		BW	Hz	BW代表载波最大输出频率
相位	-360		360	°	10KHzsine
内部周期	998.3n		100k	s	
触发源	内部,外部,手动				
门控源	外部				
触发延时			100	s	

Sweep特性					
参数	最小值	典型值	最大值	单位	条件与注释
载波类型	Sine,Square,Ramp,Arb				
扫描类型	频率,幅度				
扫描方式	线性,对数				
扫描方向	向上,向下,上下				
载波频率	1u		BW	Hz	BW代表载波最大输出频率
扫描时间	1m		500	s	
触发源	内部,外部,手动				

频率计特性					
参数	最小值	典型值	最大值	单位	条件与注释
测量参数	频率,周期,正/负脉宽,占空比				
耦合模式	AC,DC,高频抑制				
频率范围	100m 10		200M 200M	Hz	DC耦合 AC耦合

输入幅度	0.1Vrms 0.2Vrms 0.1Vrms 0.1Vrms		$\pm 2.5V$ $\pm 2.5V$ 5Vpp 5Vpp	Hz	DC耦合, $\leq 100MHz$ DC耦合, 100MHz~200MHz AC耦合, $\leq 100MHz$ AC耦合, 100MHz~200MHz
输入阻抗		1M		ohm	

参考时钟特性

10MHz输入

参数	最小值	典型值	最大值	单位	条件与注释
频率		10		MHz	
幅度	1.4			Vpp	
输入阻抗	5			Kohm	AC耦合

10MHz输出

参数	最小值	典型值	最大值	单位	条件与注释
频率		10		MHz	同步到内部时钟
幅度	2	3.3		Vpp	高阻负载
内阻		50		ohm	

辅助输入/输出特性

触发输入

参数	最小值	典型值	最大值	单位	条件与注释
V _{IH}	2		5.5	V	
V _{IL}	-0.5		0.8	V	
输入阻抗	100			Kohm	10KHz
脉宽	100			ns	
响应时间			620	ns	

触发输出					
参数	最小值	典型值	最大值	单位	条件与注释
VOH	3.8			V	IOH=8mA
VOL			0.44	V	IOL=8mA
内阻		100		ohm	
频率			1	MHz	

同步输出					
参数	最小值	典型值	最大值	单位	条件与注释
VOH	3.8			V	IOH=8mA
VOL			0.44	V	IOL=8mA
内阻		100		ohm	
脉宽		100		ns	
频率			5	MHz	

外调制输入					
参数	最小值	典型值	最大值	单位	条件与注释
频率	0		50	KHz	
输入阻抗	10			Kohm	
100%调制 时对应幅度	11	12	13	Vpp	

一般特性					
电源					
参数	最小值	典型值	最大值	单位	条件与注释
电压		15		V	
功耗		45		W	

显示					
参数	最小值	典型值	最大值	单位	条件与注释
颜色		24		bit	
对比度		500:1			
亮度		300		nit	
环境					
参数	最小值	典型值	最大值	单位	条件与注释
工作温度范围	0		40	℃	
存储温度范围	-20		60	℃	
工作湿度范围	5 5		90 50	%	≤30℃ 40℃
非工作湿度范围	5		95	%	
工作海拔高度			3048	m	
非工作海拔高度			15000	m	
电磁兼容性	符合EMC指令 (2014/30/EU) , 符合或优于EN61326-1:2013,EN61326-2-1:2013,ENIEC61000-3-2:2019+A1,EN61000-3-3:2013+A1:2019				
	传导骚扰		CISPR 11:2015+AMD1:2016/AMD2:2019	Class A group1, 0.15MHz~30MHz	
	辐射骚扰		CISPR 11:2015+AMD1:2016/AMD2:2019	Class A group1, 30MHz~1GHz	
	电压闪烁		EN 61000-3-3:2013+A1:2019+A2:2021		
	静电放电 (ESD)		EN 61000-4-2:2009	±4kV(接触), ±8kV(空气)	
	射频电磁场抗扰度		EN IEC 61000-4-3:2020	10V/m(80MHz to 1GHz); 3V/m(1.4GHz to 6GHz)	
	电快速瞬变脉冲群(eft)		EN 61000-4-4:2012	2kV电源线	
	浪涌		EN 61000-4-5: 2014+A1:2017	1kV(相-中性点电压); 2kV(相-地电压);2kV(中性点-地电压)	
	射频连续传导抗扰度		EN IEC 61000-4-6:2023	3V,0.15MHz~80MHz	

	电压暂降与 短时中断	EN IEC 61000-4-11: 2020+AC:2022		电压跌落: 0% UT during half cycle; 0% UT during 1 cycle; 70% UT during 25 cycles 短时断电:0% UT during 250 cycles	
RoHS	符合EU2015/863				
校正					
参数	最小值	典型值	最大值	单位	条件与注释
校正周期		1		年	
结构					
尺寸	269×164.5×58.4mm				
重量	≈953.4g				

配件

标配附件	数量
快速指南	1
电源线	1
适配器	1
双BNC同轴电缆	2
数据线	1
接地线	1

Product Overview

The DPG1122 Desktop Function/Arbitrary Waveform Generator is a 2CHs 120MHz Function/Arbitrary Waveform Generator. It features an advanced sampling system with a 1.2GSa/s sample rate and 16-bit vertical resolution. Equipped with innovative VeriPoint and ZeroSurg technologies, the generator overcomes the inherent limitations of traditional DDS when generating arbitrary, square, or pulse waveforms, delivering high-fidelity, low-jitter signals suitable for a wide range of applications.

Features and Benefits

- 2CH, 120 MHz max frequency, 20 Vpp max amplitude, delivering high-fidelity signals with an 80 dB dynamic range.
- Advanced sampling system with 1.2 GSa/s sample rate and 16-bit vertical resolution, preserving waveform details in both time and amplitude domains.
- Innovative VeriPoint technology delivers arbitrary waveforms point by point. It outputs low-jitter waveforms of 8 points to 8 M points with a variable sample rate of 1 μ Sa/s to 300 MSa/s, ensuring no loss of waveform details.
- The innovative ZeroSurg technology provides low-jitter square, pulse, and triangular waveforms. Pulse waves feature finely adjustable pulse width and rise/fall times, with extremely high resolution and a wide adjustment range.
- Comprehensive analog and digital modulation capabilities: AM, DSB-AM, FM, PM, FSK, ASK, PSK, and PWM.
- Sweep, burst, and harmonic output functions for flexible signal generation.
- Built-in arbitrary waveform memory with 214 preset waveforms and hardware frequency counter functionality.
- Multiple communication interfaces: standard USB Host, USB Device (USBTMC), and LAN.
- 7.0-inch touchscreen with 800 $\times$ 480 resolution for intuitive and convenient operation.

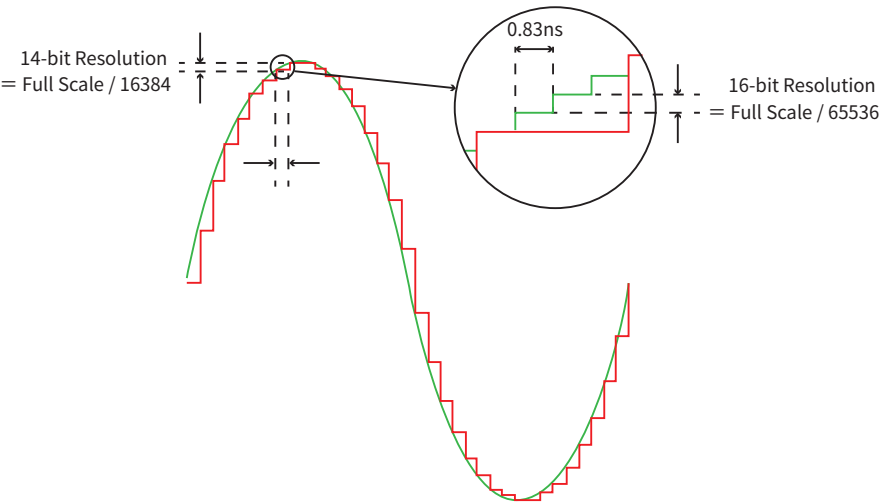
Key Specifications

Model	DPG1122
Max Output Frequency	120MHz
Sample Rate	1.2 GSa/s (4× Interpolation)
Vertical Resolution	16bit
Channels	2
Max Output Amplitude	±10V
Display	7.0-inch touchscreen, resolution 800 × 480
Interfaces	USB Host, USB Device, LAN

Design Features

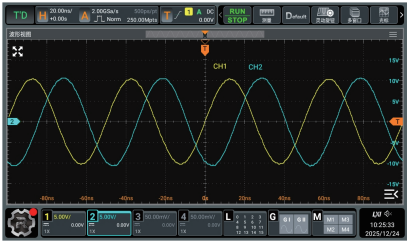
■ Advanced Sampling System

The 16-bit, 1.2 GSa/s sampling system delivers high temporal and amplitude resolution, accurately reproducing waveform details while minimizing distortion.

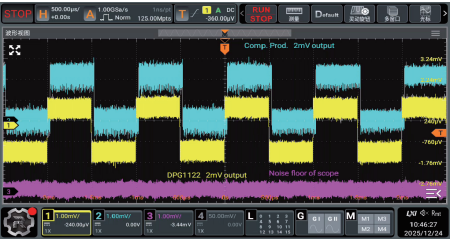


■ Exceptional Channel Performance

High-Amplitude Output at High Frequencies: Both channels can still deliver full 20 Vpp output at 20 MHz.

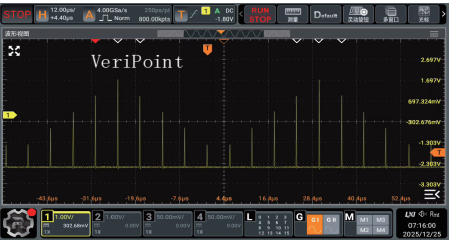


Ultra-Low Noise: The output signal features an improved signal-to-noise ratio (SNR).



■ Innovative VeriPoint Technology

When generating arbitrary waveforms, VeriPoint combines all the advantages of traditional DDS technology while overcoming its inherent drawbacks, such as increased jitter and distortion. VeriPoint outputs each data point of the stored waveform individually, ensuring that no points are skipped or repeated, and accurately produces low-jitter arbitrary waveforms.



VeriPoint technology enables point-by-point output of arbitrary waveforms, ensuring that no waveform detail is missed.

■ Innovative ZeroSurg Technology



ZeroSurg effectively overcomes the single-sample-period jitter inherent in DDS.



It supports a minimum pulse width of 9.2 ns with fine pulse-width adjustment in steps as small as 100 ps. Rise and fall times can be set independently, also with adjustment steps as small as 100 ps, allowing precise waveform shaping at any frequency. The maximum pulse rate can reach 480 kHz.

■ Comprehensive Modulation Capabilities



Supports a wide range of analog and digital modulation modes, including AM, FM, PM, FSK, ASK, PSK, and DSB-AM. Modulation can be applied using either internal or external signal sources.

■ Burst Function



Supports two burst modes, “N-cycle” and “Gated”, with three trigger sources: internal, external, and manual.

■ Sweep Function



Supports linear and logarithmic sweep modes, with upward and downward sweep directions, and three trigger sources: internal, external, and manual.

Frequency Counter Function



A high-precision frequency counter capable of measuring frequencies from 0.1 Hz to 200 MHz.

7-Inch Touchscreen Display



A 7-inch display with touchscreen operation for more intuitive and efficient instrument control.

Specifications

All specifications related to analog channel outputs apply to both Channel 1 and Channel 2. Unless otherwise stated, specifications are guaranteed only under the following conditions:

- ① The signal source is within its calibration period.
- ② Ambient temperature is between 18 °C and 28 °C, and the instrument has been operating continuously for more than 30 minutes.

Frequency					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Resolution		1u		Hz	
Timebase Accuracy	-1		+1	ppm	25°C
	-2		+2		0~40°C
Timebase Aging Rate (1 Year)	-1		+1	ppm	25°C
Timebase Aging Rate (10 Years)	-3.5		+3.5	ppm	25°C

Sine Wave Characteristics					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Frequency	1u		120M	Hz	
Timebase Accuracy			-65	dBc	[0,10]MHz
			-60	dBc	(10,20]MHz
			-55	dBc	(20,40]MHz
			-50	dBc	(40,60]MHz
			-45	dBc	(60,80]MHz
			-40	dBc	(80,100]MHz
			-38	dBc	(100,120]MHz
Total Harmonic Distortion (THD)			0.075	%	0dBm, 10Hz~20kHz
Non-Harmonic Spurious Emissions			-70	dBc	<=50MHz
			-65		>50MHz

Square Wave Characteristics					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Frequency	1u		25M	Hz	
Rise/Fall Time		7		ns	10%~90%,1Vpp,50Ω
Overshoot		1.5		%	100kHz,1Vp-p,50Ω
Duty Cycle	0.01		99.99	%	This parameter is limited by the frequency setting.
Jitter (rms), Cycle-to-Cycle			150	ps	1Vpp,50Ω

Pulse Characteristics					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Frequency	1u		25M	Hz	
Pulse Width		12		ns	ns
Pulse Width Accuracy				$\pm (0.01\% + 0.3\text{ns})$	
Rise/Fall Time	6n		800k	s	10%~90%, 1 Vpp, 50Ω
Overshoot		1.5		%	100Khz, 1Vp p, 50Ω
Duty Cycle	0.01		99.99	%	This parameter is limited by the frequency setting.
Jitter (rms), Cycle-to-Cycle			150	ps	1 Vpp, 10 ns Rise/Fall, 50 Ω

Noise Characteristics					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
-3dB Bandwidth		120		MHz	
Bandwidth Adjustment Range	20		120	MHz	

Triangle Wave Characteristics					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Frequency	1u		26M	Hz	
Symmetry	0		100	%	
Linearity					Measured at 1 kHz, 1 Vpp, 100 % Symmetry, output expressed as a percentage of peak-to-peak.

Arbitrary Waveform Characteristics

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
DDS Mode					
Frequency	1u		20MHz	Hz	Sample Rate 300Msa/s
Waveform Length		16K		pts	
Rise/Fall Time		4		ns	
Point-by-Point Mode					
Sample Rate	1u		300M	Sa/s	
Waveform Length	8		8M	pts	
Jitter			150	ps	

DC Characteristics

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Range	-10		+10	V	High-Impedance Load
	-5		+5	V	50 Ω Load
Accuracy	$\pm(1\%+2mV)$				

Harmonic Output Characteristics

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Harmonic Order			16	次	
Harmonic Type	Odd, Even, All				

Output Characteristics

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Range	2m 2m		20 10	V _{pp}	≤ 20 MHz, High-Impedance Load > 20 MHz, High-Impedance Load (For a 50 Ω load, the specified value is halved)

Accuracy	$\pm(1\%+1\text{mV})$				Measured with a 10 kHz sine wave, 0 V offset.
Amplitude Flatness	-0.3		+0.3	dB	Measured with 2.5 Vpp into 50 Ω , relative to a 10 kHz sine wave, over 0 – 100 MHz.
	-0.4		+0.4	dB	Measured with 2.5 Vpp into 50 Ω , relative to a 10 kHz sine wave, over 100 – 120 MHz
Internal Resistance		50		Ω	10KHzsine
Output Current	-200		+200	mA	
Channel Isolation		-60		dBc	

Modulation Characteristics

AM

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Carrier Type	Sine,Square,Ramp,Arb				
Modulation Source	Internal / External				
Modulation Waveform	Sine,Square,Ramp,Arb,Noise				
Modulation Depth	0		120	%	10KHzsine
Modulation Frequency	1m		1M	Hz	When the modulation source is set to Internal.

FM

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Carrier Type	Sine,Square,Ramp,Arb				
Modulation Source	Internal / External				
Modulation Waveform	Sine,Square,Ramp,Arb,Noise				
Frequency Deviation	0		0.5*BW		BW indicates the maximum output frequency. This parameter is limited by the frequency setting.
Modulation Frequency	1m		1M	Hz	When the modulation source is set to Internal.

PM					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Carrier Type	Sine,Square,Ramp,Arb				
Modulation Source	Internal / External				
Modulation Waveform	Sine,Square,Ramp,Arb,Noise				
Phase Offset	0		360		
Modulation Frequency	1m		1M	Hz	When the modulation source is set to Internal.
ASK					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Carrier Type	Sine,Square,Ramp,Arb				
Modulation Source	Internal / External				
Modulation Waveform	50% Duty Cycle Square Wave				
Keying Frequency	1m		1M	Hz	When the modulation source is set to Internal.
FSK					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Carrier Type	Sine,Square,Ramp,Arb				
Modulation Source	Internal / External				
Modulation Waveform	50% Duty Cycle Square Wave				
Keying Frequency	1m		1M	Hz	When the modulation source is set to Internal.
PWM					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Carrier Type	Pulse				
Modulation Source	Internal / External				
Modulation Waveform	Sine,Square,Ramp,Arb,Noise				
Keying Frequency	1m		1M	Hz	When the modulation source is set to Internal.
Pulse Width/Offset Resolution	6.67			ns	

Burst Characteristics					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Carrier Type	Sine, Square, Ramp, Arb, Noise, Pulse				
Burst Type	Count (1–1,000,000 cycles), Infinite, Gated				
Carrier Frequency	20u		BW	Hz	BW indicates the maximum output frequency of the carrier.
Phase	-360		360	°	10KHzsine
Internal Period	998.3n		100k	s	
Trigger Source	Internal, External, Manual				
Gate Source	External				
Trigger Delay			100	s	

Sweep Characteristics					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Carrier Type	Sine, Square, Ramp, Arb				
Sweep Type	Frequency / Amplitude				
Sweep Mode	Linear / Logarithmic				
Sweep Direction	Up, Down, Up/Down				
Carrier Frequency	1u		BW	Hz	BW indicates the maximum output frequency of the carrier.
Sweep Time	1m		500	s	
Trigger Source	Internal, External, Manual				

Frequency Counter Characteristics					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Measured Parameter	Frequency, Period, Positive/Negative Pulse Width, and Duty Cycle				
Coupling Mode	AC, DC, and High-Frequency Rejection				
Frequency Range	100m 10		200M 200M	Hz	DC Coupling AC Coupling

Input Amplitude	0.1Vrms 0.2Vrms 0.1Vrms 0.1Vrms		$\pm 2.5V$ $\pm 2.5V$ 5Vpp 5Vpp	Hz	DC Coupling, $\leq 100\text{ MHz}$ DC Coupling, 100 MHz – 200 MHz AC Coupling, $\leq 100\text{ MHz}$ AC Coupling, 100 MHz – 200 MHz
Input Impedance		1M		Ω	

Reference Clock Characteristics

10MHz Input

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Frequency		10		MHz	
Amplitude	1.4			Vpp	
Input Impedance	5			K Ω	AC Coupling

10MHz Output

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Frequency		10		MHz	Synchronized to Internal Timebase
Amplitude	2	3.3		Vpp	High-Impedance Load
Internal Resistance		50		Ω	

Auxiliary Input/Output Characteristics

Trigger Input

Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
VIH	2		5.5	V	
VIL	-0.5		0.8	V	
Input Impedance	100			K Ω	10KHz
Pulse Width	100			ns	
Response Time			620	ns	

Trigger Output					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
VOH	3.8			V	IOH=8mA
VOL			0.44	V	IOL=8mA
Input Impedance		100		Ω	
Frequency			1	MHz	

Sync Output					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
VOH	3.8			V	IOH=8mA
VOL			0.44	V	IOL=8mA
Input Impedance		100		Ω	
Pulse Width		100		ns	
Frequency			5	MHz	

External Modulation Input					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Frequency	0		50	KHz	
Input Impedance	10			K Ω	
Amplitude at 100% Modulation	11	12	13	Vpp	

General Characteristics					
Power Supply					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Voltage		15		V	
Power Consumption		45		W	

Display					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Color		24		bit	
Contrast		500:1			
Brightness		300		nit	
Environment					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Operating Temperature Range	0		40	°C	
Storage Temperature Range	-20		60	°C	
Operating Humidity Range	5 5		90 50	%	≤30°C 40°C
Non-Operating Humidity Range	5		95	%	
Operating Altitude			3048	m	
Non-Operating Altitude			15000	m	
EMC	The product complies with the EMC Directive (2014/30/EU) and meets or exceeds the requirements of EN 61326-1:2013, EN 61326-2-1:2013, EN IEC 61000-3-2:2019 + A1, and EN 61000-3-3:2013 + A1:2019.				
	Conducted Emission		CISPR 11:2015+AMD1:2016/AMD2:2019		Class A group1, 0.15MHz~30MHz
	Radiated Emission		CISPR 11:2015+AMD1:2016/AMD2:2019		Class A group1, 30MHz~1GHz
	Voltage Fluctuations & Flicker		EN 61000-3-3:2013+A1:2019+A2:2021		
	Electrostatic Discharge (ESD)		EN 61000-4-2:2009		±4 kV (contact), ±8 kV (air)
	RF Electromagnetic Field		EN IEC 61000-4-3:2020		10V/m(80MHz to 1GHz); 3V/m(1.4GHz to 6GHz)
	Fast Transients		EN 61000-4-4:2012		2 kV on power lines
	Surges		EN 61000-4-5: 2014+A1:2017		1 kV (line-to-neutral) 2 kV (line-to-ground) 2 kV (neutral-to-ground)
	RF Conducted Immunity		EN IEC 61000-4-6:2023		3V,0.15MHz~80MHz

	Volt. Interruptions Volt. Dips	EN IEC 61000-4-11: 2020+AC:2022	Voltage Dips: 0% UT during half cycle 0% UT during 1 cycle 70% UT during 25 cycles Short Interruptions: 0% UT during 250 cycles		
RoHS	Complies with EU 2015/863				
Calibration					
Parameter	Minimum	Typical Value	Maximum	Unit	Conditions / Notes
Calibration Interval		1		Year	
Dimensions					
Dimensions	269×164.5×58.4mm				
Net Weight	≈953.4g				

Accessories

Quick Guide	1
Power Cord	1
Adapter	1
Dual BNC Coaxial Cable	2
Data Cable	1
Ground Wire	1

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深圳市菲尼瑞斯科技有限公司 / Shenzhen FNIRSI Technology Co., Ltd.)

服务热线 / Service Hotline: 0755-28020752

官方网站 / Official Website: www.fnirsi.cn

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