

## Characteristics of DG1022 Function/Arbitrary Waveform Generator



1. Advanced DDS technology, 2 analog channels output, 20 MHz maximum output frequency
2. 100 MSa/s maximum sample rate ,14 bits vertical resolution,4 kpts of memory depth
3. High accuracy and wide bandwidth frequency counter inside, range up to 200 MHz
4. USB Device & Host interface configured, to support USB disk storage
5. Seamless connectivity with DS series products

## Characteristics(DG1012、 DG1022)

Frequency (DG1022)	
Waveforms	Sine, Square, Ramp, Triangle, Pulse, Noise, Arb
Sine	1μHz ~ 20MHz
Square	1μHz ~ 5MHz
Ramp, Triangle	1μHz ~ 150kHz
Pulse	500μHz ~ 3MHz
Noise	5MHz (-3dB)
Arb	1μHz ~ 5MHz
Resolution	1 μHz
Accuracy	±50 ppm in 90 days ±100 ppm in 1year 18°C - 28°C
Temperature index	< 5 ppm/°C

Sine Wave Spectral Purity			
Harmonic Distortion		< 1 V <sub>PP</sub>	> 1 V <sub>PP</sub>
	DC to 20 kHz	-75 dBc	-70 dBc

	20 kHz to 100 kHz	-70 dBc	-60 dBc
	100 kHz to 1 MHz	-55 dBc	-50 dBc
	1 MHz to 10 MHz	-45 dBc	-40 dBc
Total Harmonic Distortion	DC to 20 kHz, 1Vpp	<0.2%	
Spurious (non-harmonic)	DC to 1 MHz	< -70 dBc	
	1 MHz to 10 MHz	< -70 dBc + 6 dB/octave	
Phase Noise	10kHz Offset -115 dBc / Hz (Typical)		

<b>Square Wave</b>		
Rise/Fall Time	< 20 ns (10% to 90%), Typical, 1kHz 1Vpp	
Overshoot	< 5% (Typical, 1kHz 1Vpp)	
Duty Cycle	1μHz to 3MHz	20% to 80%
	3MHz(not contain) to 4MHz	40% to 60%
	4MHz (not contain) to 5MHz	50%
Asymmetry (below 50% Duty Cycle)	1% of period+ 20ns	
Jitter	6ns + 0.1% of period	

<b>Ramp Wave</b>	
Linearity	< 0.1% of peak output (typical, 1KHz, 1Vpp, 100% Symmetry)
Symmetry	0% to 100%

<b>Pulse Wave</b>	
Pulse Width	2000s max period; 20ns min period; 1ns resolution
Overshoot	< 5%
Jitter	6ns + 100ppm of period

<b>Arb Wave</b>	<b>CH1</b>	<b>CH2</b>
Waveform Length	4k points	1k points
Amplitude Accuracy	14 bits (including sign)	10 bits (including sign)
Sample Rate	100MSa/s	100MSa/s
Minimum Rising /Falling Time	35ns	35ns
Jitter (RMS)	6 ns + 30ppm	6 ns + 30ppm
Non-Volatile Storage (Total:10 Waveforms)	10 waveforms	10 waveforms

<b>Output</b>	<b>CH1</b>	<b>CH2</b>
Amplitude	2 mVPP ~ 10 VPP (50 Ω)	2 mVPP ~ 3 VPP (50 Ω)
	4 mVPP ~ 20 VPP (High Z)	4 mVPP ~6 VPP (High Z)
Amplitude Accuracy (100)	± 1% of setting ± 1 mVPP	± 1% of setting ± 1 mVPP

kHz)		
Amplitude Flatness (sine wave relative to 1 00kHz)	<100kHz 0.1 dB ( $\pm 1\%$ )	<100kHz 0.1 dB ( $\pm 1\%$ )
	100kHz ~ 5MHz 0.15 dB ( $\pm 1.5\%$ )	100kHz ~ 5MHz 0.15 dB ( $\pm 1.5\%$ )
	5MHz ~ 20MHz 0.3 dB ( $\pm 3.5\%$ )	5MHz ~ 20MHz 0.3 dB ( $\pm 3.5\%$ )

DC Offset	CH1	CH2
Range (peak AC+DC)	$\pm 5V$ ( $50\Omega$ ) $\pm 10 V$ (High Z)	$\pm 1.5V$ ( $50\Omega$ ) $\pm 3 V$ (High Z)
Accuracy	$\pm 2\%$ of the Offset Setting $\pm 0.5\%$ ( $ V_{offset} $ ) of the Amplitude $\pm 2mV$	$\pm 2\%$ of the Offset Setting $\pm 0.5\%$ ( $ V_{offset} $ ) of the Amplitude $\pm 2mV$

Waveform Output	CH1	CH2
Impedance	$50 \Omega$ typical	$50 \Omega$ typical
Protection	Short-circuit protected; Overload disables the output automatically	none

AM (CH1)	
Carrier Waveforms	Sine, Square, Ramp, Arb(Except DC)
Source	Internal/ External
Modulating Waveforms	Sine, Square, UpRamp, DnRamp, Triangle, Noise, Arb (2mHz to 20kHz)
Depth	0% - 120%
FM (CH1)	
Carrier Waveforms	Sine, Square, Ramp, Arb(Except DC)
Source	Internal/ External
Modulating Waveforms	Sine, Square, UpRamp, DnRamp, Triangle, Noise, Arb (2mHz to 20kHz)
Frequency Deviation	DC~ 5 MHz
PM (CH1)	
Carrier Waveforms	Sine, Square, Ramp, Arb(Except DC)
Source	Internal/ External
Modulating Waveforms	Sine, Square, UpRamp, DnRamp, Triangle, Noise, Arb (2mHz to 20kHz)
Phase Deviation	0 to $360^\circ$
FSK (CH1)	
Carrier Waveforms	Sine, Square, Ramp, Arb(Except DC)
Source	Internal/ External
Modulating Waveforms	50% duty cycle square (2mHz to 50kHz)

<b>Sweep (CH1)</b>	
Carrier Waveforms	Sine, Square, Ramp, Arb(Except DC)
Type	Linear or Logarithmic
Direction	Up or Down
Sweep Time	1 ms to 500 s $\pm$ 0.1%
Source	Internal/External/Manual

<b>Burst (CH1)</b>	
Waveforms	Sine, Square, Ramp, Pulse, Noise, Arb(Except DC)
Types	Count (1 to 50,000 periods), infinite, gated
Start Phase	-360° to +360°
Internal Period	1 $\mu$ s – 500s $\pm$ 1%
Gate Source	External Trigger
Trigger Source	Internal/External/Manual

<b>Rear Panel Connector</b>	
External AM Modulation	$\pm$ 5 V <sub>PK</sub> = 100% modulation 5k $\Omega$ input impedance
External Trigger	TTL-compatible

<b>Trigger Input</b>	
Input Level	TTL-compatible
Slope	Rising or falling (selectable)
Pulse Width	> 100 ns
Input Impedance	> 10 k $\Omega$ , DC coupled
Linear Sweep	< 500 $\mu$ s (typical)
Latency Sweep	< 500 ns (typical)

<b>Trigger Output</b>	
Level	TTL-compatible into >1k $\Omega$
Pulse Width	> 400ns typical
Output Impedance	50 $\Omega$ , typical
Maximum Rate	1 MHz

<b>Sync Output (CH1)</b>	
Level	TTL-compatible into >1k $\Omega$
Pulse Width	> 50ns (typical)
Output Impedance	50 $\Omega$ (typical)
Maximum Frequency	2 MHz

<b>Counter Specification</b>			
Function	Frequency, period, positive/negative Pulse width, Duty cycle		
Frequency range	Single channel: 100mHz ~ 200MHz		
Frequency resolution	6 digits/second		
Voltage range and sensitivity (not modulated signal)			
Auto mode:	1Hz to 200MHz	200 mV <sub>PP</sub> to 5 V <sub>PP</sub>	
Manual mode	DC	DC offset range	±1.5 V <sub>DC</sub>
		100mHz~100MHz	20m V <sub>RMS</sub> to ±5 V <sub>ac+dc</sub>
		100MHz~200MHz	40m V <sub>RMS</sub> to ±5 V <sub>ac+dc</sub>
	AC	1Hz~100MHz	50m V <sub>PP</sub> to ±5 V <sub>PP</sub>
		100MHz~200MHz	100m V <sub>PP</sub> to ±5 V <sub>PP</sub>
Pulse width and Duty cycle measure	1Hz to 10MHz (100mV <sub>PP</sub> ~ 10V <sub>PP</sub> )		
Input adjust	Input impedance		1MΩ
	Coupling mode		AC、DC
	High frequency restrain		High frequency noise restrain (HFR) on or off
	sensitivity		Low, Medium, High
Trigger mode	The trigger level can adjust manually/ automatically		
	Trigger level range: ±3 V (0.1% to 100%)		
	Resolution: 6 mV		

## General Specifications

<b>Display</b>	
Type	Black and White LCD Screen
Resolution	256 Horizontal x 64 Vertical
Grey Degree	4 Grey Level
Contrast (typical)	150 : 1
Light (typical)	300 nit

<b>Power</b>	
Supply	100-240 VAC <sub>RMS</sub> , 45-440Hz, CAT II
Consumption	Less than 40W
Fuse	2A, T Level , 250V

<b>Environment</b>	
Temperature Range	Operation: 10°C~+40°C
	Non-operation: -20°C~+60°C
Cooling	Natural cooling
Humidity Range	Below +35°C: ≤90% relative humidity
	+35°C~+40°C: ≤60%relative humidity
Height Range	Operation : below 3,000m
	Non-operation: below 15,000m

<b>Instrument Specifications</b>		
Dimension	Width	232mm
	Height	108mm
	Depth	288mm
Weight	Package excluded	2.65 Kg
	Package Included	4Kg

<b>IP Protection</b>
IP2X

<b>Calibration Interval</b>
One year suggested