

XDG2000 Series Dual-Channel Arbitrary Waveform Generator

Technical Specifications

All technical specifications are guaranteed when the following conditions are met, unless otherwise stated.

- The signal generator must be operated continuously for more than 30 minutes at the specified operating temperature (20°C to 30°C) to meet these specifications;
- The signal generator is in the calibration interval and has performed a self-calibration.

In addition to the specifications marked with the word "Typical", the specifications used are guaranteed.

Waveforms

Waveforms		
Bandwidth	XDG2100	100 MHz
	XDG2080	80 MHz
	XDG2060	60 MHz
	XDG2035	35 MHz
Sample Rate	500MSa/s	
Vertical Resolution	14 bits	
Channel	2	
Standard Waveforms	Sine wave, square wave, ramp wave, pulse wave, noise, harmonic	
Arbitrary Waveforms	Sinc, exponential rise, exponential decline, electrocardiogram, Gaussian, semi-positive, Lorentz, dual audio, DC voltage totaling more than 150 kinds	

Frequency Characteristics

Frequency Characteristics (Frequency resolution to 1 μ Hz)		
Sine wave	XDG2100	1 μ Hz - 100 MHz
	XDG2080	1 μ Hz - 80 MHz
	XDG2060	1 μ Hz - 60 MHz
	XDG2035	1 μ Hz - 35 MHz
Square wave	XDG2100	1 μ Hz - 30 MHz
	XDG2080	1 μ Hz - 30 MHz
	XDG2060	1 μ Hz - 30 MHz
	XDG2035	1 μ Hz - 15 MHz
Pulse wave	XDG2100	1 μ Hz - 25 MHz
	XDG2080	1 μ Hz - 25 MHz
	XDG2060	1 μ Hz - 25 MHz
	XDG2035	1 μ Hz - 15 MHz
Ramp wave	1 μ Hz - 3 MHz	
Noise wave (-3 dB)	XDG2100	100 MHz BW

	XDG2080	80 MHz BW
	XDG2060	60 MHz BW
	XDG2035	35 MHz BW
Arbitrary wave	1 μ Hz - 15 MHz	
Harmonic wave	XDG2100	1 μ Hz - 50 MHz
	XDG2080	1 μ Hz - 40 MHz
	XDG2060	1 μ Hz - 30 MHz
	XDG2035	1 μ Hz - 17.5MHz
Frequency resolution	1 μ Hz or 10 significant figures	
Frequency stability	± 2 ppm at 25 ± 5 $^{\circ}$ C	
Frequency aging rate	± 1 ppm per year	

Amplitude Characteristics

Amplitude Characteristics (not specifically labeled, the load defaults to 50 Ω)		
Output amplitude (load defaults to 50 Ω)	50 Ω	1mVpp to 10Vpp (≤ 25 MHz) 1mVpp to 5Vpp (≤ 60 MHz) 1mVpp to 2.5Vpp (≤ 100 MHz)
	High Z	2mVpp to 20Vpp (≤ 25 MHz) 2mVpp to 10Vpp (≤ 60 MHz) 2mVpp to 5Vpp (≤ 100 MHz)
Bandwidth flatness (relative to 100 kHz Sine wave, 1 Vpp, 50 Ω)	≤ 10 MHz: ± 0.2 dB ≤ 60 MHz: ± 0.3 dB ≤ 100 MHz: ± 0.5 dB	
Amplitude accuracy	$\pm$ (1% of setting + 1 mVpp) (1kHz sine, 0V offset, >10mVpp)	
Amplitude resolution	0.1mVpp or 4 digits (The amplitude ≥ 1 Vpp is 1mVpp)	
DC offset range (High Z)	$\pm$ (10 Vpk – Amplitude Vpp / 2)	
DC offset accuracy	$\pm$ (1 % of setting + 1 mV + amplitude Vpp * 0.5%)	
Offset resolution	0.1 mVpp or 4 digits (The amplitude > 1 Vpp is 1 mVpp)	
Units	mVpp, Vpp, Vrms, mVrms, dBm	
Output Impedance	0-10k Ω adjustable (>0 Ω , 50 Ω Typical); High Z	
Output protection	Short circuit protection, the output will be automatically turned off when overloaded	

Signal Characteristics

Signal Characteristics	
Sine	
Harmonic distortion	Typical (0dBm) DC to 1MHz: <-65dBc 1MHz to 10MHz: <-60dBc 10MHz to 60MHz: <-55dBc 60MHz to 100MHz: <-50dBc
Total harmonic distortion	< 0.05 %, 10 Hz to 20 kHz, 1 Vpp

Non-harmonic distortion	Typical (0dBm) ≤10MHz: <-70dBc >10MHz: <-70dBc + 6dB/ sound interval	
Phase noise	Typical (0dBm, 10kHz offset) 10MHz: ≤-110dBc/Hz	
Square		
Rise/fall time	< 8ns	
Jitter (rms), typical (1Vpp, 50Ω)	≤5MHz: 2ppm + 300ps >5MHz: 300ps	
Overshoot	Typical (100 kHz, 1 Vpp) < 3%	
Duty cycle	50.00% (fixed)	
Ramp		
Linearity	< 0.1% of peak output (typical 1 kHz, 1 Vpp, symmetry 50%)	
Symmetry	0.0% to 100.0%	
Pulse		
Period	XDG2100 XDG2080 XDG2060	40 ns to 1000 ks
	XDG2035	66.667 ns to 1000 ks
Pulse Width	XDG2100 XDG2080 XDG2060	≥ 12ns
	XDG2035	≥ 18ns
Duty cycle	0.1% to 99.9% (limited by the frequency setting)	
Rise and fall time	≥ 8ns (limited by the pulse width setting)	
Overshoot	< 3%	
Jitter (rms), typical (1Vpp, 50Ω)	≤5MHz: 2ppm + 300ps >5MHz: 300ps	
Noise		
Types	Gaussian white noise	
Bandwidth (-3dB)	XDG2100	100 MHz BW
	XDG2080	80 MHz BW
	XDG2060	60 MHz BW
	XDG2035	35 MHz BW
Arbitrary wave		
Waveform length	2 to 10M points	
Sampling rate	500M Sa/s	
Amplitude accuracy	14 bits	
Minimum rise and fall time	< 8 ns	
Jitter (rms), typical (1Vpp, 50Ω)	≤5MHz: 2ppm + 300ps >5MHz: 300ps	
Harmonic wave		
Harmonic number	≤16	

Harmonic type	Odd, even, sequential, custom
Harmonic amplitude	Each harmonic amplitude can be set
Harmonic phase	Each harmonic phase can be set

Modulation Characteristics

Modulation Characteristics	
Modulation Type	AM, DSB-AM, FM, PM, ASK, FSK, PSK, BPSK, QPSK, 3FSK, 4FSK, OSK, PWM, SUM
AM	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave (except DC)
Modulated signal source	Internal or external
Internal modulation waveform	Sine wave, square wave, ramp wave, white noise, arbitrary waveform
Internal amplitude modulation frequency	2 mHz to 1 MHz
Depth	0% to 120%
DSB-AM	
Carrier	Sine wave, square wave, ramp wave
Modulated signal source	Internal or external
Internal modulation waveform	Sine wave, square wave, ramp wave
Internal amplitude modulation frequency	2 mHz to 1 MHz
Depth	0% to 100%
FM	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave (except DC)
Modulated signal source	Internal or external
Internal modulation waveform	Sine, square, ramp, white noise, and arbitrary waveforms
Internal modulation frequency	2 mHz to 1 MHz
Frequency offset	$2 \text{ mHz} \leq \text{offset} \leq \min(\text{carrier frequency}, \text{carrier maximum frequency} - \text{carrier frequency})$ by default, the smaller of the two
PM	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave (except DC)
Modulated signal source	Internal or external
Internal modulation waveform	Sine, square, ramp, white noise, and arbitrary waveforms
Internal phase modulation frequency	2 mHz to 1 MHz
Phase deviation range	0° to 180°
PWM	
Carrier	Pulse wave

Modulated signal source	Internal or external
Internal modulation waveform	Sine, square, ramp, white noise, and arbitrary waveforms (except DC)
Internal phase modulation frequency	2 mHz to 1 MHz
Offset	0 to min (min is the smaller value of pulse wave duty cycle and 100%-pulse wave duty cycle)
ASK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
ASK frequency	2 mHz to 1MHz
PSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
PSK frequency	2 mHz to 1MHz
FSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal or external
Internal modulation waveform	50% square wave
FSK frequency	2 mHz to 1MHz
3FSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal
Internal modulation waveform	50% square wave
FSK frequency	2 mHz to 1MHz
4FSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal
Internal modulation waveform	50% square wave
FSK frequency	2 mHz to 1MHz
BPSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal
Internal modulation waveform	50% square wave

BPSK frequency	2 mHz to 1MHz
QPSK	
Carrier	Sine wave, square wave, ramp wave, arbitrary wave
Modulated signal source	Internal
Internal modulation waveform	50% square wave
QPSK frequency	2 mHz to 1MHz
OSK	
Carrier	Sine wave
Modulated signal source	Internal
Internal modulation waveform	50% square wave
Oscillation time	8ns to 249.75μs
OSK frequency	2 mHz to 1MHz
SUM	
Carrier	Sine wave, square wave, ramp wave
Modulated signal source	Internal or external
Internal modulation waveform	Sine wave, square wave, ramp wave, white noise, arbitrary waveform
Internal amplitude modulation frequency	2 mHz to 1 MHz
Depth	0.0% to 100.0%

Sweep Characteristics

Sweep Characteristics			
Carrier	Sine, rectangular wave, ramp wave, arbitrary wave (Except DC)		
Minimum/maximum starting frequency	1μHz		
Maximum/Stop frequency	Sine wave	XDG2100	100MHz
		XDG2080	80MHz
		XDG2060	60MHz
		XDG2035	35MHz
	Square wave	XDG2100 XDG2080 XDG2060	30MHz
		XDG2035	15MHz
	Ramp wave	3MHz	
	Arbitrary wave	15MHz (built-in waveform) or 25MHz (user-defined waveform)	
Types	Linear, logarithmic, Step		
Sweep direction	Up / Down		
Sweep time	1 ms to 500 s ± 0.1%		
Trigger source	Internal, external, manual		

Burst Characteristics

Burst Characteristics	
Waveform	Sine wave, square wave, ramp wave, pulse wave, Noise wave (Except N Cycle) and arbitrary wave (Except DC)
Types	Count (1 to 100,000 cycles), unlimited, gated
Trigger source	Internal, external, manual
Carrier frequency	2mHz to BW/ 2
Trigger cycle	20ns - 500 s (Min = Cycles * Period)
Gated source	External trigger

Counter Specifications

Counter Specifications	
Measurement function	Frequency, period, positive pulse width, negative pulse width, duty cycle
Frequency Range	100 mHz - 200 MHz
Frequency resolution	7 digits
Coupling method	AC, DC
Voltage range and sensitivity (non-modulated signal)	
DC offset range	±1.5V
DC coupling	100mHz - 100 MHz: 250 mVpp - 5 Vpp (AC+DC) 100 Hz - 200 MHz: 400 mVpp - 5 Vpp (AC+DC)
AC coupling	1Hz - 100 MHz: 250 mVpp - 5 Vpp 100 Hz - 200 MHz: 400 mVpp - 5 Vpp
Pulse width and duty cycle measurement	1 Hz - 10 MHz (250 mVpp - 5 Vpp)
Input resistance	1 MΩ
Sensitivity	Can be set high, medium and low
Trigger level range	±2.5 V

Input/Output Characteristics

Input/Output Characteristics	
Communication Interface	USB Host, USB Device, LAN, COM (Optional)
Channel coupling	Channel copy, amplitude syn, frequency syn, align phase
External modulation input	
Input frequency range	DC - 100 kHz
Input level range	± 1V full scale
Input impedance	10 kΩ (typical)
External trigger input	
Level	TTL-compatible
Slope	Rising or falling (selectable)
Pulse Width	>100ns
External clock input	
Impedance	1MΩ, AC coupling

Input level range	1Vpp to 3.3Vpp
Lock time	<1s
Lock range	10 MHz ± 50Hz
Internal clock output	
Frequency	10 MHz ± 50Hz
Impedance	50 Ω, DC coupling
Amplitude	1.2Vpp (50Ω)
Sync Output	
Level	3.3V LVTTTL
Impedance	50 Ω, DC coupling
Maximum frequency	1MHz

General Specifications

Display	
Display type	7-inch color LCD display
Display resolution	800 Horizontal × 480 Vertical pixels
Display color	65536 colors, 16 bits, TFT
Touch screen (Optional)	capacitive, multi-touch
Power	
Voltage	100 - 240 V (± 10%), 50 / 60 Hz
Power consumption	Less than 50VA
Fuse	250V, F2AL
Environment	
Temperature	Working temperature: 0 °C to 40 °C
	Storage temperature: -20 °C to 60 °C
Relative humidity	Less than 35°C: ≤ 90% relative humidity 35°C to 40°C: ≤ 60% relative humidity
Height	Operating 3,000 meters Non-operation 12,000 meters
Cooling method	Smart fan cooling
Mechanical Specification	
Dimension	340 mm (Length) × 177 mm (Height) × 90mm (Width)
Weight	Approx. 2.3 kg
Others	
IP protection	IP2X
Adjustment interval	The recommended calibration interval is one year



V 1.0.2

※: The illustrations, interface, icons and characters in the user manual may be slightly different from the actual product. Please refer to the actual product.