

## SDG1000 Series DataSheet

# Data Sheet

## Function/Arbitrary Waveform Generator

- ◆ DDS technology, dual-channel output
- ◆ 125MSa/s sample rate, 14bit vertical resolution.
- ◆ 5 types of standard output waveform, built-in 46 arbitrary waveforms(include DC)
- ◆ Complete set of modulation functions: AM, FM, PM, FSK, ASK, PWM, linear/logarithmic sweep, burst
- ◆ Abundant input/output: waveform output, Synchronous signal output, External modulation source input, 10MHz clock input, external trigger input, internal trigger output etc
- ◆ Channel duplication function
- ◆ Built-in accurate frequency counter enables to measure ranges 100mHz-200MHz (single channel)
- ◆ Standard interfaces: USB Device, USB Host, Optional interface: GPIB
- ◆ Supplied with powerful arbitrary editing software
- ◆ Remote control support



### Application fields:

- ◆ Analog sensor
- ◆ Simulation environment signals
- ◆ Circuit function test
- ◆ IC test
- ◆ Researching and training

### Edit arbitrary waveform

Enables edition of 14-bit 16kpts arbitrary output waveforms, Arbitrary editing software EasyWave provides 9 standard waveforms: Sine, Square, Ramp, Pulse, ExRise, ExpFall, Sinc, Noise and DC, which meets all engineers' basic needs; In addition, it provides plenty of ways of manual drawing, point-to-point line drawing and arbitrary point drawing. It facilitates to create complex waveforms; Multi-file screen management helps users to edit multiple-waveform simultaneously. It provides 10 Storage in non-volatile RAM. You can edit and store more waveforms by EasyWave.

### Reasonable price & Outstanding performance

SDG1000 series Function/Arbitrary Waveform Generator is a new family member of SIGLENT with friendly design: 3.5 inch TFT-LCD display; Built-in Chinese/English language; Online help function; Support USB and internal storage, facilitate files management; Special connection terminal for grounding.

## Arbitrary waveform output

Built-in 46 arbitrary waveforms (include DC), including math, engineering and other commonly-used waveforms.

## Complete set of modulation functions, sweep output,

### burst output

- ◆ Complete set of modulation functions: AM, DSB-AM, FM, PM, FSK, ASK, PWM, the modulation waveform can be observed directly, which it is suitable for education and training;
- ◆ Sweep output: change output frequency from starting frequency to ending one within sweeping time, Sweeping time range: 1ms~500s. The carrier can be Sine, Square, Triangle and Arbitrary waveforms.
- ◆ Burst output: It can periodically generate pulse sequence. Internal counter and external control signal are available to control burst output.

## Dual-channel

### Duplicating function

- ◆ Channel duplicating: allows to duplicate parameters from one channel to the other.

## Built-in frequency counter

Wide frequency range: 100mHz~200MHz.  
Measurable parameters: frequency, period, duty-cycle, positive pulse width, negative pulse width  
Setting: it can set DC/AC coupling, trigger level and high frequency rejection.

## Specification

Model	SDG1010	SDG1025	SDG1050
Max. output frequency	10MHz	25MHz	50MHz
Output channels	2		
Sample rate	125MSa/s		
Arbitrary waveform length	16kpts		
Frequency resolution	1 $\mu$ Hz		
vertical resolution	14bits		
Waveform	Sine, Square, Ramp, Pulse, Gaussian Noise. 46 built-in arbitrary waveforms (include DC)		
Modulation	AM, DSB-AM, FM, PM, FSK, ASK, PWM, Sweep, Burst		
Frequency counter	Frequency range:100mHz~200MHz		
Standard interface	USB Host & Device		
Dimension	W x H x D=229mm x 105mm x 281mm		

### Attention:

All these specifications apply to the SDG1000 Series Function/Arbitrary Waveform Generator unless otherwise explanation. To satisfy these specifications, the following conditions must be met first:

1. The instrument has been operating continuously for more than 30 minutes within specified operating temperature range (18°C~28°C).
2. The temperature variation does not exceed 5°C.

Note: all specifications are guaranteed unless where noted 'typical'.

<b>Frequency Specification</b>			
	SDG1010	SDG1025	SDG1050
Waveform	Sine, Square, Ramp, Pulse, Noise, Arbitrary		
Sine	1μHz ~ 10MHz	1μHz ~ 25MHz	1μHz ~ 50MHz
Square	1μHz ~ 10MHz	1μHz ~ 25MHz	1μHz ~ 25MHz
Pulse	500μHz ~ 5MHz	500μHz ~ 5MHz	500μHz ~ 5MHz
Ramp/Triangular	1μHz ~ 300kHz	1μHz ~ 300kHz	1μHz ~ 300kHz
Gaussian white noise	>10MHz (-3dB)	>25MHz (-3dB)	50MHz (-3dB)
Arbitrary	1μHz ~ 5MHz	1μHz ~ 5MHz	1μHz ~ 5MHz
Resolution	1μHz		
Accuracy	Within 90days: ±50ppm; within 1 year: ±100ppm 18°C~28°C		
Temperature coefficient	<5ppm/°C		

<b>Sine Spectrum Purity</b>	
Harmonic Distortion	CH1/CH2
DC~1MHz	-60dBc
1MHz~5MHz	-53dBc
5MHz~25MHz	-35dBc
25MHz~50MHz	-32dBc
Total harmonic waveform distortion	DC~20kHz, 1Vpp<0.2%
Spurious signal(non-harmonic)	DC~1MHz<-70dBc 1MHz~10MHz<-70dBc+6dB/octave
Phase noise	10kHz Offset, -108dBc/Hz (typical value)

<b>Square</b>		
Rise/fall time	<12ns (10% ~ 90%)	
Overshoot	<5% (typical, 1kHz, 1Vpp)	
Duty Cycle	1μHz ~10MHz	20%~80%
	10MHz~20MHz	40%~60%
	20MHz~25MHz	50%
Asymmetric(50% Duty Cycle)	1% of period+20ns (typical, 1kHz, 1Vpp)	
Jitter	0.1% of period (typical, 1kHz, 1Vpp)	

Ramp/Triangle	
Linearity	<0.1% of Peak value output (typical, 1kHz, 1Vpp, 100% symmetric)
Symmetry	0%~100%

Pulse	
Pulse width	1998s, Max. 16ns, Min. 1ns resolution
Rise/Fall time (10% ~ 90%, typical, 1 kHz, 1Vpp)	7ns
Duty Cycle	0.1% Resolution
Overshoot	<5%
Jitter (pk-pk)	8ns

Arbitrary	
Waveform length	16k points
Vertical resolution	14bits
Sample rate	125MSa/s
Min. Rise/Fall time	7ns (typical)
Jitter(pk-pk)	8ns (typical)
Storage in non-volatile RAM memory (10 in total)	10 waveforms

Output Specification		
Output	CH1	CH2
Amplitude	2mVpp~10Vpp (50Ω, ≤10MHz) 2mVpp~5Vpp (50Ω, >10MHz) 4mVpp~20Vpp (HiZ, ≤10MHz) 4mVpp~10Vpp (HiZ, >10MHz)	2mVpp~3Vpp (50Ω) 4mVpp~6Vpp (HiZ)
Vertical accuracy (100 kHz sine)	±(0.3dB+1mVpp of setting value)	±(0.3dB+1mVpp of setting value)
Amplitude flatness (compared to 100 kHz sine, 5Vpp)	±0.3 dB	
Channel phase deviation	< 400ps (classic value, sine, 50MHz, 4vpp)	
Cross talk	<-70dBc	

<b>DC Offset</b>		
Range(DC)	±5V (50Ω) ±10V (high impedance)	±1.5V (50Ω) ±3V (high impedance)
Offset accuracy	±( setting offset value *1%+3mV)	±( setting offset value *1%+3mV)

<b>Waveform Output</b>		
Impedance	50Ω (typical)	50Ω (typical)

<b>AM Modulation(CH1/CH2)</b>	
Carrier	Sine, Square, Ramp, Arbitrary (except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary (2mHz ~ 20kHz)
Modulation depth	0% ~ 120%
<b>FM Modulation(CH1/CH2)</b>	
Carrier	Sine, Square, Ramp, Arbitrary (except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary (2mHz~20kHz)
Frequency deviation	0 ~0.5*bandwidth 1mHz resolution
<b>PM Modulation(CH1/CH2)</b>	
Carrier	Sine, Square, Ramp, Arbitrary (except DC)
Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Noise, Arbitrary (2mHz~20kHz)
Phase Deviation	0~360° ,0.1°Resolution
<b>FSK Modulation(CH1/CH2)</b>	
Carrier	Sine, Square, Ramp, Arbitrary (except DC)
Source	Internal/External
Modulation waveform	50% duty-cycle square waveform (2mHz~50kHz)
<b>ASK Modulation(CH1/CH2)</b>	
Carrier	Sine, Square, Ramp, Arbitrary (except DC)
Source	Internal/External
Modulation waveform	50%duty-cycle square waveform (2mHz~50kHz)
<b>PWM Modulation(CH1/CH2)</b>	
Frequency	500μHz~20kHz

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Source	Internal/External
Modulation waveform	Sine, Square, Ramp, Arbitrary (except DC)
External Modulation range	-6V~+6V (maximum width deviation)
<b>Sweep(CH1/CH2)</b>	
Carrier	Sine, Square, Ramp, Arbitrary (except DC)
Type	linear/logarithmic
Direct	Up/down
Sweep time	1ms~500s
Trigger source	Manual, external, internal
<b>Burst(CH1/CH2)</b>	
Waveform	Sine, Square, Ramp, Pulse, Arbitrary (except DC)
Type	Count (1~50,000 periods), infinite, Gated
Start/Stop phrase	0°~+360°
Internal period	1μs~500s
Gated source	External trigger
Trigger source	Manual, External or Internal

### Rear Panel Connector

External modulation	±6V=100% modulation >5kΩ input impedance
External trigger	TTL compatible
Note: The external input voltage can't be over ±6V, otherwise instrument gets damaged.	

### Trigger Input

Input Level	TTL compatible
Slope	Up or down (optional)
Pulse width	>100ns
Input impedance	>5kΩ, DC coupling

### Trigger Output

Voltage level	TTL compatible
Pulse width	>400ns
Output impedance	50Ω (typical)
Max. frequency	1MHz

### Reference Frequency Input

Voltage level	5 V <sub>pp</sub> ~ 5.5 V <sub>pp</sub>
Frequency range	10MHz±1kHz
Input impedance	>5kΩ,AC coupling

### SYNC Output

Voltage level	TTL compatible
Pulse width	>50ns
Output impedance	50Ω (typical)
Max. frequency	2MHz

### Frequency Counter

Measurement	Frequency, Period, Positive/negative pulse width, duty cycle		
Frequency range	Single Channel:100mHz~200MHz		
Frequency resolution	6bits/s		
Voltage range (non-modulated signal)			
Manual	DC coupling	DC offset range	±1.5VDC
		100mHz~100MHz	50mVrms~±2.5V
		100MHz~200MHz	100mVrms~±2.5V
	AC coupling	1Hz~100MHz	50mVrms~5Vpp
		100MHz~200MHz	100mVrms~5Vpp
Pulse width and duty-cycle measurement	1Hz~10MHz (50mVrms~5Vpp)		
Input adjustment	Input impedance	1MΩ	
	Coupling mode	AC,DC	
	High-frequency rejection	ON/OFF	
Trigger level range	-3V~ +1.8V		



## General Specification

<b>Display</b>	
Display type	3.5 inch TFT-LCD
Resolution	320×RGB×240
Color depth	24bit
Contrast Ratio	350:1 (typical)
Luminance	300cd/m <sup>2</sup> (typical)
<b>Power</b>	
Voltage	100~240 VAC <sub>RMS</sub> , 50/60Hz 100~120 VAC <sub>RMS</sub> , 440Hz
Consumption	50W Max
Fuse	1.25A, 250V
<b>Environment</b>	
Temperature	Operation:0°C~40°C
	Storage:-20°C~60°C
Humidity range	Below +35°C:≤90% relative humidity
	+35°C~+40°C:≤60% relative humidity
Altitude	Operation: below 3,000 meters
	Storage: below 15,000 meters
Electromagnetic Compatibility	2004/108/EC Directive
	Applicable standards EN 61326-1:2006
	EN 61000-3-2:2006 + A2:2009
	EN 61000-3-3:2008
Safety	2006/95/EC Low Voltage Directive
	EN 61010-1:2010/EN 61010-031:2002+A1:2008
	UL 61010-1:2012,CAN/CSA-C22.2 No.61010-1:2012
	UL 61010-2-030:2012,CAN/CSA-C22.2 No.61010-2-030:2012
<b>Others</b>	
Dimension	Width:229mm
	Height:105mm
	Depth:281mm
Weight	N.W: 2.6Kg
	G.W: 3.4Kg
<b>IP protection</b>	
IP20	
<b>Calibration Cycle</b>	
1year	

## Ordering Information

### Product Name

**SDG1000 Series Function/Arbitrary Waveform Generator**

### Models:

SDG1050      50MHz

SDG1025      25MHz

SDG1010      10MHz

### Standard Accessories

- A Quick Start
- A Calibration Certificate
- A Power Cord that fits the standard of destination country
- A USB Cable

### Optional Accessories

- BNC cable
- GPIB-USB Adapter

## Contact SIGLENT

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