

Chapter 13 Specifications

All the specifications can be guaranteed if the following two conditions are met unless where noted.

- The generator is within the calibration period and has performed self-calibration.
- The generator has been working continuously for 30 minutes at specified temperature (18°C ~ 28°C).

All the specifications are guaranteed unless those marked with "typical".

Model	DG5352/ DG5351	DG5252/ DG5251	DG5102/ DG5101	DG5072/ DG5071
Channel	2/1	2/1	2/1	2/1
Maximum Frequency	350 MHz	250 MHz	100 MHz	70 MHz
Sample Rate	1 GSa/s			
Waveforms				
Standard Waveforms	Sine, Square, Ramp, Pulse, Noise			
Arbitrary Waveforms	Sinc, Exponential Rise, Exponential Fall, ECG, Gauss, HaverSine, Lorentz, Dual-Tone, DC			
Frequency Characteristics				
Sine	1 μ Hz to 350 MHz	1 μ Hz to 250 MHz	1 μ Hz to 100 MHz	1 μ Hz to 70 MHz
Square	1 μ Hz to 120 MHz	1 μ Hz to 120 MHz	1 μ Hz to 100 MHz	1 μ Hz to 70 MHz
Ramp	1 μ Hz to 5 MHz	1 μ Hz to 5 MHz	1 μ Hz to 3 MHz	1 μ Hz to 3 MHz
Pulse	1 μ Hz to 50 MHz	1 μ Hz to 50 MHz	1 μ Hz to 50 MHz	1 μ Hz to 50 MHz
Noise	250 MHz Bandwidth			
Arb	1 μ Hz to 50 MHz	1 μ Hz to 50 MHz	1 μ Hz to 50 MHz	1 μ Hz to 50 MHz
Resolution	1 μ Hz			
Accuracy	± 1 ppm, 18 °C to 28 °C			
Sine Wave Spectrum Purity				
Harmonic Distortion	Typical (0 dBm) ≤ 100 MHz:	Typical (0 dBm) ≤ 100 MHz:	Typical (0 dBm) ≤ 100 MHz:	Typical (0 dBm) ≤ 70 MHz:

	<-40dBc >100MHz: <-35dBc	<-40dBc >100MHz: <-35dBc	<-40dBc	<-40dBc
Total Harmonic Distortion	<0.5% (10 Hz to 20 kHz, 0 dBm)			
Spurious (non-harmonic)	Typical (0 dBm) ≤100MHz: <-50dBc >100MHz: -50dBc+6dBc/oct ave	Typical (0 dBm) ≤100MHz: <-50dBc >100MHz: -50dBc+6dBc/oct ave	Typical (0 dBm) ≤100MHz: <-50dBc	Typical (0 dBm) ≤70MHz: <-50dBc
Phase Noise	Typical (0 dBm, 10 kHz deviation) 10 MHz: <-110 dBc			
Signal Characteristics				
Square				
Rise/Fall Time	Typical Value (1Vpp, 50Ω) <2.5 ns	Typical Value (1Vpp, 50Ω) <2.5 ns	Typical Value (1Vpp, 50Ω) <3 ns	Typical Value (1Vpp, 50Ω) <4 ns
Overshoot	Typical Value (1Vpp) <5%			
Duty Cycle	≤10 MHz: 20.0% to 80.0% 10 MHz to 40 MHz: 40.0% to 60.0% >40 MHz: 50.0% (fixed)			
Non-symmetry	1% of period +5 ns			
Jitter (rms)	Typical Value (1Vpp) ≤30 MHz: 10ppm+500 ps >30 MHz: 500 ps			
Ramp				
Linearity	≤ 0.5% of peak output			
Symmetry	0% to 100%			
Pulse				
Period	20 ns to 1000000 s			
Pulse Width	4 ns to 1000000 s			
Leading/ Trailing Edge Time	Typical Value (1Vpp, 50Ω) 2.5 ns to 1 ms	Typical Value (1Vpp, 50Ω) 2.5 ns to 1 ms	Typical Value (1Vpp, 50Ω) 3 ns to 1 ms	Typical Value (1Vpp, 50Ω) 4 ns to 1 ms

Overshoot	Typical Value (1Vpp) <5%			
Jitter (rms)	Typical Value (1Vpp) 10 ppm+500 ps			
Arb				
Waveform Length	Normal Mode: 2 to 16M points Play Mode: 2 to 128M points			
Vertical Resolution	14 bits			
Mode	Normal Mode, Play Mode			
Sample Rate	Normal Mode (Waveform Length is from 2 to 16M points): 1G Sa/s (fixed); Play Mode (Waveform Length is from 2 to 128M points): $\leq 1G$ Sa/s (variable)			
Minimum Rise/Fall Time	Typical Value (1Vpp) ≤ 3 ns			
Jitter (rms)	3 ns			
Interpolation Method	Close, Linear, Sinc			
Edit Method	Edit Point, Edit Block			
Non-Volatile Memory	1G Bytes			
Output Characteristics				
Amplitude (into 50 Ω)				
Range	$\leq 100\text{MHz}$: 5mVpp to 10Vpp $\leq 250\text{MHz}$: 5mVpp to 5Vpp $\leq 350\text{MHz}$: 5mVpp to 2Vpp	$\leq 100\text{MHz}$: 5mVpp to 10Vpp $\leq 250\text{MHz}$: 5mVpp to 5Vpp	5mVpp to 10Vpp	5mVpp to 10Vpp
Accuracy	Typical (1 kHz Sine, 0 V Deviation, >10 mVpp, Auto) $\pm 1\%$ of setting ± 1 mVpp			
Amplitude Flatness (relative to 100 kHz, 1.25Vpp Sine wave, 50 Ω)	<10MHz: $\pm 0.1\text{dB}$ 10MHz to 60MHz: $\pm 0.2\text{dB}$ 60MHz to 100MHz: $\pm 0.4\text{dB}$ 100MHz to	<10MHz: $\pm 0.1\text{dB}$ 10MHz to 60MHz: $\pm 0.2\text{dB}$ 60MHz to 100MHz: $\pm 0.4\text{dB}$ 100MHz to	<10MHz: $\pm 0.1\text{dB}$ 10MHz to 60MHz: $\pm 0.2\text{dB}$ 60MHz to 100MHz: $\pm 0.4\text{dB}$	<10MHz: $\pm 0.1\text{dB}$ 10MHz to 60MHz: $\pm 0.2\text{dB}$ 60MHz to 70MHz: $\pm 0.4\text{dB}$

	250MHz: $\pm 1.0\text{dB}$ >250MHz: $\pm 1.5\text{dB}$	250MHz: $\pm 1.0\text{dB}$		
Units	Vpp, Vrms, dBm, High Level, Low Level			
Resolution	0.1 mV or 4 digits			
Offset (into 50 Ω)				
Range	± 5 Vpk ac + dc			
Accuracy	1% of setting + 5mV + 0.5% of amplitude			
Waveform Output				
Impedance	50 Ω (typical)			
Isolation	42 Vpk max. to Earth			
Protection	Over-temperature protected, Short-circuit protected, Overload relay automatically disables main output			
FH Characteristic				
FH Bandwidth	1.5 MHz to 250 MHz	1.5 MHz to 250 MHz	1.5 MHz to 100 MHz	1.5 MHz to 70 MHz
FH Rate	1 Hop/s to 12.5M Hop/s			
Frequency Point Numbers	4096			
Sequence Length	4096			
Modulation Characteristics				
Modulation Types	AM, FM, PM, ASK, FSK, PSK, PWM, IQ			
AM				
Carrier Waveforms	Sine, Square, Ramp, Arb (except DC)			
Source	Internal/External			
Modulating Waveforms	Sine, Square, Ramp, Noise, Arb (2 MHz to 50 kHz)			
Depth	0% to 120%			
FM				
Carrier Waveforms	Sine, Square, Ramp, Arb (except DC)			
Source	Internal/External			

Modulating Waveforms	Sine, Square, Ramp, Noise, Arb (2 mHz to 50 kHz)
PM	
Carrier Waveforms	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveforms	Sine, Square, Ramp, Noise, Arb (2 mHz to 50 kHz)
Phase Deviation	0° to 360°
ASK	
Carrier Waveforms	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveforms	Square with 50% duty cycle (2 mHz to 1 MHz)
FSK	
Carrier Waveforms	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveforms	Square with 50% duty cycle (2 mHz to 1 MHz)
PSK	
Carrier Waveforms	Sine, Square, Ramp, Arb (except DC)
Source	Internal/External
Modulating Waveforms	Square with 50% duty cycle (2 mHz to 1 MHz)
PWM	
Carrier Waveform	Pulse
Source	Internal/External
Modulating Waveforms	Sine, Square, Ramp, Noise, Arb (2 mHz to 50 kHz)
Width Deviation	0% to 100% of Pulse Width
IQ	

Carrier Waveform	Sine (max. 200 MHz)	Sine (max. 200 MHz)	Sine (max. 100 MHz)	Sine (max. 70 MHz)
Source	Internal/External			
Code Pattern	PN Sequence, 4 bits code pattern, User			
IQ Mapping	4QAM, 8QAM, 16QAM, 32QAM, 64QAM, BPSK, QPSK, OQPSK, 8PSK, 16PSK, User			
Code Rate	1 bps to 1M bps			
External Modulation Input				
Input Range	±5 Vac			
Input Bandwidth	50 kHz			
Input Impedance	10 kΩ			
Burst Characteristics				
Carrier Waveforms	Sine, Square, Ramp, Pulse, Noise, Arb (except DC)			
Carrier Frequency	1 μHz to 120 MHz	1 μHz to 120 MHz	1 μHz to 100 MHz	1 μHz to 70 MHz
Burst Count	1 to 1 000 000 or Infinite			
Start/Stop Phase	0° to 360°			
Internal Period	1 μs to 500 s			
Gated Source	External Trigger			
Trigger Source	Internal, External or Manual			
Trigger Delay	0 ns to 85 s			
Sweep Characteristics				
Carrier Waveforms	Sine, Square, Ramp, Arb (except DC)			
Type	Linear, Log or Step			
Direction	Up or Down			
Start/Stop Frequency	1 μHz to 250 MHz	1 μHz to 250 MHz	1 μHz to 100 MHz	1 μHz to 70 MHz
Sweep Time	1 ms to 300 s			
Hold/Return Time	0 ms to 300 s			

Trigger Source	Internal, External or Manual		
Marker	Falling edge of Sync signal (programmable)		
Programming Time			
Configuration Times (Typical)			
	USB2.0	LAN	GPIB
Function Change	500ms	510ms	510ms
Frequency Change	50ms	50ms	50ms
Amplitude Change	300ms	310ms	310ms
Select User Arb	500ms	510ms	510ms
Arb Download Times (Binary Transfer)			
1 Mpts/s			
Note: Download times do not include setup or output time.			
Trigger Characteristics			
Trigger Input			
Level	TTL-compatible		
Slope	Rising or falling (selectable)		
Pulse Width	> 50 ns		
Latency	Sweep: <100 ns (typical) Burst: <300 ns (typical)		
Trigger Output			
Level	TTL-compatible		
Pulse Width	> 60 ns (typical)		
Maximum Rate	1MHz		
Clock Reference			
Phase Offset			
Range	0° to 360°		
Resolution	0.001° (arb waveform), 0.03° (other waveforms)		
External Reference Input			
Lock Range	10 MHz \pm 50 Hz		
Level	80 mVpp to 10 Vpp		
Lock Time	< 2 s		
Internal Reference Output			
Frequency	10 MHz \pm 50 Hz		

Level	632 mVpp (0 dBm), nominal value
Sync Output	
Level	TTL-compatible
Impedance	50 Ω , nominal value
General Specifications	
Power	
Power Voltage	100-127 V, 45-440Hz 100-240 V, 45-65Hz
Power Consumption	Less than 125 W
Fuse	250V, T3A
Display	
Type	4.3-inch TFT LCD
Resolution	480 Horizontal \times RGB \times 272 Vertical Resolution
Color	16M color
Environment	
Temperature Range	Operating: 10 $^{\circ}$ C to 40 $^{\circ}$ C Non-Operating: -20 $^{\circ}$ C to 60 $^{\circ}$ C
Cooling Method	Cooling by fans compulsively
Humidity Range	Less than 35 $^{\circ}$ C: \leq 90% Relative Humidity (RH) 35 $^{\circ}$ C to 40 $^{\circ}$ C: \leq 60% Relative Humidity (RH)
Altitude	Operating: Less than 3000 meters Non-Operating: Less than 15000 meters
Mechanical	
Dimensions (W \times H \times D)	230 mm \times 106 mm \times 501 mm
Weight	with no package: 4.3 kg with package: 5.84 kg
Interfaces	
USB Host (2), USB Device, GPIB, LAN	
IP Protection	
IP2X	
Calibration Interval	
Recommend 1 year for standard interval	