

Arbitrary Waveform Generator SMG1000F Series



SMG1011F



SMG1022F

Advance Features

- DDS technology, upto 10MHz / 25 MHz frequency output
- 125MS/s sample rate, and 1 μ Hz frequency resolution
- Vertical Resolution : 14 bits, and 8K arb waveform length
- 5 basic waveforms and 45 built-in arbitrary waveforms
- Modulation functions : AM, FM, PM, FSK, Sweep, and Burst
- SCPI, and LabVIEW supported
- 4" high resolution (480 x 320 pixels) LCD Display
- USB Interface

Technical Specifications	SMG1011F	SMG1022F
No. of Channels	Single	Dual
Frequency Output	10 MHz	25 MHz
Sample Rate	125 MSa/s	
Vertical Resolution	14 bits	
Waveform		
Standard Waveform	Sine, Square, Pulse, Ramp and Noise	
Arbitrary Waveform	Exponential rise, Exponential fall, Sin(x)/x, Staircase, etc. 45 built-in waveforms, User-Definable Waveforms	
Frequency Characteristic		
Sine	1 μ Hz to 10 MHz	1 μ Hz to 25 MHz
Square	1 μ Hz to 5 MHz	
Ramp	1 μ Hz to 1 MHz	
Pulse	1 μ Hz to 5 MHz	
White Noise	5 MHz bandwidth (-3 dB) (Typical)	25 MHz (-3 dB) (Typical)
Arbitrary	1 μ Hz to 5 MHz	1 μ Hz to 10 MHz
Amplitude Characteristic		
Output Impedance	50 Ω (Typical)	
Output Amplitude	1 mVpp to 25 Vpp (High Impedance) 1 mVpp to 12.5 Vpp (50 Ω)	1 mVpp - 20 Vpp (High Impedance) 1 mVpp to 10 Vpp (50 Ω)
Amplitude Resolution	1 mVpp or 4 digits	
Amplitude Accuracy	\pm (1% of setting + 1mVpp) (Typical value 1 kHz Sine, 0 V offset)	
DC offset Range (AC+ DC)	\pm 12.5 V (High Z) \pm 6.25 V (50 Ω)	\pm 10 V (High Z) \pm 5 V (50 Ω)
DC Offset Resolution	1 mV or 4 digits	
DC Offset Accuracy	\pm (1% of setting + 1 mV + 0.5% of amplitude Vpp)	

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Waveform Characteristic		
Sine		
Amplitude Flatness (Ref. 1 kHz, 1.0 V _{p-p} (+4 dBm), relative to)	1 μHz to 5 MHz : 0.2 dB 5 MHz to 10 MHz : 0.3 dB	1 μHz to 10 MHz : 0.2 dB 10 MHz to 25 MHz : 0.3 dB
Harmonic Distortion (1.0 V _{p-p})	< -40 dBc	
Total Harmonic Distortion (when the Amplitude is 1 V _{p-p})	<0.2 % (10 Hz to 20 kHz)	
Phase Noise	-110 dBc/Hz at 1 MHz frequency, 10 kHz offset, 1 V _{p-p} typical	
Square		
Rise / Fall Time	<25 ns (10% to 90%) (Typical 1 kHz, 1Vp-p)	<12 ns (10% to 90%) (Typical 1 kHz, 1Vp-p)
Duty Cycle	50% fixed	20% to 80% (< 1 MHz) 50% (1 MHz to 5 MHz)
Overshoot	< 5%	
Jitter (RMS)	< 1ns	
Ramp		
Linearity	≤ 0.1% of peak output (typical, 1kHz, 1V _{p-p} , Symmetry 50%) 10% to 90% of ampl. range	
Symmetry	0% to 100%	
Pulse		
Pulse Width	100 ns to 1000 ks	40 ns to 1000 ks
Accuracy	10 ns	
Rising/Falling Edge Time	< 25 ns	< 12 ns
Overshoot	< 5%	
Jitter (RMS)	< 1 ns	
Arbitrary		
Waveform Length	2 to 8 kpoints	
Sample Rate	125 MSa/s	
Amplitude Accuracy	14 bits	
Rise/ Fall time	35 ns (Typical)	< 10 ns
Jitter (RMS)	6 ns + 30 ppm	< 6 ns
Modulation Waveform		
AM		
Carrier Waveforms	Sine	
Source	Internal / External	
Internal Modulating Waveforms	Sine, Square, Ramp, White Noise, Arbitrary	
Internal AM Frequency	2 mHz to 20 kHz	
Depth	0% to 100%	
FM		
Carrier Waveforms	Sine	
Source	Internal / External	
Internal Modulating Waveforms	Sine, Square, Ramp, White Noise, Arbitrary	
Internal Modulating Frequency	2 mHz to 20 kHz	
Frequency Deviation	2 mHz to 1 kHz	
PM		
Carrier Waveforms	Sine	
Source	Internal / External	
Internal Modulating Waveforms	Sine, Square, Ramp, White Noise, Arbitrary	
Internal Modulating Frequency	2 mHz to 20 kHz	
Phase Deviation	0° to 180°	

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PWM			
Carrier Waveforms	-		Pulse
Source	-		Internal / External
Internal Modulating Waveforms	-		Sine, Square, Ramp, White Noise, Arbitrary
Internal Modulating Frequency	-		2 mHz to 20 kHz
Phase Deviation	-		0° to 180°
FSK			
Carrier Waveforms	Sine		
Source	Internal / External		
Internal Modulating Waveforms	50% duty cycle square		
FSK Rate	2 mHz to 100 kHz		
ASK			
Carrier Waveforms	-		Sine
Source	-		Internal / External
Internal Modulating Waveforms	-		50% Duty Cycle Square
ASK Rate	-		2 mHz to 100 kHz
PSK			
Carrier Waveforms	-		Sine
Source	-		Internal / External
Internal Modulating Waveforms	-		50% Duty Cycle Square
PSK Rate	-		2 mHz to 100 kHz
Sweep			
Type	Linear, Logarithmic		
Carrier Waveforms	Sine, Square, Ramp		
Direction	Up / Down		
Sweep Time	1 ms to 500 s ± 0.1%		
Source	Internal, External or Manual		
Burst			
Waveforms	Sine, Square, Ramp, Pulse, Arbitrary		
Types	Count (1 to 50000 periods), infinite, gated		
Start Phase	-360° to 360°		
Internal Period	(10 ms to 500 s) ± 1%		
Gated Source	External Trigger		
Trigger Sources	Internal, External or Manual		
Frequency Counter			
Function	Frequency, Period, Positive Pulse width, Duty Cycle		
Frequency Range	Single Channel : 100 mHz to 200 MHz		
Frequency Resolution	6 digits		
Voltage Ranged Sensitivity (Non-modulation signal)			
DC Coupled	DC offset Range	± 1.5 VDC	
	100 mHz to 100 MHz	250 mVpp to 5 Vpp (AC +DC)	
	100 MHz to 200 MHz	450 mVpp to 3 Vpp (AC +DC)	
AC Coupled	1 Hz to 100 MHz	250 mVpp to 5 Vpp	
	100 MHz to 200 MHz	450 mVpp to 4 Vpp	
Pulse Width and Duty Cycle Measure	1 Hz to 10 MHz (100 mVpp to 10 Vpp)	1 Hz to 10 MHz (250 mVpp to 10 Vpp)	
Input Adjust	Input Impedance	1 MΩ	
	Coupling Mode	AC, DC	
	HFR	High Frequency noise restrain (HFR) on or off	
	Sensitivity	Low, Middle, High	
Trigger Level Range	± 2 V	± 2.5 V	

Technical Specifications	SMG1011F	SMG1022F
Input / Output		
Front Panel		
Output Terminal	Output main Signal	
Sync Terminal	Rise Time : < 50 ns / Output Sync. TTL Signal	-
Rear Panel		
Interfaces	USB (Type B) Connector	
External Modulation Input		
Input Frequency Range	DC - 20 kHz	
Input Voltage Range	± 1 Vpk	± 5 Vpk
Input Impedance	10 kΩ (Typical)	
External Trigger Input		
Level	TTL-compatible	
Slope	Rising or Falling (Selectable)	
Pulse Width	> 100 ns	
External Reference Clock Input		
Impedance	1 kΩ, AC coupled	
Input Voltage Swing	100 mVpp to 5 Vpp	
Locking Range	10 MHz ± 35 kHz	10 MHz ± 9 kHz
Power Amplifier Specification (Optional)		
Input Impedance	50 kΩ	
Output Impedance	< 2 Ω	
Gain	x 10	
Max input Voltage	2.2 Vpp	
Max Output Voltage	22 Vpp	
Max. Output Power	10 W	
Full Power Bandwidth	DC- 100 kHz	
Slew Rate	10 V/μs	
Overshoot	< 7%	
General Specifications		
Display Type	4 inch colored LCD	
Display Resolution	480 (Horizontal) x 320 (Vertical) Pixels	
Input Supply	220 -240 VAC, 100-120 VAC, 50/60 Hz, CAT II	
Consumption	<18 W	< 35 W
Temperature	Operating Temperature : 0°C to 40°C Storage Temperature : -20°C to 60°C	
Relative Humidity	≤ 90%	
Colling Method	Natural cooling	Fan Cooling
Dimension (W X H X D)	235 x 110 x 295 mm	
Weight	3 kg	
Accessories	Mains Cord, Output Cable, USB Cable, CD	

Subject to change

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