

AFG-4000 Series

任意波函數信號產生器



GW INSTEK
Simply Reliable

型號	AFG-4125E	AFG-4125AE*	AFG-4225E	AFG-4235	AFG-4260	AFG-4280	AFG-4210H	AFG-4225H
通道數	單通道		雙通道					
頻率範圍(Sine)	25MHz		25MHz	35MHz	60MHz	80MHz	100MHz	250MHz
取樣率 (Sa/s)	125M		500M				1.25G	
震幅解析度	14 bits		16 bits					
記憶體深度	16k/CH		10M/CH					
觸控面板	無		提供					
通訊介面	USB(Host, Device)		USB(Host, Device), LAN					

*AFG-4125AE 提供功率放大器功能

特點

- * 提供單通道25MHz, 雙通道25/35/60/80/100/250MHz 選擇
- * 內建 Sine, Square, Triangle, Ramp, Pulse, Noise, Harmonic 與任意波選擇
- * 最小解析度 1 μ Hz
- * 取樣率: AFG-4225H: 1.25GSa/s;
AFG-4235/4260/4280/4210H: 500MSa/s;
AFG-4125E/4125AE/4225E: 125MSa/s
- * 振幅解析度: AFG-4125E/4125AE/4225E: 14bits;
AFG-4235/4260/4280/4210H/4225H: 16bits
- * 記憶體深度: AFG-4225E/4235/4260/4280/4210H/4225H: 10M/每通道; AFG-4125E/4125AE: 16k/每通道
- * 內建調變: AM, DSB-AM, FM, PM, PWM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, OSK, SUM
- * 內建掃頻, 突波, 與頻率計數器功能
- * AFG-4125AE 內建功率放大器功能
- * 通訊介面: AFG-4235/4260/4280/4210H/4225H 提供 USB, LAN; AFG-4125E/4125AE/4225E提供USB Interface
- * 8" TFT LCD 顯示, 800 x 480 解析度
- * 多點觸控顯示: AFG-4235/4260/4280/4210H/4225H 提供 (25MHz 機種除外)

應用範圍

- * 教育機構
- * 汽車電子
- * 電子產品及零件

AFG-4000系列, 提供25 ~ 250MHz頻寬, 單通道與雙通道設計, 且提供全頻段高達1 μ Hz的高解析度。其內建的正弦波、方波、三角波、突波、雜訊波、諧波等標準信號。

最高頻寬250MHz機種提供1.25GSa/s Sample rate; 中階機種35MHz~100MHz提供500MSa/s Sample rate; 25MHz 入門機種的取樣率為125MSa/s; 在解析度部分, 35MHz~250MHz 機種為16-bit 解析度。

此外, AFG-4000系列提供AM, DSB-AM, FM, PM, PWM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, OSK, SUM等調變信號輸出、信號掃描輸出、Burst以及Counter功能; AFG-4125AE更內建了放大器功能。

AFG-4000 系列內建50歐姆/高阻抗切換功能, 且配置8-inch高解析度的TFT LCD, 35MHz以上的機種更是配備觸控螢幕功能。通訊介面部分, 35MHz以上的機種內建USB與LAN的通訊介面。



Website



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規格										
Models	AFG-4125E	AFG-4125AE	AFG-4225E	AFG-4235	AFG-4260	AFG-4280	AFG-4210H	AFG-4225H		
Channels	1		2							
Waveforms	Sine, Square, Triangle, Ramp, Pulse, Noise, Harmonic wave, Arbitrary wave									
Arbitrary Functions	Built-in									
ARB Function	Built-in									
Sample Rate(*1)	125MSa/s		500MSa/s				1.25GSa/s			
Repetition Rate (Arbitrary Wave)	15MHz		30MHz							
Waveform Length	2 ~ 16k points		2 ~ 10M points							
Amplitude Resolution	14 bits		16 bits							
Minimum Rise and Fall Time	< 10 ns		< 8ns				< 5ns			
Jitter			8ns				32MB			
Non-Volatile Memory			8ns				32MB			
User-defined Output Section	From point 2 ~ 16,384		From point 2 ~ 10,240,000							
User-defined Output Marker Section	From point 2 ~ 16,384		From point 2 ~ 10,240,000							
Output Mode	1 ~ 1,000,000 cycles or infinite mode									
Frequency Characteristics										
Sine	25MHz		35MHz	60MHz	80MHz	100MHz	250MHz			
Square	5MHz		15MHz	30MHz			50MHz			
Pulse	5MHz		15MHz	25MHz			50MHz			
Triangle, Ramp	1MHz		3MHz			5MHz				
Noise (-3dB)	25MHz BW		35MHz BW	60MHz BW	80MHz BW	100MHz BW	120MHz BW			
Harmonic Wave	12.5MHz		17.5MHz	30MHz	40MHz	50MHz	125MHz			
Resolution	1 μ Hz or 10 significant figures									
Accuracy Stability	± 2 ppm at 25°C ± 5 °C				± 1 ppm, per 1 year			± 1 ppm at 0 ~ 40°C		
Aging Tolerance	± 1 ppm									
Output Characteristics(*2)										
Output Amplitude	Into 50 Ω	1mVpp ~ 10Vpp, for ≤ 25 MHz; 1mVpp ~ 5Vpp, for ≤ 60 MHz; 1mVpp ~ 2.5Vpp, for ≤ 100 MHz				1mVpp ~ 10Vpp, for ≤ 40 MHz; 1mVpp ~ 5Vpp, for ≤ 80 MHz; 1mVpp ~ 2.5Vpp, for ≤ 120 MHz; 1mVpp ~ 1Vpp, for ≤ 250 MHz				
	Open-circuit	2mVpp ~ 20 Vpp, for ≤ 25 MHz; 2mVpp ~ 10 Vpp, for ≤ 60 MHz; 2mVpp ~ 5 Vpp, for ≤ 100 MHz				2mVpp ~ 20 Vpp, for ≤ 40 MHz; 2mVpp ~ 10 Vpp, for ≤ 80 MHz; 2mVpp ~ 5 Vpp, for ≤ 120 MHz; 2mVpp ~ 2 Vpp, for ≤ 250 MHz				
Bandwidth Flatness	≤ 10 MHz: ± 0.2 dB; ≤ 60 MHz: ± 0.3 dB; ≤ 100 MHz: ± 0.5 dB; (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; ≤ 160 MHz: ± 1 dB; ≤ 250 MHz: ± 1.5 dB; (relative to 1kHz Sine wave, 1 Vpp, 50 Ω)				
Accuracy	$\pm (2\% \text{ of setting} + 1 \text{ mVpp})(1\text{kHz sine, } 0\text{V offset, } >10\text{mVpp})$									
Resolution	0.1mVpp or 4 digits (The amplitude ≥ 1 Vpp is 1mVpp)									
Output Impedance	50 Ω (Typical)									
Output protection	Short circuit protection, the output will be automatically turned off when overloaded									
DC Offset	Range	$\pm (10 \text{ Vpk} - \text{Amplitude Vpp} / 2)$, (High resistance)				$\pm (1\% \text{ of setting} + 5 \text{ mV} + \text{amplitude Vpp} \times 0.5\%)$				
	Accuracy	$\pm (3\% \text{ of setting} + 5 \text{ mV} + \text{amplitude Vpp} \times 0.5\%)$				$\pm (1\% \text{ of setting} + 5 \text{ mV} + \text{amplitude Vpp} \times 0.5\%)$				
	Resolution	0.1 mVpp or 4 digits (The amplitude > 1 Vpp is 1 mVpp)								
Sine Wave Characteristics										
Harmonic Distortion(*3)	DC-1MHz: < 65 dBc; 1MHz-10MHz: < 60 dBc; 10MHz-60MHz: < 55 dBc; 60MHz-100MHz: < 50 dBc Typical (0dBm)					DC-1MHz: < 65 dBc; 1MHz-10MHz: < 60 dBc; 10MHz-120MHz: < 50 dBc; 120MHz-250MHz: < 45 dBc Typical (0dBm)				
Total Harmonic Distortion	$< 0.05\%$, 10 Hz to 20 kHz, 1 Vpp									
Non-harmonic Distortion	≤ 10 MHz: < 70 dBc; > 10 MHz: > 70 dBc + 6dB/sound interval; Typical (0dBm)									
Phase Noise	10MHz: ≤ 110 dBc/Hz Typical (0dBm, 10kHz offset)									
Square Wave Characteristics										
Rise/Fall Time	< 30 ns		< 8 ns				< 5 ns			
Overshoot	Typical (100 kHz, 1 Vpp) $< 5\%$, (1 Vpp, 50 Ω)									
Duty Cycle	50.00% (fixed)									
Ramp Wave Characteristics										
Linearity	$< 0.1\%$ of peak output (typical 1 kHz, 1 Vpp, symmetry 50%)									
Symmetry	0.0% ~ 100.0%									
Pulse Wave Characteristics										
Period	200ns-1000ks		66.667ns-1000ks	40ns-1000ks			20ns-1000ks			
Pulse Width	≥ 48 ns		≥ 18 ns	≥ 12 ns			≥ 7 ns			
Duty cycle	0.1% ~ 99.9% (limited by the frequency setting)									
Rise and fall time	≥ 32 ns (limited by the pulse width setting)		≥ 8 ns (limited by the pulse width setting)			≥ 7 ns (limited by the pulse width setting)				
Overshoot	Typical (100 kHz, 1 Vpp) $< 5\%$									
Jitter	< 2 ns		≤ 5 MHz: 2ppm + 300ps, > 5 MHz: 300ps (rms), typical (1Vpp, 50 Ω)							
Noise Wave Characteristics										
Types	Gaussian white noise									
Bandwidth (-3dB)	25MHz BW		35MHz BW	60MHz BW	80MHz BW	100MHz BW	120MHz BW			
Harmonic Wave Characteristics										
Harmonic number	≤ 16									
Frequency Range	1 μ Hz-12.5MHz		1 μ Hz-17.5MHz	1 μ Hz-30MHz	1 μ Hz-40MHz	1 μ Hz-50MHz	1 μ Hz-125MHz			
Harmonic type	Odd, even, sequential, custom									
Harmonic amplitude	Each harmonic amplitude can be set									
Harmonic phase	Each harmonic phase can be set									
Advanced Waveform Characteristics										
Modulation Function	AM, DSB-AM, FM, PM, PWM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, OSK, SUM									
Sweep Function	Support type: Linear, logarithmic, Step									
Burst Function	Support type: count (1 ~ 1000,000 cycles), Infinite, gated									
Counter Function	Support frequency range: 100 mHz ~ 200 MHz									
Power Amplifier Function	-									
Input/Output Characteristics										
Channel Coupling	Channel copy, amplitude syn, frequency syn, align phase									
Input	External modulation input, External trigger input, External clock input									
Output	Internal clock output, Sync Output									
General Specifications										
Display	Type	8-inch color LCD display								
	Resolution	800 Horizontal x 480 Vertical pixels								
	Color	65,536 colors, 16 bits, TFT								
	Touch Screen Capacitive	-							Multi-touch	
Communication Interface	USB Host, USB Device				USB Host, USB Device, LAN					
Power	Source	100 ~ 240 V ($\pm 10\%$), 50/60 Hz								
	Power Consumption	Less than 50VA								
	Fuse	250V, F2AL								
Operating Environment	Temperature to Satisfy	18 °C ~ 28 °C								
	Operating Temperature	0 °C ~ 40 °C								
	Relative Humidity	Less than 35°C: $\leq 90\%$ relative humidity; 35°C ~ 40°C: $\leq 60\%$ relative humidity								
	Installation Category	CAT II								
	Operating Altitude	Operating 3,000 meters; Non-operation 12,000 meters								
Storage Temperature	-20 °C ~ 60 °C, Humidity: $\leq 70\%$									
Pollution Degree	IEC 61010 degree 2, Indoor use									
Safety Designed	EN61010-1									
Cooling Method	Smart fan cooling									
Dimensions & Weight	340 (W) x 177 (H) x 90 (D) mm; Approx. 2.5kg									

Note: *1. The User's available range of the sample rate is from 1 μ Sa/s to 75 MSa/s. (AFG-4125E/4125AE/4225E is from 1 μ Sa/s to 30MSa/s) Specifications subject to change without notice. AFG-4000D1_C_DH_202411
*2. Not specifically labeled, the load defaults to 50 Ω . *3. DC offset set to zero.

購買資訊	
AFG-4125E	25MHz 單通道任意波函數信號產生器
AFG-4125AE	25MHz 單通道任意波函數信號產生器及內建前置放大器功能
AFG-4225E	25MHz 雙通道任意波函數信號產生器
AFG-4235	35MHz 雙通道任意波函數信號產生器
AFG-4260	60MHz 雙通道任意波函數信號產生器
AFG-4280	80MHz 雙通道任意波函數信號產生器
AFG-4210H	100MHz 雙通道任意波函數信號產生器
AFG-4225H	250MHz 雙通道任意波函數信號產生器

標準配件	
USB Cable x 1, Power Cord x 1	
AFG-4125E/4125AE: Test Lead, BNC to Alligator Clips Cable x 1	
AFG-4225E/4235: Test Lead, BNC to Alligator Clips Cable x 2	
AFG-4260/4280/4210H/4225H: Test Lead, BNC Cable x 2	
選購配件	
GTL-101	Test Lead, BNC (P/M) to Alligator, approx. 1100mm
GTL-110	BNC Cable, BNC (P/M) to BNC (P/M), approx. 1000mm

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