

GSG-2000 Series

6 GHz 向量信號產生器 6 GHz 信號產生器



特 點

- * 頻率範圍：9 kHz to 6 GHz
- * 頻率解析度：1 mHz
- * 標配 10 ppm 頻率穩定度，2 ppm 老化率
(選配：10 ppb 頻率穩定度、0.1 ppm 老化率)
- * 振幅範圍：-140 dBm to +20 dBm
- * 0.01 dBm 振幅設定解析度
- * dBm, dB μ V, Vrms 振幅設定單位
- * 相位雜訊：<-117 dBc/Hz (Typical) @1 GHz Output and 20 kHz Offset
- * 頻率/振幅切換速度：<5 ms
- * 內建 LF 信號輸出、Pulse 信號輸出
- * 全系列內建 AM, FM, PM 類比信號調變功能
- * 支援 IQ 調變信號輸出 (僅 GSG-2160 支援)
 - 最高 60 MHz Baseband I or Q 調變信號輸出
 - 最高 120 MHz RF I+Q 調變信號輸出
 - 內建 ASK, PSK, APSK, QAM, FSK, MSK, 自定義 IQ/FSK 數位信號調變功能
- * 提供 USB, LAN and GPIB (選配), 指令符合 SCPI 標準

應用範圍

- * 教育機構
- * 汽車電子
- * 電子產品及零件
- * IoT 互聯網

GSG-2000 系列射頻信號產生器，主要是用於工業、科研與教育領域。本系列提供 6 GHz 兩個頻段。具備類比與類比+數位信號調變輸出的功能共兩個機種。本產品適用於通訊教學與研究、射頻元件測試(如放大器、天線、濾波器等)、車用電子信號測試及 IoT 應用領域等，滿足射頻產品在生產/開發等階段的測試需求。相較於主要競爭對手，GSG-2000 系列提供的優勢規格包含 +20 to -140 dBm 寬廣的振幅輸出範圍，-117 dBc/Hz 更低的相位雜訊；其頻率準確率規格為 10 ppm 頻率穩定度與 2 ppm 老化率，使用者亦可透過 OCXO (Oven Controlled Crystal Oscillator) 選配，讓頻率穩定度與老化率分別提升至 10 ppb 與 0.1 ppm。

信號調變部分，全系列內建 AM, FM, PM 類比調變；GSG-2160 則增加了數位信號調變功能，最高可達 120 MHz 頻寬的數位信號輸出，支援 ASK, PSK, APSK, QAM, FSK, MSK, User-define IQ, User-define FSK 等調變信號。

此外 GSG-2000 系列亦提供了 LF 信號與 Pulse 信號輸出，LF 信號可供使用者輸出 Sine, Square, Triangle/Ramp, Gaussian Noise 信號；Pulse 信號輸出則可模擬各種寬度的脈波應用；除了上述的信號輸出外，GSG-2000 系列也提供 AM/FM/數位 IQ 信號的輸入，以及數位 I 或 Q 信號獨立輸出埠。

GSG-2000 系列使用七吋 TFT LCD 顯示器，可以完整呈現使用者所設定的參數與狀態；並提供 USB, LAN, GPIB (選配) 等通訊界面，並提供標準 SCPI 相容的指令支援遠端控制。GSG-2000 系列專為 3 U 標準機架尺寸設計。

機 種	GSG-2160	GSG-2060
頻率範圍	9 kHz to 6 GHz	9 kHz to 6 GHz
類比調變	AM, FM, PM	AM, FM, PM
數位調變	ASK, PSK, APSK, QAM, FSK, MSK, user define IQ, user define FSK	—
LF 輸出	V	V
Pulse 輸出	V	V



Website



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規格			
FREQUENCY RANGE			
Frequency Range	9 kHz to 6 GHz	GSG-2160, GSG-2060	
Frequency Resolution	1mHz		
Frequency Bands	Band	Frequency Range	N
	1	9 kHz to 5 MHz	digital synthesis
	1	<5 MHz to 187.5 MHz	1
	2	<187.5 MHz to 375 MHz	0.25
	3	<375 MHz to 750 MHz	0.5
	4	<750 MHz to 1500 MHz	1
5	<1500 MHz to 3000 MHz	2	
6	<3000 MHz to 6000 MHz	4	
Frequency Switching	≤ 5 ms		
SSB PHASE NOISE, CW at 20 kHz OFFSET (dBc/Hz)			
Frequency (MHz)		ALC on	ALC off
	5	-	-122
	100	-112	-115
	250	-112	-117
	1000	-112	-117
	2000	-108	-112
	3000	-107	-110
6000	-102	-105	
Residual FM (0.3 kHz to 3 kHz)(1 GHz CW)	<2Hz		
NON HARMONICS			
Non Harmonics	Level > -10 dBm, Offset > 10 kHz	<-65 dBc	1 M ≤ freq. ≤ 5 M
		<-66 dBc, -70 dBc(typ)	5 M < freq. ≤ 187.5 M
		<-75 dBc	187.5 M < freq. < 750 M
		<-70 dBc, -74 dBc(typ)	750 M ≤ freq. < 1500 M
		<-62 dBc, -66 dBc(typ)	1500 M ≤ freq. < 3000 M
<-58 dBc, -60 dBc(typ)	3000 M ≤ freq. < 6000 M		
HARMONICS			
Range	Level < 4 dBm		
9 k ≤ Freq < 6000 M	<-35 dBc		
FREQUENCY REFERENCE			
Frequency Reference	10 MHz		
Temperature Stability	<10 ppm, Standard	<10 ppb, OCXO Option	
Aging	2 ppm/year, Standard	0.1 ppm/year, OCXO Option	
Output	1 Vpp, 50 Ohm Load		
Input	-3 to 20 dBm, 50 Ohm Load		
Input Deviation	Standard: 3 ppm		OCXO Option: 0.5 ppm
AMPLITUDE SPECIFICATIONS			
AMPLITUDE			
Setting Range	20 dBm to -140 dBm		
Resolution	0.01 dB		
Amplitude Unit	dBm, dBμV, Vrms		
AMPLITUDE ACCURACY			
Absolute Level Accuracy in CW Mode (ALC On)	-14 dBm to -60 dBm	-60 dBm to -90 dBm	-90 dBm to -110 dBm
	9 k < freq. < 3 GHz	±0.6 dB	±0.8 dB (±0.6 dB typical)
	3GHz < freq. < 6GHz	±0.8 dB	±1 dB (±0.6 dB typical)
Addition Level Accuracy in CW Mode (ALC Off, Power Search Run, Relative to ALC On)	0.15 dB		
VSWR (5 M to 3 GHz)	<1.8 (output ≤ -66 dBm)		
Amplitude Switching (ALC on, CW)	≤ 5 ms		
SWEEP SPECIFICATIONS			
SWEEP			
Mode	Frequency, amplitude, list		
Dwell Time	100 μs to 100 s		
Number of Points (Step)	2 to 65,535		
Number of Points (List)	1 to 4,096		
Triggering	Free, trigger key, external, timer		
ANALOG MODULATION SPECIFICATIONS			
FM			
Source	Internal, external		
Max. Deviation	N*1 MHz		
Rate	freq ≥ 10 MHz	0.1 Hz to 1 MHz	
	freq < 10 MHz	0.1 Hz to 100 kHz	
Resolution	1 mHz		
Accuracy (1 kHz rate, N*50 kHz deviation)	2 % setting + 20 Hz		
Distortion (1 kHz rate, N*50 kHz deviation)	0.4 %		
PM			
Source	Internal, external		
Max. Deviation	N* 1 MHz/rate or 5 N rad		
Rate	freq ≥ 10MHz	0.1 Hz to 1 MHz	
	freq < 10MHz	0.1 Hz to 100 kHz	
Resolution	0.001 rad		
Accuracy (1 kHz rate)	1 % of setting + 0.1 rad		
Distortion (1 kHz rate, max deviation)	0.2 %		
Response	0.1 Hz to 1 MHz		
AM			
Source	internal, external		
Resolution	0.01 %		
Depth	0 to 100 %		
Accuracy (1 kHz, 0 dBm)	<5 MHz	1.5 % setting + 1 %	
	5 M to 4 GHz	3 % of setting + 1 %	
	4 GHz to 6 GHz	5 % of setting + 1 %	
Distortion (1 kHz, 80 %, <8 dBm)	<5 MHz	1.5 %	
	5 M to 4 GHz	2 %	
	4 GHz to 6 GHz	3 %	
Response	0.1 Hz to 20 kHz		

規格		
PULSE SPECIFICATIONS		
PULSE		
Mode	Free-run, square, triggered, adjustable doublet, trigger doublet, gated, pulse train, and external pulse	
Source	Internal, external	
Pulse Input	-0.5 V to 5 V, $V_{IL}=V_{IH}=1.5$ V (typ)	
Edge Time	<20 ns	
On/Off Ratio	70 dB, 5 M to 3 GHz	
	45 dB, 3 G to 6 GHz	
Repetition Rate	0.1 Hz to 10 MHz	
Pulse Period	100 ns to 42 s	
Resolution	10 ns	
Width	50 ns to period -10 ns	
Pulse Train Number of Patterns	2047	
LF SPECIFICATIONS		
LF		
Waveform	Sine, square, triangle, ramp, gaussian noise	
Frequency Range	Sine	0.1 Hz to 10 MHz
	Square, Triangle, Ramp	0.1 Hz to 1 MHz
	Gaussian Noise	10 MHz BW
Resolution	1 mHz	
Output	2 mVpp to 6 Vpp	
Impedance	50 Ohm	
VECTOR MODULATION SPECIFICATIONS		
VECTOR MODULATION (GSG-2160 only)		
Source	Internal, external	
Bandwidth (baseband)	60 MHz	
Bandwidth (RF)	120 MHz	
Carrier Frequency	<5 MHz to 6,000 MHz	
Carrier Suppression	25 ± 5 °C >50 dBc	
Sideband Suppression	25 ± 5 °C >50 dBc	
Modulation Mode	ASK, PSK, APSK, QAM, FSK, MSK, user define IQ, user define FSK	
ASK	2ASK(0 to 100 %), 4ASK, 8ASK, 16ASK, 32ASK	
PSK	BPSK, QPSK, DQPSK, OQPSK, $\pi/4$ DQPSK, 8PSK, D8PSK, 16PSK	
APSK	16APSK, 32APSK	
QAM	16QAM, 32QAM, 64QAM, 128QAM, 256QAM	
FSK	2FSK, 4FSK, 8FSK, 16FSK	
Internal Modulation EVM (16 QAM, RRC filter, $\alpha=0.25$, 4 Msps, level ≤ 4 dBm, ALC off)	0.8 %, 10 MHz < freq < 3 GHz 1.2 %, 3 GHz < freq < 5 GHz	
IQ GENERATOR		
Resolution	16 bit	
Sample Rate	10 kHz to 180 MHz	
Baseband Bandwidth	60 MHz	
ARB Memory	Waveform Length	16 Msa
	Storage Capacity	16 GB
Trigger Type	Free, single, gated, trigger and run	
Trigger Source	External, trigger key	
INTERNAL IQ ADJUSTMENT		
IQ Offset	± 10 %	
IQ Gain	± 6 dB	
IQ Skew	max 30 ps to 100 ps	
EXTERNAL IQ OUTPUT		
Impedance	50 Ohm per output	
Maximum per Output	0.5 Vpk	
Bandwidth	60 MHz	
Common Mode Offset	± 1.25 V	
Differential Mode Offset	± 50 mV	
EXTERNAL IQ INPUT		
Bandwidth	60 MHz	
Full Scale	± 1 V into 50 Ohm	
IQ Offset	± 10 % full scale	
IQ Gain	± 6 dB	
SIMULTANEOUS MODULATION		
All modulation types (I/Q, FM, AM, Φ M, and pulse modulation) may be simultaneously enabled except: FM and phase modulation		
GENERAL SPECIFICATIONS		
Power Source	AC 100 to 240 V, 50 to 60 Hz	
Power Consumption	90 VA Maximum	
Display	7 inch TFT LCD, 1024(RGB)*600	
Interface	GPIB (option), USB, LAN	
Operating Temperature	0 to 50 °C	
Storage Temperature	-10 to 70 °C	
Humidity	85 % at 40 °C	
Altitude	Up to 2000m	
Dimensions & Weight	430(W) x 140(H) x 540(D)mm ; Approx. 13 kg	

規格若有局部變更，恕不另行通知！ GSG-2000_C_CD1DH

購買資訊

GSG-2160 6GHz 向量信號產生器
GSG-2060 6GHz 信號產生器

標準配件

CD (使用手冊) x 1, 電源線 x 1

選購配件

ADP-001 N(M)-BNC(F)轉接頭 **GTL-301** N(M)-N(M)射頻信號線
ADP-002 N(M)-SMA(F)轉接頭 **GTL-303** SMA(M)-SMA(M)射頻信號線
GRA-447 Rack Mount Kit. 19", 3U Size

OPTION

OCXO clock reference source

* GPIB and OCXO options can only be installed prior to the shipment. Please select these options while placing an order.

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