Low Harmonics level

USB Synthesized Signal Generator SSG-4000LH

500 -60 dBm to +10 dBm, 250-4000 MHz

The Big Deal

- Low Harmonics (-66dBc typ.)
- ?OdB Adjustable output power range
- Internal Pulse Modulation
- Cost effective Signal Generator

Installation CD with Software induded

Case Style: LV1753

3Dday MONEY-BACK GUARANTEE! Click Here For More Details

Product Overview

Mni-circuits' SSG-4000LH (RoHS compliant) is a wideband Synthesized Signal Generator operating over the frequency range 250 to 4000 MHz The signal generator is cased in a rugged metal shielded package(size of 11.0" x 8.5" x 2.15") and equipped with a N-type 50Q connector at the RF output port. The signal generator is controlled through a USB 2.0 interface using unique user friendly GUI software allowing the user to select one of several different output modes including multiple pulsed RF options, frequency sweep and power sweep (up, down or bidirectional).

The SSG-4000LH is supplied along with a CD containing the graphical user interface control program and programming APis for 32 and 64 bit environments. Also included are a 2.7ft. USB cable, and a power adapter, see pages 8&10 for details. Longer USB cables and mounting brackets are available as additional options.

Key Features

Feature	Advantages
VVide output power dynamic range	Dynamic range 70 dB. output power from -60dBm to +10dBm in 0.25dB steps
USB HID (Human Interface Device)	Plug-and-Play (no need to install a driver for the device)
Pulse modulation options	The SSG-4000LH can be set to produce RF pulses either triggered. or continuous (1J.1Sec resolution)
Multiple sweep options	The SSG-4000LH can be set to sweep either power or frequency up. down or bidirectionally
$24V_0$c Operating voltage	The SSG-4000LH is powered using the supplied 24V AC/DC e>dernal power adaptor with three wire line cord (Use only grounded power supply)
Software CD with program instructions for various operating systems	A CD containing programing instructions for Linux® and windows® operating systems (32 and 64 bit systems), a friendly Windows® Graphical User Inter1ace (GUI) controlprogram and APIobjects is included. The SSG-4000LH is compatible with 32/64-bit VVindows® or LinU>:® operating systems. as well as LabVIEV\.®. Delphi®. C++. C#. Visual Basic®. and .NET software.

Low Harmonics level

USB Synthesized Signal Generator

500 -60 dBm to+10 dBm, 250-4000 MHz

Features

- Low Harmonics level (-66 dBc typ.)
- Adjustable output power, 70 dB dynamic range
- USB HID controlinterface (Plug and Play)
- Small, light weight
- Can sweep either frequency or power up, down or bidirectionally
- Multiple pulsed RF options (free run, triggered)
- Separate Trigger In and Trigger Out ports
- Compatible with 32/64-bit Windows® or Linux® operating systems
- ActiveX com object and .Net class library for use with other software: C++, C#, CVI®, Delphi®, LabVIEW® 8 or newer, MATLAB® 7 or newer, Python, Agilent VE. Visual Basic®, Visual Studio® 6 or newer, AutoiT and more [1]
- Friendly Windows® Graphical User Interface
- Mounting bracket (Optional)

Installation CD with Software included

SSG-4000LH

Model P/N	Description	Qty.
SSG-4000LH	USB Signal Generator	(1)

Included Accessories

AC/DC-24-3W1	ACIDC 24V Adapter *(see Ordering Information)*
CBL-3W1-XX	AC power cord *(see Ordering Information)*
USB-CBL-AB-3+	2.7H. USB cable
SSG-CD	Sollware CD

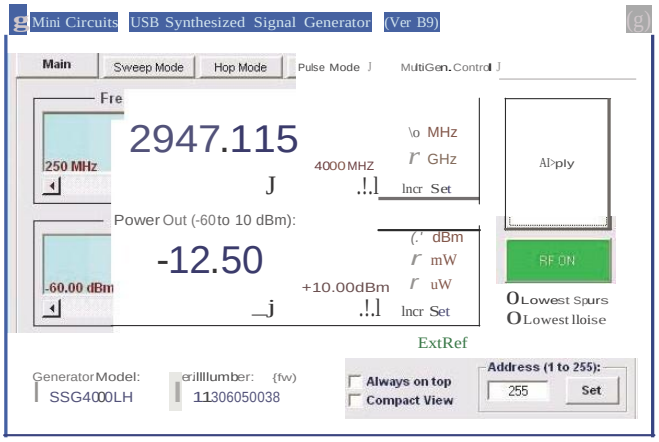
RoHS *Compliant*

See our web site for RoHS Compliance methodolog1es and qualifications

Applications

- Lab Test equipment
- Automated Test capability
- Production line testing
- Field testing

Mini-Circuits Control Program for USB Synthesized SignalGenerators



Note 1 IN1ndows and VIsual Basic are reg1stered trademarks of M1crosoft CorporatiOn Unux1s a registered trademark of Linus Torvalds LabVIEINts a regstered trademark of Nat1onal Instruments Corp. Delphi is a registeredtrademark of Codegear LLC. Neither Mini-Circuits nor the Mini-Ci rcuits SSG-4000LH Signal Generator are affiliated with or endorsedby the owners of the above referenced trademarks.

M1n1-Cirru1ts and the M1n1-Cira.J1ts logo are reg stered trademarks of Saent1f1c Components Corporation

t:IMini-Circuits®
www.minicircuits.com P.O. Box 35166, Brooklyn, NY 11235 0003 (718) 934-4500 sales@minicircuits.com

ElectncalS1pec1 1cat1ons at +25

Parameter	Test Conditions		Min.	Typ.	Max.	Units
Output Frequency	–		250	–	4000	MHZ
Frequency Resolution	–		5	–	–	kHz
Frequency accuracy	Using Internal Reference		–	±1	–	ppm
Settling time 2.4	–		–	2.5	–	msec
Minimum Dwelllme 3.4	–		–	15	–	
VSWR	250-3000 MHZ		–	1.5	–	:1
	3000 - 4000 MHZ		–	2.3	–	
Output power range	–		-60	–	10	dBm
Power resolution (nom.)	–		–	0.25	–	dB
Dynamic range	–		–	70	–	dB
Output power accuracy	–		–	±0.25	–	dB
RF output level	@RFOFF		–	-95	–	dBm
Harmonics & Sub-Harmonics	PWR our -50 dBm		–	-58	–	dBc
	PWR our -30 dBm		–	-78	–	
	PWR out= -10 dBm		–	-78	–	
	PWR our 0 dBm		–	-74	–	
	PWR out= +10 dBm		–	-47	–	
Non-Harmonic Spurious 5	@Frequency step size = 5kHz		–	-50	–	dBc
	@Frequency step size= 1ookHz		–	-66	–	
	@Frequency step size = 1 MHz		–	-so	–	
	@Frequency step size= 10 MHz		–	-94	–	
SSB Phase Noise 5	RFout=250 MHz @Software mode: Lowest Spur I Lowest Noise	@ 100 Hz offset	–	-95 1-96	–	dBdHz
		@ 1 kHz offset	–	-102 1-111	–	
		@ 10kHz offset	–	-101 1-107	–	
		@ 100 kHz offset	–	-121 1-123	–	
		@ 1MHz offset	–	-147 1-147	–	
SSB Phase Noise 5	RFour1060 MHz @Software mode: Lowest Spur I Lowest Noise	@ 1oo Hz offset	–	-81 1-83	–	dBdHz
		@ 1 kHz offset	–	-92 1-98	–	
		@ 10kHz offset	–	-91 1-94	–	
		@ 100 kHz offset	–	-111 1-112	–	
		@ 1MHz offset	–	-139 1-139	–	
SSB Phase Noise 5	RFour2600 MHz @Software mode: Lowest Spur I Lowest Noise	@ 1oo Hz offset	–	-74 1-75	–	dBdHz
		@ 1 kHz offset	–	-82 1-91	–	
		@ 10kHz offset	–	-82 1-89	–	
		@ 100 kHz offset	–	-102 1-105	–	
		@ 1MHz offset	–	-132 1-132	–	
SSB Phase Noise 5	RFout=4000 MHZ @Software mode: Lowest Spur I Lowest Noise	@ 1oo Hz offset	–	-70 1-72	–	dBdHz
		@ 1 kHz offset	–	-79 1-85	–	
		@ 10kHz offset	–	-81 1-88	–	
		@ 100 kHz offset	–	-101 1-106	–	
		@ 1MHz offset	–	-131 1-131	–	

2 Settling t1me - transWm between two s1gnals dJrlng which generatcr ls 1n RF CFF state.
S Dwell t1me - durat1m ct each slgnal pont 1n a Sweep cr Hop sequence set by user. Default 1s m1n1mum dwefl t1me.
4 Generatcr respmse t1me!s Dwefl t1me + Settlmg T1me
0 It1s rennmerdEd towcrk 1n Lowest Spur mo:B when usngfrequercy stepSIZe ct I.P to 50 kHz andLO!t'est Ncose modefa-freqJerey step SIZe geater than 50kHz.1\I:<k1ng1n LONest 8pJ cr Lowest Ncose mo:BcutSide theroccrnmerdEd r<nge may rnuse e><cesSive Ncose (In Lowest Spur mo:B) cr e>ressve SillS (In L011est Ncose mo:B)

Electrical Specifications (Pulse modulation modes) [6] at +25°C

Parameter	Test Conditions	Min.	Typ.	Max.	Units
Pulse Width resolution	Nominal value	1	–		J1Sec
Pulse Period	Measured at the 50% points	2J1Sec	–	10Sec	–
Duty cycle [7]	Pulse Width divided by Pulse Period	0.01	–	99.99	St0
Rise / Fall time	Measured between 10% and 90%	–	30 / 45	–	nsec
Pulse Width Accuracy	Measured at the 500/o points	–	±2	–	0
Trigger response delay 8.9	Relevant trigger edge to 500/o point of the pulse	–	3.5	–	J1Sec
Pulse Power ratio	@ PWRour+20dBm, FREOour250 MHz	–	60	–	dB
Pulse Power ratio	@ PWRouT=+17dBm, FREOouT=4000 MHz	–	50	–	

[6] Pulsemoders s4+00oo fran Frrmw<TeRev B3 Frrmwarefrcm Rev B1 enward;can t:e CWäcJ00 LBngthelatmt sdtw<TeCD (avalat1efcr cbwnlood fran rttp/lwww miniarruts can>Suf:PC'llsoftware_cbwnbodttml
[7] InFree Run mode
[8] Max tnvvr fr cy is 200kHz
9 InTrig;JE<edmodetheSSG40XLH em t:etriwroo by either risngedgecr fallrngedgeas cBededbythe rustaner usngthe suf:Predsdtw<Te

Electrical Specifications at +25°C (Reference, Trigger & DC power)

Parameter		Test Conditions	Min.	Typ.	Max.	Units
Aging		Using Internal Reference	–	1	–	ppmlyr
Reference In	Frequency	–	–	10	–	MHz
	Power	–	-3.5	–	+7.5	dBm
Reference Out	Frequency	–	–	10	–	MHZ
	Freq. Accuracy	Using Internal Reference	–	±1	–	ppm
	Power	–	–	+7	–	dBm
	Aging	Using Internal Reference	–	1	–	ppmlyr
Trigger out, Low		–	0	–	0.4	V
Trigger out, High		–	2.4	–	3.3	
Trigger In, Low		–	0	–	0.8	
Trigger In, High		–	2.4	–	3.3	
Supply Voltage 1o		–	22.8	24	25.2	Voc
supply current 1o		–	–	400	500	mA
USB current [10]		–	–	Note 11	–	mA

10 Power 01SeqJence Connect the 24V power, fdlowed by the USB centro! befcre turnrng on the Generatcr
11 SSG-400QH cbes not draw po wer from the USB bus, cnly from DC power adapter

Minimum System Requirements

Interface	USB HID
Host operating system	**32 Bit operating system:** Windows 98®, Windows XP®, Windows Vista®, Windows 7®, Windows 8® **64 Bit operating system:** Windows Vista®, Windows 7®, Windows 8® **Linux® support:** 32164 Bit operating system
Hardware	Pentium® II or better

Absolute Maximum Ratings

Operating Temperature	O"C to +50°C
Storage Temperature	-20"C to+600C
Power in @ Reference In	+10 dBm
Reverse Power(DC)@ Reference Out	25Voc
Reverse Power(DC)@ RF Out	10Voc
Voltage @ Trigger out	-0.3V_0c to +3.5Voc
Voltage @ Trigger in	-0.3Voc to +3.5Voc

Permanent damag> may 000ur if any of these limrts are e•o:ee::Jed

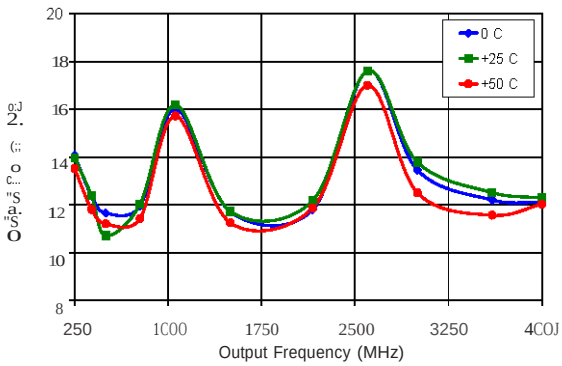
Connections

RF Output	(N Type-Female)
Ref. In	(BNC-Female)
Ref. Out	(BNC-Female)
Trigger In	(BNC-Female)
Trigger Out	(BNC-Female)
Power In	(2.1 mm DC socket)
USB Port	(USB B female)

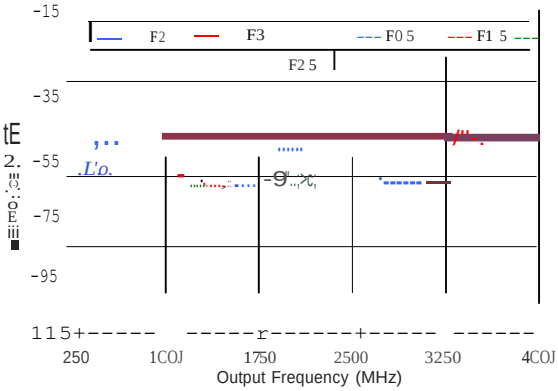
Typical Performance Curves*

•at +25"C l11less mert1mEd ctherw1se

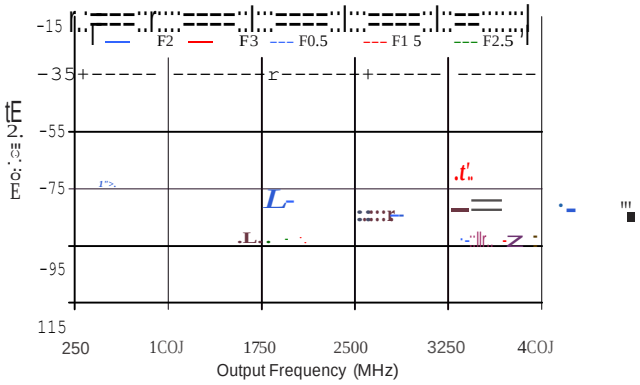
Max. Power Output
Vs. Output Frequency



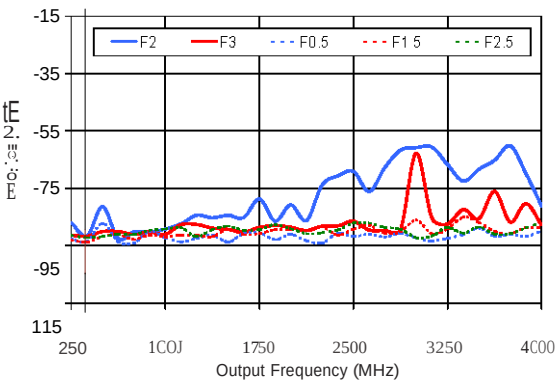
Harmonics & Sub-Harmonics Levels
Vs. Output Frequency PWR=-50dBm



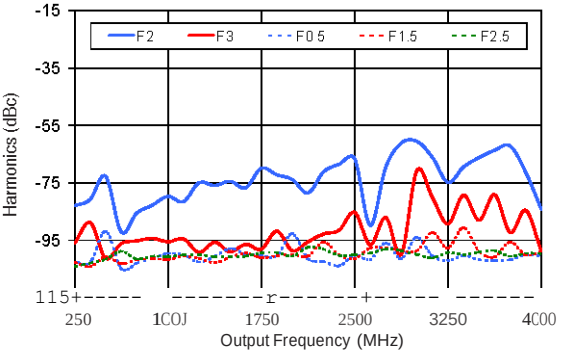
Harmonics & Sub-Harmonics Levels



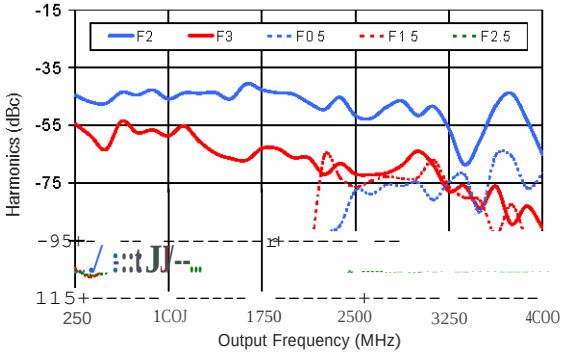
Harmonics & Sub-Harmonics Levels



Harmonics & Sub-Harmonics Levels
Vs. Output Frequency PWR=OdBm



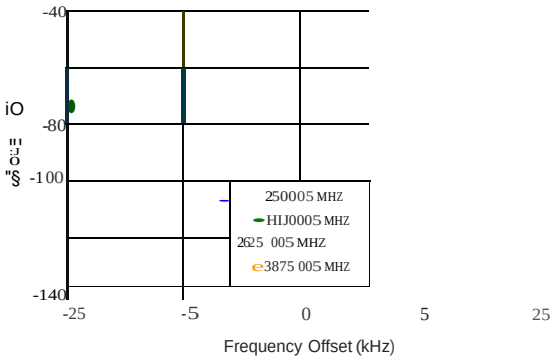
Harmonics & Sub-Harmonics Levels
Vs. Output Frequency PWR=+10dBm



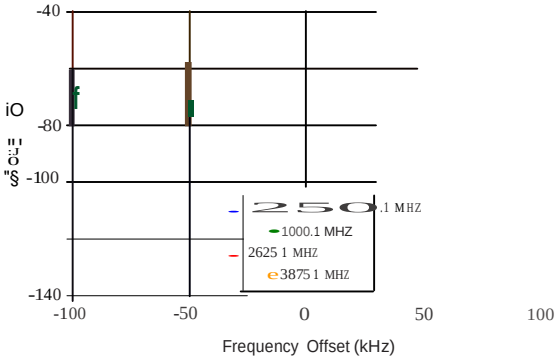
Typical Performance Curves* (continued)

•at +25"C l11ess mert1mEd ctherw1se

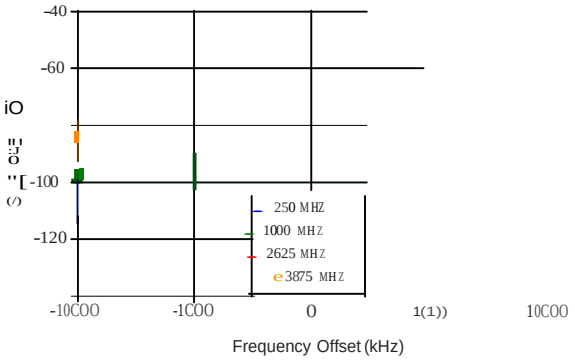
Spurious@ Freq. Resolution 5kHz
Vs Frequency Offset



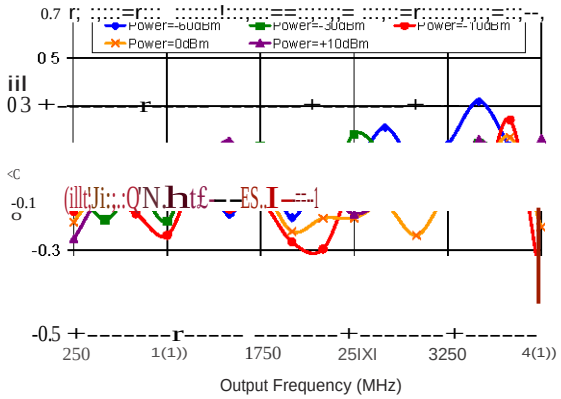
Spurious @ Freq. Resolution 100 kHz
Vs Frequency Offset



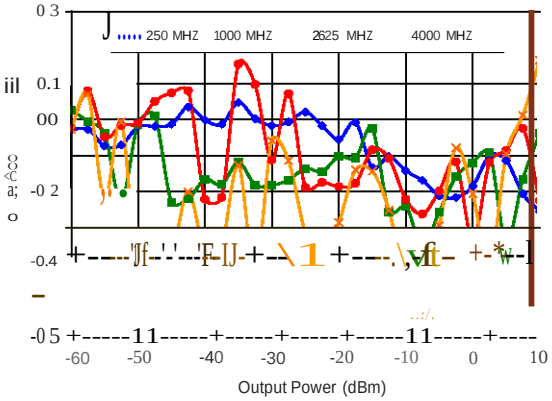
Spurious @ Freq. Resolution 1 MHz
Vs Frequency Offset



Power Accuracy

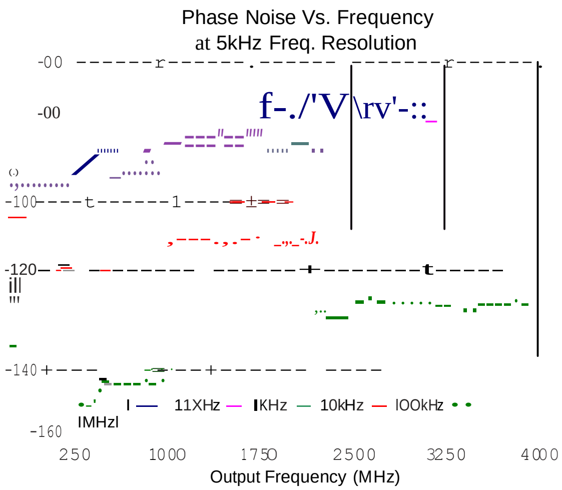


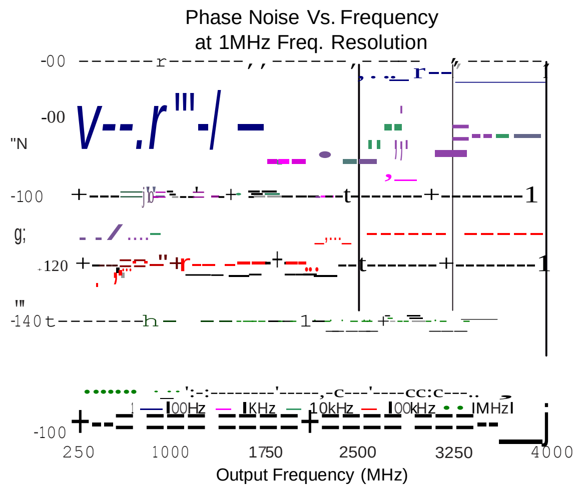
Power Accuracy

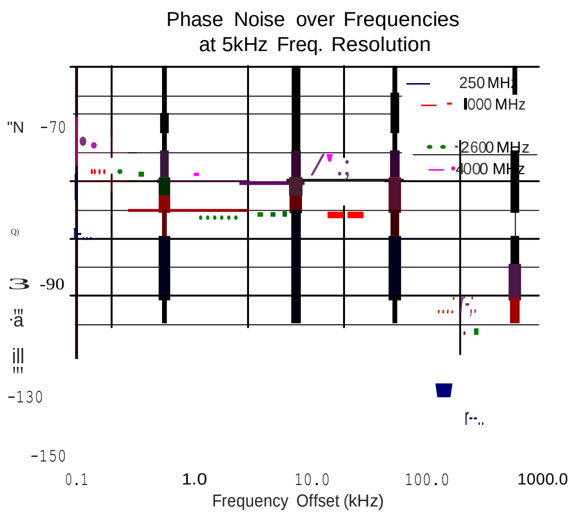


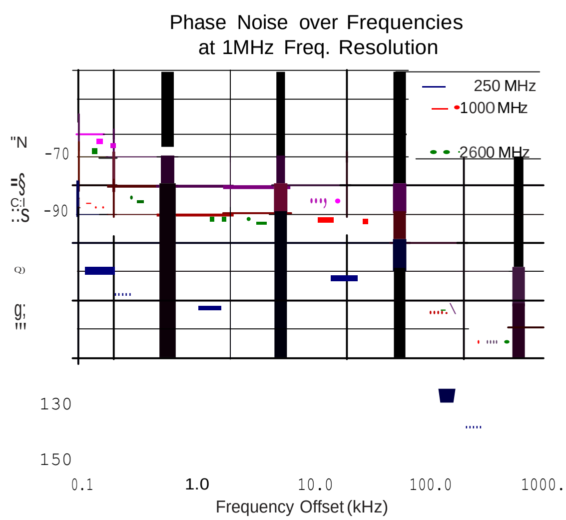
Typical Performance Curves* (continued)

*at +25°C unless noted otherwise

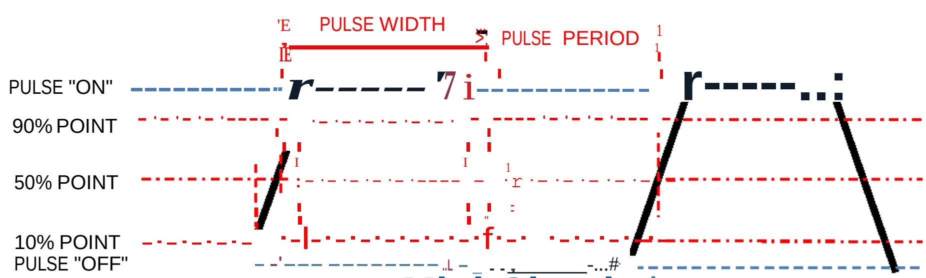






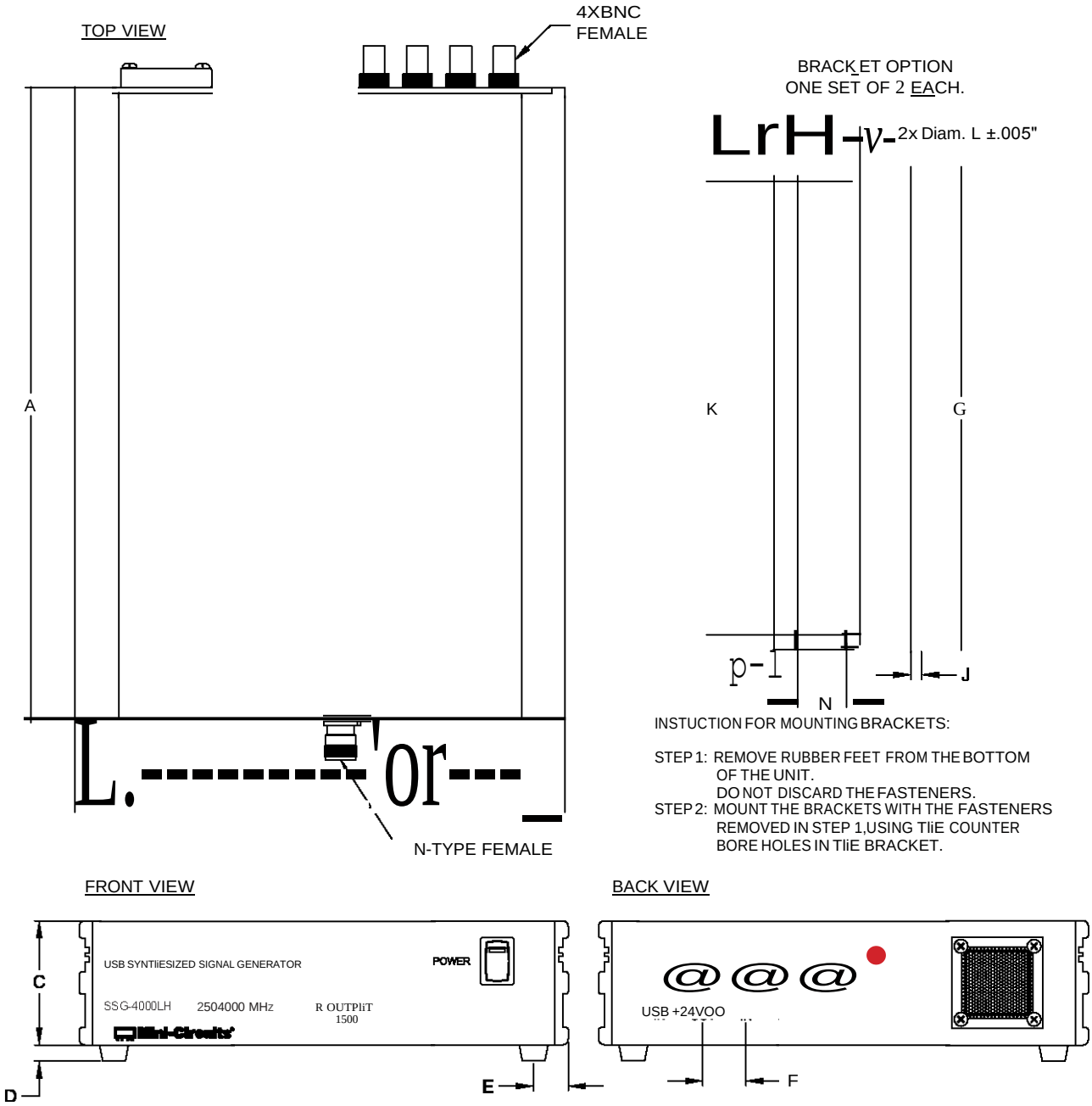


Pulse mode definitions




RISE TIME
FALL TIME

Outline Drawing LV1753



Outline Dimensions (;'#;')

A	B	C	D	E	F	G	H	J	K	L	M	N	p	WT. GRAMS
11.00	8.50	2.15	0.28	0.60	0.75	8.37	1.50	0.18	7.870	0.158	0.25	0.850	0.40	2500
279.4	215.9	54.6	7.1	15.2	19.05	212.6	38.1	4.6	199.9	4.0	6.35	21.6	10.2	

Ordering, Pricing & Availability Information see our web site

Model	Description
SSG-4000LH	USB Synthesized Signal Generator

Included Accessories	Part No.	Description
	AC/DG-24-3W1	AC/DC24V$_{OO}$ Grounded Power Adaptor. Cperating temperature 0•C to +40•C, 1Max=2.5A
	CBL-3W1-XX	AC Power Cord *(Select one power cord from below with each Signal Generator}*
	SSG-CD	Software CD
	USB-CBL-AB-3+	2.7ft (0.8 m) USB Cable USB type A(Male) to USB type B(Male)

AC Power Cords[11]	Part No.	Description
	CBL-3W1-US	Power Cord for United States
	CBL-3W1-EU	Power Cord for Europe
	CBL-3W1-UK	Power Cord for United Kingdom
	CBL-3W1-AU	Power Cord for Aurtralia and China
	CBL-3WHL	Power Cord for Israel

11. PoVter cords for other counl·ies ae aso avalaJJe, if you need a i'"Vter cord for a country not listed in the taJJe pea;e conteet app>®minidrruits.com or meek http:li\AMMiminicirruits.comloJntcctbffices.html for regiona offices e-mail rnd phone numters.

Optional Accessories	Description
USB-CBL-AB-3+ (spare)	2.7 ft. (0.8 m) USB cable
USB-CBL-AB-7+	6.8 ft. (2 1 m) USB Cable
USB-CBL-AB-11+	11 ft (3.4 m) USB Cable
BKT-280-06+	Bracket (One set of 2 each)

Calibration	Description	
CALSSG-4000LH	Calibration Service	Click Here

Additional Notes

A. Performance and quality attributes and conditions not exp-essly stated in this specification document are intended to be excluded and do not form a part cf this specification document

B Electlical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable establishedtest performance criteria and measurement instructions.

C The parts covered by ltlis specification document are subject to Mini-Circuits standard limited warranty and terms and condtions (cdlectively, "standard Terms"): Purchaser.> cf this part are entitled to the rights and benefits contained therein. For a full statement of ltle Standard Terms and the exclusive rights and remedies ltlereunder, please visit Mini-Circuits' website at www mjnjmmts com/MCI store/terms jsp