S1101 Series RF Signal Generator

(250kHz - 6GHz/3GHz)

Datasheet

Saluki Technology Inc.

The document applies to the S1101 RF signal generators of the following models:

- S1101A RF signal generator (250kHz-6GHz).
- S1101B RF signal generator (250kHz-3GHz).

Standard pack and accessories

- Main Machine
- Power Cord
- User Manual

Options of the S1101 series RF signal generator in addition to standard accessories:

- S1101-001, 115dB programmable step attenuator stepping by 5dB.
- S1101-002, Vector modulation module. Need option S1101-003.
- S1101-003, base-band signal generator, need option S1101-002
- S1101-005, aluminum case.
- S1101-006, Cabinet installation kit

Preface

Thank you for choosing S1101 RF signal generator produced by Saluki Technology Inc.

We devote ourselves to meeting your demands, providing you high-quality measuring instrument and the best after-sales service. We persist with “superior quality and considerate service”, and are committed to offering satisfactory products and service for our clients.

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Saluki Technology

Document Authorization

Product Quality Assurance

The warranty period of the product is 36 months from the date of delivery. The instrument manufacturer will repair or replace damaged parts according to the actual situation within the warranty period.

Product Quality Certificate

The product meets the indicator requirements of the document at the time of delivery. Calibration and measurement are completed by the measuring organization with qualifications specified by the state, and relevant data are provided for reference.

Quality/Settings Management

Research, development, manufacturing and testing of the product comply with the requirements of the quality and environmental management system.

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Content

1. Overview

S1101 series RF signal generator covers a frequency range from 250 kHz to 6 GHz / 3 GHz. S1101 provides extremely low phase noise, accuracy frequency resolution, wide output dynamic range, and multiple built-in functions. it is widely used for R&D, education, electronic device

1. 1. Definitions

Specification (Spec.)

Specifications describe the performance of parameters within the warranty of the instrument. Product specifications applies under the following conditions:

1) Two hours storage at ambient temperature(0-40℃) followed by 30 minutes warm-up operation
2) Specified environmental conditions met
3) Instrument is within its calibration cycle.
4) The specification listed in the datasheet includes measurement uncertainties.

Data in this document are Spec. unless otherwise noted.

Typical (typ.)

Typical data is not guaranteed by instrument warranty. It describes additional product performance information that 80 percent of the units exhibit. Typical data only valid at 25℃. Typical performance does not include measurement uncertainty.

Nominal(nom.)

Nominal values indicate expected performance, or describe product performance that is useful in the application of the product, but are not covered by the product warranty.

2. Specifications

2. 1. Frequency & Sweep

2. 1. 1. Frequency Range

Model	Frequency Range
S1101A	250kHz - 3GHz
S1101B	250kHz - 6GHz

2. 1. 2. Frequency Resolution

Frequency Resolution	0.01Hz (settable to 0.001Hz)

2. 1. 3. Frequency Band (Nom.)

Band	N	Frequency Range
1	1	250kHz≤f≤250MHz
2	1/2	250MHz≤f≤500MHz
3	1	500MHz≤f≤1GHz
4	2	1GHz≤f≤2GHz
5	4	2GHz≤f≤3.2GHz
6	8	3.2GHz≤f≤6GHz

2. 1. 4. CW Switching Speed

Frequency Switching Time	<50ms

2. 1. 5. Aging Rate

Timebase Aging Rate (Typ.)	1 x 10^{-9} /day (powered 7days or more)

2. 1. 6. Sweep Mode

Sweep Modes	Step Sweep / List Sweep /
List Sweep Point	2 - 1601
Dwell Time	1ms - 60s

2. 1. 7. Trigger

Triggering	Auto, external, single, or GPIB

2. 1. 8. Residual FM

Residual FM	< N x 1Hz

2. 2. Amplitude Specifications

2. 2. 1. Output Power Level (for full frequency range)

23℃±5℃

Model	Standard	With Programmable Step Attenuator (Option 001)
S1101A	-20dBm - +7dBm	-120dBm - +7dBm (settable to -135dBm)
S1101B	-20dBm - +7dBm	-120dBm - +7dBm (settable to -135dBm)

2. 2. 2. Output Power Accuracy

- **With Attenuator (Option 001)**

	Output Power	Uncertainty
Output Power Accuracy (23±5℃)	-10dBm - +7dBm	±0.8dB
	-60dBm - -10dBm	±1.0dB
	-90dBm - -60dBm	±1.5dB (Typ.)
	-120dBm - -90dBm	±3.0dB (Typ.)

- **Without Attenuator**

	Output Power	Uncertainty
Output Power Accuracy (23±5℃)	-10dBm - +7dBm	±0.8dB
	-20dBm - -10dBm	±1.0dB (Typ.)

2. 2. 3. SWR (0dB Attenuation)

SWR	<1.8:1

2. 3. Signal Purity Specifications

2. 3. 1. Harmonics

Harmonics	Sub-Harmonics	Non-Harmonics (1KHz offset)
<-30dBc	-	<-62dBc

2. 3. 2. SSB Phase Noise

Frequency	Frequency Offset			
	100Hz	1kHz	10kHz	100kHz
250kHz - 250MHz	<-91dBc/Hz	<-107dBc/Hz	<-125dBc/Hz	<-127dBc/Hz
250MHz - 500MHz	<-97dBc/Hz	<-121dBc/Hz	<-129dBc/Hz	<-133dBc/Hz
500MHz - 1GHz	<-91dBc/Hz	<-115dBc/Hz	<-127dBc/Hz	<-127dBc/Hz
1GHz - 2GHz	<-85dBc/Hz	<-110dBc/Hz	<-121dBc/Hz	<-121dBc/Hz
2GHz - 3GHz	<-81dBc/Hz	<-106dBc/Hz	<-117dBc/Hz	<-117dBc/Hz
3GHz - 6GHz	<-75dBc/Hz	<-100dBc/Hz	<-111dBc/Hz	<-111dBc/Hz

2. 4. Modulation Specifications

2. 4. 1. Modulation Signal Generator

- **AM,FM,PM Modulating Signal**

Modulation Type	amplitude modulation, frequency modulation, phase modulation	
Waveform	Sine, square, triangle, ramp, noise, double sine, swept sine	
Frequency Range	Sine wave, double sine, swept sine:	1Hz - 1MHz
	Square, triangle wave, sawtooth	1Hz - 100KHz
Frequency Resolution	1Hz	
Pulse Modulation	Pulse width	20ns - (42s-10ns)
	Pulse cycle	100ns - 42s,
	Resolution	10ns

- **Pulse Modulating Signal**

Pulse Width	40ns - (42s-20ns)
Pulse period	100ns - 42s
Resolution	20ns

- **Base band signal Generator (Option 002, 003)**

Modulation Type	BPSK,QPSK,0QPSK,8PSK,MSK,2FSK,16QAM	
Symbol Rate	BPSK, QPSK, 0QPSK, 8PSK, 16QAM	10ksps - 10Msps
	MSK, 2FSK	10ksps - 2Msps
DAC Resolution	16bit DAC	
Filter Parameter	Nyquist	0.20≤ α ≤0.80
	Gaussian	0.20≤BT≤0.80

2. 4. 2. Amplitude Modulation Specifications

100MHz<CF≤6GHz	Max. Modulation depth	90%
	AM width	(3dB, 30%modulation depth):DC - 100kHz
	AM Accuracy	<±(6%*Modulation depth + 1%) (1KHz Modulation Rate, 300Hz~3KHz Demodulation bandwidth, modulation depth <90%)
	AM distortion	<1.5% (1KHz Modulation Rate, 30%modulation depth)

2. 4. 3. Frequency Modulation

Max. Frequency Deviation	N x 1MHz (Typ.)
Modulation Rate (3dB bandwidth, 100kHz deviation)	Internal DC: DC - 100kHz
	Internal AC: 100kHz - 1MHz
	External DC: DC - 100kHz
	External AC: 100kHz - 10MHz
Accuracy **(1KHz rate, 300Hz~3KHz Demodulation bandwidth, deviation<N×100KHz,residual FM removed)**	±（5%×deviation＋20Hz）
Distortion **(1KHz rate,100kHz deviation)**	<1%

2. 4. 4. Phase Modulation

Max. Phase Deviation	Modulation Bandwidth 100kHz:	N × 10rad (Typ.)
	Modulation Bandwidth 1MHz	N x 1rad
Modulation rate (3dB bandwidth, 5rad deviation)	Modulation Bandwidth 100kHz:	DC - 100kHz
	Modulation Bandwidth 1MHz	100kHz~1MHz (Typ.)
Accuracy (1KHz rate, 300Hz ~ 3kHz demodulation bandwidth, deviation <N × 10rad)		<± (5% × offset + 0.01rad)
Modulation Distortion (1kHz rate, 5 rad deviation)		<1%

2. 4. 5. Pulse Modulation

Pulse on/ off ratio		>60dB
Pulse modulation rise/fall time		<150ns
Pulse repetition frequency		0Hz-10MHz
Pulse repetition frequency	**ALC on**	20Hz - 100kHz
	ALC off	DC - 1MHz
Min Pulse Width (ALC on)		0.2us

2. 4. 6. Vector Modulation (Option 002, 003) CF>100MHz

Operation Mode	External I/Q input	
Input Port	BNC (female) 50ohm	
Modulating Frequency Range (typ. 3dB)	DC - 10MHz	
Accuracy typ. **(4Msps, QPSK , Nyquist filter, α =0.3)**	EVM (rms)	<3%
	Amplitude error (rms)	<3%
	Phase Error	<2% (100MHz -3.2GHz) <3% (3.2GHz - 6GHz)

2. 5. Interfaces

2. 5. 1. Front Panel

- **RF Output Port**

S1101A	S1101B
N type (F)	N type (F)

- **Other Ports**

Description	Interface Type
External modulation signal input	BNC (F) 50ohm
Low frequency Output	BNC (F), output frequency 0.01Hz -1MHz, 40mVp - 4Vp
Pulse signal input	BNC (F) 2kohm
Pulse monitor signal output	BNC (F),50ohm
Pulse sync signal output	BNC (F),50ohm
USB port (for data record, software upgrade only)	USB 2.0
I Input	BNC (F),50ohm
Q input	BNC (F),50ohm

2. 5. 2. Rear Panel

- **Telecommunication Ports**

LAN (10base-T RJ45)	Remote control, software upgrade
RS-232	External Monitor
GPIB	Remote Control

- **Other Ports**

Description	Interface Type
Stop sweep input/output	BNC (F) .damage level >5.5V, <-0.5V
External detection input	BNC (F), 1kohm, damage level >15V, <-15V
Trigger In	BNC (F), damage level >5.5V, <-0.5V
Trigger Out	BNC (F)
10MHz In	BNC (F), 50ohm, input signal frequency 10MHz ± 100Hz, 0 - 10dBm Damage Level >10V, <-5V
10MHz Out	BNC (F), 50ohm, signal level 0dBm ± 3dBm
Sweep Output	BNC (F), 0V - 10V
Z-axis blank/frequency marker Output	BNC (F)
/I signal Output	BNC (F), 50ohm
/Q signal Output	BNC (F), 50ohm
I signal Input	BNC (F), 50ohm
Q signal Input	BNC (F), 50ohm

2. 6. General

Screen	TFT-LCD
Dimension	426×133×510mm（without handles,feet）
	Standard Pack: 482×152×582mm（with handles,feet）
Weight	23kg
Operating Temperature	0- +40℃
Storage Temperature	-40℃ - +70℃
Temperature Stability	0.02dB/℃ @ 250kHz -3.2GHz 0.01dB/℃ @3.2GHz - 67GHz
Max.Power	300W
Power Supply	220V(±10%), 50Hz (±5%) AC

2. 7. Compliant

2. 7. 1. CE

CE

- EMC

Complies with the requirements of the **EC EMC directive 2014/30/EU** with amendments.

Test Standards:

EN 61326-1:2013

EN 61000-3-2:2014

EN 61000-3-3:2013

- Safety

Complies with **EC LVD Directive 2014/35/EU** with amendment.

Test Standard

EN61010-1:2010

2. 7. 2. ISO

International Organization for Standardization ISO 9001

- Manufacturing

This instrument is manufactured in an ISO-9001 registered facility

- End of Document -