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# DG1000Z Series Function/Arbitrary Waveform Generator

- SiFi (Signal Fidelity) for 100% waveform replication
- 8Mpts (standard) or 16Mpts (optional) arbitrary waveform memory length for each channel
- Standard 2 full functional independent channels
- ±1ppm frequency stability, -125dBc/Hz phase noise, 200ps low jitter
- Built-in 8 orders harmonics generator
- Built-in 7 digits/s counter up to 200MHz
- 160 built-in pre-edited waveforms
- Intuitive arbitrary waveform editing software.
- Full modulation supported: AM, FM, PM, ASK, FSK, PSK and PWM

DG1000Z series function/arbitrary waveform generator is a multifunctional generator that combines many functions in one, including Function Generator, Arbitrary Waveform Generator, Noise Generator, Pulse Generator, Harmonics Generator, Analog/Digital Modulator and Counter. As a multi-functional, high performance and portable generator, it will be a new selection in education, R&D, production, test and etc.



**RIGOL TECHNOLOGIES, INC.** 

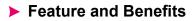
<u>Sifi</u>

# **DG1000Z Series Function/Arbitrary Waveform Generator**





Dimensions: Width × Height × Depth=261.5mm × 112mm × 318.4mm Weight: 3.2kg (without package)



#### Standard 2 full functional channels

| Freq            | 1,000,000,000 kHz<br>5,000,0 Vpp      | -    | Period           |
|-----------------|---------------------------------------|------|------------------|
| Offset<br>Phase | 0,000,0 VH<br>0,000 °                 |      | Ampl<br>HiLove   |
|                 | 1,000,000,000 kHz                     |      | Offset<br>LoLeve |
|                 | 5,000,0 Vpp<br>0,000,0 V++<br>0,000 ° | 2    | Start            |
| Sne             |                                       | Hete | Align<br>Phase   |
| Sanet           |                                       | 1687 | Sine -           |

<u>SiFi</u>

# Arbitrary waveform function with innovative SiFi technology

| Freq<br>Ampl             | 1,000,000,000 kHz<br>5,000,0 ∀pp |       | 0C                |
|--------------------------|----------------------------------|-------|-------------------|
| Offset<br>Phase<br>Wform | 0,000,0 Ve<br>0,000 *            | myhan | Builtin           |
|                          | 1,000,000,000 kHz                |       | Stored            |
|                          | ° 000,0                          | myhun | Volatile<br>Wlorm |

#### Multiple analog and digital modulations

#### Up to 160 built-in waveforms



#### **Burst function**

|        | N_Cycle<br>0,0 no                             |          | NCYC            |
|--------|---|----------|-----------------|
| Cycles | 1<br>10,000,000,0 ms                          | ∕∖       | Burst<br>Period |
|        | Internal<br>1,000,0 s                         | (i - i   | Polant<br>Pes   |
|        | 0,0 ms<br>100,000,000 Hz<br>1,000,000,000 kHz |          | Trigge          |
| Mark   | OFF   | Hanannan | Delay           |

#### Standard harmonic generator

| Irder            | * >      | 1,000,000,000 kHz<br>5,000,0 ∨pp                          | Freq<br>Ampl            |
|------------------|----------|---|-------------------------|
| ype              | li serie | 0,000,0 Vie<br>0,000 °<br>2,264,7 Vpp                     | Offset<br>Phase<br>Ampl |
| 5N<br>mor<br>mpl |          | 1,000,000,000 kHz<br>5,000,0 Vpp<br>0,000,0 Vw<br>0,000 V | Citizet                 |
| đ                |          | 0,000,0 VH  | Ctfset                  |

#### Channels and system setting

|              | Ubility  | Channel  |
|--------------|----------|----------|
| CH1 Sync     | :On      | Set      |
| CHT Polarity | Normal   | Coupling |
| CH1 Delay    | 0,0 ns   | Set      |
| CH1 Output   | Normal   | Channel  |
| CH1 Resi     | HighZ    | Copy     |
| CH1 Mode     | Normal   | Set To   |
| CH1 Gated    | Positive | Default  |
| CH1 Range    | Auto     |          |
|              |          | Language |



#### Waveform summing function

| :Ott<br>ce :Sine   | 01                     |
|--------------------|------------------------|
| re (Sine           |                        |
|                    | Sum                    |
| -1,000,000,000 kHz | Saurce                 |
| 100,0 %            | Sum<br>Freq            |
|                    | Sum<br>Ratio           |
|                    | -1,000,000,000 kHz<br> |

#### In line with LXI Core Device 2011

|              | Ublity             | DHCP       |
|--------------|--------------------|------------|
| LAN Status   | Disconnect         | 06         |
| IP Configure |                    | Autol      |
| DHCP         | :ON / 1/21         | Ön         |
| Auto IP      | ON LAN             | Manual     |
| Manual IP    | OFF                | Off        |
| MAC          | :00-14-0E-42-12-CF | ( Bitter   |
| VISA         | TCPIPO: 0.0        | Defaul     |
|              | 0.0 INSTR          | Config     |
|              |                    | Curren     |
| and a        | / ON IS            | tor Config |

#### Sweep function

|                                 | 1,000,0 s<br>0,0 ms<br>100,000,000 Hz<br>1,000,000,000 kHz<br>0FF | Type<br>Linear<br>Sweep<br>Time |
|---------------------------------|---|---------------------------------|
| Sweep                           | 1,000,0 =   | <br>Return                      |
| Return<br>Start<br>Stop<br>Mark | 0.0 ms<br>100,000,000 Hz<br>1,000,000,000 kHz<br>OFF              | Start<br>Center<br>Stop         |

# Standard 7 digits/s full function frequency counter with 200MHz bandwidth

| 1,310m         | AC OFF<br>0.000.0 V      | Gate<br>Time   |
|----------------|--------------------------|----------------|
| Freque         | ncy:                     | Select<br>Meas |
| Penod          | 99.996,250,0 Hz          | Statist        |
| Duty<br>+Width | 52,145 %<br>521,460,9 us | Displa         |
| She            | 478.542,8 ut             | Clear          |
|                | OFF NUM                  | Count          |

#### File Management Function

| C: \ |   | File   |
|------|---|--------|
| Disk | State File  | Туре   |
| No.  | 51:0.KSF<br>52:   | Browse |
|      | <ul> <li>S3:000.KSF</li> <li>S4:222.RSF</li> <li>S5:012.RSF</li> <li>S6:</li> </ul> |        |
|      | B 57:0.RSF<br>B 58:<br>B 59:  |        |
|      | <b>B</b> 510:   | Copy   |

## Specifications

All the specifications can be guaranteed if the following two conditions are met unless where noted.  $\cdot$  The generator is within the calibration period and has performed self-calibration.

• The generator has been working continuously for at least 30 minutes under the specified temperature (18°C ~ 28°C ).

All the specifications are guaranteed unless those marked with "typical".

| Model                       | DG1032Z   | DG1062Z  |
|-----------------------------|---|--|
| Channel                     | 2   | 2  |
| Max Frequency               | 30 MHz  | 60 MHz   |
| Sample Rate                 | 200 MSa/s   |  |
| Waveform                    |   |  |
| Basic Waveform              | Sine, Square, Ramp, Pulse, Noise                                      |  |
| Built-in Arbitrary Waveform |   | ise, Exponential Fall, ECG, Gauss, HaverSine, Lorentz, |
| Frequency Characteristics   |   |  |
| Sine                        | 1 µHz to 30 MHz   | 1 µHz to 60MHz   |
| Square                      | 1 µHz to 15 MHz   | 1 µHz to 25 MHz  |
| Ramp                        | 1 µHz to 500kHz   | 1 µHz to 1MHz  |
| Pulse                       | 1 µHz to 15 MHz   | 1 µHz to 25 MHz  |
| Harmonic                    | 1uHz to 10MHz   | 1uHz to 20MHz  |
| Noise (-3dB)                | 30 MHz bandwidth  | 60 MHz bandwidth                                       |
| Arbitrary Waveform          | 1 µHz to 10 MHz   | 1 µHz to 20 MHz  |
| Resolution                  | 1 µHz   |  |
| Accuracy                    | ±1 ppm of the setting value, 18°C to 28°C                             | >  |
|                             |   |  |
| Sine Wave Spectrum Purity   |   |  |
|                             | Typical (0 dBm)   |  |
| Harmonic Distortion         | DC-10 MHz (included): <-65 dBc<br>10 MHz to 30 MHz (included): <-55 d | Be   |
|                             | 30 MHz to 60 MHz (included): <-50 d                                   |  |
| Total Harmonic Distortion   | <ul> <li>&lt;0.075% (10 Hz to 20 kHz, 0 dBm)</li> </ul>               |  |
|                             | Typical (0 dBm)   |  |
| Spurious (non-harmonic)     | <pre>≤10 MHz &lt;-70 dBc &gt;10 MHz &lt;-70 dBc + 6 dB/octave</pre>   |  |
| Phase Noise                 | Typical (0 dBm, 10 kHz offset)<br>10 MHz: <-125 dBc/Hz                |  |
|                             |   |  |
| Signal Characteristics      |   |  |
| Square                      | Typical (1)(pp)   |  |
| Rise/Fall Time              | Typical (1 Vpp)<br><10ns  |  |
| Overshoot                   | Typical (100 kHz, 1 Vpp)<br>≤5%                                       |  |
| Duty Cycle                  | 0.01% to 99.99% (limited by the current                               | frequency setting)                                     |
| Non-symmetry                | 1% of the period + 5 ns   |  |
| Jitter (rms)                | Typical (1 Vpp)<br>≤5 MHz 2 ppm + 200 ps<br>> 5 MHz 200 ps            |  |
| Ramp                        |   |  |
| Linearity                   | ≤1% of peak output (typical, 1 kHz, 1 VP                              | P, 100% symmetry)                                      |
| Symmetry                    | 0% to 100%  |  |
| Pulse                       |   |  |
| Pulse Width                 | ≥16 ns (limited by the current frequency                              |  |
| Duty Cycle                  | 0.001% to 99.999% (limited by the curre                               |  |
| Rising/Falling Edge         | ≥10 ns (limited by the current frequency                              | setting and pulse width setting)                       |
| Overshoot                   | Typical (1 Vpp)<br>≤5%  |  |
| Jitter (rms)                | Typical (1 Vpp)<br>≤5 MHz 2 ppm + 200 ps<br>> 5 MHz 200 ps            |  |
| Arbitrary Waveform          |   |  |
| Waveform Length             | 8pts to 8Mpts (16Mpts optional)                                       |  |
| Vertical Resolution         | 14 bits   |  |

| Sample Rate   | 200MSa/s  |
|---|---|
| •   | Typical (1 Vpp)   |
| Min Rise/Fall Time  | <10 ns  |
|   | Typical (1 Vpp)   |
| Jitter (rms)  | ≤5 MHz 2 ppm + 200 ps   |
| Edition Mode  | > 5 MHz 200 ps  |
| Editing Mode  | Point Edit, Block Edit, Insert Built-in Waveform  |
| Harmonic Output   |   |
| Harmonic Order  | <8  |
| Harmonic Type   | Even Harmonic, Odd harmonic, Order Harmonic, User   |
| Harmonic Amplitude  | The amplitude of each order of harmonic can be set  |
| Harmonic Phase  | The phase of each order of harmonic can be set  |
| Output Characteristics  |   |
| Amplitude (into 50 Ω)   |   |
|   | ≤10 MHz: 2.5 mVpp to 10 Vpp   |
| Range   | ≤30 MHz: 2.5 mVpp to 5.0 Vpp<br>≤60 MHz: 2.5 mVpp to 2.5 Vpp  |
|   | Typical (1 kHz sine, 0 V offset, >10 mVpp, auto)  |
| Accuracy  | ±(1% of the setting value) ±1 mV  |
|   | Typical (sine, 2.5 Vpp)   |
| Flatness  | ≤10 MHz ±0.1 dB   |
|   | ≤60 MHz ±0.2 dB   |
| Unit  | Vpp, Vrms, dBm  |
| Resolution  | 0.1mVpp or 4 digits   |
| Offset (into 50 Ω)  |   |
| Range (Peak ac+dc)  | ±5 V  |
| Accuracy  | $\pm$ (1% of the setting value + 5mV + 0.5% of the amplitude)   |
| Waveform Output   |   |
| Output Impedance  | 50 Ω (typical)  |
| Protection  | Short-circuit protection, automatically disable the waveform output when overload occurs  |
| Modulation Type AM  | AM, FM, PM, ASK, FSK, PSK, PWM  |
| Carrier Waveform  | Sine, Square, Ramp, Arb (except DC)   |
| Source  | Internal/External   |
|   | Internal External   |
| Modulating Waveform   | Sine, Square, Ramp, Noise, Arb  |
|   |   |
| Modulating Waveform   | Sine, Square, Ramp, Noise, Arb  |
| Modulating Waveform<br>Modulation Depth   | Sine, Square, Ramp, Noise, Arb<br>0% to 120%  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency   | Sine, Square, Ramp, Noise, Arb0% to 120%2 mHz to 1 MHz  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br>FM   | Sine, Square, Ramp, Noise, Arb<br>0% to 120%  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br>FM<br>Carrier Waveform   | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform   | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb   |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency   | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb   |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b>  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Source  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb   |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform   | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°  |
| Modulating Waveform<br>Modulating Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz   |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b>  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Source<br>Modulating Waveform<br>Key Frequency   | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz  |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br>FM<br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br>PM<br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br>ASK<br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br>FSK   | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz   |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br><b>FSK</b><br>Carrier Waveform  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)                           |
| Modulating Waveform<br>Modulating Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br><b>FSK</b><br>Carrier Waveform<br>Source  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz   |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Phase Deviation<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br><b>FSK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Phase Deviation<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br><b>FSK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Source<br>Modulating Waveform<br>Source | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz   |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Phase Deviation<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br><b>FSK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform  | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz   |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Phase Deviation<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br><b>FSK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Source<br>Modulating Waveform<br>Source | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle |
| Modulating Waveform<br>Modulation Depth<br>Modulating Frequency<br><b>FM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Modulating Frequency<br><b>PM</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Phase Deviation<br>Modulating Frequency<br><b>ASK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br><b>FSK</b><br>Carrier Waveform<br>Source<br>Modulating Waveform<br>Key Frequency<br><b>FSK</b>                      | Sine, Square, Ramp, Noise, Arb         0% to 120%         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Noise, Arb         0° to 360°         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz         Sine, Square, Ramp, Arb (except DC)         Internal/External         Square with 50% duty cycle         2 mHz to 1 MHz   |

| Key Frequency  | 2 mHz to 1 MHz   |  |  |                              |
|--|--|--|--|------------------------------|
| PWM  |  |  |  |                              |
| Carrier Waveform   | Pulse  |  |  |                              |
| Source   | Internal/External  |  |  |                              |
| Modulating Waveform  | Sine, Square, Ramp, Noise, Arb   |  |  |                              |
| Width Deviation  | 0% to 100% of the pulse width  |  |  |                              |
| Modulating Frequency   | 2 mHz to 1 MHz   |  |  |                              |
| External Modulation Input  |  |  |  |                              |
| Input Range  | 75 mVRMS to ±5 Vac + dc  |  |  |                              |
|  | 50 kHz   |  |  |                              |
| Input Bandwidth  |  |  |  |                              |
| Input Impedance  | 10ΚΩ   |  |  |                              |
| Durat Characteristics  |  |  |  |                              |
| Burst Characteristics  |  |  | 、<br>、   |                              |
| Carrier Waveform   | Sine, Square, Ramp, Pulse, Noi   | se, Arb (except DC   |  |                              |
| Carrier Frequency  | 2 mHz to 30 MHz  |  | 2 mHz to 60 MHz  |                              |
| Burst Count  | 1 to 1,000,000 or Infinite   |  |  |                              |
| Start/Stop Phase   | 0° to 360°   |  |  |                              |
| Internal Period  | 1 µs to 500 s  |  |  |                              |
| Gated Source   | External Trigger   |  |  |                              |
| Trigger Source   | Internal, External or Manual   |  |  |                              |
| Trigger Delay  | 0 ns to 100 s  |  |  |                              |
|  |  |  |  |                              |
| Sweep Characteristics  |  |  |  |                              |
| Carrier Waveform   | Sine, Square, Ramp, Arb (excep   | ot DC)   |  |                              |
| Туре   | Linear, Log or Step  | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,  |  |                              |
| Direction  | Up or Down   |  |  |                              |
|  |  | imit of the correct  | nding corrier freque   |                              |
| Start/Stop Frequency   | The same with the upper/lower limit of the corresponding carrier frequency   |  |  |                              |
| Sweep Time   | 1 ms to 500 s  |  |  |                              |
| Hold/Return Time   | 0 ms to 500 s  |  |  |                              |
| Trigger Source   | Internal, External or Manual   |  |  |                              |
| Marker   | Falling edge of the sync signal (  | programmable)  |  |                              |
|  |  |  |  |                              |
| En  |  | p g,   |  |                              |
| Frequency Counter  |  | · · ·  |  |                              |
| Function   | Frequency, Period, Positive/Neg  | pative Pulse Width,  | Duty Cycle   |                              |
| Function<br>Frequency Resolution   | 7 digits/second (Gate Time = 1s  | pative Pulse Width,  | Duty Cycle   |                              |
| Function<br>Frequency Resolution   |  | pative Pulse Width,  | Duty Cycle   |                              |
| Function<br>Frequency Resolution<br>Frequency Range  | 7 digits/second (Gate Time = 1s  | pative Pulse Width,  |  |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement  | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range   | pative Pulse Width,<br>)   |  |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement  | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range<br>(non-modulating signal)  | pative Pulse Width,<br>)   |  |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity   | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range   | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc  | ;  |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity   | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1μHz to 100 MHz  | jative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2   | 5 Vac + dc   |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity   | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1μHz to 100 MHz<br>100 MHz to 200 MHz  | 5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±3  | 5 Vac + dc<br>.2.5 Vac + dc  |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling  | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1μHz to 100 MHz<br>100 MHz to 200 MHz<br>1 μHz to 100 MHz  | 100 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2  | 2.5 Vac + dc<br>2.5 Vac + dc<br>2.5 Vac + dc   |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling   | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1μHz to 100 MHz<br>100 MHz to 200 MHz<br>1 μHz to 100 MHz<br>100 MHz to 200 MHz  | 5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±3  | 2.5 Vac + dc<br>2.5 Vac + dc<br>2.5 Vac + dc   |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M   | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1μHz to 100 MHz<br>100 MHz to 200 MHz<br>1 μHz to 100 MHz<br>100 MHz to 200 MHz  | 100 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2  | 2.5 Vac + dc<br>2.5 Vac + dc<br>2.5 Vac + dc   |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude  | 7 digits/second (Gate Time = 1s<br>1 μHz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1μHz to 100 MHz<br>100 MHz to 200 MHz<br>1 μHz to 100 MHz<br>100 MHz to 200 MHz  | 100 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2  | .5 Vac + dc<br>.2.5 Vac + dc<br>.5 Vpp<br>.2.5 Vpp<br>.2.5 Vpp   |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude  | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz   | 50 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2<br>50 mVRMS to ±2   | .5 Vac + dc<br>.2.5 Vac + dc<br>.5 Vpp<br>.2.5 Vpp<br>.2.5 Vpp   |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges  | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>50 mVRMS to ±2<br>20 ms  | .5 Vac + dc<br>.2.5 Vac + dc<br>.5 Vpp<br>.2.5 Vpp<br>.2.5 Vpp   | DC Coupling                  |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width   | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>50 mVRMS to ±2<br>≥20 ns<br>5 ns   | .5 Vac + dc<br>.2.5 Vac + dc<br>.5 Vpp<br>.2.5 Vpp<br>.2.5 Vpp   | DC Coupling                  |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle   | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>50 mVRMS to ±2<br>20 ms  | .5 Vac + dc<br>.2.5 Vac + dc<br>.5 Vpp<br>.2.5 Vpp<br>.2.5 Vpp   | DC Coupling                  |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics  | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>50 mVRMS to ±2<br>≥20 ns<br>5 ns   | .5 Vac + dc<br>.2.5 Vac + dc<br>.5 Vpp<br>.2.5 Vpp<br>.2.5 Vpp   | DC Coupling                  |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics  | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>50 mVRMS to ±2<br>≥20 ns<br>5 ns   | .5 Vac + dc<br>.2.5 Vac + dc<br>.5 Vpp<br>.2.5 Vpp<br>.2.5 Vpp   |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics  | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution<br>Measurement Range (display)   | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%   | .5 Vac + dc<br>.2.5 Vac + dc<br>.5 Vpp<br>.2.5 Vpp<br>.2.5 Vpp   |                              |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range                                      | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution<br>Measurement Range (display)<br>Breakdown Voltage  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw  | :.5 Vac + dc<br>:2.5 Vac + dc<br>:.5 Vpp<br>:2.5 Vpp<br>:.5 Vac + dc   | Input Impedance = 1 MΩ       |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range                                      | 7 digits/second (Gate Time = 1s         1 μHz to 200 MHz         Measurement Range         (non-modulating signal)         DC Offset Range         1μHz to 100 MHz         100 MHz to 200 MHz         1 μHz to 100 MHz         100 MHz to 200 MHz         100 MHz to 200 MHz         Ideasurement         1 μHz to 25 MHz         Min Pulse Width         Pulse Width Resolution         Measurement Range (display)         Breakdown Voltage         Coupling Mode         High-frequency Rejection  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw  | :.5 Vac + dc<br>:2.5 Vac + dc<br>:.5 Vpp<br>:2.5 Vpp<br>:.5 Vac + dc   | Input Impedance = 1 MΩ       |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range<br>Input Adjustment                  | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution<br>Measurement Range (display)<br>Breakdown Voltage<br>Coupling Mode<br>High-frequency Rejection<br>Trigger Level Range  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw<br>-2.5V to +2.5V  | :.5 Vac + dc<br>:2.5 Vac + dc<br>:.5 Vpp<br>:2.5 Vpp<br>:.5 Vac + dc<br>:.5 Vac + dc<br>idth = 250 kHz;<br>idth = 200 MHz  | Input Impedance = 1 MΩ<br>DC |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range<br>Input Adjustment                  | 7 digits/second (Gate Time = 1s         1 μHz to 200 MHz         Measurement Range         (non-modulating signal)         DC Offset Range         1μHz to 100 MHz         100 MHz to 200 MHz         1 μHz to 100 MHz         100 MHz to 200 MHz         100 MHz to 200 MHz         Ideasurement         1 μHz to 25 MHz         Min Pulse Width         Pulse Width Resolution         Measurement Range (display)         Breakdown Voltage         Coupling Mode         High-frequency Rejection  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw<br>-2.5V to +2.5V  | <ul> <li>i.5 Vac + dc</li> <li>i.2.5 Vac + dc</li> <li>i.5 Vpp</li> <li>i.2.5 Vpp</li> <li>i.5 Vac + dc</li> <li>i.5 Vac + dc</li> <li>iidth = 250 kHz;</li> <li>iidth = 200 MHz</li> <li>mV hysteresis vol</li> </ul> | Input Impedance = 1 MΩ<br>DC |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range<br>Input Adjustment                  | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution<br>Measurement Range (display)<br>Breakdown Voltage<br>Coupling Mode<br>High-frequency Rejection<br>Trigger Level Range  | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw<br>-2.5V to +2.5V<br>0% (about 140   | <ul> <li>i.5 Vac + dc</li> <li>i.2.5 Vac + dc</li> <li>i.5 Vpp</li> <li>i.2.5 Vpp</li> <li>i.5 Vac + dc</li> <li>i.5 Vac + dc</li> <li>iidth = 250 kHz;</li> <li>iidth = 200 MHz</li> <li>mV hysteresis vol</li> </ul> | Input Impedance = 1 MΩ<br>DC |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range<br>Input Adjustment                  | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 200 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution<br>Measurement Range (display)<br>Breakdown Voltage<br>Coupling Mode<br>High-frequency Rejection<br>Trigger Level Range<br>Trigger Sensitivity Range   | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw<br>-2.5V to +2.5V<br>0% (about 140<br>hysteresis voltag  | <ul> <li>i.5 Vac + dc</li> <li>i.2.5 Vac + dc</li> <li>i.5 Vpp</li> <li>i.2.5 Vpp</li> <li>i.5 Vac + dc</li> <li>i.5 Vac + dc</li> <li>iidth = 250 kHz;</li> <li>iidth = 200 MHz</li> <li>mV hysteresis vol</li> </ul> | Input Impedance = 1 MΩ<br>DC |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range<br>Input Adjustment<br>Input Trigger | 7 digits/second (Gate Time = 1s<br>1 $\mu$ Hz to 200 MHz<br>Measurement Range<br>(non-modulating signal)<br>DC Offset Range<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>1 $\mu$ Hz to 100 MHz<br>100 MHz to 200 MHz<br>leasurement<br>1 $\mu$ Hz to 25 MHz<br>Min Pulse Width<br>Pulse Width Resolution<br>Measurement Range (display)<br>Breakdown Voltage<br>Coupling Mode<br>High-frequency Rejection<br>Trigger Level Range<br>Trigger Sensitivity Range<br>GateTime1<br>GateTime2   | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw<br>Off: Input Bandw<br>-2.5V to +2.5V<br>0% (about 140<br>hysteresis voltag<br>1.310ms<br>10.48ms  | <ul> <li>i.5 Vac + dc</li> <li>i.2.5 Vac + dc</li> <li>i.5 Vpp</li> <li>i.2.5 Vpp</li> <li>i.5 Vac + dc</li> <li>i.5 Vac + dc</li> <li>iidth = 250 kHz;</li> <li>iidth = 200 MHz</li> <li>mV hysteresis vol</li> </ul> | Input Impedance = 1 MΩ       |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range<br>Input Adjustment                  | 7 digits/second (Gate Time = 1s         1 μHz to 200 MHz         Measurement Range         (non-modulating signal)         DC Offset Range         1μHz to 100 MHz         100 MHz to 200 MHz         1 μHz to 100 MHz         100 MHz to 200 MHz         100 MHz to 200 MHz         1 μHz to 100 MHz         100 MHz to 200 MHz         leasurement         1 μHz to 25 MHz         Min Pulse Width         Pulse Width Resolution         Measurement Range (display)         Breakdown Voltage         Coupling Mode         High-frequency Rejection         Trigger Level Range         Trigger Sensitivity Range         GateTime1         GateTime3 | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw<br>Off: Input Bandw<br>-2.5V to +2.5V<br>0% (about 140<br>hysteresis voltag<br>1.310ms<br>10.48ms<br>166.7ms                               | <ul> <li>i.5 Vac + dc</li> <li>i.2.5 Vac + dc</li> <li>i.5 Vpp</li> <li>i.2.5 Vpp</li> <li>i.5 Vac + dc</li> <li>i.5 Vac + dc</li> <li>iidth = 250 kHz;</li> <li>iidth = 200 MHz</li> <li>mV hysteresis vol</li> </ul> | Input Impedance = 1 MΩ<br>DC |
| Function<br>Frequency Resolution<br>Frequency Range<br>Period Measurement<br>Voltage Range and Sensitivity<br>DC Coupling<br>AC Coupling<br>Pulse Width and Duty Cycle M<br>Frequency and Amplitude<br>Ranges<br>Pulse Width<br>Duty Cycle<br>Input Characteristics<br>Input Signal Range<br>Input Adjustment<br>Input Trigger | 7 digits/second (Gate Time = 1s         1 μHz to 200 MHz         Measurement Range         (non-modulating signal)         DC Offset Range         1μHz to 100 MHz         100 MHz to 200 MHz         1 μHz to 100 MHz         100 MHz to 200 MHz         100 MHz to 200 MHz         100 MHz to 200 MHz         Ieasurement         1 μHz to 25 MHz         Min Pulse Width         Pulse Width Resolution         Measurement Range (display)         Breakdown Voltage         Coupling Mode         High-frequency Rejection         Trigger Level Range         Trigger Sensitivity Range         GateTime1         GateTime3         GateTime4        | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw<br>Off: Input Bandw<br>Off: Input Bandw<br>-2.5V to +2.5V<br>0% (about 140<br>hysteresis voltag<br>1.310ms<br>10.48ms<br>166.7ms<br>1.342s | <ul> <li>i.5 Vac + dc</li> <li>i.2.5 Vac + dc</li> <li>i.5 Vpp</li> <li>i.2.5 Vpp</li> <li>i.5 Vac + dc</li> <li>i.5 Vac + dc</li> <li>iidth = 250 kHz;</li> <li>iidth = 200 MHz</li> <li>mV hysteresis vol</li> </ul> | Input Impedance = 1 MΩ<br>DC |
| Function Frequency Resolution Frequency Range Period Measurement Voltage Range and Sensitivity DC Coupling AC Coupling Pulse Width and Duty Cycle M Frequency and Amplitude Ranges Pulse Width Duty Cycle Input Characteristics Input Signal Range Input Adjustment Input Trigger  | 7 digits/second (Gate Time = 1s         1 μHz to 200 MHz         Measurement Range         (non-modulating signal)         DC Offset Range         1μHz to 100 MHz         100 MHz to 200 MHz         1 μHz to 100 MHz         100 MHz to 200 MHz         100 MHz to 200 MHz         1 μHz to 100 MHz         100 MHz to 200 MHz         leasurement         1 μHz to 25 MHz         Min Pulse Width         Pulse Width Resolution         Measurement Range (display)         Breakdown Voltage         Coupling Mode         High-frequency Rejection         Trigger Level Range         Trigger Sensitivity Range         GateTime1         GateTime3 | ative Pulse Width,<br>)<br>5ns to 16 days<br>±1.5 Vdc<br>50 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>100 mVRMS to ±2<br>20 mVRMS to ±2<br>≥20 ns<br>5 ns<br>0% to 100%<br>±7Vac+dc<br>AC<br>On: Input Bandw<br>Off: Input Bandw<br>-2.5V to +2.5V<br>0% (about 140<br>hysteresis voltag<br>1.310ms<br>10.48ms<br>166.7ms   | <ul> <li>i.5 Vac + dc</li> <li>i.2.5 Vac + dc</li> <li>i.5 Vpp</li> <li>i.2.5 Vpp</li> <li>i.5 Vac + dc</li> <li>i.5 Vac + dc</li> <li>iidth = 250 kHz;</li> <li>iidth = 200 MHz</li> <li>mV hysteresis vol</li> </ul> | Input Impedance = 1 MΩ<br>DC |

| Trigger Characteristics |  |
|-------------------------|--|
| Trigger Input           |  |
| Level                   | TTL-compatible                                       |
| Slope                   | Rising or falling (selectable)                       |
| Pulse Width             | >100ns   |
| Latency                 | Sweep: <100 ns (typical)<br>Burst: <300 ns (typical) |
| Trigger Output          |  |
| Level                   | TTL-compatible                                       |
| Pulse Width             | > 60 ns (typical)                                    |
| Maximum Frequency       | 1 MHz  |

| Reference Clock           |                   |
|---------------------------|-------------------|
| Phase Offset              |                   |
| Range                     | 0° to 360°        |
| Resolution                | 0.03°             |
| External Reference Input  |                   |
| Lock Range                | 10 MHz ± 50 Hz    |
| Level                     | 250 mVpp to 5 Vpp |
| Lock Time                 | <2s               |
| Input Impedance (Typical) | 1 kΩ, AC coupling |
| Internal Reference Output |                   |
| Frequency                 | 10 MHz ± 50 Hz    |
| Level                     | 3.3 Vpp           |
| Input Impedance (Typical) | 50 Ω, AC coupling |

| Sync Output |                     |
|-------------|---------------------|
| Level       | TTL-compatible      |
| Impedance   | 50 Ω, nominal value |

#### **Overvoltage Protection**

Occurred when:

- The instrument amplitude setting is greater than 2Vpp or the output offset is greater than |2Vpc| and the input voltage is greater than ±11.5 × (1 ± 5%)V (<10kHz).</li>
- The instrument amplitude setting is lower than or equal to 2Vpp or the output offset is lower than or equal to |2Vpc| and the input voltage is greater than ±3.5 × (1 ± 5%)V (<10kHz).

| General Specifications |  |
|------------------------|--|
| Power Supply           |  |
| Power Voltage          | 100 V to 240 V (45 Hz to 440 Hz)   |
| Power Consumption      | Lower than 40 W  |
| Fuse                   | 250 V, T3.15 A   |
| Display                |  |
| Туре                   | 3.5-inch TFT LCD   |
| Resolution             | 320 horizontal × RGB × 240 vertical resolution   |
| Color                  | 16 M color   |
| Environment            |  |
| Temperature Range      | Operating: 0°C to 50°C<br>Non-operating: -40°C to 70°C   |
| Cooling Method         | Fan cooling  |
| Humidity Range         | Lower than 30°C : ≤95% relative humidity<br>30°C to 40°C : ≤75% relative humidity<br>40°C to 50°C : ≤45% relative humidity |
| Altitude               | Operating: below 3000 meters<br>Non-operating: below 15,000 meters   |
| Mechanical             |  |
| Dimensions (W×H×D)     | 261.5 mm × 112 mm × 318.4 mm   |
| Weight                 | Without Package: 3.2 kg<br>With Package: 4.5 kg  |
| Interfaces             | USB Host, USB Device, LAN  |
| IP Protection          | IP2X   |
| Calibration Interval   | 1 year recommended calibration interval  |

| Certification Information |   |  |
|---------------------------|---|--|
|                           | in line with EN61326-1:2006   |  |
|                           | IEC 61000-3-2:2000  | ±4.0kV (contact discharge)<br>±4.0kV (air discharge)   |
|                           | IEC 61000-4-3:2002  | 3 V/m (80 MHz to 1 GHz)<br>3 V/m (1.4 GHz to 2 GHz)<br>1 V/m (2.0 GHz to 2.7 GHz)  |
|                           | IEC 61000-4-4:2004  | 1 kV power lines   |
| EMC                       | IEC 61000-4-5:2001  | 0.5kV (Phase to Neutral)<br>0.5kV (Phase to PE)<br>1 kV (Neutral to PE)  |
|                           | IEC 61000-4-6:2003  | 3V,0.15MHz-80MHz   |
|                           | IEC 61000-4-11:2004   | Voltage dip:<br>0 % UT during half cycle<br>0 % UT during 1 cycle<br>70 % UT during 25 cycles<br>Short interruption:<br>0 % UT during 250 cycles |
| Electrical Safety         | Electrical Safety in line with<br>USA:UL 61010-1:2012,<br>Canada: CAN/CSA-C22.2 No. 61010-1-2012<br>EN 61010-1:2010 |  |

### Ordering Information

|                      | Description                                   | Order Number        |
|----------------------|---|---------------------|
| Model                | DG1032Z (30MHz, Dual-channel)                 | DG1032Z             |
|                      | DG1062Z (60MHz, Dual-channel)                 | DG1062Z             |
| Standard Accessories | Power Cord                                    | -                   |
|                      | USB Cable                                     | CB-USBA-USBB-FF-150 |
|                      | BNC Cable                                     | CB-BNC-BNC-MM-100   |
|                      | Quick Guide                                   | -                   |
|                      | Resource CD (including User's Guide and etc.) | -                   |
| Options              | 16Mpts Memory for Arb                         | Arb16M-DG1000Z      |
|                      | Rack Mount Kit (for single instrument)        | RM-1-DG1000Z        |
|                      | Rack Mount Kit (for dual instruments)         | RM-2-DG1000Z        |
|                      | 40dB Attenuator                               | RA5040K             |
|                      | 10W Power Amplifier                           | PA1011              |
|                      | USB-GPIB Converter                            | USB-GPIB            |

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