



50 MHz Arbitrary Waveform Generator The LXI interface makes easier for the test system!

Function Generator



The FGA5050 is a function generator that equips with the arbitrary waveform function. In addition to Sine waveform, Square waveform, Ramp waveform of those custom waveform generation function, the FGA5050 offers to realize high precision waveform with 1 μ Hz of resolution and 50 MHz of wideband frequency. The FGA5050 can be used in wide application such as "Voltage variation test for Automotive Electronic Components", "ECU false signal source", "Charge-Discharge test for the rechargeable battery", "Ripple super-impose test" and it can be used as the trigger signal for the various type of test system. Further more, three types of interface, LAN / USB / GPIB* are equipped with the FGA5050 as standard feature, it applies for automated test along with manual operation.

Wide band frequency

- Sine waveform : 1 μHz to 50 MHz, Square waveform : 1 μHz to 25 MHz
- Sine waveform, Square waveform, Ramp waveform, Triangle waveform, Pulse waveform, Noise waveform, DC, Arbitrary waveform output
- Waveform editor application software "WAVEPATT" is included as standard
- Various modulation types AM, FM, PM, FSK, PWM, Frequency sweep, Burst, External Modulation Input
- I6 bits / up to 50 MHz pattern out
- 14 bits / 256 k-point, 125 MSs/s
- 10 MHz clock in and out
- Trigger Input and Trigger output (TTL compatible)
- Interface : LAN / USB / GPIB* standard

*Only available in Model FGA5050GC

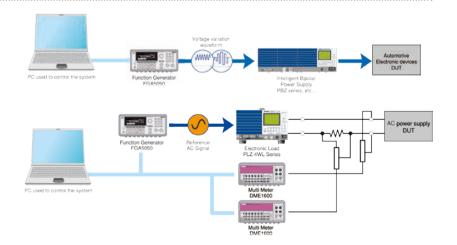
Application

Voltage variation test for Automotive Electronic devices

The system combined with the FGA5050 and the Bipolar power supply, it can be used as the "Signal Source" for the "Voltage variation test of the automotive electronic components" complied to the ISO standard and other manufacturer's standard.

Measurement of the output impedance of the power supply

The system combined with the FGA5050, electronic load, and multi-meter, it can be used as the "Reference AC Signal" for the "Impedance measurement of power supply output".



Specifications

| | acteristics Standard waveforms | Sine square ramp | triangle pulse p | pise and DC | |
|--|---|--|---|--|--|
| Waveforms | | Sine, square, ramp, triangle, pulse, noise, and DC Exponential rising wave, exponential falling wave, reverse ramp | | | |
| | Arbitrary waveforms | | ardiac electrogram wave) | | |
| | Frequency | 1 µHz to 50 MHz | | | |
| | Amplitude | Less than 100 kHz | | 0.1 dB | |
| | flatness *1 *2 | Less than 5 MHz | | 0.15 dB | |
| | (relative to 1 kHz) | Less than 20 MHz | | 0.3 dB | |
| | | Less than 50 MHz | | 0.5 dB | |
| | Harmonic distortion *2 *3 | DC to 20 kHz 20 kHz to 100 kHz | Less than 1 Vpp 1 Vpp or more | -70 dBc -70 dBc | |
| | | | Less than 1 Vpp | -65 dBc | |
| | | | 1 Vpp or more | -60 dBc | |
| Sine waves | | 100 kHz to 1 MHz | Less than 1 Vpp | -50 dBc | |
| | | | 1 Vpp or more | -45 dBc | |
| | | | Less than 1 Vpp | -40 dBc | |
| | | | 1 Vpp or more | -35 dBc | |
| | | 20 MHz to 50 MHz | Less than 1 Vpp | -35 dBc | |
| | | | 1 Vpp or more | -30 dBc | |
| | Total harmonic distortion | DC to 20 kHz | 0.5 Vpp or more | 0.06 % or less | |
| | Spurious *2 *4 | DC to 1 MHz | | -70 dBc | |
| | (non-harmonic) | 1 MHz to 50 MHz | | -70 dBc + 6 dB/octave | |
| | Phase noise (10 kHz offset) | | Typically -115 dBc/Hz | | |
| | Frequency Rising, falling time | 1 µHz to 25 MHz Less than 10 ns | | | |
| | Overshoot | Less than 10 ns | | | |
| Square waves | | Less than 10 MHz | | 20 % to 80 % | |
| oquare waves | Variable duty cycle | Less than 25 MHz | | 40 % to 60 % | |
| | Asymmetry | 50 % duty cycle | | 1 % of period + 5 ns | |
| | Jitter (RMS) | 0.1 Vpp or more, 1 | MHz or more | 200 ps | |
| _ | Frequency | 1 µHz to 200 kHz | | | |
| Ramp and triangle waves | Linearity | Less than 0.1 % of | the peak output | | |
| | Symmetry | 0.0 % to 100.0 % | | | |
| | Frequency | 500 µHz to 10 MHz | | | |
| Pulse wave | Pulse width | 20 ns minimum | | | |
| | | Resolution (period ≤ 10 s) 10 ns | | | |
| | Variable edge time | Less than 10 ns to 100 ns | | | |
| | Overshoot | Less than 2 % | | | |
| Noise waves | Jitter (RMS) Bandwidth | 0.1 Vpp or more, 50 kHz or more 200 ps | | | |
| NOISE WAVES | Frequency | Typically 20 MHz 1 µHz to 10 MHz | | | |
| | Wavelength | 2 to 256 K points | | | |
| | Resolution | 14 bits (including the sign) | | | |
| | Sampling rate | 125 megasamples per second | | | |
| Arbitrary waveforms | Minimum rising or falling time | | | | |
| waveloinis | Linearity | Less than 0.1 % of | the peak output | | |
| | Cattling times | Up to 0.5 % of the f | final value | 1 11 0 20 | |
| | Settling time | | 6 ns + 30 ppm | | |
| | Jitter (RMS) | 6 ns + 30 ppm | | Less than 250 ns | |
| | Jitter (RMS) Non-volatile memory | | <pre>< points per wavef</pre> | | |
| | Jitter (RMS) Non-volatile memory form characteristics | 6 ns + 30 ppm 4 waveforms, 256 k | <pre>< points per wavefo</pre> | | |
| | Jitter (RMS) Non-volatile memory | 6 ns + 30 ppm 4 waveforms, 256 k 1 μHz | <pre>< points per wavefe</pre> | orm | |
| | Jitter (RMS) Non-volatile memory form characteristics | 6 ns + 30 ppm 4 waveforms, 256 k 1 μHz 50 Ω termination | <pre>< points per wavefe</pre> | orm 10 mVpp to 10 Vpp | |
| Frequency | Jitter (RMS) Non-volatile memory form characteristics Resolution Range | 6 ns + 30 ppm 4 waveforms, 256 k 1 μHz 50 Ω termination No termination | <pre>< points per wavefe</pre> | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp | |
| Frequency | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 | 6 ns + 30 ppm 4 waveforms, 256 H 1 μHz 50 Ω termination No termination At 1 kHz | | orm 10 mVpp to 10 Vpp | |
| Frequency | Jitter (RMS) Non-volatile memory form characteristics Resolution Range | 6 ns + 30 ppm 4 waveforms, 256 k 1 μHz 50 Ω termination No termination At 1 kHz Vpp, Vrms, and dBd | | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp | |
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| Frequency | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution | 6 ns + 30 ppm 4 waveforms, 256 H 1 μHz 50 Ω termination No termination At 1 KHz Vpp, Vrms, and dBi 4 digits | | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp | |
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| Frequency Amplitude | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution Range (peak AC + DC) | 6 ns + 30 ppm 4 waveforms, 256 h 1 μHz $50 \Omega \text{ termination}$ No termination At 1 kHz Vpp, Vrms, and dBi 4 digits $50 \Omega \text{ termination}$ No termination $k_2 \% \text{ of offset settii}$ 4 digits | m | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp ±5 V ±10 V | |
| Frequency | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution Range (peak AC + DC) Accuracy *2 *5 | 6 ns + 30 ppm 4 waveforms, 256 h 1 μHz 50 Ω termination No termination At 1 kHz Vpp, Vrms, and dBi 4 digits 50 Ω termination ±2 % of offset settii | m | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp ±5 V ±10 V | |
| Frequency Amplitude DC offset | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution Range (peak AC + DC) Accuracy *2 *5 Resolution Impedance Isolation | 6 ns + 30 ppm 4 waveforms, 256 H 1 μHz 50 Ω termination No termination At 1 KHz Vpp, Vrms, and dBi 4 digits 50 Ω termination ±2 % of offset settii 4 digits Typically 50 Ω | m ng ±0.5 % of ampli | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp ±5 V ±10 V tude setting ±2 mV | |
| Frequency Amplitude DC offset Main Output | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution Range (peak AC + DC) Accuracy *2 *5 Resolution Impedance | 6 ns + 30 ppm 4 waveforms, 256 h 1 μHz 50 Ω termination No termination At 1 kHz Vpp, Vrms, and dBi 4 digits 50 Ω termination ±2 % of offset settii 4 digits Typically 50 Ω From earth Short-circuit protect | m ng ±0.5 % of ampli | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp ±5 V ±10 V tude setting ±2 mV Up to 42 Vpk pratically stops output | |
| Frequency Amplitude DC offset Main Output Internal frequency | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution Range (peak AC + DC) Accuracy *2 *5 Resolution Impedance Isolation Protection | 6 ns + 30 ppm 4 waveforms, 256 H 1 μHz 50 Ω termination At 1 kHz Vpp, Vrms, and dBi 4 digits 50 Ω termination No termination ±2 % of offset settiit 4 digits Typically 50 Ω From earth Short-circuit protec 90 days | m ng ±0.5 % of ampli | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp ±5 V ±10 V tude setting ±2 mV Up to 42 Vpk matically stops output ±10 pm | |
| Frequency Amplitude DC offset Main Output nternal frequency eference | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution Range (peak AC + DC) Accuracy *2 *5 Resolution Impedance Isolation Protection Accuracy *5 | 6 ns + 30 ppm 4 waveforms, 256 H 1 μHz 50 Ω termination No termination At 1 KHz Vpp, Vrms, and dBi 4 digits 50 Ω termination ±2 % of offset settil 4 digits Typically 50 Ω From earth Short-circuit protect 90 days 1 year | m ng ±0.5 % of ampli | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp ±5 V ±10 V tude setting ±2 mV Up to 42 Vpk pratically stops output | |
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| Frequency Amplitude DC offset Main Output Internal frequency reference External frequency | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution Range (peak AC + DC) Accuracy *2 *5 Resolution Impedance Isolation Protection Accuracy *5 Lock range Level | 6 ns + 30 ppm 4 waveforms, 256 h 1 μHz 50 Ω termination No termination At 1 kHz Vpp, Vrms, and dBi 4 digits 50 Ω termination ±2 % of offset settif 4 digits Typically 50 Ω From earth Short-circuit protec 90 days 1 year 10 MHz ± 500 Hz 100 mVpp to 5 Vpp | m ng ±0.5 % of ampli tion, overload auto | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp ±5 V ±10 V tude setting ±2 mV Up to 42 Vpk pmatically stops output ±10 ppm ±20 ppm | |
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| Common waves Frequency Amplitude DC offset Main Output Internal frequency reference External frequency reference input Frequency reference output Phase offset | Jitter (RMS) Non-volatile memory form characteristics Resolution Range Accuracy *2 *5 Units Resolution Range (peak AC + DC) Accuracy *2 *5 Resolution Impedance Isolation Protection Accuracy *5 Lock range Level Impedance Lock time Lock range Level Lock range | 6 ns + 30 ppm 4 waveforms, 256 H 1 μHz 50 Ω termination No termination At 1 kHz Vpp, Vrms, and dBi 4 digits 50 Ω termination No termination ±2 % of offset settil 4 digits Typically 50 Ω From earth Short-circuit protece 90 days 1 year 10 MHz ± 500 Hz 100 mVpp to 5 Vpp AC coupled Less than 2 s 10 MHz Typically 632 mVpp | m ng ±0.5 % of ampli ction, overload auto | 10 mVpp to 10 Vpp 20 mVpp to 20 Vpp ±1 % of setting ± 1 mVpp ±5 V ±10 V tude setting ± 2 mV Up to 42 Vpk omatically stops output ±10 ppm ±20 ppm | |

Add 1/10th to the output amplitude and DC offset specifications per 1 °C for operations out-side the range of *1 18 °C to 28 °C. When autoranging is enabled DC offset set to 0 V

*2 *3

3 DLC offset set to 0 V
 4 Spurious output at low amplitudes is typically -75 dBm.
 5 Add 1 ppm/1 °C (average) for operations outside the range of 18 °C to 28 °C.
 76 FSK modulation uses the Trig In/Out, FSK/Burst connector (the maximum frequency is 1 MHz).
 7 Sine and square waveforms above 10 MHz are can only be used with an infinite burst count.

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Issue:Oct.2019

| Carrier wave Sine, square, ramp, or arbitrary Modulation signal Internal or external Internal modulation signal Sine, square, ramp, triangle, noise, or arbitrary FM Carrier wave Sine, square, ramp, triangle, noise, or arbitrary Modulation signal Internal modulation signal Sine, square, ramp, or arbitrary Internal modulation signal Internal or external Internal modulation signal Internal modulation signal DC to 25 MHz DC to 25 MHz PM Carrier wave Sine, square, ramp, or arbitrary Internal modulation signal Internal or external Modulation signal Internal or external Internal modulation signal Internal or external Modulation signal Internal or external Internal modulation signal Internal or external Internal modulation signal | lodulation | AM, FM, PM. F | FSK, PWM. s | weep, and burst | | |
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| Internal modulation dipph 0.0 % to 120.0 % FM Carrier wave Sine, square, ramp, or arbitrary Internal modulation signal Internal or external Internal modulation signal Sine, square, ramp, triangle, noise, or arbitrary Internal modulation signal Internal or external Deviation DC to 25 MHz Modulation signal Internal or external Internal modulation signal Sine, square, ramp, triangle, noise, or arbitrary Internal modulation signal Sine, square, ramp, triangle, noise, or arbitrary Internal modulation signal Internal or external Modulation signal Internal or external Internal modulation signal Internal or external Internal modulation signal Internal or external Modulation signal Internal or external Internal modulation signal Internal or external Internal modulation signal Internal or | | | | | | |
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| Trequency range DC to 25 MHz PM Carrier wave Sine, square, ramp, or arbitrary Modulation signal Internal or external Internal modulation signal Sine, square, ramp, triangle, noise, or arbitrary Internal modulation signal 2 mHz to 20 kHz Deviation 0.0 ° to 360 ° Modulation signal Internal or external Internal modulation signal Sine, square, ramp, triangle, noise, or arbitrary Internal modulation signal Sine, square, ramp, or arbitrary Internal modulation signal Square, ramp, or arbitrary Modulation signal Internal or external Internal modulation signal Square wave signal with a 50 % duty cycle Internal modulation signal Square wave signal with a 50 % duty cycle Internal modulation signal Square wave signal with a 50 % duty cycle Internal modulation signal Square wave signal with a 50 % duty cycle Internal modulation signal Square wave signal with a 50 % duty cycle Internal modulation signal Square wave signal with a 50 % duty cycle Internal modulation signal Square wave signal with a 50 % duty cycle Internal or external <td< td=""><td>1</td><td colspan="2"></td><td colspan="2">2 mHz to 20 kHz</td></td<> | 1 | | | 2 mHz to 20 kHz | | |
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| Input voltage range Single-phase 100 Vac to 240 Vac, 50 Hz to 60 Hz Single-phase 100 Vac to 120 Vac, 400 Hz Input frequency range 50 Hz/60 Hz, 400 Hz | | | | 2 to 256 K points | | |
| Input voltage range Single-phase 100 Vac to 240 Vac, 50 Hz to 60 Hz Single-phase 100 Vac to 120 Vac, 400 Hz Input frequency range 50 Hz/60 Hz, 400 Hz | eneral | | | | | |
| Input frequency range Single-phase 100 Vac to 120 Vac, 400 Hz 50 Hz/60 Hz, 400 Hz | | | Single-phas | e 100 Vac to 240 Vac, 50 Hz to 60 Hz | | |
| Input frequency range 50 Hz/60 Hz, 400 Hz | | | | | | |
| | | | | | | |
| | | | | | | |
| Operating temperature range 0 °C to 55 °C (80 %rh or less, no condensation) | | | | | | |
| | | | | · · · | | |
| Operating altitude Up to 2000 m | 0 1 0 | | | | | |
| | | | | | | |
| | | | 253W × 107H × 381D mm (9.96W × 4.21H × 15.0D inch)/ Approx. 4 kg(8.8 lb) | | | |
| Interfaces LAN, USB, GPIB (factory option) | iterfaces | | | | | |
| Accessories "Power cord" 1 pc. (with three-pronged plug). "Pattern generator cat "USB cable" 1pc., "CD-R" 1pc., "Packing list,safety precautions" 1 I Japanese, "China RoHS disclosure report" 1pc. | Accessories "USB cable | | "USB cable" | 1pc., "CD-R"* 1pc., "Packing list, safety precautions" 1 English, 1 | | |
| Electromagnetic compatibility Complies with the requirements of the following directive and standa EMC Directive 2014/30/EU, EN 61326-1(Class A), EN 55011(Class A) | Electromagnetic compatibility Complies | | Complies wi EMC Directi | th the requirements of the following directive and standard. ve 2014/30/EU, EN 61326-1(Class A), EN 55011(Class A, Group | | |
| Complies with the requirements of the following directive and standa | - (-) | | EN 61000-3-2, EN 61000-3-3 Complies with the requirements of the following directive and standard | | | |
| Safety Low Voltage Directive 2014/35/EU, EN 61010-1(Class I, Pollution de | Safety | | | | | |

*including the "Operation Manual" and "Communication Interface Manual"

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