KIKUSUI

NEW

LXI CE

50MHz Arbitrary Waveform Generator

The LXI interface makes easier for the test system !

Function Generator

FGA5050

- **FGA5050**
- **FGA5050GC** (with GPIB)

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 μHz of resolution and 50MHz 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 : 1μHz to 50MHz, Square waveform : 1μHz to 25MHz
- 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
- 16 bits / up to 50MHz pattern out
- 14 bits / 256k-point, 125MSs/s
- 10MHz clock in and out
- Trigger Input and Trigger output (TTL compatible)
- Interface : LAN / USB / GPIB*standard

*Only available in Model FGA5050GC

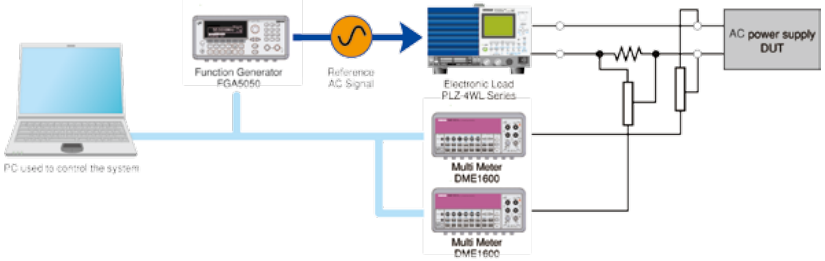
Application

Voltage variation test for Automotive Electronic devices

The system combined with the FGA5050 and the Bi-polar 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

Waveform Characteristic				
Waveform	Standard waveforms	Sine, Square, Ramp, Triangle, Pulse, Noise, DC		
	Built-in arbitrary waveforms	Exponential Rise and Fall、Negative ramp、Sin(x)/x 、cardiac		
Sine	Frequency	1 μHz to 50 MHz		
	Amplitude Flatness *1 *2 (Relative to 1 kHz)	< 100 kHz	0.1 dB	
		< 5 MHz	0.15 dB	
		< 20 MHz	0.3 dB	
		< 50 MHz	0.5 dB	
	Harmonic distortion *2 *3	DC to 20 kHz	< 1 Vpp	-70 dBc
			≥ 1 Vpp	-70 dBc
		20 kHz to 100 kHz	< 1 Vpp	-65 dBc
			≥ 1 Vpp	-60 dBc
		100 kHz to 1 MHz	< 1 Vpp	-50 dBc
			≥ 1 Vpp	-45 dBc
		1 MHz to 20 MHz	< 1 Vpp	-40 dBc
			≥ 1 Vpp	-35 dBc
		20 MHz to 50 MHz	< 1 Vpp	-35 dBc
			≥ 1 Vpp	-30 dBc
	Total Harmonic distortion	DC to 20 kHz	< 0.5 Vpp	≤ 0.06 %
	Spurious *2 *4 (non-harmonic)	DC to 1 MHz		-70 dBc
		1 MHz to 50 MHz		-70 dBc+6 db/ octave
	Phase Noise (10 kHz Offset)	≥ 1 MHz	≥ 0.1 Vpp	-115 dBc/Hz typical
Square	Frequency	1 μHz to 25 MHz		
	Rise / Fall time	< 10 ns		
	Overshoot	< 2 %		
	Variable Duty Cycle	< 10 MHz	20 % ～ 80 %	
		< 25 MHz	40 % ～ 60 %	
	Asymmetry	1%of period +5 ns (@50 % duty)		
	Jitter (RMS)	≥ 0.1 Vpp ≥ 1 MHz	200 ps	
Ramp, Triangle	Frequency	1 μHz to 200 kHz		
	Linearity	< 0.1 % of peak output		
	Symmetry	0.0 % to 100.0 %		
Pulse	Frequency	500 μHz to 10 MHz		
	Pulse width	20 ns minimum		
		10 ns res. (period ≤ 10 s)		
	Variable Edge Time	< 10 ns to 100 ns		
	Overshoot	< 2 %		
	Jitter (RMS)	≥ 0.1 Vpp ≥ 50 kHz	200 ps	
Noise	Bandwidth	20 MHz typical		
Arbitrary	Frequency	1 μHz to 10 MHz		
	Length	2 K to 256 K		
	Resolution	14 bits (including sign)		
	Sample Rate	125 M Sa/s		
	Min Rise / Fall time	30 ns typical		
	Linearity	< 0.1 % of peak output		
	Setting Time	< 250 ns to 0.5 % of finai value		
	Jitter (RMS)	6 ns+300 ppm		
	Non-voltage Memory	4 Waveforms ＊ 256 K points		

Common Characteristic		
Frequency	Resolution	1 μHz
Amplitude	Range	10 mVpp to 10 Vpp in 50Ω
		20 mVpp to 20 Vpp in No Load (open-circuited)
	Accuracy *2 *5 (at 1 kHz)	± 1 % of setting ± 1 mVpp
	Units	Vpp、Vrms、dBm
	Resolution	4 digits
DC Offset	Range	± 5 V in 50Ω
		± 10 V in No Load (open-circuited)
	Accuracy *2 *5(at 1 kHz)	± 2% of offset setting ± 0.5 % of amplitude setting
	Resolution	4 digits
Main Output	Impedance	50 Ω typical
	Isolation	42 Vpeak maximum to earth
	Protection	Short-circuit protection, Stop the output automatically at the state of over-load
Internal Frequency	Accuracy *5	± 10 ppm in 90 days
		± 20 ppm in 1 years
External Frequency Input	Lock Range	10 MHz ± 500 Hz
	Level	100 mVpp ～ 5 Vpp
	Impedance	1 kΩ typical, AC coupled
	Lock Time	< 2 sec
External Frequency Output	Lock Range	10 MHz
	Level	632 mVpp (0 dBm) typical
	Impedance	50Ω typical, AC coupled
Phase Offset	range	-360 ° ～ +360 °
	Resolution	0.001°

*1 Add 1/10th of output amplitude and offset spec per ℃ for operation outside the range of 18 ℃ to 28 ℃
*2 Autorange enabled
*3 DC offset set to 0V
*4 Spurious output at low amplitude is -75 dBm typical
*5 Add 1 ppm/℃ average for operation outside the range of 18 ℃ to 28 ℃
*6 FSK uses trigger input(1MHz maximum)
*7 Sine and square waveforms above 10 MHz are allowed only with an "infinite" burst count

Modulation		
Modulation Type	AM, FM, PM, FSK, PWM, SWEEP and BURST	
AM	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / External
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2 mHz to 20 kHz
	Depth	0.0 % to 120.0 %
FM	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / External
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2 mHz to 20 kHz
	Deviation	DC to 25 MHz
PM	Source	Internal / External
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2 mHz to 20 kHz
	Deviation	0.0 ° to 360 °
PWM	Carrier	Pulse
	Source	Internal / External
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2 mHz to 20 kHz
	Deviation	0 % to 100 %of pulse width
FSK	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / External
	Internal Modulation	50 % duty cycle Square
	Frequency (Internal)	2 mHz to 100 kHz
External Modulation Input *6	Voltage Range	± 5 V full scale
	Input Resistance	8.7 kΩ typical
	Bandwidth	DC to 20 kHz
SWEEP	Waveforms	Sine, Square, Ramp, Arb
	Type	Linear, Log
	Direction	Up or Down
	Sweep Time	1 ms to 500 s
	Trigger Source	Internal, External or Manual
	Marker	falling edge of sync signal (programmable frequency)
BURST	Waveforms*7	Sine, Square, Ramp, Triangle, Noise, Arb
	Type	Internal / External
	Start / Stop Phase	-360 ° to +360 °
	Internal Period	1 μs to 500 s
	Gated Source	External trigger
	Trigger Source	Internal, External or Manual
Trigger Input	Level	TTL compatible
	Slope	Rising or Falling (Selectable)
	Pulse width	≥ 100 ns
	Impedance	≥ 10 kΩ DC coupled
	Latency	< 500 ns
Trigger Output	Level	TTL compatible into ≥ 1 kΩ
	Pulse width	≥ 400 ns
	Impedance	50Ω typical
	Maximum rate	1 MHz
	Fan-out	≤ 4 FGA5050s

Pattern Mode Characteristic		
Output	Clock Maximum Rate	50 MHz
	Output Level	TTL compatible into ≥ 2 kΩ
	Output Impedance	110Ω typical
	Pattern Length	2 K to 256 K

General	
voltage / frequency range	100 Vac ～ 240 Vac (single phase) ／ 50 Hz/60 Hz
Power consumption	80 VAmax
Operating Temperature range	0 ℃ to 55 ℃
Operating Humidity range	30 %rh(0 ℃, 50 ℃), 40 %rh(18 ℃, 23 ℃, 28 ℃), 80 %rh(35 ℃), non condensing
Storage Temperature range	-40 ℃ to 70 ℃
Operating Altitude	Up to 2000 m
Dimensions / Weight	224 W × 107 H × 380 D mm ／ 4.08 kg
Interfaces	LAN、USB、GPIB (only GC)
Accessories	"Power cable" 1pc. (with 3P plug), "Pattern generator cable" 1pc., "USB cable" 1pc., "CD-R"*1pc., Packing list, "For Safety documents" 2pcs. (1 each for English, Japanese)
Electromagnetic compatibility (EMC)	Conforms to the requirements of the following directive and standard. EMC Directive2004/108/EC EMC: EN61326-1:2006 EMI: CISPR 11:2003 Class A、IEC61000-3-2:2000 IEC61000-3-3:1994+A1:2001 EMS:IEC61000-4-2:1995+A1:1998+A2:2000、IEC61000-4-3:2002 IEC61000-4-4:2004、IEC61000-4-5:1995+A1:2000、IEC61000-4-6:1996+A1:2000 IEC61000-4-8:1993+A1:2000、IEC61000-4-11:2004
Safety	Conforms to the requirements of the following directive and standard. IEC61010-1:2001/ EN 6010-1:2001 (2nd Edition)

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

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