



**NEW**

LXI CE

# 50 MHz Arbitrary Waveform Generator

## The LXI interface makes easier for the test system !

F u n c t i o n   G e n e r a t o r

# 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  $\mu$ Hz 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.

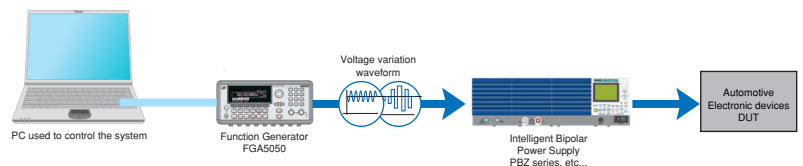
- Wide band frequency  
Sine waveform : 1 $\mu$ Hz to 50MHz, Square waveform : 1 $\mu$ Hz to 25MHz
- Sine waveform, Square waveform, Ramp waveform, Triangle waveform, Pulse waveform, Noise waveform, DC, Arbitrary waveform output
- Waveform Editor Application Software "WAVEPATT" is included as standard
- 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

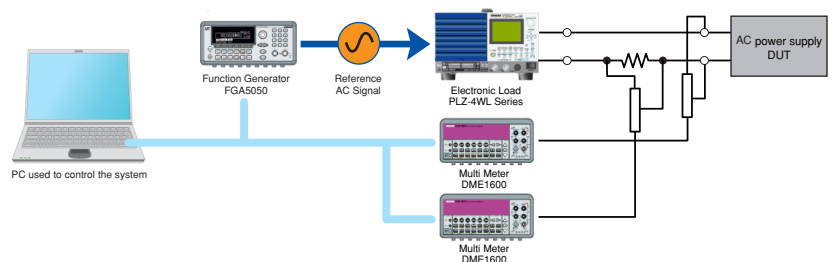
#### Voltage variation test for Automotive Electronic devices

The system combined with the FGA5050 and the 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

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	< 100 kHz < 5 MHz	0.1 dB 0.15 dB	
	Flatness *1 *2 (Relative to 1 kHz)	< 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	200 ps	
≥ 1 MHz				
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	200 ps	
		≥ 50 kHz		
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 final value		
	Jitter (RMS)	6 ns+300 ppm		
	Non-voltage Memory	4 Waveforms * 256 K points		
	Common Characteristic			
Frequency	Resolution	1 μHz		
	Range	10 mVpp to 10 Vpp in 50 Ω		
		20 mVpp to 20 Vpp in No Load (open-circuited)		
Amplitude	Accuracy *2 *5 (at 1 kHz)	± 1 % of setting ± 1 mVpp		
	Units	Vpp, Vrms, dBm		
	Resolution	4 digits		
	DC Offset	Range	± 5 V in 50 Ω ± 10 V in No Load (open-circuited)	
DC Offset	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 k Ω typical, AC coupled		
External Frequency Output	Lock Range	10 MHz		
	Level	632 mVpp (0 dBm) typical		
	Impedance	50 Ω typical, AC coupled		
Phase Offset	range	-360 ° ~ +360 °		
	Resolution	0.001°		

\*1 Add 1/10th of output amplitude and offset spec per °C for operation outside the range of 18 °C to 28 °C  
 \*2 Autorange enabled  
 \*3 DC offset set to 0V  
 \*4 Spurious output at low amplitude is -75 dBm typical  
 \*5 Add 1 ppm/C average for operation outside the range of 18 °C to 28 °C  
 \*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	
	Carrier	Sine, Square, Ramp, Arb
AM	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
PM	Deviation	DC to 25 MHz
	Source	Internal / External
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
	Frequency (Internal)	2 mHz to 20 kHz
PWM	Deviation	0.0 ° to 360 °
	Carrier	Pulse
	Source	Internal / External
	Internal Modulation	Sine, Square, Ramp, Triangle, Noise, Arb
FSK	Frequency (Internal)	2 mHz to 100 kHz
	Deviation	0 % to 100 % of pulse width
	Carrier	Sine, Square, Ramp, Arb
	Source	Internal / External
External Modulation Input *6	Internal Modulation	50 % duty cycle Square
	Frequency (Internal)	2 mHz to 100 kHz
	Voltage Range	± 5 V full scale
	Input Resistance	8.7 k Ω typical
SWEEP	Bandwidth	DC to 20 kHz
	Waveforms	Sine, Square, Ramp, Arb
	Type	Linear, Log
	Direction	Up or Down
BURST	Sweep Time	1 ms to 500 s
	Trigger Source	Internal, External or Manual
	Marker	falling edge of sync signal (programmable frequency)
	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
	Level	TTL compatible
Trigger Input	Slope	Rising or Falling (Selectable)
	Pulse width	≥ 100 ns
	Impedance	≥ 10 k Ω DC coupled
	Latency	< 500 ns
Trigger Output	Level	TTL compatible into ≥ 1 k Ω
	Pulse width	≥ 400 ns
	Impedance	50 Ω typical
	Maximum rate	1 MHz
Fan-out	≤ 4 FGA5050s	
Pattern Mode Characteristic		
Output	Clock Maximum Rate	50 MHz
	Output Level	TTL compatible into ≥ 2 k Ω
	Output Impedance	110 Ω 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 VAmx	
Operating Temperature range	0 °C to 55 °C	
Operating Humidity range	30 %rh(0 °C, 50 °C), 40 %rh(18 °C, 23 °C, 28 °C), 80 %rh(35 °C), non condensing	
Storage Temperature range	-40 °C to 70 °C	
Operating Altitude	Up to 2000 m	
Dimensions / Weight	224 W X 107 H X 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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