# AFG-3051 & AFG-3081 Specifications

The specifications apply when the AFG-3051 & AFG-3081 is powered on for at least 30 minutes under +20°C~+30°C.

| | | AFG-3081 | AFG-3051 |
|---|---|---|---|
| **Waveforms** | | **Sine, Square, Ramp, Pulse, Noise, DC, Sin(x)/x, Exponential Rise, Exponential Fall, Negative Ramp** | |
| **Arbitrary Waveforms** | | | |
| **ARB Function** | | **Built in** | |
| **Sample Rate** | | **200 MSa/s** | |
| **Repetition Rate** | | **100MHz** | |
| **Waveform Length** | | **1M points** | |
| **Amplitude Resolution** | | **16 bits** | |
| **Non-Volatile Memory** | | **Ten 1M waveforms**(1) | |
| **User define Output Section** | | **Any section from 2 to 1M points** | |
| **User define Mark Output** | | **Any section from 2 to 1M points** | |
| **Frequency Characteristics** | | | |
| **Range** | Sine | **80MHz** | **50MHz** |
| | Square | | |
| | Triangle, Ramp | **1MHz** | |
| **Resolution** | | **1uHz** | |
| **Accuracy** | Stability | **±1 ppm** 0 to 50℃ | |
| | | **±0.3 ppm** 18 to 28℃ | |
| | Aging | **±1 ppm,** per 1 year | |
| | Tolerance | **≦ 1 uHz** | |
| **Output Characteristics**(2) | | | |
| **Amplitude** | Range | **10 mVpp to 10 Vpp**( into 50Ω)<br>**20 mVpp to 20 Vpp**(open-circuit) | |
| | Accuracy | **± 1% of setting ±1 mVpp**<br>(at 1 kHz,>10 mVpp) | |
| | Resolution | **0.1 mV or 4 digits** | |
| | Flatness | **± 1% (0.1dB) <10 MHz**<br>**± 2% (0.2 dB) 10 MHz to 50 MHz**<br>**± 10% (0.9 dB) 50 MHz to 70 MHz**<br>**± 20% (1.9 dB) 70 MHz to 80 MHz**<br>(sinewave relative to 1 kHz) | |
| | Units | **Vpp, Vrms, dBm,** | |
| **Offset** | Range | **±5 Vpk ac +dc** (into 50Ω)<br>**±10Vpk ac +dc** (Open circuit) | |
| | Accuracy | **1% of setting + 2 mV+ 0.5% of amplitude** | |
| **Waveform Output** | Impedance | **50Ω typical** (fixed)<br>> 10MΩ (output disabled) | |
| | Protection | **Short-circuit protected**<br>**Overload relay auto-matically disables main output** | |
| **SYNC Output** | Level | **TTL-compatible into>1kΩ** | |
| | Impedance | **50Ω nominal** | |
| **Sinewave Characteristics** | | | |
| **Harmonic Distortion**(5) | | **–60 dBc** DC～1 MHz, Ampl＜3 Vpp<br>**–55 dBc** DC～1 MHz, Ampl＞3 Vpp<br>**–45 dBc** 1MHz～5 MHz, Ampl＞3 Vpp<br>**–30 dBc** 5MHz～80 MHz, Ampl＞3 Vpp | |
| **Total Harmonic Distortion** | | **< 0.2%+0.1mVrms**<br>DC to 20 kHz | |
| **Spurious** (non-harmonic)(5) | | **–60 dBc** DC～1 MHz | |

| | | |
|---|---|---|
| | **–50 dBc** 1MHz～20MHz<br>**–50 dBc+ 6 dBc/octave** 1MHz～80MHz | |
| **Phase Noise** | **＜-65dBc typical** 10MHz, 30 kHz band<br>**＜-47dBc typical** 80MHz, 30 kHz band | |
| **Square wave Characteristics** | | |
| **Rise/Fall Time** | **<8 nS**(3) | |
| **Overshoot** | **< 5%** | |
| **Asymmetry** | **1% of period+1 ns** | |
| **Variable Duty Cycle** | **20.0% to 80.0%** ≦ 25 MHz<br>**40.0% to 60.0%** 25～50MHz<br>**50.0%(Fixed)** 50～80MHz | |
| **Jitter** | **0.01%+525ps** ＜ 2 MHz<br>**0.1%+75ps** ＞ 2 MHz | |
| **Ramp Characteristics** | | |
| **Linearity** | **＜ 0.1% of peak output** | |
| **Variable Symmetry** | **0% to 100%** | |
| **Pulse Characteristics** | | |
| **Period** | **20ns～ 2000s** | |
| **Pulse Width** | **8ns～ 1999.9s**<br>Minimum Pulse Width:<br>8nS when FREQ≦50MHz<br>5% of setting period when FREQ≦6.5MHz<br>Resolution:<br>1nS when FREQ≦50MHz<br>1% of setting period when FREQ≦6.5MHz | |
| **Overshoot** | **<5%** | |
| **Jitter** | **100 ppm +50 ps** | |
| **AM Modulation** | | |
| **Carrier Waveforms** | **Sine, Square, Triangle, Ramp, Pulse, Arb** | |
| **Modulating Waveforms** | **Sine, Square, Triangle, Up/Dn Ramp** | |
| **Modulating Frequency** | **2 mHz to 20 kHz** | |
| **Depth** | **0% to 120.0%** | |
| **Source** | **Internal / External** | |
| **FM Modulation** | | |
| **Carrier Waveforms** | **Sine, Square, Triangle, Ramp** | |
| **Modulating Waveforms** | **Sine, Square, Triangle, Up/Dn Ramp** | |
| **Modulating Frequency** | **2 mHz to 20 kHz** | |
| **Peak Deviation** | **DC to 80 MHz** | **DC to 50 MHz** |
| **Source** | **Internal / External** | |
| **PWM** | | |
| **Carrier Waveforms** | **Square** | |
| **Modulating Waveforms** | **Sine, Square, Triangle, Up/Dn Ramp** | |
| **Modulating Frequency** | **2 mHz to 20 kHz** | |
| **Deviation** | **0% ～ 100.0% of pulse width** | |
| **Source** | **Internal / External** | |
| **FSK** | | |
| **Carrier Waveforms** | **Sine, Square, Triangle, Ramp, Pulse** | |
| **Modulating Waveforms** | **50% duty cycle square** | |
| **Internal Rate** | **2 mHz to 100 kHz** | |
| **Frequency Range** | **DC to 80 MHz** | **DC to 50 MHz** |
| **Source** | **Internal / External** | |
| **SWEEP** | | |
| **Waveforms** | **Sine, Square, Triangle, Arb** | |
| **Type** | **Linear or Logarithmic** | |

| | | | |
|---|---|---|---|
| **Direction** | | **Up or Down** | |
| **Start F / Stop FREQ** | | **100 uHz to 80 MHz** | **100 uHz to 50 MHz** |
| **Sweep Time** | | **1 ms to 500 s** | |
| **Trigger** | | **Single, External, Internal** | |
| **Marker** | | **Falling edge of Mark signal (Programmable frequency)** | |
| **Source** | | **Internal / External** | |
| **BURST** | | | |
| **Waveforms** | | **Sine, Square, Triangle, Ramp** | |
| **Frequency** | | **1 uHz to 80 MHz**(4) | **1 uHz to 50 MHz(4)** |
| **Burst Count** | | **1 to 1000000 cycles or Infinite** | |
| **Start / Stop Phase** | | **-360.0∘to +360.0∘** | |
| **Internal Period** | | **1 ms to 500 s** | |
| **Gate Source** | | **External Trigger** | |
| **Trigger Source** | | **Single, External or Internal Rate** | |
| **Trigger Delay** | | **N-Cycle, Infinite: 0s to 85 s** | |
| **External Modulation Input** | | | |
| **Type** | | **for AM, FM, Sweep, PWM** | |
| **Voltage Range** | | **± 5V full scale** | |
| **Input Impedance** | | **10kΩ** | |
| **Frequency** | | **DC to 20 kHz** | |
| **External Trigger Input** | | | |
| **Type** | | **for FSK, Burst, Sweep** | |
| **Input Level** | | **TTL Compatible** | |
| **Slope** | | **Rising or falling(selectable)** | |
| **Pulse Width** | | **> 100 ns** | |
| **Input Impedance** | | **10kΩ,DC coupled** | |
| **Latency** | Sweep | **< 10 us (typical)** | |
| | Burst | **< 100 ns (typical)** | |
| **Jitter** | Sweep | **2.5 us** | |
| | Burst | **1 ns; except pulse,300 ps** | |
| **Modulation Output** | | | |
| **Type** | | **for AM, FM, Sweep, PWM** | |
| **Amplitude** | Range | **≧1Vpp** | |
| | Impedance | **> 10kΩ typical** (fixed) | |
| **Trigger Output** | | | |
| **Type** | | **for Burst, Sweep** | |
| **Level** | | **TTL Compatible into 50Ω** | |
| **Pulse Width** | | **> 450 ns** | |
| **Maximum Rate** | | **1 MHz** | |
| **Fan-out** | | **≧4 TTL load** | |
| **Impedance** | | **50Ω typical** | |
| **Marker Output** | | | |
| **Type** | | **for ARB, Sweep** | |
| **Level** | | **TTL Compatible into 50Ω** | |
| **Fan-out** | | **≧4 TTL load** | |
| **Impedance** | | **50Ω typical** | |
| **Store/Recall** | | **10 Groups of Setting Memories** | |
| **Interface** | | **GPIB, RS232, USB** | |
| **Display** | | **4.3 inch TFT LCD 480 × 3 (RGB) × 272** | |
| **System Characteristics** | | | |
| **Configuration Times (typical)** | | **Function Change:** Standard---->102ms | |

| | | | |
|---|---|---|---|
| | Pulse--------->660ms<br>Built-In Arb- >240ms<br>**Frequency Change:** 24ms<br>**Amplitude Change:** 50ms<br>**Offset Change:** 50ms<br>**Select User Arb:** < 2s for 1M points<br>**Modulation Change:** < 200ms | | |
| **Arb Download Times** | **Binary Code** | | **ASCII Code** |
| **(typical)** | **GPIB / RS-232 (115 Kbps)** | **USB(Device)** | **USB(Host)** |
| 1M points | **189 Sec** | **34 Sec** | **70 Sec** |
| 512K points | **95 Sec** | **18Sec** | **35 Sec** |
| 256K points | **49 Sec** | **9 Sec** | **18 Sec** |
| 64K points | **16 Sec** | **3 Sec** | **6 Sec** |
| 16K points | **7 Sec** | **830mS** | **1340 mS** |
| 8K points | **6 Sec** | **490mS** | **780mS** |
| 4K points | **6 Sec** | **365mS** | **520 mS** |
| 2K points | **5 Sec** | **300mS** | **390 mS** |
| **General Specifications** | | | |
| **Power Source** | **AC100～240V , 50～60Hz** | | |
| **Power Consumption** | **65 VA** | | |
| **Operating Environment** | Temperature to satisfy the specification : **18 ~ 28◦C**<br>Operating temperature : **0 ~ 40◦C**<br>Relative Humidity:<br>**≤ 80%, 0 ~ 40°C**<br>**≤ 70%, 35 ~ 40°C**<br>Installation category： **CAT Ⅱ** | | |
| **Operating Altitude** | **2000 meters** | | |
| **Pollution Degree** | **IEC 61010 Degree 2, Indoor Use** | | |
| **Storage Temperature** | **-10 ~ 70◦C, Humidity: ≤70%** | | |
| **Dimensions (WxHxD)** | Bench Top **: 265 (W) x 107 (H) x 374 (D)** | | |
| **Weight** | **Approx. 4kg** | | |
| **Safety Designed to** | **EN61010-1** | | |
| **EMC Tested to** | **EN 55011, IEC-61326-1** | | |
| **Accessories** | **GTL-110× 1**<br>**Instruction Manual×1**<br>**Power cord×1** | | |

**(1).** A total of ten waveforms can be stored.(Every waveform can composed of 1M points maximum.)
**(2)**. Add 1/10th of output amplitude and offset specification per ◦C for operation outside of 0◦C to 28◦C range (1-year specification).
**(3).** Edge time decreased at higher frequency.
**(4).** Sine and square waveforms above 25 MHz are allowed only with an "Infinite" count.
**(5).** Harmonic distortion and Spurious noise at low amplitudes is limited by a -70 dBm floor.