



Top: AV-106A-B, -30A into 0.94 $\Omega$ . 10 V/div, 400 ns/div.  
Bottom: Narrow Monitor into 50 $\Omega$ . 1 V/div, 400 ns/div.

The AV-106 series of pulse generators is designed for pulsing laser diodes and other low impedance loads with current pulses as high 100 Amps, with wide pulse widths.

The AV-106A family provides up to 30 A with pulse widths variable from 0.5 to 50  $\mu$ s and 50 ns rise and fall times. These units will operate with a load voltage in the range of 0 to 30 V, and exhibit less than a 5% change in current for a load voltage change of 30 Volts.

For higher currents, the AV-106B family provides up to 100A in the pulse width range of 2 to 200  $\mu$ s.

For wider pulse width applications, the AV-106C family provides pulse widths to 1 ms and peak currents to 15 A.

The AV-106D family provides pulse widths to 1 ms, peak currents to 5 A and duty cycles to 50%.

The AV-106F family tolerates very high load voltages (up to 300V), making it ideal for testing laser diode stacks. The maximum current is 5A, with pulse widths up to 50 ms.

All AV-106 models (except for the AV-106F-B) have a rear-panel output connector to which a unique 100 cm long high-current transmission line may be attached (model AV-CLZ1-100). This line has a characteristic impedance ( $Z_0$ ) of 1 $\Omega$ . (see <http://www.avtechpulse.com/transmission/av-clz1> for details.) This allows the load to be placed away from the instrument without degrading the pulse shape. A medium-power test load (5 Watts) is provided with these models for the convenience of initial testing purposes.

The AV-106F provides its output on a BNC connector.

The AV-106 models are pulsed constant current sources. The output current is largely independent of the load voltage. The instrument will function properly into short circuits and diode loads. For optimal waveform shape, however, it may be beneficial to add a small resistance to the load ( $\sim 1\Omega$ ), to better match the load impedance to the cable characteristic impedance.

Either output polarity (+ or -) can be provided. All models are available with a dual polarity option. On dual polarity units, two output connector are present (one +, one -), but only one is active at a time.

A delay control and a sync output are provided for scope triggering purposes. The units can also be triggered

- Pulsed current laser diode drivers
- Peak outputs of 5 to 100 Amps
- Pulse widths from 1  $\mu$ s to 50 ms
- Rise times from 50 ns to 10  $\mu$ s
- Rugged 100 cm output cables
- IEEE-488.2 GPIB and RS-232 interfaces

externally using a TTL-level pulse. When triggered externally, the pulse width may be controlled by the front-panel controls, or the output pulse width can be set to track the input trigger pulse width. A push-button is provided for one-shot operation.

All models are available with optional remote analog electronic control (0 to +10V) of the output amplitude. Electronic control units also include the standard front-panel one-turn controls.

All models are protected against excessively high duty cycles by an automatic control feature that limits the output power for as long as the overload condition persists. All models incorporate an Output On/Off function and soft-power-on circuitry to protect the load.

A monitor output provides an attenuated coincident replica of the main output current pulse.

All models include a complete computer control interface (see <http://www.avtechpulse.com/gpib> for details). This provides GPIB and RS-232 computer-control, as well as front panel keypad and adjust knob control of the output pulse parameters. A large backlit LCD displays the output amplitude, polarity, frequency, pulse width, and delay. To allow easy integration into automated test systems, the programming command set is based on the SCPI standard, and LabView drivers are available at <http://www.avtechpulse.com/labview>.

A standard rear-panel Ethernet connector allows the instrument to be remotely controlled using the VXI-11.3, ssh, telnet, and web protocols. In particular, the VXI-11.3 feature allows software like LabView to control an instrument using standard VISA communications drivers and network cabling, instead of using older-style GPIB cabling and GPIB controller cards. For details, see <http://www.avtechpulse.com/options/vxi>.

All models require 100-240V, 50-60 Hz prime power.

See the continuously-updated applications note area of the Avtech web site for general applications assistance (<http://www.avtechpulse.com/appnote>). For the higher applications, see the AV-108 and for lower currents see the AV-107 series (<http://www.avtechpulse.com/current>).

Model <sup>1</sup> :	AV-106A-B	AV-106B-B	AV-106C-B	AV-106D-B	AV-106F-B
Amplitude <sup>2</sup> :	1 to 30 A	3 to 100 A	0.5 to 15 A	0.2 to 5 A	0.1 to 5 A
Load voltage range:	0 to 30 Volts	0 to 100 Volts	0 to 20 Volts	0 to 5 Volts	0 to 300V
Pulse width (FWHM):	0.5 to 50 us	2 to 200 us	1 us to 1 ms	1 us to 1 ms	50 us to 50 ms
Rise & fall times (20%-80%) <sup>6</sup> :	≤ 50 ns	≤ 1 us	≤ 50 ns	≤ 0.5 us	< 10 us
Maximum PRF:	1 kHz	100 Hz	1 kHz	1 kHz	20 Hz
Duty cycle: (max)	0.25%	0.1%	1%	50%	0.1%
Output impedance:	≥ 50 Ohms				
Output regulation:	≤ ±5% change in current for a load voltage change from 0 V to max. rated load voltage				
Polarity <sup>3</sup> :	Specify - Positive or negative or both. Dual polarity not available on AV-106F-B.				
GPIB & RS-232 control <sup>1</sup> :	Standard on -B units.				
LabView drivers:	Check <a href="http://www.avtechpulse.com/labview">http://www.avtechpulse.com/labview</a> for availability and downloads				
Ethernet port, for remote control using VXI-11.3, ssh, telnet, & web:	Included. Recommended as a modern alternative to GPIB / RS-232. See <a href="http://www.avtechpulse.com/options/vxi">http://www.avtechpulse.com/options/vxi</a> for details.				
Settings resolution:	The resolution of the timing parameters (pulse width, delay, period) varies, but is always better than 0.15% of ( set value  + 20 ns). The amplitude resolution is < 0.1% of the maximum amplitude.				
Settings accuracy:	Typically ± 3% of setting (plus ± 1% of maximum, for amplitude) after a 10 minute warmup. For high-accuracy applications requiring traceable calibration, verify the output parameters with a calibrated oscilloscope <sup>4</sup> .				
Propagation delay (Jitter):	≤ 100 ns, (± 100 ps ± 0.03% of sync delay, Ext trig in to pulse out)				
Trigger modes:	Internal trigger, external trigger (TTL level pulse, > 10 ns, 1 kΩ input impedance), front-panel "Single Pulse" pushbutton, or single pulse trigger via computer command				
Variable delay:	Sync to main out: 0 to 1.0 seconds, for all trigger modes (including external trigger).				
Sync output:	+3 Volts, > 50 ns, will drive 50 Ohm loads				
Gate input:	Sync or async, active high or low, switchable. Suppresses triggering when active.				
Monitor output:	Provides an attenuated coincident replica of output current pulse.				
Supplied output transmission line:	Detachable high-current transmission line cable assembly. See <a href="http://www.avtechpulse.com/transmission">http://www.avtechpulse.com/transmission</a> for details.				None
Part number, length, Z <sub>0</sub> :	AV-CLZ1-100 (see <a href="http://www.avtechpulse.com/transmission/av-clz1">http://www.avtechpulse.com/transmission/av-clz1</a> ), 1 Ω, 100 cm				N/A
Output connection:	End of cable: DB-37 male. Pins 1-19 = signal, pins 20-37 = ground.				BNC female
Supplied test load <sup>5</sup> :	AV-CTL1-ENC. See <a href="http://www.avtechpulse.com/accessories/av-ctl1">http://www.avtechpulse.com/accessories/av-ctl1</a> for details.				None
Connectors (other):	Trig, Sync, Gate, Monitor: BNC				
Power requirements:	100 - 240 Volts, 50 - 60 Hz				
Dimensions:	100 x 430 x 375 mm (3.9" x 17" x 14.8")				
Temperature range:	+5°C to +40°C				

- 1) -B suffix indicates IEEE-488.2 GPIB and RS-232 control of amplitude, pulse width, PRF and delay (see <http://www.avtechpulse.com/gpib> for details).
- 2) The minimum useful amplitude is 3% of the maximum amplitude.
- 3) Indicate desired polarity by suffixing the model number with -P or -N (i.e. positive or negative) or -PN for dual polarity option.
- 4) These instruments are provided with a basic calibration checksheet, showing a selection of measured output parameters. These measurements are performed with equipment that is calibrated on a regular basis by a third-party ISO/IEC 17025:2005 accredited calibration laboratory. However, Avtech itself does not claim any accreditation. For applications requiring traceable performance, use a calibrated measurement system rather than relying on the accuracy of the pulse generator settings.

- 5) The supplied test load is for low-duty-cycle basic operational tests only. The power rating of the load is 5 Watts. It may not be capable of supporting the instrument's full maximum average output power. See <http://www.avtechpulse.com/accessories/> for details about the AV-CTL series of test loads.
- 6) Valid for a resistive (and non-inductive) load installed at the end of the supplied output cable (at the output connector for the AV-106F-B), with a load impedance of (maximum allowed load voltage) ÷ (maximum allowed current amplitude). For lower resistances and/or more inductive loads, the rise and fall times may increase as governed by the L/R time constant, where L is the parasitic inductance of any cabling and load, and R is the load resistance.



AV-106A-B, shown with the supplied accessories (AV-CLZ1-100 cable and AV-CTL1-ENC test load).  
See <http://www.avtechpulse.com/transmission/av-clz1> for more information about the AV-CLZ1-100 cable.  
See <http://www.avtechpulse.com/accessories/av-ctl1> for more information about the AV-CTL1-ENC test load.