

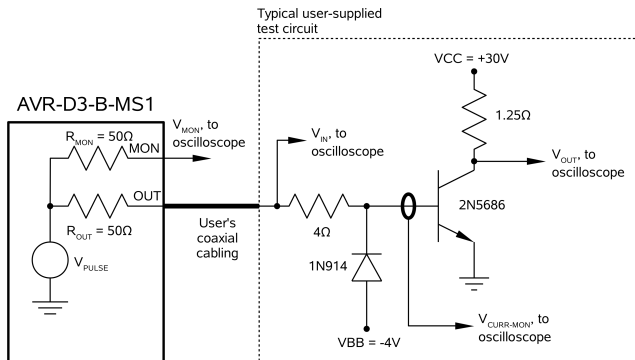
- Generates MIL-PRF-19500 test waveforms
- Voltages to  $\pm 250$  Volts
- Amplitudes to  $\pm 5$  Amps
- Rise times less than 20 ns
- IEEE-488.2 GPIB and RS-232 interfaces
- Ethernet port for VXI-11.3 support

The AVR-D3-B generates bipolar pulse waveforms of up to  $\pm 250$  Volts,  $\pm 5$  Amps, for testing the turn-on, turn-off, and storage times of high-power bipolar transistors. It is useful for MIL-STD-750E Method 3251.1 tests, including MIL-PRF-19500/464G, MIL-PRF-19500/498E, MIL-S-19500/537, and others.

The AVR-D3-B generates the bipolar waveform shown above. A wide negative pulse (with pulse width PW2 and amplitude -V2) is interrupted by a shorter positive pulse (PW1, +V1). The three highlighted transition have switching times of 20 ns or less. (The final transition to ground is slower).

This waveform allows both turn-on and turn-off transitions to be tested, without biasing the devices with thermally-troublesome DC currents.

The main output is normally connected to a user-supplied test circuit, similar to that shown below:



A 50 Ohm output impedance exists between the internal pulse generator circuit and the output connector on the front panel of the instrument.

A monitor output (“MON”) is provided as well, for monitoring the internal pulse waveform. A dedicated current transformer or current probe is recommended for current sensing.

Standard models provide the output waveform on a front-panel BNC connector, and the user is responsible for assembling a suitable test jig with the necessary matching circuitry (usually specified in the military “slash sheet”) and socketing. Avtech can provide suitable test jigs with high-speed sockets. If you require a test jig, contact Avtech ([info@avtechpulse.com](mailto:info@avtechpulse.com)) with the slash sheet number, the device part numbers, and details of the packaging.

The AVR-D3-B includes 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 back-lit 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 for download 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 additional details, please see <http://www.avtechpulse.com/options/vxi>.

The AVR-D3-B requires 100-240V, 50-60 Hz prime power.

A related model, the AVR-D2-B, is available for testing lower-current, higher-speed transistors. For details, please see <http://www.avtechpulse.com/semiconductor/avr-d2>.

These models can be customized readily to meet special test requirements.

Avtech also offers a variety of pulse generators for use in recovery time tests (forward and reverse), dV/dt tests, and common mode transient immunity tests. For more information, please visit:

<http://www.avtechpulse.com/semiconductor>



AVR-D3-B



## SPECIFICATIONS

## AVR-D3 SERIES

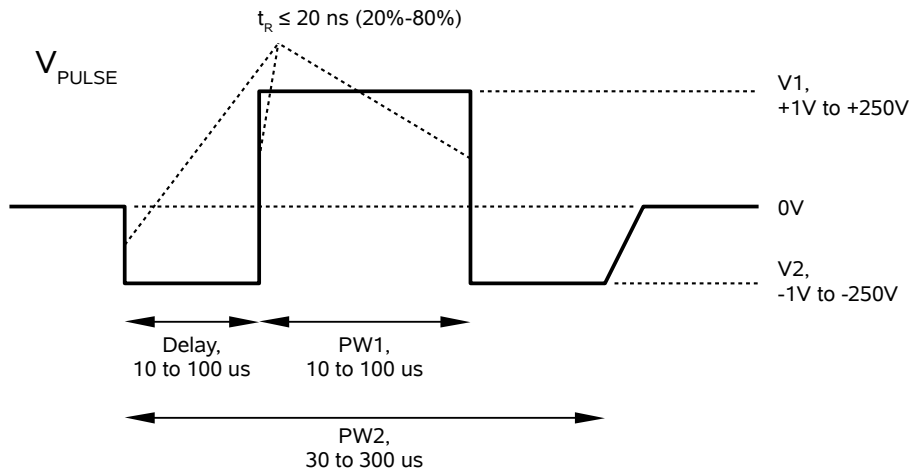
Model <sup>1</sup> :	AVR-D3-B
Waveform:	See diagram on next page.
V1 amplitude:	+1V to +250V
V2 amplitude:	-1V to -250V
PW1 pulse width:	10 to 100 us
PW2 pulse width:	30 to 300 us
Output impedance (R <sub>OUT</sub> ):	50 Ohms
Maximum output current:	$\pm 250V / R_{OUT} = \pm 5$ Amps
Maximum power dissipated internally, in R <sub>OUT</sub> :	$(5A)^2 \times 50\Omega \times 300\text{ us} \times 10\text{ Hz} = 3.75\text{ W}$
Switching time (t <sub>R</sub> ):	$\leq 20\text{ ns}$ (20%-80%), as measured at the "MON" connector. The switching times at the "OUT" connector may be slower due to the effective of R <sub>OUT</sub> and and the cabling / circuit capacitance (C <sub>LOAD</sub> ). The time constant of any degradation will be given by $\tau = R_{OUT} \times C_{LOAD}$ . This switching time (t <sub>R</sub> ) applies to the three transitions noted in the waveform diagram on the next page. The fourth transition will be much slower.
Pulse repetition frequency:	1 Hz to 10 Hz, adjustable, or single-shot.
Supplied test jigs:	None (user-supplied)
Propagation delay:	$\leq 150\text{ ns}$ (Ext trig in to pulse out)
Jitter:	$\pm 100\text{ ps} \pm 0.03\%$ of sync delay (Ext trig in to pulse out)
Trigger modes:	Internal trigger, external trigger (TTL level pulse, > 10 ns, 1 k $\Omega$ 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
Gated operation:	Active high or low, switchable.
Connectors:	Out, Trig, Sync, Gate: BNC
GPIB & RS-232 control <sup>1</sup> :	Standard feature on all -B units.
LabView drivers:	Available for download at <a href="http://www.avtechpulse.com/labview">http://www.avtechpulse.com/labview</a> .
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 $\pm 3\%$ (plus $\pm 1V$ or $\pm 2\text{ ns}$ ) after 10 minute warmup. For high-accuracy applications requiring traceable calibration, verify the output parameters with a calibrated oscilloscope <sup>2</sup> .
Power requirements:	100 - 240 Volts, 50 - 60 Hz
Dimensions:	100 mm x 430 mm x 375 mm (3.9" x 17" x 14.8")
Chassis material:	Cast aluminum frame and handles, blue vinyl on aluminum cover plates
Mounting:	Any. Add -R5 to the model number to add a rack-mount kit.
Temperature range:	+5°C to +40°C

1)-B suffix indicates IEEE-488.2 GPIB and RS-232 control of amplitude and frequency. See <http://www.avtechpulse.com/gpib> for details.

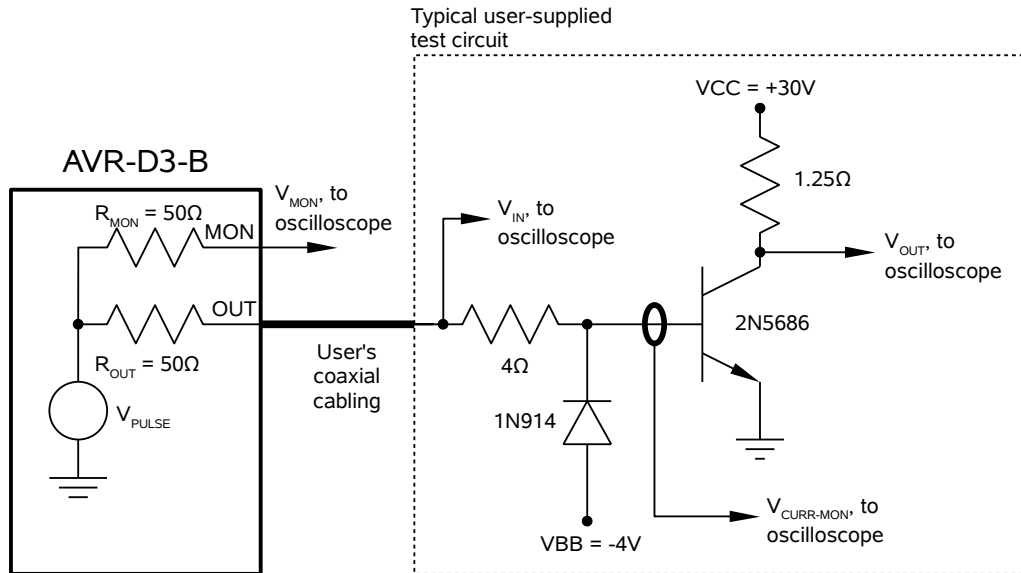
2)These instruments are provided with a basic calibration checksheet, showing a selection of measured output parameters. These measurements are performed with

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.

## WAVEFORM DETAILS



## TYPICAL USER-SUPPLIED TEST CIRCUIT



## TYPICAL RESULTS

Sample waveforms for various devices are included in the operating manual, available for download at:

<http://www.avtechpulse.com/semiconductor/avr-d3/#manuals>