



# Agilent 33502A 2-channel 50 Vpp Isolated Amplifier

## Data Sheet



- Full-power BW 100kHz @ 50Vpp
- Small-signal BW > 300kHz
- Slew Rate 20V/μs min.
- THD+N < 0.01% @ 10kHz, 40Vpp.
- Output drive 200mA max.
- Isolation Floats ±42Vpk to earth

The Agilent 33502A is a dual-channel, high voltage output amplifier. It has an isolated analog front end with up to 50 Vpp ( $\pm 25$  V) output voltage range. It is also a very low-distortion amplifier with < 0.01% @ 10 kHz and 40 Vpp. The 33502A is designed to work as a companion for function generators to offer low-distortion, higher voltage outputs.

The 33502A has a fully isolated front end, which offers superior 5X voltage amplification to other amplifiers. You can independently configure input coupling (AC | DC) and input impedance (50Ω | 1MΩ) to match your circuit. The input path can also be switched from amplified to direct (unamplified) without removing or connecting cables.

The 33502A, in a 2 unit, half-rack mechanical form factor, fits well on both your bench and in your test system. It also is configured with LAN (LXI Class-C compliant) and USB interfaces to meet your computer IO needs.

The 33502A provides both a programmable interface and a softkey-driven front panel for flexibility in configuring.

The 33502A is compatible with existing Agilent function/arbitrary waveform generators including the 33120A, 33210A, 33220A, and 33250A. It can also be used to amplify signals from non-Agilent function and arbitrary waveform generators.



Table 1.

Feature	Characteristic
<b>General</b>	
Number of channels	2
Channel to channel ground connection	Not connected in BYPASS ON. Connected with both channels OFF or in Gain of 5x
Floating Voltage	±42 Vpk to earth
<b>Input Configuration &amp; Specification</b>	
<b>Input Coupling</b>	
AC Coupling	Programmable
DC Coupling	Default, Programmable
<b>Input Impedance</b>	
1MΩ	Default, Programmable
50Ω	Programmable
<b>Input Voltage Range</b>	
Maximum Voltage Range	±5 Vpk for gain of 5x, ±30 Vpk for bypass
Damage Level	±10 Vpk for 50 Ω input ±35 Vpk for 1 MΩ input
Input Path	Programmable gain of 5x, bypass (1x), or off state
Input Gain 5X	5X, Fixed, Non-Inverting
Gain Accuracy <sup>2</sup>	±0.1% @ 1KHz
Flatness DC coupling <sup>1</sup>	0.1% : dc - 10KHz 1% : dc - 40KHz 5% : dc - 100KHz
Flatness AC coupling <sup>1</sup>	0.1% : 30Hz - 10KHz 1% : 10Hz - 40KHz 5% : 3Hz - 100KHz
Small Signal Bandwidth <sup>1</sup>	> 300 KHz (-3db)
Full Power Bandwidth <sup>1</sup>	100KHz @ 50Vpp output
<b>Input Bypass</b>	
Bandwidth for 50Ω system Maximum Current	> 300 MHz (-3db) 0.2 Apk
<b>Noise</b>	
Input referred noise	< 40nV/ rt-Hz @ 1kHz
<b>Output Configuration &amp; Specification</b>	
Output Current	200mA. (150mA for continuous output from -8V to +8V)
DC Output Resistance	< 2Ω
Max Output Level <sup>1</sup>	±25Vpk
Output DC Offset	<10mV
Output Slew Rate <sup>1</sup>	> 20V/us
THD + N <sup>1</sup>	< 0.01% @ 10kHz, 40 Vpp
Aberrations <sup>1</sup>	<5% for waveforms with <3V input step or non slewing output

<sup>1</sup>For all loads >250 ohms and <400 pF of capacitance

<sup>2</sup>Measured with ≥1 Mohm load and 1 Mohm input selection.

Table 1 (cont'd).

Feature	Characteristic
Transition time <sup>1</sup> (Final value ±1% of step size)	2.5uSec+ 50nSec/volt of output step
Channel to channel isolation for gains of 5x	> 75dB
Capacitive Load for no oscillation	< 1 nF
Output Protection	Continuous short circuit protection
	Thermal overload shutdown.
	Over temperature status flag.

<sup>1</sup>For all loads >250 ohms and <400 pF of capacitance.

Table 2

General Characteristics	
Power Supply	100V/120V/ 220V / 240V ± 10%
Power Line Frequency	50–60 Hz ± 10%, 400 Hz ± 10%.
Power Consumption	100 VA peak (typical value depends on configuration and load)
Operating Environment	Full accuracy for 0 °C to 55 °C Full accuracy to 80% R.H. at 40°C Non–condensing
Storage Temperature	–40 °C to 70 °C
Operating Altitude	Up to 3000m
Bench Dimensions (WxHxD)	261.2mm x 103.8mm x 303.2mm
Weight	3.1 kg (6.8 lbs)
Safety	Complies with European Low Voltage Directive and carries the CE-marking
	Conforms to UL 61010-1, CSA C22.2 61010-1, and IEC 61010-1:2001
EMC	Complies with European EMC Directive for test and measurement products. - IEC/EN 61326-1 - CISPR Pub 11 Group 1, class A - AS/NZS CISPR 11 - ICES/NMB-001
	Complies with Australian standard and carries C-Tick mark This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme á la norme NMB-001 du Canada
Acoustic Noise	Normal operating mode: SPL 35db(A)
Display	4.3" Color TFT WQVGA (480x272), LED backlight
Remote Interfaces	10/100Mbit LAN USB 2.0 Standard
Language	SCPI – 1994.0, IEEE–488.2
LXI Compliance	LXI Class C, Version 1.0
Number of Channels	2
Channel to channel ground connection	Not connected in BYPASS ON. Connected with both channels OFF or in Gain of 5x
Floating Voltage	±42 Vpk to earth

[www.agilent.com](http://www.agilent.com)  
[www.agilent.com/find/33502a](http://www.agilent.com/find/33502a)

 **Agilent Email Updates**

[www.agilent.com/find/emailupdates](http://www.agilent.com/find/emailupdates)  
 Get the latest information on the products and applications you select.



**www.lxistandard.org**

LXI is the LAN-based successor to GPIB, providing faster, more efficient connectivity. Agilent is a founding member of the LXI consortium.

**Agilent Channel Partners**

**www.agilent.com/find/channelpartners**

Get the best of both worlds: Agilent's measurement expertise and product breadth, combined with channel partner convenience.

**Remove all doubt**

Our repair and calibration services will get your equipment back to you, performing like new, when promised. You will get full value out of your Agilent equipment throughout its lifetime. Your equipment will be serviced by Agilent-trained technicians using the latest factory calibration procedures, automated repair diagnostics and genuine parts. You will always have the utmost confidence in your measurements. For information regarding self maintenance of this product, please contact your Agilent office.

Agilent offers a wide range of additional expert test and measurement services for your equipment, including initial start-up assistance, onsite education and training, as well as design, system integration, and project management.

For more information on repair and calibration services, go to:

[www.agilent.com/find/removealldoubt](http://www.agilent.com/find/removealldoubt)

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

[www.agilent.com/find/contactus](http://www.agilent.com/find/contactus)

**Americas**

Canada	(877) 894 4414
Latin America	305 269 7500
United States	(800) 829 4444

**Asia Pacific**

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Thailand	1 800 226 008

**Europe & Middle East**

Austria	43 (0) 1 360 277 1571
Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
Switzerland	0800 80 53 53
United Kingdom	44 (0) 118 9276201

Other European Countries:

[www.agilent.com/find/contactus](http://www.agilent.com/find/contactus)

Revised: October 1, 2009

Product specifications and descriptions in this document subject to change without notice.

© Agilent Technologies, Inc. 2009  
 Printed in USA, October 29, 2009  
 5990-4826EN



**Agilent Technologies**