

# 33502A

## 2-Channel 50 Vpp Isolated Amplifier

### Enabling Low-Distortion and High Voltage Outputs

The Keysight Technologies, Inc. 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.



## Introduction

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 (50  $\Omega$ |1 M $\Omega$ ) 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 Keysight function/arbitrary waveform generators including the 33120A, 33210A, 33220A, and 33250A. It can also be used to amplify signals from non-Keysight function and arbitrary waveform generators.

## Features

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

## Key Features and Characteristics

Feature	Characteristics
<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 and specification</b>	
<b>Input Coupling</b>	
AC coupling	Programmable
DC coupling	Default, programmable
<b>Input Impedance</b>	
1 MΩ	Default, programmable
50 Ω	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% @ 1 KHz
Flatness DC coupling <sup>1</sup>	0.1% : dc - 10 KHz
	1% : dc - 40 KHz
	5% : dc - 100 KHz
Flatness AC coupling <sup>1</sup>	0.1% : 30 Hz - 10 KHz
	1% : 10 Hz - 40 KHz
	5% : 3 Hz - 100 KHz
Small signal bandwidth <sup>1</sup>	> 300 KHz (-3 db)
Full power bandwidth <sup>1</sup>	100 KHz @ 50 Vpp output
<b>Input bypass</b>	
Bandwidth for 50 Ω system	> 300 MHz (-3 db)
Maximum current	0.2 Apk
<b>Noise</b>	
Input referred noise	< 40 nV/ rt-Hz @ 1 kHz

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

2. Measured with ≥ 1 Mohm load and 1 Mohm input selection.

Output configuration and specification	
Output current	200 mA (150 mA for continuous output from -8 V to +8 V)
DC output resistance	< 2 $\Omega$
Max output level <sup>1</sup>	$\pm$ 25 Vpk
Output DC offset	< 10 mV
Output slew rate <sup>1</sup>	> 20 V/ $\mu$ s
THD + N <sup>1</sup>	< 0.01% @ 10 kHz, 40 Vpp
Aberrations <sup>1</sup>	< 5% for waveforms with < 3 V input step or non slewing output
Transition time <sup>1</sup> (Final value $\pm$ 1% of step size)	2.5 $\mu$ Sec+ 50 nSec/volt of output step
Channel to channel isolation for gains of 5x	> 75 dB
Capacitive Load for no oscillation	< 1 nF
Output protection	Continuous short circuit protection.
	Thermal overload shutdown.
	Over temperature status flag.
General characteristics	
Power supply	100 V/120 V/220 V/240 V $\pm$ 10%
Power line frequency	50–60 Hz $\pm$ 10%
	400 Hz $\pm$ 10%
Power consumption	100 VA peak (typical value depends on configuration and load)
Operating environment	Full accuracy for 0 to 55 $^{\circ}$ C
	Full accuracy to 80% R.H. at 40 $^{\circ}$ C Non–condensing
Storage temperature	–40 to 70 $^{\circ}$ C
Operating altitude	Up to 3000 m
Bench Dimensions (W x H x D)	261.2 mm x 103.8 mm x 303.2 mm
Weight	3.1 kg (6.8 lbs)
Safety and EMC	Refer to Declaration of Conformity for the latest revisions of regulatory compliance at: <a href="http://www.keysight.com/go/conformity">www.keysight.com/go/conformity</a>
Acoustic noise	Normal operating mode: SPL 35db(A)
Display	4.3" Color TFT WQVGA (480 x 272), 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

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

## Accessories

Accessories available	
1CM124A	Rackmount kit
1CM107A	2U dual flange kit
34194A	Dual lock link kit

Learn more at: [www.keysight.com](http://www.keysight.com)

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