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ANALOG DEVICES

Ultralow Noise, High Accuracy Voltage References

Data Sheet **ADR4520/ADR4525/ADR4530/ADR4533/ADR4540/ADR4550**

FEATURES

Maximum temperature coefficient (TCV_{OUT}): 2 ppm/°C
Output noise (0.1 Hz to 10 Hz)
  Less than 1 μV p-p at V_{OUT} of 2.048 V typical
Initial output voltage error: ±0.02% (maximum)
Input voltage range: 3 V to 15 V
Operating temperature: −40°C to +125°C
Output current: +10 mA source/−10 mA sink
Low quiescent current: 950 μA (maximum)
Low dropout voltage: 300 mV at 2 mA (V_{OUT} ≥ 3 V)
8-lead SOIC package

APPLICATIONS

Precision data acquisition systems
High resolution data converters
High precision measurement devices
Industrial instrumentation
Medical devices
Automotive battery monitoring

GENERAL DESCRIPTION

The ADR4520/ADR4525/ADR4530/ADR4533/ADR4540/ADR4550 devices are high precision, low power, low noise voltage references featuring ±0.02% maximum initial error, excellent temperature stability, and low output noise.

This family of voltage references uses an innovative core topology to achieve high accuracy while offering industry-leading temperature stability and noise performance. The low, thermally induced output voltage hysteresis and low long-term output voltage drift of the devices also improve system accuracy over time and temperature variations.

A maximum operating current of 950 μA and a maximum low dropout voltage of 300 mV allow the devices to function very well in portable equipment.

The ADR4520/ADR4525/ADR4530/ADR4533/ADR4540/ADR4550 series of references is provided in an 8-lead SOIC package and is available in a wide range of output voltages, all of which are specified over the extended industrial temperature range of −40°C to +125°C.

PIN CONFIGURATION

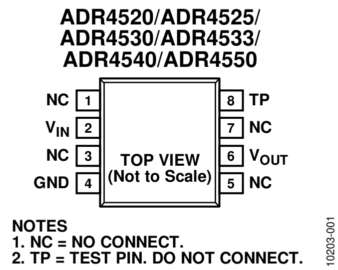

Figure 1. 8-Lead SOIC

Table 1. Selection Guide

Model	Output Voltage (V)
ADR4520	2.048
ADR4525	2.5
ADR4530	3.0
ADR4533	3.3
ADR4540	4.096
ADR4550	5.0

Table 2. Voltage Reference Choices from Analog Devices

V_{OUT} (V)	Low Cost/ Low Power	Micropower	Ultralow Noise	High Voltage, High Performance
2.048	ADR360 ADR3420	REF191	ADR430 ADR440	
2.5	ADR3425 AD1582 ADR361	ADR291 REF192	ADR431 ADR441	ADR03 AD780
5.0	ADR3450 AD1585 ADR365	ADR293 REF195	ADR435 ADR445	ADR02 AD586

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Tel: 781.329.4700 **www.analog.com**
Fax: 781.461.3113

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REVISION HISTORY

4/12—Revision 0: Initial Version

SPECIFICATIONS

ADR4520 ELECTRICAL CHARACTERISTICS

Unless otherwise noted, V_{IN} = 3 V to 15 V, I_L = 0 mA, T_A = 25°C.

Table 3.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
OUTPUT VOLTAGE	V_{OUT}			2.048		V
INITIAL OUTPUT VOLTAGE ERROR	V_{OUT_ERR}	B grade			±0.02	%
					410	µV
		A grade			±0.04	%
					820	µV
SOLDER HEAT SHIFT				±0.02		%
TEMPERATURE COEFFICIENT	TCV_{OUT}	B grade, −40°C ≤ T_A ≤ +125°C			2	ppm/°C
		A grade, −40°C ≤ T_A ≤ +125°C			4	ppm/°C
LINE REGULATION	$\Delta V_{OUT}/\Delta V_{IN}$	−40°C ≤ T_A ≤ +125°C		1	10	ppm/V
LOAD REGULATION	$\Delta V_{OUT}/\Delta I_L$	I_L = 0 mA to +10 mA source, −40°C ≤ T_A ≤ +125°C		30	80	ppm/mA
		I_L = 0 mA to −10 mA sink, −40°C ≤ T_A ≤ +125°C		100	120	ppm/mA
QUIESCENT CURRENT	I_Q	−40°C ≤ T_A ≤ +125°C, no load		700	950	µA
DROPOUT VOLTAGE	V_{DO}	−40°C ≤ T_A ≤ +125°C, no load			1	V
		−40°C ≤ T_A ≤ +125°C, I_L = 2 mA			1	V
RIPPLE REJECTION RATIO	RRR	f_{IN} = 1 kHz		90		dB
OUTPUT CURRENT CAPACITY	I_L					
Sinking					−8	mA
Sourcing					10	mA
OUTPUT VOLTAGE NOISE	$e_{N p\text{-}p}$	0.1 Hz to 10.0 Hz		1.0		µV p-p
OUTPUT VOLTAGE NOISE DENSITY	e_N	1 kHz		35.8		nV/√Hz
OUTPUT VOLTAGE HYSTERESIS	ΔV_{OUT_HYS}	T_A = temperature cycled from +25°C to −40°C to +125°C and back to +25°C		50		ppm
LONG-TERM DRIFT	ΔV_{OUT_LTD}	1000 hours at 60°C		25		ppm
TURN-ON SETTLING TIME	t_R	I_L = 0 mA, C_L = 1 µF, C_{IN} = 0.1 µF, R_L = 1 kΩ		90		µs
LOAD CAPACITANCE			1		100	µF

ADR4525 ELECTRICAL CHARACTERISTICS

Unless otherwise noted, V_{IN} = 3 V to 15 V, I_L = 0 mA, T_A = 25°C.

Table 4.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
OUTPUT VOLTAGE	V_{OUT}			2.500		V
INITIAL OUTPUT VOLTAGE ERROR	V_{OUT_ERR}	B grade			±0.02	%
					500	µV
		A grade			±0.04	%
					1	mV
SOLDER HEAT SHIFT				±0.02		%
TEMPERATURE COEFFICIENT	TCV_{OUT}	B grade, −40°C ≤ T_A ≤ +125°C			2	ppm/°C
		A grade, −40°C ≤ T_A ≤ +125°C			4	ppm/°C
LINE REGULATION	$\Delta V_{OUT}/\Delta V_{IN}$	−40°C ≤ T_A ≤ +125°C		1	10	ppm/V
LOAD REGULATION	$\Delta V_{OUT}/\Delta I_L$	I_L = 0 mA to +10 mA source, −40°C ≤ T_A ≤ +125°C		30	80	ppm/mA
		I_L = 0 mA to −10 mA sink, −40°C ≤ T_A ≤ +125°C		60	120	ppm/mA
QUIESCENT CURRENT	I_Q	−40°C ≤ T_A ≤ +125°C, no load		700	950	µA
DROPOUT VOLTAGE	V_{DO}	−40°C ≤ T_A ≤ +125°C, no load			500	mV
		−40°C ≤ T_A ≤ +125°C, I_L = 2 mA			500	mV
RIPPLE REJECTION RATIO	RRR	f_{IN} = 1 kHz		90		dB
OUTPUT CURRENT CAPACITY	I_L					
Sinking					−10	mA
Sourcing					10	mA
OUTPUT VOLTAGE NOISE	e_{Np-p}	0.1 Hz to 10.0 Hz		1.25		µV p-p
OUTPUT VOLTAGE NOISE DENSITY	e_N	1 kHz		41.3		nV/√Hz
OUTPUT VOLTAGE HYSTERESIS	ΔV_{OUT_HYS}	T_A = temperature cycled from +25°C to −40°C to +125°C and back to +25°C		50		ppm
LONG-TERM DRIFT	ΔV_{OUT_LTD}	1000 hours at 60°C		25		ppm
TURN-ON SETTLING TIME	t_R	I_L = 0 mA, C_L = 1 µF, C_{IN} = 0.1 µF, R_L = 1 kΩ		125		µs
LOAD CAPACITANCE			1		100	µF

ADR4530 ELECTRICAL CHARACTERISTICS

Unless otherwise noted, V_{IN} = 3.1 V to 15 V, I_L = 0 mA, T_A = 25°C.

Table 5.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
OUTPUT VOLTAGE	V_{OUT}			3.000		V
INITIAL OUTPUT VOLTAGE ERROR	V_{OUT_ERR}	B grade			±0.02	%
					600	µV
		A grade			±0.04	%
					1.2	mV
SOLDER HEAT SHIFT				±0.02		%
TEMPERATURE COEFFICIENT	TCV_{OUT}	B grade, −40°C ≤ T_A ≤ +125°C			2	ppm/°C
		A grade, −40°C ≤ T_A ≤ +125°C			4	ppm/°C
LINE REGULATION	$\Delta V_{OUT}/\Delta V_{IN}$	−40°C ≤ T_A ≤ +125°C		1	10	ppm/V
LOAD REGULATION	$\Delta V_{OUT}/\Delta I_L$	I_L = 0 mA to +10 mA source, −40°C ≤ T_A ≤ +125°C		30	80	ppm/mA
		I_L = 0 mA to −10 mA sink, −40°C ≤ T_A ≤ +125°C		60	120	ppm/mA
QUIESCENT CURRENT	I_Q	−40°C ≤ T_A ≤ +125°C, no load		700	950	µA
DROPOUT VOLTAGE	V_{DO}	−40°C ≤ T_A ≤ +125°C, no load			100	mV
		−40°C ≤ T_A ≤ +125°C, I_L = 2 mA			300	mV
RIPPLE REJECTION RATIO	RRR	f_{IN} = 1 kHz		90		dB
OUTPUT CURRENT CAPACITY	I_L					
Sinking					−10	mA
Sourcing					10	mA
OUTPUT VOLTAGE NOISE	e_{Np-p}	0.1 Hz to 10.0 Hz		1.6		µV p-p
OUTPUT VOLTAGE NOISE DENSITY	e_N	1 kHz		60		nV/√Hz
OUTPUT VOLTAGE HYSTERESIS	ΔV_{OUT_HYS}	T_A = temperature cycled from +25°C to −40°C to +125°C and back to +25°C		50		ppm
LONG-TERM DRIFT	ΔV_{OUT_LTD}	1000 hours at 60°C		25		ppm
TURN-ON SETTLING TIME	t_R	I_L = 0 mA, C_L = 0.1 µF, C_{IN} = 0.1 µF, R_L = 1 kΩ		130		µs
LOAD CAPACITANCE			0.1		100	µF

ADR4533 ELECTRICAL CHARACTERISTICS

Unless otherwise noted, V_{IN} = 3.4 V to 15 V, I_L = 0 mA, T_A = 25°C.

Table 6.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
OUTPUT VOLTAGE	V_{OUT}			3.300		V
INITIAL OUTPUT VOLTAGE ERROR	V_{OUT_ERR}	B grade			±0.02	%
					660	µV
		A grade			±0.04	%
					1.32	mV
SOLDER HEAT SHIFT				±0.02		%
TEMPERATURE COEFFICIENT	TCV_{OUT}	B grade, −40°C ≤ T_A ≤ +125°C			2	ppm/°C
		A grade, −40°C ≤ T_A ≤ +125°C			4	ppm/°C
LINE REGULATION	$\Delta V_{OUT}/\Delta V_{IN}$	−40°C ≤ T_A ≤ +125°C		1	10	ppm/V
LOAD REGULATION	$\Delta V_{OUT}/\Delta I_L$	I_L = 0 mA to +10 mA source, −40°C ≤ T_A ≤ +125°C		30	80	ppm/mA
		I_L = 0 mA to −10 mA sink, −40°C ≤ T_A ≤ +125°C		60	120	ppm/mA
QUIESCENT CURRENT	I_Q	−40°C ≤ T_A ≤ +125°C, no load		700	950	µA
DROPOUT VOLTAGE	V_{DO}	−40°C ≤ T_A ≤ +125°C, no load			100	mV
		−40°C ≤ T_A ≤ +125°C, I_L = 2 mA			300	mV
RIPPLE REJECTION RATIO	RRR	f_{IN} =1 kHz		90		dB
OUTPUT CURRENT CAPACITY	I_L					
Sinking					−10	mA
Sourcing					10	mA
OUTPUT VOLTAGE NOISE	e_{Np-p}	0.1 Hz to 10.0 Hz		2.1		µV p-p
OUTPUT VOLTAGE NOISE DENSITY	e_N	1 kHz		64.2		nV/√Hz
OUTPUT VOLTAGE HYSTERESIS	ΔV_{OUT_HYS}	T_A = temperature cycled from +25°C to −40°C to +125°C and back to +25°C		50		ppm
LONG-TERM DRIFT	ΔV_{OUT_LTD}	1000 hours at 60°C		25		ppm
TURN-ON SETTLING TIME	t_R	I_L = 0 mA, C_L = 0.1 µF, C_{IN} = 0.1 µF, R_L = 1 kΩ		135		µs
LOAD CAPACITANCE			0.1		100	µF

ADR4540 ELECTRICAL CHARACTERISTICS

Unless otherwise noted, V_{IN} = 4.2 V to 15 V, I_L = 0 mA, T_A = 25°C.

Table 7.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
OUTPUT VOLTAGE	V_{OUT}			4.096		V
INITIAL OUTPUT VOLTAGE ERROR	V_{OUT_ERR}	B grade			±0.02	%
					820	µV
		A grade			±0.04	%
					1.64	mV
SOLDER HEAT SHIFT				±0.02		%
TEMPERATURE COEFFICIENT	TCV_{OUT}	B grade, −40°C ≤ T_A ≤ +125°C			2	ppm/°C
		A grade, −40°C ≤ T_A ≤ +125°C			4	ppm/°C
LINE REGULATION	$\Delta V_{OUT}/\Delta V_{IN}$	−40°C ≤ T_A ≤ +125°C		1	10	ppm/V
LOAD REGULATION	$\Delta V_{OUT}/\Delta I_L$	I_L = 0 mA to +10 mA source, −40°C ≤ T_A ≤ +125°C		25	80	ppm/mA
		I_L = 0 mA to −10 mA sink, −40°C ≤ T_A ≤ +125°C		50	120	ppm/mA
QUIESCENT CURRENT	I_Q	−40°C ≤ T_A ≤ +125°C, no load		700	950	µA
DROPOUT VOLTAGE	V_{DO}	−40°C ≤ T_A ≤ +125°C, no load			100	mV
		−40°C ≤ T_A ≤ +125°C, I_L = 2 mA			300	mV
RIPPLE REJECTION RATIO	RRR	f_{IN} = 1 kHz		90		dB
OUTPUT CURRENT CAPACITY	I_L					
Sinking					−10	mA
Sourcing					10	mA
OUTPUT VOLTAGE NOISE	e_{Np-p}	0.1 Hz to 10.0 Hz		2.7		µV p-p
OUTPUT VOLTAGE NOISE DENSITY	e_N	1 kHz		83.5		nV/√Hz
OUTPUT VOLTAGE HYSTERESIS	ΔV_{OUT_HYS}	T_A = temperature cycled from +25°C to −40°C to +125°C and back to +25°C		50		ppm
LONG-TERM DRIFT	ΔV_{OUT_LTD}	1000 hours at 60°C		25		ppm
TURN-ON SETTLING TIME	t_R	I_L = 0 mA, C_L = 0.1 µF, C_{IN} = 0.1 µF, R_L = 1 kΩ		155		µs
LOAD CAPACITANCE			0.1		100	µF

ADR4550 ELECTRICAL CHARACTERISTICS

Unless otherwise noted, V_{IN} = 5.1 V to 15 V, I_L = 0 mA, T_A = 25°C.

Table 8.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
OUTPUT VOLTAGE	V_{OUT}			5.000		V
INITIAL OUTPUT VOLTAGE ERROR	V_{OUT_ERR}	B grade			±0.02	%
					1	mV
		A grade			±0.04	%
					2	mV
SOLDER HEAT SHIFT				±0.02		%
TEMPERATURE COEFFICIENT	TCV_{OUT}	B grade, −40°C ≤ T_A ≤ +125°C			2	ppm/°C
		A grade, −40°C ≤ T_A ≤ +125°C			4	ppm/°C
LINE REGULATION	$\Delta V_{OUT}/\Delta V_{IN}$	−40°C ≤ T_A ≤ +125°C		1	10	ppm/V
LOAD REGULATION	$\Delta V_{OUT}/\Delta I_L$	I_L = 0 mA to +10 mA source, −40°C ≤ T_A ≤ +125°C		25	80	ppm/mA
		I_L = 0 mA to −10 mA sink, −40°C ≤ T_A ≤ +125°C		35	120	ppm/mA
QUIESCENT CURRENT	I_Q	−40°C ≤ T_A ≤ +125°C, no load		700	950	µA
DROPOUT VOLTAGE	V_{DO}	−40°C ≤ T_A ≤ +125°C, no load			100	mV
		−40°C ≤ T_A ≤ +125°C, I_L = 2 mA			300	mV
RIPPLE REJECTION RATIO	RRR	f_{IN} = 1 kHz		90		dB
OUTPUT CURRENT CAPACITY	I_L					
Sinking					−10	mA
Sourcing					10	mA
OUTPUT VOLTAGE NOISE	e_{Np-p}	0.1 Hz to 10.0 Hz		2.8		µV p-p
OUTPUT VOLTAGE NOISE DENSITY	e_N	1 kHz		95.3		nV/√Hz
OUTPUT VOLTAGE HYSTERESIS	ΔV_{OUT_HYS}	T_A = temperature cycled from +25°C to −40°C to +125°C and back to +25°C		50		ppm
LONG-TERM DRIFT	ΔV_{OUT_LTD}	1000 hours at 60°C		25		ppm
TURN-ON SETTLING TIME	t_R	I_L = 0 mA, C_L = 0.1 µF, C_{IN} = 0.1 µF, R_L = 1 kΩ		160		µs
LOAD CAPACITANCE			0.1		100	µF

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C, unless otherwise noted.

Table 9.

Parameter	Rating
Supply Voltage	16 V
Operating Temperature Range	−40°C to +125°C
Storage Temperature Range	−65°C to +150°C
Junction Temperature Range	−65°C to +150°C

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

THERMAL RESISTANCE

θ_{JA} is specified for the worst-case conditions; that is, a device soldered in a circuit board for surface-mount packages.

Table 10. Thermal Resistance

Package Type	θ_{JA}	θ_{JC}	Unit
8-Lead SOIC	120	42	°C/W

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

PIN CONFIGURATION AND FUNCTION DESCRIPTIONS

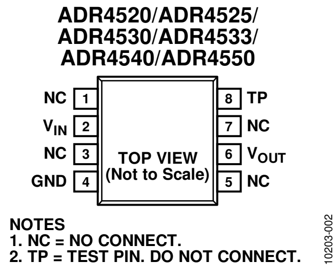

Figure 2. Pin Configuration

Table 11. Pin Function Descriptions

Pin No.	Mnemonic	Description
1	NC	No Connect. This pin is not connected internally.
2	V_{IN}	Input Voltage Connection.
3	NC	No Connect. This pin is not connected internally.
4	GND	Ground.
5	NC	No Connect. This pin is not connected internally.
6	V_{OUT}	Output Voltage.
7	NC	No Connect. This pin is not connected internally.
8	TP	Test Pin. Do not connect.

TYPICAL PERFORMANCE CHARACTERISTICS

T_A = 25°C, unless otherwise noted.

ADR4520

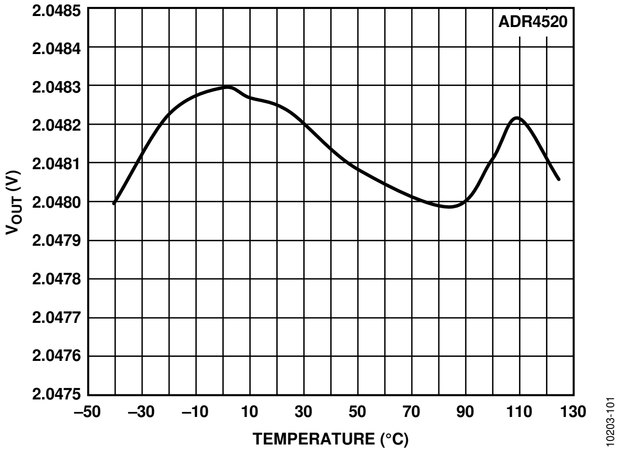

Figure 3. ADR4520 Output Voltage vs. Temperature

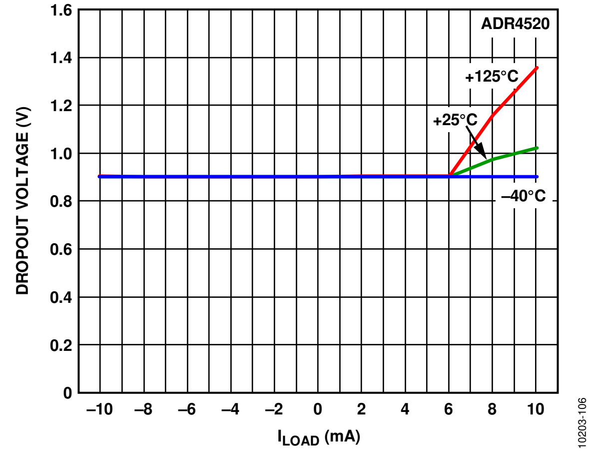

Figure 6. ADR4520 Dropout Voltage vs. Load Current

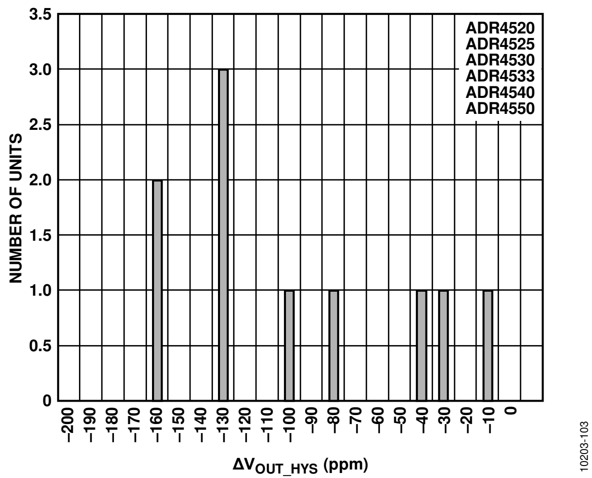

Figure 4. ADR4520 Thermally Induced Output Voltage Hysteresis Distribution

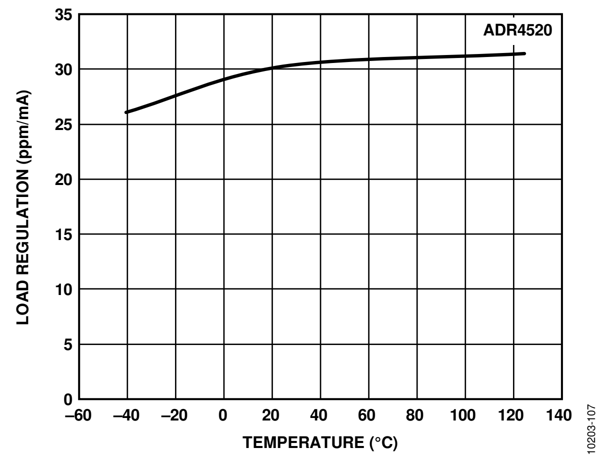

Figure 7. ADR4520 Load Regulation vs. Temperature (Sourcing)

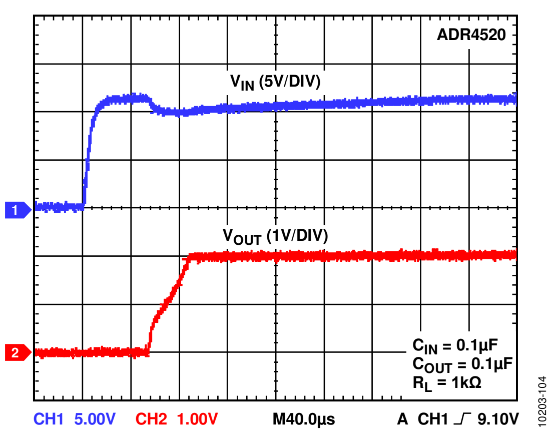

Figure 5. ADR4520 Output Voltage Start-Up Response

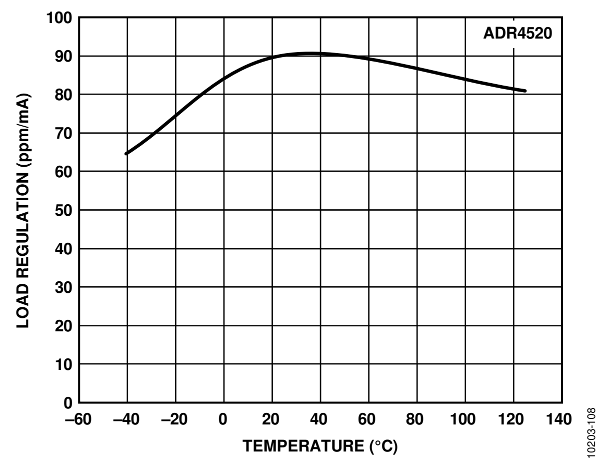

Figure 8. ADR4520 Load Regulation vs. Temperature (Sinking)

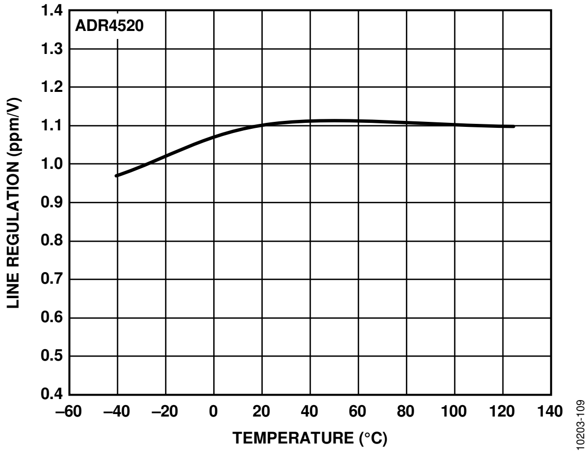

Figure 9. ADR4520 Line Regulation vs. Temperature

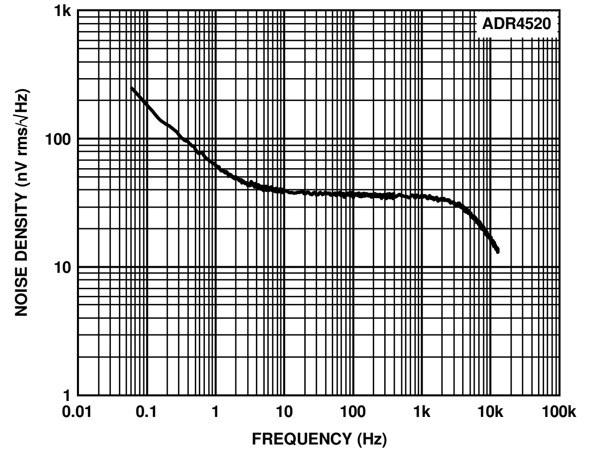

Figure 12. ADR4520 Output Noise Spectral Density

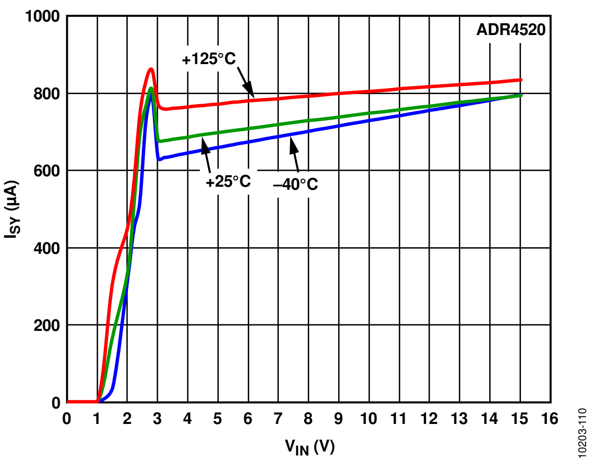

Figure 10. ADR4520 Supply Current vs. Supply Voltage

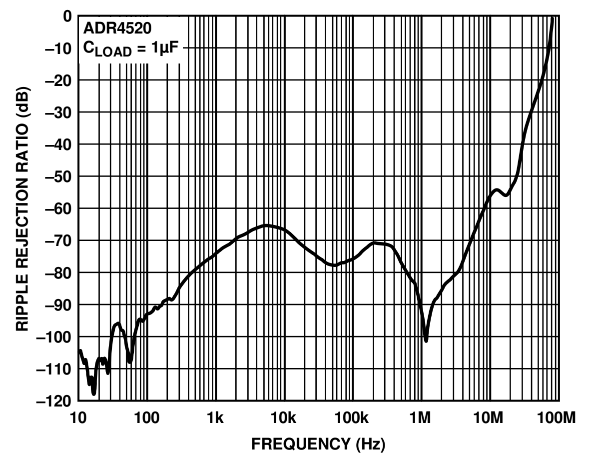

Figure 13. ADR4520 Ripple Rejection Ratio vs. Frequency

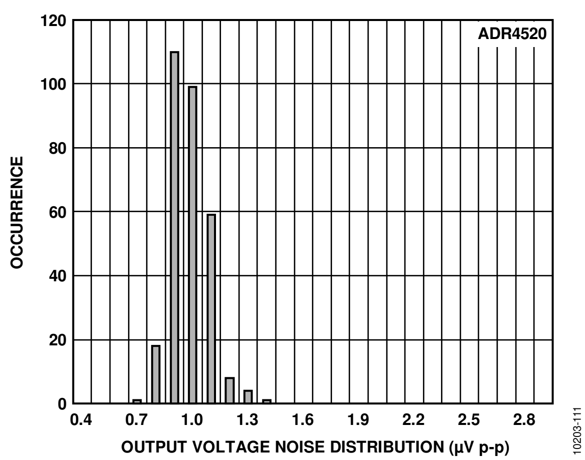

Figure 11. ADR4520 Output Voltage Noise (Maximum Amplitude from 0.1 Hz to 10 Hz)

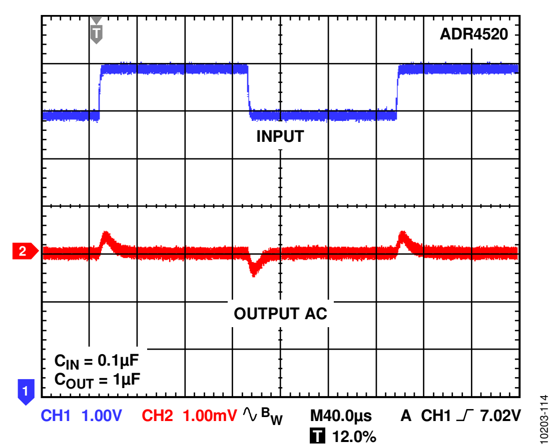

Figure 14. ADR4520 Line Transient Response

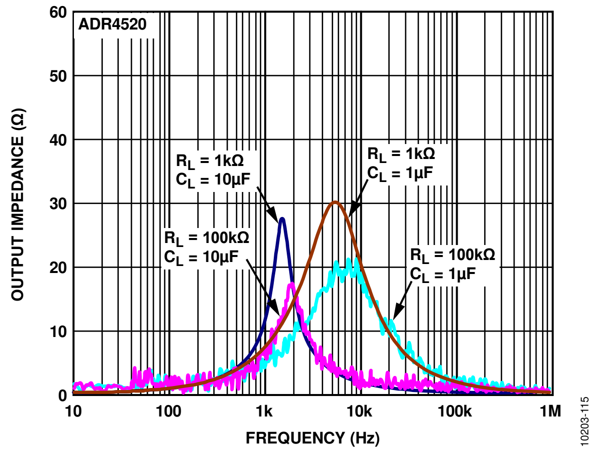

Figure 15. ADR4520 Output Impedance vs. Frequency

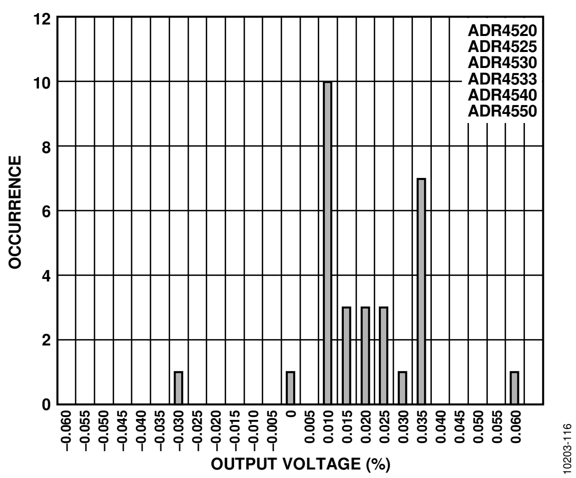

Figure 16. ADR4520 Output Voltage Drift Distribution After Reflow (SHR Drift)

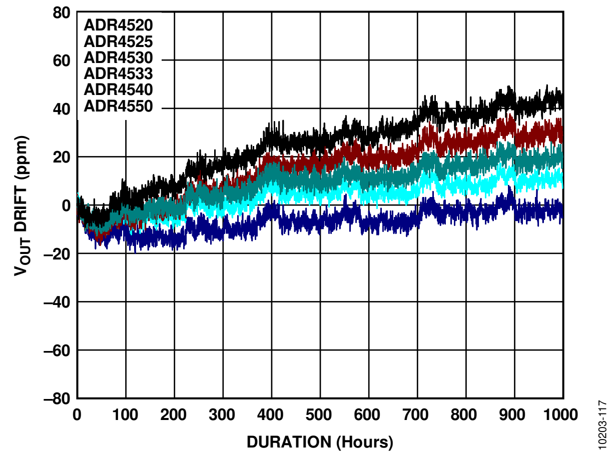

Figure 17. ADR4520 Typical Long-Term Output Voltage Drift (1000 Hours)

ADR4525

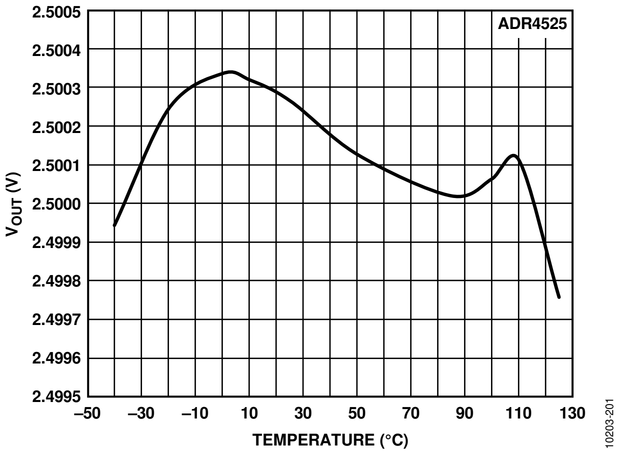

Figure 18. ADR4525 Output Voltage vs. Temperature

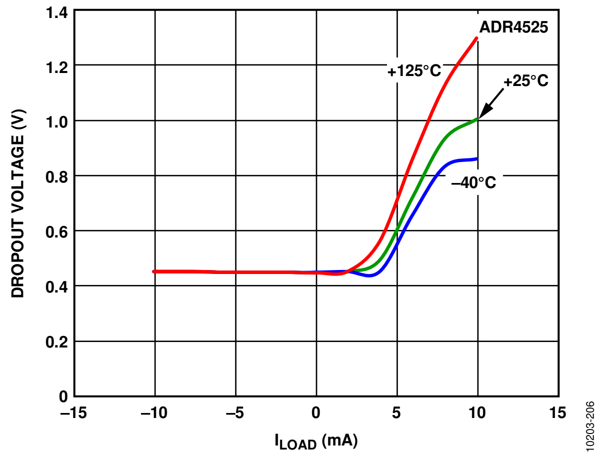

Figure 21. ADR4525 Dropout Voltage vs. Load Current

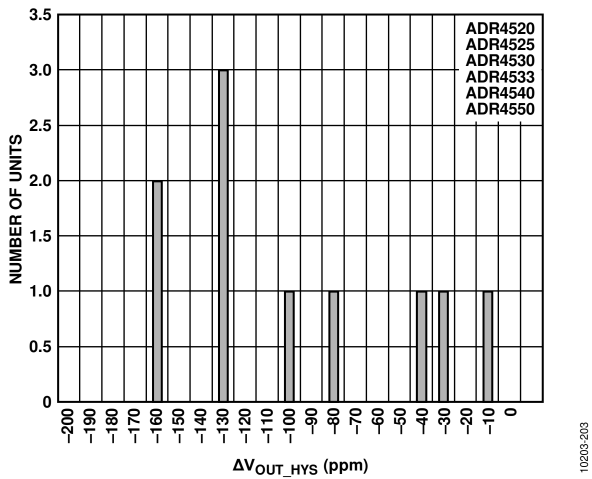

Figure 19. ADR4525 Thermally Induced Output Voltage Hysteresis Distribution

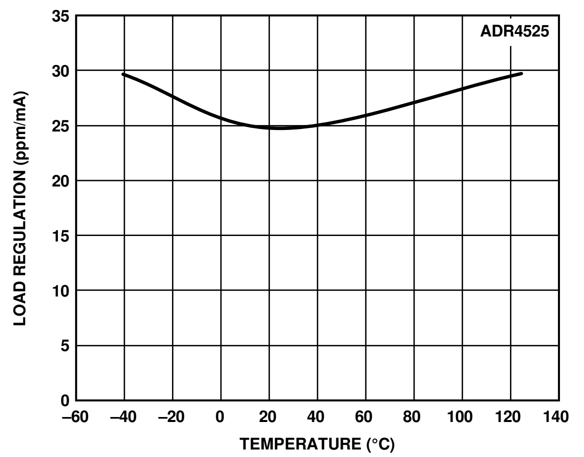

Figure 22. ADR4525 Load Regulation vs. Temperature (Sourcing)

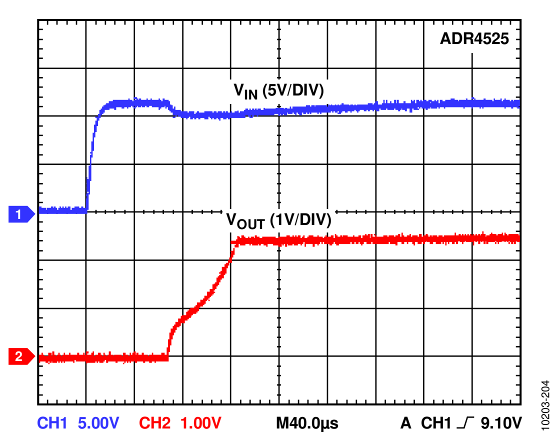

Figure 20. ADR4525 Output Voltage Start-Up Response

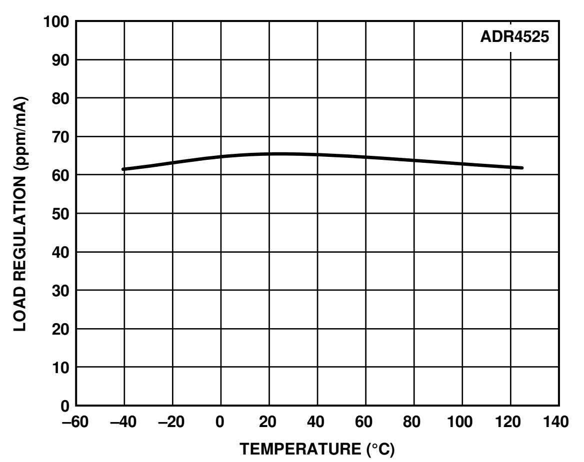

Figure 23. ADR4525 Load Regulation vs. Temperature (Sinking)

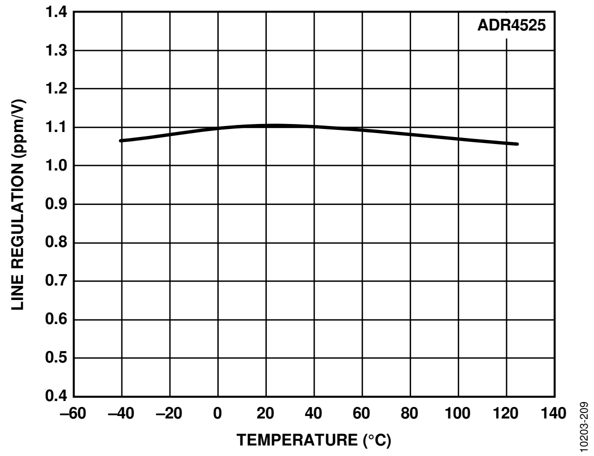

Figure 24. ADR4525 Line Regulation vs. Temperature

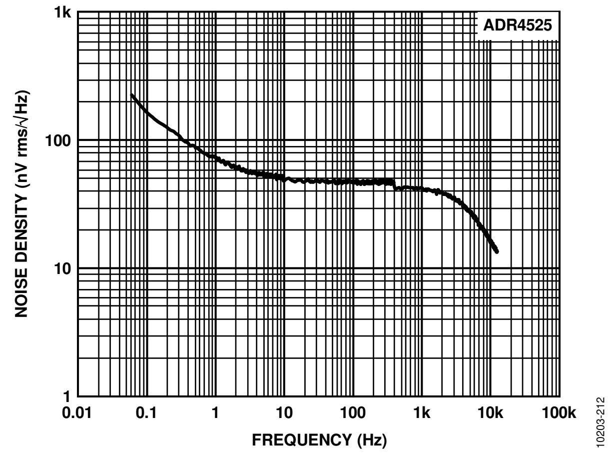

Figure 27. ADR4525 Output Noise Spectral Density

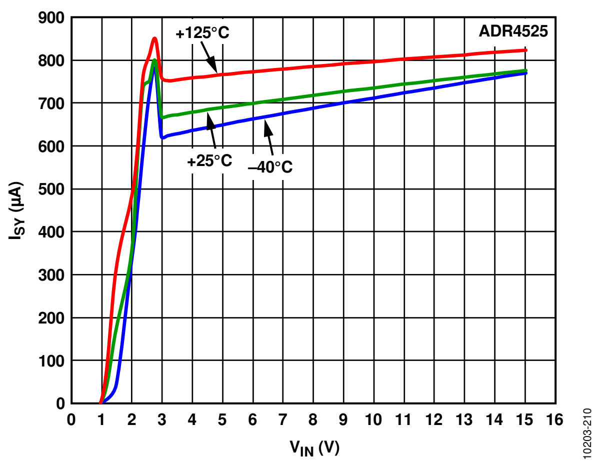

Figure 25. ADR4525 Supply Current vs. Supply Voltage

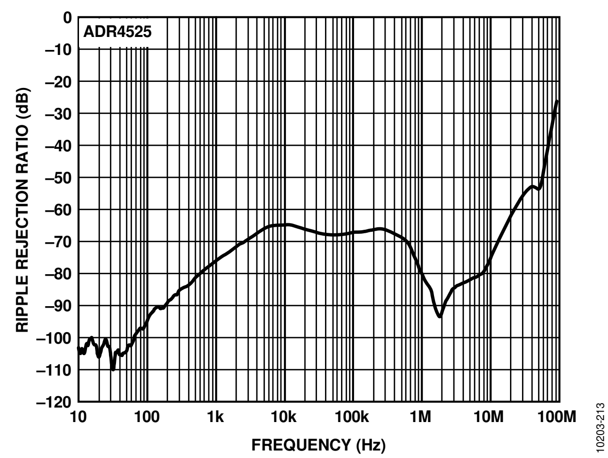

Figure 28. ADR4525 Ripple Rejection Ratio vs. Frequency

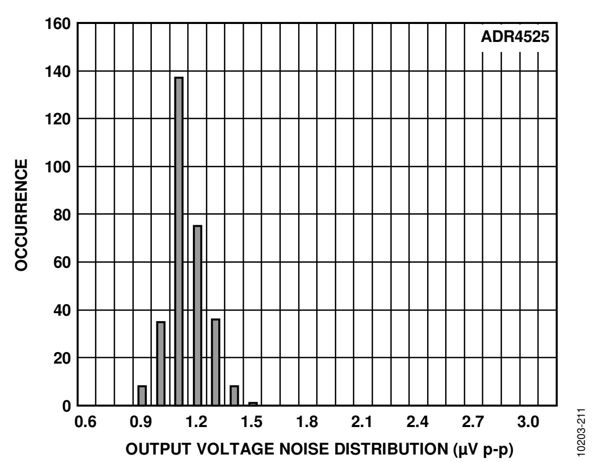

Figure 26. ADR4525 Output Voltage Noise (Maximum Amplitude from 0.1 Hz to 10 Hz)

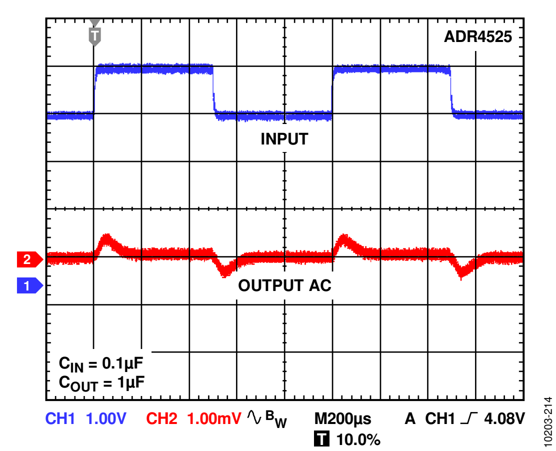

Figure 29. ADR4525 Line Transient Response

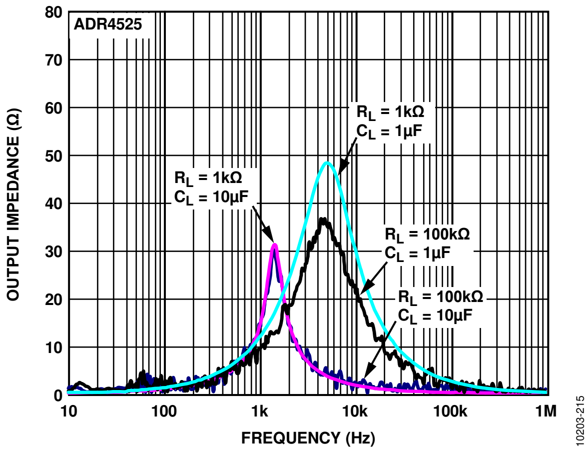

Figure 30. ADR4525 Output Impedance vs. Frequency

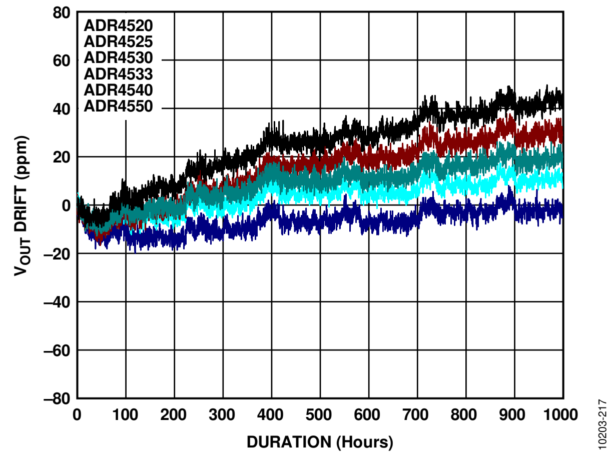

Figure 32. ADR4525 Typical Long-Term Output Voltage Drift (1000 Hours)

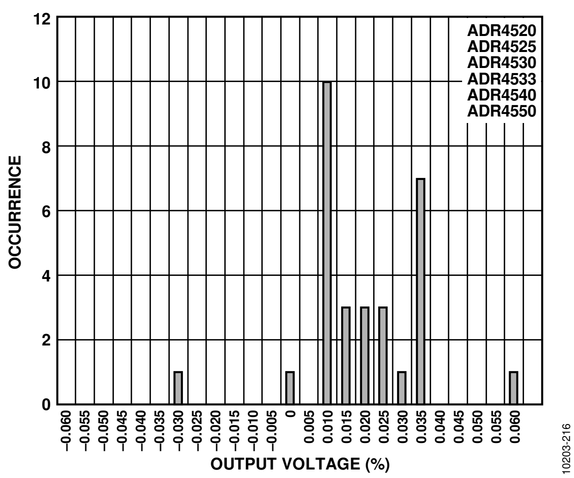

Figure 31. ADR4525 Output Voltage Drift Distribution After Reflow (SHR Drift)

ADR4530

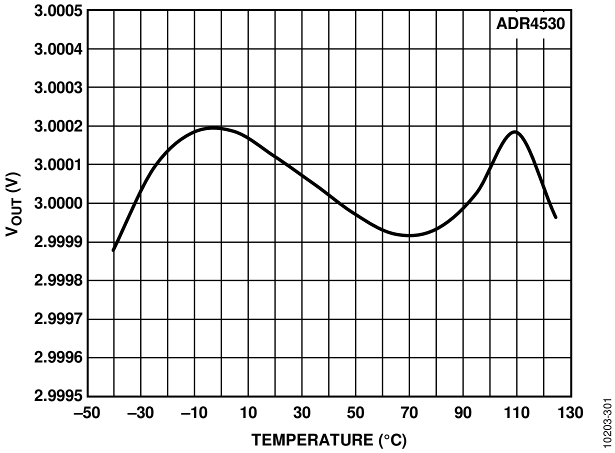

Figure 33. ADR4530 Output Voltage vs. Temperature

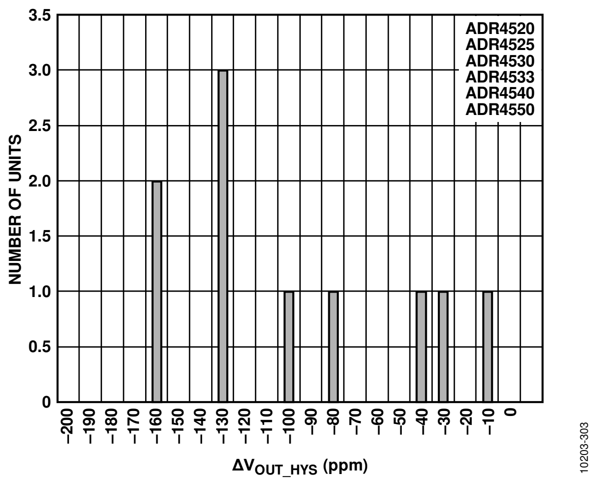

Figure 34. ADR4530 Thermally Induced Output Voltage Hysteresis Distribution

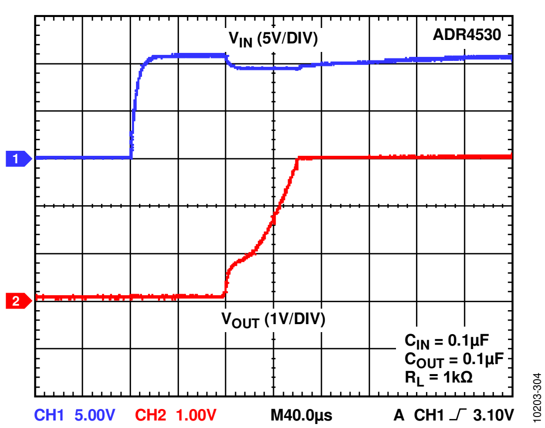

Figure 35. ADR4530 Output Voltage Start-Up Response

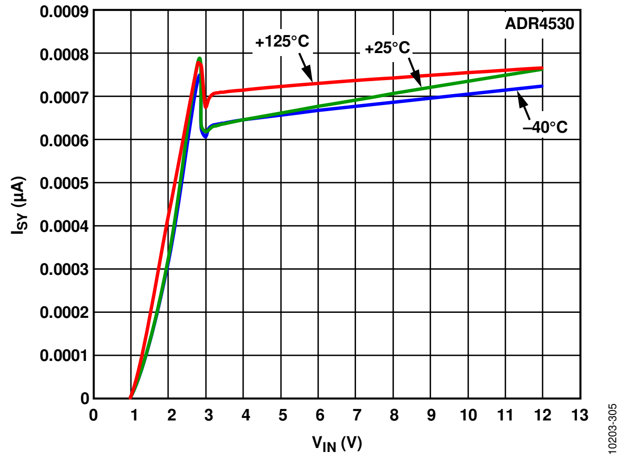

Figure 36. ADR4530 Supply Current vs. Supply Voltage

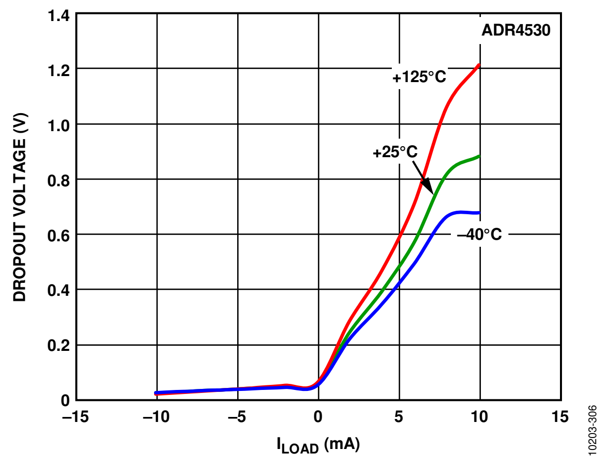

Figure 37. ADR4530 Dropout Voltage vs. Load Current

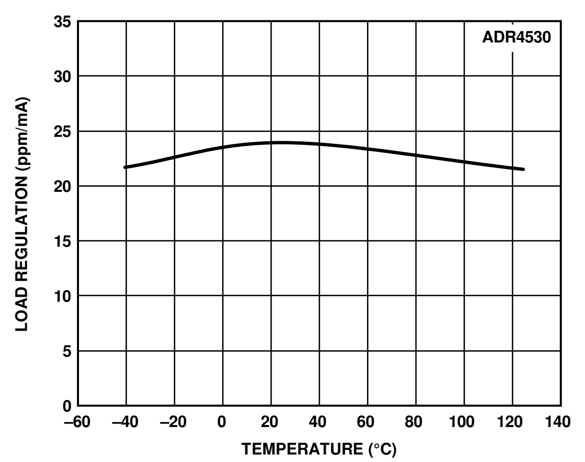

Figure 38. ADR4530 Load Regulation vs. Temperature (Sourcing)

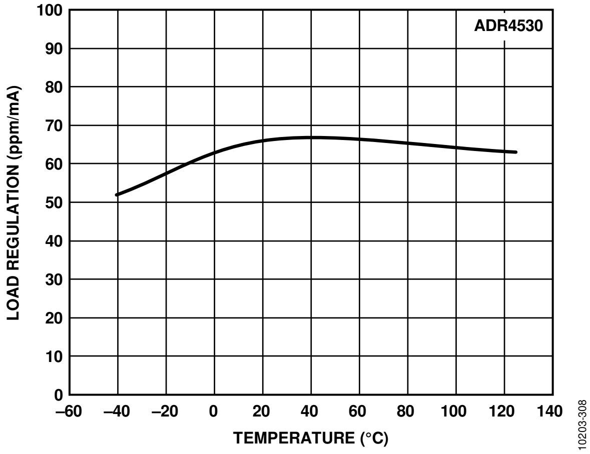

Figure 39. ADR4530 Load Regulation vs. Temperature (Sinking)

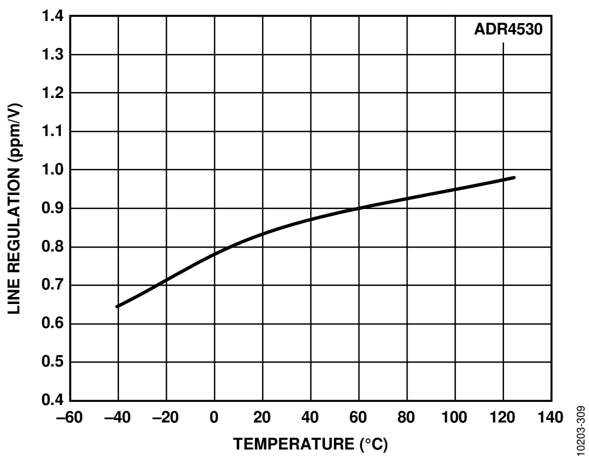

Figure 40. ADR4530 Line Regulation vs. Temperature

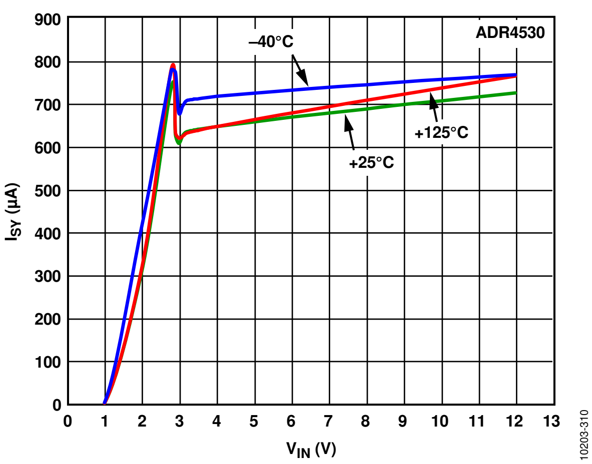

Figure 41. ADR4530 Supply Current vs. Supply Voltage

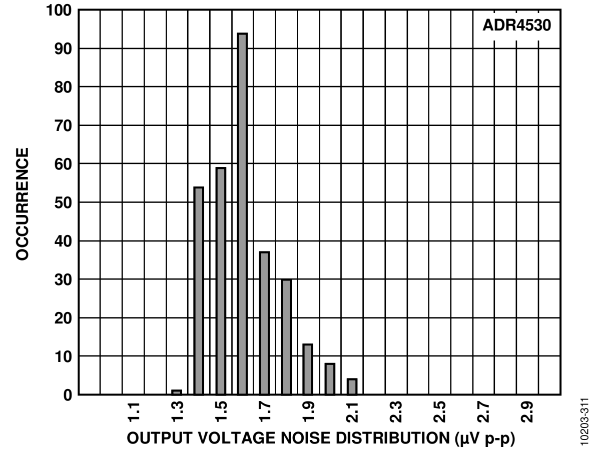

Figure 42. ADR4530 Output Voltage Noise (Maximum Amplitude from 0.1 Hz to 10 Hz)

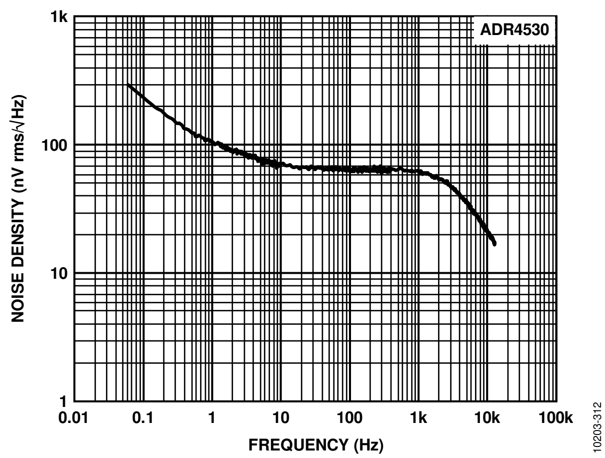

Figure 43. ADR4530 Output Noise Spectral Density

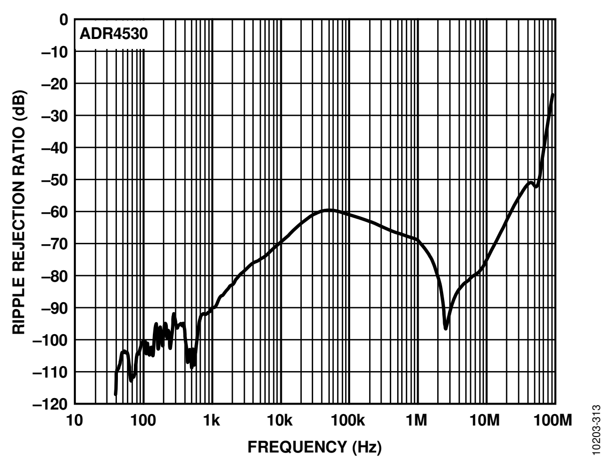

Figure 44. ADR4530 Ripple Rejection Ratio vs. Frequency

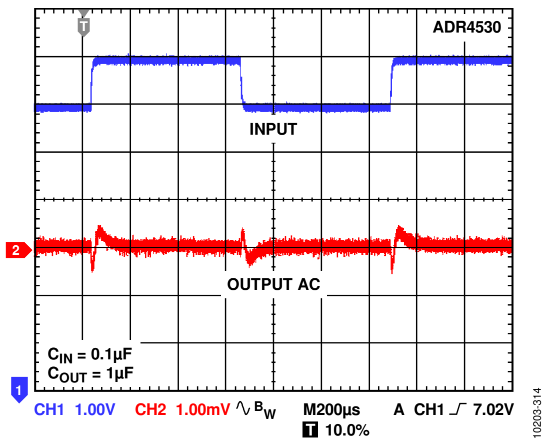

Figure 45. ADR4530 Line Transient Response

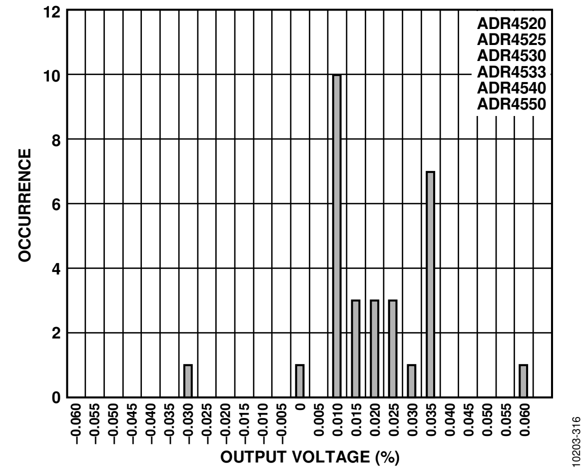

Figure 47. ADR4530 Output Voltage Drift Distribution After Reflow (SHR Drift)

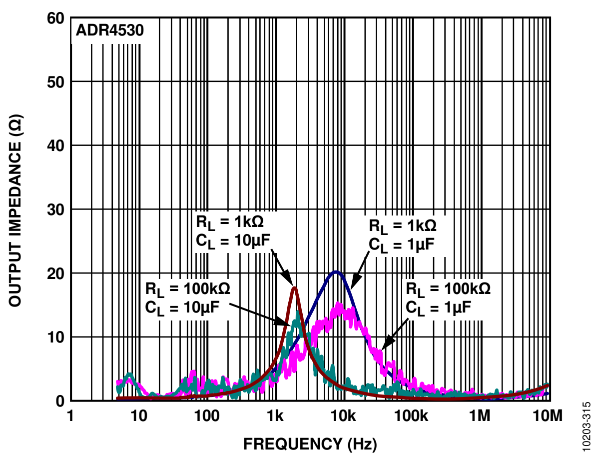

Figure 46. ADR4530 Output Impedance vs. Frequency

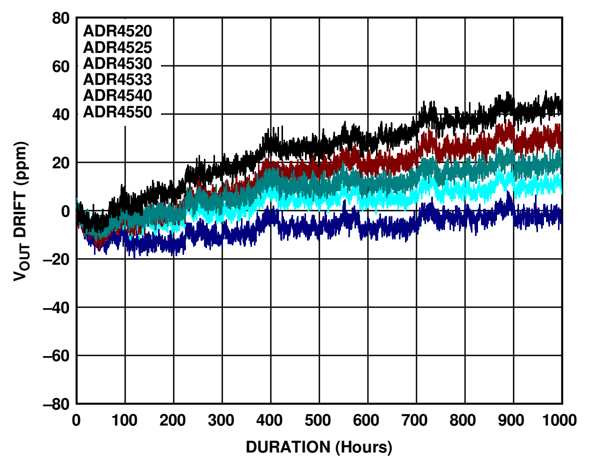

Figure 48. ADR4530 Typical Long-Term Output Voltage Drift (1000 Hours)

ADR4533

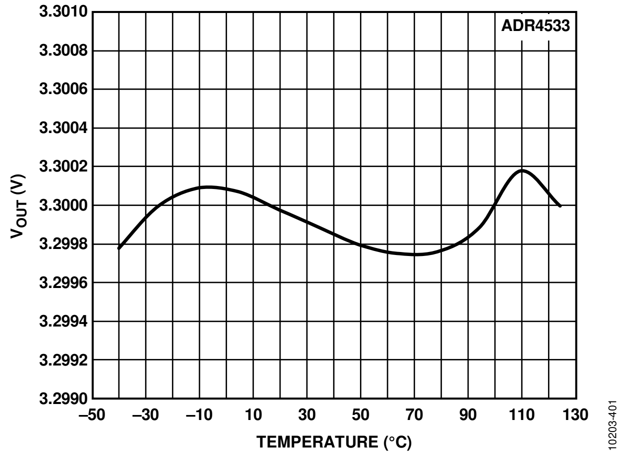

Figure 49. ADR4533 Output Voltage vs. Temperature

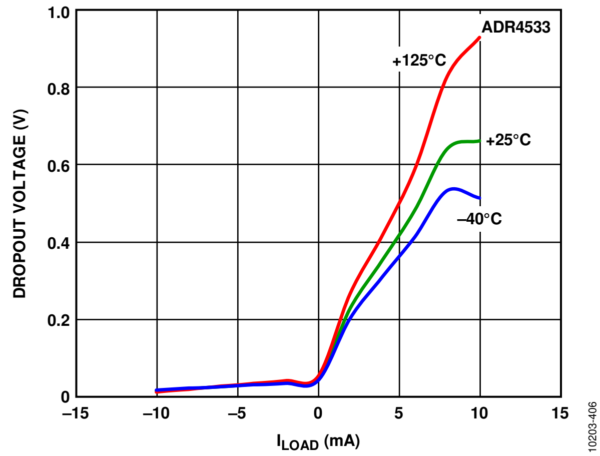

Figure 52. ADR4533 Dropout Voltage vs. Load Current

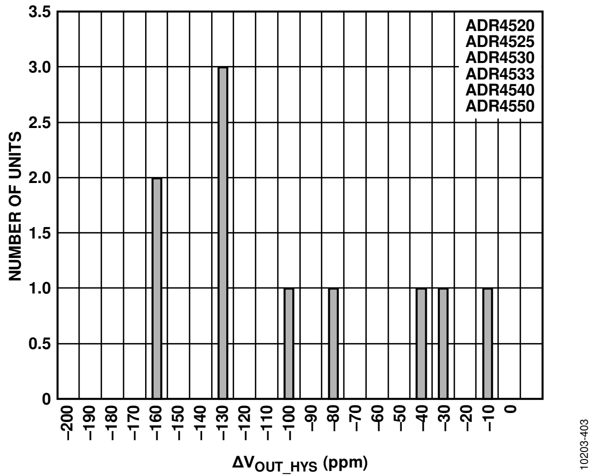

Figure 50. ADR4533 Thermally Induced Output Voltage Hysteresis Distribution

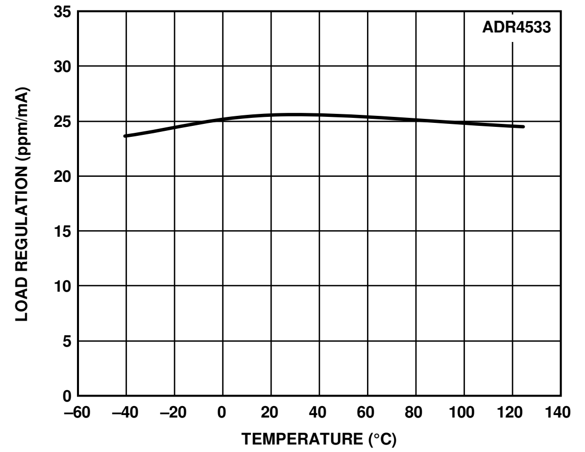

Figure 53. ADR4533 Load Regulation vs. Temperature (Sourcing)

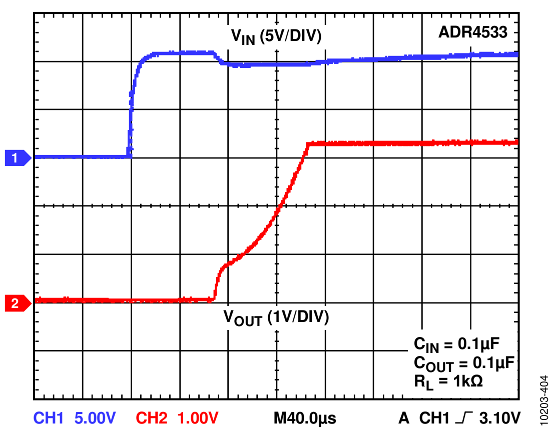

Figure 51. ADR4533 Output Voltage Start-Up Response

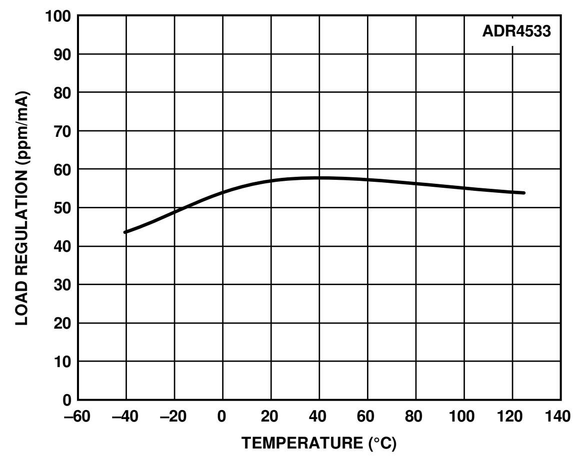

Figure 54. ADR4533 Load Regulation vs. Temperature (Sinking)

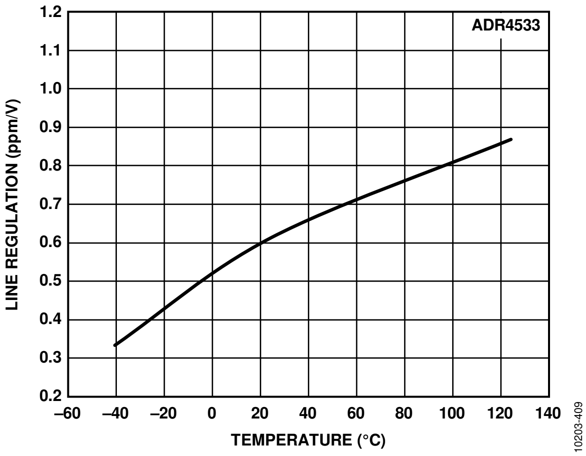

Figure 55. ADR4533 Line Regulation vs. Temperature

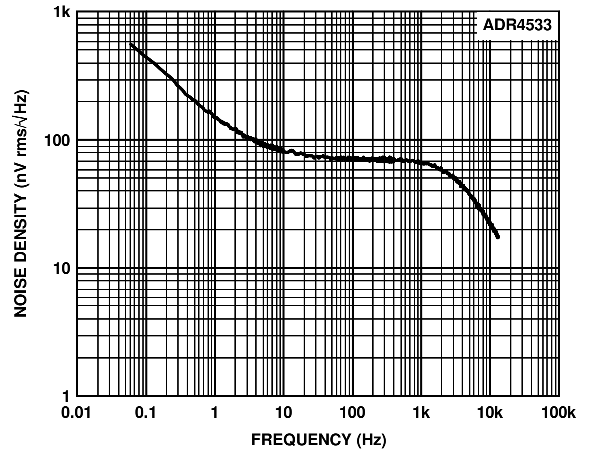

Figure 58. ADR4533 Output Noise Spectral Density

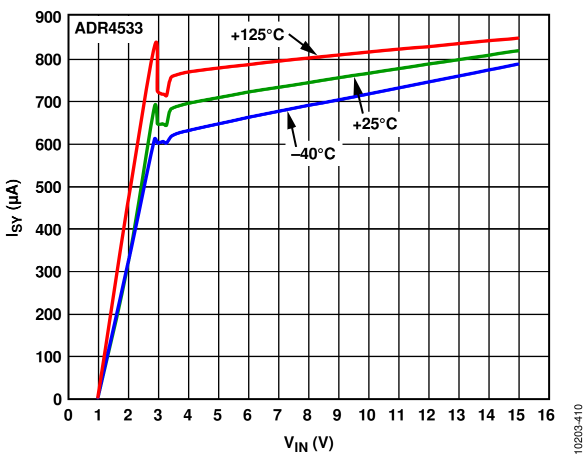

Figure 56. ADR4533 Supply Current vs. Supply Voltage

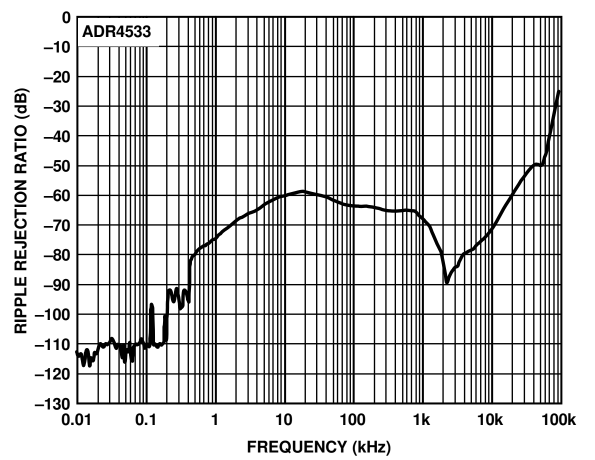

Figure 59. ADR4533 Ripple Rejection Ratio vs. Frequency

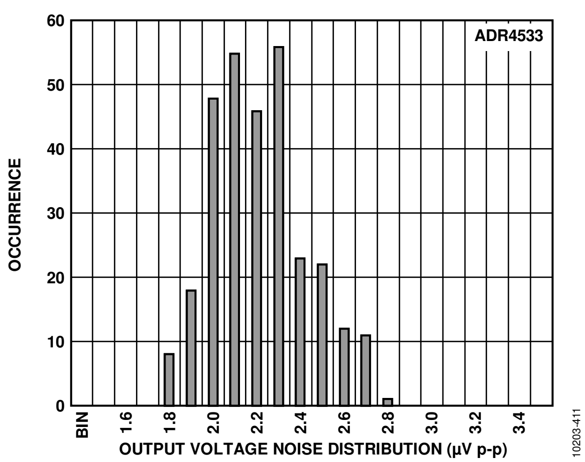

Figure 57. ADR4533 Output Voltage Noise
(Maximum Amplitude from 0.1 Hz to 10 Hz)

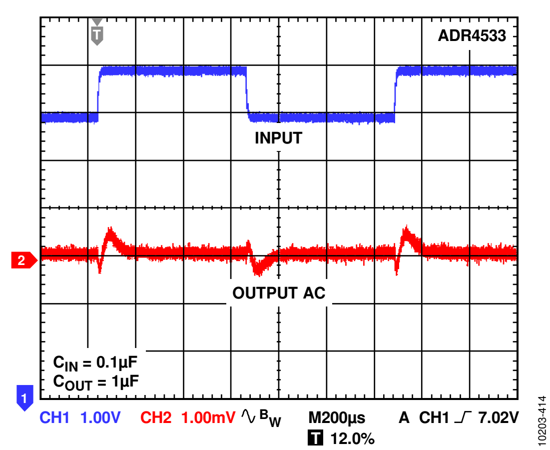

Figure 60. ADR4533 Line Transient Response

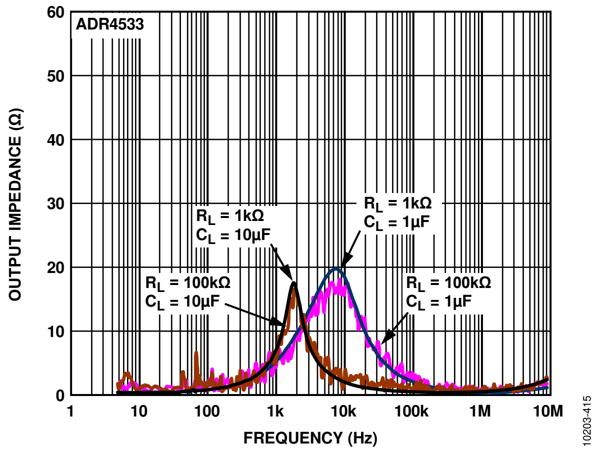

Figure 61. ADR4533 Output Impedance vs. Frequency

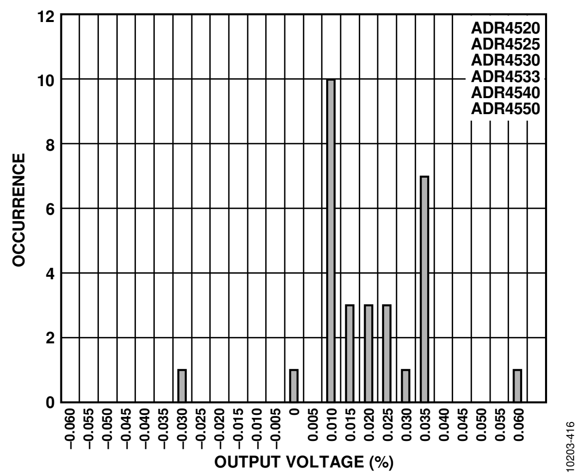

Figure 62. ADR4533 Output Voltage Drift Distribution After Reflow (SHR Drift)

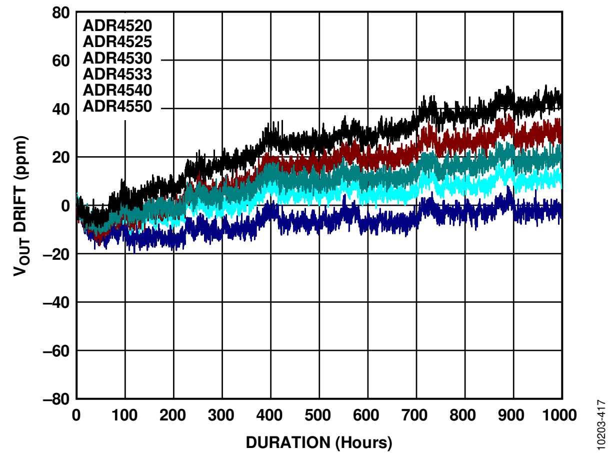

Figure 63. ADR4533 Typical Long-Term Output Voltage Drift (1000 Hours)

ADR4540

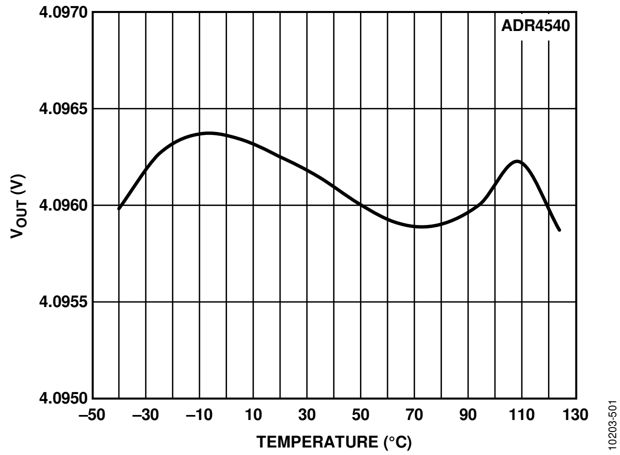

Figure 64. ADR4540 Output Voltage vs. Temperature

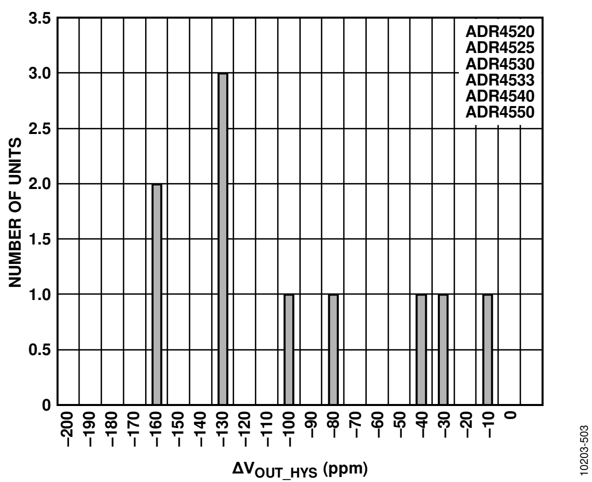

Figure 65. ADR4540 Thermally Induced Output Voltage Hysteresis Distribution

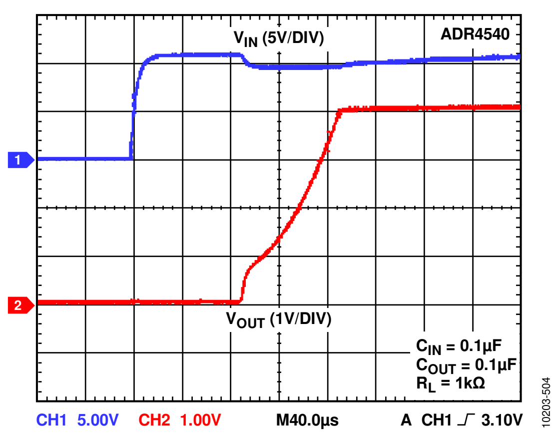

Figure 66. ADR4540 Output Voltage Start-Up Response

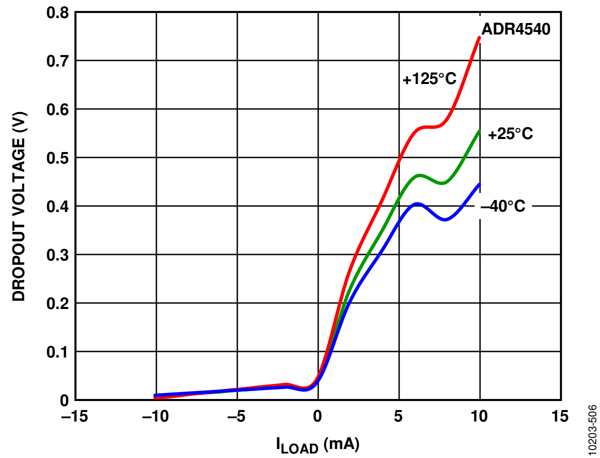

Figure 67. ADR4540 Dropout Voltage vs. Load Current

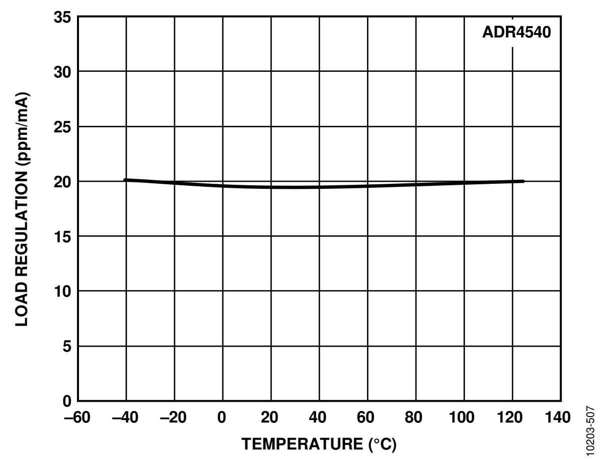

Figure 68. ADR4540 Load Regulation vs. Temperature (Sourcing)

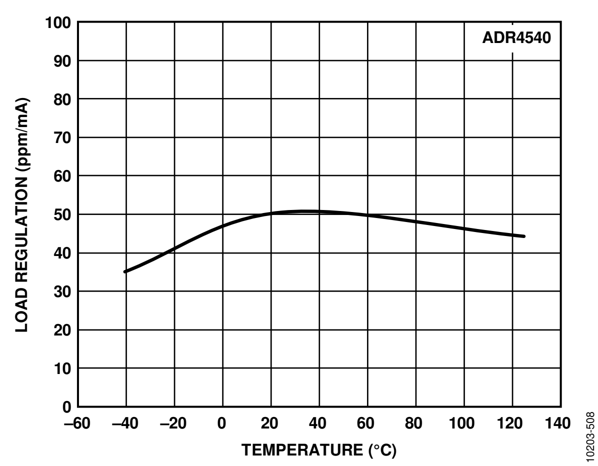

Figure 69. ADR4540 Load Regulation vs. Temperature (Sinking)

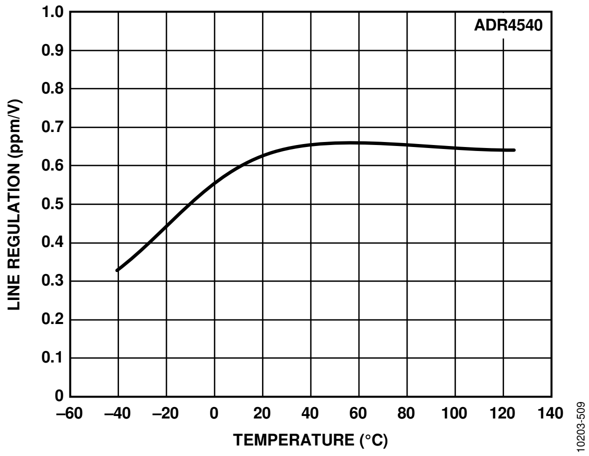

Figure 70. ADR4540 Line Regulation vs. Temperature

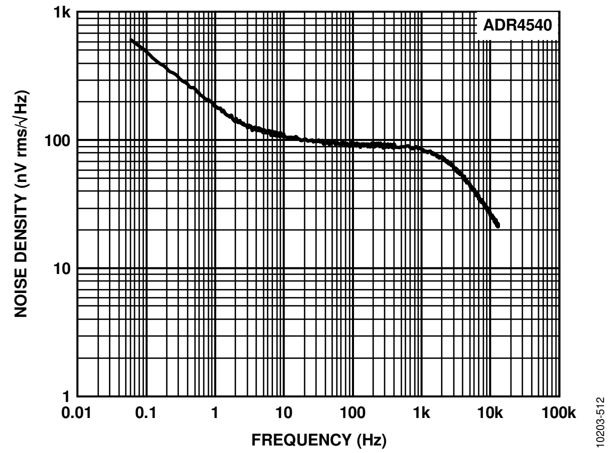

Figure 73. ADR4540 Output Noise Spectral Density

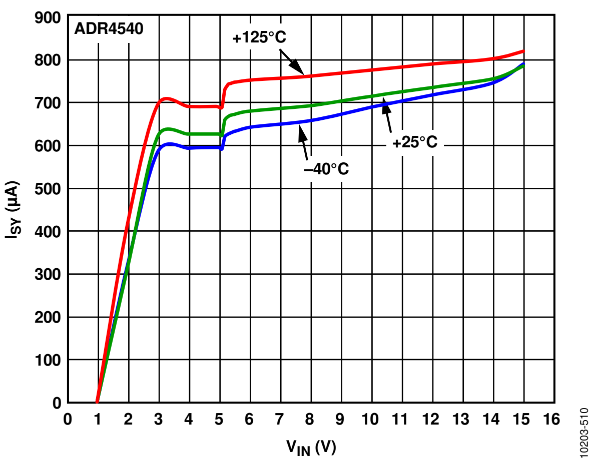

Figure 71. ADR4540 Supply Current vs. Supply Voltage

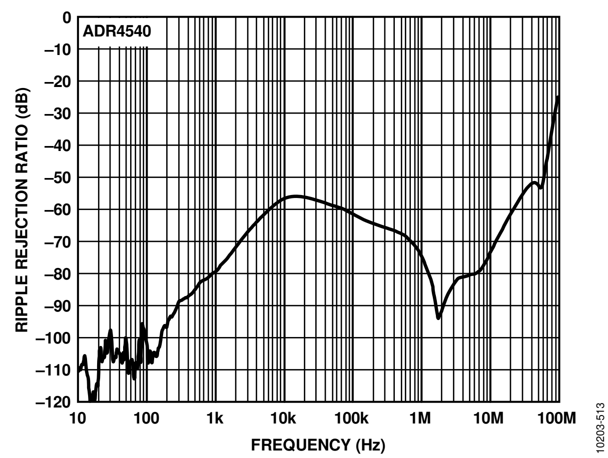

Figure 74. ADR4540 Ripple Rejection Ratio vs. Frequency

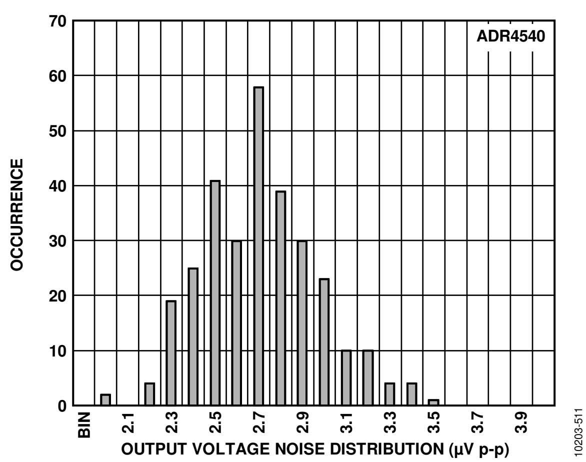

Figure 72. ADR4540 Output Voltage Noise
(Maximum Amplitude from 0.1 Hz to 10 Hz)

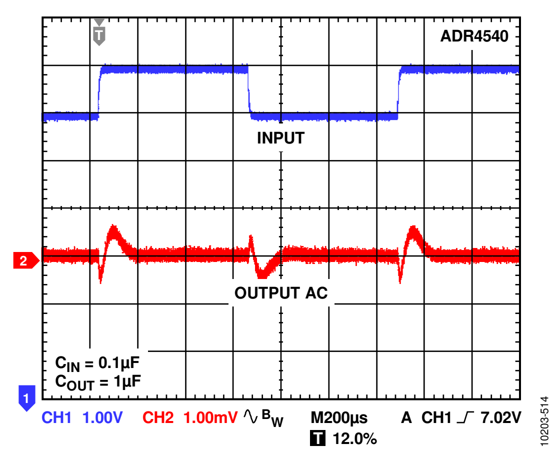

Figure 75. ADR4540 Line Transient Response

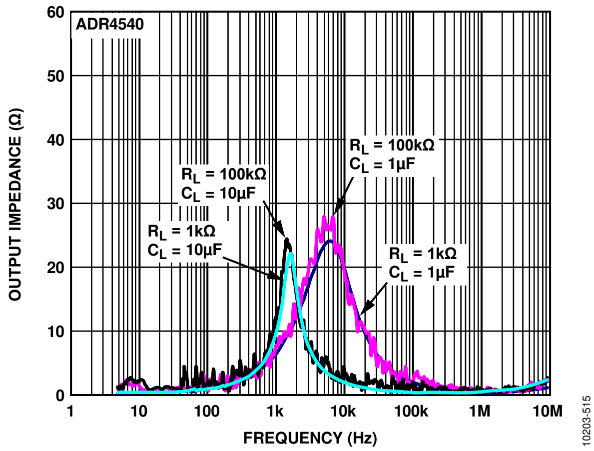

Figure 76. ADR4540 Output Impedance vs. Frequency

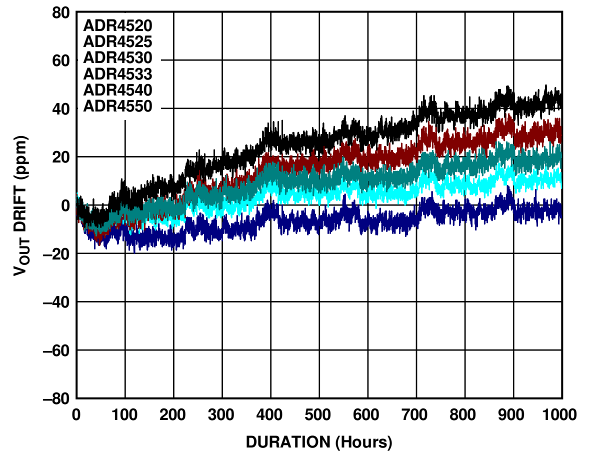

Figure 78. ADR4540 Typical Long-Term Output Voltage Drift (1000 Hours)

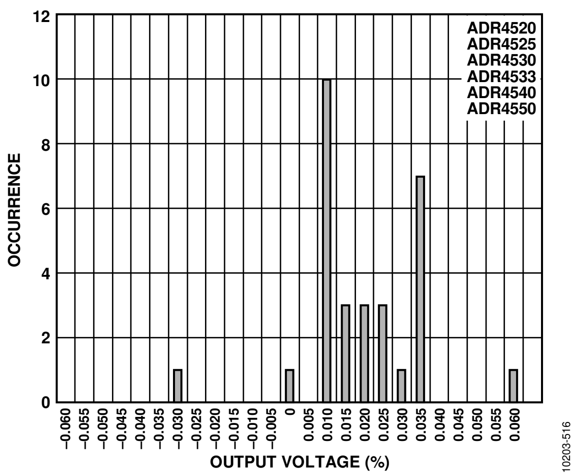

Figure 77. ADR4540 Output Voltage Drift Distribution After Reflow (SHR Drift)