Low Power, 3.6 MHz, Low Noise, Rail-to-Rail Output, Operational Amplifiers

ADA4691-2/ADA4691-4/ADA4692-2/ADA4692-4

FEATURES

Low power: 180 µA typical
Very low input bias currents: 0.5 pA typical
Low noise: 16 nV/√Hz typical
3.6 MHz bandwidth
Offset voltage: 500 µV typical
Low offset voltage drift: 4 µV/°C maximum
Low distortion: 0.003% THD + N
2.7 V to 5 V single supply or ±1.35 V to ±2.5 V dual supply
Available in very small 2 mm × 2 mm LFCSP packages

APPLICATIONS

Photodiode amplifiers
Sensor amplifiers
Portable medical and instrumentation
Portable audio: MP3s, PDAs, and smartphones
Communications
Low-side current sense
ADC drivers
Active filters
Sample-and-hold

GENERAL DESCRIPTION

The ADA4691-2/ADA4692-2 are dual and the ADA4691-4/ADA4692-4 are the quad rail-to-rail output, single-supply amplifiers featuring low power, wide bandwidth, and low noise. The ADA4691-2 has two independent shutdown pins, allowing further reduction in supply current. The ADA4691-4 is a quad with dual shutdown pins each controlling a pair of amplifiers and is available in the 16-lead LFCSP. The ADA4692-4 is a quad version without shutdown.

These amplifiers are ideal for a wide variety of applications. Audio, filters, photodiode amplifiers, and charge amplifiers, all benefit from this combination of performance and features. Additional applications for these amplifiers include portable consumer audio players with low noise and low distortion that provide high gain and slew rate response over the audio band at low power. Industrial applications with high impedance sensors, such as pyroelectric and IR sensors, benefit from the high impedance and low 0.5 pA input bias, low offset drift, and enough bandwidth and response for low gain applications.

The ADA4691/ADA4692 family is fully specified over the extended industrial temperature range (−40°C to +125°C). The ADA4691-2 is available in a 10-lead LFCSP and a 9-ball WLCSP. The ADA4692-2 is available in an 8-lead SOIC and 8-lead LFCSP. The ADA4691-4 is available in a 16-lead LFCSP. The ADA4692-4 is available in a 14-lead TSSOP. For pin configurations, see the Pin Configurations section.

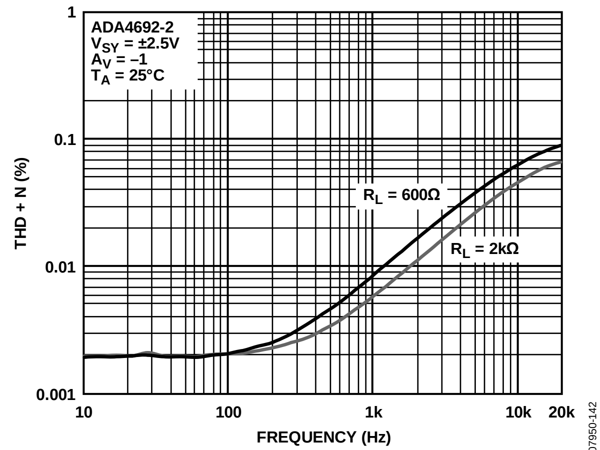

Figure 1. THD + Noise vs. Frequency

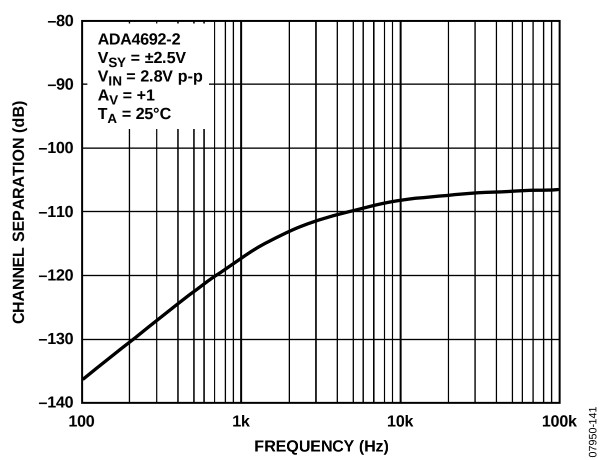

Figure 2. Channel Separation vs. Frequency

Table 1.

	Micropower	Low Power	Low Power with Shutdown	Standard Op Amp With Shutdown	High Bandwidth
Single	AD8613			AD8591	AD8691
Dual	AD8617	ADA4692-2	ADA4691-2	AD8592	AD8692
Quad	AD8619	ADA4692-4	ADA4691-4	AD8594	AD8694

Rev. C

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REVISION HISTORY

12/09—Rev. B to Rev. C

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Changes to Table 1 ... 3
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Changes to Table 4 ... 6
Updated Outline Dimensions ... 17
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9/09—Rev. A to Rev. B

Added ADA4691-2, 9-Ball WLCSP; ADA4692-2, 8-Lead LFCSP; and ADA4692-4, 14-Lead TSSOP ... Throughout
Changes to General Description ... 1
Updated Outline Dimensions ... 16
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6/09—Rev. 0 to Rev. A

Added ADA4691-2, 10 Lead LFCSP ... Throughout
Changes to Table 1 ... 3
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Added Shutdown Operations Section ... 15
Updated Outline Dimensions ... 16
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3/09—Revision 0: Initial Version

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS—2.7 V OPERATION

V_{SY} = 2.7 V, V_{CM} = $V_{SY}/2$, T_A = 25°C, unless otherwise specified.

Table 2.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	V_{CM} = −0.3 V to +1.6 V		0.5	2.5	mV
Dual (ADA469x-2)		V_{CM} = −0.1 V to +1.6 V; −40°C < T_A < +125°C			3.5	mV
Quad (ADA469x-4)		V_{CM} = −0.1 V to +1.6 V; −40°C < T_A < +125°C			4.0	mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	−40°C < T_A < +125°C		1	4	µV/°C
Input Bias Current	I_B			0.5	5	pA
		−40°C < T_A < +125°C			360	pA
Input Offset Current	I_{OS}			1	8	pA
		−40°C < T_A < +125°C			225	pA
Input Voltage Range		−40°C < T_A < +125°C	−0.3		+1.6	V
Common-Mode Rejection Ratio	CMRR	V_{CM} = −0.3 V to +1.6 V	70	90		dB
		V_{CM} = −0.1 V to +1.6 V; −40°C < T_A < +125°C	62			dB
Large Signal Voltage Gain	A_{VO}	R_L = 2 kΩ, V_{OUT} = 0.5 V to 2.2 V	90	100		dB
		−40°C < T_A < +85°C	80			dB
		−40°C < T_A < +125°C	63			dB
		R_L = 600 Ω, V_{OUT} = 0.5 V to 2.2 V	85	95		dB
Input Capacitance	C_{IN}					
Differential Mode	C_{INDM}			2.5		pF
Common Mode	C_{INCM}			7		pF
Logic High Voltage (Enabled)	V_{IH}	−40°C < T_A < +125°C	1.6			V
Logic Low Voltage (Power-Down)	V_{IL}	−40°C < T_A < +125°C			0.5	V
Logic Input Current (Per Pin)	I_{IN}	−40°C < T_A < +125°C, 0 V ≤ V_{SD} ≤ 2.7 V			1	µA
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	R_L = 2 kΩ to GND	2.65	2.67		V
		−40°C < T_A < +125°C	2.6			V
		R_L = 600 Ω to GND	2.55	2.59		V
		−40°C < T_A < +125°C	2.5			V
Output Voltage Low	V_{OL}	R_L = 2 kΩ to V_{SY}		24	30	mV
		−40°C < T_A < +125°C			40	mV
		R_L = 600 Ω to V_{SY}		78	95	mV
		−40°C < T_A < +125°C			130	mV
Short-Circuit Current	I_{SC}	V_{OUT} = V_{SY} or GND		±15		mA
Closed-Loop Output Impedance	Z_{OUT}	f = 1 MHz, A_V = −100		372		Ω
Output Pin Leakage Current		−40°C < T_A < +125°C, shutdown active, V_{SD} = V_{SS}		10		nA
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	V_S = 2.7 V to 5.5 V	80	90		dB
		−40°C < T_A < +125°C	75			dB
Supply Current Per Amplifier	I_{SY}	V_{OUT} = $V_{SY}/2$		165	200	µA
		−40°C < T_A < +125°C			240	µA
Supply Current Shutdown Mode	I_{SD}	All amplifiers shut down, V_{SD} = V_{SS}		10		nA
		−40°C < T_A < +125°C			2	µA

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L = 600 Ω, C_L = 20 pF, A_V = +1		1.1		V/μs
		R_L = 2 kΩ, C_L = 20 pF, A_V = +1		1.4		V/μs
Settling Time to 0.1%	t_S	Step = 0.5 V, R_L = 2 kΩ, 600 Ω		1		μs
Gain Bandwidth Product	GBP	R_L = 1 MΩ, C_L = 35 pF, A_V = +1		3.6		MHz
Phase Margin	$Φ_M$	R_L = 1 MΩ, C_L = 35 pF, A_V = +1		49		Degrees
Turn-On/Turn-Off Time		R_L = 600 Ω		1		μs
NOISE PERFORMANCE						
Distortion	THD + N	A_V = −1, R_L = 2 kΩ, f = 1 kHz, V_{IN} rms = 0.15 V rms		0.009		%
		A_V = −1, R_L = 600 Ω, f = 1 kHz, V_{IN} rms = 0.15 V rms		0.01		%
		A_V = +1, R_L = 2 kΩ, f = 1 kHz, V_{IN} rms = 0.15 V rms		0.006		%
		A_V = +1, R_L = 600 Ω, f = 1 kHz, V_{IN} rms = 0.15 V rms		0.009		%
Voltage Noise	e_n p-p	f = 0.1 Hz to 10 Hz		3.1		μV p-p
Voltage Noise Density	e_n	f = 1 kHz		16		nV/√Hz
		f = 10 kHz		13		nV/√Hz

ELECTRICAL CHARACTERISTICS—5 V OPERATION

V_{SY} = 5 V, V_{CM} = $V_{SY}/2$, T_A = 25°C, unless otherwise specified.

Table 3.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	V_{CM} = −0.3 V to +3.9 V		0.5	2.5	mV
Dual (ADA469x-2)		V_{CM} = −0.1 V to +3.9 V; −40°C < T_A < +125°C			3.5	mV
Quad (ADA469x-4)		V_{CM} = −0.1 V to +3.9 V; −40°C < T_A < +125°C			4.0	mV
Offset Voltage Drift	$ΔV_{OS}/ΔT$	−40°C < T_A < +125°C		1	4	μV/°C
Input Bias Current	I_B			0.5	5	pA
		−40°C < T_A < +125°C			360	pA
Input Offset Current	I_{OS}			1	8	pA
		−40°C < T_A < +125°C			260	pA
Input Voltage Range		−40°C < T_A < +125°C	−0.3		+3.9	V
Common-Mode Rejection Ratio	CMRR	V_{CM} = −0.3 V to +3.9 V	75	98		dB
		V_{CM} = −0.1 V to +3.9 V; −40°C < T_A < +125°C	68			dB
Large Signal Voltage Gain	A_{VO}	R_L = 2 kΩ, V_O = 0.5 V to 4.5 V, V_{CM} = 0 V	95	110		dB
		−40°C < T_A < +85°C	80			dB
		−40°C < T_A < +125°C	70			dB
		R_L = 600 Ω, V_O = 0.5 V to 4.5 V, V_{CM} = 0 V	90	100		dB
Input Capacitance						
Differential Mode	C_{INDM}			2.5		pF
Common Mode	C_{INCM}			7		pF
Logic High Voltage (Enabled)	V_{IH}	−40°C < T_A < +125°C	2.0			V
Logic Low Voltage (Power-Down)	V_{IL}	−40°C < T_A < +125°C			0.8	V
Logic Input Current (Per Pin)	I_{IN}	−40°C < T_A < +125°C, 0 V ≤ V_{SD} ≤ 2.7 V			1	μA

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	R_L = 2 kΩ	4.95	4.97		V
		−40°C ≤ T_A ≤ +125°C	4.90			V
		R_L = 600 Ω to GND	4.85	4.88		V
		−40°C ≤ T_A ≤ +125°C	4.80			V
Output Voltage Low	V_{OL}	R_L = 2 kΩ		30	35	mV
		−40°C ≤ T_A ≤ +125°C			50	mV
		R_L = 600 Ω		100	110	mV
		−40°C ≤ T_A ≤ +125°C			155	mV
Short-Circuit Limit	I_{SC}	V_{OUT} = V_{SY} or GND		±55		mA
Closed-Loop Output Impedance	Z_{OUT}	ADA4691-2, f = 1 MHz, A_V = −100		364		Ω
		ADA4691-2, f = 1 MHz, A_V = −100		246		Ω
Output Pin Leakage Current		−40°C < T_A < +125°C, shutdown active, V_{SD} = V_{SS}		10		nA
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	V_{SY} = 2.7 V to 5.5 V	80	90		dB
		−40°C ≤ T_A ≤ +125°C	75			dB
Supply Current Per Amplifier	I_{SY}	V_{OUT} = V_{SY}/2		180	225	µA
		−40°C ≤ T_A ≤ +125°C			275	µA
Supply Current Shutdown Mode	I_{SD}	All amplifiers shut down, V_{SD} = V_{SS}		10		nA
		−40°C ≤ T_A ≤ +125°C			2	µA
DYNAMIC PERFORMANCE						
Slew Rate	SR	R_L = 2 kΩ, 600 Ω, C_L = 20 pF, A_V = +1		1.3		V/µs
Settling Time to 0.1%	t_S	V_{IN} = 2 V step, R_L = 2 kΩ or 600 Ω		1.5		µs
Gain Bandwidth Product	GBP	R_L = 1 MΩ, C_L = 35 pF, A_V = +1		3.6		MHz
Phase Margin	Φ_M	R_L = 1 MΩ, C_L = 35 pF, A_V = +1		52		Degrees
Turn-On/Turn-Off Time		R_L = 600 Ω		1		µs
NOISE PERFORMANCE						
Distortion	THD + N	A_V = −1, R_L = 2 kΩ, f = 1 kHz, V_{IN} rms = 0.8 V rms		0.006		%
		A_V = −1, R_L = 600 Ω, f = 1 kHz, V_{IN} rms = 0.8 V rms		0.008		%
		A_V = +1, R_L = 2 kΩ, f = 1 kHz, V_{IN} rms = 0.8 V rms		0.001		%
		A_V = +1, R_L = 600 Ω, f = 1 kHz, V_{IN} rms = 0.8 V rms		0.003		%
Voltage Noise	e_n p-p	f = 0.1 Hz to 10 Hz		3.2		µV p-p
Voltage Noise Density	e_n	f = 1 kHz		16		nV/√Hz
	e_n	f = 10 kHz		13		nV/√Hz

ABSOLUTE MAXIMUM RATINGS

Table 4.

Parameter	Rating
Supply Voltage	6 V
Input Voltage	V_{SS} − 0.3 V to V_{DD} + 0.3 V
Input Current[1]	±10 mA
Shutdown Pin Rise/Fall Times	50 µs maximum
Differential Input Voltage[2]	$\pm V_{SY}$
Output Short-Circuit Duration to GND	Indefinite
Temperature	
Storage Temperature Range	−65°C to +150°C
Operating Temperature Range	−40°C to +125°C
Junction Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 60 sec)	300°C

[1] Input pins have clamp diodes to the supply pins. Limit the input current to 10 mA or less whenever the input signal exceeds the power supply rail by 0.3 V.
[2] Differential input voltage is limited to 5 V or the supply voltage, whichever is less.

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

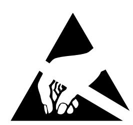
θ_{JA} is specified for the worst-case conditions, that is, a device soldered in a circuit board for surface-mount packages and measured using a standard 4-layer board, unless otherwise specified.

Table 5. Thermal Resistance

Package Type	θ_{JA}	θ_{JC}	Unit
8-Lead SOIC_N (R-8)	120	45	°C/W
8-Lead LFCSP (CP-8-6)	125	40	°C/W
9-Ball WLCSP (CB-9-3)	77	N/A[1]	°C/W
10-Lead LFCSP (CP-10-11)	115	40	°C/W
16-Lead LFCSP (CP-16-22)	75	12	°C/W
14-Lead TSSOP (RU-14)	112	35	°C/W

[1] N/A = not applicable.

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 CONFIGURATIONS

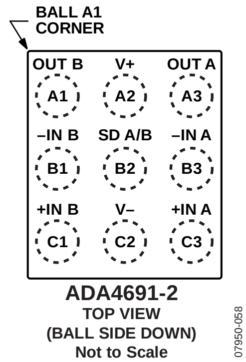


Figure 3. 9-Ball Wafer Level Chip Scale WLCSP (CB-9-3)

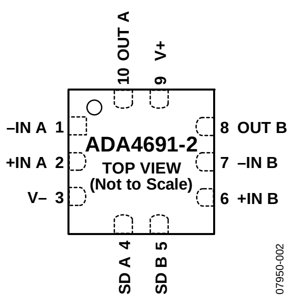


Figure 4. 10-Lead, 2 mm × 2 mm LFCSP (CP-10-11)

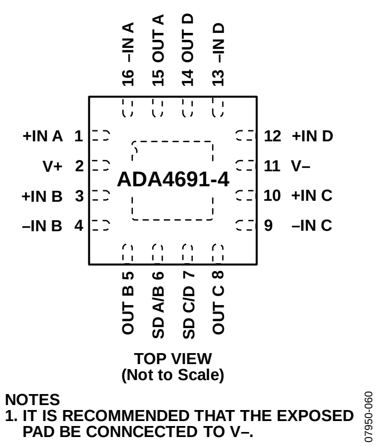


Figure 5. 16-Lead, 3 mm × 3 mm LFCSP (CP-16-22)

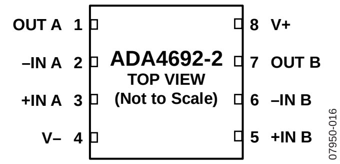


Figure 6. 8-Lead, 2 mm × 2 mm LFCSP (CP-8-6)

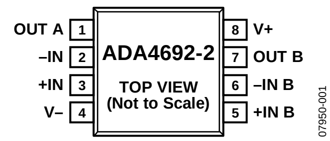


Figure 7. 8-Lead SOIC_N (R-8)

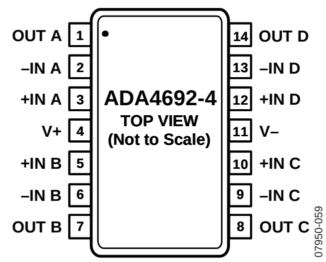


Figure 8. 14-Lead TSSOP (RU-14)

TYPICAL PERFORMANCE CHARACTERISTICS

T_A = 25°C, unless otherwise noted.

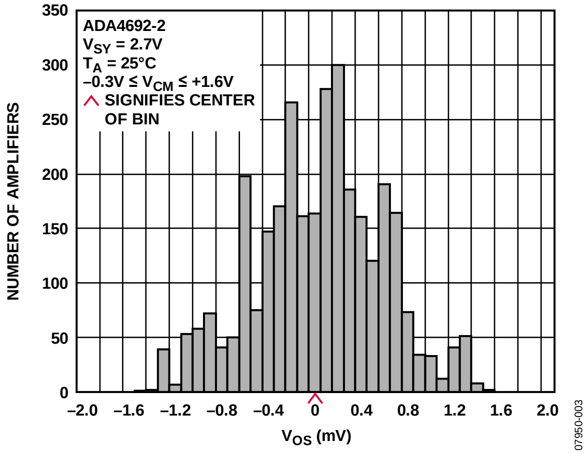


Figure 9. Input Offset Voltage Distribution

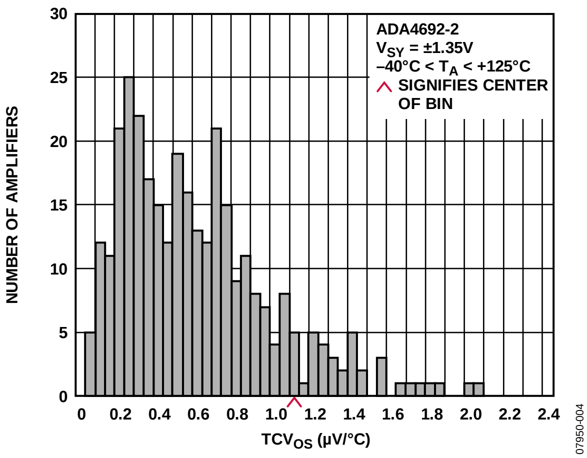


Figure 10. Input Offset Voltage Drift Distribution

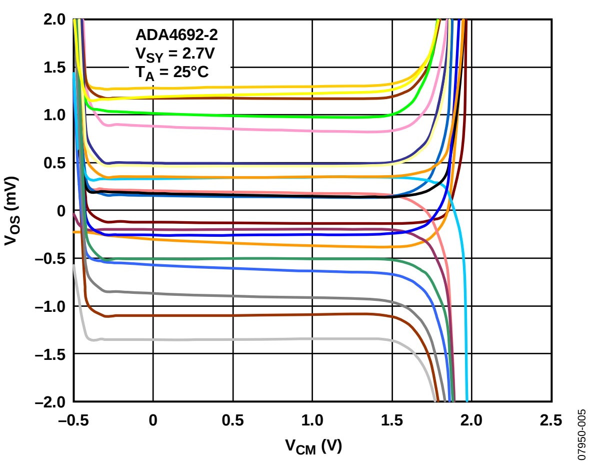


Figure 11. Input Offset Voltage vs. Common-Mode Voltage

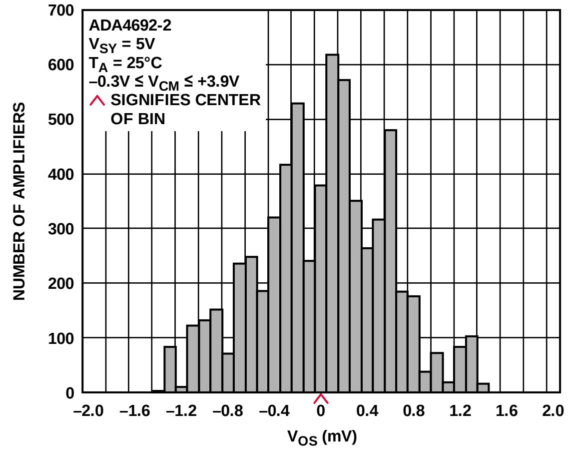


Figure 12. Input Offset Voltage Distribution

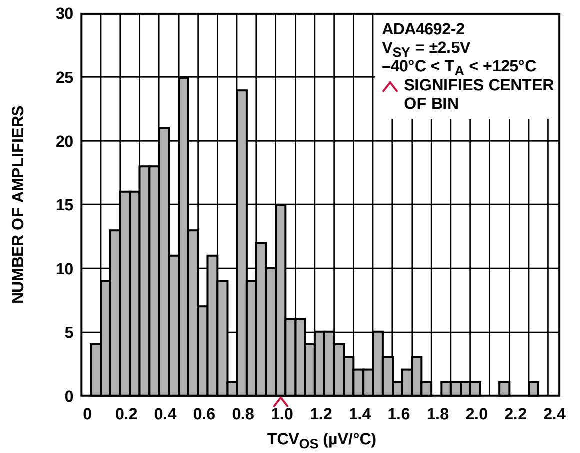


Figure 13. Input Offset Voltage Drift Distribution

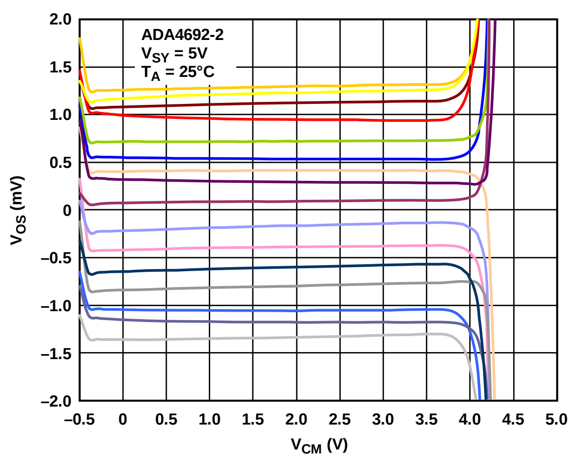


Figure 14. Input Offset Voltage vs. Common-Mode Voltage

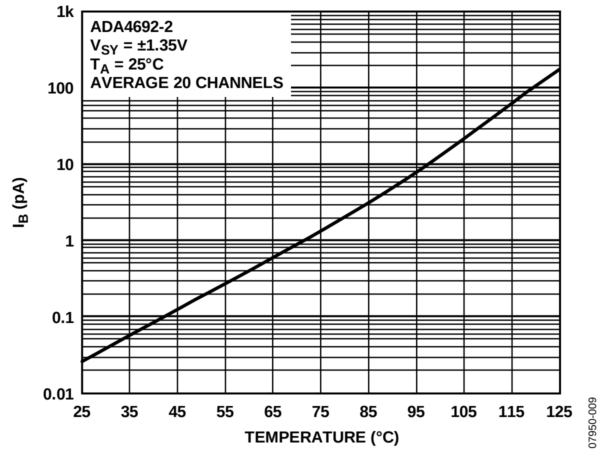


Figure 15. Input Bias Current vs. Temperature

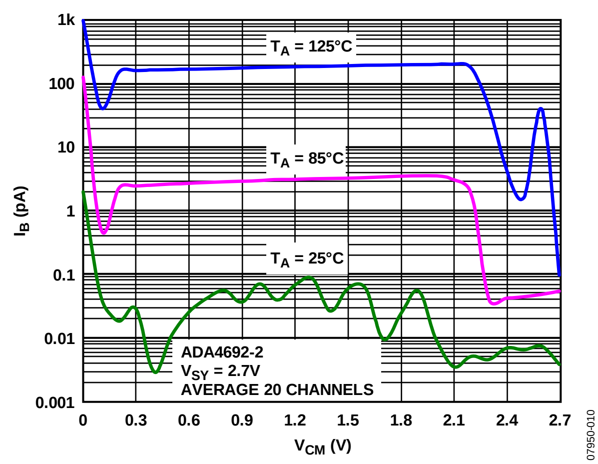


Figure 16. Input Bias Current vs. Common-Mode Voltage

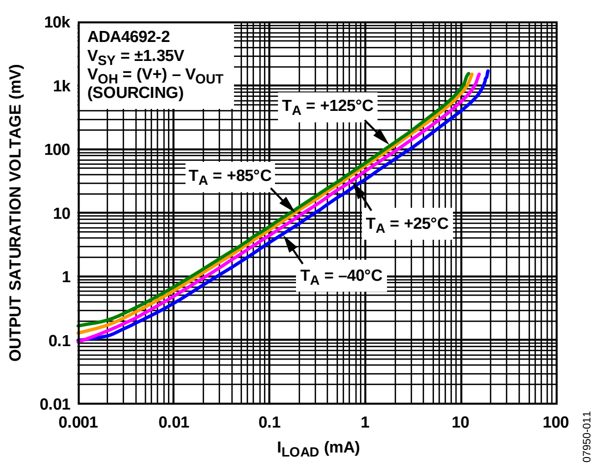


Figure 17. Output Voltage (V_{OH}) to Supply Rail vs. Load Current

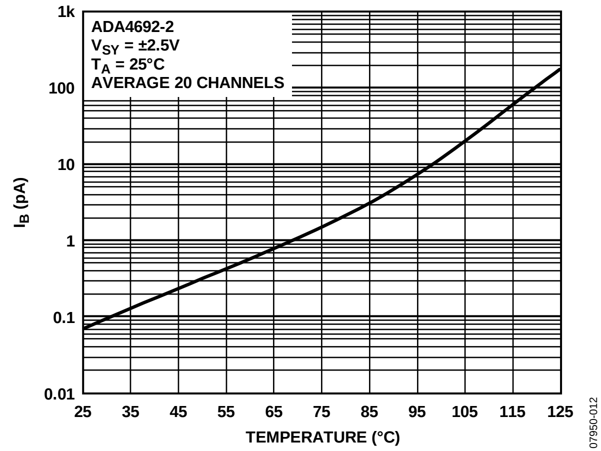


Figure 18. Input Bias Current vs. Temperature

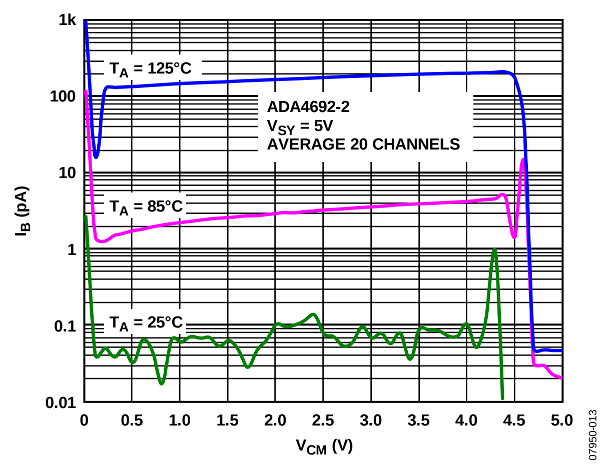


Figure 19. Input Bias Current vs. Common-Mode Voltage

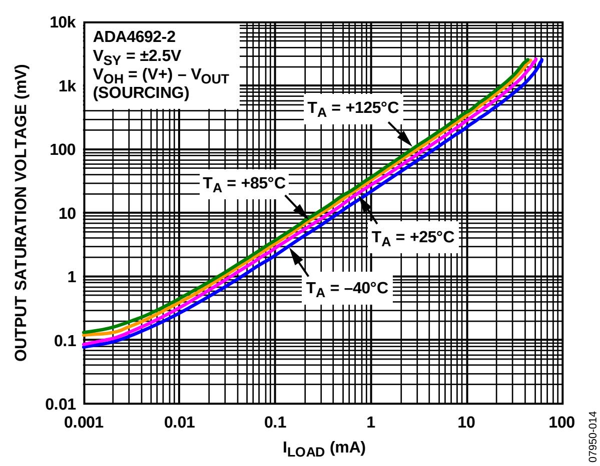


Figure 20. Output Voltage (V_{OH}) to Supply Rail vs. Load Current

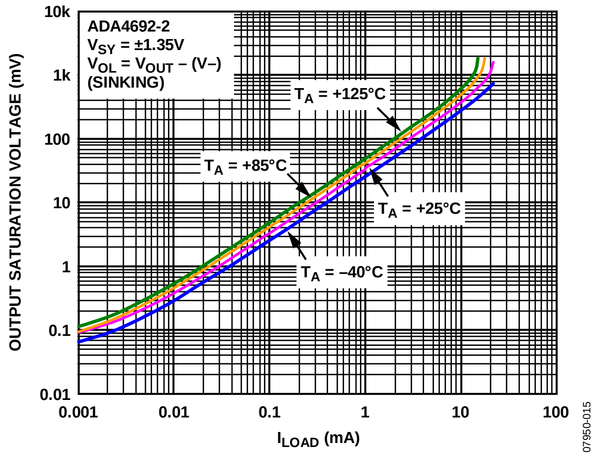


Figure 21. Output Voltage (V_{OL}) to Supply Rail vs. Load Current

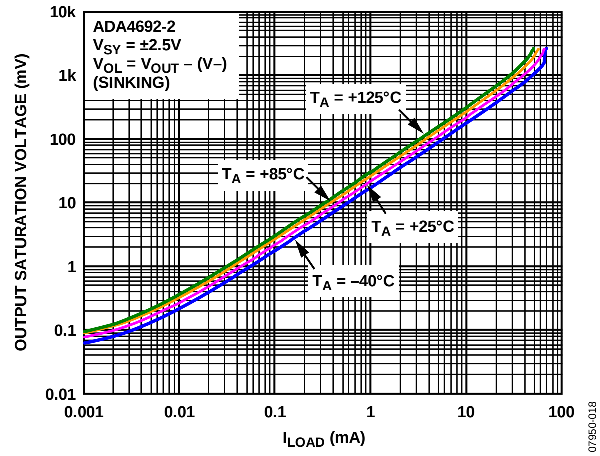


Figure 24. Output Voltage (V_{OL}) to Supply Rail vs. Load Current

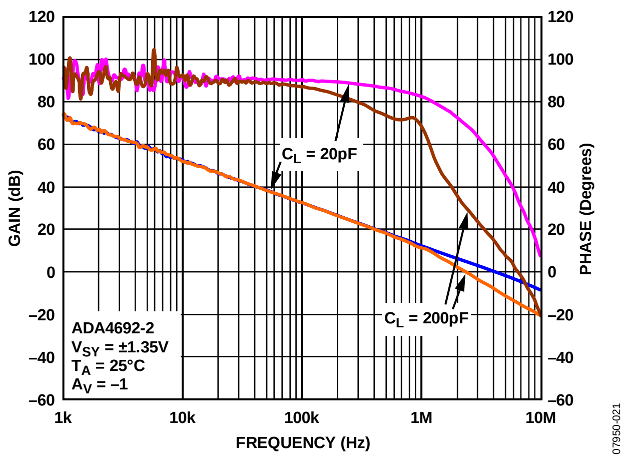


Figure 22. Open-Loop Gain and Phase vs. Frequency

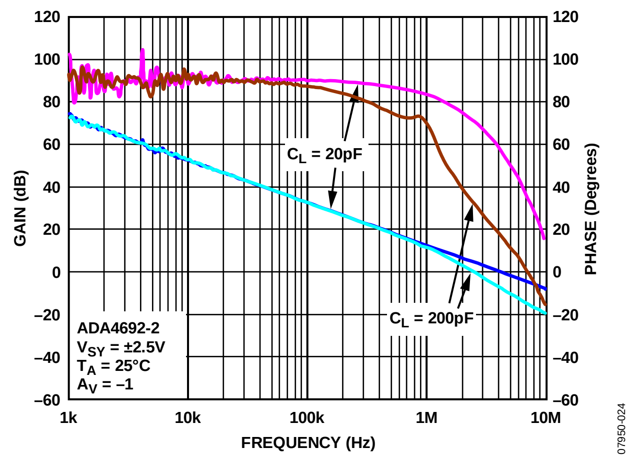


Figure 25. Open-Loop Gain and Phase vs. Frequency

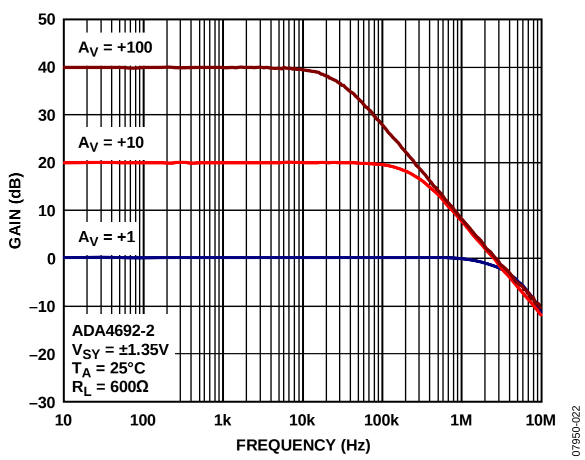


Figure 23. Closed-Loop Gain vs. Frequency

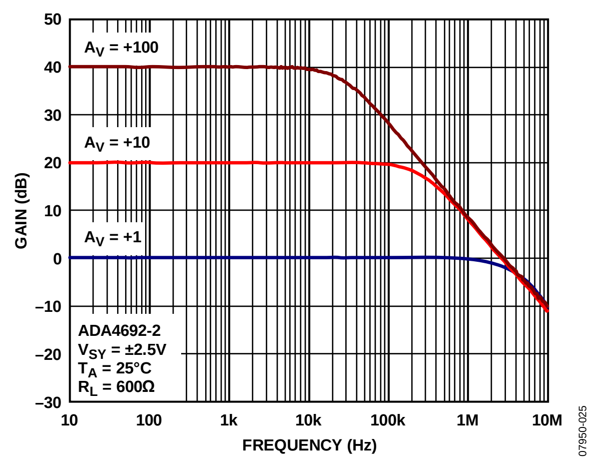


Figure 26. Closed-Loop Gain vs. Frequency

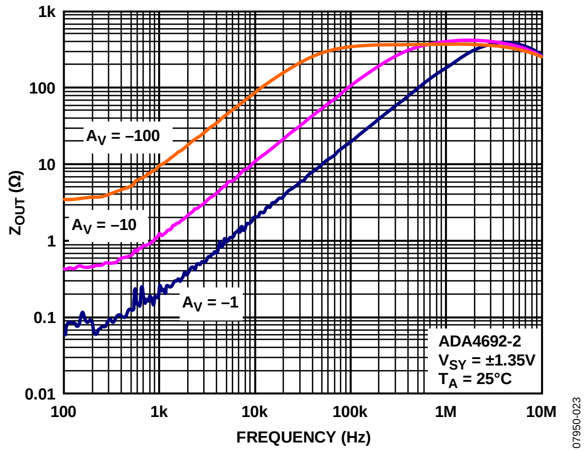


Figure 27. Output Impedance vs. Frequency

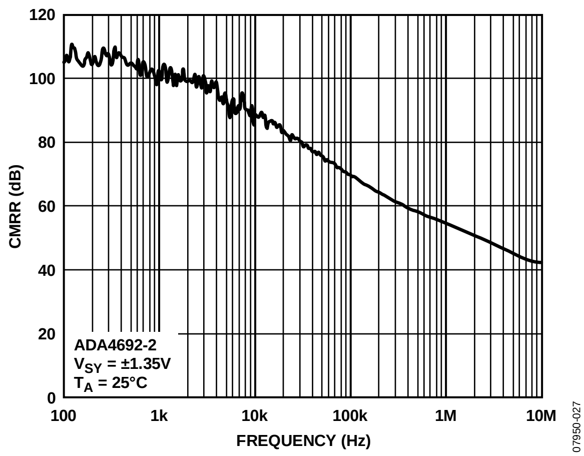


Figure 28. CMRR vs. Frequency

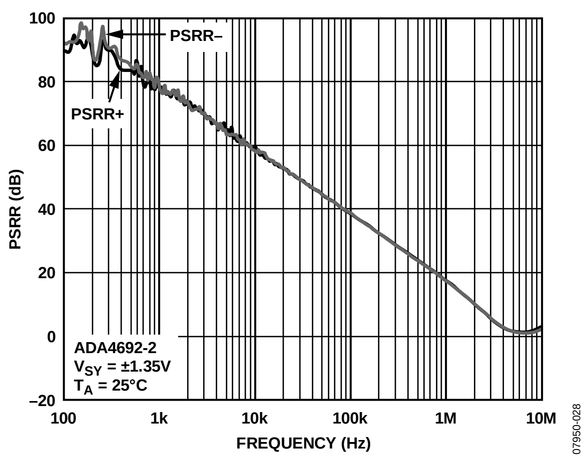


Figure 29. PSRR vs. Frequency

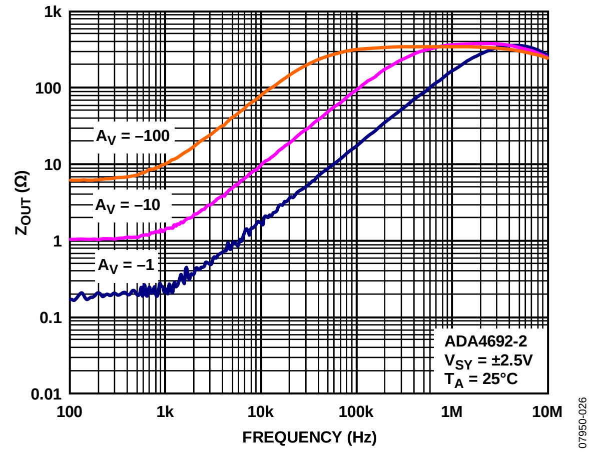


Figure 30. Output Impedance vs. Frequency

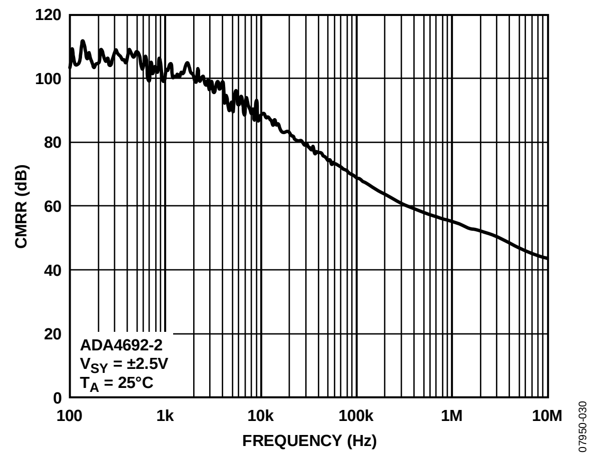


Figure 31. CMRR vs. Frequency

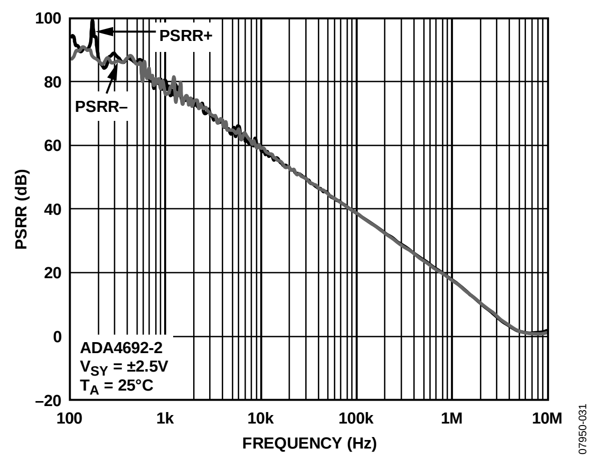


Figure 32. PSRR vs. Frequency

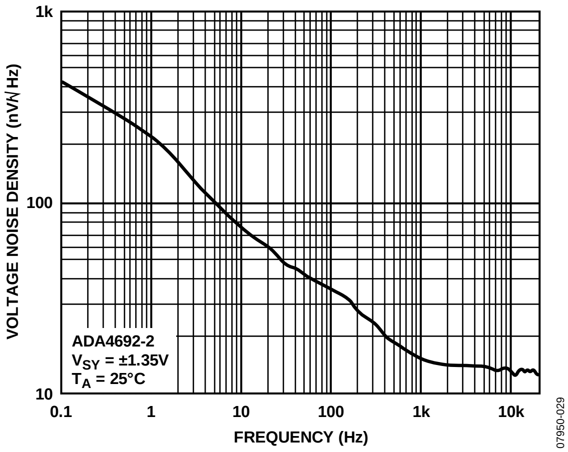


Figure 33. Voltage Noise Density vs. Frequency

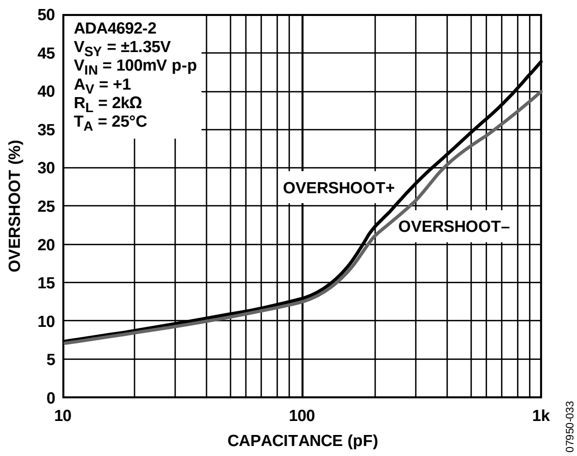


Figure 34. Small Signal Overshoot vs. Load Capacitance

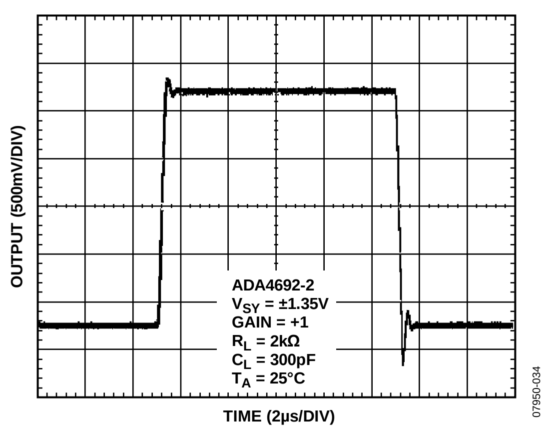


Figure 35. Large Signal Transient Response

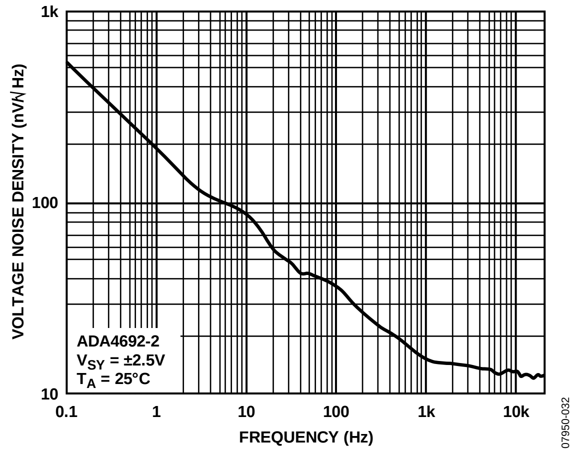


Figure 36. Voltage Noise Density vs. Frequency

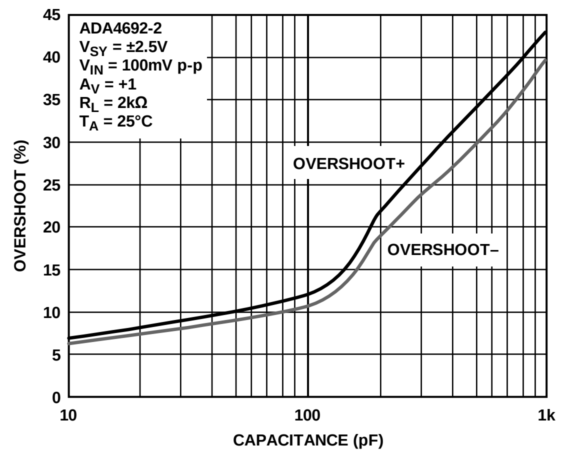


Figure 37. Small Signal Overshoot vs. Load Capacitance

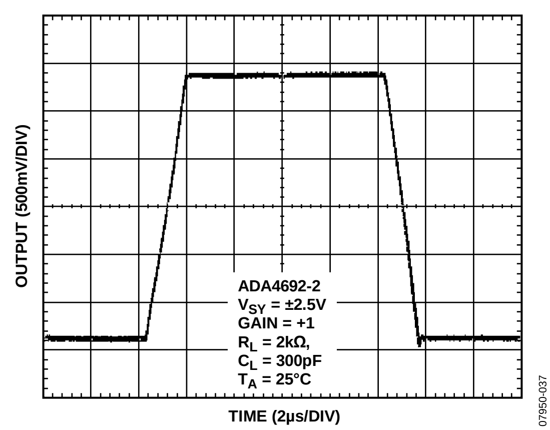


Figure 38. Large Signal Transient Response

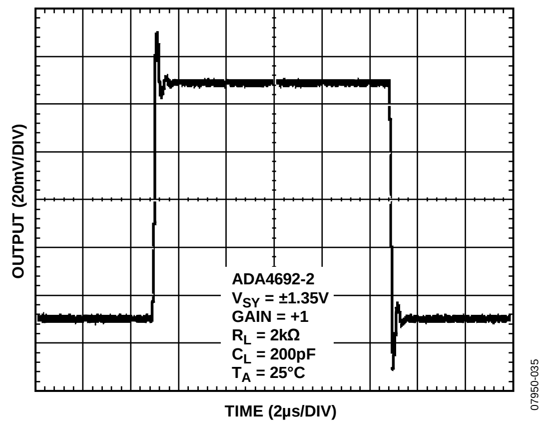


Figure 39. Small Signal Transient Response

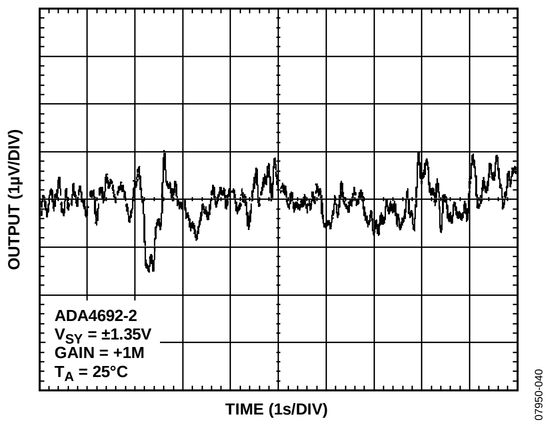


Figure 40. 0.1 Hz to 10 Hz Noise

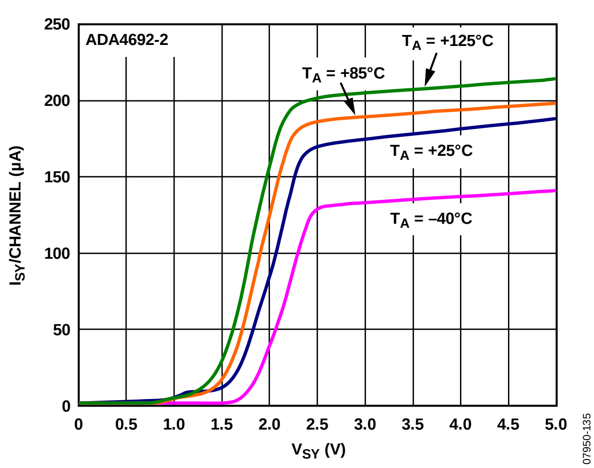


Figure 41. Supply Current per Amplifier vs. Supply Voltage

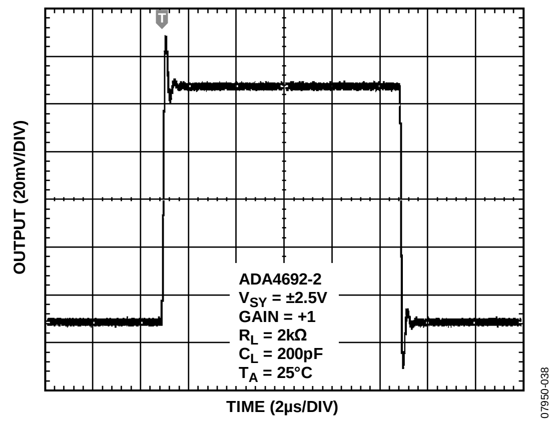


Figure 42. Small Signal Transient Response

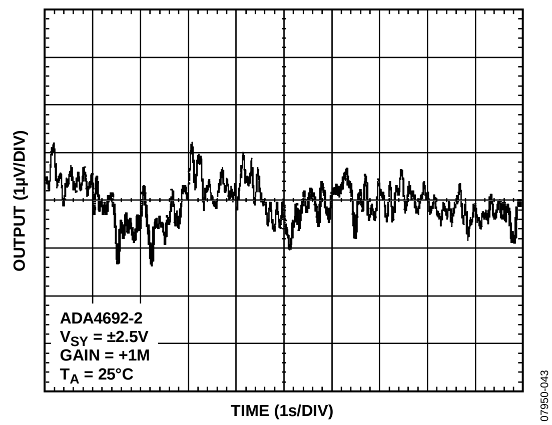


Figure 43. 0.1 Hz to 10 Hz Noise

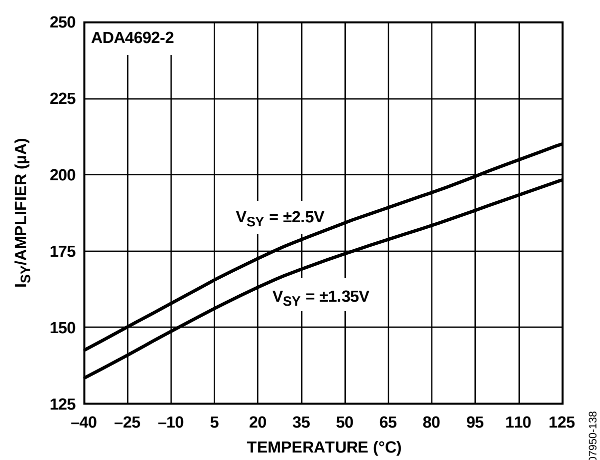


Figure 44. Supply Current per Channel vs. Temperature

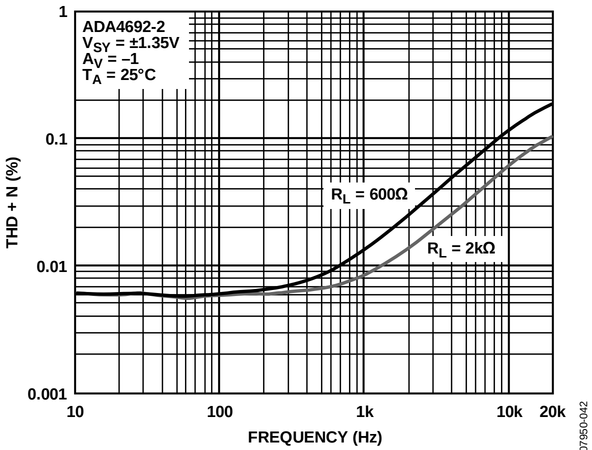


Figure 45. THD + Noise vs. Frequency

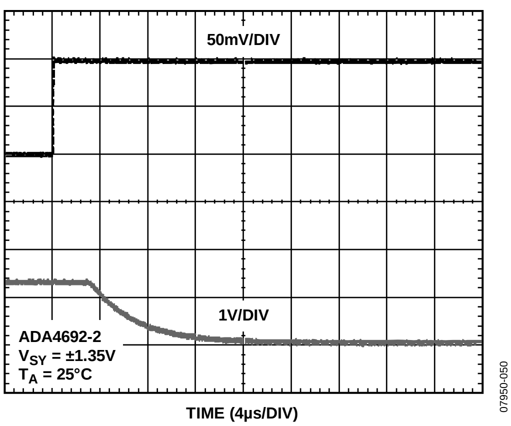


Figure 46. Positive Overload Recovery

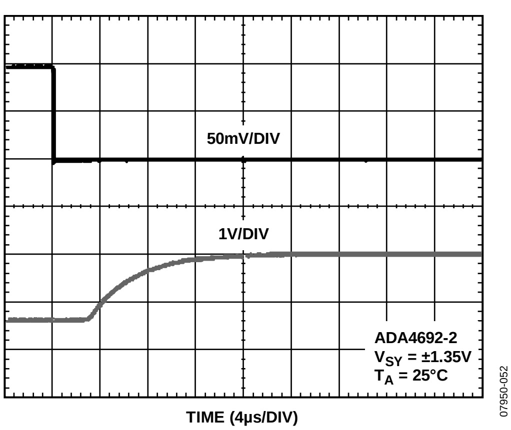


Figure 47. Negative Overload Recovery

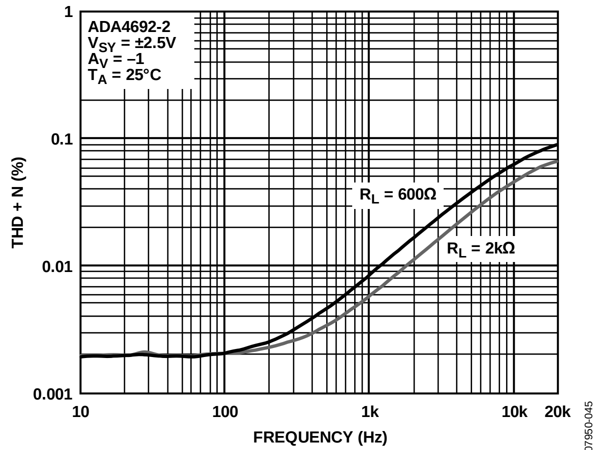


Figure 48. THD + Noise vs. Frequency

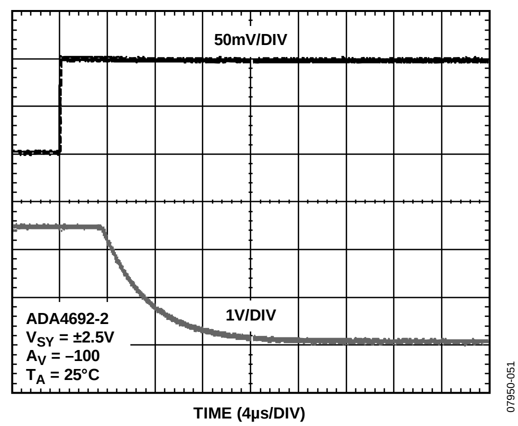


Figure 49. Positive Overload Recovery

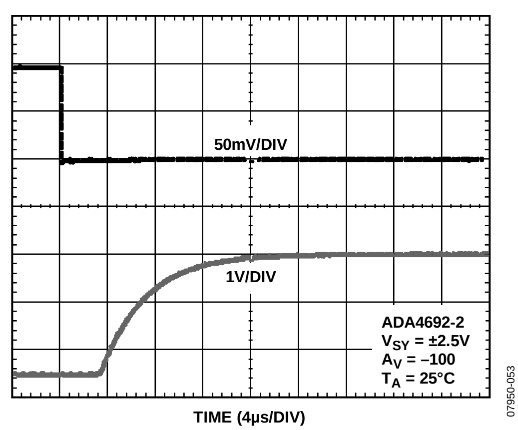


Figure 50. Negative Overload Recovery

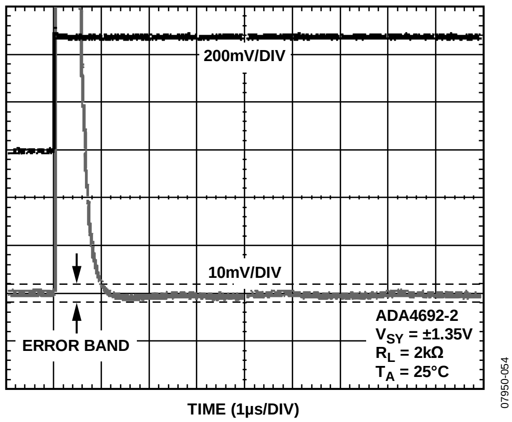


Figure 51. Positive Settling Time to 0.1%

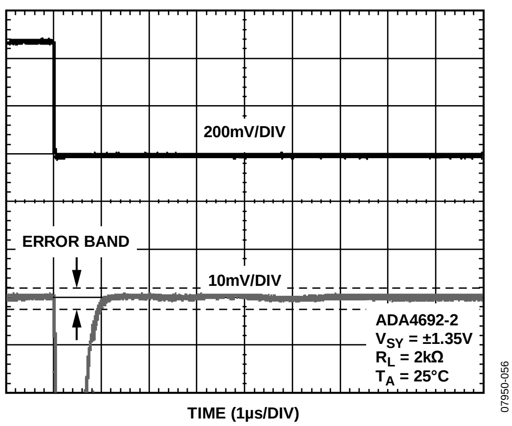


Figure 52. Negative Settling Time to 0.1%

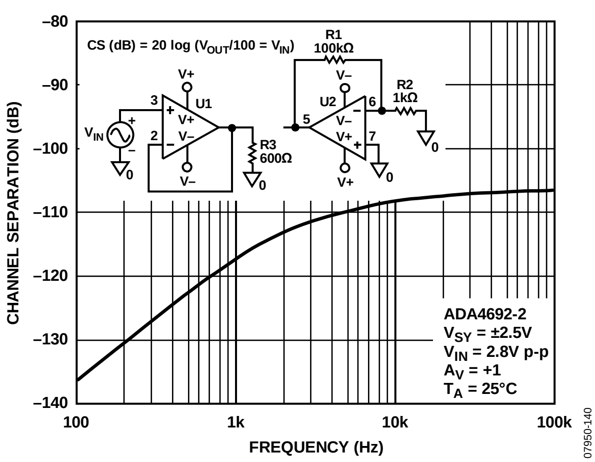


Figure 53. Channel Separation (CS) vs. Frequency

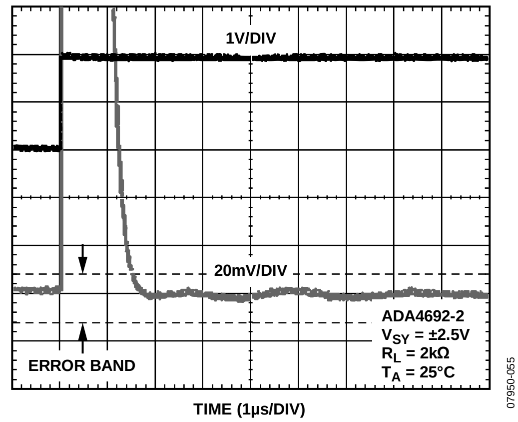


Figure 54. Positive Settling Time to 0.1%

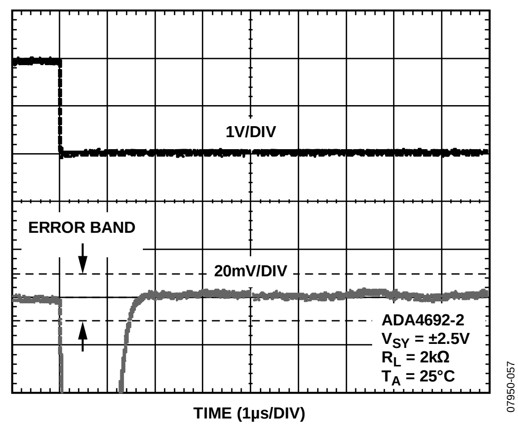


Figure 55. Negative Settling Time to 0.1%

SHUTDOWN OPERATION

INPUT PIN CHARACTERISTICS

The ADA4691-2 has a classic CMOS logic inverter input for each shutdown pin, as shown in Figure 56.

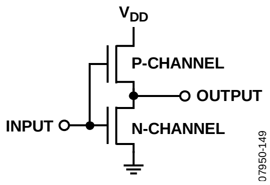


Figure 56. CMOS Inverter

With slowly changing inputs, the top transistor and bottom transistor may be slightly on at the same time, increasing the supply current. This can be avoided by driving the input with a digital logic output having fast rise and fall times. Figure 57 through Figure 59 show the supply current for both sections switching simultaneously with rise times of 1 µs, 10 µs, and 1 ms. Clearly, the rise and fall times should be faster than 10 µs. Using an RC time constant to enable/disable shutdown is not recommended.

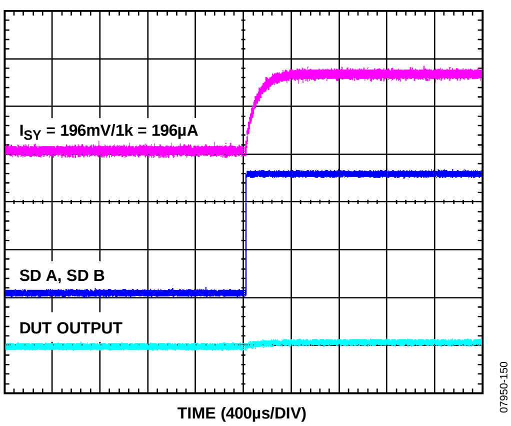


Figure 57. Shutdown Pin Rise Time = 1 µs

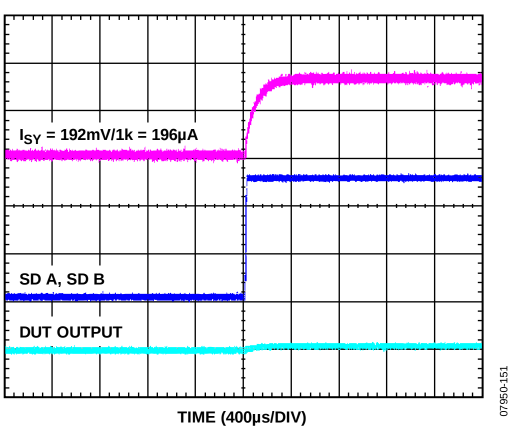


Figure 58. Shutdown Pin Rise Time = 10 µs

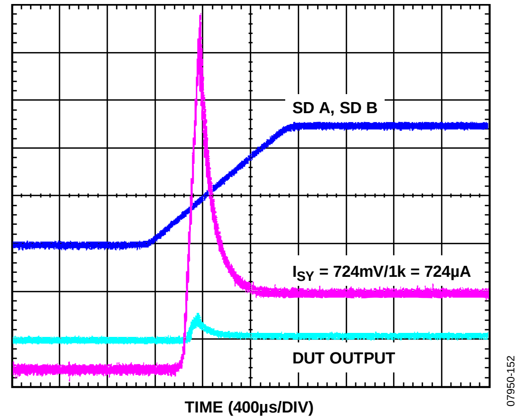


Figure 59. Shutdown Pin Rise Time = 1 ms

INPUT THRESHOLD

The input threshold is approximately 1.2 V above the V− pin when operating on ground and 5 V and 0.9 V when operating on 2.7 V (see Figure 60 and Figure 61). The threshold is relatively stable over temperature. For operation on split supplies, the logic swing may have to be level shifted.

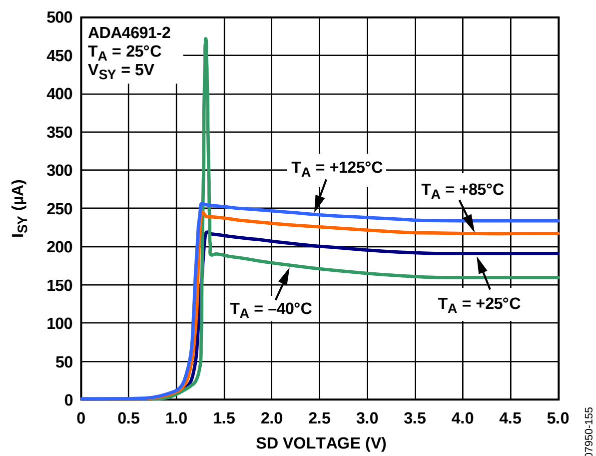


Figure 60. Supply Current vs. Temperature, V_{SY} = 5 V

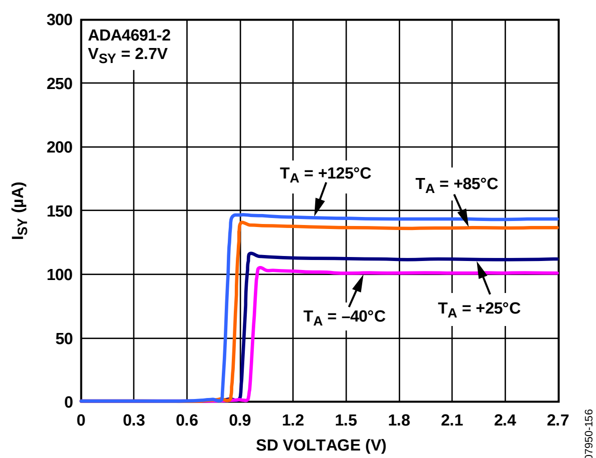


Figure 61. Supply Current vs. Temperature, V_{SY} = 2.7 V

OUTLINE DIMENSIONS

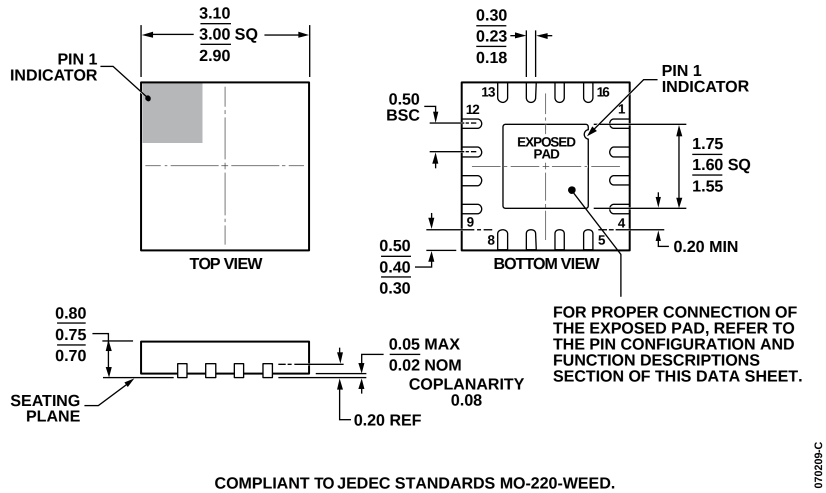


Figure 62. 16-Lead Lead Frame Chip Scale Package [LFCSP_WQ]
3 mm × 3 mm Body, Very Very Thin Quad
(CP-16-22)
Dimensions shown in millimeters

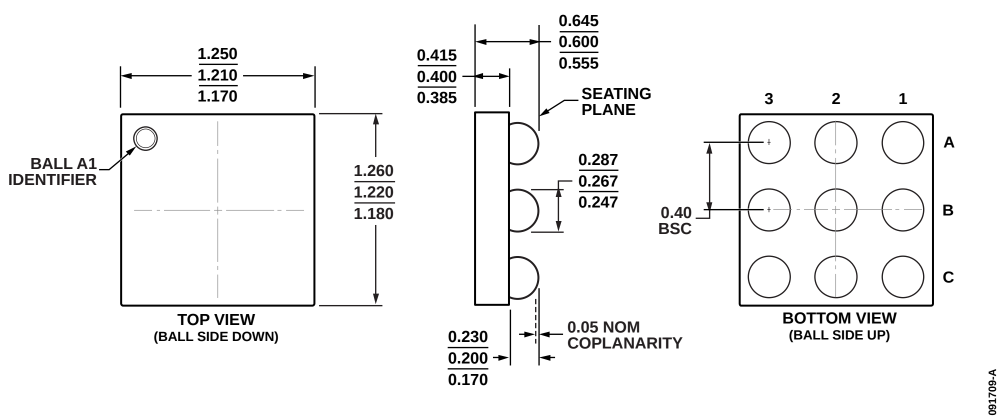


Figure 63. 9-Ball Wafer Level Chip Scale Package [WLCSP]
(CB-9-3)
Dimensions shown in millimeters

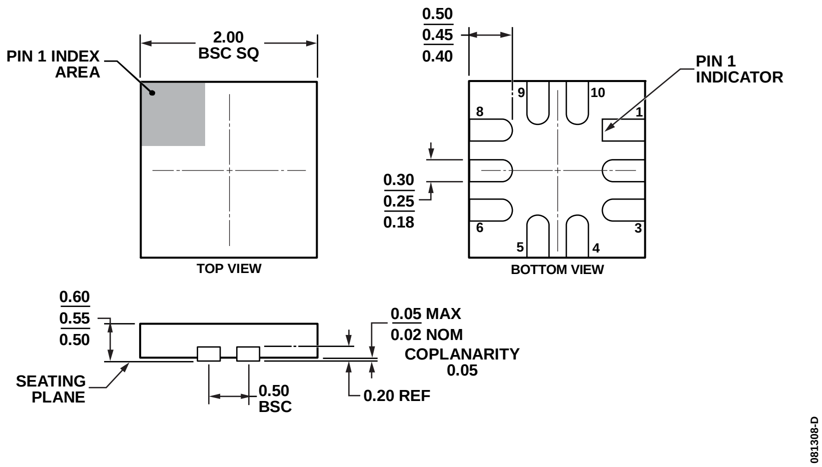


Figure 64. 10-Lead Lead Frame Chip Scale Package [LFCSP_UQ]
2 mm × 2 mm Body, Ultra Thin Quad
(CP-10-11)
Dimensions shown in millimeters

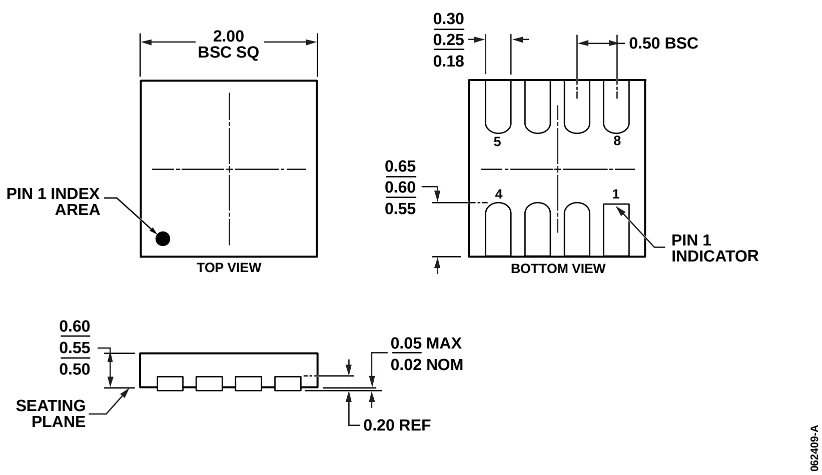


Figure 65. 8-Lead Lead Frame Chip Scale Package [LFCSP_UD]
2 mm × 2 mm Body, Ultra Thin, Dual Lead
(CP-8-6)
Dimensions shown in millimeters

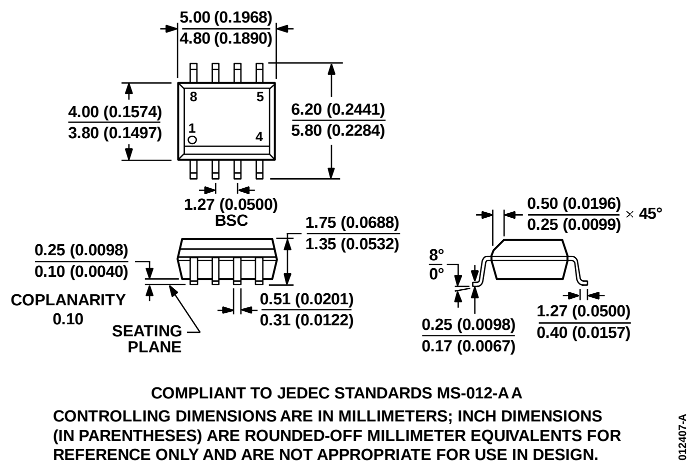


Figure 66. 8-Lead Standard Small Outline Package [SOIC_N]
Narrow Body
(R-8)
Dimensions shown in millimeters and (inches)

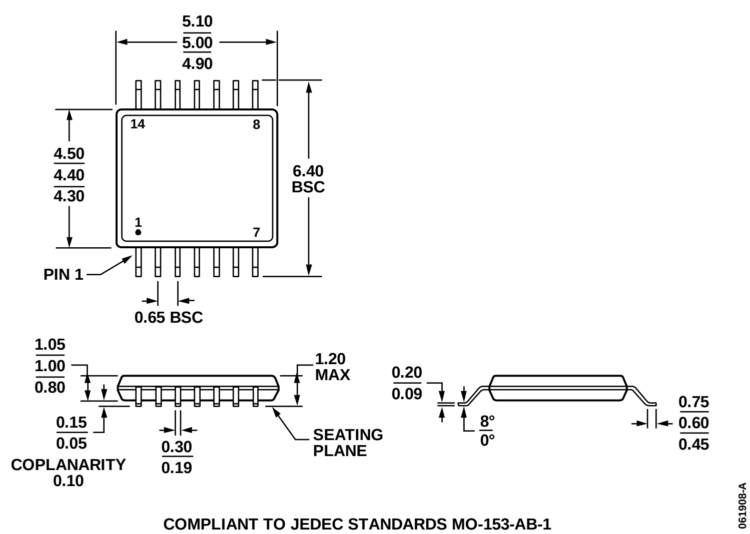


Figure 67. 14-Lead Thin Shrink Small Outline Package [TSSOP]
(RU-14)
Dimensions shown in millimeters

ORDERING GUIDE

Model[1]	Temperature Range	Package Description	Package Option	Branding
ADA4691-2ACBZ-R7	−40°C to +125°C	9-Ball WLCSP	CB-9-3	A2C
ADA4691-2ACBZ-RL	−40°C to +125°C	9-Ball WLCSP	CB-9-3	A2C
ADA4691-2ACPZ-R7	−40°C to +125°C	10-Lead LFCSP_UQ	CP-10-11	A2
ADA4691-2ACPZ-RL	−40°C to +125°C	10-Lead LFCSP_UQ	CP-10-11	A2
ADA4691-4ACPZ-R2	−40°C to +125°C	16-Lead LFCSP_WQ	CP-16-22	A2P
ADA4691-4ACPZ-R7	−40°C to +125°C	16-Lead LFCSP_WQ	CP-16-22	A2P
ADA4691-4ACPZ-RL	−40°C to +125°C	16-Lead LFCSP_WQ	CP-16-22	A2P
ADA4692-2ACPZ-R7	−40°C to +125°C	8-Lead LFCSP_UD	CP-8-6	A3
ADA4692-2ACPZ-RL	−40°C to +125°C	8-Lead LFCSP_UD	CP-8-6	A3
ADA4692-2ARZ	−40°C to +125°C	8-Lead SOIC_N	R-8	
ADA4692-2ARZ-R7	−40°C to +125°C	8-Lead SOIC_N	R-8	
ADA4692-2ARZ-RL	−40°C to +125°C	8-Lead SOIC_N	R-8	
ADA4692-4ARUZ	−40°C to +125°C	14-Lead TSSOP	RU-14	
ADA4692-4ARUZ-RL	−40°C to +125°C	14-Lead TSSOP	RU-14	

[1] Z = RoHS Compliant Part.

Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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