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REVISION HISTORY

2/09—Rev. A to Rev. B	
Added Table 1; Renumbered Sequentially	1
Changes to Typical Performance Characteristics Section.....	6
8/06—Rev. 0 to Rev. A	
Updated Format.....	Universal
Changes to Figure 17, Figure 18, and Figure 19	8
4/06—Revision 0: Initial Version	

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

@ $V_S = 5\text{ V}$, $V_{CM} = V_S/2$, $T_A = 25^\circ\text{C}$, unless otherwise noted.

Table 2.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	$0\text{ V} < V_{CM} < 5\text{ V}$		0.235	1	mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	$-40^\circ\text{C} < T_A < +85^\circ\text{C}$		3	10	$\mu\text{V}/^\circ\text{C}$
Input Voltage Range			-0.3		+5.3	V
Input Bias Current	I_B	$-40^\circ\text{C} < T_A < +85^\circ\text{C}$		1	10	pA
		$-40^\circ\text{C} < T_A < +125^\circ\text{C}$			100	pA
					600	pA
Input Offset Current	I_{OS}	$-40^\circ\text{C} < T_A < +85^\circ\text{C}$		0.5	5	pA
		$-40^\circ\text{C} < T_A < +125^\circ\text{C}$			50	pA
					100	pA
Common-Mode Rejection Ratio	CMRR	$0\text{ V} < V_{CM} < 5\text{ V}$	75	90		dB
		$-40^\circ\text{C} < T_A < +85^\circ\text{C}$	70	90		dB
Large Signal Voltage Gain	A_{VO}	$0.1\text{ V} < V_{OUT} < 4.9\text{ V}$	98	120		dB
		$0.1\text{ V} < V_{OUT} < 4.9\text{ V}; -40^\circ\text{C} < T_A < +85^\circ\text{C}$	80			dB
Input Capacitance	C_{DIFF}			2		pF
	C_{CM}			4.5		pF
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	$R_{LOAD} = 100\text{ k}\Omega$ to GND	4.970	4.995		V
		$R_{LOAD} = 10\text{ k}\Omega$ to GND	4.900	4.960		V
Output Voltage Low	V_{OL}	$R_{LOAD} = 100\text{ k}\Omega$ to V_S		0.85	5	mV
		$R_{LOAD} = 10\text{ k}\Omega$ to V_S		6.5	15	mV
Short-Circuit Current	I_{SC}	$V_{OUT} = \text{GND}$		± 5		mA
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	$1.8\text{ V} < V_S < 5\text{ V}$	90	110		dB
		$-40^\circ\text{C} < T_A < +85^\circ\text{C}$	80			dB
Supply Current/Amplifier	I_{SY}	$V_O = V_S/2$		0.75	1	μA
		$-40^\circ\text{C} < T_A < +85^\circ\text{C}$			1.5	μA
		$-40^\circ\text{C} < T_A < +125^\circ\text{C}$			2	μA
DYNAMIC PERFORMANCE						
Slew Rate	SR			0.004		V/ μs
Gain Bandwidth Product	GBP			7		kHz
Phase Margin	ϕ_O			60		Degrees
NOISE PERFORMANCE						
Peak-to-Peak Noise		0.1 Hz to 10 Hz		6		$\mu\text{V p-p}$
Voltage Noise Density	e_n	$f = 1\text{ kHz}$		190		nV/ $\sqrt{\text{Hz}}$
Current Noise Density	i_n	$f = 1\text{ kHz}$		0.1		pA/ $\sqrt{\text{Hz}}$

AD8500

@ $V_S = 1.8\text{ V}$, $V_{CM} = V_S/2$, $T_A = 25^\circ\text{C}$, unless otherwise noted.

Table 3.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
INPUT CHARACTERISTICS						
Offset Voltage	V_{OS}	$0\text{ V} < V_{CM} < 1.8\text{ V}$		0.235	1	mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	$-40^\circ\text{C} < T_A < +85^\circ\text{C}$		3.5	12	$\mu\text{V}/^\circ\text{C}$
Input Voltage Range			-0.3		+2.1	V
Input Bias Current	I_B	$-40^\circ\text{C} < T_A < +85^\circ\text{C}$		1	10	pA
		$-40^\circ\text{C} < T_A < +125^\circ\text{C}$			100	pA
		$-40^\circ\text{C} < T_A < +125^\circ\text{C}$			600	pA
Input Offset Current	I_{OS}	$-40^\circ\text{C} < T_A < +85^\circ\text{C}$		0.5	5	pA
		$-40^\circ\text{C} < T_A < +125^\circ\text{C}$			50	pA
		$-40^\circ\text{C} < T_A < +125^\circ\text{C}$			100	pA
Common-Mode Rejection Ratio	CMRR	$0\text{ V} < V_{CM} < 1.8\text{ V}$	65	85		dB
		$-40^\circ\text{C} < T_A < +85^\circ\text{C}$	60	83		dB
Large Signal Voltage Gain	A_{VO}	$0.1\text{ V} < V_{OUT} < 1.7\text{ V}$	88	115		dB
		$0.1\text{ V} < V_{OUT} < 1.7\text{ V}; -40^\circ\text{C} < T_A < +85^\circ\text{C}$	70			dB
Input Capacitance	C_{DIFF} C_{CM}			2 4.5		pF pF
OUTPUT CHARACTERISTICS						
Output Voltage High	V_{OH}	$R_{LOAD} = 100\text{ k}\Omega$ to GND	1.790	1.798		V
		$R_{LOAD} = 10\text{ k}\Omega$ to GND	1.760	1.783		V
Output Voltage Low	V_{OL}	$R_{LOAD} = 100\text{ k}\Omega$ to V_S		0.70	5	mV
		$R_{LOAD} = 10\text{ k}\Omega$ to V_S		5	15	mV
Short-Circuit Current	I_{SC}			± 2		mA
POWER SUPPLY						
Power Supply Rejection Ratio	PSRR	$1.8\text{ V} < V_S < 5\text{ V}$	90	110		dB
		$-40^\circ\text{C} < T_A < +85^\circ\text{C}$	80			dB
Supply Current/Amplifier	I_{SY}	$V_O = V_S/2$		0.65	1	μA
		$-40^\circ\text{C} < T_A < +85^\circ\text{C}$			1.5	μA
		$-40^\circ\text{C} < T_A < +125^\circ\text{C}$			2	μA
DYNAMIC PERFORMANCE						
Slew Rate	SR			0.004		V/ μs
Gain Bandwidth Product	GBP			7		kHz
Phase Margin	ϕ_O			60		Degrees
NOISE PERFORMANCE						
Peak-to-Peak Noise		0.1 Hz to 10 Hz		6		$\mu\text{V p-p}$
Voltage Noise Density	e_n	$f = 1\text{ kHz}$		190		nV/ $\sqrt{\text{Hz}}$
Current Noise Density	i_n	$f = 1\text{ kHz}$		0.1		pA/ $\sqrt{\text{Hz}}$

ABSOLUTE MAXIMUM RATINGS

$T_A = 25^\circ\text{C}$, unless otherwise noted.

Table 4.

Parameter	Rating
Supply Voltage	6 V
Input Voltage	$V_{SS} - 0.4\text{ V}$ to $V_{DD} + 0.4\text{ V}$
Differential Input Voltage	$\pm 6\text{ V}$
Output Short-Circuit Duration to GND	Indefinite
Storage Temperature Range	-65°C to $+150^\circ\text{C}$
Operating Temperature Range	-40°C to $+125^\circ\text{C}$
Junction Temperature Range	-65°C to $+150^\circ\text{C}$
Lead Temperature (Soldering, 60 sec)	300°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.

Absolute maximum ratings apply at 25°C , unless otherwise noted.

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 5. Thermal Characteristics

Package Type	θ_{JA}	θ_{JC}	Unit
5-Lead SC70 (KS-5)	376	126	$^\circ\text{C}/\text{W}$

ESD CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this product features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



TYPICAL PERFORMANCE CHARACTERISTICS

$T_A = 25^\circ\text{C}$, unless otherwise noted.

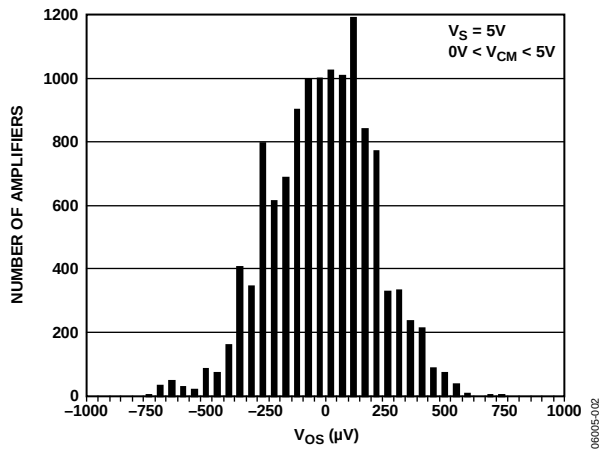


Figure 2. Input Offset Voltage Distribution

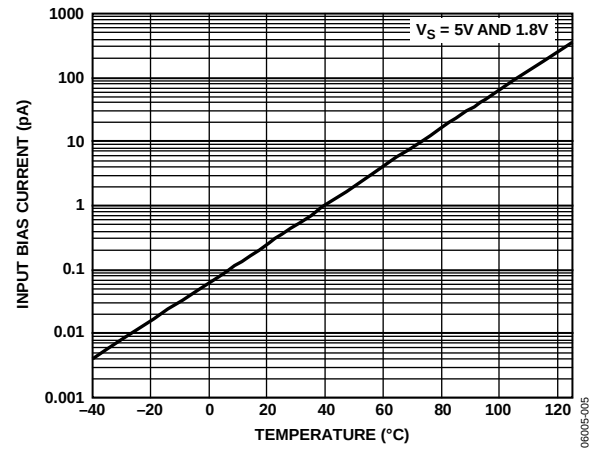


Figure 5. Input Bias Current vs. Temperature

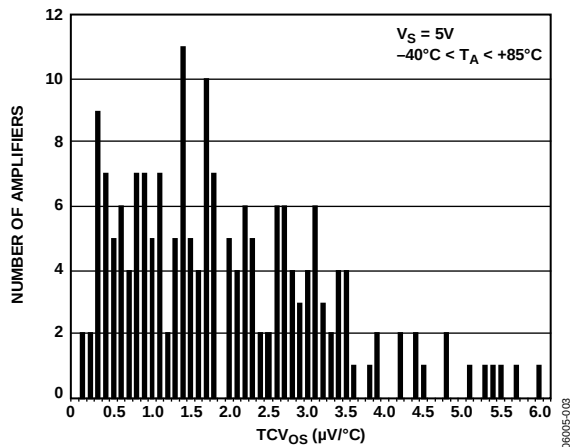


Figure 3. Input Offset Voltage Drift Distribution

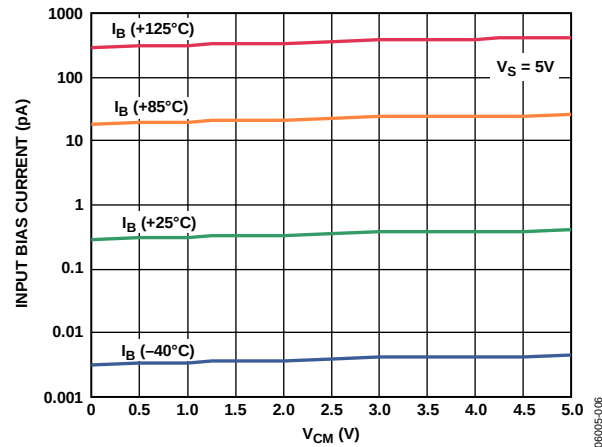


Figure 6. Input Bias Current vs. Common-Mode Voltage

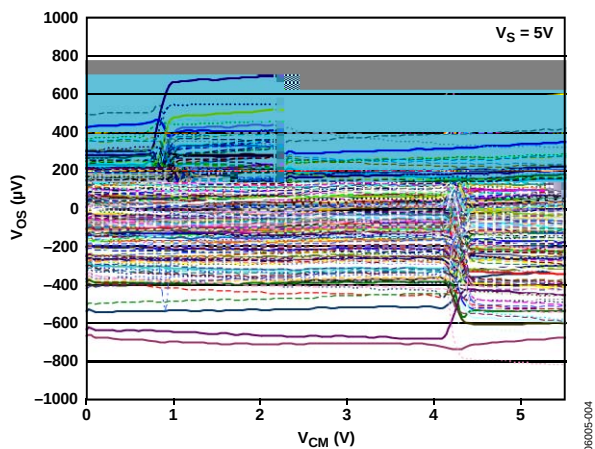


Figure 4. Input Offset Voltage vs. Common-Mode Voltage

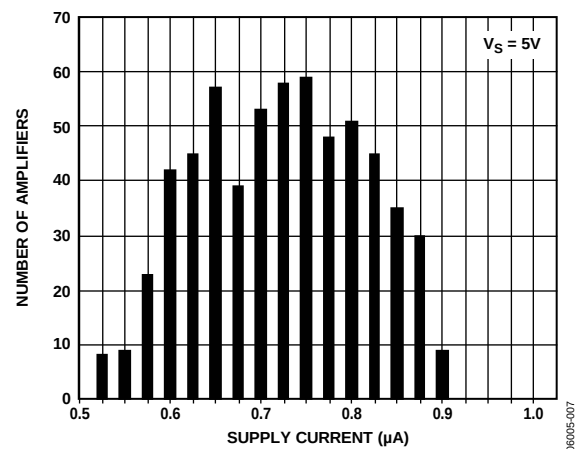


Figure 7. Supply Current Distribution

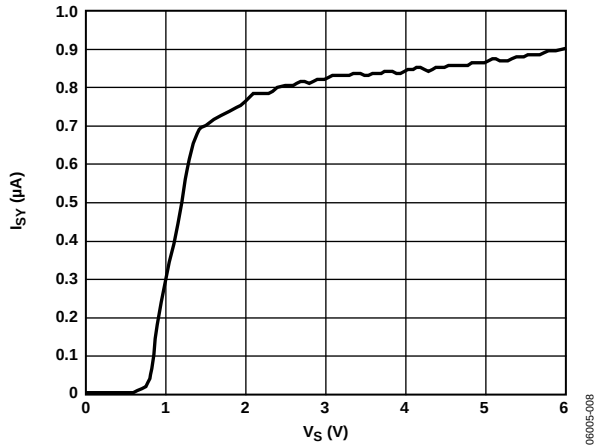


Figure 8. Supply Current vs. Supply Voltage

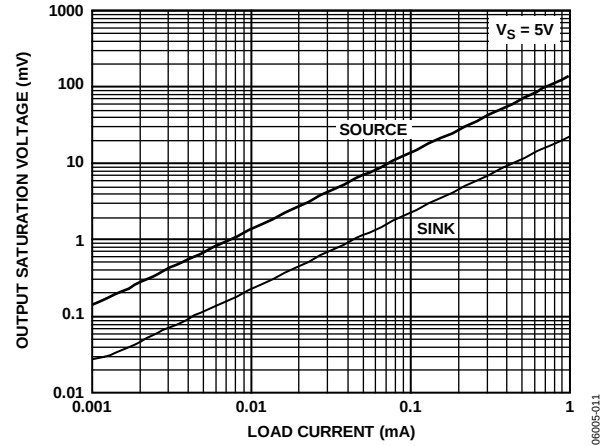


Figure 11. Output Saturation Voltage vs. Load Current

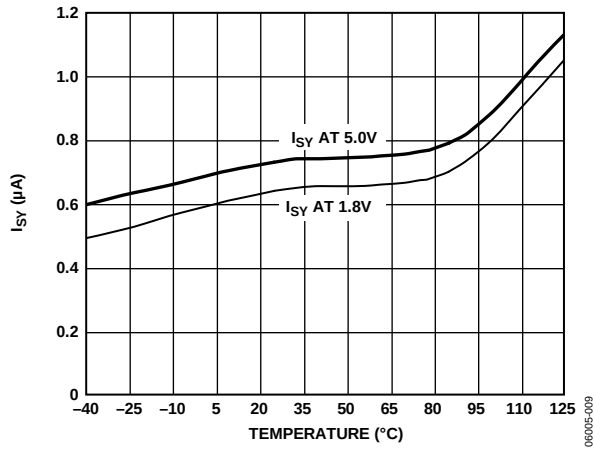


Figure 9. Supply Current vs. Temperature

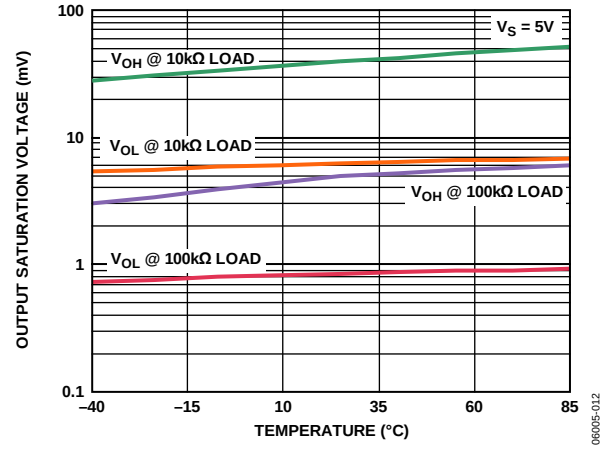


Figure 12. Output Saturation Voltage vs. Temperature

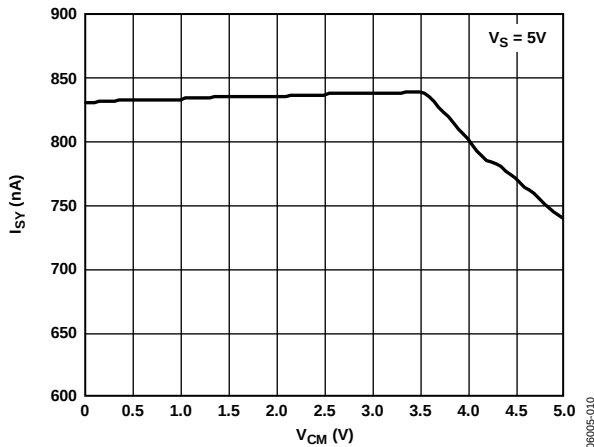


Figure 10. Supply Current vs. Input Common-Mode Voltage

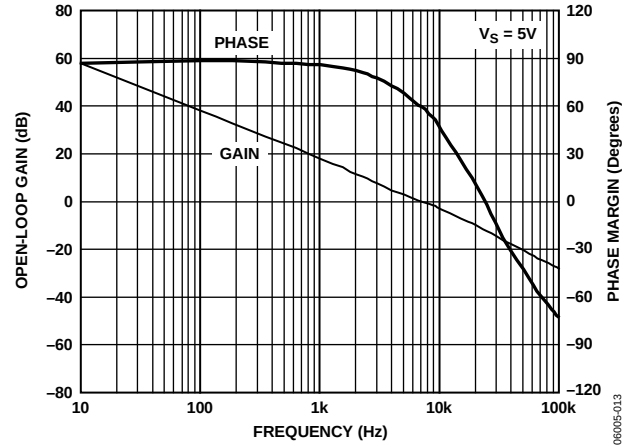


Figure 13. Open-Loop Gain and Phase vs. Frequency

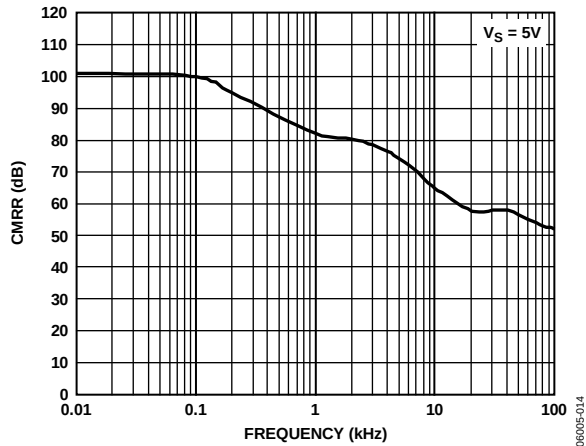


Figure 14. CMRR vs. Frequency

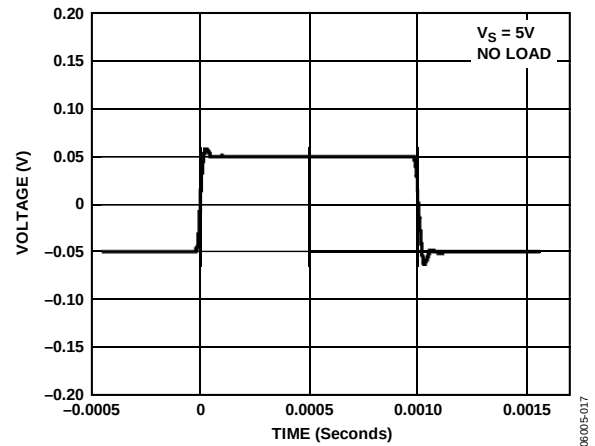


Figure 17. Small Signal Transient Response

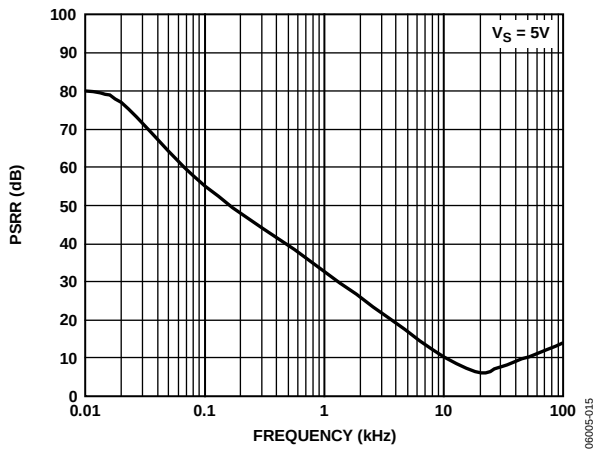


Figure 15. PSRR vs. Frequency

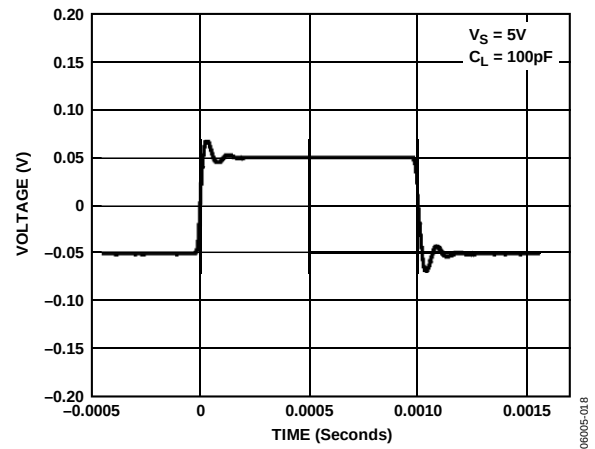


Figure 18. Small Signal Transient Response

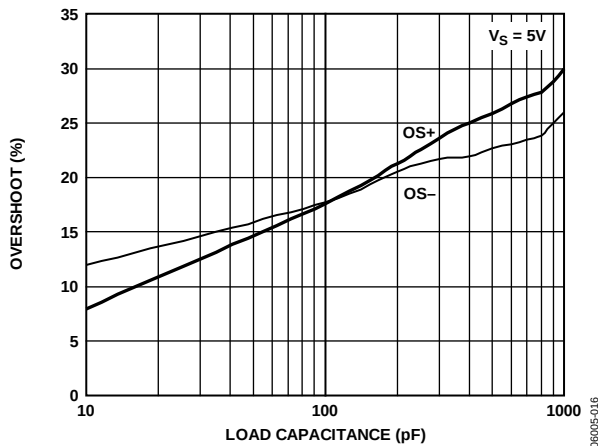


Figure 16. Small Signal Overshoot vs. Load Capacitance

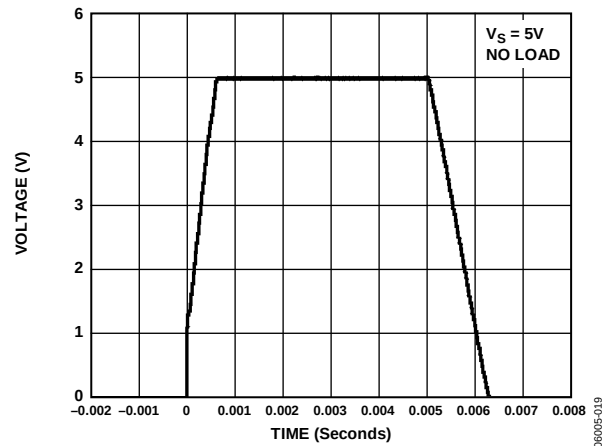


Figure 19. Large Signal Transient Response

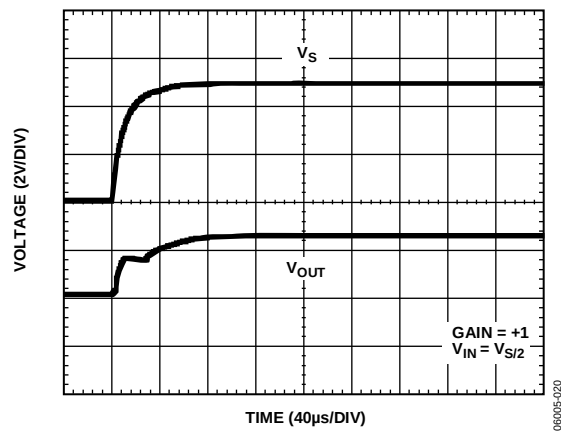


Figure 20. Turn-On Transient Response

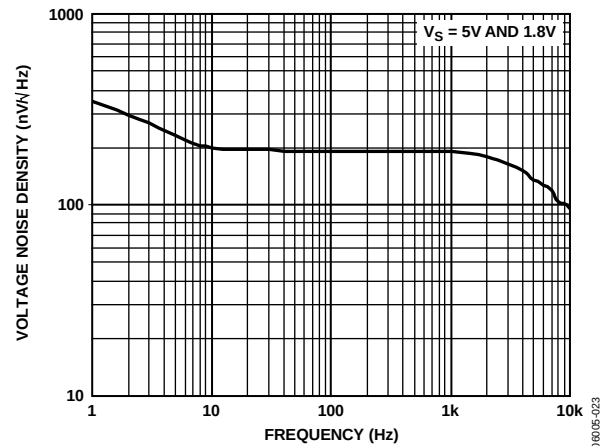


Figure 23. Voltage Noise Density

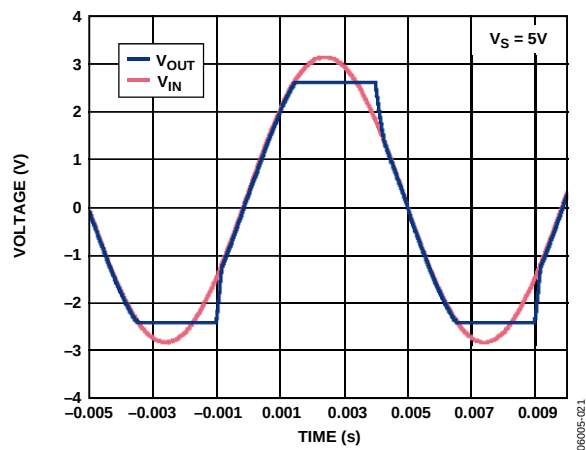


Figure 21. No Phase Reversal

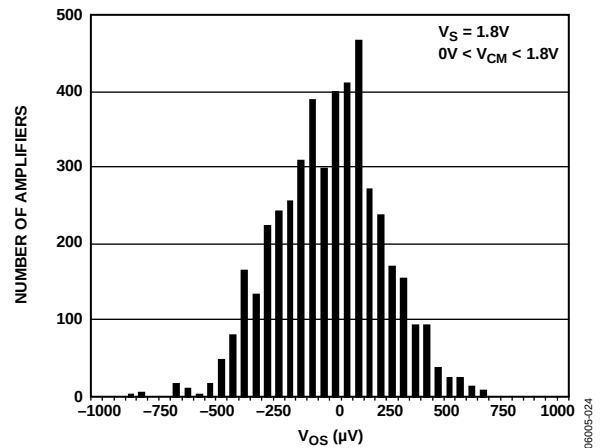


Figure 24. Input Offset Voltage Distribution

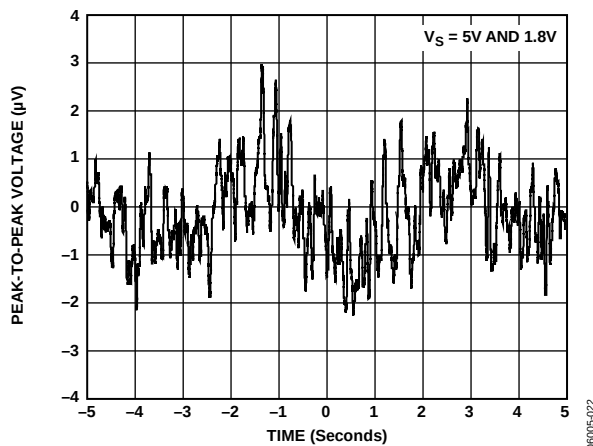


Figure 22. 0.1 Hz to 10 Hz Input Voltage Noise

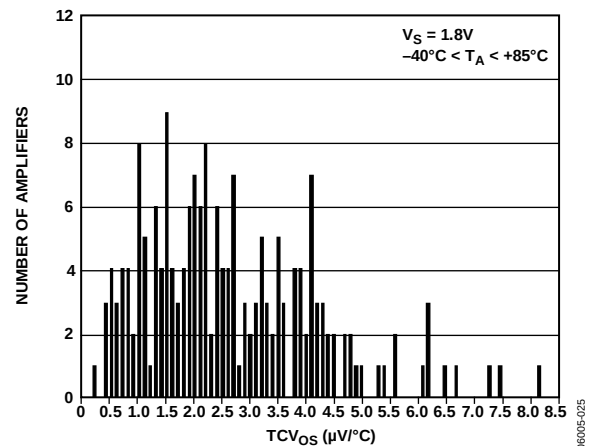


Figure 25. Input Offset Voltage Drift Distribution

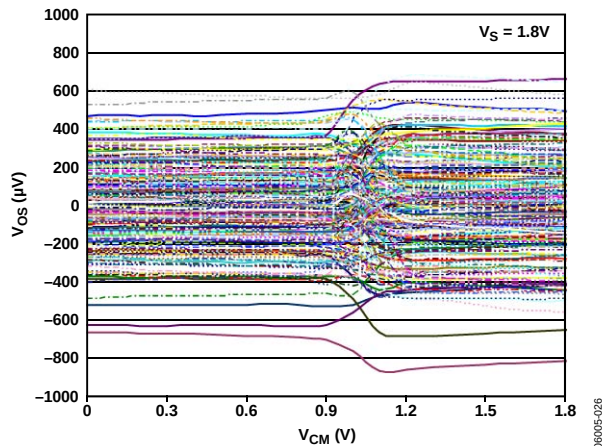


Figure 26. Input Offset Voltage vs. Input Common-Mode Voltage

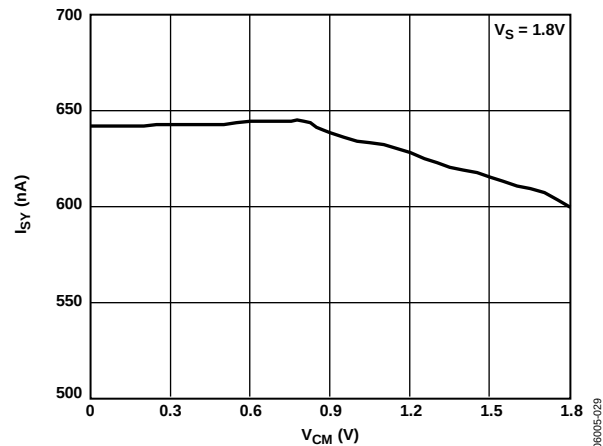


Figure 29. Supply Current vs. Input Common-Mode Voltage

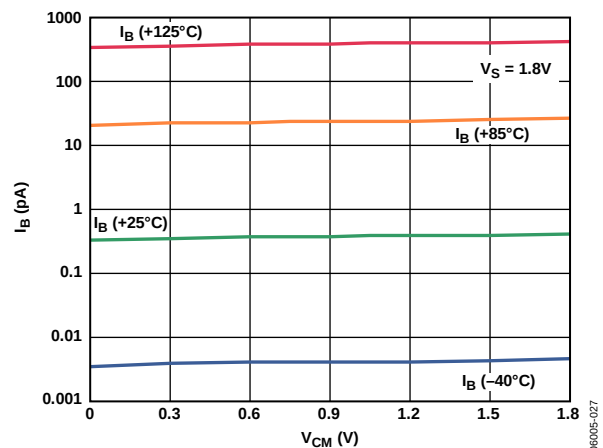


Figure 27. Input Bias Current vs. Input Common-Mode Voltage

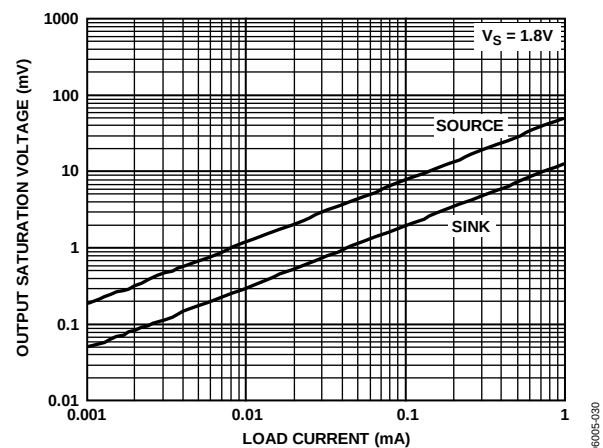


Figure 30. Output Saturation Voltage vs. Load Current

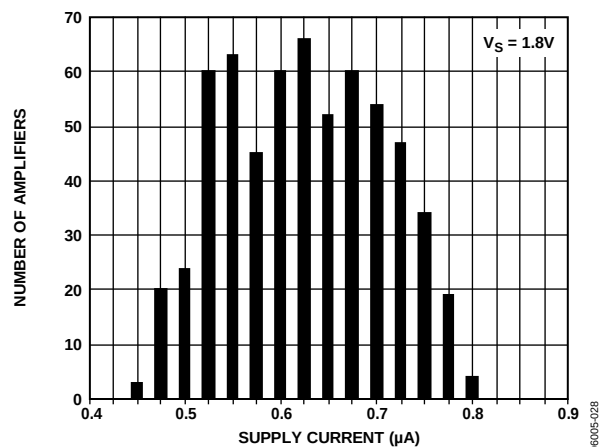


Figure 28. Supply Current Distribution

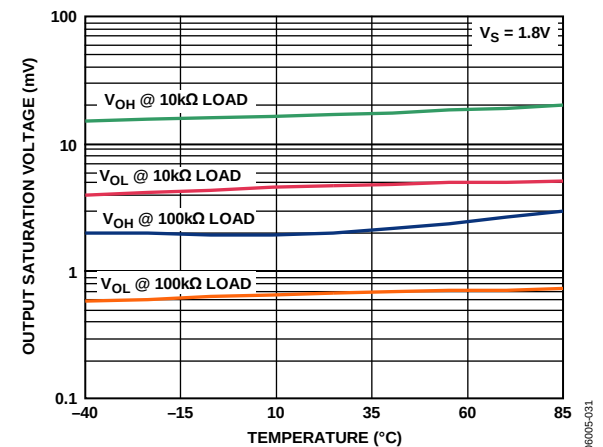


Figure 31. Output Saturation Voltage vs. Temperature

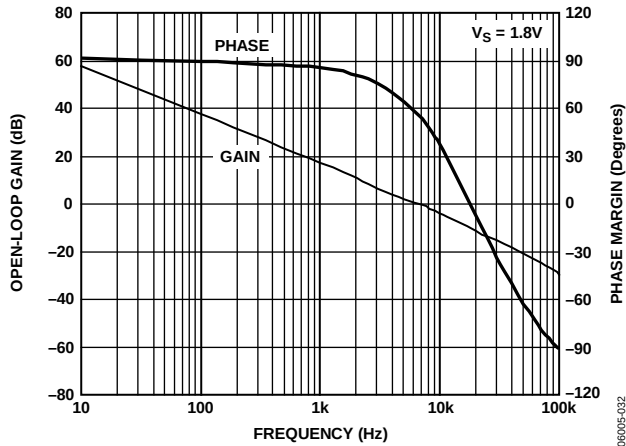


Figure 32. Open-Loop Gain and Phase vs. Frequency

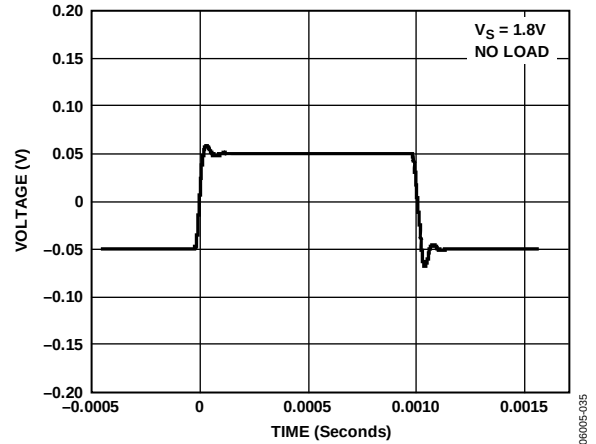


Figure 35. Small Signal Transient Response

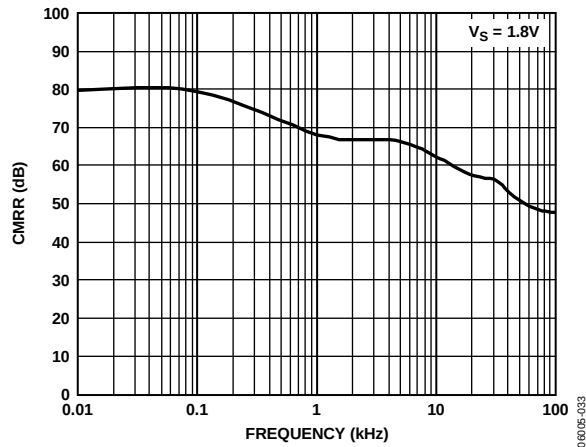


Figure 33. CMRR vs. Frequency

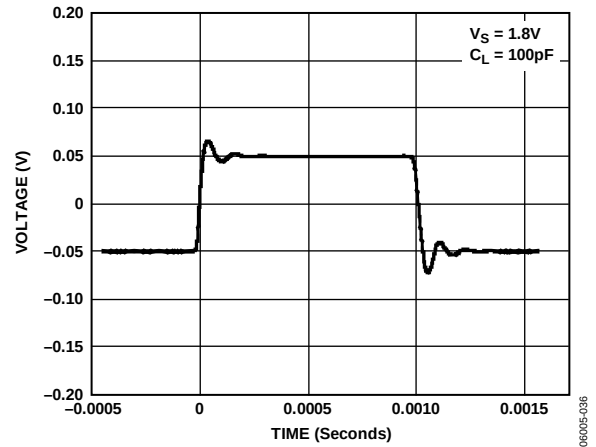


Figure 36. Small Signal Transient Response

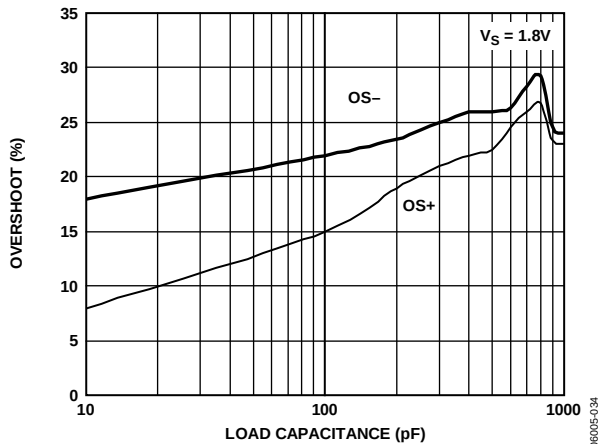


Figure 34. Small Signal Overshoot vs. Load Capacitance

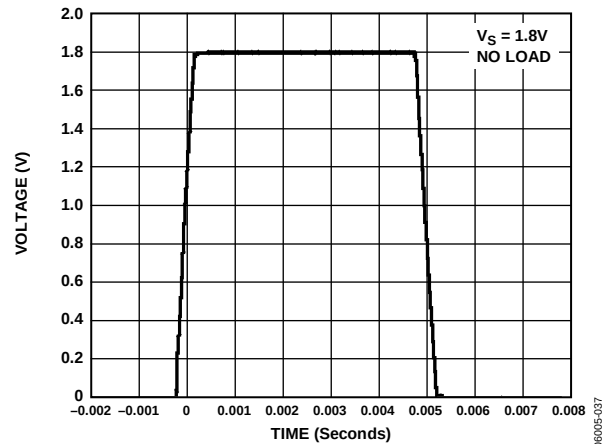
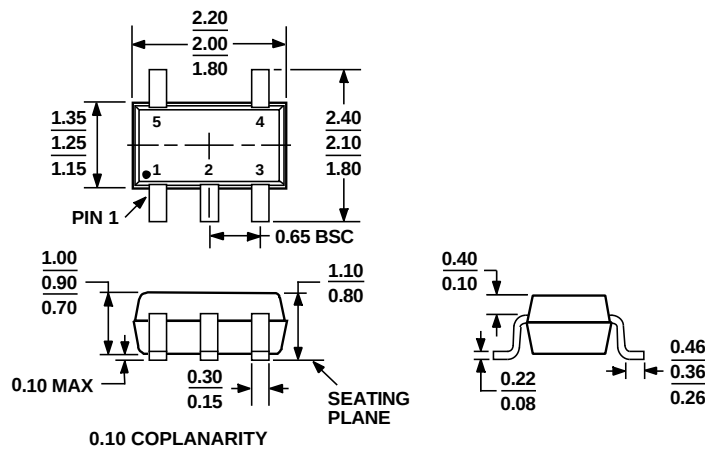


Figure 37. Large Signal Transient Response

OUTLINE DIMENSIONS



COMPLIANT TO JEDEC STANDARDS MO-203-AA

Figure 38. 5-Lead Thin Shrink Small Outline Transistor Package [SC70]
(KS-5)

Dimensions shown in millimeters

ORDERING GUIDE

Model	Temperature Range	Package Description	Package Option	Branding
AD8500AKSZ-R2 ¹	–40°C to +125°C	5-Lead SC70	KS-5	A0F
AD8500AKSZ-REEL ¹	–40°C to +125°C	5-Lead SC70	KS-5	A0F
AD8500AKSZ-REEL7 ¹	–40°C to +125°C	5-Lead SC70	KS-5	A0F

¹ Z = RoHS Compliant Part.