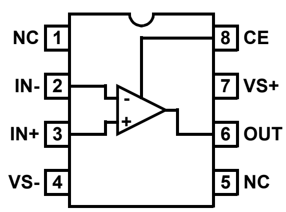
670MHz Low Noise Amplifiers

The EL5132 and EL5133 are ultra-low voltage noise, high speed voltage feedback amplifiers that are ideal for applications requiring low voltage noise, including communications and imaging. These devices offer extremely low power consumption for exceptional noise performance. Stable at gains as low as 10, these devices offer 120mA of drive performance. Not only do these devices find perfect application in high gain applications, they maintain their performance down to lower gain settings.

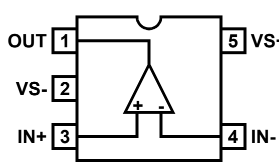
These amplifiers are available in small package options (SOT-23) as well as the industry-standard SO packages. All parts are specified for operation over the -40°C to +85°C temperature range.

Pinouts

EL5132
(8 LD SO)
TOP VIEW



EL5133
(5 LD SOT-23)
TOP VIEW



Features

- 670MHz -3dB bandwidth
- Ultra low noise 0.9nV/√Hz
- 1000V/µs slew rate
- Low supply current = 12mA
- Single supplies from 5V to 12V
- Dual supplies from ±2.5V to ±5V
- Fast disable on the EL5132
- Low cost
- Pb-free plus anneal available (RoHS compliant)

Applications

- Imaging
- Instrumentation
- Communications devices

Ordering Information

PART NUMBER	PART MARKING	PACKAGE	TAPE & REEL	PKG. DWG. #
EL5132IS	5132IS	8 Ld SO	-	MDP0027
EL5132IS-T7	5132IS	8 Ld SO	7”	MDP0027
EL5132IS-T13	5132IS	8 Ld SO	13”	MDP0027
EL5132ISZ (See Note)	5132ISZ	8 Ld SO (Pb-free)	-	MDP0027
EL5132ISZ-T7 (See Note)	5132ISZ	8 Ld SO (Pb-free)	7”	MDP0027
EL5132ISZ-T13 (See Note)	5132ISZ	8 Ld SO (Pb-free)	13”	MDP0027
EL5133IW-T7	BCAA	5 Ld SOT-23	7” (3K pcs)	MDP0038
EL5133IW-T7A	BCAA	5 Ld SOT-23	7” (250 pcs)	MDP0038

NOTE: Intersil Pb-free plus anneal products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.

Absolute Maximum Ratings (T_A = 25°C)

Supply Voltage from V_S+ to V_S- 13.2V
I_{IN}-, I_{IN}+, CE . . . . ±5mA
Continuous Output Current 150mA
Power Dissipation . . . . See Curves

Storage Temperature . . . . -65°C to +125°C
Ambient Operating Temperature . . . . -40°C to +85°C
Operating Junction Temperature . . . . +125°C

CAUTION: Stresses above those listed in “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

IMPORTANT NOTE: All parameters having Min/Max specifications are guaranteed. Typical values are for information purposes only. Unless otherwise noted, all tests are at the specified temperature and are pulsed tests, therefore: $T_J = T_C = T_A$

Electrical Specifications

V_S+ = +5V, V_S- = -5V, R_L = 500Ω, R_F = 225Ω, R_G = 25Ω, T_A = 25°C, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITIONS	MIN	TYP	MAX	UNIT
V_{OS}	Offset Voltage		-1	0.5	1	mV
T_CV_{OS}	Offset Voltage Temperature Coefficient	Measured from T_{MIN} to T_{MAX}		0.8		µV/°C
IB	Input Bias Current	V_{IN} = 0V	8	12	20	µA
I_{OS}	Input Offset Current	V_{IN} = 0V	-1250	400	+1250	nA
T_CI_{OS}	Input Bias Current Temperature Coefficient	Measured from T_{MIN} to T_{MAX}		3		nA/°C
PSRR	Power Supply Rejection Ratio	V_S+ = ±4.75V to ±5.25V	75	87		dB
CMRR	Common Mode Rejection Ratio	V_{IN} = ±3.0 V	80	100		dB
CMIR	Common Mode Input Range	Guaranteed by CMRR test	±3	±3.3		V
R_{IN}	Input Resistance	Common mode	2	5		MΩ
C_{IN}	Input Capacitance			2		pF
I_S	Supply Current		9.2	11	13	mA
AVOL	Open Loop Gain	V_{OUT} = ±2.5V, R_L = 1kΩ to GND	5	8.5		KV/V
V_O	Output Voltage Swing	R_F = 900Ω, R_G = 100Ω, R_L = 150Ω	±3.1	3.5		V
I_{SC}	Short Circuit Current	R_L = 10Ω	70	140		mA
BW	-3dB Bandwidth	A_V = +10, R_L = 1kΩ		670		MHz
BW	±0.1dB Bandwidth	A_V = +10, R_L = 1kΩ		90		MHz
GBWP	Gain Bandwidth Product			3000		MHz
PM	Phase Margin	R_L = 1kΩ, C_L = 6pF		55		°
SR	Slew Rate	R_L = 100Ω, V_{OUT} = ±2.5V	700	1000		V/µs
t_R, t_F	Rise Time, Fall Time	±0.1V_{STEP}		TBD		ns
OS	Overshoot	±0.1V_{STEP}		TBD		%
t_{PD}	Propagation Delay	±0.1V_{STEP}		TBD		ns
t_S	0.01% Settling Time			6.6		ns
dG	Differential Gain	A_V = +2, R_F = 1kΩ		0.01		%
dP	Differential Phase	A_V = +2, R_F = 1kΩ		0.01		°
e_N	Input Noise Voltage	f = 10kHz		0.9		nV/√Hz
i_N	Input Noise Current	f = 10kHz		4.9		pA/√Hz

Typical Performance Curves

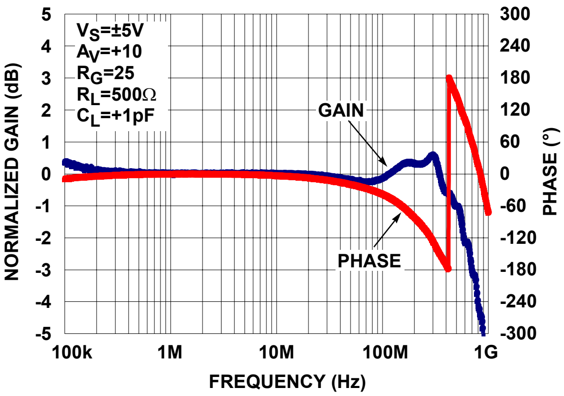


FIGURE 1. GAIN & PHASE vs FREQUENCY

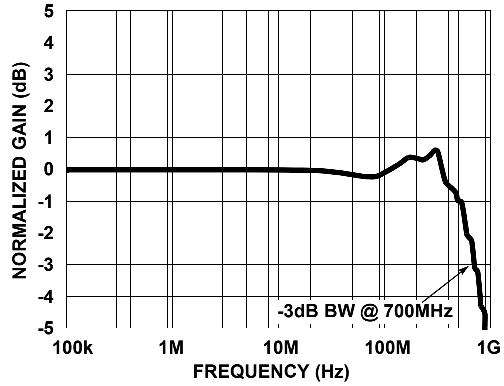


FIGURE 2. -3dB BANDWIDTH

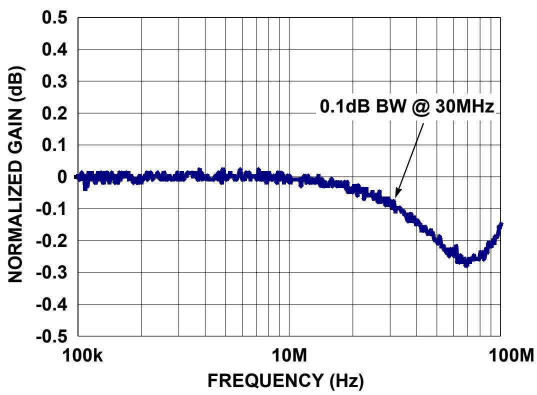


FIGURE 3. 0.1dB BANDWIDTH

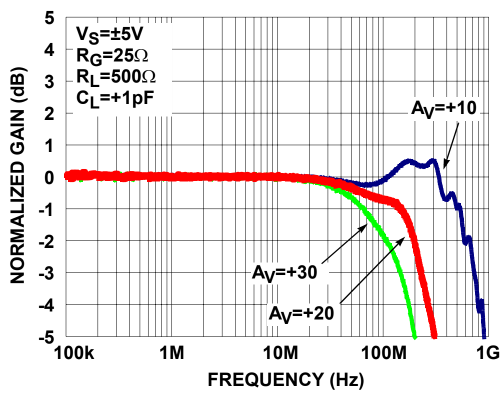


FIGURE 4. GAIN vs FREQUENCY FOR VARIOUS $+A_V$

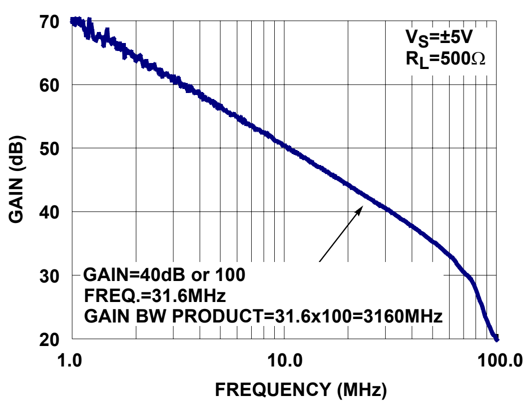


FIGURE 5. GAIN BANDWIDTH PRODUCT

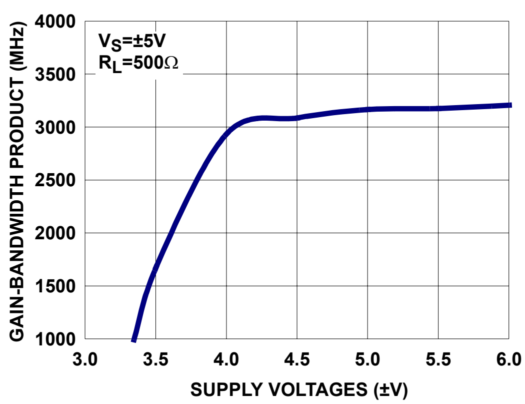


FIGURE 6. GAIN BANDWIDTH PRODUCT vs SUPPLY VOLTAGES

Typical Performance Curves (Continued)

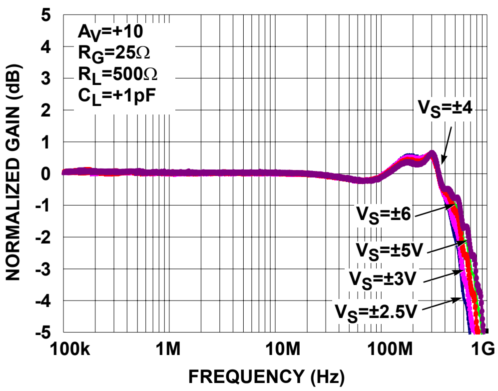


FIGURE 7. GAIN vs FREQUENCY FOR VARIOUS $\pm V_S$

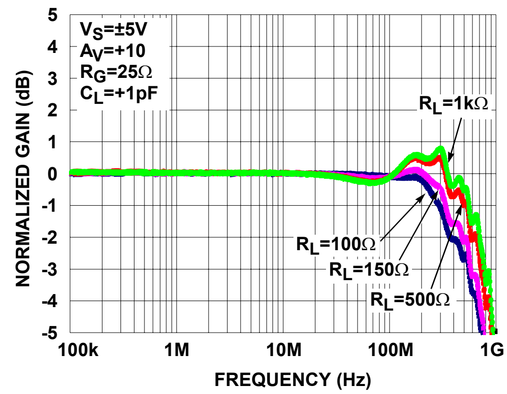


FIGURE 8. GAIN vs FREQUENCY FOR VARIOUS R_{LOAD} (A_V = +10)

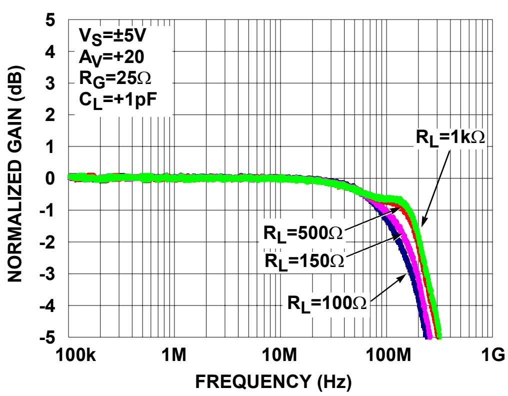


FIGURE 9. GAIN vs FREQUENCY FOR VARIOUS R_{LOAD} (A_V = +20)

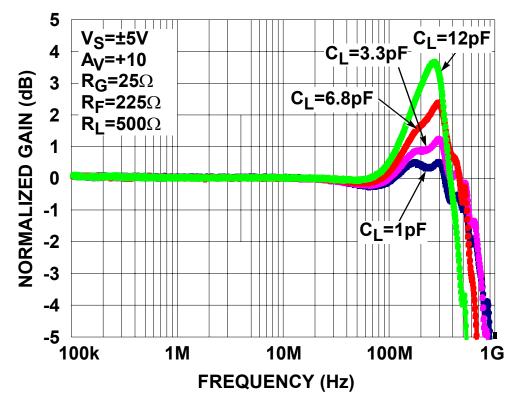


FIGURE 10. GAIN vs FREQUENCY FOR VARIOUS C_{LOAD} (A_V = +10)

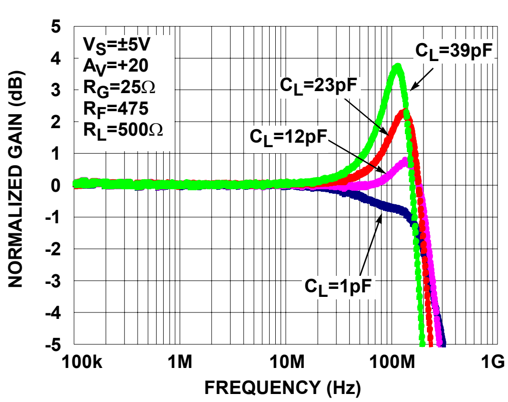


FIGURE 11. GAIN vs FREQUENCY FOR VARIOUS C_{LOAD} (A_V = +20)

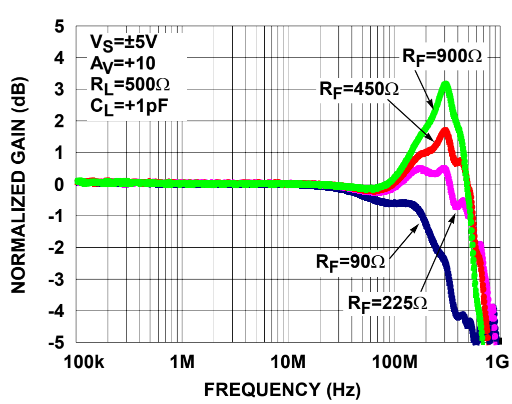


FIGURE 12. GAIN vs FREQUENCY FOR VARIOUS R_F (A_V = +10)

Typical Performance Curves (Continued)

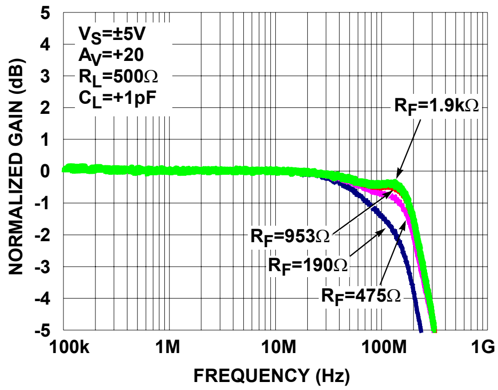


FIGURE 13. GAIN vs FREQUENCY FOR VARIOUS R_F (A_V = +20)

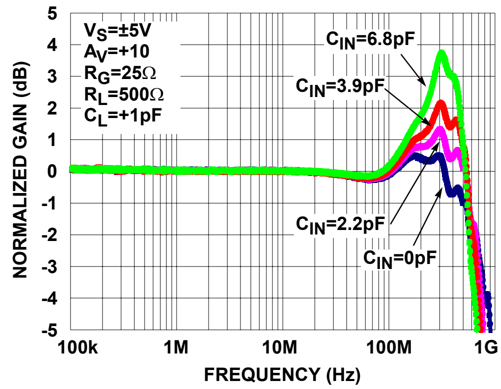


FIGURE 14. GAIN vs FREQUENCY FOR VARIOUS C_{IN}(-) (A_V = +10)

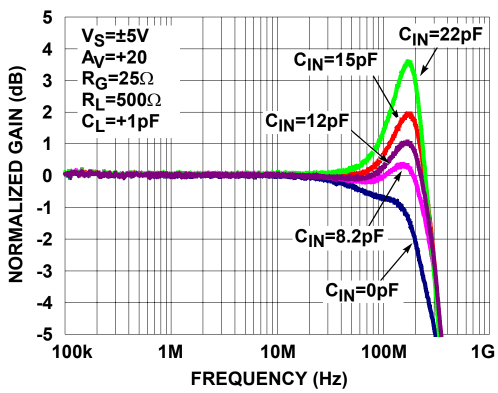


FIGURE 15. GAIN vs FREQUENCY FOR VARIOUS C_{IN} (A_V = +20)

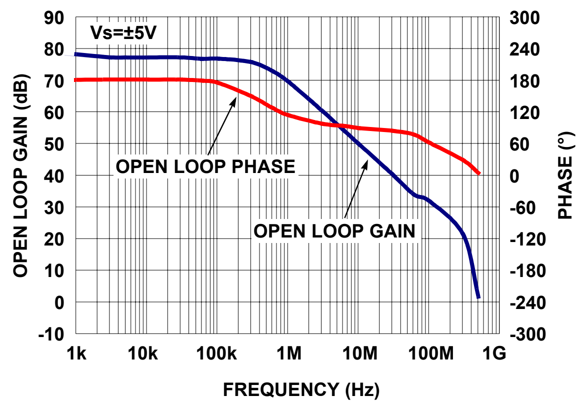


FIGURE 16. OPEN LOOP GAIN & PHASE vs FREQUENCY

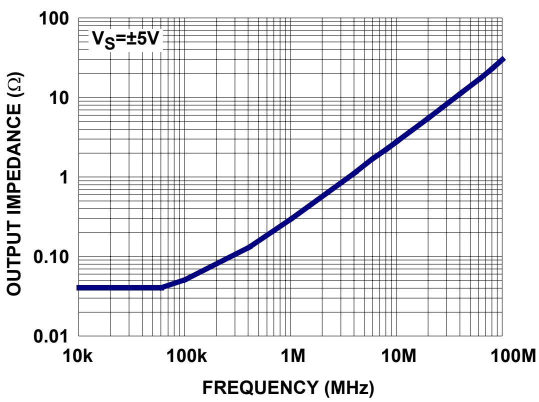


FIGURE 17. OUTPUT IMPEDANCE vs FREQUENCY

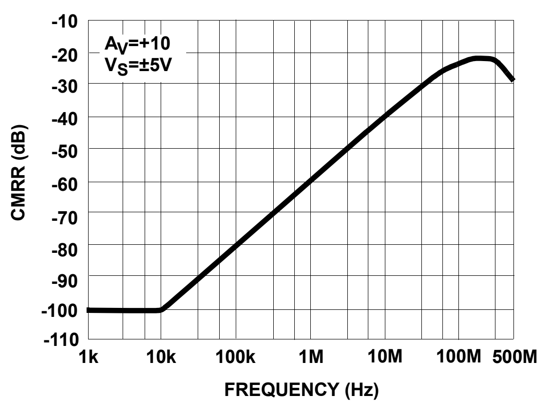


FIGURE 18. CMRR vs FREQUENCY

Typical Performance Curves (Continued)

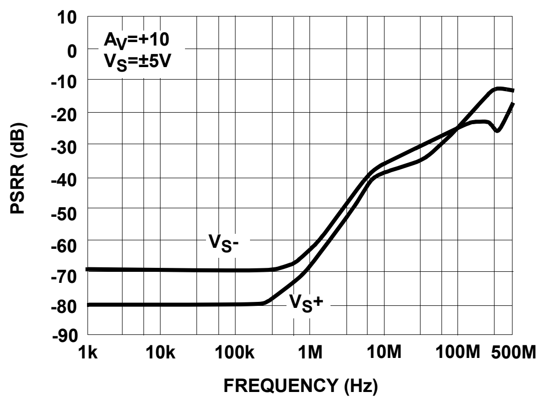


FIGURE 19. PSRR vs FREQUENCY

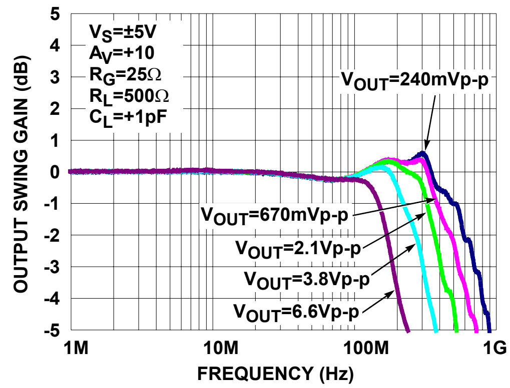


FIGURE 20. OUTPUT SWING vs FREQUENCY

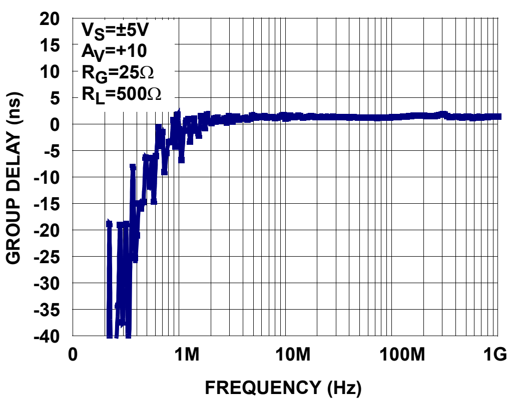


FIGURE 21. GROUP DELAY vs FREQUENCY

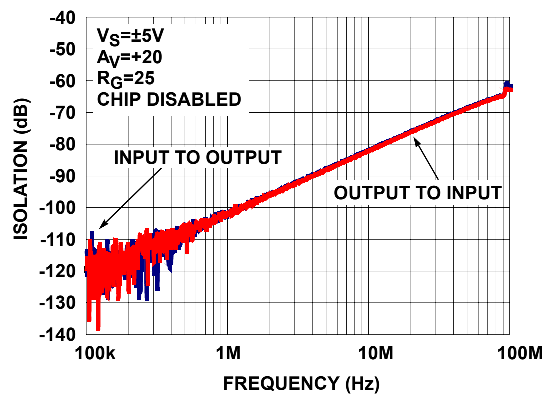


FIGURE 22. INPUT & OUTPUT ISOLATION

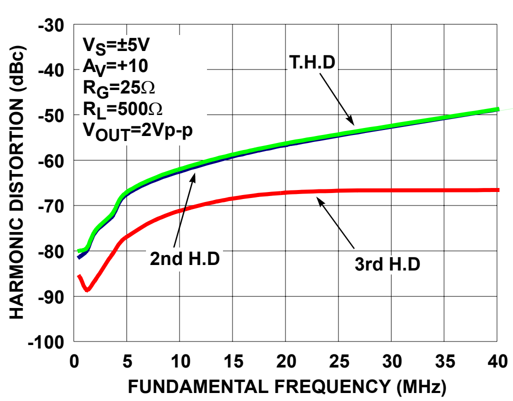


FIGURE 23. HARMONIC DISTORTION vs FREQUENCY

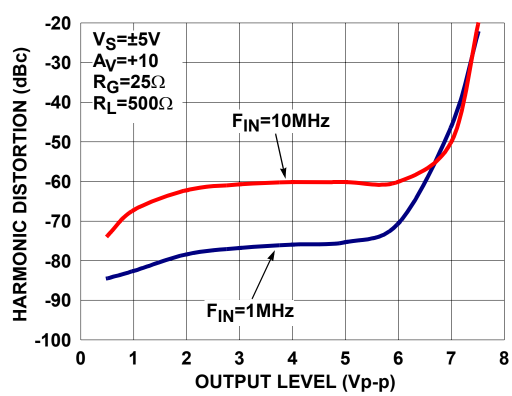


FIGURE 24. TOTAL HARMONIC DISTORTION vs OUTPUT VOLTAGE

Typical Performance Curves (Continued)

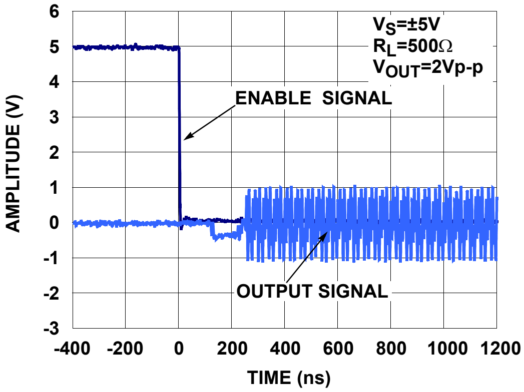


FIGURE 25. ENABLE TIME

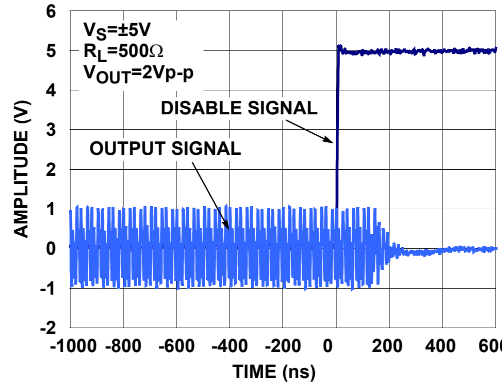


FIGURE 26. DISABLE TIME

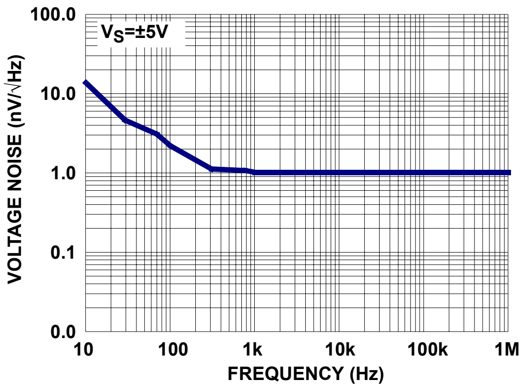


FIGURE 27. EQUIVALENT INPUT VOLTAGE NOISE vs FREQUENCY

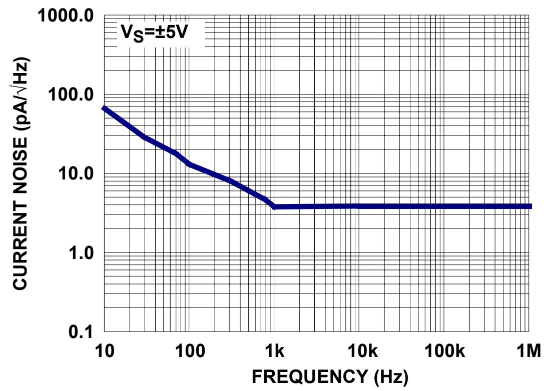


FIGURE 28. EQUIVALENT INPUT CURRENT NOISE vs FREQUENCY

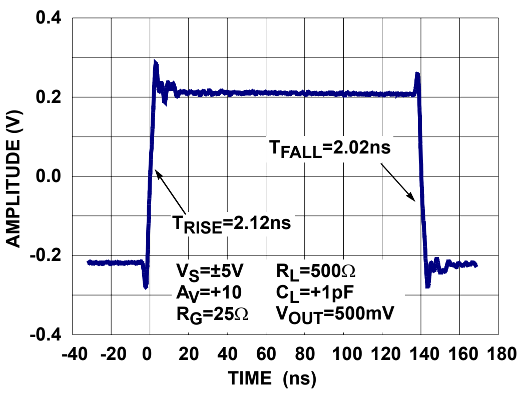


FIGURE 29. SMALL SIGNAL STEP RESPONSE_RISE & FALL TIME

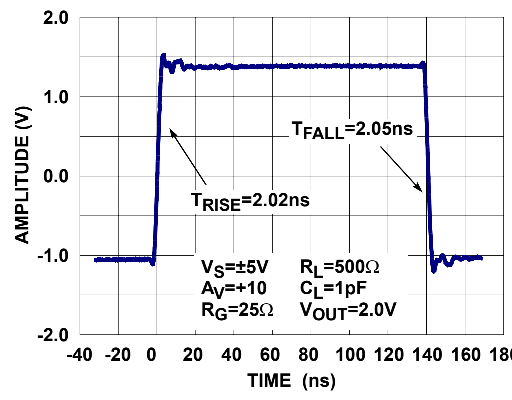


FIGURE 30. LARGE SIGNAL STEP RESPONSE_RISE & FALL TIME

Typical Performance Curves (Continued)

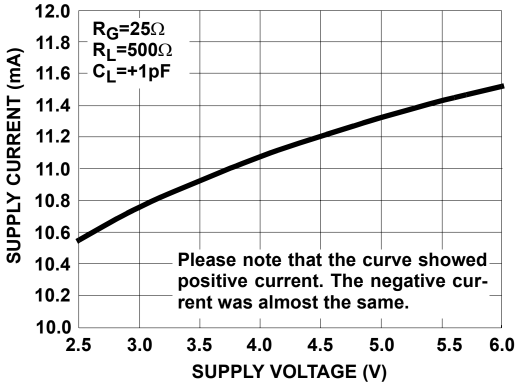


FIGURE 31. SUPPLY CURRENT vs SUPPLY VOLTAGE

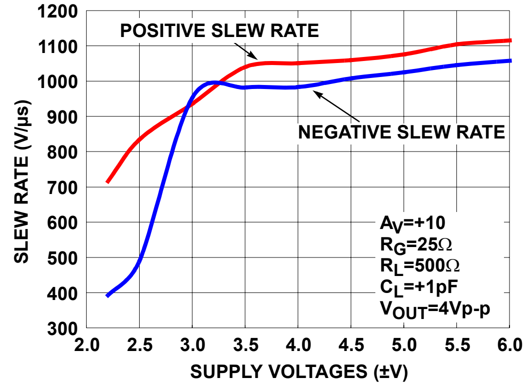


FIGURE 32. SLEW RATE vs SUPPLY VOLTAGES

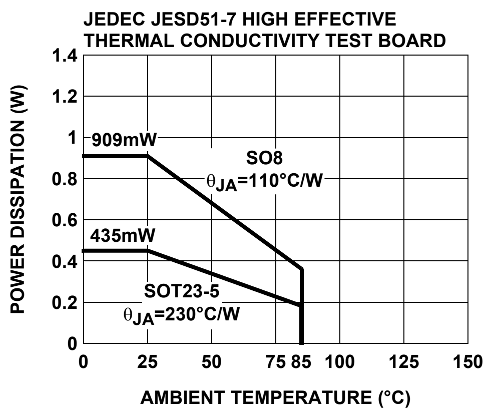


FIGURE 33. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

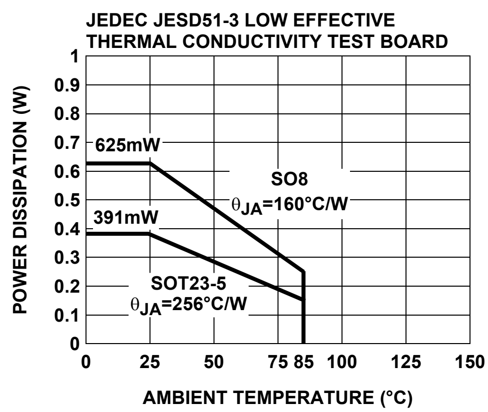


FIGURE 34. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

Typical Performance Curves (Continued)

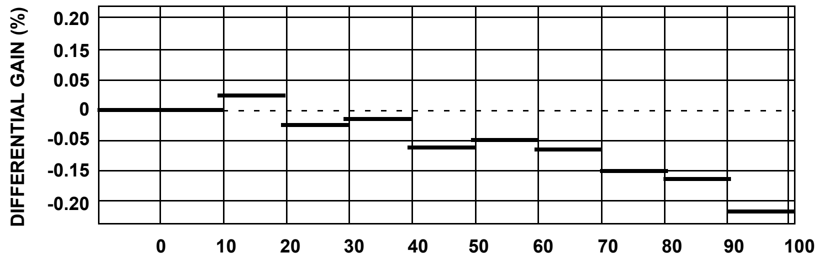


FIGURE 35. DIFFERENTIAL GAIN (%)

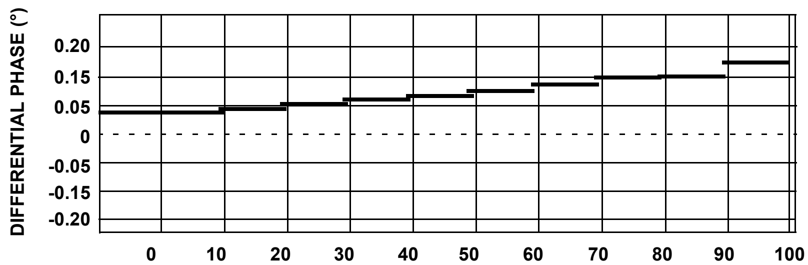


FIGURE 36. DIFFERENTIAL PHASE (°)