PRELIMINARY | Data Sheet | October 25, 2004 | FN7381.2

500MHz Low Noise Amplifiers

The EL5130 and EL5131 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 5, these devices offer 100mA 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.

Ordering Information

PART NUMBER	PACKAGE	TAPE & REEL	PKG. DWG. #
EL5130IS	8-Pin SO	-	MDP0027
EL5130IS-T7	8-Pin SO	7”	MDP0027
EL5130IS-T13	8-Pin SO	13”	MDP0027
EL5130ISZ (See Note)	8-Pin SO (Pb-free)	-	MDP0027
EL5130ISZ-T7 (See Note)	8-Pin SO (Pb-free)	7”	MDP0027
EL5130ISZ-T13 (See Note)	8-Pin SO (Pb-free)	13”	MDP0027
EL5131IW-T7	5-Pin SOT-23	7” (3K pcs)	MDP0038
EL5131IW-T7A	5-Pin SOT-23	7” (250 pcs)	MDP0038
EL5131IWZ-T7 (See Note)	5-Pin SOT-23 (Pb-free)	7” (3K pcs)	MDP0038
EL5131IWZ-T7A (See Note)	5-Pin SOT-23 (Pb-free)	7” (250 pcs)	MDP0038

NOTE: Intersil Pb-free 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-020C.

Features

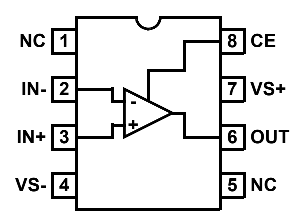
- 500MHz -3dB bandwidth
- Ultra low noise 1.8nV/√Hz
- 350V/µs slew rate
- Low supply current = 4mA
- Single supplies from 5V to 12V
- Dual supplies from ±2.5V to ±5V
- Fast disable on the EL5130
- Low cost
- Pb-Free Available (RoHS Compliant)

Applications

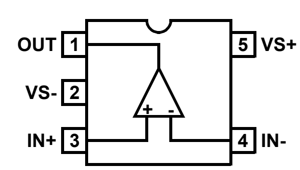
- Imaging
- Instrumentation
- Communications devices

Pinouts

EL5130
(8-PIN SO)
TOP VIEW



EL5131
(5-PIN SOT-23)
TOP VIEW



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 100mA
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 = 150Ω, R_F = 900Ω, R_G = 100Ω, T_A = 25°C, unless otherwise specified.

PARAMETER	DESCRIPTION	CONDITIONS	MIN	TYP	MAX	UNIT
V_{OS}	Offset Voltage		-0.9	0.2	0.9	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	1.5	2.27	3.3	µA
I_{OS}	Input Offset Current	V_{IN} = 0V	-500	100	500	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	90		dB
CMRR	Common Mode Rejection Ratio	V_{IN} = ±3.0V	95	110		dB
CMIR	Common Mode Input Range	Guaranteed by CMRR test	±3	±3.3		V
R_{IN}	Input Resistance	Common mode	5	20		MΩ
C_{IN}	Input Capacitance			1		pF
I_S	Supply Current		3.0	3.54	4.1	mA
AVOL	Open Loop Gain	V_{OUT} = ±2.5V, R_L = 1kΩ to GND	10	16		kV/V
V_O	Output Voltage Swing	R_L = 1kΩ, R_F = 900Ω, R_G = 100Ω	±3.5	±3.8		V
		R_L = 150Ω	±3.5	±3.3		mV
I_{SC}	Short Circuit Current	R_L = 10Ω	50	100		mA
BW	-3dB Bandwidth	A_V = +5, R_L = 1kΩ		500		MHz
BW	±0.1dB Bandwidth	A_V = +5, R_L = 1kΩ		60		MHz
GBWP	Gain Bandwidth Product			1500		MHz
PM	Phase Margin	R_L = 1kΩ, C_L = 6pF		55		°
SR	Slew Rate	V_S = ±5V, R_L = 150Ω, V_{OUT} = ±2.5V	225	350		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			14		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		1.8		nV/√Hz
i_N	Input Noise Current	f = 10kHz		1.1		pA/√Hz

Typical Performance Curves

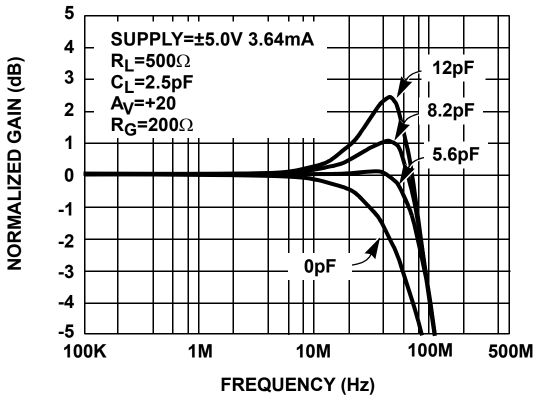


FIGURE 1. GAIN vs FREQUENCY FOR VARIOUS C_{IN}-

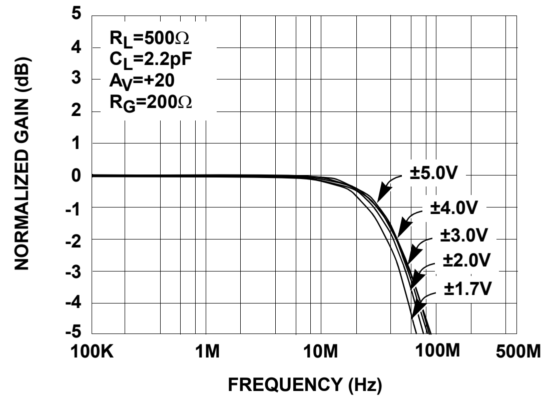


FIGURE 2. GAIN vs FREQUENCY FOR VARIOUS SUPPLY VOLTAGES

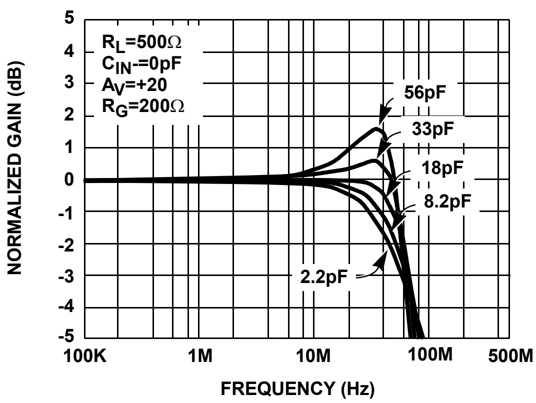


FIGURE 3. GAIN vs FREQUENCY FOR VARIOUS C_L

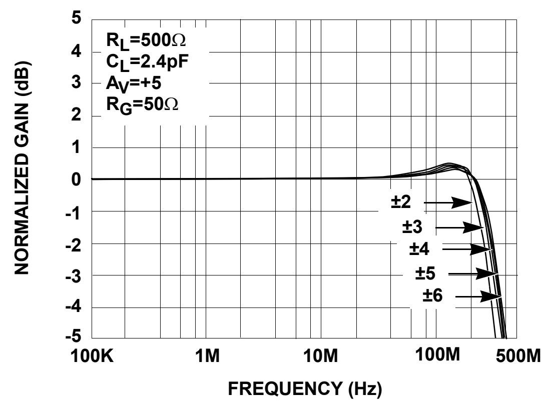


FIGURE 4. FREQUENCY vs GAIN FOR VARIOUS SUPPLY VOLTAGES

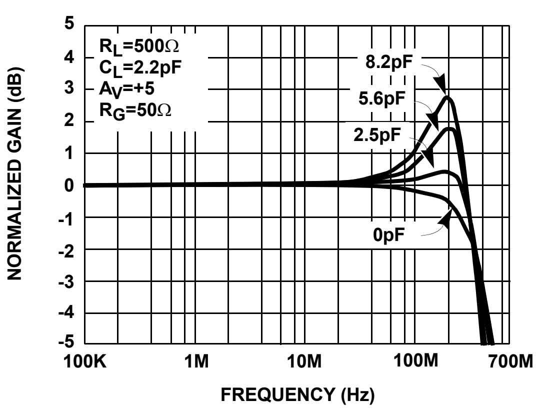


FIGURE 5. GAIN vs FREQUENCY FOR VARIOUS C_{IN}-

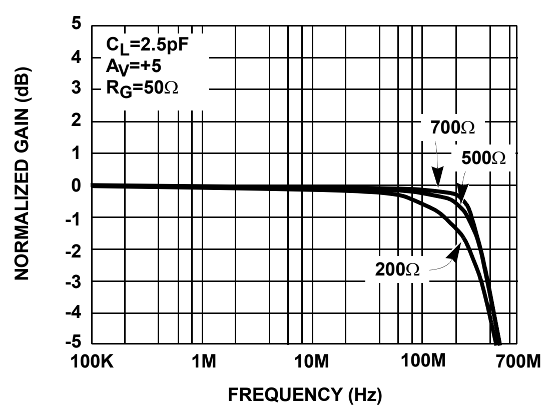


FIGURE 6. GAIN vs FREQUENCY FOR VARIOUS R_L

Typical Performance Curves (Continued)

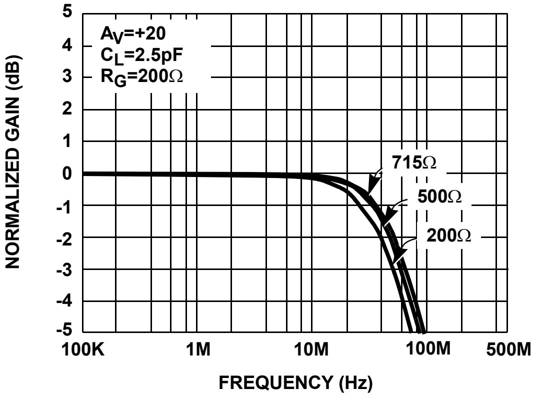


FIGURE 7. GAIN vs FREQUENCY FOR VARIOUS R_L

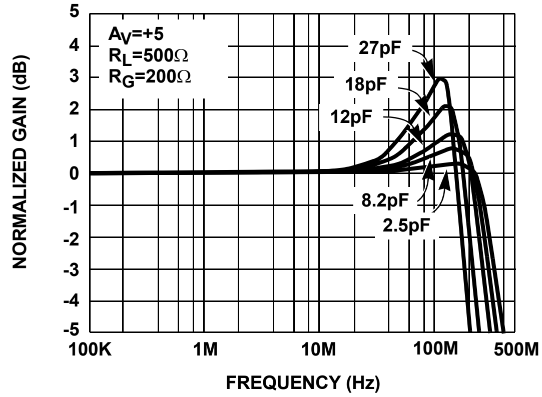


FIGURE 8. FREQUENCY vs GAIN FOR VARIOUS C_L

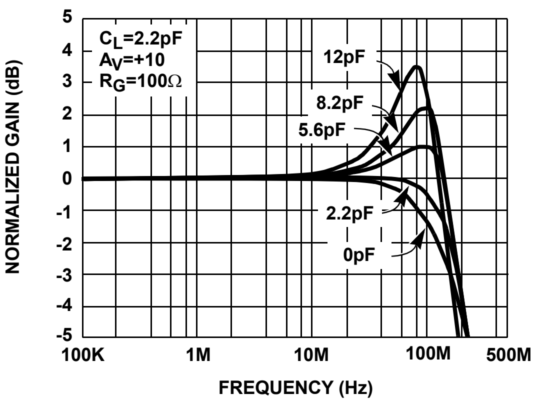


FIGURE 9. GAIN vs FREQUENCY FOR VARIOUS C_{IN}-

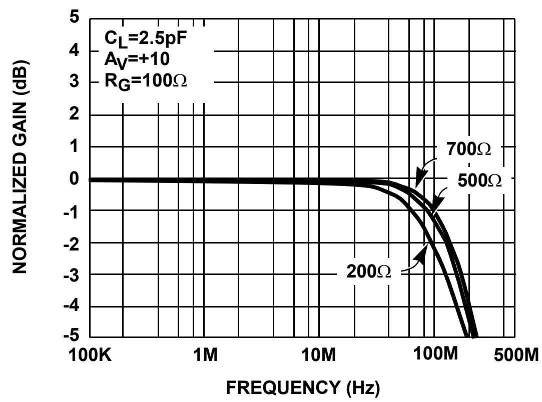


FIGURE 10. GAIN vs FREQUENCY FOR VARIOUS R_L

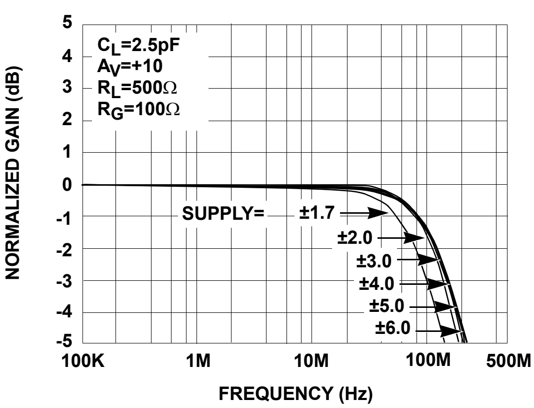


FIGURE 11. GAIN vs FREQUENCY FOR VARIOUS V_S+, V_S-

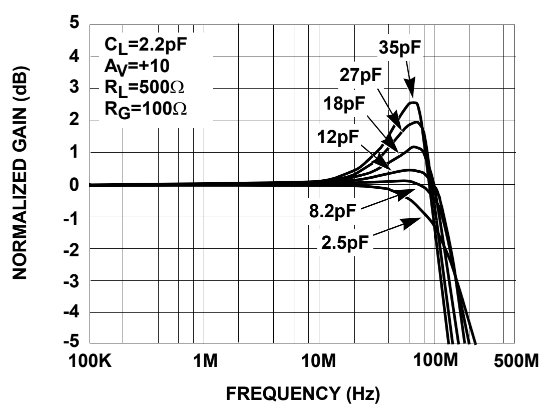


FIGURE 12. GAIN vs FREQUENCY FOR VARIOUS R_L

Typical Performance Curves (Continued)

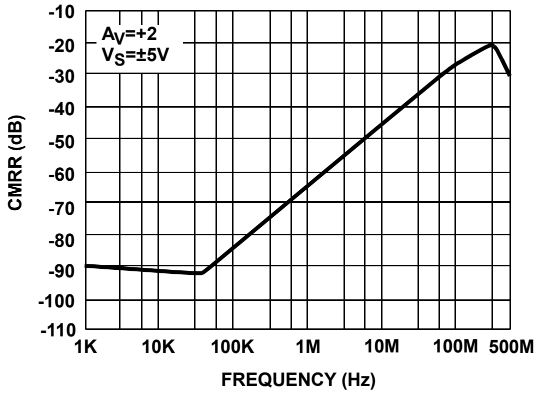


FIGURE 13. CMRR vs FREQUENCY

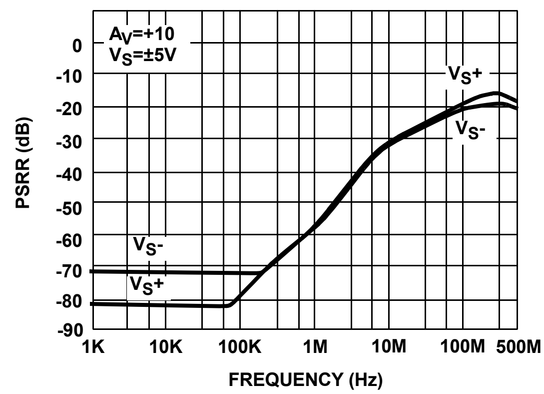


FIGURE 14. PSRR vs FREQUENCY

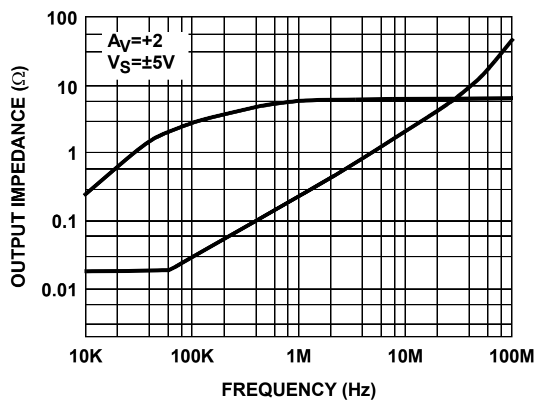


FIGURE 15. OUTPUT IMPEDANCE vs FREQUENCY

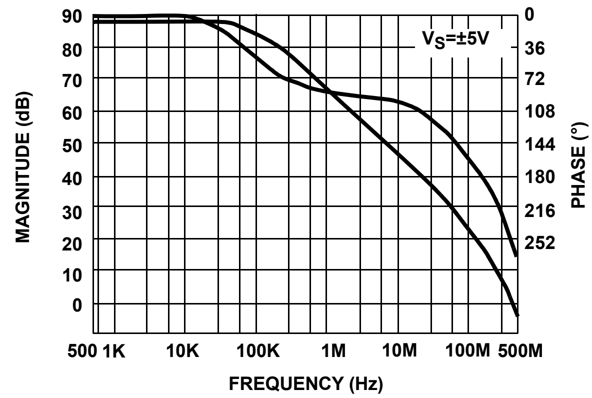


FIGURE 16. OPEN LOOP GAIN AND PHASE vs FREQUENCY

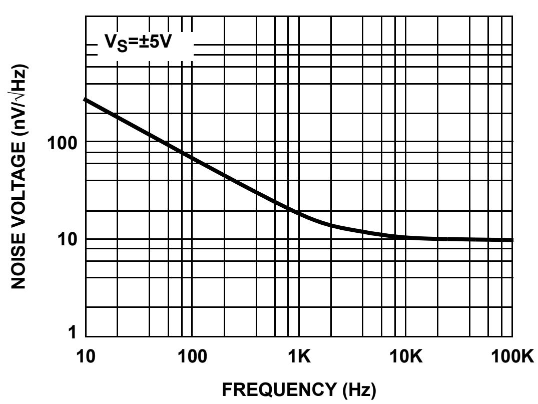


FIGURE 17. EQUIVALENT INPUT VOLTAGE NOISE vs FREQUENCY

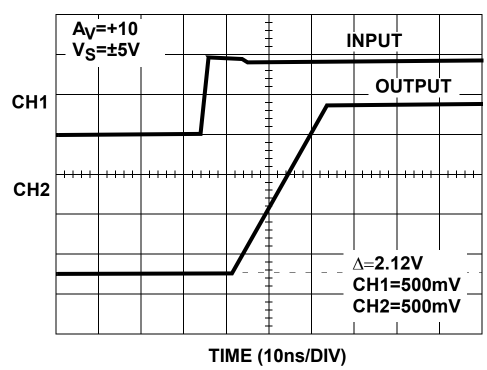


FIGURE 18. LARGE SIGNAL RISE TIME

Typical Performance Curves (Continued)

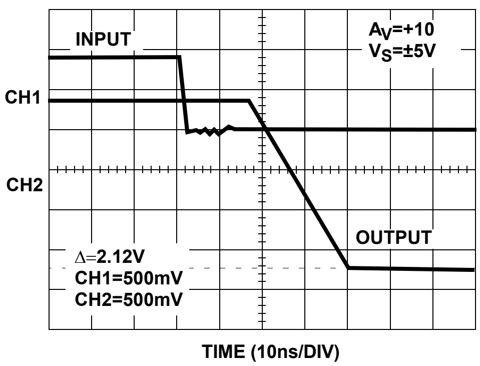


FIGURE 19. LARGE SIGNAL FALL TIME

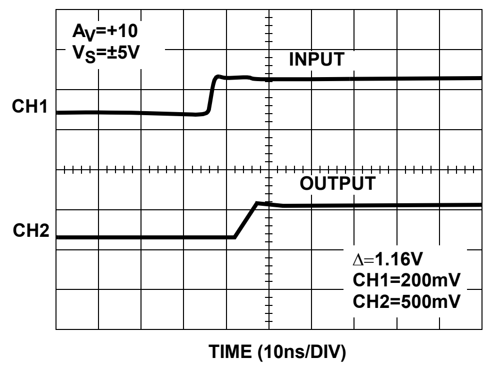


FIGURE 20. SMALL SIGNAL RISE TIME

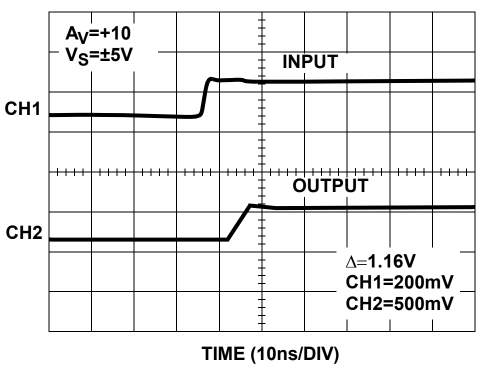


FIGURE 21. SMALL SIGNAL FALL TIME

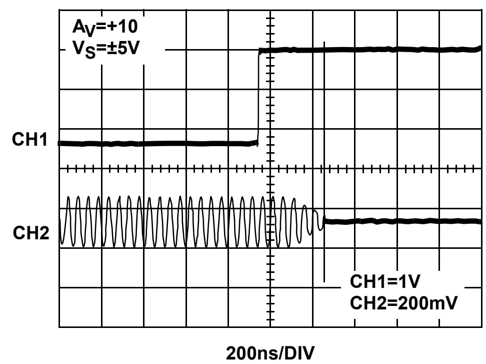


FIGURE 22. TURN OFF TIME

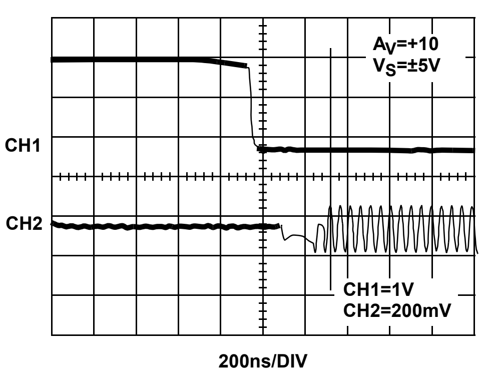


FIGURE 23. TURN ON TIME

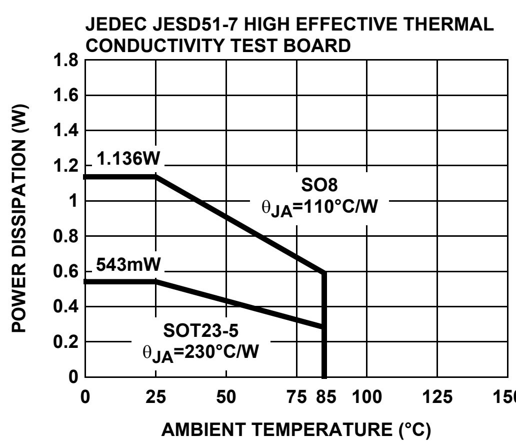


FIGURE 24. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

Typical Performance Curves (Continued)

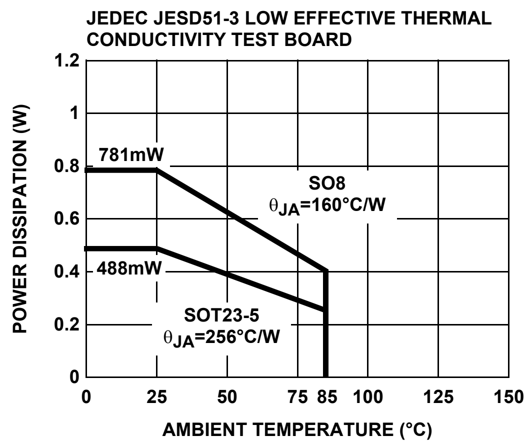


FIGURE 25. PACKAGE POWER DISSIPATION vs AMBIENT TEMPERATURE

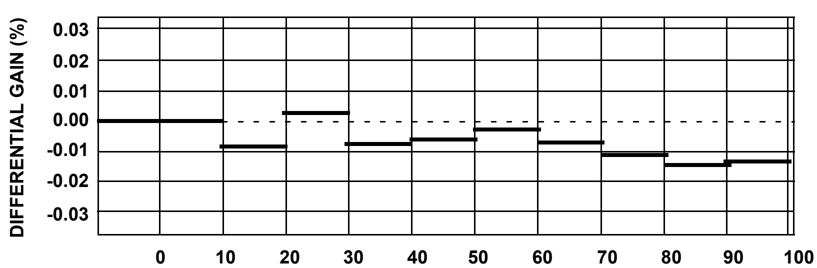


FIGURE 26. DIFFERENTIAL GAIN (%)

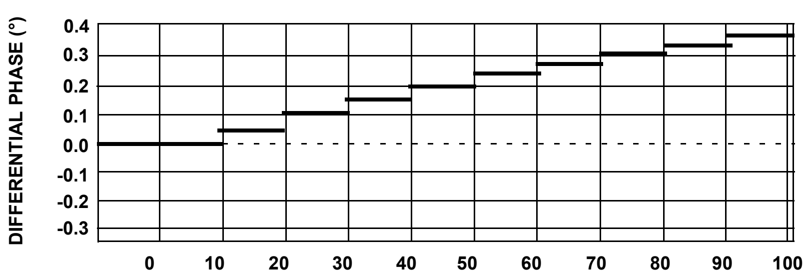


FIGURE 27. DIFFERENTIAL PHASE (°)