

Features

- Voltage noise of only $1.3\text{nV}/\sqrt{\text{Hz}}$
- Current noise of only $1.2\text{pA}/\sqrt{\text{Hz}}$
- Low offset voltage $\leq 200\mu\text{V}$
- 90MHz -3dB BW for $A_V=10$
- Very low supply current -4.7mA
- SOT23 package
- $\pm 5\text{V}$ to $\pm 15\text{V}$ operation

Applications

- Ultrasound input amplifiers
- Wideband instrumentation
- Communication equipment
- AGC & PLL active filters
- Wideband sensors

Ordering Information

Part No	Package	Tape & Reel	Outline #
EL2126CW	5-Pin SOT23		MDP0038
EL2126CS	8-Pin SO		MDP0027
EL2126CN	8-Pin PDIP		MDP0031

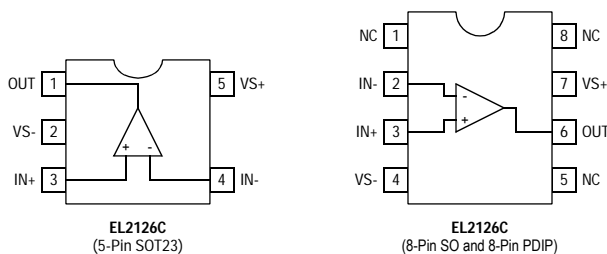
General Description

The EL2126C is an ultra-low noise, wideband amplifier that runs on half the supply current of competitive parts. It is intended for use in systems such as ultrasound imaging where a very small signal needs to be amplified by a large amount without adding significant noise. Its low power dissipation enables it to be packaged in the tiny SOT23 package, which further helps systems where many input channels create both space and power dissipation problems.

The EL2126C is stable for gains of 10 and greater and uses traditional voltage feedback. This allows the use of reactive elements in the feedback loop, a common requirement for many filter topologies. It operates from $\pm 5\text{V}$ to $\pm 15\text{V}$ supplies and is available in a 5-pin SOT23 package and 8-pin SO and 8-pin PDIP packages.

The EL2126C is fabricated in Elantec's proprietary complementary bipolar process, and is specified for operation over the full -40°C to $+85^\circ\text{C}$ temperature range.

Connection Diagrams



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Ultra-low Noise, Low Power, Wideband Amplifier

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$)

V_{S+} to V_{S-}	33V	Power Dissipation	See Curves
Continuous Output Current	40mA	Operating Temperature	-40°C to +85°C
Any Input	$V_{S+} - 0.3\text{V}$ to $V_{S-} + 0.3\text{V}$	Storage Temperature	-60°C to +150°C

Important Note:

All parameters having Min/Max specifications are guaranteed. Typ 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 Characteristics

$V_{S+} = +5\text{V}$, $V_{S-} = -5\text{V}$, $T_A = 25^\circ\text{C}$, $R_F = 180\Omega$, $R_G = 20\Omega$, $R_L = 500\Omega$ unless otherwise specified.

Parameter	Description	Conditions	Min	Typ	Max	Unit
DC Performance						
V_{OS}	Input Offset Voltage (SO8 & PDIP8)			0.5	3	mV
	Input Offset Voltage (SOT23-5)				3	mV
T_{CVOS}	Offset Voltage Temperature Coefficient			TBD		$\mu\text{V}/^\circ\text{C}$
I_B	Input Bias Current		-15	-6		μA
I_{OS}	Input Bias Current Offset			0.13	0.8	μA
T_{CIB}	Input Bias Current Temperature Coefficient			TBD		$\text{nA}/^\circ\text{C}$
C_{IN}	Input Capacitance			2.2		pF
A_{VOL}	Open Loop Gain	$V_O = \pm 2.5\text{V}$	75	86		dB
PSRR	Power Supply Rejection Ratio ^[1]		70	100		dB
CMRR	Common Mode Rejection Ratio ^[2]		70	85		dB
CMIR	Common Mode Input Range		± 3.5			V
V_{OUT+}	Positive Output Voltage Swing	$R_F = 1\text{k}\Omega$, $R_L = \infty$	+3.7	+3.8		V
V_{OUT-}	Negative Output Voltage Swing		-3.7	-4		V
V_{OUTL}	Output Voltage Swing into 100 Ω		± 3	± 3.4		V
I_{OUT}	Output Short Circuit Current ^[3]		70	100		mA
I_{SY}	Supply Current			4.7	5.5	mA
AC Performance - $V_{CC} = -5\text{V}$, $R_G = 20\Omega$, $C_L = 3\text{pF}$						
BW	-3dB Bandwidth, $R_L = 500\Omega$			98		MHz
BW $\pm 0.1\text{dB}$	$\pm 0.1\text{dB}$ Bandwidth, $R_L = 500\Omega$			17		MHz
BW $\pm 1\text{dB}$	$\pm 1\text{dB}$ Bandwidth, $R_L = 500\Omega$			80		MHz
Peaking	Peaking, $R_L = 500\Omega$			0.6		dB
SR	Slew Rate ($\pm 2.5\text{V}$ Square Wave, Measured 20%-80%)		TBD	120		V/ μs
OS+	Negative Overshoot, 4Vpk-pk Output Square Wave			+2.8		%
OS-	Positive Overshoot, 4Vpk-pk Output Square Wave			-7		%
T_S	Settling Time to 0.1% of $\pm 1\text{V}$ Pulse			51		ns
V_N	Voltage Noise Spectral Density			1.3		$\text{nV}/\sqrt{\text{Hz}}$
I_N	Current Noise Spectral Density			1.2		$\text{pA}/\sqrt{\text{Hz}}$
HD2	2nd Harmonic Distortion ^[4]			TBD		dBc
HD3	3rd Harmonic Distortion ^[4]			TBD		dBc
THD	Total Harmonic Distortion ^[5]			TBD		dBc
IMD	Intermodulation Distortion ^[6]			TBD		%

1. Measured by moving the supplies from $\pm 4\text{V}$ to $\pm 6\text{V}$
2. Measured with the input moving -4.4V to +3.5V

EL2126C - Preliminary

Ultra-low Noise, Low Power, Wideband Amplifier

EL2126C - Preliminary

3. Pulse test only and using a 10 Ω load
4. Frequency = 10MHz, V_{OUT} = 1Vpk-pk, into 100 Ω and 5pF load
5. Frequency = 20MHz, V_{OUT} = -20dBm (0.0274V_{RMS}) into 500 Ω and 15pF load
6. Two-tone IMD, frequencies = 5MHz and 6MHz at -20dBm output level, R_{LOAD} = 500 Ω and 15pF

Electrical Characteristics

V_{S+} = +15V, V_{S-} = -15V, T_A = 25°C, R_F = 180 Ω , R_G = 20 Ω , R_L = 500 Ω unless otherwise specified.

Parameter	Description	Conditions	Min	Typ	Max	Unit
DC Performance						
V_{OS}	Input Offset Voltage (SO8 & PDIP8)			-0.5	3	mV
	Input Offset Voltage (SOT23-5)				3	mV
T_{CVOS}	Offset Voltage Temperature Coefficient			TBD		$\mu V/^{\circ}C$
I_B	Input Bias Current		-15	-5		μA
I_{OS}	Input Bias Current Offset			0.16	0.7	μA
T_{CIB}	Input Bias Current Temperature Coefficient			TBD		nA/ $^{\circ}C$
C_{IN}	Input Capacitance			2.2		pF
A_{VOL}	Open Loop Gain		75	88		dB
$PSRR$	Power Supply Rejection Ratio ^[1]		65	80		dB
$CMRR$	Common Mode Rejection Ratio ^[2]		70	85		dB
$CMIR$	Common Mode Input Range		± 13.5	TBD		V
V_{OUT}	Output Voltage Swing		± 13.5	± 13.7		V
V_{OUTL+}	Positive Output Voltage Swing into 100 Ω	$R_F = 1k\Omega$, $R_L = \infty$	10.7	11.7		V
V_{OUTL-}	Negative Output Voltage Swing into 100 Ω		-9.5	-10.2		V
I_{OUT}	Output Short Circuit Current ^[3]		90	150		mA
I_{SY}	Supply Current			5	6	mA
AC Performance - $V_{CC} = -5V$, $R_G = 20\Omega$, $C_L = 3pF$						
BW	-3dB Bandwidth, $R_L = 500\Omega$			136		MHz
$BW \pm 0.1dB$	$\pm 0.1dB$ Bandwidth, $R_L = 500\Omega$			26		MHz
$BW \pm 1dB$	$\pm 1dB$ Bandwidth, $R_L = 500\Omega$			60		MHz
Peaking	Peaking, $R_L = 500\Omega$			2.1		dB
SR	Slew Rate ($\pm 2.5V$ Square Wave, Measured 25%-75%)		TBD	150		V/ μS
$OS+$	Positive Overshoot, 4Vpk-pk Output Square Wave			1.6		%
$OS-$	Negative Overshoot, 4Vpk-pk Output Square Wave			-4.4		%
T_S	Settling Time to 0.1% of $\pm 1V$ Pulse			48		ns
V_N	Voltage Noise Spectral Density			1.4		nV/ \sqrt{Hz}
I_N	Current Noise Spectral Density			1.1		pA/ \sqrt{Hz}
HD_2	2nd Harmonic Distortion ^[4]			TBD		dBc
HD_3	3rd Harmonic Distortion ^[4]			TBD		dBc
THD	Total Harmonic Distortion ^[5]			TBD		dBc
IMD	Intermodulation Distortion ^[6]			TBD		%

1. Measured by moving the supplies from $\pm 13.5V$ to $\pm 16.5V$
2. Measured with the input moving -14.4V to +13.8V
3. Pulse test only and using a 10 Ω load
4. Frequency = 10MHz, V_{OUT} = 1Vpk-pk, into 100 Ω and 5pF load
5. Frequency = 20MHz, V_{OUT} = -20dBm (0.0274V_{RMS}) into 500 Ω and 15pF load

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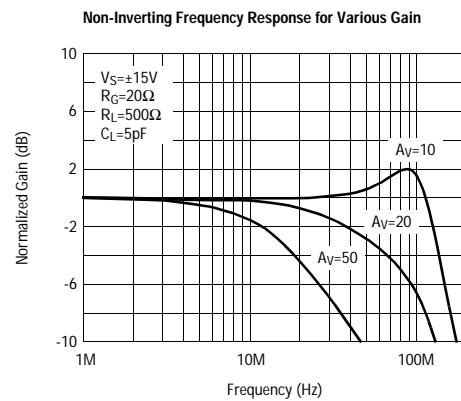
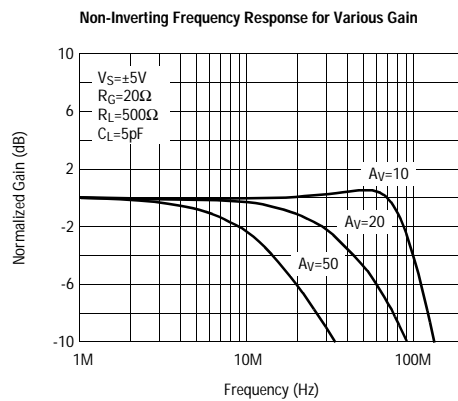
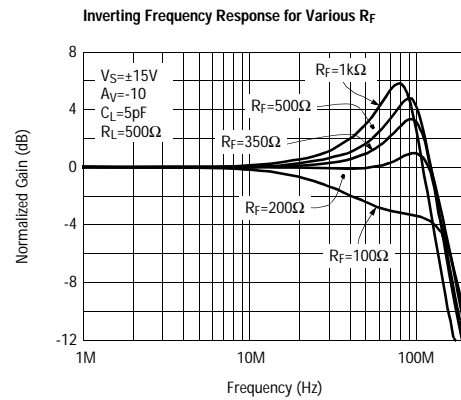
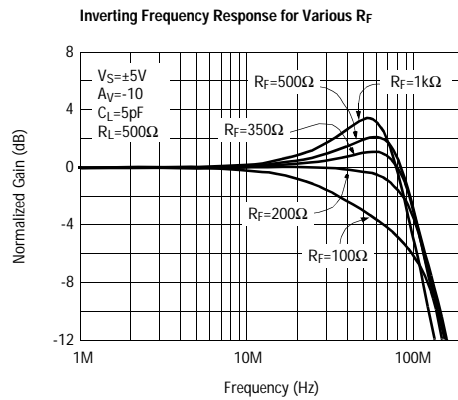
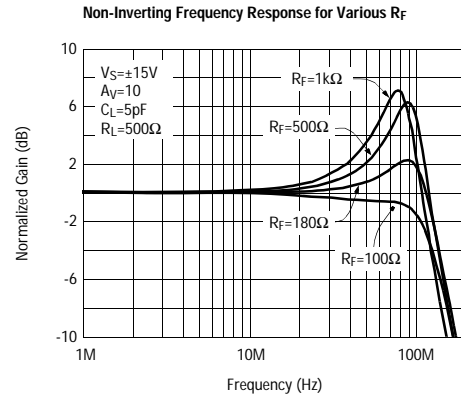
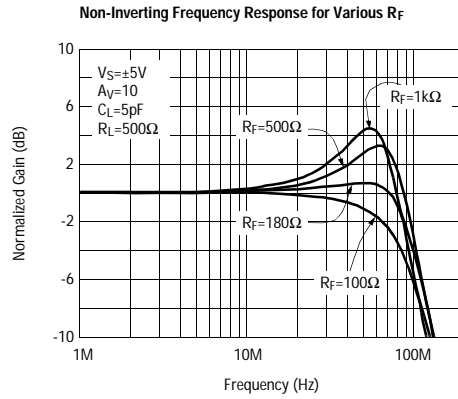
6. Two-tone IMD, frequencies = 5MHz and 6MHz at -20dBm output level, $R_{LOAD} = 500\Omega$ and 15pF

EL2126C - Preliminary

Ultra-low Noise, Low Power, Wideband Amplifier

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Typical Performance Curves

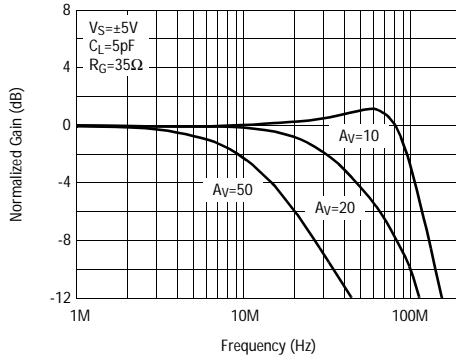


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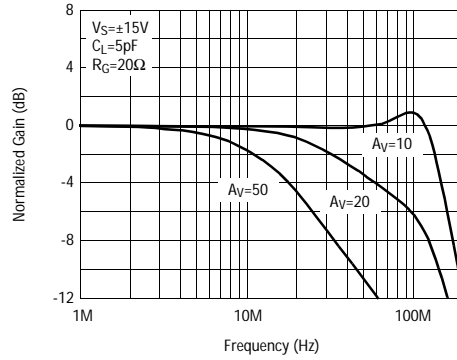
Ultra-low Noise, Low Power, Wideband Amplifier

Typical Performance Curves

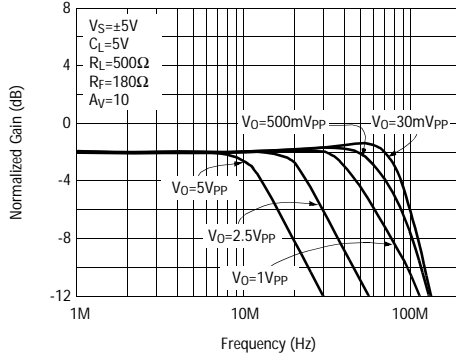
Inverting Frequency Response for Various Gain



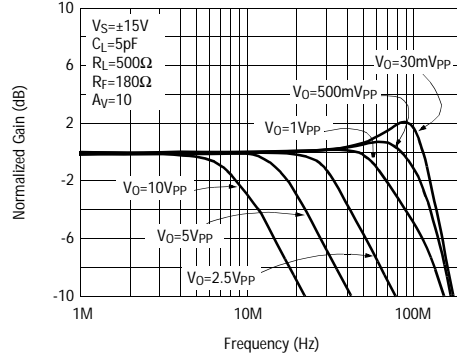
Inverting Frequency Response for Various R_F



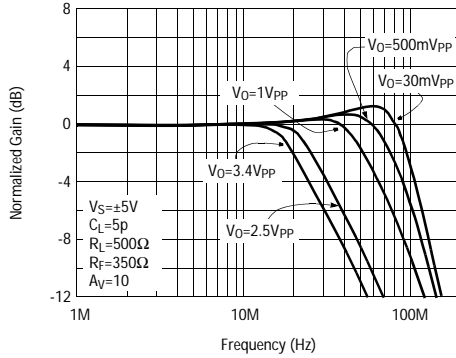
Non-Inverting Frequency Response for Various Output Signal Levels



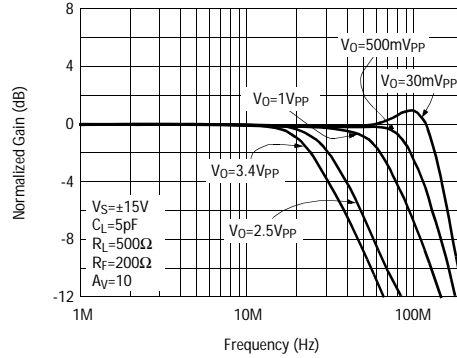
Non-Inverting Frequency Response for Various Output Signal Levels



Inverting Frequency Response for Various Output Signal Levels



Inverting Frequency Response for Various Output Signal Levels

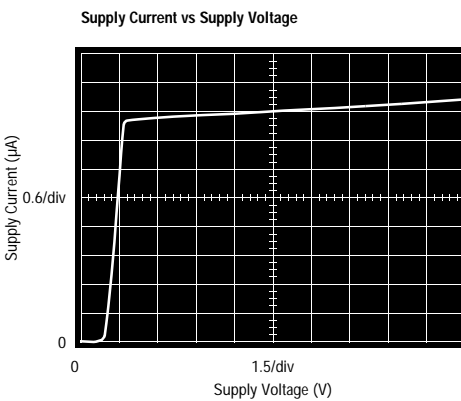
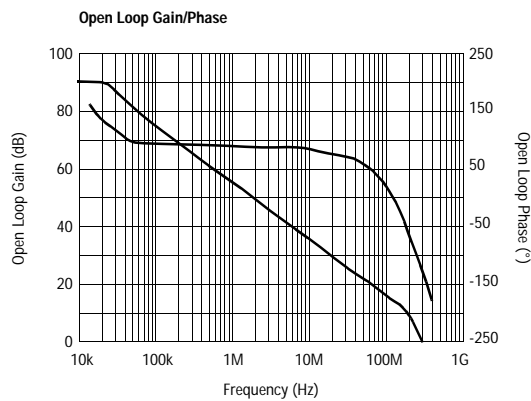
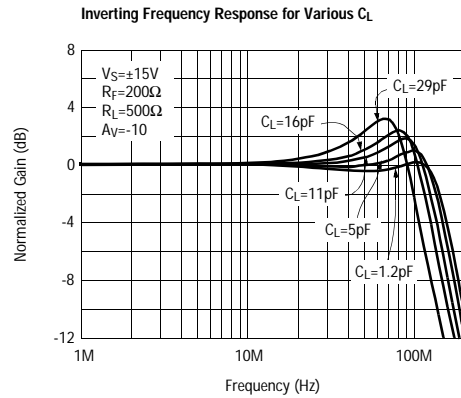
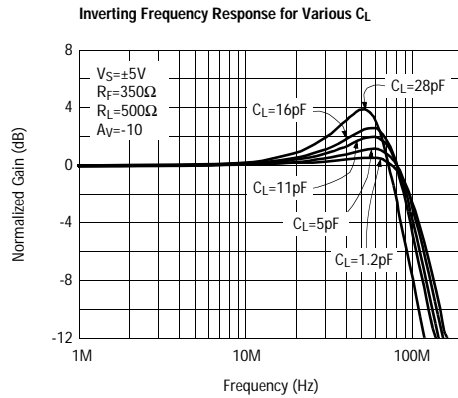
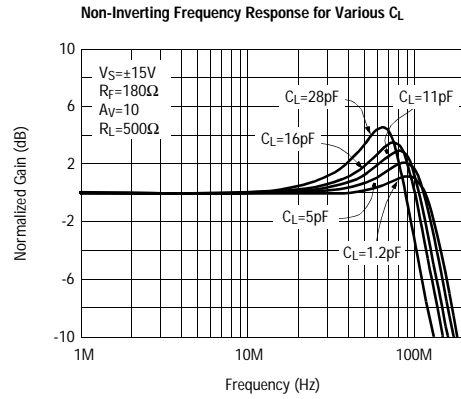
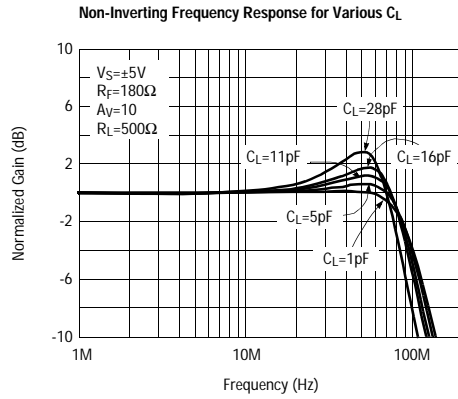


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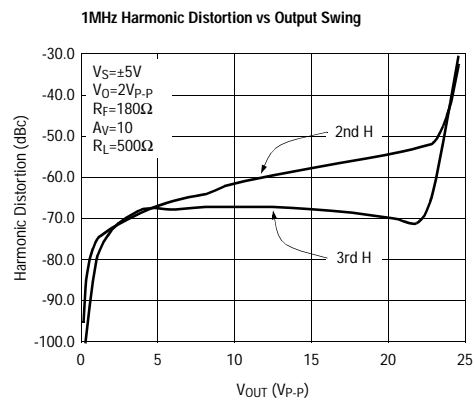
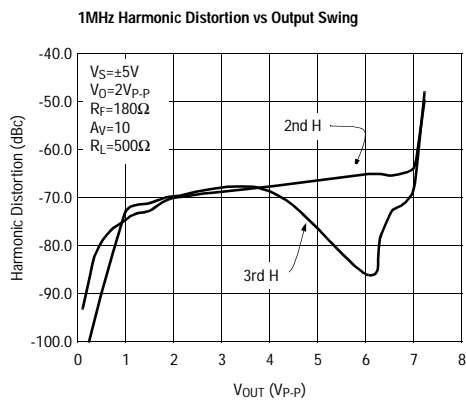
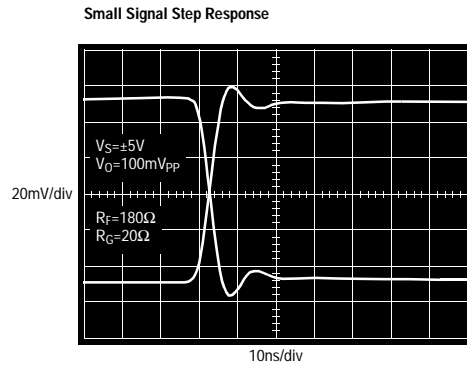
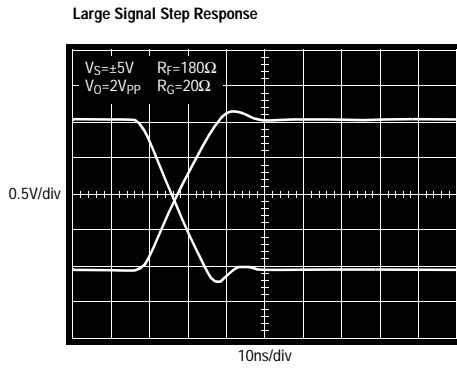
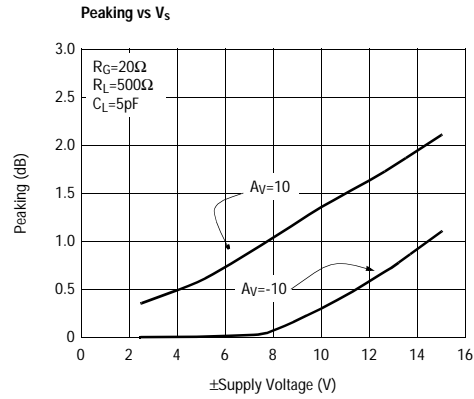
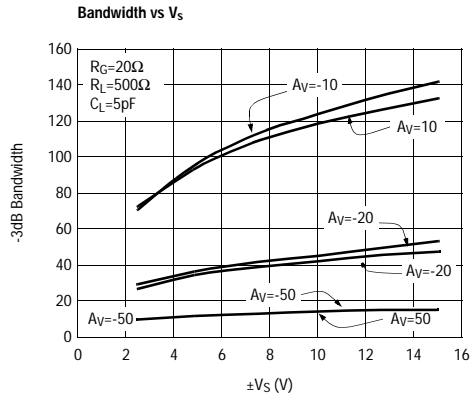
Typical Performance Curves



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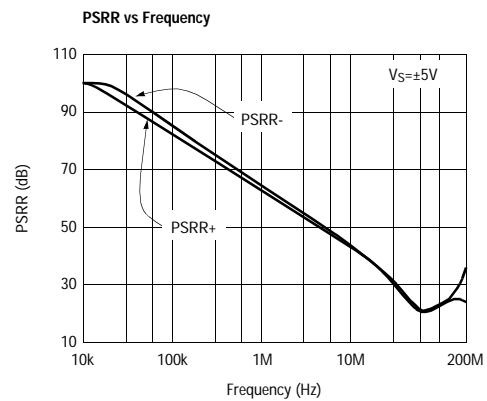
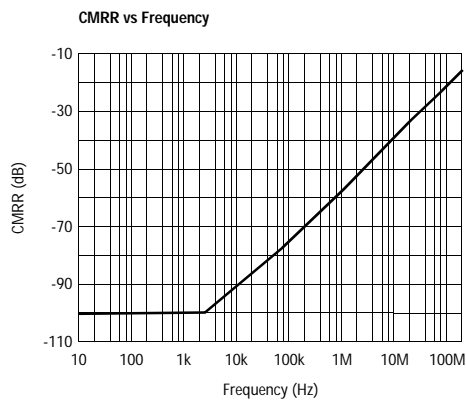
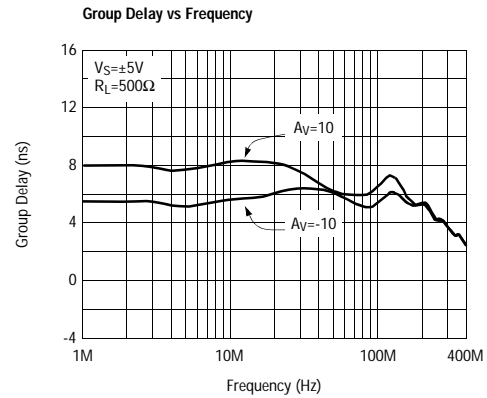
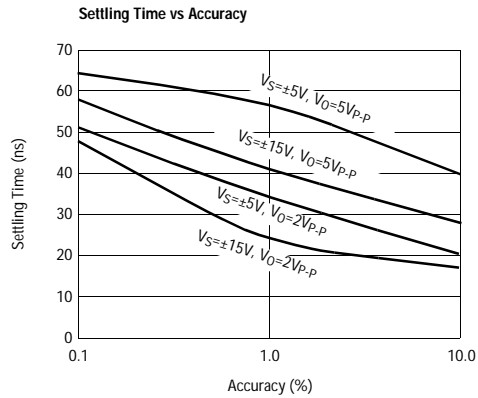
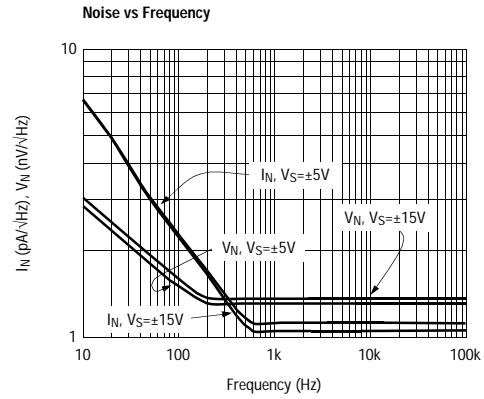
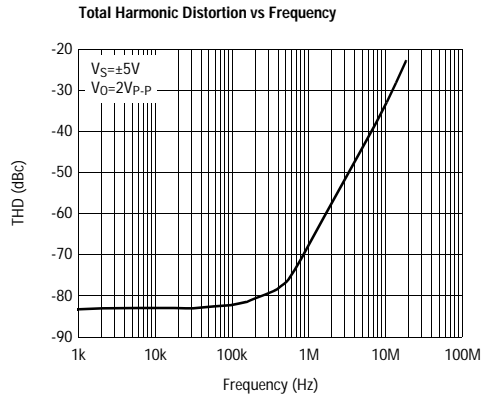


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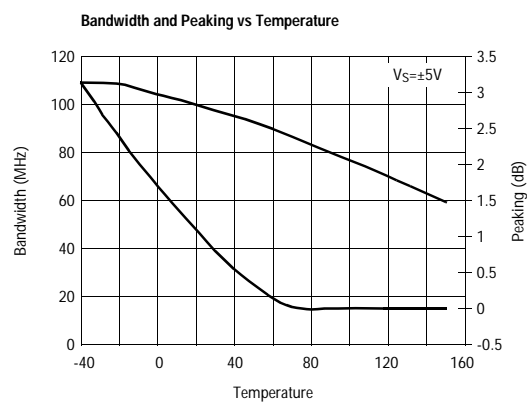
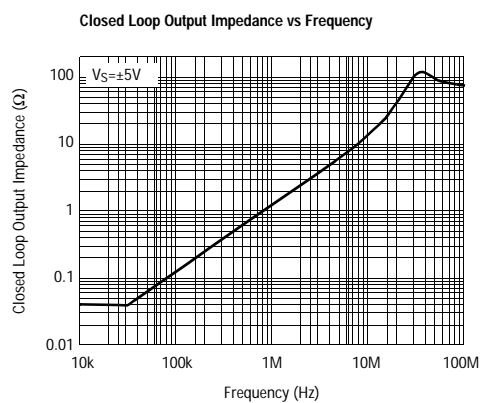
Typical Performance Curves



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Typical Performance Curves



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