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**CMOS PROGRAMMABLE LOW POWER OPERATIONAL AMPLIFIERS**

New Product

**Description**

The TLC271 operational amplifier combines a wide range of input offset voltage grades with low offset voltage drift and high input impedance. In addition, the TLC271 offers a bias-select mode that allows the user to select the best combination of power dissipation and AC performance for a particular application.

Using the bias-select option, these devices can be programmed to fit a wide range of applications. Three offset voltage grades are available, ranging from the low-cost TLC271 (10mV) to the TLC271B (2mV) low-offset version. The devices are offered in both commercial and industrial operating temperature ranges.

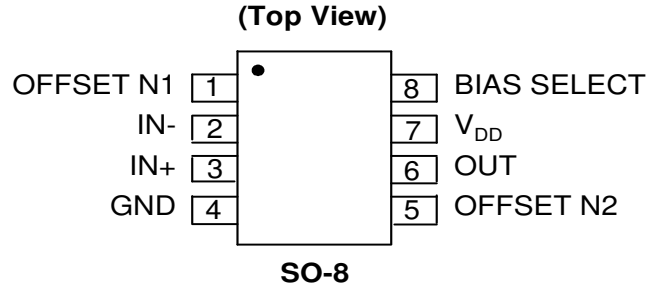
The extremely high input impedance and low bias currents, in conjunction with good common-mode and supply voltage rejection make these devices an excellent choice for high performance designs.

The devices also feature low-voltage single-supply operation with a common-mode input voltage range which includes the negative rail.

**Features**

- Wide range of supply voltages over specified temperature range:
  - 0°C to 70°C . . . 3 V to 16 V
  - 40°C to 85°C . . . 4 V to 16 V
- Single-Supply Operation
- Common-Mode Input Voltage Range
- Extends Below the Negative Rail
- Low Noise:
  - 20 nV/√Hz Typical @ f = 1kHz
  - (High-Bias Mode)
- Output Voltage Range Includes Negative Rail
- High Input Impedance
- ESD-Protection Circuitry
- Designed-In Latch-Up Immunity
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Pin Assignments**



**Applications**

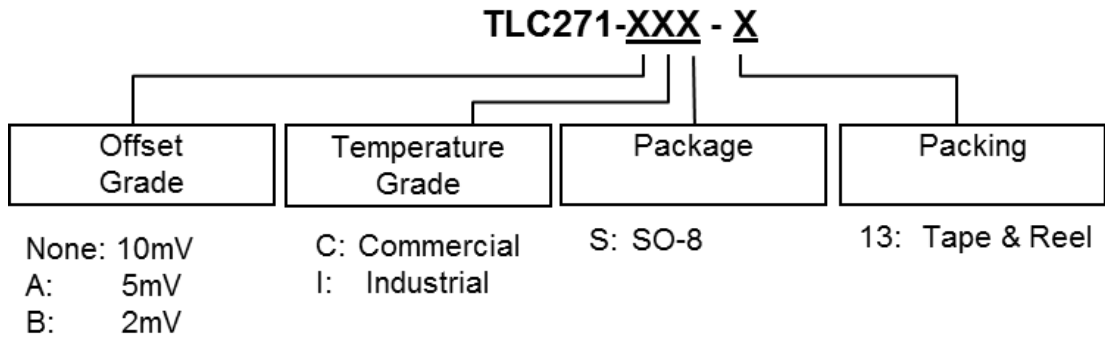
With the programmability options of the TLC271, a designer can choose a very low current option allowing for extended battery life or choose a higher current option for more performance. It is possible to switch performance modes as the application demands change.

The TLC271 is well suited for many consumer audio, industrial and other low power applications.

- Audio
  - Microphone Preamplifier
  - Filtering – Equalizers
  - Signal Amplification
- Industrial
  - Power Supply
  - Instrumentation
  - Metering
- Medical
  - Portable Meters and Measurement
  - Instrumentation

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.  
 2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.  
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

## Ordering Information



Device	Package Code	Offset Voltage	Operating Temperature Range	Packaging (Note 4)	13" Tape and Reel	
					Quantity	Part Number Suffix
TLC271CS-13	S	10mV	0 to 70°C	SO-8	2500/Tape & Reel	-13
TLC271ACS-13	S	5mV	0 to 70°C	SO-8	2500/Tape & Reel	-13
TLC271BCS-13	S	2mV	0 to 70°C	SO-8	2500/Tape & Reel	-13
TLC271IS-13	S	10mV	-40 to 85°C	SO-8	2500/Tape & Reel	-13
TLC271AIS-13	S	5mV	-40 to 85°C	SO-8	2500/Tape & Reel	-13
TLC271BIS-13	S	2mV	-40 to 85°C	SO-8	2500/Tape & Reel	-13

Note: 4. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

## Pin Descriptions

Pin Name	Pin number	Description
OFFSET N1	1	Offset Control Inverting Input
IN-	2	Inverting Input
IN+	3	Non-Inverting Input
GND	4	Ground
OFFSET N2	5	Offset Control Non-Inverting Input
OUT	6	Output
V <sub>DD</sub>	7	Supply
BIAS SELECT	8	Bias Mode Select



**Absolute Maximum Ratings (Notes 5, 6, 7, 8, 9)**

Symbol	Parameter		Rating	Unit
$V_{DD}$	Supply Voltage (Note 6)		18	V
$V_{ID}$	Differential Input Voltage (Note 7)		$\pm V_{DD}$	V
$V_{IN}$	Input Voltage Range (either input)		-0.3 to $V_{DD}$	V
$I_{IN}$	Input Current		$\pm 5$	mA
$I_o$	Output Current		$\pm 30$	mA
	Output Short-Circuit to GND (Note 8)		Continuous	—
$P_D$	Power Dissipation (Note 9)		1065	mW
$T_A$	Operating Temperature Range	C Grade	0 to +70	°C
		I Grade	-40 to +85	
$T_J$	Operating Junction Temperature		150	°C
$T_{ST}$	Storage Temperature Range		-65 to +150	°C
ESD HBM	Human Body Model ESD Protection (1.5k $\Omega$ in series with 100pF)		1.5	kV

- Notes:
- Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
  - All voltage values, except differential voltages, are with respect to ground.
  - Differential input voltages are at  $IN+$  with respect to  $IN-$ .
  - The output may be shorted to either supply. Temperature and/or supply voltages must be limited to ensure that the maximum dissipation rating is not exceeded.
  - For operating at high temperatures, the TLC271 must be derated 8.5mW/°C to zero based on a +150°C maximum junction temperature and a thermal resistance of +117 °C/W when the device is soldered to a printed circuit board, operating in a still air ambient.

**Recommended Operating Conditions**

Symbol	Parameter		C grade		I grade		Unit
			Min	Max	Min	Max	
$V_{DD}$	Supply Voltage		3	16	4	16	V
$V_{IC}$	Common Mode Input Voltage	$V_{DD} = 5V$	-0.2	3.5	-0.2	3.5	V
		$V_{DD} = 10V$	-0.2	8.5	-0.2	8.5	
$T_A$	Operating Free Air Temperature		0	+70	-40	+85	°C

**Electrical Characteristics**

High Bias Mode			Conditions	T <sub>A</sub>	TLC271C, TLC271AC, TLC271BC						Unit
Parameter					V <sub>DD</sub> = 5V			V <sub>DD</sub> = 10V			
					Min	Typ	Max	Min	Typ	Max	
V <sub>IO</sub>	Input Offset Voltage	TLC271C	V <sub>o</sub> = 1.4V, V <sub>IC</sub> = 0V, R <sub>S</sub> = 50Ω, R <sub>L</sub> = 10kΩ	+25°C	—	1.1	10	—	1.1	10	mV
				0 to +70°C	—	—	12	—	—	12	
		TLC271AC		+25°C	—	0.9	5	—	0.9	5	
				0 to 70°C	—	—	6.5	—	—	6.5	
		TLC271BC		25°C	—	0.34	2	—	0.39	2	
				0 to +70°C	—	—	3	—	—	3	
α <sub>VI</sub>	Average Temperature Coefficient of Input Offset Voltage		—	+25°C to 70°C	1.8			2			μV/°C
I <sub>IO</sub>	Input Offset Current (Note 10)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.1	60	—	0.1	60	pA
				+70°C	—	7	300	—	7	300	
I <sub>IB</sub>	Input Bias Current (Note 10)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.6	60	—	0.7	60	pA
				+70°C	—	40	600	—	50	600	
V <sub>ICR</sub>	Common Mode Input Voltage (Note 11)		—	+25°C	-0.2 to 4	-0.3 to 4.2	—	-0.2 to 9	-0.3 to 9.2	—	V
				0 to +70°C	-0.2 to 3.5	—	—	-0.2 to 8.5	—	—	V
V <sub>OH</sub>	High Level Output Voltage		V <sub>ID</sub> = 100mV, R <sub>L</sub> = 10kΩ	+25°C	3.2	3.8	—	8	8.5	—	V
				0°C	3	3.8	—	7.8	8.5	—	
				+70°C	3	3.8	—	7.8	8.4	—	
V <sub>OL</sub>	Low Level Output Voltage		V <sub>ID</sub> = -100mV, I <sub>L</sub> = 0	+25°C	—	0	50	—	0	50	mV
				0°C	—	0	50	—	0	50	
				+70°C	—	0	50	—	0	50	
A <sub>VD</sub>	Large Signal Differential Voltage Gain		R <sub>L</sub> = 10kΩ (Note 12)	+25°C	5	23	—	10	36	—	V/mV
				0°C	4	27	—	7.5	42	—	
				+70°C	4	20	—	7.5	32	—	
CMRR	Common Mode Rejection Ratio		V <sub>IC</sub> = V <sub>ICRmin</sub>	+25°C	65	80	—	65	85	—	dB
				0°C	60	84	—	60	88	—	
				+70°C	60	85	—	60	88	—	
k <sub>SVR</sub>	Supply Voltage Rejection Ratio (ΔV <sub>DD</sub> /ΔV <sub>IO</sub> )		V <sub>DD</sub> = 5V to 10V, V <sub>o</sub> = 1.4V	+25°C	65	95	—	65	95	—	dB
				0°C	60	94	—	60	94	—	
				+70°C	60	96	—	60	96	—	
I <sub>I(SEL)</sub>	Input Current (BIAS SELECT)		V <sub>I(SEL)</sub> = 0	+25°C	—	-1.4	—	—	-1.9	—	μA
I <sub>DD</sub>	Supply Current		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2, No load	+25°C	—	675	1600	—	950	2000	μA
				0°C	—	775	1800	—	1125	2200	
				+70°C	—	575	1300	—	750	1700	

Notes: 10. The typical values of input bias current and input offset current below 5pA were calculated.  
 11. This range also applies to each input individually.  
 12. At V<sub>DD</sub> = 5 V, V<sub>o</sub> = 0.25 V to 2 V; at V<sub>DD</sub> = 10 V, V<sub>o</sub> = 1 V to 6 V.

**Electrical Characteristics**

High bias mode			Conditions	T <sub>A</sub>	TLC271I, TLC271AI, TLC271BI						Unit
Parameter					V <sub>DD</sub> = 5V			V <sub>DD</sub> = 10V			
					Min	Typ	Max	Min	Typ	Max	
V <sub>IO</sub>	Input Offset Voltage	TLC271I	V <sub>o</sub> = 1.4V, V <sub>IC</sub> = 0V, R <sub>S</sub> = 50Ω, R <sub>L</sub> = 10kΩ	+25°C	—	1.1	10	—	1.1	10	mV
				-40 to 85°C	—	—	13	—	—	13	
		TLC271AI		+25°C	—	0.9	5	—	0.9	5	
				-40 to 85°C	—	—	7	—	—	7	
		TLC271BI		+25°C	—	0.34	2	—	0.39	2	
				-40 to 85°C	—	—	3.5	—	—	3.5	
α <sub>VI</sub>	Average Temperature Coefficient of Input Offset Voltage	—	—	+25 to 85°C	1.8			2			μV/°C
I <sub>IO</sub>	Input Offset Current (Note 13)	—	V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.1	60	—	0.1	60	pA
				+85°C	—	24	1000	—	26	1000	
I <sub>IB</sub>	Input Bias Current (Note 13)	—	V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.6	60	—	0.7	60	pA
				+85°C	—	200	2000	—	220	2000	
V <sub>ICR</sub>	Common Mode Input Voltage (Note 14)	—	—	+25°C	-0.2 to 4	-0.3 to 4.2	—	-0.2 to 9	-0.3 to 9.2	—	V
				-40 to +85°C	-0.2 to 3.5	—	—	-0.2 to 8.5	—	—	V
V <sub>OH</sub>	High Level Output Voltage	—	V <sub>ID</sub> = 100mV, R <sub>L</sub> = 10kΩ	+25°C	3.2	3.8	—	8	8.5	—	V
				-40°C	3	3.8	—	7.8	8.5	—	
				+85°C	3	3.8	—	7.8	8.5	—	
V <sub>OL</sub>	Low Level Output Voltage	—	V <sub>ID</sub> = -100mV, I <sub>L</sub> = 0	+25°C	—	0	50	—	0	50	mV
				-40°C	—	0	50	—	0	50	
				+85°C	—	0	50	—	0	50	
A <sub>VD</sub>	Large Signal Differential Voltage Gain	—	R <sub>L</sub> = 10kΩ (Note 15)	+25°C	5	23	—	10	36	—	V/mV
				-40°C	3.5	32	—	7	46	—	
				+85°C	3.5	19	—	7	31	—	
CMRR	Common Mode Rejection Ratio	—	V <sub>IC</sub> = V <sub>ICRmin</sub>	+25°C	65	80	—	65	85	—	dB
				-40°C	60	81	—	60	87	—	
				+85°C	60	86	—	60	88	—	
k <sub>SVR</sub>	Supply Voltage Rejection Ratio (ΔV <sub>DD</sub> /ΔV <sub>IO</sub> )	—	V <sub>DD</sub> = 5V to 10V, V <sub>o</sub> = 1.4V	+25°C	65	95	—	65	95	—	dB
				-40°C	60	92	—	60	92	—	
				+85°C	60	96	—	60	96	—	
I <sub>I(SEL)</sub>	Input Current (BIAS SELECT)	—	V <sub>I(SEL)</sub> = 0	+25°C	—	-1.4	—	—	-1.9	—	μA
I <sub>DD</sub>	Supply Current	—	V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2, No load	+25°C	—	675	1600	—	950	2000	μA
				-40°C	—	950	2200	—	1375	2500	
				+85°C	—	525	1200	—	725	1600	

Notes: 13. The typical values of input bias current and input offset current below 5pA were calculated.  
 14. This range also applies to each input individually.  
 15. At V<sub>DD</sub> = 5 V, V<sub>o</sub> = 0.25 V to 2 V; at V<sub>DD</sub> = 10 V, V<sub>o</sub> = 1 V to 6 V.

**Electrical Characteristics**

High bias mode: $V_{DD} = 5V$								
Parameter		Conditions		$T_A$	TLC271C, TLC271AC, TLC271BC			Unit
					Min	Typ	Max	
SR	Slew Rate at Unity Gain	$R_L = 10k\Omega$ , $C_L = 20pF$	$V_{I(PP)} = 1V$	+25°C	—	3.6	—	V/ $\mu$ s
				0°C	—	4	—	
				+70°C	—	3	—	
		See Figure 92	$V_{I(PP)} = 2.5V$	+25°C	—	2.9	—	
				0°C	—	3.1	—	
				+70°C	—	2.5	—	
$V_n$	Equivalent Input Noise Voltage	$F = 1kHz$ , $R_S = 20\Omega$ See Figure 93		+25°C	—	25	—	nV/ $\sqrt{Hz}$
$B_M$	Maximum Output Swing Bandwidth	$V_o = V_{OH}$ , $C_L = 20pF$ , $R_L = 10k\Omega$ See Figure 92		+25°C	—	200	—	kHz
				0°C	—	220	—	
				+70°C	—	140	—	
$B_1$	Unity Gain Bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94		+25°C	—	2.2	—	MHz
				0°C	—	2.5	—	
				+70°C	—	1.8	—	
$\phi_m$	Phase Margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94		+25°C	—	49°	—	—
				0°C	—	50°	—	
				+70°C	—	46°	—	
High bias mode: $V_{DD} = 10V$								
Parameter		Conditions		$T_A$	TLC271C, TLC271AC, TLC271BC			Unit
					Min	Typ	Max	
SR	Slew Rate at Unity Gain	$R_L = 10k\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	5.3	—	V/ $\mu$ s
				0°C	—	5.9	—	
				+70°C	—	4.3	—	
		See Figure 92	$V_{I(PP)} = 5.5V$	+25°C	—	4.6	—	
				0°C	—	5.1	—	
				+70°C	—	3.8	—	
$V_n$	Equivalent Input Noise Voltage	$F = 1kHz$ , $R_S = 20\Omega$ See Figure 93		+25°C	—	25	—	nV/ $\sqrt{Hz}$
$B_M$	Maximum Output Swing Bandwidth	$V_o = V_{OH}$ , $C_L = 20pF$ , $R_L = 10k\Omega$ See Figure 92		+25°C	—	200	—	kHz
				0°C	—	220	—	
				+70°C	—	140	—	
$B_1$	Unity Gain Bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94		+25°C	—	2.2	—	MHz
				0°C	—	2.5	—	
				+70°C	—	1.8	—	
$\phi_m$	Phase Margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94		+25°C	—	49°	—	—
				0°C	—	50°	—	
				+70°C	—	46°	—	

**Electrical Characteristics**

High bias mode: $V_{DD} = 5V$								
Parameter		Conditions		$T_A$	TLC271I, TLC271AI, TLC271BI			Unit
					Min	Typ	Max	
SR	Slew rate at unity gain	$R_L = 10k\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	3.6	—	V/ $\mu$ s
				-40°C	—	4.5	—	
				+85°C	—	2.8	—	
			$V_{I(PP)} = 2.5V$	+25°C	—	2.9	—	
				-40°C	—	3.5	—	
				+85°C	—	2.3	—	
$V_n$	Equivalent input noise voltage	$F = 1kHz$ , $R_S = 20\Omega$ See Figure 93	+25°C	—	25	—	nV/ $\sqrt{Hz}$	
$B_{OM}$	Maximum output swing bandwidth	$V_o = V_{OH}$ , $C_L = 20pF$ , $R_L = 10k\Omega$ See Figure 92	+25°C	—	320	—	kHz	
			-40°C	—	380	—		
			+85°C	—	250	—		
$B_1$	Unity gain bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	1.7	—	MHz	
			-40°C	—	2.6	—		
			+85°C	—	1.2	—		
$\phi_m$	Phase margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	46°	—	—	
			-40°C	—	49°	—		
			+85°C	—	43°	—		
High bias mode: $V_{DD} = 10V$								
Parameter		Conditions		$T_A$	TLC271I, TLC271AI, TLC271BI			Unit
					Min	Typ	Max	
SR	Slew rate at unity gain	$R_L = 10k\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	5.3	—	V/ $\mu$ s
				-40°C	—	6.8	—	
				+85°C	—	4	—	
			$V_{I(PP)} = 5.5V$	+25°C	—	4.6	—	
				-40°C	—	5.8	—	
				+85°C	—	3.5	—	
$V_n$	Equivalent input noise voltage	$F = 1kHz$ , $R_S = 20\Omega$ See Figure 93	+25°C	—	25	—	nV/ $\sqrt{Hz}$	
$B_{OM}$	Maximum output swing bandwidth	$V_o = V_{OH}$ , $C_L = 20pF$ , $R_L = 10k\Omega$ See Figure 92	+25°C	—	200	—	kHz	
			-40°C	—	260	—		
			+85°C	—	130	—		
$B_1$	Unity gain bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	2.2	—	MHz	
			-40°C	—	3.1	—		
			+85°C	—	1.7	—		
$\phi_m$	Phase margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	49°	—	—	
			-40°C	—	52°	—		
			+85°C	—	46°	—		



**Electrical Characteristics**

Medium bias mode											
Parameter			Conditions	T <sub>A</sub>	TLC271C, TLC271AC, TLC271BC						Unit
					V <sub>DD</sub> = 5V			V <sub>DD</sub> = 10V			
					Min	Typ	Max	Min	Typ.	Max	
V <sub>IO</sub>	Input Offset Voltage	TLC271C	V <sub>o</sub> = 1.4V, V <sub>IC</sub> = 0V, R <sub>S</sub> = 50Ω, R <sub>L</sub> = 100kΩ	+25°C	—	1.1	10	—	1.1	10	mV
		0 to +70°C		—	—	12	—	—	12		
		+25°C		—	0.9	5	—	0.9	5		
		0 to +70°C		—	—	6.5	—	—	6.5		
		TLC271AC		+25°C	—	0.25	2	—	0.26	2	
		TLC271BC		0 to +70°C	—	—	3	—	—	3	
α <sub>VIO</sub>	Average temperature coefficient of input offset voltage			25 to +70°C	1.7			2.1			μV/°C
I <sub>IO</sub>	Input offset current (Note 16)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.1	60	—	0.1	60	pA
				+70°C	—	7	300	—	7	300	
I <sub>IB</sub>	Input bias current (Note 16)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.6	60	—	0.7	60	pA
				+70°C	—	40	600	—	50	600	
V <sub>ICR</sub>	Common mode input voltage (Note 17)			+25°C	-0.2 to 4	-0.3 to 4.2	—	-0.2 to 9	-0.3 to 9.2	—	V
				0 to +70°C	-0.2 to 3.5	—	—	-0.2 to 8.5	—	—	—
V <sub>OH</sub>	High level output voltage		V <sub>ID</sub> = 100mV, R <sub>L</sub> = 100kΩ	+25°C	3.2	3.9	—	8	8.7	—	V
				0°C	3	3.9	—	7.8	8.7	—	
				+70°C	3	4	—	7.8	8.7	—	
V <sub>OL</sub>	Low level output voltage		V <sub>ID</sub> = -100mV, I <sub>L</sub> = 0	+25°C	—	0	50	—	0	50	mV
				0°C	—	0	50	—	0	50	
				+70°C	—	0	50	—	0	50	
A <sub>VD</sub>	Large signal differential voltage gain		R <sub>L</sub> = 100kΩ (Note 18)	+25°C	25	170	—	25	275	—	V/mV
				0°C	15	200	—	15	320	—	
				+70°C	15	140	—	15	230	—	
CMRR	Common mode rejection ratio		V <sub>IC</sub> = V <sub>ICRmin</sub>	+25°C	65	91	—	65	94	—	dB
				0°C	60	91	—	60	94	—	
				+70°C	60	92	—	60	94	—	
k <sub>SVR</sub>	Supply voltage rejection ratio (ΔV <sub>DD</sub> /ΔV <sub>IO</sub> )		V <sub>DD</sub> = 5V to 10V, V <sub>o</sub> = 1.4V	+25°C	70	93	—	70	93	—	dB
				0°C	60	92	—	60	92	—	
				+70°C	60	94	—	60	94	—	
I <sub>I(SEL)</sub>	Input current (BIAS SELECT)		V <sub>I(SEL)</sub> = 0	+25°C	—	-130	—	—	-160	—	nA
I <sub>DD</sub>	Supply current		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2, No load	+25°C	—	105	280	—	143	300	μA
				0°C	—	125	320	—	173	400	
				+70°C	—	85	220	—	110	280	

Notes: 16. The typical values of input bias current and input offset current below 5pA were calculated.  
 17. This range also applies to each input individually.  
 18. At V<sub>DD</sub> = 5 V, V<sub>o</sub> = 0.25 V to 2 V; at V<sub>DD</sub> = 10 V, V<sub>o</sub> = 1 V to 6 V.

**Electrical Characteristics**

Medium bias mode			Conditions	T <sub>A</sub>	TLC271I, TLC271AI, TLC271BI						Unit	
Parameter					V <sub>DD</sub> = 5V			V <sub>DD</sub> = 10V				
					Min	Typ	Max	Min	Typ	Max		
V <sub>IO</sub>	Input Offset Voltage	TLC271I	V <sub>o</sub> = 1.4V, V <sub>IC</sub> = 0V, R <sub>S</sub> = 50Ω, R <sub>L</sub> = 100kΩ	+25°C	—	1.1	10	—	1.1	10	mV	
				-40 to +85°C	—	—	13	—	—	13		
		TLC271AI		+25°C	—	0.9	5	—	0.9	5		
				-40 to +85°C	—	—	7	—	—	7		
		TLC271BI		+25°C	—	0.25	2	—	0.26	2		
				-40 to +85°C	—	—	3.5	—	—	3.5		
α <sub>VIO</sub>	Average temperature coefficient of input offset voltage			+25 to +85°C	1.7			2.1			μV/°C	
I <sub>IO</sub>	Input offset current (Note 19)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.1	60	—	0.1	60	pA	
				+85°C	—	24	1000	—	26	1000		
I <sub>IB</sub>	Input bias current (Note 19)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.6	60	—	0.7	60	pA	
				+85°C	—	200	2000	—	220	2000		
V <sub>ICR</sub>	Common mode input voltage (Note 20)			+25°C	-0.2 to 4	-0.3 to 4.2	—	-0.2 to 9	-0.3 to 9.2	—	V	
				-40 to +85°C	-0.2 to 3.5	—	—	-0.2 to 8.5	—	—	—	V
V <sub>OH</sub>	High level output voltage		V <sub>ID</sub> = 100mV, R <sub>L</sub> = 100kΩ	+25°C	3.2	3.9	—	8	8.7	—	V	
					-40°C	3	3.9	—	7.8	8.7		—
					+85°C	3	4	—	7.8	8.7		—
V <sub>OL</sub>	Low level output voltage		V <sub>ID</sub> = -100mV, I <sub>L</sub> = 0	+25°C	—	0	50	—	0	50	mV	
					-40°C	—	0	50	—	0		50
					+85°C	—	0	50	—	0		50
A <sub>VD</sub>	Large signal differential voltage gain		R <sub>L</sub> = 100kΩ (Note 21)	+25°C	25	170	—	25	275	—	V/mV	
					-40°C	15	270	—	15	390		—
					+85°C	15	130	—	15	220		—
CMRR	Common mode rejection ratio		V <sub>IC</sub> = V <sub>ICRmin</sub>	+25°C	65	91	—	65	94	—	dB	
					-40°C	60	90	—	60	93		—
					+85°C	60	90	—	60	94		—
k <sub>SVR</sub>	Supply voltage rejection ratio (ΔV <sub>DD</sub> /ΔV <sub>IO</sub> )		V <sub>DD</sub> = 5V to 10V, V <sub>o</sub> = 1.4V	+25°C	70	93	—	70	93	—	dB	
					-40°C	60	91	—	60	91		—
					+85°C	60	94	—	60	94		—
I <sub>I(SEL)</sub>	Input current (BIAS SELECT)		V <sub>I(SEL)</sub> = 0	+25°C	—	-130	—	—	-160	—	nA	
I <sub>DD</sub>	Supply current		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2, No load	+25°C	—	105	280	—	143	300	μA	
					-40°C	—	158	400	—	225		450
					+85°C	—	80	200	—	103		260

Notes: 19. The typical values of input bias current and input offset current below 5pA were calculated.  
 20. This range also applies to each input individually.  
 21. At V<sub>DD</sub> = 5 V, V<sub>o</sub> = 0.25 V to 2 V; at V<sub>DD</sub> = 10 V, V<sub>o</sub> = 1 V to 6 V.

**Electrical Characteristics**

Medium bias mode: $V_{DD} = 5V$								
Parameter		Conditions		$T_A$	TLC271C, TLC271AC, TLC271BC			Unit
					Min	Typ	Max	
SR	Slew rate at unity gain	$R_L = 100k\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	0.43	—	V/ $\mu$ s
				0°C	—	0.46	—	
				+70°C	—	0.36	—	
			$V_{I(PP)} = 2.5V$	+25°C	—	0.4	—	
				0°C	—	0.43	—	
				+70°C	—	0.34	—	
$V_n$	Equivalent input noise voltage	$F = 1kHz$ , $R_S = 20\Omega$	See Figure 93	25°C	—	32	—	nV/ $\sqrt{Hz}$
$B_M$	Maximum output swing bandwidth	$V_o = V_{OH}$ , $C_L = 20pF$ , $R_L = 100k\Omega$	See Figure 92	+25°C	—	55	—	kHz
				0°C	—	60	—	
				+70°C	—	50	—	
$B_1$	Unity gain bandwidth	$V_I = 10mV$ , $C_L = 20pF$	See Figure 94	+25°C	—	525	—	MHz
				0°C	—	600	—	
				+70°C	—	400	—	
$\phi_m$	Phase margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$	See Figure 94	+25°C	—	40°	—	—
				0°C	—	41°	—	
				+70°C	—	39°	—	
Medium bias mode: $V_{DD} = 10V$								
Parameter		Conditions		$T_A$	TLC271C, TLC271AC, TLC271BC			Unit
					Min	Typ	Max	
SR	Slew Rate at Unity Gain	$R_L = 100k\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	0.62	—	V/ $\mu$ s
				0°C	—	0.67	—	
				+70°C	—	0.51	—	
			$V_{I(PP)} = 5.5V$	+25°C	—	0.56	—	
				0°C	—	0.61	—	
				+70°C	—	0.46	—	
$V_n$	Equivalent Input Noise Voltage	$F = 1kHz$ , $R_S = 20\Omega$	See Figure 93	+25°C	—	32	—	nV/ $\sqrt{Hz}$
$B_M$	Maximum Output Swing Bandwidth	$V_o = V_{OH}$ , $C_L = 20pF$ , $R_L = 100k\Omega$	See Figure 92	+25°C	—	35	—	kHz
				0°C	—	40	—	
				+70°C	—	30	—	
$B_1$	Unity Gain Bandwidth	$V_I = 10mV$ , $C_L = 20pF$	See Figure 94	+25°C	—	635	—	MHz
				0°C	—	710	—	
				+70°C	—	510	—	
$\phi_m$	Phase Margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$	See Figure 94	+25°C	—	43°	—	—
				0°C	—	44°	—	
				+70°C	—	42°	—	

**Electrical Characteristics**

Medium bias mode: $V_{DD} = 5V$								
Parameter		Conditions		$T_A$	TLC271I, TLC271AI, TLC271BI			Unit
					Min	Typ	Max	
SR	Slew rate at unity gain	$R_L = 100k\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	0.43	—	V/ $\mu$ s
				-40°C	—	0.51	—	
				+85°C	—	0.35	—	
			$V_{I(PP)} = 2.5V$	+25°C	—	0.4	—	
				-40°C	—	0.48	—	
				+85°C	—	0.32	—	
$V_n$	Equivalent input noise voltage	$F = 1kHz$ , $R_S = 20\Omega$ See Figure 93	See	+25°C	—	32	—	nV/ $\sqrt{Hz}$
$B^*M$	Maximum output swing bandwidth	$V_o = V_{oH}$ , $C_L = 20pF$ , $R_L = 100k\Omega$ See Figure 92	See	+25°C	—	55	—	kHz
				-40°C	—	75	—	
				+85°C	—	45	—	
$B_1$	Unity gain bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94	See	+25°C	—	525	—	MHz
				-40°C	—	770	—	
				+85°C	—	370	—	
$\phi_m$	Phase margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94	See Figure	+25°C	—	40°	—	—
				-40°C	—	43°	—	
				+85°C	—	38°	—	
Medium bias mode: $V_{DD} = 10V$								
Parameter		Conditions		$T_A$	TLC271I, TLC271AI, TLC271BI			Unit
					Min	Typ	Max	
SR	Slew Rate at Unity Gain	$R_L = 100k\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	0.62	—	V/ $\mu$ s
				-40°C	—	0.77	—	
				+85°C	—	0.47	—	
			$V_{I(PP)} = 5.5V$	+25°C	—	0.56	—	
				-40°C	—	0.7	—	
				+85°C	—	0.44	—	
$V_n$	Equivalent Input Noise Voltage	$F = 1kHz$ , $R_S = 20\Omega$ See Figure 93	See	+25°C	—	32	—	nV/ $\sqrt{Hz}$
$B^*M$	Maximum Output Swing Bandwidth	$V_o = V_{oH}$ , $C_L = 20pF$ , $R_L = 100k\Omega$ See Figure 92	See	+25°C	—	35	—	kHz
				-40°C	—	45	—	
				+85°C	—	25	—	
$B_1$	Unity Gain Bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94	See	+25°C	—	635	—	MHz
				-400°C	—	880	—	
				+85°C	—	480	—	
$\phi_m$	Phase Margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94	See	+25°C	—	43°	—	—
				-40°C	—	46°	—	
				+85°C	—	41°	—	

**Electrical Characteristics**

Low bias mode											
Parameter			Conditions	T <sub>A</sub>	TLC271C, TLC271AC, TLC271BC						Unit
					V <sub>DD</sub> = 5V			V <sub>DD</sub> = 10V			
					Min	Typ	Max	Min	Typ.	Max	
V <sub>IO</sub>	Input Offset Voltage	TLC271C	V <sub>o</sub> = 1.4V, V <sub>IC</sub> = 0V, R <sub>S</sub> = 50Ω, R <sub>L</sub> = 1MΩ	+25 °C	—	1.1	10	—	1.1	10	mV
		0 to +70 °C		—	—	12	—	—	12		
		+25 °C		—	0.9	5	—	0.9	5		
		0 to +70 °C		—	—	6.5	—	—	6.5		
		TLC271AC		+25 °C	—	0.24	2	—	0.26	2	
		TLC271BC		0 to +70 °C	—	—	3	—	—	3	
α <sub>VI</sub>	Average Temperature Coefficient of Input Offset Voltage		—	+25 to +70 °C	1.1			1			μV/°C
I <sub>IO</sub>	Input Offset Current (Note 22)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25 °C	—	0.1	60	—	0.1	60	pA
				+70 °C	—	7	300	—	8	300	
I <sub>IB</sub>	Input Bias Current (Note 22)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25 °C	—	0.6	60	—	0.7	60	pA
				+70 °C	—	40	600	—	50	600	
V <sub>ICR</sub>	Common Mode Input Voltage (Note 23)		—	+25 °C	-0.2 to 4	-0.3 to 4.2	—	-0.2 to 9	-0.3 to 9.2	—	V
				0 to +70 °C	-0.2 to 3.5	—	—	-0.2 to 8.5	—	—	
V <sub>OH</sub>	High Level Output Voltage		V <sub>ID</sub> = 100mV, R <sub>L</sub> = 1MΩ	+25 °C	3.2	4.1	—	8	8.9	—	V
				0 °C	3	4.1	—	7.8	8.9	—	
				+70 °C	3	4.2	—	7.8	8.9	—	
V <sub>OL</sub>	Low Level Output Voltage		V <sub>ID</sub> = -100mV, I <sub>OL</sub> = 0	+25 °C	—	0	50	—	0	50	mV
				0 °C	—	0	50	—	0	50	
				+70 °C	—	0	50	—	0	50	
A <sub>VD</sub>	Large Signal Differential Voltage Gain		R <sub>L</sub> = 1MΩ (Note 24)	+25 °C	50	520	—	50	870	—	V/mV
				0 °C	50	700	—	50	1030	—	
				+70 °C	50	380	—	50	660	—	
CMRR	Common Mode Rejection Ratio		V <sub>IC</sub> = V <sub>ICRmin</sub>	+25 °C	65	94	—	65	97	—	dB
				0 °C	60	95	—	60	97	—	
				+70 °C	60	95	—	60	97	—	
k <sub>SVR</sub>	Supply Voltage Rejection Ratio (ΔV <sub>DD</sub> /ΔV <sub>IO</sub> )		V <sub>DD</sub> = 5V to 10V, V <sub>o</sub> = 1.4V	+25 °C	70	97	—	70	97	—	dB
				0 °C	60	97	—	60	97	—	
				+70 °C	60	98	—	60	98	—	
I <sub>I(SEL)</sub>	Input Current (BIAS SELECT)		V <sub>I(SEL)</sub> = 0	+25 °C	—	65	—	—	95	—	nA
I <sub>DD</sub>	Supply Current		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2, No load	+25 °C	—	10	17	—	14	23	μA
				0 °C	—	12	21	—	18	33	
				+70 °C	—	8	14	—	11	20	

Notes: 22. The typical values of input bias current and input offset current below 5pA were calculated.  
 23. This range also applies to each input individually.  
 24. At V<sub>DD</sub> = 5 V, V<sub>o</sub> = 0.25 V to 2 V; at V<sub>DD</sub> = 10 V, V<sub>o</sub> = 1 V to 6 V.



**Electrical Characteristics**

Low bias mode			Conditions	T <sub>A</sub>	TLC271I, TLC271AI, TLC271BI						Unit	
Parameter					V <sub>DD</sub> = 5V			V <sub>DD</sub> = 10V				
					Min	Typ	Max	Min	Typ	Max		
V <sub>IO</sub>	Input Offset Voltage	TLC271I	V <sub>o</sub> = 1.4V, V <sub>IC</sub> = 0V, R <sub>S</sub> = 50Ω, R <sub>L</sub> = 1MΩ	+25°C	—	1.1	10	—	1.1	10	mV	
				-40 to +85°C	—	—	13	—	—	13		
		TLC271AI		+25°C	—	0.9	5	—	0.9	5		
				-40 to +85°C	—	—	7	—	—	7		
		TLC271BI		+25°C	—	0.24	2	—	0.26	2		
				-40 to +85°C	—	—	3.5	—	—	3.5		
α <sub>VI</sub>	Average Temperature Coefficient of Input Offset Voltage			+25 to +85°C	1.1			1			μV/°C	
I <sub>IO</sub>	Input Offset Current (Note 25)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.1	60	—	0.1	60	pA	
				+85°C	—	24	1000	—	26	1000		
I <sub>IB</sub>	Input Bias Current (Note 25)		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2	+25°C	—	0.6	60	—	0.7	60	pA	
				+85°C	—	200	2000	—	220	2000		
V <sub>ICR</sub>	Common Mode Input Voltage (Note 26)		—	+25°C	-0.2 to 4	-0.3 to 4.2	—	-0.2 to 9	-0.3 to 9.2	—	V	
					-40 to +85°C	-0.2 to 3.5	—	—	-0.2 to 8.5	—	—	V
V <sub>OH</sub>	High Level Output Voltage		V <sub>ID</sub> = 100mV, R <sub>L</sub> = 1MΩ	+25°C	3	4.1	—	8	8.9	—	V	
					-40°C	3	4.1	—	7.8	8.9		—
					+85°C	3	4.2	—	7.8	8.9		—
V <sub>OL</sub>	Low Level Output Voltage		V <sub>ID</sub> = -100mV, I <sub>L</sub> = 0	+25°C	—	0	50	—	0	50	mV	
					-40°C	—	0	50	—	0		50
					+85°C	—	0	50	—	0		50
A <sub>VD</sub>	Large Signal Differential Voltage Gain		R <sub>L</sub> = 1MΩ (Note 27)	+25°C	50	520	—	50	870	—	V/mV	
					-40°C	50	900	—	50	1550		—
					+85°C	50	330	—	50	585		—
CMRR	Common Mode Rejection Ratio		V <sub>IC</sub> = V <sub>ICRmin</sub>	+25°C	65	94	—	65	97	—	dB	
					-40°C	60	95	—	60	97		—
					+85°C	60	95	—	60	98		—
k <sub>SVR</sub>	Supply Voltage Rejection Ratio (ΔV <sub>DD</sub> /ΔV <sub>IO</sub> )		V <sub>DD</sub> = 5V to 10V, V <sub>o</sub> = 1.4V	+25°C	70	97	—	70	97	—	dB	
					-40°C	60	97	—	60	97		—
					+85°C	60	98	—	60	98		—
I <sub>I(SEL)</sub>	Input Current (BIAS SELECT)		V <sub>I(SEL)</sub> = 0	+25°C	—	65	—	—	95	—	nA	
I <sub>DD</sub>	Supply Current		V <sub>o</sub> = V <sub>DD</sub> /2, V <sub>IC</sub> = V <sub>DD</sub> /2, No load	+25°C	—	10	17	—	14	23	μA	
					-40°C	—	16	27	—	25		43
					+85°C	—	17	13	—	10		18

Notes: 25. The typical values of input bias current and input offset current below 5pA were calculated.

26. This range also applies to each input individually.

27. At V<sub>DD</sub> = 5 V, V<sub>o</sub> = 0.25 V to 2 V; at V<sub>DD</sub> = 10 V, V<sub>o</sub> = 1 V to 6 V.

**Electrical Characteristics**

Low bias mode: $V_{DD} = 5V$								
Parameter		Conditions		$T_A$	TLC271C, TLC271AC, TLC271BC			Unit
					Min	Typ	Max	
SR	Slew Rate at Unity Gain	$R_L = 1M\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	0.03	—	V/ $\mu$ s
				0°C	—	0.04	—	
				+70°C	—	0.03	—	
			$V_{I(PP)} = 2.5V$	+25°C	—	0.03	—	
				0°C	—	0.03	—	
				+70°C	—	0.02	—	
$V_n$	Equivalent Input Noise Voltage	F = 1kHz, $R_S = 20\Omega$ See Figure 93		+25°C	—	68	—	nV/ $\sqrt{Hz}$
$B^*_{M}$	Maximum Output Swing Bandwidth	$V^* = V^*_H$ , $C_L = 20pF$ , $R_L = 1M\Omega$ See Figure 92	+25°C	—	5	—	kHz	
			0°C	—	6	—		
			+70°C	—	4.5	—		
$B_1$	Unity Gain Bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	85	—	MHz	
			0°C	—	100	—		
			+70°C	—	65	—		
$\phi_m$	Phase Margin	F = $B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	34°	—	—	
			0°C	—	36°	—		
			+70°C	—	30°	—		
Low bias mode: $V_{DD} = 10V$								
Parameter		Conditions		$T_A$	TLC271C, TLC271AC, TLC271BC			Unit
					Min	Typ	Max	
SR	Slew Rate at Unity Gain	$R_L = 1M\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	0.05	—	V/ $\mu$ s
				0°C	—	0.05	—	
				+70°C	—	0.04	—	
			$V_{I(PP)} = 5.5V$	+25°C	—	0.04	—	
				0°C	—	0.05	—	
				+70°C	—	0.04	—	
$V_n$	Equivalent Input Noise Voltage	F = 1kHz, $R_S = 20\Omega$ See Figure 93		+25°C	—	68	—	nV/ $\sqrt{Hz}$
$B^*_{M}$	Maximum Output Swing Bandwidth	$V^* = V^*_H$ , $C_L = 20pF$ , $R_L = 1M\Omega$ See Figure 92	+25°C	—	1	—	kHz	
			0°C	—	1.3	—		
			+70°C	—	0.9	—		
$B_1$	Unity Gain Bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	110	—	MHz	
			0°C	—	125	—		
			+70°C	—	90	—		
$\phi_m$	Phase Margin	F = $B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	38°	—	—	
			0°C	—	40°	—		
			+70°C	—	34°	—		

**Electrical Characteristics**

Low bias mode: $V_{DD} = 5V$								
Parameter		Conditions		$T_A$	TLC271I, TLC271AI, TLC271BI			Unit
					Min	Typ	Max	
SR	Slew Rate at Unity Gain	$R_L = 1M\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	0.03	—	V/ $\mu$ s
				-40°C	—	0.04	—	
				+85°C	—	0.03	—	
			$V_{I(PP)} = 2.5V$	+25°C	—	0.03	—	
				-40°C	—	0.04	—	
				+85°C	—	0.02	—	
$V_n$	Equivalent Input Noise Voltage	$F = 1kHz$ , $R_S = 20\Omega$ See Figure 93	+25°C	—	68	—	nV/ $\sqrt{Hz}$	
$B_M$	Maximum Output Swing Bandwidth	$V_o = V_{OH}$ , $C_L = 20pF$ , $R_L = 1M\Omega$ See Figure 92	+25°C	—	5	—	kHz	
			-40°C	—	7	—		
			+85°C	—	4	—		
$B_1$	Unity Gain Bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	85	—	MHz	
			-40°C	—	130	—		
			+85°C	—	55	—		
$\phi_m$	Phase Margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	34°	—	—	
			-40°C	—	38°	—		
			+85°C	—	28°	—		
Low bias mode: $V_{DD} = 10V$								
Parameter		Conditions		$T_A$	TLC271I, TLC271AI, TLC271BI			Unit
					Min	Typ	Max	
SR	Slew Rate at Unity Gain	$R_L = 1M\Omega$ , $C_L = 20pF$ See Figure 92	$V_{I(PP)} = 1V$	+25°C	—	0.05	—	V/ $\mu$ s
				-40°C	—	0.06	—	
				+85°C	—	0.03	—	
			$V_{I(PP)} = 5.5V$	+25°C	—	0.04	—	
				-40°C	—	0.05	—	
				+85°C	—	0.03	—	
$V_n$	Equivalent Input Noise Voltage	$F = 1kHz$ , $R_S = 20\Omega$ See Figure 93	+25°C	—	68	—	nV/ $\sqrt{Hz}$	
$B_M$	Maximum Output Swing Bandwidth	$V_o = V_{OH}$ , $C_L = 20pF$ , $R_L = 1M\Omega$ See Figure 92	+25°C	—	1	—	kHz	
			-40°C	—	1.4	—		
			+85°C	—	0.8	—		
$B_1$	Unity Gain Bandwidth	$V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	110	—	MHz	
			-40°C	—	155	—		
			+85°C	—	80	—		
$\phi_m$	Phase Margin	$F = B_1$ , $V_I = 10mV$ , $C_L = 20pF$ See Figure 94	+25°C	—	38°	—	—	
			-40°C	—	42°	—		
			+85°C	—	32°	—		

**Typical Performance Characteristics Table Index of Graphs**

			Figure		
			High Bias Mode	Medium Bias Mode	Low Bias Mode
$V_{I^o}$	Input Offset Voltage	Distribution	1,2	31,32	61,62
$V_{OH}$	High Level Output Voltage	vs. High Level Output Current	3,4	33,34	63,64
		vs. Supply Voltage	5	35	65
		vs. Free Air Temperature	6	36	66
$V_{OL}$	Low Level Output Voltage	vs. Common Mode Input Voltage	7,8	37,38	67,68
		vs. Differential Input Voltage	9	39	69
		vs. Free Air Temperature	10	40	70
		vs. Low Level Output Current	11,12	41,42	71,72
$A_{VD}$	Large Signal Differential Voltage Gain	vs. Supply Voltage	13	43	73
		vs. Free Air Temperature	14	44	74
$I_{IB}$	Input Bias Current	vs. Free Air Temperature	15	45	75
$I_{I^o}$	Input Offset Current	vs. Free Air Temperature	15	45	75
$V_{IC}$	Common Mode Input Voltage	vs. Supply Voltage	16	46	76
$I_{DD}$	Supply Current	vs. Supply Voltage	17	47	77
		vs. Free Air Temperature	18	48	78
SR	Slew Rate	vs. Supply Voltage	19	49	79
		vs. Free Air Temperature	20	50	80
$I_{sel}$	Bias Select Current	vs. Supply Voltage	21	51	81
$V_{o(PP)}$	Maximum Peak to Peak Output Voltage	vs. Frequency	22	52	82
$B_1$	Unity Gain Bandwidth	vs. Free Air Temperature	23	53	83
		vs. Supply Voltage	24	54	84
$A_{VD}$	Large Signal Differential Voltage Gain	vs. Frequency	29,30	59,60	89,90
$\phi_m$	Phase Margin	vs. Supply Voltage	25	55	85
		vs. Free Air Temperature	26	56	86
		vs. Capacitive Load	27	57	87
$V_n$	Equivalent Input Noise Voltage	vs. Frequency	28	58	88
$\phi_{shift}$	Phase Shift	vs. Frequency	29,30	59,60	89,90

**Typical Performance Characteristics High Bias Mode**

New Product

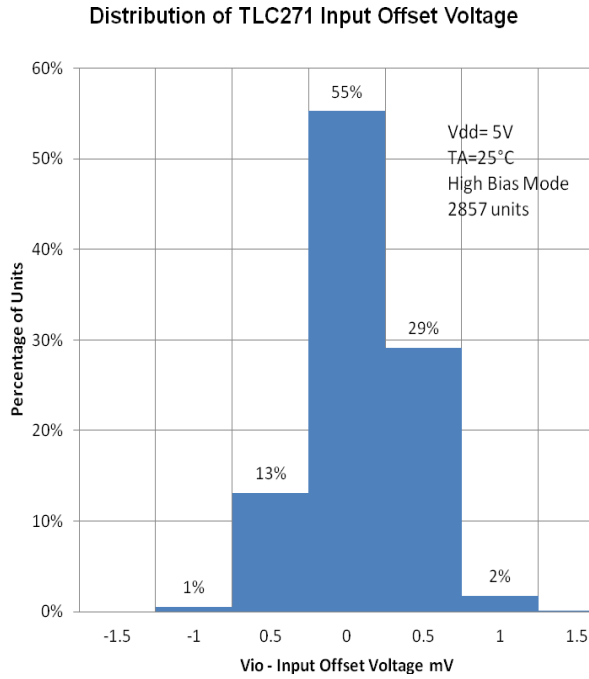


Figure 1

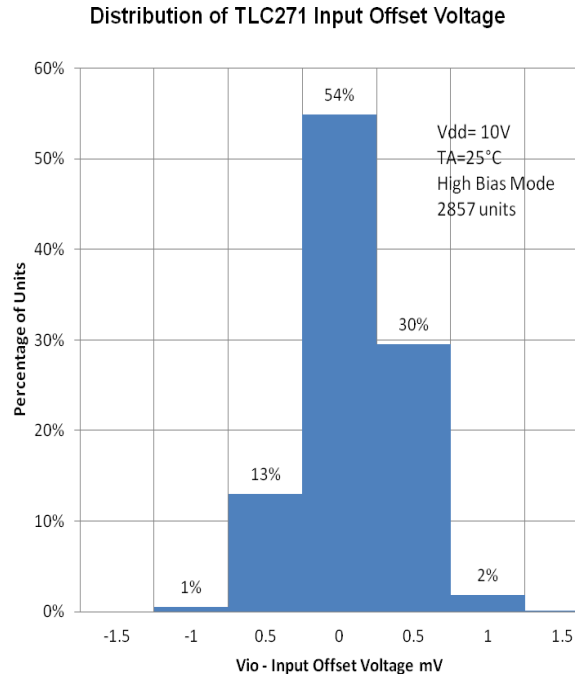


Figure 2

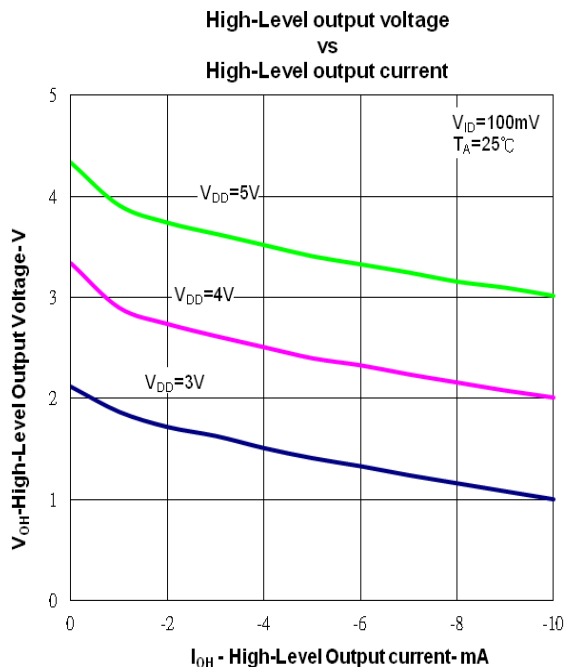


Figure 3

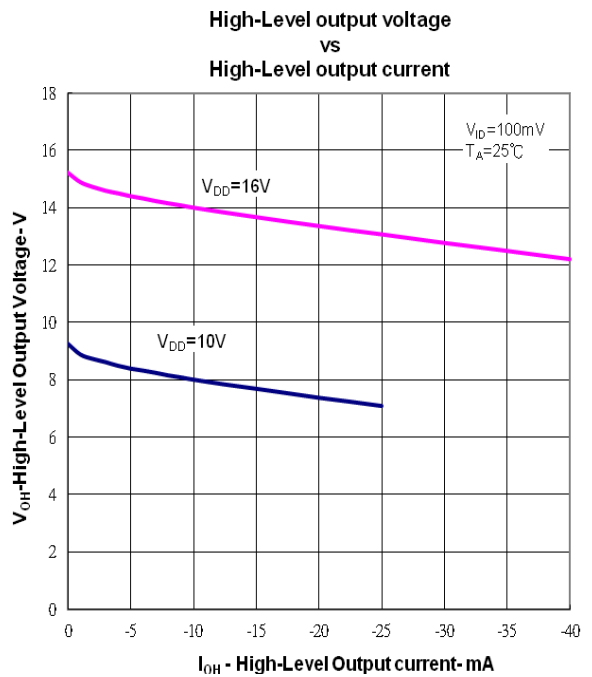


Figure 4



**Typical Performance Characteristics High Bias Mode**

High-Level output voltage  
vs  
Supply Voltage

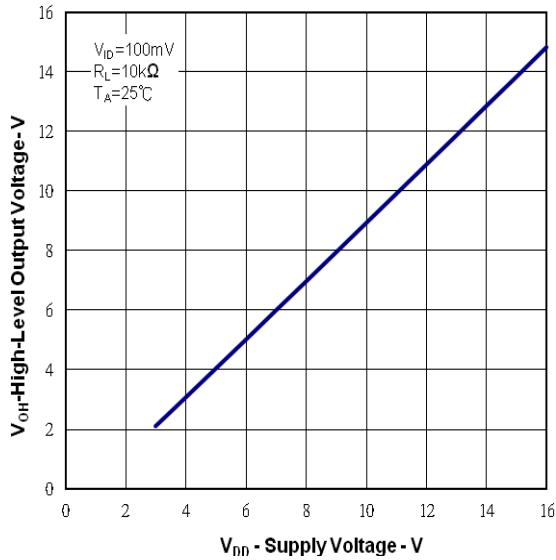


Figure 5

High-Level output voltage  
vs  
Free Air Temperature

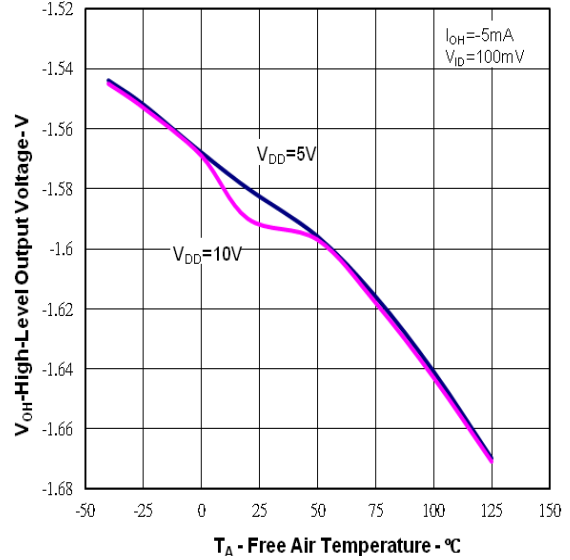


Figure 6

Low-level output voltage  
vs  
common-mode input voltage

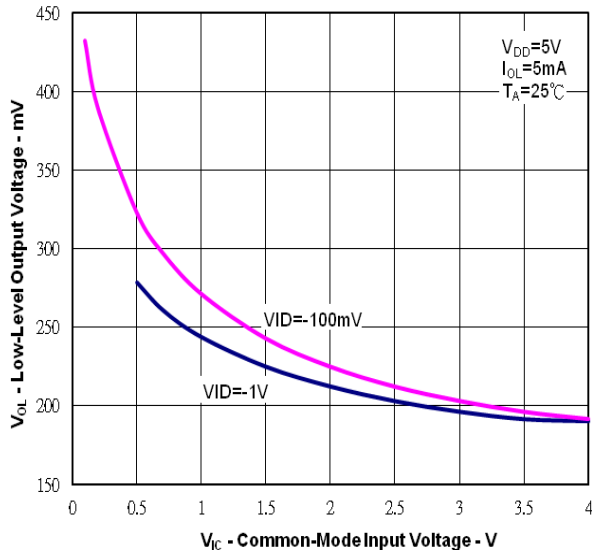


Figure 7

Low-level output voltage  
vs  
common-mode input voltage

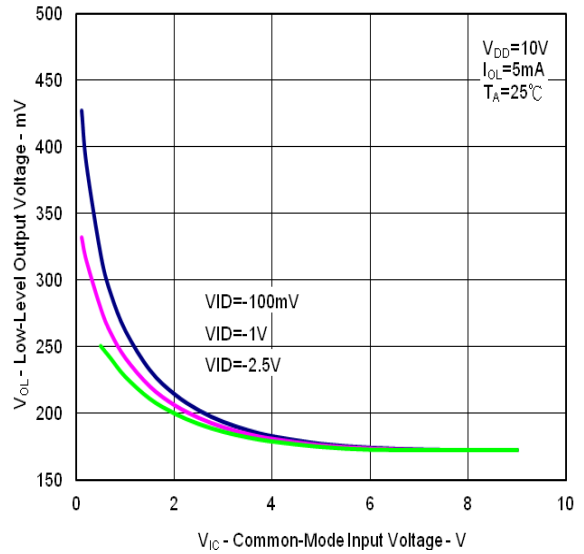


Figure 8

New Product

**Typical Performance Characteristics High Bias Mode**

Low-level output voltage  
vs  
Differential input voltage

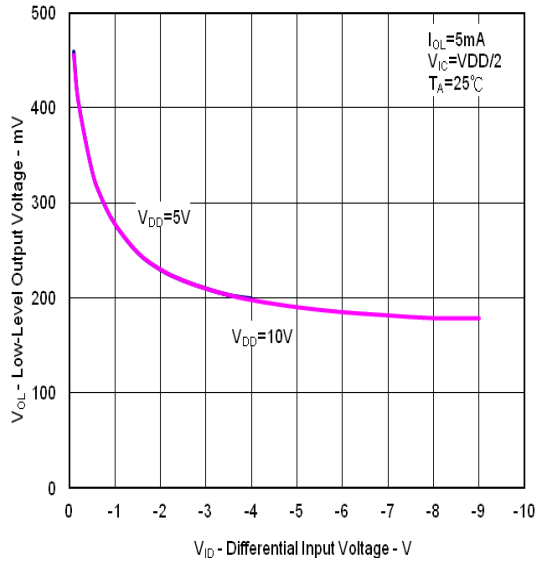


Figure 9

Low-level output voltage  
vs  
Free-Air temperature

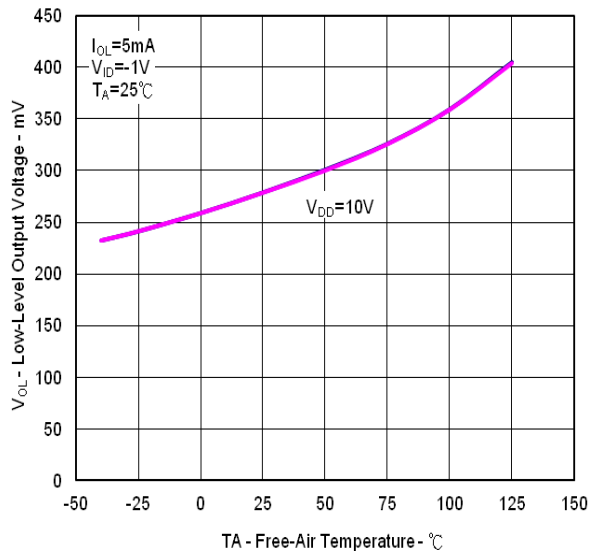


Figure 10

Low-level output voltage  
vs  
Low-level output current

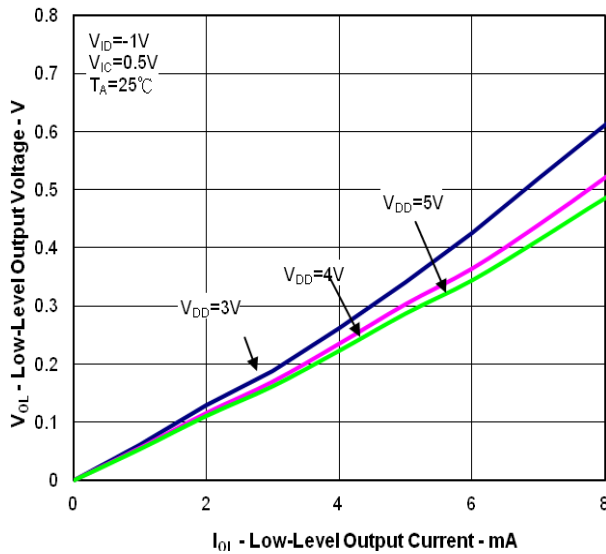


Figure 11

Low-level output voltage  
vs  
Low-level output current

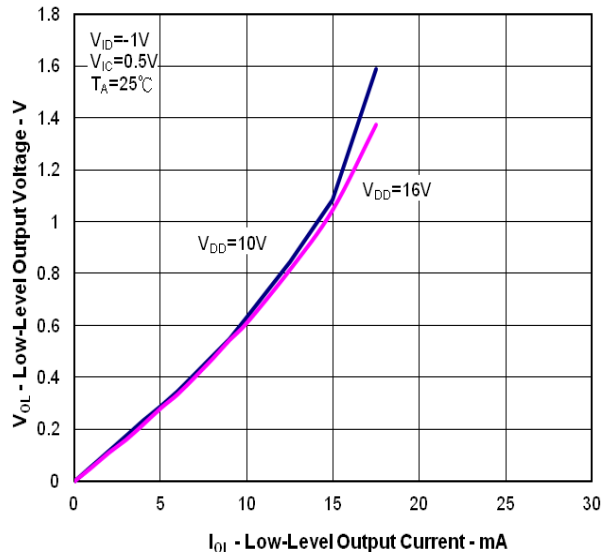


Figure 12

Typical Performance Characteristics High Bias Mode

New Product

Large-Signal Differential Voltage Amplification  
vs  
Supply Voltage

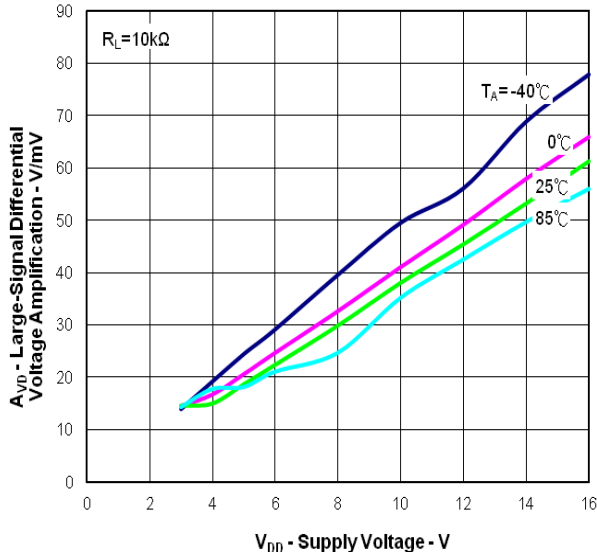


Figure 13

Large-Signal Differential Voltage Amplification  
vs  
Free-Air Temperature

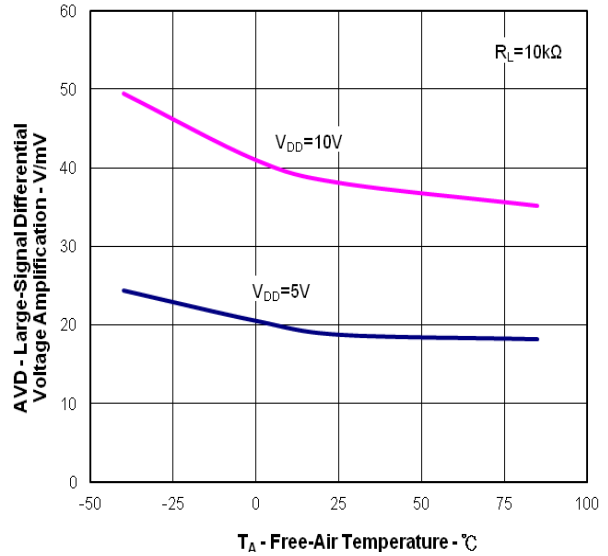


Figure 14

Input Bias Current and Input Offset Current  
vs  
Free-Air Temperature

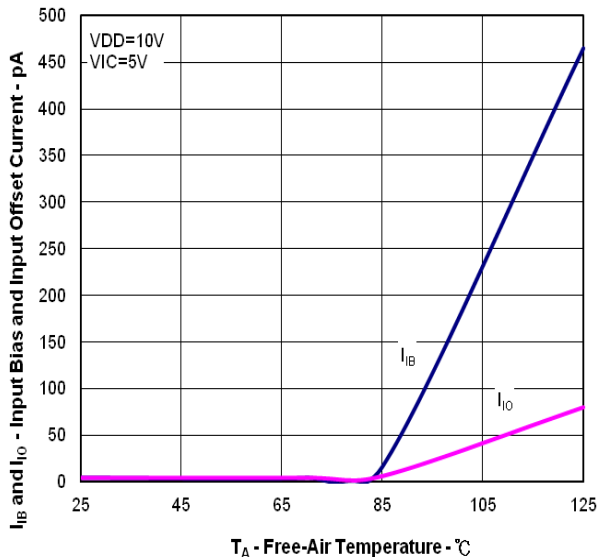


Figure 15

Common-mode input voltage  
(positive limit)  
vs  
Supply Voltage

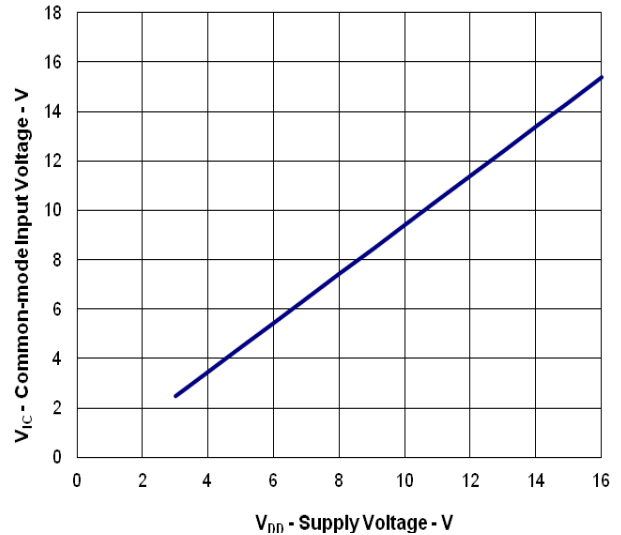


Figure 16

**Typical Performance Characteristics High Bias Mode**

New Product

Supply current  
vs  
Supply Voltage

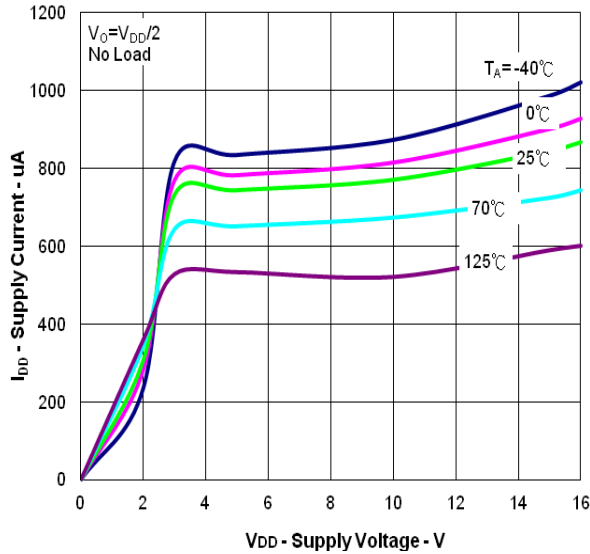


Figure 17

Supply current  
vs  
Free-Air Temperature

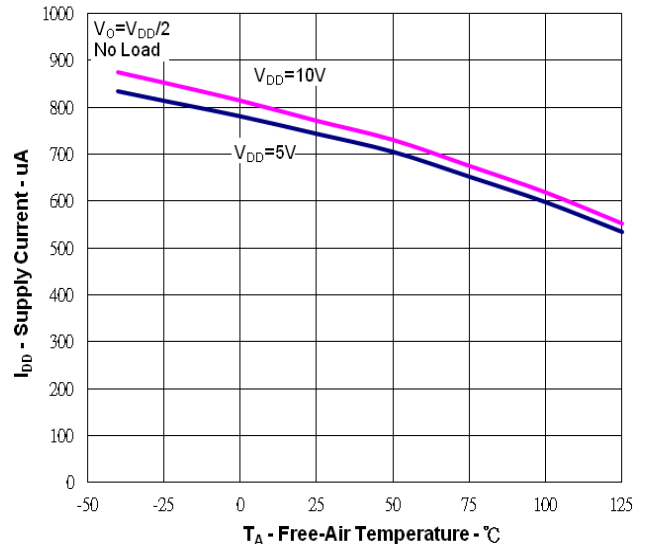


Figure 18

Slew Rate  
vs  
Supply Voltage

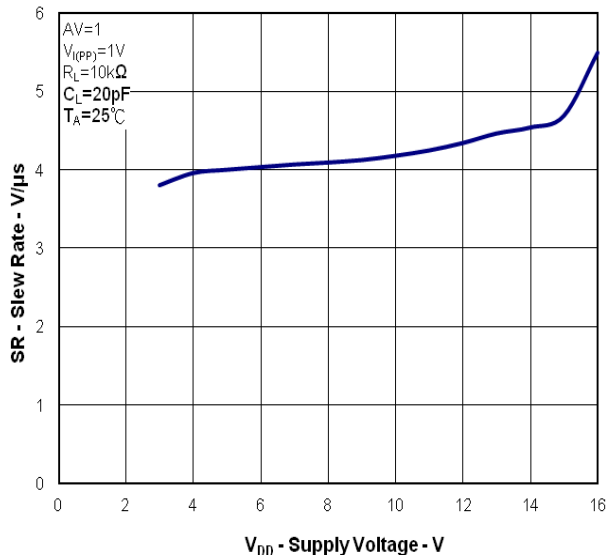


Figure 19

Slew rate  
vs  
Free-Air Temperature

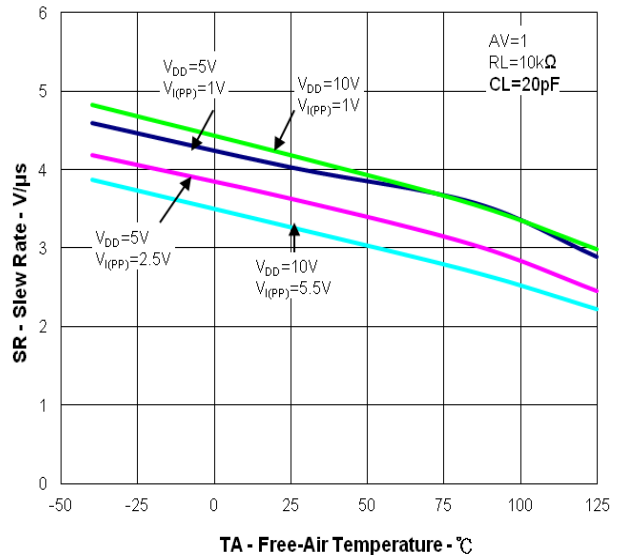
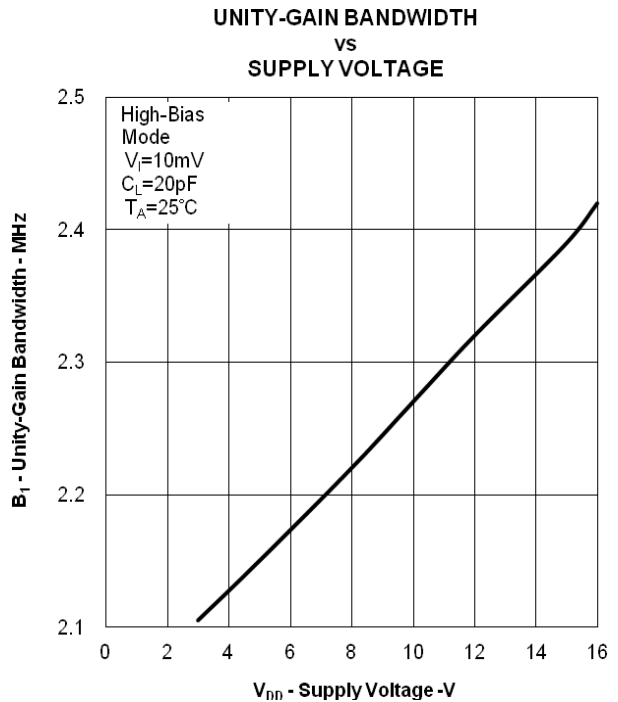
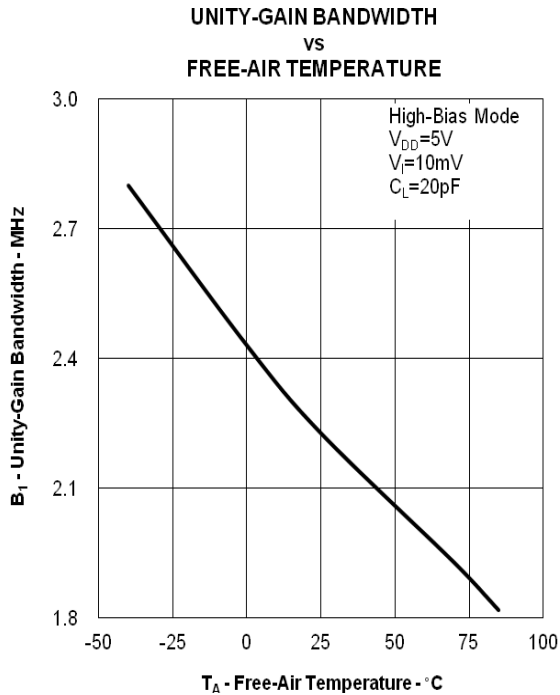
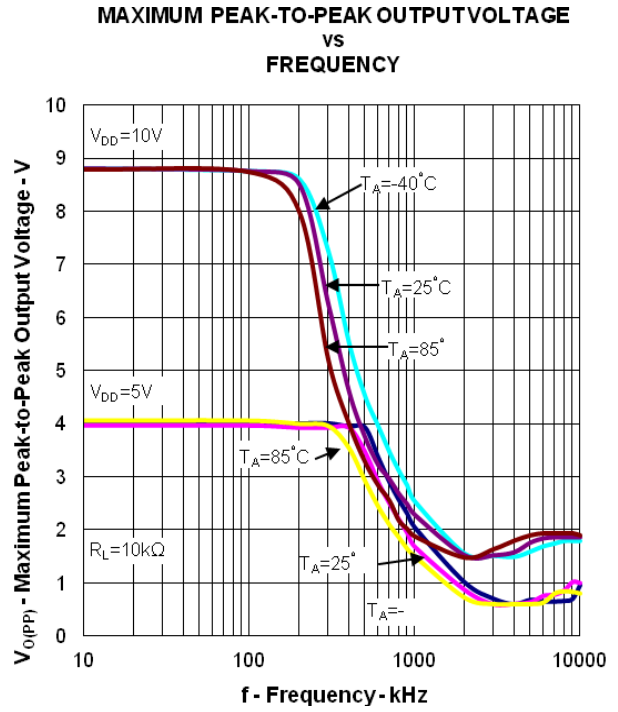
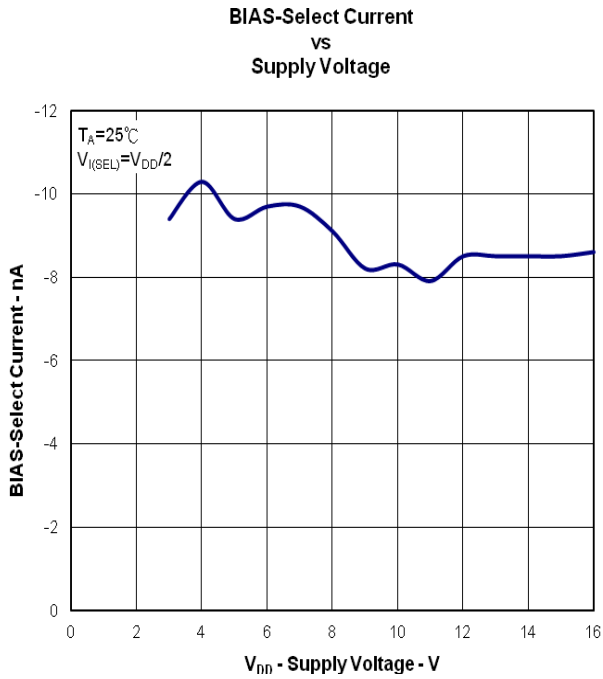


Figure 20

**Typical Performance Characteristics High Bias Mode**

New Product





**Typical Performance Characteristics High Bias Mode**

New Product

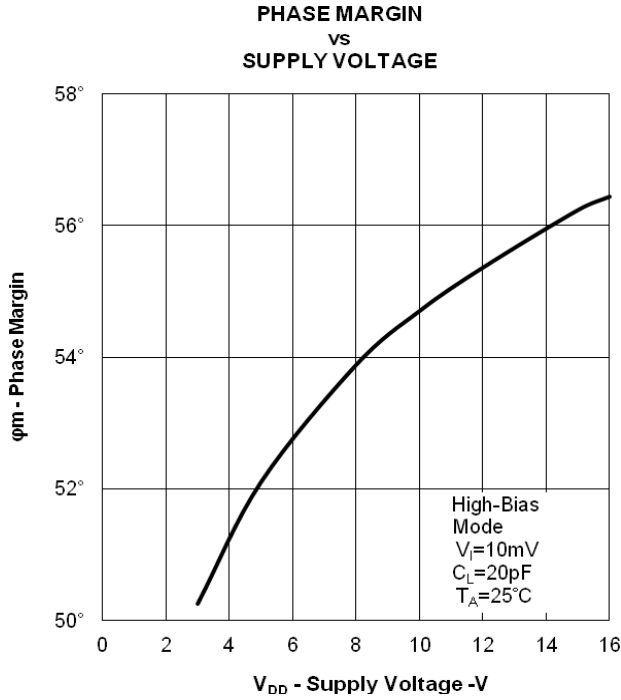


Figure 25

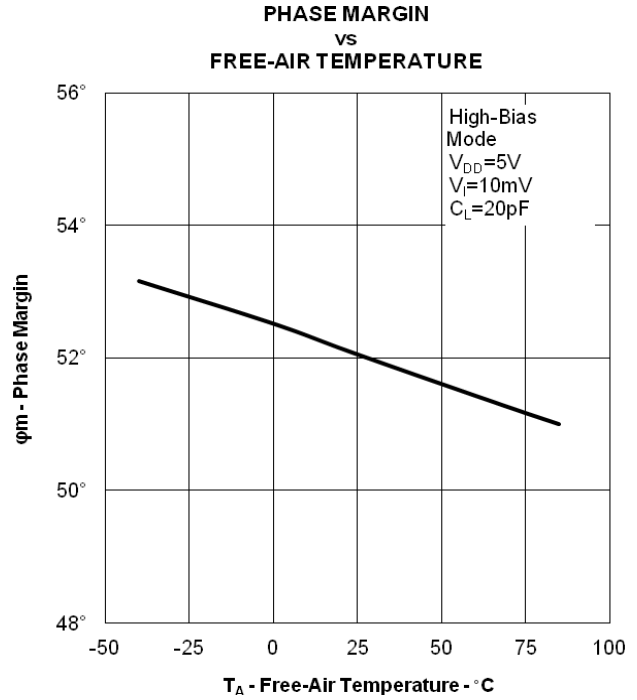


Figure 26

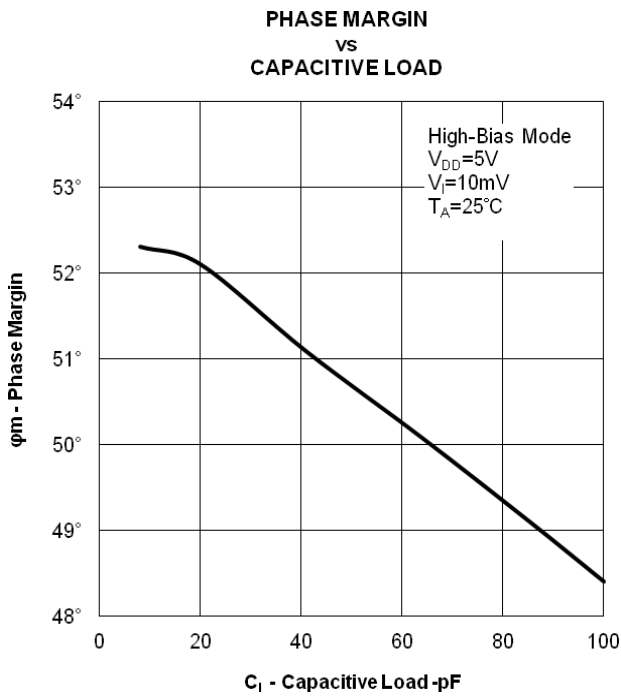


Figure 27

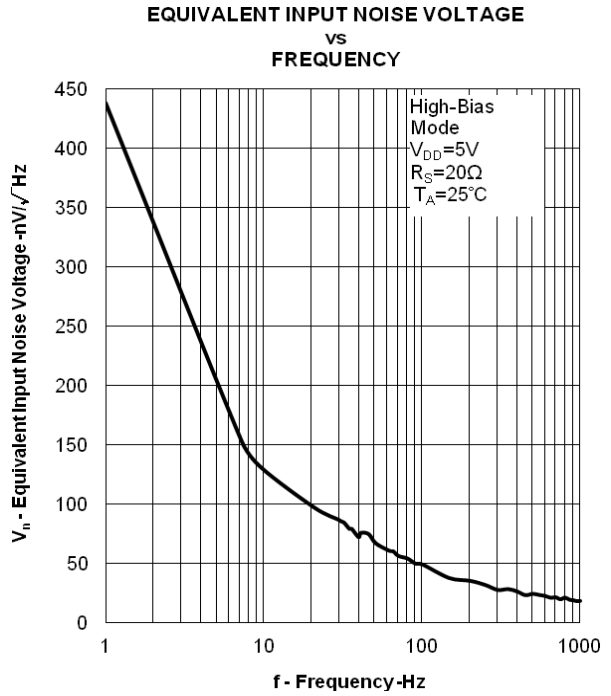


Figure 28

**Typical Performance Characteristics High Bias Mode**

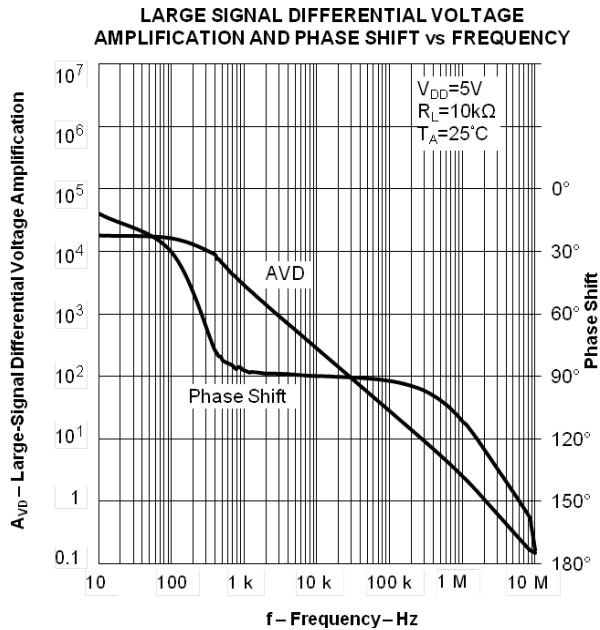


Figure 29

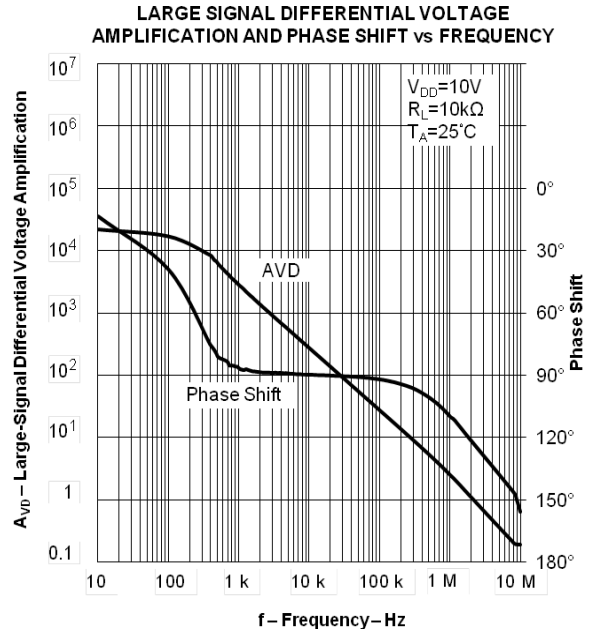


Figure 30

**Typical Performance Characteristics Medium Bias Mode**

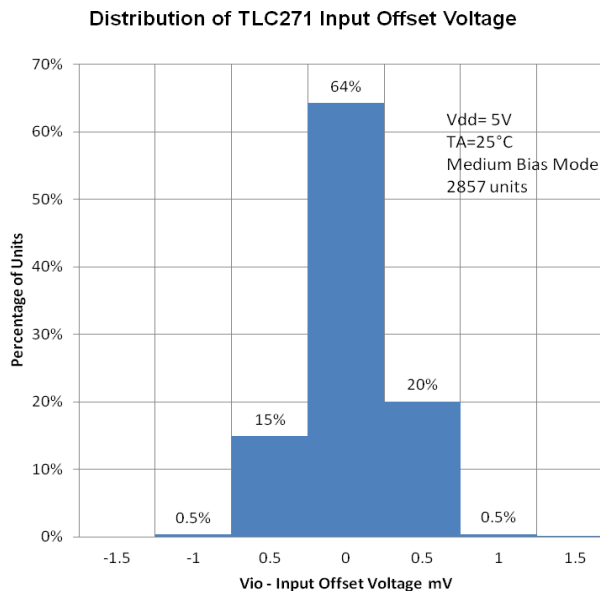


Figure 31

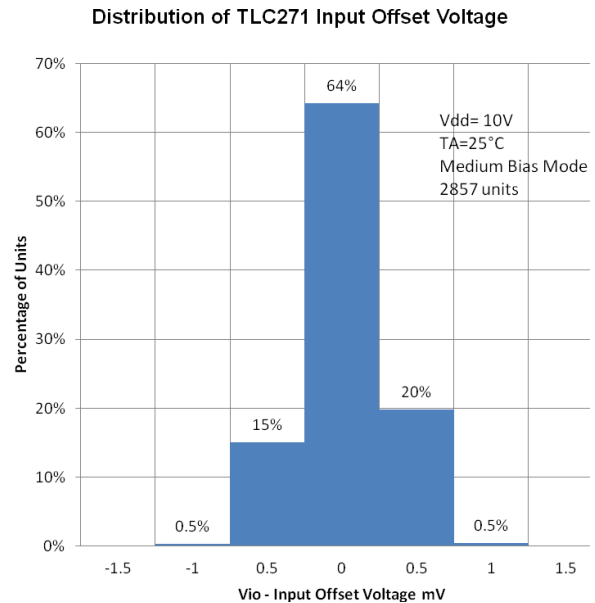


Figure 32

**Typical Performance Characteristics Medium Bias Mode**

New Product

