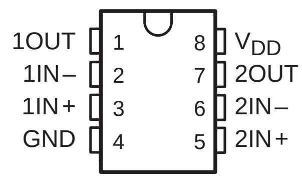
- Input Offset Voltage Drift . . . Typically 0.1 µV/Month, Including the First 30 Days
- Wide Range of Supply Voltages Over Specified Temperature Range:
  - 0°C to 70°C . . . 3 V to 16 V
  - −40°C to 85°C . . . 4 V to 16 V
  - −55°C to 125°C . . . 4 V to 16 V
- Single-Supply Operation
- Common-Mode Input Voltage Range Extends Below the Negative Rail (C-Suffix, I-Suffix types)
- Low Noise . . . Typically 25 nV/$\sqrt{\text{Hz}}$ at f = 1 kHz
- Output Voltage Range Includes Negative Rail
- High Input impedance . . . 10^{12} Ω Typ
- ESD-Protection Circuitry

272 DIP/SOP
(TOP VIEW)

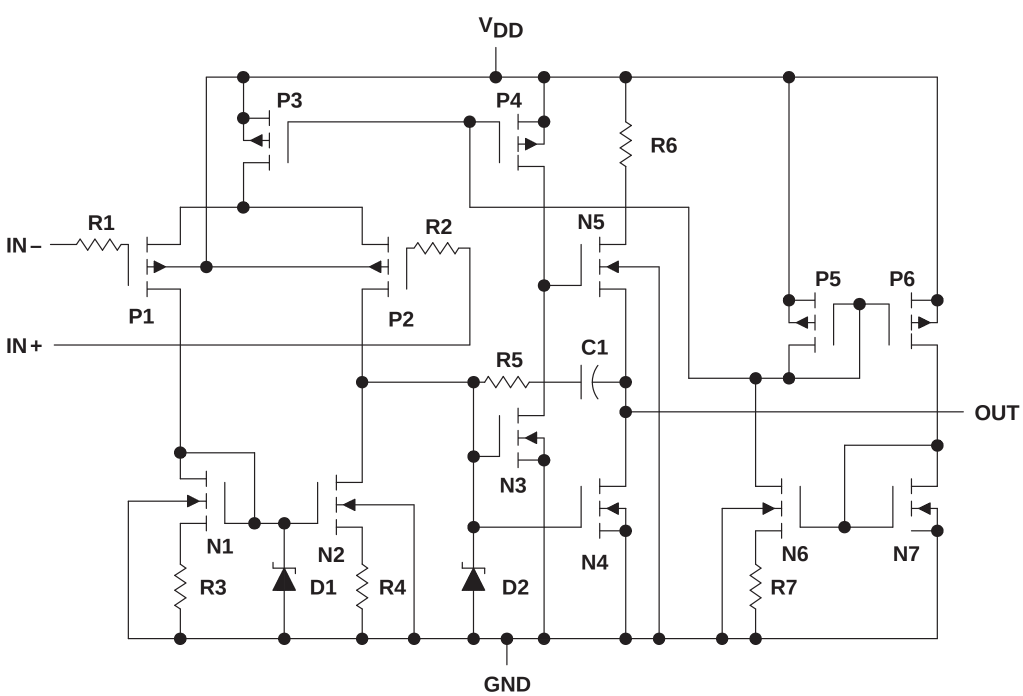


FK PACKAGE
(TOP VIEW)

description

The 272 precision dual operational amplifiers combine a wide range of input offset voltage grades with low offset voltage drift, high input impedance, low noise, and speeds approaching that of general-purpose BiFET devices.

equivalent schematic (each amplifier)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage, V_{DD} (see Note 1)	18 V
Differential input voltage, V_{ID} (see Note 2)	$\pm V_{DD}$
Input voltage range, V_I (any input)	–0.3 V to V_{DD}
Input current, I_I	±5 mA
output current, I_O (each output)	±30 mA
Total current into V_{DD}	45 mA
Total current out of GND	45 mA
Duration of short-circuit current at (or below) 25°C (see Note 3)	unlimited
Continuous total dissipation	See Dissipation Rating Table
Operating free-air temperature, T_A: C suffix	0°C to 70°C
I suffix	–40°C to 85°C
M suffix	–55°C to 125°C
Storage temperature range	–65°C to 150°C
Case temperature for 60 seconds: FK package	260°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D, P, or PW package	260°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: JG package	300°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and 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.

NOTES: 1. All voltage values, except differential voltages, are with respect to network ground.
2. Differential voltages are at IN+ with respect to IN–.
3. 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 (see application section).

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 85°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW	377 mW	N/A
FK	1375 mW	11 mW/°C	880 mW	715 mW	275 mW
JG	1050 mW	8.4 mW/°C	672 mW	546 mW	210 mW
P	1000 mW	8.0 mW/°C	640 mW	520 mW	N/A
PW	525 mW	4.2 mW/°C	336 mW	N/A	N/A

recommended operating conditions

		C SUFFIX		I SUFFIX		M SUFFIX		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
Supply voltage, V_{DD}		3	16	4	16	4	16	V
Common-mode input voltage, V_{IC}	V_{DD} = 5 V	–0.2	3.5	–0.2	3.5	0	3.5	V
	V_{DD} = 10 V	–0.2	8.5	–0.2	8.5	0	8.5	
Operating free-air temperature, T_A		0	70	–40	85	–55	125	°C

electrical characteristics at specified free-air temperature, V_{DD} = 5 V (unless otherwise noted)

PARAMETER			TEST CONDITIONS		T_A†	XD272 DIP8 XL272 SOP8			UNIT
						MIN	TYP	MAX	
V_{IO}	Input offset voltage	272	V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		1.1	10	mV
					Full range			12	
			V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		0.9	5	
					Full range			6.5	
			V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		230	2000	µV
					Full range			3000	
α_{VIO}	Temperature coefficient of input offset voltage				25°C to 70°C		1.8		µV/°C
I_{IO}	Input offset current (see Note 4)		V_O = 2.5 V,	V_{IC} = 2.5 V	25°C		0.1		pA
					70°C		7	300	
I_{IB}	Input bias current (see Note 4)		V_O = 2.5 V,	V_{IC} = 2.5 V	25°C		0.6		pA
					70°C		40	600	
V_{ICR}	Common-mode input voltage range (see Note 5)				25°C	−0.2 to 4	−0.3 to 4.2		V
					Full range	−0.2 to 3.5			V
V_{OH}	High-level output voltage		V_{ID} = 100 mV,	R_L = 10 kΩ	25°C	3.2	3.8		V
					0°C	3	3.8		
					70°C	3	3.8		
V_{OL}	Low-level output voltage		V_{ID} = –100 mV,	I_{OL} = 0	25°C		0	50	mV
					0°C		0	50	
					70°C		0	50	
A_{VD}	Large-signal differential voltage amplification		V_O = 0.25 V to 2 V,	R_L = 10 kΩ	25°C	5	23		V/mV
					0°C	4	27		
					70°C	4	20		
CMRR	Common-mode rejection ratio		$V_{IC} = V_{ICR}min$		25°C	65	80		dB
					0°C	60	84		
					70°C	60	85		
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{DD}/\Delta V_{IO}$)		V_{DD} = 5 V to 10 V,	V_O = 1.4 V	25°C	65	95		dB
					0°C	60	94		
					70°C	60	96		
I_{DD}	Supply current (two amplifiers)		V_O = 2.5 V, No load	V_{IC} = 5 V,	25°C		1.4	3.2	mA
					0°C		1.6	3.6	
					70°C		1.2	2.6	

† Full range is 0°C to 70°C.

NOTES: 4. The typical values of input bias current and input offset current below 5 pA were determined mathematically.

5. This range also applies to each input individually.

electrical characteristics at specified free-air temperature, V_{DD} = 10 V (unless otherwise noted)

PARAMETER			TEST CONDITIONS		T_A†	XD272 DIP8 XL272 SOP8			UNIT
						MIN	TYP	MAX	
V_{IO}	Input offset voltage	272	V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		1.1	10	mV
					Full range			12	mV
			V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		0.9	5	mV
					Full range			6.5	mV
			V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		290	2000	μV
					Full range			3000	μV
α_{VIO}	Temperature coefficient of input offset voltage				25°C to 70°C		2		μV/°C
I_{IO}	Input offset current (see Note 4)		V_O = 5 V,	V_{IC} = 5 V	25°C		0.1		pA
					70°C		7	300	
I_{IB}	Input bias current (see Note 4)		V_O = 5 V,	V_{IC} = 5 V	25°C		0.7		pA
					70°C		50	600	
V_{ICR}	Common-mode input voltage range (see Note 5)				25°C	−0.2 to 9	−0.3 to 9.2		V
					Full range	−0.2 to 8.5			V
V_{OH}	High-level output voltage		V_{ID} = 100 mV,	R_L = 10 kΩ	25°C	8	8.5		V
					0°C	7.8	8.5		
					70°C	7.8	8.4		
V_{OL}	Low-level output voltage		V_{ID} = –100 mV,	I_{OL} = 0	25°C		0	50	mV
					0°C		0	50	
					70°C		0	50	
A_{VD}	Large-signal differential voltage amplification		V_O = 1 V to 6 V,	R_L = 10 kΩ	25°C	10	36		V/mV
					0°C	7.5	42		
					70°C	7.5	32		
CMRR	Common-mode rejection ratio		V_{IC} = V_{ICR}min		25°C	65	85		dB
					0°C	60	88		
					70°C	60	88		
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{DD}/\Delta V_{IO}$)		V_{DD} = 5 V to 10 V,	V_O = 1.4 V	25°C	65	95		dB
					0°C	60	94		
					70°C	60	96		
I_{DD}	Supply current (two amplifiers)		V_O = 2.5 V, No load	V_{IC} = 5 V,	25°C		1.9	4	mA
					0°C		2.3	4.4	
					70°C		1.6	3.4	

† Full range is 0°C to 70°C.

NOTES: 4. The typical values of input bias current and input offset current below 5 pA were determined mathematically.

5. This range also applies to each input individually.

electrical characteristics at specified free-air temperature, V_{DD} = 5 V (unless otherwise noted)

PARAMETER			TEST CONDITIONS		T_A†	XD272 DIP8 XL272 SOP8 MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage		V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		1.1	10	mV
					Full range			13	
		272	V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		0.9	5	
					Full range			7	
			V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		230	2000	μV
					Full range			3500	
α_{VIO}	Temperature coefficient of input offset voltage				25°C to 85°C		1.8		μV/°C
I_{IO}	Input offset current (see Note 4)		V_O = 2.5 V,	V_{IC} = 2.5 V	25°C		0.1		pA
					85°C		24	15	
I_{IB}	Input bias current (see Note 4)		V_O = 2.5 V,	V_{IC} = 2.5 V	25°C		0.6		pA
					85°C		200	35	
V_{ICR}	Common-mode input voltage range (see Note 5)				25°C	–0.2 to 4	–0.3 to 4.2		V
					Full range	–0.2 to 3.5			V
V_{OH}	High-level output voltage		V_{ID} = 100 mV,	R_L = 10 kΩ	25°C	3.2	3.8		V
					–40°C	3	3.8		
					85°C	3	3.8		
V_{OL}	Low-level output voltage		V_{ID} = –100 mV,	I_{OL} = 0	25°C		0	50	mV
					–40°C		0	50	
					85°C		0	50	
A_{VD}	Large-signal differential voltage amplification		V_O = 1 V to 6 V,	R_L = 10 kΩ	25°C	5	23		V/mV
					–40°C	3.5	32		
					85°C	3.5	19		
CMRR	Common-mode rejection ratio		$V_{IC} = V_{ICR}$min		25°C	65	80		dB
					–40°C	60	81		
					85°C	60	86		
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{DD}/\Delta V_{IO}$)		V_{DD} = 5 V to 10 V,	V_O = 1.4 V	25°C	65	95		dB
					–40°C	60	92		
					85°C	60	96		
I_{DD}	Supply current (two amplifiers)		V_O = 5 V, No load	V_{IC} = 5 V,	25°C		1.4	3.2	mA
					–40°C		1.9	4.4	
					85°C		1.1	2.4	

† Full range is –40°C to 85°C.

NOTES: 4. The typical values of input bias current and input offset current below 5 pA were determined mathematically.

5. This range also applies to each input individually.

electrical characteristics at specified free-air temperature, V_{DD} = 10 V (unless otherwise noted)

PARAMETER			TEST CONDITIONS		T_A†	XD272 DIP8 XL272 SOP8 MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	272	V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		1.1	10	mV
					Full range			13	
			V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		0.9	5	
					Full range			7	
			V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		290	2000	µV
					Full range			3500	
α_{VIO}	Temperature coefficient of input offset voltage				25°C to 85°C		2		µV/°C
I_{IO}	Input offset current (see Note 4)		V_O = 5 V,	V_{IC} = 5 V	25°C		0.1		pA
					85°C		26	1000	
I_{IB}	Input bias current (see Note 4)		V_O = 5 V,	V_{IC} = 5 V	25°C		0.7		pA
					85°C		220	2000	
V_{ICR}	Common-mode input voltage range (see Note 5)				25°C	−0.2 to 9	−0.3 to 9.2		V
					Full range	−0.2 to 8.5			V
V_{OH}	High-level output voltage		V_{ID} = 100 mV,	R_L = 10 kΩ	25°C	8	8.5		V
					−40°C	7.8	8.5		
					85°C	7.8	8.5		
V_{OL}	Low-level output voltage		V_{ID} = −100 mV,	I_{OL} = 0	25°C		0	50	mV
					−40°C		0	50	
					85°C		0	50	
A_{VD}	Large-signal differential voltage amplification		V_O = 1 V to 6 V,	R_L = 10 kΩ	25°C	10	36		V/mV
					−40°C	7	46		
					85°C	7	31		
CMRR	Common-mode rejection ratio		V_{IC} = V_{ICR}min		25°C	65	85		dB
					−40°C	60	87		
					85°C	60	88		
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{DD}/\Delta V_{IO}$)		V_{DD} = 5 V to 10 V,	V_O = 1.4 V	25°C	65	95		dB
					−40°C	60	92		
					85°C	60	96		
I_{DD}	Supply current (two amplifiers)		V_O = 5 V, No load	V_{IC} = 5 V,	25°C		1.4	4	mA
					−40°C		2.8	5	
					85°C		1.5	3.2	

† Full range is −40°C to 85°C.

NOTES: 4. The typical values of input bias current and input offset current below 5 pA were determined mathematically.

5. This range also applies to each input individually.

electrical characteristics at specified free-air temperature, V_{DD} = 5 V (unless otherwise noted)

PARAMETER			TEST CONDITIONS		T_A†	XD272 DIP8/XL272 SOP8 MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	272	V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		1.1	10	mV
					Full range			12	
									μV
α_{VIO}	Temperature coefficient of input offset voltage				25°C to 125°C		2.1		μV/°C
I_{IO}	Input offset current (see Note 4)		V_O = 2.5 V	V_{IC} = 2.5 V	25°C		0.1		pA
					125°C		1.4	15	nA
I_{IB}	Input bias current (see Note 4)		V_O = 2.5 V	V_{IC} = 2.5 V	25°C		0.6		pA
					125°C		9	35	nA
V_{ICR}	Common-mode input voltage range (see Note 5)				25°C	0 to 4	–0.3 to 4.2		V
					Full range	0 to 3.5			V
V_{OH}	High-level output voltage		V_{ID} = 100 mV,	R_L = 10 kΩ	25°C	3.2	3.8		V
					–55°C	3	3.8		
					125°C	3	3.8		
V_{OL}	Low-level output voltage		V_{ID} = –100 mV,	I_{OL} = 0	25°C		0	50	mV
					–55°C		0	50	
					125°C		0	50	
A_{VD}	Large-signal differential voltage amplification		V_O = 0.25 V to 2 V	R_L = 10 kΩ	25°C	5	23		V/mV
					–55°C	3.5	35		
					125°C	3.5	16		
CMRR	Common-mode rejection ratio		$V_{IC} = V_{ICR}min$		25°C	65	80		dB
					–55°C	60	81		
					125°C	60	84		
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{DD}/\Delta V_{IO}$)		V_{DD} = 5 V to 10 V,	V_O = 1.4 V	25°C	65	95		dB
					–55°C	60	90		
					125°C	60	97		
I_{DD}	Supply current (two amplifiers)		V_O = 2.5 V, No load	V_{IC} = 2.5 V,	25°C		1.4	3.2	mA
					–55°C		2	5	
					125°C		1	2.2	

† Full range is –55°C to 125°C.

NOTES: 4. The typical values of input bias current and input offset current below 5 pA were determined mathematically.

5. This range also applies to each input individually.

electrical characteristics at specified free-air temperature, V_{DD} = 10 V (unless otherwise noted)

PARAMETER			TEST CONDITIONS		T_A†	XD272 DIP8/XL272 SOP8			UNIT
						MIN	TYP	MAX	
V_{IO}	Input offset voltage	272	V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ	25°C		1.1	10	mV
					Full range			12	mV
									µV
α_{VIO}	Temperature coefficient of input offset voltage				25°C to 125°C		2.2		µV/°C
I_{IO}	Input offset current (see Note 4)		V_O = 5 V,	V_{IC} = 5 V	25°C		0.1		pA
					125°C		1.8	15	nA
I_{IB}	Input bias current (see Note 4)		V_O = 5 V,	V_{IC} = 5 V	25°C		0.7		pA
					125°C		10	35	nA
V_{ICR}	Common-mode input voltage range (see Note 5)				25°C	0 to 9	–0.3 to 9.2		V
					Full range	0 to 8.5			V
V_{OH}	High-level output voltage		V_{ID} = 100 mV,	R_L = 10 kΩ	25°C	8	8.5		V
					–55°C	7.8	8.5		
					125°C	7.8	8.4		
V_{OL}	Low-level output voltage		V_{ID} = –100 mV,	I_{OL} = 0	25°C		0	50	mV
					–55°C		0	50	
					125°C		0	50	
A_{VD}	Large-signal differential voltage amplification		V_O = 1 V to 6 V,	R_L = 10 kΩ	25°C	10	36		V/mV
					–55°C	7	50		
					125°C	7	27		
CMRR	Common-mode rejection ratio		V_{IC} = V_{ICR}min		25°C	65	85		dB
					–55°C	60	87		
					125°C	60	86		
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{DD}/\Delta V_{IO}$)		V_{DD} = 5 V to 10 V,	V_O = 1.4 V	25°C	65	95		dB
					–55°C	60	90		
					125°C	60	97		
I_{DD}	Supply current (two amplifiers)		V_O = 5 V, No load	V_{IC} = 5 V,	25°C		1.9	4	mA
					–55°C		3	6	
					125°C		1.3	2.8	

† Full range is –55°C to 125°C.

NOTES: 4. The typical values of input bias current and input offset current below 5 pA were determined mathematically.

5. This range also applies to each input individually.

electrical characteristics, V_{DD} = 5 V, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS		XD272 DIP8/XL272 SOP8 MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ		1.1	10	mV
α_{VIO}	Temperature coefficient of input offset voltage				1.8		μV/°C
I_{IO}	Input offset current (see Note 4)	V_O = 2.5 V,	V_{IC} = 2.5 V		0.1		pA
I_{IB}	Input bias current (see Note 4)	V_O = 2.5 V,	V_{IC} = 2.5 V		0.6		pA
V_{ICR}	Common-mode input voltage range (see Note 5)			–0.2 to 4	–0.3 to 4.2		V
V_{OH}	High-level output voltage	V_{ID} = 100 mV,	R_L = 10 kΩ	3.2	3.8		V
V_{OL}	Low-level output voltage	V_{ID} = –100 mV,	I_{OL} = 0		0	50	mV
A_{VD}	Large-signal differential voltage amplification	V_O = 0.25 V to 2 V	R_L = 10 kΩ	5	23		V/mV
CMRR	Common-mode rejection ratio	V_{IC} = V_{ICR}min		65	80		dB
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{DD}/\Delta V_{IO}$)	V_{DD} = 5 V to 10 V,	V_O = 1.4 V	65	95		dB
I_{DD}	Supply current (two amplifiers)	V_O = 2.5 V, No load	V_{IC} = 2.5 V,		1.4	3.2	mA

NOTES: 4. The typical values of input bias current and input offset current below 5 pA were determined mathematically.
5. This range also applies to each input individually.

electrical characteristics, V_{DD} = 10 V, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS		XD272 DIP8/XL272 SOP8 MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	V_O = 1.4 V, R_S = 50 Ω,	V_{IC} = 0, R_L = 10 kΩ		1.1	10	mV
α_{VIO}	Temperature coefficient of input offset voltage				1.8		μV/°C
I_{IO}	Input offset current (see Note 4)	V_O = 5 V,	V_{IC} = 5 V		0.1		pA
I_{IB}	Input bias current (see Note 4)	V_O = 5 V,	V_{IC} = 5 V		0.7		pA
V_{ICR}	Common-mode input voltage range (see Note 5)			–0.2 to 9	–0.3 to 9.2		V
V_{OH}	High-level output voltage	V_{ID} = 100 mV,	R_L = 10 kΩ	8	8.5		V
V_{OL}	Low-level output voltage	V_{ID} = –100 mV,	I_{OL} = 0		0	50	mV
A_{VD}	Large-signal differential voltage amplification	V_O = 1 V to 6 V,	R_L = 10 kΩ	10	36		V/mV
CMRR	Common-mode rejection ratio	V_{IC} = V_{ICR}min		65	85		dB
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{DD}/\Delta V_{IO}$)	V_{DD} = 5 V to 10 V,	V_O = 1.4 V	65	95		dB
I_{DD}	Supply current (two amplifiers)	V_O = 5 V, No load	V_{IC} = 5 V,		1.9	4	mA

NOTES: 4. The typical values of input bias current and input offset current below 5 pA were determined mathematically.
5. This range also applies to each input individually.

operating characteristics at specified free-air temperature, V_{DD} = 5 V

PARAMETER		TEST CONDITIONS			XD272 DIP8 XL272 SOP8 MIN	TYP	MAX	UNIT
SR	Slew rate at unity gain	R_L = 10 kΩ, C_L = 20 pF, See Figure 1	V_{IPP} = 1 V	25°C		3.6		V/µs
				0°C		4		
				70°C		3		
			V_{IPP} = 2.5 V	25°C		2.9		
				0°C		3.1		
				70°C		2.5		
V_n	Equivalent input noise voltage	f = 1 kHz, See Figure 2	R_S = 20 Ω,	25°C		25		nV/√Hz
B_{OM}	Maximum output-swing bandwidth	V_O = V_{OH}, R_L = 10 kΩ,	C_L = 20 pF, See Figure 1	25°C		320		kHz
				0°C		340		
				70°C		260		
B_1	Unity-gain bandwidth	V_I = 10 mV, See Figure 3	C_L = 20 pF,	25°C		1.7		MHz
				0°C		2		
				70°C		1.3		
ϕ_m	Phase margin	V_I = 10 mV, C_L = 20 pF,	f = B_1, See Figure 3	25°C		46°		
				0°C		47°		
				70°C		43°		

operating characteristics at specified free-air temperature, V_{DD} = 10 V

PARAMETER		TEST CONDITIONS		T_A	XD272 DIP8 XL272 SOP8 MIN	TYP	MAX	UNIT
SR	Slew rate at unity gain	R_L = 10 kΩ, C_L = 20 pF, See Figure 1	V_{IPP} = 1 V	25°C		5.3		V/µs
				0°C		5.9		
				70°C		4.3		
			V_{IPP} = 5.5 V	25°C		4.6		
				0°C		5.1		
				70°C		3.8		
V_n	Equivalent input noise voltage	f = 1 kHz, See Figure 2	R_S = 20 Ω,	25°C		25		nV/√Hz
B_{OM}	Maximum output-swing bandwidth	V_O = V_{OH}, R_L = 10 kΩ,	C_L = 20 pF, See Figure 1	25°C		200		kHz
				0°C		220		
				70°C		140		
B_1	Unity-gain bandwidth	V_I = 10 mV, See Figure 3	C_L = 20 pF,	25°C		2.2		MHz
				0°C		2.5		
				70°C		1.8		
ϕ_m	Phase margin	V_I = 10 mV, C_L = 20 pF,	f = B_1, See Figure 3	25°C		49°		
				0°C		50°		
				70°C		46°		

operating characteristics at specified free-air temperature, V_{DD} = 5 V

PARAMETER		TEST CONDITIONS		T_A	XD272 DIP8 XL272 SOP8 MIN	TYP	MAX	UNIT
SR	Slew rate at unity gain	R_L = 10 kΩ, C_L = 20 pF, See Figure 1	V_{IPP} = 1 V	25°C		3.6		V/µs
				–40°C		4.5		
				85°C		2.8		
			V_{IPP} = 2.5 V	25°C		2.9		
				–40°C		3.5		
				85°C		2.3		
V_n	Equivalent input noise voltage	f = 1 kHz, See Figure 2	R_S = 20 Ω,	25°C		25		nV/√Hz
B_{OM}	Maximum output-swing bandwidth	V_O = V_{OH}, R_L = 10 kΩ,	C_L = 20 pF, See Figure 1	25°C		320		kHz
				–40°C		380		
				85°C		250		
B_1	Unity-gain bandwidth	V_I = 10 mV, See Figure 3	C_L = 20 pF,	25°C		1.7		MHz
				–40°C		2.6		
				85°C		1.2		
ϕ_m	Phase margin	V_I = 10 mV, C_L = 20 pF,	f = B_1, See Figure 3	25°C		46°		
				–40°C		49°		
				85°C		43°		

operating characteristics at specified free-air temperature, V_{DD} = 10 V

PARAMETER		TEST CONDITIONS		T_A	XD272 DIP8 XL272 SOP8 MIN	TYP	MAX	UNIT
SR	Slew rate at unity gain	R_L = 10 kΩ, C_L = 20 pF, See Figure 1	V_{IPP} = 1 V	25°C		5.3		V/µs
				–40°C		6.8		
				85°C		4		
			V_{IPP} = 5.5 V	25°C		4.6		
				–40°C		5.8		
				85°C		3.5		
V_n	Equivalent input noise voltage	f = 1 kHz, See Figure 2	R_S = 20 Ω,	25°C		25		nV/√Hz
B_{OM}	Maximum output-swing bandwidth	V_O = V_{OH}, R_L = 10 kΩ,	C_L = 20 pF, See Figure 1	25°C		200		kHz
				–40°C		260		
				85°C		130		
B_1	Unity-gain bandwidth	V_I = 10 mV, See Figure 3	C_L = 20 pF,	25°C		2.2		MHz
				–40°C		3.1		
				85°C		1.7		
ϕ_m	Phase margin	V_I = 10 mV, C_L = 20 pF,	f = B_1, See Figure 3	25°C		49°		
				–40°C		52°		
				85°C		46°		

operating characteristics at specified free-air temperature, V_{DD} = 5 V

PARAMETER		TEST CONDITIONS		T_A	XD272 DIP8 XL272 SOP8 MIN	TYP	MAX	UNIT
SR	Slew rate at unity gain	R_L = 10 kΩ, C_L = 20 pF, See Figure 1	V_{IPP} = 1 V	25°C		3.6		V/µs
				–55°C		4.7		
				125°C		2.3		
			V_{IPP} = 2.5 V	25°C		2.9		
				–55°C		3.7		
				125°C		2		
V_n	Equivalent input noise voltage	f = 1 kHz, See Figure 2	R_S = 20 Ω,	25°C		25		nV/√Hz
B_{OM}	Maximum output-swing bandwidth	V_O = V_{OH}, R_L = 10 kΩ,	C_L = 20 pF, See Figure 1	25°C		320		kHz
				–55°C		400		
				125°C		230		
B_1	Unity-gain bandwidth	V_I = 10 mV, See Figure 3	C_L = 20 pF,	25°C		1.7		MHz
				–55°C		2.9		
				125°C		1.1		
ϕ_m	Phase margin	V_I = 10 mV, C_L = 20 pF,	f = B_1, See Figure 3	25°C		46°		
				–55°C		49°		
				125°C		41°		

operating characteristics at specified free-air temperature, V_{DD} = 10 V

PARAMETER		TEST CONDITIONS		T_A	XD272 DIP8 XL272 SOP8 MIN	TYP	MAX	UNIT
SR	Slew rate at unity gain	R_L = 10 kΩ, C_L = 20 pF, See Figure 1	V_{IPP} = 1 V	25°C		5.3		V/µs
				–55°C		7.1		
				125°C		3.1		
			V_{IPP} = 5.5 V	25°C		4.6		
				–55°C		6.1		
				125°C		2.7		
V_n	Equivalent input noise voltage	f = 1 kHz, See Figure 2	R_S = 20 Ω,	25°C		25		nV/√Hz
B_{OM}	Maximum output-swing bandwidth	V_O = V_{OH}, R_L = 10 kΩ,	C_L = 20 pF, See Figure 1	25°C		200		kHz
				–55°C		280		
				125°C		110		
B_1	Unity-gain bandwidth	V_I = 10 mV, See Figure 3	C_L = 20 pF,	25°C		2.2		MHz
				–55°C		3.4		
				125°C		1.6		
ϕ_m	Phase margin	V_I = 10 mV, C_L = 20 pF,	f = B_1, See Figure 3	25°C		49°		
				–55°C		52°		
				125°C		44°		

operating characteristics, V_{DD} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS			272 MIN	272 TYP	272 MAX	UNIT
SR	Slew rate at unity gain	R_L = 10 kΩ, See Figure 1	C_L = 20 pF,	V_{IPP} = 1 V		3.6		V/µs
				V_{IPP} = 2.5 V		2.9		
V_n	Equivalent input noise voltage	f = 1 kHz,	R_S = 20 Ω,	See Figure 2		25		$nV/\sqrt{Hz}$
B_{OM}	Maximum output-swing bandwidth	$V_O = V_{OH}$, See Figure 1	C_L = 20 pF,	R_L = 10 kΩ,		320		kHz
B_1	Unity-gain bandwidth	V_I = 10 mV,	C_L = 20 pF,	See Figure 3		1.7		MHz
ϕ_m	Phase margin	V_I = 10 mV, See Figure 3	f = B_1,	C_L = 20 pF,		46°		

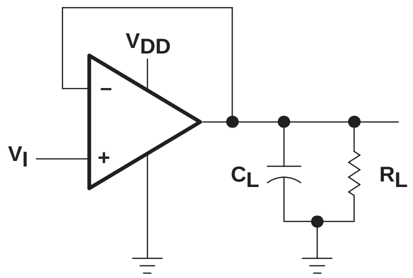
operating characteristics, V_{DD} = 10 V, T_A = 25°C

PARAMETER		TEST CONDITIONS			272 MIN	272 TYP	272 MAX	UNIT
SR	Slew rate at unity gain	R_L = 10 kΩ, See Figure 1	C_L = 20 pF,	V_{IPP} = 1 V		5.3		V/µs
				V_{IPP} = 5.5 V		4.6		
V_n	Equivalent input noise voltage	f = 1 kHz,	R_S = 20 Ω,	See Figure 2		25		$nV/\sqrt{Hz}$
B_{OM}	Maximum output-swing bandwidth	$V_O = V_{OH}$, See Figure 1	C_L = 20 pF,	R_L = 10 kΩ,		200		kHz
B_1	Unity-gain bandwidth	V_I = 10 mV,	C_L = 20 pF,	See Figure 3		2.2		MHz
ϕ_m	Phase margin	V_I = 10 mV, See Figure 3	f = B_1,	C_L = 20 pF,		49°		

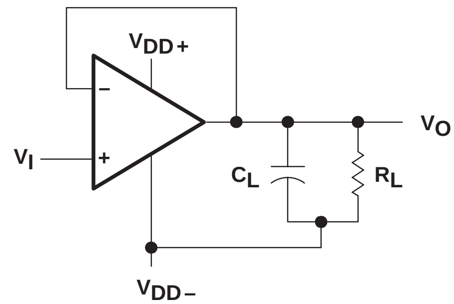
PARAMETER MEASUREMENT INFORMATION

single-supply versus split-supply test circuits

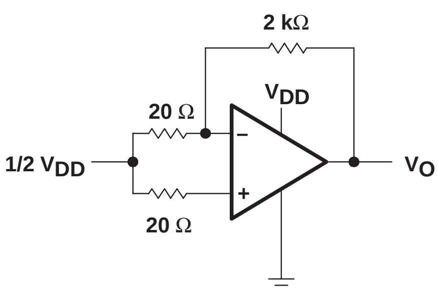
Because the 272 are optimized for single-supply operation, circuit configurations used for the various tests often present some inconvenience since the input signal, in many cases, must be offset from ground. This inconvenience can be avoided by testing the device with split supplies and the output load tied to the negative rail. A comparison of single-supply versus split-supply test circuits is shown below. The use of either circuit gives the same result.



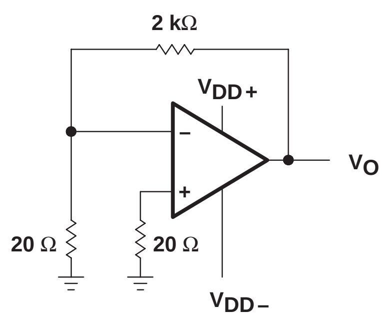
(a) SINGLE SUPPLY



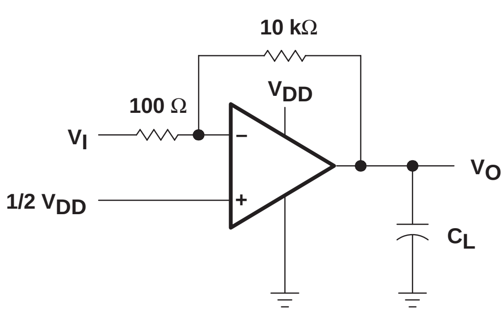
(b) SPLIT SUPPLY



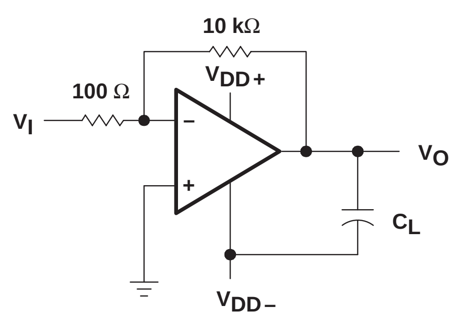
(a) SINGLE SUPPLY



(b) SPLIT SUPPLY



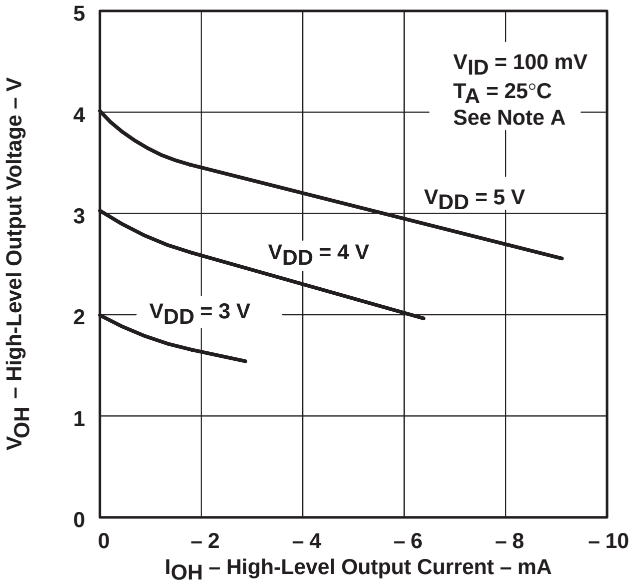
(a) SINGLE SUPPLY



(b) SPLIT SUPPLY

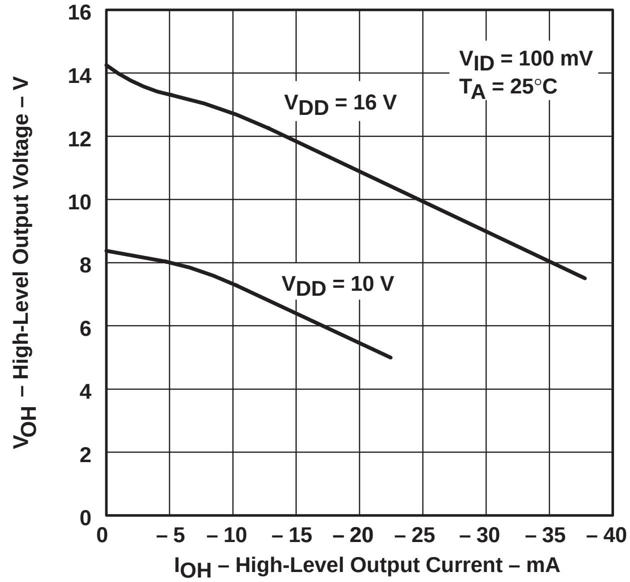
TYPICAL CHARACTERISTICS†

HIGH-LEVEL OUTPUT VOLTAGE vs HIGH-LEVEL OUTPUT CURRENT

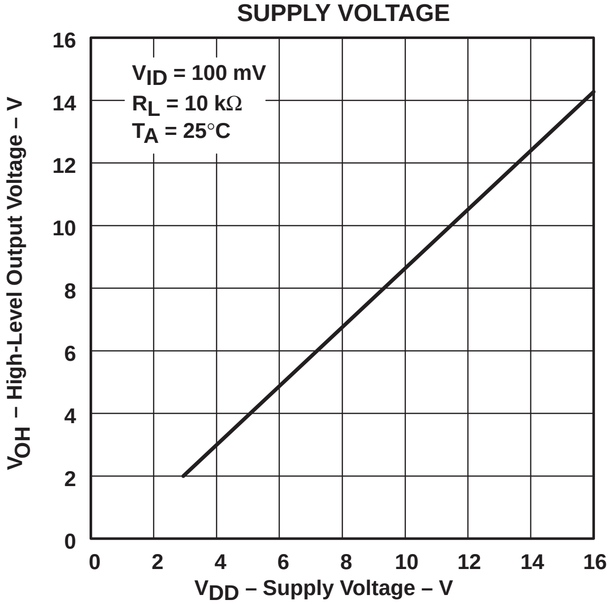


NOTE A: The 3-V curve only applies to the C version.

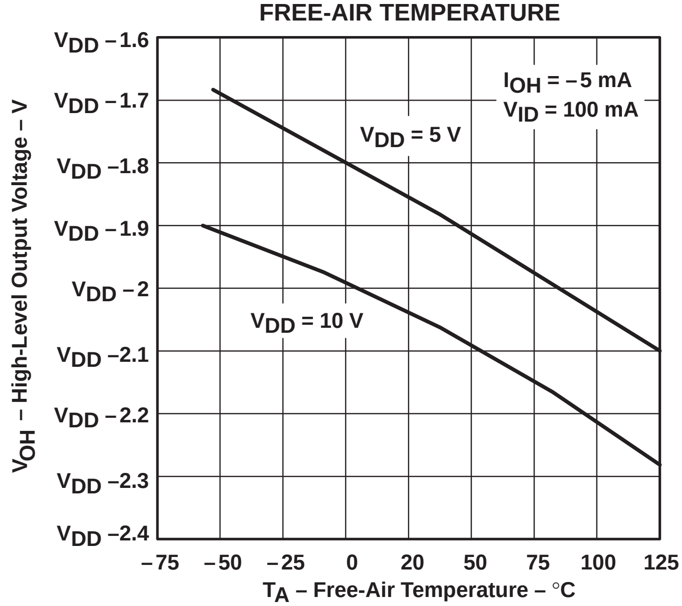
HIGH-LEVEL OUTPUT VOLTAGE vs HIGH-LEVEL OUTPUT CURRENT



HIGH-LEVEL OUTPUT VOLTAGE vs SUPPLY VOLTAGE

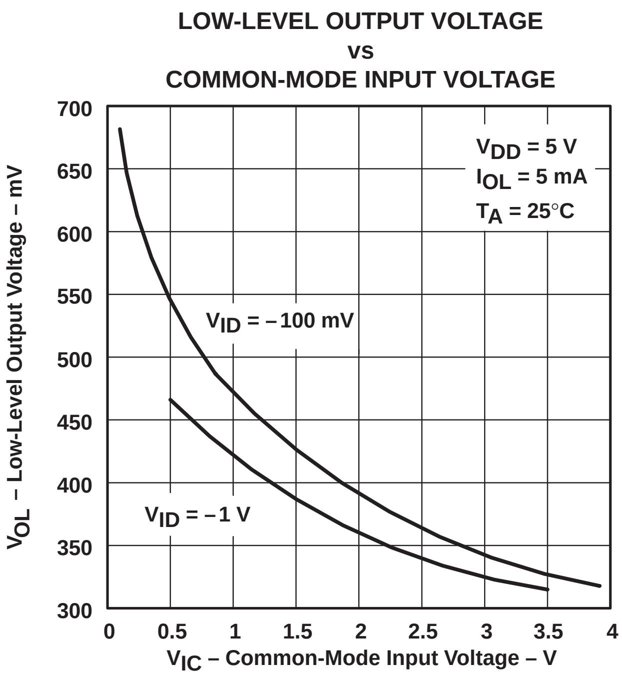


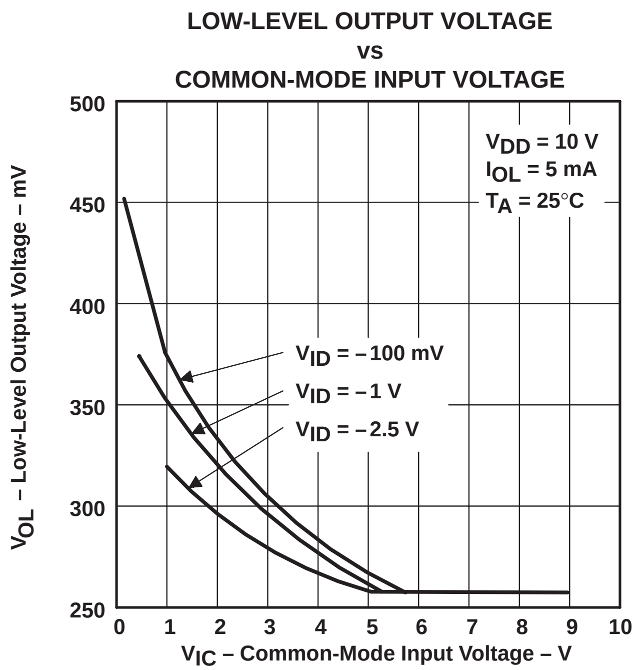
HIGH-LEVEL OUTPUT VOLTAGE vs FREE-AIR TEMPERATURE

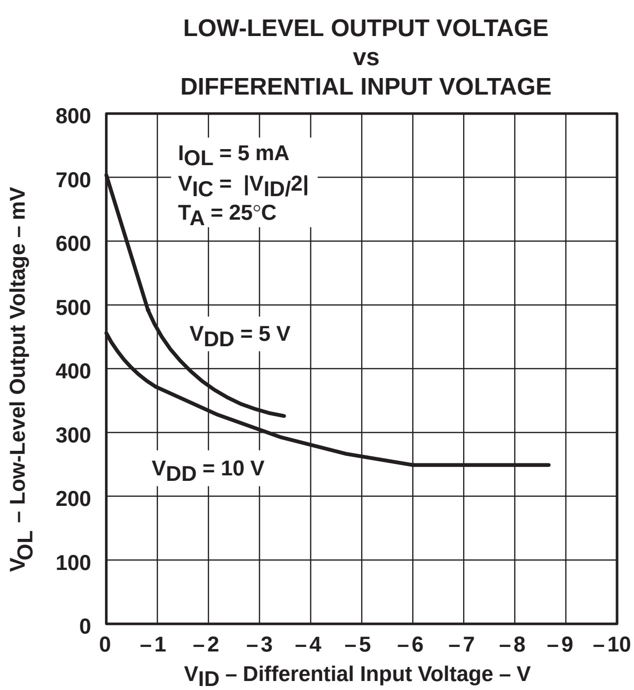


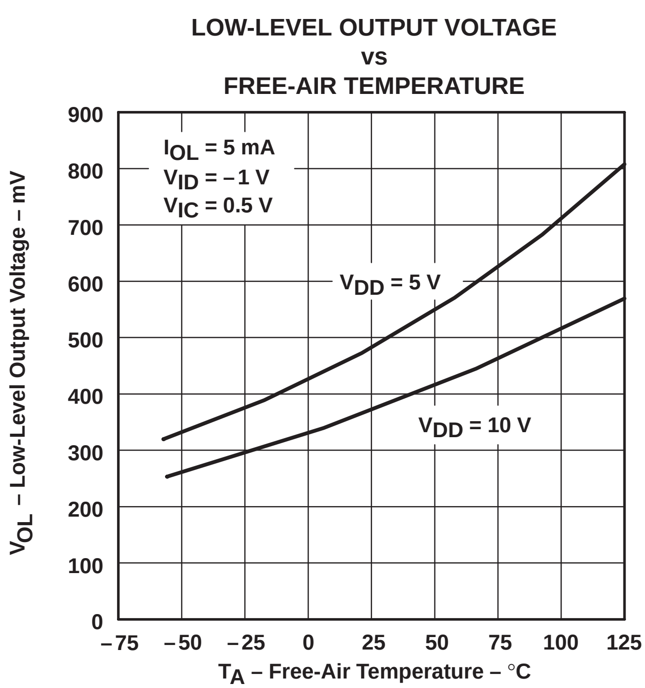
† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

TYPICAL CHARACTERISTICS†



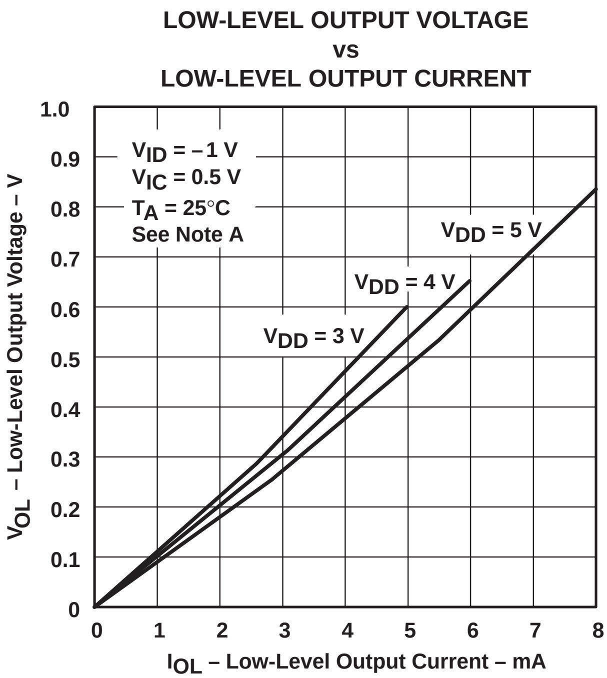


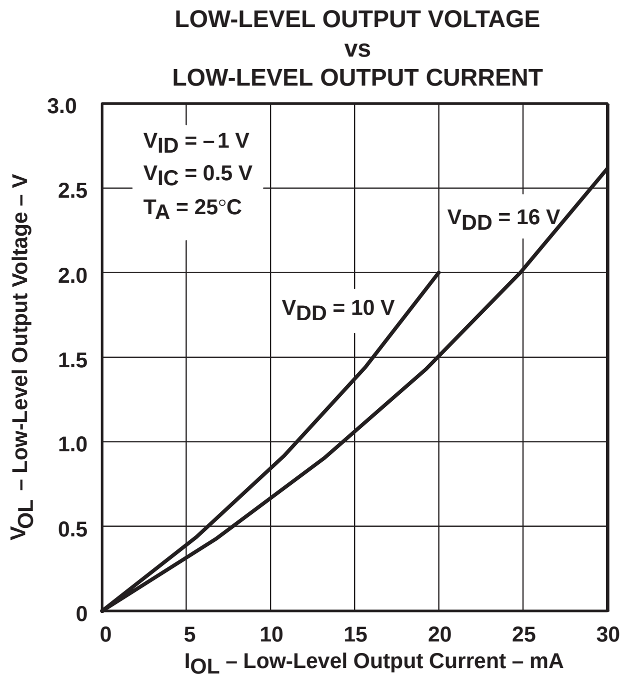




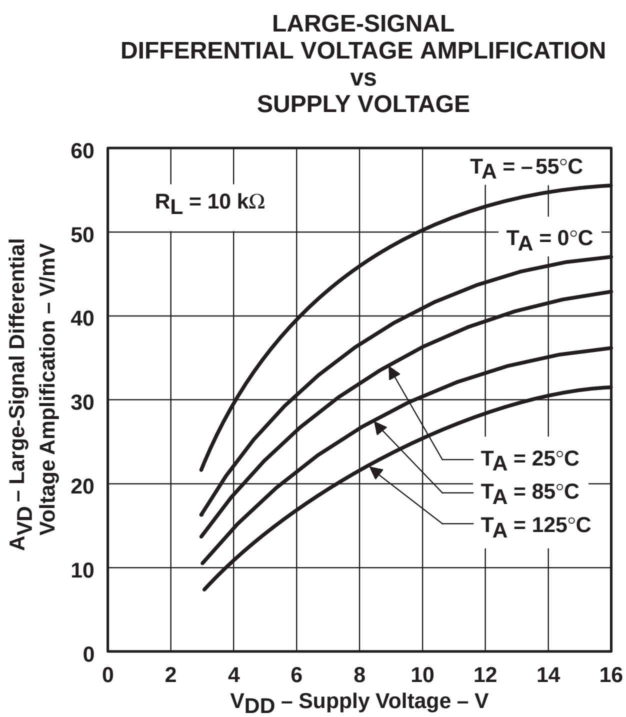
† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

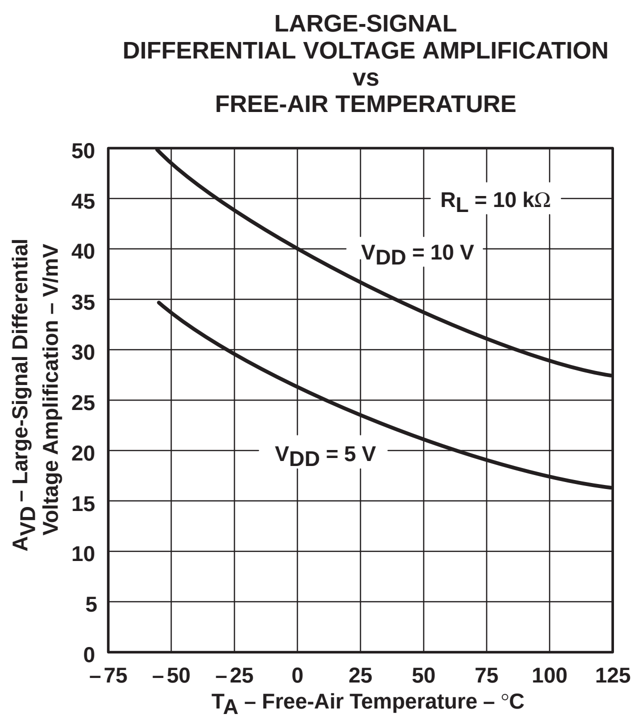
TYPICAL CHARACTERISTICS†





NOTE A: The 3-V curve only applies to the C version.

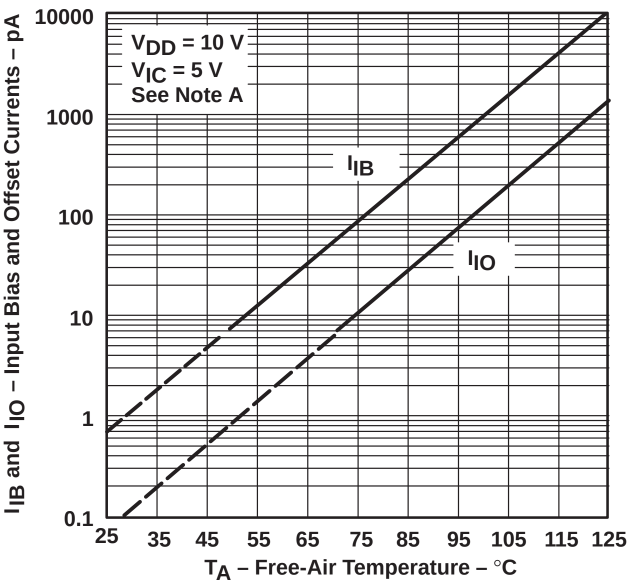




† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

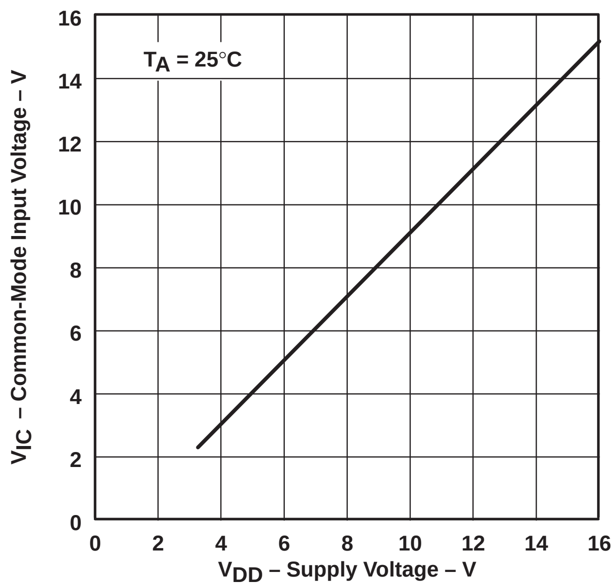
TYPICAL CHARACTERISTICS†

INPUT BIAS CURRENT AND INPUT OFFSET CURRENT vs FREE-AIR TEMPERATURE

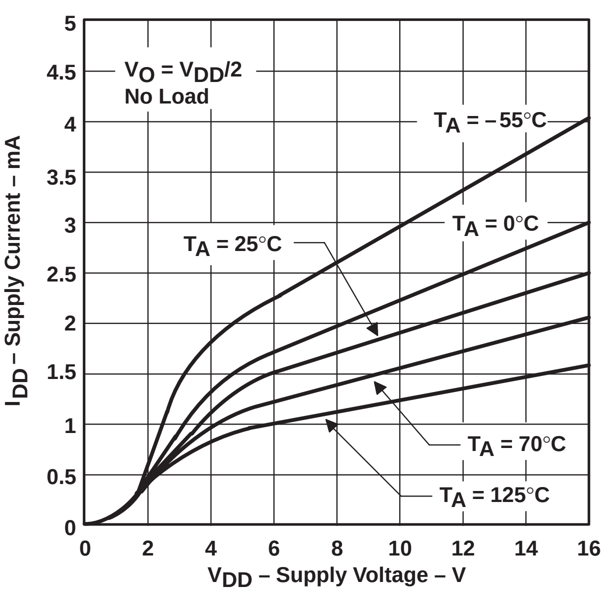


NOTE A: The typical values of input bias current and input offset current below 5 pA were determined mathematically.

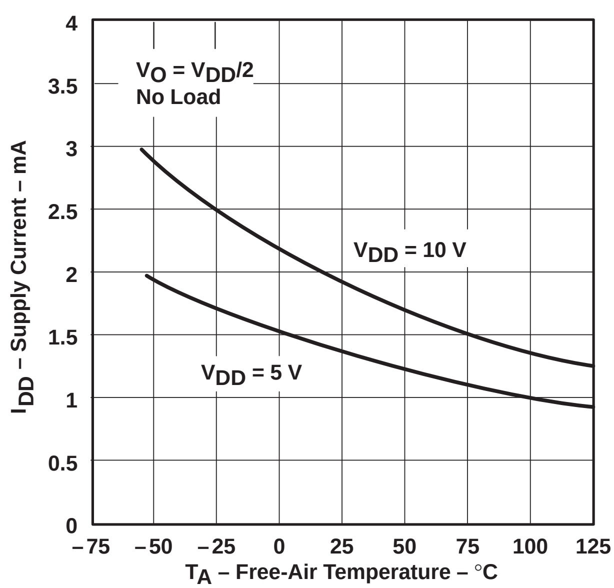
COMMON-MODE INPUT VOLTAGE POSITIVE LIMIT vs SUPPLY VOLTAGE



SUPPLY CURRENT vs SUPPLY VOLTAGE



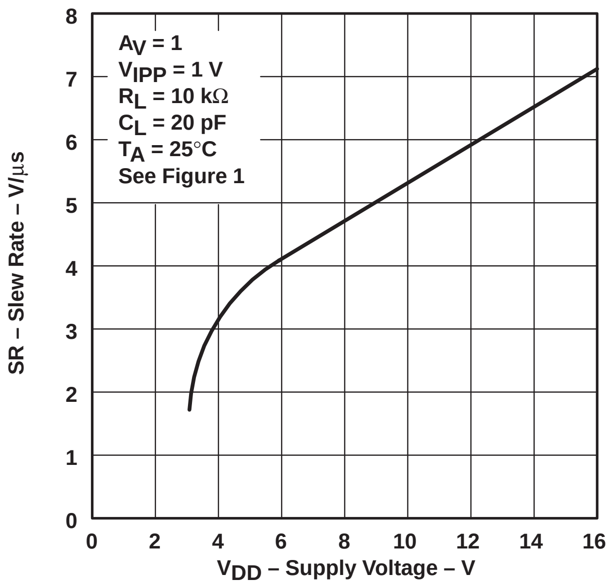
SUPPLY CURRENT vs FREE-AIR TEMPERATURE



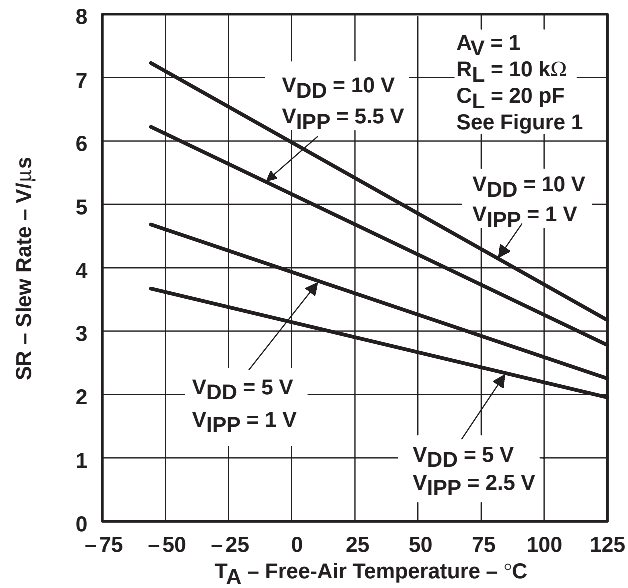
† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

TYPICAL CHARACTERISTICS†

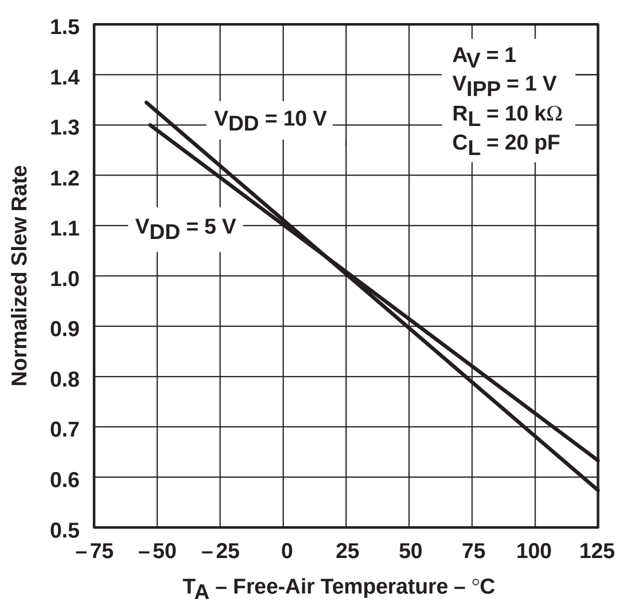
SLEW RATE vs SUPPLY VOLTAGE



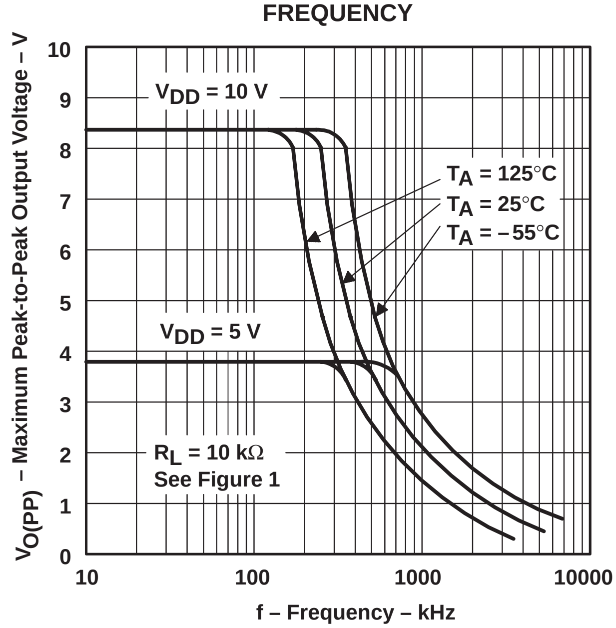
SLEW RATE vs FREE-AIR TEMPERATURE



NORMALIZED SLEW RATE vs FREE-AIR TEMPERATURE



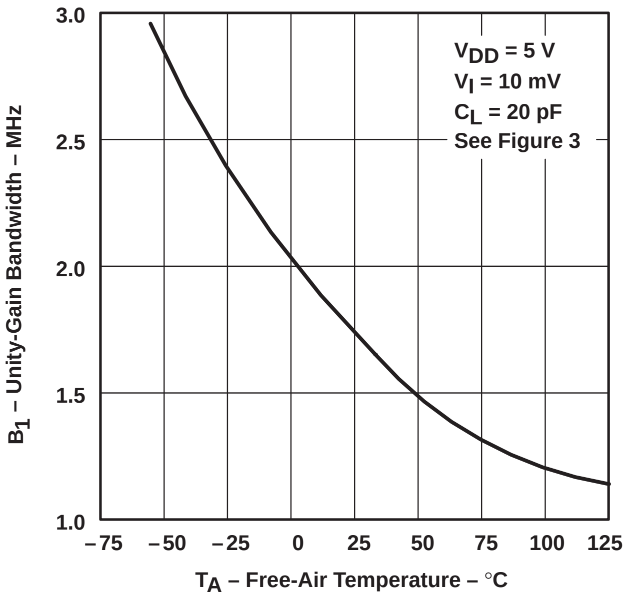
MAXIMUM PEAK OUTPUT VOLTAGE vs FREQUENCY



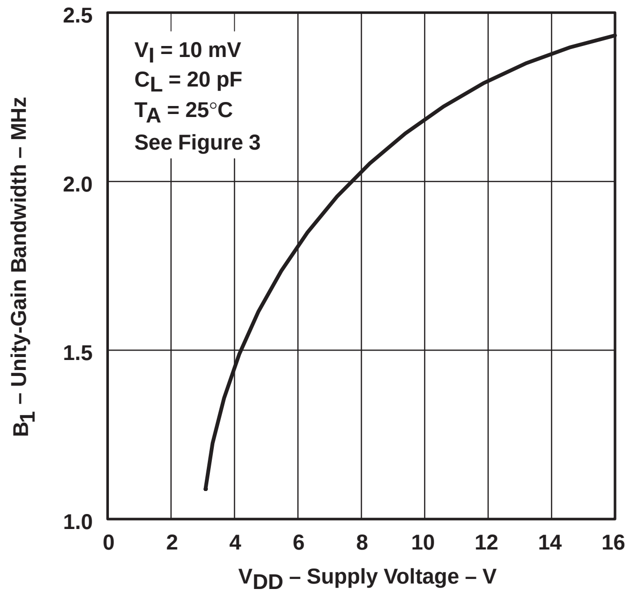
† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

TYPICAL CHARACTERISTICS†

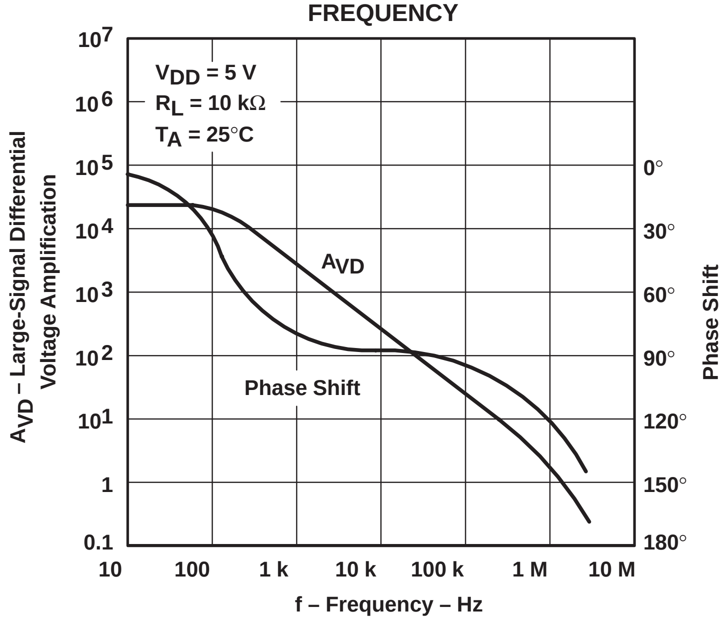
UNITY-GAIN BANDWIDTH vs FREE-AIR TEMPERATURE



UNITY-GAIN BANDWIDTH vs SUPPLY VOLTAGE



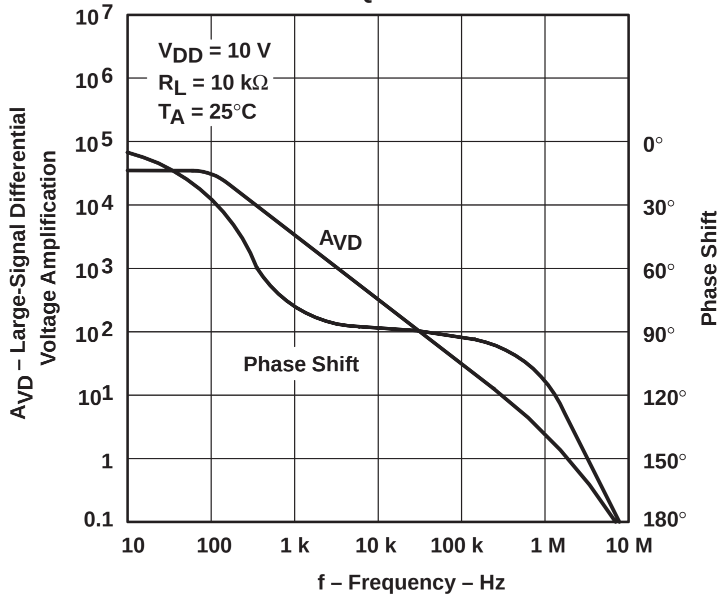
LARGE-SIGNAL DIFFERENTIAL VOLTAGE AMPLIFICATION AND PHASE SHIFT vs FREQUENCY



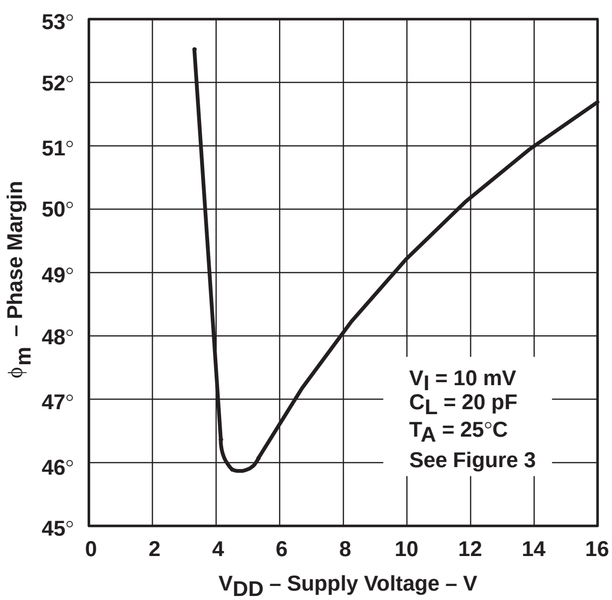
† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.

TYPICAL CHARACTERISTICS†

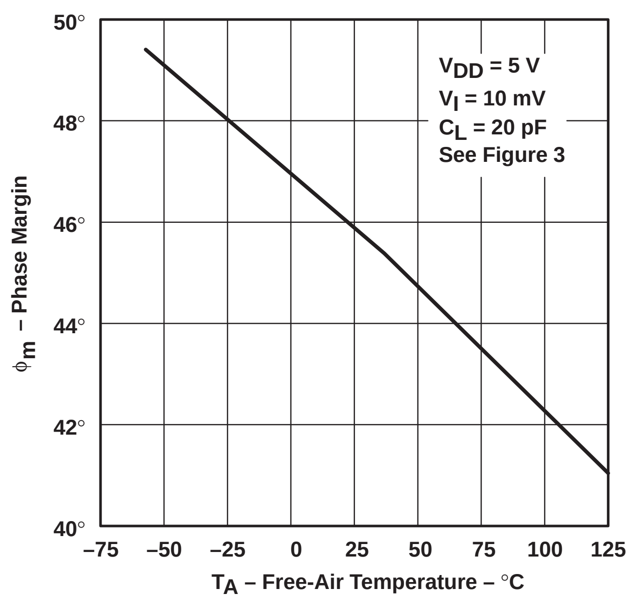
LARGE-SIGNAL DIFFERENTIAL VOLTAGE AMPLIFICATION AND PHASE SHIFT vs FREQUENCY



PHASE MARGIN vs SUPPLY VOLTAGE



PHASE MARGIN vs FREE-AIR TEMPERATURE



† Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.