- **Output Swing Includes Both Supply Rails**
- Low Noise . . . 9 nV/ $\sqrt{\text{Hz}}$ Typ at f = 1 kHz
- Low Input Bias Current . . . 1 pA Typ
- Fully Specified for Both Single-Supply and **Split-Supply Operation**
- **Common-Mode Input Voltage Range Includes Negative Rail**
- High-Gain Bandwidth . . . 2.2 MHz Typ
- High Slew Rate . . . 3.6 V/us Typ

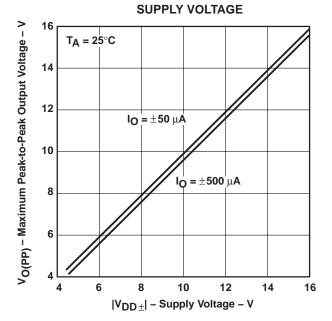
description

The TLC2272 and TLC2274 are dual and quadruple operational amplifiers from Texas Instruments. Both devices exhibit rail-to-rail output performance for increased dynamic range in single- or split-supply applications. The TLC227x family offers 2 MHz of bandwidth and 3 V/µs of slew rate for higher speed applications. These devices offer comparable ac performance while having better noise, input offset voltage, and power dissipation than existing operational amplifiers. The TLC227x has a noise voltage of 9 nV/ \sqrt{Hz} , two times lower than competitive solutions.

The TLC227x, exhibiting high input impedance and low noise, is excellent for small-signal conditioning for high-impedance sources, such as piezoelectric transducers. Because of the micropower dissipation levels, these devices work well in hand-held monitoring and remote-sensing applications. In addition, the rail-to-rail output feature, with single- or split-supplies, makes this

- Low Input Offset Voltage 950 μ V Max at T_A = 25°C
- **Macromodel Included**
- Performance Upgrades for the TS272, TS274, TLC272, and TLC274
- **Available in Q-Temp Automotive HighRel Automotive Applications Configuration Control / Print Support Qualification to Automotive Standards**

MAXIMUM PEAK-TO-PEAK OUTPUT VOLTAGE



family a great choice when interfacing with analog-to-digital converters (ADCs). For precision applications, the TLC227xA family is available with a maximum input offset voltage of 950 μV. This family is fully characterized at 5 V and \pm 5 V.

The TLC2272/4 also makes great upgrades to the TLC272/4 or TS272/4 in standard designs. They offer increased output dynamic range, lower noise voltage, and lower input offset voltage. This enhanced feature set allows them to be used in a wider range of applications. For applications that require higher output drive and wider input voltage range, see the TLV2432 and TLV2442 devices.

If the design requires single amplifiers, see the TLV2211/21/31 family. These devices are single rail-to-rail operational amplifiers in the SOT-23 package. Their small size and low power consumption, make them ideal for high density, battery-powered equipment.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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TLC2272 AVAILABLE OPTIONS

				PACKAGED	DEVICES		
TA	V _{IO} max At 25°C	SMALL CERAMIC OUTLINET LCC (D) (FK)		CERAMIC DIP (JG)	PLASTIC DIP (P)	TSSOP‡ (PW)	CERAMIC FLAT PACK (U)
0°C to 70°C			TLC2272ACP TLC2272CP	TLC2272ACPW TLC2272CPW			
-40°C to 125°C	950 μV 2.5 mV	TLC2272AID TLC2272ID	_	_	TLC2272AIP TLC2272IP	— TLC2272IPW	
-40°C to 125°C	950 μV 2.5 mV	TLC2272AQD TLC2272QD			_	TLC2272AQPW TLC2272QPW	_ _
-55°C to 125°C	950 μV 2.5 mV	TLC2272AMD TLC2272MD	TLC2272AMFK TLC2272MFK	TLC2272AMJG TLC2272MJG	TLC2272AMP TLC2272MP	_	TLC2272AMU TLC2272MU

[†] The D packages are available taped and reeled. Add R suffix to the device type (e.g., TLC2272CDR).

TLC2274 AVAILABLE OPTIONS

			_	PACKAGE	D DEVICES	_	_			
T _A	V _{IO} max AT 25°C	SMALL OUTLINE† (D)	CERAMIC LCC (FK)	CERAMIC DIP (J)	PLASTIC DIP (N)	TSSOP [‡] (PW)	CERAMIC FLAT PACK (W)			
0°C to 70°C	950 μV 2.5 mV	TLC2274ACD TLC2274CD		_	TLC2274ACN TLC2274CN	TLC2274ACPW TLC2274CPW				
4000 1- 40500	950 μV 2.5 mV	TLC2274AID TLC2274ID	_	_	TLC2274AIN TLC2274IN	TLC2274AIPW TLC2274IPW	_			
-40°C to 125°C	950 μV 2.5 mV	TLC2274AQD TLC2274QD	_	_	_	_	_			
-55°C to 125°C	950 μV 2.5 mV	TLC2274AMD TLC2274MD	TLC2274AMFK TLC2274MFK	TLC2274AMJ TLC2274MJ	TLC2274AMN TLC2274MN	_	TLC2274AMW TLC2274MW			

[†] The D packages are available taped and reeled. Add R suffix to device type (e.g., TLC2274CDR).

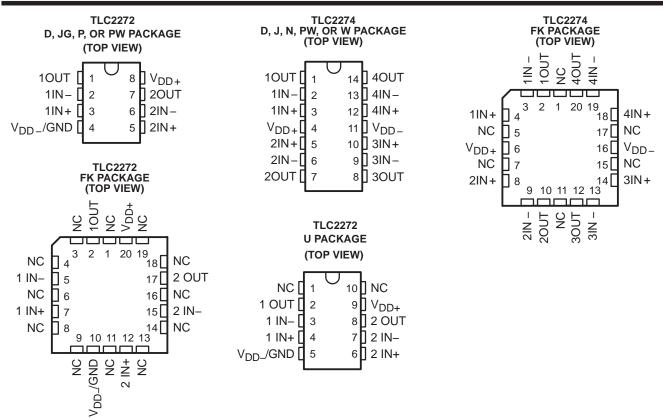


[‡] The PW package is available taped and reeled. Add R suffix to the device type (e.g., TLC2272PWR).

[§] Chips are tested at 25°C.

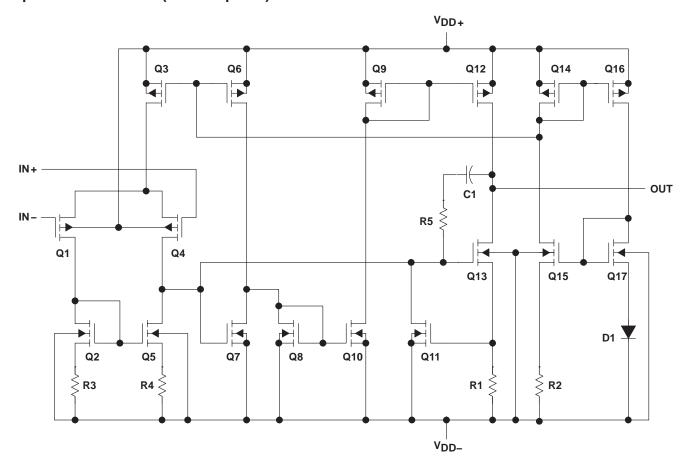
[‡]The PW package is available taped and reeled.

[§] Chips are tested at 25°C.



NC - No internal connection

equivalent schematic (each amplifier)



ACTUAL DEVI	CE COMPONENT	COUNT
COMPONENT	TLC2272	TLC2274
Transistors	38	76
Resistors	26	52
Diodes	9	18
Capacitors	3	6
Capacitors	3	6

[†] Includes both amplifiers and all ESD, bias, and trim circuitry

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

Supply voltage, V _{DD+} (see Note 1))		8 V
Supply voltage, V _{DD} (see Note 1)			
Differential input voltage, V _{ID} (see			
Input voltage range, V _I (any input,			
Input current, I _I (any input)			
Output current, IO			
Total current into V _{DD+}			±50 mA
Total current out of V _{DD}			
Duration of short-circuit current at			
Package thermal impedance, θ _{JA} ((see Notes 4 and 5)	: D package (8 pin)	97.1°C/W
		D package (14 pin)	86.2°C/W
		N package	79.7°C/W
		P package	84.6°C/W
		PW package (8 pin)	149°C/W
		PW package (14 pin)	113°C/W
Package thermal impedance, θ _{JC}	(see Notes 4 and 5)	: FK package	5.6°C/W
-		J package	15.1°C/W
		U package	14.7°C/W
Operating free-air temperature ran	ge, TA: C suffix		0°C to 70°C
	I, Q suffix		40°C to 125°C
	M suffix .		–55°C to 125°C
Storage temperature range			
Lead temperature 1,6 mm (1/16 inc			
Lead temperature 1,6 mm (1/16 inc			

[†] 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 the midpoint between VDD+ and VDD -.

- 2. Differential voltages are at IN+ with respect to IN-. Excessive current will flow if input is brought below V_{DD} 0.3 V.
- 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.
- 4. Maximum power dissipation is a function of $T_J(max)$, θ_{JA} , and T_A . The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(max) T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.
- 5. The package thermal impedance is calculated in accordance with JESD 51-7 (plastic) or MIL-STD-883 Method 1012 (ceramic).

recommended operating conditions

	C S	C SUFFIX		SUFFIX	Q :	SUFFIX	М :	SUFFIX	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	UNIT
Supply voltage, V _{DD±}	±2.2	±8	±2.2	±8	±2.2	±8	±2.2	±8	V
Input voltage, V _I	V _{DD} -	V _{DD+} -1.5	V_{DD-}	V _{DD+} -1.5	V_{DD-}	V _{DD+} -1.5	V_{DD-}	V _{DD+} -1.5	V
Common-mode input voltage, VIC	V _{DD} _	V _{DD+} -1.5	V_{DD-}	V _{DD+} -1.5	V_{DD-}	V _{DD+} -1.5	V_{DD-}	V _{DD+} -1.5	V
Operating free-air temperature, TA	0	70	-40	125	-40	125	-55	125	°C



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TLC2272C electrical characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$ (unless otherwise noted)

	DADAMETED	TEST CON	DITIONS	T. +	T	LC22720	2	TL	.C2272A	C	
	PARAMETER	TEST CON	DITIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
V _{IO}	Input offset voltage			25°C		300	2500		300	950	μV
VIO	input onset voltage			Full range			3000			1500	μν
αΛΙΟ	Temperature coefficient of input offset voltage			25°C to 70°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)	$V_{IC} = 0 \text{ V},$ $V_{DD} \pm = \pm 2.5 \text{ V},$ $V_{O} = 0 \text{ V},$ $R_{S} = 50 \Omega$		25°C		0.002			0.002		μV/mo
IIO	Input offset current			25°C		0.5	60		0.5	60	pА
				Full range			100			100	'
I _{IB}	Input bias current			25°C		1	60		1	60	рA
				Full range			100			100	
VICR	Common-mode input	$R_S = 50 \Omega$,	V _{IO} ≤ 5 mV	25°C	0 to 4	-0.3 to 4.2		0 to 4	-0.3 to 4.2		V
VICK	voltage	113 - 00 32,	[VIO] = 0 IIIV	Full range	0 to 3.5			0 to 3.5			٧
		$I_{OH} = -20 \mu A$		25°C		4.99			4.99		
	High lovel output	I _{OH} = -200 μA		25°C	4.85	4.93		4.85	4.93		
∨он	High-level output voltage	10H = -200 μΑ		Full range	4.85			4.85			V
	renage	I _{OH} = –1 mA		25°C	4.25	4.65		4.25	4.65		
		IOH = - I IIIA		Full range	4.25			4.25			
		$V_{IC} = 2.5 V$,	$I_{OL} = 50 \mu\text{A}$	25°C		0.01			0.01		
		V _{IC} = 2.5 V,	I _{OL} = 500 μA	25°C		0.09	0.15		0.09	0.15	
VOL	Low-level output voltage	V C = 2.5 V,	ΙΟΕ = 300 μΑ	Full range			0.15			0.15	V
		V _{IC} = 2.5 V,	$I_{OL} = 5 \text{ mA}$	25°C		0.9	1.5		0.9	1.5	
		VIC = 2.5 V,	IOL = 3 IIIA	Full range			1.5			1.5	
	Large signal differential	V 2 F V	$R_L = 10 \text{ k}\Omega^{\ddagger}$	25°C	15	35		15	35		
A_{VD}	Large-signal differential voltage amplification	$V_{IC} = 2.5 \text{ V},$ $V_{O} = 1 \text{ V to 4 V}$		Full range	15			15			V/mV
	voltago amplinoation	VO = 1 V 10 1 V	$R_L = 1 \text{ m}\Omega^{\ddagger}$	25°C		175			175		
^r id	Differential input resistance			25°C		10 ¹²			10 ¹²		Ω
rį	Common-mode input resistance			25°C		1012			1012		Ω
ci	Common-mode input capacitance	f = 10 kHz,	P package	25°C		8			8		pF
z _O	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		140			140		Ω
	Common-mode	V _{IC} = 0 V to 2.7 V	/.	25°C	70	75		70	75		
CMRR	rejection ratio	$V_0 = 2.5 \text{ V},$	$R_S = 50 \Omega$	Full range	70			70			dB
	Supply-voltage	V _{DD} = 4.4 V to 16	V,VIC = Vnn/2.	25°C	80	95		80	95		
ksvr	rejection ratio $(\Delta V_{DD}/\Delta V_{IO})$	No load	, IC 100, 21	Full range	80			80			dB
lo s	Cupply surrent	Vo - 2 F V	Nolood	25°C		2.2	3		2.2	3	m ^
lDD	Supply current	$V_{O} = 2.5 \text{ V},$	No load	Full range			3			3	mA

[†]Full range is 0°C to 70°C.

NOTE 6: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150$ °C extrapolated to $T_A = 25$ °C using the Arrhenius equation and assuming an activation energy of 0.96 eV.



[‡]Referenced to 0 V

TLC2272C operating characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$

	DADAMETED	TEAT CONDITI	ONO	- +	Т	LC22720	;	TI	LC2272A	С	LINUT
'	PARAMETER	TEST CONDITI	ONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
	Slew rate at unity	$V_0 = 0.5 \text{ V to } 2.5 \text{ V},$		25°C	2.3	3.6		2.3	3.6		
SR	gain	$R_L = 10 \text{ k}\Omega^{\ddagger}, \qquad C_L = 10 \text{ k}\Omega^{\ddagger}$	= 100 pF‡	Full range	1.7			1.7			V/μs
	Equivalent input	f = 10 Hz		25°C		50			50		nV/√ Hz
Vn	noise voltage	f = 1 kHz		25°C		9			9		nv/√Hz
.,	Peak-to-peak	f = 0.1 Hz to 1 Hz		25°C		1					
VNPP	equivalent input noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			1.4		μV
In	Equivalent input noise current			25°C		0.6			0.6		fA/√Hz
		$V_{\Omega} = 0.5 \text{ V to } 2.5 \text{ V},$	A _V = 1			0.0013%			0.0013%		
THD + N	Total harmonic distortion plus noise	f = 20 kHz,	A _V = 10	25°C		0.004%			0.004%		
	distortion plus holse	$R_L = 10 \text{ k}\Omega^{\ddagger}$	A _V = 100			0.03%			0.03%		
	Gain-bandwidth product	$f = 10 \text{ kHz}, R_L = 100 \text{ pF}^{\ddagger}$	= 10 kΩ [‡] ,	25°C		2.18			2.18		MHz
ВОМ	Maximum output-swing bandwidth	$V_{O(PP)} = 2 \text{ V}, \qquad A_{V} = R_{L} = 10 \text{ k}\Omega^{\ddagger}, \qquad C_{L} = 0$	= 1, = 100 pF‡	25°C		1			1		MHz
	Cattling time	$A_V = -1$, Step = 0.5 V to 2.5 V,	To 0.1%	25°C		1.5			1.5		
t _S	Settling time	$R_L = 10 \text{ k}\Omega^{\ddagger},$ $C_L = 100 \text{ pF}^{\ddagger}$	To 0.01%	20 0		2.6			2.6		μ\$
φm	Phase margin at unity gain	$R_L = 10 \text{ k}\Omega^{\ddagger}, C_L = 10 \text{ k}\Omega^{\ddagger}$	= 100 pF‡	25°C		50°			50°		
	Gain margin	1	•	25°C		10			10		dB

[†] Full range is 0°C to 70°C. ‡ Referenced to 0 V



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TLC2272C electrical characteristics at specified free-air temperature, $V_{DD\pm}$ = ± 5 V (unless otherwise specified)

	PARAMETER	TEST CC	NDITIONS	- +	TI	_C22720)	TL	.C2272A	C	
	PARAMETER	1231 00	MUITIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
V	Input offeet voltage			25°C		300	2500		300	950	μV
VIO	Input offset voltage			Full range			3000			1500	μν
αΝΙΟ	Temperature coefficient of input offset voltage]		25°C to 70°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)	$V_{IC} = 0 V,$ $R_S = 50 \Omega$	V _O = 0 V,	25°C		0.002			0.002		μV/mo
lio	Input offset current			25°C		0.5	60		0.5	60	pА
10	input onset current	1		Full range			100			100	PΛ
I _{IB}	Input bias current			25°C		1	60		1	60	pА
'IB	input bias current			Full range			100			100	Pr
VICR	Common-mode input	Rs = 50 Ω,	V _{IO} ≤5 mV	25°C	–5 to 4	-5.3 to 4.2		-5 to 4	-5.3 to 4.2		V
VICK	voltage	115 = 50 32,	V O = 0 111 V	Full range	-5 to 3.5			-5 to 3.5			V
		$I_0 = -20 \mu A$		25°C		4.99			4.99		
	Maximum positive peak	$I_{O} = -200 \mu A$	1	25°C	4.85	4.93		4.85	4.93		
VOM+	output voltage	10 = -200 μ/	`	Full range	4.85			4.85			V
	3.	I _O = -1 mA		25°C	4.25	4.65		4.25	4.65		
				Full range	4.25			4.25			
		$V_{IC} = 0 V$	I _O = 50 μA	25°C		-4.99			-4.99		
	Maximum negative peak	V _{IC} = 0 V,	ΙΟ = 500 μΑ	25°C	-4.85	-4.91		-4.85	-4.91		
VOM−	output voltage	10 - 7		Full range	-4.85			-4.85			V
		$V_{IC} = 0 V$	$I_O = 5 \text{ mA}$	25°C	-3.5	-4.1		-3.5	-4.1		
			 	Full range	-3.5			-3.5			
	Large-signal differential		$R_L = 10 \text{ k}\Omega$	25°C	25	50		25	50		
AVD	voltage amplification	$V_O = \pm 4 V$	D 4 == 0	Full range	25	200		25	200		V/mV
	Differential inner	-	$R_L = 1 \text{ m}\Omega$	25°C		300			300		
^r id	Differential input resistance			25°C		1012			1012		Ω
rį	Common-mode input resistance			25°C		1012			1012		Ω
ci	Common-mode input capacitance	f = 10 kHz,	P package	25°C		8			8		pF
z _o	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		130			130		Ω
CMDD	Common-mode rejection	$V_{IC} = -5 V to$	2.7 V,	25°C	75	80		75	80		40
CMRR	ratio	$V_O = 0 V$	$R_S = 50 \Omega$	Full range	75			75			dB
kovo	Supply-voltage rejection	$V_{DD\pm} = 2.2$		25°C	80	95		80	95		dB
ksvr	ratio ($\Delta V_{DD\pm}/\Delta V_{IO}$)	$V_{IC} = 0 V$	No load	Full range	80			80			ub
Inc	Supply current	V _O = 0 V	No load	25°C		2.4	3		2.4	3	mA
IDD	очрріу сипені	νO = 0 ν	INU IUdU	Full range			3			3	IIIA

[†] Full range is 0°C to 70°C.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150^{\circ}C$ extrapolated to $T_A = 25^{\circ}C$ using the Arrhenius equation and assuming an activation energy of 0.96 eV.



TLC2272C operating characteristics at specified free-air temperature, $V_{DD\pm}$ = $\pm 5~\text{V}$

		TEST CONDITIO	210	_ +		TLC22720	;	Т	С		
P/	ARAMETER	TEST CONDITION	ONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
				25°C	2.3	3.6		2.3	3.6		
SR	Slew rate at unity gain	$V_O = \pm 2.3 \text{ V},$ R $C_L = 100 \text{ pF}$	t _L = 10 kΩ,	Full range	1.7			1.7			V/µs
.,	Equivalent input	f = 10 Hz		25°C		50			50		nV/√ Hz
Vn	noise voltage	f = 1 kHz		25°C		9			9		nv/∜HZ
\/	Peak-to-peak equivalent input	f = 0.1 Hz to 1 Hz		25°C		1			1		
VNPP	noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			μV		
In	Equivalent input noise current			25°C		0.6			0.6		fA/√Hz
	Total harmonic	$V_0 = \pm 2.3 \text{ V},$	$A_V = 1$			0.0011%			0.0011%		
THD + N	distortion pulse	f = 20 kHz,	$A_{V} = 10$	25°C		0.004%			0.004%		
	duration	$R_L = 10 \text{ k}\Omega$	$A_{V} = 100$			0.03%			0.03%		
	Gain-bandwidth product	f = 10 kHz, R C _L = 100 pF	L = 10 kΩ,	25°C		2.25			2.25		MHz
ВОМ	Maximum output- swing bandwidth	O ()	v = 1, L = 100 pF	25°C		0.54			0.54		MHz
	Cassilia a sima	$A_V = -1$, Step = -2.3 V to 2.3 V,	To 0.1%	25°C		1.5			1.5		
t _S	Settling time	R_L = 10 kΩ, C_L = 100 pF	To 0.01%	∠5°C		3.2			3.2		μS
φm	Phase margin at unity gain	$R_{I} = 10 \text{ k}\Omega,$	S _I = 100 pF	25°C		52°			52°		
	Gain margin	1 - ′	- '	25°C		10			10		dB

[†] Full range is 0°C to 70°C.

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TLC2274C electrical characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$ (unless otherwise noted)

	PARAMETER	TEST CON	IDITIONS	- +	Т	LC2274	С	TL	.C2274A	C	
	PARAMETER	TEST CON	IDITIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
V _{IO}	Input offset voltage			25°C		300	2500		300	950	μV
VIO	Input onset voltage			Full range			3000			1500	μν
αΛΙΟ	Temperature coefficient of input offset voltage			25°C to 70°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)	$V_{DD\pm} = \pm 2.5 \text{ V},$ $V_{O} = 0 \text{ V},$	$V_{IC} = 0 V$, $R_S = 50 \Omega$	25°C		0.002			0.002		μV/mo
IIO	Input offset current			25°C		0.5	60		0.5	60	pА
10	mpat onoot ourront			Full range			100			100	P/
I _{IB}	Input bias current			25°C		1	60		1	60	pА
,IR	input blub ourrent			Full range			100			100	P/
V _{ICR}	Common-mode input	R _S = 50 Ω,	$ V_{IO} \le 5 \text{ mV},$	25°C	0 to 4	-0.3 to 4.2		0 to 4	-0.3 to 4.2		V
VICR	voltage	115 - 30 22,	1V O = 3 111V,	Full range	0 to 3.5			0 to 3.5			V
		$I_{OH} = -20 \mu A$		25°C		4.99			4.99		
		1 200 4		25°C	4.85	4.93		4.85	4.93		
Vон	High-level output voltage	I _{OH} = -200 μA		Full range	4.85			4.85			V
		1 4 1		25°C	4.25	4.65		4.25	4.65		
		$I_{OH} = -1 \text{ mA}$		Full range	4.25			4.25			
		V _{IC} = 2.5 V,	I _{OL} = 50 μA	25°C		0.01			0.01		
		V _{IC} = 2.5 V, I _{OL} = 500 μA		25°C		0.09	0.15		0.09	0.15	
VOL	Low-level output voltage	VIC = 2.5 V, IC)[= 500 μΑ	Full range			0.15			0.15	V
		V _{IC} = 2.5 V,	I _{OL} = 5 mA	25°C		0.9	1.5		0.9	1.5	
		VIC = 2.5 V,	IOL = 3 IIIA	Full range			1.5			1.5	
	Laura d'avail d'ffanair (al	0.537	B. 40 kot	25°C	15	35		15	35		
AVD	Large-signal differential voltage amplification	$V_{IC} = 2.5 \text{ V},$ $V_{O} = 1 \text{ V to 4 V}$	$R_L = 10 \text{ k}\Omega^{\ddagger}$	Full range	15			15			V/mV
	voltage amplification	VO = 1 V 10 4 V	$R_L = 1 \text{ m}\Omega^{\ddagger}$	25°C		175			175		
r _{id}	Differential input resistance			25°C		10 ¹²			10 ¹²		Ω
rį	Common-mode input resistance			25°C		1012			1012		Ω
ci	Common-mode input capacitance	f = 10 kHz,	N package	25°C		8			8		pF
z _O	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		140			140		Ω
OL ADS	Common-mode rejection	V _{IC} = 0 V to 2.7 \	/,	25°C	70	75		70	75		
CMRR	ratio	$V_0 = 2.5 \text{ V},$	$R_S = 50 \Omega$	Full range	70			70			dB
	Supply-voltage rejection	V _{DD} = 4.4 V to 1	6 V,	25°C	80	95		80	95		.15
ksvr	ratio (ΔV _{DD} /ΔV _{IO})	$V_{IC} = V_{DD}/2$,	No load	Full range	80			80			dB
	0 1	V 0.7.		25°C		4.4	6		4.4	6	
IDD	Supply current	$V_0 = 2.5 V$,	No load	Full range			6			6	mA

[†] Full range is 0°C to 70°C.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150$ °C extrapolated to $T_A = 25$ °C using the Arrhenius equation and assuming an activation energy of 0.96 eV.



[‡]Referenced to 0 V

TLC2274C operating characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$

		TEOT 001/DI		- +	1	TLC22740	;	TI	TLC2274AC		
PA	RAMETER	TEST CONDI	IIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
				25°C	2.3	3.6		2.3	3.6		
SR	Slew rate at unity gain	$V_O = 0.5 \text{ V to } 2.5 \text{ V},$ $R_L = 10 \text{ k}\Omega^{\ddagger},$	$C_L = 100 \text{ pF}^{\ddagger}$	Full range	1.7			1.7			V/μs
\/	Equivalent input	f = 10 Hz		25°C		50			50		-> /// -
Vn	noise voltage	f = 1 kHz		25°C		9			9		nV/√Hz
.,	Peak-to-peak	f = 0.1 Hz to 1 Hz		25°C		1			1		V
V _{N(PP)}	equivalent input noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			1.4		μV
In	Equivalent input noise current			25°C		0.6			0.6		fA/√Hz
	Total harmonic	$V_{O} = 0.5 \text{ V to } 2.5 \text{ V},$	A _V = 1			0.0013%			0.0013%		
THD + N	distortion plus	f = 20 kHz,	A _V = 10	25°C		0.004%			0.004%		
	noise	$R_L = 10 \text{ k}\Omega^{\ddagger}$	A _V = 100			0.03%			0.03%		
	Gain-bandwidth product	f = 10 kHz, C _L = 100 pF‡	$R_L = 10 \text{ k}\Omega^{\ddagger}$,	25°C		2.18			2.18		MHz
ВОМ	Maximum output-swing bandwidth	$V_{O(PP)} = 2 V,$ $R_{L} = 10 \text{ k}\Omega^{\ddagger},$	A _V = 1, C _L = 100 pF‡	25°C		1			1		MHz
	Cottling time	$A_V = -1$, Step = 0.5 V to 2.5 V,	To 0.1%	25°C		1.5			1.5		
t _S	Settling time	$R_L = 10 \text{ k}\Omega^{\ddagger},$ $C_L = 100 \text{ pF}^{\ddagger}$	To 0.01%	25°C		2.6			2.6		μs
φm	Phase margin at unity gain	R _L = 10 kΩ [‡] ,	C _L = 100 pF‡	25°C		50°			50°		
	Gain margin			25°C		10			10		dB

[†] Full range is 0°C to 70°C. ‡ Referenced to 0 V



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TLC2274C electrical characteristics at specified free-air temperature, $V_{DD\pm}$ = ± 5 V (unless otherwise noted)

	DADAMETED	TEST CO	NULTIONS	- +	Т	LC2274	C	TL	.C2274A	C	
	PARAMETER	IESI CC	ONDITIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
VIO	Input offset voltage			25°C		300	2500		300	950	μV
VIO	input onset voltage]		Full range			3000			1500	μν
αΛΙΟ	Temperature coefficient of input offset voltage			25°C to 70°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)	$V_{IC} = 0 V$, $R_S = 50 \Omega$	$V_O = 0 V$,	25°C		0.002			0.002		μV/mo
1	Innut offeet europt]		25°C		0.5	60		0.5	60	
lio	Input offset current			Full range			100			100	рA
lin	Input bias current			25°C		1	60		1	60	рA
IB	input bias current			Full range			100			100	рΑ
\/.05	Common-mode input	Po - 50 O	\/.o. <	25°C	-5 to 4	-5.3 to 4.2		-5 to 4	-5.3 to 4.2		V
VICR	voltage	KS = 50 Ω,	$ V_{IO} \le 5 \text{ mV}$	Full range	-5 to 3.5			-5 to 3.5			V
		I _O = -20 μA		25°C		4.99			4.99		
			Δ.	25°C	4.85	4.93		4.85	4.93		
VOM+	Maximum positive peak output voltage	$I_{O} = -200 \mu$	А	Full range	4.85			4.85			V
	voltage	Ι- 4 Δ		25°C	4.25	4.65		4.25	4.65		
		$I_O = -1 \text{ mA}$		Full range	4.25			4.25			
		$V_{IC} = 0 V$,	ΙΟ = 50 μΑ	25°C		-4.99			-4.99		
				25°C	-4.8 5	-4.91		-4.85	-4.91		
VOM-	Maximum negative peak output voltage	VIC = 0 V,	ΙΟ = 500 μΑ	Full range	-4.8 5			-4.85			V
		.,		25°C	-3.5	-4.1		-3.5	-4.1		1
		VIC = 0 V	$I_O = -5 \text{ mA}$	Full range	-3.5			-3.5			
			D. 1010	25°C	25	50		25	50		
AVD	Large-signal differential voltage amplification	V _O = ±4 V	R _L = 10 kΩ	Full range	25			25			V/mV
	voltage amplification		$R_L = 1 M\Omega$	25°C		300			300		
rid	Differential input resistance			25°C		1012			1012		Ω
rį	Common-mode input resistance			25°C		1012			1012		Ω
ci	Common-mode input capacitance	f = 10 kHz,	N package	25°C		8			8		pF
z _O	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		130			130		Ω
CMRR	Common-mode rejection ratio	V _{IC} = -5 V	to 2.7 V,	25°C	75	80		75	80		dB
CIVIKK	Common-mode rejection ratio	$V_{O} = 0 V,$	$R_S = 50 \Omega$	Full range	75			75			uD
kovis	Supply-voltage rejection ratio	V _{DD±} = ±2.	2 V to ±8 V,	25°C	80	95		80	95		dB
ksvr	$(\Delta V_{DD\pm}/\Delta V_{IO})$	$V_{IC} = 0 V$	No load	Full range	80			80			uD
Inc	Supply current	V _O = 0 V,	No load	25°C		4.8	6		4.8	6	mA
IDD	Зарріу сапені	νΟ = υ ν,	INU IUaU	Full range			6			6	IIIA

[†] Full range is 0°C to 70°C.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150^{\circ}C$ extrapolated to $T_A = 25^{\circ}C$ using the Arrhenius equation and assuming an activation energy of 0.96 eV.



TLC2274C operating characteristics at specified free-air temperature, $V_{DD\pm}$ = $\pm 5~\text{V}$

		TEGT CONDU	FIGNIC	_ +	Т	TLC22740	;	TI	_C2274A	С	
P.	ARAMETER	TEST CONDIT	TIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
	01		4010	25°C	2.3	3.6		2.3	3.6		
SR	Slew rate at unity gain	$V_{O} = \pm 2.3 \text{ V}, \qquad R_{L}$ $C_{L} = 100 \text{ pF}$	= 10 kΩ,	Full range	1.7			1.7			V/μs
.,	Equivalent input	f = 10 Hz		25°C		50			50		nV/√ Hz
Vn	noise voltage	f = 1 Hz		25°C		9			9		nv/√HZ
V	Peak-to-peak equivalent input	f = 0.1 Hz to 1 Hz		25°C		1			1		
V _{N(PP)}	noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			1.4		μV
In	Equivalent input noise current			25°C		0.6			0.6		fA/√Hz
	Total harmonic	$V_0 = \pm 2.3 \text{ V},$	A _V = 1			0.0011%			0.0011%		
THD + N	distortion plus	f = 20 kHz,	$A_{V} = 10$	25°C		0.004%			0.004%		
	noise	$R_L = 10 \text{ k}\Omega$	$A_{V} = 100$			0.03%			0.03%		
	Gain-bandwidth product	$f = 10 \text{ kHz}, \qquad \text{R}_{\text{L}}$ $\text{C}_{\text{L}} = 100 \text{ pF}$	= 10 kΩ,	25°C		2.25			2.25		MHz
B _{OM}	Maximum output-swing bandwidth	$V_{O(PP)} = 4.6 \text{ V}, A_{V}$ $R_{L} = 10 \text{ k}\Omega, C_{L}$	= 1, = 100 pF	25°C		0.54			0.54		MHz
	Cattling time	$A_V = -1$, Step = -2.3 V to 2.3 V	V, To 0.1%	25°C		1.5			1.5		
t _S	Settling time	$R_L = 10 \text{ k}\Omega$, $C_L = 100 \text{ pF}$	To 0.01%	25-0		3.2			3.2		μs
фm	Phase margin at unity gain	$R_{I} = 10 \text{ k}\Omega, \qquad C_{I}$	= 100 pF	25°C		52°			52°		
	Gain margin	1 -	•	25°C		10			10		dB

[†] Full range is 0°C to 70°C.

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TLC2272I electrical characteristics at specified free-air temperature, V_{DD} = 5 V (unless otherwise noted)

	PARAMETER	TEST CO	NDITIONS	-+	_	TLC2272	l	Т	LC2272	AI .	
	PARAMETER	1231 001	NDITIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
\/	Input offset voltage			25°C		300	2500		300	950	μV
V _{IO}	input onset voltage]		Full range			3000			1500	μν
α_{VIO}	Temperature coefficient of input offset voltage			25°C to 85°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)		$V_{DD\pm} = \pm 2.5 \text{ V}$	25°C		0.002			0.002		μV/mo
		$V_O = 0 V$,	$R_S = 50 \Omega$	25°C		0.5	60		0.5	60	
I _{IO}	Input offset current			-40°C to 85°C			150			150	pА
				Full range			800			800	
				25°C		1	60		1	60	
I _{IB}	Input bias current			-40°C to 85°C			150			150	pА
				Full range			800			800	
V _{ICR}	Common-mode input	$R_S = 50 \Omega$	V _{IO} ≤ 5 mV	25°C	0 to 4	-0.3 to 4.2		0 to 4	-0.3 to 4.2		V
·ICK	voltage	1.5 00 11,	[10]= 0	Full range	0 to 3.5			0 to 3.5			·
		$I_{OH} = -20 \mu A$		25°C		4.99			4.99		
	High-level output	I _{OH} = -200 μA		25°C	4.85	4.93		4.85	4.93		
V_{OH}	voltage	I _{OH} = -200 μA	Full range	4.85			4.85			V	
	-			25°C	4.25	4.65		4.25	4.65		
				Full range	4.25			4.25			
		$V_{IC} = 2.5 \text{ V},$	I _{OL} = 50 μA	25°C		0.01			0.01	0.4=	
. ,	Low-level output	V _{IC} = 2.5 V,	$I_{OL} = 500 \mu A$	25°C	ļ	0.09	0.15		0.09	0.15	.,
V_{OL}	voltage			Full range 25°C		0.0	0.15		0.0	0.15	V
		$V_{IC} = 2.5 V$,	$I_{OL} = 5 \text{ mA}$			0.9	1.5		0.9	1.5 1.5	
			I	Full range 25°C	15	35	1.5	15	35	1.5	
۸	Large-signal differential	$V_{IC} = 2.5 V$,	$R_L = 10 \text{ k}\Omega^{\ddagger}$	Full range	15	- 33		15	- 33		V/m\
A_{VD}	voltage amplification	$V_0 = 1 \text{ V to 4 V}$	$R_L = 1 \text{ m}\Omega^{\ddagger}$	25°C	10	175		- 10	175		V/1111
r _{id}	Differential input resistance		11 11132	25°C		10 ¹²			10 ¹²		Ω
r _i	Common-mode input resistance			25°C		10 ¹²			10 ¹²		Ω
c _i	Common-mode input capacitance	f = 10 kHz,	P package	25°C		8			8		pF
z _o	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		140			140		Ω
CMRR	Common-mode	$V_{IC} = 0 \text{ V to } 2.7 \text{ V}$		25°C	70	75		70	75		dB
	rejection ratio	$V_0 = 2.5 \text{ V},$	$R_S = 50 \Omega$	Full range	70			70			
k _{SVR}	Supply-voltage rejection ratio	V _{DD} = 4.4 V to 1		25°C	80	95		80	95		dB
3410	$(\Delta V_{DD}/\Delta V_{IO})$	$V_{IC} = V_{DD}/2$,	No load	Full range	80			80			
I _{DD}	Supply current	V _O = 2.5 V,	No load	25°C		2.2	3		2.2	3	mA
יטטי	Cappiy Carrent	10 = 2.0 v,	1.0 1000	Full range			3			3	111/

[†] Full range is – 40°C to 125°C.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at T_A = 150°C extrapolated to $T_A = 25^{\circ}C$ using the Arrhenius equation and assuming an activation energy of 0.96 eV.



[‡]Referenced to 0 V

TLC2272I operating characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$

	DAMETER	TEST CONDITION	2110	- +		TLC2272I		1	LC2272AI		
PA	ARAMETER	TEST CONDITION	ONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
	Olassa mata at	V 05V1-05V		25°C	2.3	3.6		2.3	3.6		
SR	Slew rate at unity gain	$V_O = 0.5 \text{ V to } 2.5 \text{ V},$ $R_L = 10 \text{ k}\Omega^{\ddagger},$ C_I	_ = 100 pF‡	Full range	1.7			1.7			V/μs
.,	Equivalent input	f = 10 Hz		25°C		50			50		nV√ Hz
V _n	noise voltage	f = 1 kHz		25°C		9			9		nv√Hz
V	Peak-to-peak equivalent input	f = 0.1 Hz to 1 Hz		25°C		1			1		\/
V _{NPP}	noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			1.4		μV
In	Equivalent input noise current			25°C		0.6			0.6		fA√Hz
	Total harmonic	$V_{O} = 0.5 \text{ V to } 2.5 \text{ V},$	A _V = 1			0.0013%			0.0013%		
THD + N	distortion plus	f = 20 kHz,	$A_{V} = 10$	25°C		0.004%			0.004%		
	noise	$R_L = 10 \text{ k}\Omega^{\ddagger}$	$A_{V} = 100$			0.03%			0.03%		
	Gain-bandwidth product	$f = 10 \text{ kHz},$ $C_L = 100 \text{ pF}^{\ddagger}$	$_{-}$ = 10 k Ω [‡] ,	25°C		2.18			2.18		MHz
ВОМ	Maximum output- swing bandwidth		/ = 1, _ = 100 pF‡	25°C		1			1		MHz
	Settling time	$A_V = -1$, Step = 0.5 V to 2.5 V,	To 0.1%	25°C		1.5			1.5		
t _S	Setting time	$R_L = 10 \text{ k}\Omega^{\ddagger},$ $C_L = 100 \text{ pF}^{\ddagger}$	To 0.01%	20 0		2.6			2.6		μS
фm	Phase margin at unity gain	$R_{I} = 10 \text{ k}\Omega^{\ddagger},$ C_{I}	= 100 pF‡	25°C		50°			50°		
	Gain margin] -	- '	25°C		10			10		dB

[†] Full range is – 40°C to 125°C. ‡ Referenced to 0 V

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TLC2272I electrical characteristics at specified free-air temperature, $V_{DD\pm}$ = ± 5 V (unless otherwise noted)

	PARAMETER	TEST CO	NDITIONS		Т	LC2272I		Т	LC2272A	_	
	PARAMETER	lesi coi	NDITIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
V	lanut offeet veltere			25°C		300	2500		300	950	\/
V_{IO}	Input offset voltage			Full range			3000			1500	μV
α_{VIO}	Temperature coefficient of input offset voltage			25°C to 85°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)	$V_{IC} = 0 V$, $R_S = 50 \Omega$	V _O = 0 V,	25°C		0.002			0.002		μV/mo
				25°C		0.5	60		0.5	60	
I _{IO}	Input offset current			-40°C to 85°C			150			150	pА
				Full range			800			800	
				25°C		1	60		1	60	
I _{IB}	Input bias current			-40°C to 85°C			150			150	pА
				Full range			800			800	
.,	Common-mode	B 50.0	\\ \< 5 ~~\\	25°C	–5 to 4	-5.3 to 4.2		–5 to 4	-5.3 to 4.2		V
V _{ICR}	input voltage	$R_S = 50 \Omega$,	$ V_{IO} \le 5 \text{ mV}$	Full range	-5 to 3.5			–5 to 3.5			V
		$I_O = -20 \mu A$		25°C		4.99			4.99		
		J 200 A		25°C	4.85	4.93		4.85	4.93		
V _{OM+}	Maximum positive peak output voltage	$I_{O} = -200 \mu\text{A}$		Full range	4.85			4.85			V
	peak output voltage	1 4 4		25°C	4.25	4.65		4.25	4.65		
		$I_O = -1 \text{ mA}$		Full range	4.25			4.25			
		$V_{IC} = 0 V$,	I _O = 50 μA	25°C		-4.99			-4.99		
		V 0V	I 500 ·· A	25°C	-4.85	-4.91		-4.85	-4.91		
V _{OM} _	Maximum negative peak output voltage	$V_{IC} = 0 V$	$I_{O} = 500 \mu A$	Full range	-4.85			-4.85			V
	peak output voltage	V 0V	I 5 A	25°C	-3.5	-4.1		-3.5	-4.1		
		$V_{IC} = 0 V$,	$I_O = 5 \text{ mA}$	Full range	-3.5			-3.5			
	Large-signal		5 4010	25°C	25	50		25	50		
A_{VD}	differential voltage	$V_O = \pm 4 \text{ V}$	$R_L = 10 \text{ k}\Omega$	Full range	25			25			V/mV
	amplification		$R_L = 1 \text{ m}\Omega$	25°C		300			300		
r _{id}	Differential input resistance			25°C		10 ¹²			10 ¹²		Ω
r _i	Common-mode input resistance			25°C		10 ¹²			10 ¹²		Ω
Ci	Common-mode input capacitance	f = 10 kHz,	P package	25°C		8			8		pF
z _o	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		130			130		Ω
CMRR	Common-mode	$V_{IC} = -5 \text{ V to } 2.7$		25°C	75	80		75	80		dB
CIVIRR	rejection ratio	$V_O = 0 V$,	$R_S = 50 \Omega$	Full range	75			75			UD
k _{SVR}	Supply-voltage rejection ratio	$V_{DD} = 4.4 \text{ V to } 1$ $V_{IC} = V_{DD}/2$,	6 V, No load	25°C	80	95		80	95		dB
	$(\Delta V_{DD\pm}/\Delta V_{IO})$	VIC - VDD/2,	INO IOdu	Full range	80			80			
l	Supply current	V _O = 0 V,	No load	25°C		2.4	3		2.4	3	mA
I _{DD}	Supply culterit	vO = 0 v,	INU IUdU	Full range		_	3	_	· <u> </u>	3	IIIA

[†] Full range is – 40°C to 125°C.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150$ °C extrapolated to $T_A = 25$ °C using the Arrhenius equation and assuming an activation energy of 0.96 eV.



TLC2272I operating characteristics at specified free-air temperature, $V_{DD\pm}$ = $\pm 5~V$

		TEGT CONDITIO		_ +		TLC2272I		Т	LC2272A	J	
12/	ARAMETER	TEST CONDITIO	ONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
	Slew rate at	$V_0 = \pm 2.3 \text{ V}, R$	ı = 10 kΩ,	25°C	2.3	3.6		2.3	3.6		
SR	unity gain	$C_L = 100 \text{ pF}$	L = 10 KS2,	Full range	1.7			1.7			V/μs
.,	Equivalent input	f = 10 Hz		25°C		50			50		nV√ Hz
Vn	noise voltage	f = 1 kHz		25°C		9			9		nv√Hz
\/	Peak-to-peak equivalent input	f = 0.1 Hz to 1 Hz		25°C		1			1		
VNPP	noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			1.4		μV
In	Equivalent input noise current			25°C		0.6			0.6		fA√ Hz
	Total harmonic	V _O = ±2.3 V	A _V = 1			0.0011%			0.0011%		
THD + N	distortion plus	$R_L = 10 \text{ k}\Omega$	$A_{V} = 10$	25°C		0.004%			0.004%		
	noise	f = 20 kHz	$A_{V} = 100$			0.03%			0.03%		
	Gain-bandwidth product	f = 10 kHz, R C _L = 100 pF	L = 10 kΩ,	25°C		2.25			2.25		MHz
B _{OM}	Maximum output-swing bandwidth	$V_{O(PP)} = 4.6 \text{ V},$ Aν $R_{L} = 10 \text{ k}\Omega,$ C	v = 1, L = 100 pF	25°C		0.54			0.54		MHz
	Cattling time	$A_V = -1$, Step = -2.3 V to 2.3 V,	To 0.1%	25°C		1.5			1.5		
t _S	Settling time	R_L = 10 kΩ, C_L = 100 pF	To 0.01%	25°C		3.2			3.2		μs
фm	Phase margin at unity gain	$R_{I} = 10 \text{ k}\Omega,$ C	ı = 100 pF	25°C		52°			52°		
	Gain margin	1 -	- '	25°C		10			10		dB

[†] Full range is –40°C to 125°C.

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TLC2274I electrical characteristics at specified free-air temperature, V_{DD} = 5 V (unless otherwise noted)

	PARAMETER	TEST CON	IDITIONS	T +	Т	LC2274	ı	TI	LC2274	AI .	LINUT
	FARAIVIETER	1231 CON	פאטוויטו	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
V _{IO}	Input offset voltage			25°C		300	2500		300	950	μV
V10	input onset voltage]		Full range			3000			1500	μν
α_{VIO}	Temperature coefficient of input offset voltage			25°C to 85°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)	$V_{DD\pm} = \pm 2.5 \text{ V},$	V:==0.V	25°C		0.002			0.002		μV/mo
		$V_{O} = 0 \text{ V},$	$R_S = 50 \Omega$	25°C		0.5	60		0.5	60	
I _{IO}	Input offset current			-40°C to 85°C			150			150	рА
				Full range			800			800	
]		25°C		1	60		1	60	
I_{IB}	Input bias current			-40°C to 85°C			150			150	рА
				Full range			800			800	
V	Common-mode input	D 500	N/ 1< 5 m)/	25°C	0 to 4	-0.3 to 4.2		0 to 4	-0.3 to 4.2		V
V _{ICR}	voltage	$R_S = 50 \Omega$,	$ V_{IO} \le 5 \text{ mV}$	Full range	0 to 3.5			0 to 3.5			V
		$I_{OH} = -20 \mu A$		25°C		4.99			4.99		
				25°C	4.85	4.93		4.85	4.93		
V _{OH}	High-level output voltage	$I_{OH} = -200 \mu A$		Full range	4.85			4.85			V
				25°C	4.25	4.65		4.25	4.65		
		$I_{OH} = -1 \text{ mA}$		Full range	4.25			4.25			
		V _{IC} = 2.5 V,	I _{OL} = 50 μA	25°C		0.01			0.01		
		V 25V	I 500 A	25°C		0.09	0.15		0.09	0.15	
V_{OL}	Low-level output voltage	$V_{IC} = 2.5 \text{ V},$	$I_{OL} = 500 \mu\text{A}$	Full range			0.15			0.15	V
		V _{IC} = 2.5 V,	I _{OL} = 5 mA	25°C		0.9	1.5		0.9	1.5	
		V _{IC} = 2.5 V,	10L = 2 111A	Full range			1.5			1.5	
			B 10 kgt	25°C	15	35		15	35		
A_{VD}	Large-signal differential voltage amplification	$V_{IC} = 2.5 \text{ V},$ $V_{O} = 1 \text{ V to 4 V}$	$R_L = 10 \text{ k}\Omega^{\ddagger}$	Full range	15			15			V/mV
	ronage ampimoanon		$R_L = 1 M\Omega^{\ddagger}$	25°C		175			175		
r _{id}	Differential input resistance			25°C		10 ¹²			10 ¹²		Ω
r _i	Common-mode input resistance			25°C		10 ¹²			10 ¹²		Ω
c _i	Common-mode input capacitance	f = 10 kHz,	N package	25°C		8			8		pF
Z _O	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		140			140		Ω
CMDD	Common-mode rejection	V _{IC} = 0 V to 2.7 V	V,	25°C	70	75		70	75		40
CMRR	ratio	$V_0 = 2.5 \text{ V},$	$R_S = 50 \Omega$	Full range	70			70			dB
l _e	Supply-voltage rejection	V _{DD} = 4.4 V to 1	6 V,	25°C	80	95		80	95		٩D
k _{SVR}	ratio (ΔV _{DD} /ΔV _{IO})	$V_{IC} = V_{DD}/2,$	No load	Full range	80			80			dB
1	Supply current	V 2 5 V	No load	25°C		4.4	6		4.4	6	m^
I _{DD}	Supply current	$V_0 = 2.5 \text{ V},$	INU IUaU	Full range			6			6	mA

[†] Full range is – 40°C to 125°C.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150$ °C extrapolated to $T_A = 25$ °C using the Arrhenius equation and assuming an activation energy of 0.96 eV.



[‡]Referenced to 0 V

TLC2274I operating characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$

		TEGT CONDITI	0110	_ +		TLC22741		Т	LC2274A	J	
	PARAMETER	TEST CONDITI	ONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
	01	V 05V 05V		25°C	2.3	3.6		2.3	3.6		
SR	Slew rate at unity gain	$V_O = 0.5 \text{ V to } 2.5 \text{ V},$ $R_L = 10 \text{ k}\Omega^{\ddagger}, C_L =$	100 pF‡	Full range	1.7			1.7			V/μs
	Equivalent input	f = 10 Hz		25°C		50			50		nV/√ Hz
V _n	noise voltage	f = 1 kHz		25°C		9			9		nv/√HZ
	Peak-to-peak	f = 0.1 Hz to 1 Hz		25°C		1			1		V
V _{N(PP)}	equivalent input noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			1.4		μV
In	Equivalent input noise current			25°C		0.6			0.6		fA/√Hz
		$V_O = 0.5 \text{ V to } 2.5 \text{ V},$	A _V = 1			0.0013%			0.0013%		
THD + N	Total harmonic distortion plus noise	f = 20 kHz,	A _V = 10	25°C		0.004%			0.004%		
	allotoratori prao riolog	$R_L = 10 \text{ k}\Omega^{\ddagger}$	$A_{V} = 100$			0.03%			0.03%		
	Gain-bandwidth product	$f = 10 \text{ kHz}, R_L = C_L = 100 \text{ pF}^{\ddagger}$	10 kΩ [‡] ,	25°C		2.18			2.18		MHz
ВОМ	Maximum output-swing bandwidth	$V_{O(PP)} = 2 \text{ V}, A_{V} = R_{L} = 10 \text{ k}\Omega^{\ddagger}, C_{L} = 0$	1, 100 pF [‡]	25°C		1			1		MHz
4	Cattling time	$A_V = -1$, Step = 0.5 V to 2.5 V,	To 0.1%	25°C		1.5			1.5		
t _S	Settling time	$R_L = 10 \text{ k}\Omega^{\ddagger},$ $C_L = 100 \text{ pF}^{\ddagger}$	To 0.01%	25 0		2.6			2.6		μs
φm	Phase margin at unity gain	$R_{I} = 10 \text{ k}\Omega^{\ddagger}, C_{I} =$	100 pF [‡]	25°C		50°			50°		
	Gain margin] -	•	25°C		10			10		dB

[†] Full range is – 40°C to 125°C. ‡ Referenced to 0 V

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TLC2274I electrical characteristics at specified free-air temperature, $V_{DD\pm}$ = ± 5 V (unless otherwise noted)

	DADAMETED	TEST C	ONDITIONS		Т	LC2274I		TI	LC2274A	I	
	PARAMETER	1551 C	ONDITIONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
V	Innut offset voltage			25°C		300	2500		300	950	\/
V _{IO}	Input offset voltage			Full range			3000			1500	μV
ανιο	Temperature coefficient of input offset voltage			25°C to 85°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)	V 0V	V 0V	25°C		0.002			0.002		μV/mo
		$V_{IC} = 0 V$, $R_S = 50 \Omega$	ν _O = υ ν,	25°C		0.5	60		0.5	60	
I _{IO}	Input offset current			-40°C to 85°C			150			150	рА
				Full range			800			800	
		1		25°C		1	60		1	60	
I_{IB}	Input bias current			-40°C to 85°C			150			150	рА
				Full range			800			800	
V	Common-mode input	B - 50.0	V _{IO} ≤ 5 mV	25°C	–5 to 4	-5.3 to 4.2		–5 to 4	-5.3 to 4.2		V
V _{ICR}	voltage	$R_{\rm S} = 50 \Omega_{\rm s}$	1010 ≥ 2 min	Full range	-5 to 3.5			–5 to 3.5			V
		$I_0 = -20 \mu A$		25°C		4.99			4.99		
		. 200	^	25°C	4.85	4.93		4.85	4.93		
V _{OM+}	Maximum positive peak output voltage	$I_{O} = -200 \mu$	A	Full range	4.85			4.85			V
	early are remarked	I _O = -1 mA		25°C	4.25	4.65		4.25	4.65		
		10 = - 1 1114		Full range	4.25			4.25			
		$V_{IC} = 0 V$,	$I_O = 50 \mu A$	25°C		-4.99			-4.99		
	Mandagon a south or a set	V ₁₀ = 0 V	I _O = 500 μA	25°C	-4.85	-4.91		-4.85	-4.91		
V _{OM} –	Maximum negative peak output voltage	V ₁ C = 0 V,	10 = 000 μ/τ	Full range	-4.85			-4.85			V
	. 0	V _{IC} = 0 V,	I _O = 5 mA	25°C	-3.5	-4.1		-3.5	-4.1		
		V _{IC} = 0 V,	10 = 3 11/1	Full range	-3.5			-3.5			
	Large-signal differential		$R_1 = 10 \text{ k}\Omega$	25°C	25	50		25	50		
A_{VD}	voltage amplification	$V_O = \pm 4 V$	_	Full range	25			25			V/mV
			$R_L = 1 M\Omega$	25°C		300			300		
r _{id}	Differential input resistance			25°C		10 ¹²			10 ¹²		Ω
r _i	Common-mode input resistance			25°C		10 ¹²			10 ¹²		Ω
Ci	Common-mode input capacitance	f = 10 kHz,	N package	25°C		8			8		pF
Z _O	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		130			130		Ω
CMDD	Common-mode rejection	$V_{IC} = -5 V t$	o 2.7 V,	25°C	75	80		75	80		٩D
CMRR	ratio	$V_O = 0 V$,	$R_S = 50 \Omega$	Full range	75			75			dB
kau-	Supply-voltage rejection	$V_{DD\pm} = \pm 2.2$		25°C	80	95		80	95		dB
k _{SVR}	ratio ($\Delta V_{DD\pm}/\Delta V_{IO}$)	$V_{IC} = 0 V$,	No load	Full range	80			80			ub
I _{DD}	Supply current	V _O = 0 V,	No load	25°C		4.8	6		4.8	6	mA
-טט		- 0 = 0 v,	. 10 1000	Full range			6			6	

[†] Full range is – 40°C to 125°C.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150^{\circ}C$ extrapolated to $T_A = 25^{\circ}C$ using the Arrhenius equation and assuming an activation energy of 0.96 eV.



TLC2274I operating characteristics at specified free-air temperature, $V_{DD\pm}$ = $\pm 5~V$

		TEGT COMPLETE		_ +		TLC22741		Т	LC2274A	I	
"	ARAMETER	TEST CONDITION	ONS	T _A †	MIN	TYP	MAX	MIN	TYP	MAX	UNIT
	01	у	4010	25°C	2.3	3.6		2.3	3.6		
SR	Slew rate at unity gain	$V_{O} = \pm 2.3 \text{ V},$ $C_{L} = 100 \text{ pF}$	L = 10 kΩ,	Full range	1.7			1.7			V/μs
.,	Equivalent input	f = 10 Hz		25°C		50			50		nV/√ Hz
V _n	noise voltage	f = 1 kHz		25°C		9			9		nv/√Hz
.,	Peak-to-peak	f = 0.1 Hz to 1 Hz		25°C		1			1		.,
V _{N(PP)}	equivalent input noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			1.4		μV
In	Equivalent input noise current			25°C		0.6			0.6		fA/√ Hz
	Total harmonic	$V_{O} = \pm 2.3 \text{ V},$	A _V = 1			0.0011%			0.0011%		
THD + N	distortion plus	$R_L = 10 \text{ k}\Omega$	A _V = 10	25°C		0.004%			0.004%		
	noise	f = 20 kHz	A _V = 100			0.03%			0.03%		
	Gain-bandwidth product	$f = 10 \text{ kHz},$ $C_L = 100 \text{ pF}$	L = 10 kΩ,	25°C		2.25			2.25		MHz
B _{OM}	Maximum output- swing bandwidth		y = 1, L = 100 pF	25°C		0.54			0.54		MHz
	Cattling time	$A_V = -1$, Step = -2.3 V to 2.3 V,	To 0.1%	25°C		1.5			1.5		
t _S	Settling time	R_L = 10 kΩ, C_L = 100 pF	To 0.01%	25°C		3.2			3.2		μS
φm	Phase margin at unity gain	$R_{I} = 10 \text{ k}\Omega,$ C_{I}	ı = 100 pF	25°C		52°			52°		
	Gain margin]	- '	25°C		10			10		dB

[†] Full range is –40°C to 125°C.

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TLC2272Q and TLC2272M electrical characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$ (unless otherwise noted)

	PARAMETER	TEST CO	NDITIONS	T _A †		LC22720 LC2272			C2272A .C2272A		UNIT
				'	MIN	TYP	MAX	MIN	TYP	MAX	
\/	lanut affact valtage			25°C		300	2500		300	950	\/
VIO	Input offset voltage			Full range			3000			1500	μV
αΛΙΟ	Temperature coefficient of input offset voltage			25°C to 125°C		2			2		μV/°C
	Input offset voltage long- term drift (see Note 4)	V _{IC} = 0 V, V _O = 0 V,	$V_{DD\pm} = \pm 2.5 \text{ V},$ R _S = 50 Ω	25°C		0.002			0.002		μV/mo
li o	Input offset current	1		25°C		0.5	60		0.5	60	nΛ
ΙO	Input offset current			Full range			800			800	pA
<u>.</u>	Input bias current			25°C		1	60		1	60	pА
IB	Input bias current			Full range			800			800	PΛ
V _{ICR}	Common-mode input	$R_S = 50 \Omega$,	V _{IO} ≤ 5 mV	25°C	0 to 4	-0.3 to 4.2		0 to 4	-0.3 to 4.2		V
VICR	voltage	NS = 50 sz,	v O	Full range	0 to 3.5			0 to 3.5			٧
		$I_{OH} = -20 \mu A$		25°C		4.99			4.99		
	High lavel avience	Jan - 200 u A		25°C	4.85	4.93		4.85	4.93		
Vон	High-level output voltage	I _{OH} = -200 μA		Full range	4.85			4.85			V
	voltage	I _{OH} = -1 mA		25°C	4.25	4.65		4.25	4.65		
		IOH = - I IIIA		Full range	4.25			4.25			
		$V_{IC} = 2.5 V$,	$I_{OL} = 50 \mu A$	25°C		0.01			0.01		
		V _{IC} = 2.5 V,	I _{OL} = 500 μA	25°C		0.09	0.15		0.09	0.15	
VOL	Low-level output voltage	V ₁ C = 2.0 V,		Full range			0.15			0.15	V
		V _{IC} = 2.5 V,	$I_{OL} = 5 \text{ mA}$	25°C		0.9	1.5		0.9	1.5	
		1,0 =:0 1,	-OL 0	Full range			1.5			1.5	
	Large-signal	V _{IC} = 2.5 V,	$R_L = 10 \text{ k}\Omega^{\ddagger}$	25°C	10	35		10	35		
AVD	differential voltage	$V_0 = 1 \text{ V to 4 V}$		Full range	10			10			V/mV
	amplification	Ŭ	$R_L = 1 \text{ m}\Omega^{\ddagger}$	25°C		175			175		
^r id	Differential input resistance			25°C		10 ¹²			1012		Ω
rį	Common-mode input resistance			25°C		10 ¹²			1012		Ω
ci	Common-mode input capacitance	f = 10 kHz,	P package	25°C		8			8		pF
z _O	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		140			140		Ω
CMRR	Common-mode rejection ratio	$V_{IC} = 0 \text{ V to } 2.7$ $V_{O} = 2.5 \text{ V},$	V, Rs = 50 Ω	25°C Full range	70 70	75		70 70	75		dB
	Supply-voltage rejection	$V_{DD} = 4.4 \text{ V to 1}$		25°C	80	95		80	95		
ksvr	ratio (ΔV _{DD} /ΔV _{IO})	$V_{IC} = V_{DD}/2$	No load	Full range	80			80			dB
	. 22/ 10/	-		25°C	<u> </u>	2.2	3		2.2	3	
I_{DD}	Supply current	$V_0 = 2.5 V$,	No load	Full range	 		3			3	mA
		l			<u> </u>						

Full range is -40°C to 125°C for Q level part, -55°C to 125°C for M level part.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150$ °C extrapolated to $T_A = 25$ °C using the Arrhenius equation and assuming an activation energy of 0.96 eV.



[‡]Referenced to 2.5 V

TLC2272Q and TLC2272M operating characteristics at specified free-air temperature, V_{DD} = 5 V

P/	ARAMETER	TEST CONDITION	ONS	T _A †		LC22720 FLC2272N		TLC2272AQ, TLC2272AM MIN TYP MAX 2.3 3.6 1.7 50 9 1 1.4 0.6 0.0013% 0.004% 0.03% 2.18	UNIT		
					MIN	TYP	MAX	MIN	TYP	MAX	
				25°C	2.3	3.6		2.3	3.6		
SR	Slew rate at unity gain	$V_{O} = 1.25 \text{ V to } 2.75 \text{ V},$ $R_{L} = 10 \text{ k}\Omega^{\ddagger}, \qquad C_{L} = 10 \text{ k}\Omega^{\ddagger}$	= 100 pF‡	Full range	1.7			1.7			V/µs
	Equivalent input	f = 10 Hz		25°C		50			50		nV/√ Hz
V _n	noise voltage	f = 1 kHz		25°C		9			9		nv/√HZ
\ ,	Peak-to-peak equivalent input	f = 0.1 Hz to 1 Hz		25°C		1			1		v
V _{NPP}	noise voltage	f = 0.1 Hz to 10 Hz		25°C		1.4			1.4		μV
In	Equivalent input noise current			25°C		0.6			0.6		fA/√ Hz
	Total harmonic	$V_{O} = 0.5 \text{ V to } 2.5 \text{ V}$	$A_V = 1$			0.0013%			0.0013%		
THD + N	distortion plus	f = 20 kHz,	A _V = 10	25°C		0.004%			0.004%		
	noise	$R_L = 10 \text{ k}\Omega^{\ddagger}$,	$A_V = 100$			0.03%			0.03%		
	Gain-bandwidth product	$f = 10 \text{ kHz},$ $C_L = 100 \text{ pF}^{\ddagger}$	L = 10 kΩ [‡] ,	25°C		2.18			2.18		MHz
B _{OM}	Maximum output- swing bandwidth		v = 1, L = 100 pF [‡]	25°C		1			1		MHz
	Cattling time	$A_V = -1$, Step = 0.5 V to 2.5 V,	To 0.1%	25°C		1.5			1.5		
t _S	Settling time	$R_L = 10 \text{ k}\Omega^{\ddagger},$ $C_L = 100 \text{ pF}^{\ddagger}$	To 0.01%	25.0		2.6			2.6		μs
φm	Phase margin at unity gain	$R_L = 10 \text{ k}\Omega^{\ddagger}$, C	L = 100 pF‡	25°C		50°			50°		
	Gain margin]		25°C		10			10		dB

[†] Full range is -40°C to 125°C for Q level part, -55°C to 125°C for M level part.

[‡]Referenced to 2.5 V

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TLC2272Q and TLC2272M electrical characteristics at specified free-air temperature, $V_{DD\pm}$ = ± 5 V (unless otherwise noted)

	PARAMETER	TEST CO	ONDITIONS	T _A †		LC22720 LC22721			C2272A .C2272A		UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
1/	lanut effect valtage			25°C		300	2500		300	950	
VIO	Input offset voltage			Full range			3000			1500	μV
ανιο	Temperature coefficient of input offset voltage			25°C to 125°C		2			2		μV/°C
	Input offset voltage long-term drift (see Note 4)	$V_{IC} = 0 V,$ $R_S = 50 \Omega$	V _O = 0 V,	25°C		0.002			0.002		μV/mo
lio	Input offset current			25°C		0.5	60		0.5	60	pА
10	input onset current]		Full range			800			800	РΑ
I _{IB}	Input bias current			25°C		1	60		1	60	рA
.ID	mpat blad darront			Full range			800			800	ρ, τ
VICR	Common-mode input	$R_S = 50 \Omega$	V _{IO} ≤ 5 mV	25°C	-5 to 4	-5.3 to 4.2		-5 to 4	-5.3 to 4.2		V
VICR	voltage	115 - 50 52,	v O ≥ 3 mv	Full range	-5 to 3.5			-5 to 3.5			V
		$I_0 = -20 \mu A$		25°C		4.99			4.99		
	Mandanan mandiban manda	I _O = -200 μA		25°C	4.85	4.93		4.85	4.93		
V _{OM+}	Maximum positive peak output voltage	$10 = -200 \mu\text{A}$		Full range	4.85			4.85			V
	output voltage	I _O = -1 mA		25°C	4.25	4.65		4.25	4.65		
		10 = - 1 IIIA		Full range	4.25			4.25			
		$V_{IC} = 0 V$	$I_O = 50 \mu A$	25°C		-4.99			-4.99		
	Maximum negative peak	V _{IC} = 0 V,	ΙΟ = 500 μΑ	25°C	-4.85	-4.91		-4.85	-4.91		
VOM−	output voltage	VIC = 0 V,	10 = 300 μΑ	Full range	-4.85			-4.85			V
	- and an a second	V _{IC} = 0 V,	$I_O = 5 \text{ mA}$	25°C	-3.5	-4.1		-3.5	-4.1		
		VIC = 0 V,	.0-011111	Full range	-3.5			-3.5			
	Large-signal differential		$R_{I} = 10 \text{ k}\Omega$	25°C	20	50		20	50		
AVD	voltage amplification	$V_O = \pm 4 V$		Full range	20			20			V/mV
			$R_L = 1 \text{ m}\Omega$	25°C		300			300		
^r id	Differential input resistance			25°C		1012			1012		Ω
rį	Common-mode input resistance			25°C		1012			1012		Ω
ci	Common-mode input capacitance	f = 10 kHz,	P package	25°C		8			8		pF
z _o	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		130			130		Ω
CMDD	Common-mode rejection	$V_{IC} = -5 V tc$	2.7 V,	25°C	75	80		75	80		40
CMRR	ratio	$V_0 = 0 V$	$R_S = 50 \Omega$	Full range	75			75			dB
leas :-	Supply-voltage rejection	V _{DD} = ±2.2 \	/ to ±8 V,	25°C	80	95		80	95		40
ksvr	ratio ($\Delta V_{DD\pm}/\Delta V_{IO}$)	$V_{IC} = 0 V$	No load	Full range	80			80			dB
1	Cumply ourroad	V- 05V	No loo d	25°C		2.4	3		2.4	3	A
IDD	Supply current	$V_{O} = 2.5 \text{ V},$	No load	Full range			3			3	mA

[†] Full range is -40°C to 125°C for Q level part, -55°C to 125°C for M level part.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150$ °C extrapolated to $T_A = 25$ °C using the Arrhenius equation and assuming an activation energy of 0.96 eV.



TLC2272Q and TLC2272M operating characteristics at specified free-air temperature, $V_{DD\pm}$ = $\pm 5~V$

PARAMETER		TEST CONDITIONS		T _A †	TLC2272Q, TLC2272M			TLC2272AQ, TLC2272AM			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
	Slew rate at	V- 14.V D.	= 10 kΩ,	25°C	2.3	3.6		2.3	3.6		
SR	unity gain	$V_{O} = \pm 1 \text{ V}, R_{L} = C_{L} = 100 \text{ pF}$	= 10 KS2,	Full range	1.7			1.7			V/µs
V	Equivalent input	f = 10 Hz		25°C		50			50		nV/√ Hz
Vn	noise voltage	f = 1 kHz		25°C		9			9		IIV/∀⊓Z
V:	Peak-to-peak equivalent input	f = 0.1 Hz to 1 Hz f = 0.1 Hz to 10 Hz		25°C		1			1		.,
V _{NPP}	noise voltage			25°C	1.4		1.4			μV	
In	Equivalent input noise current		25°C 0.6			0.6			fA/√Hz		
	Total harmonic distortion plus noise	$V_O = \pm 2.3 \text{ V}$ $R_L = 10 \text{ k}\Omega,$ $f = 20 \text{ kHz}$	A _V = 1			0.0011%			0.0011%		
THD + N			Ay = 10	25°C		0.004%			0.004%		
			A _V = 100			0.03%			0.03%		
	Gain-bandwidth product	f = 10 kHz, C _L = 100 pF	$R_L = 10 \text{ k}\Omega$,	25°C	2.25			2.25		MHz	
ВОМ	Maximum output-swing bandwidth	$V_{O(PP)} = 4.6 \text{ V},$ $R_{L} = 10 \text{ k}\Omega,$	A _V = 1, C _L = 100 pF	25°C		0.54			0.54		MHz
	Cattling time	$A_V = -1$, Step = -2.3 V to 2.3 V,	To 0.1%	25°C		1.5			1.5		
t _S	Settling time	$R_L = 10 \text{ k}\Omega$, $C_L = 100 \text{ pF}$	To 0.01%	25-0		3.2			3.2		μS
фm	Phase margin at unity gain	$R_{I} = 10 \text{ k}\Omega$	C _I = 100 pF	25°C	52°		52°				
	Gain margin	_ · ·	p.	25°C		10			10		dB

[†] Full range is -40°C to 125°C for Q level part, -55°C to 125°C for M level part.

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TLC2274Q and TLC2274M electrical characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$ (unless otherwise noted)

	PARAMETER	TEST CONDITIONS		T _A †	TLC2274Q, TLC2274M			TLC2274AQ, TLC2274AM			UNIT	
					MIN	TYP	MAX	MIN	TYP	MAX		
1/1-2	Innut offset voltage			25°C		300	2500		300	950	\/	
VIO	Input offset voltage			Full range			3000			1500	μV	
ανιο	Temperature coefficient of input offset voltage			25°C to 125°C		2			2		μV/°C	
	Input offset voltage long-term drift (see Note 4)	$V_{DD\pm} = \pm 2.5 \text{ V},$ $V_{O} = 0 \text{ V},$	$V_{IC} = 0 V$, $R_S = 50 \Omega$	25°C		0.002			0.002		μV/mo	
IIO	Input offset current			25°C		0.5	60		0.5	60	pА	
10	input onset current			Full range			800			800	PΛ	
I _{IB}	Input bias current			25°C		1	60		1	60	рA	
'IB	input blub building			Full range			800			800	Pr	
Vion	Common-mode input	$R_S = 50 \Omega$	\/\c\ < 5 m\/	25°C	0 to 4	-0.3 to 4.2		0 to 4	-0.3 to 4.2		V	
VICR voltage	voltage	NS = 30 22,	$ V_{IO} \le 5 \text{ mV}$	Full range	0 to 3.5			0 to 3.5			\ \ \ \ \ \	
		$I_{OH} = -20 \mu A$		25°C 4.99				4.99				
	High-level output voltage	I _{OH} = -200 μA		25°C	4.85	4.93		4.85	4.93		V	
∨он				Full range	4.85			4.85				
		I _{OH} = -1 mA		25°C	4.25	4.65		4.25	4.65			
				Full range	4.25			4.25				
	Low-level output voltage	$V_{IC} = 2.5 V,$	$I_{OL} = 50 \mu\text{A}$	25°C		0.01			0.01			
		$V_{IC} = 2.5 V,$		25°C		0.09	0.15		0.09	0.15		
VOL		I _{OL} = 500 μA		Full range			0.15			0.15	V	
		V _{IC} = 2.5 V,	$I_{OL} = 5 \text{ mA}$	25°C		0.9	1.5		0.9	1.5		
				Full range			1.5			1.5		
	Large-signal differential voltage amplification	V _{IC} = 2.5 V, V _O = 1 V to 4 V	$R_L = 10 \text{ k}\Omega^{\ddagger}$	25°C	10	35		10	35		V/mV	
AVD				Full range	10			10				
		0	$R_L = 1 M\Omega^{\ddagger}$	25°C		175			175			
rid	Differential input resistance			25°C		1012			1012		Ω	
rį	Common-mode input resistance			25°C		10 ¹²			10 ¹²		Ω	
ci	Common-mode input capacitance	f = 10 kHz,	N package	25°C		8			8		pF	
z ₀	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		140			140		Ω	
CMRR	Common-mode	V _{IC} = 0 V to 2.7 \		25°C	70	75		70	75		dB	
	rejection ratio	V _O = 2.5 V,	$R_S = 50 \Omega$	Full range	70			70	0.5			
ksvr	Supply-voltage rejection	$V_{DD} = 4.4 \text{ V to } 16$		25°C	80	95		80	95		dB	
	ratio (ΔV _{DD} /ΔV _{IO})	$V_{IC} = V_{DD}/2,$	No load	Full range	80	4 4		80	4.4			
I _{DD}	Supply current	$V_0 = 2.5 V$,	No load	25°C		4.4	6		4.4	6	mA	
Ļ				Full range			6			6		

[†] Full range is -40°C to 125°C for Q level part, -55°C to 125°C for M level part.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150^{\circ}C$ extrapolated to $T_A = 25^{\circ}C$ using the Arrhenius equation and assuming an activation energy of 0.96 eV.



[‡]Referenced to 2.5 V

TLC2274Q and TLC2274M operating characteristics at specified free-air temperature, $V_{DD} = 5 \text{ V}$

PARAMETER		TEST CONDITIONS		T _A †	TLC2274Q, TLC2274M			TLC2274AQ, TLC2274AM			UNIT				
					MIN	TYP	MAX	MIN TYP MAX							
	01	V 05V/ 05V/	0 100 Ft	25°C	2.3	3.6		2.3	3.6						
SR	Slew rate at unity gain	$V_{O} = 0.5 \text{ V to } 2.5 \text{ V}, \qquad C_{L} = 100 \text{ pF}^{\ddagger}$ $R_{L} = 10 \text{ k}\Omega^{\ddagger},$		Full range	1.7			1.7			V/μs				
.,	Equivalent input	f = 10 Hz		25°C		50			50		->4/15				
Vn	noise voltage	f = 1 kHz		25°C		9			9		nV/√Hz				
,,	Peak-to-peak	f = 0.1 Hz to 1 Hz f = 0.1 Hz to 10 Hz		25°C		1			1						
V _{N(PP)}	equivalent input noise voltage			25°C	1.4			1.4			μV				
In	Equivalent input noise current			25°C	0.6		0.6			fA/√Hz					
	Total harmonic distortion plus noise	V_O = 0.5 V to 2.5 V, f = 20 kHz, R_L = 10 k Ω^{\ddagger}	A _V = 1		0.0013%			0.0013%							
THD + N			A _V = 10	25°C	0.004%			0.004%							
			A _V = 100		0.03%				0.03%						
	Gain-bandwidth product	f = 10 kHz, $C_L = 100 \text{ pF}^{\ddagger}$	$R_L = 10 \text{ k}\Omega^{\ddagger}$,	25°C		2.18		2.18			MHz				
B _{OM}	Maximum out- put-swing band- width	$V_{O(PP)} = 2 \text{ V},$ $R_{L} = 10 \text{ k}\Omega^{\ddagger},$	Ay = 1, C _L = 100 pF‡	25°C	1		1		1		1		1		MHz
	Cattling time	$A_V = -1$, Step = 0.5 V to 2.5 V,	To 0.1%	25°C	1.5			1.5							
t _S	Settling time	$R_L = 10 \text{ k}\Omega^{\ddagger},$ $C_L = 100 \text{ pF}^{\ddagger}$	To 0.01%	25-0		2.6			2.6		μS				
φm	Phase margin at unity gain	$R_L = 10 \text{ k}\Omega^{\ddagger}$,	C _L = 100 pF [‡]	25°C		50°			50°						
	Gain margin	_	,	25°C		10			10		dB				

[†] Full range is -40°C to 125°C for Q level part, -55°C to 125°C for M level part. ‡ Referenced to 2.5 V

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TLC2274Q and TLC2274M electrical characteristics at specified free-air temperature, $V_{DD\pm}$ = ± 5 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS		τ _Α †	TLC2274Q, TLC2274M			TLC2274AQ, TLC2274AM			UNIT
					MIN	TYP	MAX	MIN	TYP	MAX	
\/	lanut effect veltere			25°C		300	2500		300	950	
VIO	Input offset voltage			Full range			3000			1500	μV
αΝΙΟ	Temperature coefficient of input offset voltage			25°C to 125°C		2			2		μV/°C
	Input offset voltage long- term drift (see Note 4)	$V_{IC} = 0 V$, $R_S = 50 \Omega$	$V_O = 0 V$,	25°C		0.002			0.002		μV/mo
	land offers and]		25°C		0.5	60		0.5	60	0
lio	Input offset current			Full range			800			800	рA
1	Innut bigg gurrent			25°C		1	60		1	60	n ^
IB	Input bias current			Full range			800			800	рA
\/	Common-mode input	Pa - 50 O	V _{IO} ≤ 5 mV	25°C	-5 to 4	-5.3 to 4.2		-5 to 4	-5.3 to 4.2		V
VICR	voltage	KS = 50 12,	IAIO I ≥ 2 IIIA	Full range	-5 to 3.5			-5 to 3.5			V
	Maximum positive peak output voltage	$I_{O} = -20 \mu\text{A}$		25°C		4.99			4.99		
		Ι _Ο = -200 μΑ		25°C	4.85	4.93		4.85	4.93		
VOM+				Full range	4.85			4.85			V
		I _O = -1 mA		25°C	4.25	4.65		4.25	4.65		
				Full range	4.25			4.25			
		$V_{IC} = 0 V$	$I_{O} = 50 \mu A$	25°C		-4.99			-4.99		
	Maximum pagativa pagk	V _{IC} = 0 V,	ΙΟ = 500 μΑ	25°C	-4.85	-4.91		-4.85	-4.91		
VOM−	Maximum negative peak output voltage			Full range	-4.85			-4.85			V
		V _{IC} = 0 V,	I _O = 5 mA	25°C	-3.5	-4.1		-3.5	-4.1		
				Full range	-3.5			-3.5			
	Langa signal differential		P 10 kO	25°C	20	50		20	50		
AVD	Large-signal differential voltage amplification	$V_0 = \pm 4 V$	$R_L = 10 \text{ k}\Omega$	Full range	20			20			V/mV
			$R_L = 1 M\Omega$	25°C		300			300		
rid	Differential input resistance			25°C		1012			1012		Ω
ri	Common-mode input resistance			25°C		10 ¹²			10 ¹²		Ω
ci	Common-mode input capacitance	f = 10 kHz,	N package	25°C		8			8		pF
z ₀	Closed-loop output impedance	f = 1 MHz,	A _V = 10	25°C		130			130		Ω
01/55	Common-mode rejection	V _{IC} = -5 V	to 2.7 V	25°C	75	80		75	80		15
CMRR	ratio	$V_{O} = 0 V,$	$R_S = 50 \Omega$	Full range	75			75			dB
1.	Supply-voltage rejection	V _{DD+} = ± 2	.2 V to ±8 V,	25°C	80	95		80	95		dB
ksvr	ratio ($\Delta V_{DD\pm}/\Delta V_{IO}$)	$V_{IC} = 0 \text{ V},$	No load	Full range	80			80			
la e	Cupply ourront	,,	No lood	25°C		4.8	6		4.8	6	
lDD	Supply current	$V_O = 0 V$,	No load	Full range			6			6	mA

[†] Full range is –40°C to 125°C for Q level part, –55°C to 125°C for M level part.

NOTE 4: Typical values are based on the input offset voltage shift observed through 168 hours of operating life test at $T_A = 150^{\circ}$ C extrapolated to $T_A = 25^{\circ}$ C using the Arrhenius equation and assuming an activation energy of 0.96 eV.



TLC2274Q and TLC2274M operating characteristics at specified free-air temperature, $V_{DD\pm}$ = $\pm 5~V$

PARAMETER		TEST CONDITIONS		T _A †	TLC2274Q, TLC2274M			TLC2274AQ, TLC2274AM			UNIT
					MIN TYP MAX		MAX	MIN TYP MAX			
	01	V 100V 5	40.1.0	25°C	2.3	3.6		2.3	3.6		
SR	Slew rate at unity gain	$V_O = \pm 2.3 \text{ V},$ $C_L = 100 \text{ pF}$	= 10 kΩ,	Full range	1.7			1.7			V/μs
.,	Equivalent input	f = 10 Hz		25°C		50			50		\ //\
v _n	noise voltage	f = 1 kHz		25°C		9		9			nV/√Hz
.,	Peak-to-peak	f = 0.1 Hz to 1 Hz f = 0.1 Hz to 10 Hz		25°C		1			1		
V _{N(PP)}	equivalent input noise voltage			25°C	1.4			1.4			μV
In	Equivalent input noise current			25°C	0.6		0.6			fA/√Hz	
	Total harmonic distortion plus noise	$V_{O} = \pm 2.3 \text{ V},$	A _V = 1		0.0011%				0.0011%		
THD + N		$R_L = 10 \text{ k}\Omega$, f = 20 kHz	A _V = 10	25°C	0.004%			0.004%]
			$A_{V} = 100$			0.03%			0.03%		
	Gain-bandwidth product	f = 10 kHz, R _L : C _L = 100 pF	= 10 kΩ,	25°C		2.25			2.25		MHz
B _{OM}	Maximum output-swing bandwidth	$V_{O(PP)} = 4.6 \text{ V}, \text{AV} = R_{L} = 10 \text{ k}\Omega, \text{C}_{L} = 0.0 \text{ C}$	= 1, = 100 pF	25°C	0.54		0.54		0.54		MHz
	O a title and the a	$A_V = -1$, Step = -2.3 V to 2.3 V,	To 0.1%	0500	1.5			1.5			_
t _S	Settling time	R_L = 10 kΩ, C_L = 100 pF	To 0.01%	25°C		3.2			3.2		μS
φm	Phase margin at unit gain	R _L = 10 kΩ, C _L :	= 100 pF	25°C		52°	_		52°	_	
	Gain margin	1 /		25°C	10		10			dB	

[†] Full range is –40°C to 125°C for Q level part, –55°C to 125°C for M level part.

Table of Graphs

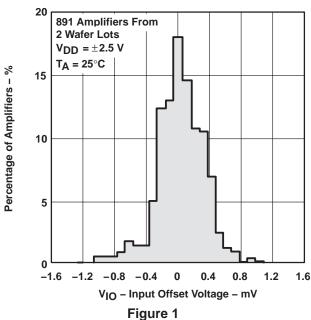
			FIGURE
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NOTE: For all graphs where $V_{DD} = 5 \text{ V}$, all loads are referenced to 2.5 V.



Percentage of Amplifiers - %

DISTRIBUTION OF TLC2272 INPUT OFFSET VOLTAGE



DISTRIBUTION OF TLC2272 INPUT OFFSET VOLTAGE

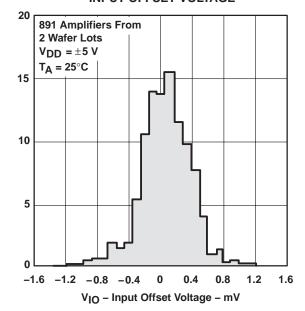


Figure 2

DISTRIBUTION OF TLC2274 INPUT OFFSET VOLTAGE

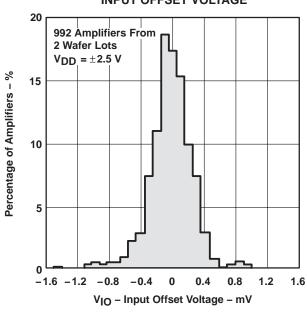


Figure 3

DISTRIBUTION OF TLC2274 INPUT OFFSET VOLTAGE

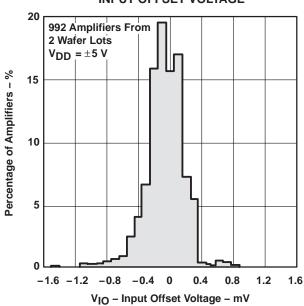


Figure 4

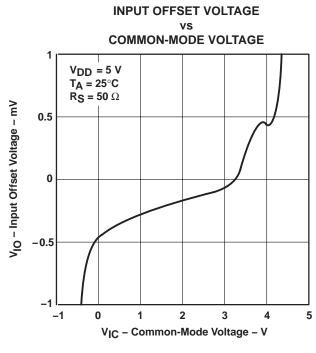


Figure 5

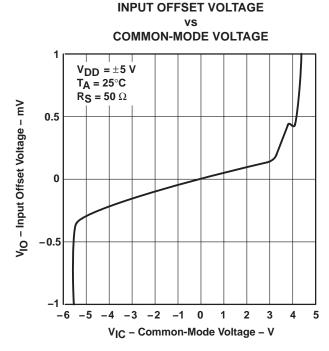


Figure 6

DISTRIBUTION OF TLC2272 INPUT OFFSET VOLTAGE TEMPERATURE COEFFICIENT[†]

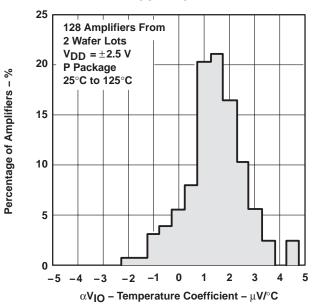


Figure 7

DISTRIBUTION OF TLC2272 INPUT OFFSET VOLTAGE TEMPERATURE **COEFFICIENT**†

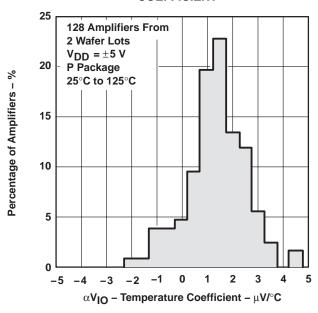


Figure 8

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



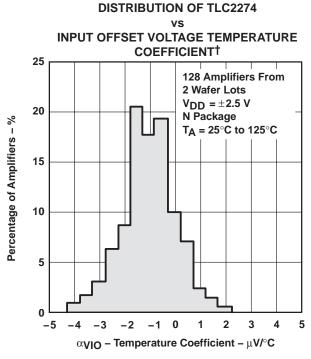


Figure 9

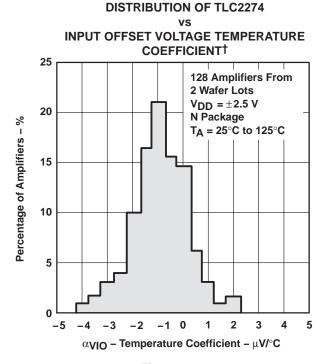
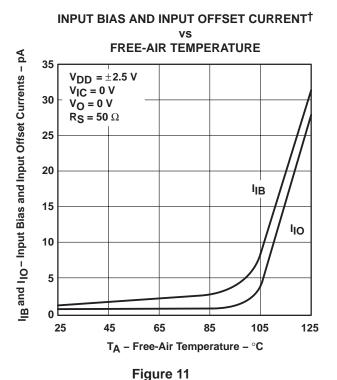
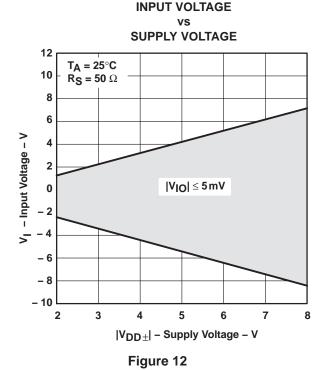


Figure 10





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



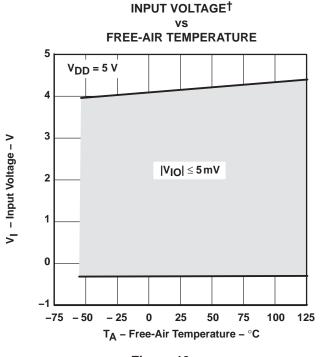
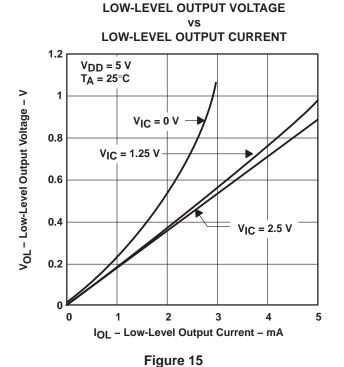


Figure 13



HIGH-LEVEL OUTPUT VOLTAGE[†] **HIGH-LEVEL OUTPUT CURRENT**

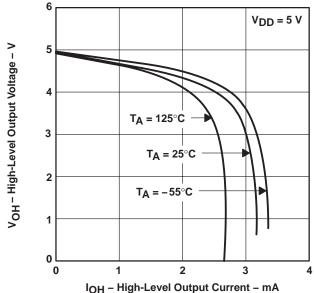


Figure 14

LOW-LEVEL OUTPUT VOLTAGE[†] **LOW-LEVEL OUTPUT CURRENT**

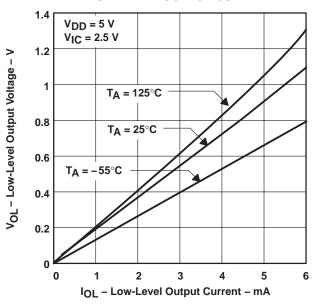


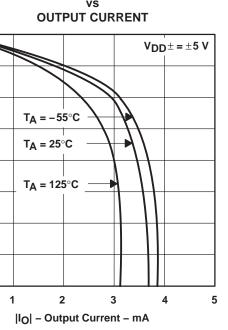
Figure 16

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



MAXIMUM POSITIVE PEAK OUTPUT VOLTAGE[†] **OUTPUT CURRENT** V_{OM} + - Maximum Positive Peak Output Voltage - V $V_{DD} \pm = \pm 5 V$ $T_A = -55^{\circ}C$ $T_A = 25^{\circ}C$ $T_A = 125^{\circ}C$ 5 0 2 3 4

Figure 17



MAXIMUM NEGATIVE PEAK OUTPUT VOLTAGE[†]

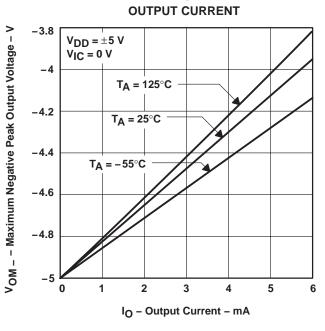
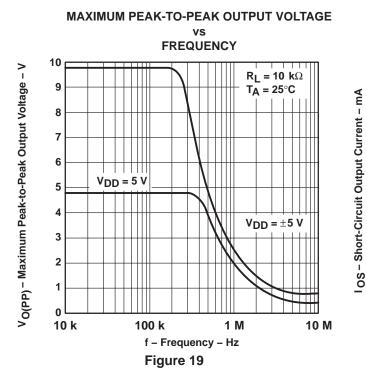
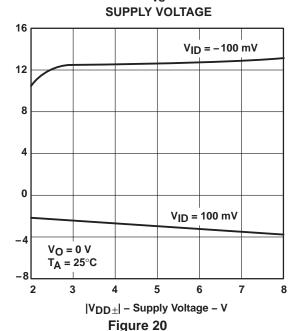


Figure 18



SHORT-CIRCUIT OUTPUT CURRENT



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



SHORT-CIRCUIT OUTPUT CURRENT[†] FREE-AIR TEMPERATURE 15 $V_O = 0 V$ $V_{DD} = \pm 5 V$ I OS - Short-Circuit Output Current - mA $V_{ID} = -100 \text{ mV}$ 11 7 -3 $V_{ID} = 100 \text{ mV}$ -75 -50 0 25 50 75 100 125 T_A – Free-Air Temperature – $^{\circ}C$

Figure 21

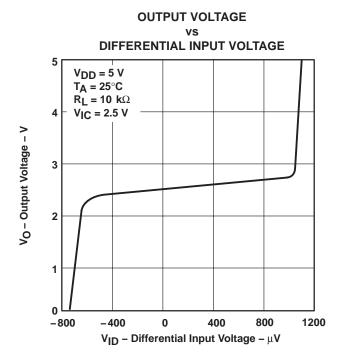
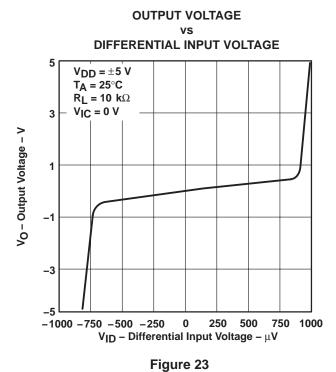


Figure 22

LARGE-SIGNAL DIFFERENTIAL



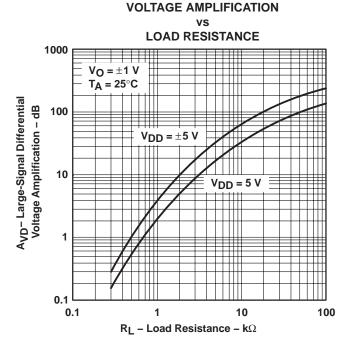


Figure 24

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



LARGE-SIGNAL DIFFERENTIAL VOLTAGE AMPLIFICATION AND PHASE MARGIN

FREQUENCY 80 180° $V_{DD} = 5 V$ $R_L = 10 \text{ k}\Omega$ $C_L = 100 \text{ pF}$ $T_A = 25^{\circ}\text{C}$ 135° 60 A_{VD}- Large-Signal Differential Voltage Amplification - dB 40 90° ^om − Phase Margin 20 45° 0 **0**° -20 -45° -90° 1 k 10 k 100 k 1 M 10 M f - Frequency - Hz

Figure 25

LARGE-SIGNAL DIFFERENTIAL VOLTAGE AMPLIFICATION AND PHASE MARGIN

FREQUENCY 80 180° $V_{DD} = \pm 5 V$ $R_L = 10 \text{ k}\Omega$ $C_{L} = 100 \text{ pF}$ 135° 60 $T_A = 25^{\circ}C$ A_{VD}- Large-Signal Differential Voltage Amplification - dB ⁰m − Phase Margin 40 90° 45° 20 **0**° 0 -20 –45° -40 -90° 1 k 10 k 100 k 1 M 10 M f - Frequency - Hz

Figure 26

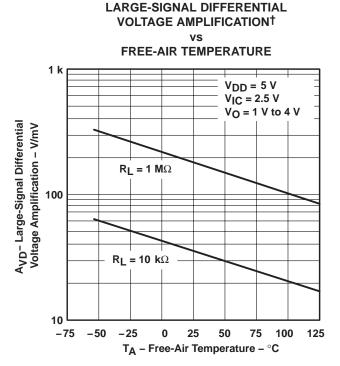


1 k

10 └ -75

-50

-25



LARGE-SIGNAL DIFFERENTIAL

VOLTAGE AMPLIFICATION†
vs
FREE-AIR TEMPERATURE

 $V_{DD} = \pm 5 V$

VIC = 0 V

Figure 27

Figure 28

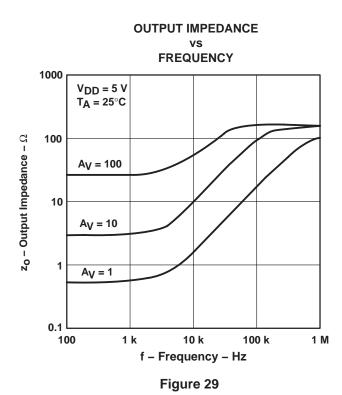
0

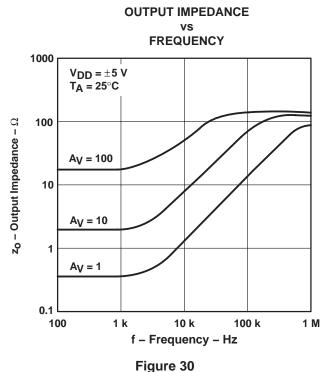
25

TA - Free-Air Temperature - °C

50

75 100



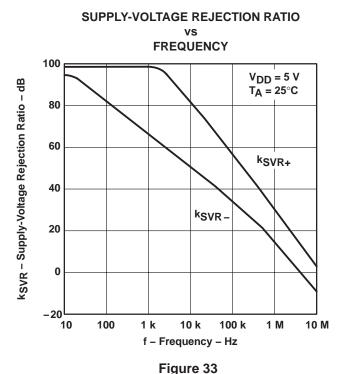


[†]Data at high and low temperatures are applicable only within the rated operating free-air temperature ranges of the various devices.



COMMON-MODE REJECTION RATIO FREQUENCY 100 T_A = 25°C CMRR - Common-Mode Rejection Ratio - dB $V_{DD} = \pm 5 V$ 80 $V_{DD} = 5 V$ 60 40 20 100 100 k 10 M 10 1 k 10 k 1 M f - Frequency - Hz

Figure 31



COMMON-MODE REJECTION RATIO vs

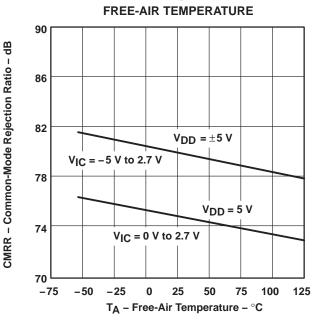


Figure 32

SUPPLY-VOLTAGE REJECTION RATIO

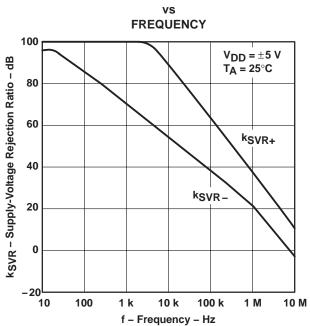
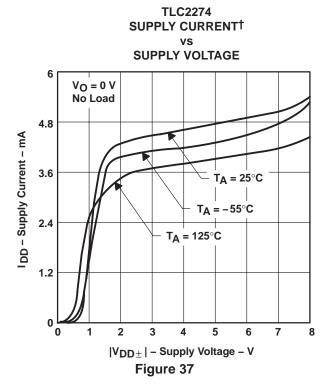


Figure 34

SUPPLY VOLTAGE REJECTION RATIO† FREE-AIR TEMPERATURE $V_{DD} \pm = \pm 2.2 \text{ V to } \pm 8 \text{ V}$ kSVR - Supply Voltage Rejection Ratio - dB $V_O = 0 V$ 105 100 95 90 85 75 100 -50 25 -75 -25 50 T_A – Free-Air Temperature – $^{\circ}C$

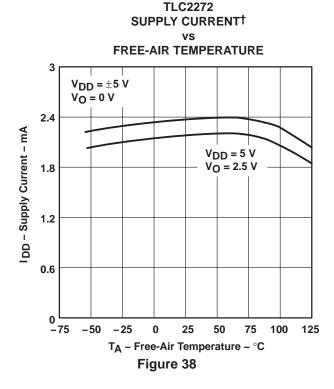
Figure 35



TLC2272 SUPPLY CURRENT† vs **SUPPLY VOLTAGE** $V_O = 0 V$ No Load 2.4 I DD - Supply Current - mA 1.8 T_A = 25°C $T_A = -55^{\circ}C$ 1.2 T_A = 125°C 0.6 7 0 4 8

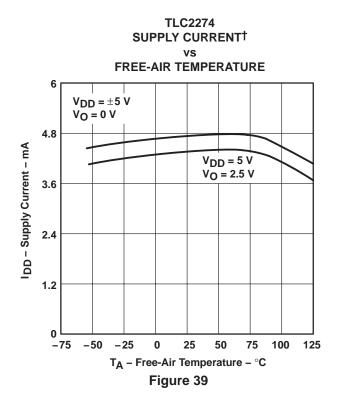
Figure 36

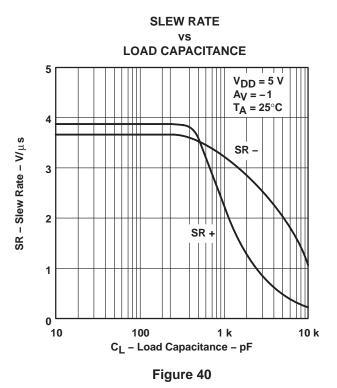
|V_{DD±} | - Supply Voltage - V



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







SLEW RATE† FREE-AIR TEMPERATURE 5 SR -SR - Slew Rate - V/µs SR + 3 2 $V_{DD} = 5 V$ $R_L = 10 \text{ k}\Omega$ C_L = 100 pF $A_V = 1$ 25 50 -75 -50 -25 0 75 100 125 T_A - Free-Air Temperature - °C

Figure 41

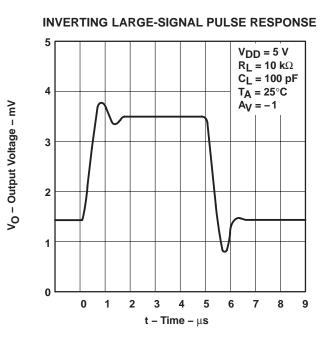


Figure 42

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



INVERTING LARGE-SIGNAL PULSE RESPONSE

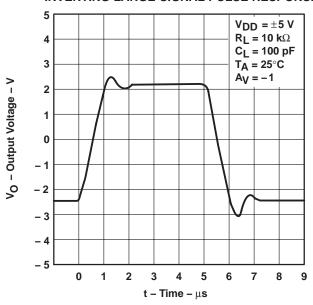


Figure 43

VOLTAGE-FOLLOWER LARGE-SIGNAL PULSE RESPONSE

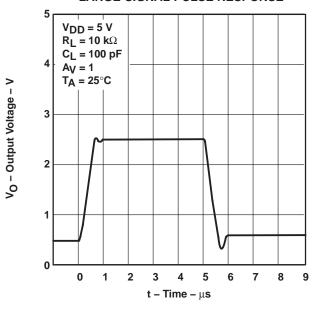


Figure 44

VOLTAGE-FOLLOWER LARGE-SIGNAL PULSE RESPONSE

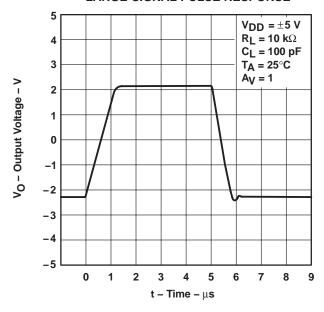


Figure 45

INVERTING SMALL-SIGNAL PULSE RESPONSE

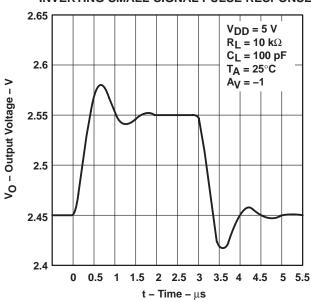


Figure 46



INVERTING SMALL-SIGNAL PULSE RESPONSE 100 $V_{DD} = \pm 5 V$ $R_L = 10 \text{ k}\Omega$ $C_{L} = 100 \text{ pF}$ $T_A = 25^{\circ}C$ A_V = 1 50 Vo - Output Voltage - mV 0 -50 -1000 0.5 1.5 2 2.5 3 3.5 1 t – Time – μ s

Figure 47

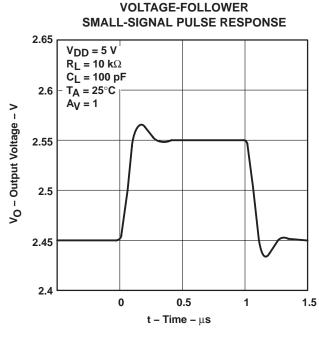
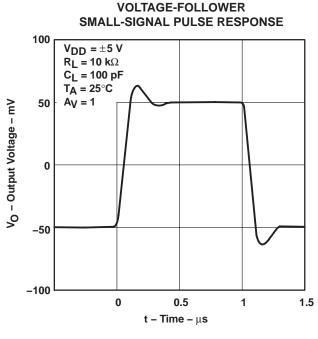
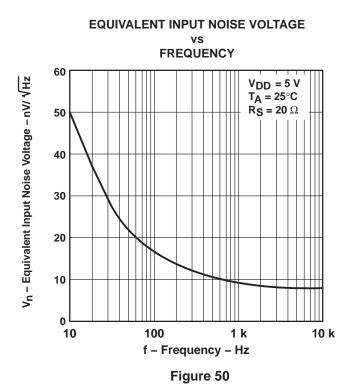


Figure 48







TEXAS INSTRUMENTS

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EQUIVALENT INPUT NOISE VOLTAGE

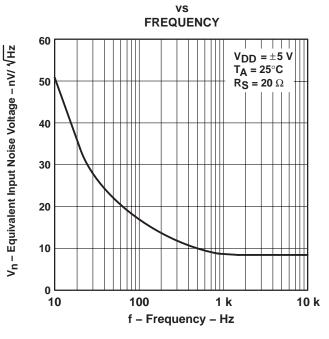


Figure 51

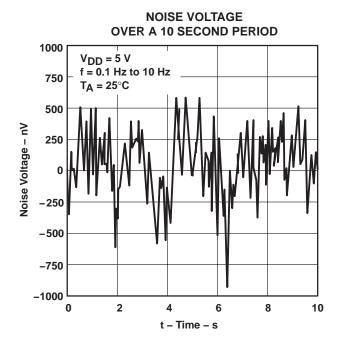


Figure 52

INTEGRATED NOISE VOLTAGE

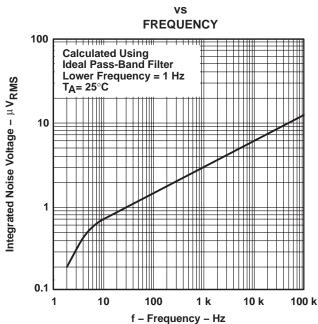


Figure 53

TOTAL HARMONIC DISTORTION PLUS NOISE

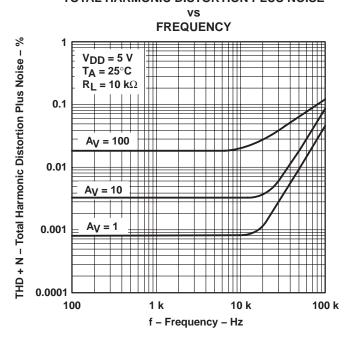
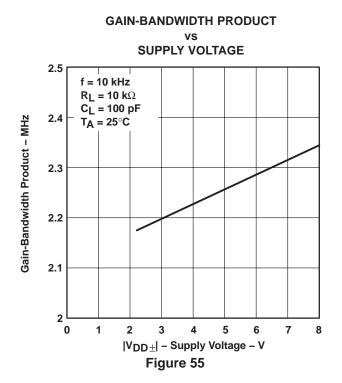
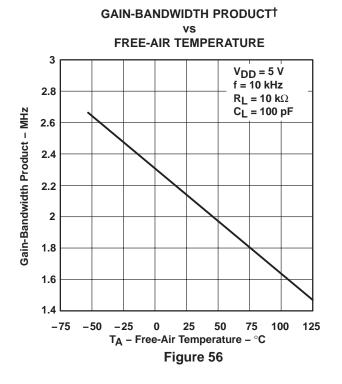
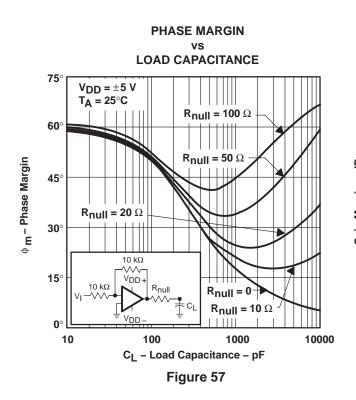


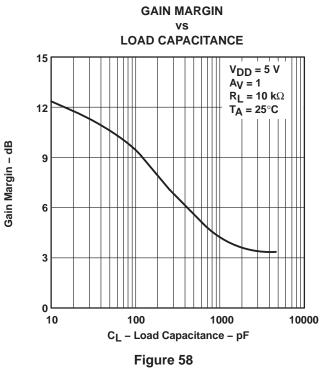
Figure 54











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



APPLICATION INFORMATION

macromodel information

Macromodel information provided was derived using Microsim $Parts^{TM}$, the model generation software used with Microsim $PSpice^{TM}$. The Boyle macromodel (see Note 5) and subcircuit in Figure 59 were generated using the TLC227x typical electrical and operating characteristics at $T_A = 25^{\circ}C$. Using this information, output simulations of the following key parameters can be generated to a tolerance of 20% (in most cases):

- Maximum positive output voltage swing
- Maximum negative output voltage swing
- Slew rate
- Quiescent power dissipation
- Input bias current
- Open-loop voltage amplification

- Unity gain frequency
- Common-mode rejection ratio
- Phase margin
- DC output resistance
- AC output resistance
- Short-circuit output current limit

NOTE 5: G. R. Boyle, B. M. Cohn, D. O. Pederson, and J. E. Solomon, "Macromodeling of Integrated Circuit Operational Amplifiers", *IEEE Journal of Solid-State Circuits*, SC-9, 353 (1974).

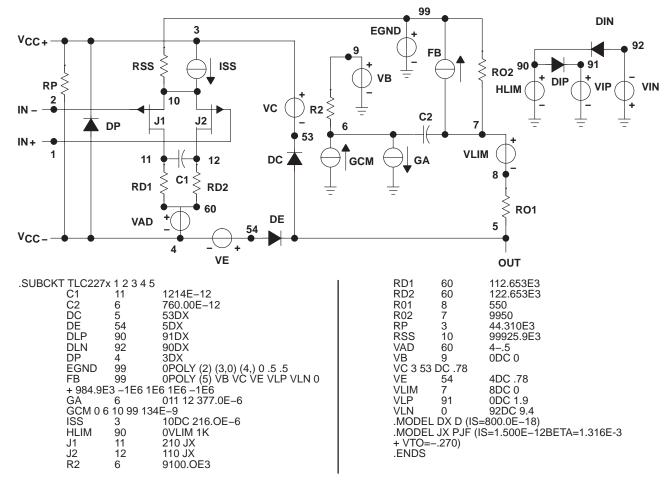
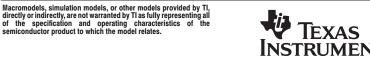


Figure 59. Boyle Macromodel and Subcircuit

PSpice and Parts are trademarks of MicroSim Corporation.







PACKAGING INFORMATION

Orderable Device		Package Type	Package Drawing	Pins	Package Qty		Lead/Ball Finish		Op Temp (°C)	Device Marking	Samples
5962-9318201M2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	(3) N / A for Pkg Type	-55 to 125	(4/5) 5962- 9318201M2A TLC2274 MFKB	Samples
5962-9318201MCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9318201MC A TLC2274MJB	Samples
5962-9318201QDA	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9318201QD A TLC2274MWB	Samples
5962-9318202Q2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 9318202Q2A TLC2274 AMFKB	Samples
5962-9318202QCA	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9318202QC A TLC2274AMJB	Samples
5962-9318202QDA	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9318202QD A TLC2274AMWB	Samples
5962-9555201NXD	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	Q2272M	Samples
5962-9555201NXDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	Q2272M	Samples
5962-9555201Q2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 9555201Q2A TLC2272 MFKB	Samples
5962-9555201QHA	ACTIVE	CFP	U	10	1	TBD	A42	N / A for Pkg Type	-55 to 125	9555201QHA TLC2272M	Samples
5962-9555201QPA	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	9555201QPA TLC2272M	Samples
5962-9555202Q2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 9555202Q2A TLC2272 AMFKB	Samples





Orderable Device	Status	Package Type	Package Drawing	Pins		Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)				Qty	(2)		(3)		(4/5)	
5962-9555202QHA	ACTIVE	CFP	U	10	1	TBD	A42	N / A for Pkg Type	-55 to 125	9555202QHA TLC2272AM	Samples
5962-9555202QPA	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	9555202QPA TLC2272AM	Samples
TLC2272ACD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AC	Samples
TLC2272ACDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AC	Samples
TLC2272ACDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AC	Samples
TLC2272ACDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AC	Samples
TLC2272ACP	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2272AC	Samples
TLC2272ACPE4	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2272AC	Samples
TLC2272ACPW	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		P2272A	Samples
TLC2272ACPWG4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		P2272A	Samples
TLC2272ACPWLE	OBSOLETI	E TSSOP	PW	8		TBD	Call TI	Call TI			
TLC2272ACPWR	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		P2272A	Samples
TLC2272ACPWRG4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		P2272A	Samples
TLC2272AID	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AI	Samples
TLC2272AIDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AI	Samples
TLC2272AIDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AI	Samples
TLC2272AIDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AI	Samples
TLC2272AIP	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2272AI	Samples





Orderable Device	Status	Package Type	U	Pins	_	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)		(3)		(4/5)	
TLC2272AIPE4	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2272AI	Samples
TLC2272AMD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	2272AM	Samples
TLC2272AMDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AM	Samples
TLC2272AMDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	2272AM	Samples
TLC2272AMDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272AM	Samples
TLC2272AMFKB	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 9555202Q2A TLC2272 AMFKB	Samples
TLC2272AMJGB	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	9555202QPA TLC2272AM	Samples
TLC2272AMP	OBSOLETI	E PDIP	Р	8		TBD	Call TI	Call TI	-55 to 125		
TLC2272AMUB	ACTIVE	CFP	U	10	1	TBD	A42	N / A for Pkg Type	-55 to 125	9555202QHA TLC2272AM	Samples
TLC2272AQD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	C2272A	Samples
TLC2272AQDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		C2272A	Samples
TLC2272AQDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	C2272A	Samples
TLC2272AQDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		C2272A	Samples
TLC2272CD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	2272C	Samples
TLC2272CDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	2272C	Samples
TLC2272CDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	2272C	Samples
TLC2272CDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	2272C	Samples





Orderable Device	Status	Package Type	_	Pins	_	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Sample				
	(1)		Drawing		Qty	(2)		(3)		(4/5)					
TLC2272CP	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	TLC2272CP	Sample				
TLC2272CPE4	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	TLC2272CP	Sample				
TLC2272CPSR	ACTIVE	SO	PS	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2272	Sample				
TLC2272CPSRG4	ACTIVE	SO	PS	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2272	Sample				
TLC2272CPW	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2272	Sample				
TLC2272CPWG4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2272	Sample				
TLC2272CPWLE	OBSOLETE	TSSOP	PW	8		TBD	Call TI	Call TI	0 to 70						
TLC2272CPWR	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2272	Sampl				
TLC2272CPWRG4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2272	Sampl				
TLC2272ID	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		22721	Sampl				
TLC2272IDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		22721	Sampl				
TLC2272IDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		22721	Sampl				
TLC2272IDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		22721	Sampl				
TLC2272IP	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2272IP	Sampl				
TLC2272IPE4	ACTIVE	PDIP	Р	8	50	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		N / A for Pkg Type		N / A for Pkg Type		TLC2272IP	Sampl
TLC2272IPW	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		Y2272	Samp				
TLC2272IPWG4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		Y2272	Samp				
TLC2272IPWLE	OBSOLETE	TSSOP	PW	8		TBD	Call TI	Call TI							
TLC2272IPWR	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		Y2272	Samp				



Orderable Device	Status	Package Type	U	Pins	·	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)		(3)		(4/5)	
TLC2272IPWRG4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		Y2272	Samples
TLC2272MD	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	2272M	Samples
TLC2272MDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272M	Samples
TLC2272MDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	2272M	Samples
TLC2272MDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2272M	Samples
TLC2272MFKB	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 9555201Q2A TLC2272 MFKB	Samples
TLC2272MJG	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	TLC2272MJG	Samples
TLC2272MJGB	ACTIVE	CDIP	JG	8	1	TBD	A42	N / A for Pkg Type	-55 to 125	9555201QPA TLC2272M	Samples
TLC2272MP	OBSOLETE	PDIP	P	8		TBD	Call TI	Call TI	-55 to 125		
TLC2272MUB	ACTIVE	CFP	U	10	1	TBD	A42	N / A for Pkg Type	-55 to 125	9555201QHA TLC2272M	Samples
TLC2272QDG4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		C2272Q	Samples
TLC2272QDR	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	C2272Q	Samples
TLC2272QDRG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		C2272Q	Samples
TLC2272QPWRG4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		T2272Q	Samples
TLC2274ACD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	2274AC	Samples
TLC2274ACDG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	2274AC	Samples
TLC2274ACDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	2274AC	Samples
TLC2274ACDRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	2274AC	Samples





Orderable Device	Status	Package Type		Pins	_	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)		(3)		(4/5)	
TLC2274ACN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	TLC2274ACN	Samples
TLC2274ACNE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	TLC2274ACN	Samples
TLC2274ACPW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2274A	Samples
TLC2274ACPWG4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2274A	Samples
TLC2274ACPWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2274A	Samples
TLC2274ACPWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2274A	Samples
TLC2274AID	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	2274AI	Samples
TLC2274AIDG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	2274AI	Samples
TLC2274AIDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	2274AI	Samples
TLC2274AIDRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	2274AI	Samples
TLC2274AIN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 125	TLC2274AIN	Samples
TLC2274AINE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 125	TLC2274AIN	Samples
TLC2274AIPW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	Y2274A	Samples
TLC2274AIPWG4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	Y2274A	Samples
TLC2274AIPWLE	OBSOLETE	TSSOP	PW	14		TBD	Call TI	Call TI	-40 to 125		
TLC2274AIPWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	Y2274A	Samples
TLC2274AIPWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	Y2274A	Samples
TLC2274AMD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	2274AM	Samples



Orderable Device	Status	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking (4/5)	Samples
TLC2274AMDG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2274AM	Sample
TLC2274AMDR	OBSOLETE	SOIC	D	14		TBD	Call TI	Call TI	-55 to 125	2274AM	
TLC2274AMDRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		2274AM	Samples
TLC2274AMFKB	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 9318202Q2A TLC2274 AMFKB	Samples
TLC2274AMJB	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9318202QC A TLC2274AMJB	Samples
TLC2274AMWB	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9318202QD A TLC2274AMWB	Samples
TLC2274AQD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	TLC2274A	Samples
TLC2274AQDG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		PJ2274A	Samples
TLC2274AQDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	TLC2274A	Samples
TLC2274AQDRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		PJ2274A	Samples
TLC2274CD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274C	Samples
TLC2274CDG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274C	Samples
TLC2274CDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274C	Samples
TLC2274CDRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274C	Samples
TLC2274CN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2274CN	Samples
TLC2274CNE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2274CN	Samples
TLC2274CNSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274	Samples



Orderable Device		Package Type	_	Pins		Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Sampl
	(1)		Drawing		Qty	(2)		(3)		(4/5)	
TLC2274CNSRG4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274	Sampl
TLC2274CPW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		P2274	Sampl
TLC2274CPWG4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		P2274	Samp
TLC2274CPWLE	OBSOLETE	TSSOP	PW	14		TBD	Call TI	Call TI			
TLC2274CPWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		P2274	Samp
TLC2274CPWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	P2274	Samp
TLC2274ID	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274I	Samp
TLC2274IDG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274I	Samp
TLC2274IDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274I	Samp
TLC2274IDRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274I	Samp
TLC2274IN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2274IN	Samp
TLC2274INE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type		TLC2274IN	Samp
TLC2274IPW	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		Y2274	Samp
TLC2274IPWG4	ACTIVE	TSSOP	PW	14	90	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		Y2274	Samp
TLC2274IPWLE	OBSOLETE	TSSOP	PW	14		TBD	Call TI	Call TI			
TLC2274IPWR	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		Y2274	Samp
TLC2274IPWRG4	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		Y2274	Sam
TLC2274MD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	TLC2274M	Sam
TLC2274MDG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		PJ2274M	Samj





Orderable Device	Status	Package Type	Package	Pins	Package	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)		(3)		(4/5)	
TLC2274MDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	TLC2274M	Samples
TLC2274MDRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		PJ2274M	Samples
TLC2274MFKB	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 9318201M2A TLC2274 MFKB	Samples
TLC2274MJ	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	TLC2274MJ	Samples
TLC2274MJB	ACTIVE	CDIP	J	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9318201MC A TLC2274MJB	Samples
TLC2274MN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	TLC2274MN	Samples
TLC2274MWB	ACTIVE	CFP	W	14	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9318201QD A TLC2274MWB	Samples
TLC2274QD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	TLC2274	Samples
TLC2274QDG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274	Samples
TLC2274QDR	OBSOLETE	SOIC	D	14		TBD	Call TI	Call TI	-40 to 125	TLC2274	
TLC2274QDRG4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM		TLC2274	Samples
TLC2274Y	PREVIEW	DIESALE	Υ	0		TBD	Call TI	Call TI			

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

TBD: The Pb-Free/Green conversion plan has not been defined.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

PACKAGE OPTION ADDENDUM



25-Sep-2013

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes. **Pb-Free** (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

- (3) MSL. Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.
- (4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- (5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF TLC2272, TLC2272A, TLC2272AM, TLC2272M, TLC2274A, TLC2274AM, TLC2274AM, TLC2274AM:

- Catalog: TLC2272A, TLC2272, TLC2274A, TLC2274
- Automotive: TLC2272-Q1, TLC2272A-Q1, TLC2272A-Q1, TLC2272A-Q1, TLC2274-Q1, TLC2274A-Q1, TLC2274A-Q1, TLC2274A-Q1
- Enhanced Product: TLC2272A-EP, TLC2272A-EP, TLC2274A-EP, TLC2274A-EP, TLC2274A-EP, TLC2274A-EP
- Military: TLC2272M, TLC2272AM, TLC2274M, TLC2274AM

NOTE: Qualified Version Definitions:

- Catalog TI's standard catalog product
- Automotive Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product Supports Defense, Aerospace and Medical Applications





• Military - QML certified for Military and Defense Applications

PACKAGE MATERIALS INFORMATION

8-Jul-2013 www.ti.com

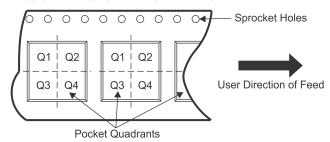
TAPE AND REEL INFORMATION



TAPE DIMENSIONS Ф $\phi \phi \phi$ Ф Cavity → A0 **←**

Α0	Dimension designed to accommodate the component width
	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



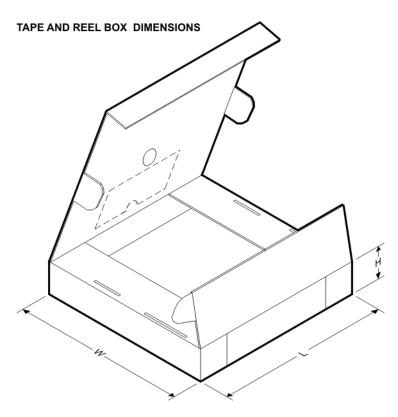
*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
5962-9555201NXDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC2272ACDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC2272ACPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC2272AIDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC2272AMDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC2272AMDRG4	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC2272CDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC2272CPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC2272IDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC2272IPWR	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
TLC2272MDR	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	8.0	12.0	Q1
TLC2274ACDR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
TLC2274ACPWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
TLC2274AIDR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
TLC2274AIPWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
TLC2274AQDR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
TLC2274CDR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
TLC2274CNSR	SO	NS	14	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1

PACKAGE MATERIALS INFORMATION

www.ti.com 8-Jul-2013

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TLC2274CPWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
TLC2274IDR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
TLC2274IPWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
TLC2274MDR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
TLC2274MDRG4	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
TLC2274QDRG4	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
5962-9555201NXDR	SOIC	D	8	2500	367.0	367.0	35.0
TLC2272ACDR	SOIC	D	8	2500	340.5	338.1	20.6
TLC2272ACPWR	TSSOP	PW	8	2000	367.0	367.0	35.0
TLC2272AIDR	SOIC	D	8	2500	340.5	338.1	20.6
TLC2272AMDR	SOIC	D	8	2500	367.0	367.0	35.0
TLC2272AMDRG4	SOIC	D	8	2500	367.0	367.0	35.0
TLC2272CDR	SOIC	D	8	2500	340.5	338.1	20.6
TLC2272CPWR	TSSOP	PW	8	2000	367.0	367.0	35.0
TLC2272IDR	SOIC	D	8	2500	340.5	338.1	20.6
TLC2272IPWR	TSSOP	PW	8	2000	367.0	367.0	35.0
TLC2272MDR	SOIC	D	8	2500	367.0	367.0	35.0



PACKAGE MATERIALS INFORMATION

www.ti.com 8-Jul-2013

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TLC2274ACDR	SOIC	D	14	2500	333.2	345.9	28.6
TLC2274ACPWR	TSSOP	PW	14	2000	367.0	367.0	35.0
TLC2274AIDR	SOIC	D	14	2500	333.2	345.9	28.6
TLC2274AIPWR	TSSOP	PW	14	2000	367.0	367.0	35.0
TLC2274AQDR	SOIC	D	14	2500	367.0	367.0	38.0
TLC2274CDR	SOIC	D	14	2500	333.2	345.9	28.6
TLC2274CNSR	SO	NS	14	2000	367.0	367.0	38.0
TLC2274CPWR	TSSOP	PW	14	2000	367.0	367.0	35.0
TLC2274IDR	SOIC	D	14	2500	333.2	345.9	28.6
TLC2274IPWR	TSSOP	PW	14	2000	367.0	367.0	35.0
TLC2274MDR	SOIC	D	14	2500	367.0	367.0	38.0
TLC2274MDRG4	SOIC	D	14	2500	367.0	367.0	38.0
TLC2274QDRG4	SOIC	D	14	2500	367.0	367.0	38.0

JG (R-GDIP-T8)

CERAMIC DUAL-IN-LINE



NOTES: A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification.
- E. Falls within MIL STD 1835 GDIP1-T8

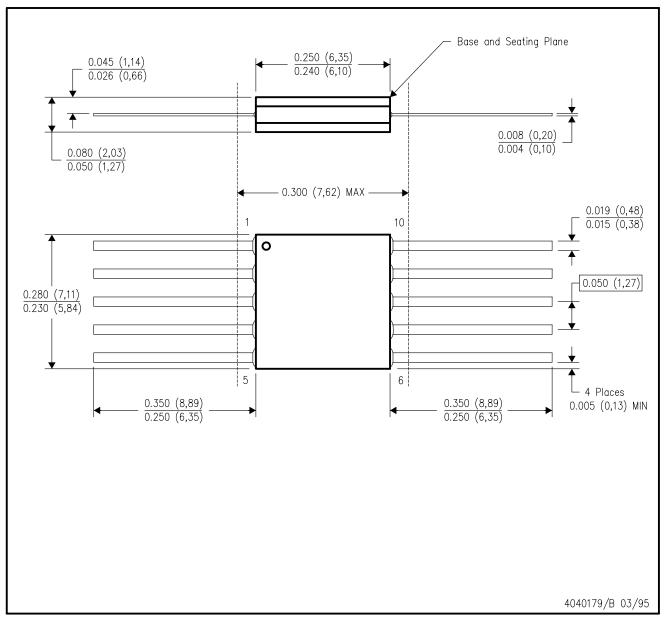
14 LEADS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package is hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
- E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

U (S-GDFP-F10)

CERAMIC DUAL FLATPACK



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within MIL STD 1835 GDFP1-F10 and JEDEC MO-092AA



W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within MIL STD 1835 GDFP1-F14 and JEDEC MO-092AB



FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a metal lid.
- D. Falls within JEDEC MS-004



P (R-PDIP-T8)

PLASTIC DUAL-IN-LINE PACKAGE



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Falls within JEDEC MS-001 variation BA.



D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AB.



D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
 - Sody length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
- E. Falls within JEDEC MO-153



PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



D (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AA.



D (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.





NOTES: A. All linear dimensions are in millimeters.

B. This drawing is subject to change without notice.

C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



PS (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



PW (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
- E. Falls within JEDEC MO-153



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