THE DATASHEET OF

TL34072AP

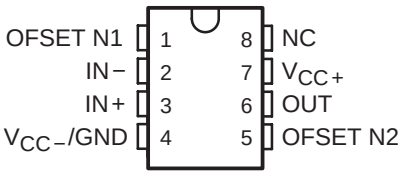
win-source.net 0086-755-83957316

TL3x071, TL3x071A, TL3x072, TL3x072A, TL3x074, TL3x074A
HIGH-SLEW-RATE, SINGLE-SUPPLY OPERATIONAL AMPLIFIERS

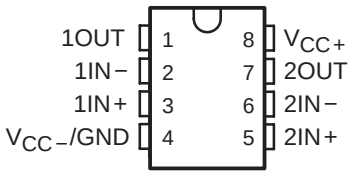
SLOS097C − MARCH 1991 − REVISED AUGUST 1996

- **Wide Gain-Bandwidth Product . . . 4.5 MHz**
- **High Slew Rate . . . 13 V/μs**
- **Fast Settling Time . . . 1.1 μs to 0.1%**
- **Wide-Range Single-Supply Operation 4 V to 44 V**
- **Wide Input Common-Mode Range Includes Ground (V_{CC-})**
- **Low Total Harmonic Distortion . . . 0.02%**
- **Low Input Offset Voltage . . . 3 mV Max (A Suffix)**
- **Large Output Voltage Swing −14.7 V to 14 V (With ±15-V Supplies)**
- **Large Capacitance Drive Capability 10,000 pF**
- **Excellent Phase Margin . . . 60°**
- **Excellent Gain Margin . . . 12 dB**
- **Output Short-Circuit Protection**

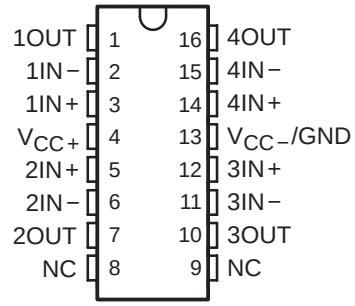
D OR P PACKAGE
(SINGLE, TOP VIEW)



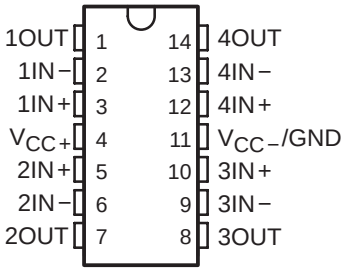
D OR P PACKAGE
(DUAL, TOP VIEW)



DW PACKAGE
(QUAD, TOP VIEW)



N PACKAGE
(QUAD, TOP VIEW)



NC − No internal connection

AVAILABLE OPTIONS

T_A	COMPLEXITY	PACKAGE			
		PLASTIC DIP		SMALL OUTLINE	
		STANDARD GRADE	PRIME GRADE	STANDARD GRADE	PRIME GRADE
0°C to 70°C	Single	TL34071P	TL34071AP	TL34071D	TL34071AD
	Dual	TL34072P	TL34072AP	TL34072D	TL34072AD
	Quad	TL34074N	TL34074AN	TL34074DW	TL34074ADW
−40°C to 105°C	Single	TL33071P	TL33071AP	TL33071D	TL33071AD
	Dual	TL33072P	TL33072AP	TL33072D	TL33072AD
	Quad	TL33074N	TL33074AN	TL33074DW	TL33074ADW
−55°C to 125°C	Single	TL35071P	TL35071AP	TL35071D	TL35071AD
	Dual	TL35072P	TL35072AP	TL35072D	TL35072AD
	Quad	TL35074N	TL35074AN	TL35074DW	TL35074ADW

D and DW packages are available taped and reeled. Add R suffix to device type (e.g., TL34071ADR).

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.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

Copyright © 1996, Texas Instruments Incorporated

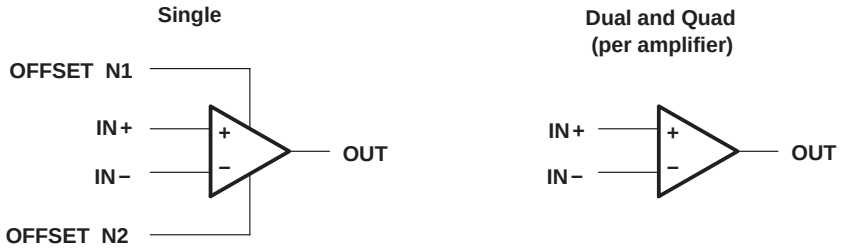
TEXAS INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265
POST OFFICE BOX 1443 • HOUSTON, TEXAS 77251−1443

description

Quality, low cost, bipolar fabrication with innovative design concepts are employed for the TL33071/2/4, TL34071/2/4, and TL35071/2/4 series of monolithic operational amplifiers. This series of operational amplifiers offers 4.5 MHz of gain bandwidth product, 13 V/μs slew rate, and fast settling time without the use of JFET device technology. Although this series can be operated from split supplies, it is particularly suited for single-supply operation since the common-mode input voltage range includes ground potential (V_{CC-}). With a Darlington transistor input stage, this series exhibits high input resistance, low input offset voltage, and high gain. The all-npn output stage, characterized by no dead-band crossover distortion and large output voltage swing, provides high-capacitance drive capability, excellent phase and gain margins, low open-loop high-frequency output impedance, and symmetrical source/sink ac frequency response.

The TL34071/2/4 devices are avaliable in standard or prime performance (A-suffix) grades and are specified over the commercial (0°C to 70°C) temperature range. The TL33071/2/4 devices are available in standard or prime performance (A-suffix) grades and are specified over industrial/vehicular (−40°C to 105°C) temperature range. The TL35071/2/4 devices are avaliable in standard or prime performance (A-suffix) grades and are specified over the military (−55°C to 125°C) temperature range. These low-cost amplifiers are available in single, dual, and quad configurations and are pin compatible with the MC33071/2/4, MC34071/2/4, and MC35071/2/4 series of amplifiers. Packaging options include standard plastic DIP and SO packages.

symbol



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

Supply voltage, V_{CC+} (see Note 1) . . . . . 22 V
Supply voltage, V_{CC-} . . . . . −22 V
Differential input voltage, V_{ID} (see Note 2) . . . . . ±44 V
Input voltage, V_I (any input) . . . . . $V_{CC±}$
Input current, I_I (each input) . . . . . ±1 mA
Output current, I_O . . . . . ±80 mA
Total current into V_{CC+} . . . . . 80 mA
Total current out of V_{CC-} . . . . . 80 mA
Duration of short-circuit current at (or below) 25°C (see Note 3) . . . . . unlimited
Continuous total power dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range, T_A: TL3307x . . . . . −40°C to 105°C
TL3407x . . . . . 0°C to 70°C
TL3507x . . . . . −55°C to 125°C
Storage temperature range, T_{stg} . . . . . −65°C to 150°C
Lead temperature 1.6 mm (1/16 inch) from case for 10 seconds: D, DW, N, or P package . . . . . 260°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. All voltage values, except differential voltages, are with respect to the midpoint between V_{CC+} and V_{CC-}.
2. Differential voltages are at the noninverting input with respect to the inverting input. Excessive current flows if input is brought below V_{CC-} − 0.3 V.
3. The output can be shorted to either supply. Temperature and/or supply voltages must be limited to ensure that the maximum dissipation rating is not exceeded.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 105°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW	261 mW	145 mW
DW	1025 mW	8.2 mW/°C	656 mW	369 mW	205 mW
N	1150 mW	9.2 mW/°C	736 mW	414 mW	230 mW
P	1000 mW	8.0 mW/°C	640 mW	360 mW	200 mW

recommended operating conditions

		TL3307x		TL3407x		TL3507x		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
Supply voltage, $V_{CC±}$		±2	±22	±2	±22	±2	±22	V
Common-mode input voltage, V_{IC}	V_{CC} = 5 V	0	2.7	0	2.9	0	2.7	V
	$V_{CC±}$ = ±15 V	−15	12.7	−15	12.9	−15	12.7	
Operating free-air temperature, T_A		−40	105	0	70	−55	125	°C

electrical characteristics at specified free-air temperature, $V_{CC\pm}$ = ±15 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS		T_A†	TL3x07xA			TL3x07x			UNIT
					MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IO}	Input offset voltage	V_{IC} = 0, V_O = 0, R_S = 50 Ω	V_{CC} = 5 V	25°C		0.5	3		1.5	5	mV
			V_{CC} = ±15 V	25°C		0.5	3		1.0	5	
				Full range			5			7	
αV_{IO}	Temperature coefficient of input offset voltage		V_{CC} = ±15 V	Full range		10			10		µV/°C
I_{IO}	Input offset current		V_{CC} = ±15 V	25°C		7	100		7	100	nA
				Full range			250			250	
I_{IB}	Input bias current		V_{CC} = 5 V	25°C		−0.8	−2		−0.8	−2	µA
				Full range			−2.3			−2.3	
			V_{CC} = ±15 V	25°C		−0.7	−1.5		−0.7	−1.5	
				Full range			−1.8			−1.8	
V_{ICR}	Common-mode input voltage range	R_S = 50 Ω		25°C	−15 to 13.2			−15 to 13.2			V
				Full range	−15 to 12.8			−15 to 12.8			
V_{OH}	High-level output voltage	V_{CC+} = 5 V, V_{CC-} = 0, R_L = 2 kΩ		25°C	3.7	4		3.7	4		V
		R_L = 10 kΩ		25°C	13.6	14		13.6	14		
		R_L = 2 kΩ		Full range	13.4			13.4			
V_{OL}	Low-level output voltage	V_{CC+} = 5 V, V_{CC-} = 0, R_L = 2 kΩ		25°C		0.1	0.3		0.1	0.3	V
		R_L = 10 kΩ		25°C		−14.7	−14.3		−14.7	−14.3	
		R_L = 2 kΩ		Full range			−13.5			−13.5	
A_{VD}	Large-signal differential voltage amplification	V_O = ±10 V, R_L = 2 kΩ		25°C	50	100		25	100		V/mV
				Full range	25			20			
I_{OS}	Short-circuit output current	Source: V_{ID} = 1 V, V_O = 0		25°C	−10	−30		−10	−30		mA
		Sink: V_{ID} = −1 V, V_O = 0			20	30		20	30		
CMRR	Common-mode rejection ratio	V_{IC} = V_{ICR}min, R_S = 50 Ω		25°C	80	97		70	97		dB
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{CC\pm}/\Delta V_{IO}$)	$V_{CC\pm}$ = ±13.5 V to ±16.5 V, R_S = 100 Ω		25°C	80	97		70	97		dB
I_{CC}	Supply current (per channel)	V_O = 0, No Load		25°C		3.5	4.5		3.5	4.5	mA
				Full range			4.7			4.7	
		V_{CC+} = 5 V, V_{CC-} = 0, V_O = 0, No Load		25°C		3.4	4.4		3.4	4.4	
				Full range			4.6			4.6	

† Full range is 0°C to 70°C for the TL3407x devices, and −40°C to 105°C for the TL3307x devices, and −55°C to 125°C for the TL3507x devices.
‡ All typical values are at T_A = 25°C.

operating characteristics, $V_{CC\pm}$ = ±15 V, T_A = 25°C

PARAMETER		TEST CONDITIONS		TL3x07xA			TL3x07x			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
SR+	Positive slew rate	V_I = −10 V to 10 V, R_L = 2 kΩ	A_V = 1	8	10		8	10		V/μs
SR−	Negative slew rate		A_V = −1		13			13		
t_s	Settling time	A_{VD} = −1, 10-V step	To 0.1%		1.1			1.1		μs
			To 0.01%		2.2			2.2		
V_n	Equivalent input noise voltage	f = 1 kHz,	R_S = 100 Ω		32			32		nV/√Hz
I_n	Equivalent input noise current	f = 1 kHz			0.22			0.22		pA/√Hz
THD	Total harmonic distortion	V_O = 2 V to 20 V, R_L = 2 kΩ, A_{VD} = 10,	f = 10 kHz		0.02			0.02		%
GBW	Gain-bandwidth product	f =100 kHz		3.5	4.5		3.5	4.5		MHz
BW	Power bandwidth	R_L = 2 kΩ, A_{VD} = 1,	$V_{O(PP)}$ = 20 V, THD = 5.0%		200			200		kHz
ϕ_m	Phase margin	R_L = 2 kΩ,	C_L = 0		60°			60°		
		R_L = 2 kΩ,	C_L = 300 pF		40°			40°		
	Gain margin	R_L = 2 kΩ,	C_L = 0		12			12		dB
		R_L = 2 kΩ,	C_L = 300 pF		4			4		
r_i	Differential input resistance	V_{IC} = 0			150			150		MΩ
C_i	Input capacitance	V_{IC} = 0			2.5			2.5		pF
	Channel separation	f = 10 kHZ			120			120		dB
z_o	Open-loop output impedance	f = 1 MHZ			30			30		Ω

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
TL35072P	ACTIVE	PDIP	P	8	50	RoHS & Green	NIPDAU	N / A for Pkg Type		TL35072P	Samples

(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.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(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.

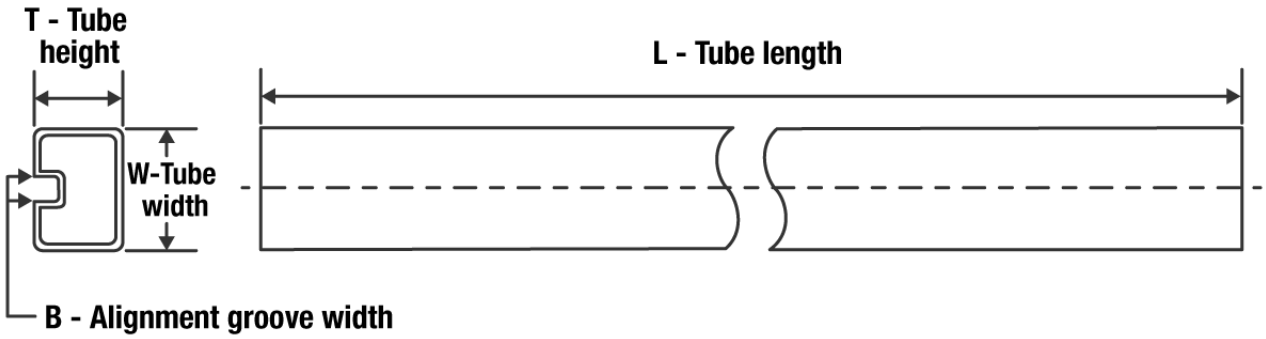
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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.

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
TL35072P	P	PDIP	8	50	506	13.97	11230	4.32

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2024, Texas Instruments Incorporated

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- View TL34072AP on WIN SOURCE
- Texas Instruments Information

Optimize Your Supply Chain with WIN SOURCE Solutions

- Global Sourcing Solution
- Obsolete Management
- Cost Control Management
- Shortage Management
- Alternative Solution
- Excess Inventory Management