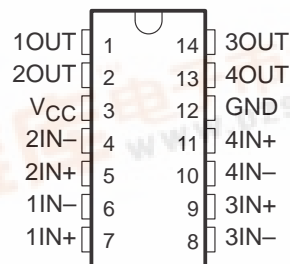


## QUADRUPLE DIFFERENTIAL COMPARATOR

SLCS014—OCTOBER 1977—REVISED APRIL 1988

- Single Supply or Dual Supplies
- Wide Range of Supply Voltage  
2 V to 28 V
- Low Supply Current Drain Independent of Supply Voltage . . . 0.8 mA Typ
- Low Input Bias Current . . . 25 nA Typ
- Low Input Offset Current . . . 3 nA Typ
- Low Input Offset Voltage . . . 3 mV Typ
- Common-Mode Input Voltage Range Includes Ground
- Differential Input Voltage Range Equal to Maximum-Rated Supply Voltage . . .  $\pm 28$  V
- Low Output Saturation Voltage
- Output Compatible With TTL, MOS, and CMOS

D, J, OR N PACKAGE  
(TOP VIEW)

## description

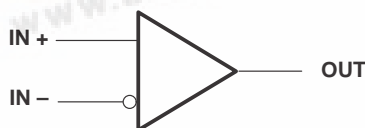
This device consists of four independent voltage comparators that are designed to operate from a single power supply over a wide range of voltages. Operation from dual supplies is also possible so long as the difference between the two supplies is 2 V to 28 V and  $V_{CC}$  is a least 1.5 V more positive than the input common-mode voltage. Current drain is independent of the supply voltage. The outputs can be connected to other open-collector outputs to achieve wired-AND relationships.

AVAILABLE OPTIONS

$T_A$	$V_{IOmax}$ at 25°C	PACKAGE		
		SMALL OUTLINE (D) <sup>†</sup>	CERAMIC DIP (J)	PLASTIC DIP (N)
-40°C to 85°C	20 mV	LM3302D	LM3302J	LM3302N

<sup>†</sup> The D packages are available taped and reeled. Add the suffix R to the device type, when ordering (i.e., LM3302DR).

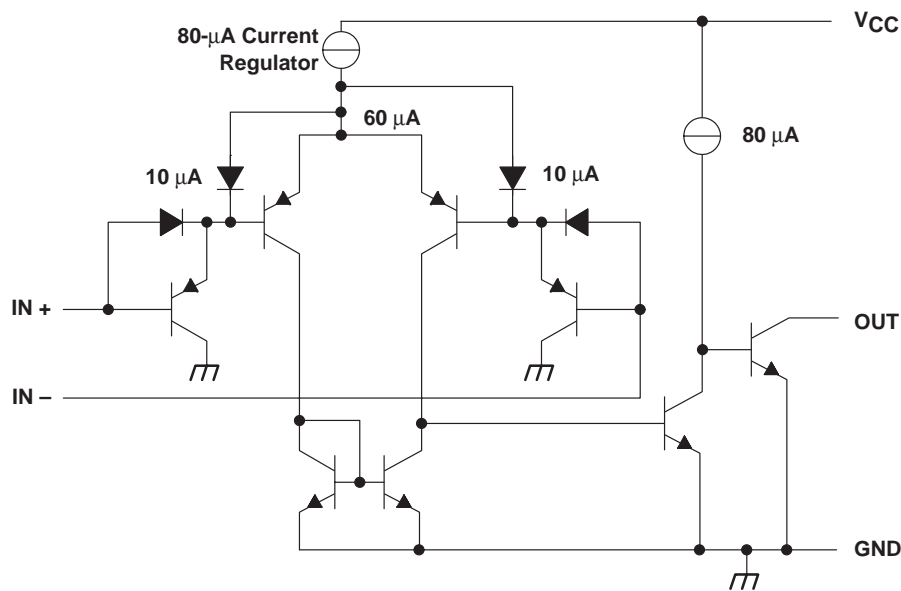
## symbol (each comparator)



LM3302  
QUADRUPLE DIFFERENTIAL COMPARATOR

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schematic



Current values shown are nominal.

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

Supply voltage, $V_{CC}$ (see Note 1)	28 V
Differential input voltage, $V_{ID}$ (see Note 2)	$\pm 28$ V
Input voltage range, $V_I$ (either input), $V_I$	$-0.3$ V to 28 V
Output voltage, $V_O$	28 V
Output current, $I_O$	20 mA
Duration of output short-circuit to ground (see Note 3)	unlimited
Continuous total dissipation	See Dissipation Rating Table
Operating free-air temperature range, $T_A$	$-40^{\circ}\text{C}$ to $85^{\circ}\text{C}$
Storage temperature range	$-65^{\circ}\text{C}$ to $150^{\circ}\text{C}$
Lead temperature range 1,6 mm (1/16 inch) from case for 60 seconds: J package	$300^{\circ}\text{C}$
Lead temperature range 1,6 mm (1/16 inch) from case for 10 seconds: D or N package	$260^{\circ}\text{C}$

<sup>†</sup> Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. There are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the recommended operating conditions section of this specification 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 network ground.  
2. Differential voltages are at IN+ with respect to IN-.  
3. Short circuits from the output to  $V_{CC}$  can cause excessive heating and eventual destruction.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25^{\circ}\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^{\circ}\text{C}$	$T_A = 70^{\circ}\text{C}$ POWER RATING	$T_A = 85^{\circ}\text{C}$ POWER RATING
D	950 mW	7.6 mW/ $^{\circ}\text{C}$	608 mW	494 mW
J	1025 mW	8.2 mW/ $^{\circ}\text{C}$	656 mW	533 mW
N	1150 mW	9.2 mW/ $^{\circ}\text{C}$	736 mW	598 mW

# LM3302

## QUADRUPLE DIFFERENTIAL COMPARATOR

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

PARAMETER	TEST CONDITIONS†	$T_A$	MIN	TYP	MAX	UNIT
$V_{IO}$ Input offset voltage	$V_{CC} = 5\text{ V to } 28\text{ V}$ , $V_{IC} = V_{ICR\text{ min}}$ , $V_O = 1.4\text{ V}$	25°C		3	20	mV
		– 40°C to 85°C			40	
$I_{IO}$ Input offset current	$V_O = 1.4\text{ V}$	25°C		3	100	nA
		– 40°C to 85°C			300	
$I_{IB}$ Input bias current		25°C		– 25	– 500	nA
		– 40°C to 85°C			–1000	
$V_{ICR}$ Common-mode input voltage range		25°C		0 to $V_{CC} - 1.5$		V
		– 40°C to 85°C		0 to $V_{CC} - 2$		
$A_{VD}$ Large-signal differential voltage amplification	$V_{CC} = 15\text{ V}$ , $V_O = 1.4\text{ V to } 11.4\text{ V}$ , $R_L = 15\text{ }\Omega\text{ to } V_{CC}$	25°C		2	30	V/mV
$I_{OH}$ High-level output current	$V_{ID} = 1\text{ V}$ , $V_{OH} = 5\text{ V}$	25°C		0.1		nA
		– 40°C to 85°C			1	μA
$V_{OL}$ Low-level output voltage	$V_{ID} = 1\text{ V}$ , $V_{OH} = 5\text{ V}$	25°C		150	500	mV
		– 40°C to 85°C			700	
$I_{OL}$ Low-level output current	$V_{ID} = 1\text{ V}$ , $V_{OL} = 1.5\text{ V}$	25°C		6	16	mA
$I_{CC}$ Supply current (four comparators)	$V_O = 2.5\text{ V}$ , No load	25°C		0.8		mA

† All characteristics are measured with zero common-mode input voltage unless otherwise specified.

switching characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Response time	$R_L = 5.1\text{ k}\Omega\text{ to } 5\text{ V}$ , $C_L = 15\text{ pF}^\dagger$ , See Note 4	100-mV input step with 5-mV overdrive		1.3	μs
		TTL-level input step		0.3	

†  $C_L$  includes probe and jig capacitance.

NOTE 4: The response time specified is the interval between the input step function and the instant when the output crosses 1.4 V.

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