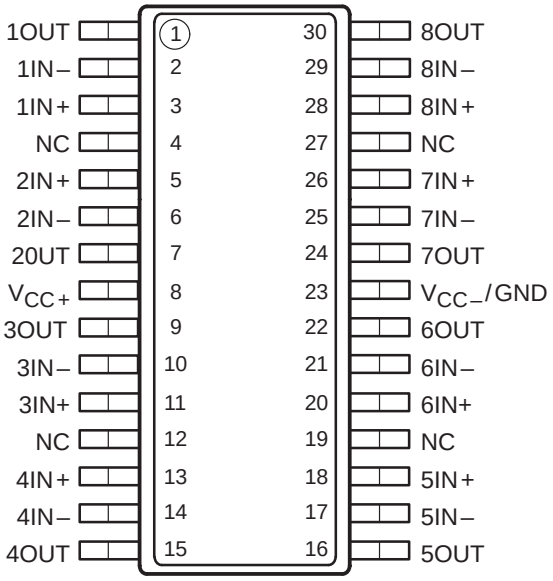
- **Wide Range of Supply Voltages:**
  Single Supply . . . 3 V to 30 V
  or Dual Supplies
- **Low Supply-Current Drain Independent of Supply Voltage . . . 1.4 mA Typ**
- **Common-Mode Input Voltage Range Includes Ground Allowing Direct Sensing Near Ground**
- **Low Input Bias and Offset Parameters:**
  Input Offset Voltage . . . 3 mV Typ
  Input Offset Current . . . 2 nA Typ
  Input Bias Current . . . –20 nA Typ
- **Differential Input Voltage Range Equal to Maximum-Rated Supply Voltage . . . 32 V**
- **Open-Loop Differential Voltage Amplification . . . 100 V/mV Typ**
- **Internal Frequency Compensation**

DB PACKAGE
(TOP VIEW)

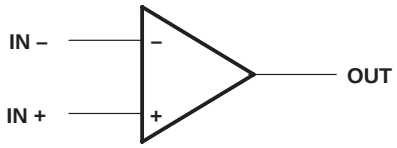


NC – No internal connection

description

The LM324x2 device consists of eight independent, high-gain frequency-compensated operational amplifiers that are designed specifically to operate from a single supply over a wide range of voltages. Operation from split supplies is also possible when the difference between the two supplies is 3 V to 30 V and V_{CC} is at least 1.5 V more positive than the input common-mode voltage. The low supply-current drain is independent of the magnitude of the supply voltage.

symbol (each amplifier)



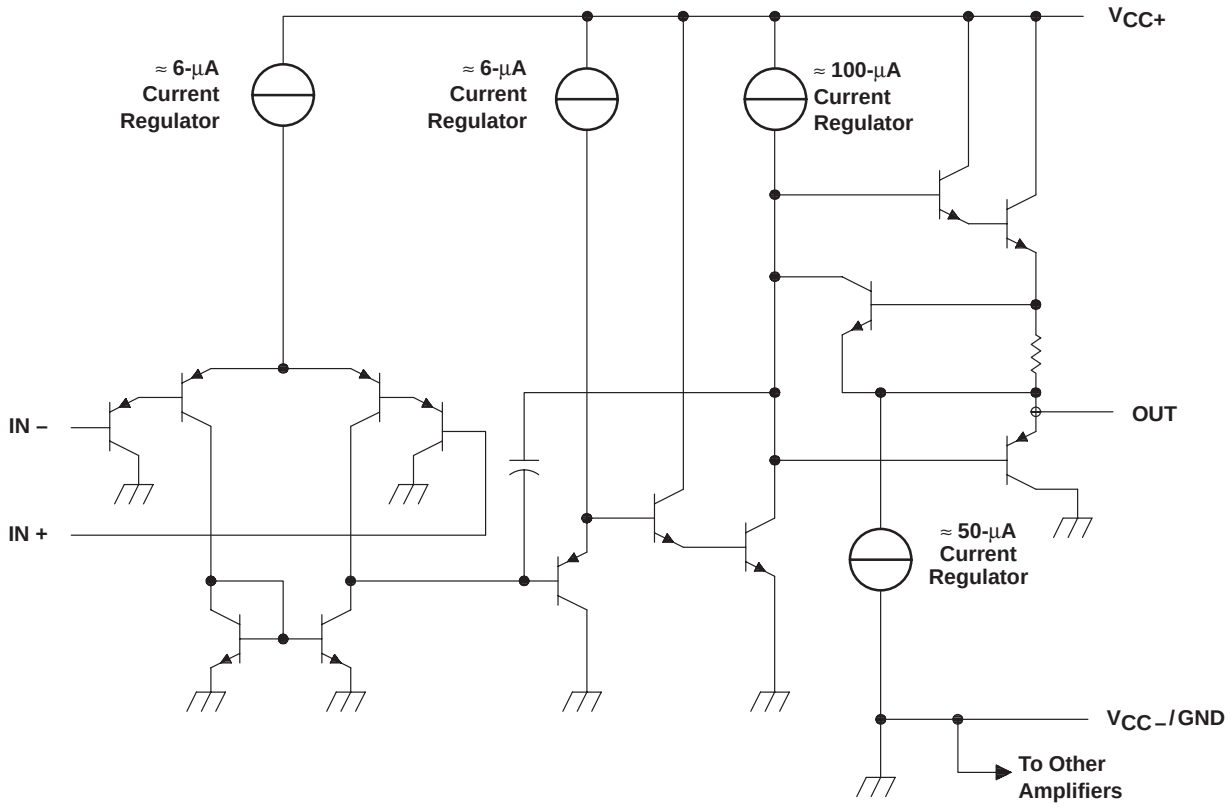
Applications include transducer amplifiers, dc amplification blocks, and all the conventional operational-amplifier circuits that now can be more easily implemented in single-supply-voltage systems.

AVAILABLE OPTION

T_A	V_{IO}max AT 25°C	PACKAGE
		SMALL OUTLINE (DB)†
0°C to 70°C	7 mV	LM324x2DBLE

† The DB package is only available left-end taped and reeled.

schematic (each amplifier)



COMPONENT COUNT (total device)	
Epi-FET	2
Transistors	190
Diodes	8
Resistors	22
Capacitors	8

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

Supply voltage, V_{CC} (see Note 1) . . . . . 32 V
Differential input voltage, V_{ID} (see Note 2) . . . . . ±32 V
Input voltage range, V_I (any input) . . . . . –0.3 V to 32 V
Duration of output short circuit to ground (see Note 3) . . . . . unlimited
Continuous total power dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range, T_A . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°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 conditions beyond those indicated is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. All voltage values, except differential voltages and V_{CC} specified for the measurement of I_{OS}, are with respect to GND.
2. Differential voltages are at IN + with respect to IN –.
3. Short circuits from outputs to V_{CC} can cause excessive heating and eventual destruction.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING
DB	1024 mW	8.2 mW/°C	655 mW

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

PARAMETER		TEST CONDITIONS†		T_A‡	MIN	TYP§	MAX	UNIT
V_{IO}	Input offset voltage	V_{CC} = 5 V to MAX, $V_{IC} = V_{ICR}$min,	V_O = 1.4 V	25°C		3	7	mV
				Full range			9	
I_{IO}	Input offset current	V_O = 1.4 V		25°C		2	50	nA
				Full range			150	
I_{IB}	Input bias current	V_O = 1.4 V		25°C		−20	−250	nA
				Full range			−500	
V_{ICR}	Common-mode input voltage range	V_{CC} = 5 V to MAX		25°C	0 to V_{CC}−1.5			V
				Full range	0 to V_{CC}−2			
V_{OH}	High-level output voltage	R_L = 2 kΩ		25°C	V_{CC}−1.5			V
		V_{CC} = MAX,	R_L = 2 kΩ	Full range	26			
		V_{CC} = MAX,	R_L ≥ 10 kΩ	Full range	27	28		
V_{OL}	Low-level output voltage	R_L ≤ 10 kΩ		Full range		5	20	mV
A_{VD}	Large-signal differential voltage amplification	V_{CC} = 15 V, R_L = ≥ 2 kΩ	V_O = 1 V to 11 V,	25°C	25	100		V/mV
				Full range	15			
CMRR	Common-mode rejection ratio	$V_{IC} = V_{ICR}$min		25°C	65	80		dB
k_{SVR}	Supply-voltage rejection ratio ($\Delta V_{CC}/\Delta V_{IO}$)			25°C	65	100		dB
V_{O1}/V_{O2}	Crosstalk attenuation	f = 1 kHz to 20 kHz		25°C		120		dB
I_O	Output current	V_{CC} = 15 V, V_O = 0	V_{ID} = 1 V,	25°C	−20	−30	−60	mA
				Full range	−10			
		V_{CC} = 15 V, V_O = 15 V	V_{ID} = −1 V,	25°C	10	20		
				Full range	5			
		V_{ID} = −1 V,	V_O = 200 mV	25°C	12	30		µA
I_{OS}	Short-circuit output current	V_O = 0,	GND = −5 V	25°C		±40	±60	mA
I_{CC}	Supply current (eight amplifiers)	V_O = 2.5 V,	No load	Full range		1.4	2.4	mA
		V_{CC} = MAX, No load	V_O = 0.5 V_{CC},	Full range		2.2	6	

† All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified. MAX V_{CC} for testing purposes is 30 V.
‡ Full range is 0°C to 70°C.
§ All typical values are at T_A = 25°C.

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