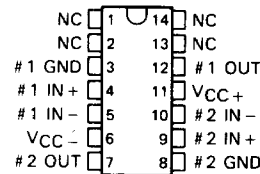


- Can Operate from Single 5-V Supply
- Fast Response Time . . . 80 ns Typ with $V_{CC} = \pm 15\text{ V}$
- Low Input Bias Current Over Temperature Range
- Inputs and Outputs Can Be Isolated from System Ground
- High Common-Mode Slew Rate
- Outputs Compatible with TTL Circuits

J OR N DUAL-IN-LINE PACKAGE
(TOP VIEW)



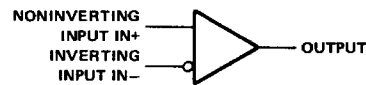
NC—No internal connection

description

The LM219 and LM319 each consists of two high-speed precision comparators that operate over a wide range of supply voltages. These comparators are fully specified for power supplies up to ± 15 volts, but are specifically designed to operate from a single 5-volt digital logic supply. Due to the uncommitted collector at the outputs, the LM219 and LM319 are compatible with TTL circuits. These comparators are also well-suited for driving lamps and relays at currents up to 25 milliamperes. The LM219 series features faster response times but greater power dissipation than the LM111 series.

The LM219 is characterized for operation over the temperature range of -25°C to 85°C ; the LM319 is characterized for operation over the temperature range of 0°C to 70°C .

symbol (each comparator)



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

| | |
|---|--|
| Supply voltage, V_{CC+} to V_{CC-} | 36 V |
| Supply voltage, V_{CC+} (see Note 1) | 18 V |
| Supply voltage, V_{CC-} (see Note 1) | -25 V |
| Differential input voltage (see Note 2) | $\pm 5\text{ V}$ |
| Input voltage (either input, see Note 3) | $\pm 15\text{ V}$ |
| Voltage from output to V_{CC-} | 36 V |
| Duration of output short-circuit (see Note 4) | 10 s |
| Continuous total power dissipation at (or below) 25°C free-air temperature (see Note 5) | 500 mW |
| Operating free-air temperature range: LM219 | -25°C to 85°C |
| LM319 | 0°C to 70°C |
| Storage temperature range | -65°C to 150°C |
| Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J package | 300°C |
| Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: N package | 260°C |

- NOTES: 1. All voltage values, except differential voltages, are with respect to the appropriate comparator ground terminal unless otherwise specified.
 2. Differential voltages are at the noninverting input terminal with respect to the inverting input terminal.
 3. The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 volts, whichever is less.
 4. The output may be shorted to ground or to either power supply.
 5. For operation above 25°C free-air temperature, refer to Dissipation Derating Curves, Section 2.

TYPES LM219, LM319 DUAL DIFFERENTIAL COMPARATORS

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

| PARAMETER | TEST CONDITIONS [†] | LM219 | | | LM319 | | | UNIT |
|--|--|--------------------------|--------------|-------------------|--------------|------------------|---------------|------|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| V_{IO} Input offset voltage | See Note 6 | 25°C | 0.7 | 4 | 2 | 8 | mV | |
| | | Full range | | 7 | | 10 | | |
| I_{IO} Input offset current | See Note 6 | 25°C | 30 | 75 | 80 | 200 | nA | |
| | | Full range | | 100 | | 300 | | |
| I_{IB} Input bias current | | 25°C | 150 | 500 | 250 | 1000 | nA | |
| | | Full range | | 1000 | | 1200 | | |
| V_{ICR} Common-mode input voltage range | $V_{CC+} = 5\text{ V}$, $V_{CC-} = 0$ | Full range | ± 12 | ± 13 | ± 13 | | V | |
| | | | 1 to 3 | | 1 to 3 | | | |
| A_{VD} Large-signal differential voltage amplification | $V_O = 1\text{ V to }4\text{ V}$, $V_{CC+} = 5\text{ V}$, $V_{CC-} = 0$, $R_L = 2\text{ k}\Omega$ | 25°C | 10 | 40 | 8 | 40 | V/mV | |
| V_{OL} Low-level output voltage | $I_{OL} = 25\text{ mA}$, $V_{CC+} = 4.5\text{ V}$, $V_{CC-} = 0$, $I_{OL} = 3.2\text{ mA}$ | $V_{ID} = -5\text{ mV}$ | 25°C | 0.75 | 1.5 | | V | |
| | | $V_{ID} = -10\text{ mV}$ | 25°C | | | 0.75 | | 1.5 |
| | | $V_{ID} = -6\text{ mV}$ | 0°C to 85°C | 0.23 [‡] | 0.4 | | | |
| | | $V_{ID} = -10\text{ mV}$ | 0°C to 70°C | | | 0.3 [‡] | | 0.4 |
| I_{OH} High-level output current | $V_{CC+} = 15\text{ V}$, $V_{CC-} = 0$, $V_{OH} = 35\text{ V}$ | $V_{ID} = -6\text{ mV}$ | -25°C to 0°C | | 0.6 | | μA | |
| | | $V_{ID} = 5\text{ mV}$ | 25°C | 0.2 | 2 | | | |
| | | $V_{ID} = 10\text{ mV}$ | 25°C | | | 0.2 | | 10 |
| I_{CC+} Positive supply current | $V_{CC+} = 5\text{ V}$, $V_{CC-} = 0$ | 25°C | 4.3 | | 4.3 | | mA | |
| | | 25°C | 8 | 11.5 | 8 | 12.5 | | |
| I_{CC-} Negative supply current | | 25°C | -3 | -4.5 | -3 | -5 | mA | |

[†]Full range is -25°C to 85°C for the LM219 and 0°C to 70°C for the LM319.

[‡]These typical values are at worst-case temperature.

NOTE 6: Both the offset voltages and the offset currents are the maximum values needed to drive the output to within 1 volt of either supply with a 1-mA load. These parameters define an error band that includes the worst-case effects of voltage amplification and input impedance.

switching characteristics, $V_{CC} = -15\text{ V}$, $T_A = 25^\circ\text{C}$

| PARAMETER | TEST CONDITIONS | LM219 | | | LM319 | | | UNIT |
|---------------|-----------------|-------|-----|-----|-------|-----|-----|------|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| Response time | See Note 7 | | 80 | | | 80 | | ns |

NOTE 7: The response time specified is for a 100-mV input step with 5 mV overdrive and is the interval between the input step function and the instant when the output crosses 1.4 V.

4

Voltage Comparators