

HIGH SPEED DIFFERENTIAL COMPARATOR

■ GENERAL DESCRIPTION

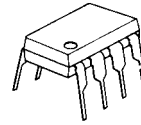
The NJM360 is a very high speed differential input, complementary TTL output voltage comparator. The device has been optimized for greater speed, input impedance and fan-out and lower input offset voltage.

Applications involve high speed analog to digital converters and zero-crossing detectors in disc file systems.

■ FEATURES

- Operating Voltage ($\pm 4.5V \sim \pm 6.5V$)
- High Speed Guarantee (20ns max.)
- Both output delay time has been precisely adjusted
- Complementary TTL Output
- High Input Impedance
- Stabilized Speed for Over Driving Change
- Bipolar Technology
- Fan-out is 4
- Low Input Offset Voltage
- Package Outline DIP8, DMP8, EMP8

■ PACKAGE OUTLINE



NJM360D

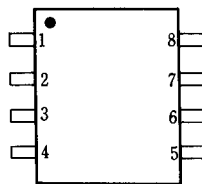


NJM360M



NJM360E

■ PIN CONFIGURATION

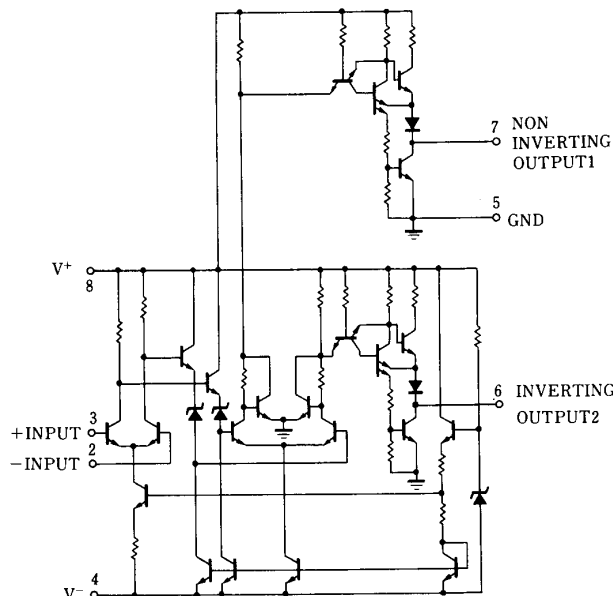


NJM360D
NJM360M
NJM360E

PIN FUNCTION

- 1. NC
- 2. -INPUT
- 3. +INPUT
- 4. V^-
- 5. GND
- 6. OUT2
- 7. OUT1
- 8. V^+

■ EQUIVALENT CIRCUIT



NJM360

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------------|-----------|--|------|
| Supply Voltage | V^+V^- | ± 8 | V |
| Differential Input Voltage | V_{ID} | ± 5 | V |
| Input Voltage | V_I | ± 8 (note1) | V |
| Power Dissipation | P_D | (DIP8) 500 (DMP8) 300 (EMP8) 300 | mW |
| Maximum Output Current | I_O | ± 20 | mA |
| Operating Temperature Range | T_{opr} | -40~+85 | °C |
| Storage Temperature Range | T_{stg} | -40~+125 | °C |

(note1) For supply voltage less than $\pm 8V$, the absolute input voltage is equal to the supply voltage.

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|--------------------------|--|---------|-----------|------|------------------|
| Operating Supply Voltage | V^+ | | 4.5 | 5 | 6.5 | V |
| Operating Supply Voltage | V^- | | -4.5 | -5 | -6.5 | V |
| Input Offset Voltage | V_{IO} | $R_S \leq 200\Omega$ | - | 2 | 5 | mV |
| Input Offset Current | I_{IO} | | - | 0.5 | 3 | μA |
| Input Bias Current | I_B | | - | 5 | 20 | μA |
| Output Resistance | R_O | $V_{OUT}=V_{OM}$ | - | 100 | - | Ω |
| Response Time 1 | t_{R1} | $V^+V^-=\pm 5V$ (note1) | - | 13 | 25 | ns |
| Response Time 2 | t_{R2} | $V^+V^-=\pm 5V$ (note2) | - | 12 | 20 | ns |
| Response Time 3 | t_{R3} | $V^+V^-=\pm 5V$ (note3) | - | 14 | - | ns |
| Response Time Difference Between Outputs ($t_{pd} \text{ of } +V_{IN1}$)-($t_{pd} \text{ of } -V_{IN2}$) | | (note1) | - | 2 | - | ns |
| ($t_{pd} \text{ of } +V_{IN2}$)-($t_{pd} \text{ of } -V_{IN1}$) | | (note1) | - | 2 | - | ns |
| ($t_{pd} \text{ of } +V_{IN1}$)-($t_{pd} \text{ of } +V_{IN2}$) | | (note1) | - | 2 | - | ns |
| ($t_{pd} \text{ of } -V_{IN1}$)-($t_{pd} \text{ of } -V_{IN2}$) | | (note1) | - | 2 | - | ns |
| Input Resistance | R_{IN} | $f=1\text{MHz}$ | - | 17 | - | k Ω |
| Input Capacitance | C_{IN} | $f=1\text{MHz}$ | - | 3 | - | pF |
| Average Temperature Coefficient of Input Offset Voltage | $\Delta V_{IO}/\Delta T$ | $R_S=50\Omega$ | - | 8 | - | $\mu V/^\circ C$ |
| Average Temperature Coefficient of Input Offset Current | $\Delta I_{IO}/\Delta T$ | | - | 7 | - | nA/°C |
| Common Mode Input Voltage Range | V_{ICM} | $V^+V^-=\pm 6.5V$ | ± 4 | ± 4.5 | - | V |
| Differential Input Voltage Range | V_{ID} | | ± 5 | - | - | V |
| Output High Voltage (High) | V_{OH} | $V^+V^-=\pm 4.5V, I_{OUT}=-320\mu A$ | 2.4 | 3 | - | V |
| Output Low Voltage (Low) | V_{OL} | $V^+V^-=\pm 4.5V, I_{SINK}=6.4\text{mA}$ | - | 0.25 | 0.4 | V |
| Positive Supply Current | I^+ | $V^+V^-=\pm 6.5V$ | - | 18 | 32 | mA |
| Negative Supply Current | I^- | $V^+V^-=\pm 6.5V$ | - | -9 | -16 | mA |

(note1) Response time measured from the 50% point of a 30mV_{P-P} 10MHz sinusoidal input to the 50% point of the output.

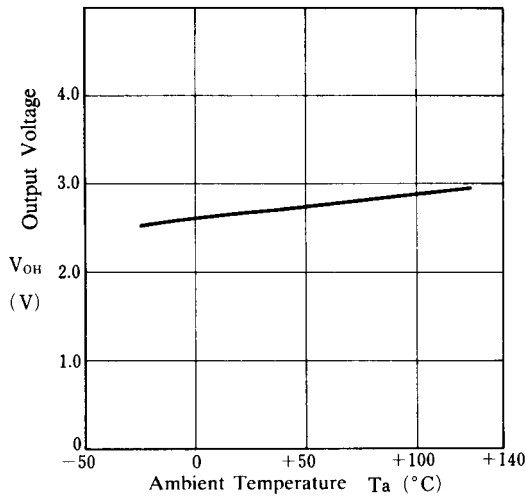
(note2) Response time measured from the 50% point of a 2V_{P-P} 10MHz sinusoidal input to the 50% point of the output.

(note3) Response time measured from the start of a 100mV input step with 5mV overdrive to the time when the output crosses the logic threshold.

■ TYPICAL CHARACTERISTICS

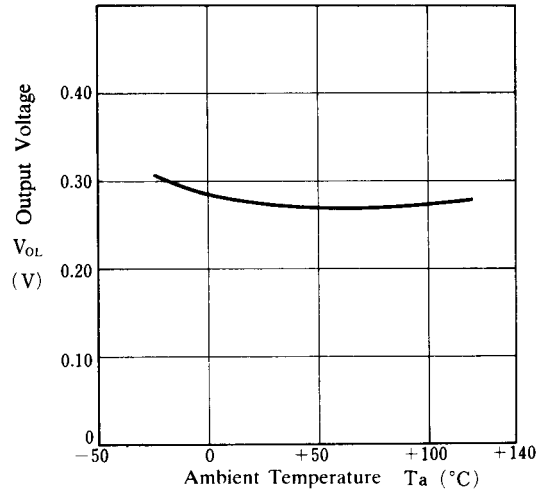
Output Voltage (High) vs. Temperature

($V^+/V^- = \pm 4.5V$, $I_{OUT} = -320\mu A$)



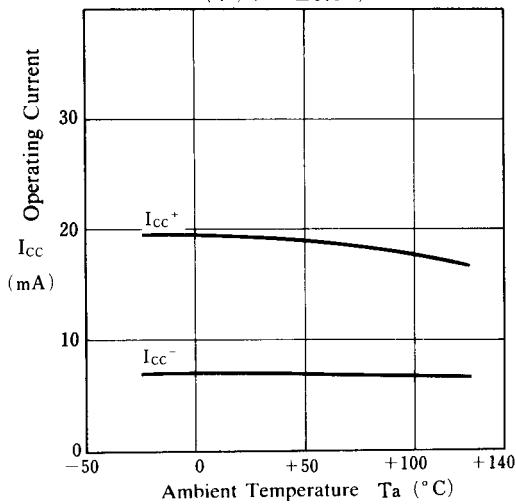
Output Voltage (Low) vs. Temperature

($V^+/V^- = \pm 4.5V$, $I_{SINK} = 6.4mA$)



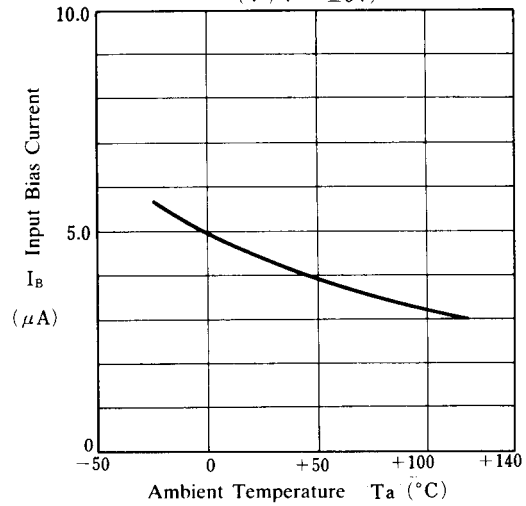
Operating Current vs. Temperature

($V^+/V^- = \pm 6.5V$)



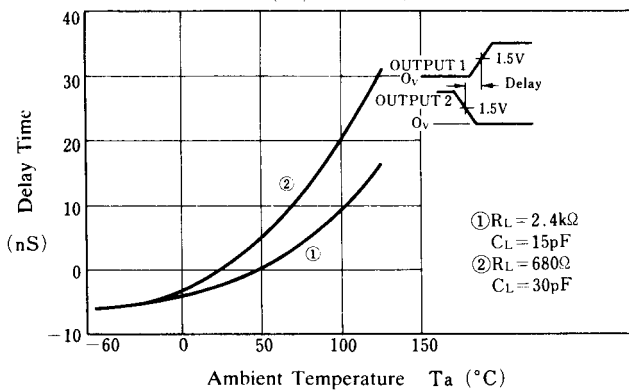
Input Bias Current vs. Temperature

($V^+/V^- = \pm 5V$)



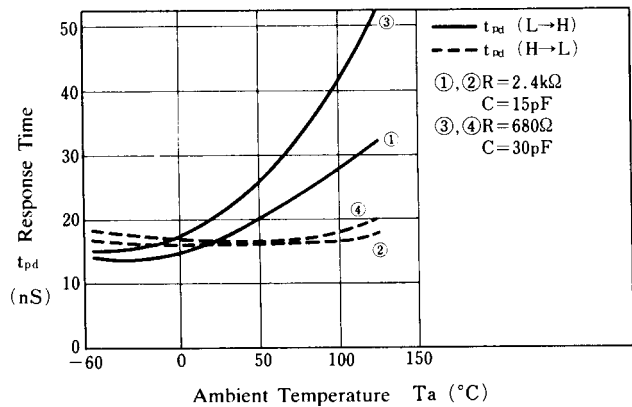
OUTPUT1 and OUTPUT2 Delay Time vs. Temperature

($V^+/V^- = \pm 5V$)



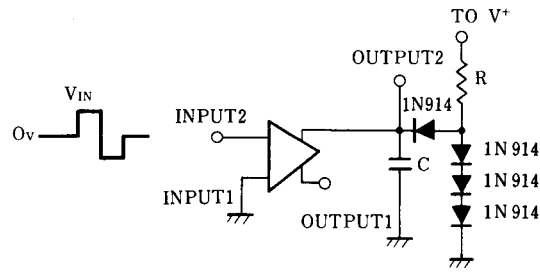
Response Time vs. Temperature

($V^+/V^- = \pm 5V$, $V_{IN} = \pm 50mV$)



NJM360

■ AC TEST CIRCUIT



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