

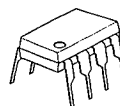
## HIGH SPEED DIFFERENTIAL COMPARATOR

## ■ GENERAL DESCRIPTION

The NJM360 is a very high speed differential input, complementally 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 convertors and zero-crossing detectors in disc file systems.

## ■ PACKAGE OUTLINE



NJM360D

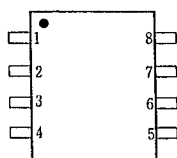


NJM360M

## ■ FEATURES

- Operating Voltage ( $\pm 4.5V \sim \pm 6.5V$ )
- High Speed Guarantee (20ns max.)
- Both output delay time has been precisely adjusted
- Complimentally 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, (SSOP8)

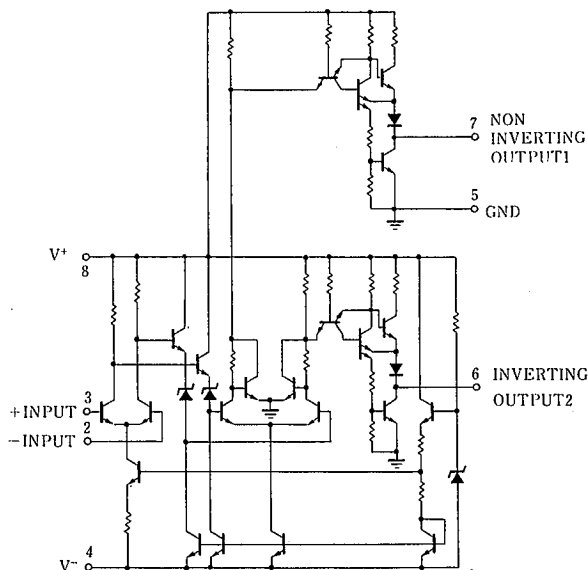
## ■ PIN CONFIGURATION

NJM360D  
NJM360M

## PIN FUNCTION

1. NC
2. -INPUT
3. +INPUT
4. V-
5. GND
6. OUT 2
7. OUT 1
8. V+

## ■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup> /V <sup>-</sup>	±8	V
Differential Input Voltage	V <sub>ID</sub>	±5	V
Input Voltage	V <sub>I</sub>	±8(note 1)	V
Power Dissipation	P <sub>D</sub>	(DIP8) 500	mW
		(DMP8) 300	mW
Maximum Output Current	I <sub>O</sub>	±20	mA
Operating Temperature Range	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature Range	T <sub>stg</sub>	-40 ~ +125	°C

(note 1) For supply voltage less than ±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 <sup>+</sup>		4.5	5	6.5	V
Operating Supply Voltage	V <sup>-</sup>		-4.5	-5	-6.5	V
Input Offset Voltage	V <sub>IO</sub>	R <sub>S</sub> ≤ 200Ω	—	2	5	mV
Input Offset Current	I <sub>IO</sub>		—	0.5	3	μA
Input Bias Current	I <sub>B</sub>		—	5	20	μA
Output Resistance	R <sub>O</sub>	V <sub>OUT</sub> = V <sub>OM</sub>	—	100	—	Ω
Response Time 1	t <sub>R 1</sub>	V <sup>+</sup> /V <sup>-</sup> = ±5V(note 1)	—	13	25	ns
Response Time 2	t <sub>R 2</sub>	V <sup>+</sup> /V <sup>-</sup> = ±5V(note 2)	—	12	20	ns
Response Time 3	t <sub>R 3</sub>	V <sup>+</sup> /V <sup>-</sup> = ±5V(note 3)	—	14	—	ns
Response Time Difference Between Outputs						
(t <sub>pd</sub> of + V <sub>IN1</sub> ) - (t <sub>pd</sub> of - V <sub>IN2</sub> )		(note 1)	—	2	—	ns
(t <sub>pd</sub> of + V <sub>IN2</sub> ) - (t <sub>pd</sub> of - V <sub>IN1</sub> )		(note 1)	—	2	—	ns
(t <sub>pd</sub> of + V <sub>IN1</sub> ) - (t <sub>pd</sub> of + V <sub>IN2</sub> )		(note 1)	—	2	—	ns
(t <sub>pd</sub> of - V <sub>IN1</sub> ) - (t <sub>pd</sub> of - V <sub>IN2</sub> )		(note 1)	—	2	—	ns
Input Resistance	R <sub>IN</sub>	f = 1MHz	—	17	—	kΩ
Input Capacitance	C <sub>IN</sub>	f = 1MHz	—	3	—	pF
Average Temperature Coefficient of Input Offset Voltage	ΔV <sub>IO</sub> /ΔT	R <sub>S</sub> = 50Ω	—	8	—	μV/°C
Average Temperature Coefficient of Input Offset Current	ΔI <sub>IO</sub> /ΔT		—	7	—	nA/°C
Common Mode Input Voltage Range	V <sub>ICM</sub>	V <sup>+</sup> /V <sup>-</sup> = ±6.5V	±4	±4.5	—	V
Differential Input Voltage Range	V <sub>ID</sub>		±5	—	—	V
Output High Voltage (High)	V <sub>OH</sub>	I <sub>OUT</sub> = -320μA, V <sup>+</sup> /V <sup>-</sup> = ±4.5V	2.4	3	—	V
Output Low Voltage (Low)	V <sub>OL</sub>	I <sub>SINK</sub> = 6.4mA, V <sup>+</sup> /V <sup>-</sup> = ±4.5V	—	0.25	0.4	V
Positive Supply Current	I <sup>+</sup>	V <sup>+</sup> /V <sup>-</sup> = ±6.5V	—	18	32	mA
Negative Supply Current	I <sup>-</sup>	V <sup>+</sup> /V <sup>-</sup> = ±6.5V	—	-9	-16	mA

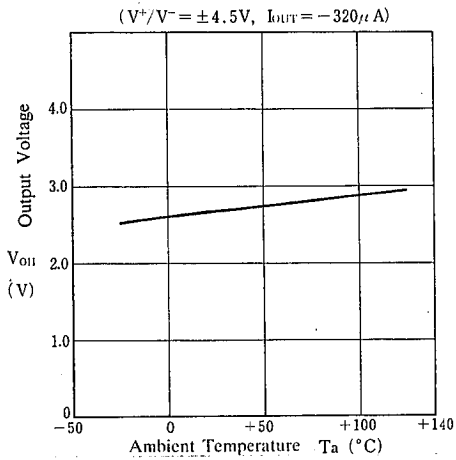
Note 1: Response time measured from the 50% point of a 30mV<sub>p-p</sub> 10MHz sinusoidal input to the 50% point of the output.

Note 2: Response time measured from the 50% point of a 2V<sub>p-p</sub> 10MHz sinusoidal input to the 50% point of the output.

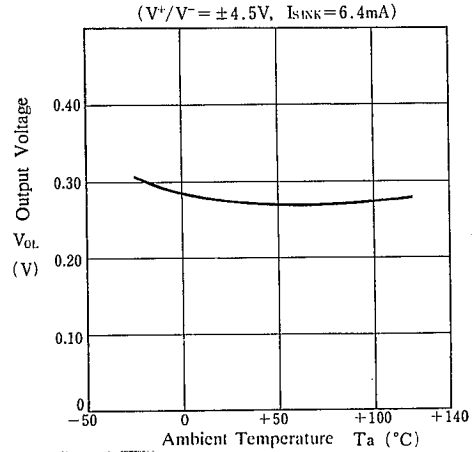
Note 3: Response time measured from the start of a 100mV input step with 5mV overdrive to the time when the output crosses the logic threshold.

## ■ TYPICAL CHARACTERISTICS

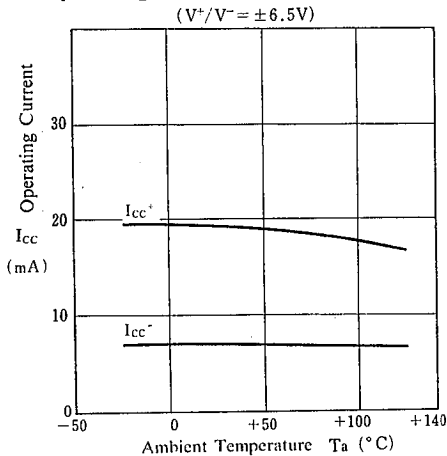
### Output Voltage (High) vs. Temperature



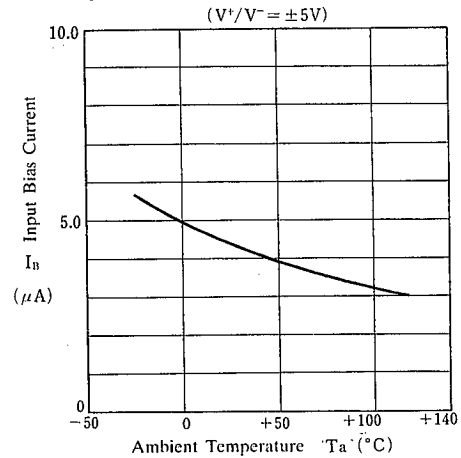
### Output Voltage (Low) vs. Temperature



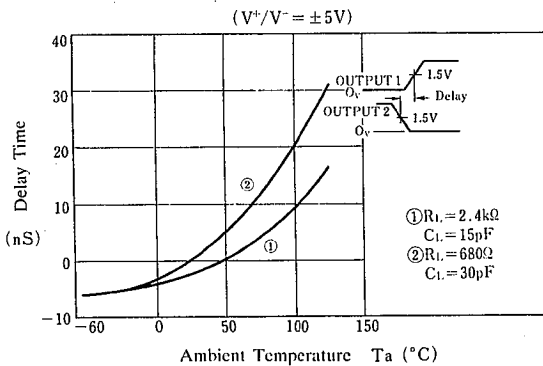
### Operating Current vs. Temperature



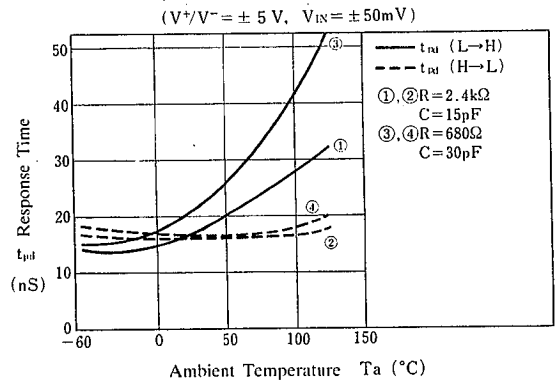
### Input Bias Current vs. Temperature



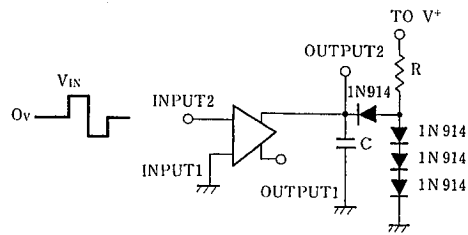
### OUTPUT1 and OUTPUT2 Delay Time vs. Temperature



### Response Time vs. Temperature



■ AC TEST CIRCUIT



## MEMO

**[CAUTION]**

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