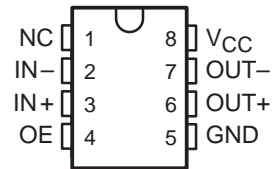


# TL712 DIFFERENTIAL COMPARATOR

SLCS002B – JUNE 1983 – REVISED DECEMBER 1992

- Operates From a Single 5-V Supply
- 0 to 5 V Common-Mode Input Voltage Range
- Self-Biased Inputs
- Complementary 3-State Outputs
- Enable Capability
- Hysteresis . . . 5 mV Typ
- Response Times . . . 25 ns Typ

D, JG, P, OR PW PACKAGE  
(TOP VIEW)



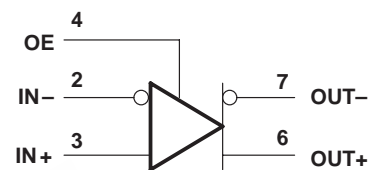
NC—No internal connection

## description

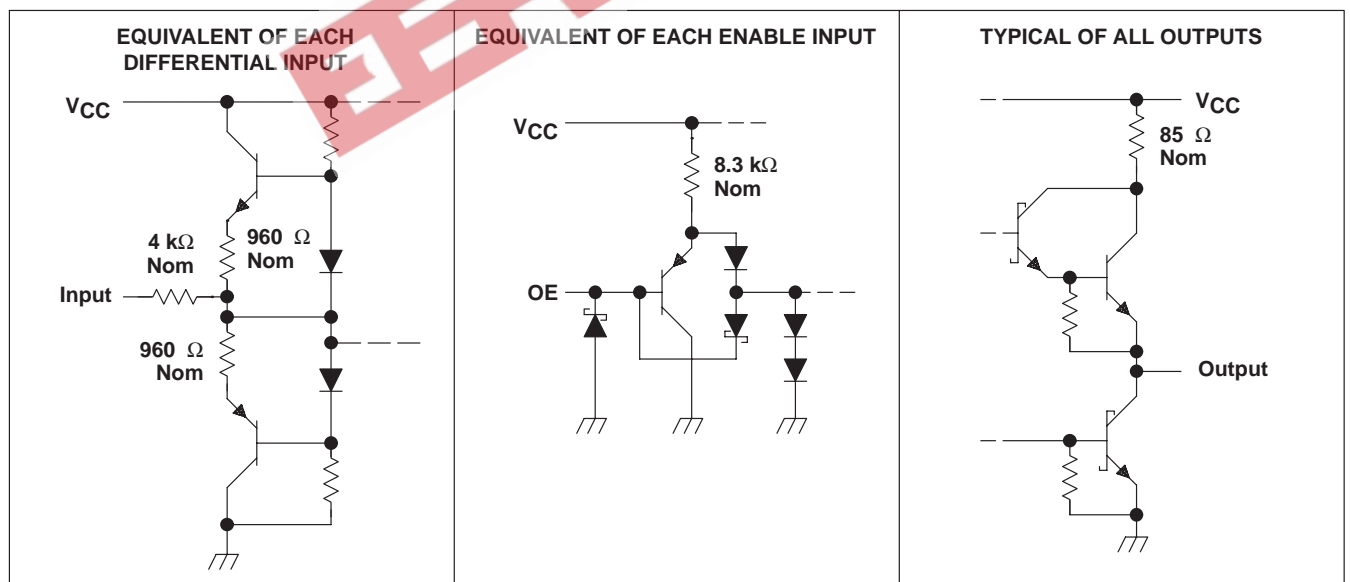
The TL712 is a high-speed comparator fabricated with bipolar Schottky process technology. The circuit has differential analog inputs and complementary 3-state TTL-compatible logic outputs with symmetrical switching characteristics. When the output enable, (OE), is low, both outputs are in the high-impedance state. This device operates from a single 5-V supply and is useful as a disk memory read-chain data comparator.

The TL712 is characterized for operation from 0°C to 70°C.

## symbol (positive logic)



## schematics of inputs and outputs



PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS  
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# TL712

## DIFFERENTIAL COMPARATOR

SLCS002B – JUNE 1983 – REVISED DECEMBER 1992

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage, $V_I$ , any differential input	$\pm 25$ V
Differential input voltage, $V_{ID}$ (see Note 2)	$\pm 25$ V
Enable input voltage	7 V
Low-level output current, $I_{OL}$	50 mA
Operating free-air temperature range, $T_A$	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: JG package	300°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D, P, or PW package	260°C

<sup>†</sup> 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 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 voltage values are at  $IN+$  with respect to  $IN-$ .

### recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, $V_{CC}$	4.75	5	5.25	V
Common-mode input voltage, $V_{IC}$	0		5	V
High-level output current, $I_{OH}$			-1	mA
Low-level output current, $I_{OL}$			16	mA
Operating free-air temperature, $T_A$	0		70	°C

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

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_T$ Threshold voltage ( $V_{T+}$ and $V_{T-}$ )	$V_{ICR} = 0$ to 5 V	-100 <sup>‡</sup>		100	mV
$V_{hys}$ Hysteresis ( $V_{T+} - V_{T-}$ )			5		mV
$V_{OH}$ High-level output voltage	$V_{ID} = 100$ mV, $I_{OH} = -1$ mA	2.7	3.5		V
$V_{OL}$ Low-level output voltage	$V_{ID} = -100$ mV, $I_{OL} = 16$ mA		0.4	0.5	V
$I_{OZ}$ Off-state output current	$V_O = 2.4$ V			-20	$\mu\text{A}$
$I_I$ Enable current	$V_I = 5.5$ V			100	$\mu\text{A}$
$I_{IH}$ High-level enable current	$V_{IH} = 2.7$ V			20	$\mu\text{A}$
$I_{IL}$ Low-level enable current	$V_{IL} = 0.4$ V			-360	$\mu\text{A}$
$r_i$ Differential input resistance		4			k $\Omega$
$r_o$ Output resistance				100	$\Omega$
$I_{OS}$ Short-circuit output current		-15		-85	mA
$I_{CC}$ Supply current	$V_{ID} = 0$ , No load		17	20	mA

<sup>‡</sup> The algebraic convention, where the more negative limit is designated as minimum, is used in this data sheet for input threshold voltage levels only.

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

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$ Propagation delay time, low-to-high-level output	TTL load, See Figure 1, See Note 3		25		ns
$t_{PHL}$ Propagation delay time, high-to-low-level output			25		ns

NOTE 3: The response time specified is for a 100-mV input step with 5-mV overdrive (105 mV total), and is the interval between the input step function and the instant when the output crosses 2.5 V.

PARAMETER MEASUREMENT INFORMATION

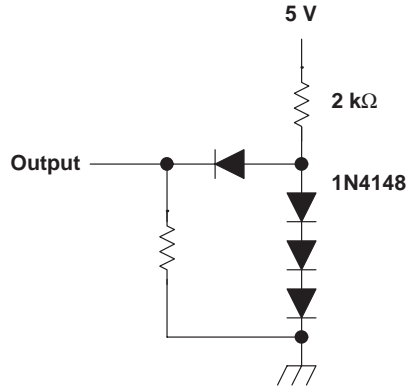


Figure 1. TTL Output Load Circuit

TYPICAL CHARACTERISTICS

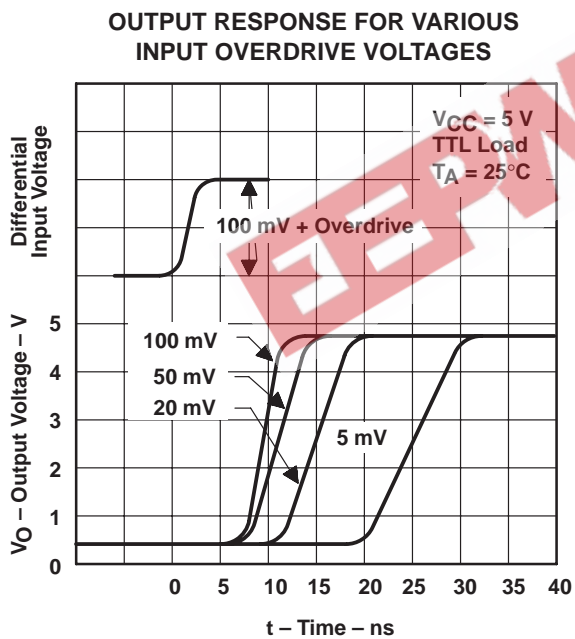


Figure 2

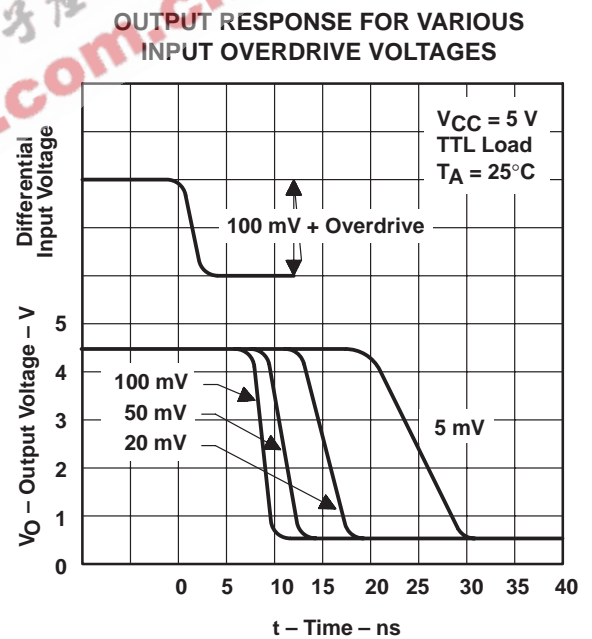
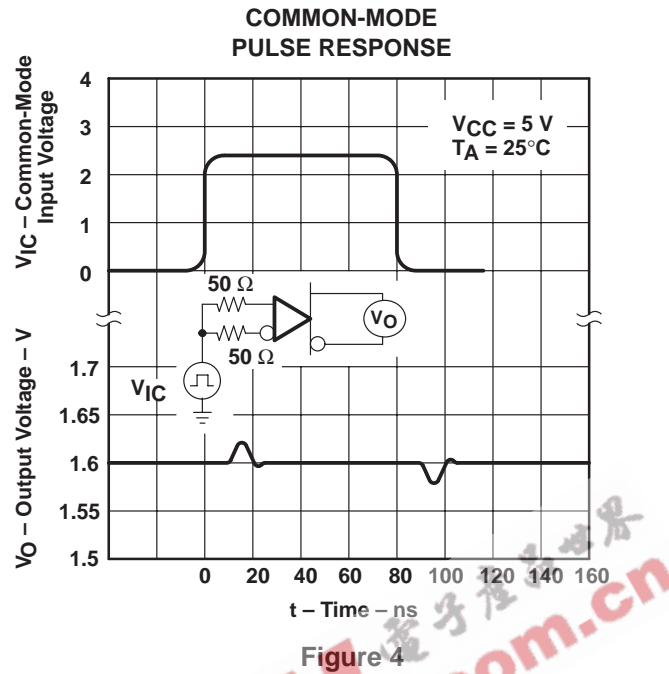


Figure 3

# TL712 DIFFERENTIAL COMPARATOR

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## TYPICAL CHARACTERISTICS



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