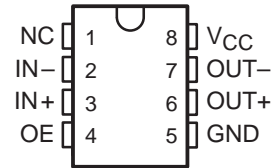- **Operates From a Single 5-V Supply**
- **0 to 5 V Common-Mode Input Voltage Range**
- **Self-Biased Inputs**
- **Complementary 3-State Outputs**
- **Enable Capability**
- **Hysteresis . . . 5 mV Typ**
- **Response Times . . . 25 ns Typ**

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

|			
NC	1	8	V_{CC}
IN–	2	7	OUT–
IN+	3	6	OUT+
OE	4	5	GND

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)
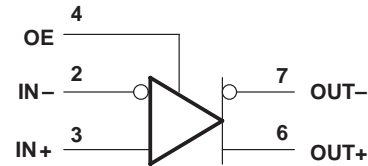
schematics of inputs and outputs

Copyright © 1992, Texas Instruments Incorporated

TEXAS INSTRUMENTS
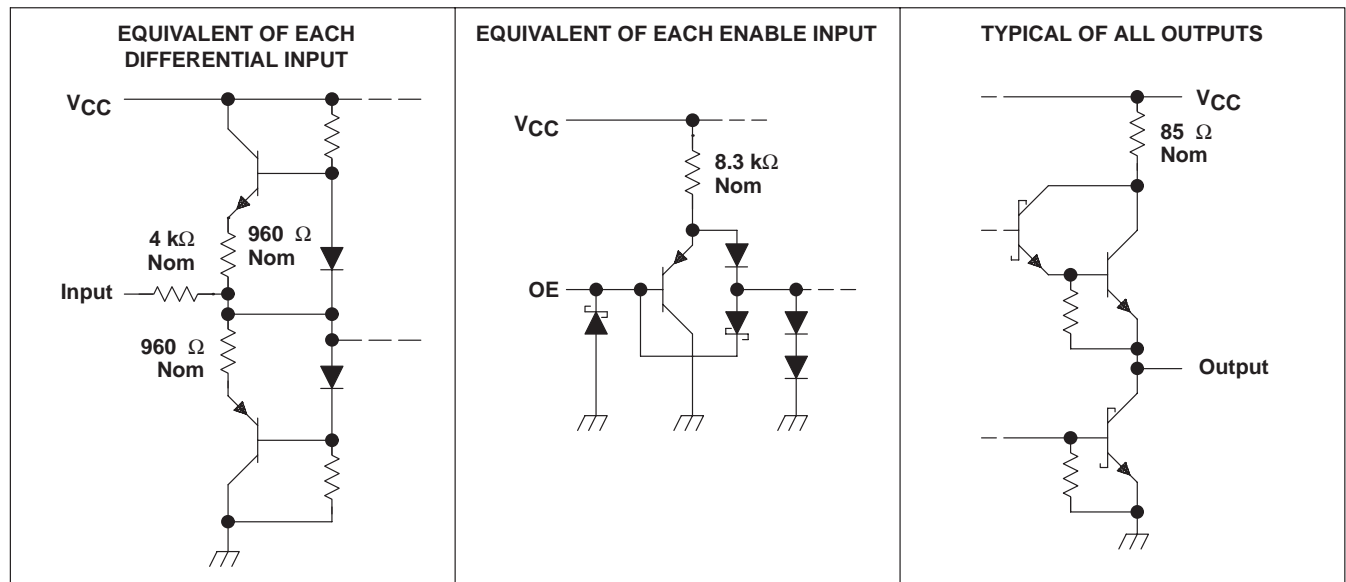
TL712
DIFFERENTIAL COMPARATOR

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

Supply voltage, V_{CC} (see Note 1) . . . . 7 V
Input voltage, V_I, any differential input . . . . ±25 V
Differential input voltage, V_{ID} (see Note 2) . . . . ±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

† 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°C

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_T	Threshold voltage (V_{T+} and V_{T-})	V_{ICR} = 0 to 5 V	–100‡		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	µA
I_I	Enable current	V_I = 5.5 V			100	µA
IIH	High-level enable current	V_{IH} = 2.7 V			20	µA
I_{IL}	Low-level enable current	V_{IL} = 0.4 V			–360	µA
r_i	DIfferential input resistance		4			kΩ
r_o	Output resistance				100	W
I_{OS}	Short-circuit output current		–15		–85	mA
I_{CC}	Supply current	V_{ID} = 0, No load		17	20	mA

‡ 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°C

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
tPLH	Propagation delay time, low-to-high-level output	TTL load, See Figure 1, See Note 3		25		ns
tPHL	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.

TEXAS INSTRUMENTS

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

PARAMETER MEASUREMENT INFORMATION
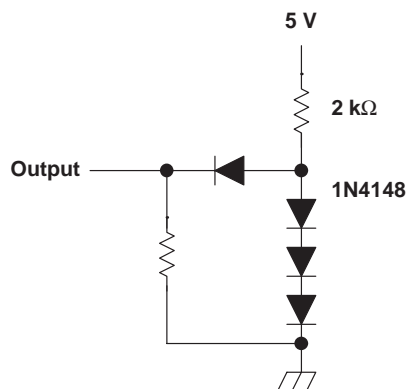
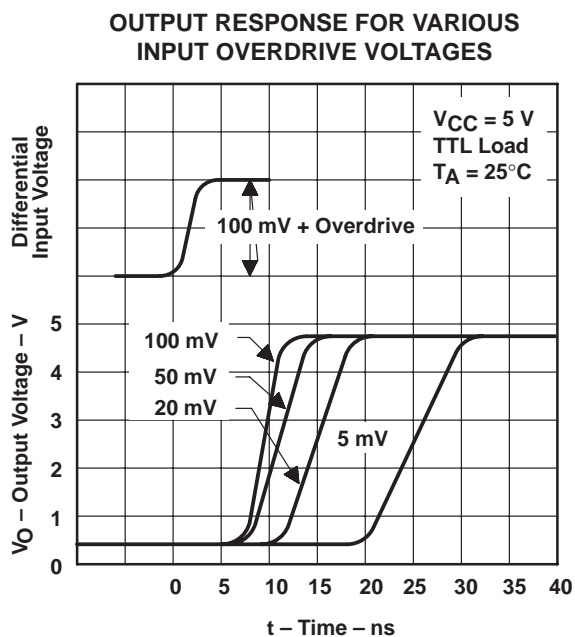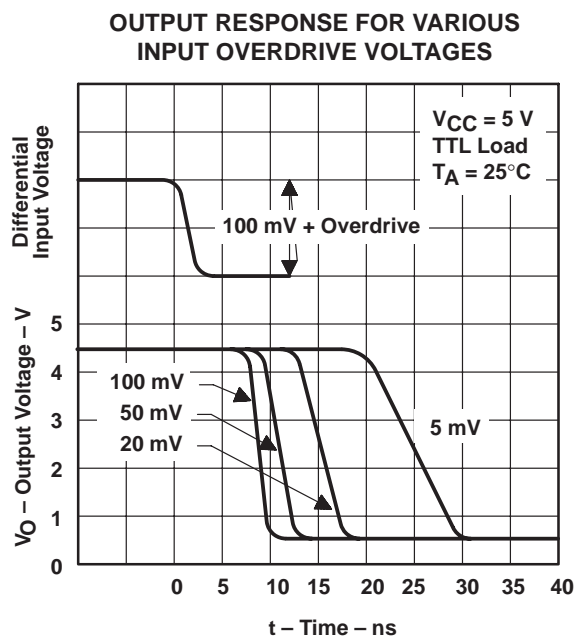**Figure 1. TTL Output Load Circuit**
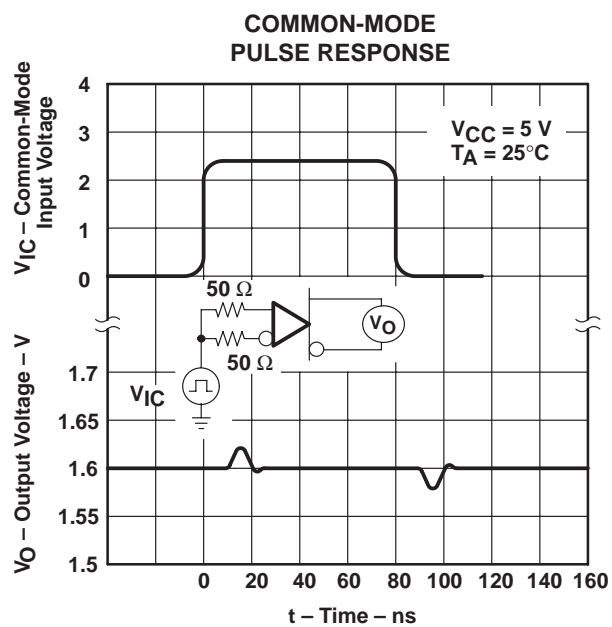
TYPICAL CHARACTERISTICS

**OUTPUT RESPONSE FOR VARIOUS
INPUT OVERDRIVE VOLTAGES**

Figure 2

**OUTPUT RESPONSE FOR VARIOUS
INPUT OVERDRIVE VOLTAGES**

Figure 3

TEXAS
INSTRUMENTS

POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

TYPICAL CHARACTERISTICS

**COMMON-MODE
PULSE RESPONSE**

Figure 4

TEXAS
INSTRUMENTS

POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.