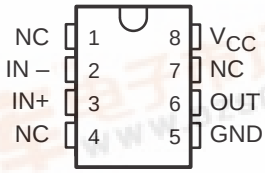
TL714C
HIGH-SPEED DIFFERENTIAL COMPARATOR

SLCS015 – DECEMBER 1988 – REVISED JUNE 1989

- **Operates From a 5-V Supply**
- **Self-Biasing Inputs**
- **Hysteresis . . . 10 mV Typ**
- **Response Time . . . 6 ns Typ**
- **Maximum Operating Frequency 50 MHz Typ**

D OR P PACKAGE
(TOP VIEW)

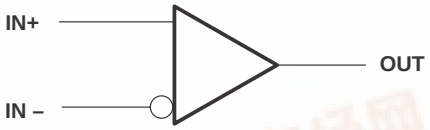


NC — No internal connection

description

The TL714C is a high-speed differential comparator fabricated with bipolar Schottky process technology. The circuit has differential inputs and a TTL-compatible logic output with symmetrical switching characteristics.

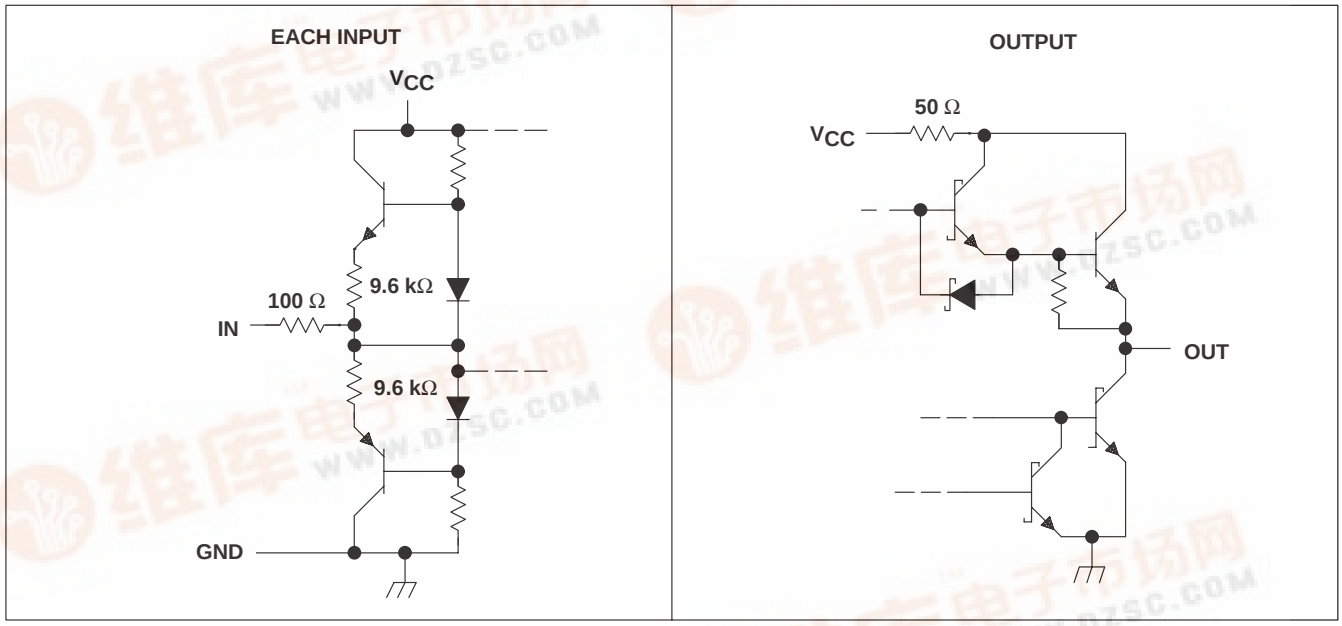
symbol



The device operates from a single 5-V supply and is useful as a disk-memory read-chain data comparator.

The TL714C is characterized for operation from 0°C to 70°C.

schematic of inputs and outputs



All resistor values shown are nominal.

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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Differential input voltage, V_{ID} (see Note 2) . . . . . ± 5 V
Input voltage range, V_I . . . . . V_{CC} to GND
Low-level output current, I_{OL} . . . . . 40 mA
Continuous total power dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range, T_A . . . . . 0°C to 70°C
Storage temperature range . . . . . – 65°C to 150°C
Lead temperature1,6 mm (1/16 inch) from case for 10 seconds . . . . . 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 voltage, are with respect to the network ground.
2. Differential voltage values are at IN+ with respect to IN –.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR	DERATE ABOVE T_A	$T_A = 75°C$ POWER RATING
D	500 mW	5.8 mW/°C	64°C	464 mW
P	500 mW	N/A	N/A	500 mW

recommended operating conditions

	MIN	MAX	UNIT
Supply voltage, V_{CC}	4.75	5.25	V
Common-mode input voltage, V_{IC}	1.4 to V_{CC} – 1.4		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 over free-air operating temperature range, V_{CC} = 5 V (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP‡	MAX	UNIT
V_T	Threshold voltage ($V_{T+} – V_{T–}$)	V_{IC} = 1.4 V to 3.6 V	–75§		75	mV
V_{hys}	Hysteresis ($V_{T+} – V_{T–}$)		2	10	30	mV
V_{OH}	High-level output voltage	V_{ID} = 100 mV, I_{OH} = – 1 mA	2.7	3.4		V
V_{OL}	Low-level output voltage	V_{ID} = – 100 mV, I_{OL} = 16 mA		0.4	0.5	V
I_{OS}	Short-circuit output current		– 30		– 110	mA
r_i	Differential input resistance		2.9			kΩ
I_{CC}	Supply current	V_{ID} = –100 mV, I_O = 0		7	12	mA

‡ All typical values are at T_A = 25°C.
§ 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
f_{max}	Maximum operating frequency	V_{ID} = ± 250 mV, C_L = 25 pF,	$t_r = t_f$ = 4 ns, Input duty cycle = 50%		50		MHz
t_{PLH}	Propagation delay time, low-to-high-level output	V_{ID} = ± 100 mV, See Figures 1 and 2	C_L = 25 pF,		6	12	ns
t_{PHL}	Propagation delay time, high-to-low-level output				6	12	ns
t_r	Rise time	V_{ID} = ± 100 mV, See Figure 3	C_L = 25 pF,		4	8	ns
t_f	Fall time				4	8	ns

† All typical values are at T_A = 25°C.

PARAMETER MEASUREMENT INFORMATION

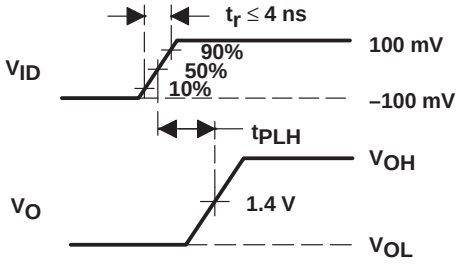

Figure 1. Propagation Delay Time, Low to High (t_{PLH})

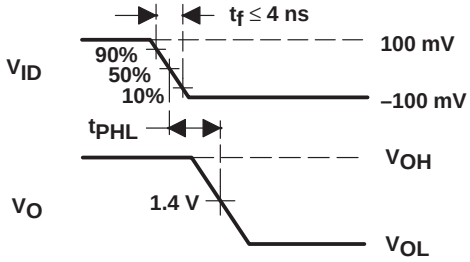

Figure 2. Propagation Delay Time, High to Low (t_{PHL})

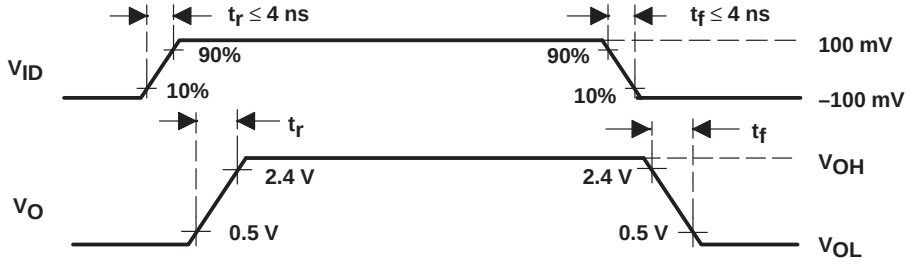

Figure 3. Rise and Fall Times (t_r, t_f)

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