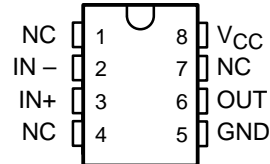


# TL714C HIGH-SPEED DIFFERENTIAL COMPARATOR

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

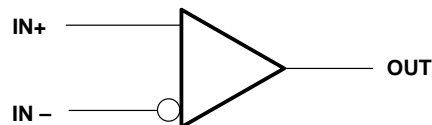
## description

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.

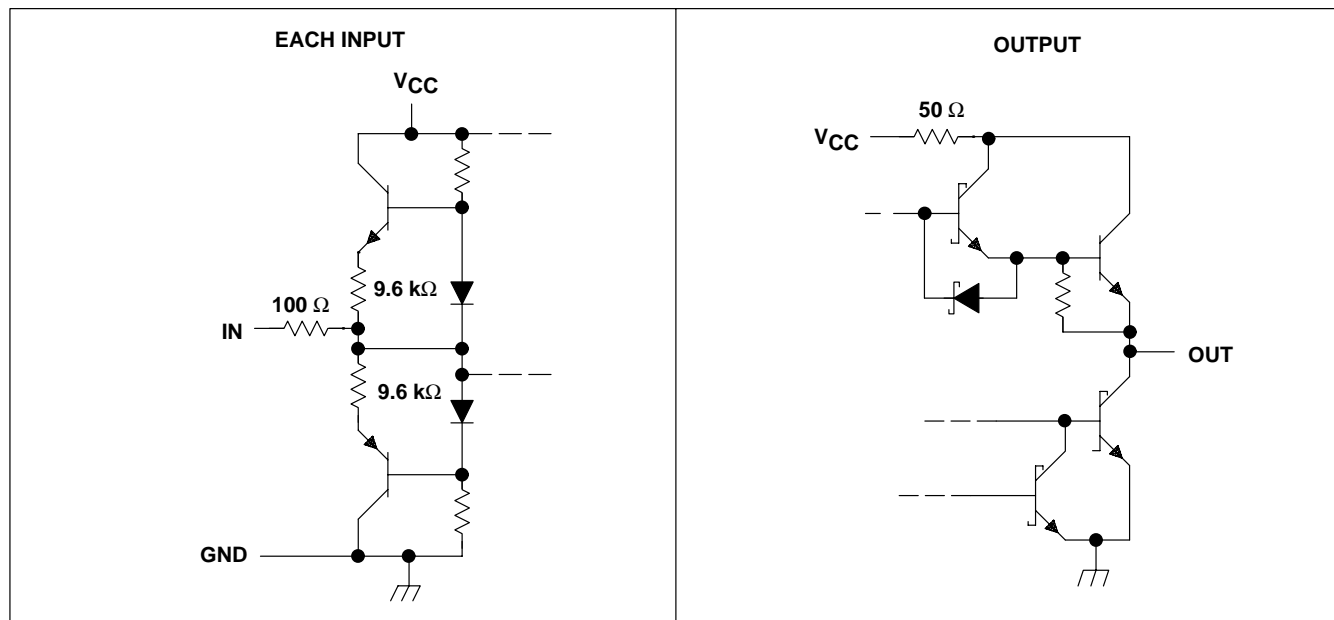
The device operates from a single 5-V supply and is useful as a disk-memory read-chain data comparator.

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

## symbol



## 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)	$\pm 5$ 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 temperature 1,6 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	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR	DERATE ABOVE $T_A$	$T_A = 75^\circ\text{C}$ 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			k $\Omega$
$I_{CC}$ Supply current	$V_{ID} = -100$ mV, $I_O = 0$		7	12	mA

‡ All typical values are at  $T_A = 25^\circ\text{C}$ .

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



# TL714C HIGH-SPEED DIFFERENTIAL COMPARATOR

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

PARAMETER	TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$f_{\text{max}}$ Maximum operating frequency	$V_{\text{ID}} = \pm 250\text{ mV}$ , $C_L = 25\text{ pF}$ , $t_r = t_f = 4\text{ ns}$ , Input duty cycle = 50%		50		MHz
$t_{\text{PLH}}$ Propagation delay time, low-to-high-level output	$V_{\text{ID}} = \pm 100\text{ mV}$ , $C_L = 25\text{ pF}$ , See Figures 1 and 2		6	12	ns
$t_{\text{PHL}}$ Propagation delay time, high-to-low-level output	See Figures 1 and 2		6	12	ns
$t_r$ Rise time	$V_{\text{ID}} = \pm 100\text{ mV}$ , $C_L = 25\text{ pF}$ , See Figure 3		4	8	ns
$t_f$ Fall time	See Figure 3		4	8	ns

† All typical values are at  $T_A = 25^\circ\text{C}$ .

## PARAMETER MEASUREMENT INFORMATION

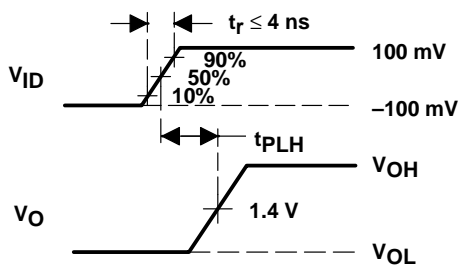


Figure 1. Propagation Delay Time, Low to High ( $t_{\text{PLH}}$ )

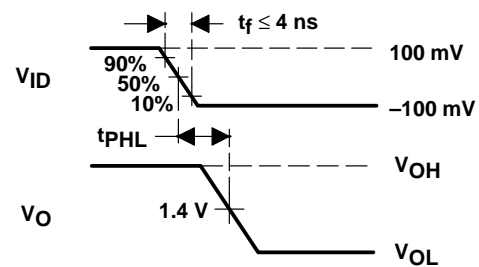


Figure 2. Propagation Delay Time, High to Low ( $t_{\text{PHL}}$ )

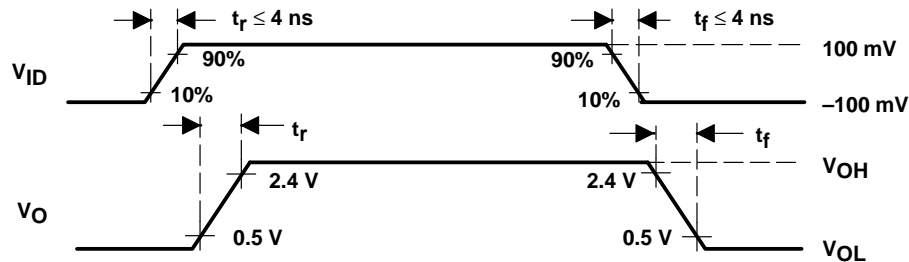


Figure 3. Rise and Fall Times ( $t_r$ ,  $t_f$ )

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