ADVANCED LOW POWR SCHOTTKY TTL HD74ALS SERIES

- HD74ALS00 — Quadruple 2-input Positive NAND Gates
- HD74ALS01 — Quadruple 2-input Positive NAND Gates (with open collector outputs)
- HD74ALS03 — Quadruple 2-input Positive NAND Gates (with open collector outputs)
- HD74ALS04 — Hex Inverters
- HD74ALS05 — Hex Inverters (with open collector outputs)
- HD74ALS08 — Quadruple 2-input Positive AND Gates
- HD74ALS09 — Quadruple 2-input Positive AND Gates (with open collector output)
- HD74ALS20 — Dual 4-input Positive NAND Gates
- HD74ALS21 — Dual 4-input Positive AND Gates
- HD74ALS74 — Dual D-type Positive-edge-triggered Flip-Flops (with Preset and Clear)
- HD74ALS109 — Dual J-$\bar{K}$ Positive-edge-triggered Flip-Flops (with Preset and Clear)

Hitachi has developed a new product, Super Shottky TTL HD74ALS Series. Using Hitachi's SiO_2 isolation technology, this series provides higher characteristics than former ones. (Refer to Fig. 1)

Essentially TTL is the saturation logic type bipolar digital IC, so it has the limits of the switching speed because of the stored charge of transistors. But on the other hand, it allows the low power dissipation, the wide noise margin and the stable operation.

Moreover the wide variety of families allows the easy section meeting use. This series makes selection of TTL wider and grade-up of various systems easier. Would you mind understanding the characteristics of this series and good use for your work.

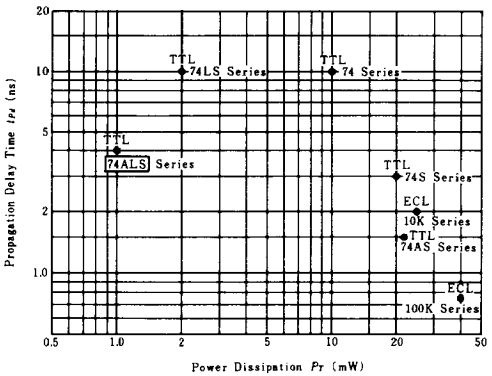


Fig. 1 Speed-power Product

■FEATURES

- High-speed (4ns/gate) and low power dissipation (1 mW/ gate) by SiO_2 isolation technology and submicron technology.
- Improved threshold level ($V_{TH} \approx 1.4V$ typ.).

Table 1 Characteristics of 74ALS vs. 74LS

Item	Unit	HD74ALS	HD74LS
t_{pd}	ns/gate	4	10
P_T	mW/gate	1	2
$t_{pd} \cdot P_T$	pJ/gate	4	20

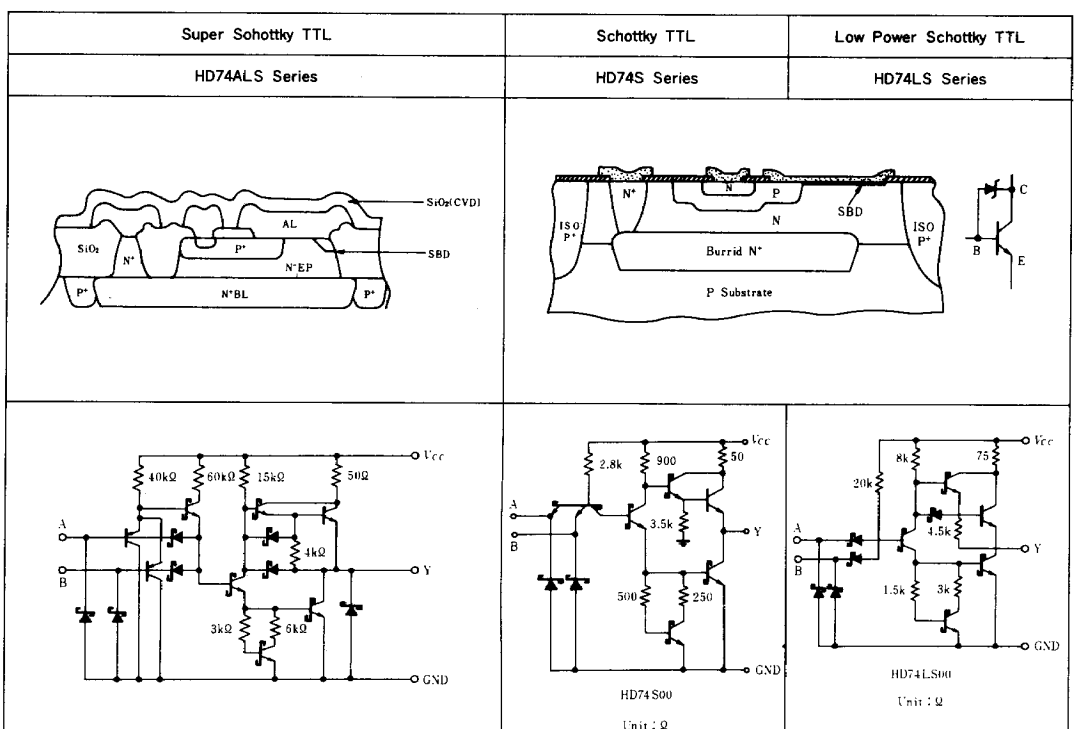


Fig. 2 Structure and Basic Circuit of 74ALS vs. 74LS

■ELECTRICAL CHARACTERISTICS

●Absolute Maximum Ratings

Item	Symbol	HD74ALS Series	HD74LS Series		HD74S Series	Unit
			Diode input	Emitter input		
Supply voltage*	V_{CC}	7	7	7	7	V
Input voltage	V_{IN}	7	7	5.5	5.5	V
Interemitter voltage**	V_{BI}	—	—	5.5	5.5	V
Power dissipation	P_T	400	400	400	800	mW
Storage temperature range	T_{stg}	−65～+150	−65～+150	−65～+150	−65～+150	℃

* Voltage values, unless otherwise noted, are with respect to network ground terminal.
** This is the voltage between two emitters of a multiple-emitter transistor. This rating applies between inputs that go directly into the same AND or NAND gate in the functional block diagram.

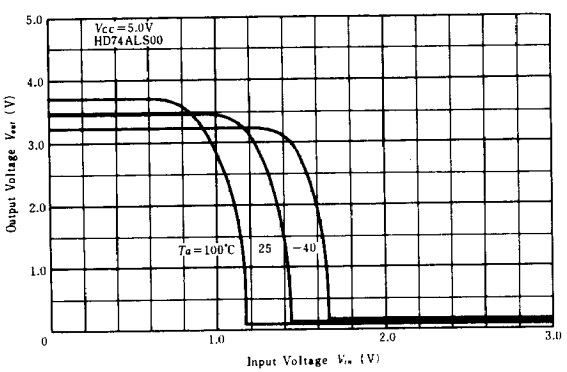
■RECOMMENDED OPERATING CONDITIONS

Item	Symbol	HD74ALS Sries			HD74LS Series			HD74S Series			Unit
		min	typ	max	min	typ	max	min	typ	max	
Supply voltage range	V_{CC}	4.5	5.0	5.5	4.75	5.00	5.25	4.75	5.00	5.25	V
Output current	I_{OH}*	—	—	−400	—	—	−400	—	—	−1000	μA
	I_{OL}	—	—	8	—	—	8	—	—	20	mA
Operating temperature range	T_{opr}	−20	25	75	−20	25	75	−20	25	75	℃

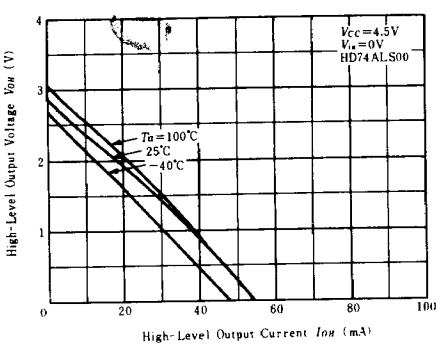
* Totem-pole output only

■TYPICAL CHARACTERISTICS

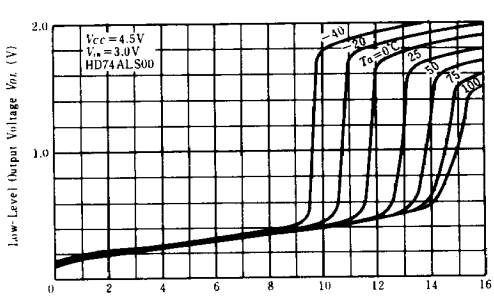
●Output voltage vs. Input voltage



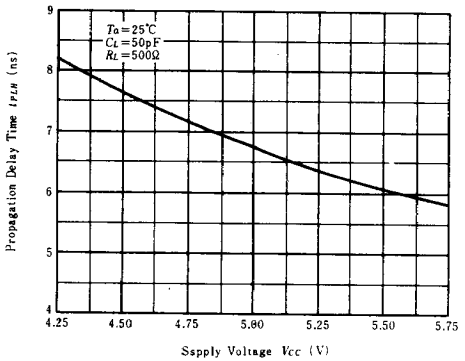
●High-level output characteristics



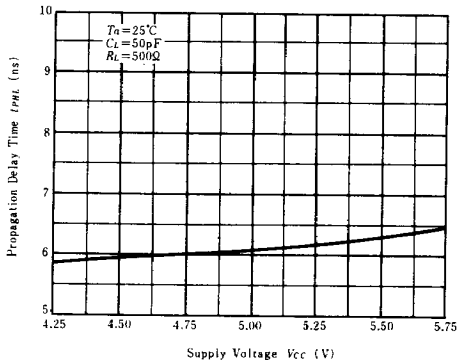
●Low-level output characteristics



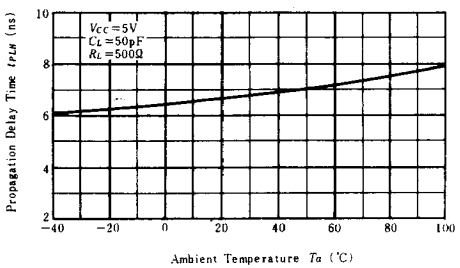
●Propagation delay vs. Supply voltage (1)



●Propagation delay vs. Supply voltage (2)



●Propagation delay vs. Ambient temperature (1)



●Propagation delay vs. Ambient temperature (2)