SYNERGY SEMICONDUCTOR

# LOW POWER HEX TTL-to-ECL TRANSLATOR

**SY100S324**
**SY101S324**

DEC 18 '90

## FEATURES

- **Max. Propagation Delay of 1.5ns.**
- **IEE min. of -55mA.**
- **ESD protection of 2000V.**
- **Industry standard 100K ECL levels.**
- **Extended supply voltage option:**
  **SY100S324: VEE = -4.5V**
  **SY101S324: VEE = -5.2V**
- **Differential outputs.**
- **Voltage and Temperature compensation for improved noise immunity.**
- **Twice as fast as National or Signetics.**
- **Approximately 35% lower power than National or Signetics.**
- **Function and pinout compatible with National and Signetics.**
- **Available in CERDIP, CERPACK, PLCC and CLCC packages.**

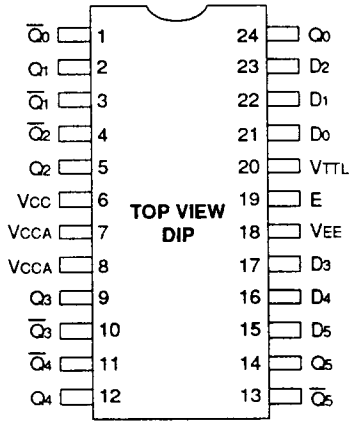
## DESCRIPTION

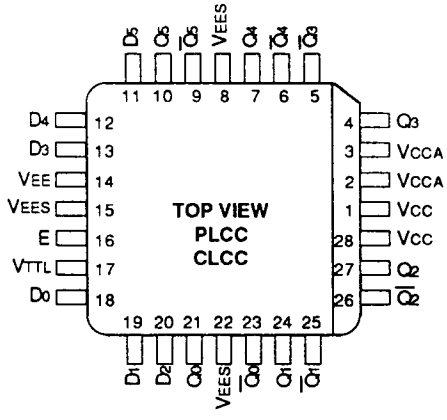
The SY100/101S324 is a hex translator, designed to convert TTL logic levels to 100K ECL levels. The inputs are TTL compatible with differential outputs that can either be used as an inverting/non-inverting translator or as differential line drivers. A common Enable (E), when LOW, holds all inverting outputs HIGH and holds all non-inverting outputs LOW.

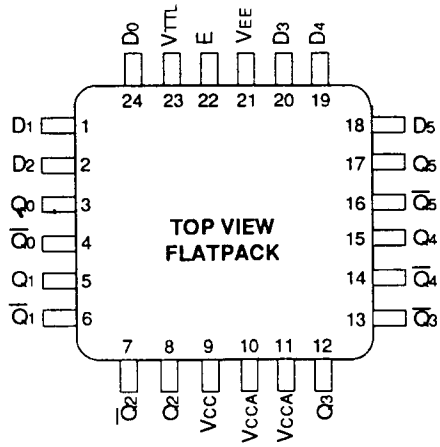
When used in the differential mode, due to its high common mode rejection, it overcomes voltage gradients between the TTL and ECL ground systems.

The SY100/101S324 meets the standard 100K ECL signal levels at both -4.5V (100K) and -5.2V (101K) supply levels and features on-chip voltage and temperature compensation. The SY101S324 meets standard 100K I/O levels, but at -5.2V supply.

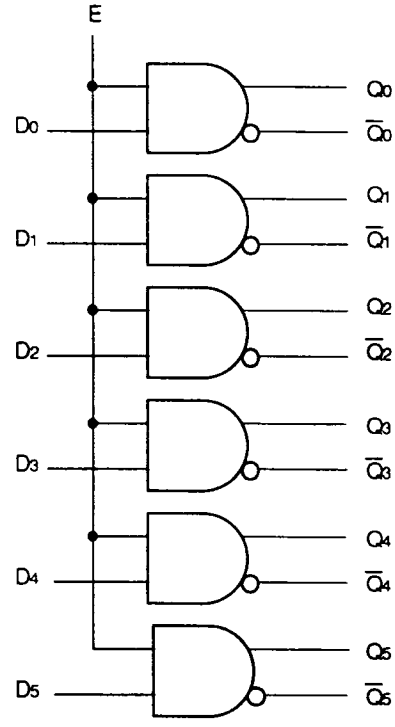
## PIN CONFIGURATIONS




## LOGIC DIAGRAM




## PIN NAMES

| Pin | Function |
|---|---|
| D0 - D5 | Data Inputs |
| E | Enable Inputs |
| Q0 - Q5 | Data Outputs |
| Q̄0 - Q̄5 | Complementary Data Outputs |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## DC ELECTRICAL CHARACTERISTICS

$V_{EE}$ = -4.2V to -5.7V unless otherwise specified, $V_{CC}$ = GND, $V_{TTL}$ = +4.5V to +5.5V, $T_C$ = 0°C to +85°C

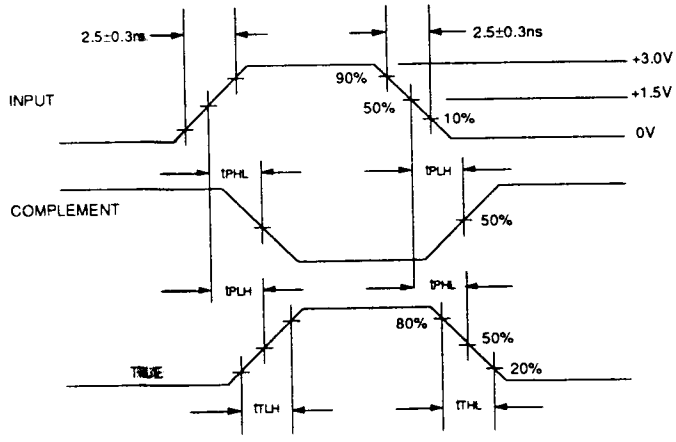
| Symbol | Parameter | Min. | Sim | Max. | Unit | Condition | |
|---|---|---|---|---|---|---|---|
| $V_{OH}$ | Output HIGH Voltage | -1025 | -986 | -880 | mV | $V_{IN}$ = $V_{IH}$ (Max.) | Loading with 50Ω |
| $V_{OL}$ | Output LOW Voltage | -1810 | -1674 | -1620 | mV | $V_{IN}$ = $V_{IL}$ (Min.) | |
| $V_{OHC}$ | Output HIGH Voltage | -1035 | — | — | mV | $V_{IN}$ = $V_{IH}$ (Min.) | Loading with 50Ω to -2V |
| $V_{OLC}$ | Output LOW Voltage | — | — | -1610 | mV | $V_{IN}$ = $V_{IL}$ (Max.) | |
| $V_{IH}$ | Input High Voltage | 2.0 | — | 5.0 | V | Guaranteed HIGH Signal for All Inputs | |
| $V_{IL}$ | Input LOW Voltage | 0 | — | 0.8 | V | Guaranteed LOW Signal for All Inputs | |
| $V_{CD}$ | Input Clamp Diode Voltage | -1.5 | — | — | V | $I_{IN}$ = -10mA | |
| $I_{IH}$ | Input HIGH Current<br>Data<br>Enable | —<br>— | —<br>— | 20<br>120 | µA | $V_{IN}$ = +2.4V,<br>All Other Inputs $V_{IN}$ = GND | |
| $I_{IH}$ | Input HIGH Current<br>Breakdown Test, All Inputs | — | — | 1.0 | mA | $V_{IN}$ = +5.5V, $V_{TTL}$ = Max.,<br>All Other Inputs $V_{IN}$ = GND | |
| $I_{IL}$ | Input LOW Current<br>Data<br>Enable | -1.2<br>-6.7 | —<br>— | —<br>— | mA | $V_{IN}$ = +0.4V,<br>All Other Inputs $V_{IN}$ = $V_{IH}$ | |
| $I_{EE}$ | $V_{EE}$ Power Supply Current | -55 | -35 | -28 | mA | All Inputs $V_{IN}$ = +4.0V | |
| $I_{TTL}$ | $V_{TTL}$ Power Supply Current | — | 14 | 25 | mA | All Inputs $V_{IN}$ = GND | |

## AC ELECTRICAL CHARACTERISTICS

$V_{EE}$ = -4.2V to -5.7V unless otherwise specified, $V_{CC}$ = GND, $V_{TTL}$ = +4.5V to +5.5V,

| Symbol | Parameter | Min. | Sim | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>Data and Enable to Output | 0.5 | 0.84 | 1.5 | ns | See Switching Wave Form Figures |
| $t_{TLH}$<br>$t_{THL}$ | Transition Time<br>20% to 80%, 80% to 20% | 0.45 | — | 1.80 | ns | |

## SWITCHING WAVEFORM




**Propagation Delay and Transition Times**

## ORDERING INFORMATION

SY100 S 324 D C

- C — Temperature Range
  - C = Commercial
  - $T_C$ (Case Temperature) = 0°C to +85°C (100K)
  - = 0°C to +75°C (101K)
- D — Package Identifier
  - D = CERDIP
  - F = CERPACK
  - J = PLCC (Plastic Leaded Chip Carrier)
  - H = CLCC (Ceramic Leaded Chip Carrier)
- 324 — Function Code
- SY100 — Device Type Prefix
  - 100 = 100K DC levels with -4.2V to 4.8V supply
  - 101 = 100K DC levels with -5.2V ± 5% supply