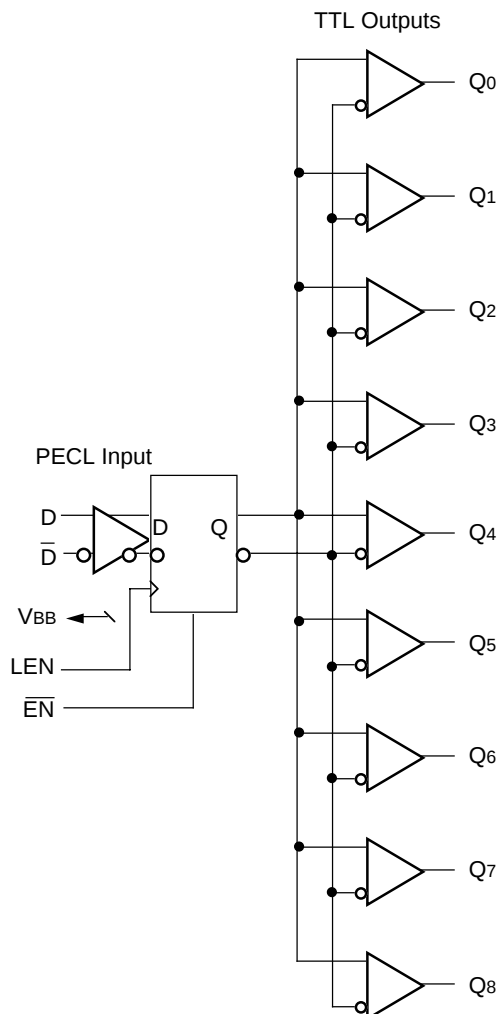


## FEATURES

- 3.3V power supply
- PECL-to-TTL version of popular ECLinPS E111
- Guaranteed low skew specification
- Latched input
- Differential ECL internal design
- V<sub>BB</sub> output for single-ended operation
- Reset/enable
- Extra TTL and ECL power/ground pins
- Choice of ECL compatibility: MECL 10KH (10Hxxx) or 100K (100Hxxx)
- Available in 28-pin PLCC package

## BLOCK DIAGRAM



Precision Edge®

## DESCRIPTION

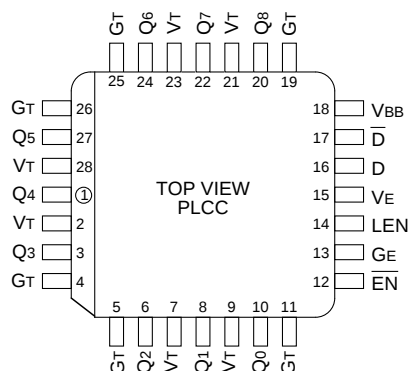
The SY10/100H641L are single supply, low skew translating 1:9 clock drivers. Devices in the Micrel H600 translator series utilize the 28-lead PLCC for optimal power pinning, signal flow-through and electrical performance.

The devices feature a 24mA TTL output stage with AC performance specified into a 20pF load capacitance. A latch is provided on-chip. When LEN is LOW (or left open, in which case it is pulled LOW by the internal pull-downs), the latch is transparent. A HIGH on the enable pin (/EN) forces all outputs LOW.

The 10H version is compatible with MECL 10KH ECL logic levels. The 100H version is compatible with 100K levels.

## PIN NAMES

| Pin                             | Function                                |
|---------------------------------|-----------------------------------------|
| G <sub>T</sub>                  | TTL Ground (0V)                         |
| V <sub>T</sub>                  | TTL V <sub>CC</sub> (+3.0V)             |
| V <sub>E</sub>                  | ECL V <sub>CC</sub> (+3.0V)             |
| G <sub>E</sub>                  | ECL Ground (0V)                         |
| D, /D                           | Signal Input (PECL)                     |
| V <sub>BB</sub>                 | V <sub>BB</sub> Reference Output (PECL) |
| Q <sub>0</sub> – Q <sub>8</sub> | Signal Outputs (TTL)                    |
| /EN                             | Enable Input (PECL)                     |
| LEN                             | Latch Enable Input (PECL)               |

**PACKAGE/ORDERING INFORMATION****28-Pin PLCC (J28-1)****Ordering Information<sup>(1)</sup>**

| Part Number                      | Package Type | Operating Range | Package Marking                              | Lead Finish |
|----------------------------------|--------------|-----------------|----------------------------------------------|-------------|
| SY10H641LJC                      | J28-1        | Commercial      | SY10H641LJC                                  | Sn-Pb       |
| SY10H641LJCTR <sup>(2)</sup>     | J28-1        | Commercial      | SY10H641LJC                                  | Sn-Pb       |
| SY100H641LJC                     | J28-1        | Commercial      | SY100H641LJC                                 | Sn-Pb       |
| SY100H641LJCTR <sup>(2)</sup>    | J28-1        | Commercial      | SY100H641LJC                                 | Sn-Pb       |
| SY10H641LJZ <sup>(3)</sup>       | J28-1        | Commercial      | SY10H641LJZ with Pb-Free bar-line indicator  | Matte-Sn    |
| SY10H641LJZTR <sup>(2, 3)</sup>  | J28-1        | Commercial      | SY10H641LJZ with Pb-Free bar-line indicator  | Matte-Sn    |
| SY100H641LJZ <sup>(3)</sup>      | J28-1        | Commercial      | SY100H641LJZ with Pb-Free bar-line indicator | Matte-Sn    |
| SY100H641LJZTR <sup>(2, 3)</sup> | J28-1        | Commercial      | SY100H641LJZ with Pb-Free bar-line indicator | Matte-Sn    |

**Notes:**

1. Contact factory for die availability. Dice are guaranteed at  $T_A = 25^\circ\text{C}$ , DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

| Symbol                                       | Rating                                    | Value                        | Unit |
|----------------------------------------------|-------------------------------------------|------------------------------|------|
| V <sub>E</sub> (ECL)<br>V <sub>T</sub> (TTL) | Power Supply Voltage                      | −0.5 to +7.0<br>−0.5 to +7.0 | V    |
| V <sub>I</sub> (ECL)                         | Input Voltage                             | 0.0 to V <sub>E</sub>        | V    |
| V <sub>OUT</sub> (TTL)                       | Disabled 3-State Output                   | 0.0 to V <sub>T</sub>        | V    |
| I <sub>OUT</sub> (ECL)                       | Output Current<br>- Continuous<br>- Surge | 50<br>100                    | mA   |
| T <sub>LEAD</sub>                            | Lead Temperature Range (soldering, 20sec) | +260                         | °C   |
| T <sub>store</sub>                           | Storage Temperature                       | −65 to +150                  | °C   |
| T <sub>A</sub>                               | Operating Temperature                     | 0 to +85                     | °C   |

**Note:**

1. Do not exceed.

**TRUTH TABLE**

| D | LEN | /EN | Q              |
|---|-----|-----|----------------|
| L | L   | L   | L              |
| H | L   | L   | H              |
| X | H   | L   | Q <sub>0</sub> |
| X | X   | H   | L              |

**DC ELECTRICAL CHARACTERISTICS**V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V

| Symbol            | Parameter            |     | T <sub>A</sub> = 0°C |      | T <sub>A</sub> = +25°C |      | T <sub>A</sub> = +85°C |      | Unit | Condition                     |
|-------------------|----------------------|-----|----------------------|------|------------------------|------|------------------------|------|------|-------------------------------|
|                   |                      |     | Min.                 | Max. | Min.                   | Max. | Min.                   | Max. |      |                               |
| I <sub>EE</sub>   | Power Supply Current | ECL | —                    | 30   | —                      | 30   | —                      | 30   | mA   | V <sub>E</sub> Pin            |
| I <sub>CC</sub> H |                      | TTL | —                    | 30   | —                      | 30   | —                      | 30   |      | Total all V <sub>T</sub> pins |
| I <sub>CC</sub> L |                      |     | —                    | 35   | —                      | 35   | —                      | 35   |      |                               |

**TTL DC ELECTRICAL CHARACTERISTICS**V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V

| Symbol          | Parameter                    | T <sub>A</sub> = 0°C |      | T <sub>A</sub> = +25°C |      | T <sub>A</sub> = +85°C |      | Unit | Condition                |
|-----------------|------------------------------|----------------------|------|------------------------|------|------------------------|------|------|--------------------------|
|                 |                              | Min.                 | Max. | Min.                   | Max. | Min.                   | Max. |      |                          |
| V <sub>OH</sub> | Output HIGH Voltage          | 2.0                  | —    | 2.0                    | —    | 2.0                    | —    | V    | I <sub>OH</sub> = −3.0mA |
| V <sub>OL</sub> | Output LOW Voltage           | —                    | 0.5  | —                      | 0.5  | —                      | 0.5  | V    | I <sub>OL</sub> = 24mA   |
| I <sub>OS</sub> | Output Short Circuit Current | −100                 | —    | −100                   | —    | −100                   | —    | mA   | V <sub>OUT</sub> = 0V    |

**10H ECL DC ELECTRICAL CHARACTERISTICS**V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V

| Symbol           | Parameter                               | T <sub>A</sub> = 0°C |       | T <sub>A</sub> = +25°C |       | T <sub>A</sub> = +85°C |       | Unit | Condition             |
|------------------|-----------------------------------------|----------------------|-------|------------------------|-------|------------------------|-------|------|-----------------------|
|                  |                                         | Min.                 | Max.  | Min.                   | Max.  | Min.                   | Max.  |      |                       |
| I <sub>I</sub> H | Input HIGH Current                      | —                    | 225   | —                      | 175   | —                      | 175   | μA   | —                     |
| I <sub>I</sub> L | Input LOW Current                       | 0.5                  | —     | 0.5                    | —     | 0.5                    | —     | μA   | —                     |
| V <sub>I</sub> H | Input HIGH Voltage <sup>(1)</sup>       | 2.130                | 2.460 | 2.170                  | 2.490 | 2.240                  | 2.580 | V    | V <sub>E</sub> = 3.3V |
| V <sub>I</sub> L | Input LOW Voltage <sup>(1)</sup>        | 1.350                | 1.820 | 1.350                  | 1.820 | 1.350                  | 1.855 | V    | V <sub>E</sub> = 3.3V |
| V <sub>BB</sub>  | Output Reference Voltage <sup>(1)</sup> | 1.920                | 2.030 | 1.950                  | 2.050 | 1.990                  | 2.110 | V    | V <sub>E</sub> = 3.3V |

**Note:**

1. V<sub>I</sub>H, V<sub>I</sub>L and V<sub>BB</sub> are referenced to V<sub>E</sub> and will vary 1:1 with the power supply. The levels shown are for V<sub>E</sub> = +3.3V.

**100H ECL DC ELECTRICAL CHARACTERISTICS**V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V

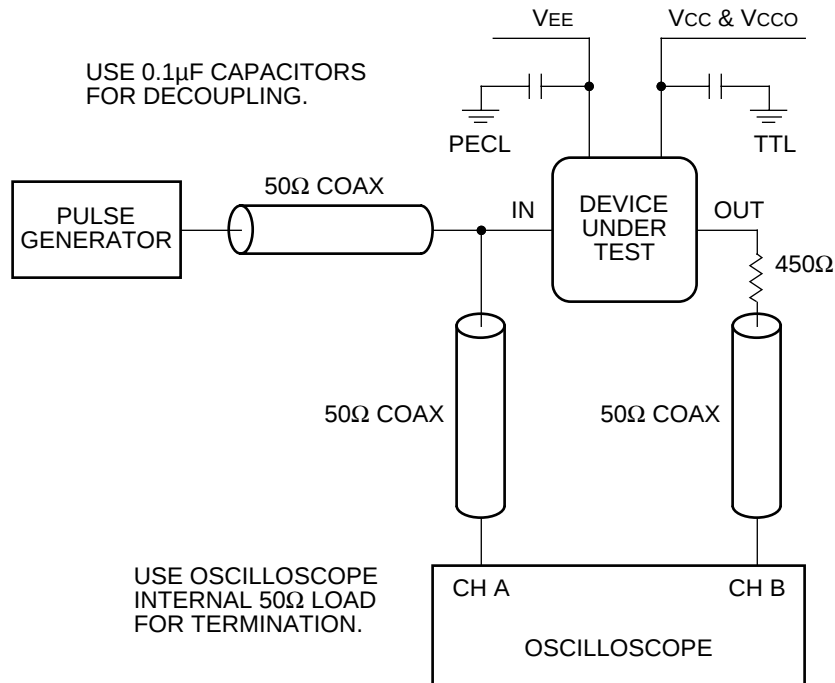
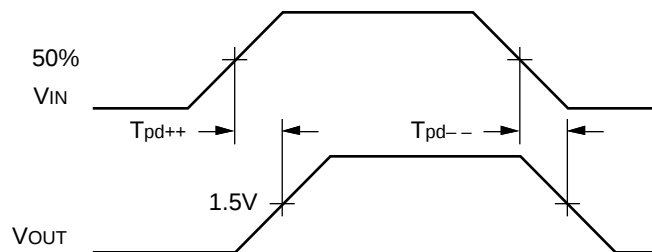
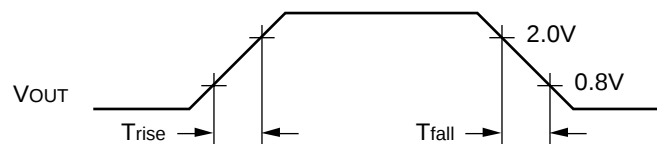
| Symbol          | Parameter                               | T <sub>A</sub> = 0°C |       | T <sub>A</sub> = +25°C |       | T <sub>A</sub> = +85°C |       | Unit | Condition             |
|-----------------|-----------------------------------------|----------------------|-------|------------------------|-------|------------------------|-------|------|-----------------------|
|                 |                                         | Min.                 | Max.  | Min.                   | Max.  | Min.                   | Max.  |      |                       |
| I <sub>IH</sub> | Input HIGH Current                      | —                    | 225   | —                      | 175   | —                      | 175   | μA   | —                     |
| I <sub>IL</sub> | Input LOW Current                       | 0.5                  | —     | 0.5                    | —     | 0.5                    | —     | μA   | —                     |
| V <sub>IH</sub> | Input HIGH Voltage <sup>(1)</sup>       | 2.135                | 2.420 | 2.135                  | 2.420 | 2.135                  | 2.420 | V    | V <sub>E</sub> = 3.3V |
| V <sub>IL</sub> | Input LOW Voltage <sup>(1)</sup>        | 1.490                | 1.825 | 1.490                  | 1.825 | 1.490                  | 1.825 | V    | V <sub>E</sub> = 3.3V |
| V <sub>BB</sub> | Output Reference Voltage <sup>(1)</sup> | 1.920                | 2.040 | 1.920                  | 2.040 | 1.920                  | 2.040 | V    | V <sub>E</sub> = 3.3V |

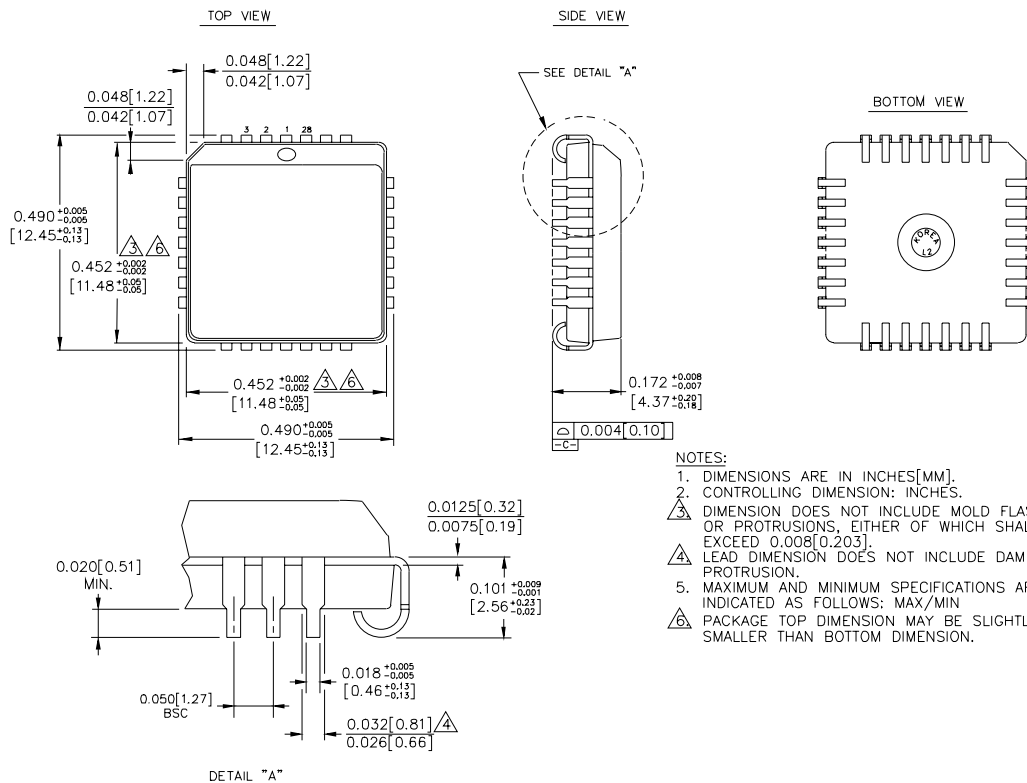
**Note:**1. V<sub>IH</sub>, V<sub>IL</sub> and V<sub>BB</sub> are referenced to V<sub>E</sub> and will vary 1:1 with the power supply. The levels shown are for V<sub>E</sub> = +3.3V.**AC ELECTRICAL CHARACTERISTICS**V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V

| Symbol                                     | Parameter                                | T <sub>A</sub> = 0°C |                                           | T <sub>A</sub> = +25°C |                                           | T <sub>A</sub> = +85°C |                                           | Unit     | Condition                                      |
|--------------------------------------------|------------------------------------------|----------------------|-------------------------------------------|------------------------|-------------------------------------------|------------------------|-------------------------------------------|----------|------------------------------------------------|
|                                            |                                          | Min.                 | Max.                                      | Min.                   | Max.                                      | Min.                   | Max.                                      |          |                                                |
| t <sub>PLH</sub><br>t <sub>PHL</sub>       | Propagation Delay<br>D to Output         | 2.0<br>2.5           | 3.0<br>3.5                                | 2.0<br>2.5             | 3.0<br>3.5                                | 2.0<br>2.5             | 3.0<br>3.5                                | ns       | C <sub>L</sub> = 20pF                          |
| t <sub>skpp</sub>                          | Part-to-Part Skew <sup>(1,4)</sup>       | —                    | 0.5                                       | —                      | 0.5                                       | —                      | 0.5                                       | ns       | C <sub>L</sub> = 20pF                          |
| t <sub>skew++</sub><br>t <sub>skew--</sub> | Within-Device Skew <sup>(2,3,4)</sup>    | —<br>—               | 0.3 <sup>(7)</sup><br>0.35 <sup>(8)</sup> | —<br>—                 | 0.3 <sup>(7)</sup><br>0.35 <sup>(8)</sup> | —<br>—                 | 0.3 <sup>(7)</sup><br>0.35 <sup>(8)</sup> | ns<br>ns | C <sub>L</sub> = 20pF<br>C <sub>L</sub> = 20pF |
| t <sub>PLH</sub><br>t <sub>PHL</sub>       | Propagation Delay<br>LEN to Output       | 2.0                  | 3.5                                       | 2.0                    | 3.5                                       | 2.0                    | 3.5                                       | ns       | C <sub>L</sub> = 20pF                          |
| t <sub>PLH</sub><br>t <sub>PHL</sub>       | Propagation Delay<br>/EN to Output       | 2.0                  | 3.5                                       | 2.0                    | 3.5                                       | 2.0                    | 3.5                                       | ns       | C <sub>L</sub> = 20pF                          |
| t <sub>r</sub><br>t <sub>f</sub>           | Output Rise/Fall Time<br>1.0V to 2.0V    | —<br>—               | 1.7<br>1.6                                | —<br>—                 | 1.7<br>1.6                                | —<br>—                 | 1.7<br>1.6                                | ns       | C <sub>L</sub> = 20pF                          |
| f <sub>MAX</sub>                           | Maximum Input Frequency <sup>(5,6)</sup> | 135                  | —                                         | 135                    | —                                         | 135                    | —                                         | MHz      |                                                |
| —                                          | Pulse Width                              | 1.5                  | —                                         | 1.5                    | —                                         | 1.5                    | —                                         | ns       | —                                              |
| —                                          | Recovery Time                            | 1.25                 | —                                         | 1.25                   | —                                         | 1.25                   | —                                         | ns       | —                                              |
| t <sub>s</sub>                             | Set-up Time                              | 0.5 (typ.)           |                                           | 0.5 (typ.)             |                                           | 0.5 (typ.)             |                                           | ns       | —                                              |
| t <sub>h</sub>                             | Hold Time                                | 0.5 (typ.)           |                                           | 0.5 (typ.)             |                                           | 0.5 (typ.)             |                                           | ns       | —                                              |

**Notes:**

1. Device-to-Device Skew considering HIGH-to-HIGH transitions at common V<sub>CC</sub> level.
2. Within-Device Skew considering HIGH-to-HIGH transitions at common V<sub>CC</sub> level.
3. Within-Device Skew considering LOW-to-LOW transitions at common V<sub>CC</sub> level.
4. All skew parameters are guaranteed but not tested.
5. Frequency at which output levels will meet a 0.8V to 2.0V minimum swing.
6. The f<sub>MAX</sub> value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.
7. V<sub>T</sub> = V<sub>E</sub> = +3.15V to +3.45V, (i.e. V<sub>E</sub> ± 5%).
8. V<sub>T</sub> = V<sub>E</sub> = +3.0V to +3.6V, (i.e. V<sub>E</sub> ± 10%).

**TTL SWITCHING CIRCUIT****ECL/TTL PROPAGATION DELAY — SINGLE ENDED****ECL/TTL WAVEFORMS: RISE AND FALL TIMES**

**28-PIN PLCC (J28-1)**

Rev. 03

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