

FEATURES

- Input frequencies up to 135MHz
- PECL-to-TTL version of popular ECLinPS E111
- Guaranteed low skew specification
- Latched input
- Differential internal design
- VBB output VECL for single-ended operation
- Single +5V supply
- 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



Precision Edge®

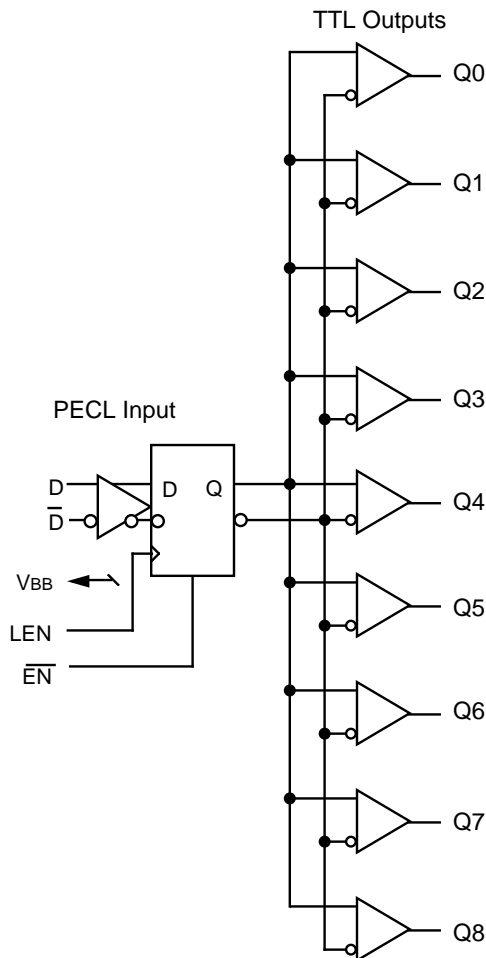
DESCRIPTION

The SY10/100H641 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 50pF 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 (\overline{EN}) forces all outputs LOW.

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

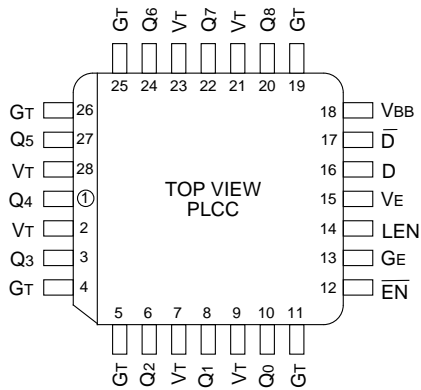
BLOCK DIAGRAM



PIN NAMES

| Pin | Function |
|-------------------|-----------------------------|
| GT | TTL Ground (0V) |
| VT | TTL Vcc (+5.0V) |
| VE | ECL Vcc (+5.0V) |
| GE | ECL Ground (0V) |
| D, \overline{D} | Signal Input (PECL) |
| VBB | VBB Reference Output (PECL) |
| Q0 - Q8 | Signal Outputs (TTL) |
| \overline{EN} | Enable Input (PECL) |
| LEN | Latch Enable Input (PECL) |

PACKAGE/ORDERING INFORMATION



28-Pin PLCC (J28-1)

Ordering Information⁽¹⁾

| Part Number | Package Type | Operating Range | Package Marking | Lead Finish |
|---------------------------------|--------------|-----------------|---|-------------|
| SY10H641JC | J28-1 | Commercial | SY10H641JC | Sn-Pb |
| SY10H641JCTR ⁽²⁾ | J28-1 | Commercial | SY10H641JC | Sn-Pb |
| SY100H641JC | J28-1 | Commercial | SY100H641JC | Sn-Pb |
| SY100H641JCTR ⁽²⁾ | J28-1 | Commercial | SY100H641JC | Sn-Pb |
| SY10H641JZ ⁽³⁾ | J28-1 | Commercial | SY10H641JZ with Pb-Free bar-line indicator | Matte-Sn |
| SY10H641JZTR ^(2, 3) | J28-1 | Commercial | SY10H641JZ with Pb-Free bar-line indicator | Matte-Sn |
| SY100H641JZ ⁽³⁾ | J28-1 | Commercial | SY100H641JZ with Pb-Free bar-line indicator | Matte-Sn |
| SY100H641JZTR ^(2, 3) | J28-1 | Commercial | SY100H641JZ with Pb-Free bar-line indicator | Matte-Sn |

Notes:

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

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

| Symbol | Rating | Value | Unit |
|----------------------|---|------------------------------|------|
| VE (ECL) VT (TTL) | Power Supply Voltage | -0.5 to +7.0 -0.5 to +7.0 | V |
| VI (ECL) | Input Voltage | 0.0 to VEE | V |
| VOUT (TTL) | Disabled 3-State Output | 0.0 to VCC | V |
| IOUT (ECL) | Output Current - Continuous - Surge | 50 100 | mA |
| TLEAD | Lead Temperature Range (soldering, 20sec) | +260 | °C |
| Tstore | Storage Temperature | -65 to +150 | °C |
| TA | Operating Temperature | 0 to +85 | °C |

TRUTH TABLE

| D | LEN | EN | Q |
|---|-----|----|----|
| L | L | L | L |
| H | L | L | H |
| X | H | L | Q0 |
| X | X | H | L |

Note:

1. Do not exceed.

VCC AND CLOAD

Ranges to meet duty cycle requirement: 0°C ≤ TA ≤ 85°C. Output duty cycle measured relative to 1.5V.

| Symbol | Parameter | Min. | Typ. | Max. | Unit | Condition | |
|--------|---|------|-------|------|-------|-----------|-------------|
| PW1 | Ranges of VCC and CL to meet min. pulse width (HIGH or LOW) at fOUT ≤ 40MHz | VCC | 4.75 | 5.0 | 5.25 | V | All Outputs |
| | | CL | 10 | — | 50 | pF | |
| | | Pw | 11 | — | — | ns | |
| PW2 | Ranges of VCC and CL to meet min. pulse width (HIGH or LOW) at fOUT ≤ 50MHz | VCC | 4.875 | 5.0 | 5.125 | V | All Outputs |
| | | CL | 15 | — | 27 | pF | |
| | | Pw | 9.0 | — | — | ns | |

DC ELECTRICAL CHARACTERISTICS

VT = VE = 5.0V ± 5%

| Symbol | Parameter | TA = 0°C | | TA = +25°C | | TA = +85°C | | Unit | Condition | |
|--------|----------------------|----------|------|------------|------|------------|------|------|-----------|-------------------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | | | |
| IEE | Power Supply Current | ECL | — | 30 | — | 30 | — | 30 | mA | VE Pin |
| ICCH | | TTL | — | 30 | — | 30 | — | 30 | | Total all VT pins |
| ICCL | | — | 35 | — | 35 | — | 35 | | | |

TTL DC ELECTRICAL CHARACTERISTICS

VT = VE = 5.0V ± 5%

| Symbol | Parameter | TA = 0°C | | TA = +25°C | | TA = +85°C | | Unit | Condition |
|--------|------------------------------|----------|------|------------|------|------------|------|------|-------------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | | |
| VOH | Output HIGH Voltage | 2.0 | — | 2.0 | — | 2.0 | — | V | IOH = -15mA |
| VOL | Output LOW Voltage | — | 0.5 | — | 0.5 | — | 0.5 | V | IOL = 24mA |
| Ios | Output Short Circuit Current | -100 | -225 | -100 | -225 | -100 | -225 | mA | VOUT = 0V |

10H ECL DC ELECTRICAL CHARACTERISTICS

$V_T = V_E = 5.0V \pm 5\%$

| Symbol | Parameter | TA = 0°C | | TA = +25°C | | TA = +85°C | | Unit | Condition |
|-----------------|---|----------|-------|------------|-------|------------|-------|------|-----------------------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | | |
| I _{IH} | Input HIGH Current | — | 225 | — | 175 | — | 175 | μA | — |
| I _{IL} | Input LOW Current | 0.5 | — | 0.5 | — | 0.5 | — | μA | — |
| V _{IH} | Input HIGH Voltage ⁽¹⁾ | 3.830 | 4.160 | 3.870 | 4.190 | 3.940 | 4.280 | V | V _E = 5.0V |
| V _{IL} | Input LOW Voltage ⁽¹⁾ | 3.050 | 3.520 | 3.050 | 3.520 | 3.050 | 3.555 | V | V _E = 5.0V |
| V _{BB} | Output Reference Voltage ⁽¹⁾ | 3.620 | 3.730 | 3.650 | 3.750 | 3.690 | 3.810 | V | V _E = 5.0V |

Note:

1. V_{IH}, V_{IL} and V_{BB} are referenced to V_E and will vary 1:1 with the power supply. The levels shown are for V_E = +5.0V.

100H ECL DC ELECTRICAL CHARACTERISTICS

$V_T = V_E = 5.0V \pm 5\%$

| Symbol | Parameter | TA = 0°C | | TA = +25°C | | TA = +85°C | | Unit | Condition |
|-----------------|---|----------|-------|------------|-------|------------|-------|------|-----------------------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | | |
| I _{IH} | Input HIGH Current | — | 225 | — | 175 | — | 175 | μA | — |
| I _{IL} | Input LOW Current | 0.5 | — | 0.5 | — | 0.5 | — | μA | — |
| V _{IH} | Input HIGH Voltage ⁽¹⁾ | 3.835 | 4.120 | 3.835 | 4.120 | 3.835 | 4.120 | V | V _E = 5.0V |
| V _{IL} | Input LOW Voltage ⁽¹⁾ | 3.190 | 3.525 | 3.190 | 3.525 | 3.190 | 3.525 | V | V _E = 5.0V |
| V _{BB} | Output Reference Voltage ⁽¹⁾ | 3.620 | 3.740 | 3.620 | 3.740 | 3.620 | 3.740 | V | V _E = 5.0V |

Note:

1. V_{IH}, V_{IL} and V_{BB} are referenced to V_E and will vary 1:1 with the power supply. The levels shown are for V_E = +5.0V.

AC ELECTRICAL CHARACTERISTICS

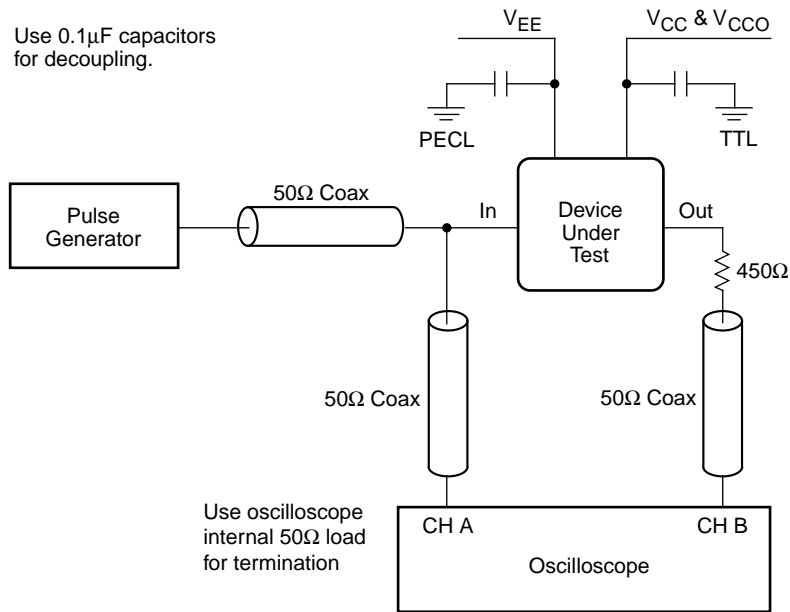
$V_T = V_E = 5.0V \pm 5\%$

| Symbol | Parameter | TA = 0°C | | TA = +25°C | | TA = +85°C | | Unit | Condition |
|--------------------------------------|--|------------|------|------------|------|------------|------|------|-----------|
| | | Min. | Max. | Min. | Max. | Min. | Max. | | |
| t _{PD} | Propagation Delay D to Output | 5.0 | 6.0 | 4.8 | 5.8 | 5.3 | 6.3 | ns | CL = 50pF |
| t _{skpp} | Part-to-Part Skew ^(1,4) | — | 1.0 | — | 1.0 | — | 1.0 | ns | CL = 50pF |
| t _{skew++} | Within-Device Skew ^(2,4) | — | 0.5 | — | 0.5 | — | 0.5 | ns | CL = 50pF |
| t _{skew--} | Within-Device Skew ^(3,4) | — | 0.5 | — | 0.5 | — | 0.5 | ns | CL = 50pF |
| t _{PLH} t _{PHL} | Propagation Delay LEN to Output | 4.9 | 6.9 | 4.9 | 6.9 | 5.0 | 7.0 | ns | CL = 50pF |
| t _{PLH} t _{PHL} | Propagation Delay EN to Output | 5.0 | 7.0 | 4.9 | 6.9 | 5.0 | 7.0 | ns | CL = 50pF |
| t _r t _f | Output Rise/Fall Time 0.8V to 2.0V | — | 1.7 | — | 1.7 | — | 1.7 | ns | CL = 50pF |
| f _{MAX} | Maximum Input Frequency ^(5,6) | 135 | — | 135 | — | 135 | — | MHz | CL = 50pF |
| — | Pulse Width | 1.5 | — | 1.5 | — | 1.5 | — | ns | — |
| — | Recovery Time | 1.25 | — | 1.25 | — | 1.25 | — | ns | — |
| t _S | Set-up Time | 0.5 (typ.) | | 0.5 (typ.) | | 0.5 (typ.) | | ns | — |
| t _H | Hold Time | 0.5 (typ.) | | 0.5 (typ.) | | 0.5 (typ.) | | ns | — |

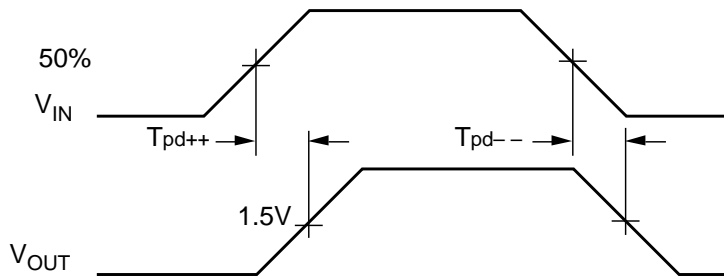
Notes:

- Device-to-Device Skew considering HIGH-to-HIGH transitions at common power supply voltage.
- Within-Device Skew considering HIGH-to-HIGH transitions at common power supply voltage.
- Within-Device Skew considering LOW-to-LOW transitions at common power supply voltage.
- All skew parameters are guaranteed but not tested.
- Frequency at which output levels will meet a 0.8V to 2.0V minimum swing.
- The f_{MAX} value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.

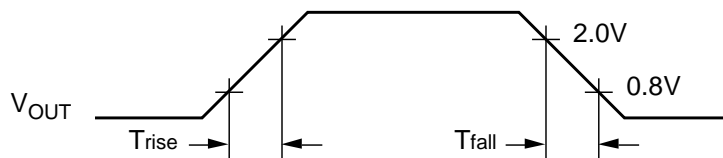
TTL SWITCHING CIRCUIT



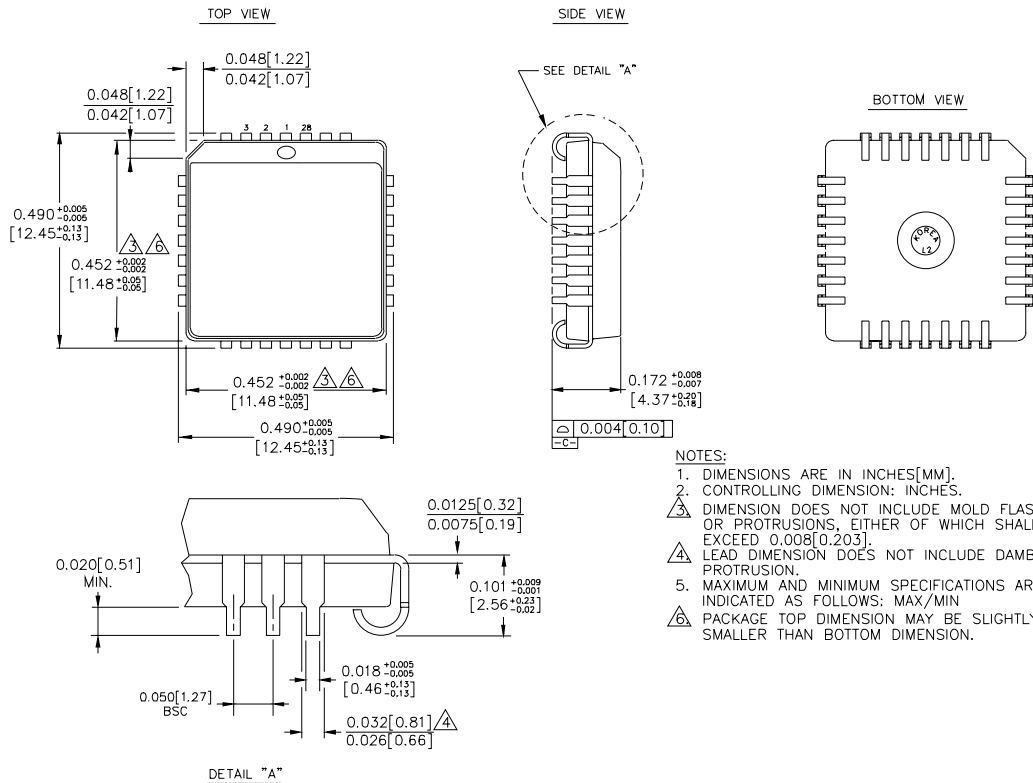
ECL/TTL PROPAGATION DELAY — SINGLE ENDED



ECL/TTL WAVEFORMS: RISE AND FALL TIMES



28-PIN PLCC (J28-1)



- NOTES:**
1. DIMENSIONS ARE IN INCHES[MM].
 2. CONTROLLING DIMENSION: INCHES.
 3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008[0.203].
 4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
 5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX/MIN
 6. PACKAGE TOP DIMENSION MAY BE SLIGHTLY SMALLER THAN BOTTOM DIMENSION.

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