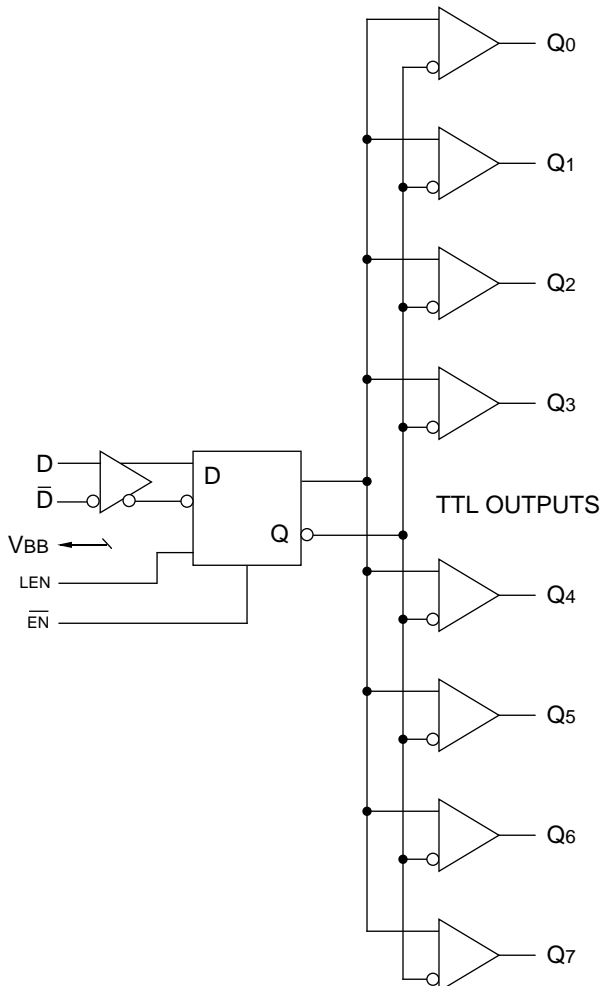


## FEATURES

- ECL/TTL version of popular ECLinPS™ E111
- 400ps within device skew
- 800ps part-to-part skew
- Latch
- Differential internal design
- VBB output
- Dual supply
- Reset/Enable
- Multiple TTL and ECL power/ground pins
- Fully compatible with Motorola MC100H643
- Higher performance than H643 versions
- Industrial temperature availability
- Available in 28-pin PLCC package

## BLOCK DIAGRAM



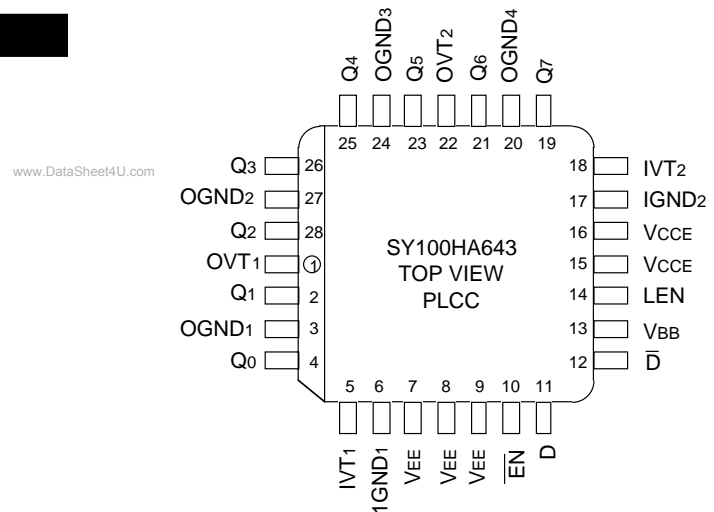
## DESCRIPTION

The SY100HA643 is an enhanced dual supply, low skew translating 1:8 clock driver. Devices in the Micrel-Synergy H600 translators series utilize the 28-lead PLCC for optimal power pinning, signal flow through and electrical performance. The dual-supply HA643 is similar to the H641, which is a single-supply 1:9 version of the same function, with higher performance than the H643 versions.

The device features a 48mA 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 pulldowns) the latch is transparent. A HIGH on the enable pin ( $\overline{EN}$ ) forces all outputs LOW.

The 100HA643 is compatible with 100K ECL logic levels.

## PIN CONFIGURATION



## PIN NAMES

| Pin               | Function                 |
|-------------------|--------------------------|
| OGND              | TTL Output Ground (0V)   |
| OVTTL             | Output Vcc (+5.0V)       |
| IGND              | Internal TTL GND (0V)    |
| IVT               | Internal TTL Vcc (+5.0V) |
| VEE               | ECL VEE (-5.2/-4.5V)     |
| VCCE              | ECL Ground (0V)          |
| D, $\overline{D}$ | Signal Input (ECL)       |
| VBB               | VBB Reference Output     |
| Q0 - Q7           | Signal Outputs (TTL)     |
| $\overline{EN}$   | Enable Input (ECL)       |
| LEN               | Latch Enable Input (ECL) |

**TRUTH TABLE**

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

**DC CHARACTERISTICS**

IVT = OVT = 5.0V ±5%; VEE = -4.2V to -5.5V; VCC = GND

| Symbol | Parameter                        | TA = -40°C |       | TA = 0°C |       | TA = +25°C |       | TA = +85°C |       | Unit | Condition                                       |
|--------|----------------------------------|------------|-------|----------|-------|------------|-------|------------|-------|------|---|
|        |                                  | Min.       | Max.  | Min.     | Max.  | Min.       | Max.  | Min.       | Max.  |      |   |
| IEE    | Power Supply                     | ECL        | —     | 58       | —     | 58         | —     | 58         | —     | 58   | mA<br>VEE Pins<br>Total all OVT<br>and IVT pins |
| ICCL   |                                  | TTL        | —     | 83       | —     | 83         | —     | 83         | —     | 83   |   |
| ICCH   |                                  |            | —     | 73       | —     | 73         | —     | 73         | —     | 73   |   |
| VOH    | TTL Output HIGH Voltage          | 2.5        | —     | 2.5      | —     | 2.5        | —     | 2.5        | —     | V    | IOH = -3.0mA<br>IOH = -15mA                     |
| VOL    | TTL Output LOW Voltage           | —          | 0.5   | —        | 0.5   | —          | 0.5   | —          | 0.5   | V    | IOL = 48mA                                      |
| IOS    | TTL Output Short Circuit Current | -80        | -200  | -80      | -200  | -80        | -200  | -80        | -200  | mA   | VOU = 0V  |
| IiH    | ECL Input HIGH Current           | —          | 225   | —        | 225   | —          | 175   | —          | 175   | µA   |   |
| IiL    | ECL Input LOW Current            | 0.5        | —     | 0.5      | —     | 0.5        | —     | 0.5        | —     | µA   |   |
| ViH    | ECL Input HIGH Voltage           | —          | —     | -1165    | -880  | -1165      | -880  | -1165      | -880  | mV   |   |
| ViL    | ECL Input LOW Voltage            | —          | —     | -1810    | -1475 | -1810      | -1475 | -1810      | -1475 | mV   |   |
| VBB    | ECL Output Reference Voltage     | -1380      | -1260 | -1380    | -1260 | -1380      | -1260 | -1380      | -1260 | mV   |   |

**AC CHARACTERISTICS**

IVT = OVT = 5.0V ±5%; VEE = -4.2V to -5.5V ; VCCE = GND

| Symbol                           | Parameter  | TA = -40°C   |        | TA = 0°C     |        | TA = +25°C   |        | TA = +85°C   |        | Unit     | Condition |
|----------------------------------|--|--------------|--------|--------------|--------|--------------|--------|--------------|--------|----------|-----------|
|                                  |  | Min.         | Max.   | Min.         | Max.   | Min.         | Max.   | Min.         | Max.   |          |           |
| t <sub>IH</sub>                  | Propagation Delay to Output<br>D<br>LEN<br>EN                    | 2.3          | 3.1    | 2.3          | 3.1    | 2.3          | 3.1    | 2.3          | 3.1    | ns       | CL = 20pF |
| t <sub>skew</sub>                | Within-Device Skew <sup>(1)</sup>                                | —            | 0.4    | —            | 0.4    | —            | 0.4    | —            | 0.4    | ns       |           |
| t <sub>PW</sub>                  | Pulse Width Out <sup>(2)</sup><br>HIGH or LOW<br>@ FOUT = 100MHz | 4.5          | 5.5    | 4.5          | 5.5    | 4.5          | 5.5    | 4.5          | 5.5    | ns       | CL = 20pF |
| t <sub>S</sub>                   | Setup Time<br>D  | 0.75         | —      | 0.75         | —      | 0.75         | —      | 0.75         | —      | ns       |           |
| t <sub>H</sub>                   | Hold Time<br>D   | 0.75         | —      | 0.75         | —      | 0.75         | —      | 0.75         | —      | ns       |           |
| t <sub>RR</sub>                  | Recovery Time<br>LEN<br>EN                                       | 1.25<br>1.25 | —<br>— | 1.25<br>1.25 | —<br>— | 1.25<br>1.25 | —<br>— | 1.25<br>1.25 | —<br>— | ns<br>ns |           |
| t <sub>PW</sub>                  | Minimum Pulse<br>Width<br>LEN<br>EN                              | 1.5<br>1.5   | —<br>— | 1.5<br>1.5   | —<br>— | 1.5<br>1.5   | —<br>— | 1.5<br>1.5   | —<br>— | ns<br>ns |           |
| t <sub>r</sub><br>t <sub>f</sub> | Rise / Fall times<br>0.8V — 2.0V                                 | —            | 1.5    | —            | 1.5    | —            | 1.5    | —            | 1.5    | ns       | CL = 20pF |
| f <sub>MAX</sub>                 | Max. Input Frequency <sup>(3,4)</sup>                            | 160          | —      | 160          | —      | 160          | —      | 160          | —      | MHz      | CL = 20pF |

**NOTES:**

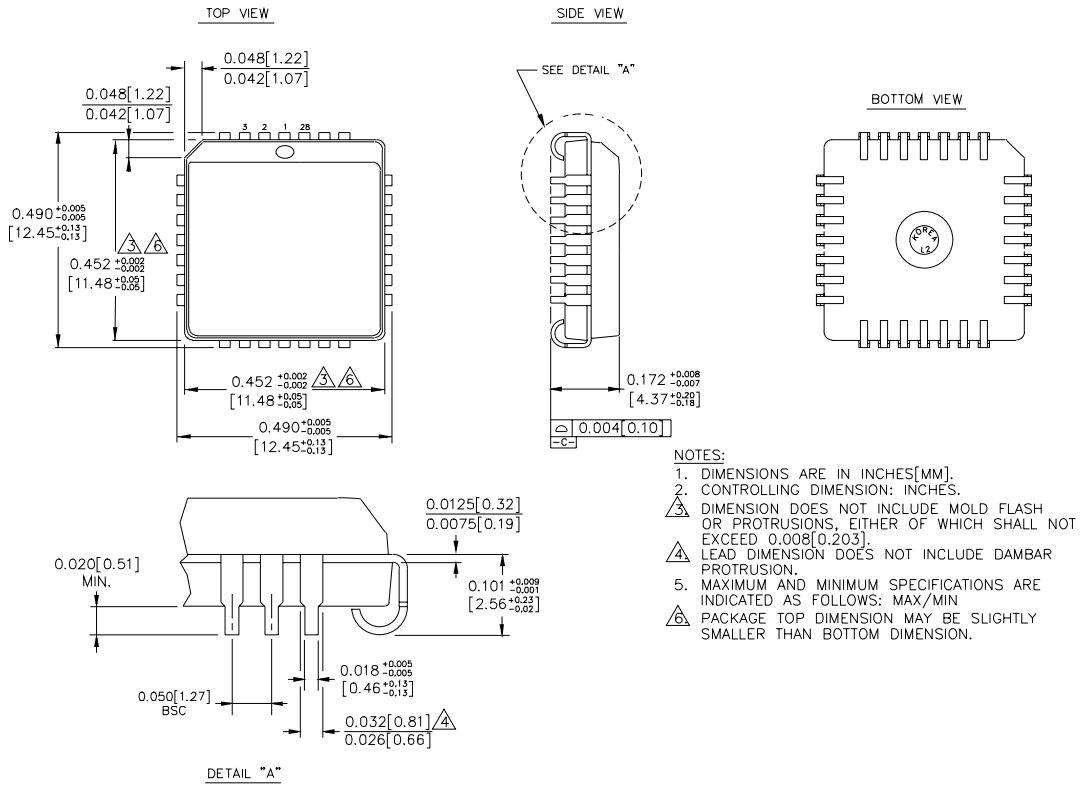
1. Within-Device skew defined as identical transitions on similar paths through a device.
2. Pulse width is defined relative to 1.5V measurement points on the output waveform.
3. Frequency at which output levels will meet a 0.8V to 2.0V minimum swing.
4. The f<sub>MAX</sub> value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.

**PRODUCT ORDERING CODE**

| Ordering Code  | Package Type | Operating Range |
|----------------|--------------|-----------------|
| SY100HA643JC   | J28-1        | Commercial      |
| SY100HA643JCTR | J28-1        | Commercial      |

| Ordering Code  | Package Type | Operating Range |
|----------------|--------------|-----------------|
| SY100HA643JI   | J28-1        | Industrial      |
| SY100HA643JITR | J28-1        | Industrial      |

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



Rev. 03

**MICREL-SYNERGY 3250 SCOTT BOULEVARD SANTA CLARA CA 95054 USA**

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