



## DUAL SUPPLY OCTAL ECL-TO-TTL

Precision Edge®  
SY100HA643

### 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 MC100H643
- Higher performance than H643 versions
- Industrial temperature availability
- Available in 28-pin PLCC package



Precision Edge®

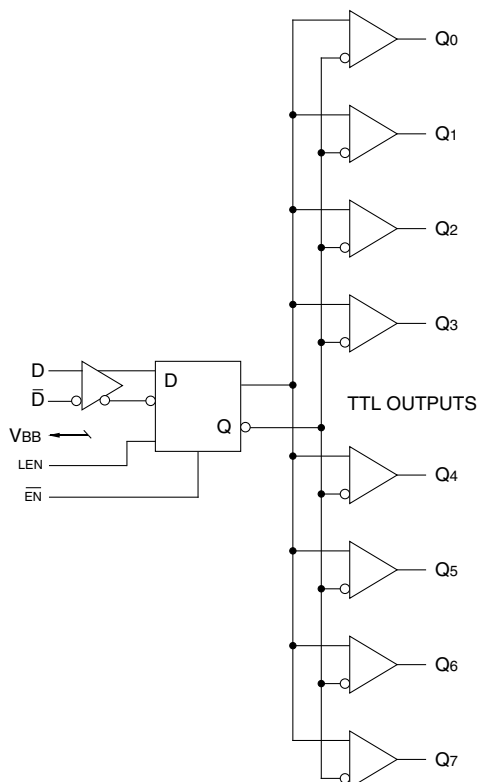
### DESCRIPTION

The SY100HA643 is an enhanced dual supply, low skew translating 1:8 clock driver. Devices in the Micrel 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 (EN) forces all outputs LOW.

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

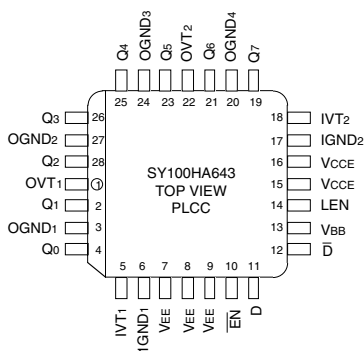
### BLOCK DIAGRAM



### 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, $\bar{D}$ | Signal Input (ECL)       |
| VBB          | VBB Reference Output     |
| Q0 - Q7      | Signal Outputs (TTL)     |
| $\bar{EN}$   | Enable Input (ECL)       |
| LEN          | Latch Enable Input (ECL) |

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

| Part Number                      | Package Type | Operating Range | Package Marking                              | Lead Finish |
|----------------------------------|--------------|-----------------|----------------------------------------------|-------------|
| SY100HA643JC                     | J28-1        | Commercial      | SY100HA643JC                                 | Sn-Pb       |
| SY100HA643JCTR <sup>(2)</sup>    | J28-1        | Commercial      | SY100HA643JC                                 | Sn-Pb       |
| SY100HA643JI                     | J28-1        | Industrial      | SY100HA643JI                                 | Sn-Pb       |
| SY100HA643JITR <sup>(2)</sup>    | J28-1        | Industrial      | SY100HA643JI                                 | Sn-Pb       |
| SY100HA643JY <sup>(3)</sup>      | J28-1        | Industrial      | SY100HA643JY with Pb-Free bar-line indicator | Matte-Sn    |
| SY100HA643JYTR <sup>(2, 3)</sup> | J28-1        | Industrial      | SY100HA643JY 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.

**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                     | —          | 58     | —          | 58     | —          | 58     | —          | 58     | mA   | VEE Pins<br>Total all OVT<br>and IVT pins |
| ICCL   |                                  | —          | 83     | —          | 83     | —          | 83     | —          | 83     | mA   |                                           |
| ICCH   |                                  | —          | 73     | —          | 73     | —          | 73     | —          | 73     | mA   |                                           |
| VOH    | TTL Output HIGH Voltage          | 2.5<br>2.0 | —<br>— | 2.5<br>2.0 | —<br>— | 2.5<br>2.0 | —<br>— | 2.5<br>2.0 | —<br>— | 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   | VOUT = 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   |                                           |

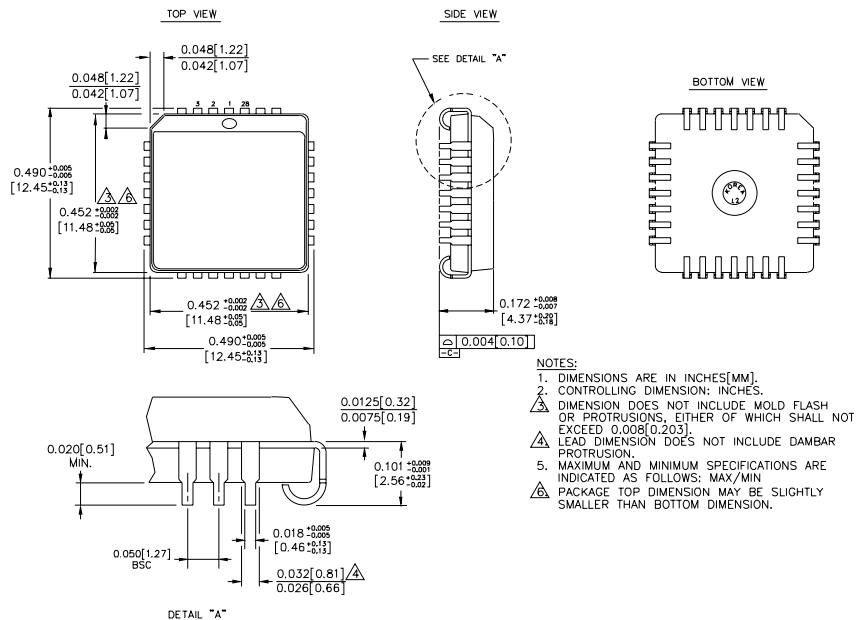
**AC CHARACTERISTICS**

IVT = OVT = 5.0V ±5%; VEE = -4.2V to -5.5V ; 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.   |          |           |
| 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.

**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 0.006[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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