# MC10H643, MC100H643

# Dual Supply ECL to TTL 1:8 Clock Driver

The MC10H/100H643 is a dual supply, low skew translating 1:8 clock driver. Devices in the ON Semiconductor H600 translator series utilize the PLCC−28 for optimal power pinning, signal flow through and electrical performance. The dual−supply H643 is similar to the H641, which is a single−supply 1:9 version of the same function.

The device features a 48 mA TTL output stage, with AC performance specified into a 50 pF 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 10H version is compatible with MECL™ 10H ECL logic levels. The 100H version is compatible with 100K levels.

- ECL/TTL Version of Popular ECLinPS™ E111
- Low Skew Within Device 0.5 ns
- Guaranteed Skew Spec Part−to−Part 1.0 ns
- Latch
- Differential Internal Design
- $V_{BB}$ Output
- Dual Supply
- Reset/Enable
- Multiple TTL and ECL Power/Ground Pins

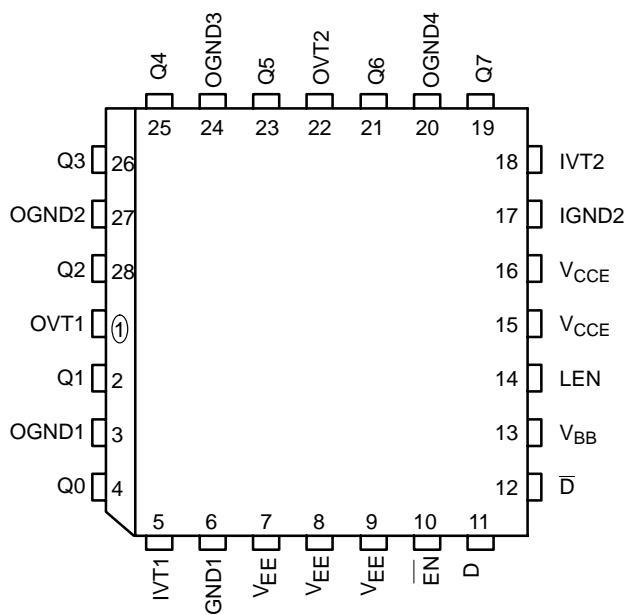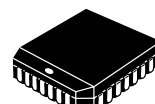**MARKING DIAGRAM**

**PLCC−28
FN SUFFIX
CASE 776**

1

10H643
AWLYYWW
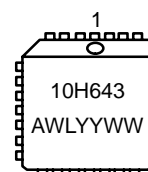
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week

## PIN NAMES

| PIN | FUNCTION |
|---|---|
| OGND | TTL Output Ground (0V) |
| OVT | TTL Output $V_{CC}$ (+5.0V) |
| IGND | Internal TTL GND (0V) |
| IVT | Internal TTL $V_{CC}$ (+5.0V) |
| $V_{EE}$ | ECL $V_{EE}$ (−5.2/−4.5V) |
| $V_{CCE}$ | ECL Ground (0V) |
| D, $\overline{D}$ | Signal Input (ECL) |
| $V_{BB}$ | $V_{BB}$ Reference Output |
| Q0−Q7 | Signal Outputs (TTL) |
| $\overline{EN}$ | Enable Input (ECL) |
| LEN | Latch Enable Input (ECL) |

## ORDERING INFORMATION

| Device | Package | Shipping |
|---|---|---|
| MC10H643FN | PLCC−28 | 37 Units/Rail |
| MC100H643FN | PLCC−28 | 37 Units/Rail |



**Figure 1. Pinout: PLCC−28**
(Top View)

**Figure 2. Logic Diagram**
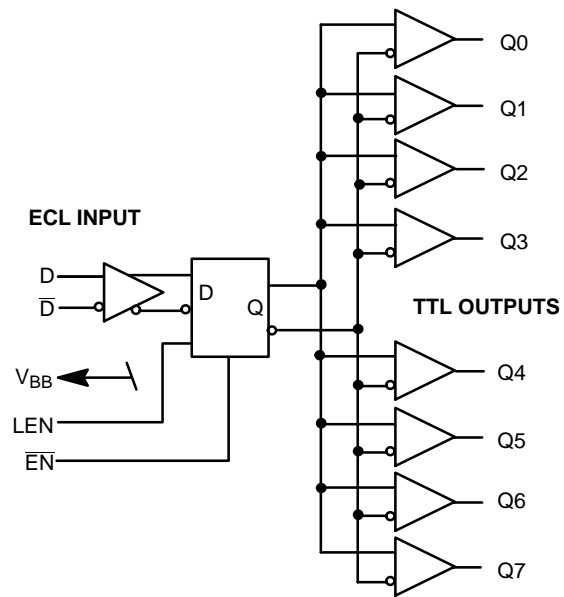
**TRUTH TABLE**

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

# MC10H643, MC100H643

**DC CHARACTERISTICS** (IVT = OVT = 5.0 V ±5%; $V_{EE}$ = –5.2 V ±5% (10H Version); $V_{EE}$ = –4.2 V to –5.5 V (100H Version))

| Symbol | Characteristic | | Condition | 0°C | | 25°C | | 85°C | | Unit |
|--------|----------------|--|-----------|-----|-----|------|-----|------|-----|------|
| | | | | Min | Max | Min | Max | Min | Max | |
| $I_{EE}$ | Power Supply Current | ECL | $V_{EE}$ Pins | – | 42 | – | 42 | – | 42 | mA |
| $I_{CCL}$ | | TTL | Total all OVT | – | 106 | – | 106 | – | 106 | mA |
| $I_{CCH}$ | | | and IVT pins | – | 95 | – | 95 | – | 95 | mA |

**10H ECL DC CHARACTERISTICS** (IVT = OVT = 5.0 V ±5%; $V_{EE}$ = –5.2 V ±5% (10H Version))

| Symbol | Characteristic | 0°C | | 25°C | | 85°C | | Unit |
|--------|----------------|-----|-----|------|-----|------|-----|------|
| | | Min | Max | Min | Max | Min | Max | |
| $I_{INH}$<br>$I_{INL}$ | Input HIGH Current<br>Input LOW Current | –<br>0.5 | 255<br>– | –<br>0.5 | 175<br>– | –<br>0.5 | 175<br>– | μA |
| $V_{IH}$<br>$V_{IL}$ | Input HIGH Voltage<br>Input LOW Voltage | –1170<br>–1950 | –840<br>–1480 | –1130<br>–1950 | –810<br>–1480 | –1070<br>–1950 | –735<br>–1450 | mV |
| $V_{BB}$ | Output Reference Voltage | –1380 | –1270 | –1350 | –1250 | –1310 | –1190 | mV |

**100H ECL DC CHARACTERISTICS** (IVT = OVT = 5.0 V ±5%; $V_{EE}$ = –4.2 V to –5.5 V (100H))

| Symbol | Characteristic | 0°C | | 25°C | | 85°C | | Unit |
|--------|----------------|-----|-----|------|-----|------|-----|------|
| | | Min | Max | Min | Max | Min | Max | |
| $I_{INH}$<br>$I_{INL}$ | Input HIGH Current<br>Input LOW Current | –<br>0.5 | 255<br>– | –<br>0.5 | 175<br>– | –<br>0.5 | 175<br>– | μA |
| $V_{IH}$<br>$V_{IL}$ | Input HIGH Voltage<br>Input LOW Voltage | –1165<br>–1810 | –880<br>–1475 | –1165<br>–1810 | –880<br>–1475 | –1165<br>–1810 | –880<br>–1475 | mV |
| $V_{BB}$ | Output Reference Voltage | –1380 | –1260 | –1380 | –1260 | –1380 | –1260 | mV |

# MC10H643, MC100H643

**DC TTL CHARACTERISTICS** (IVT = OVT = 5.0 V ±5%; $V_{EE}$ = –5.2 V ±5% (10H Version); $V_{EE}$ = –4.2 V to –5.5 V (100H Version))

| Symbol | Characteristic | Condition | 0°C | | 25°C | | 85°C | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Min | Max | Min | Max | |
| $V_{OH}$ | Output HIGH Voltage | $I_{OH}$ = –3.0 mA<br>$I_{OH}$ = –15 mA | 2.5<br>2.0 | –<br>– | 2.5<br>2.0 | –<br>– | 2.5<br>2.0 | –<br>– | V |
| $V_{OL}$ | Output LOW Voltage | $I_{OH}$ = 48 mA | – | 0.5 | – | 0.5 | – | 0.5 | V |
| IOS | Output Short Circuit Current | $V_{OUT}$ = 0 V | –100 | –225 | –100 | –225 | –100 | –225 | mA |

**AC CHARACTERISTICS** (IVT = OVT = 5.0 V ±5%; $V_{EE}$ = –5.2 V ±10% (10H); –4.2 V to –5.5 V (100H); $V_{CCE}$ = GND)

| Symbol | Characteristic | Condition | 0°C | | 25°C | | 85°C | | Unit |
|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Max | Min | Max | Min | Max | |
| $t_{PLH}$ | Propagation Delay to Output<br>    D<br>    LEN<br>    $\overline{EN}$ | CL = 50 pF | 4.0<br>3.5<br>3.5 | 5.0<br>5.5<br>5.5 | 4.1<br>3.5<br>3.5 | 5.1<br>5.5<br>5.5 | 4.4<br>3.9<br>3.9 | 5.4<br>5.9<br>5.9 | ns |
| $t_{SKEW}$ | Within–Device Skew | (Note 1) | – | 0.5 | – | 0.5 | | 0.5 | ns |
| tw | Pulse Width Out<br>    HIGH or LOW<br>    @ $f_{out}$ = 50MHz | CL = 50 pF<br><br>(Note 2) | 9.0 | 11.0 | 9.0 | 11.0 | 9.0 | 11.0 | ns |
| $t_s$ | Setup Time<br>    D | | 0.75 | – | 0.75 | – | 0.75 | – | ns |
| $t_h$ | Hold Time<br>    D | | 0.75 | – | 0.75 | – | 0.75 | – | ns |
| $t_{RR}$ | Recovery Time<br>    LEN<br>    $\overline{EN}$ | | 1.25<br>1.25 | –<br>– | 1.25<br>1.25 | –<br>– | 1.25<br>1.25 | –<br>– | ns |
| $t_{pw}$ | Minimum Pulse Width<br>    LEN<br>    $\overline{EN}$ | | 1.5<br>1.5 | –<br>– | 1.5<br>1.5 | –<br>– | 1.5<br>1.5 | –<br>– | ns |
| $t_r$<br>$t_f$ | Rise / Fall Times<br>    0.8 V – 2.0 V | CL = 50 pF | – | 1.2 | – | 1.2 | – | 1.2 | ns |

1. Within–Device skew defined as identical transitions on similar paths through a device.
2. Pulse width is defined relative to 1.5 V measurement points on the output waveform.
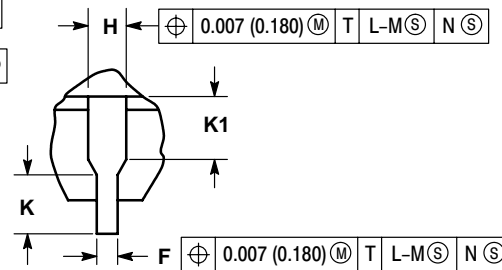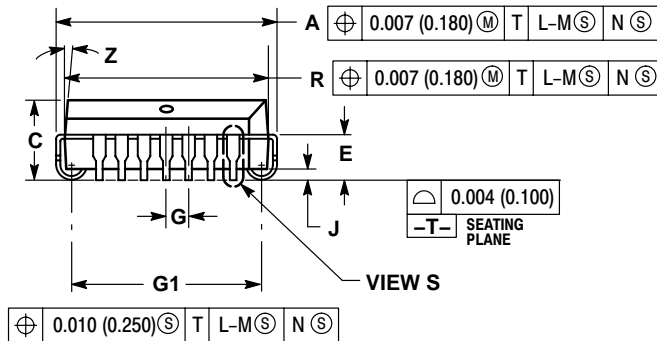
## PACKAGE DIMENSIONS

**PLCC–28**
**FN SUFFIX**
PLASTIC PLCC PACKAGE
CASE 776–02
ISSUE E
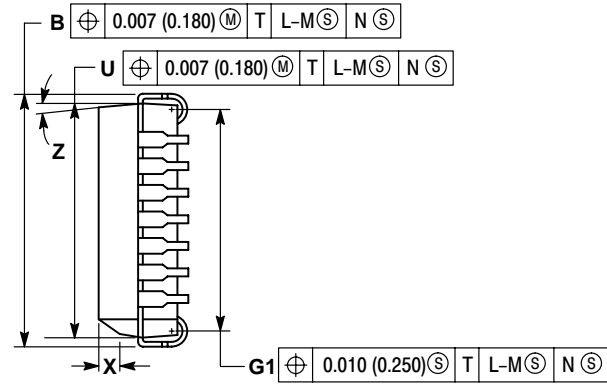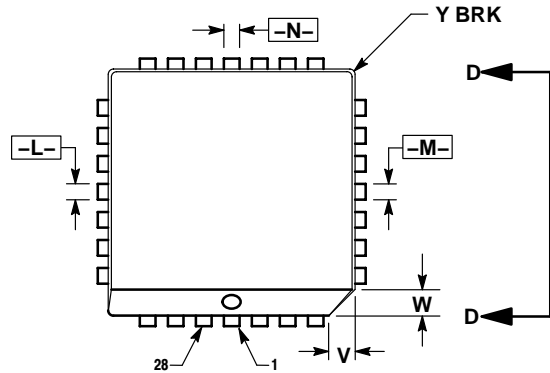
**VIEW D–D**

**VIEW S**

NOTES:
1. DATUMS –L–, –M–, AND –N– DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM –T–, SEATING PLANE.
3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
5. CONTROLLING DIMENSION: INCH.
6. THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
7. DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

| DIM | INCHES | | MILLIMETERS | |
|-----|--------|--------|-------------|--------|
| | MIN | MAX | MIN | MAX |
| A | 0.485 | 0.495 | 12.32 | 12.57 |
| B | 0.485 | 0.495 | 12.32 | 12.57 |
| C | 0.165 | 0.180 | 4.20 | 4.57 |
| E | 0.090 | 0.110 | 2.29 | 2.79 |
| F | 0.013 | 0.019 | 0.33 | 0.48 |
| G | 0.050 BSC | | 1.27 BSC | |
| H | 0.026 | 0.032 | 0.66 | 0.81 |
| J | 0.020 | --- | 0.51 | --- |
| K | 0.025 | --- | 0.64 | --- |
| R | 0.450 | 0.456 | 11.43 | 11.58 |
| U | 0.450 | 0.456 | 11.43 | 11.58 |
| V | 0.042 | 0.048 | 1.07 | 1.21 |
| W | 0.042 | 0.048 | 1.07 | 1.21 |
| X | 0.042 | 0.056 | 1.07 | 1.42 |
| Y | --- | 0.020 | --- | 0.50 |
| Z | 2 ° | 10° | 2 ° | 10° |
| G1 | 0.410 | 0.430 | 10.42 | 10.92 |
| K1 | 0.040 | --- | 1.02 | --- |

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