

MC10H643, MC100H643

Dual Supply ECL to TTL 1:8 Clock Driver

Description

The MC10H/100H643 is a dual supply, low skew translating 1:8 clock driver. Devices in the ON Semiconductor H643 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.

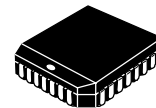
Features

- 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
- Pb-Free Packages are Available*



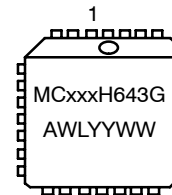
ON Semiconductor®

<http://onsemi.com>



PLCC-28
FN SUFFIX
CASE 776

MARKING DIAGRAM*



| | |
|-----|---------------------|
| xxx | = 10 or 100 |
| A | = Assembly Location |
| WL | = Wafer Lot |
| YY | = Year |
| WW | = Work Week |
| G | = Pb-Free Package |

*For additional marking information, refer to Application Note AND8002/D.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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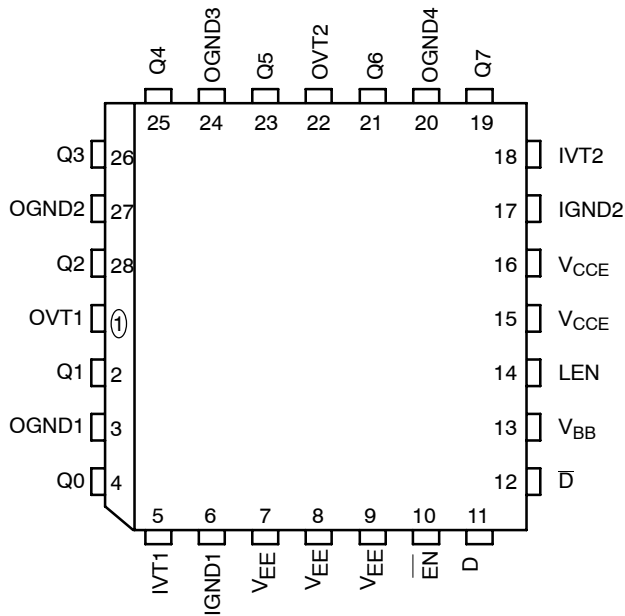


Figure 1. Pinout: PLCC-28
(Top View)

Table 1. PIN DESCRIPTION

| 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, \bar{D} | Signal Input (ECL) |
| V _{BB} | V _{BB} Reference Output |
| Q0 - Q7 | Signal Outputs (TTL) |
| EN | Enable Input (ECL) |
| LEN | Latch Enable Input (ECL) |

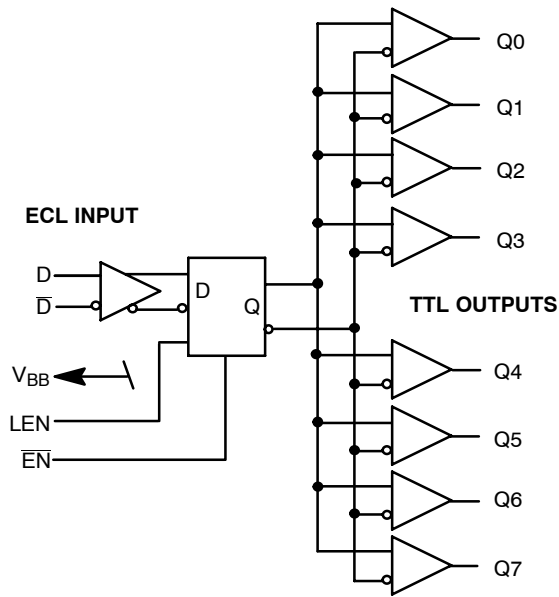


Figure 2. Logic Diagram

Table 2. TRUTH TABLE

| D | LEN | EN | Q |
|---|-----|----|----------------|
| L | L | L | L |
| H | L | L | H |
| X | H | L | Q ₀ |
| X | X | H | L |

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Table 3. DC CHARACTERISTICS (IVT = OVT = 5.0 V $\pm 5\%$; V_{EE} = -5.2 V $\pm 5\%$ (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 and IVT pins | - | 106 | - | 106 | - | 106 | mA |
| I _{CCH} | | | | - | 95 | - | 95 | - | 95 | mA |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

Table 4. 10H ECL DC CHARACTERISTICS (IVT = OVT = 5.0 V $\pm 5\%$; V_{EE} = -5.2 V $\pm 5\%$ (10H Version))

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

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

Table 5. 100H ECL DC CHARACTERISTICS (IVT = OVT = 5.0 V $\pm 5\%$; 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} I _{INL} | Input HIGH Current Input LOW Current | - | 255 - | - | 175 - | - | 175 - | μA | |
| V _{IH} V _{IL} | Input HIGH Voltage Input LOW Voltage | -1165 -1810 | -880 -1475 | -1165 -1810 | -880 -1475 | -1165 -1810 | -880 -1475 | mV | |
| V _{BB} | Output Reference Voltage | -1380 | -1260 | -1380 | -1260 | -1380 | -1260 | mV | |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

Table 6. DC TTL CHARACTERISTICS (IVT = OVT = 5.0 V $\pm 5\%$; V_{EE} = -5.2 V $\pm 5\%$ (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 I _{OH} = -15 mA | 2.5 2.0 | - - | 2.5 2.0 | - - | 2.5 2.0 | - - | V | |
| V _{OL} | Output LOW Voltage | I _{OH} = 48 mA | - | 0.5 | - | 0.5 | - | 0.5 | V | |
| I _{OS} | Output Short Circuit Current | V _{OUT} = 0 V | -100 | -225 | -100 | -225 | -100 | -225 | mA | |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

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Table 7. AC CHARACTERISTICS (IVT = OVT = 5.0 V \pm 15%; V_{EE} = -5.2 V \pm 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 D LEN EN | CL = 50 pF | 4.0 3.5 3.5 | 5.0 5.5 5.5 | 4.1 3.5 3.5 | 5.1 5.5 5.5 | 4.4 3.9 3.9 | 5.4 5.9 5.9 | ns |
| t _{SKEW} | Within-Device Skew | (Note 1) | - | 0.5 | - | 0.5 | | 0.5 | ns |
| t _w | Pulse Width Out HIGH or LOW @ f _{out} = 50MHz | CL = 50 pF (Note 2) | 9.0 | 11.0 | 9.0 | 11.0 | 9.0 | 11.0 | ns |
| t _s | Setup Time D | | 0.75 | - | 0.75 | - | 0.75 | - | ns |
| t _h | Hold Time D | | 0.75 | - | 0.75 | - | 0.75 | - | ns |
| t _{RR} | Recovery Time LEN EN | | 1.25 1.25 | - - | 1.25 1.25 | - - | 1.25 1.25 | - - | ns |
| t _{pw} | Minimum Pulse Width LEN EN | | 1.5 1.5 | - - | 1.5 1.5 | - - | 1.5 1.5 | - - | ns |
| t _r t _f | Rise / Fall Times 0.8 V – 2.0 V | CL = 50 pF | - | 1.2 | - | 1.2 | - | 1.2 | ns |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

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.

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|----------------|----------------------|-----------------------|
| MC10H643FN | PLCC-28 | 37 Units / Rail |
| MC10H643FNG | PLCC-28 (Pb-Free) | 37 Units / Rail |
| MC10H643FNR2 | PLCC-28 | 500 / Tape & Reel |
| MC10H643FNR2G | PLCC-28 (Pb-Free) | 500 / Tape & Reel |
| MC100H643FN | PLCC-28 | 37 Units / Rail |
| MC100H643FNG | PLCC-28 (Pb-Free) | 37 Units / Rail |
| MC100H643FNR2 | PLCC-28 | 500 / Tape & Reel |
| MC100H643FNR2G | PLCC-28 (Pb-Free) | 500 / Tape & Reel |

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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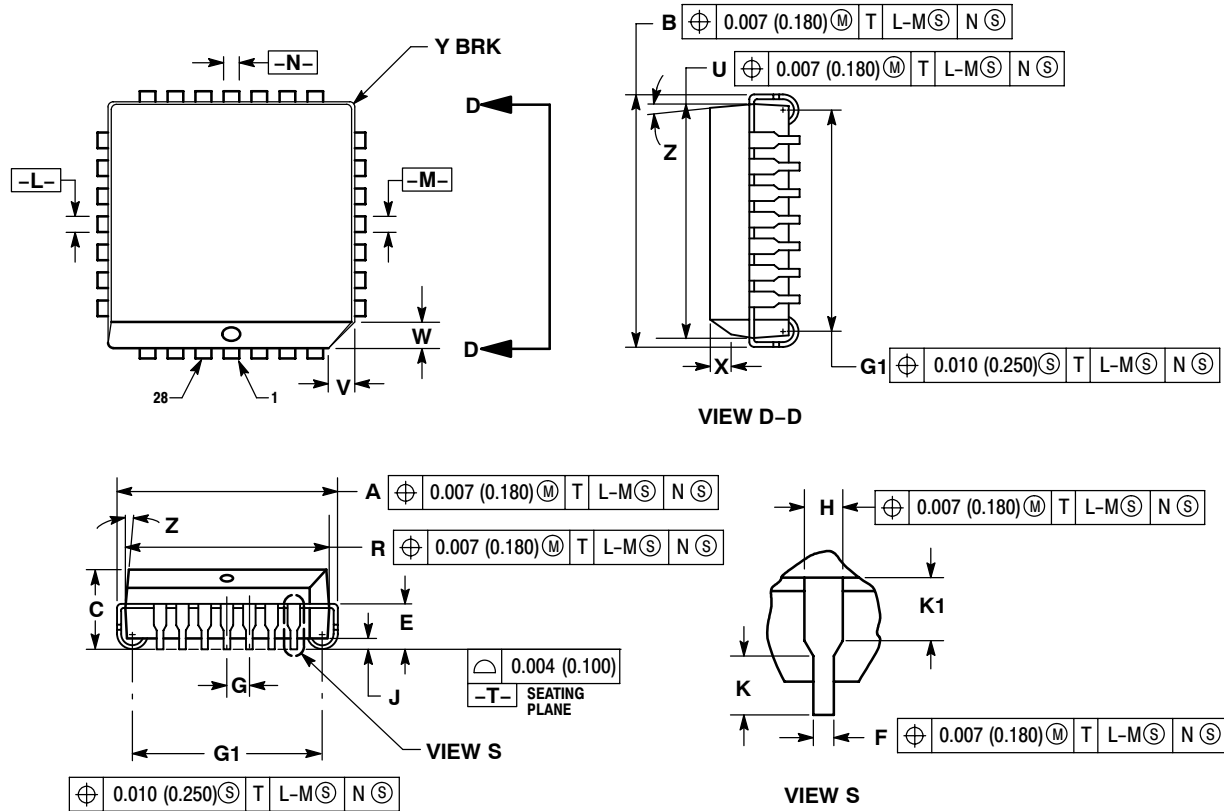
Resource Reference of Application Notes

- AN1405/D** – ECL Clock Distribution Techniques
- AN1406/D** – Designing with PECL (ECL at +5.0 V)
- AN1503/D** – ECLinPS™ I/O SPiCE Modeling Kit
- AN1504/D** – Metastability and the ECLinPS Family
- AN1568/D** – Interfacing Between LVDS and ECL
- AN1672/D** – The ECL Translator Guide
- AND8001/D** – Odd Number Counters Design
- AND8002/D** – Marking and Date Codes
- AND8020/D** – Termination of ECL Logic Devices
- AND8066/D** – Interfacing with ECLinPS
- AND8090/D** – AC Characteristics of ECL Devices

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PACKAGE DIMENSIONS

PLCC-28
FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 776-02
ISSUE E




NOTES:

- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- THE PACKAGE BOTTOM MAY BE SMALLER THAN THE PACKAGE TOP 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.
- 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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