

MC10E171, MC100E171

5V ECL 3-Bit 4:1 Multiplexer

The MC10E/100E171 contains three 4:1 multiplexers with differential outputs. Separate Select controls are provided for the leading 2:1 mux pairs (see logic symbol). The three Select inputs control which one of the four data inputs in each case is propagated to the corresponding output.

The 100 Series contains temperature compensation.

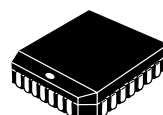
- 725 ps Max. D to Output
- Split Select
- Differential Outputs
- PECL Mode Operating Range: $V_{CC}= 4.2\text{ V to } 5.7\text{ V}$ with $V_{EE}= 0\text{ V}$
- NECL Mode Operating Range: $V_{CC}= 0\text{ V}$ with $V_{EE}= -4.2\text{ V to } -5.7\text{ V}$
- Internal Input Pulldown Resistors
- ESD Protection: $> 2\text{ KV HBM}, > 200\text{ V MM}$
- Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test
- Moisture Sensitivity Level 1
For Additional Information, see Application Note AND8003/D
- Flammability Rating: UL-94 code V-0 @ 1/8",
Oxygen Index 28 to 34
- Transistor Count = 203 devices



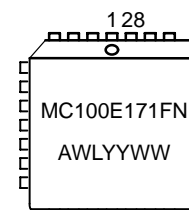
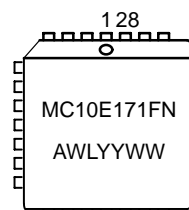
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MARKING DIAGRAMS



**PLCC-28
FN SUFFIX
CASE 776**



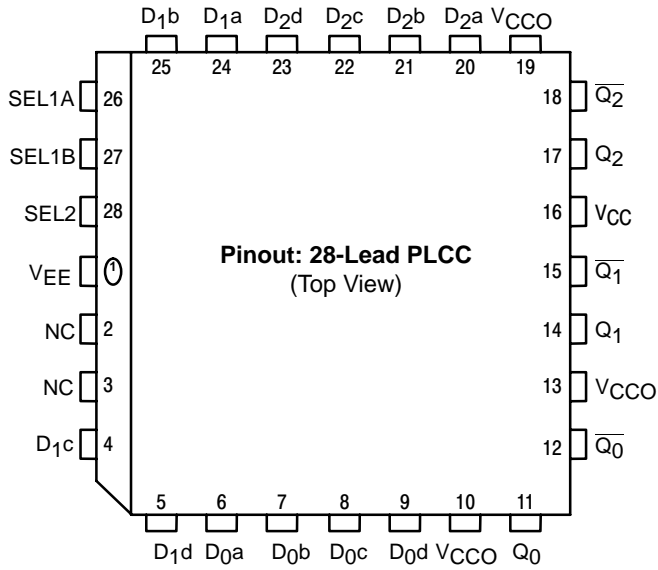
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week

ORDERING INFORMATION

| Device | Package | Shipping |
|---------------|---------|----------------|
| MC10E171FN | PLCC-28 | 37 Units/Rail |
| MC10E171FNR2 | PLCC-28 | 500 Units/Reel |
| MC100E171FN | PLCC-28 | 37 Units/Rail |
| MC100E171FNR2 | PLCC-28 | 500 Units/Reel |

MC10E171, MC100E171

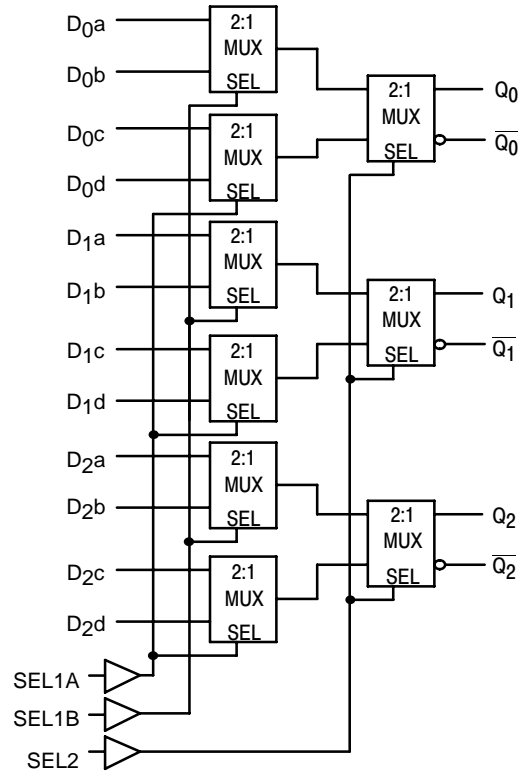
LOGIC DIAGRAM AND PINOUT ASSIGNMENT



* All VCC and VCCO pins are tied together on the die.

Warning: All VCC, VCCO, and VEE pins must be externally connected to Power Supply to guarantee proper operation.

LOGIC DIAGRAM



PIN DESCRIPTION

| PIN | FUNCTION |
|-----------------------------------|-------------------------------|
| D0x – D2x | ECL Data Inputs |
| SEL1A, SEL1B | ECL First-stage Select Inputs |
| SEL2 | ECL Second-stage Select Input |
| Q0 – Q2 | ECL True Output |
| $\overline{Q_0} - \overline{Q_2}$ | ECL Inverted Output |
| VCC, VCCO | Positive Supply |
| VEE | Negative Supply |
| NC | No Connect |

FUNCTION TABLE

| PIN | STATE | OPERATION |
|-------|-------|-----------------|
| SEL2 | H | Output c/d data |
| SEL1A | H | Input d data |
| SEL1B | H | Input b data |

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MAXIMUM RATINGS (Note 1)

| Symbol | Parameter | Condition 1 | Condition 2 | Rating | Units |
|------------------|--|--|--|----------------------------|--------------|
| V _{CC} | PECL Mode Power Supply | V _{EE} = 0 V | | 8 | V |
| V _{EE} | NECL Mode Power Supply | V _{CC} = 0 V | | −8 | V |
| V _I | PECL Mode Input Voltage NECL Mode Input Voltage | V _{EE} = 0 V V _{CC} = 0 V | V _I ≤ V _{CC} V _I ≥ V _{EE} | 6 −6 | V V |
| I _{out} | Output Current | Continuous Surge | | 50 100 | mA mA |
| T _A | Operating Temperature Range | | | 0 to +85 | °C |
| T _{stg} | Storage Temperature Range | | | −65 to +150 | °C |
| θ _{JA} | Thermal Resistance (Junction to Ambient) | 0 LFPM 500 LFPM | 28 PLCC 28 PLCC | 63.5 43.5 | °C/W °C/W |
| θ _{JC} | Thermal Resistance (Junction to Case) | std bd | 28 PLCC | 22 to 26 | °C/W |
| V _{EE} | PECL Operating Range NECL Operating Range | | | 4.2 to 5.7 −5.7 to −4.2 | V V |
| T _{sol} | Wave Solder | <2 to 3 sec @ 248°C | | 265 | °C |

1. Maximum Ratings are those values beyond which device damage may occur.

10E SERIES PECL DC CHARACTERISTICS V_{CCx} = 5.0 V; V_{EE} = 0.0 V (Note 1)

| Symbol | Characteristic | 0°C | | | 25°C | | | 85°C | | | Unit |
|-----------------|------------------------------|------|------|------|------|------|------|------|------|------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I _{EE} | Power Supply Current | | 56 | 67 | | 56 | 67 | | 56 | 67 | mA |
| V _{OH} | Output HIGH Voltage (Note 2) | 3980 | 4070 | 4160 | 4020 | 4105 | 4190 | 4090 | 4185 | 4280 | mV |
| V _{OL} | Output LOW Voltage (Note 2) | 3050 | 3210 | 3370 | 3050 | 3210 | 3370 | 3050 | 3227 | 3405 | mV |
| V _{IH} | Input HIGH Voltage | 3830 | 3995 | 4160 | 3870 | 4030 | 4190 | 3940 | 4110 | 4280 | mV |
| V _{IL} | Input LOW Voltage | 3050 | 3285 | 3520 | 3050 | 3285 | 3520 | 3050 | 3302 | 3555 | mV |
| I _{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I _{IL} | Input LOW Current | 0.5 | 0.3 | | 0.5 | 0.25 | | 0.3 | 0.2 | | μA |

NOTE: Devices are designed to meet the DC specifications shown in the above table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lfpm is maintained.

1. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.46 V / −0.06 V.

2. Outputs are terminated through a 50 ohm resistor to V_{CC}−2 volts.

10E SERIES NECL DC CHARACTERISTICS V_{CCx} = 0.0 V; V_{EE} = −5.0 V (Note 1)

| Symbol | Characteristic | 0°C | | | 25°C | | | 85°C | | | Unit |
|-----------------|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I _{EE} | Power Supply Current | | 56 | 67 | | 56 | 67 | | 56 | 67 | mA |
| V _{OH} | Output HIGH Voltage (Note 2) | −1020 | −930 | −840 | −980 | −895 | −810 | −910 | −815 | −720 | mV |
| V _{OL} | Output LOW Voltage (Note 2) | −1950 | −1790 | −1630 | −1950 | −1790 | −1630 | −1950 | −1773 | −1595 | mV |
| V _{IH} | Input HIGH Voltage | −1170 | −1005 | −840 | −1130 | −970 | −810 | −1060 | −890 | −720 | mV |
| V _{IL} | Input LOW Voltage | −1950 | −1715 | −1480 | −1950 | −1715 | −1480 | −1950 | −1698 | −1445 | mV |
| I _{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I _{IL} | Input LOW Current | 0.5 | 0.3 | | 0.5 | 0.065 | | 0.3 | 0.2 | | μA |

NOTE: Devices are designed to meet the DC specifications shown in the above table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lfpm is maintained.

1. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.46 V / −0.06 V.

2. Outputs are terminated through a 50 ohm resistor to V_{CC}−2 volts.

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100E SERIES PECL DC CHARACTERISTICS $V_{CCx}=5.0\text{ V}$; $V_{EE}=0.0\text{ V}$ (Note 1)

| Symbol | Characteristic | 0°C | | | 25°C | | | 85°C | | | Unit |
|----------|------------------------------|------|------|------|------|------|------|------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | | 56 | 67 | | 56 | 67 | | 65 | 77 | mA |
| V_{OH} | Output HIGH Voltage (Note 2) | 3975 | 4050 | 4120 | 3975 | 4050 | 4120 | 3975 | 4050 | 4120 | mV |
| V_{OL} | Output LOW Voltage (Note 2) | 3190 | 3295 | 3380 | 3190 | 3255 | 3380 | 3190 | 3260 | 3380 | mV |
| V_{IH} | Input HIGH Voltage | 3835 | 4050 | 4120 | 3835 | 4120 | 4120 | 3835 | 4120 | 4120 | mV |
| V_{IL} | Input LOW Voltage | 3190 | 3300 | 3525 | 3190 | 3525 | 3525 | 3190 | 3525 | 3525 | mV |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | 0.5 | 0.3 | | 0.5 | 0.25 | | 0.5 | 0.2 | | μA |

NOTE: Devices are designed to meet the DC specifications shown in the above table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lpm is maintained.

1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $+0.46\text{ V} / -0.8\text{ V}$.
2. Outputs are terminated through a 50 ohm resistor to $V_{CC}-2$ volts.

100E SERIES NECL DC CHARACTERISTICS $V_{CCx}=0.0\text{ V}$; $V_{EE}=-5.0\text{ V}$ (Note 1)

| Symbol | Characteristic | 0°C | | | 25°C | | | 85°C | | | Unit |
|----------|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | | 56 | 67 | | 56 | 67 | | 65 | 77 | mA |
| V_{OH} | Output HIGH Voltage (Note 2) | -1025 | -950 | -880 | -1025 | -950 | -880 | -1025 | -950 | -880 | mV |
| V_{OL} | Output LOW Voltage (Note 2) | -1810 | -1705 | -1620 | -1810 | -1745 | -1620 | -1810 | -1740 | -1620 | mV |
| V_{IH} | Input HIGH Voltage | -1165 | -950 | -880 | -1165 | -880 | -880 | -1165 | -880 | -880 | mV |
| V_{IL} | Input LOW Voltage | -1810 | -1700 | -1475 | -1810 | -1475 | -1475 | -1810 | -1475 | -1475 | mV |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | 0.5 | 0.3 | | 0.5 | 0.25 | | 0.5 | 0.2 | | μA |

NOTE: Devices are designed to meet the DC specifications shown in the above table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lpm is maintained.

1. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $+0.46\text{ V} / -0.8\text{ V}$.
2. Outputs are terminated through a 50 ohm resistor to $V_{CC}-2$ volts.

AC CHARACTERISTICS $V_{CCx}=5.0\text{ V}$; $V_{EE}=0.0\text{ V}$ or $V_{CCx}=0.0\text{ V}$; $V_{EE}=-5.0\text{ V}$ (Note 1)

| Symbol | Characteristic | 0°C | | | 25°C | | | 85°C | | | Unit |
|------------------------|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| f_{MAX} | Maximum Toggle Frequency | | TBD | | | TBD | | | TBD | | GHz |
| t_{PLH} t_{PHL} | Propagation Delay to Output D SEL1 SEL2 | 275 450 350 | 480 650 550 | 650 850 700 | 275 450 350 | 480 650 550 | 650 850 700 | 275 450 350 | 480 650 550 | 650 850 700 | ps |
| t_{SKEW} | Within-Device Skew (Note 1.) Dnm, Dnm to Qn Da, Db, Dc, Dd to Q | | 60 40 | | | 60 40 | | | 60 40 | | ps |
| t_{JITTER} | Cycle-to-Cycle Jitter | | TBD | | | TBD | | | TBD | | ps |
| t_r t_f | Rise/Fall Time (20 - 80%) | 300 | 475 | 650 | 300 | 475 | 650 | 300 | 475 | 650 | ps |

1. 10 Series: V_{EE} can vary $+0.46\text{ V} / -0.06\text{ V}$.
- 100 Series: V_{EE} can vary $+0.46\text{ V} / -0.8\text{ V}$.

1. Within-device skew is defined as identical transitions on similar paths through a device; n = 0,1,2 m = a,b,c,d.

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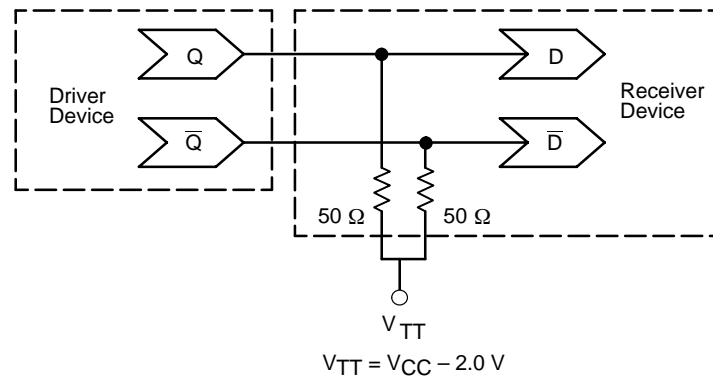


Figure 1. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020 – Termination of ECL Logic Devices.)

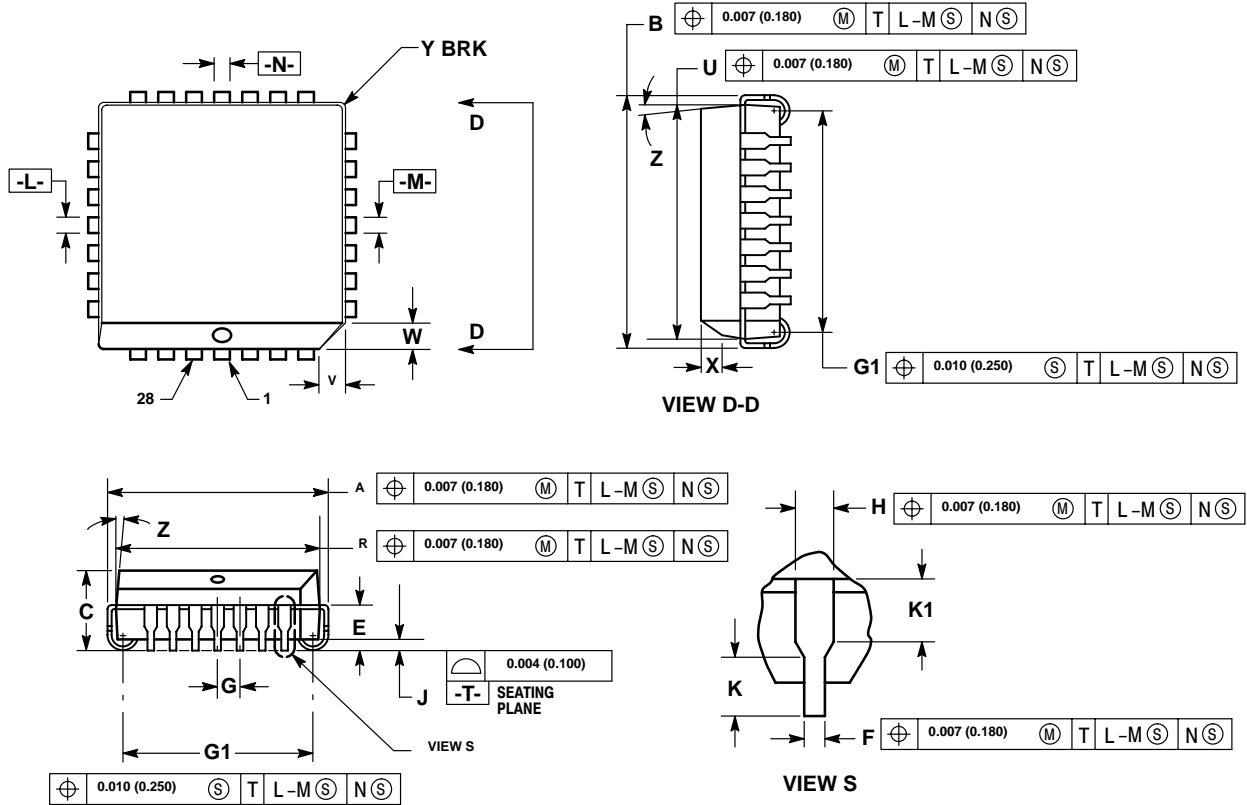
Resource Reference of Application Notes

- AN1404** – ECLinPS Circuit Performance at Non-Standard V_{IH} Levels
- AN1405** – ECL Clock Distribution Techniques
- AN1406** – Designing with PECL (ECL at +5.0 V)
- AN1503** – ECLinPS I/O SPICE Modeling Kit
- AN1504** – Metastability and the ECLinPS Family
- AN1568** – Interfacing Between LVDS and ECL
- AN1596** – ECLinPS Lite Translator ELT Family SPICE I/O Model Kit
- AN1650** – Using Wire-OR Ties in ECLinPS Designs
- AN1672** – The ECL Translator Guide
- AND8001** – Odd Number Counters Design
- AND8002** – Marking and Date Codes
- AND8020** – Termination of ECL Logic Devices

MC10E171, MC100E171

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.
- DIM G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIM 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 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.
- 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 | — |

Notes

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