

MC100LVEL13

3.3V ECL Dual 1:3 Fanout Buffer

Description

The MC100LVEL13 is a dual, fully differential 1:3 fanout buffer. The Low Output–Output Skew of the device makes it ideal for distributing two different frequency synchronous signals.

The differential inputs have special circuitry which ensures device stability under open input conditions. When both differential inputs are left open the D input will pull down to V_{EE} , The \bar{D} input will bias around $V_{CC}/2$ and the Q output will go LOW.

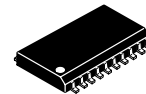
Features

- 500 ps Typical Propagation Delays
- 50 ps Output–Output Skews
- ESD Protection: >2 kV Human Body Model
- The 100 Series Contains Temperature Compensation
- PECL Mode Operating Range: $V_{CC} = 3.0\text{ V}$ to 3.8 V with $V_{EE} = 0\text{ V}$
- NECL Mode Operating Range: $V_{CC} = 0\text{ V}$ with $V_{EE} = -3.0\text{ V}$ to -3.8 V
- Internal Input Pulldown Resistors
- Q Output will Default LOW with Inputs Open or at V_{EE}
- 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 V-0 @ 0.125 in, Oxygen Index: 28 to 34
- Transistor Count = 143 devices
- Pb–Free Packages are Available*



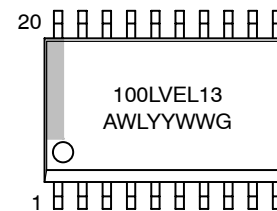
ON Semiconductor®

<http://onsemi.com>



SO–20 WB
DW SUFFIX
CASE 751D

MARKING DIAGRAM*



A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week
G = Pb–Free Package

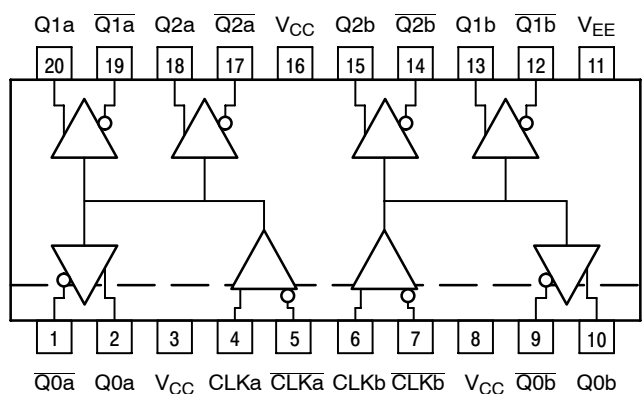
*For additional marking information, refer to Application Note AND8002/D.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 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.

MC100LEVEL13



Warning: All V_{CC} and V_{EE} pins must be externally connected to Power Supply to guarantee proper operation.

Figure 1. Logic Diagram and Pinout: 20-Lead SOIC (Top View)

Table 1. PIN DESCRIPTION

| PIN | FUNCTION |
|-----------------------------|--------------------------------|
| $Q_{na}, \overline{Q_{na}}$ | ECL Differential Clock Outputs |
| $Q_{nb}, \overline{Q_{nb}}$ | ECL Differential Clock Outputs |
| $CLK_n, \overline{CLK_n}$ | ECL Differential Clock Inputs |
| V_{CC} | Positive Supply |
| V_{EE} | Negative Supply |

Table 2. MAXIMUM RATINGS

| Symbol | Parameter | Condition 1 | Condition 2 | Rating | Unit |
|---------------|--|--|--|-------------------|--------------|
| V_{CC} | PECL Mode Power Supply | $V_{EE} = 0\text{ V}$ | | 8 to 0 | V |
| V_{EE} | NECL Mode Power Supply | $V_{CC} = 0\text{ V}$ | | -8 to 0 | V |
| V_I | PECL Mode Input Voltage NECL Mode Input Voltage | $V_{EE} = 0\text{ V}$ $V_{CC} = 0\text{ V}$ | $V_I \leq V_{CC}$ $V_I \geq V_{EE}$ | 6 to 0 -6 to 0 | V V |
| I_{out} | Output Current | Continuous Surge | | 50 100 | mA mA |
| T_A | Operating Temperature Range | | | -40 to +85 | °C |
| T_{stg} | Storage Temperature Range | | | -65 to +150 | °C |
| θ_{JA} | Thermal Resistance (Junction to Ambient) | 0 lfpm 500 lfpm | 20 SOIC 20 SOIC | 90 60 | °C/W °C/W |
| θ_{JC} | Thermal Resistance (Junction to Case) | Standard Board | 20 SOIC | 30 to 35 | °C/W |
| T_{sol} | Wave Solder | | | | |
| | Pb | <2 to 3 sec @ 248°C | | 265 | °C |
| | Pb-Free | <2 to 3 sec @ 260°C | | 265 | |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

MC100LEVEL13

Table 3. LVPECL DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$; $V_{EE} = 0.0\text{ V}$ (Note 1)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|--|-----------------------------|------|------|------|------|------|------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | | 30 | 38 | | 30 | 38 | | 32 | 40 | mA |
| V_{OH} | Output HIGH Voltage (Note 2) | 2215 | 2295 | 2420 | 2275 | 2345 | 2420 | 2275 | 2345 | 2420 | mV |
| V_{OL} | Output LOW Voltage (Note 2) | 1470 | 1605 | 1745 | 1490 | 1595 | 1680 | 1490 | 1595 | 1680 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | 2135 | | 2420 | 2135 | | 2420 | 2135 | | 2420 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | 1490 | | 1825 | 1490 | | 1825 | 1490 | | 1825 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential) (Note 6) | | | | | | | | | | |
| | | $V_{PP} < 500\text{ mV}$ | 1.3 | 2.9 | 1.2 | 2.9 | 1.2 | 2.9 | 1.4 | 2.9 | V |
| | | $V_{PP} \geq 500\text{ mV}$ | 1.5 | 2.9 | 1.4 | 2.9 | 1.4 | 2.9 | 1.4 | 2.9 | V |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | CLKn | 0.5 | | 0.5 | | | 0.5 | | | μA |
| | | $\overline{\text{CLKn}}$ | -300 | | -300 | | | -300 | | | μA |

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 lpm. 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. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $\pm 0.3\text{ V}$.
2. Outputs are terminated through a $50\ \Omega$ resistor to $V_{CC} - 2.0\text{ V}$.
3. V_{IHCMR} min varies 1:1 with V_{EE} , max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{PPmin} and 1 V .

Table 4. LVNECL DC CHARACTERISTICS $V_{CC} = 0.0\text{ V}$; $V_{EE} = -3.3\text{ V}$ (Note 4)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|--|-----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | | 30 | 38 | | 30 | 38 | | 32 | 40 | mA |
| V_{OH} | Output HIGH Voltage (Note 5) | -1085 | -1005 | -880 | -1025 | -955 | -880 | -1025 | -955 | -880 | mV |
| V_{OL} | Output LOW Voltage (Note 5) | -1830 | -1695 | -1555 | -1810 | -1705 | -1620 | -1810 | -1705 | -1620 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | -1165 | | -880 | -1165 | | -880 | -1165 | | -880 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | -1810 | | -1475 | -1810 | | -1475 | -1810 | | -1475 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential) (Note 6) | | | | | | | | | | |
| | | $V_{PP} < 500\text{ mV}$ | -2.0 | -0.4 | -2.1 | -0.4 | -2.1 | -0.4 | -2.1 | -0.4 | V |
| | | $V_{PP} \geq 500\text{ mV}$ | -1.8 | -0.4 | -1.9 | -0.4 | -1.9 | -0.4 | -1.9 | -0.4 | V |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | CLKn | 0.5 | | 0.5 | | | 0.5 | | | μA |
| | | $\overline{\text{CLKn}}$ | -300 | | -300 | | | -300 | | | μA |

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 lpm. 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.

4. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $\pm 0.3\text{ V}$.
5. Outputs are terminated through a $50\ \Omega$ resistor to $V_{CC} - 2.0\text{ V}$.
6. V_{IHCMR} min varies 1:1 with V_{EE} , max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{PPmin} and 1 V .

MC100LVEL13

Table 5. AC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$; $V_{EE} = 0.0\text{ V}$ or $V_{CC} = 0.0\text{ V}$; $V_{EE} = -3.3\text{ V}$ (Note 7)

| Symbol | Characteristic | -40°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 CLK to Q/ \bar{Q} | 410 | | 600 | 430 | 500 | 620 | 450 | | 640 | ps |
| $t_{\text{sk(O)}}$ | Output-Output Skew Any Qa to Qa, Any Qb to Qb Any Qa to Any Qb | | | 50 75 | | | 50 75 | | | 50 75 | ps |
| t_{skew} | Duty Cycle Skew $ t_{\text{PLH}} - t_{\text{PHL}} $ | | | 50 | | | 50 | | | 50 | ps |
| t_{JITTER} | Cycle-to-Cycle Jitter | | TBD | | | TBD | | | TBD | | ps |
| V_{PP} | Input Swing (Note 8) | 150 | | 1000 | 150 | | 1000 | 150 | | 1000 | mV |
| t_{r} t_{f} | Output Rise/Fall Times Q (20% - 80%) | 230 | | 500 | 230 | | 500 | 230 | | 500 | ps |

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.

7. V_{EE} can vary $\pm 0.3\text{ V}$.

8. $V_{\text{PP}}(\text{min})$ is minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈ 40 .

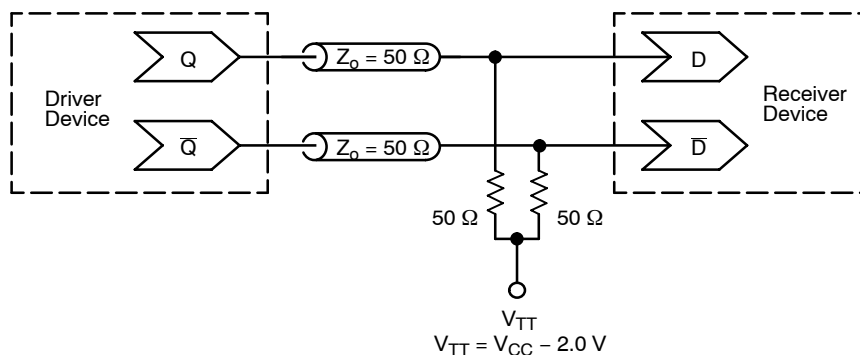


Figure 2. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020/D – Termination of ECL Logic Devices.)

MC100LEVEL13

ORDERING INFORMATION

| Device | Package | Shipping† |
|-------------------|-----------------------|--------------------|
| MC100LEVEL13DW | SO-20 WB | 38 Units / Rail |
| MC100LEVEL13DWG | SO-20 WB (Pb-Free) | 38 Units / Rail |
| MC100LEVEL13DWR2 | SO-20 WB | 1000 / Tape & Reel |
| MC100LEVEL13DWR2G | SO-20 WB (Pb-Free) | 1000 / 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.

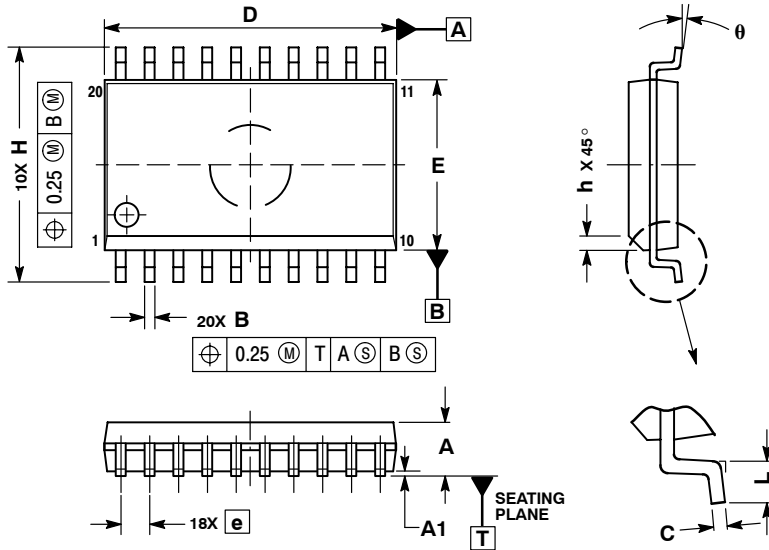
Resource Reference of Application Notes

- 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

MC100LVEL13

PACKAGE DIMENSIONS

SO-20 WB
DW SUFFIX
CASE 751D-05
ISSUE G



NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS | |
|-----|-------------|-------|
| | MIN | MAX |
| A | 2.35 | 2.65 |
| A1 | 0.10 | 0.25 |
| B | 0.35 | 0.49 |
| C | 0.23 | 0.32 |
| D | 12.65 | 12.95 |
| E | 7.40 | 7.60 |
| e | 1.27 BSC | |
| H | 10.05 | 10.55 |
| h | 0.25 | 0.75 |
| L | 0.50 | 0.90 |
| θ | 0° | 7° |

ECLinPS are registered trademarks of Semiconductor Components Industries, LLC (SCILLC).

ON Semiconductor and **ON** are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada
Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910
Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com
Order Literature: <http://www.onsemi.com/orderlit>
For additional information, please contact your local Sales Representative

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru