

3.3 V/5 V ECL 1:2 Differential Fanout Buffer MC10EP11, MC100EP11

Description

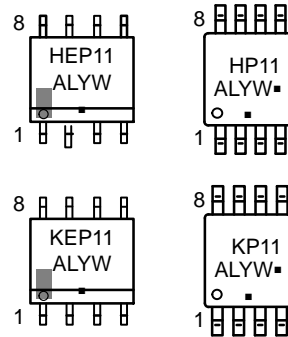
The MC10/100EP11 is a differential 1:2 fanout buffer. The device is pin and functionally equivalent to the LVEL11 device. With AC performance much faster than the LVEL11 device, the EP11 is ideal for applications requiring the fastest AC performance available.

The 100 Series contains temperature compensation.

Features

- € 220 ps Typical Propagation Delay
- € Maximum Clock Frequency > 3 GHz Typical
- € PECL Mode Operating Range:
 ↓ $V_{CC} = 3.0\text{ V to }5.5\text{ V}$ with $V_{EE} = 0\text{ V}$
- € NECL Mode Operating Range:
 ↓ $V_{CC} = 0\text{ V}$ with $V_{EE} = 3.0\text{ V to }5.5\text{ V}$
- € Open Input Default State
- € Safety Clamp on Inputs
- € Q Outputs Will Default LOW with Inputs Open or at V_{EE}
- € These Devices are Pb-Free, Halogen Free and are RoHS Compliant

MARKING DIAGRAM



- H = MC10
- K = MC100
- ZZ = MC100
- M̄ = Date Code
- A = Assembly Location
- L = Wafer Lot
- Y = Year
- W = Work Week
- = Pb-Free Package

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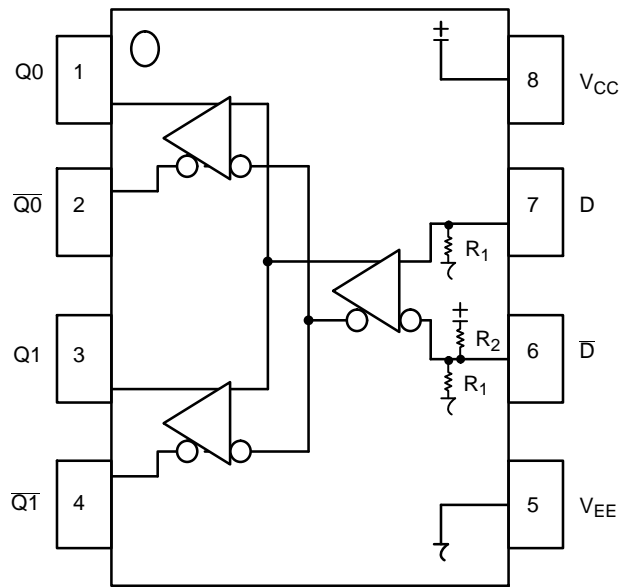


Figure 1. 8-Lead Pinout (Top View) and Logic Diagram

Table 1. PIN DESCRIPTION

PIN	FUNCTION
D*, D**	ECL Data Inputs
Q0, Q0-bar, Q1, Q1-bar	ECL Data Outputs
V _{CC}	Positive Supply
V _{EE}	Negative Supply
EP	(DFN-8 only) Thermal exposed pad must be connected to a sufficient thermal conduit. Electrically connect to the most negative supply (GND) or leave unconnected, floating open.

* Pins will default LOW when left open.

** Pins will default to high when left open.

Table 2. ATTRIBUTES

Characteristics	Value
Internal Input Pulldown Resistor	75 kΩ
Internal Input Pullup Resistor	37.5 kΩ
ESD Protection Human Body Model Machine Model Charged Device Model	> 4 kV > 200 V > 2 kV
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Pb-Free Pkg
SOIC-8 NB TSSOP-8 DFN-8	Level 1 Level 3 Level 1
Flammability Rating Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count	73 Devices
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	

1. For additional information, see Application Note [AND8003/D](#).

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Table 3. MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V_{CC}	PECL Mode Power Supply	$V_{EE} = 0\text{ V}$		6	V
V_{EE}	NECL Mode Power Supply	$V_{CC} = 0\text{ V}$		-6	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 -6	V
I_{out}	Output Current	Continuous			

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Table 5. 10EP DC CHARACTERISTICS, PECL ($V_{CC} = 5.0\text{ V}$, $V_{EE} = 0\text{ V}$ (Note 1))

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Negative Power Supply Current	20	29	37	20	30	39	31	40		mA
V_{OH}	Output HIGH Voltage (Note 2)	3865	3990	4115	3930	4055	4180	4115	4240		mV
V_{OL}	Output LOW Voltage (Note 2)	3065	3190	3315	3130	3255	3380	3315	3440		mV
V_{IH}	Input HIGH Voltage (Single-Ended)	3790		4115	3855		4180		4240		mV
V_{IL}	Input LOW Voltage (Single-Ended)	3065		3390	3130		3455		3515		mV
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 3)	2.0		5.0	2.0		5.0		5.0		V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current D D	0.5 -150			0.5 -150			0.5 -150			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.

1. Input and output parameters vary 1:1 with V_{CC} .
2. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.
3. V_{IHCMR} min varies 1:1 with V_{EE} , V_{IHCMR} max varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 6. 10EP DC CHARACTERISTICS, NECL ($V_{CC} = 0\text{ V}$; $V_{EE} = -5.5\text{ V}$ to -3.0 V (Note 1))

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Negative Power Supply Current	20	29								

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Table 7. 100EP DC CHARACTERISTICS, PECL ($V_{CC} = 3.3\text{ V}$, $V_{EE} = 0\text{ V}$ (Note 1))

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Negative Power Supply Current	26	35	44	26	35	44	26	35	46	mA
V_{OH}	Output HIGH Voltage (Note 2)	2155	2280	2405	2155	2280	2405	2155	2280	2405	mV
V_{OL}	Output LOW Voltage (Note 2)	1355	1480	1605	1355	1480	1605	1355	1480	1605	mV
V_{IH}	Input HIGH Voltage (Single-Ended)	2075		2420	2075		2420	2075		2420	mV
V_{IL}	Input LOW Voltage (Single-Ended)	1355		1675	1355		1675	1355		1675	mV
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential Configuration)(Note 3)	2.0		3.3	2.0		3.3	2.0		3.3	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current D \bar{D}	0.5 -150			0.5 -150			0.5 -150			μA

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Table 9. 100EP DC CHARACTERISTICS, NECL ($V_{CC} = 0\text{ V}$; $V_{EE} = -5.5\text{ V}$ to -3.0 V (Note 1))

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Negative Power Supply Current	26	35	44	26	35	44	26	35	46	mA
V_{OH}	Output HIGH Voltage (Note 2)	-1145	-1020	-895	-1145	-1020	-895	-1145	-1020	-895	mV
V_{OL}	Output LOW Voltage (Note 2)	-1945	-1820	-1695	-1945	-1820	-1695	-1945	-1820	-1695	mV
V_{IH}											

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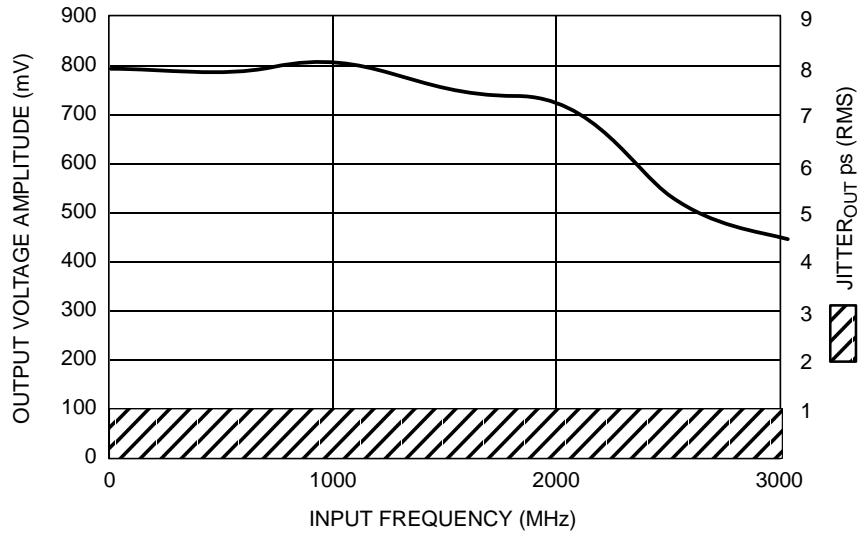


Figure 2. Output Voltage Amplitude (V_{OUTPP}) RMS Jitter vs. Input Clock Frequency at Ambient Temperature

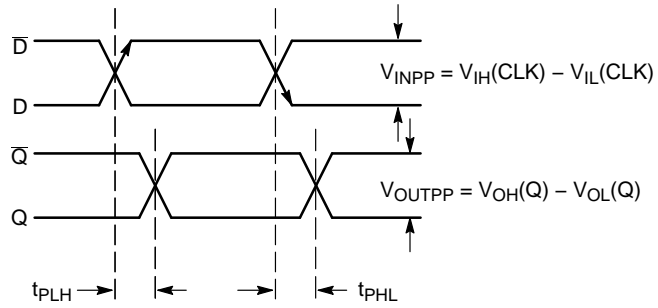


Figure 3. AC Reference Measurement

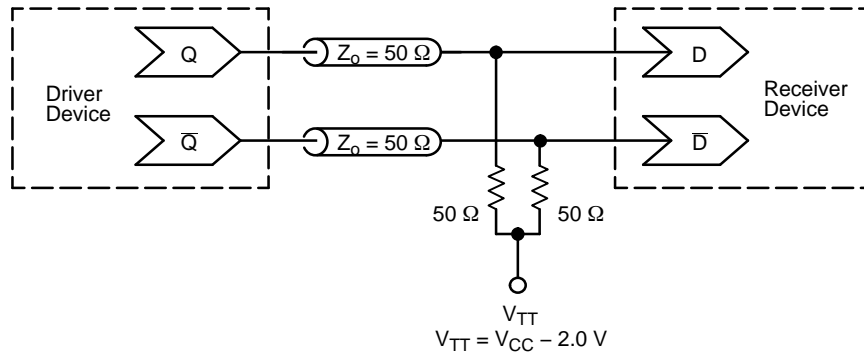


Figure 4. Typical Termination for Output Driver and Device Evaluation (See Application Note [AND8020/D](#) – Termination of ECL Logic Devices.)

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ORDERING INFORMATION

Device	Package	Shipping†
MC10EP11DG	SOIC-8 NB (Pb-Free)	98 Units / Tube
MC10EP11DR2G	SOIC-8 NB (Pb-Free)	2500 / Tape & Reel
MC100EP11DG	SOIC-8 NB (Pb-Free)	98 Units / Tube
MC100EP11DR2G	SOIC-8 NB (Pb-Free)	2500 / Tape & Reel
MC100EP11DTG	TSSOP-8 (Pb-Free)	100 Units / Tube
MC100EP11DTR2G	TSSOP-8 (Pb-Free)	2500 / Tape & Reel
MC100EP11MNR4G	DFN-8 (Pb-Free)	1000 / Tape & Reel

DISCONTINUED (Note 3)

Device	Package	Shipping†
MC10EP11DTG	TSSOP-8 (Pb-Free)	100 Units / Tube

†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](#).

3. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

Resource Reference of Application Notes

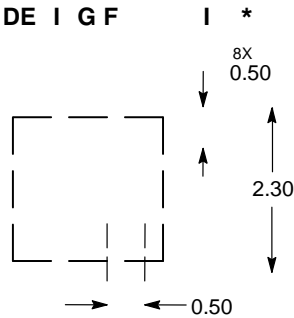
- AN1405/D** – ECL Clock Distribution Techniques
- AN1406/D** – Designing with PECL (ECL at +5.0 V)
- AN1503/D** – ECLinPS™ I/O SPiCE Modeling Kit
- AN1504/D** – Metastability and the ECLinPS Family
- AN1568/D** – Interfacing Between LVDS and ECL
- AN1672/D** – The ECL Translator Guide
- AND8001/D** – 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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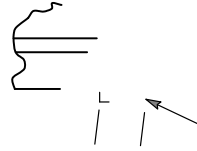
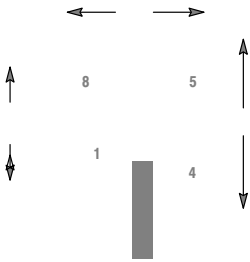


DIMENSIONS: MILLIMETERS

*For additional information on our Pb-Free strategy and soldering details, please download the [Soldering and Mounting Techniques Reference Manual, SOLDERRM/D](#).

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