

MC100EL17

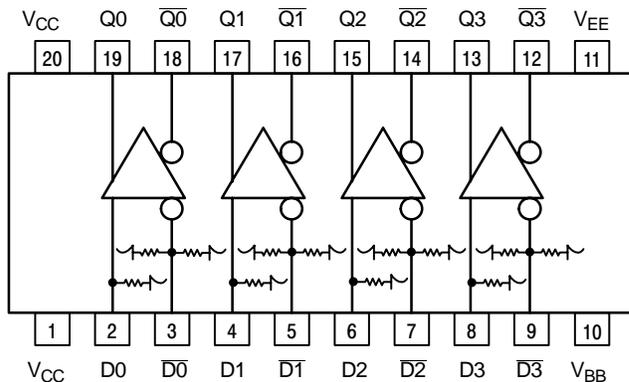
5V ECL Quad Differential Receiver

The MC100EL17 is a low-voltage, quad differential receiver. The device is functionally equivalent to the E116 device

Under open input conditions, the \bar{D} input will be biased at $V_{CC}/2$ and the D input will be pulled down to V_{EE} . This operation will force the Q output LOW and ensure stability.

The V_{BB} pin, an internally generated voltage supply, is available to this device only. For single-ended input conditions, the unused differential input is connected to V_{BB} as a switching reference voltage. V_{BB} may also rebias AC coupled inputs. When used, decouple V_{BB} and V_{CC} via a 0.01 μF capacitor and limit current sourcing or sinking to 0.5 mA. When not used, V_{BB} should be left open.

- 325 ps Propagation Delay
- The 100 Series Contains Temperature Compensation
- PECL Mode Operating Range: $V_{CC} = 4.2 \text{ V}$ to 5.7 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 V
- Internal Input Pulldown Resistors on D Inputs, Pullup and Pulldown Resistors on \bar{D} Inputs
- Q Output will Default LOW with Inputs Open or at V_{EE}



* All V_{CC} pins are tied together on the die.

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: (Top View)

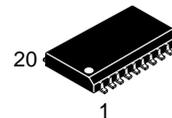
PIN DESCRIPTION

PIN	FUNCTION
D_n, \bar{D}_n	ECL Differential Data Inputs
Q_n, \bar{Q}_n	ECL Differential Data Outputs
V_{BB}	Reference Voltage Output
V_{CC}	Positive Supply
V_{EE}	Negative Supply



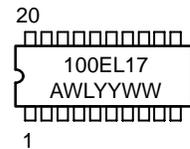
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SO-20L
DW SUFFIX
CASE 751D

MARKING* DIAGRAM



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

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

ORDERING INFORMATION

Device	Package	Shipping†
MC100EL17DW	SO-20L	38 Units/Rail
MC100EL17DWR2	SO-20L	1000 Tape & Reel

†For additional tape and reel information, refer to Brochure BRD8011/D.

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ATTRIBUTES

Characteristics	Value
Internal Input Pulldown Resistor	75 K Ω
Internal Input Pullup Resistor	75 K Ω
ESD Protection	Human Body Model Machine Model Charged Device Model
	> 2 KV > 200 V > 4 V
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Level 1
Flammability Rating Oxygen Index	UL 94 V-0 @ 0.125 in 28 to 34
Transistor Count	141
Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	

1. For additional information, see Application Note AND8003/D.

MAXIMUM RATINGS (Note 2)

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	V _{EE} = 0 V	V _I ≤ V _{CC}	6	V
	NECL Mode Input Voltage	V _{CC} = 0 V	V _I ≥ V _{EE}	-6	
I _{out}	Output Current	Continuous		50	mA
		Surge		100	mA
I _{BB}	V _{BB} Sink/Source			± 0.5	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	SO-20L	90	°C/W
		500 LFPM	SO-20L	60	°C/W
θ _{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	SO-20L	30 to 35	°C/W
T _{sol}	Wave Solder	< 2 to 3 sec @ 248°C		265	°C

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

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100EL SERIES PECL DC CHARACTERISTICS $V_{CC} = 5.0\text{ V}$; $V_{EE} = 0.0\text{ V}$ (Note 3)

Symbol	Characteristic	-40 °C			25 °C			85 °C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Power Supply Current		26	31		26	31		27	33	mA
V_{OH}	Output HIGH Voltage (Note 4)	3915	3995	4120	3975	4045	4120	3975	4050	4120	mV
V_{OL}	Output LOW Voltage (Note 4)	3170	3305	3445	3190	3295	3380	3190	3295	3380	mV
V_{IH}	Input HIGH Voltage (Single-Ended)	3835		4120	3835		4120	3835		4120	mV
V_{IL}	Input LOW Voltage (Single-Ended)	3190		3525	3190		3525	3190		3525	mV
V_{BB}	Output Voltage Reference	3.62		3.74	3.62		3.74	3.62		3.74	V
V_{IHCMR}	Common Mode Range (Differential) (Note 5) $V_{PP} < 500\text{ mV}$ $V_{PP} \geq 500\text{ mV}$	1.3 1.5		4.6 4.6	1.2 1.4		4.6 4.6	1.2 1.4		4.6 4.6	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current	0.5			0.5			0.5			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 lfm is maintained.

- Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $+0.8\text{ V} / -0.5\text{ V}$.
- Outputs are terminated through a $50\ \Omega$ resistor to $V_{CC} - 2.0\text{ V}$.
- 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. 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.

100EL SERIES NECL DC CHARACTERISTICS $V_{CC} = 0.0\text{ V}$; $V_{EE} = -5.0\text{ V}$ (Note 6)

Symbol	Characteristic	-40 °C			25 °C			85 °C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Power Supply Current		26	31		26	31		27	33	mA
V_{OH}	Output HIGH Voltage (Note 7)	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	mV
V_{OL}	Output LOW Voltage (Note 7)	-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_{BB}	Output Voltage Reference	-1.38		-1.26	-1.38		-1.26	-1.38		-1.26	V
V_{IHCMR}	Common Mode Range (Differential) (Note 8) $V_{PP} < 500\text{ mV}$ $V_{PP} \geq 500\text{ mV}$	-3.7 -3.5		-0.4 -0.4	-3.8 -3.6		-0.4 -0.4	-3.8 -3.6		-0.4 -0.4	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current	0.5			0.5			0.5			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 lfm is maintained.

- Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $+0.8\text{ V} / -0.5\text{ V}$.
- Outputs are terminated through a $50\ \Omega$ resistor to $V_{CC} - 2.0\text{ V}$.
- 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. 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.

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AC CHARACTERISTICS $V_{CC} = 5.0\text{ V}$; $V_{EE} = 0.0\text{ V}$ or $V_{CC} = 0.0\text{ V}$; $V_{EE} = -5.0\text{ V}$ (Note 9)

Symbol	Characteristic	-40 °C			25 °C			85 °C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{MAX}	Maximum Toggle Frequency					1.75					GHz
t_{PLH} t_{PHL}	Propagation Delay D to Q Diff S.E.	330 280		530 580	350 300		550 600	360 310		560 610	ps
t_{SKEW}	Skew Output-to-Output (Note 10) Part-to-Part (Diff) (Note 10) Duty Cycle (Diff) (Note 11)			75 200 25			75 200 25			75 200 25	ps
t_{JITTER}	Random Clock Jitter (RMS)					0.7					ps
V_{PP}	Input Swing (Note 12)	150		1000	150		1000	150		1000	mV
t_r t_f	Output Rise/Fall Times Q (20% - 80%)	280		550	280		550	280		550	ps

9. V_{EE} can vary +0.8 V / -0.5 V.

10. Skews are valid across specified voltage range, part-to-part skew is for a given temperature.

11. Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.

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

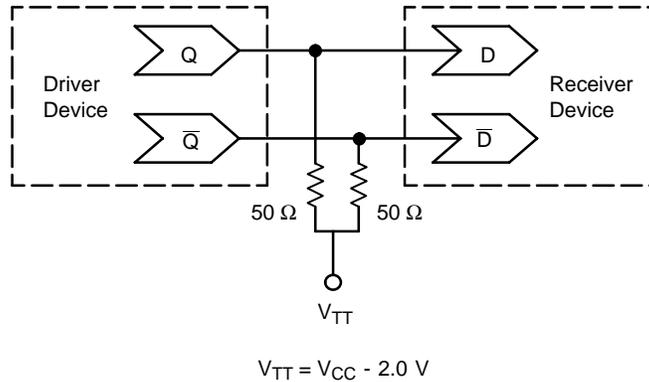


Figure 2. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020 - Termination of ECL Logic Devices.)

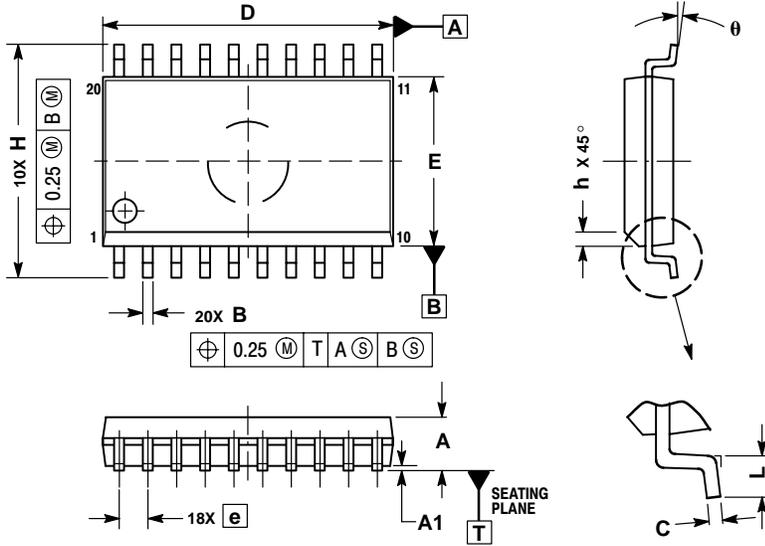
Resource Reference of Application Notes

- 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
- AN1560** - Low Voltage ECLinPS SPICE Modeling Kit
- 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
- AND8090** - AC Characteristics of ECL Devices

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PACKAGE DIMENSIONS

SO-20L
DW SUFFIX
PLASTIC SOIC PACKAGE
CASE 751D-05
ISSUE F



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.

MILLIMETERS	
DIM	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°

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