

# Low-Voltage Quad Differential Receiver

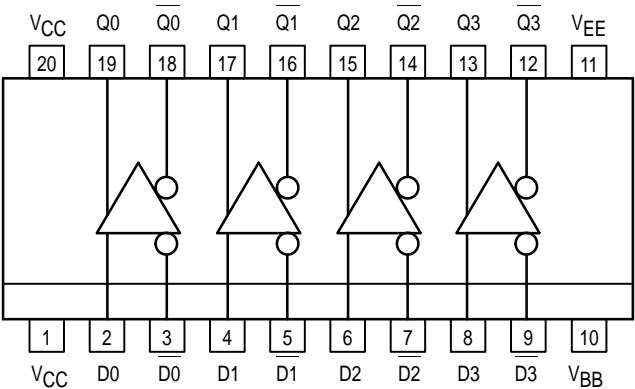
The MC100LVEL17 is a low-voltage, quad differential receiver. The device is functionally equivalent to the E116 device with the capability of operation from either a  $-3.3\text{V}$  or  $+3.3\text{V}$  supply voltage. The MC100EL17 is pin and functionally equivalent to the MC100LVEL17, but is specified for operation at the standard 100E ECL voltage supply.

The LVEL17 provides a  $V_{BB}$  output for either single-ended use or as a DC bias for AC coupling to the device. The  $V_{BB}$  pin should be used only as a bias for the LVEL17 as its current sink/source capability is limited. Whenever used, the  $V_{BB}$  pin should be bypassed to ground via a  $0.01\mu\text{F}$  capacitor.

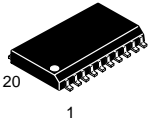
Under open input conditions, the  $\overline{D}$  input will be biased at  $V_{CC}/2$  and the D input will be pulled down to  $V_{EE}$ . This operation will force the Q output LOW and ensure stability.

- 325ps Propagation Delay
- High Bandwidth Output Transitions
- >2000V ESD Protection
- Operates from  $-3.3/-4.5\text{V}$  (or  $+3.3/+5.0\text{V}$ ) Supply

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



## MC100LVEL17 MC100EL17



DW SUFFIX  
PLASTIC SOIC PACKAGE  
CASE 751D-04

### PIN NAMES

Pins	Function
Dn	Data Inputs
Qn	Data Outputs
VBB	Reference Voltage Output

### MC100LVEL17

#### DC CHARACTERISTICS ( $V_{EE} = -3.0\text{V}$ to $-3.8\text{V}$ ; $V_{CC} = \text{GND}$ ) Note 1

Symbol	Characteristic	$-40^{\circ}\text{C}$			$0^{\circ}\text{C}$			$25^{\circ}\text{C}$			$85^{\circ}\text{C}$			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		26	31		26	31		26	31		27	33	mA
$V_{BB}$	Output Reference Voltage	-1.38		-1.26	-1.38		-1.26	-1.38		-1.26	-1.38		-1.26	V
$I_{IH}$	Input HIGH Current			150			150			150			150	$\mu\text{A}$
$I_{INL}$	Input LOW Current	$D_n$ 0.5 $\overline{D}_n$ -300			0.5 -300			0.5 -300			0.5 -300			$\mu\text{A}$

1. All other DC characteristics are the same as Standard 100K ECL.



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### AC CHARACTERISTICS ( $V_{EE} = -3.0V$ to $-3.8V$ ; $V_{CC} = GND$ )

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Diff D to Q S.E.	330 280		530 580	340 290		540 590	350 300		550 600	360 310		560 610	ps
t <sub>SKEW</sub>	Skew Output-to-Output <sup>1</sup> Part-to-Part (Diff) <sup>1</sup> Duty Cycle (Diff) <sup>2</sup>			75 200 25			75 200 25			75 200 25			75 200 25	ps
V <sub>PP</sub>	Minimum Input Swing <sup>3</sup>	150			150			150			150			mV
V <sub>CMR</sub>	Common Mode Range <sup>4</sup> V <sub>PP</sub> < 500mV V <sub>PP</sub> ≥ 500mV	-2.0 -1.8		-0.4 -0.4	-2.1 -1.9		-0.4 -0.4	-2.1 -1.9		-0.4 -0.4	-2.1 -1.9		-0.4 -0.4	V
t <sub>r</sub> t <sub>f</sub>	Output Rise/Fall Times Q (20% – 80%)	280		550	280		550	280		550	280		550	ps

1. Skews are valid across specified voltage range, part-to-part skew is for a given temperature.
2. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
3. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
4. The CMR 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<sub>ppmin</sub> and 1V. The lower end of the CMR range varies 1:1 with V<sub>EE</sub>. The numbers in the spec table assume a nominal V<sub>EE</sub> = -3.3V. Note for PECL operation, the V<sub>CMR(min)</sub> will be fixed at 3.3V - |V<sub>CMR(min)</sub>|.

## MC100EL17

### DC CHARACTERISTICS ( $V_{EE} = -4.2V$ to $-5.5V$ ; $V_{CC} = GND$ ) Note 1

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I <sub>EE</sub>	Power Supply Current		26	31		26	31		26	31		27	33	mA
V <sub>BB</sub>	Output Reference Voltage	-1.38		-1.26	-1.38		-1.26	-1.38		-1.26	-1.38		-1.26	V
I <sub>IH</sub>	Input HIGH Current			150			150			150			150	μA
I <sub>INL</sub>	Input LOW Current D <sub>n</sub> D <sub>n</sub>	0.5 -300			0.5 -300			0.5 -300			0.5 -300			μA

1. All other DC characteristics are the same as Standard 100K ECL.

## MC100EL17

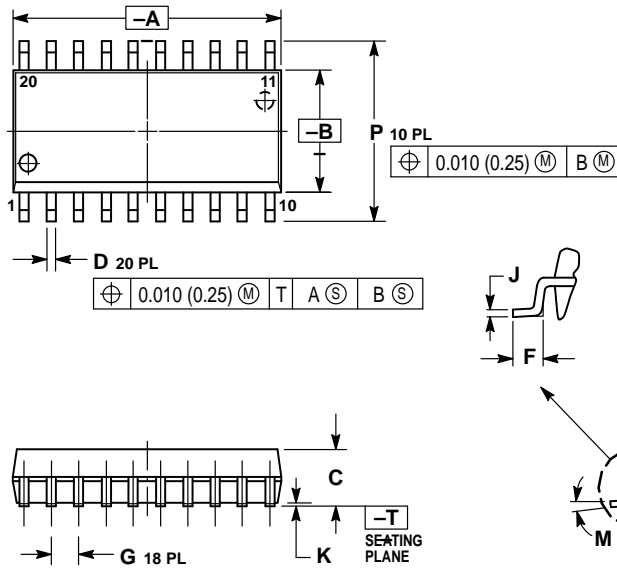
### AC CHARACTERISTICS ( $V_{EE} = -4.20V$ to $-5.5V$ ; $V_{CC} = GND$ )

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay Diff D to Q S.E.	330 280		530 580	340 290		540 590	350 300		550 600	360 310		560 610	ps
t <sub>SKEW</sub>	Skew Output-to-Output <sup>1</sup> Part-to-Part (Diff) <sup>1</sup> Duty Cycle (Diff) <sup>2</sup>			75 200 25			75 200 25			75 200 25			75 200 25	ps
V <sub>PP</sub>	Minimum Input Swing <sup>3</sup>	150			150			150			150			mV
V <sub>CMR</sub>	Common Mode Range <sup>4</sup> V <sub>PP</sub> < 500mV V <sub>PP</sub> ≥ 500mV	-3.2 -3.0		-0.4 -0.4	-3.3 -3.1		-0.4 -0.4	-3.3 -3.1		-0.4 -0.4	-3.3 -3.1		-0.4 -0.4	V
t <sub>r</sub> t <sub>f</sub>	Output Rise/Fall Times Q (20% – 80%)	280		550	280		550	280		550	280		550	ps

1. Skews are valid across specified voltage range, part-to-part skew is for a given temperature.
2. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
3. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
4. The CMR 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<sub>ppmin</sub> and 1V. The lower end of the CMR range varies 1:1 with V<sub>EE</sub>. The numbers in the spec table assume a nominal V<sub>EE</sub> = -4.5V. Note for PECL operation, the V<sub>CMR(min)</sub> will be fixed at 5.0V - |V<sub>CMR(min)</sub>|.

## OUTLINE DIMENSIONS


**DW SUFFIX**  
**PLASTIC SOIC PACKAGE**  
**CASE 751D-04**  
**ISSUE E**



## NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.150 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.65	12.95	0.499	0.510
B	7.40	7.60	0.292	0.299
C	2.35	2.65	0.093	0.104
D	0.35	0.49	0.014	0.019
F	0.50	0.90	0.020	0.035
G	1.27 BSC		0.050 BSC	
J	0.25	0.32	0.010	0.012
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	10.05	10.55	0.395	0.415
R	0.25	0.75	0.010	0.029

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