1:4 Clock Distribution Chip

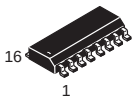
MC10EL15
MC100EL15

The MC10EL/100EL15 is a low skew 1:4 clock distribution chip designed explicitly for low skew clock distribution applications. The device can be driven by either a differential or single-ended ECL or, if positive power supplies are used, PECL input signal. If a single-ended input is to be used the V_{BB} output should be connected to the $\overline{CLK}$ input and bypassed to ground via a 0.01µF capacitor. The V_{BB} output is designed to act as the switching reference for the input of the EL15 under single-ended input conditions, as a result this pin can only source/sink up to 0.5mA of current.

The EL15 features a multiplexed clock input to allow for the distribution of a lower speed scan or test clock along with the high speed system clock. When LOW (or left open and pulled LOW by the input pulldown resistor) the SEL pin will select the differential clock input.

The common enable ($\overline{EN}$) is synchronous so that the outputs will only be enabled/disabled when they are already in the LOW state. This avoids any chance of generating a runt clock pulse when the device is enabled/disabled as can happen with an asynchronous control. The internal flip flop is clocked on the falling edge of the input clock, therefore all associated specification limits are referenced to the negative edge of the clock input.

- 50ps Output-to-Output Skew
- Synchronous Enable/Disable
- Multiplexed Clock Input
- 75kΩ Internal Input Pulldown Resistors
- >1000V ESD Protection



D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751B-05

PIN DESCRIPTION

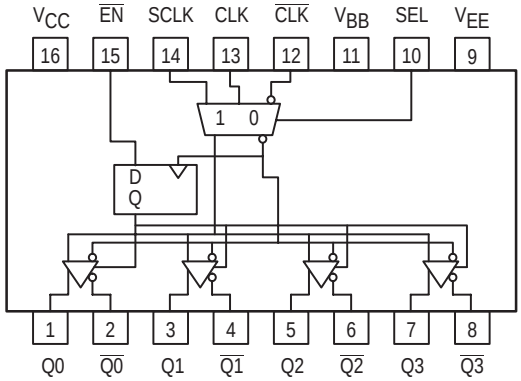
PIN	FUNCTION
CLK	Diff Clock Inputs
SCLK	Scan Clock Input
$\overline{EN}$	Sync Enable
SEL	Clock Select Input
V_{BB}	Reference Output
$Q_{0–3}$	Diff Clock Outputs

FUNCTION TABLE

CLK	SCLK	SEL	$\overline{EN}$	Q
L	X	L	L	L
H	X	L	L	H
X	L	H	L	L
X	H	H	L	H
X	X	X	H	L*

* On next negative transition of CLK or SCLK

LOGIC DIAGRAM AND PINOUT ASSIGNMENT



ABSOLUTE MAXIMUM RATINGS[1]

Symbol	Characteristic	Rating	Unit
V_{EE}	Power Supply (V_{CC} = 0V)	–8.0 to 0	VDC
V_I	Input Voltage (V_{CC} = 0V)	0 to –6.0	VDC
I_{out}	Output Current Continuous Surge	50 100	mA
T_A	Operating Temperature Range	–40 to +85	°C
V_{EE}	Operating Range[1,2]	–5.7 to –4.2	V

1. Absolute maximum rating, beyond which, device life may be impaired, unless otherwise specified on an individual data sheet.
2. Parametric values specified at: 100EL Series: –4.20V to –5.50V
   10EL Series: –4.94V to –5.50V

10EL SERIES
DC CHARACTERISTICS (V_{EE} = V_{EE}(min) – V_{EE}(max); V_{CC} = GND[1])

Symbol	Characteristic	–40°C		0°C		25°C		85°C		Unit
		Min	Max	Min	Max	Min	Max	Min	Max	
V_{OH}	Output HIGH Voltage	–1080	–890	–1020	–840	–980	–810	–910	–720	mV
V_{OL}	Output LOW Voltage	–1950	–1650	–1950	–1630	–1950	–1630	–1950	–1595	mV
V_{IH}	Input HIGH Voltage	–1230	–890	–1170	–840	–1130	–810	–1060	–720	mV
V_{IL}	Input LOW Voltge	–1950	–1500	–1950	–1480	–1950	–1480	–1950	–1445	mV
I_{IL}	Input LOW Current	0.5	—	0.5	—	0.5	—	0.3	—	µA

1. 10EL circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained. Outputs are terminated through a 50Ω resistor to –2.0V except where otherwise specified on the individual data sheets.

100EL SERIES
DC CHARACTERISTICS (V_{EE} = V_{EE}(min) – V_{EE}(max); V_{CC} = GND[1])

Symbol	Characteristic	–40°C			0°C to 85°C			Unit	Condition
		Min	Typ	Max	Min	Typ	Max		
V_{OH}	Output HIGH Voltage	–1085	–1005	–880	–1025	–955	–880	mV	V_{IN} = V_{IH}(max)
V_{OL}	Output LOW Voltage	–1830	–1695	–1555	–1810	–1705	–1620	mV	or V_{IL}(min)
V_{OHA}	Output HIGH Voltage	–1095	—	—	–1035	—	—	mV	V_{IN} = V_{IH}(max)
V_{OLA}	Output LOW Voltage	—	—	–1555	—	—	–1610	mV	or V_{IL}(min)
V_{IH}	Input HIGH Voltage	–1165	—	–880	–1165	—	–880	mV	
V_{IL}	Input LOW Voltge	–1810	—	–1475	–1810	—	–1475	mV	
I_{IL}	Input LOW Current	0.5	—	—	0.5	—	—	µA	V_{IN} = V_{IL}(max)

1. This table replaces the three tables traditionally seen in ECL 100K data books. The same DC parameter values at V_{EE} = –4.5V now apply across the full V_{EE} range of –4.2V to –5.5V. Outputs are terminated through a 50Ω resistor to –2.0V except where otherwise specified on the individual data sheets.

AC/DC CHARACTERISTICS (V_{EE} = V_{EE}(min) to V_{EE}(max); V_{CC} = GND)

		–40°C			0°C			25°C			85°C			
Symbol	**Characteristic**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Unit**
I_{EE}	Power Supply Current 10EL 100EL		25 25	35 35		25 25	35 35		25 25	35 35		25 25	35 38	mA
V_{BB}	Output Reference Voltage 10EL 100EL	–1.43 –1.38		–1.30 –1.26	–1.38 –1.38		–1.27 –1.26	–1.35 –1.38		–1.25 –1.26	–1.31 –1.38		–1.19 –1.26	V
I_{IH}	Input High Current			150			150			150			150	µA
t_{PLH} t_{PHL}	Propagation Delay CLK to Q (Diff) CLK to Q (SE) SCLK to Q	 460 410 410		 660 710 710	 470 420 420		 610 720 720	 470 420 420		 610 720 720	 500 450 470		 700 750 750	ps
t_{SKEW}	Part-to-Part Skew Within-Device Skew[1]			200 50			200 50			200 50			200 50	ps
t_S	Setup Time $\overline{EN}$	150			150			150			150			ps
t_H	HoldTime $\overline{EN}$	400			400			400			400			ps
V_{PP}	Minimum Input Swing CLK[2]	250			250			250			250			mV
V_{CMR}	Common Mode Range CLK[3]	–2.0		–0.4	–2.0		–0.4	–2.0		–0.4	–2.0		–0.4	V
t_r t_f	Output Rise/Fall Times Q (20% – 80%)				325		575	325		575	325		575	ps

1. Skews are specified for identical LOW-to-HIGH or HIGH-to-LOW transitions.
2. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
3. 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_{PP}min and 1V. The lower end of the CMR range is dependent on V_{EE} and is equal to V_{EE} + 2.5V.

OUTLINE DIMENSIONS

D SUFFIX
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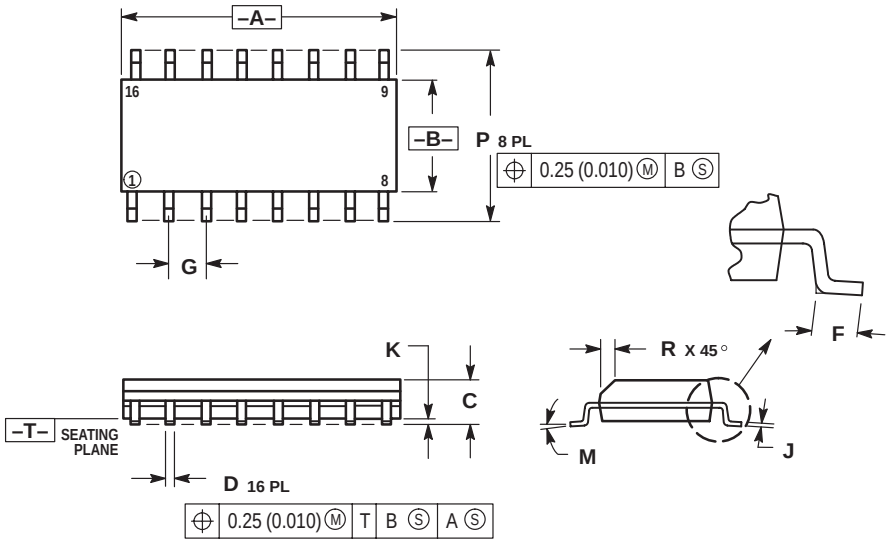
CASE 751B-05
ISSUE J



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 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	9.80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

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