

# Differential Clock D Flip-Flop

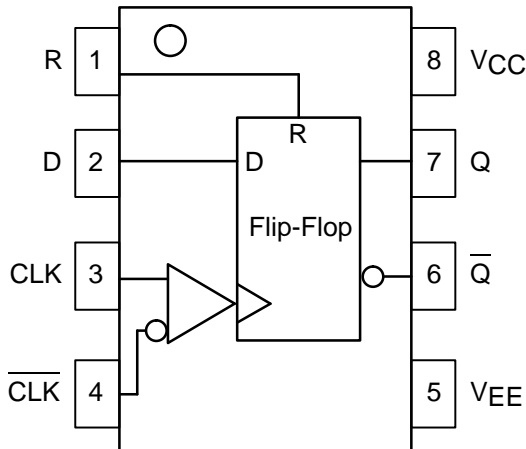
The MC10EL/100EL51 is a differential clock D flip-flop with reset. The device is functionally similar to the E151 device with higher performance capabilities. With propagation delays and output transition times significantly faster than the E151 the EL51 is ideally suited for those applications which require the ultimate in AC performance.

The reset input is an asynchronous, level triggered signal. Data enters the master portion of the flip-flop when the clock is LOW and is transferred to the slave, and thus the outputs, upon a positive transition of the clock. The differential clock inputs of the EL51 allow the device to be used as a negative edge triggered flip-flop.

The differential input employs clamp circuitry to maintain stability under open input (pulled down to  $V_{EE}$ ) conditions.

- 475ps Propagation Delay
- 2.8GHz Toggle Frequency
- 75k $\Omega$  Internal Input Pulldown Resistors
- >1000V ESD Protection

## LOGIC DIAGRAM AND PINOUT ASSIGNMENT



# MC10EL51 MC100EL51



**D SUFFIX**  
PLASTIC SOIC PACKAGE  
CASE 751-05

## TRUTH TABLE

D	R	CLK	Q
L	L	Z	L
H	L	Z	H
X	H	X	L

Z = LOW to HIGH Transition



# MC10EL51 MC100EL51

## DC CHARACTERISTICS ( $V_{EE} = V_{EE}(\text{min})$ to $V_{EE}(\text{max})$ ; $V_{CC} = \text{GND}$ )

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current		24 24	29 29		24 24	29 29		24 24	29 29		24 30	29 36	mA
$V_{EE}$	Power Supply Voltage	-4.75 -4.20	-5.2 -4.5	-5.5 -5.5	-4.75 -4.20	-5.2 -4.5	-5.5 -5.5	-4.75 -4.20	-5.2 -4.5	-5.5 -5.5	-4.75 -4.20	-5.2 -4.5	-5.5 -5.5	V
$I_{IH}$	Input HIGH Current			150			150			150			150	$\mu\text{A}$

## AC CHARACTERISTICS ( $V_{EE} = V_{EE}(\text{min})$ to $V_{EE}(\text{max})$ ; $V_{CC} = \text{GND}$ )

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{\text{MAX}}$	Maximum Toggle Frequency	1.8	2.8		2.2	2.8		2.2	2.8		2.2	2.8		GHz
$t_{\text{PLH}}$ $t_{\text{PHL}}$	Propagation Delay to Output CLK R	325 305	465 455	605 605	375 355	465 455	555 555	385 355	475 465	565 565	440 410	530 510	620 620	ps
$t_{\text{S}}$	Setup Time	150	0		150	0		150	0		150	0		ps
$t_{\text{H}}$	Hold Time	250	100		250	100		250	100		250	100		ps
$t_{\text{RR}}$	Reset Recovery	400	200		400	200		400	200		400	200		ps
$t_{\text{PW}}$	Minimum Pulse Width CLK, Reset	400			400			400			400			ps
$V_{\text{PP}}$	Minimum Input Swing <sup>1</sup>	150			150			150			150			mV
$V_{\text{CMR}}$	Common Mode Range <sup>2</sup>	-0.4		See <sup>2</sup>	-0.4		See <sup>2</sup>	-0.4		See <sup>2</sup>	-0.4		See <sup>2</sup>	V
$t_{\text{r}}$ $t_{\text{f}}$	Output Rise/Fall Times Q (20% – 80%)	100	225	350	100	225	350	100	225	350	100	225	350	ps

1. Minimum input swing for which AC parameters are guaranteed.

2. 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  $V_{\text{ppmin}}$  and 1V. The lower end of the CMR range is dependent on  $V_{\text{EE}}$  and is equal to  $V_{\text{EE}} + 2.5\text{V}$ .

OUTLINE DIMENSIONS

D SUFFIX  
PLASTIC SOIC PACKAGE  
CASE 751-05  
ISSUE P



NOTES:

1. DIMENSIONS A AND B ARE DATUMS AND T IS A DATUM SURFACE.
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
3. DIMENSIONS ARE IN MILLIMETER.
4. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
6. DIMENSION D DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	4.80	5.00
B	3.80	4.00
C	1.35	1.75
D	0.35	0.49
F	0.40	1.25
G	1.27 BSC	
J	0.18	0.25
K	0.10	0.25
M	0°	7°
P	5.80	6.20
R	0.25	0.50

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