MOTOROLA
SEMICONDUCTOR TECHNICAL DATA

Differential Data and Clock D Flip-Flop

The MC10EL/100EL52 is a differential data, differential clock D flip-flop with reset. The device is functionally equivalent to the E452 device with higher performance capabilities. With propagation delays and output transition times significantly faster than the E452 the EL52 is ideally suited for those applications which require the ultimate in AC performance.

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 EL52 allow the device to also be used as a negative edge triggered device.

The EL52 employs input clamping circuitry so that under open input conditions (pulled down to V_{EE}) the outputs of the device will remain stable.

- 365ps Propagation Delay
- 2.0GHz Toggle Frequency
- 75kΩ Internal Input Pulldown Resistors
- >1000V ESD Protection

LOGIC DIAGRAM AND PINOUT ASSIGNMENT
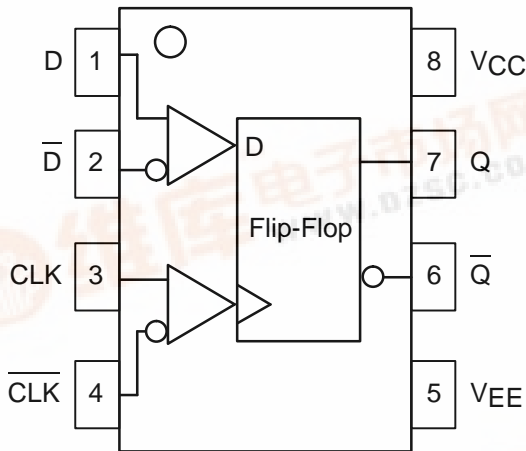
MC10EL52
MC100EL52

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751-05

PIN DESCRIPTION

PIN	FUNCTION
D	Data Input
CLK	Clock Input
Q	Data Output

TRUTH TABLE

D	CLK	Q
L	Z	L
H	Z	H

Z = LOW to HIGH Transition

MC10EL52 MC100EL52

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

Symbol	Characteristic		−40°C Min	−40°C Typ	−40°C Max	0°C Min	0°C Typ	0°C Max	25°C Min	25°C Typ	25°C Max	85°C Min	85°C Typ	85°C Max	Unit
I_{EE}	Power Supply Current	10EL 100EL		21 21	25 25		21 21	25 25		21 21	25 25		21 24	25 29	mA
V_{EE}	Power Supply Voltage	10EL 100EL	−4.94 −4.20	−5.2 −4.5	−5.5 −5.5	−4.94 −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	µA

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

Symbol	Characteristic	−40°C Min	−40°C Typ	−40°C Max	0°C Min	0°C Typ	0°C Max	25°C Min	25°C Typ	25°C Max	85°C Min	85°C Typ	85°C Max	Unit
f_{MAX}	Maximum Toggle Frequency	1.8	2.5		2.2	2.8		2.2	2.8		2.2	2.8		GHz
t_{PLH} t_{PHL}	Propagation Delay to Output CLK	225	335	515	275	365	465	275	365	465	320	410	510	ps
t_S	Setup Time	125	0		125	0		125	0		125	0		ps
t_H	Hold Time	150	50		150	50		150	50		150	50		ps
t_{PW}	Minimum Pulse Width	400			400			400			400			ps
V_{PP}	Minimum Input Swing[1]	150			150			150			150			mV
V_{CMR}	Common Mode Range[2] D (10EL) D (100EL) CLK (10EL) CLK (100EL)	−0.4 −0.4 −0.6 −0.8		−1.6 −1.2 See[3] See[3]	−0.4 −0.4 −0.6 −0.8		−1.6 −1.2 See[3] See[3]	−0.4 −0.4 −0.6 −0.8		−1.6 −1.2 See[3] See[3]	−0.4 −0.4 −0.6 −0.8		−1.6 −1.2 See[3] See[3]	V
t_r t_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_{PP}min and 1V.
3. The lower end of the CMR range is dependent on V_{EE} and is equal to V_{EE} + 2.5V.

OUTLINE DIMENSIONS

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751–05
ISSUE P
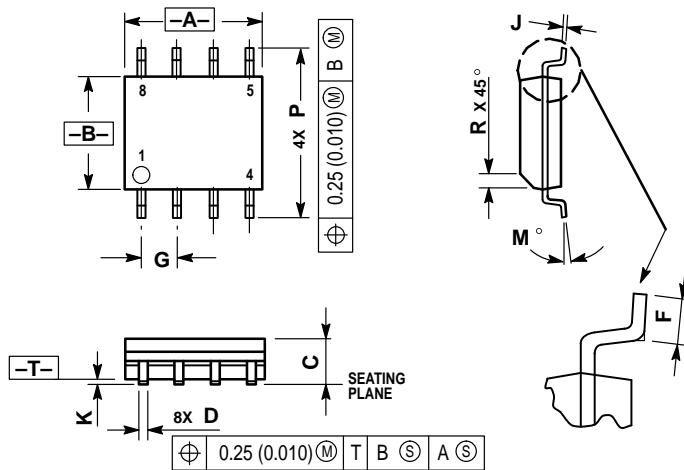
NOTES:
1. DIMENSIONS A AND B ARE DATUMS AND T IS A DATUM SURFACE.
2. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
3. DIMENSIONS ARE IN MILLIMETER.
4. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
5. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
6. DIMENSION D DOES NOT INCLUDE MOLD PROTRUSION. ALLOWABLE 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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