

Dual Differential Data and Clock D Flip-Flop With Set and Reset

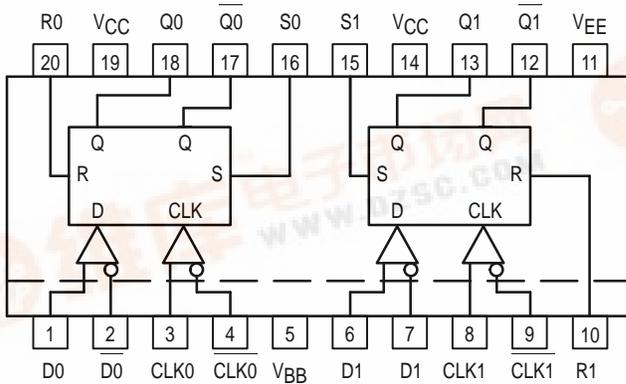
The MC100LVEL29 is a dual master–slave flip flop. The device features fully differential Data and Clock inputs as well as outputs. The MC100EL29 is pin and functionally equivalent to the MC100LVEL29 but is specified for operation at the standard 100E ECL voltage supply. A V_{BB} output is provided for AC coupling, refer to the interfacing section of the ECLinPS Data Book (DL140) for more information on AC coupling ECL signals. Data enters the master latch when the clock is LOW and transfers to the slave upon a positive transition on the clock input.

The differential inputs have special circuitry which ensures device stability under open input conditions. When both differential inputs are left open the D input will pull down to V_{EE} and the D input will bias around $V_{CC}/2$. The outputs will go to a defined state, however the state will be random based on how the flip flop powers up.

Both flip flops feature asynchronous, overriding Set and Reset inputs. Note that the Set and Reset inputs cannot both be HIGH simultaneously.

- 1100MHz Flip–Flop Toggle Frequency
- 20–lead SOIC Package
- 580ps Propagation Delays

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

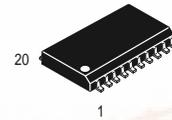


MC100LVEL29

DC 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	
I_{EE}	Power Supply Current		35	50		35	50		35	50		35	50	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	μA
I_{IL}	Input LOW Current													μA
			Dn Inputs	0.5		0.5		0.5		0.5		0.5		μA
			Dn Inputs	-300		-300		-300		-300		-300		μA

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DW SUFFIX
PLASTIC SOIC PACKAGE
CASE 751D-04

TRUTH TABLE

R	S	D	CLK	Q	\bar{Q}
L	L	L	Z	L	H
L	L	H	Z	H	L
H	L	X	X	L	H
L	H	X	X	H	L
H	H	X	X	Undef	Undef

Z = LOW to HIGH Transition

PIN NAMES

Pins	Function
D0–D1	Data Inputs
R0–R1	Reset Inputs
CLK0–CLK1	Clock Inputs
S0–S1	Set Inputs



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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										
f _{MAX}	Maximum Toggle Frequency	1.1			1.1			1.1			1.1			GHz
t _{PLH} t _{PHL}	Propagation Delay to Output CLK S, R	480 480		680 700	490 490		690 710	500 500		700 720	520 520		720 740	ps
t _S t _H	Setup Time Hold Time	0 100			0 100			0 100			0 100			ps
t _{RR}	Set/Reset Recovery	100			100			100			100			ps
t _{PW}	Minimum Pulse Width CLK, Set, Reset	400			400			400			400			ps
V _{PP}	Minimum Input Swing	150			150			150			150			mV
V _{CMR} ¹	Common Mode Range V _{PP} <500mV V _{PP} ≥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 _r t _f	Output Rise/Fall Times Q (20% – 80%)	280		550	280		550	280		550	280		550	ps

1. 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_{ppmin} and 1V. The lower end of the CMR range varies 1:1 with V_{EE}. The numbers in the spec table assume a nominal V_{EE} = -3.3V. Note for PECL operation, the V_{CMR(min)} will be fixed at 3.3V - |V_{CMR(min)}|.

MC100EL29

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

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max										
I _{EE}	Power Supply Current		35	50		35	50		35	50		35	50	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	μA
I _{IL}	Input LOW Current Dn Inputs Dn Inputs	0.5 -300			0.5 -300			0.5 -300			0.5 -300			μA

MC100EL29

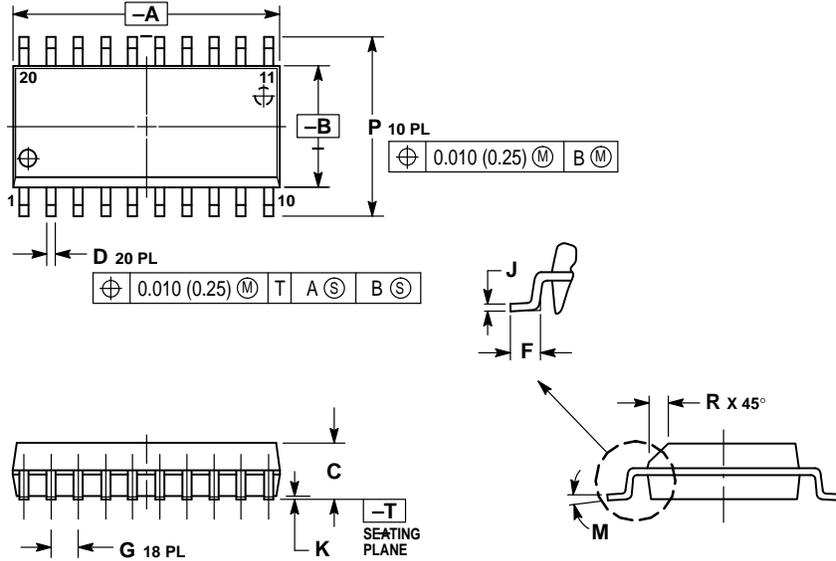
AC CHARACTERISTICS ($V_{EE} = -4.2V$ to $-5.5V$; $V_{CC} = GND$)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max										
f _{MAX}	Maximum Toggle Frequency	1.1			1.1			1.1			1.1			GHz
t _{PLH} t _{PHL}	Propagation Delay to Output CLK S, R	480 480		680 700	490 490		690 710	500 500		700 720	520 520		720 740	ps
t _S t _H	Setup Time Hold Time	0 100			0 100			0 100			0 100			ps
t _{RR}	Set/Reset Recovery	100			100			100			100			ps
t _{PW}	Minimum Pulse Width CLK, Set, Reset	400			400			400			400			ps
V _{PP}	Minimum Input Swing	150			150			150			150			mV
V _{CMR} ¹	Common Mode Range V _{PP} <500mV V _{PP} ≥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 _r t _f	Output Rise/Fall Times Q (20% – 80%)	280		550	280		550	280		550	280		550	ps

1. 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_{ppmin} and 1V. The lower end of the CMR range varies 1:1 with V_{EE}. The numbers in the spec table assume a nominal V_{EE} = -4.5V. Note for PECL operation, the V_{CMR(min)} will be fixed at 5.0V - |V_{CMR(min)}|.

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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How to reach us:

USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447 or 602-303-5454

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, 6F Seibu-Butsuryu-Center,
3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-81-3521-8315

MFAX: RMFAX0@email.sps.mot.com - TOUCHTONE 602-244-6609
INTERNET: http://Design-NET.com

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298