



5V/3.3V DUAL DIFFERENTIAL DATA AND CLOCK D FLIP-FLOP w/SET AND RESET

Precision Edge®
SY100EL29V

FEATURES

- 3.3V and 5V power supply option
- Differential D, CLK and Q
- Extended V_{EE} range of -3.0V to -5.5V
- V_{BB} output for single-ended use
- 1100MHz min. toggle frequency
- Asynchronous Reset and Set
- Fully compatible with Motorola MC100LVEL29 and MC100EL29
- Available in 20-pin SOIC package



Precision Edge®

DESCRIPTION

The SY100EL29V is a dual differential register with differential data (inputs and outputs) and clock. The registers are triggered by a positive transition of the positive clock (CLK) input. A HIGH on the Reset (Rx) asynchronously resets the appropriate register so that the Q outputs go LOW. A HIGH on the Set (Sx) asynchronously resets the appropriate register so that the Q outputs go HIGH. The Set and Reset inputs cannot both be HIGH simultaneously.

The differential input structures are clamped so that the inputs of unused registers can be left open without upsetting the bias network of the devices. The clamping action will assert the /D and the /CLK sides of the inputs. The noninverting input will pull down to V_{EE} and the inverting input will be biased around $V_{CC}/2$. Because of the edge-triggered flip-flop nature of the devices, simultaneously opening both the clock and data inputs will result in an output which reaches an unidentified but valid state.

The fully differential design of the devices makes them ideal for very high frequency applications where a registered data path is necessary.

PIN NAMES

Pin	Function
CLK, /CLK	Differential Clock Inputs
D[0:1], /D[0:1]	Differential Data Inputs
Q[0:1], /Q[0:1]	Differential Data Outputs
R_0, R_1	Reset Inputs
S_0, S_1	Set Inputs
V_{BB}	V_{BB} Reference Output
V_{CC}	V_{CC}
V_{EE}	V_{EE}

TRUTH TABLE

R	S	D	CLK	Q	/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

NOTE:

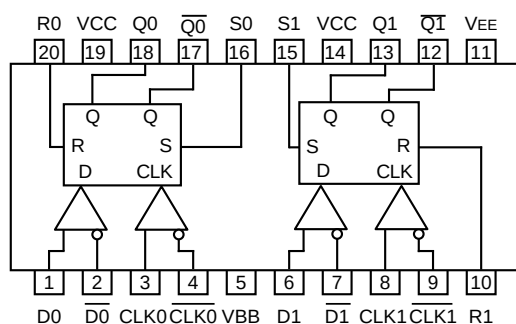
Z = LOW-to-HIGH Transition

PACKAGE/ORDERING INFORMATION**Ordering Information⁽¹⁾**

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY100EL29VZC	Z20-1	Commercial	SY100EL29VZC	Sn-Pb
SY100EL29VZCTR ⁽²⁾	Z20-1	Commercial	SY100EL29VZC	Sn-Pb
SY100EL29VZI	Z20-1	Industrial	SY100EL29VZI	Sn-Pb
SY100EL29VZITR ⁽²⁾	Z20-1	Industrial	SY100EL29VZI	Sn-Pb
SY100EL29VZG ⁽³⁾	Z20-1	Industrial	SY100EL29VZG with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL29VZGTR ^(2, 3)	Z20-1	Industrial	SY100EL29VZG with Pb-Free bar-line indicator	Pb-Free NiPdAu

Notes:

1. Contact factory for die availability. Dice are guaranteed at $T_A = 25^\circ\text{C}$, DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

**20-Pin Wide SOIC (Z20-1)**

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Symbol	Rating	Value	Unit
V_{EE}	Power Supply ($V_{CC} = 0V$)	-8.0 to 0	VDC
$V_{IN}^{(3)}$	Input Voltage ($V_{CC} = 0V$)	0 to -6.0	VDC
I_{OUT}	Output Current -Continuous -Surge	50 100	mA
T_{LEAD}	Lead Temperature (soldering, 20sec.)	+260	°C
T_A	Operating Temperature Range	-40 to +85	°C
V_{EE}	Operating Range ^{(1),(2)}	-5.7 to -3.0	V

Notes:

1. Absolute maximum rating, beyond which, device life may be impaired, unless otherwise specified on an individual data sheet.
2. Parametric values specified at: 100EL29V Series: -3.0V to -5.5V.
3. In PECL mode operation, $V_I(\text{Max}) = V_{CC}$.

DC ELECTRICAL CHARACTERISTICS

$V_{EE} = -3.0V$ to $+5.5V$; $V_{CC} = GND$

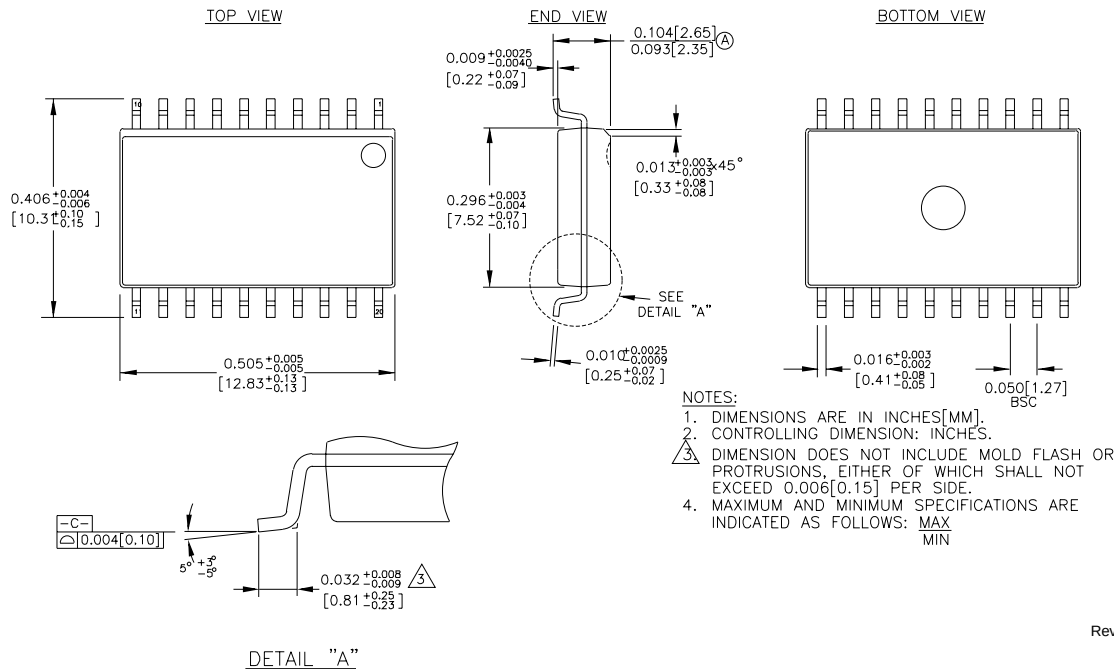
Symbol	Parameter	$T_A = -40^\circ\text{C}$		$T_A = 0^\circ\text{C}$		$T_A = +25^\circ\text{C}$			$T_A = +85^\circ\text{C}$		Unit
		Min.	Max.	Min.	Max.	Min.	Typ.	Max.	Min.	Max.	
I_{EE}	Power Supply Current	—	50	—	50	—	30	50	—	50	mA
I_{IH}	Input HIGH Current	—	150	—	150	—	—	150	—	150	μA
I_{IL}	Input LOW Current /CLK, /Dn	0.5 -300	— —	0.5 -300	— —	0.5 -300	— —	— —	0.5 -300	— —	μA
V_{BB}	Output Reference Voltage	-1.38	-1.26	-1.38	-1.26	-1.38	—	-1.26	-1.38	-1.26	V

AC ELECTRICAL CHARACTERISTICS $V_{EE} = -3.0V$ to $+5.5V$; $V_{CC} = GND$

Symbol	Parameter	$T_A = -40^{\circ}C$		$T_A = 0^{\circ}C$		$T_A = +25^{\circ}C$			$T_A = +85^{\circ}C$		Unit
		Min.	Max.	Min.	Max.	Min.	Typ.	Max.	Min.	Max.	
f_{MAX}	Max. Toggle Frequency	1.1	—	1.1	—	1.1	—	—	1.1	—	GHz
t_{PD}	Propagation Delay CLK to Output S, R	480 450	680 670	490 450	690 670	500 450	— —	700 670	520 450	720 670	ps
t_S	Set-Up Time, D	200	—	200	—	200	—	—	200	—	ps
t_H	Hold Time, D	150	—	150	—	150	—	—	150	—	ps
t_{RR}	Reset Recovery Time	300	—	300	—	300	—	—	300	—	ps
t_{PW}	Minimum Pulse Width CLK, Set, Reset	400	—	400	—	400	—	—	400	—	ps
V_{CMR}	Common Mode Range ⁽¹⁾ <500mV ≥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
$V_{PP(AC)}$	Minimum Input Swing ⁽²⁾	150	—	150	—	150	—	—	150	—	mV
t_r t_f	Output Rise/Fall Time Q (20–80%)	280	550	280	550	280	330	550	280	550	ps

Notes:

- V_{CMR} is referenced to the most positive side of the differential input signal. Normal operation is obtained when the input signals are within the V_{CMR} range and the input swing is greater than $V_{PP}(\text{Min.})$ and $<1V$. The lower end of the V_{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 $V_{CMR}(\text{Min})$ will be fixed at $3.3V - |V_{CMR}(\text{Min})|$.
- Minimum input swing for which AC parameters are guaranteed.

20-PIN SOIC .300" WIDE (Z20-1)

Rev. 03

MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USATEL + 1 (408) 944-0800 FAX + 1 (408) 474-1000 WEB <http://www.micrel.com>

The information furnished by Micrel in this datasheet is believed to be accurate and reliable. However, no responsibility is assumed by Micrel for its use.
Micrel reserves the right to change circuitry and specifications at any time without notification to the customer.

Micrel Products are not designed or authorized for use as components in life support appliances, devices or systems where malfunction of a product can reasonably be expected to result in personal injury. Life support devices or systems are devices or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform can be reasonably expected to result in a significant injury to the user. A Purchaser's use or sale of Micrel Products for use in life support appliances, devices or systems is at Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale.

© 2006 Micrel, Incorporated.