

FEATURES

- Guaranteed maximum frequency >4GHz
- Guaranteed <410ps propagation delay over temperature
- 3.3V and 5V power supply options
- 75Ω internal input pulldown resistor
- Wide operating temperature range: -40°C to +85°C
- Available in 8-Pin (3mm) MSOP and SOIC package



ECL Pro™

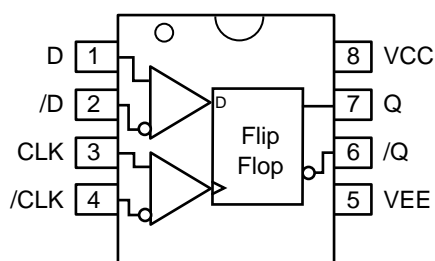
DESCRIPTION

The SY10EP52V is a differential data, differential clock D flip-flop. The device is functionally equivalent to the EL52 device.

Data enters the master portion of the flip-flop when CLK is LOW and is transferred to the slave, and thus the outputs, upon a positive transition of the CLK. The differential clock inputs of the EP52V allow the device to be used as a negative edge triggered flip-flop.

The EP52V employs input clamping circuitry so that under open input condition (pulled down to V_{EE}) the outputs of the device will remain stable.

PIN CONFIGURATION/BLOCK DIAGRAM



Available in 8-pin SOIC and MSOP Packages

PIN NAMES

Pin	Function
CLK, /CLK	ECL Clock Inputs
D, /D	ECL Data Input
Q, /Q	ECL Data Outputs
V_{CC}	Positive Supply
V_{EE}	Negative, 0 Supply

TRUTH TABLE

D	CLK	Q
L	Z	L
H	Z	H

Z = LOW to HIGH Transition

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Symbol	Rating	Value	Unit
V_{CC}	Power Supply Voltage ($V_{EE} = 0$)	+6.0 to 0	V
V_{EE}	Power Supply Voltage ($V_{CC} = 0$)	-6.0 to 0	V
V_{IN}	Input Voltage ($V_{CC} = 0V$, V_{IN} not more negative than V_{EE}) Input Voltage ($V_{EE} = 0V$, V_{IN} not more positive than V_{CC})	-6.0 to 0 +6.0 to 0	V V
I_{OUT}	Output Current —Continuous —Surge	50 100	mA
T_A	Operating Temperature Range	-40 to +85	°C
T_{STORE}	Storage Temperature Range	-65 to +150	°C
θ_{JA}	Thermal Resistance (Junction-to-Ambient) —Still Air —500lfpm	TBD TBD	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction-to-Case)	TBD	°C/W

Note 1. Permanent device damage may occur if ABSOLUTE MAXIMUM RATINGS are exceeded. This is a stress rating only and functional operation is not implied at conditions other than those detailed in the operational sections of this data sheet. Exposure to ABSOLUTE MAXIMUM RATING conditions for extended periods may affect device reliability.

5V PECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾

$V_{CC} = +5.0V \pm 10\%$, $V_{EE} = 0V^{(2)}$

Symbol	Parameter	$T_A = -40^\circ C$			$T_A = +25^\circ C$			$T_A = +85^\circ C$			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
I_{EE}	Power Supply Current	—	—	47	—	35	47	—	—	47	mA
V_{OH}	Output HIGH Voltage ⁽³⁾	3865	3990	4115	3930	4055	4180	3990	4115	4240	mV
V_{OL}	Output LOW Voltage ⁽³⁾	3050	3190	3315	3050	3255	3380	3050	3315	3440	mV
V_{IH}	Input HIGH Voltage (Single-Ended)	3790	—	4115	3855	—	4180	3915	—	4240	mV
V_{IL}	Input LOW Voltage (Single-Ended)	3065	—	3390	3130	—	3455	3190	—	3515	mV
V_{IHCMR}	Input HIGH Voltage ⁽⁴⁾ Common Mode Range (Diff.)	2.0	—	V_{CC}	2.0	—	V_{CC}	2.0	—	V_{CC}	V
I_{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	μA
I_{IL}	Input LOW Current CLK, D /CLK, /D	0.5 -150	— —	— —	0.5 -150	— —	— —	0.5 -150	— —	— —	μA

Note 1. 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and traverse airflow greater than 500lfpm is maintained.

Note 2. Input and output parameters vary 1:1 with V_{CC} .

Note 3. All loading with 50Ω to $V_{CC} - 2.0V$.

Note 4. $V_{IHCMR}(\min)$ varies 1:1 with V_{EE} , $V_{IHCMR}(\max)$ varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

3.3V LVPECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾ $V_{CC} = +3.3V \pm 10\%$, $V_{EE} = 0V^{(2)}$

Symbol	Parameter	$T_A = -40^\circ C$			$T_A = +25^\circ C$			$T_A = +85^\circ C$			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
I_{EE}	Power Supply Current	—	—	44	—	—	45	—	—	47	mA
V_{OH}	Output HIGH Voltage ⁽³⁾	2165	2240	2415	2230	2355	2480	2290	2415	2540	mV
V_{OL}	Output LOW Voltage ⁽³⁾	1350	1490	1615	1350	1555	1680	1350	1615	1740	mV
V_{IH}	Input HIGH Voltage (Single-Ended)	2090	—	2415	2155	—	2480	2215	—	2540	mV
V_{IL}	Input LOW Voltage (Single-Ended)	1365	—	1690	1430	—	1755	1490	—	1815	mV
V_{IHCMR}	Input HIGH Voltage ⁽⁴⁾ Common Mode Range (Diff.)	1.2	—	V_{CC}	1.2	—	V_{CC}	1.2	—	V_{CC}	V
I_{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	μA
I_{IL}	Input LOW Current CLK,D /CLK, /D	0.5 -150	— —	— —	0.5 -150	— —	— —	0.5 -150	— —	— —	μA

Note 1. 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and traverse airflow greater than 500lfpm is maintained.

Note 2. Input and output parameters vary 1:1 with V_{CC} .

Note 3. All loading with 50Ω to $V_{CC} - 2.0V$.

Note 4. $V_{IHCMR}(\min)$ varies 1:1 with V_{EE} , $V_{IHCMR}(\max)$ varies 1:1 with V_{CC} . The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

NECL/LVECL DC ELECTRICAL CHARACTERISTICS⁽¹⁾ $V_{CC} = 0V$, $V_{EE} = -5.5V$ to $-3.0V^{(2)}$

Symbol	Parameter	$T_A = -40^\circ C$			$T_A = +25^\circ C$			$T_A = +85^\circ C$			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
I_{EE}	Power Supply Current ⁽³⁾	—	—	47	—	35	47	—	—	47	mA
V_{OH}	Output HIGH Voltage ⁽⁴⁾	-1135		-0885	-1070	-0945	-0820	-1010		-0760	mV
V_{OL}	Output LOW Voltage ⁽⁴⁾	-1950		-1685	-1950	-1745	-1620	-1950		-1560	mV
V_{IH}	Input HIGH Voltage	-1210		-0885	-1145	—	-0820	-1085	—	-0760	mV
V_{IL}	Input LOW Voltage	-1935		-1610	-1870	—	-1545	-1810	—	-1485	mV
V_{IHCMR}	Input HIGH Voltage Common Mode Range ⁽⁵⁾	$V_{EE}+2.0$		V_{CC}	$V_{EE}+2.0$		V_{CC}	$V_{EE}+2.0$		V_{CC}	V
I_{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	μA
I_{IL}	Input LOW Current CLK,D /CLK, /D	0.5 -150	— —	— —	0.5 -150	— —	— —	0.5 -150	— —	— —	μA

Note 1. 10EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and traverse airflow greater than 500lfpm is maintained.

Note 2. Input and output parameters vary 1:1 with V_{CC} .

Note 3. $V_{CC} = 0V$, $V_{EE} = V_{EE}(\min)$ to $V_{EE}(\max)$, all other pins floating.

Note 4. All loading with 50Ω to $V_{CC} - 2.0V$.

Note 5. $V_{IHCMR}(\min)$ varies 1:1 with V_{EE} , (max) varies 1:1 with V_{CC} .

AC ELECTRICAL CHARACTERISTICS⁽¹⁾NECL: $V_{CC} = 0V$, $V_{EE} = -3.3V$ to $-5.0V \pm 10\%$; PECL: $V_{EE} = 0V$, $V_{CC} = +3.3V$ to $+5.0V \pm 10\%$

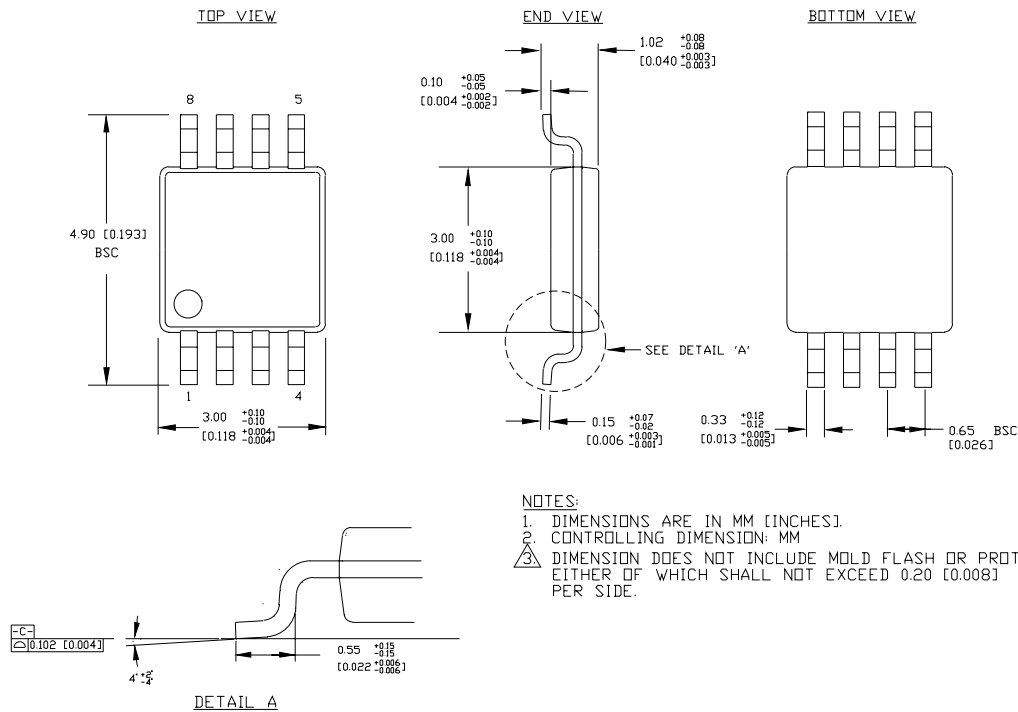
Symbol	Parameter	$T_A = -40^\circ C$			$T_A = +25^\circ C$			$T_A = +85^\circ C$			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
f_{MAX}	Maximum Toggle Frequency ⁽²⁾	4	—	—	4	—	—	4	—	—	GHz
t_{PLH} t_{PHL}	Propagation Delay to Output Differential CLK → Q, /Q	250	300	350	280	330	380	310	360	410	ps
t_S	Setup Time	50	—	—	50	—	—	50	—	—	ps
t_H	Hold Time	50	—	—	50	—	—	50	—	—	ps
t_{PW}	Minimum Pulse Width CLK	—	—	—	—	450	—	—	—	—	ps
t_{JITTER}	Cycle-to-Cycle Jitter (RMS)	—	—	—	—	0.2	1.0	—	—	—	ps(rms)
V_{DIFF}	Differential Input Voltage Range	150	800	1200	150	800	1200	150	800	1200	mV
t_r t_f	Output Rise/Fall Times Q, /Q (20% to 80%)	70	100	170	80	120	180	90	130	200	ps

Note 1. Measured using a 750mV source, 50% duty cycle clock source. All loading with 50Ω to $V_{CC} - 2.0V$.**Note 2.** f_{MAX} guaranteed for functionality only. V_{OL} and V_{OH} levels are guaranteed at DC only.**PRODUCT ORDERING CODE**

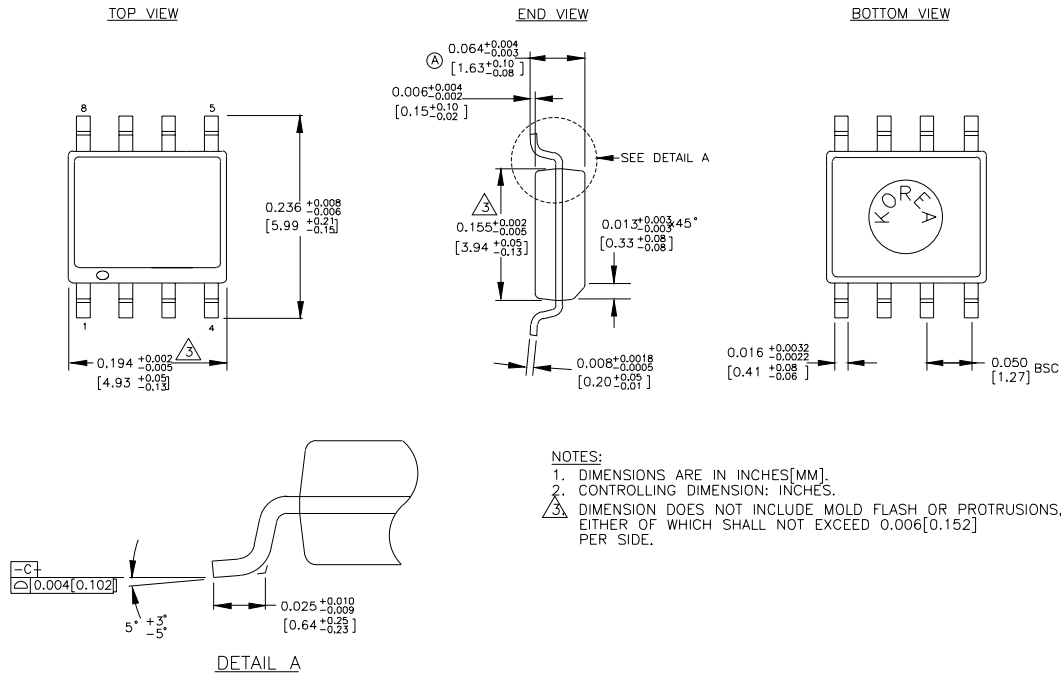
Ordering Code	Package Type	Operating Range	Package Marking	Ordering Code	Package Type	Operating Range	Package Marking
SY10EP52VKC	K8-1	Commercial	HP52	SY10EP52VKI ⁽²⁾	K8-1	Industrial	HP52
SY10EP52VKCTR ⁽¹⁾	K8-1	Commercial	HP52	SY10EP52VKITR ^(1,2)	K8-1	Industrial	HP52
SY10EP52VZC	Z8-1	Commercial	HEP52V	SY10EP52VZI ⁽²⁾	Z8-1	Industrial	HEP52V
SY10EP52VZCTR ⁽¹⁾	Z8-1	Commercial	HEP52V	SY10EP52VZITR ^(1,2)	Z8-1	Industrial	HEP52V

Note 1. Tape and Reel.**Note 2.** Recommended for new designs.

8 LEAD MSOP (K8-1)



Rev. 01

8 LEAD PLASTIC SOIC (Z8-1)

Rev. 03

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