SY10/100EL11V

5V/3.3V 1:2 Differential Fanout Buffer

Revision 10.0

General Description

The SY10/100EL11V are 1:2 differential fanout gates. These devices are functionally similar to the E111A/L devices, with higher performance capabilities. Having within-device skews and output transition times significantly improved over the E111A/L, the EL11V is ideally suited for those applications which require the ultimate in AC performance.

The differential inputs of the EL11V employ clamping circuitry to maintain stability under open input conditions. If the inputs are left open (pulled to V_{EE}), the Q outputs will go LOW.

Datasheets and support documentation are available on Micrel's web site at: www.micrel.com.



Precision Edge

Features

- 3.3V and 5V power supply options
- 265ps propagation delay
- 5ps skew between outputs
- High bandwidth output transitions
- Internal 75kΩ input pull-down resistors
- Replaces SY10/100EL11
- Improved output waveform characteristics
- Available in 8-pin SOIC package

Pin Names

Pin	Function
D	Data Inputs
Q_0, Q_1	Data Outputs

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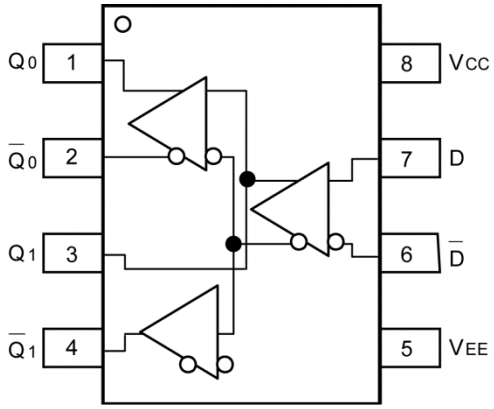
Ordering Information[1]

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10EL11VZG	Z8-1	Industrial	HEL11V with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY10EL11VZG TR[2]	Z8-1	Industrial	HEL11V with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL11V	Z8-1	Industrial	XEL11V with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL11VZG TR[2]	Z8-1	Industrial	XEL11V with Pb-Free bar-line indicator	Pb-Free NiPdAu

Note:

1. Contact factory for die availability. Dice are guaranteed at T_A = 25°C, DC Electricals only.
2. Tape and Reel.

Pin Configuration



8-Pin SOIC (Z8-1)

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Absolute Maximum Ratings[3]

Power Supply Voltage (V_{EE} = 0V) ..... 0V to +6V
Power Supply Voltage (V_{CC} = 0V) ..... -6V to +0V
Input Voltage (V_{IN})
(V_{CC} = 0V, V_{IN} not more positive than V_{EE}) .... -6V to +0V
(V_{EE} = 0V, V_{IN} not more positive than V_{CC}) ... +0V to +6V
Output Current (I_{OUT})
Continuous 50mA
Surge 100mA
Lead Temperature Range (soldering, 20s) ..... 260°C
Storage Temperature (T_s) ..... -65 to +150°C
ESD Rating[5] ..... >1.5kV

Operating Ratings[4]

Supply Voltage (V_{CC}) ..... 3.0V to 5.5V
Ambient Temperature (T_A) ..... –40°C to +85°C
Junction Thermal Resistance
Junction-to-Ambient (θ_{JA})
Still Air ..... 98.9°C/W
Junction-to-Case (θ_{JC}) ..... 48.8°C/W

10K Series DC Electrical Characteristics[6,7]

V_{CC} = 3.0V to 5.5V, V_{EE} = 0V, T_A = -40°C to +85°C, R_L = 50Ω to V_{CC} – 2V, unless otherwise stated.

Symbol	Parameter	Condition	Min.	Max.	Units
V_{OH}	Output HIGH Voltage	T_A = -40°C	V_{CC} – 1.080	V_{CC} – 0.890	V
		T_A = 0°C	V_{CC} – 1.020	V_{CC} – 0.840	
		T_A = +25°C	V_{CC} – 0.980	V_{CC} – 0.810	
		T_A = +85°C	V_{CC} – 0.910	V_{CC} – 0.720	
V_{OL}	Output LOW Voltage	T_A = -40°C	V_{CC} – 1.950	V_{CC} – 1.650	V
		T_A = 0°C	V_{CC} – 1.950	V_{CC} – 1.630	
		T_A = +25°C	V_{CC} – 1.950	V_{CC} – 1.630	
		T_A = +85°C	V_{CC} – 1.950	V_{CC} – 1.595	
V_{IH}	Input HIGH Voltage	T_A = -40°C	V_{CC} - 1.230	V_{CC} – 0.890	V
		T_A = 0°C	V_{CC} – 1.170	V_{CC} – 0.840	
		T_A = +25°C	V_{CC} – 1.130	V_{CC} – 0.810	
		T_A = +85°C	V_{CC} – 1.060	V_{CC} – 0.720	
V_{IL}	Input LOW Voltage	T_A = -40°C	V_{CC} – 1.950	V_{CC} – 1.500	V
		T_A = 0°C	V_{CC} – 1.950	V_{CC} – 1.480	
		T_A = +25°C	V_{CC} – 1.950	V_{CC} – 1.480	
		T_A = +85°C	V_{CC} – 1.950	V_{CC} – 1.445	
I_{IH}	Input HIGH Current	T_A = -40°C to +85°C		150	µA
I_{IL}	Input LOW Current	T_A = -40°C to +85°C	0.5		µA

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100K Series DC Electrical Characteristics[6]

V_{CC} = 3.0V to 5.5V, V_{EE} = 0V, T_A = -40°C to +85°C, R_L = 50Ω to V_{CC} – 2V, unless otherwise stated.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
V_{OH}	Output HIGH Voltage	T_A = -40°C, V_{IN} = V_{IH} (Max) or V_{IL} (Min)	V_{CC} – 1.085	V_{CC} – 1.005	V_{CC} – 0.880	V
		T_A = 0°C to +85°C, V_{IN} = V_{IH} (Max) or V_{IL} (Min)	V_{CC} – 1.025	V_{CC} – 0.955	V_{CC} – 0.880	
V_{OL}	Output LOW Voltage	T_A = -40°C, V_{IN} = V_{IH} (Max) or V_{IL} (Min)	V_{CC} – 1.830	V_{CC} – 1.695	V_{CC} – 1.555	V
		T_A = 0°C to +85°C, V_{IN} = V_{IH} (Max) or V_{IL} (Min)	V_{CC} – 1.810	V_{CC} – 1.705	V_{CC} – 1.620	
V_{IH}	Input HIGH Voltage[9]	T_A = -40°C to +85°C	V_{CC} – 1.165		V_{CC} – 0.880	V
V_{IL}	Input LOW Voltage[10]	T_A = -40°C to +85°C	V_{CC} – 1.810		V_{CC} – 1.475	V
I_{IH}	Input HIGH Current	T_A = -40°C to +85°C			150	µA
I_{IL}	Input LOW Current	T_A = -40°C to +85°C, V_{IN} = V_{IL} (Min)	0.5			µA

Notes:

3. 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.
4. The device is not guaranteed to function outside its operating ratings.
5. Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5k in series with 100pF.
6. Specification for packaged product only
7. 10EL circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained. Outputs are terminated through a 50Ω resistor to V_{CC}-2.0V except where otherwise specified.
8. This table replaces the three tables traditionally seen in ECL 100K data books. The same DC parameter values at V_{EE} = -4.5V now apply across the full V_{EE} range of -4.2V to -5.5V. Outputs are terminated through a 50Ω resistor to -2.0V except where otherwise specified. 100K circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established and where transverse airflow greater than 500 lfpm is maintained.
9. Guaranteed HIGH Signal for all Inputs.
10. Guaranteed LOW Signal for all Inputs.

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10K Series DC Electrical Characteristics[6,7,8]

V_{CC} =0, V_{EE} = -3.0V to -5.5V, T_A = -40°C to +85°C, R_L = 50Ω to V_{CC} – 2V, unless otherwise stated.

Symbol	Parameter	Condition	Min.	Max.	Units
V_{OH}	Output HIGH Voltage	T_A = -40°C	V_{CC} – 1.080	V_{CC} – 0.890	V
		T_A = 0°C	V_{CC} – 1.020	V_{CC} – 0.840	
		T_A = +25°C	V_{CC} – 0.980	V_{CC} – 0.810	
		T_A = +85°C	V_{CC} – 0.910	V_{CC} – 0.720	
V_{OL}	Output LOW Voltage	T_A = -40°C	V_{CC} – 1.950	V_{CC} – 1.650	V
		T_A = 0°C	V_{CC} – 1.950	V_{CC} – 1.630	
		T_A = +25°C	V_{CC} – 1.950	V_{CC} – 1.630	
		T_A = +85°C	V_{CC} – 1.950	V_{CC} – 1.595	
V_{IH}	Input HIGH Voltage[9]	T_A = -40°C	V_{CC} – 1.230	V_{CC} – 0.890	V
		T_A = 0°C	V_{CC} – 1.170	V_{CC} – 0.840	
		T_A = +25°C	V_{CC} – 1.130	V_{CC} – 0.810	
		T_A = +85°C	V_{CC} – 1.060	V_{CC} – 0.720	
V_{IL}	Input LOW Voltage[10]	T_A = -40°C	V_{CC} – 1.950	V_{CC} – 1.500	V
		T_A = 0°C	V_{CC} – 1.950	V_{CC} – 1.480	
		T_A = +25°C	V_{CC} – 1.950	V_{CC} – 1.480	
		T_A = +85°C	V_{CC} – 1.950	V_{CC} – 1.445	
I_{IH}	Input HIGH Current	T_A = -40°C to +85°C		150	µA
I_{IL}	Input LOW Current	T_A = -40°C to +85°C	0.5		µA

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100K Series DC Electrical Characteristics[6,8]

V_{CC} =0, V_{EE} = -3.0V to -5.5V, T_A = -40°C to +85°C, R_L = 50Ω to V_{CC} – 2V, unless otherwise stated.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
V_{OH}	Output HIGH Voltage	T_A = -40°C, V_{IN} = V_{IH} (Max) or V_{IL} (Min)	V_{CC} – 1.085	V_{CC} – 1.005	V_{CC} – 0.880	V
		T_A = 0°C to +85°C, V_{IN} = V_{IH} (Max) or V_{IL} (Min)	V_{CC} – 1.025	V_{CC} – 0.955	V_{CC} – 0.880	
V_{OL}	Output LOW Voltage	T_A = -40°C, V_{IN} = V_{IH} (Max) or V_{IL} (Min)	V_{CC} – 1.830	V_{CC} – 1.695	V_{CC} – 1.555	V
		T_A = 0°C to +85°C, V_{IN} = V_{IH} (Max) or V_{IL} (Min)	V_{CC} – 1.810	V_{CC} – 1.705	V_{CC} – 1.620	
V_{IH}	Input HIGH Voltage[9]	T_A = -40°C to +85°C	V_{CC} – 1.165		V_{CC} – 0.880	V
V_{IL}	Input LOW Voltage[10]	T_A = -40°C to +85°C	V_{CC} – 1.810		V_{CC} – 1.475	V
I_{IH}	Input HIGH Current	T_A = -40°C to +85°C			150	µA
I_{IL}	Input LOW Current	T_A = -40°C to +85°C, V_{IN} = V_{IL} (Min)	0.5			µA

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AC Electrical Characteristics[11]

V_{CC} - V_{EE} = 3.0V to 5.5V, T_A = -40°C to +85°C, R_L = 50Ω to V_{CC} – 2V, unless otherwise stated.

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
f_{max}	Maximum Frequency		750			MHz
t_{PLH} t_{PHL}	Propagation Delay to Output D	T_A = -40°C	135	260	385	ps
		T_A = 0°C	185	260	335	
		T_A = +25°C	190	265	340	
		T_A = +85°C	215	290	365	
t_{skew}	Within-Device Skew[12]	T_A = -40°C		5		ps
	Duty Cycle Skew[13]	T_A = 0°C to +85°C		5	20	
T_{JITTER}	Additive Phase Jitter (RMS)	Carrier = 622MHz Integration Range: 12kHz – 20MHz T_A = +25°C		28		fs_{RMS}
V_{PP}	Minimum Input Swing[14]	T_A = -40°C to +85°C	150			mV
V_{CMR}	Common Mode Range[15]	T_A = -40°C	V_{CC} - 1.300		V_{CC} - 0.400	µA
		T_A = 0°C to +85°C	V_{CC} - 1.400		V_{CC} - 0.400	µA
t_r t_f	Output Rise/Fall Times Q (20% to 80%)	T_A = -40°C to +85°C	100	225	350	ps

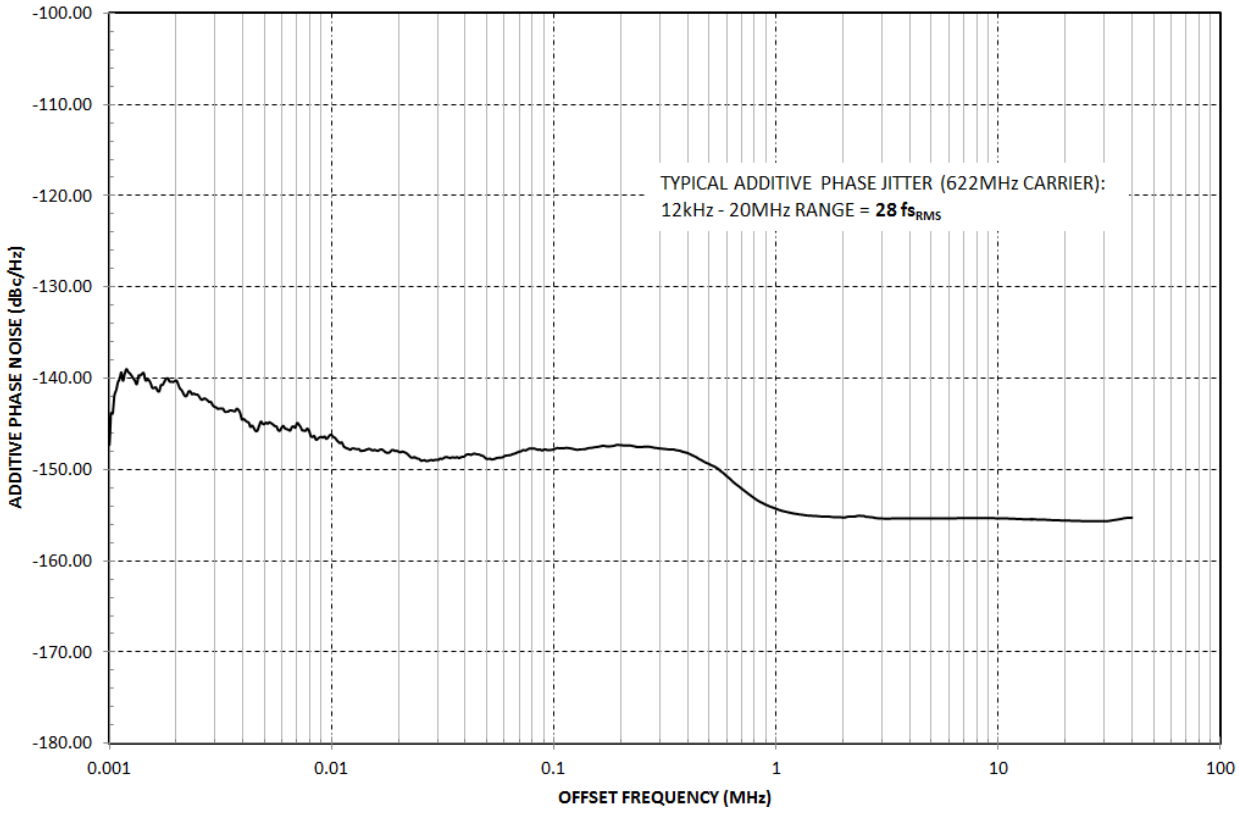
Notes:

11. Parametric values specified at: -3.0V to -5.5V.
12. Within-device skew defined as identical transitions on similar paths through a device.
13. Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.
14. Minimum input swing for which AC parameters are guaranteed. The device has a DC gain of 40.
15. 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. 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 - $|V_{CMR(min)}|$.

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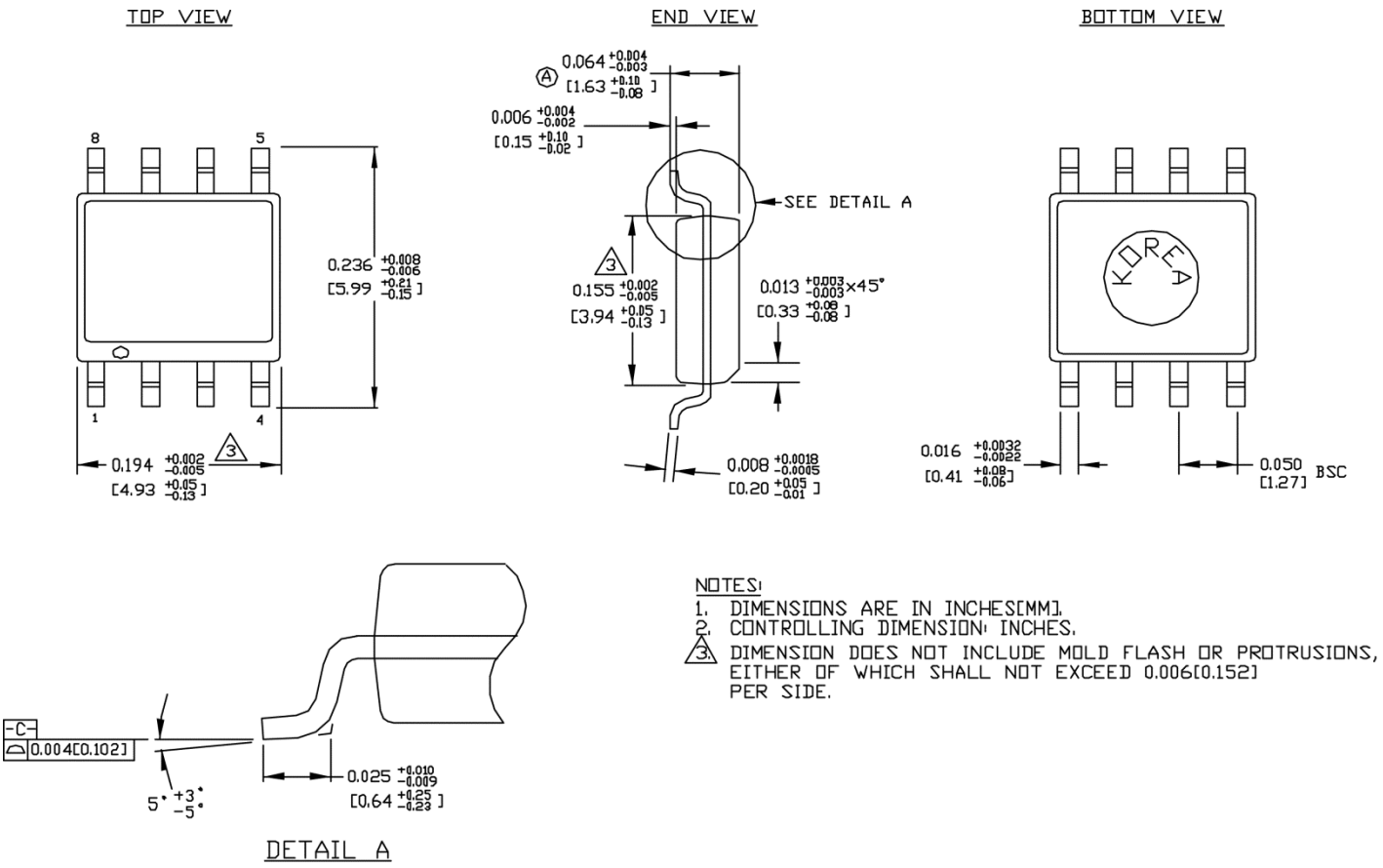
Additive Phase Noise Plot

V_{CC} = 3.3V, T_A = +25°C.



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Package Information[16]



8-Pin SOIC (Z8-1)

Note:

16. Package information is correct as of the publication date. For updates and most current information, go to www.micrel.com.

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Revision History

Date	Change Description/Edits by:	Rev.
7/15/2014	Complete Reflow. D. Tanabe	10
7/29/2014	Specs edited, Additive Phase Noise included. K. Carreon	11

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