SY100EL16V

5V/3.3V ECL Differential Receiver

Features

- 3.3V and 5V Power Supply Options
- 250 ps Propagation Delay (typical)
- High Bandwidth Output Transitions
- Internal 75 KΩ Input Pull-Down Resistors
- Available in 8-pin (3x3 mm) MSOP and SOIC Package

General Description

The SY100EL16V is a differential receiver. With fast output transition times, the SY100EL16V is ideally suited for interfacing with high-frequency sources.

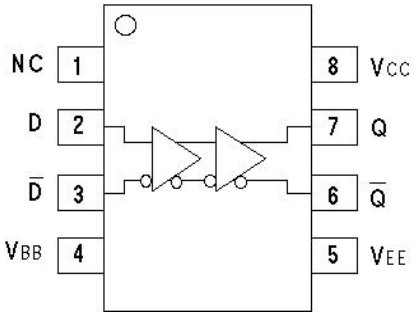
The SY100EL16V provides a VBB output for either single-ended use or as a DC bias for AC coupling to the device. The VBB pin should be used only as a bias for the SY100EL16V as its current sink/source capability is limited. Whenever used, the VBB pin should be bypassed to ground via a 0.01µF capacitor.

Under open input conditions (pulled to VEE), internal input clamps will force the Q output LOW.

Package Type

8-Pin MSOP (K8-1)

8-Pin SOIC (Z8-1)



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

PECL Power Supply Voltage (V_{CC}) (Note 1) ..... +8V
NECL Power Supply Voltage (V_{EE}) (Note 2) ..... –8V
PECL Mode Input Voltage (V_{IN}) (Note 3) ..... +6V
NECL Mode Input Voltage (V_{IN}) (Note 4) ..... –6V
Continuous Output Current (I_{OUT}) ..... 50 mA
Surge Output Current (I_{OUT}) ..... 100 mA
ESD Rating (Note 5) ..... >2 kV

† Notice: Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. Exposure to maximum rating conditions for extended periods may affect device reliability.

Note 1: V_{EE} = 0V

2: V_{CC} = 0V

3: V_{EE} = 0V, $V_{IN} \le V_{CC}$

4: V_{CC} = 0V, $V_{IN} \le V_{EE}$

5: Mil Std. 883 Human Body Model, all pins

TABLE 1-1: DC ELECTRICAL CHARACTERISTICS

Electrical Characteristics PECL: V_{CC} = 3.0V to 5.5V; V_{EE} = 0V; T_A = –40°C to 85°C, unless otherwise stated (Note 1)

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Power Supply Current	I_{EE}	—	18	22	mA	T_A = –40°C to +25°C
		—	21	26		T_A = +85°C
Output High Voltage (Note 2)	V_{OH}	V_{CC} – 1.085	V_{CC} – 1.005	V_{CC} – 0.88	V	T_A = –40°C
		V_{CC} – 1.025	V_{CC} – 0.955	V_{CC} – 0.88		T_A = 0°C to 85°C
Output High Voltage (Note 2)	V_{OL}	V_{CC} – 1.830	V_{CC} – 1.695	V_{CC} – 1.555	V	T_A = –40°C
		V_{CC} – 1.810	V_{CC} – 1.705	V_{CC} – 1.620		T_A = 0°C to 85°C
Input High Voltage (Single Ended)	V_{IH}	V_{CC} – 1.165	—	V_{CC} – 0.880	V	
Input Low Voltage (Single Ended)	V_{IL}	V_{CC} – 1.810	—	V_{CC} – 1.475	V	
Output Reference Voltage	V_{BB}	V_{CC} – 1.38	—	V_{CC} – 1.26	V	
Common Mode Range (Note 3)	V_{IHCMR}	V_{CC} – 1.3	—	V_{CC} – 0.4	V	T_A = –40°C
		V_{CC} – 1.4	—	V_{CC} – 0.4		T_A = 0°C to 85°C
Input High Current	I_{IH}		—	150	µA	
Input Low Current	I_{IL}	0.5	—		µA	V_{IN} = V_{IL} (Min)

Note 1: Devices are designed to meet the DC specifications shown in the above table after thermal equilibration 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.

2: Outputs are terminated through a 50 Ω resistor to V_{CC} – 2.0V.

3: The CMR range is referenced to the most positive side of the differential input voltage. Normal operation is obtained if the high level falls within the specified range and the peak-to-peak voltage lies between 150 mV and 1V.

TABLE 1-2: DC ELECTRICAL CHARACTERISTICS

Electrical Characteristics NECL: V_{EE} = -5.5V to -3.0V; V_{CC} = 0V; T_A = –40°C to 85°C, unless otherwise stated (Note 1)

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Power Supply Current	I_{EE}	—	18	22	mA	T_A = –40°C to +25°C
		—	21	26		T_A = +85°C
Output High Voltage (Note 2)	V_{OH}	– 1.085	– 1.005	– 0.88	V	T_A = –40°C
		– 1.025	– 0.955	– 0.88		T_A = 0°C to 85°C
Output High Voltage (Note 2)	V_{OL}	– 1.830	– 1.695	– 1.555	V	T_A = –40°C
		– 1.810	– 1.705	– 1.620		T_A = 0°C to 85°C
Input High Voltage (Single Ended)	V_{IH}	– 1.165	—	– 0.880	V	
Input Low Voltage (Single Ended)	V_{IL}	– 1.810	—	– 1.475	V	
Output Reference Voltage	V_{BB}	– 1.38	—	– 1.26	V	
Common Mode Range (Note 3)	V_{IHCMR}	– 1.3	—	– 0.4	V	T_A = –40°C
		– 1.4	—	– 0.4		T_A = 0°C to 85°C
Input High Current	I_{IH}		—	150	µA	
Input Low Current	I_{IL}	0.5	—		µA	V_{IN} = V_{IL} (Min)

Note 1: Devices are designed to meet the DC specifications shown in the above table after thermal equilibration 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.

2: Outputs are terminated through a 50 Ω resistor to V_{CC} – 2.0V.

3: The CMR range is referenced to the most positive side of the differential input voltage. Normal operation is obtained if the high level falls within the specified range and the peak-to-peak voltage lies between 150 mV and 1V.

TABLE 1-3: AC ELECTRICAL CHARACTERISTICS

Electrical Characteristics: V_{CC} = 3.0V to 5.5V; V_{EE} = 0V or V_{EE} = –5.5V to –3.0V; V_{CC} = 0V; T_A = –40°C to 85°C, unless otherwise stated (Note 1)

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Propagation Delay D to Q D (Differential)	t_{PLH} t_{PHL}	125	250	375	ps	T_A = –40°C
		175	250	325		T_A = 0°C, +25°C
		205	280	355		T_A = +85°C
Propagation Delay D to Q (Single Ended)	t_{PLH} t_{PHL}	75	250	425	ps	T_A = –40°C
		125	250	375		T_A = 0°C, +25°C
		155	280	405		T_A = +85°C
Duty Cycle Skew (Note 2)	t_{skew}	—	5	—	ps	T_A = –40°C
		—	5	20		T_A = 0°C to +85°C
Input Swing (Note 3)	V_{PP}	150	—	1000	mV	
Output Rise/Fall Time Q (20% to 80%)	t_r/t_f	100	225	350	ps	

Note 1: Specification for packaged product only.

2: Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.

3: Input swing for which AC parameters are guaranteed. The device has a DC gain of ≈40.

TEMPERATURE SPECIFICATIONS

Parameter	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Operating Temperature Range	T_A	–40	—	+85	°C	
Storage Temperature	T_S	–65	—	+150	°C	
Lead Temperature	T_{LEAD}	—	—	+260	°C	Soldering, 20 sec.
Thermal Resistance						
Junction-to-Ambient	θ_{JA}	—	160	—	°C/W	Still Air
		—	109	—	°C/W	500 lfpm
Junction-to-Case	θ_{JC}	—	39	—	°C/W	

2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 2-1.

TABLE 2-1: PIN FUNCTION TABLE

Pin Name	Description
D	Data Input
Q	Data Output
V_{BB}	Reference Voltage Output
NC	Not Connected
V_{CC}	Positive Power Supply
V_{EE}	Negative Power Supply

3.0 PACKAGING INFORMATION

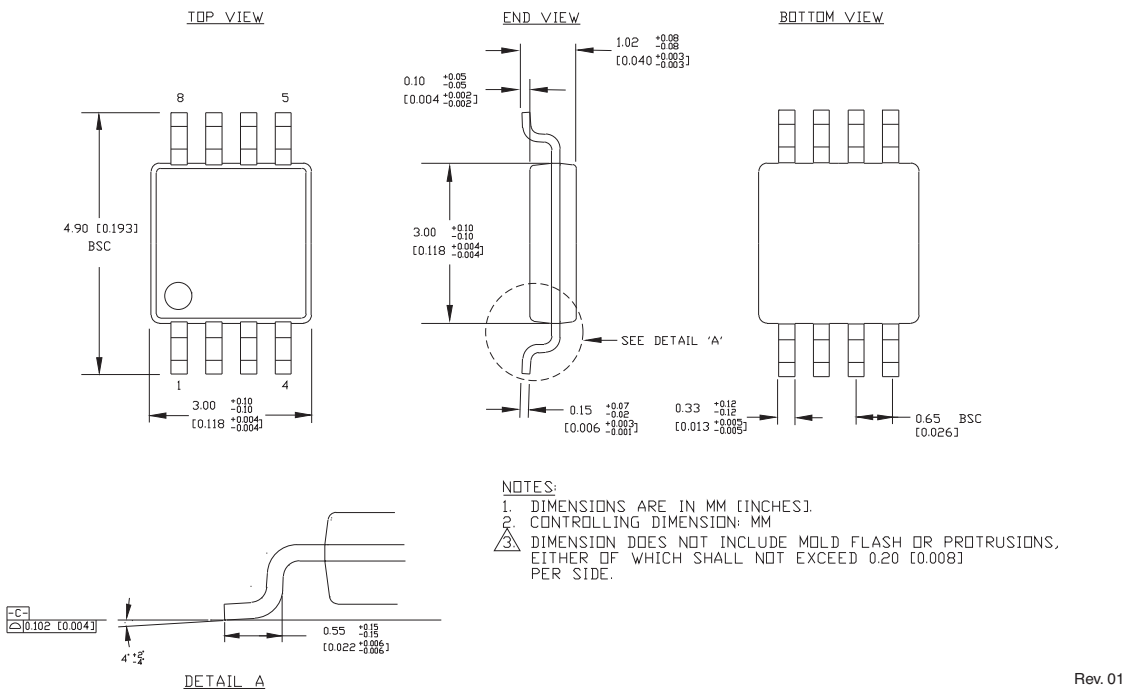
3.1 Package Marking Information

8-Lead SOIC*

Example

Legend:	XX...X	Product code or customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week ‘01’)
	NNN	Alphanumeric traceability code
	(e3)	Pb-free JEDEC® designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator ((e3)) can be found on the outer packaging for this package.
	●, ▲, ▼	Pin one index is identified by a dot, delta up, or delta down (triangle mark).
Note:	In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.	
	Underbar (_) and/or Overbar (¯) symbol may not be to scale.	

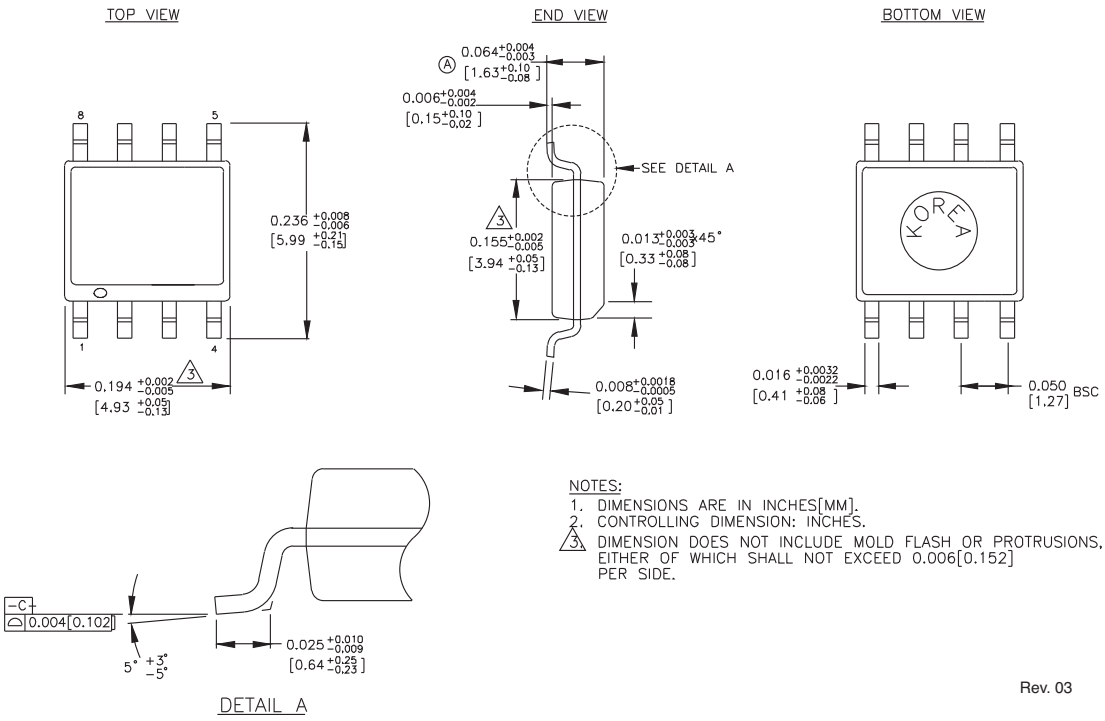
8-PIN MSOP (K8-1)



Package Notes:

Note 1. Package meets Level 1 moisture sensitivity.

8-PIN SOIC (Z8-1)



Package Notes:

Note 1. Package meets Level 1 moisture sensitivity.

NOTES:

APPENDIX A: REVISION HISTORY

Revision A (November 2018)

- Converted Micrel document SY100EL16V to Microchip data sheet template DS20006115A.
- Made minor text changes throughout the document.
- Removed all reference to the EOL SY10EL16V version.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

PART NO.	X	X	-XX
Device	Package	Temperature Range	Special Processing

Device:	SY100EL16V: Differential Receiver		
Package:	Z	=	8-Lead SOIC (Pb-Free NiPdAu)
	K	=	8-Lead MSOP (Pb-Free NiPdAu)
Temperature Range:	G	=	–40°C to +85°C
Special Processing:	<blank>=		95/Tube
	TR	=	1,000/Reel

Examples:

a) SY100EL16VZG: SY100EL16V, 8-Lead SOIC, –40°C to +85°C (Pb-Free NiPdAu), 95/Tube

b) SY100EL16VZG-TR: SY100EL16V, 8-Lead SOIC, –40°C to +85°C (Pb-Free NiPdAu), 1,000/Reel

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

NOTES:

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
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