



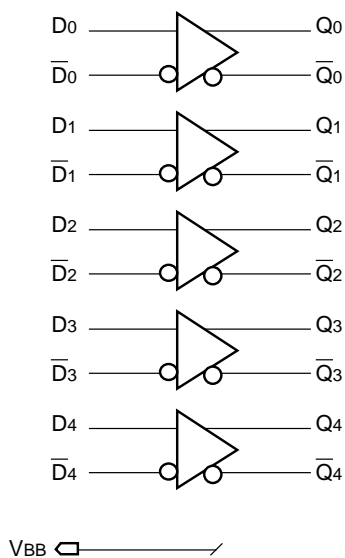
**QUINT DIFFERENTIAL  
LINE RECEIVER**

**SY10E116  
SY100E116**

**FEATURES**

- 450ps max. Propagation Delay
- Extended 100E VEE range of -4.2V to -5.5V
- VBB output for single-ended reception
- Fully compatible with industry standard 10KH, 100K I/O levels
- Internal 75KΩ input pulldown resistors
- Fully compatible with Motorola MC10E/100E116
- Available in 28-pin PLCC package

**BLOCK DIAGRAM**



**DESCRIPTION**

The SY10/100E116 are quint differential line receivers designed for use in new, high-performance ECL systems. These devices have emitter-follower outputs and an internally generated reference supply (VBB) for single-ended reception.

Active current sources combined with Micrel's ASSET™ technology provide the receivers with excellent common mode noise rejection.

The receiver design features clamp circuitry to cause a defined output state if both the inverting and non-inverting inputs are left open; in this case the Q output goes LOW, while the  $\bar{Q}$  output goes HIGH.

If both inverting and non-inverting inputs are at equal potential, the receiver does *not* go to a defined state, but rather shares current in normal differential amplifier fashion, producing output voltage levels midway between HIGH and LOW.

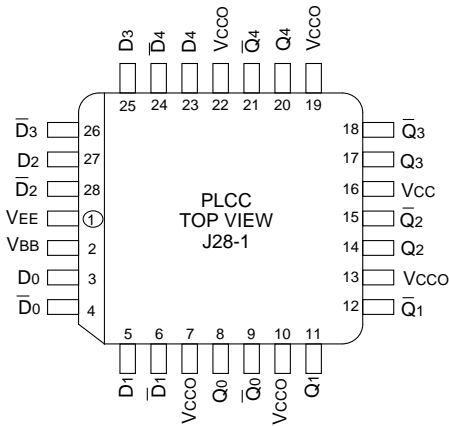
The VBB output is intended for use as a reference voltage for single-ended reception of ECL signals to that device only. When using VBB for this purpose, it is recommended that VBB is decoupled to VCC via a 0.01 μF capacitor.

For higher bandwidth, please refer to the SY10/100E416 device.

**PIN NAMES**

Pin	Function
D0, $\bar{D}_0$ -D4, $\bar{D}_4$	Differential Input Pairs
Q0, $\bar{Q}_0$ -Q4, $\bar{Q}_4$	Differential Output Pairs
VBB	Reference Voltage Output
Vcco	Vcc to Output

**PACKAGE/ORDERING INFORMATION**



**28-Pin PLCC (J28-1)**

**Ordering Information<sup>(1)</sup>**

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10E116JI	J28-1	Industrial	SY10E116JI	Sn-Pb
SY10E116JITR <sup>(2)</sup>	J28-1	Industrial	SY10E116JI	Sn-Pb
SY100E116JI	J28-1	Industrial	SY100E116JI	Sn-Pb
SY100E116JITR <sup>(2)</sup>	J28-1	Industrial	SY100E116JI	Sn-Pb
SY10E116JC	J28-1	Commercial	SY10E116JC	Sn-Pb
SY10E116JCTR <sup>(2)</sup>	J28-1	Commercial	SY10E116JC	Sn-Pb
SY100E116JC	J28-1	Commercial	SY100E116JC	Sn-Pb
SY100E116JCTR <sup>(2)</sup>	J28-1	Commercial	SY100E116JC	Sn-Pb
SY10E116JY <sup>(3)</sup>	J28-1	Industrial	SY10E116JY with Pb-Free bar-line indicator	Matte-Sn
SY10E116JYTR <sup>(2, 3)</sup>	J28-1	Industrial	SY10E116JY with Pb-Free bar-line indicator	Matte-Sn
SY100E116JY <sup>(3)</sup>	J28-1	Industrial	SY100E116JY with Pb-Free bar-line indicator	Matte-Sn
SY100E116JYTR <sup>(2, 3)</sup>	J28-1	Industrial	SY100E116JY with Pb-Free bar-line indicator	Matte-Sn

**Notes:**

1. Contact factory for die availability. Dice are guaranteed at T<sub>A</sub> = 25°C, DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

**LOGIC EQUATION**

$$Q_n = D_n$$

**DC ELECTRICAL CHARACTERISTICS**

VEE = VEE(Min.) to VEE(Max.); VCC = VCCO = GND

Symbol	Parameter	TA = -40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit	
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
V <sub>BB</sub>	Output Reference Voltage	10E	-1.43	—	-1.30	-1.38	—	-1.27	-1.35	—	-1.25	-1.31	—	-1.19	V
		100E	-1.43	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	
I <sub>IH</sub>	Input HIGH Current	—	—	200	—	—	200	—	—	200	—	—	200	μA	
I <sub>EE</sub>	Power Supply Current	10E	—	29	35	—	29	35	—	29	35	—	29	35	mA
		100E	—	29	35	—	29	35	—	29	35	—	33	40	
V <sub>PP</sub> (DC)	Input Sensitivity <sup>(1)</sup>	150	—	—	150	—	—	150	—	—	150	—	—	mV	
V <sub>CMR</sub>	Common Mode Range <sup>(2)</sup>	-2.0	—	-0.6	-2.0	—	-0.6	-2.0	—	-0.6	-2.0	—	-0.6	V	

**Notes:**

- V<sub>PP</sub> is the minimum differential input voltage required to assure full ECL levels are present at the outputs.
- V<sub>CMR</sub> is referenced to the most positive side of the differential input signal. Normal operation is obtained when the "HIGH" input is within the V<sub>CMR</sub> range and the input swing is greater than V<sub>PP</sub> (min.) and <1V.

**AC ELECTRICAL CHARACTERISTICS**

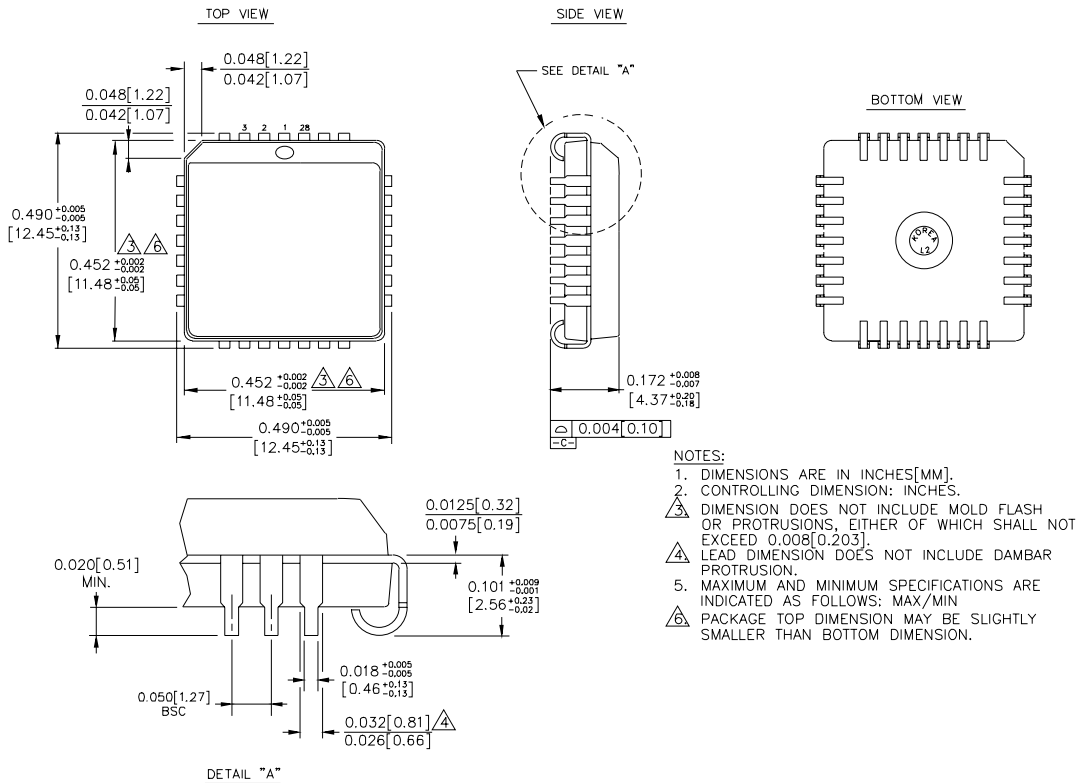
VEE = VEE(Min.) to VEE(Max.); VCC = VCCO = GND

Symbol	Parameter	TA = -40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit	
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
t <sub>PD</sub>	Propagation Delay to Output	D	150	300	500	200	300	450	200	300	450	200	300	450	ps
		D (S.E.)	150	300	550	150	300	500	150	300	500	150	300	500	
V <sub>PP</sub> (DC)	Input Sensitivity <sup>(1)</sup>	150	—	150	150	—	—	150	—	—	150	—	—	mV	
t <sub>skew</sub>	Within-Device Skew <sup>(2)</sup> D <sub>n</sub> to Q <sub>n</sub> , $\bar{Q}_n$	—	50	—	—	50	—	—	50	—	—	50	—	ps	
t <sub>skew</sub>	Duty Cycle Skew <sup>(3)</sup> t <sub>PLH</sub> - t <sub>PHL</sub>	—	±10	—	—	±10	—	—	±10	—	—	±10	—	ps	
t <sub>r</sub> t <sub>f</sub>	Rise/Fall Time 20% to 80%	250	375	625	275	375	575	275	375	575	275	375	575	ps	

**Notes:**

- Minimum input swing for which AC parameters are guaranteed.
- Within-device skew is defined as identical transitions on similar paths through a device.
- Duty cycle skew is defined only for differential operation when the delays are measured from the cross point of the inputs to the cross point of the outputs.

**28-PIN PLCC (J28-1)**



Rev. 03

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