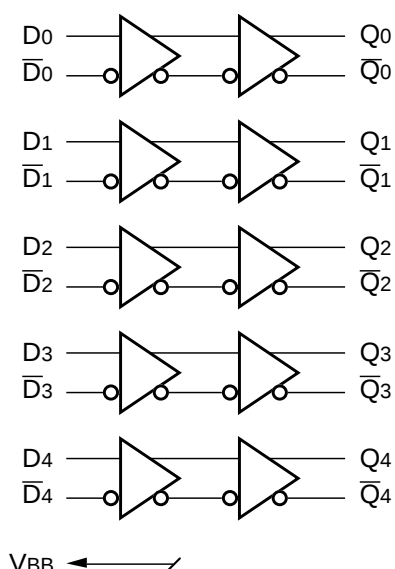


FEATURES

- 3.3V and 5V power supplies required
- Also, supports LVPECL-to-PECL translation
- 500ps propagation delays
- Fully differential design
- Differential line receiver capability
- Available in 28-pin PLCC package

BLOCK DIAGRAM



FUNCTION TABLE

Function	Vcc	Vcco	Vcc_VBB
PECL-to-LVPECL	5.0V	3.3V	5.0V
LVPECL-to-PECL	5.0V	5.0V	3.3V
PECL-to-PECL	5.0V	5.0V	5.0V
LVPECL-to-LVPECL	5.0V	3.3V	3.3V

DESCRIPTION

The SY100E417 is a quint LVPECL-to-PECL translator. It can also be used as a quint PECL-to-LVPECL translator. The device receives standard PECL signals and translates them to differential LVPECL output signals (or vice versa).

The SY100E417 can also be used as a differential line receiver for PECL-to-PECL or LVPECL-to-LVPECL signals. However, please note that for the latter we will need two different power supplies. Please refer to Function Table for more details.

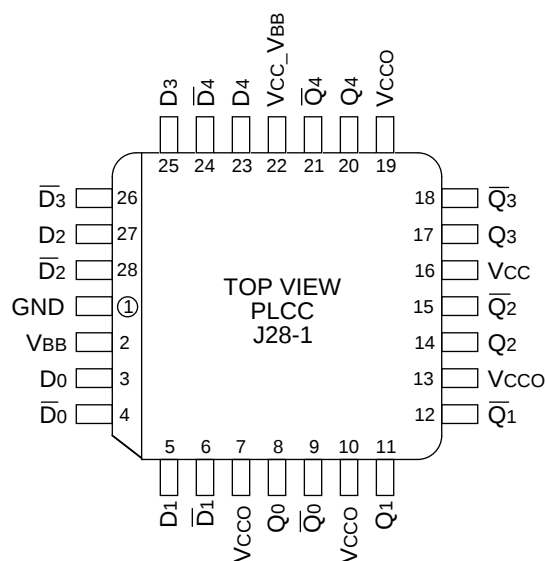
A VBB output is provided for interfacing single ended input signals. If a single ended input is to be used, the VBB output should be connected to the $\bar{D}_n$ input and the active signal will drive the D_n input. When used, the VBB should be bypassed to Vcc via a 0.01 μ F capacitor. The VBB is designed to act as a switching reference for the SY100E417 under single ended input conditions. As a result, the pin can only source/sink 0.5mA of current.

To accomplish the PECL-to-LVPECL level translation, the SY100E417 requires three power rails. The Vcc and Vcc_VBB supply is to be connected to the standard PECL supply, the 3.3V supply is to be connected to the Vcco supply, and GND is connected to the system ground plane. Both the Vcc and Vcco should be bypassed to ground with a 0.01 μ F capacitor.

To accomplish the LVPECL-to-PECL level translation, the SY100E417 requires three power rails as well. The 5.0V supply is connected to the Vcc and Vcco pins, 3.3V supply is connected to the Vcc_VBB pin and GND is connected to the system ground plane. Vcc_VBB is used to provide a proper VBB output level if a single ended input is used. Vcc_VBB = 3.3V is only required for single-ended LVPECL input. For differential LVPECL input, Vcc_VBB can be either 3.3V or 5.0V.

Under open input conditions, the D_n input will be biased at a Vcc/2 voltage level and the $\bar{D}_n$ input will be pulled to GND. This condition will force the "Qn" output low, ensuring stability.

PIN CONFIGURATION



PIN NAMES

Pin	Function
D _n	PECL / LVPECL Inputs
Q _n	PECL / LVPECL Outputs
V _{BB}	Reference Voltage Output
V _{CCO}	V _{CC} for Outputs
V _{CC_VBB}	V _{CC} for V _{BB} Output
GND	Common Ground Rail
V _{CC}	V _{CC} for Internal Circuitry

PECL INPUT DC ELECTRICAL CHARACTERISTICS

V_{CC_VBB} = V_{CC} = +4.5V to +5.5V

Symbol	Parameter	T _A = -40°C			T _A = 0°C			T _A = +25°C			T _A = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
V _{CC}	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
V _{IH}	Input HIGH Voltage ⁽¹⁾	3.835	—	4.120	3.835	—	4.120	3.835	—	4.120	3.835	—	4.120	V
V _{IL}	Input LOW Voltage ⁽¹⁾	3.190	—	3.515	3.190	—	3.525	3.190	—	3.525	3.190	—	3.525	V
V _{PP}	Minimum Peak-to-Peak Input	150	—	—	150	—	—	150	—	—	150	—	—	mV
I _{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
I _{IL}	Input LOW Current	0.5	—	—	0.5	—	—	0.5	—	—	0.5	—	—	μA
		D _n			D _n			D _n			D _n			
		-600	—	—	-600	—	—	-600	—	—	-600	—	—	
V _{BB}	Output Reference ⁽¹⁾	3.620	—	3.740	3.620	—	3.740	3.620	—	3.740	3.620	—	3.740	V
I _{CC}	Power Supply Current	—	—	20	—	—	20	—	14	20	—	—	20	mA

NOTE:

1. These levels are for V_{CC_VBB} = 5.0V. Level specifications will vary 1:1 with V_{CC_VBB}.

LVPECL OUTPUT DC ELECTRICAL CHARACTERISTICS

V_{CC} = +4.5V to +5.5V; V_{CCO} = +3.0V to 3.8V

Symbol	Parameter	T _A = -40°C			T _A = 0°C			T _A = +25°C			T _A = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
V _{CCO}	Power Supply Voltage	3.0	—	3.8	3.0	—	3.8	3.0	3.3	3.8	3.0	—	3.8	V
V _{OH}	Output HIGH Voltage ⁽¹⁾	2.215	—	2.420	2.275	—	2.420	2.275	2.350	2.420	2.275	—	2.420	V
V _{OL}	Output LOW Voltage ⁽¹⁾	1.470	—	1.745	1.490	—	1.680	1.490	1.600	1.680	1.490	—	1.680	V
I _{CCO}	Power Supply Current	—	—	35	—	—	35	—	23	35	—	—	37	mA

NOTE:

1. These levels are for V_{CCO} = 3.3V. Level specifications will vary 1:1 with V_{CCO}.

LVPECL INPUT DC ELECTRICAL CHARACTERISTICS

V_{CC_VBB} = +3.0V to +3.8V⁽¹⁾; V_{CC} = +4.5V to +5.5V

Symbol	Parameter	T _A = -40°C			T _A = 0°C			T _A = +25°C			T _A = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
V _{CC}	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
V _{IH}	Input HIGH Voltage ⁽²⁾	2.135	—	2.420	2.135	—	2.420	2.135	—	2.420	2.135	—	2.420	V
V _{IL}	Input LOW Voltage ⁽²⁾	1.490	—	1.825	1.490	—	1.825	1.490	—	1.825	1.490	—	1.825	V
V _{PP}	Minimum Peak-to-Peak Input	150	—	—	150	—	—	150	—	—	150	—	—	mV
I _{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
I _{IL}	Input LOW Current $\frac{Dn}{Dn}$	0.5 -600	— —	— —	0.5 -600	— —	— —	0.5 -600	— —	— —	0.5 -600	— —	— —	μA
V _{BB}	Output Reference ⁽²⁾	1.92	—	2.04	1.92	—	2.04	1.92	—	2.04	1.92	—	2.04	V
I _{CC}	Power Supply Current	—	—	20	—	—	20	—	14	20	—	—	20	mA

NOTES:

1. V_{CC_VBB} = 3.3V is only required for single-ended LVPECL input. For differential LVPECL input, V_{CC_VBB} can be either 3.3V or 5V.
2. These levels are for V_{CC_VBB} = 3.3V. Level specifications will vary 1:1 with V_{CC_VBB}.

PECL OUTPUT DC ELECTRICAL CHARACTERISTICS

VCC = VCCO = +4.5V to +5.5V

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.	
VCCO	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
VOH	Output HIGH Voltage ⁽¹⁾	3.915	—	4.120	3.975	—	4.120	3.975	—	4.120	3.975	—	4.120	V
VOL	Output LOW Voltage ⁽¹⁾	3.170	—	3.445	3.190	—	3.380	3.190	—	3.380	3.190	—	3.380	V
ICCO	Power Supply Current	—	—	35	—	—	35	—	23	35	—	—	37	mA

NOTES:

1. These levels are for VCCO = 5.0V. Level specifications will vary 1:1 with VCCO.

AC ELECTRICAL CHARACTERISTICS⁽¹⁾

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.	
tPLH tPHL	Propagation Delay D to Q Diff. S.E.	410 380	510 530	610 680	410 380	510 530	610 680	410 380	510 530	610 680	410 380	510 530	610 680	ps
tskew	Within-Device Skew	—	—	—	—	—	—	—	—	—	—	—	—	ps
	Output-to-Output ⁽²⁾	—	20	100	—	20	100	—	20	100	—	20	100	
	Part-to-Part (Diff.) ⁽²⁾	—	20	200	—	20	200	—	20	200	—	20	200	
	Duty Cycle (Diff.) ⁽³⁾	—	25	—	—	25	—	—	25	—	—	25	—	
VPP	Minimum Input Swing ⁽⁴⁾	150	—	—	150	—	—	150	—	—	150	—	—	mV
VCMR	Common Mode Range ⁽⁵⁾	—	—	—	—	—	—	—	—	—	—	—	—	V
	VPP < 500mV	1.3	—	VCC-0.2	1.2	—	VCC-0.2	1.2	—	VCC-0.2	1.2	—	VCC-0.2	
	VPP ≥ 500mV	1.5	—	VCC-0.2	1.4	—	VCC-0.2	1.4	—	VCC-0.2	1.4	—	VCC-0.2	
tr tf	Output Rise/Fall Times Q (20% to 80%)	320	—	580	320	—	580	320	—	580	320	—	580	ps

NOTES:

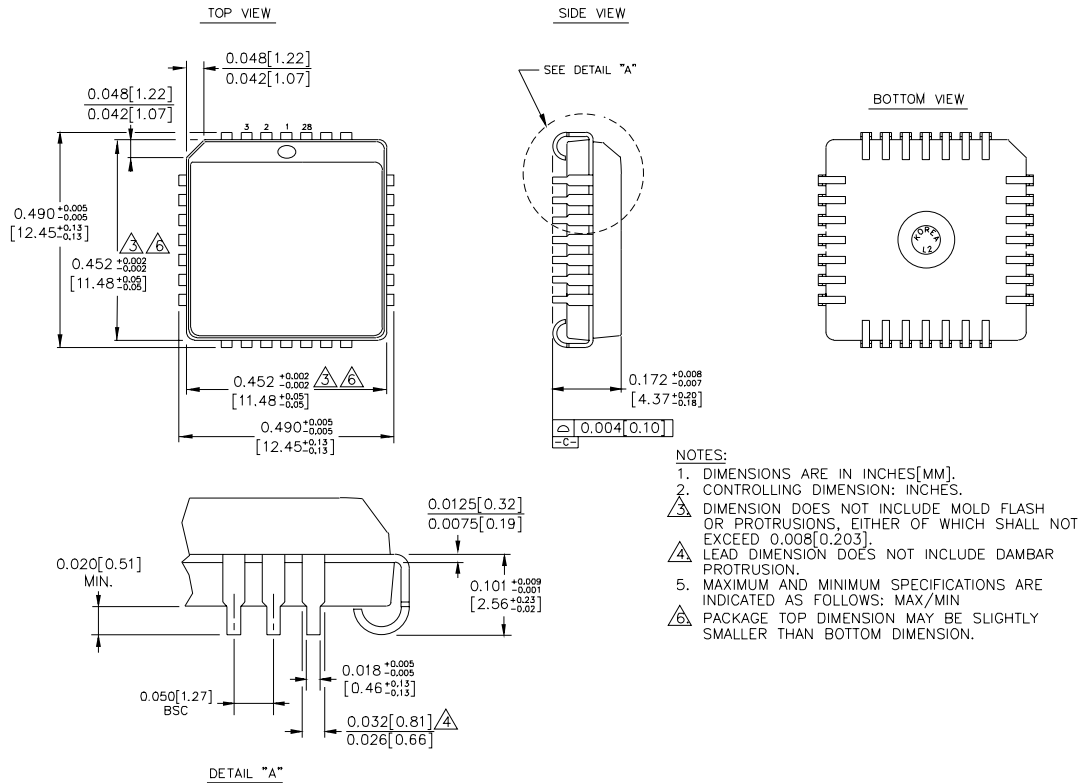
- Power supply requirements applies as indicated in the DC electrical characteristics tables.
- Skew is measured between outputs under identical transitions.
- Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device Common Mode Range.
- Minimum input swing for which AC parameters are guaranteed. The device has a DC gain of ~40.
- 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 VPP min. and 1V.

PRODUCT ORDERING CODE

Ordering Code	Package Type	Operating Range
SY100E417JC	J28-1	Commercial
SY100E417JCTR	J28-1	Commercial

Ordering Code	Package Type	Operating Range
SY100E417JI	J28-1	Industrial
SY100E417JITR	J28-1	Industrial

28 LEAD PLCC (J28-1)



Rev. 03

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