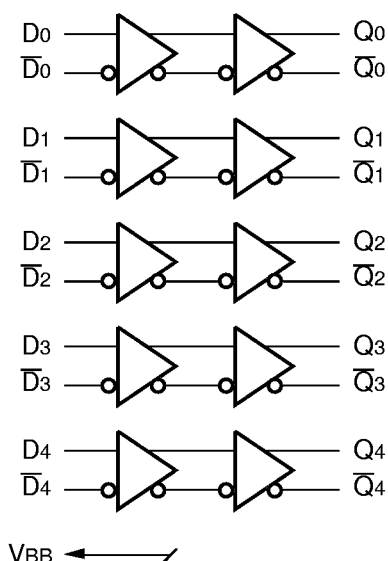


FEATURES

- 3.3V and 5V power supplies required
- Also, supports LVPECL-to-PECL translation
- 500ps propagation delays
- Fully differential design
- ESD protection of 2000V
- 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

PIN NAMES

Pin	Function
Dn	PECL / LVPECL Inputs
Qn	PECL / LVPECL Outputs
VBB	Reference Voltage Output
Vcco	Vcc for Outputs
Vcc_VBB	Vcc for VBB Output
GND	Common Ground Rail
Vcc	Vcc for Internal Circuitry

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).

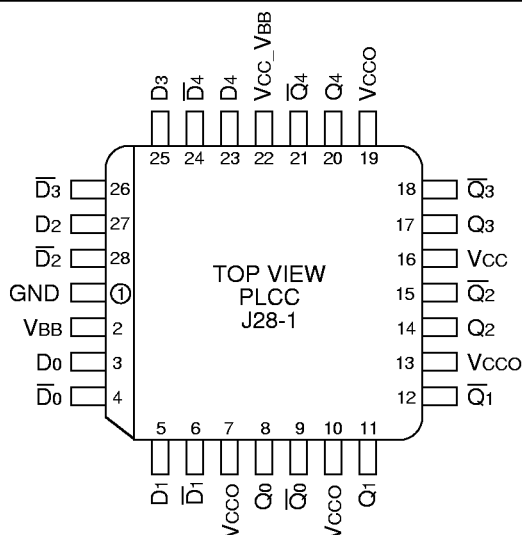
A VBB output is provided for interfacing single ended PECL signals at the inputs. If a single ended PECL input is to be used, the VBB output should be connected to the $\bar{D}_n$ input and the active signal will drive the D_n input. When used, the VBB should be bypassed to ground via a 0.01 μ F capacitor. 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 LVCC 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 Vcc supply is connected to the Vcc and Vcco pins, LVCC 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. If inputs are differential signals, LVCC is still required and must be connected to Vcc_VBB to maintain proper functionality.

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

PIN CONFIGURATION



PECL INPUT DC ELECTRICAL CHARACTERISTICS

VCC_VBB = VCC = +4.5V to +5.5V; VCCO = +3.0V to +3.8V

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.	
VCC	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
VIH	Input HIGH Voltage ⁽¹⁾	3.835	—	4.120	3.835	—	4.120	3.835	—	4.120	3.835	—	4.120	V
VIL	Input LOW Voltage ⁽¹⁾	3.190	—	3.515	3.190	—	3.525	3.190	—	3.525	3.190	—	3.525	V
VPP	Minimum Peak-to-Peak Input	150	—	—	150	—	—	150	—	—	150	—	—	mV
IiH	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
IiL	Input LOW Current $\frac{Dn}{Dn}$	0.5 -600	—	—	0.5 -600	—	—	0.5 -600	—	—	0.5 -600	—	—	μA
VBB	Output Reference ⁽¹⁾	3.620	—	3.740	3.620	—	3.740	3.620	—	3.740	3.620	—	3.740	V
Icc	Power Supply Current	—	—	20	—	—	20	—	14	20	—	—	20	mA

NOTE:

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

LVPECL OUTPUT DC ELECTRICAL CHARACTERISTICS

VCC_VBB = VCC = +4.5V to +5.5V; VCCO = +3.0V to +3.8V

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	3.0	—	3.8	3.0	—	3.8	3.0	3.3	3.8	3.0	—	3.8	V
VOH	Output HIGH Voltage ⁽¹⁾	2.215	—	2.420	2.275	—	2.420	2.275	2.350	2.420	2.275	—	2.420	V
VOL	Output LOW Voltage ⁽¹⁾	1.470	—	1.745	1.490	—	1.680	1.490	1.600	1.680	1.490	—	1.680	V
Icco	Power Supply Current	—	—	35	—	—	35	—	23	35	—	—	37	mA

NOTE:

1. These levels are for VCCO = 3.3V. Level specifications will vary 1:1 with VCCO.

LVPECL INPUT DC ELECTRICAL CHARACTERISTICS

VCC_VBB = +3.0V to +3.8V⁽¹⁾; 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.	
VCC	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
VIH	Input HIGH Voltage ⁽²⁾	2.135	—	2.420	2.135	—	2.420	2.135	—	2.420	2.135	—	2.420	V
VIL	Input LOW Voltage ⁽²⁾	1.490	—	1.825	1.490	—	1.825	1.490	—	1.825	1.490	—	1.825	V
VPP	Minimum Peak-to-Peak Input	150	—	—	150	—	—	150	—	—	150	—	—	mV
IiH	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
IiL	Input LOW Current $\frac{Dn}{Dn}$	0.5 -600	—	—	0.5 -600	—	—	0.5 -600	—	—	0.5 -600	—	—	μA
VBB	Output Reference ⁽²⁾	1.92	—	2.04	1.92	—	2.04	1.92	—	2.04	1.92	—	2.04	V
Icc	Power Supply Current	—	—	20	—	—	20	—	14	20	—	—	20	mA

NOTES:

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

PECL OUTPUT DC ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	$T_A = -40^{\circ}C$			$T_A = 0^{\circ}C$			$T_A = +25^{\circ}C$			$T_A = +85^{\circ}C$			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
V_{CCO}	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
V_{OH}	Output HIGH Voltage ⁽¹⁾	3.915	—	4.120	3.975	—	4.120	3.975	—	4.120	3.975	—	4.120	V
V_{OL}	Output LOW Voltage ⁽¹⁾	3.170	—	3.445	3.190	—	3.380	3.190	—	3.380	3.190	—	3.380	V
I_{CCO}	Power Supply Current	—	—	35	—	—	35	—	23	35	—	—	37	mA

NOTES:

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

AC ELECTRICAL CHARACTERISTICS⁽¹⁾

Symbol	Parameter	$T_A = -40^{\circ}C$			$T_A = 0^{\circ}C$			$T_A = +25^{\circ}C$			$T_A = +85^{\circ}C$			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
t_{PLH} t_{PHL}	Propagation Delay D to Q Diff. S.E.	490 440	590 590	690 740	510 460	610 610	710 760	510 460	610 610	710 760	530 480	630 630	730 780	ps
t_{skew}	Within-Device Skew Output-to-Output ⁽²⁾ Part-to-Part (Diff.) ⁽²⁾ Duty Cycle (Diff.) ⁽³⁾	— — —	20 20 25	100 200 —	— — —	20 20 25	100 200 —	— — —	20 20 25	100 200 —	— — —	20 20 25	100 200 —	ps
V_{PP}	Minimum Input Swing ⁽⁴⁾	150	—	—	150	—	—	150	—	—	150	—	—	mV
V_{CMR}	Common Mode Range ⁽⁵⁾ $V_{PP} < 500mV$ $V_{PP} \geq 500mV$	1.3 1.5	— —	$V_{CC}-0.2$ $V_{CC}-0.2$	1.2 1.4	— —	$V_{CC}-0.2$ $V_{CC}-0.2$	1.2 1.4	— —	$V_{CC}-0.2$ $V_{CC}-0.2$	1.2 1.4	— —	$V_{CC}-0.2$ $V_{CC}-0.2$	V
t_r t_f	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 V_{PP} 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 PLASTIC LEADED CHIP CARRIER (J28-1)

FILE/REV #: PD0008A03

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