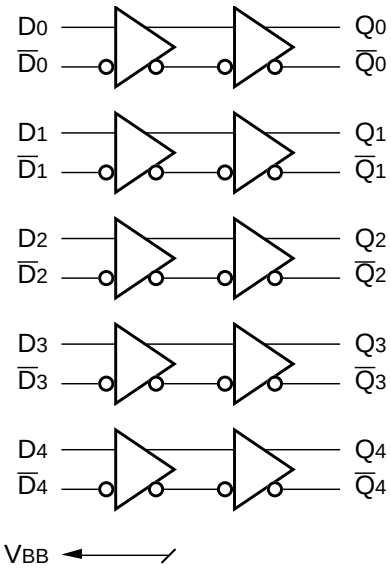
OR PECL-TO-LVPECL TRANSLATOR

SY100E417

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**



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 V_{BB} output is provided for interfacing single ended input signals. If a single ended input is to be used, the V_{BB} output should be connected to the $\overline{D}n$ input and the active signal will drive the Dn input. When used, the V_{BB} should be bypassed to V_{CC} via a 0.01µF capacitor. The V_{BB} 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.

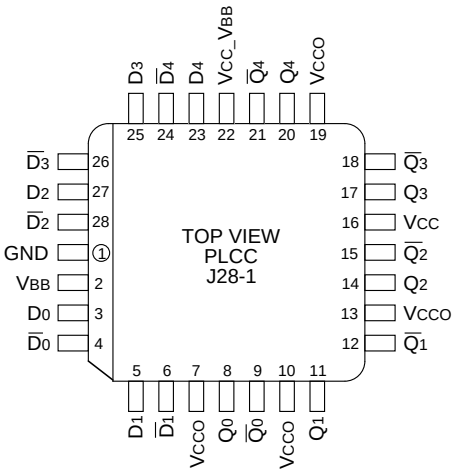
To accomplish the PECL-to-LVPECL level translation, the SY100E417 requires three power rails. The V_{CC} and V_{CC_VBB} supply is to be connected to the standard PECL supply, the 3.3V supply is to be connected to the V_{CCO} supply, and GND is connected to the system ground plane. Both the V_{CC} and V_{CCO} should be bypassed to ground with a 0.01µF 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 V_{CC} and V_{CCO} pins, 3.3V supply is connected to the V_{CC_VBB} pin and GND is connected to the system ground plane. V_{CC_VBB} is used to provide a proper V_{BB} output level if a single ended input is used. 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 5.0V.

Under open input conditions, the Dn input will be biased at a $V_{CC}/2$ voltage level and the $\overline{D}n$ input will be pulled to GND. This condition will force the "Qn" output low, ensuring stability.

Pin	Function
Dn	PECL / LVPECL Inputs
Qn	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

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



28-Pin PLCC (J28-1)

(1)

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY100E417JI	J28-1	Industrial	SY100E417JI	Sn-Pb
SY100E417JITR[2]	J28-1	Industrial	SY100E417JI	Sn-Pb
SY100E417JC	J28-1	Commercial	SY100E417JC	Sn-Pb
SY100E417JCTR[2]	J28-1	Commercial	SY100E417JC	Sn-Pb
SY100E417JY[3]	J28-1	Industrial	SY100E417JY with Pb-Free bar-line indicator	Matte-Sn
SY100E417JYTR[2, 3]	J28-1	Industrial	SY100E417JY with Pb-Free bar-line indicator	Matte-Sn

Notes:

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

5V LVPECL POWER SUPPLY

$V_{CC_V_{BB}}$ = 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 Dn $\overline{Dn}$	0.5 –600	— —	— —	0.5 –600	— —	— —	0.5 –600	— —	— —	0.5 –600	— —	— —	µA
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 $V_{CC_V_{BB}}$ = 5.0V. Level specifications will vary 1:1 with $V_{CC_V_{BB}}$.

3.3V LVPECL POWER SUPPLY

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}.

3.3V LVPECL POWER SUPPLY

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

100E Differential Output

V_{CCO} = +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_{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:

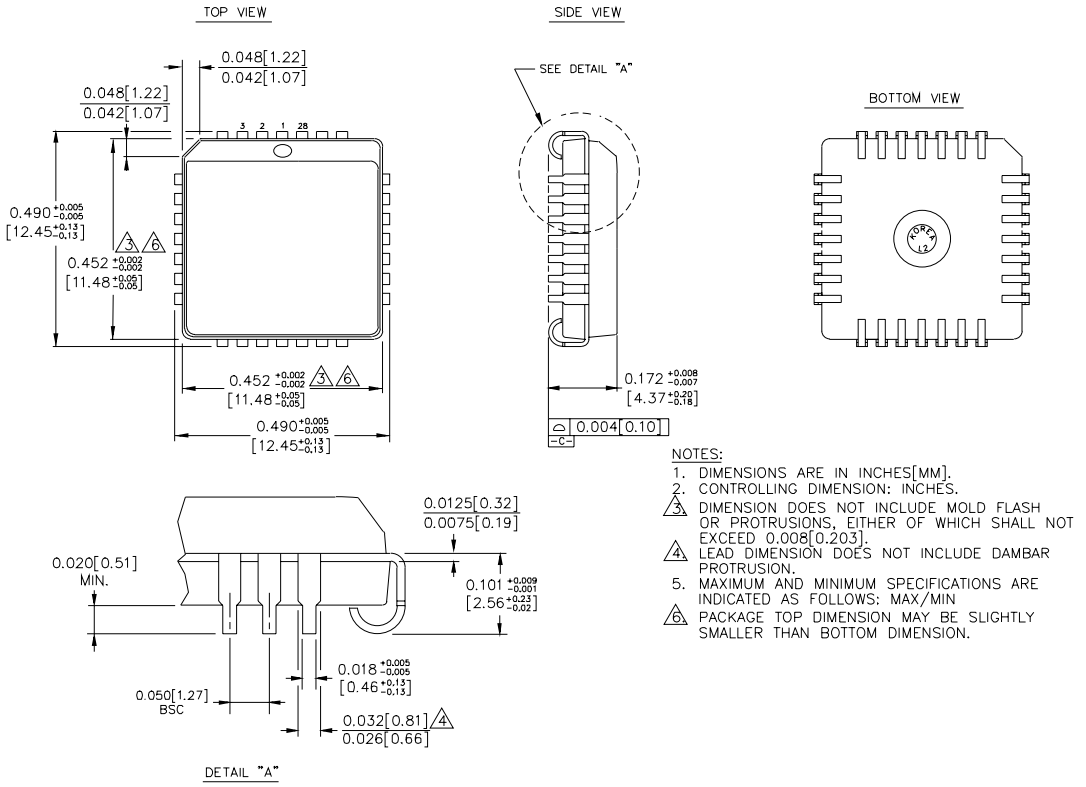
1. These levels are for V_{CCO} = 5.0V. Level specifications will vary 1:1 with V_{CCO}.

AC Electrical Characteristics

Symbol	Parameter	$_A$ = –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.	
t_{PD}	Propagation Delay Diff.	410	510	610	410	510	610	410	510	610	410	510	610	ps
	D to Q S.E.	380	530	680	380	530	680	380	530	680	380	530	680	
t_{skew}	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	—	
V_{PP}	Minimum Input Swing(4)	150	—	—	150	—	—	150	—	—	150	—	—	mV
V_{CMR}	Common Mode Range(5)													V
	V_{PP} < 500mV	1.3	—	V_{CC}–0.2	1.2	—	V_{CC}–0.2	1.2	—	V_{CC}–0.2	1.2	—	V_{CC}–0.2	
	V_{PP} ≥ 500mV	1.5	—	V_{CC}–0.2	1.4	—	V_{CC}–0.2	1.4	—	V_{CC}–0.2	1.4	—	V_{CC}–0.2	
t_r t_f	Output Rise/Fall Times Q (20% to 80%)	320	—	580	320	—	580	320	—	580	320	—	580	ps

Notes:

1. Power supply requirements applies as indicated in the DC electrical characteristics tables.
2. Skew is measured between outputs under identical transitions.
3. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device Common Mode Range.
4. Minimum input swing for which AC parameters are guaranteed. The device has a DC gain of ~40.
5. 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.



NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008[0.203].
4. LEAD DIMENSION DOES NOT INCLUDE DAMBAR PROTRUSION.
5. MAXIMUM AND MINIMUM SPECIFICATIONS ARE INDICATED AS FOLLOWS: MAX/MIN
6. PACKAGE TOP DIMENSION MAY BE SLIGHTLY SMALLER THAN BOTTOM DIMENSION.

Rev. 03

MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA

TEL + 1 (408) 944-0800 FAX + 1 (408) 474-1000 WEB http://www.micrel.com

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