Pin Description

Pin #	Pin Name	I/O Type	Description
1	S0	Input	Select pin 0 (Internal pull-up resistor). See Table 1.
2	S1	Input	Select pin 1 (Internal pull-up resistor). See Table 1.
3	SS0	Input	Spread Select pin 0 (Internal pull-up resistor). See Table 2.
4	X1/CLK	Input	Crystal or clock input. Connect to a 25MHz crystal or single ended clock.
5	X2	Output	Crystal connection. Leave unconnected for clock input.
6	OE	Input	Output enable. Internal pull-up resistor.
7	GNDX	Power	Crystal ground pin.
8	SS1	Input	Spread Select pin 1 (Internal pull-up resistor). See Table 2.
9	IREF	Output	Precision resistor attached to this pin is connected to the internal current reference.
10	$\overline{\text{CLK1}}$	Output	HCSL compliment clock output
11	CLK1	Output	HCSL clock output
12	VDDA	Power	Connect to a +3.3V source.
13	GNDA	Power	Output and analog circuit ground.
14	$\overline{\text{CLK0}}$	Output	HCSL compliment clock output
15	CLK0	Output	HCSL clock output
16	VDDX	Power	Connect to a +3.3V source.

Table 1: Output Frequency Select Table

S1	S0	CLK(MHz)
0	0	25
0	1	100
1	0	125
1	1	200

Table 2: Spread Selection Table

SS1	SS0	Spread
0	0	No Spread
0	1	Down -0.5
1	0	Down -0.75
1	1	No Spread

Application Information

Decoupling Capacitors

Decoupling capacitors of 0.01µF should be connected between each V_{DD} pin and the ground plane and placed as close to the V_{DD} pin as possible.

Crystal

Use a 25MHz fundamental mode parallel resonant crystal with less than 300PPM of error across temperature.

Crystal Capacitors

C_L = Crystals's load capacitance in pF

Crystal Capacitors (pF) = (C_L - 8) *2

For example, for a crystal with 16pF load caps, the external effective crystal cap would be 16 pF. (16-8)*2=16.

Current Source (IREF) Reference Resistor - R_R

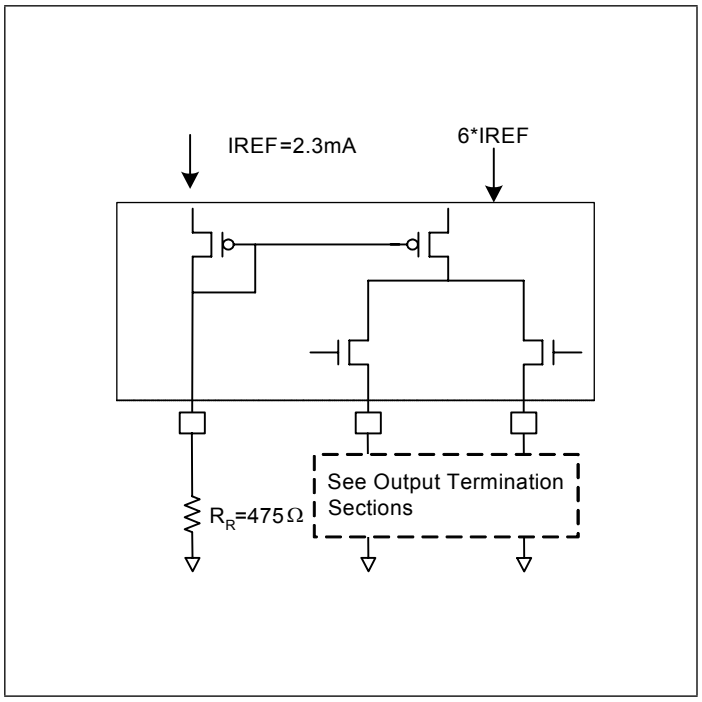
If board target trace impedance is 50Ω,
then R_R = 475Ω providing an IREF of 2.32 mA. The output current (I_{OH}) is 6*IREF.

Output Termination

The PCI Express differential clock outputs of the PI6C557-03A are open source drivers and require an external series resistor and a resistor to ground. These resistor values and their allowable locations are shown in detail in the PCI Express Layout Guidelines section.

The PI6C557-03A can be configured for LVDS compatible voltage levels. See the LVDS Compatible Layout Guidelines section.

Output Structures



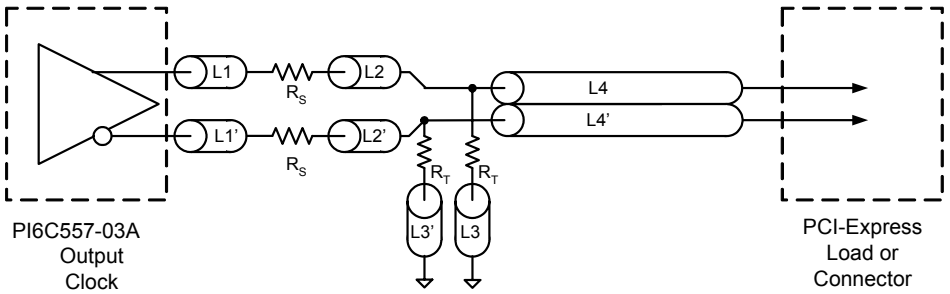
PCI Express Layout Guidelines

Common Recommendations for Differential Routing	Dimension or Value	Unit
L1 length, route as non-coupled 50Ω trace.	0.5 max	inch
L2 length, route as non-coupled 50Ω trace.	0.2 max	inch
L3 length, route as non-coupled 50Ω trace.	0.2 max	inch
R_S	33	Ω
R_T	49.9	Ω

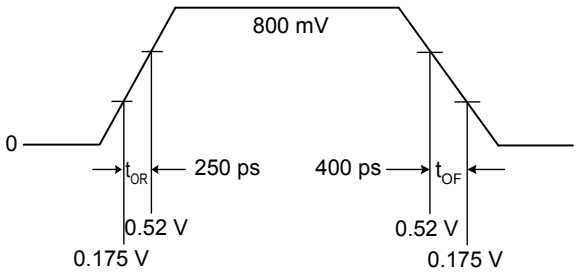
Differential Routing on a Single PCB	Dimension or Value	Unit
L4 length, route as coupled microstrip 100Ω differential trace.	2 min to 16 max	inch
L4 length, route as coupled stripline 100Ω differential trace.	1.8 min to 14.4 max	inch

Differential Routing to a PCI Express connector	Dimension or Value	Unit
L4 length, route as coupled microstrip 100Ω differential trace.	0.25 min to 14 max	inch
L4 length, route as coupled stripline 100Ω differential trace.	0.225 min to 12.6 max	inch

PCI Express Device Routing



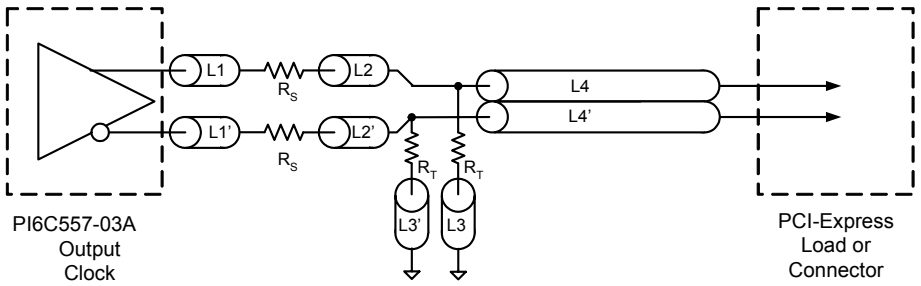
Typical PCI Express (HCSL) Waveform



Application Information

LVDS Recommendations for Differential Routing	Dimension or Value	Unit
L1 length, route as non-coupled 50Ω trace.	0.5 max	inch
L2 length, route as non-coupled 50Ω trace.	0.2 max	inch
RP	100	Ω
RQ	100	Ω
RT	150	Ω
L3 length, route as 100Ω differential trace.		
L3 length, route as 100Ω differential trace.		

LVDS Device Routing



Maximum Ratings

(Above which useful life may be impaired. For user guidelines, not tested.)

Supply Voltage to Ground Potential 5.5V
All Inputs and Outputs . . . . . -0.5V to V_{DD}+0.5V
Ambient Operating Temperature . . . . . -40 to +85°C
Storage Temperature . . . . . -65 to +150°C
Junction Temperature . . . . . 150°C
Soldering Temperature . . . . . 260°C
ESD Protection (Input) . . . . . 2000 V min (HBM)

Note:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Electrical Specifications

Recommended Operation Conditions

Parameter	Min.	Typ.	Max.	Unit
Ambient Operating Temperature	-40		+85	°C
Power Supply Voltage (measured in respect to GND)	+3.0		+3.6	V

DC Characteristics (V_{DD} = 3.3V ±10%, T_A = -40°C to +85°C)

Symbol	Parameter	Conditions		Min.	Typ.	Max.	Unit
V_{DD}	Supply Voltage			3.0	3.3	3.6	V
V_{IH}	Input High Voltage[1]	OE		2.0		V_{DD} +0.3	V
V_{IL}	Input Low Voltage[1]	OE		GND -0.3		0.8	V
I_{IL}	Input Leakage Current	0 < Vin < V_{DD}	With input pull-up and pull-downs	-20		20	µA
			Without input pull-up and pull-downs	-5		5	
I_{DD}	Operating Supply Current	R_L = 50Ω, C_L = 2pF				95	mA
I_{DDOE}		OE = LOW				50	mA
C_{IN}	Input Capacitance	@ 55MHz				7	pF
C_{OUT}	Output Capacitance	@ 55MHz				6	pF
L_{PIN}	Pin Inductance					5	nH
R_{OUT}	Output Resistance	CLK Outputs		3.0			kΩ

Notes:

1. Single edge is monotonic when transitioning through region.

HCSL Output AC Characteristics (V_{DD} = 3.3V ±10%, T_A = -40°C to +85°C)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
F_{IN}	Input Frequency			25		MHz
V_{OUT}	Output Frequency		25		200	MHz
V_{OH}	Output High Voltage (1,2)	100 MHz HCSL output @ V_{DD} = 3.3V	660	800	900	mV
V_{OL}	Output Low Voltage(1,2)		-150	0		mV
V_{CPA}	Crossing Point Voltage(1,2)	Absolute	250	350	550	mV
V_{CN}	Crossing Point Voltage(1,2,4)	Variation over all edges			140	mV
J_{CC}	Jitter, Cycle-to-Cycle(1,3)			35	60	ps
J_{RMS}	PCIe RMS Jitter	PCIe 2.0 Test Method @ 100MHz Output			3.1	ps
MF	Modulation Frequency	Spread Spectrum	30	31.5	33	kHz
t_{OR}	Rise Time(1,2)	From 0.175V to 0.525V	175		500	ps
t_{OF}	Fall Time(1,2)	From 0.525V to 0.175V	175		500	ps
T_{SKEW}	Skew between outputs	At Crossing Point Voltage			50	ps
$T_{DUTY-CYCLE}$	Duty Cycle(1,3)		45		55	%
T_{OE}	Output Enable Time(5)	All outputs			10	µs
T_{OT}	Output Disable Time(5)	All outputs			10	µs
t_{STABLE}	From power-up to V_{DD}=3.3V	From Power-up V_{DD}=3.3V		3.0		ms
t_{SPREAD}	Setting period after spread change	Setting period after spread change		3.0		ms

Notes:

1. R_L = 50-Ohm with C_L = 2 pF
2. Single-ended waveform
3. Differential waveform
4. Measured at the crossing point
5. CLK pins are tri-stated when OE is LOW

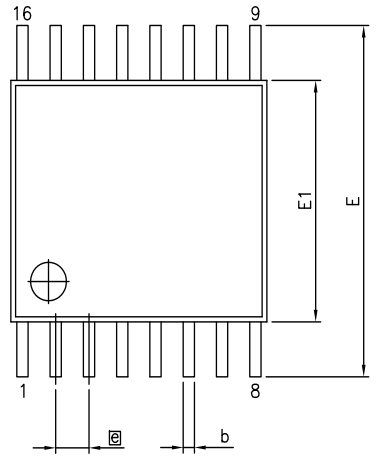
Thermal Characteristics

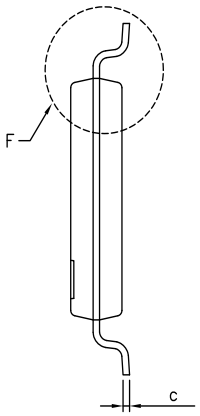
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
θ_{JA}	Thermal Resistance Junction to Ambient	Still air			90	°C/W
θ_{JC}	Thermal Resistance Junction to Case				24	°C/W

Recomended Crystal Specification

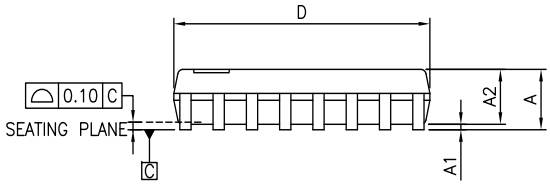
Pericom recommends:
a) GC2500003 XTAL 49S/SMD(4.0 mm), 25M, CL=18pF, +/-30ppm
http://www.pericom.com/pdf/datasheets/se/GC_GF.pdf
b) FY2500081, SMD 5x3.2(4P), 25M, CL=18pF, +/-30ppm
http://www.pericom.com/pdf/datasheets/se/FY_F9.pdf
c) FL2500047, SMD 3.2x2.5(4P), 25M, CL=18pF, +/-20ppm
http://www.pericom.com/pdf/datasheets/se/FL.pdf

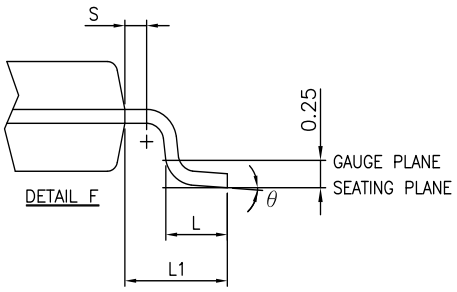
Packaging Mechanical: 16-Pin TSSOP (L)





SYMBOLS	MIN.	NOM.	MAX.
A	–	–	1.20
A1	0.05	–	0.15
A2	0.80	1.00	1.05
b	0.19	–	0.30
c	0.09	–	0.20
D	4.90	5.00	5.10
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
e	0.65 BSC		
L1	1.00 REF		
L	0.45	0.60	0.75
S	0.20	–	–
θ	0°	–	8°





NOTES:
1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.
2. JEDEC MO-153F
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

PERICOM Enabling Serial Connectivity

DATE: 03/24/16

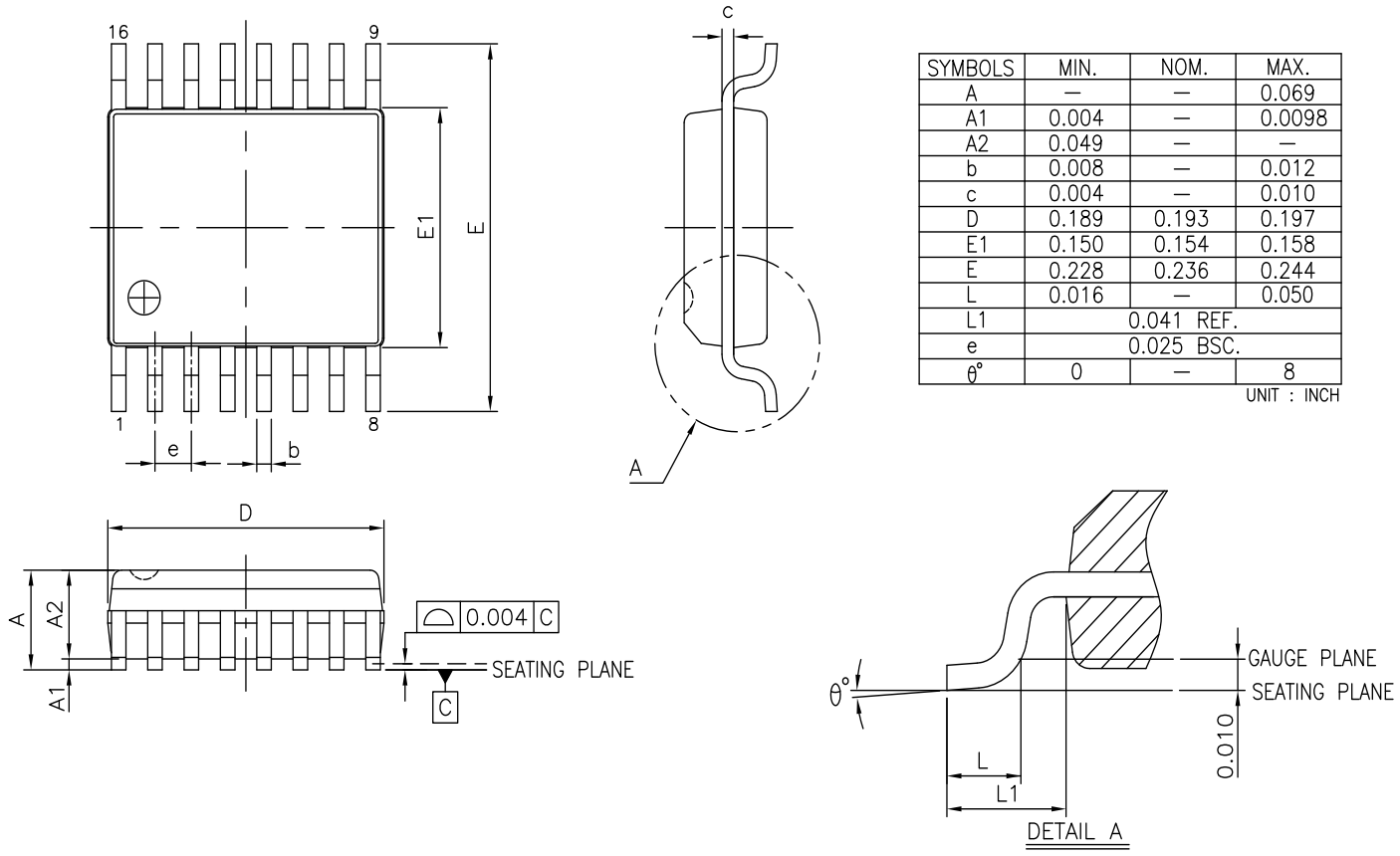
DESCRIPTION: 16-Pin, 173mil Wide TSSOP

PACKAGE CODE: L (L16)

DOCUMENT CONTROL #: PD-1310 REVISION: G

16-0061

Packaging Mechanical: 16-Pin QSOP (Q)



SYMBOLS	MIN.	NOM.	MAX.
A	—	—	0.069
A1	0.004	—	0.0098
A2	0.049	—	—
b	0.008	—	0.012
c	0.004	—	0.010
D	0.189	0.193	0.197
E1	0.150	0.154	0.158
E	0.228	0.236	0.244
L	0.016	—	0.050
L1		0.041 REF.	
e		0.025 BSC.	
θ°	0	—	8

UNIT : INCH

NOTES:
1. ALL DIMENSIONS IN INCH. ANGLES IN DEGREES.
2. JEDEC MO-137E
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

PERICOM Enabling Serial Connectivity

DATE: 04/08/16

DESCRIPTION: 16-Pin, 150mil Wide QSOP

PACKAGE CODE: Q (Q16)

DOCUMENT CONTROL #: PD-1201 REVISION: H

16-0056

For latest package info.

please check: http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/

Ordering Information

Ordering Code	Package Code	Package Type
PI6C557-03ALE	L	16-pin, 173mil Wide (TSSOP)
PI6C557-03ALEX	L	16-pin, 173mil Wide (TSSOP), Tape & Reel
PI6C557-03AQE	Q	16-pin, 150mil Wide (QSOP)
PI6C557-03AQEX	Q	16-pin, 150mil Wide (QSOP), Tape & Reel

Notes:

- Thermal characteristics can be found on the company web site at www.diodes.com/design/support/packaging/
- E = Pb-free and Green
- Adding an X suffix = Tape/Reel

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