Application Note

PI6CDBL401B Low Power PCIe Clock IC
Feature Highlights: 70% IO Power-Saving and 16 Built -in Resistors

PI6CDBL401B in Low Power HCSL

PI6CDBL401B is 1:4 Low Power PCIe clock ZDB buffer. The low power HCSL circuit saves the pull-down current on external termination and still meets Intel's HCSL specification. PI6CDBL401B low power HCSL works the same way as the conventional HCSL while provides the advantage of significant output IO power saving (>70%), and 4 termination resistors on each output pair and a total 16 resistors on 4 output pairs as shown in Figure 1. Figure. 2. in embedded server CPU PCIe port extension with clock design. The PCIe switch ASIC is Pericom PI7C9X2G404E and each port clock needs OE independently by either pin or I2C in system power management when extension port is in idle.
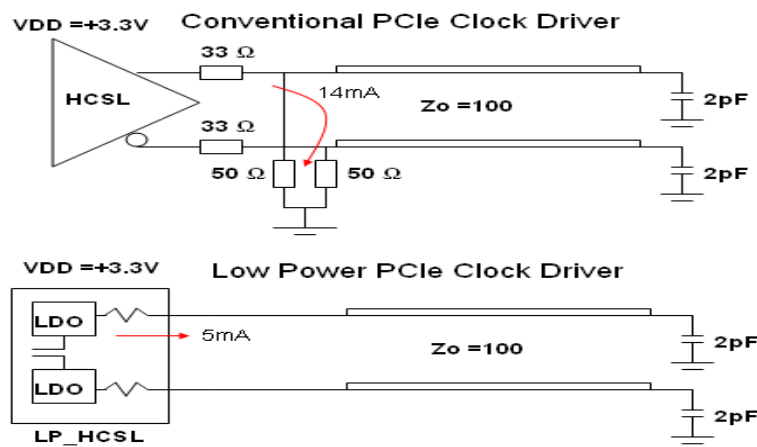

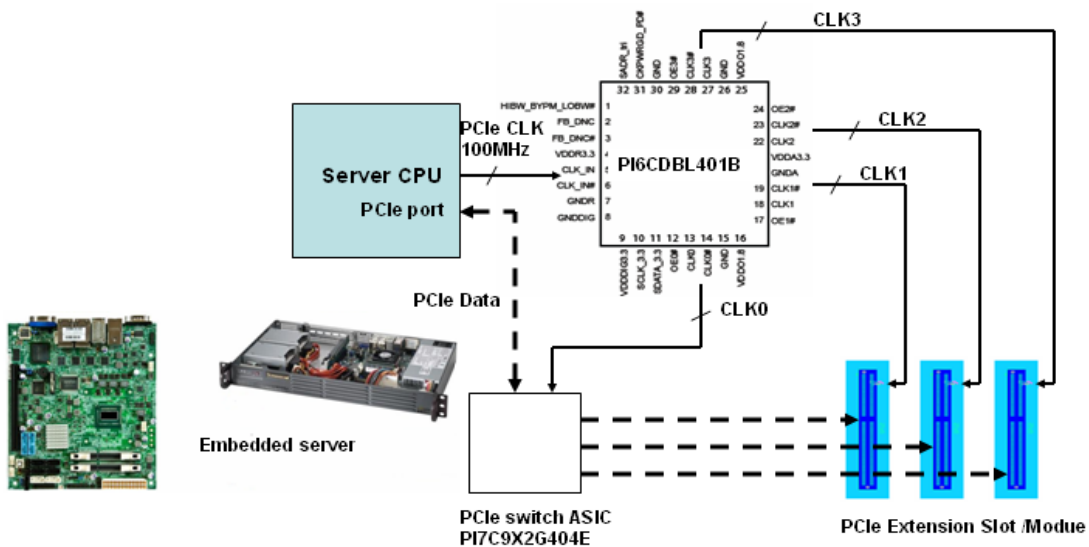Figure. 1. LP_HCSL Advantage vs. Conventional HCSL

Figure. 2. PI6CDBL401A LP_HCSL Clock Buffer in Embedded Server

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Conventional HCSL vs. Low Power HCSL

Conventional HCSL is originally defined by Intel with specifications shown in Figure. 3 as a current mode driver. The CMOS current mode has the advantage of faster drive switch time, but the disadvantage is that more current is needed to generate HCSL voltage on the external 50 pull-down. Table 1 lists HCSL after 10in. end in 2pF load specification. Figure 4 shows the bench waveform between conventional HCSL and LP_HCSL, which has no problem to meet specification too.

Table 1. Conventional HCSL output specification:

Symbol	Parameter	Min	Max	Unit
Edge_rate	Edge rate	1.0	4.0	V/ns
VoH	V high (0.7V typ)	660	850	mV
VoL	V low (0V typ)	-150	150	mV
Vcross	Ab. cross V	250	550	mV
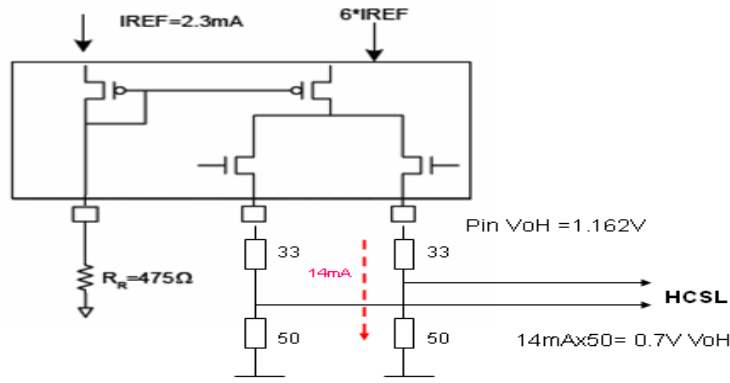
Figure 3. Conventionnel HCSL curent mode circuit
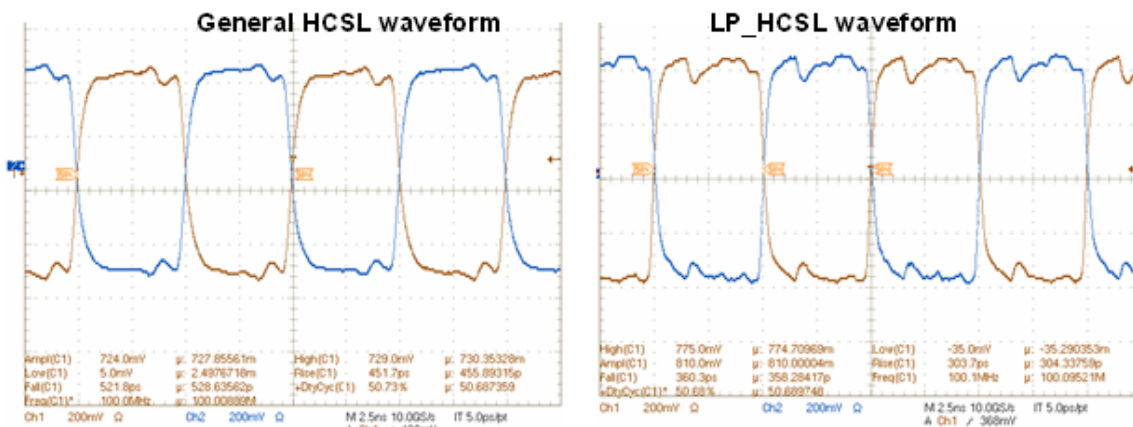
Figure 4. Waveform between Conventional HCSL and LP_HCSL

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More Low Power PCIe Clock IC in TQFN

- PI6CDBL401B, 1:4x100MHz PCIe clock buffer
- PI6CFGL401B, 4x100MHz PCIe clock generator
- PI6CFGL601B, 6x100MHz PCIe clock generator
- PI6CFGL201B, 2x100MHz PCIe clock generator

They are all 3.3V parts in TQFN package and ideal for embedded designs. Pericom is world leading Clock IC manufacturer. For more clock solution, please visit company web site:

Clock Generator: https://www.diodes.com/products/connectivity-and-timing/clock-ics/clock-generators/

Clock Buffer IC: https://www.diodes.com/products/connectivity-and-timing/clock-ics/clock-buffers/