PI33xx/PI34xx Series
8 V – 36 V ZVS Buck Regulators

Description

PI33xx/PI34xx Cool-Power® ZVS Buck Regulators afford board-level designers maximum power density and flexibility for high-efficiency point-of-load DC-DC regulation. The integration of a high performance Zero-Voltage Switching (ZVS) topology within the PI33xx/PI34xx series products increase point-of-load performance, providing best-in-class power efficiency up to 98%. Products in the PI33xx/PI34xx series are highly integrated with control circuitry, power semiconductors and support components in a high density 10 x 14 x 2.56 mm LGA System in Package (SiP). PI33xx Buck Regulators can convert input supplies ranging from 8 to 36 V to output voltages from 1 to 16 V and output current up to 15 A for power delivery up to 120 W. Power delivery can be further increased by inter-leaving multiple buck regulators using single wire current sharing.

Use of a ZVS topology enables high-frequency operation that maximizes efficiency by minimizing the significant switching losses associated with conventional buck regulators using hard-switching topologies. The high switching frequency of the PI33xx/PI34xx series also reduces the size of the external filtering components, improving power density while enabling fast dynamic response to line and load transients. The PI33xx series sustains high switching frequency all the way up to the rated input voltage without sacrificing efficiency and, with its 20 ns minimum on-time, supports large step down conversions up to 36 Vin.

The PI34xx series offers similar features to the PI33xx series, with slightly higher efficiency for 12 Vin systems (8 to 18 Vin).

10 x 14 mm
SiP Land Grid Array
Packaging

Features

Wide Operating Range
- 12 Vin optimized (8 to 18 V) and Wide Vin (8 – 36 V)
- Wide Vout (1 – 16 V)
- -40°C to 125°C operating range

Simple to Use; Fast Development Time
- Internal compensation - few external components
- No additional design or additional settings required

High Efficiency
- >95% peak 36 Vin to 12 Vout
- >96% peak 24 Vin to 12 Vout
- >95% peak 12 Vin to 5 Vout
- Light load and full load high efficiency performance

Flexible and Rich Feature Set
- Paralleling and single wire current sharing
- Frequency synchronization
- User adjustable soft-start & tracking
- Power-up into pre-biased load
- Optional I²C functionality & programmability:
  - Vout margining
  - Fault reporting
  - Enable and SYNCI pin polarity
  - Phase delay (for interleaving multiple regulators)

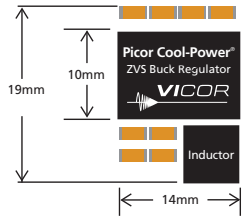
Common High Density Packaging Platform
- 10 x 14 x 2.6 mm LGA SIP package

Part Numbering

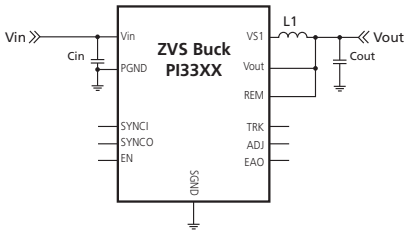
**I²C is a trademark of NXP Semiconductors.*

	Part Number	Output Range Set	Output Range Range	Iout Max
8 – 36 Vin	PI3311-00-LGIZ	1.0 V	1.0 – 1.4 V	10 A
	PI3318-00-LGIZ	1.8 V	1.4 – 2.0 V	10 A
	PI3312-00-LGIZ	2.5 V	2.0 – 3.1 V	10 A
	PI3301-00-LGIZ	3.3 V	2.3 – 4.1 V	10 A
	PI3302-00-LGIZ	5.0 V	3.3 – 6.5 V	10 A
	PI3303-00-LGIZ	12 V	6.5 – 13.0 V	8 A
	PI3305-00-LGIZ	15 V	10.0 – 16.0 V	8 A
	Higher Current Versions			
	PI3311-01-LGIZ	1.0 V	1.0 – 1.4 V	15 A
	PI3318-01-LGIZ	1.8 V	1.4 – 2.0 V	15 A
	PI3312-01-LGIZ	2.5 V	2.0 – 3.1 V	15 A
	PI3301-01-LGIZ	3.3 V	2.3 – 4.1 V	15 A
	I²C Functionality and Programmability			
	PI3311-20-LGIZ	1.0 V	1.0 – 1.4 V	10 A
	PI3318-20-LGIZ	1.8 V	1.4 – 2.0 V	10 A
	PI3312-20-LGIZ	2.5 V	2.0 – 3.1 V	10 A
	PI3301-20-LGIZ	3.3 V	2.3 – 4.1 V	10 A
	PI3302-20-LGIZ	5.0 V	3.3 – 6.5 V	10 A
	PI3303-20-LGIZ	12 V	6.5 – 13.0 V	8 A
	PI3305-20-LGIZ	15 V	10.0 – 16.0 V	8 A
	PI3311-21-LGIZ	1.0 V	1.0 – 1.4 V	15 A
	PI3318-21-LGIZ	1.8 V	1.4 – 2.0 V	15 A
	PI3312-21-LGIZ	2.5 V	2.0 – 3.1 V	15 A
	PI3301-21-LGIZ	3.3 V	2.3 – 4.1 V	15 A
	12 V Optimized Versions			
8 – 18 Vin	PI3420-00-LGIZ	1.0 V	1.0 – 1.4 V	15 A
	PI3421-00-LGIZ	1.8 V	1.4 – 2.0 V	15 A
	PI3422-00-LGIZ	2.5 V	2.0 – 3.1 V	15 A
	PI3423-00-LGIZ	3.3 V	2.3 – 4.1 V	15 A
	PI3424-00-LGIZ	5.0 V	3.3 – 6.5 V	15 A

Basic Application

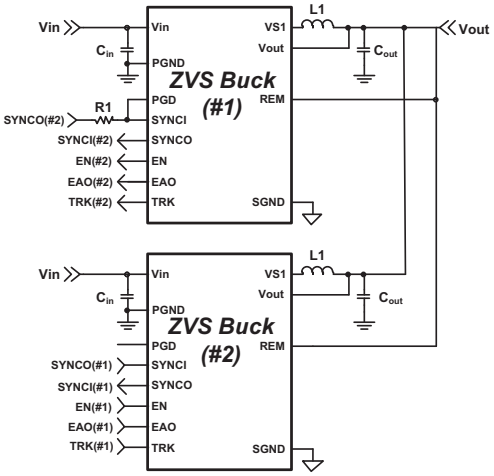


Cool-Power ZVS Buck Regulator with required components and general dimensions



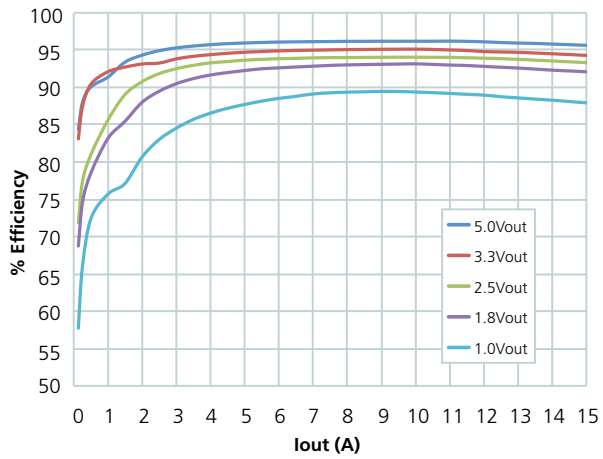
Cool-Power schematic with minimum required external components

Product Details



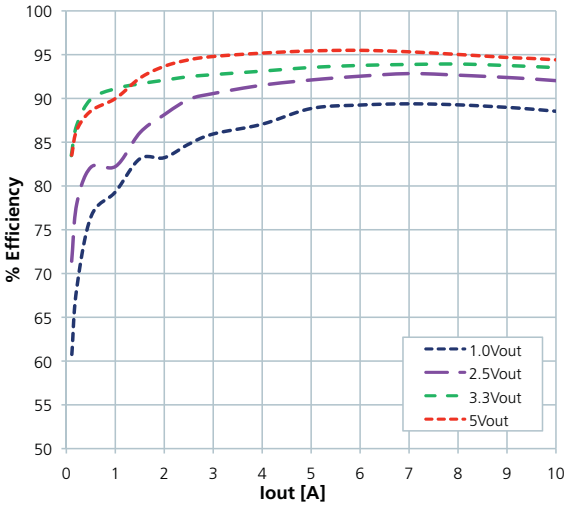
Parallel operation (up to three devices)

Performance (PI34xx-00)

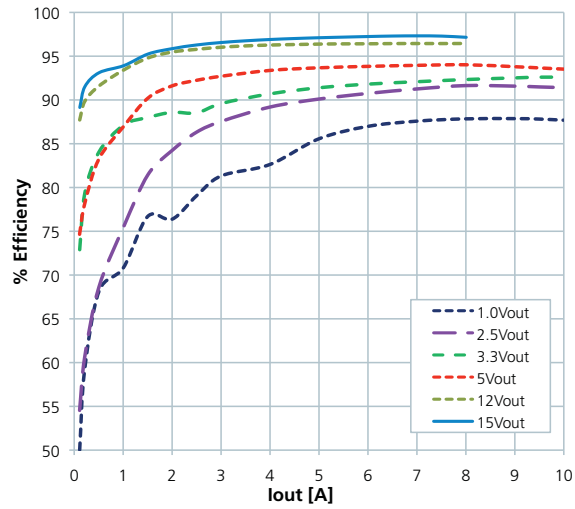


12 Vin efficiency

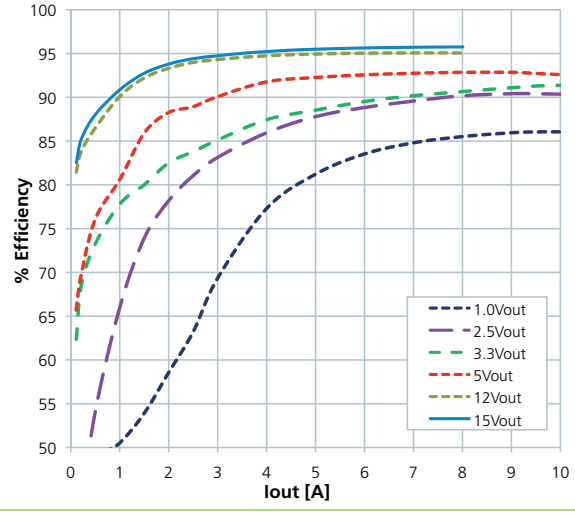
Performance (PI33xx-00)



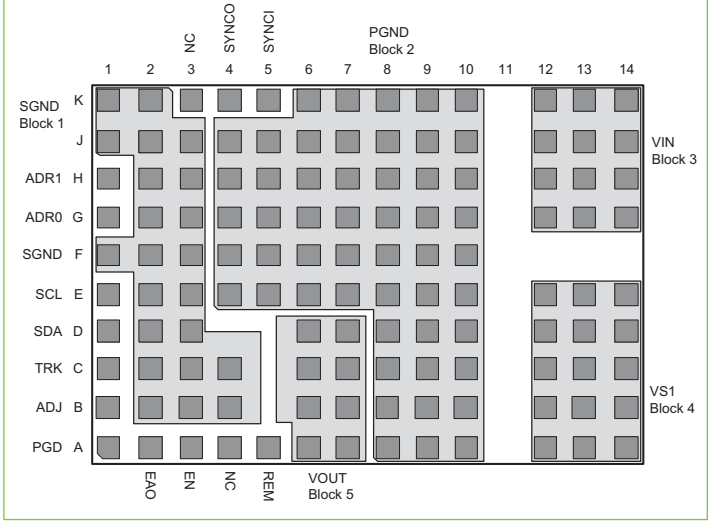
12 Vin efficiency



24 Vin efficiency



36 Vin efficiency



Package pinout