

PI33xx-xx-LGIZ Series

8 V – 36 V ZVS Buck Regulators

Description

PI33XX Cool-Power® ZVS Buck Regulator series affords 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 series increases point-of-load performance, providing best-in-class power efficiency up to 98% peak. Products in the PI33XX 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 18 A for power delivery up to 120 W. Power delivery can be further increased by interleaving up to six PI33XX buck regulators using single wire current sharing without the need of any additional components.

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 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.



10 x 14 mm
SiP Land Grid Array Packaging

Features

Wide operating range

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

Simple to use; Fast Development Time

- Few external components
- No additional design or additional settings required
- Internal compensation

High Efficiency

- 98.3% peak 18 Vin to 15 Vout
- 95.1% peak 36 Vin to 12 Vout
- 96.5% peak 24 Vin to 12 Vout
- 95.5% 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 sync, interleaving up to 6 regulators
- Programmable soft-start & tracking
- Power-up into pre-biased load
- Programmable Enable pin polarity, SYNC1 pin polarity, and phase delay
- I²C™ Vout margining tool (reduces development time)
- Optional I²C fault reporting

Common high density packaging platform

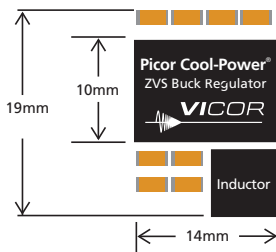
- 10 x 14 mm SiP Land Grid Array Packaging

Part Numbering

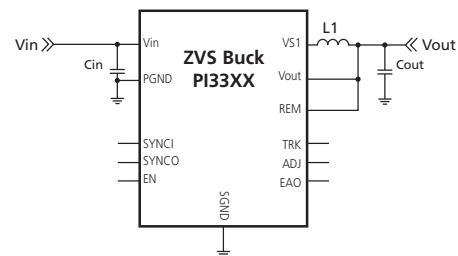
Part Number	Output Range		Iout Max
	Set	Range	
PI3311-00-LGIZ	1.0 V	1.0 – 1.4 V	10 A
PI3312-00-LGIZ	2.5 V	2.0 – 3.1 V	10 A
PI3301-00-LGIZ	3.3 V	2.3 – 4.1 V	10 A
PI3302-00-LGIZ	5.0 V	3.3 – 6.5 V	10 A
PI3303-00-LGIZ	12 V	6.5 – 13.0 V	8 A
PI3305-00-LGIZ	15 V	10.0 – 16.0 V	8 A
Higher Current Versions			
PI3311-01-LGIZ	1.0 V	1.0 – 1.4 V	18 A
PI3312-01-LGIZ	2.5 V	2.0 – 3.1 V	18 A
PI3301-01-LGIZ	3.3 V	2.3 – 4.1 V	18 A
I²C Interface Options			
PI3311-20-LGIZ	1.0 V	1.0 – 1.4 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	18 A
PI3312-21-LGIZ	2.5 V	2.0 – 3.1 V	18 A
PI3301-21-LGIZ	3.3 V	2.3 – 4.1 V	18 A

*I²C is a trademark of NXP Semiconductors.

Cool-Power and External Components

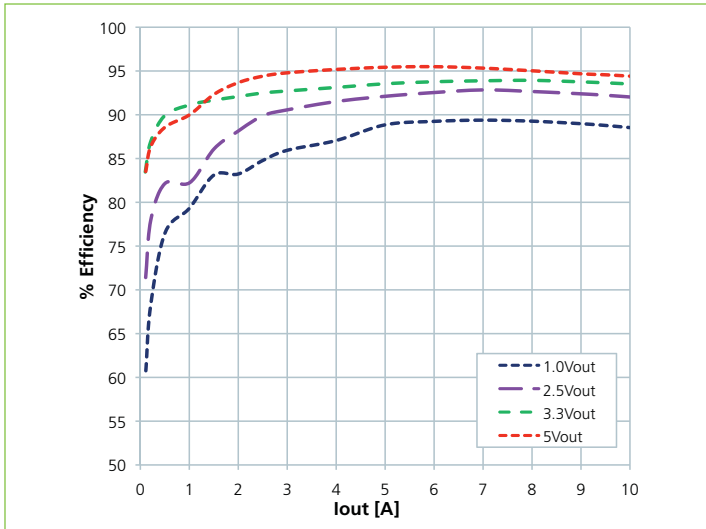


Cool-Power (shown actual size),
required components and general dimensions.



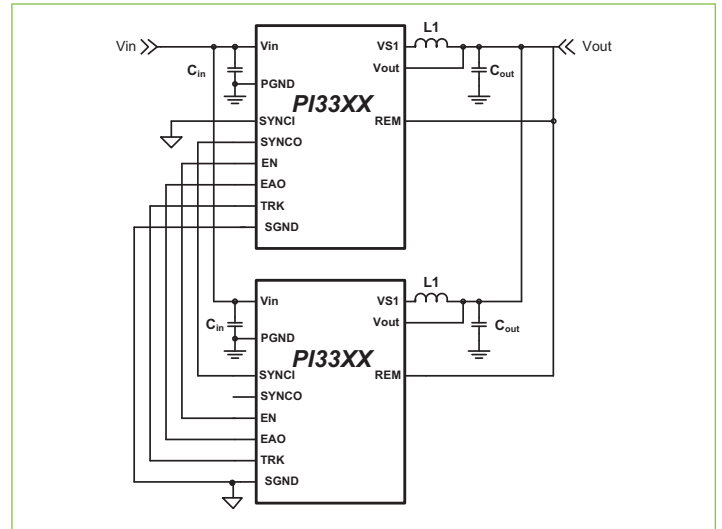
Cool-Power schematic with minimum
required external components

Performance

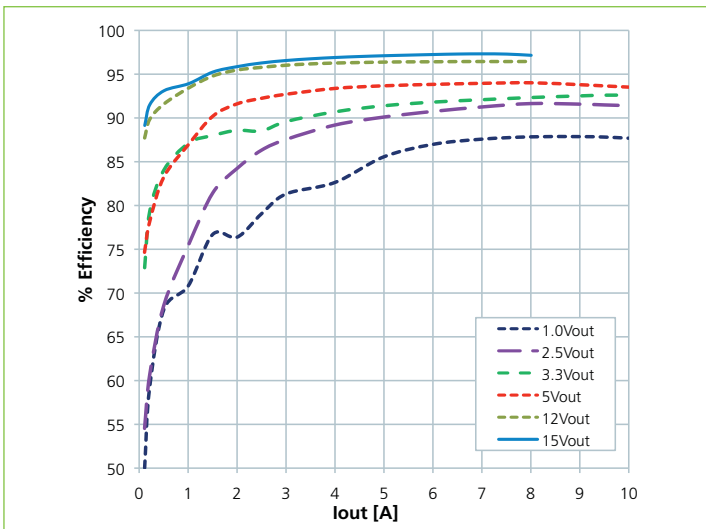


12 Vin efficiency

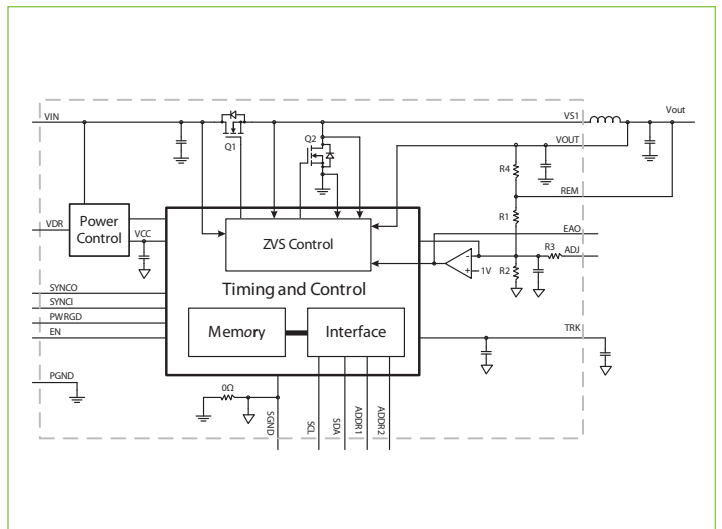
Product Details



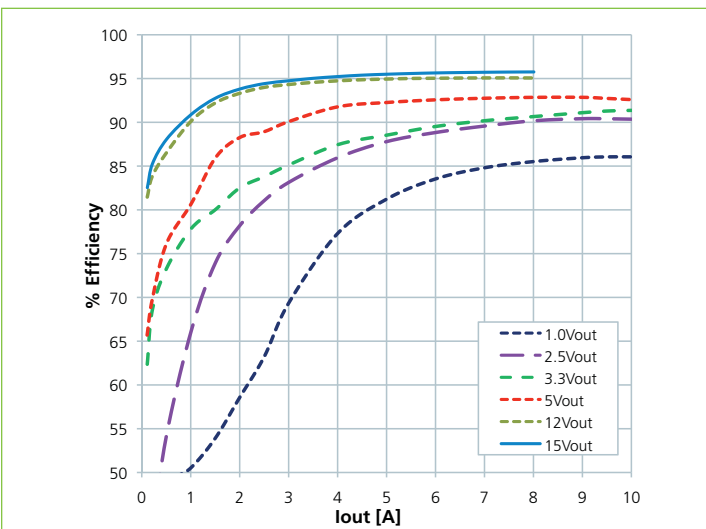
Parallel operation from two (2) to six (6) devices



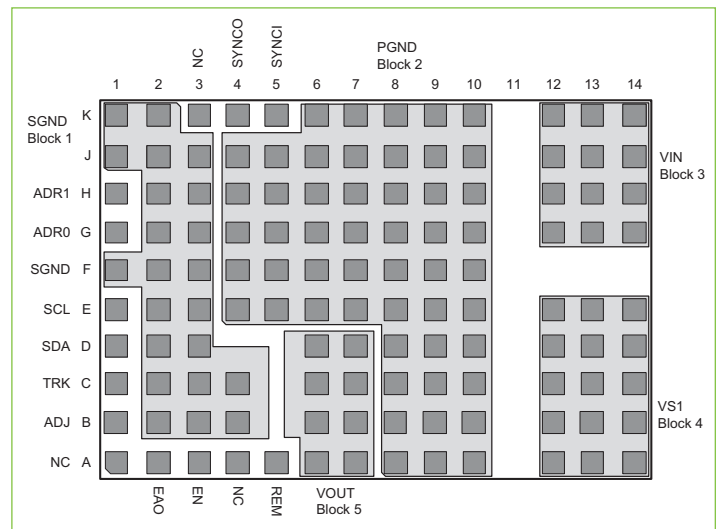
24 Vin efficiency



Block diagram



36 Vin efficiency



Package pinout