

## microBUCK® Highly Integrated Synchronous Buck Regulators



### FEATURES

- Compact scalable highly integrated solutions
- Output and over voltage protection
- > 93 % peak efficiency
- Easy to use and highly flexible CAD tool aids in design simulations to select right part
- Programmable soft-start and soft-shutdown
- Integrated Power MOSFETs

### APPLICATIONS

- Desktop and server computers
- Notebook computers
- Digital HDTV and digital consumer applications
- Networking and telecommunication equipment
- LCD TV, STB, and other consumer applications
- Embedded applications
- Point of load power supplies

### RESOURCES

- microBUCK product family datasheets: <http://www.vishay.com/power-ics/integrated-microbuck/>
- PowerCAD Simulation Design Tool: <http://www.vishay.com/power-ics/powercad-list/>
- For technical questions, contact [PowerICtechsupport@vishay.com](mailto:PowerICtechsupport@vishay.com)





**POWER ICS**  
microBUCK® PRODUCT FAMILY



Power ICS - Compact Scalable Highly Integrated Solutions

microBUCK® PRODUCT FAMILY

		SiC401 A/B	SiC402 A/B	SiC403 A/B	SiC413	SiC414/424
	Package	MLPQ55-32L			SO-8	MLPQ44-28
	Package Size	5 x 5 x 0.9 (mm)			6.2 x 5 x 0.9 (mm)	4 x 4 x 0.9 (mm)
Operating Conditions	V <sub>IN</sub>	3 V to 17 V	3 V to 28 V	3 V to 28 V	4.75 V to 26 V	3 V to 28 V
	V <sub>OUT</sub>	0.6 V to 5.5 V			0.6 V to 13.2 V	0.75 V to 5.25 V
	Operating Frequency	200 kHz to 1 MHz			500 kHz	200 kHz to 1 MHz
	I <sub>OUT</sub>	15 A	10 A	6 A	4 A	6 A
	Power save mode	•	•	•		•
	Peak efficiency	95 %	95 %	95 %	93 %	95 %
	Power good	•	•	•		•
Protection Features	Under voltage lockout	•	•	•	•	•
	Output over-voltage protection	•	•	•	•	•
	Output over-current protection	•	•	•	•	•
	Short circuit protection	•	•	•		
	Over temperature protection	•	•	•	•	•
Features	Soft-start and soft-shutdown	Programmable			Internal	Internal
	Integrated configurable LDO with bypass logic	•	•	•		•
	Output ceramic capacitor (no ESR requirement)	•	•	•	•	•
	Pseudo-fixed frequency adaptive on-time control	•	•	•		•
	1 % internal reference voltage	•	•	•		•
	Integrated bootstrap diode	•	•	•	•	•



**POWER ICS**  
microBUCK® PRODUCT FAMILY



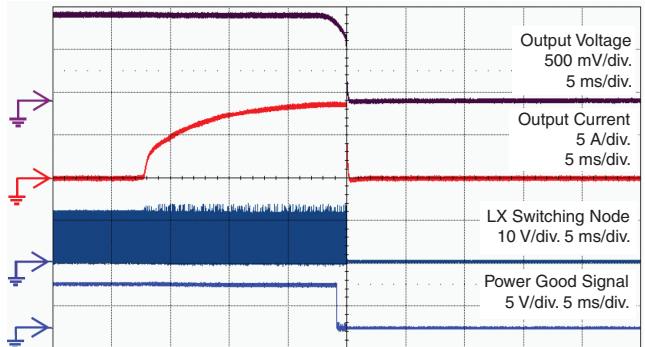
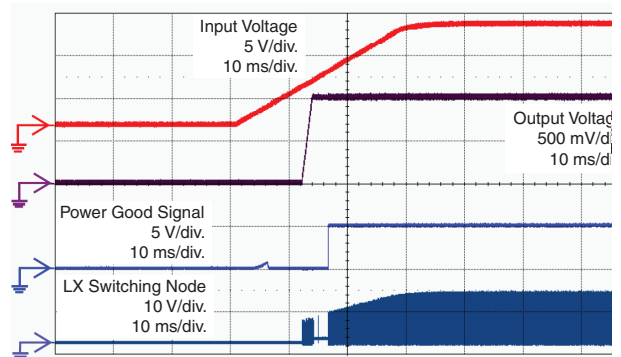
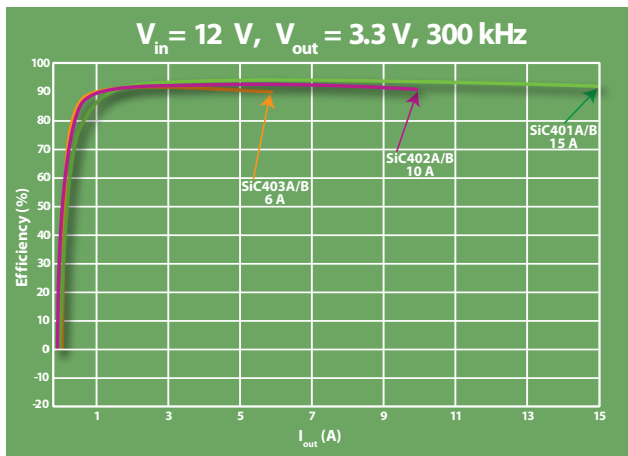
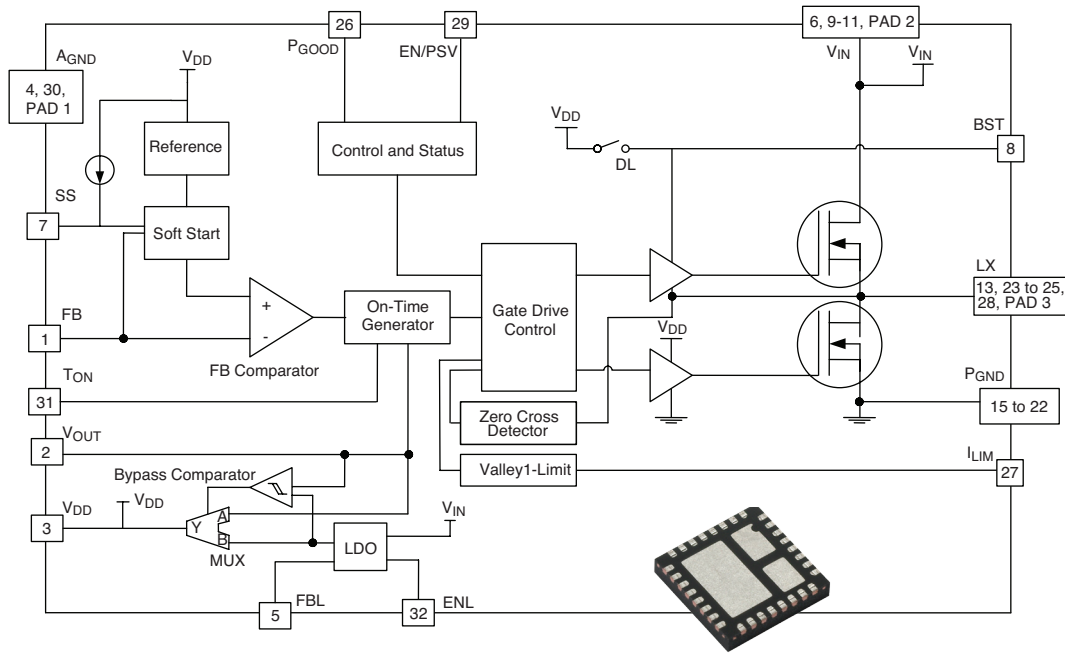
Power ICS - Compact Scalable Highly Integrated Solutions

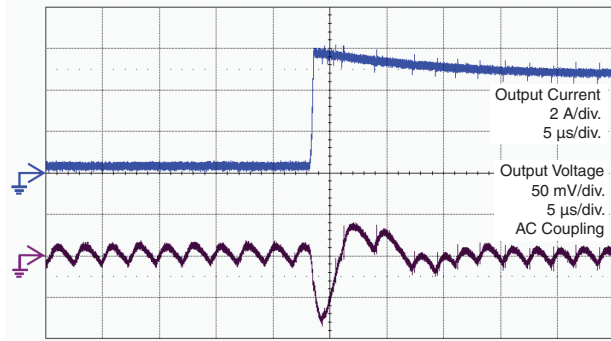
microBUCK® PRODUCT FAMILY (continued...)

	SiP12107	SiP12108	SiP12109	SiP12110	
<b>Package</b>	MLP33-16L				
<b>Package Size</b>	3 x 3 x 0.9 (mm)				
<b>Operating Conditions</b>	<b>V<sub>IN</sub></b>	2.8 V to 5.5 V		4.5 V to 16 V	
	<b>V<sub>OUT</sub></b>	0.6 V to 4.6 V		0.6 V to 5.5 V	
	<b>Operating Frequency</b>	200 kHz to 4 MHz	200 kHz to 4 MHz	400 kHz to 1.5 MHz	400 kHz to 1.5 MHz
	<b>I<sub>OUT</sub></b>	3 A	6 A	4 A	6 A
	<b>Power save mode</b>	•	•	•	•
	<b>Peak efficiency</b>	95 %	95 %	95 %	95 %
	<b>Protection Features</b>	<b>Power good</b>	•	•	•
<b>Under voltage lockout</b>		•	•	•	•
<b>Output over-voltage protection</b>		•	•	•	•
<b>Output over-current protection</b>		•	•	•	•
<b>Short circuit protection</b>		•	•	•	•
<b>Over temperature protection</b>		•	•	•	•
<b>Features</b>	<b>Soft-start and soft-shutdown</b>	Internal			
	<b>Output ceramic capacitor (no ESR requirement)</b>	•	•	•	•
	<b>Pseudo-fixed frequency adaptive on-time control</b>	•	•	•	•
	<b>1 % internal reference voltage</b>	•	•	•	•
	<b>Integrated bootstrap diode</b>			•	•

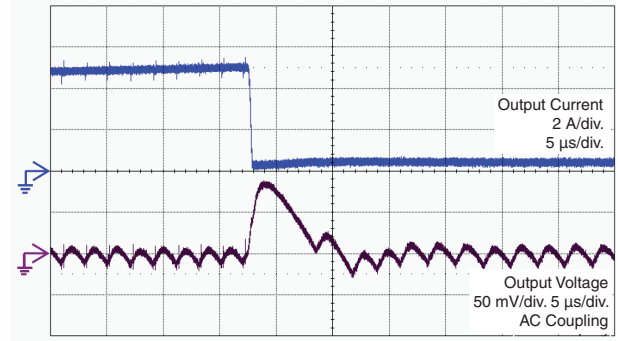
**SIC401A/B, SIC402A/B, and SIC403A/B**

**FUNCTIONAL BLOCK DIAGRAM**

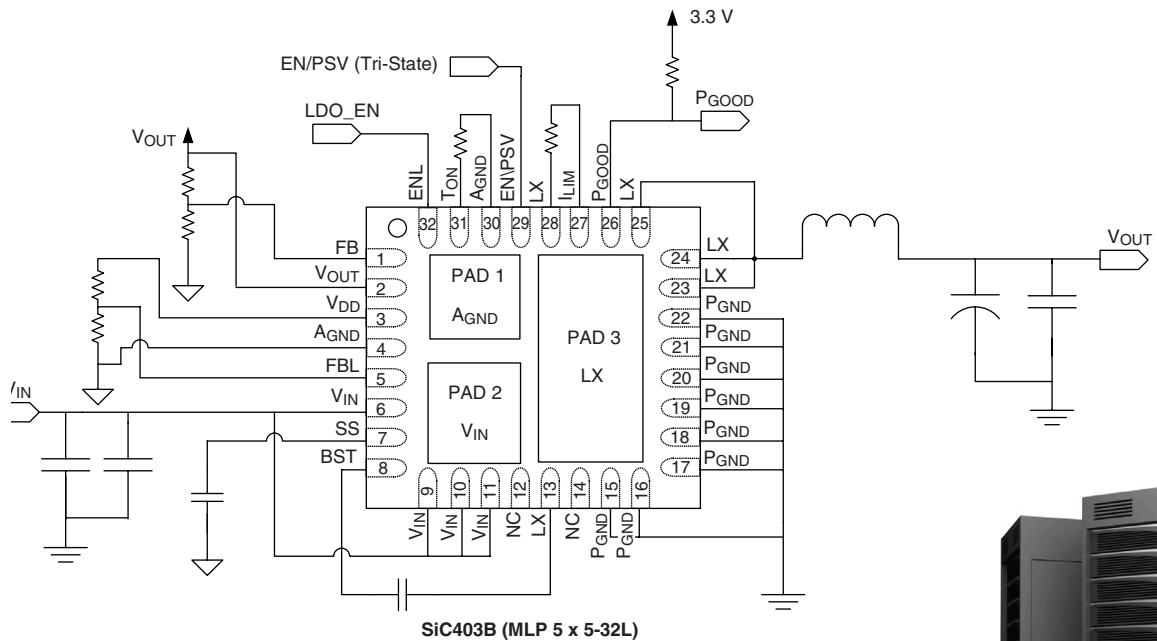


**SIC401A/B, SIC402A/B, and SIC403A/B (continued...)**


Transient response in continuous conduction mode  
 (0.2 A - 6 A)  
 ( $V_{IN} = 12\text{ V}$ ,  $V_{OUT} = 1\text{ V}$ , FSW = 500 kHz)



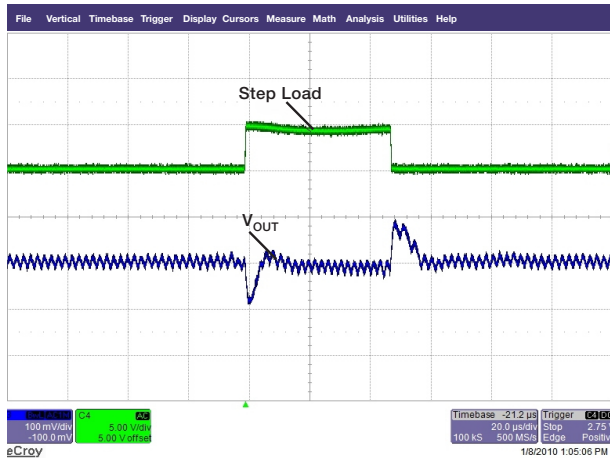
Transient response in continuous conduction mode  
 (6 A - 0.2 A)  
 ( $V_{IN} = 12\text{ V}$ ,  $V_{OUT} = 1\text{ V}$ , FSW = 500 kHz)

**TYPICAL APPLICATION CIRCUIT**


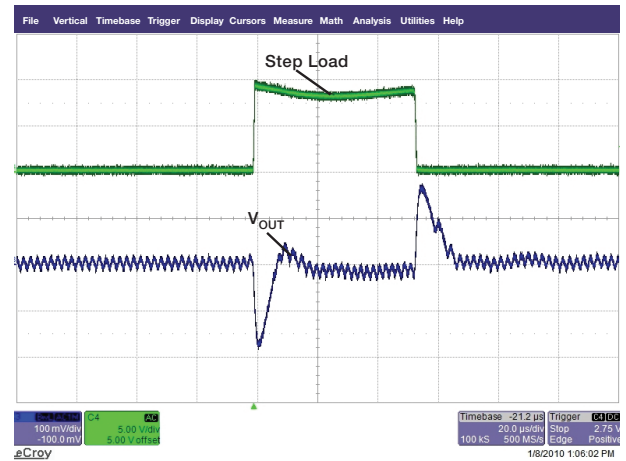


Power ICs - Compact Scalable Highly Integrated Solutions

SIC401A/B, SIC402A/B, and SIC403A/B (continued...)



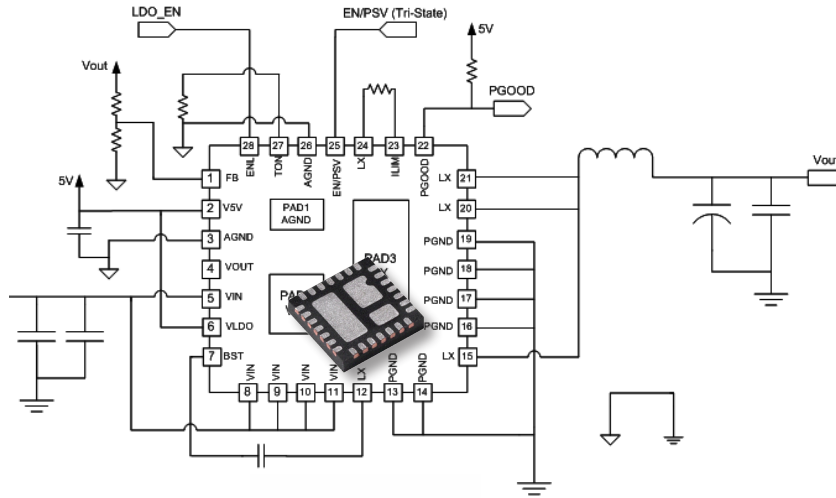
Transient response  $I_{OUT}$  5 A



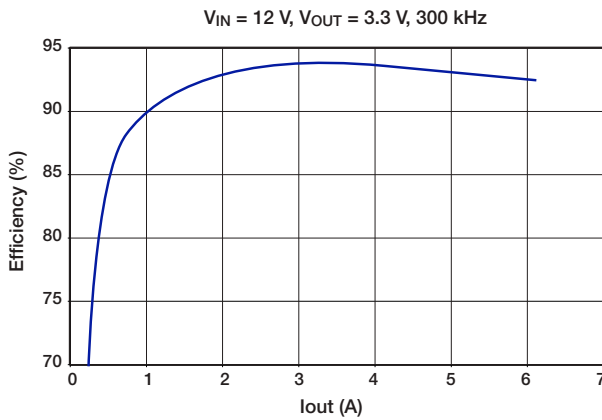
Transient response  $I_{OUT}$  10 A



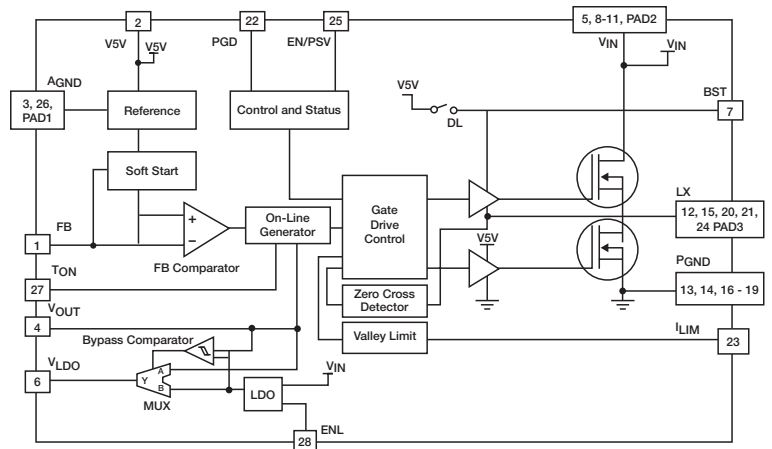
**SiC414**



SiC414CD typical application circuit

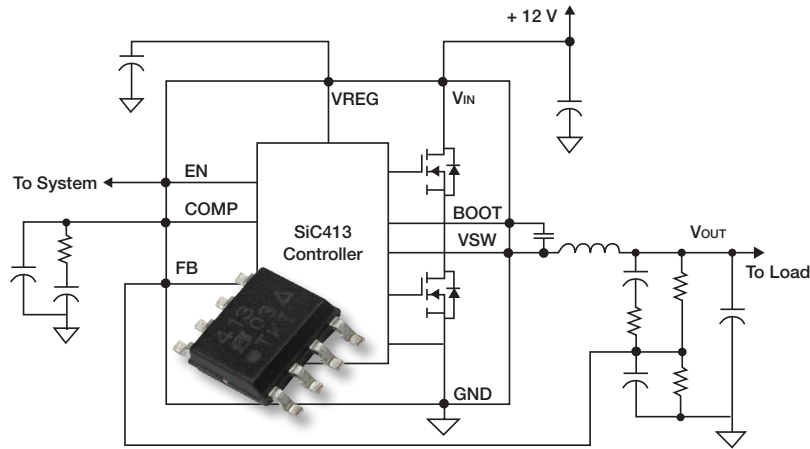


SiC414CD efficiency curve

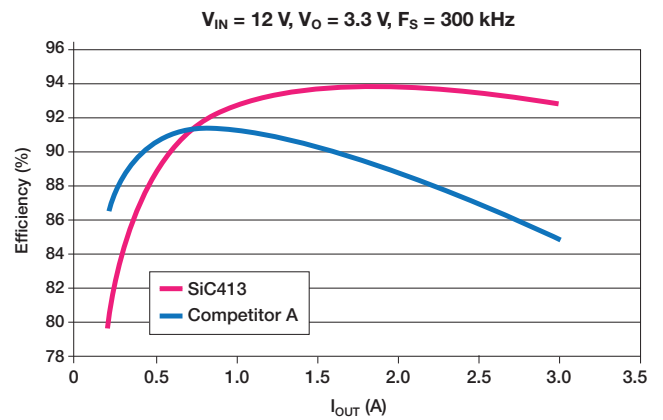


SiC414CD block diagram

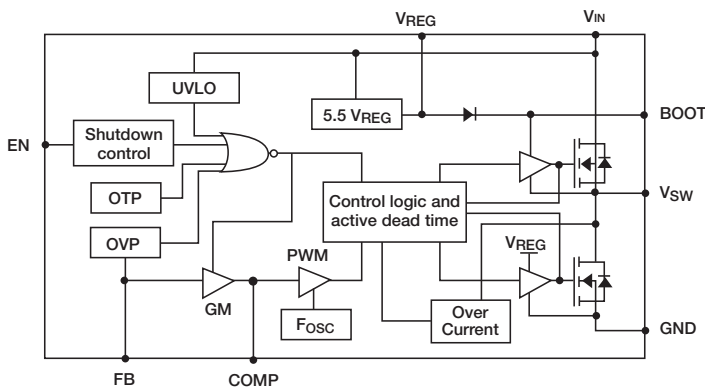
**SIC413**



SiC413CB typical application circuit



SiC413CB versus competitor efficiency

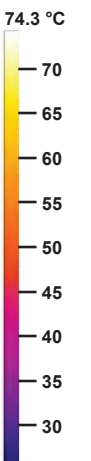
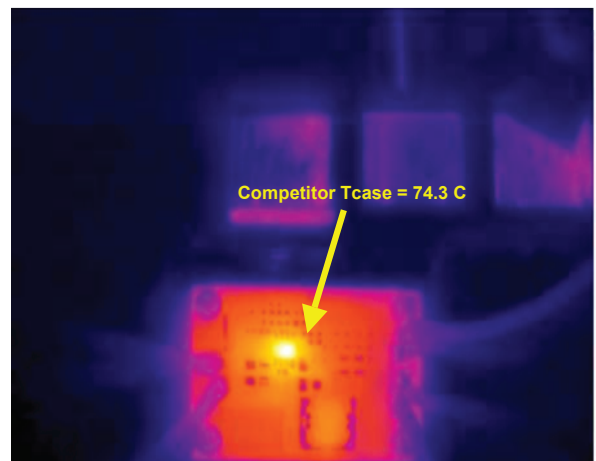
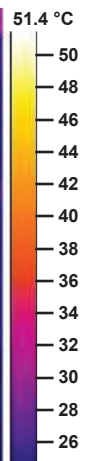
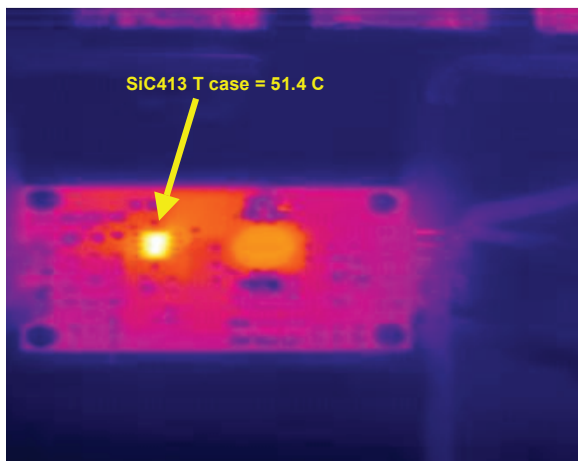


SiC413CB block diagram



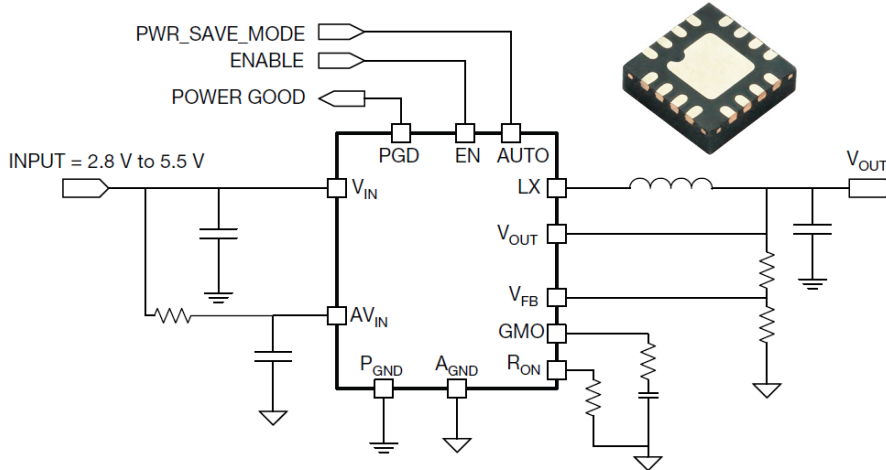
**SIC413**

SiC413CB Versus Competitor Thermals	
SiC413 is 23.2 °C cooler	
$V_{IN}$	12 V
$V_{OUT}$	3.3 V
$I_{OUT}$	3.0 A
SiC413 efficiency	93 %
Competitor's efficiency	85 %

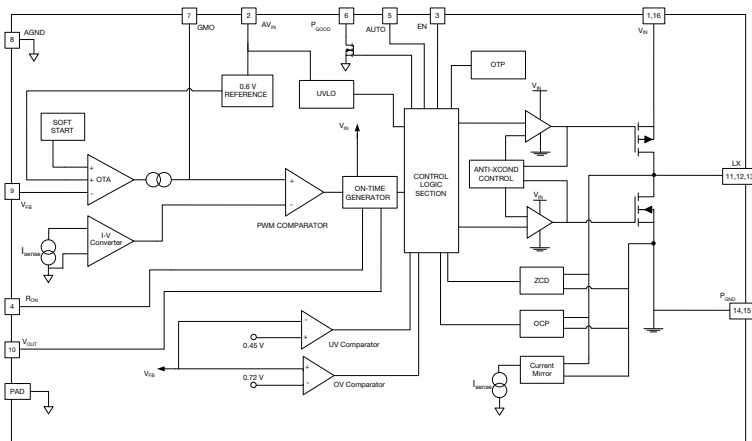


SiC413CB versus competitor thermals

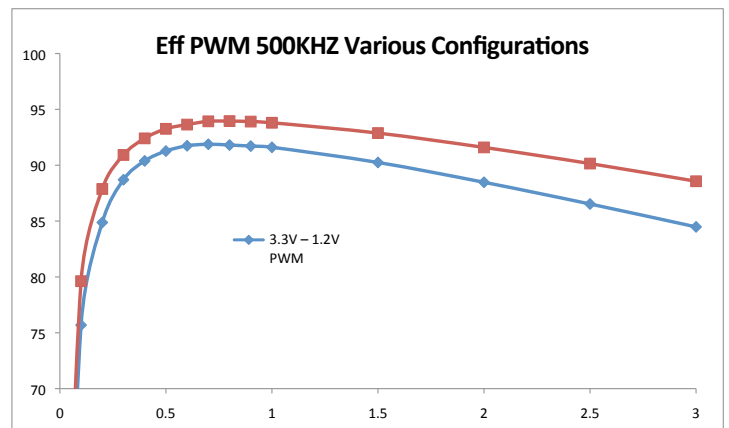
**SIP12107**



SiP12107 Typical Application Circuit

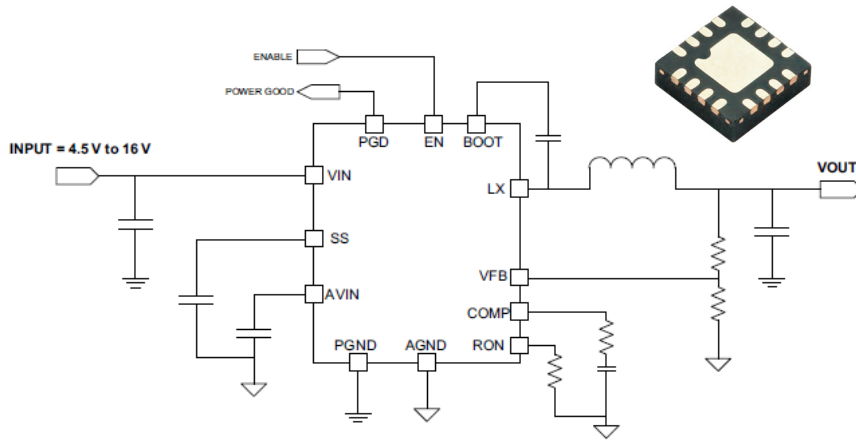


SiP12107 Typical Block Diagram

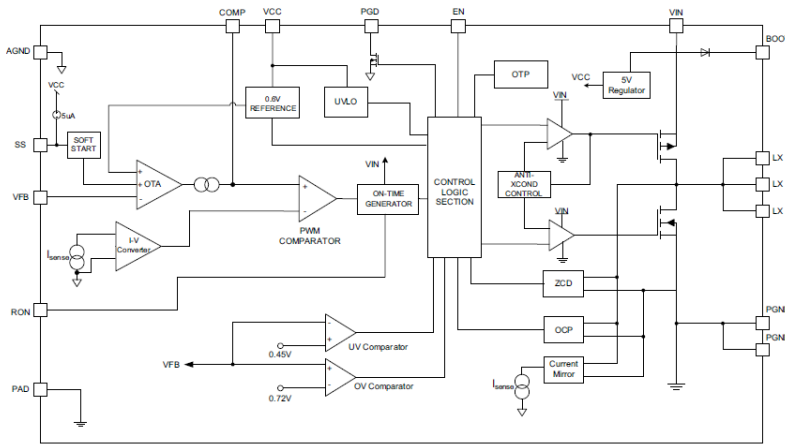


SiP12107 Efficiency Curve

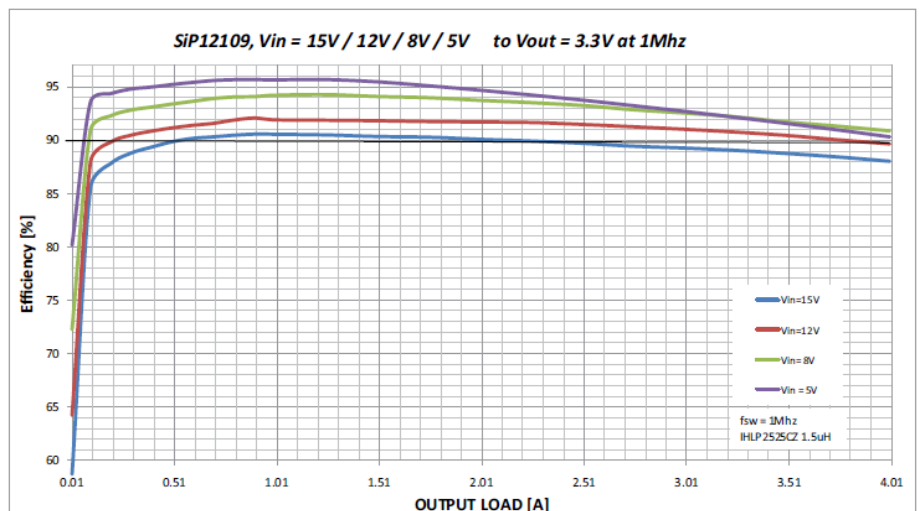
**SIP12109**



SiP12109 Typical Application Circuit



SiP12109 Block Diagram



SiP12109 Efficiency Curve

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[>>Vishay\(威世\)](#)