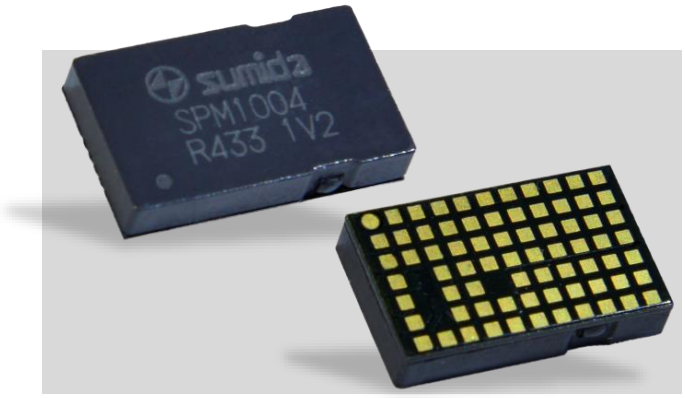
Power Supply in Inductor (PSI²)®



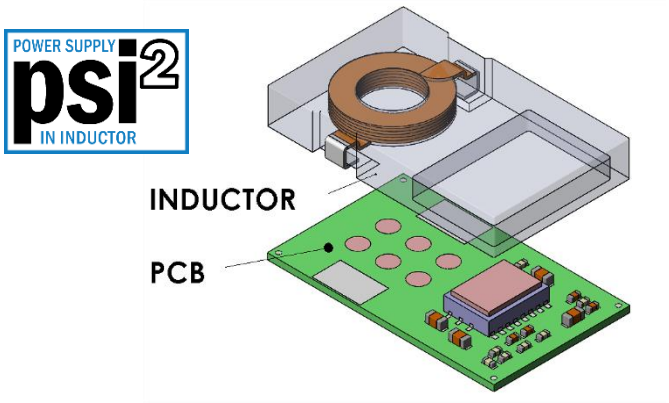
The next step in integration!

All components integrated INSIDE inductor

SUMIDA offers a new range of fully integrated power modules with outstanding performance and industry-leading power density. SUMIDA has leveraged its extensive experience in inductor technology to achieve the highest available efficiency as well as optimized packaging for thermal management.

Benefits of PSI² technology:

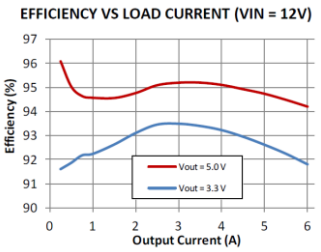
- The maximum amount of magnetic material is used, rather than plastic fillers, allowing low loss and high efficiency
- The coil can use thicker wire for lower resistive losses and higher efficiency
- The magnetic material is thermally conductive, avoiding hot spots
- The inductor provides electromagnetic shielding for the switching components
- The integrated power module is fully tested and dramatically simplifies the end product design
- The small size and very low profile (3 mm) package reduces board space, allowing higher density designs



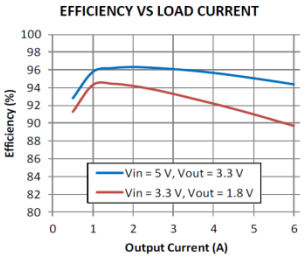
Efficiency

Industry leading efficiency

The high performance inductor minimizes losses at full load, and the circuit topology maintains excellent efficiency over the entire load range.



SPM1004



SPM1005

Thermal

Over 11°C cooler, no “hot spots”

The measured surface temperature is reduced by 11.5°C compared to a power module with an internal inductor under identical conditions (Figure 1). High thermal conductivity avoids "hot spots" (Figure 2).

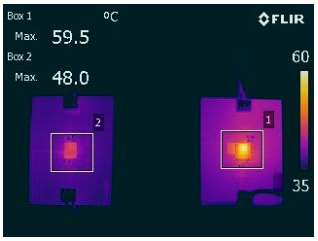


Figure 1 - Comparison

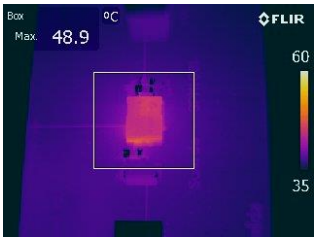


Figure 2 – SPM1005

Power density

High power density, up to 1600W/cu in

Land Grid Array (LGA) package with a very low profile (3mm), and the footprint is only 9x15mm (SPM1004 and SPM1006) or 9x11mm (SPM1005). All major components are internal to the module, minimizing total board area for high density applications.

Design time

Pre-tested module simplifies your design

Modules are qualified to IPC9592B standard, Class II. They are fully tested during production and are guaranteed to meet specifications. This simplifies the end product design and PCB layout, and avoids surprises during system testing. In contrast, a power design based on separate components on the end product PCB is higher risk and typically takes much longer to develop and debug.

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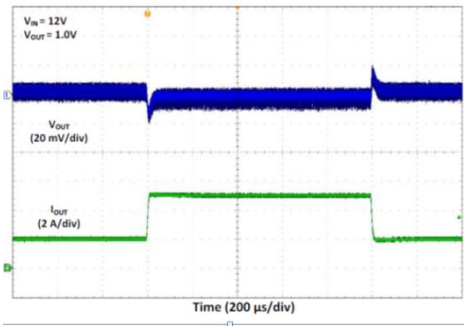
Transient response

Excellent response under step load

The circuit topology has been chosen to provide an excellent response under transient load. The figure shows less than 20mV transient under a 3A load step (SPM1004, Vin=12V and Vout=1V):



SPM1004 (Vin=12V and Vout=1V)

Applications

- Broadband and communications equipment
- DSP and FPGA Point of Load applications
- High density distributed power systems
- Automated PCI / PCI express / PXI express
- Automated test and medical equipment

Specification summary

Visit www.sumida.com for full datasheets

Parameter	Conditions	SPM1004	SPM1005	SPM1006
Input voltage		9 - 15V	2.95-6V	4 - 28V
Output current	-40 to +85°C	0-6A	0-6A	0-8A[1]
Output voltage		Fixed 0.8 - 5V	Adjustable 0.6 - 3.3V	Adjustable 0.6 - 5V[2]
Efficiency	6A load	94.2% @5V	94.2% @3.3V	93% @5V
	3A load	95.2% @5V	96.1% @3.3V	94.1% @5V
Features		Power good output		
		Enable input		
		Soft start		
		Auxiliary output		
Protection		Overcurrent protection		
		Overvoltage protection		
		Undervoltage lockout		
		Thermal shutdown		
Package - LGA	Height	3 mm		
	Footprint	9 x 15 mm	9 x 11 mm	9 x 15 mm
	Pad size	0.63 mm		
Thermal	No airflow	-40 to +85°C		

[1] Maximum 6A continuous at 85°C; refer to datasheet
[2] Higher output voltage available – consult Sumida

EMI performance

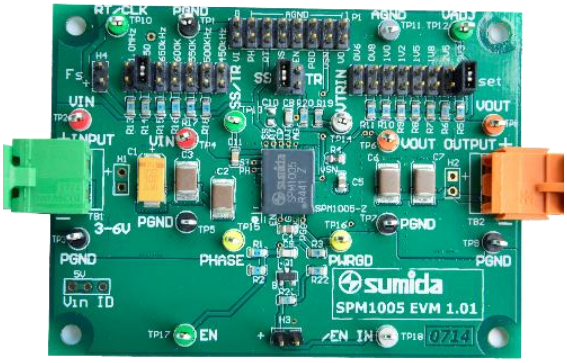
Low radiated EMI

The inductor material is conductive and acts as a shield over the internal components. All internal power traces are very short, minimizing the loop area and further reducing radiated EMI.

Evaluation boards

Available on request

SPM1004 and SPM1006 Evaluation Boards



SPM1005 Evaluation Board

Ordering information

Output Voltage	SPM1004	SPM1005	SPM1006
Adjustable	(NA)	SPM1005-ZC	SPM1006-ZC
5.0V	SPM1004-5V0C	Fixed output voltage available on request	
3.3V	SPM1004-3V3C		
2.5V	SPM1004-2V5C		
1.8V	SPM1004-1V8C		
1.5V	SPM1004-1V5C		
1.2V	SPM1004-1V2C		
1.0V	SPM1004-1V0C		
0.8V	SPM1004-0V8C		
EVM	EVM1004	EVM1005	EVM1006

To learn more about this product please email PowerModules@us.sumida.com.

For more information on this and other Sumida products, visit **www.sumida.com.**

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