Pulsiv

DISCOVER

THE FUTURE OF POWER CONVERSION

Achieve breathtaking efficiency, performance, and sustainability with Pulsiv technology

DESIGNED & DEVELOPED IN GREAT BRITAIN

ENERGY WASTE COSTS THE EARTH

Billions of electronic devices waste energy every single day.

We think it's time to do better.

OUR VISION IS SIMPLE:

A world where every device can "do more while using less"

We're taking innovation to an entirely new level by redefining power conversion for the global electronics industry. Our patented technology enables the next generation of products to maximise efficiency, be more economical, and waste less energy. This is good for consumers, manufacturers, and the planet.

Our team is committed to helping minimize the environmental harm caused by billions of electronic devices while supporting the global transition to renewable energy.

ABOUT PULSIV

Pulsiv was founded in 2013 by Dr Zaki Ahmed after he successfully patented new & intelligent methods for improving power conversion efficiency. Located in Cambridge (UK) and Plymouth (UK), we design & develop world-leading electronic solutions for AC to DC Power Supplies and Solar Energy applications using a growing suite of over 86 patents. Our unique power electronics technology can benefit billions of consumer & industrial devices whilst also enhancing every photovoltaic installation around the world.

Our goal is to maximise performance, simplify thermal management, and reduce overall energy waste enabling future products to become safer, more reliable, and less harmful to the environment.

OUR TECHNOLOGY

Pulsiv OSMIUM

TAKE POWER ELECTRONICS TO A WHOLE NEW LEVEL

With Pulsiv OSMIUM technology, you can now develop the next generation of sustainable electronic products that operate cooler, waste less energy, and are smaller than anything you've seen before.

"This technology is a gamechanger in the world of AC to DC power conversion and in my opinion, the most exciting advance in power supply design that I have seen in 30 years"

"The most exciting technology to land in the power electronics sector for many decades"

Revolutionize your power electronics designs with

PulsiV OSMIUM

99.5%	96–98%	50%	ZERO	ZERO
FRONT-END EFFICIENCY	POWER FACTOR	LESS ENERGY WASTE	INRUSH CURRENT	INPUT VOLTAGE DERATING

The new benchmark for AC to DC power conversion

WHAT IS PULSIV OSMIUM TECHNOLOGY?

Pulsiv OSMIUM technology is an AC to DC front-end conversion method that applies intelligence to an active valley fill approach and delivers a combination of game changing benefits in power electronics designs.

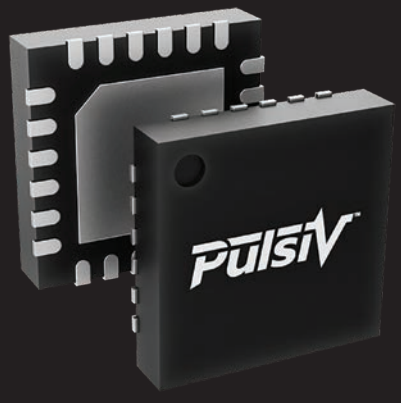
It significantly improves performance at low loads to increase overall average efficiency, reduce energy consumption and deliver a totally flat efficiency profile across all load conditions.

Pulsiv OSMIUM technology can be used with a variety of industry standard DC-DC converters including Flybacks, Forward Converters, & Asymmetric Half Bridge solutions. Where required, it also delivers Power Factor Correction as standard.

ONE DEVICE: ENDLESS POSSIBILITIES

Our new method of efficiently converting AC to DC is achieved by using a Pulsiv OSMIUM microcontroller to monitor real-time grid conditions, manage power factor correction (PFC) and regulate a high-voltage DC output to support a wide range of compatible DC-DC converters.

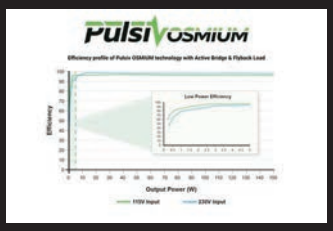
Quality, reliability, performance, and availability have been addressed by combining our unique intellectual property with industry standard devices from carefully selected global tier 1 chip manufacturers. External components are used to configure designs at various power levels which also support a number of optional features.



A UNIQUE COMBINATION OF BENEFITS

WORLD-LEADING FRONT END EFFICIENCY PROFILE

Pulsiv OSMIUM technology delivers exceptional performance gains at low loads. Our unique profile remains flat under all operating conditions to deliver efficiency levels of 99.5% peak and 97.5% average.

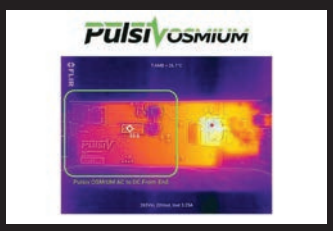


INCREASE OVERALL AVERAGE EFFICIENCY

As a result of improved performance at low loads, the average efficiency in a power electronics design can be increased by up to 50%. This directly impacts energy waste and overall power consumption under typical operating conditions.

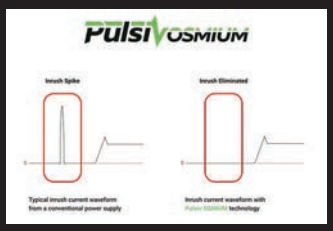
ULTRA-COOL OPERATING TEMPERATURES

Pulsiv OSMIUM technology ensures critical system components operate at significantly lower temperatures when compared to conventional designs. This enables the use of smaller components, simplifies overall thermal management, and improves reliability.



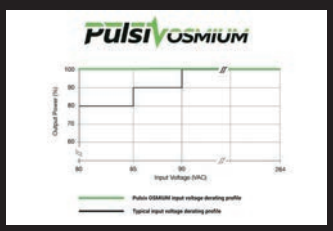
INRUSH CURRENT ELIMINATED

We were the first company in the world to completely eliminate inrush current. This game changing achievement simplifies product design, reduces cost, and improves overall reliability.



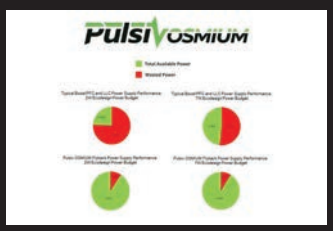
INPUT VOLTAGE DERATING ELIMINATED

In a world's first, Pulsiv OSMIUM technology has eliminated input voltage derating. We can deliver full power across the full universal input voltage range, without compromise.



COMPLY WITH THE LATEST REGULATIONS

Pulsiv OSMIUM technology minimizes conversion losses to reduce power consumption or increase the overall power budget. This flexibility enables products to maintain system functionality while complying with the latest regulations such as EcoDesign.



HOW DO WE COMPARE TO A BOO

BOOST PFC METHODS	PULSIV OSMIUM	BENEFITS
CONVERSION METHOD Current is controlled with a boost inductor used in "series" to achieve a high power factor. 100% of the required energy must be stored at a typical voltage of 400V. All of the energy is switched through the boost PFC circuit which generates inevitable losses under low-load conditions and impacts the shape of the efficiency profile.	**INNOVATIVE CONVERSION METHOD** A parallel capacitor is used to store only enough energy to ride through the AC valley period when the grid cannot support the load. Less than 50% of the required energy is stored in a capacitor typically rated at 200V. This significantly reduces losses at low-load conditions to deliver a flat efficiency profile.	**BENEFITS** • Increase efficiency at low loads • Improve system efficiency under all operating conditions • Lower operating temperatures
COMPROMISED LOW LOAD EFFICIENCY In a boost PFC design, the series inductor used to achieve power factor correction is typically designed to deliver maximum performance at full load. Under lighter load conditions, this inductor will cause substantial losses and an efficiency roll-off. The compromised performance profile makes it more difficult to meet four-point average efficiency requirements demanded by EcoDesign regulations.	**UNIQUE & FLAT EFFICIENCY PROFILE** In a Pulsiv OSMIUM design, the series inductor is replaced by a parallel capacitor to significantly reduce losses at lighter loads. As a result, a uniquely flat efficiency profile can be maintained across almost the entire load profile.	**BENEFITS** • Easier to meet global regulations • Increased power budget at low loads or in standby-mode • Overall average efficiency is improved • Energy waste is reduced
RESTRICTIVE HVDC In a typical Boost PFC design, the required storage capacitance depends on the power required by the follow-on DC-DC converter and load fluctuations can dramatically impact capacitor voltage. As a result, the nominal HVDC is around 400V with a range of between 380V - 420VDC and capacitors must be rated accordingly.	**WIDER HVDC RANGE** In a Pulsiv OSMIUM design, a pre-determined storage capacitor voltage can be selected. The voltage range is 65-85VDC minimum (depending upon the DC-DC converter requirements) to the peak AC line voltage.	**BENEFITS** • Significantly lower parasitic capacitance losses at low power levels • Lower voltage rated capacitors save space, weight, and cost • In a Flyback design, smaller transformer cores can save space, weight, and cost due to lower primary side inductance
COMPLEX POWER FACTOR CORRECTION A Boost PFC controller regulates the current through the Boost inductor. The current is sinusoidal and the peak value of this current is determined by the power being used. This creates a critical dependency between the peak power and boost PFC operation. The peak current is managed on a cycle-by-cycle basis to keep the storage capacitor within a certain voltage range.	**SIMPLIFIED POWER FACTOR CORRECTION** The Pulsiv OSMIUM microcontroller charges the storage capacitor to a pre-determined maximum value (set by the grid voltage) during every AC half cycle and the power required by the follow on DC-DC converter does not influence it's operation.	**BENEFITS** • Improved transient response for greater reliability • Maintains a high power factor of up to 0.98 over a wide input power range • Switch off or skipping power factor correction at low powers is not required

ST PFC?

BOOST PFC METHODS	PulsivOSMIUM	BENEFITS
COMPLEX HALF-ACTIVE BRIDGE INTEGRATION In a typical Boost PFC design, accurate zero-crossing detection is needed to implement a half-active bridge. Careful and complex circuitry design is required to support a universal mains input and there are recognised reliability implications.	**SIMPLIFIED HALF-ACTIVE BRIDGE INTEGRATION** When the storage capacitor is supplying the load, the line current is zero. This simplifies the switching of a half-active bridge which is controlled by Pulsiv OSMIUM as an optional feature.	**BENEFITS** • System efficiency is significantly improved at low-line AC voltages • Fewer components required saving space and cost • Overall system integration is simplified • Can improve reliability
INCREASED SWITCHING NOISE CAN AFFECT EMC COMPLIANCE The current in a Boost PFC inductor is always switched in continuous conduction mode. The energy generated by switching currents will cause more noise and require additional filtering to comply with EMC regulations.	**LOW NOISE SWITCHING SIMPLIFIES EMC COMPLIANCE** In a Pulsiv OSMIUM design, the current required to charge a capacitor operates in discontinuous conduction mode. There is no energy associated with the inductor during switch on, so the overall noise generated in the system during the switching process can be dramatically reduced.	**BENEFITS** • Fewer and/or lower value filter components required • Improved conducted and radiated emissions • Overall EMC compliance is simplified
SLOWER TRANSIENT RESPONSE In a typical Boost PFC design, the voltage on the output capacitor is regulated by the boost PFC. In order to maintain a high power factor, the controller must balance energy on a grid cycle by cycle basis.	**INSTANTANEOUS TRANSIENT RESPONSE** In a Pulsiv OSMIUM design, the charging of the capacitor is independent of the load behaviour. When the capacitor is supplying the load through the discharge diode, the system response is instantaneous.	**BENEFITS** • Improved stability during transient response • Ideal for loads requiring variable power requirements • Overall system reliability can be improved
MANAGING INRUSH CURRENT In a Boost PFC design, a large inrush (typically from 30A - 80A) will always occur when first connected to the grid due to a conduction path through the boost diode and large capacitance. This is managed using inrush current limiting strategies which can include additional circuitry, and/or components.	**INRUSH CURRENT ELIMINATED** The Pulsiv OSMIUM microcontroller manages the charging path of the capacitor. Since the switch is off during start-up and then carefully controlled, there is no parasitic path to the capacitor. Inrush current is therefore completely eliminated.	**BENEFITS** • Lower stress on the AC supply • Reduced system components • Improved system reliability

PulsiV

POWERING THE MOST DIVERSE RANGE OF APPLICATIONS FOR A MORE SUSTAINABLE FUTURE

USB-C

CONSUMER ELECTRONICS

LED LIGHTING

SMART DEVICES

POWER SUPPLIES

INDUSTRIAL

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