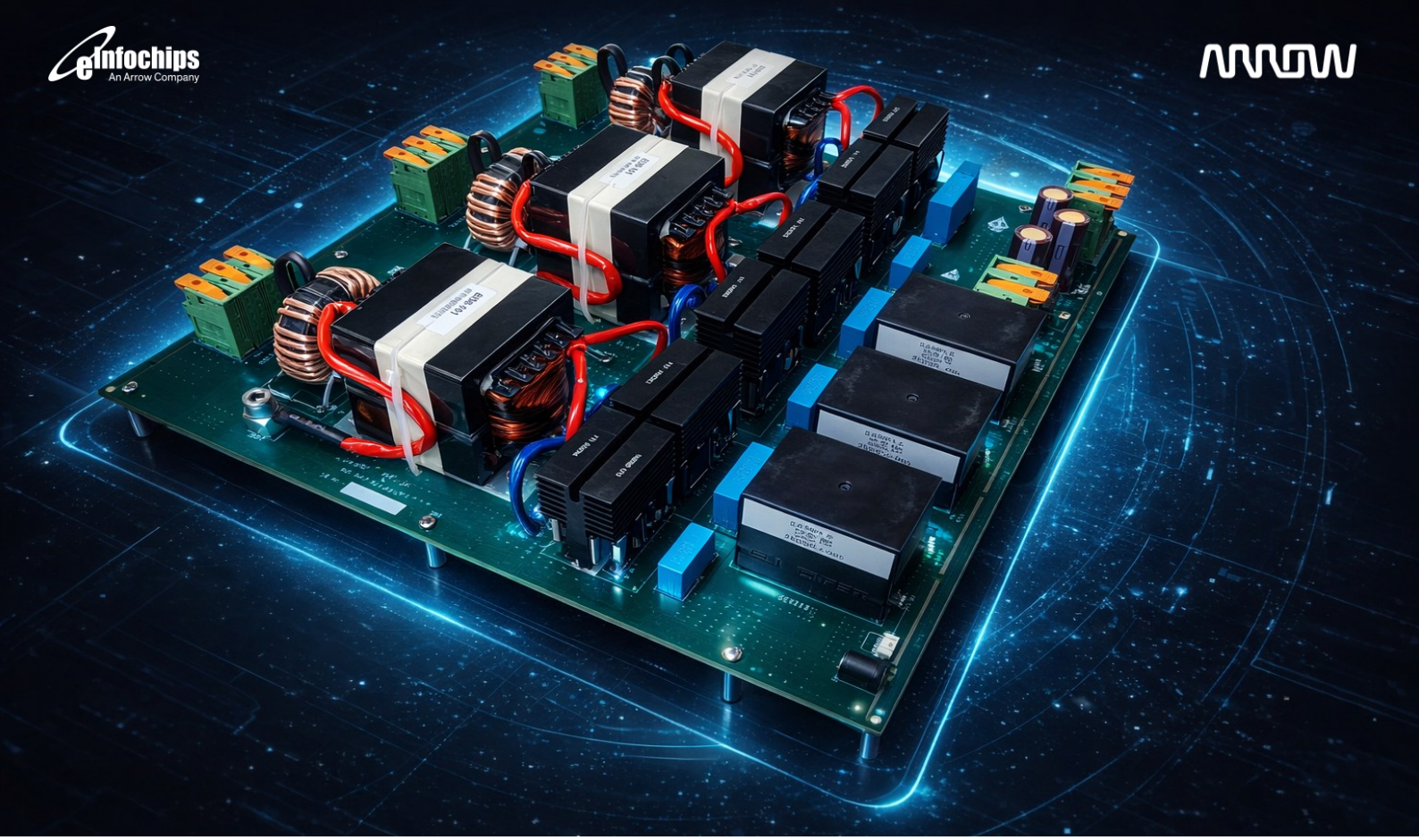


eInfochips Three-Phase – LLC Converter Design

Intelligent, Efficient, and Future-Ready Power Conversion

LLC Resonant Converters form the backbone of modern high-power DC-DC power stages due to their ability to deliver exceptional efficiency, high power density, and reliable soft-switching performance across wide operating conditions. With the growing demand for compact, energy-efficient power systems in EV charging, industrial, and energy storage applications, LLC topology has become the industry's preferred choice for next-generation power electronics.

eInfochips LLC Resonant Converter prototype is a compact yet high-performance solution, designed using the latest resonant power conversion techniques and safety-driven design practices.

It enables Zero Voltage Switching (ZVS) across a wide load range, significantly reducing switching losses, thermal stress, and EMI.

Built with optimized magnetics, robust hardware architecture, and a scalable design approach, this LLC platform is ideal for high-power isolated DC-DC stages in applications such as DC fast chargers, on-board chargers, energy storage systems, telecom power supplies, and industrial power converters.

Key Features

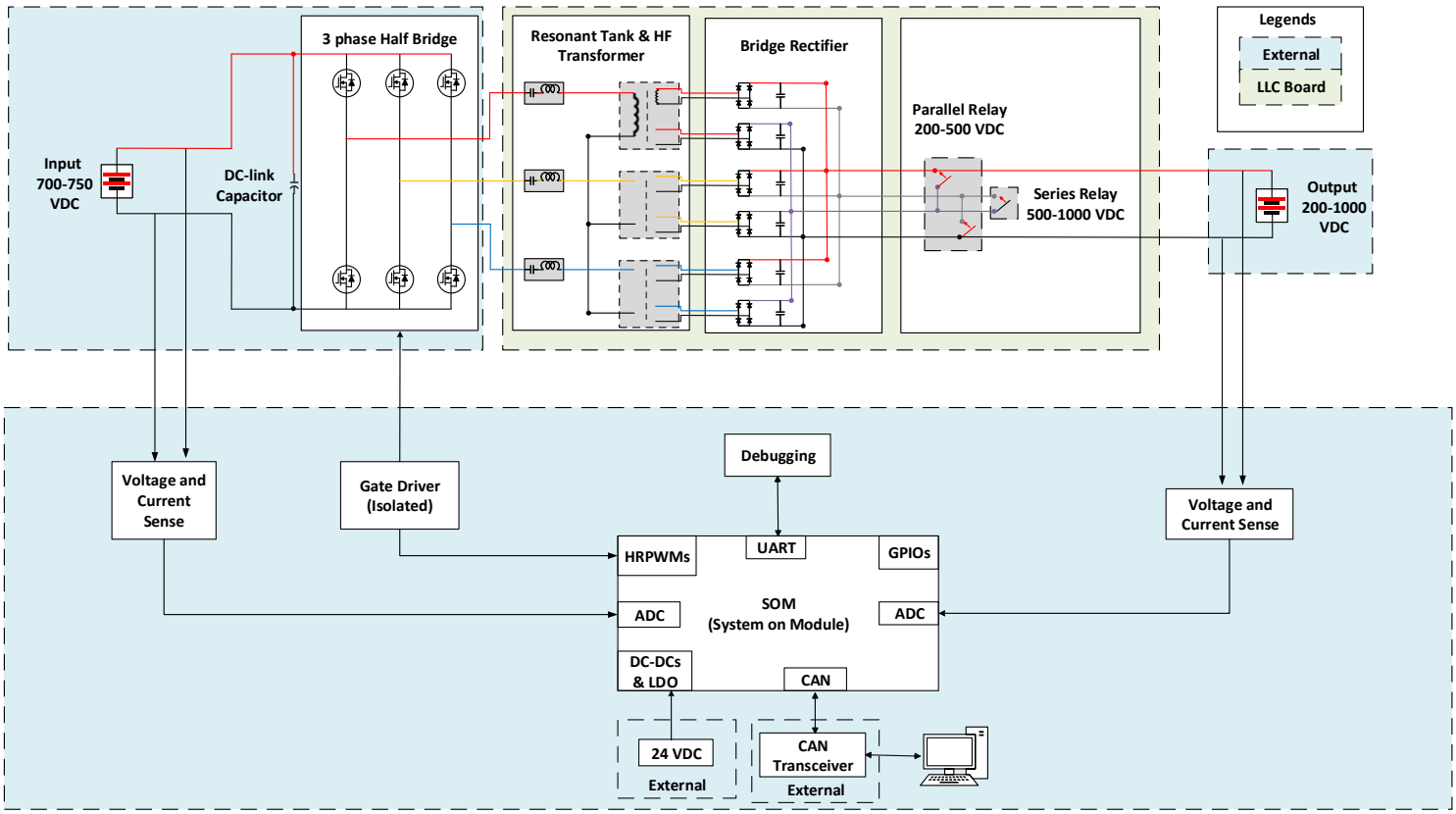
- High-Efficiency Soft-Switching Topology
- Wide Input Voltage & Load Operation
- Optimized Resonant Tank Design (Lr-Cr-Lm)
- High-Frequency Isolation Transformer
- Low EMI & Reduced Thermal Stress
- Frequency-Modulated Control Architecture
- Scalable & Modular Power Platform
- Built-In Protection Mechanisms
- Compact Footprint with High Power Density
- Ideal for High-Power Applications

Technical Specifications

Parameters	Min.	Typical	Max.	Unit
Input DC Side				
Input voltage range	700	725	750	VDC
Current	-	40	-	A
Efficiency	-	>98	-	%
Switching Frequency	90	-	210	KHz
Output DC Side				
Power	-	30	-	KW
Output voltage range	200	-	1000	VDC
Voltage ripple	-	10	-	Vpk_pk
Current	-	-	60	A
Environmental				
Operating Temperature	-30	-	60	°C
Storage Temperature	-40	-	70	°C
Humidity non-condensing	5	-	95	%Rh
Altitude	-	2000	-	m
Cooling	Forced Air Cooling			

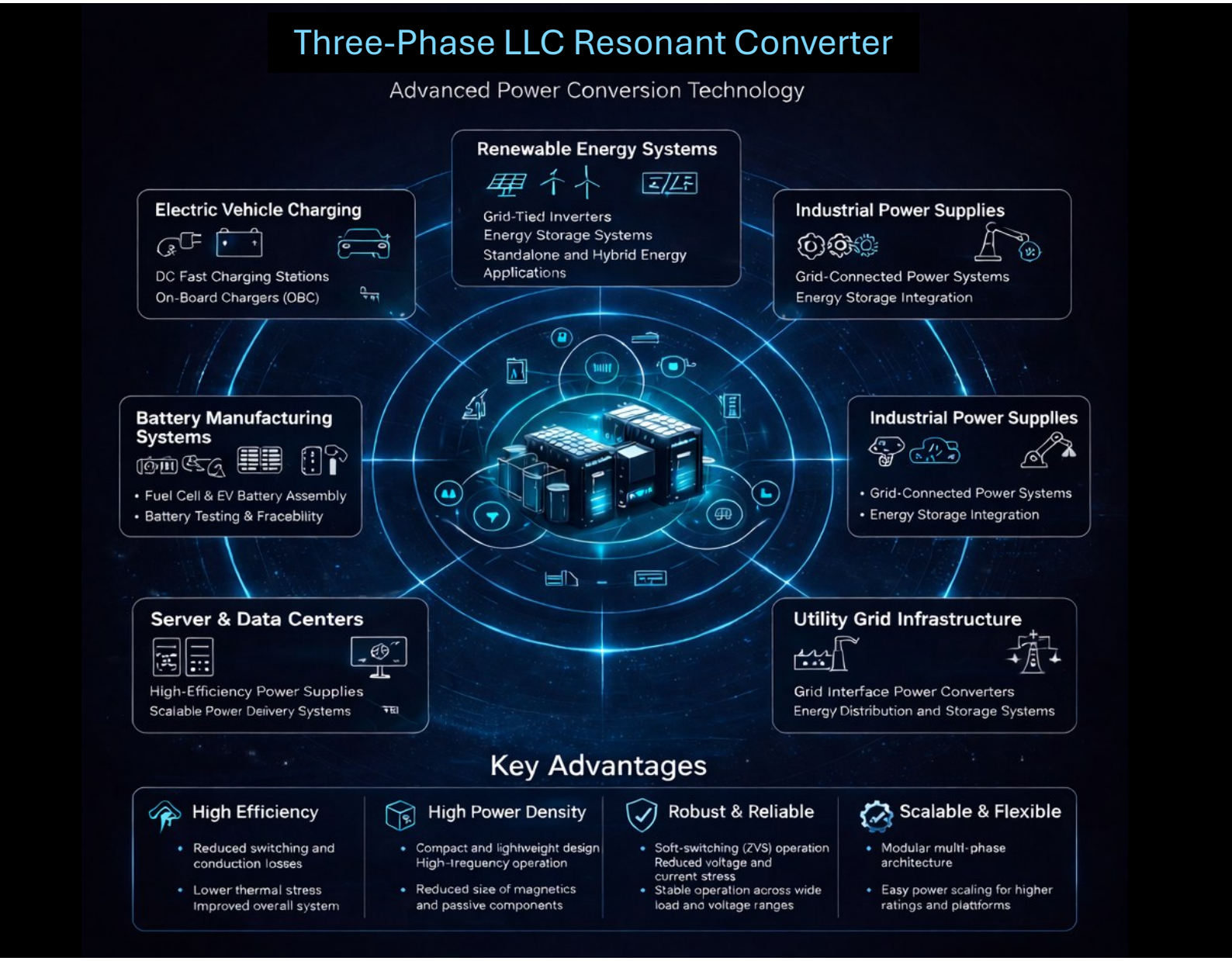
Targeted for certifications:

Architecture Diagram



High-Power Isolated DC-DC Platform for EV & Industrial Applications

- End-to-end development of high-efficiency LLC resonant DC-DC converters from concept to hardware validation.
- Optimized resonant tank (Lr–Cr–Lm) design ensuring wide input voltage range and stable regulation.
- Achieves Zero Voltage Switching (ZVS) across wide load conditions for reduced switching losses and EMI.
- High-frequency isolated transformer design enabling high power density and compact form factor.
- Complete hardware implementation including power stage, gate drive, sensing, and PCB layout.
- Integrated control and protection feature for safe, reliable operation under all conditions.
- Extensively validated through theoretical analysis, simulation, and practical measurements.
- Scalable and reusable architecture to accelerate future EV and industrial power platform development.



About eInfochips

eInfochips, an Arrow Electronics company, is a leading provider of digital transformation and product engineering services. eInfochips accelerates time to market for its customers with its expertise in the areas of IoT, AI/ML, security, sensors, wireless, cloud, and power. eInfochips has been recognized as a leader in Engineering R&D services by many top analysts and industry bodies, including Gartner, Zinnov, ISG, IDC, Nasscom and others