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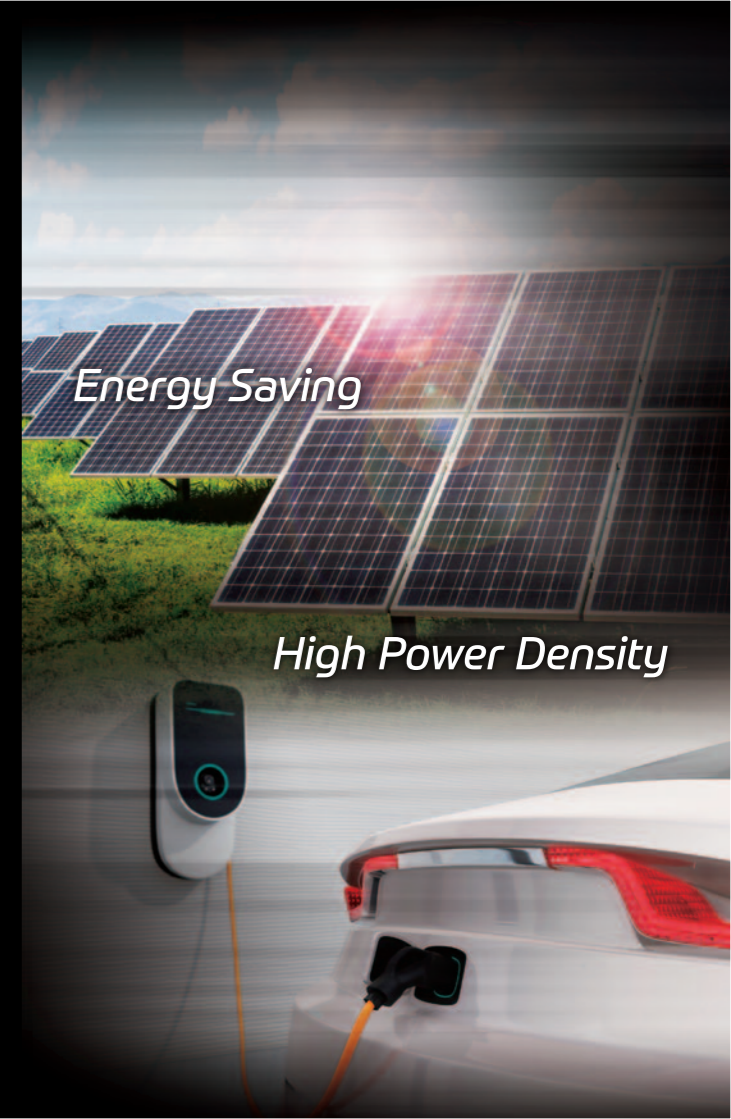
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ALPS®

Products for Power Electronics



Energy Saving

High Power Density

Liqualloy™

Alps' original iron-based magnetic amorphous alloy containing no rare earth materials

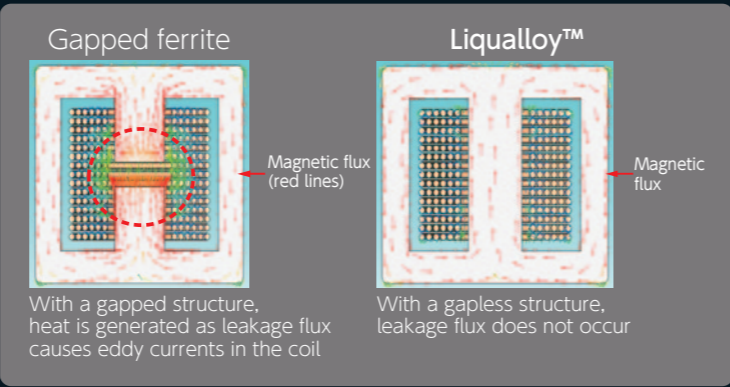


More than double the saturation flux density of ferrite

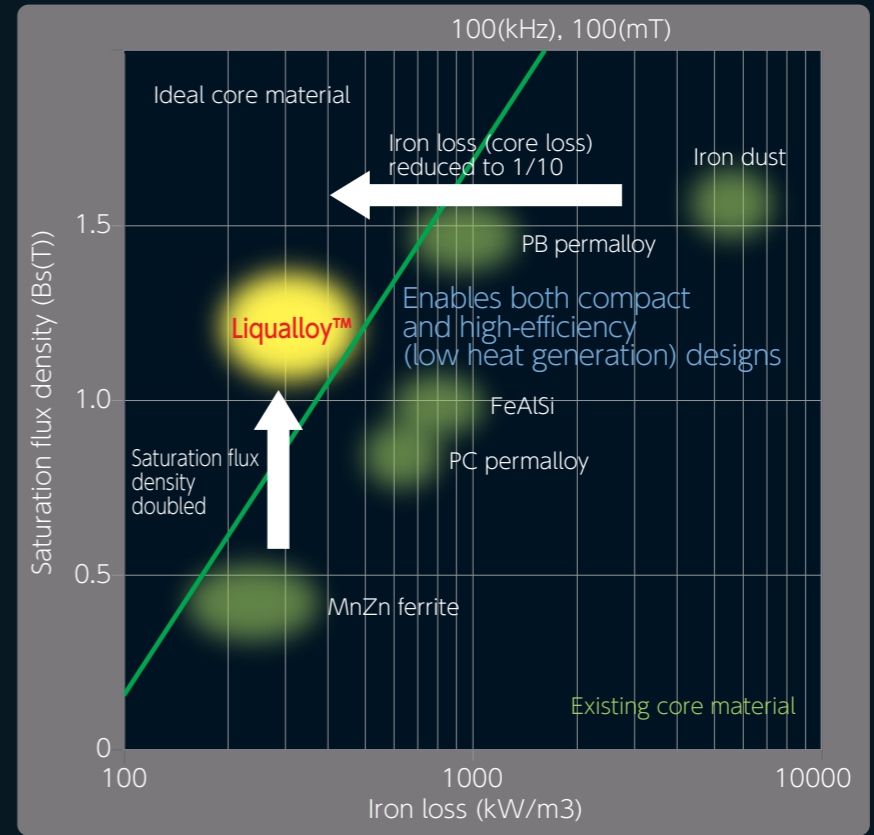
Data for material comparison

Material	B _s	Core loss (kW/m ³ @100kHz)	Electrical resistivity (material-based)	Electrical resistivity (core-based)
Liqualloy™	1.3T	200-400	153μΩm	3kΩm
MoNiFe (MPP)	0.7T	550-800	50μΩm	12-15Ωm
FeAlSi	0.8T	600-1000	45μΩm	15-20Ωm
NiFe (High Flux)	1.58T	1300-1800	16μΩm	10-15Ωm
MnZn ferrite	0.35-0.5T	200- (depends on gap)	10 ⁷ -10 ⁸ μΩm	0.2-10Ωm

Heat generation minimized with a gapless structure

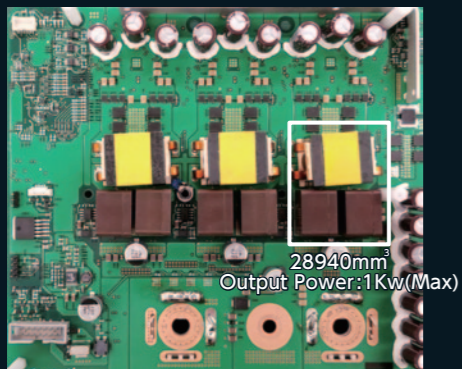


Extremely low loss with high switching frequencies



48V \leftrightarrow 12V Bidirectional DC-DC Converter

Low-core loss Licalloy™ and magnetic coupling enable both compact size and high efficiency

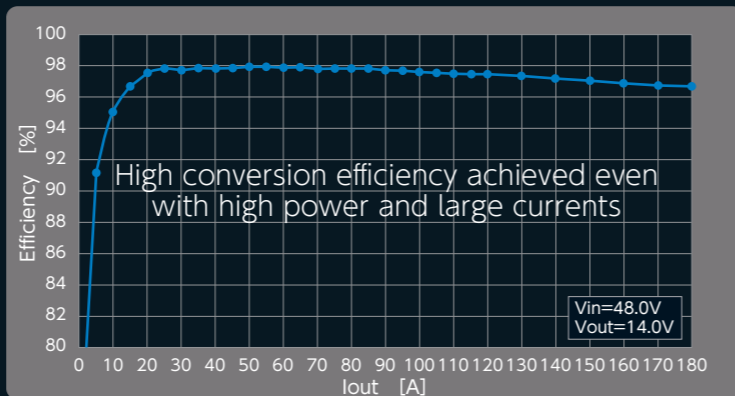


TriMagiC Converter™

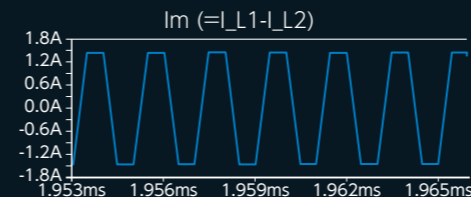
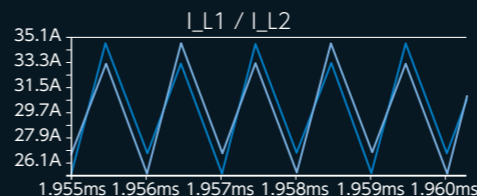
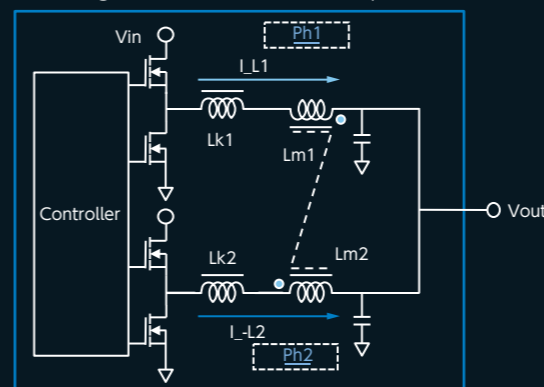
- Coupled inductor system contributed to downsizing and Licalloy™ enabled high conversion efficiency due to its high flux density and very low core loss
- Easier to design compared to an integrated magnetically coupled reactor due to separated discrete components and adaptation of appropriate magnetic materials to each part

- HV side: 36V-54Vdc
- LV side: 9V-16Vdc (2.5Kw rating/3Kw peak)
- Size/Weight (PCB): 165mm \times 185mm \times 30mm / 700g (Max)

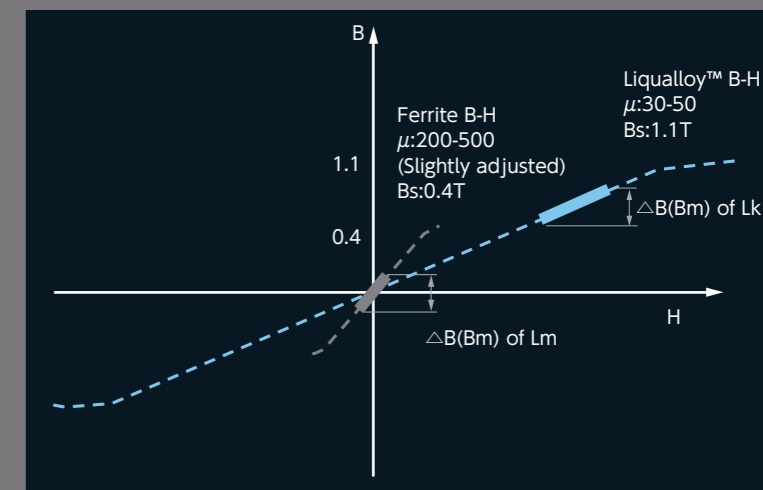
Efficiency vs. I_{out}



Block diagram
180 degree shifted interleaved operation

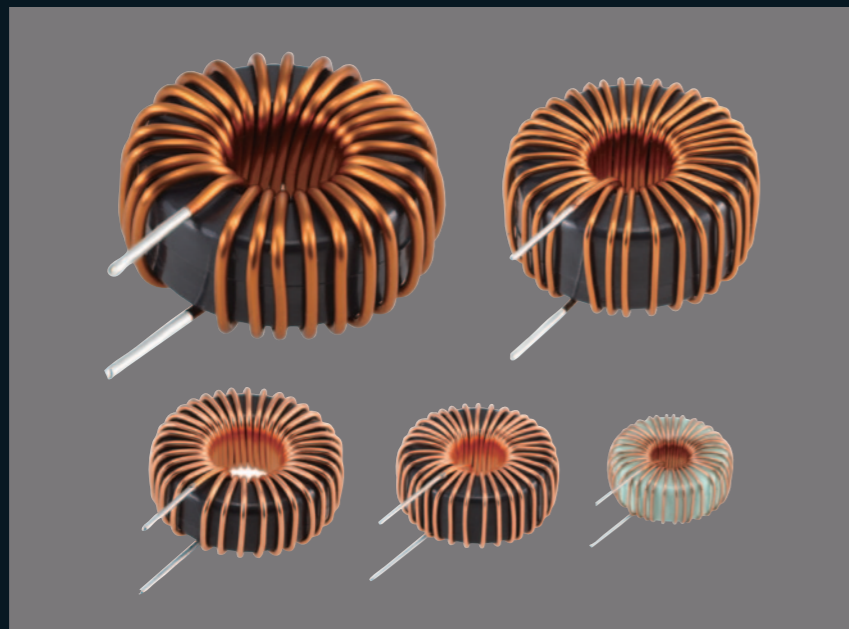


B_m behavior of Licalloy™ and MnZn ferrite



Low core loss, high magnetic flux density powder core Licalloy™ adopted for the smoothing coil part, MnZn ferrite for the flux coupling transformer part

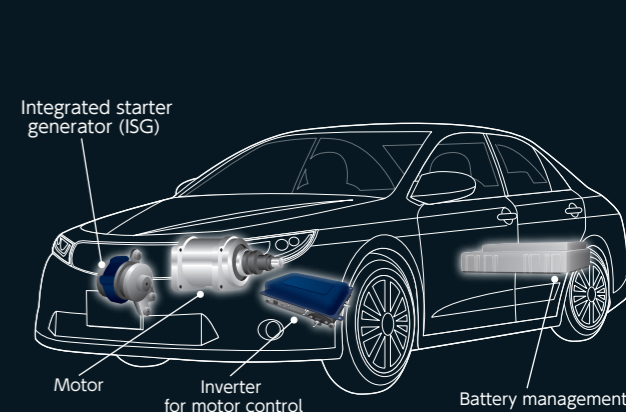
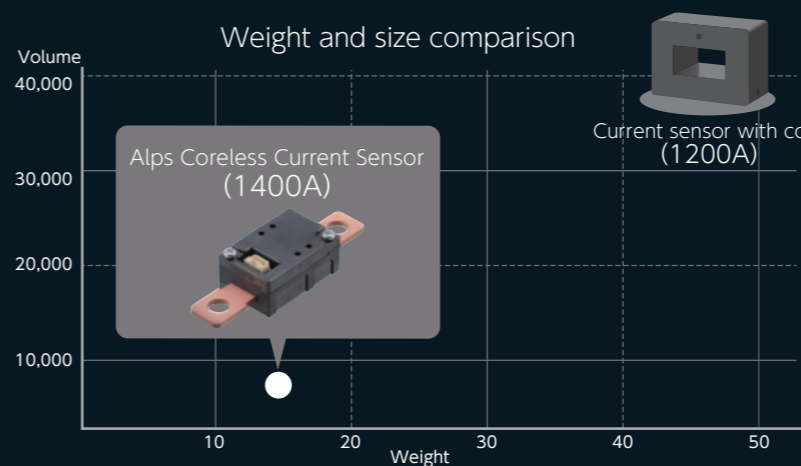
Liqualloy™ Toroidal Coils



- Employs Liqualloy™, an original soft magnetic metal material with low core loss
- Low core loss ideal for circuits with high switching frequencies and high ripple currents
- Coil operating temperature is minimized using a gapless structure

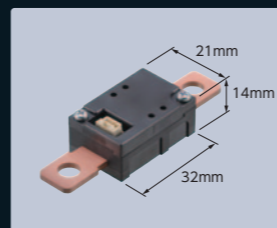
Coreless Current Sensor for Automotive

Support for 1400A with existing compact dimension

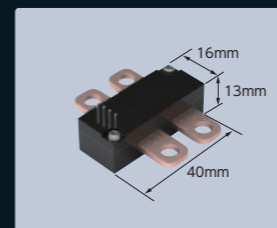


Under Development

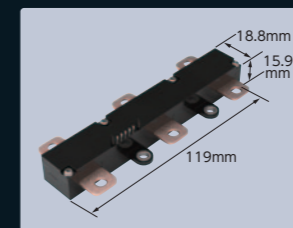
1-phase Type



2-phase Type



3-phase Type



- Support for operating temperature up to 150°C (under development)
- No core heat generation caused by eddy current
- Support for measurement range from 300A to 1400A with the same dimension