

Attracting Tomorrow



# Coupled inductors

Versatile components for diverse  
DC/DC converter topologies

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Munich, Germany  
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# Selection guide

Topology	Series / Size	Design	Inductance (Per winding)	Rated current (Max. permissible DC)	Coupling factor
SEPIC, ZETA, Multi Output Buck, FLYBACK	B82472D6 7.3 x 7.3 x 4.8 mm  <small>Compact size</small>	<b>Shielded</b> Temp. +150 °C Functional isolation up to 500 V	<b>2.2 to 47 µH</b>	<b>1.1 to 4.30 A</b>	<b>97 to 99% typ.</b>  <small>Tight coupling</small>
	B82464D6 10.4 x 10.4 x 6.3 mm  <small>Medium size</small>	<b>Shielded</b> Temp. +150 °C Functional isolation up to 500 V	<b>2.2 to 47 µH</b>	<b>1.71 to 6.17 A</b>	<b>95 to 99% typ.</b>  <small>Tight coupling</small>
	B82477D4*M900 12.5 x 12.5 x 8.5 mm  <small>Large size</small>	<b>Shielded</b> Temp. +150 °C Functional isolation up to 500 V	<b>2.0 to 100 µH</b>	<b>1.61 to 6.22 A</b>	<b>94.9 to 99.7% typ.</b>  <small>Tight coupling</small>
	B82477D6 12.5 x 12.5 x 10.5 mm  <small>Large size</small>	<b>Shielded</b> Temp. +150 °C Functional isolation up to 500 V	<b>3.9 to 47 µH</b>	<b>2.83 to 7.05 A</b>	<b>97 to 99% typ.</b>  <small>Tight coupling</small>
CUK	B82477C6*M603 12.5 x 12.5 x 10.5 mm  <small>Large size</small>	<b>Shielded</b> Temp. +150 °C Functional isolation up to 500 V	<b>4.7 to 47 µH</b>	<b>3.02 to 7.05 A</b>	<b>86 to 87% typ.</b>  <small>Loose coupling</small>

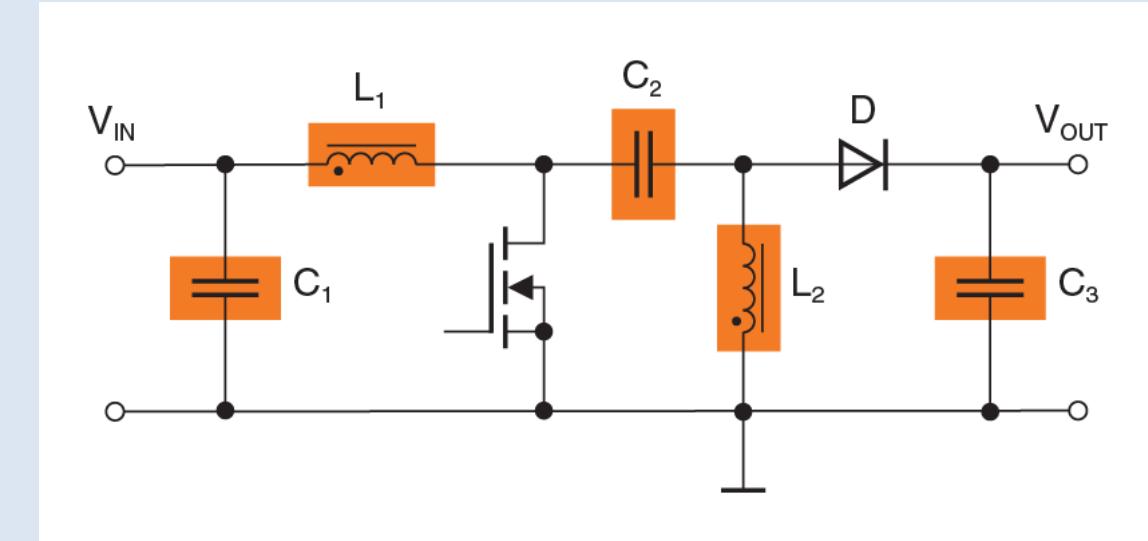
# Overview topologies (1)

	SEPIC	ZETA	CUK	Flyback	Multi Output Buck
<b>Power range</b>	Low power	Low power	Low power	Low power	Low power
<b>Typical efficiency</b>	Up to 90%	Up to 90%	Up to 90%	Up to 75%	Up to 85%
<b>Required coupling</b>	High	High	Low	High	High
<b>Output voltage</b>	Non-inverted	Non-inverted	Inverted	Non-inverted	Non-inverted
<b>Multiple output</b>	No	No	No	Yes	Yes
<b><math>V_{out} &gt; V_{in}</math></b>	Yes	Yes	Yes	Yes	No
<b><math>V_{out} &lt; V_{in}</math></b>	Yes	Yes	Yes	Yes	Yes

# Overview topologies (2)

## SEPIC (Single-Ended Primary Inductance Converter)

- ✓ Provides a constant non-inverted output voltage that can be above or below the input voltage.
- ✓ Offers a continuous input current which is reducing pulse current drain from the battery.
- ✓ The input filter consisting of C1 and L1 results in a significantly lower conducted interference.
- ✓ Many standard boost converter ICs can be used.

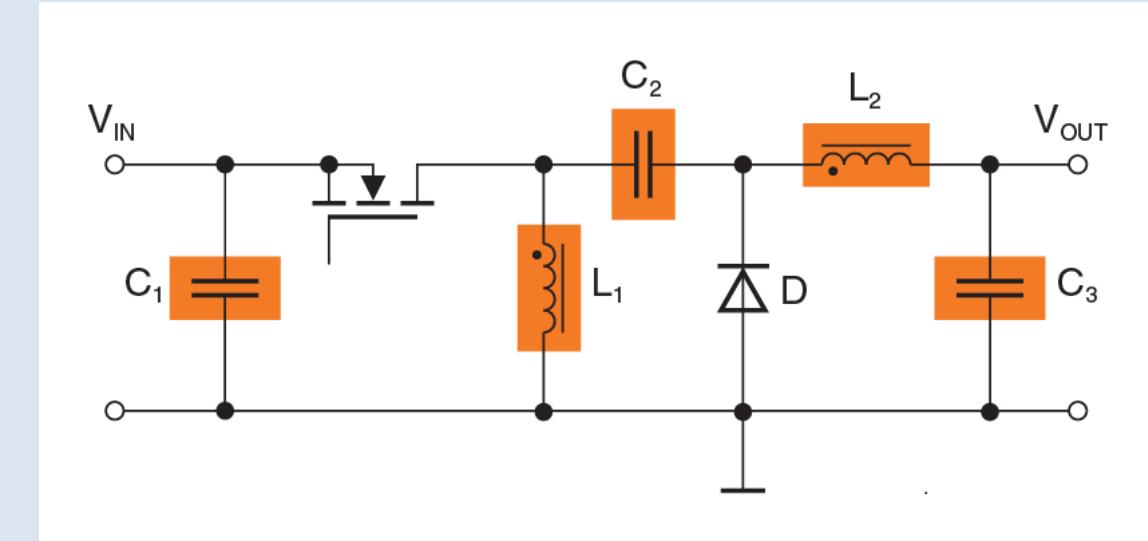


Series	Size [mm]	Inductance [ $\mu$ H] (per winding)
B82472D6	7.3 x 7.3 x 4.8	2.2 to 47
B82464D6	10.4 x 10.4 x 6.3	2.2 to 47
B82477D4*M900	12.5 x 12.5 x 8.5	2.0 to 100
B82477D6	12.5 x 12.5 x 10.5	3.9 to 47

# Overview topologies (3)

## ZETA

- ✓ Provides a constant non-inverted output voltage that can be above or below the input voltage.
- ✓ Offers a continuous output current with a low ripple.
- ✓ Like SEPIC, the coupling capacitor offers some limited DC isolation between the input and output.
- ✓ Just requires one buck controller IC directly driving a MOSFET.

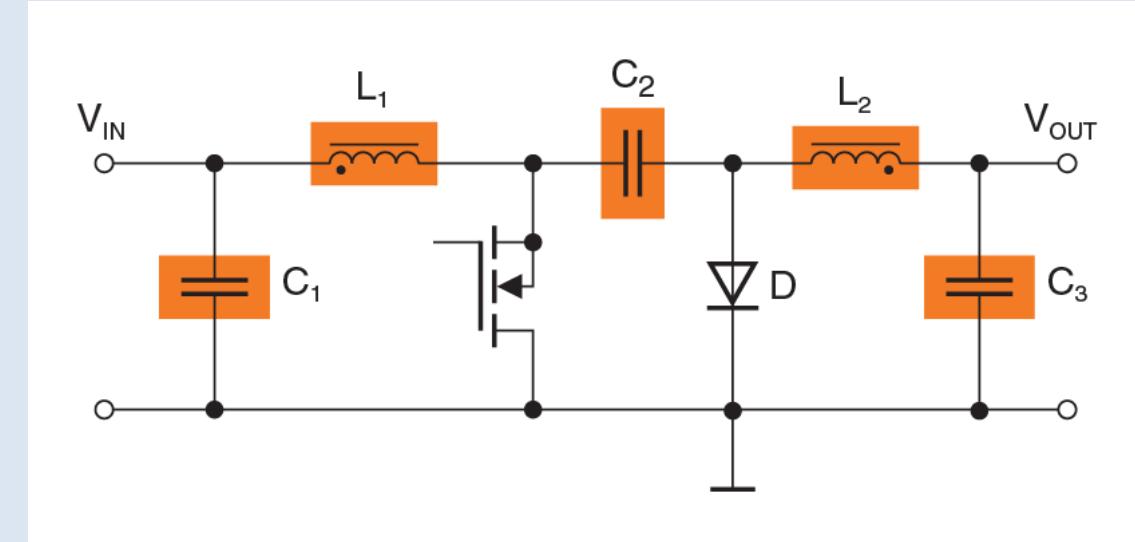


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B82477D6	12.5 x 12.5 x 10.5	3.9 to 47

# Overview topologies (4)

## CUK

- ✓ Cuk converters have the ability to regulate a voltage that is above or below the input voltage.
- ✓ This topology provides an inverted output voltage.
- ✓ Offers a continuous current flow at the input which is minimizing the pulse current drain from the battery.
- ✓ A benefit from an EMI point of view are the LC filters on both the input and output side of the converter.

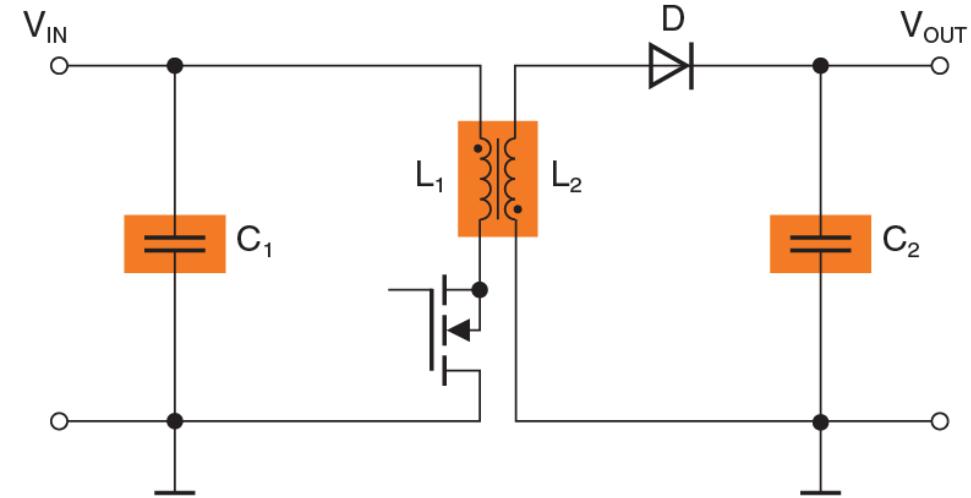


Series	Size [mm]	Inductance [ $\mu$ H] (per winding)
B82477C6*M603	12.5 x 12.5 x 10.5	4.7 to 47

# Overview topologies (5)

## FLYBACK

- ✓ Flyback converters have a relatively simple and therefore cost-efficient design.
- ✓ Can generate non-inverted output voltages which are far below or above the input voltage.
- ✓ Multiple output voltages are possible.
- ✓ The coupled inductor provides a real galvanic isolation between input and output.

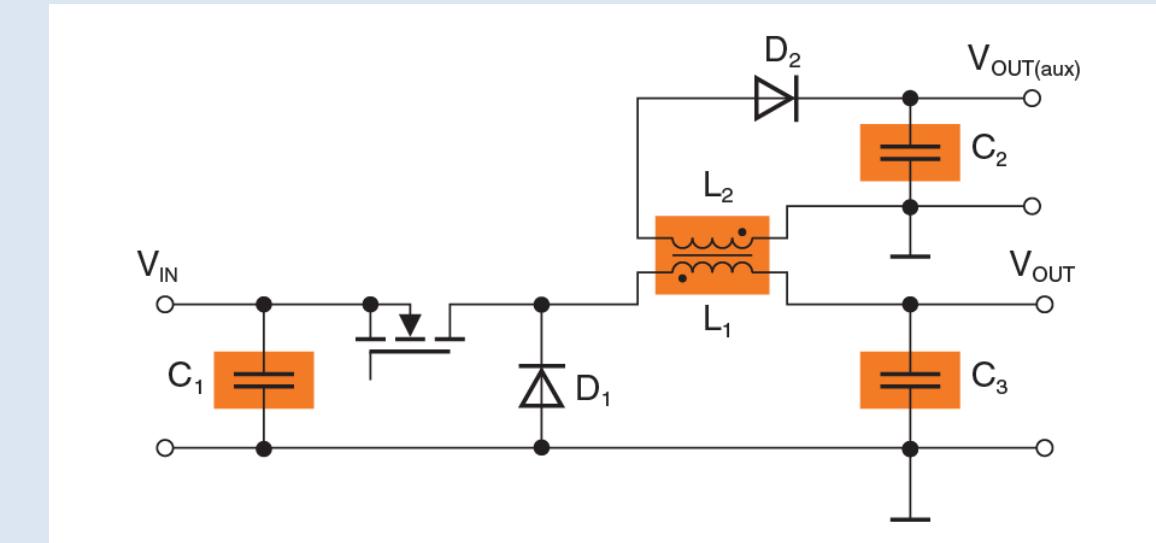


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# Overview topologies (6)

## MULTI OUTPUT BUCK

- ✓ Coupled inductors can be used to create an auxiliary and second output voltage respectively.
- ✓ Save costs.
- ✓ Reduces complexity on the board.
- ✓ Just one buck regulator required.



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