

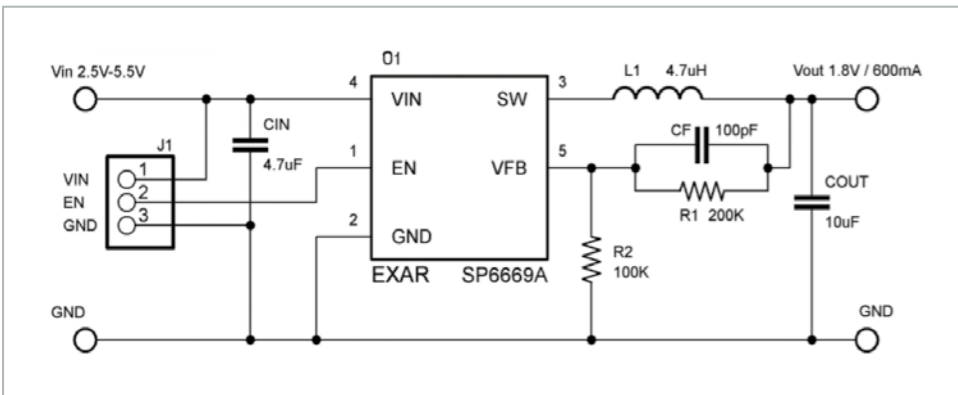
# SP6669

600 mA 1.5 MHz PWM Synchronous Step Down Converter



### Evaluation Board Configuration

<b>Input Voltage</b>	2.5 V - 5.5 V
<b>Output Voltage</b>	1.8 V
<b>Max. Output Current</b>	600 mA
<b>Operating Frequency</b>	1.5 MHz
<b>Inductor Reference</b>	4.7 µH – WE-TPC 744 025 004

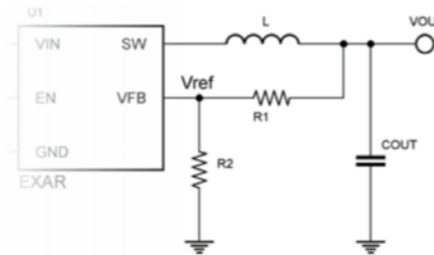


## Design Tips

### Output Voltage Selection

The output voltage is adjustable via the external resistor network R1 and R2 as per the following formula:

$$V_{OUT} = V_{REF} \cdot \left(1 + \frac{R1}{R2}\right)$$



Where

$V_{REF}$  = Reference voltage at 0.6 V

The feedback resistors must be chosen such that power dissipation of the network is minimal. R1 and R2 are typically allowed within a given range; adhere to the recommended values in the tables.

### Inductor Selection

Inductor ripple current and saturation current ratings are two factors to be considered when selecting the inductor value.

A low  $R_{DC}$  inductor is preferred. The inductor value L can be calculated from the following equation:

$$L = (V_{IN} - V_{OUT}) \cdot \left(\frac{V_{OUT}}{V_{IN}}\right) \cdot \left(\frac{1}{f}\right) \cdot \left(\frac{1}{\Delta I_L}\right)$$

Where

L = Inductor value

$V_{IN}$  = Input voltage

$V_{OUT}$  = Output voltage

f = Operating frequency

$\Delta I_L$  = Current ripple – usually set between 30% and 40% of output current desired

The inductor value for the evaluation boards is set for an output current ripple of approximately 30% to 40% of the maximum output current desired. An output current ripple level of 30% to 40% is acceptable in most designs and may provide extra flexibility in selecting the appropriate inductor value.

### Note

All product documentations, including datasheets, evaluation board manuals and bill of material can be found on

[www.exar.com/wurth\\_electronics](http://www.exar.com/wurth_electronics)

[www.we-online.com/exar](http://www.we-online.com/exar)

up to 97 % efficiency

## DESIGN KIT Low Power – Point of Load Solutions



600 mA to 1.5 A,  
Low Input Voltage  
Single and Dual  
Channel Converter

Order Code IC-744 721  
Version 1.0

### Inductor Value L – Resistor Values R1 / R2 Selector

$V_{OUT} / I_{OUT}$	$V_{IN} = 3.3 V$			$V_{IN} = 5.0 V$			R1	R2
	100 mA	300 mA	600 mA	100 mA	300 mA	600 mA		
<b>3.3 V</b>				22 µH 744 025 220	6.8 µH 744 025 006	4.7 µH <b>744 025 004</b>	453 kΩ	100 kΩ
<b>2.8 V</b>	10 µH 744 032 910 0	3.3 µH 744 025 003	1.5 µH	22 µH 744 025 220	6.8 µH 744 025 006	4.7 µH <b>744 025 004</b>	365 kΩ	100 kΩ
<b>2.5 V</b>	15 µH 744 025 150	4.7 µH <b>744 032 900 4</b>	2.2 µH 744 032 900 2	22 µH 744 025 220	6.8 µH 744 025 006	4.7 µH <b>744 025 004</b>	316 kΩ	100 kΩ
<b>1.8 V</b>	15 µH 744 025 150	4.7 µH <b>744 032 900 4</b>	3.3 µH 744 025 003	22 µH 744 025 220	6.8 µH 744 025 006	4.7 µH <b>744 025 004</b>	200 kΩ	100 kΩ
<b>1.2 V</b>	15 µH 744 025 150	4.7 µH <b>744 032 900 4</b>	3.3 µH 744 025 003	18 µH 744 032 180	6.8 µH 744 025 006	3.3 µH 744 025 003	100 kΩ	100 kΩ
<b>0.8 V</b>	15 µH 744 025 150	4.7 µH <b>744 032 900 4</b>	2.2 µH 744 032 900 2	15 µH 744 032 001 5	4.7 µH <b>744 025 004</b>	2.2 µH 744 025 002	33 kΩ	100 kΩ

Best suitable inductor

Lowest profile inductor

Evaluation board configuration

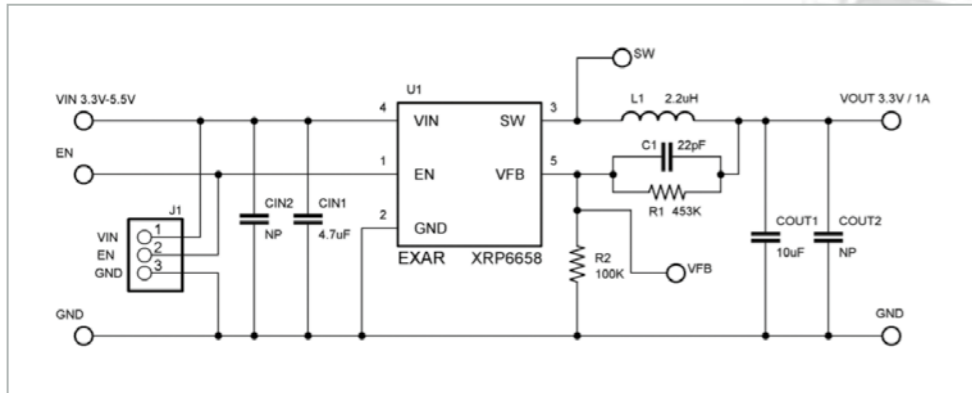
# XRP6658

1 A 1.5 MHz Synchronous Step Down Converter

More information on [www.we-online.com/exar](http://www.we-online.com/exar)

### Evaluation Board Configuration

Input Voltage	2.5 V - 5.5 V
Output Voltage	3.3 V
Max. Output Current	1 A
Operating Frequency	1.5 MHz
Inductor Reference	2.2 µH – WE-TPC 744 043 002 2



### Inductor Value L – Resistor Values R1 / R2 Selector

V <sub>out</sub> /I <sub>out</sub>	V <sub>in</sub> = 3.3 V			V <sub>in</sub> = 5.0 V			R1	R2
	100 mA	500 mA	1000 mA	100 mA	500 mA	1000 mA		
<b>3.3 V</b>				22 µH	4.7 µH	2.2 µH	453 kΩ	100 kΩ
<b>2.8 V</b>	10 µH	1.8 µH	1.0 µH	22 µH	4.7 µH	2.2 µH	365 kΩ	100 kΩ
<b>2.5 V</b>	15 µH	2.2 µH	1.2 µH	22 µH	4.7 µH	2.2 µH	316 kΩ	100 kΩ
<b>1.8 V</b>	15 µH	3.3 µH	1.5 µH	22 µH	6.8 µH	2.2 µH	200 kΩ	100 kΩ
<b>1.2 V</b>	15 µH	3.3 µH	1.5 µH	18 µH	3.3 µH	1.8 µH	100 kΩ	100 kΩ
<b>0.8 V</b>	15 µH	2.2 µH	1.2 µH	15 µH	3.3 µH	1.5 µH	33 kΩ	100 kΩ

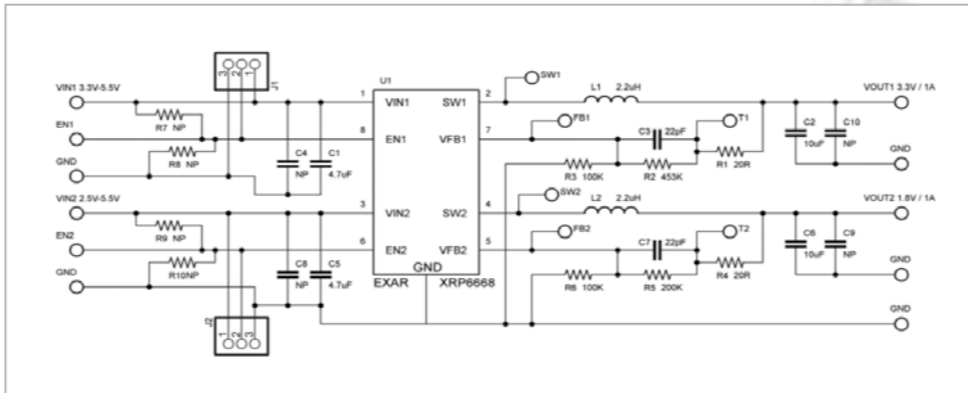
Best suitable inductor    Lowest profile inductor    Evaluation board configuration

# XRP6668

1 A/1 A Dual Channel 1.5 MHz Synchronous Step Down Converter

### Evaluation Board Configuration

Input Voltage	2.5 V - 5.5 V
Output Voltage	3.3V/1.8 V
Max. Output Current	1 A/1 A
Operating Frequency	1.5 MHz
Inductor Reference	2.2 µH – WE-TPC 744 043 002 2



### Inductor Value L – Resistor Values R1 / R2 Selector

V <sub>out</sub> /I <sub>out</sub>	V <sub>in</sub> = 3.3 V			V <sub>in</sub> = 5.0 V			R1	R2
	100 mA	500 mA	1000 mA	100 mA	500 mA	1000 mA		
<b>3.3 V</b>				22 µH	4.7 µH	2.2 µH	453 kΩ	100 kΩ
<b>2.8 V</b>	10 µH	1.8 µH	1.0 µH	22 µH	4.7 µH	2.2 µH	365 kΩ	100 kΩ
<b>2.5 V</b>	15 µH	2.2 µH	1.2 µH	22 µH	4.7 µH	2.2 µH	316 kΩ	100 kΩ
<b>1.8 V</b>	15 µH	3.3 µH	1.5 µH	22 µH	6.8 µH	2.2 µH	200 kΩ	100 kΩ
<b>1.2 V</b>	15 µH	3.3 µH	1.5 µH	18 µH	3.3 µH	1.8 µH	100 kΩ	100 kΩ
<b>0.8 V</b>	15 µH	2.2 µH	1.2 µH	15 µH	3.3 µH	1.5 µH	33 kΩ	100 kΩ

Best suitable inductor    Lowest profile inductor    Evaluation board configuration

Note: The above table values apply to each channel of the XRP6668.

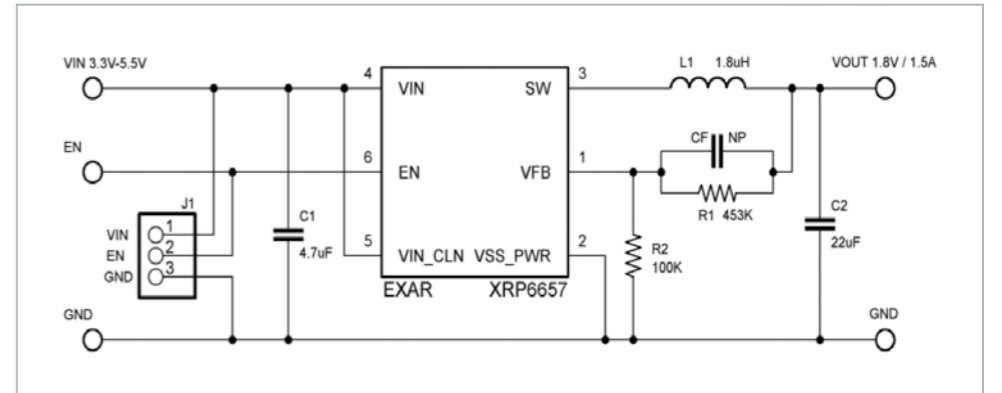
# XRP6657

1.5 A 1.3 MHz Synchronous Step Down Converter



### Evaluation Board Configuration

Input Voltage	2.5 V - 5.5 V
Output Voltage	1.8 V
Max. Output Current	1.5 A
Operating Frequency	1.3 MHz
Inductor Reference	1.8 µH – WE-PD2 744 773 018



### Inductor Value L – Resistor Values R1 / R2 Selector

V <sub>out</sub> /I <sub>out</sub>	V <sub>in</sub> = 3.3 V			V <sub>in</sub> = 5.0 V			R1	R2
	100 mA	750 mA	1500 mA	100 mA	750 mA	1500 mA		
<b>3.3 V</b>				33 µH	3.3 µH	1.8 µH	453 kΩ	100 kΩ
<b>2.8 V</b>	10 µH	1.5 µH	1.0 µH	33 µH	3.3 µH	1.8 µH	365 kΩ	100 kΩ
<b>2.5 V</b>	15 µH	1.8 µH	1.0 µH	33 µH	3.3 µH	1.8 µH	316 kΩ	100 kΩ
<b>1.8 V</b>	18 µH	2.2 µH	1.5 µH	33 µH	3.3 µH	1.8 µH	200 kΩ	100 kΩ
<b>1.2 V</b>	18 µH	2.2 µH	1.0 µH	22 µH	3.3 µH	1.5 µH	100 kΩ	100 kΩ
<b>0.8 V</b>	15 µH	1.8 µH	1.0 µH	15 µH	2.2 µH	1.0 µH	33 kΩ	100 kΩ

Best suitable inductor    Lowest profile inductor    Evaluation board configuration