

XCL226B0K1H2 Evaluation Board User Manual

0.5A Inductor Built-in Step-down “micro DC/DC” Converter

CAUTION

ENGINEERING EVALUATION PURPOSES ONLY

This evaluation board is made for the purpose of the product evaluation. It is strictly prohibited to use this evaluation board for any other purpose.

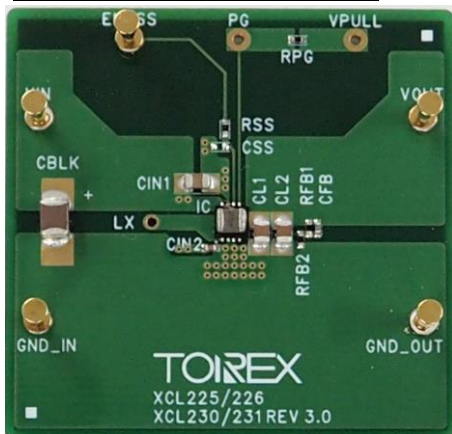
Torex Semiconductor does not guarantee that all samples will perform in exactly the same way and we recommend that you always consult our product data sheets for the minimum and maximum specifications.

It is also important that you evaluate all our products carefully before mass

XCL226B0K1H2 Evaluation Board

18V operation synchronous step-down DC/DC converter

Evaluation Board Picture



Evaluation Board SPEC

						Ta=25°C
		CONDITON.	MIN.	TYP.	MAX.	UNIT
Vin	Input Voltage Range	-	3.0	-	18.0	V
Vout	Setting Output Voltage	-	-	3.3	-	V
Iout	Output Current	-	0.0	-	500.0	mA
fosc	Switching frequency	-	-	1.2	-	MHz

XCL225/XCL226 Series Features

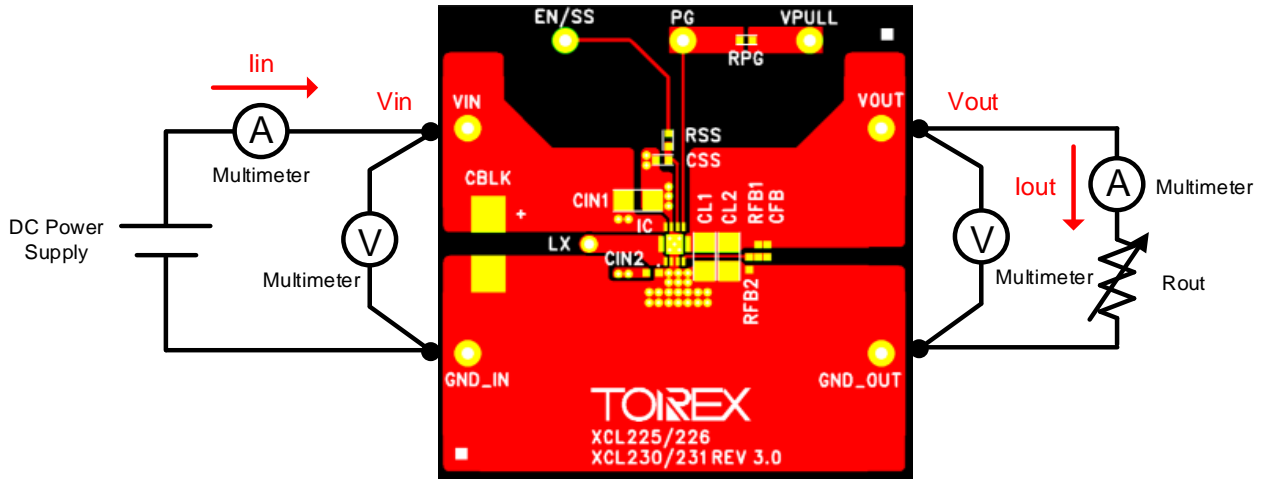
- Input Voltage Range 3.6V ~ 18.0V
- Output Voltage Range 1.0V ~ 15.0V
- Max Output Current 500mA max.
- Switching frequency 1.2MHz
- Max Duty Cycle 100%
- Small Solution Size

- Low EMI Noise
- Built-in Inductor
- Sequence Control is possible. (Power Good and Soft Start functions)

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18V operation synchronous step-down DC/DC converter

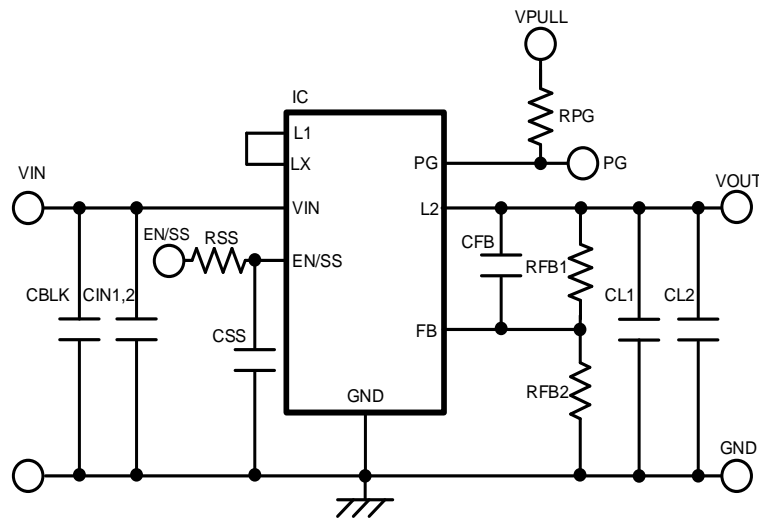
Quick Start Procedure



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18V operation synchronous step-down DC/DC converter

Schematic



BOM

Required Circuit Component

Item	Value	Description	Size [mm]	Part Number	Manufacture
IC	-	Step-Down micro DC/DC Converters	DFN3030-10B	XCL226B0K1H2	TOREX
CIN1	4.7uF	Ceramic cap., 50V	2012	UMK212BBJ475KG	Taiyo Yuden
CIN2	0.1uF	Ceramic cap., 50V	1608	CGA2B3X7R1H104K	TDK
CL1	10uF	Ceramic cap., 10V	2012	C2012X7R1A106K125AC	TDK
CL2	10uF	Ceramic cap., 10V	2012	C2012X7R1A106K125AC	TDK
RFB1	510kΩ	Resistor	1005	-	-
RFB2	150kΩ	Resistor	1005	-	-
CFB	22pF	Ceramic cap., 50V, CH	1005	-	-
RSS	Jumper	Resistor	-	-	-
CSS	-	-	-	-	-
RPG	100kΩ	Resistor	-	-	-

Additional Demo Board Circuit Components

Item	Value	Description	Size [mm]	Part Number	Manufacture
CBLK	10uF	Ceramic cap., 50V/10uF	3225	CGA6P3X7S1H106K	TDK

Vout Setting Table

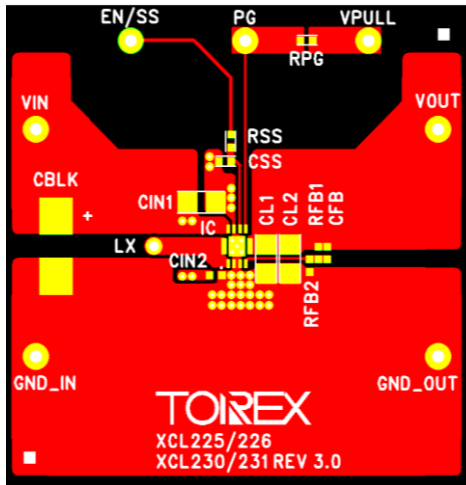
Vout Setting	RFB1	RFB2	CFB
3.0V	390kΩ	130kΩ	27pF
3.3V	510kΩ	150kΩ	22pF
5.0V	680kΩ	120kΩ	18pF
7.5V	270kΩ	30kΩ	39pF
10.0V	160kΩ	13kΩ	68pF
12.0V	360kΩ	24kΩ	33pF

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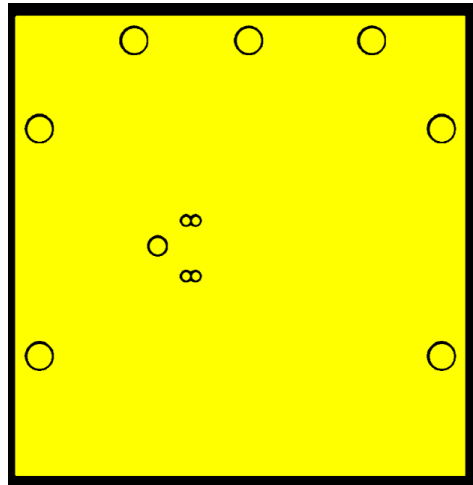
18V operation synchronous step-down DC/DC converter

PCB Layout

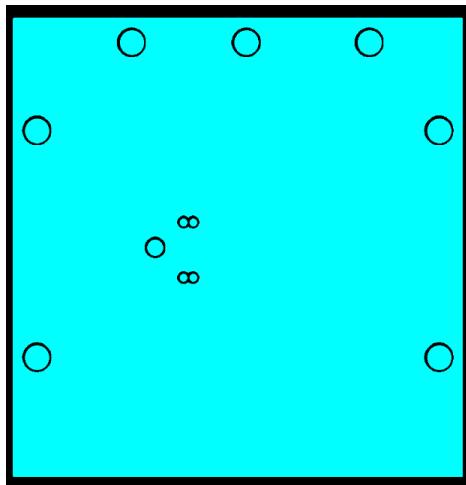
Layer 1



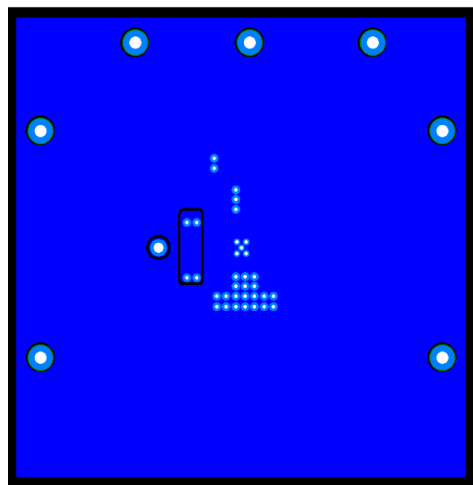
Layer 2



Layer 3



Layer 4

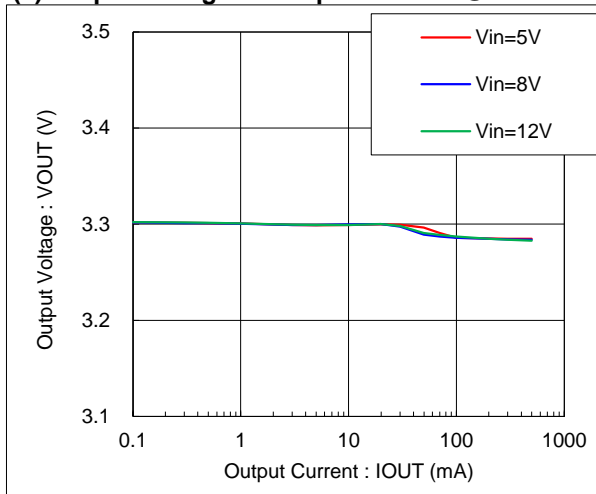


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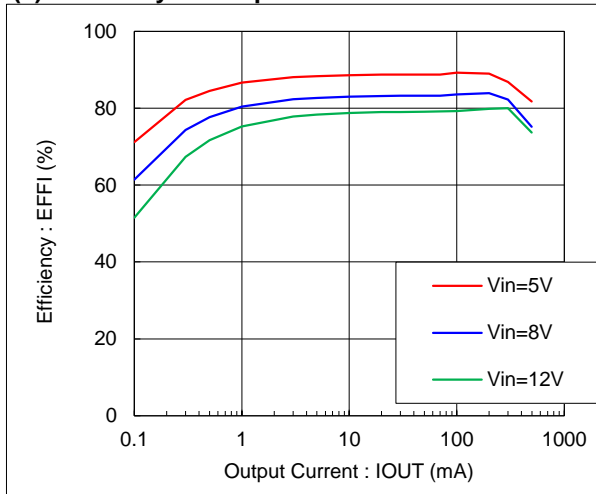
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Test Result

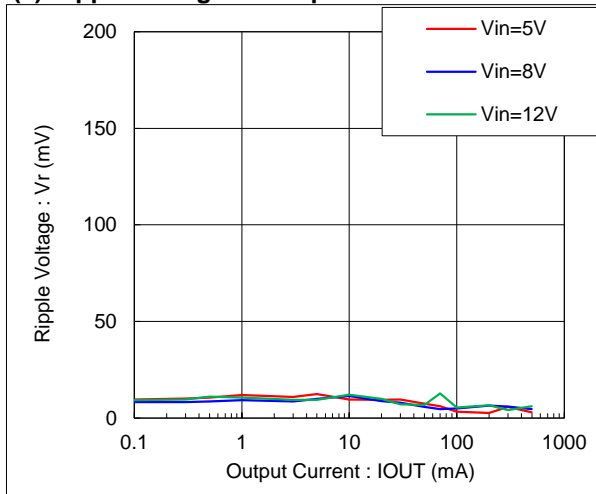
(1) Output Voltage vs Output Current @Ta=25°C



(2) Efficiency vs Output Current Ta=25°C



(3) Ripple Voltage vs Output Current Ta=25°C



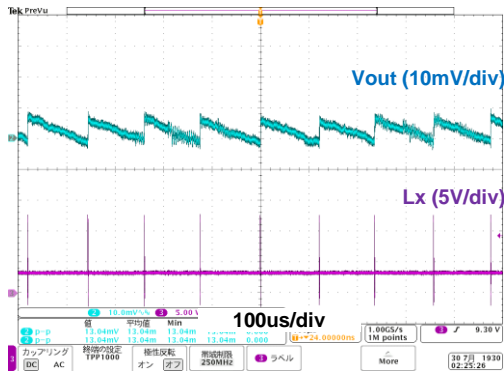
XCL226B0K1H2 Evaluation Board

18V operation synchronous step-down DC/DC converter

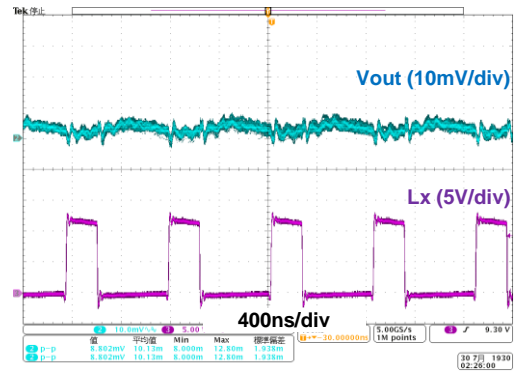
Test Result

(4) Output Voltage Waveform @ Ta=25°C

(4-1) Vin = 12V, Iout = 1mA



(4-2) Vin = 12V, Iout = 300mA



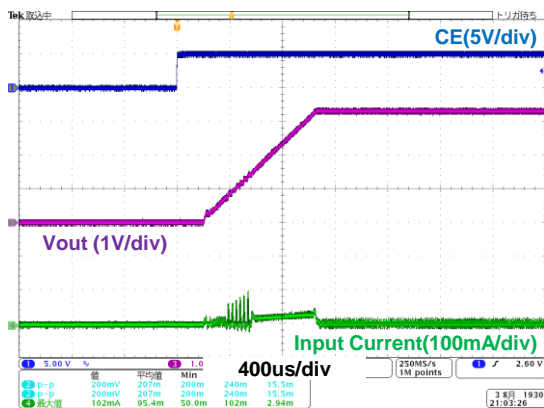
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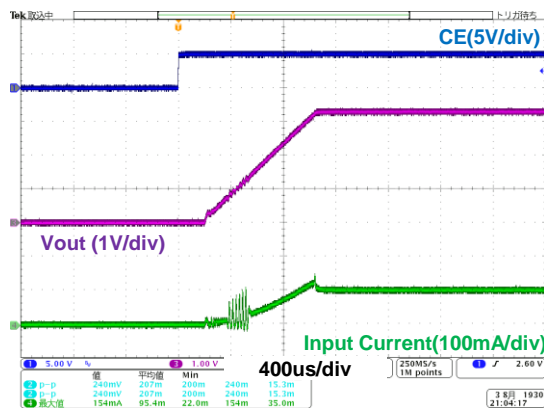
Test Result

(5) Start-up Waveform @ Ta=25°C

(5-1) Vin = 12V, Iout = 10mA



(5-2) Vin = 12V, Iout = 300mA



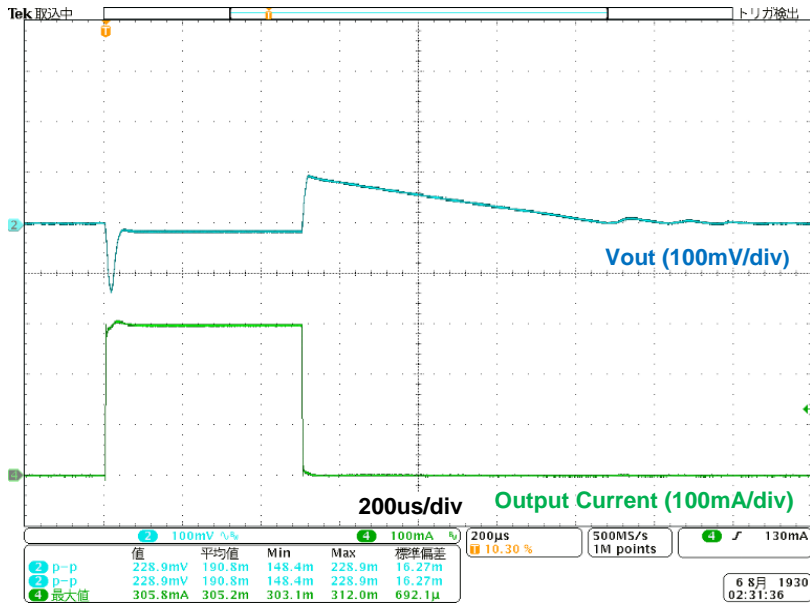
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Test Result

(6) Load Transient Waveform @ Ta=25°C

(6-1) Vin = 12V, Iout = 1mA ⇄ 300mA



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Test Result

(7) Radiation EMI : VCCI 10m

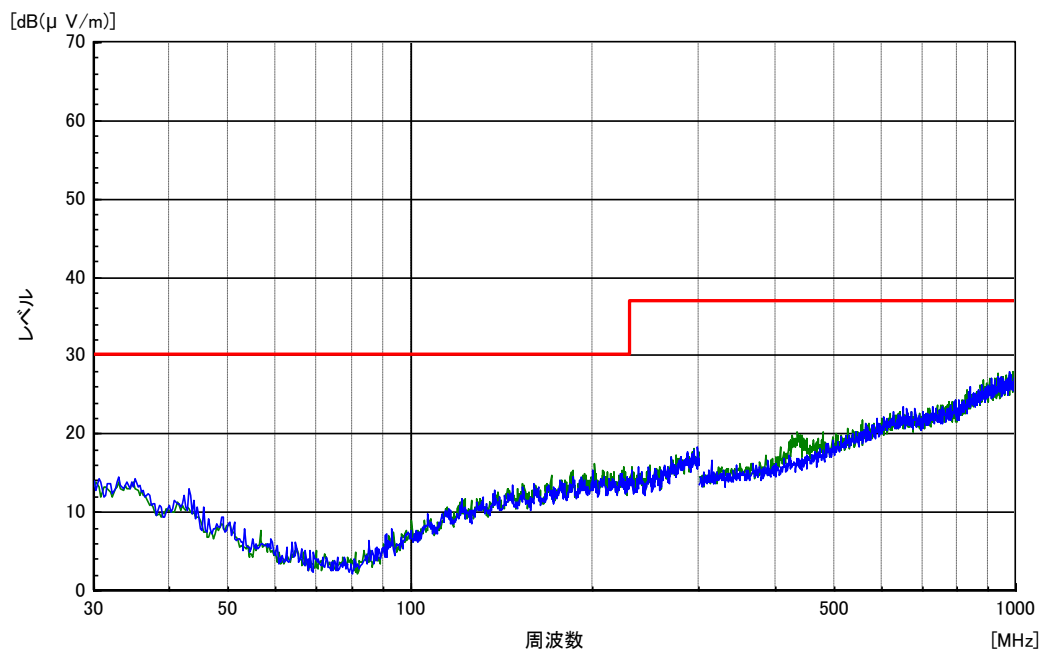
Condition

IC : XCL225B0K1H2-G

Vin : 12V

Vout : 5V

Iout : 300mA

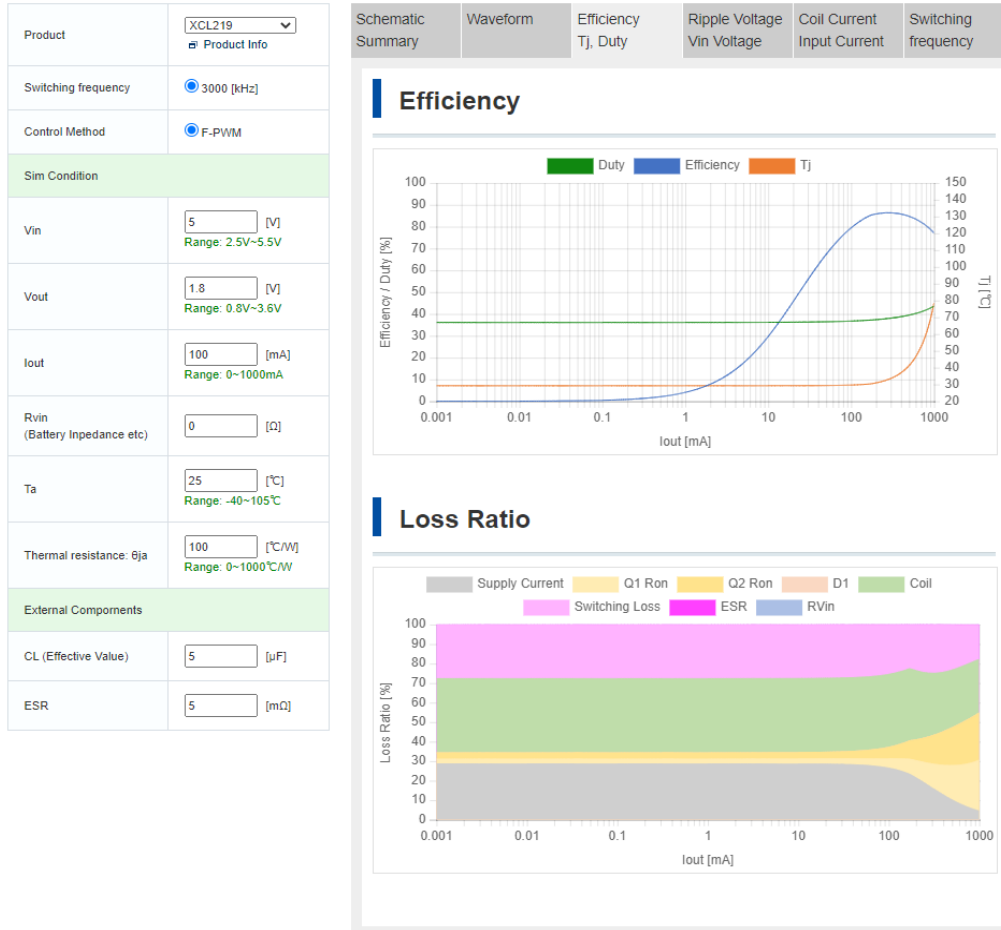


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【Appendix】 How to calculate DC/DC Converter or DC/DC Controller.

It can be calculated by the following "WEB DC/DC Simulation".



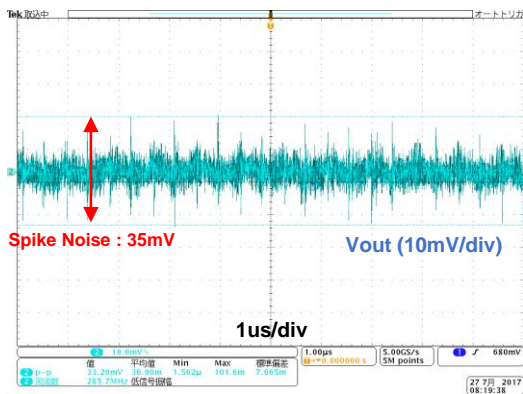
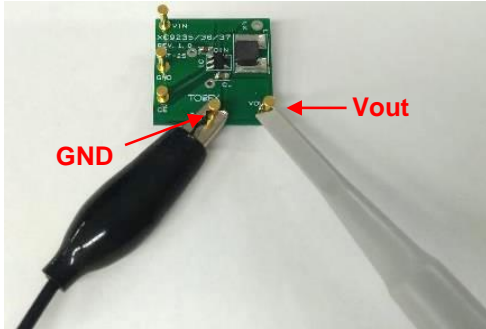
- 日本語 : <https://www.torex.co.jp/technical-support/dcdc-simulation/>
- English : <https://www.torexsemi.com/technical-support/dcdc-simulation/>
- 简体中文 : <https://www.torex.com.cn/technical-support/dcdc-simulation/>

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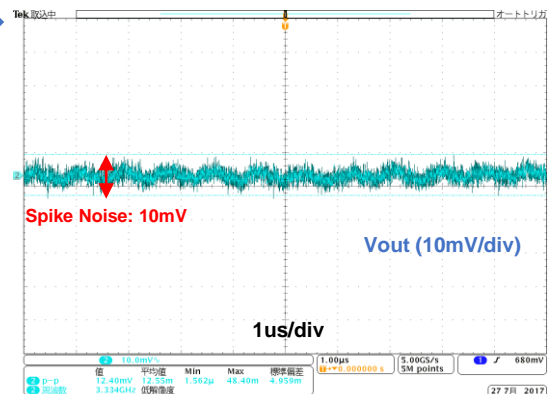
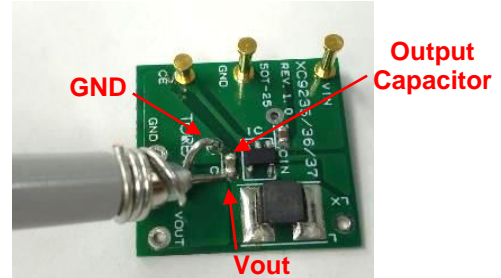
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[Appendix] How to reduce the spike noise caused by measurement (Probing method with oscilloscope)

Probing method : Before improvement



Probing method : After



* Condition : XC9236, Vin=3.6V/Vout=1.8V/100mA

English : <https://www.torexsemi.com/technical-support/tips/reduction-spike-noise/>

日本語 : <https://www.torex.co.jp/technical-support/tips/reduction-spike-noise/>