

XCL240B183FR-G Evaluation Board User Manual

HiSAT-COT[®] Control 1.0A Inductor Built-in Step-Down “micro DC/DC” Converters

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

XCL240B183FR-G Evaluation Board

Inductor Built-in synchronous step-down micro DC/DC converters

Evaluation Board Picture



Evaluation Board SPEC

| | | | | | | Ta=25°C |
|------|------------------------|-----------|------|------|------|---------|
| | | CONDITON. | MIN. | TYP. | MAX. | UNIT |
| Vin | Input Voltage Range | - | 2.5 | - | 5.5 | V |
| Vout | Setting Output Voltage | - | - | 1.8 | - | V |
| Iout | Output Current | - | 0 | - | 1000 | mA |
| fosc | Switching frequency | - | - | 3.0 | - | MHz |

XCL239/XCL240 Series Features

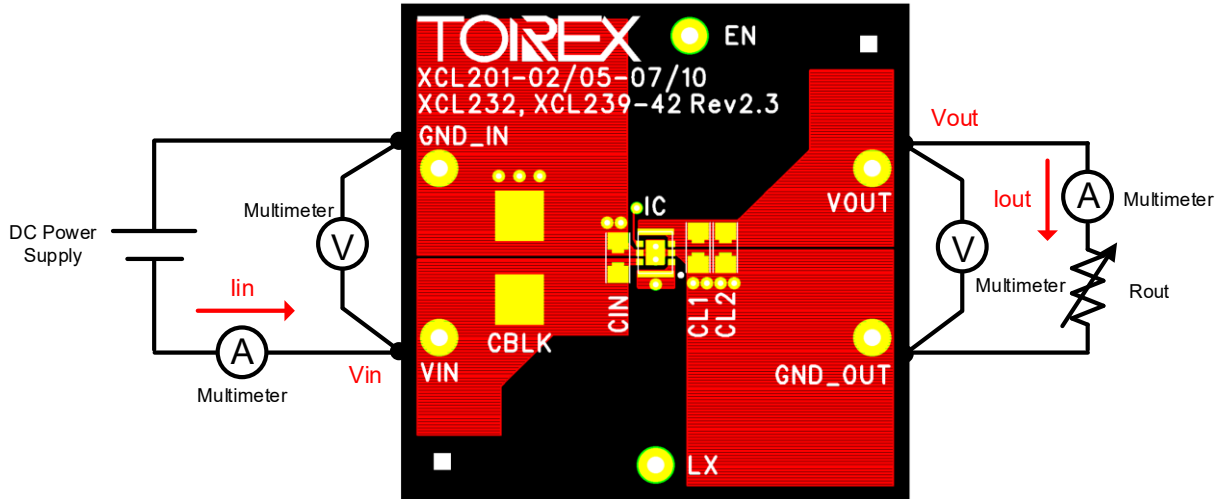
- Input Voltage Range 2.5V ~ 5.5V
- Output Voltage Range 0.8V ~ 3.6V (step 0.05V)
- Max Output Current 1000mA max.
- Switching frequency 3MHz
- Max Duty Cycle 100%

- Fast Load Transient Response
- Built-in Inductor
- Low EMI Noise

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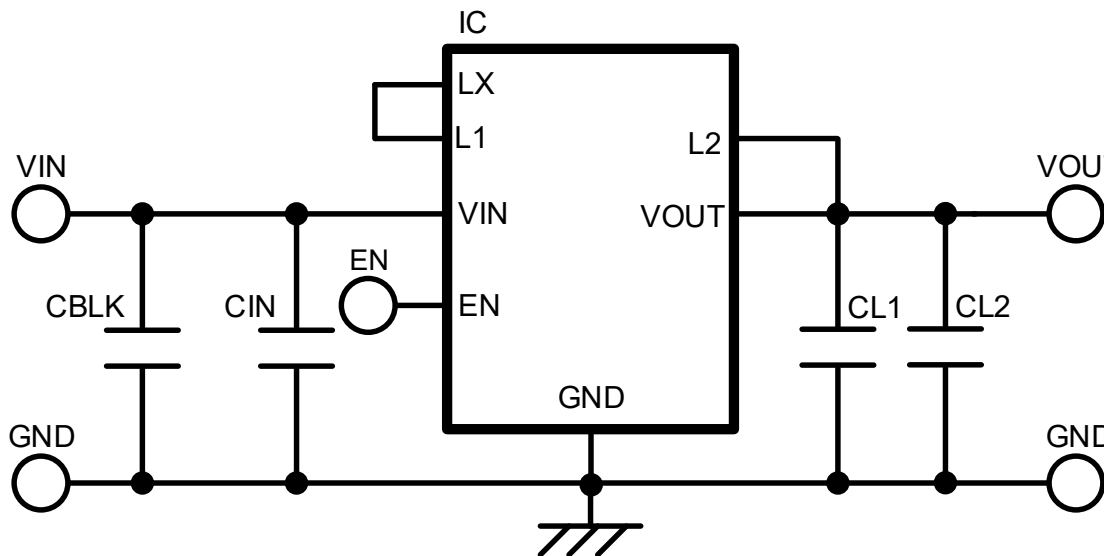
Quick Start Procedure



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Inductor Built-in synchronous step-down micro DC/DC converters

Schematic



BOM

Required Circuit Component

| Item | Value | Description | Size [mm] | Part Number | ManuFature |
|------|------------|----------------------------------|------------|------------------------------------|------------|
| IC | - | Step-Down micro DC/DC Converters | CL-2025-02 | XCL240B183FR-G | TOREX |
| CIN | 10 μ F | Ceramic cap., 10V/10 μ F | 1608 | GRM188C81A106KA73D(10V/10 μ F) | Murata |
| CL1 | 10 μ F | Ceramic cap., 10V/10 μ F | 1608 | GRM188C81A106KA73D(10V/10 μ F) | Murata |
| CL2 | - | - | - | - | - |

Additional Demo Board Circuit Components

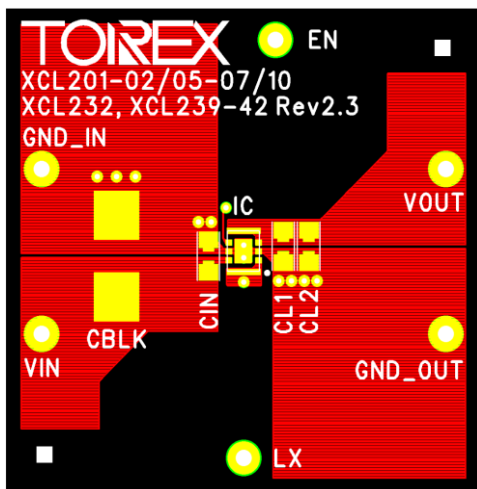
| Item | Value | Description | Size [mm] | Part Number | ManuFature |
|------|------------|------------------------------|-----------|-----------------|------------|
| CBLK | 10 μ F | Ceramic cap., 50V/10 μ F | 3225 | CGA6P3X7S1H106K | TDK |

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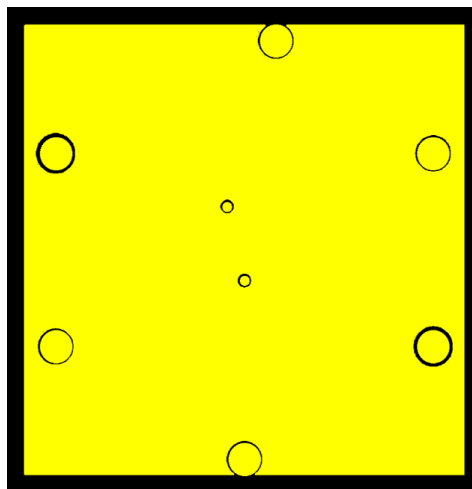
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PCB Layout

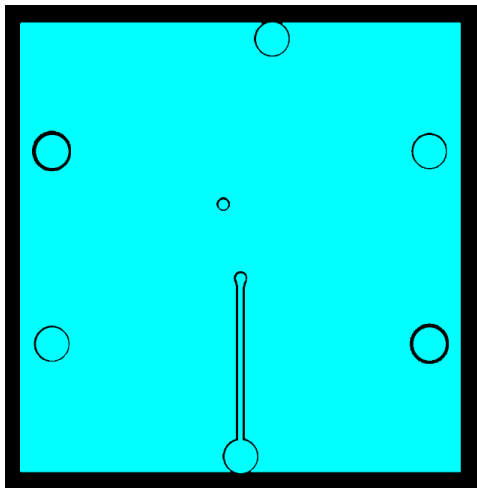
Layer 1



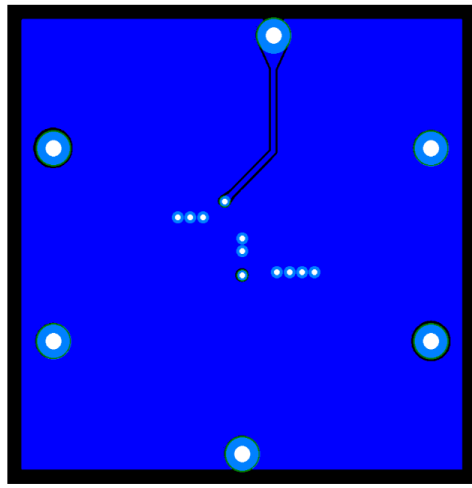
Layer 2



Layer 3



Layer 4

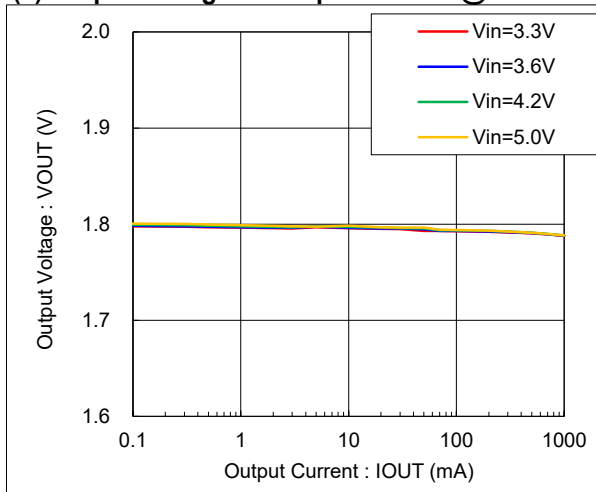


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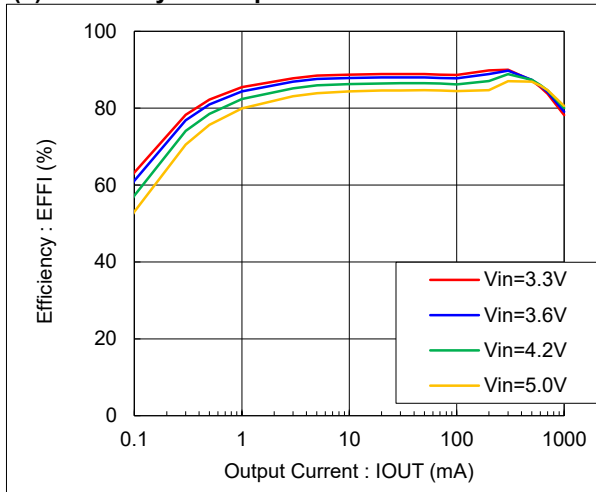
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Test Result

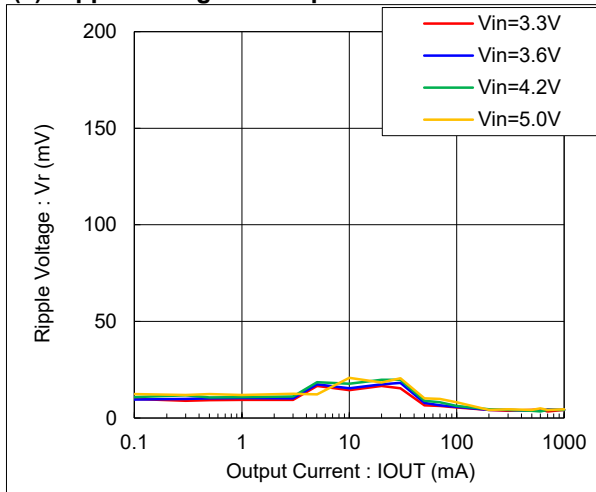
(1) Output Voltage vs Output Current @Ta=25°C



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



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



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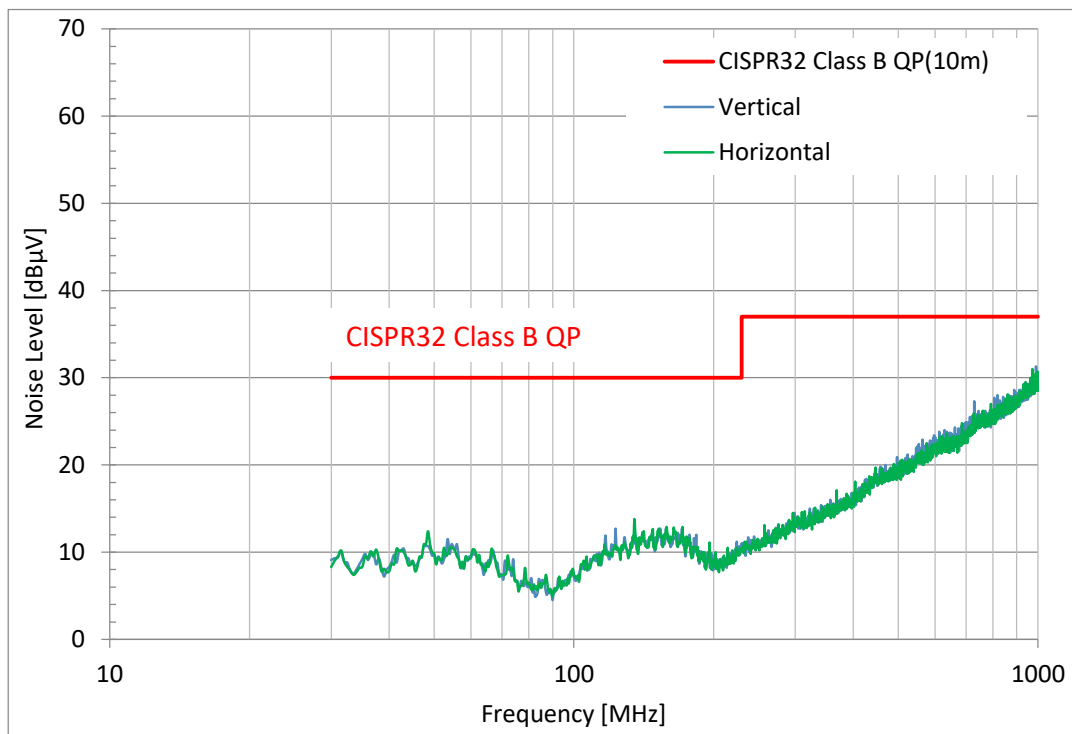
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Test Result

(7) Radiation EMI : CISPR-32/VCCI 10m Peak

Condition

IC : XCL240B183FR-G
 Vin : 3.7V
 Vout : 1.8V
 Iout : 300mA

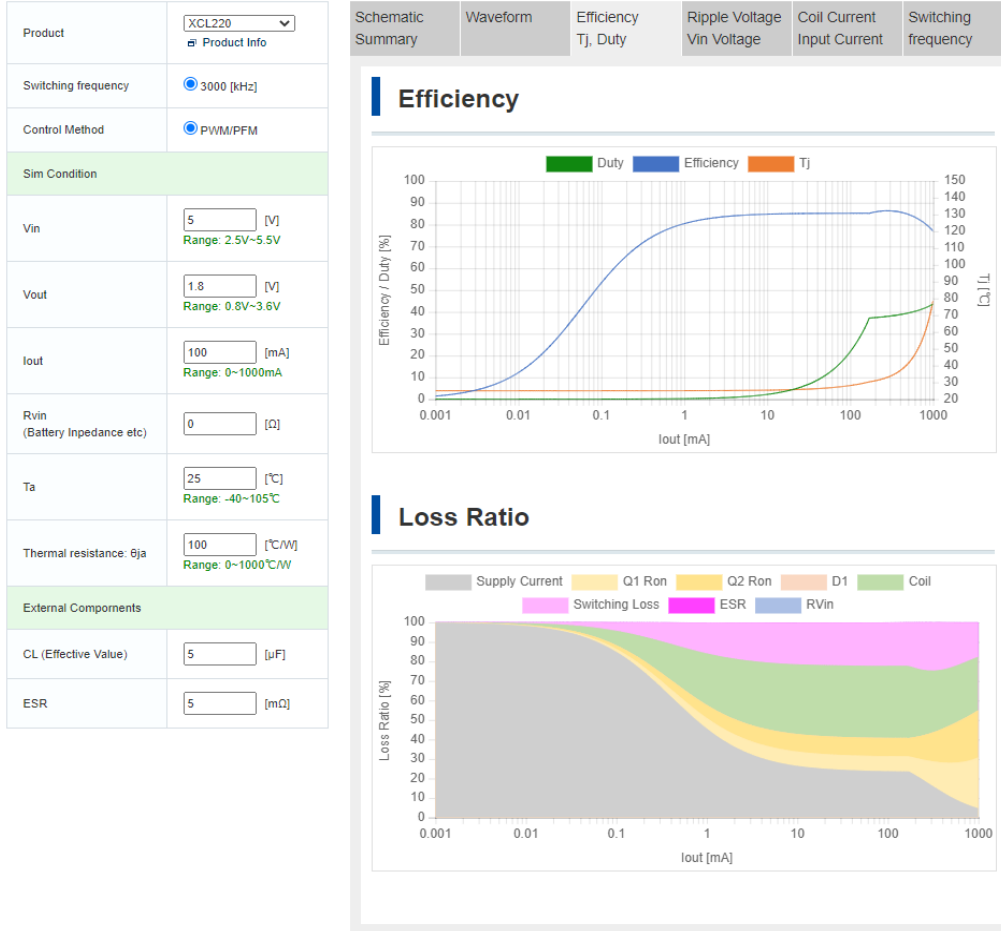


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Inductor Built-in synchronous step-down micro DC/DC converters

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

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



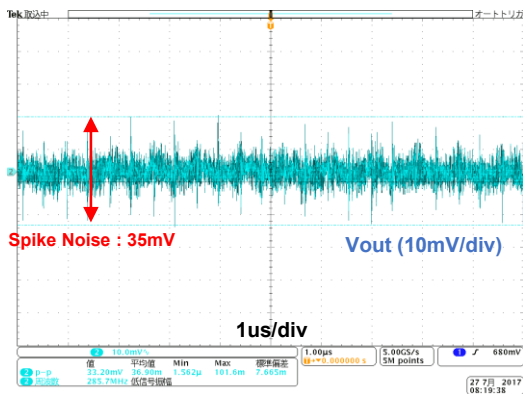
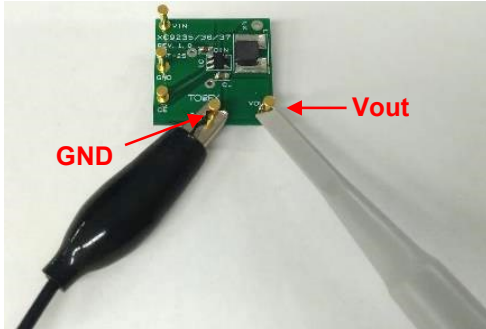
- 日本語 : <https://www.torex.co.jp/technical-support/dcdc-simulation/>
- English : <https://www.torexsemi.com/technical-support/dcdc-simulation/>
- 简体中文 : <https://www.torex.com.cn/technical-support/dcdc-simulation/>

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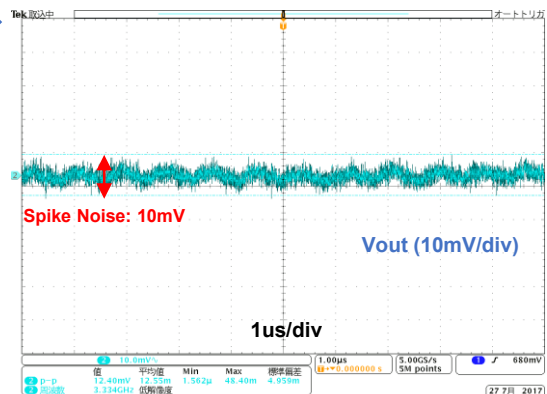
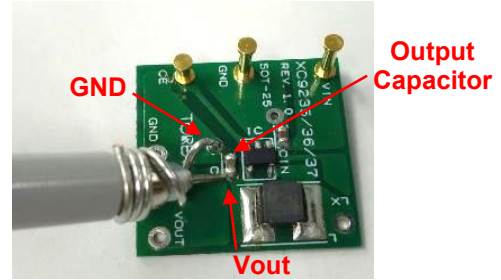
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[Appendix] How to reduce the spike noise caused by measurement (Probing method with oscilloscope)

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/>