RICOH

RP517K081D-EV

0.3 V Ultra-low Output Voltage 300 mA Buck DC/DC Converter Evaluation Board

NO.EEV-519-K081D-191021

RP517K081D-EV is the evaluation board for RP517 which has the below features, benefits and specifications.

OVERVIEW

RP517K is a low-voltage resistance buck DC/DC converter featuring ultra-low 0.3 µA quiescent current and 0.3 V output voltage. Suitable for wearable and IoT devices which require long-life batteries and downsizing.

KEY BENEFITS

- Ultra-low consumption current (I_Q: 0.3 µA) with the VFM control for DC/DC (switching frequency: 1 MHz max.)
- Suitable for low power devices due to its ultra-low output voltage range from 0.3 V to 1.2 V
- Suitable for coin batteries and USB ports due to its wide input range from 1.8 V to 5.5 V

KEY SPECIFICATIONS

- Output current: 300 mA
- Output Voltage Range: 0.3 V to 1.2 V (Settable in 0.1 V step)
- Output Voltage Accuracy: ±18 mV
- Built-in Driver On-resistance (V_{IN} = 3.6 V): Typ. PMOS 0.19 Ω, NMOS 0.19 Ω
- Standby Current: 0.01 µA
- Package: DFN(PLP)2527-10
- For more details on RP517 IC, please refer to https://www.e-devices.ricoh.co.jp/en/products/power/dcdc/rp517/rp517-ea.pdf.

PART NUMBER INFORMATION

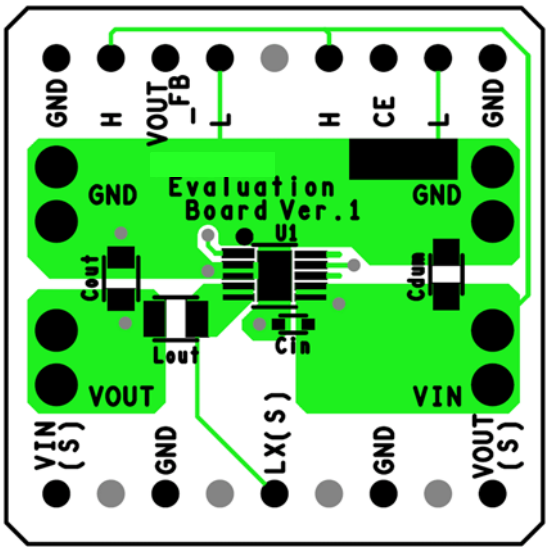
Product Name	Package
RP517K081D	DFN(PLP)2527-10

081: Specify the set output voltage (V_{SET}): 0.8 V.
D: Specify with auto-discharge function.

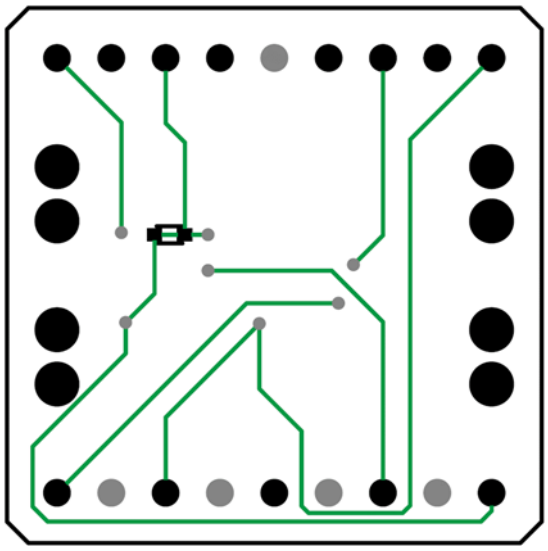
PCB LAYOUT

RP517K (DFN(PLP)2527-10)

Top Layer



Bottom Layer



ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
V_{IN}	Input Pin Voltage		−0.3 to 6.5	V
V_{LX}	LX Pin Voltage		−0.3 to V_{IN} + 0.3	V
V_{CE}	CE Pin Voltage		−0.3 to 6.5	V
V_{OUT}	VOUT Pin Voltage		−0.3 to 6.5	V
P_D	Power Dissipation(1)	DFN(PLP)2527-10, JEDEC STD. 51	2500	mW
Tj	Junction Temperature Range		−40 to 125	°C
Tstg	Storage Temperature Range		−55 to 125	°C

ABSOLUTE MAXIMUM RATINGS

Electronic and mechanical stress momentarily exceeded absolute maximum ratings may cause permanent damage and may degrade the lifetime and safety for both device and system using the device in the field. The functional operation at or over these absolute maximum ratings is not assured.

RECOMMENDED OPERATING CONDITIONS

Recommended Operating Conditions

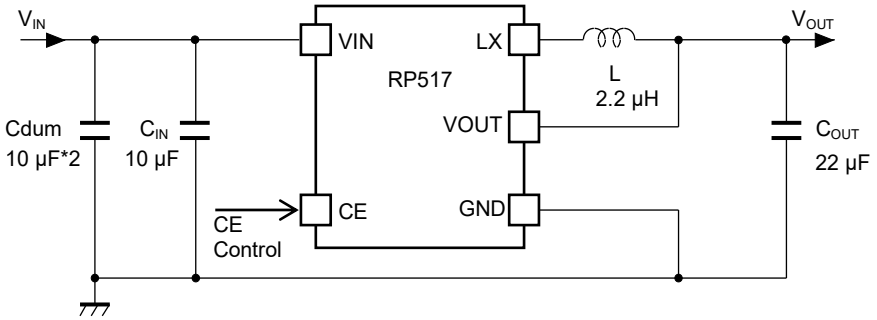
Symbol	Parameter	Rating	Unit
V_{IN}	Input Voltage	1.8 to 5.5	V
Ta	Operating Temperature Range	−40 to 85	°C

RECOMMENDED OPERATING CONDITIONS

All of electronic equipment should be designed that the mounted semiconductor devices operate within the recommended operating conditions. The semiconductor devices cannot operate normally over the recommended operating conditions, even if they are used over such conditions by momentary electronic noise or surge. And the semiconductor devices may receive serious damage when they continue to operate over the recommended operating conditions.

(1) Refer to *POWER DISSIPATION* in the product data sheet.

TYPICAL APPLICATION



RP517 Typical Application Circuit

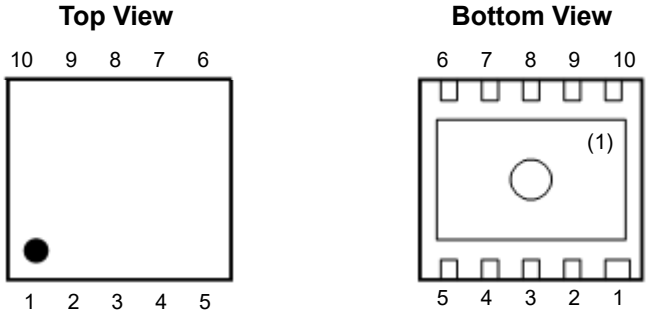
※Testing with this EV board, an external attachment might be necessary for evaluation of the correct performance of the RP517 and already has been attached as Cdum.
For evaluation, wiring for power supply or GND will be used. Considering the voltage drop or noise by the wiring, Cdum has been mounted on the EV board to obtain the right performance of the RP517.
In the actual PCB layout or measurement unit's wire is very short, and Cdum will be unnecessary.

Recommended External Components[*1]

Symbol	Value
C_{IN}	10 µF
C_{OUT}	22 µF
Cdum	10 µF x 2
L	2.2 µH

[*1] The bill of materials will be attached on the shipment of each purchased evaluation board.

PIN DESCRIPTIONS



RP517K [DFN(PLP)2527-10] Pin Configuration

RP517K [DFN(PLP)2527-10] Pin Descriptions

Pin No.	Symbol	Description
1	VOUT	Output Pin
2	GND	Ground Pin
3	GND	Ground Pin
4	LX	Switching Pin
5	LX	Switching Pin
6	VIN	Input Pin
7	VIN	Input Pin
8	NC	No connection
9	CE	Chip Enable Pin (Active-high)
10	NC	No connection
5	CE	Chip Enable Pin (Active-high)

(1) The tab on the bottom of the package enhances thermal performance and is electrically connected to GND (substrate level). It is recommended that the tab be connected to the ground plane on the board, or otherwise be left floating.

TECHNICAL NOTES

The performance of a power source circuit using this device is highly dependent on the peripheral circuit. A peripheral component or the device mounted on PCB should not exceed a rated voltage, a rated current or a rated power. When designing a peripheral circuit, please be fully aware of the following points.

・ When an intermediate voltage other than V_{IN} and GND is input to the CE pin, a supply current may be increased by a through current of a logic circuit in the IC. The CE pin is neither pulled up nor pulled down, therefore the operation is not stable at open.

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Halogen Free

Ricoh is committed to reducing the environmental loading materials in electrical devices with a view to contributing to the protection of human health and the environment.
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