

How to boost voltage for 3V system



1. Introduction

Power supplies of 3V system including 3.3V are often used at low voltage circuit. Since the nominal voltage of Murata's small Lithium ion secondary battery (CT04120) is 2.3V, voltage boost circuit is needed to drive 3V systems. As followings, we introduce small and relatively manageable boost and buck-boost converters which are compatible with CT04120

2. Description

Table 1 shows the boost and buck-boost converters which Murata has performed an operation check. TOREX's boost converter, CL101 and XCL103 series are embedded coil micro DC/DC converters. They can be used even without any knowledge of power circuit design because external parts are only two MLCCs (multilayer ceramic capacitors) of 10uF. Also, they can be mounted in a small space because of their miniature package of 2.0×2.5×1.04mm.

<https://www.torexsemi.com/>

Nisshinbo Micro Devices's RP604 series are buck-boost converters with low power consumption and high efficiency at light loads. Since the quiescent current is 0.3uA, the capacity of storage device can be used without waste. Their size is also small: the package size of WLCSP is 1.71×2.315×0.40mm, and that of DFN is 2.70×3.00×0.6mm.

The RP605 series is the same size as the RP604, but has the same buck-boost converter performance as the RP604 and the 1/3, 1/4 division output function of the input voltage. The voltage division output function is realized by ultra low consumption of 0.1uA and addition of one capacitor. By directly inputting to low voltage AD converter such as MCU, ultra low consumption and highly accurate battery voltage monitoring can be realized.

Please refer to Nisshinbo Micro Devices-Web site if you know more detail.

https://www.nisshinbo-microdevices.co.jp/en/applications/iot/monitor_pin.html

Please note we do not guarantee on the IC operation. Please confirm the operation by yourself when you consider these ICs.

- * In case of using CT04120
- Boost 2.3V→3V system load

With any converter above, full discharge capacity can be obtained because discharge cut-off voltage of CT04120 is 1.8V. Output current and quiescent current are different for every converter. Please select adequate converter according to your usage.

3. Description

Table.1 Boost DC/DC converter overview (TOREX semiconductor)

Maker	TOREX semiconductor	
IC PN	XCL101 series	XCL103 series
Circuit system	Boost	
Coil	Internal	
Quiescent current	6.3 μ A (VBAT=VOUT=+0.5V)	26 μ A (VOUT=VOUT +0.5V)
Output current	100mA (VOUT=3.3V VBAT=1.8V)	350mA (VOUT=3.3V VBAT=1.8V)
Input Voltage	0.9~5.5V	0.9~6.0V
Output Voltage	1.8~5.0V (0.1V Step)	2.2~5.5V (0.1V step)

Table.2 Boost·Down DC/DC Converter overview (Nisshinbo Micro Devices)

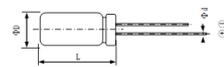
Maker	Nisshinbo Micro Devices	
IC PN	RP604 series	RP605 series
Circuit system	Boost/Down Volatge	
Coil	External	
Quiescent current	0.3 μ A (VBAT=VOUT=3.6V)	Boost/Down DCDC:0.3 μ A Battery monitor:0.1 μ A
Output current	300mA (Stepping down)	
Input Voltage	1.8~5.5V	
Output Voltage	1.6~5.2V (0.1V step)	

* When the XCL101 and XCL103 series are used for backup, only the boost operation is performed. Therefore, when the input voltage is higher than the output voltage, the input voltage is output as it is.

4. Lineup

Specification of CT04120

Product name	CT04120	Dimensions	
		Φ D	4mm
Nominal Voltage	2.3V	L	12mm
Charge Voltage	2.7V	Φ d	0.45mm
End of discharge Voltage	1.8V	F	1.5mm
Capacity	3mAh	Operating temp	-20~70°C



5. Support

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