

PFM Step-up DC/DC Converter

RCR2821

■ Features

- Minimal Number of External Components (Only an Inductor, a Diode, and a Capacitor)
- Ultra Low Input Current (5 μ A at Switch Off)
- $\pm 2\%$ High Output Voltage Accuracy
- Low Ripple and Low Noise
- Low Start-up Voltage, 0.85V at 1mA
- 85% Efficiency with Low Cost Inductor
- SOT89 and SOT23-5L Small Packages

■ General Description

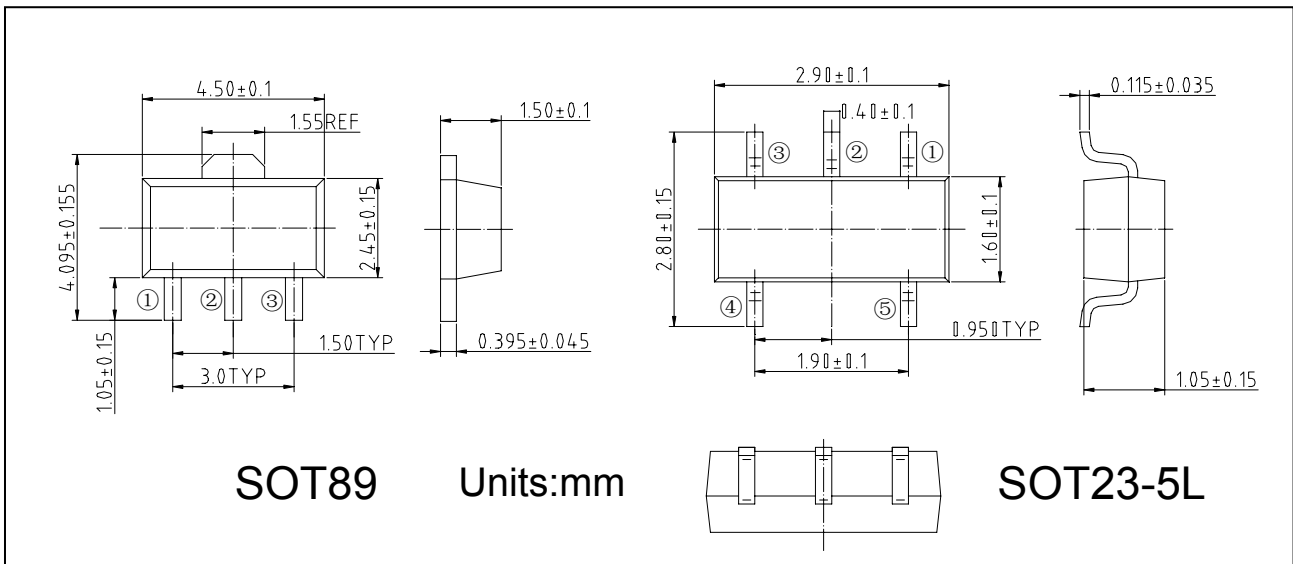
The RCR2821 Series are PFM Step-up DC/DC ICs with ultra low supply current by CMOS process and suitable for use with battery-powered instruments.

The RCR2821 IC consists of an oscillator, a PFM control circuit, a driver transistor (LX switch), a reference voltage unit, an error amplifier, resistors for voltage detection, and a LX switch protection circuit. A low ripple and high efficiency step-up DC/DC converter can be constructed of this RCR2821 IC with only three external components.

■ Applications

- Power source for battery-powered equipment
- Power source for cameras, camcorders, VCRs, PDAs, pagers, electronic data banks, and hand-held communication equipment
- Power source for applications, which require higher voltage than that of batteries used in the appliances

■ Package Information

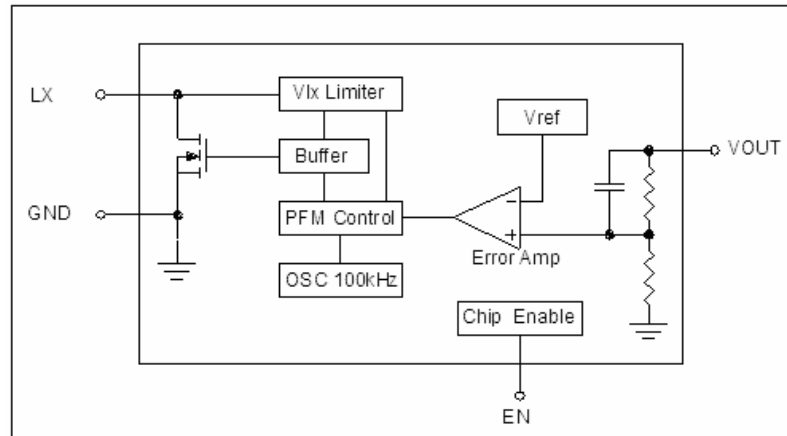


■ Pin Configurations

Pin Port	SOT89	SOT23-5L
①	GND	EN
②	VOUT	VOUT
③	LX	NC
④		GND
⑤		LX

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■ Functional Block Diagram



● Ordering Information

RCR2821 - □ □ □ □

Package Type

SK: SOT23-5L; SM: SOT89

Output Voltage

... 20 = 2.0V; 25 = 2.5V; 30 = 3.0V; 33 = 3.3V; 36 = 3.6V; 50 = 5.0V...

Indicate the product number

■ Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Output Voltage	V_{OUT}	-0.3 to +10	V
LX Pin Voltage	V_{LX}	-0.3 to +10	V
EN Pin Voltage	EN	-0.3 to +10	V
LX Pin Output Current	I_{LX}	1	A
Power Dissipation ($T_A = 25^\circ\text{C}$)	PD	SOT23-5L	250
		SOT89	500
Operating Temperature Range	T_{OPR}	-40 to 125	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 to 150	$^\circ\text{C}$

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■ Electrical Characteristics TA = 25°C , unless otherwise specified

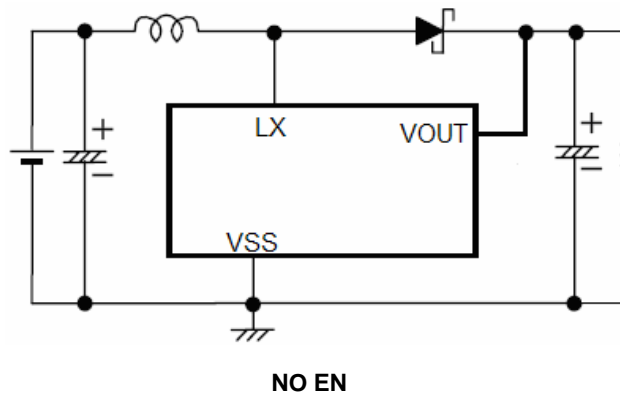
Parameter		Symbol	Test Conditions	Min	Typ	Max	Unit
Output Voltage Accuracy		ΔV_{OUT}		-2	--	+2	%
Input Voltage		V_{IN}		--	--	10	V
Start-up Voltage		V_{ST}	$I_{OUT} = 1mA, V_{IN} : 0 \text{ to } 2V$	--	0.85	1.0	V
Hold-on Voltage		V_{HO}	$I_{OUT} = 1mA, V_{IN} : 2 \text{ to } 0V$	0.7	--	--	V
Efficiency		EFFI		--	75	85	%
Input Current1	$V_{OUT} \leq 3.5V$	I_{SS1}	To be measured at V_{IN} at no load	--	30	40	μA
	$3.5V < V_{OUT} \leq 5V$			--	50	60	
Input Current 2	$V_{OUT} \leq 3.5V$	I_{SS2}	To be measured at V_{OUT} in switch off condition	--	5	8	μA
	$3.5V < V_{OUT} \leq 5V$			--	6	10	
LX Switch_ ing Current		$I_{SWITCHING}$	$V_{LX} = 0.4V$	100	200	--	mA
EN "H" Level		V_{SH}	$V_{OUT} = V_{OUT(T)} \times 0.9$	0.75	--	--	V
EN "L" Level		V_{SL}	$V_{OUT} = V_{OUT(T)} \times 0.9$	--	--	0.3	V
EN "H" Input Current		I_{SH}	$V_{EN} = 10V$	--	--	0.1	μA
EN "L" Input Current		I_{SL}	$V_{EN} = 0V$	-0.5	--	0.1	μA
Maximum Oscillator		F_{MAX}		80	120	160	KHz
Oscillator Duty Cycle		D_{OSC}	On (V_{LX} "L") side	70	78	85	%

Note1. $V_{OUT(T)}$ = Specified output Voltage.

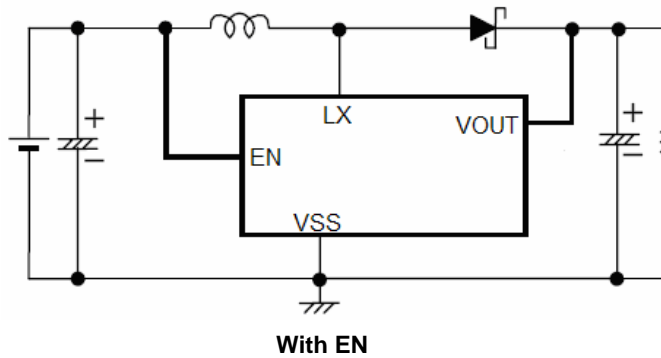
Note2. Unless otherwise provided, $V_{IN} = 1.8V, V_{SS} = 0V, I_{OUT} = 10mA, T_{OPT} = 25^\circ C$

Note3. Unless otherwise provided, $V_{IN} = 3V, V_{SS} = 0V, I_{OUT} = 10mA, T_{OPT} = 25^\circ C$

■ Typical Application Circuit



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Components:

- Inductor: 47uH, Diode: 1N5818
- Output Capacitor: 47uF/16V (Tantalum)

Typical Performance Characteristics

1、 RCR2821-30:

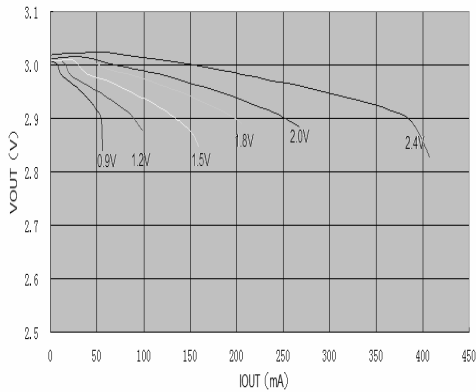


Figure1. Output Voltage VS Output Current

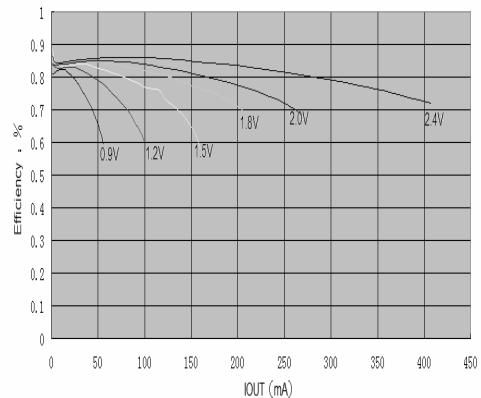


Figure2. Efficiency VS Output Current

2、 RCR2821-33:

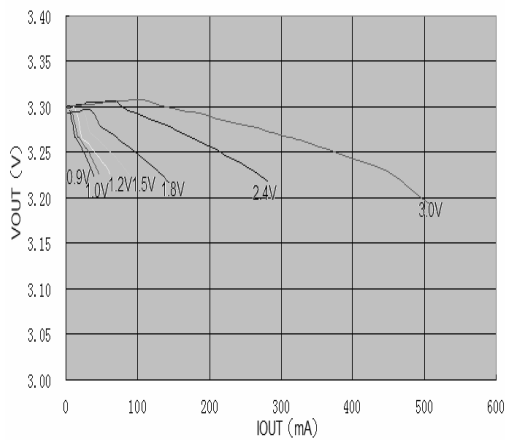


Figure3. Output Voltage VS Output Current

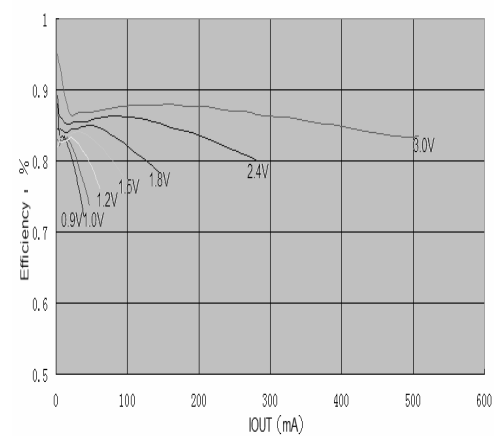


Figure4. Efficiency VS Output Current

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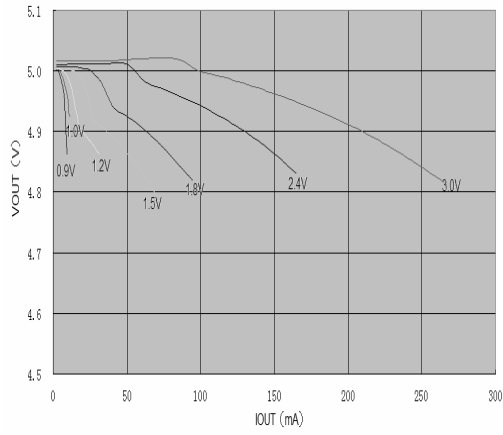


Figure5. Output Voltage VS Output Current

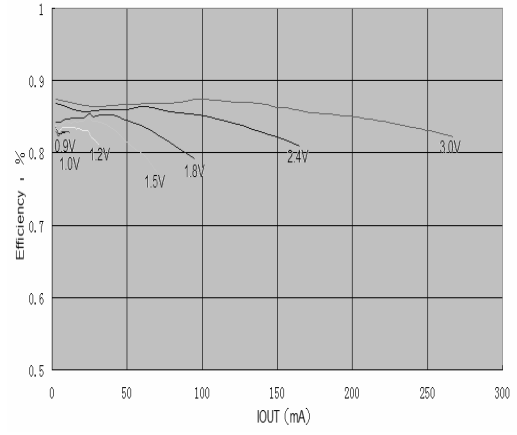


Figure6. Efficiency VS Output Current