Synchronous Buck DC/DC Converter IA3671

Features

- Up to 95% Efficiency
- Current mode operation for excellent line and load transient response
- Low quiescent current: 230μA
- Up to 700mA Output Current
- PWM/PFM Switching Control
- Low Switch on Resistance $R_{DS(ON)}$, Internal Switch: 0.35Ω
- Output voltage: 5.5V～0.6V
- No Schottky diode required
- 1.4MHz fixed frequency switching
- Short-Circuit protection
- Shutdown quiescent current: < 1μA
- Low profile SOT-23-5 package (lead-free)

Application

- Digital cameras and MP3
- Palmtop computers/PDAs
- Cellular phones
- Wireless handsets and DSL Modems
- PC cards
- Portable media players

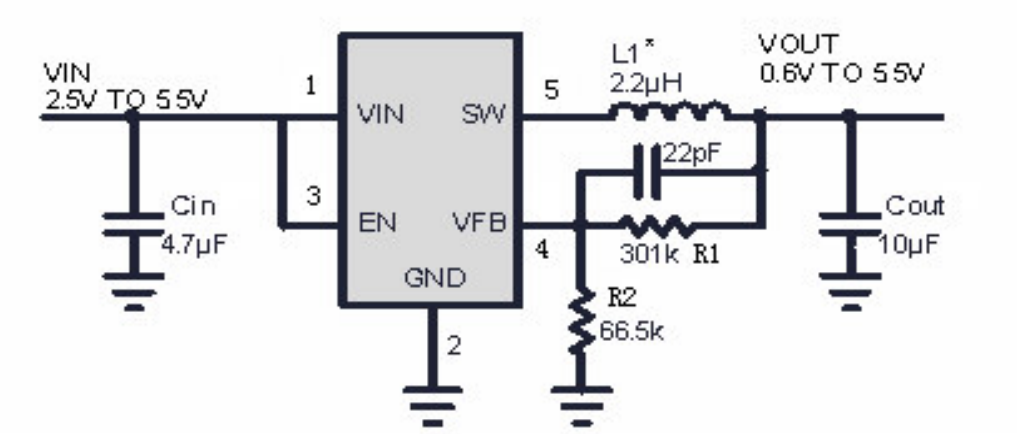
Description

The IA3671 is high efficiency synchronous, step-down DC/DC converters working under an input voltage range of 2.5V to 5.5V. This feature makes the IA3671 suitable for single Li-Ion battery-powered applications. IA3671 can be automatically switched between PWM and PFM control mode. 100% duty cycle capability extends battery life in portable devices, while the quiescent current is 230μA with no load, and drops to < 1μA in shutdown.

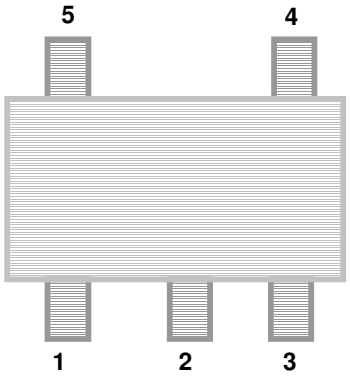
The internal synchronous 0.35Ω, 1A switch is desired to increase efficiency without an external Schottky diode. The 1.4 MHz fixed switching frequency allows the using of tiny, low profile inductors and ceramic capacitors, which minimized overall solution footprint.

The IA3671 converters are available in the industry standard SOT-23-5 power packages (or upon request).

Typical Applications



Pin Assignment



SOT-23-5

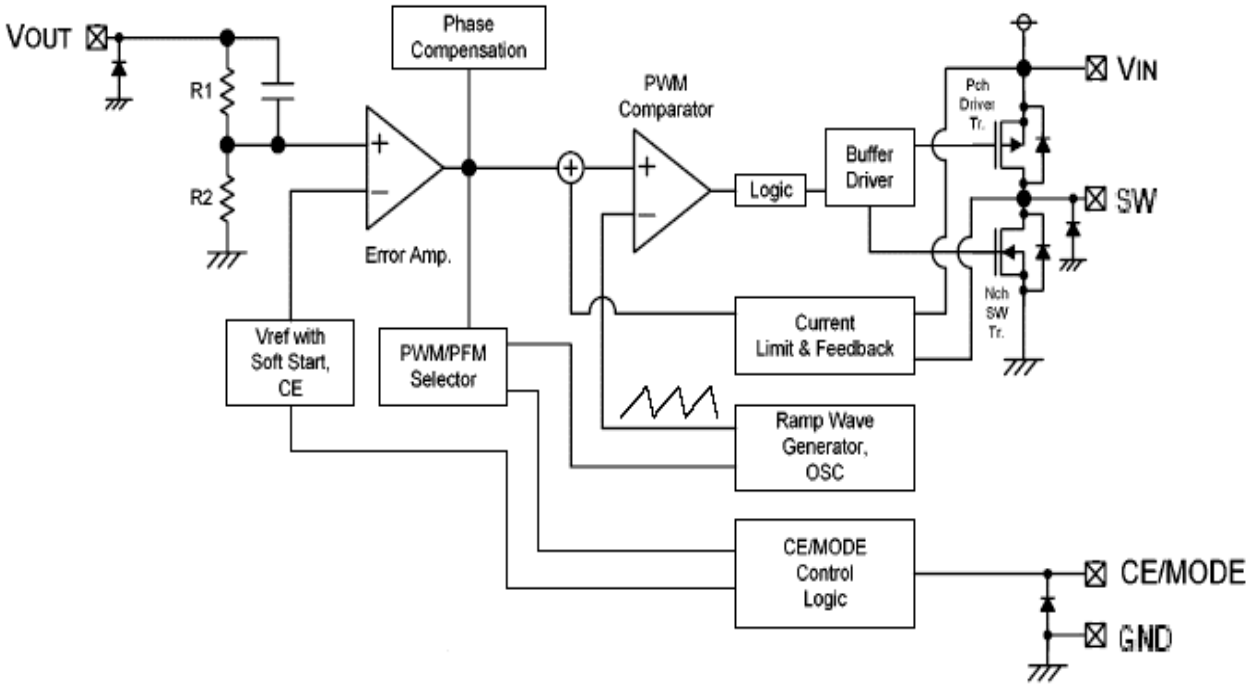
PIN NUMBER SOT-23- 5	PIN NAME	FUNCTION
1	V_{IN}	Input
2	GND	Ground
3	EN	ON/OFF Control (High Enable)
4	V_{OUT}	Output
5	SW	Switch Output

Order Information

IA3671 - ① ② : PWM / PFM Automatic Switching Control

SYMBOL	DESCRIPTION
①	Denotes Output voltage: B : 1.5V Output; C : 1.8V Output; A : Adjustable Output
②	Denotes Package Types: E: SOT-23-5

Functional Diagram



Absolute Maximum Ratings

- Power Dissipation.....Internally limited
- V_{IN} .....- 0.3 V ~ + 6 V
- $V_{ON/OFF}$ .....- 0.3 V ~ (V_{IN} + 0.3) V
- V_{SW} .....- 0.3 V ~ (V_{IN} + 0.3) V
- V_{OUT}.....- 0.3 V ~ + 6 V
- I_{SW} 1.3A
- Operating Temperature Range .....- 40℃ ~ + 85℃
- Lead Temperature (Soldering 10 sec.) .....300℃
- Storage Temperature Range .....- 65℃ ~ + 150℃
- Junction Temperature .....+ 125℃

Electrical Characteristics

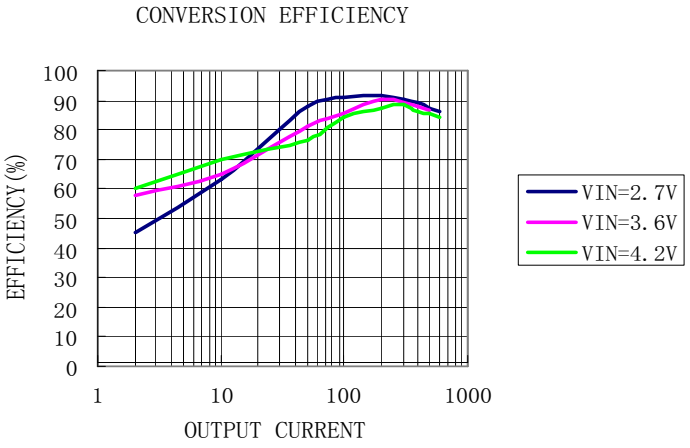
Operating Conditions: T_A=25℃, V_{IN}=3.6V unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{OUT}	Output Voltage	I_{OUT} = 100mA	1.75	1.80	1.85	V
V_{IN}	Input Voltage Range		2.5		5.5	V
F_{OSC}	Oscillator Frequency	When connected to ext. components, PWM fixed control, I_{OUT}=100mA	1.1	1.4	1.7	MHz
R_{PFET}	$R_{DS(ON)}$ of P-Channel FET	I_{SW}=100mA		0.4	0.5	Ω
R_{NFET}	$R_{DS(ON)}$ of N-Channel FET	I_{SW}=-100mA		0.35	0.45	Ω
EFFI*	Efficiency	When connected to ext. components V_{IN}=EN=3.0V,I_{OUT}=100mA		88		%
ΔV_{OUT}	Output Voltage Line Regulation	V_{IN}=2.5V~5.5V		0.04	0.4	%/V
$V_{LOADREG}$	Output Voltage Load Regulation			0.5		%
$V_{ON/OFF}$	EN Threshold		0.3	1	1.5	V
$I_{ON/OFF}$	EN Leakage Current			±0.01	±1	μA

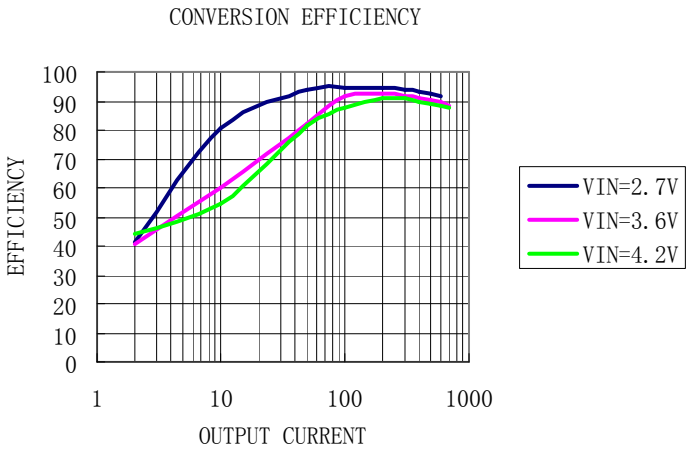
* **EFFI = [(Output Voltage × Output Current) / (Input Voltage × Input Current)] × 100%**

Typical Performance Characteristis

VOUT=1.8V



VOUT=2.5V



Application Information

PIN ASSIGNMENT

V_{IN} (Pin 1): Main Supply Pin. Must be closely decoupled to GND, Pin 2, with a 2.2μF or greater ceramic capacitor.

GND (Pin 2): Ground Pin.

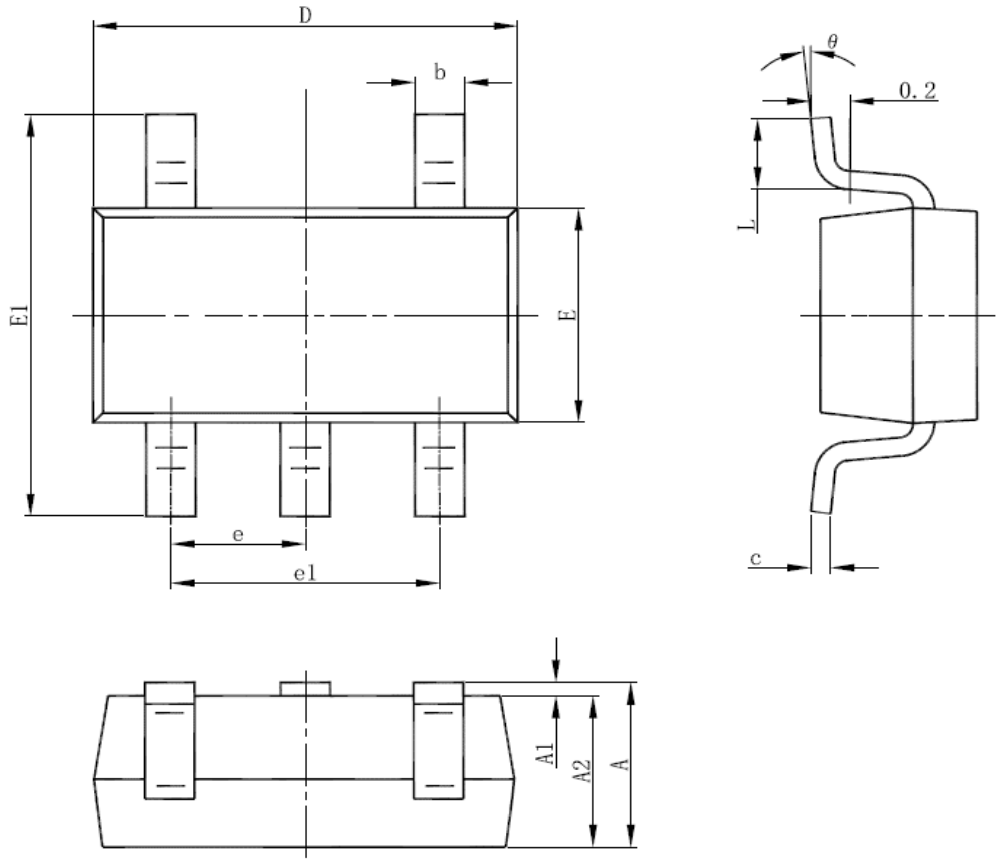
EN (Pin 3): En Control Input. Forcing this pin above 1.5V enables the part. Forcing this pin below 0.3V shutsdown the device. In shutdown, all functions are disabled drawing <1μA supply current. Do not leave EN floating.

V_{OUT} (Pin 4) : Output Voltage Feedback Pin. An internal resistive divider divides the output voltage down for comparison to the internal reference voltage. In the adjustable version, the output voltage is set by a resistive divider according to the following formula: **V_{OUT} = 0.6V • [1 + (R1/R2)]**.

SW (Pin 5): Switch Node Connection to Inductor. This pin connects to the drains of the internal main and synchronous power MOSFET switches.

Packaging Information

SOT-23-5 Package Outline Dimension



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°