1.5A 1.5MHz Sync Step-Down Regulator

Features

- High Efficiency: Up to 96%
- 2.5V to 5.5V Input Voltage Range
- 1.5MHz Constant Frequency Operation
- No Schottky Diode Required
- Low Dropout Operation: 100% Duty Cycle
- PFM Mode for High Efficiency in Light Load
- Over Temperature Protected
- Low Quiescent Current: 40μA
- Short Circuit Protection
- Inrush Current Limit and Soft Start
- 1.5A Output Current
- SOT23-5 package

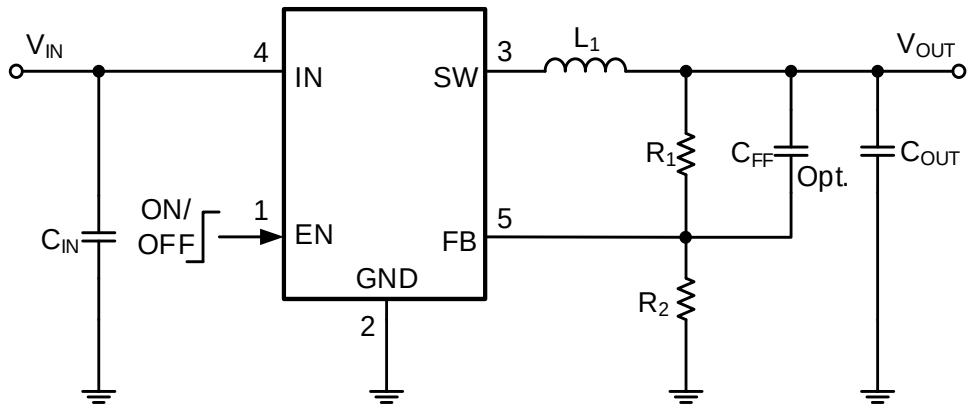
Applications

- Cellular and Smart Phones
- Wireless and DSL Modems
- PDAs
- Portable Instruments
- Digital Still and Video Cameras
- PC Cards

General Description

The TLV62565 is a high-efficiency monolithic synchronous buck regulator using a constant frequency, current mode architecture. The device is available in an adjustable version. Supply current with no load is 40uA and drops to <1uA in shutdown. The 2.5V to 5.5V input voltage range makes the TLV62565 ideally suited for single Li -Ion battery powered applications. 100% duty cycle provides low dropout operation, extending battery life in portable systems. PWM/PFM mode operation provides very low output ripple voltage for noise sensitive applications.Switching frequency is internally set at 1.5MHz, allowing the use of small surface mount inductors and capacitors. Low output voltages are easily supported with the 0.6V feedback reference voltage.The TLV62565 is offered in a low profile (1mm) 5-pin, thin SOT package, and is available in an adjustable version.

Typical Application Circuit



Basic Application Circuit

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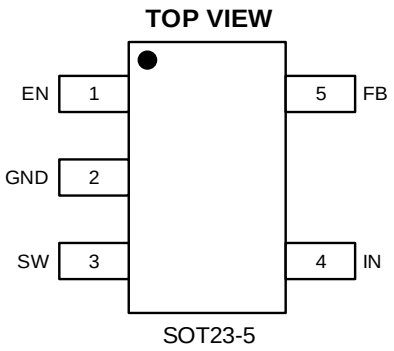
Pin Description

Pin Configuration



Top Marking: S I K

Pin Description

Pin	Name	Function
1	EN	Chip Enable Pin. Drive EN above 1.5V to turn on the part. Drive EN below 0.3V to turn it off. Do not leave EN floating.
2	GND	Ground Pin
3	SW	Power Switch Output. It is the switch node connection to Inductor. This pin connects to the drains of the internal P-ch and N-ch MOSFET switches.
4	IN	Power Supply Input. Must be closely decoupled to GND with a 10μF or greater ceramic capacitor.
5	FB	Output Voltage Feedback Pin. An internal resistive divider divides the output voltage down for comparison to the internal reference voltage.

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Absolute Maximum Ratings (1)(2)

Input Supply Voltage …… -0.3V to 6.0V
EN, FB Voltages……..... -0.3V to 6.0V
SW Voltage……..… -0.3V to (Vin+0.3V)
Peak SW Sink and Source Current ……3A
Thermal Resistance (θJA) …… 170 °C/W
ESD(Human Body Made)HMB……2KV

Operating Temperature Range ……..... -40°C to +85°C
Junction Temperature(Note2) ……...…... 125°C
Storage Temperature Range ...…...…...…. -65°C to 150°C
Lead Temperature(Soldering,10s)……. +300°C
Thermal Resistance（θJC） SOT23-5…… 130 °C/W
ESD(Machine Made)MM……200V

Note (1): Exceeding these ratings may damage the device.
Note (2): The device is not guaranteed to function outside of its operating conditions.

Electrical Characteristics (1)(2)

(V_{IN}=V_{EN}=3.6V, T_A = 25°C, unless otherwise noted.)

Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range		2.5		5.5	V
UVLO Threshold			2.4		V
Input DC Supply Current	FB = 90%, Iload=0mA		150	300	μA
	FB= 105%, Iload=0mA		40	70	μA
	V_{EN} = 0V, V_{IN}=4.2V		0.1	1.0	μA
Regulated Feedback Voltage		0.588	0.600	0.612	V
Reference Voltage Line Regulation	Vin = 2.5V to 5.5V		0.04	0.40	%/V
Output Voltage Line Regulation	V_{IN} = 2.5V to 5.5V		0.04	0.4	%
Output Voltage Load Regulation			0.5		%
Oscillation Frequency			1.5		MHz
On Resistance of PMOS	I_{SW}=100mA		0.3		Ω
ON Resistance of NMOS	I_{SW}=-100mA		0.2		Ω
Peak Current Limit	V_{IN}= 3.6V, FB=90%	1.6			A
EN up Threshold	V_{EN}-Rising	1.05	1.15	1.25	V
EN Threshold Hysteresis			140		mV
EN Leakage Current			±0.01	±1.0	μA
SW Leakage Current	V_{EN}=0V, V_{IN}=Vsw=5V		±0.01	±1.0	μA
Soft Start				1.2	mS
Thermal Shutdown			160		℃
Thermal Hysteresis			20		℃

Note (1): MOSFET on-resistance specifications are guaranteed by correlation to wafer level measurements.
Note (2): Thermal shutdown specifications are guaranteed by correlation to the design and characteristics analysis.

5.5V 1.5A 1.5MHz Sync Step-Down Regulator

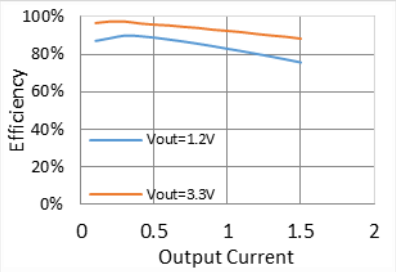
Typical Performance Characteristics

Note (1): Performance waveforms are tested on the evaluation board.

Note (2): V_{IN} =5V, V_{OUT}=3.3V, T_A = +25ºC, unless otherwise noted.

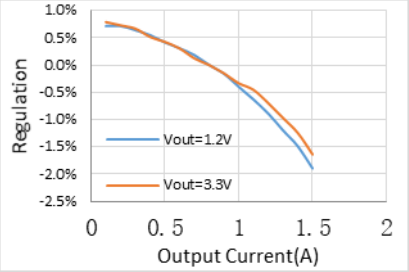
Efficiency VS Load Current

VOUT = 3.3V, 1.2V



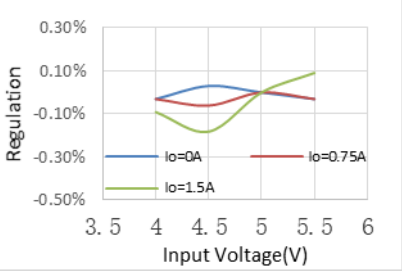
Load Regulation

VOUT = 3.3V, 1.2V



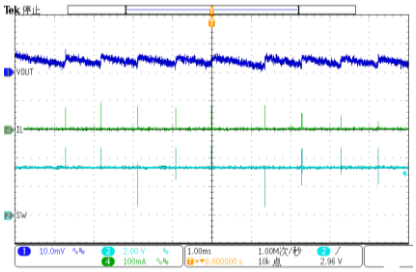
Line Regulation

VOUT = 3.3V



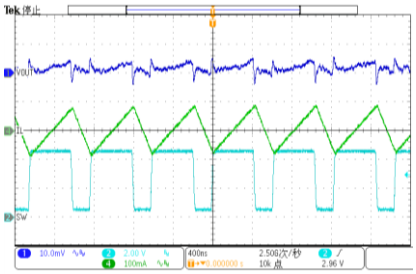
Output Ripple Voltage

VIN = 5V, VOUT = 3.3V, IOUT = 0A



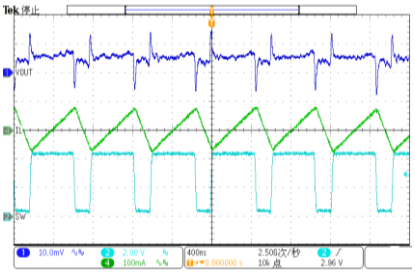
Output Ripple Voltage

VIN = 5V, VOUT = 3.3V, IOUT = 0.75A



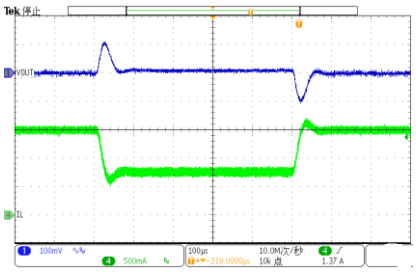
Output Ripple Voltage

VIN = 5V, VOUT = 3.3V, IOUT = 1.5A



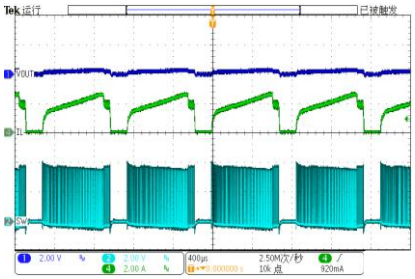
Loop Response

VIN = 5V, VOUT = 3.3V, IOUT = 0.75A-1.5A



Hiccup with Output Short

VIN = 5V, VOUT = 3.3V



Short Circuit Entry

VIN = 5V, VOUT = 3.3V