18V, 2A, Forced PWM Synchronous Step-Down C

Features

- Wide 4.5V-to-18V Operating Input Range
- Forced PWM Control
- 1MHz Switching Frequency.
- Capable of Delivering 2A
- No External Compensation Needed
- Current Mode Control
- Thermal Shutdown and UVLO
- Excellent Load and Line Transient Response
- Available in SOT23-6L Package

Product Description

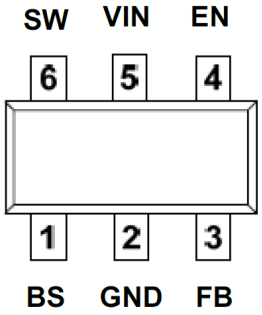
LPD5421 is a wide input range, high-efficiency and high frequency DC-to-DC step-down switching regulator, capable of delivering up to 2A of output current.
With a fixed switching frequency of 1MHz, this current mode PWM controlled converter allows the use of small external components, such as ceramic input and output caps, as well as small inductors.
LPD5421 also employs a forced PWM control scheme, thereby ensuring the minimum ripple voltage.

Applications

- Surveillance Camera
- LCD TV
- Portable Devices
- Set Top Boxes

Pin Configuration

LPD5421RF (SOT23-6L)



(Top View)

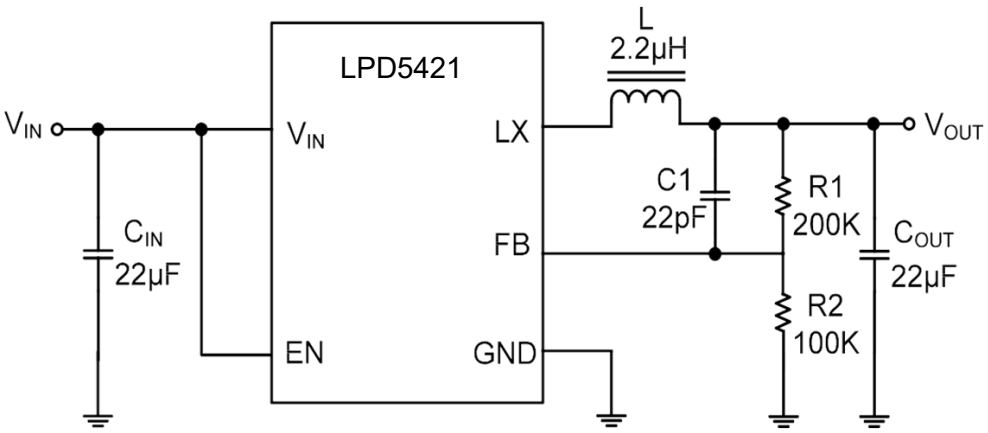
Pin Name	Description
GND	System Ground. Reference ground of the regulated output voltage, requires extra care during PCB layout.
SW	Switch Output. Connect using wide a PCB trace.
V_{IN}	Supply Voltage.
FB	Feedback Voltage.
EN	Enable pin for the IC. Drive this pin high to enable the part, Low to disable.
BS	Bootstrap pin. Connect a 10nF capacitor form this pin to SW.

Ordering Information and marking information

Marking	
CW	XW
LFC P/N Code	GS Code

Ordering Information		
Part Number	**Package**	**Quantity**
LPD5421RF	SOT23-6L	3000 PCS

Simplified Application Circuit:



Absolute Maximum Rating

V_{IN}=V_{EN}=5V, L = 2.2uH, T_A = 25°C, unless otherwise noted.

Symbol	Parameter	Maximum	Unit
V_{IN}, V_{EN}, V_{SW}	Input, Enable and SW Pin Voltage	-0.3 to 24	V
V_{BS}	Boost Pin Voltage	-0.3 to VSW+6	V
V_{FB}	Feedback Pin Voltage	-0.3 to 6	V
T_A	Operating temperature Range	-40 to 85	°C
T_{STG}	Storage temperature Range	-55 to 150	°C
T_{LEAD}	Lead temperature (Soldering 10S)	260	°C
θ_{JA}	Thermal Resistance Junction to Ambient	180	°C /W

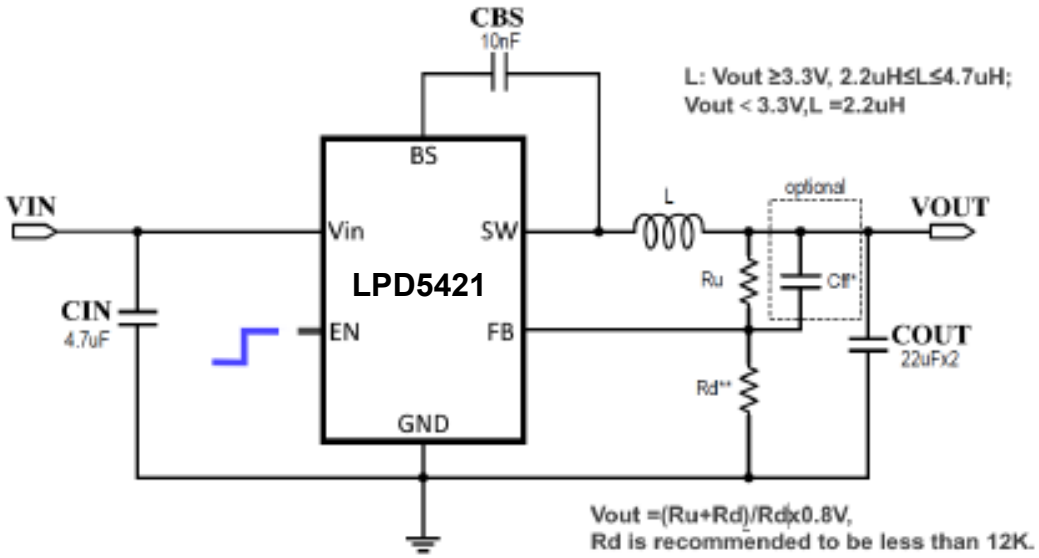
(Note: Exceeding these limits may damage the device. Exposure to absolute maximum ratings conditions for long periods may affect device reliability.)

Electrical Characteristics

(Typical values VIN=12V, VOUT=3.3V with typical TA=25℃, unless otherwise specified)

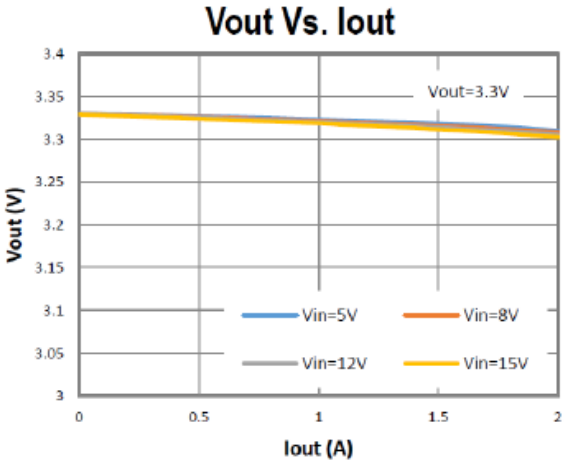
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage	-	4.5	-	18	V
V_{UVLO}	UVLO Threshold	Rising, Hysteresis=340mV	-	4.2	-	V
I_Q	Supply Current	Vin=12V, V_{FB}=0.85V, Iout=0A, No Switching	-	750	-	μA
I_{SHDN}	Shutdown Current	-	-	7	14	
V_{FB}	Feedback Voltage	-	0.784	0.8	0.816	V
V_{FBH}	FB Hiccup Threshold	-	-	0.2	-	V
I_{FB}	Feedback Current	-	-	-	1	uA
V_{OUT}	Output Voltage Range	-	0.8	-	12	V
$R_{DS(ON)H}$	High-Side Switch on Resistance	-	-	160	-	mΩ
$R_{DS(ON)L}$	Low-Side Switch on Resistance	-	-	95	-	mΩ
T_{SCH}	Short Circuit Hiccup Time	On time	-	2	-	mS
		Off time		6		mS
I_{SW}	Switch Leakage Current	VIN=VSW=12V	-	-	40	μA
F_{OSC}	Oscillation Frequency	-	-	1000	-	KHz
I_{LIMIT}		-	-	3.5	-	A
D_{MAX}		-	-	99	-	%
V_{ENH}		-	1.3	1.58	1.9	V
V_{ENL}	EN Falling Threshold	-	1.1	1.4	1.7	V
I_{EN}	EN Input Current	VEN=2V	-	1	-	μA
T_{SD}	Thermal Shutdown	Rising, Hysteresis=40℃	-	150	-	℃

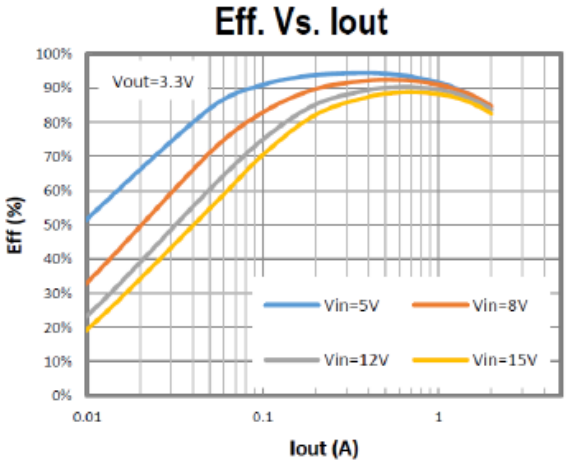
Typical Performance Characteristics

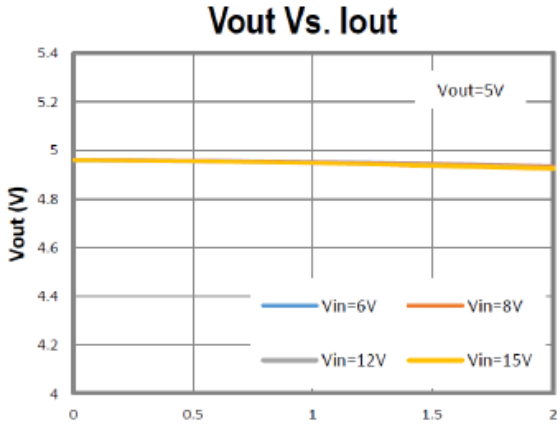


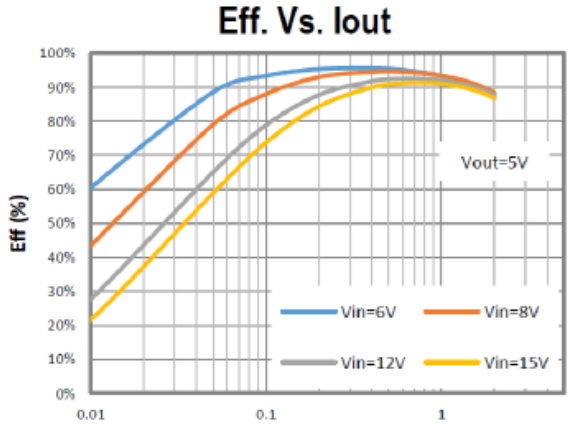
Typical Performance Characteristics

Tested under TA=25°C, unless otherwise specified





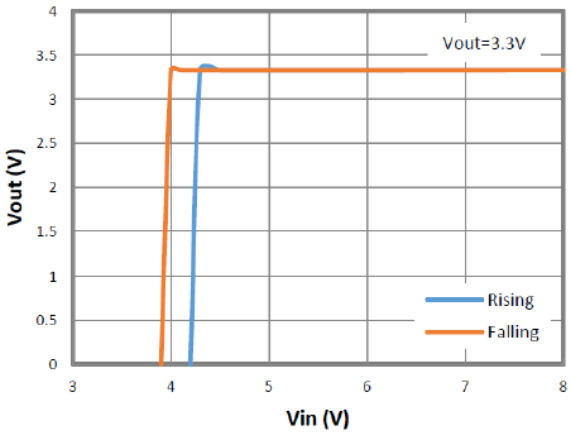




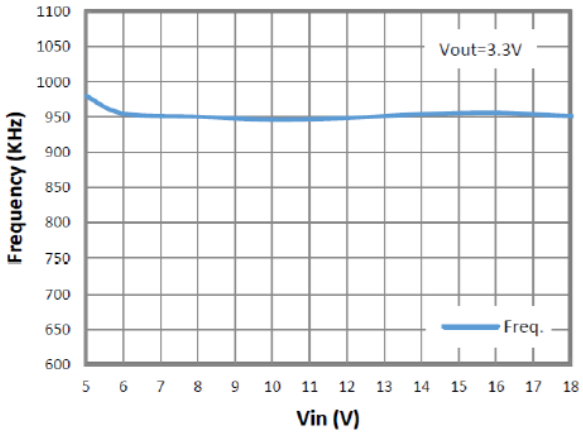
Typical Performance Characteristics (continue)

Tested under TA=25° C, unless otherwise specified

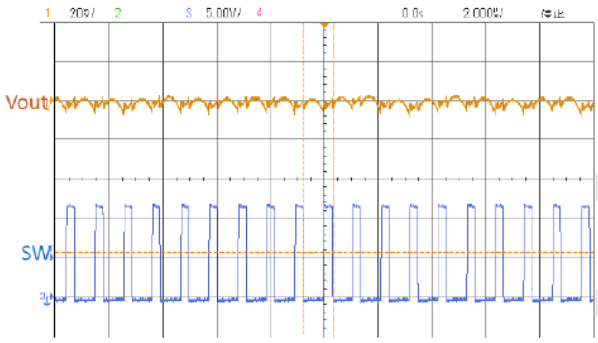
VIN UVLO



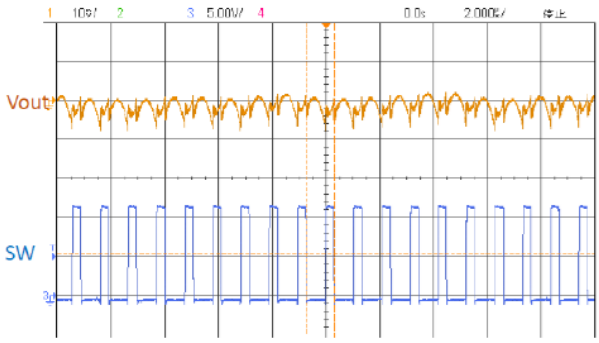
Freq. Vs. Vin



Switching Waveform at Iout = 0A
(Vin=12V, Vout=3.3V)



Switching Waveform at Iout = 1A
(Vin=12V, Vout=3.3V)



Applications Information

Setting the Output Voltage

In external Output Voltage Setting Version selected, the LPD5421 regulator is programmed using an external resistor divider. The output voltage is calculated using below equation.

$$Vout = V_{REF} * (1 + R_u/R_d)$$

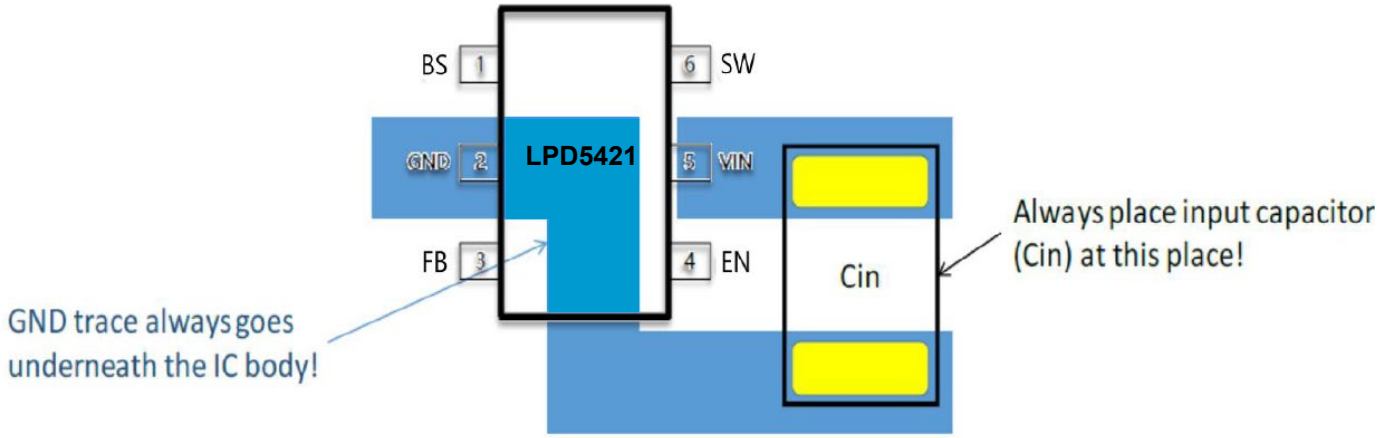
Where: V_{REF} =0.8V typically (the internal reference voltage)

Resistors Rd has to be between 1kOhm to 12kOhmand thus Ru is calculated by following equation.

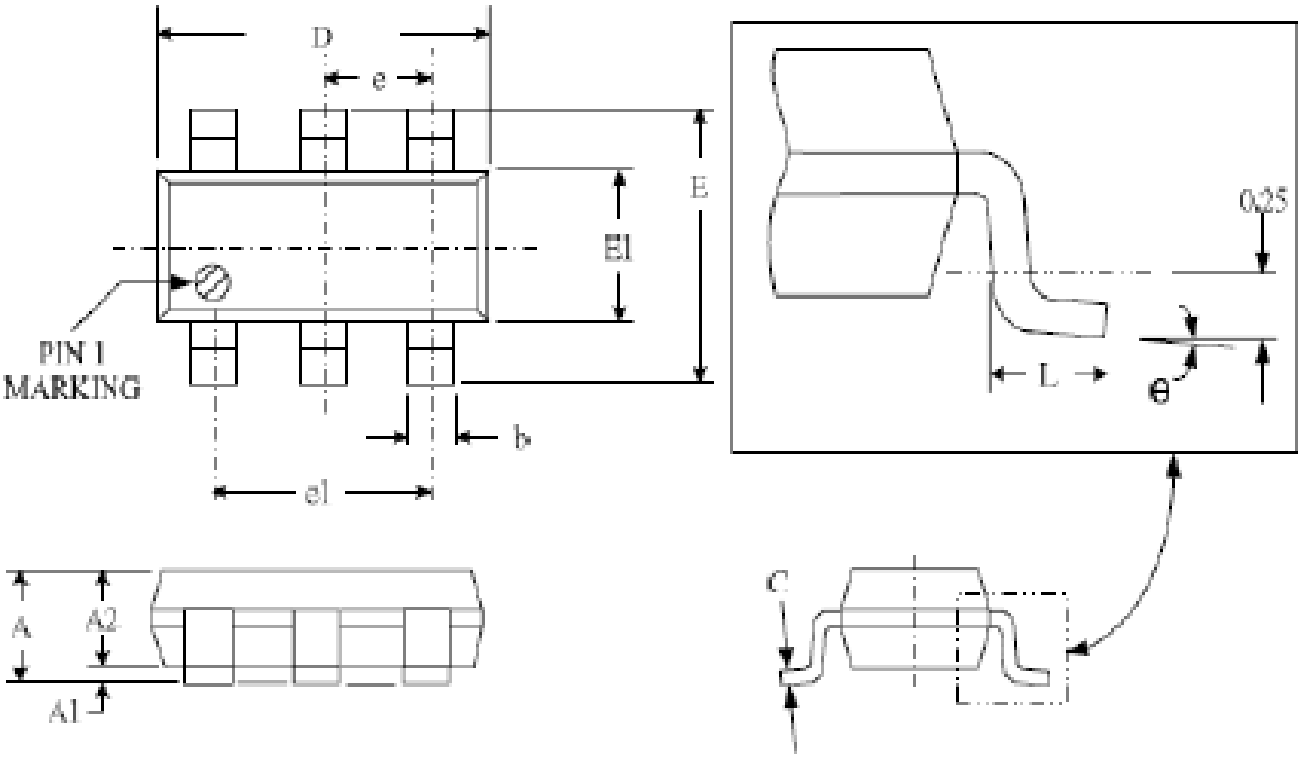
$$R_u = R_d * (\frac{V_{OUT}}{V_{REF}} - 1)$$

PCB LAYOUT GUIDE

For any high voltage buck, it is always crucial to have input capacitor placed as close to the chip's IN and GND pin without any via, because the input capacitor is to keep the chip's real input voltage from dropping too much when large switching current is drawn from the input node. A simple illustration of how to place input capacitor and draw the trace to the chip's IN and GND pins is shown below, and it is highly recommended to strictly follow this guide.



Package Dimension



Dimensions				
SYMBOL	Millimeters		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	0.95 (BSC)		0.037(BSC)	
e1	1.90 (BSC)		0.037(BSC)	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°