GS5420

High-Efficiency, 2A, 16V Input Synchronous Step-Down Converter

Product Description

GS5420 develops high efficiency synchronous step-down DC-DC converter capable of delivering 2A load current. GS5420 operates over a wide input voltage range from 4.5V to 16V and integrates main switch and synchronous switch with very low $R_{DS(ON)}$ to minimize the conduction loss.
GS5420 adopts two operation modes, PWM control and PFM Mode switching control, which allows a high efficiency over the wider range of the load. it operates at 600kHz under heavy load conditions to minimize the size of inductor and capacitor.

The GS5420 requires a minimal number of readily available, standard external components and is available in space-saving SOT-23-6L packag

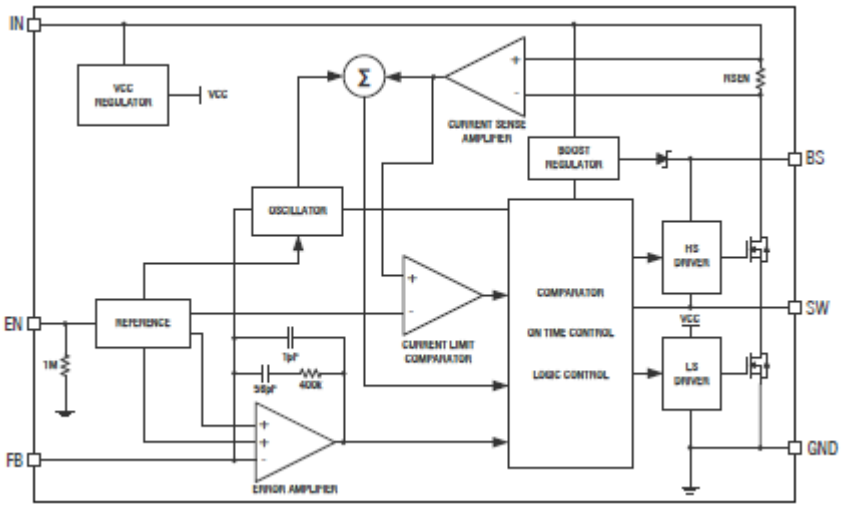
Features

- 4.5V-16V Input Voltage Range
- 90mΩ/70mΩ Low-$R_{DS(ON)}$ Internal Power MOSFETs
- 2A load current capability
- High Efficiency : up to 96%
- Fast transient responses
- Over Current Protection with Hiccup-Mode
- Two operation modes- PWM control and PFM Mode switching mode
- Tiny SOT-23-6L Package
- RoHS Compliant, 100%Pb & Halogen Free

Applications

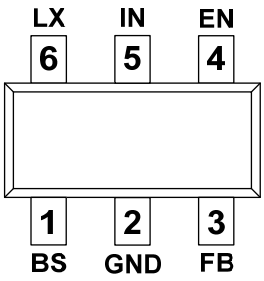
- Set Top Box
- Portable TV
- Access Point Router
- DSL Modem
- Networking

Functional Block Diagram



Packages & Pin Assignments

GS5420RF (SOT-23-6L)

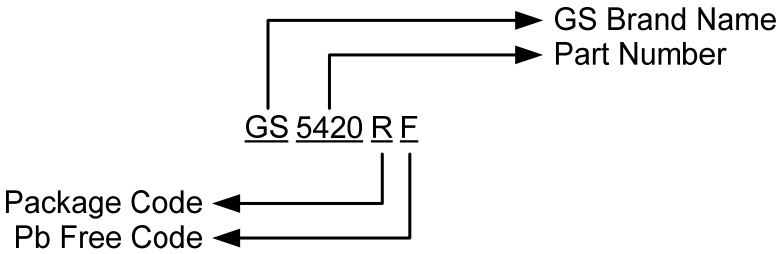


(Top View)

Pin Name	Description
BS	Boot-Strap Pin. Supply high side gate driver. Decouple this pin to LX pin with 22nF ceramic cap.
GND	Ground pin.
FB	Output Feedback Pin. Connect this pin to the center point of the output resistor divider to program the output voltage:
EN	Enable control. Pull high to turn on, low to disable and enter to shutdown mode.
IN	Power input pin.
LX	Inductor pin. Connect this pin to the switching node of inductor.

Ordering Information

Part Number	Package	Marking
GS5420RF	SOT-23-6L	A616



Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Maximum Rating	Units
V_{IN}	Input Voltage	-0.3 to 17	V
V_{SW}	Switch Voltage	-0.3 to VIN+0.5	V
V_{EN}	Enable Voltage	-0.3 to 17	V
V_{BS}	Bootstrap Voltage	(Vsw-0.3V) to (Vsw+0.5V)	V
V_{FB}	Feedback Voltage	-0.3 to +6	V
θ_{JA}	Thermal Resistance Junction to Ambient	170	°C/W
θ_{JC}	Thermal Resistance Junction to Case	130	°C/W
T_J	Junction Temperature (Note 2)	+150	°C
T_{LEAD}	Lead Temperature (soldering, 10s)	+260	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
ESD HBM	Human Body Mode	2K	V
ESD MM	Machine Mode	200	V
P_D	Power Dissipation	0.6	W

Recommended Operating Conditions (Note 3)

Symbol	Parameter	Rating	Units
V_{IN}	Input Voltage	4.5 to 16	V
T_A	Operating Temperature Range	-40 to +85	°C

Note 1：Exceeding these ratings may damage the device.

Note 2：T_J is calculated from the ambient temperature T_A and power P_D dissipation according to the following formula: $T_J = T_A + P_D * (170\ °C/W)$

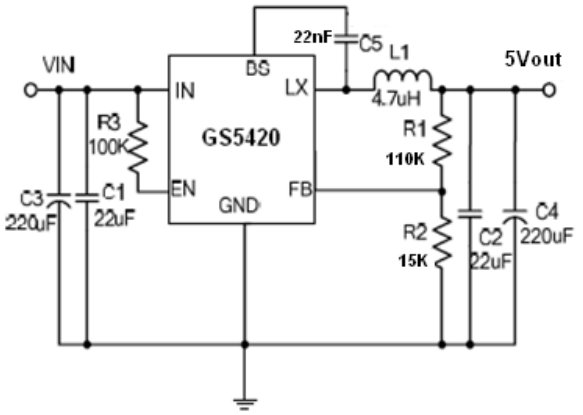
Note 3：The device is not guaranteed to function outside of its operating conditions.

Electrical Characteristics

(V_{IN}=12V, V_{OUT}=5V, L=4.7uH, T_A=25°C, unless otherwise specified)

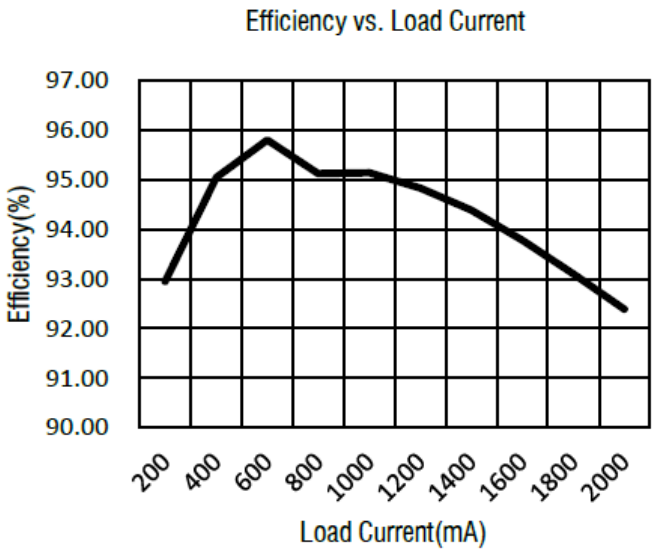
Parameter	Test Conditions	Min	Typ	Max	Units
Input Voltage Range		3.3		16	V
Shutdown Supply Current	V_{EN}=0V		1		uA
Supply Current	V_{EN}=2V, V_{FB}=1.1V		0.4	0.6	mA
Feedback Voltage	4.5V≤V_{IN}≤16V	588	600	612	mV
High-Side Switch-On Resistance			90		mΩ
Low-Side Switch-On Resistance			70		mΩ
High-Side Switch Leakage	V_{EN}=0V, V_{SW}=0V		0	10	uA
Upper Switch Current Limit	Minimum Duty Cycle		3.0		A
Oscillator Frequency			600		kHz
Min ON Time			60		ns
Max Duty Cycle	V_{FB}=0.6V		92		%
Thermal Shutdown			160		℃

Typical Application Circuit

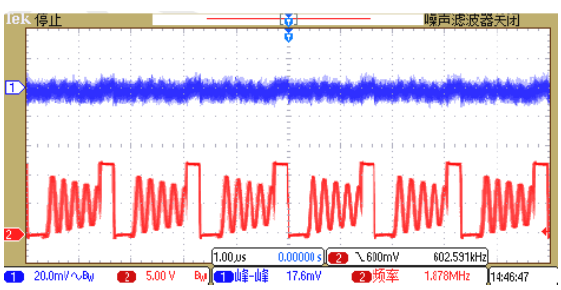


$$V_{OUT} = 0.6 \times (1 + \frac{R1}{R2})$$

Typical Characteristics



PFM Mode
(CH1: Vout (ripple) CH2: Vsw)



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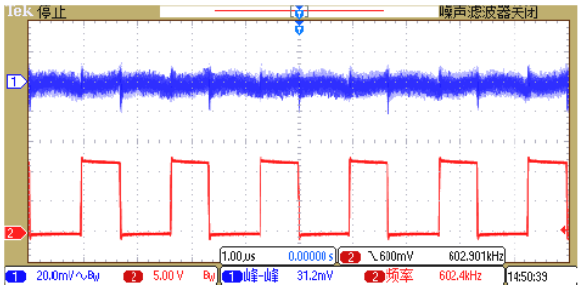
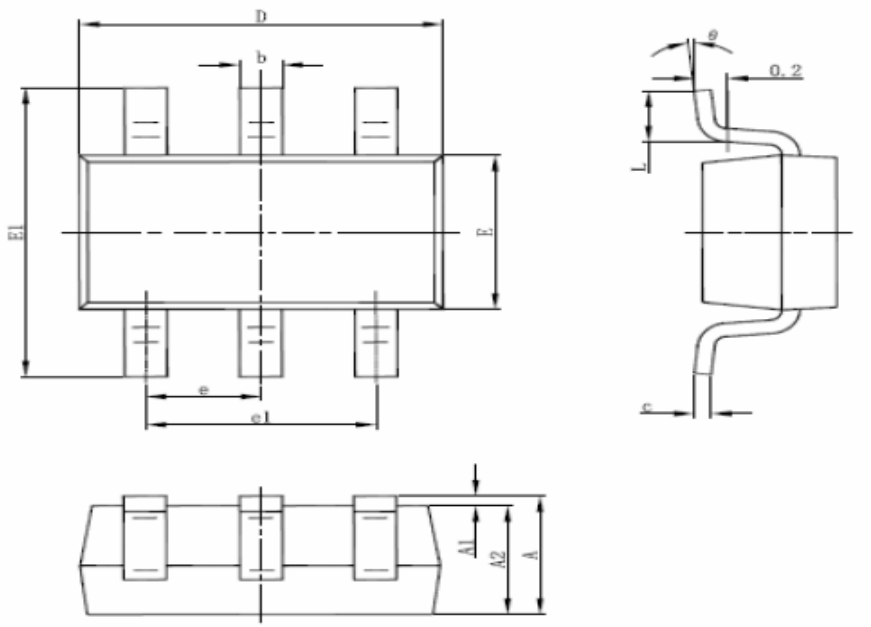


Package Dimension

SOT-23-6L PLASTIC PACKAGE



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	1.050	1.45	0.041	0.057
A1	0.000	0.15	0.000	0.006
A2	0.9	1.9	0.035	0.075
b	0.6 (TYP)		0.0236 (TYP)	
c	0.09	0.200	0.0035	0.008
D	2.80	3.020	0.11	0.119
E	1.500	1.700	0.059	0.067
E1	2.60	3.00	0.102	0.118
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°

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