

42V Input Standoff Voltage, 0.4A Step-Down Converter in SOT23-6

DESCRIPTION

The ETA2843 is a wide input range, high-efficiency, and high frequency DC-to-DC step-down switching regulator, capable of delivering up to 0.4A of output current. With a fixed switching frequency of 750KHz, 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. ETA2843 also employs a proprietary control scheme that switches the device into a power save mode during light load, thereby extending the range of high efficiency operation. An OVP function protects the IC itself and its downstream system against input voltage surges. With this OVP function, the IC can stand off input voltage as high as 42V, making it an ideal solution for industrial applications such as smart meters as well as automotive applications.

In automotive systems, power comes from the battery, with its voltage typically between 9V and 24V. Including cold crank and double battery jump-starts, the minimum input voltage may be as low as 4V and the maximum up to 36V, with even higher transient voltages. With these high input voltages, linear regulators cannot be used for high supply currents without overheating the regulator. Instead, high efficiency switching regulators such as ETA2843 must be used to minimize thermal dissipation. ETA2843 is available SOT23-6 Packages.

FEATURES

- Wide Input Operating Range from 4V to 36V
- Standoff Input Voltage: 42V
- High Efficiency at 20V In 12V Out: Up to 95%:
- High Efficiency PFM mode at light load
- Capable of Delivering 0.4A
- No External Compensation Needed
- Current Mode control
- Logic Control Shutdown
- Thermal shutdown and UVLO
- Available in SOT23-6 Package

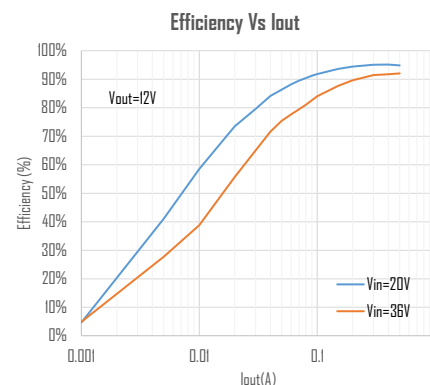
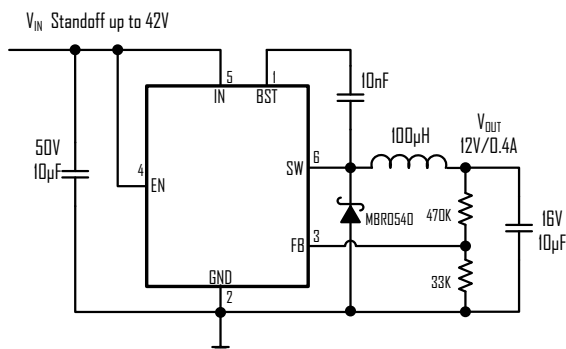
APPLICATIONS

- Smart Meters
- Industrial Applications
- Automotive Applications

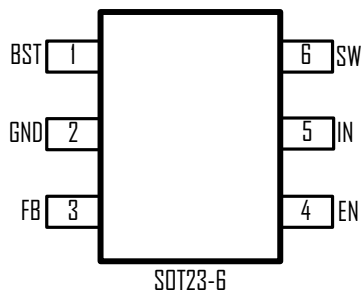
ORDERING INFORMATION

PART #	PACKAGE PIN	TOP MARK
ETA2843S2G-T	SOT23-6	EIYW ┌─── Date Code └─── Product Number

TYPICAL APPLICATION



PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

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

IN Voltage.....	-0.3V to 42V
SW, EN Voltage.....	-0.3V to VIN+0.3V
BST Voltage.....	-0.3V to SW+6V
FB Voltage.....	-0.3V to 6V
SW to ground current	Internally limited
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-55°C to 150°C
Thermal Resistance	θ_{JA} θ_{JC}
SOT23-6.....	220.....110.....°C/W

ELECTRICAL CHARACTERISTICS

(VIN = 12V, unless otherwise specified. Typical values are at TA = 25°C.)

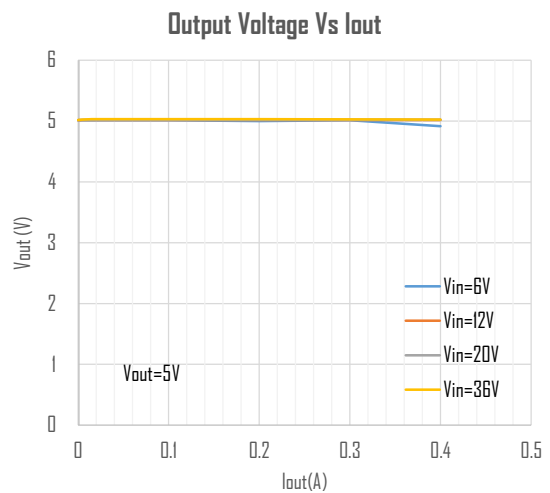
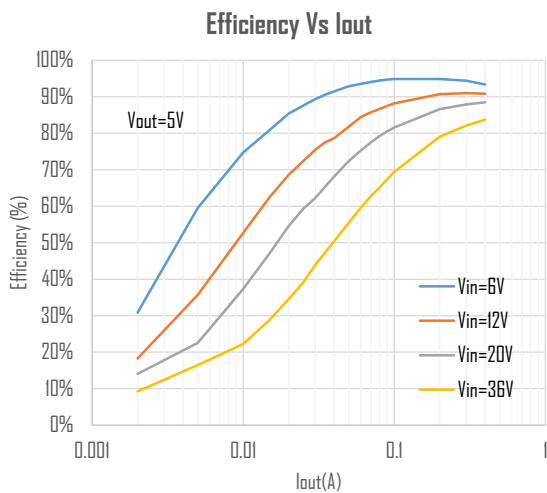
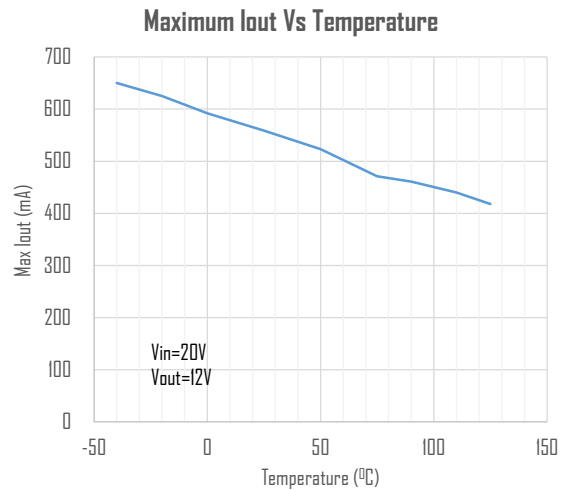
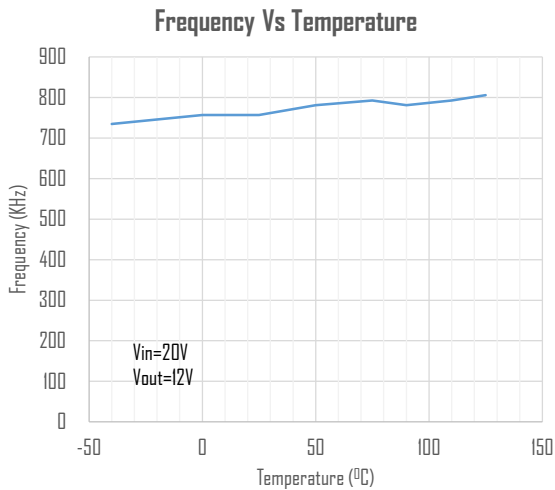
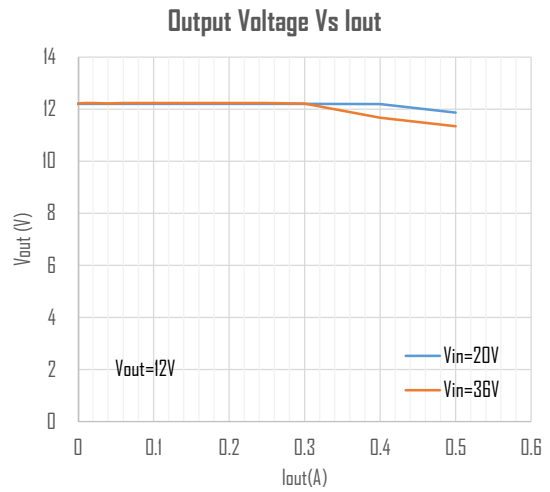
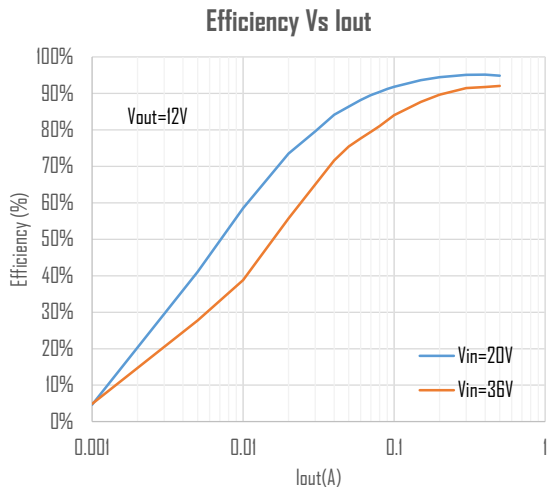
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input Standoff Voltage		42			V
Input Voltage Range		4		36	V
Input UVLO	Rising, Hysteresis=170mV		3.80		V
Input OVP	Rising, Hysteresis=2V		38		V
Input Supply Current	VFB=0.85V		0.85		mA
Input Shutdown Current			6		μA
FB Feedback Voltage		0.78	0.80	0.82	V
FB Input Current			0.01		μA
Switching Frequency			750		KHz
Maximum Duty Cycle		90			%
FoldBack Frequency	VFB = 0V		95		KHz
High side Switch On Resistance	ISW = 200mA		550		mΩ
High side Switch Current Limit			0.7		A
SW Leakage Current	VIN=12V, VSW=0, EN= GND			10	μA
EN Input Current	VIN=12V, VEN=5V		1	5	μA
EN Input Low Voltage	Rising, Hysteresis=100mV	0.8	1.1	1.4	V
Thermal Shutdown	Hysteresis=40°C		150		°C

PIN DESCRIPTION

PIN #	NAME	DESCRIPTION
1	BST	Bootstrap pin. Connect a 10nF capacitor from this pin to SW
2	GND	Ground
3	FB	Feedback Input. Connect an external resistor divider from the output to FB and GND to set VOUT
4	EN	Enable pin for the IC. Drive this pin high to enable the part, low to disable.
5	IN	Supply Voltage. Bypass with a 10μF ceramic capacitor to GND
6	SW	Inductor Connection. Connect an inductor Between SW and the regulator output.

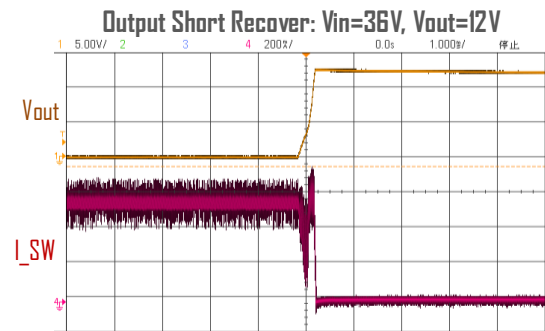
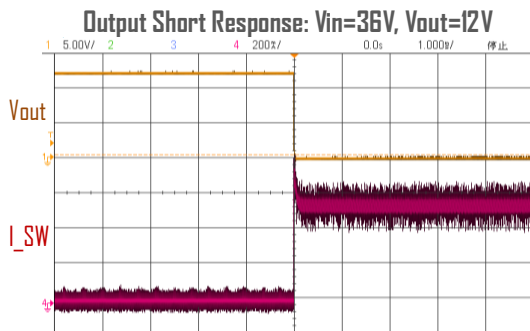
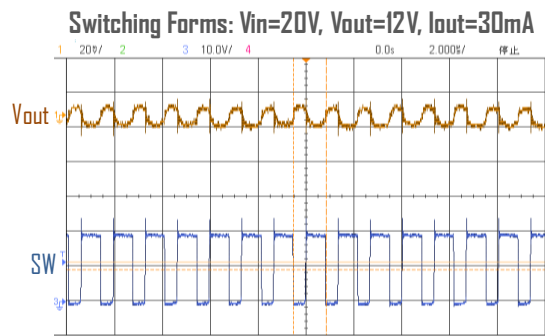
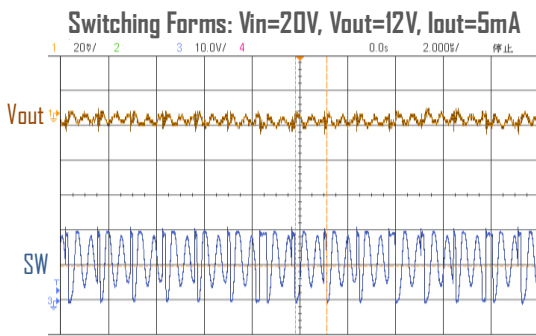
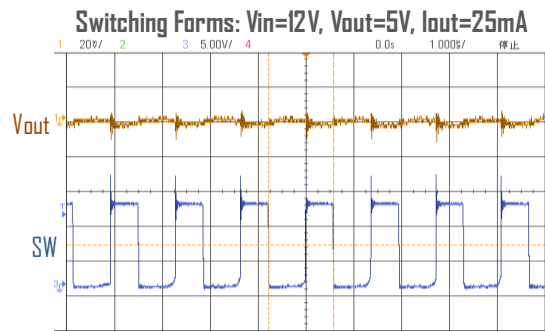
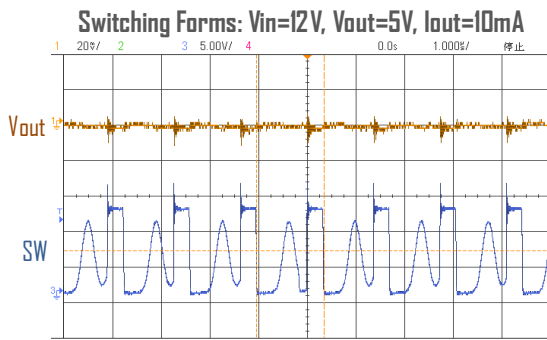
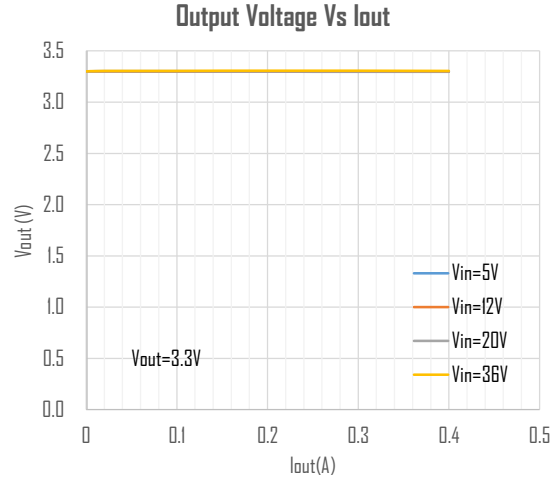
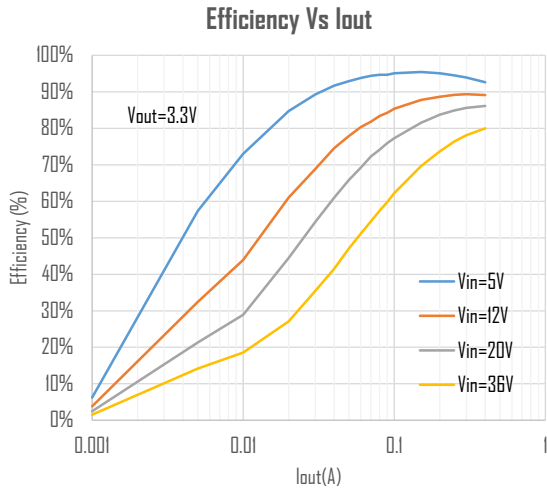
TYPICAL CHARACTERISTICS

(Typical values are at $T_A = 25^\circ\text{C}$, $L=100\mu\text{H}$, $C_{out}=10\mu\text{F}$ unless otherwise specified.)



TYPICAL CHARACTERISTICS continued

(Typical values are at $T_A = 25^\circ\text{C}$, $L=100\mu\text{H}$, $C_{out}=10\mu\text{F}$ unless otherwise specified.)



FUNCTIONAL DESCRIPTIONS

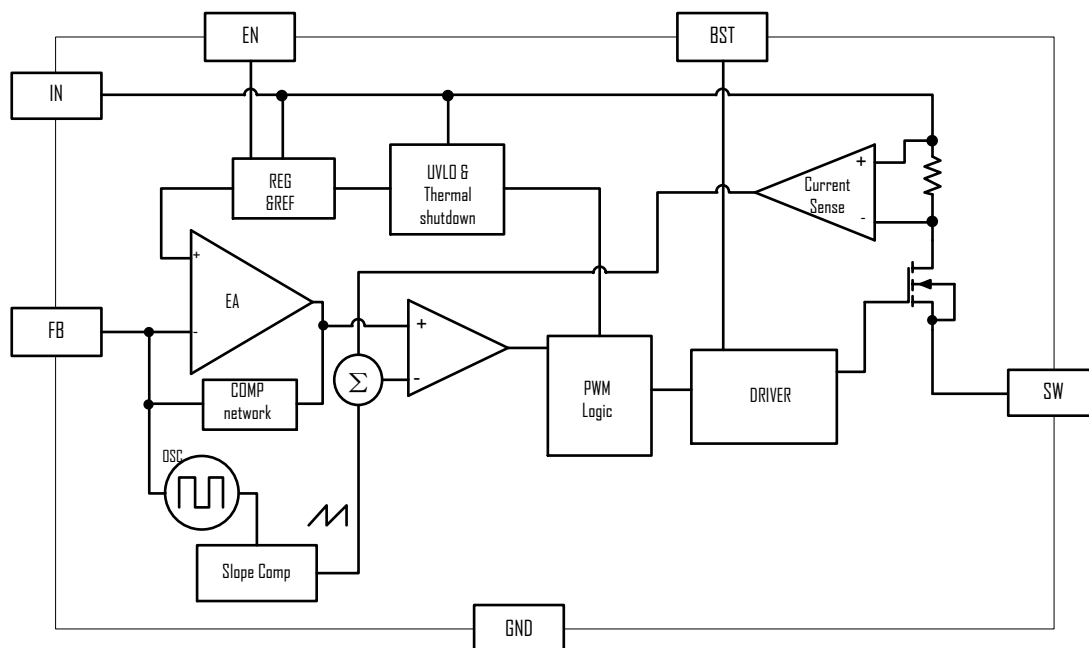
Loop Operation

The ETA2843 is a wide input range, high-efficiency, DC-to-DC step-down switching regulator, capable of delivering up to 0.4A of output current, integrated with a 550mΩ high side MOSFET. It uses a PWM current-mode control scheme. An error amplifier integrates error between the FB signal and the internal reference voltage. The output of the integrator is then compared to the sum of a current-sense signal and the slope compensation ramp. This operation generates a PWM signal that modulates the duty cycle of the power MOSFETs to achieve regulation for output voltage.

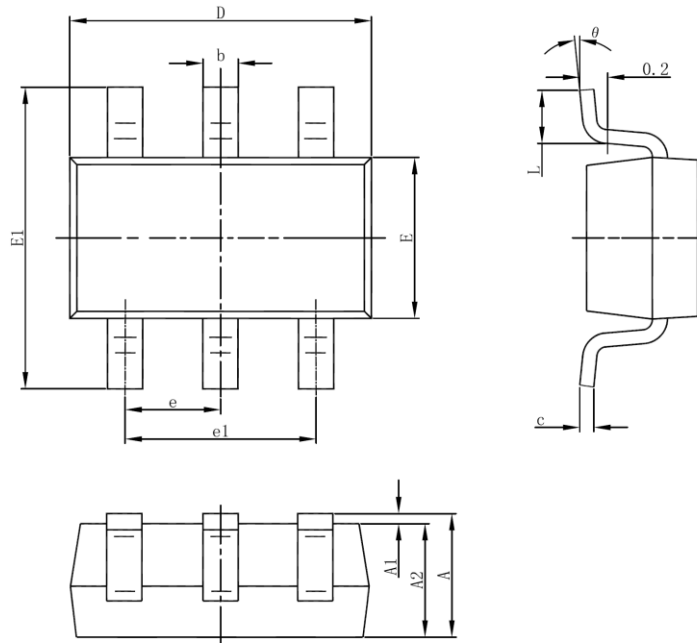
Light Load Operation

Traditionally, a fixed constant frequency PWM DC-DC regulator always switches even when the output load is small. When energy is shuffling back and forth through the power MOSFETs, power is lost due to the finite R_{DS(ON)}s of the MOSFETs and parasitic capacitances. At light load, this loss is prominent and efficiency is therefore very low. ETA2843 employs a proprietary control scheme that improves efficiency in this situation by enabling the device into a power save mode during light load, thereby extending the range of high efficiency operation.

BLOCK DIAGRAM



PACKAGE OUTLINE



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°