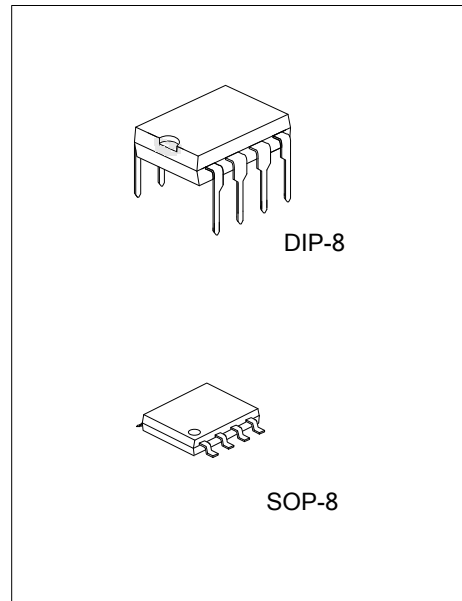




# UC2306

## LINEAR INTEGRATED CIRCUIT

### MICROPOWER DC/DC CONVERTERS WITH LOW-BATTERY DETECTOR ACTIVE IN SHUTDOWN



#### DESCRIPTION

The UTC **UC2306** is a step-up DC/DC converter which operate from a wide input supply range of 1.5V to 8V. Its peak switch current can be reduced by adding a single resistor at the I<sub>LIM</sub> pin. It is an ideal for use in small, low voltage, battery-operated systems.

#### FEATURES

- \*In shutdown mode: 10µA quiescent current.
- \*Low battery detector active
- \*Minimum Operating Voltage: 1.5V
- \*Very Low V<sub>CESAT</sub>: 370mV@1A (typ).
- \*In active mode : 120µA quiescent current.
- \*Only by one resistor: peak current is programmable.

#### ORDERING INFORMATION

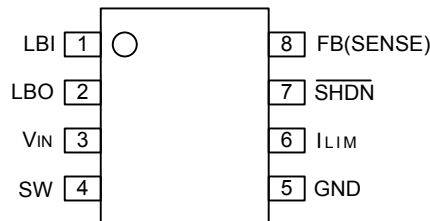
Ordering Number		Package	Packing
Lead Free	Halogen Free		
UC2306L-xx-D08-T	UC2306G-xx-D08-T	DIP-8	Tube
UC2306L-xx-S08-T	UC2306G-xx-S08-T	SOP-8	Tube
UC2306L-xx-S08-R	UC2306G-xx-S08-R	SOP-8	Tape Reel

<p>UC2306L-xx-D08-T</p> <ul style="list-style-type: none"> <li>(1) Packing Type</li> <li>(2) Package Type</li> <li>(3) Voltage Code</li> <li>(4) Lead Plating</li> </ul>	<ul style="list-style-type: none"> <li>(1) T: Tube, R: Tape Reel</li> <li>(2) D08: DIP-8, S08: SOP-8</li> <li>(3) xx: refer to Output Voltage Code</li> <li>(4) L: Lead Free, G: Halogen Free</li> </ul>
--	--

### MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
DIP-8 SOP-8	33: 3.3V 50: 5.0V AD: ADJ	

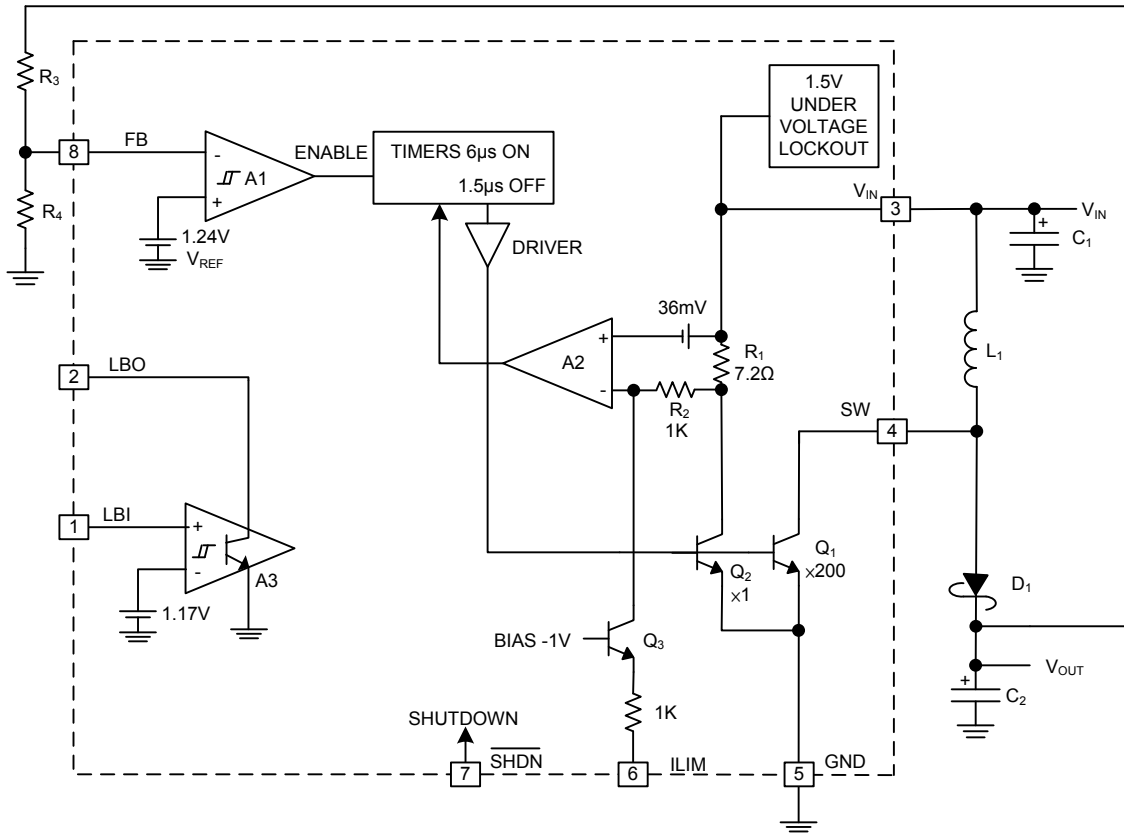
### PIN CONFIGURATION



### PIN DESCRIPTION

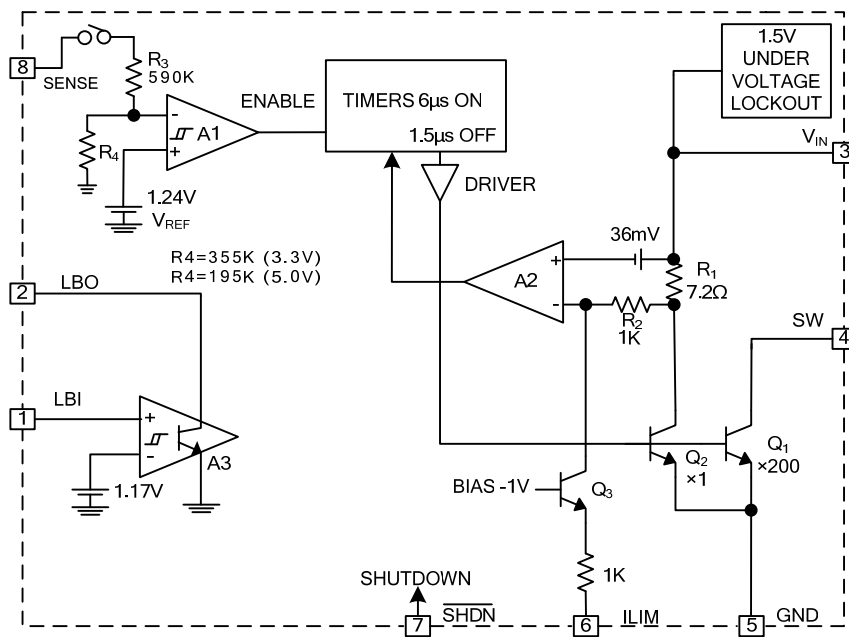
PIN No.	SYMBOL	DESCRIPTION
1	LBI	Input of Low Battery Detector. Detector output is low when voltage on this pin is less than 1.17V.
2	LBO	Output of Low Battery Detector.
3	V <sub>IN</sub>	Input Voltage Supply.
4	SW	The Collector Pin of Power NPN.
5	GND	Ground.
6	I <sub>LIM</sub>	Pin For Current Limit Set. Connected to nothing for 1A peak switch current; and connect to a resistor to ground will lower peak current
7	SHDN	Input of Shutdown. Held low, then switching regulator is turned off. This Pin should not be float. When SHDN mode is not used, connect it to V <sub>IN</sub>
8	FB/SENSE	This pin connects to the resistor divider. In shutdown mode, the divider is disconnected from it.

## ■ BLOCK DIAGRAMS



**UC2306** Block Diagram.

Note: A3 Remains Alive When Device Is in Shutdown



UC2306-3.3/UC2306-5.0 Block Diagram

### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Input Voltage	$V_{IN}$	8	V
SW Voltage	$V_{SW}$	-0.4 ~ +25	V
FB Voltage(UC2306)	$V_{FB}$	$V_{IN}+0.3$	V
$I_{LIM}$ Voltage(UC2306-3.3/UC2306-5.0)	$V_{LIM}$	5	V
SHDN Voltage	$V_{SHDN}$	6	V
LBI Voltage	$V_{LBI}$	$V_{IN}$	V
LBO Voltage	$V_{LBO}$	8	V
Maximum Power Dissipation	$P_D$	500	mW
Junction Temperature	$T_J$	125	°C
Operating Temperature	$T_{OPR}$	-20 ~ +85	°C
Storage Temperature	$T_{STG}$	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

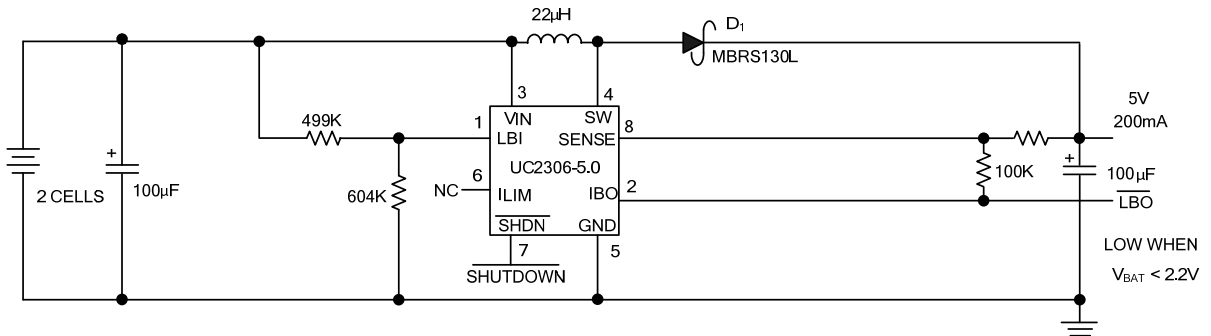
### ■ ELECTRICAL CHARACTERISTICS ( $V_{IN}=2V$ , $V_{SHDN}=2V$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Minimum Operating Voltage	$V_{CC(MIN)}$			1.5	1.65	V
Operating Voltage	$V_{IN}$				8	V
Quiescent Current	$I_Q$	$V_{SHDN}=2V$ , Not switching(Note)		120	200	$\mu A$
Quiescent Current In Shutdown	$I_{SD}$	$V_{SHDN}=0V$ , $V_{IN}=2V$ (Note)		7	15	$\mu A$
		$V_{SHDN}=0V$ , $V_{IN}=5V$ (Note)		27	50	$\mu A$
Comparator Trip Point		(Note)	1.22	1.24	1.26	V
FB Pin Bias Current	$I_{FB}$	(Note)		10	25	nA
Sense Pin Leakage in Shutdown	$I_{LEAK(SD)}$	$V_{SHDN}=0V$ , Fixed Output Versions(Note)		0.002	1	$\mu A$
Line Regulation	$\Delta V_{OUT}$	$1.8V \leq V_{IN} \leq 8V$ (Note)		0.04	0.15	%/V
LBI Input Threshold	$V_{LBI(THR)}$	Falling Edge(Note)	1.10	1.17	1.25	V
LBI Bias Current	$I_{LBI(BIAS)}$	(Note)		6	20	nA
LBI Input Hysteresis	$I_{LBI(HYS)}$	(Note)		35	65	mV
LBO Output Voltage Low	$V_{LBO(OL)}$	$I_{SINK}=500\mu A$ (Note)		0.2	0.4	V
LBO Output Leakage Current	$I_{LBO(LEAK)}$	LBI=1.5V, LBO=5V(Note)		0.01	0.1	$\mu A$
SHDN Input Voltage	$V_{SHDN}$	High		1.4		V
		Low			0.4	V
SHDN Pin Bias Current	$I_{SHDN}$	$V_{SHDN}=5V$ (Note)		5	8	$\mu A$
		$V_{SHDN}=0V$ (Note)	-5	-2		$\mu A$
Switching Off Time	$t_{OFF}$	(Note)	1	1.5	2	$\mu s$
Switch On Time	$t_{ON}$	Current Limit Not Asserted (Note)	4	6	8	$\mu s$
Maximum Duty Cycle	$t_{DUTY}$	Current Limit Not Asserted (Note)	76	80	88	%
Peak Switch Current	$I_{(SW)}$	$I_{LIM}$ Pin Open, $V_{IN}=5V$	0.8	1	1.2	A
		20K from $I_{LIM}$ to GND		500		mA
Switch Saturation Voltage	$V_{SW(SAT)}$	$I_{sw}=1A$		0.37		V
		$I_{sw}=700mA$ (Note)		0.26	0.35	V
Switch Leakage	$I_{LEAK(SW)}$	Switch off, $V_{sw}=5V$		0.01	7	$\mu A$

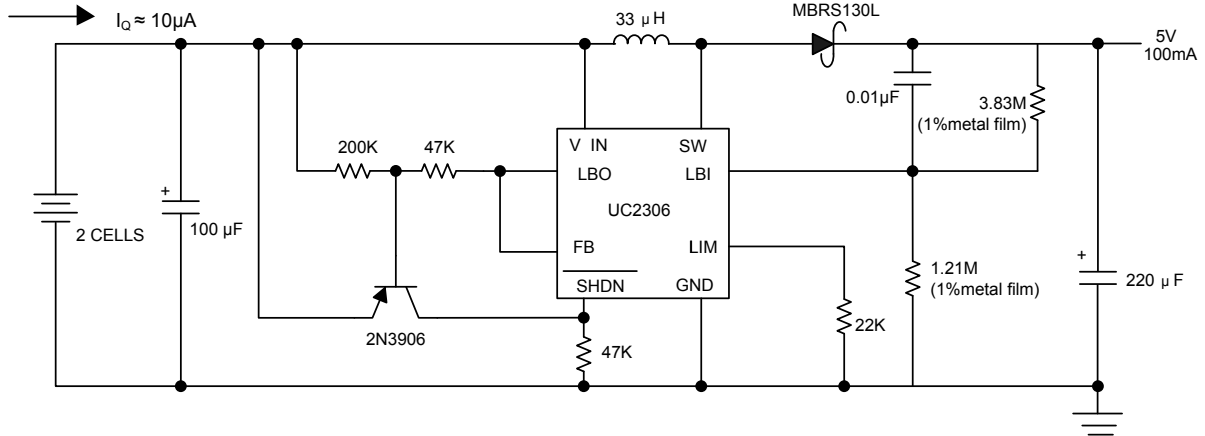
Note: Denotes specifications which apply over the 0°C to 70°C operating temperature range.

## ■ TYPICAL APPLICATION

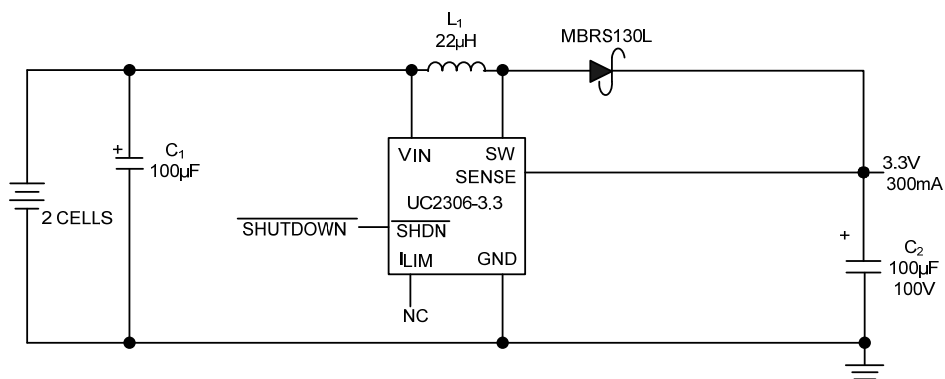
### 2-Cell to 5V Step-Up Converter with Low-Battery Detect



### Super Burst Low $I_Q$ DC/DC Converter

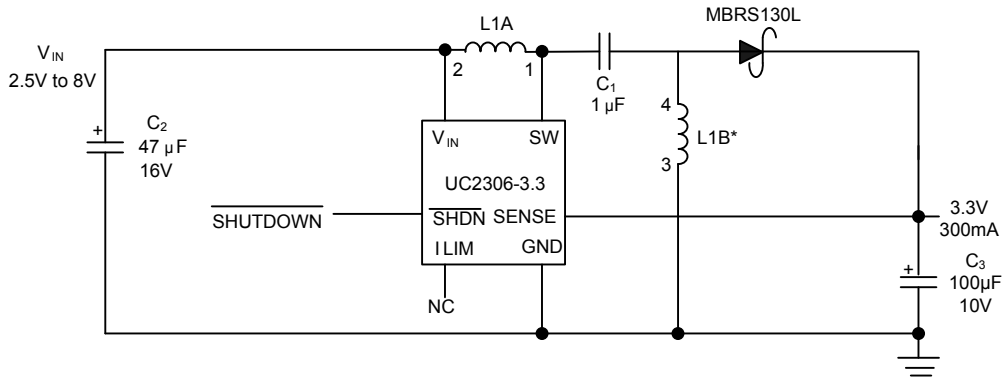


### 2-Cell to 3.3V Boost Converter

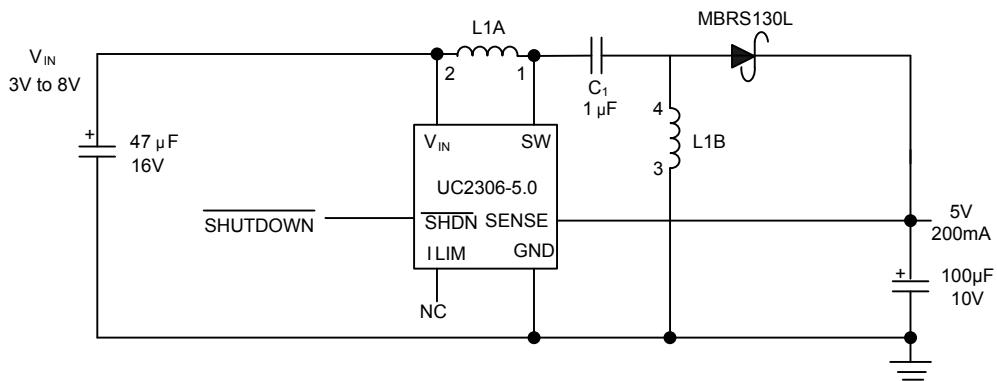


## ■ TYPICAL APPLICATION(Cont.)

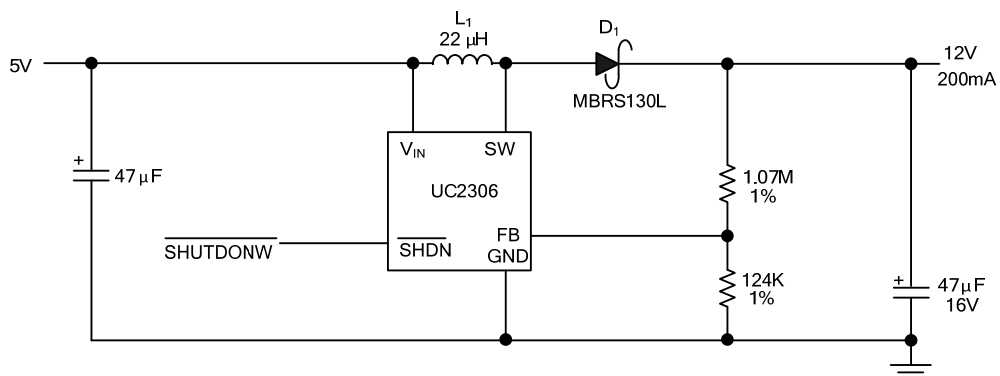
### 3.3V SEPIC Efficiency(Step-Up/Step-Down Converter)



### 5V SEPIC (Step-Up/Step-Down Converter)



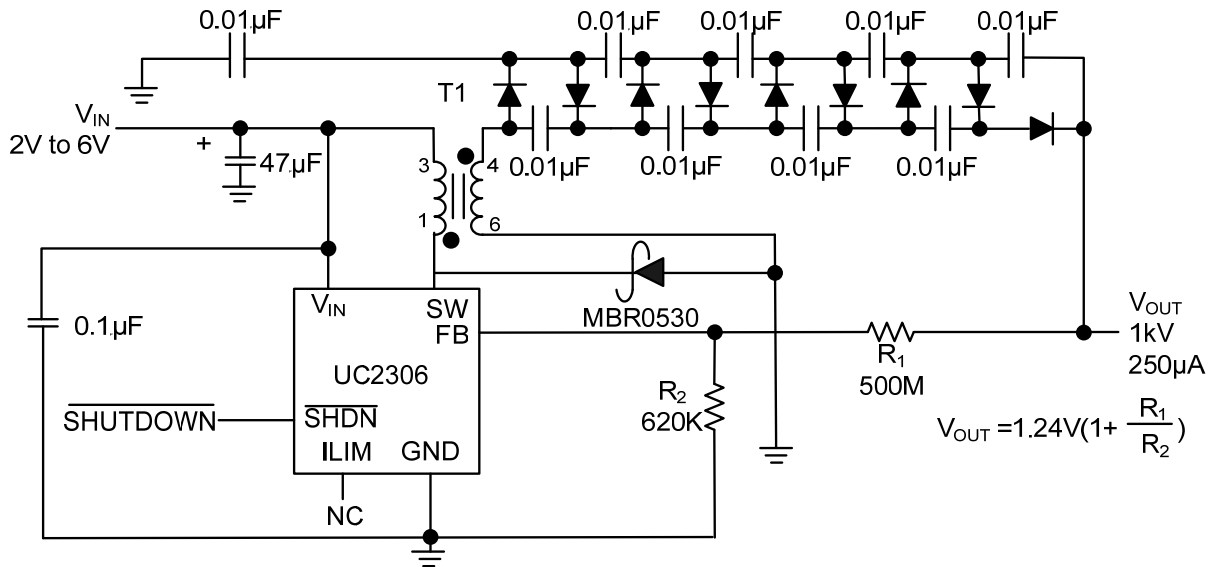
### 5V to 12V DC/DC Converter



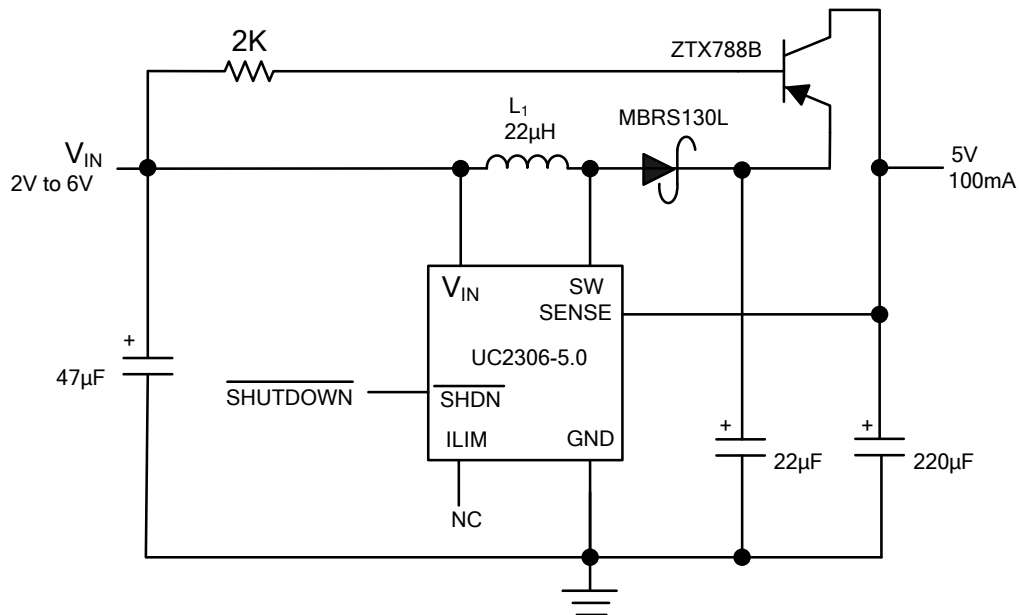


## ■ TYPICAL APPLICATION(Cont.)

### 2-to 4-Cell to 1kV Step-Up Converter

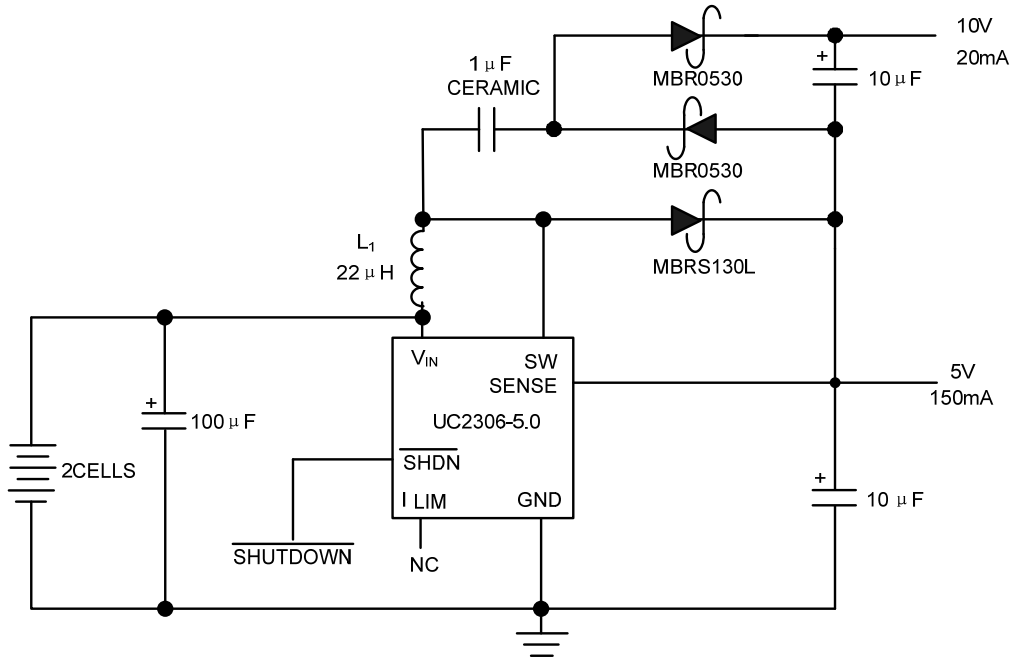


### 2- TO 4- Cell to 5V Converter with Output Disconnect

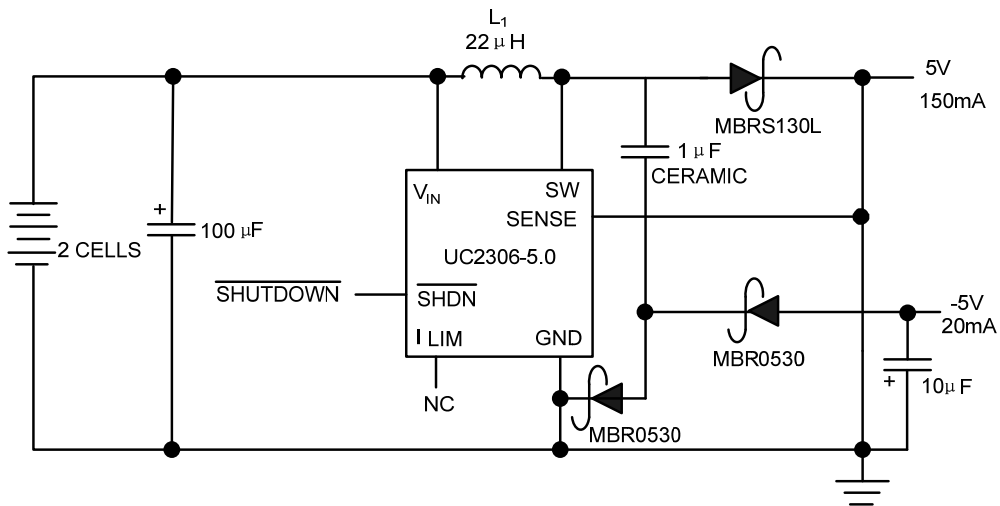


## ■ TYPICAL APPLICATION(Cont.)

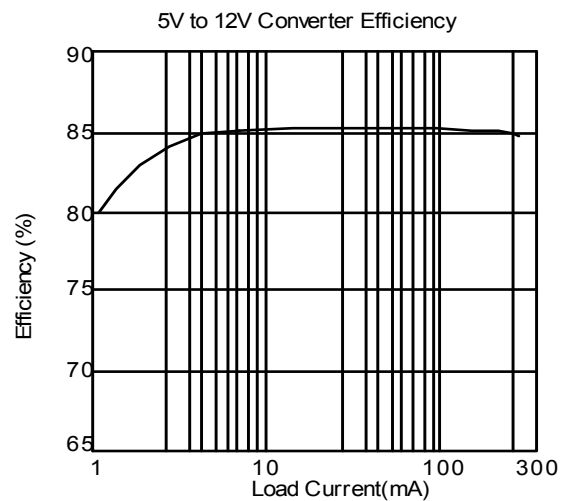
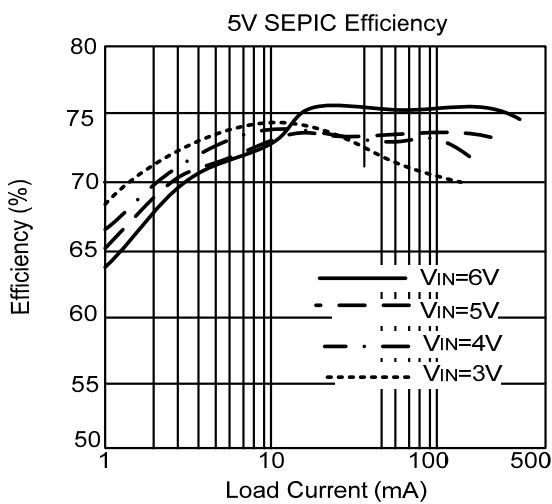
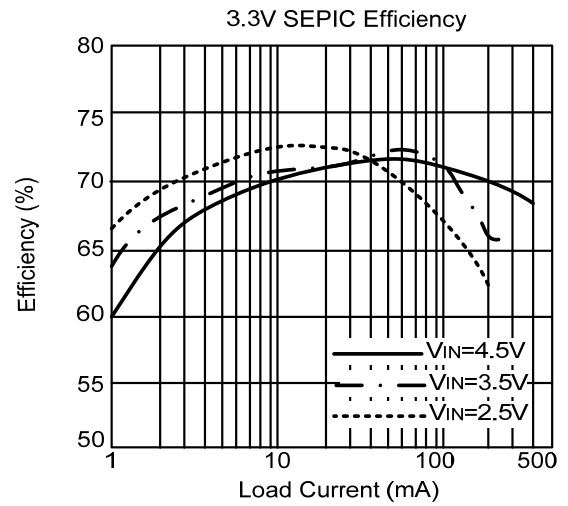
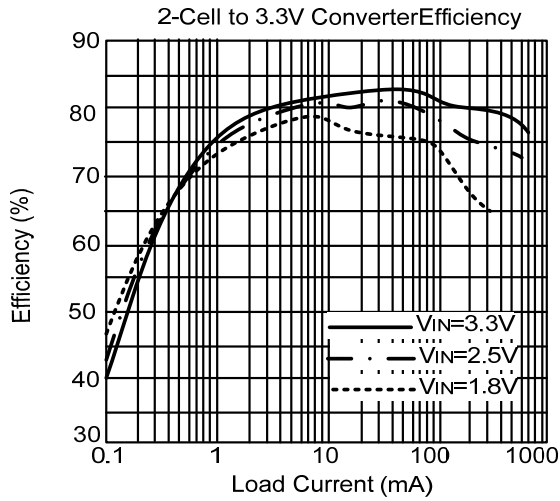
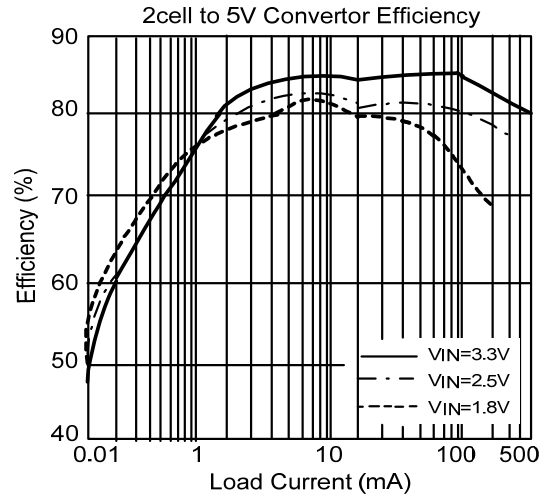
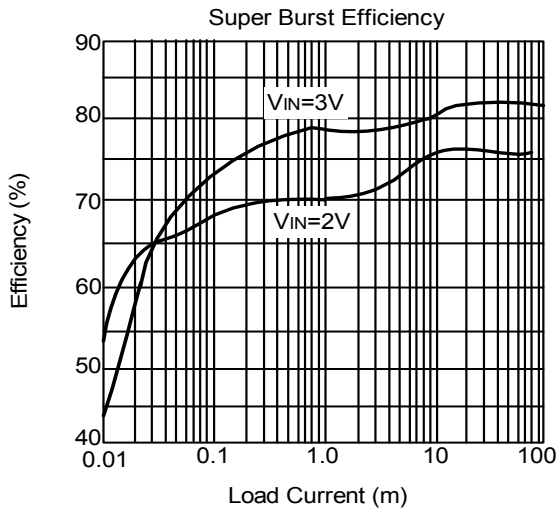
2- Cell to 5V Converter with Auxiliary 10V Output



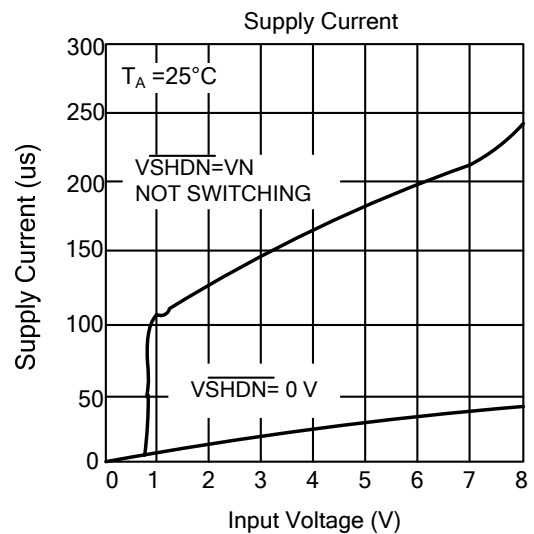
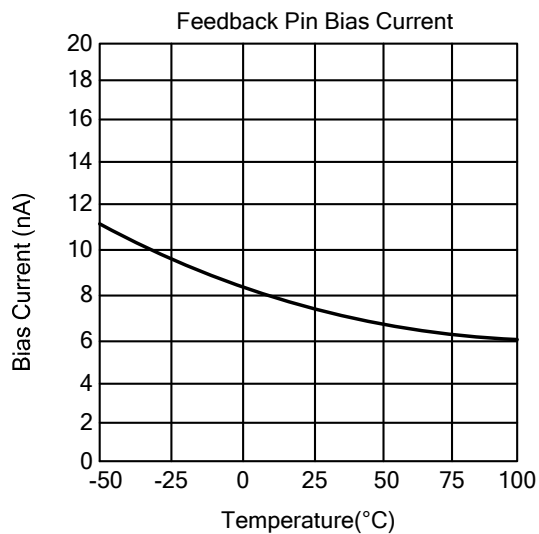
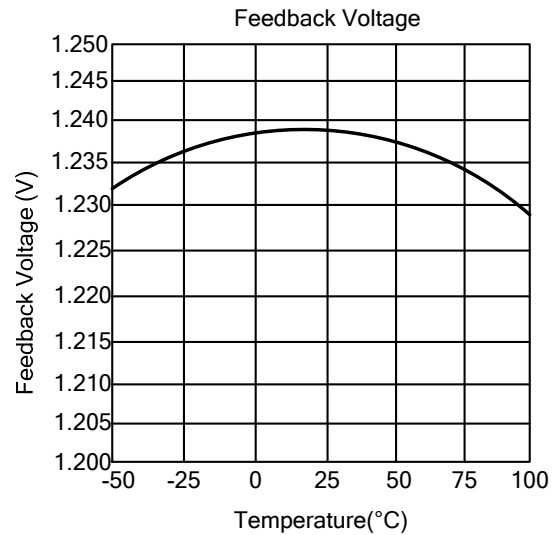
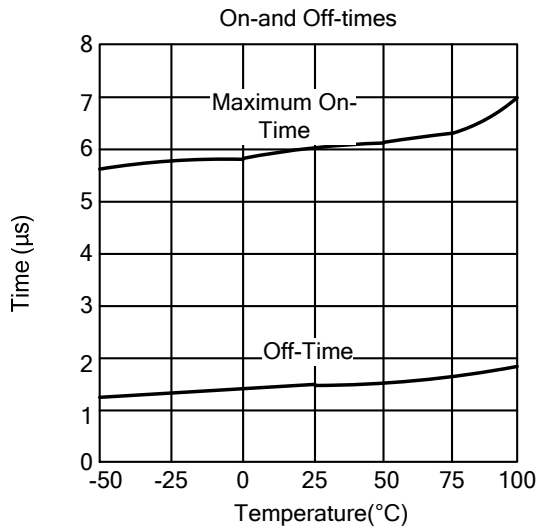
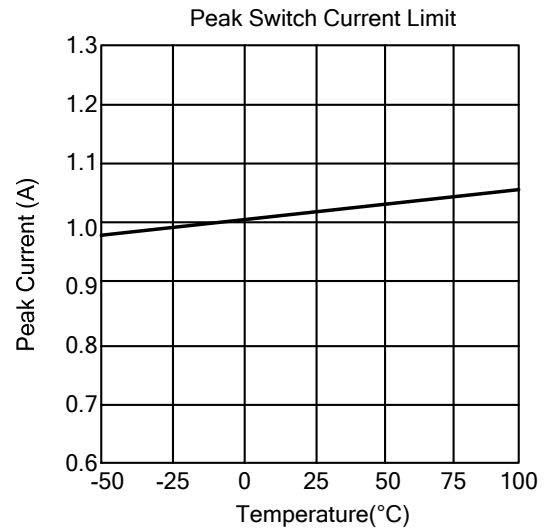
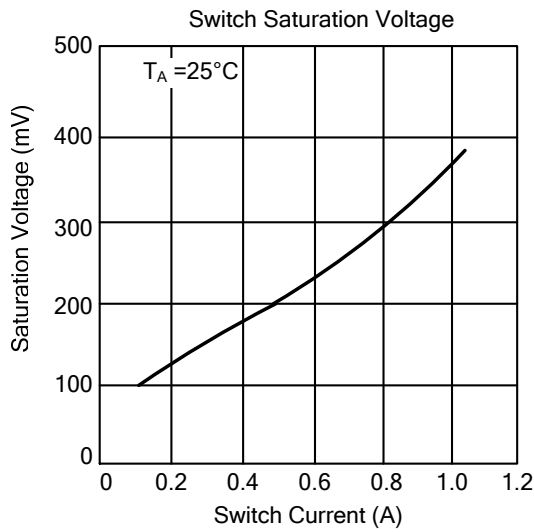
2- Cell to 5V Converter with Auxiliary -5V Output



## ■ TYPICAL CHARACTERISTICS



## ■ TYPICAL CHARACTERISTICS(Cont.)



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.