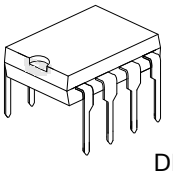
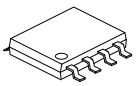
MICROPOWER DC/DC CONVERTERS WITH LOW-BATTERY DETECTOR ACTIVE IN SHUTDOWN



DIP-8



SOP-8

■ 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_{LIM} 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 $V_{CESAT:}$ 370mV@1A (typ).
*In active mode :120μA quiescent current.
*Only by one resistor: peak current is programmable.

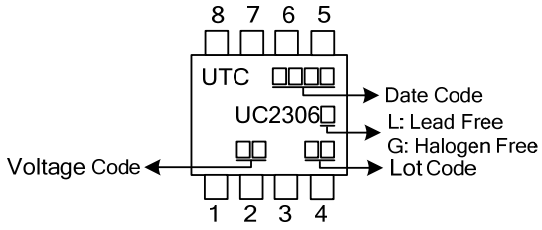
■ ORDERING INFORMATION

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

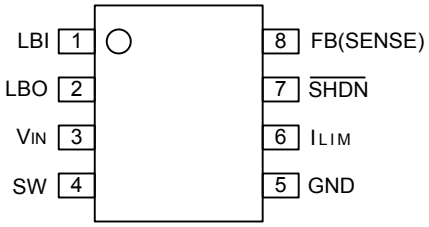
UC2306L-xx-D08-T
(1)Packing Type
(2)Package Type
(3)Voltage Code
(4)Lead Plating

(1) T: Tube, R: Tape Reel
(2) D08: DIP-8, S08: SOP-8
(3) xx: refer to Output Voltage Code
(4) L: Lead Free, G: Halogen Free

■ MARKING INFORMATION

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

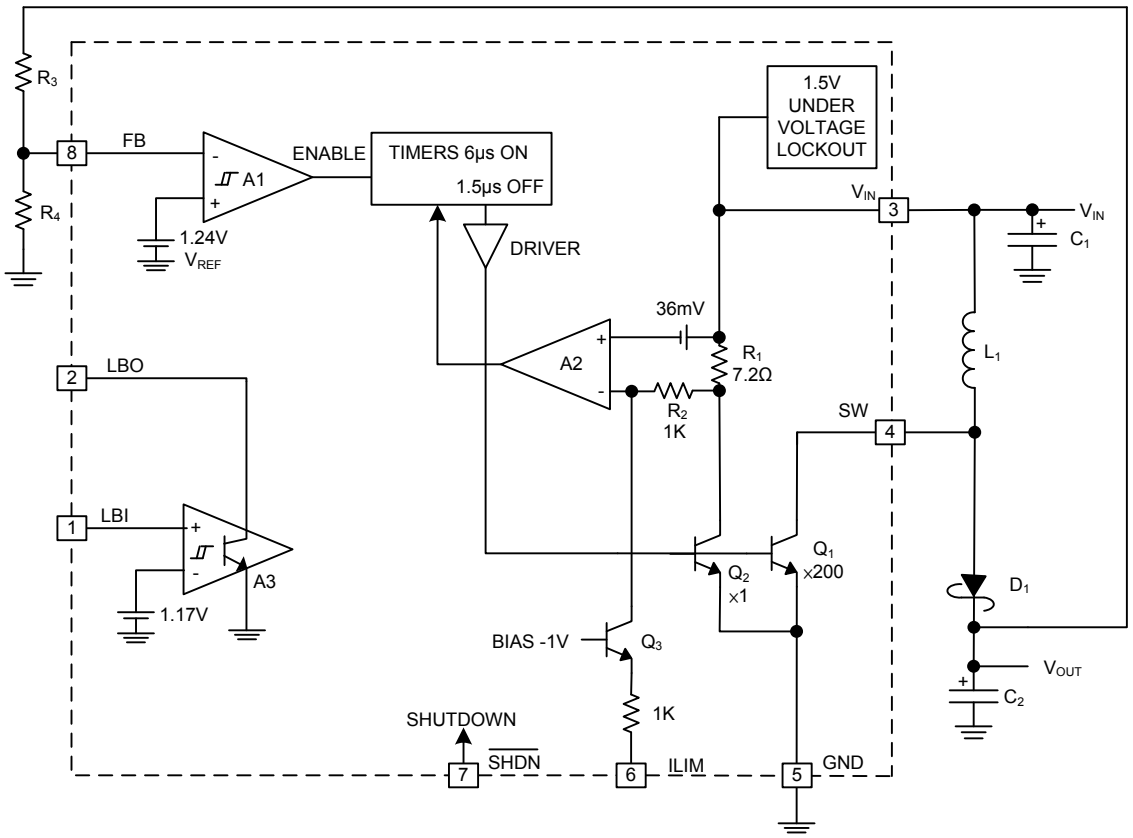
■ PIN CONFIGURATION



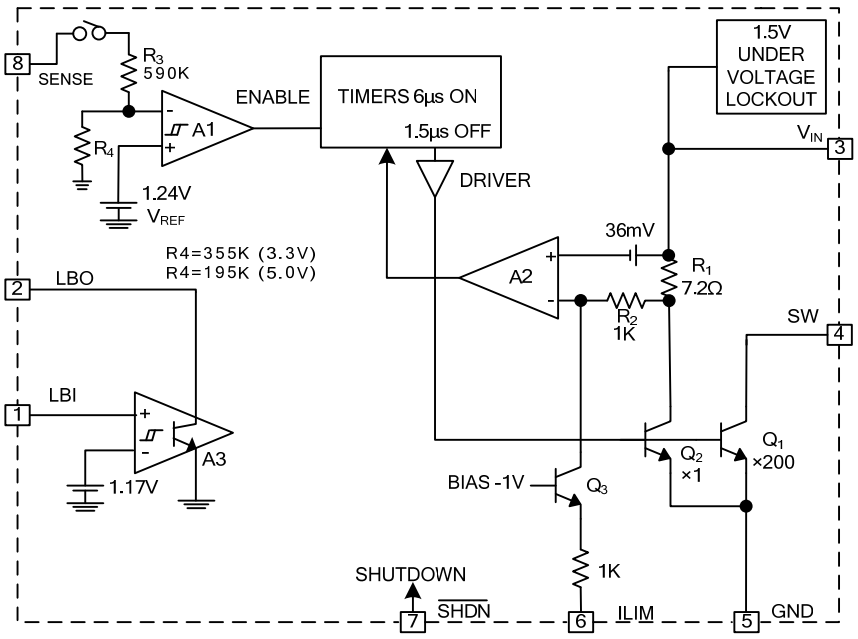
■ PIN DESCRIPTION

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_{IN}	Input Voltage Supply.
4	SW	The Collector Pin of Power NPN.
5	GND	Ground.
6	I_{LIM}	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	$\overline{SHDN}$	Input of Shutdown.Held low, then switching regulator is turned off. This Pin should not be float. When $\overline{SHDN}$ mode is not used, connect it to V_{IN}
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_{ILIM}	5	V
$\overline{SHDN}$ Voltage	$V_{\overline{SHDN}}$	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.

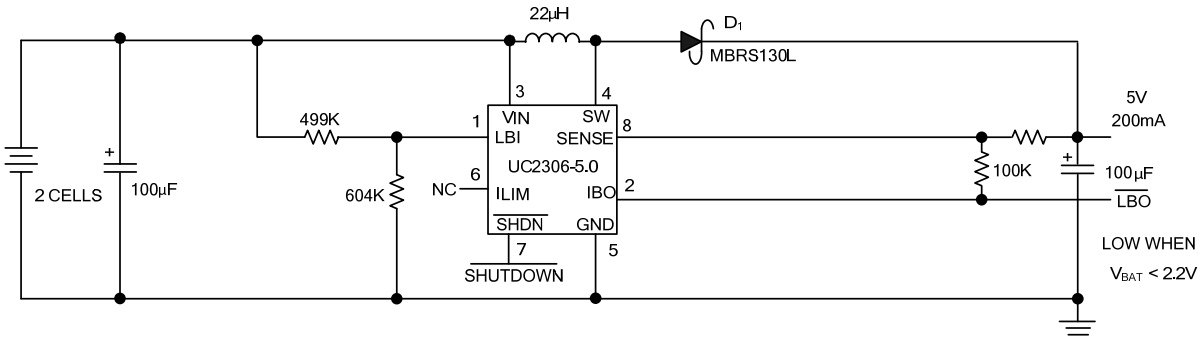
■ ELECTRICAL CHARACTERISTICS (V_{IN}=2V, $V_{\overline{SHDN}}$=2V, unless otherwise specified)

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	$V_{\overline{SHDN}}$ =2V, Not switching(Note)		120	200	μA
Quiescent Current In Shutdown		I_{SD}	$V_{\overline{SHDN}}$ =0V, V_{IN}=2V(Note)		7	15	μA
			$V_{\overline{SHDN}}$ =0V, V_{IN}=5V(Note)		27	50	μA
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		$I_{LEAK(SD)}$	$V_{\overline{SHDN}}$ =0V, Fixed Output Versions(Note)		0.002	1	μA
Line Regulation		ΔV_{OUT}	1.8V≤V_{IN}≤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}=500μA(Note)		0.2	0.4	V
LBO Output Leakage Current		$I_{LBO(LEAK)}$	LBI=1.5V, LBO=5V(Note)		0.01	0.1	μA
$\overline{SHDN}$ Input Voltage	High	$V_{\overline{SHDN}}$	(Note)	1.4			V
	Low		(Note)			0.4	V
$\overline{SHDN}$ Pin Bias Current		$I_{\overline{SHDN}}$	$V_{\overline{SHDN}}$ =5V(Note)		5	8	μA
			$V_{\overline{SHDN}}$ =0V(Note)	-5	-2		μA
Switching Off Time		t_{OFF}	(Note)	1	1.5	2	μs
Switch On Time		t_{ON}	Current Limit Not Asserted (Note)	4	6	8	μs
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		$V_{SW(SAT)}$	Isw=1A		0.37		V
			Isw=700mA(Note)		0.26	0.35	V
Switch Leakage		$I_{LEAK(SW)}$	Switch off, Vsw=5V		0.01	7	μA

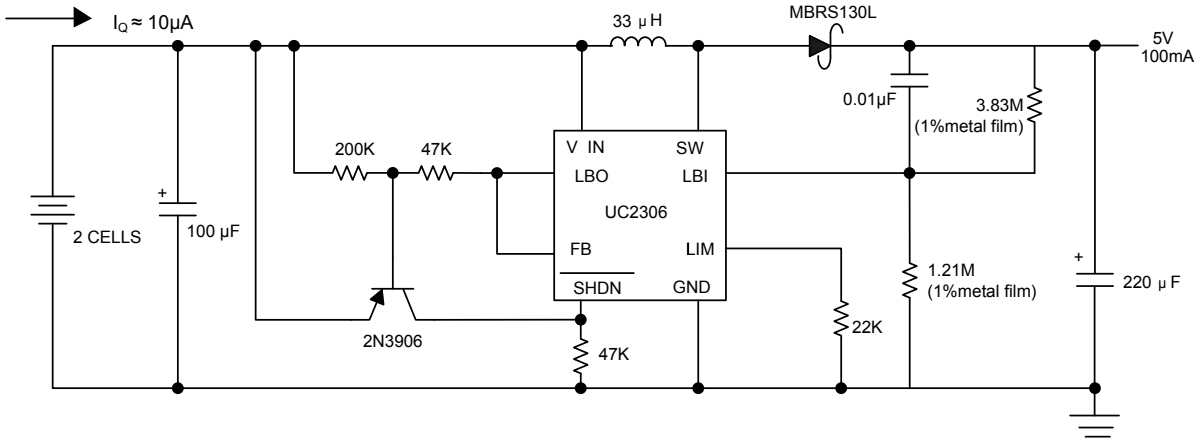
Note: Denotes specifications which apply over the 0°C to 70°C operating temperature range.

■ TYPICAL APPLICATION

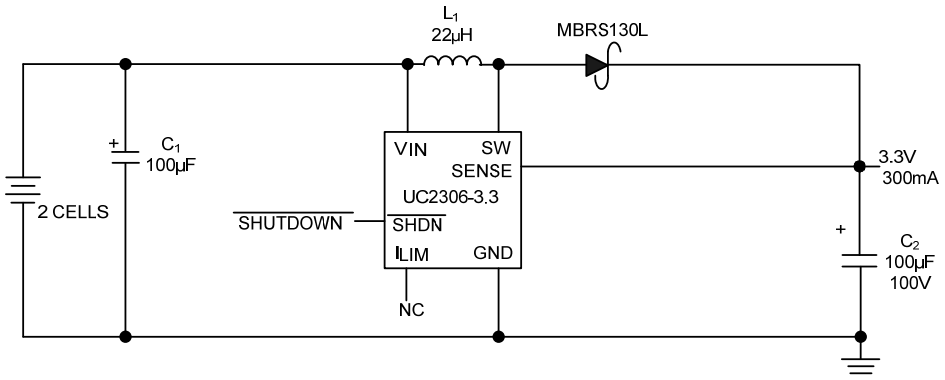
2-Cell to 5V Step-Up Converter with Low-Battery Detect



Super Burst Low I_Q DC/DC Converter

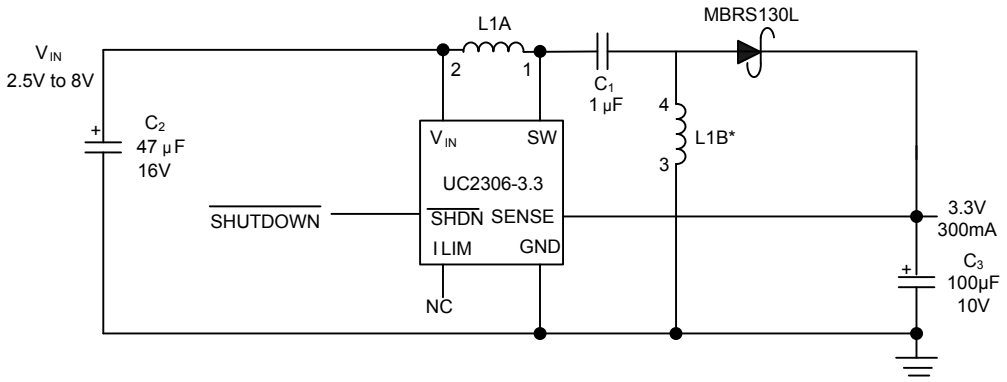


2-Cell to 3.3V Boost Converter

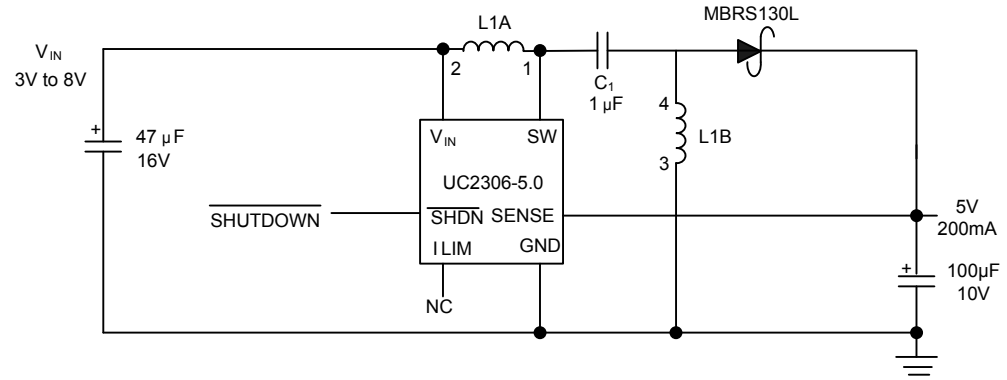


■ TYPICAL APPLICATION(Cont.)

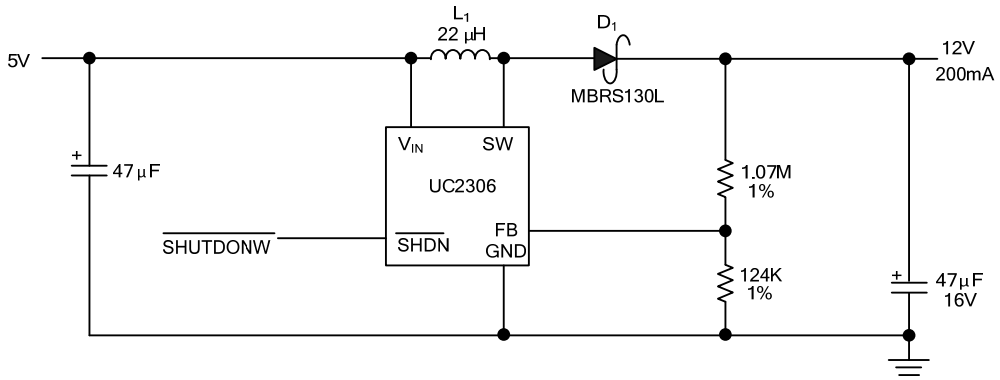
3.3V SEPIC Efficiency(Step-Up/Step-Down Converter)



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

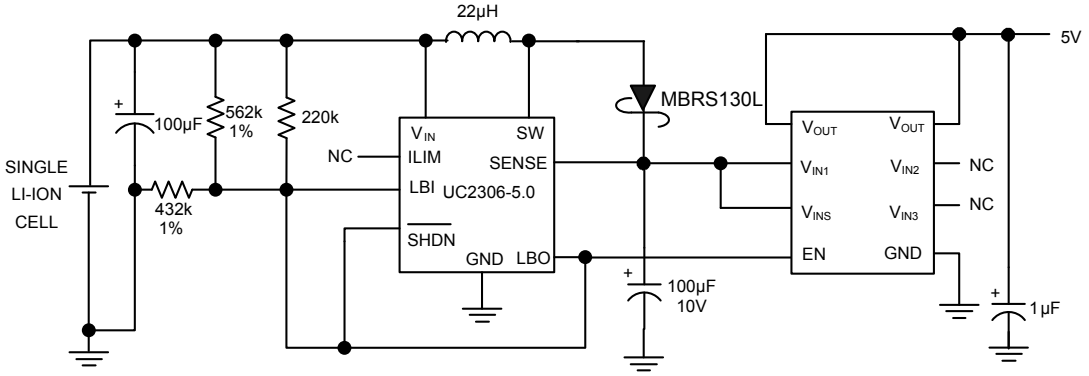


5V to 12V DC/DC Converter

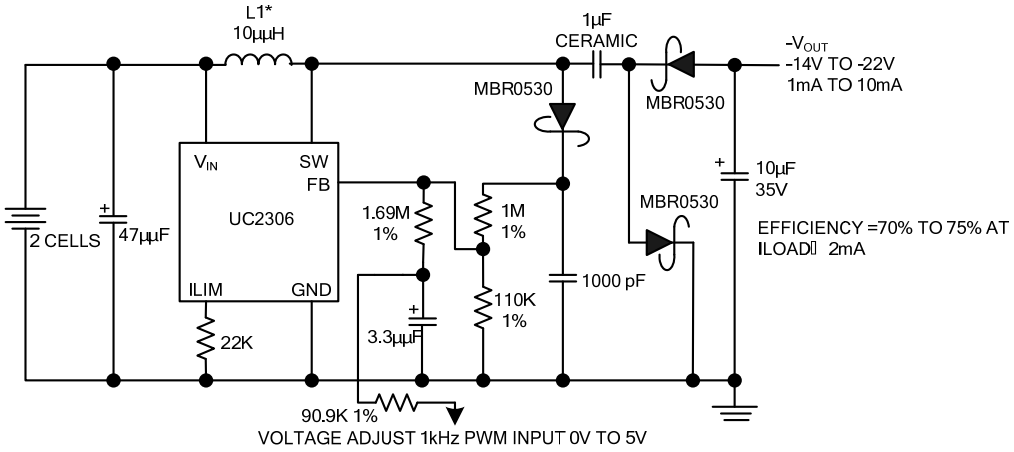


■ TYPICAL APPLICATION(Cont.)

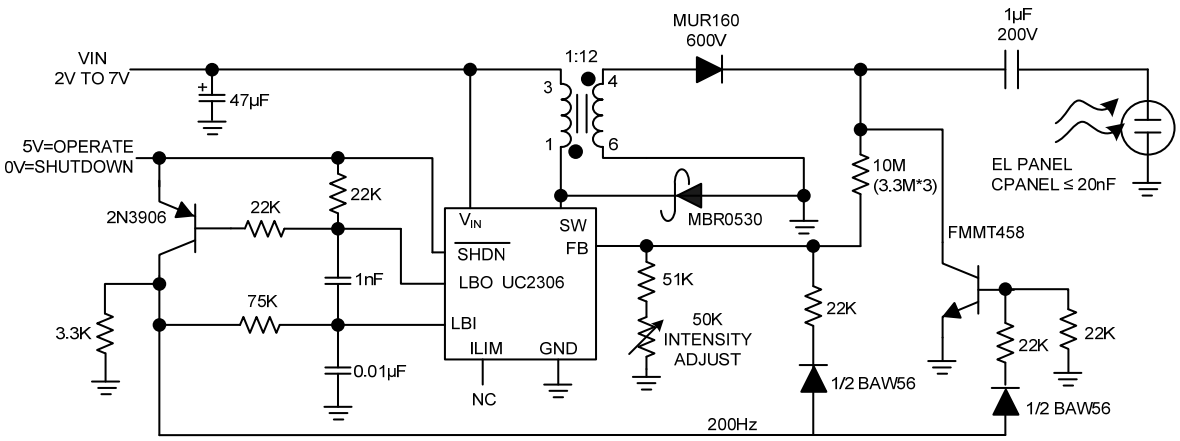
Single Li-Ion Cell to 5V Converter with Load Disconnect at V_{IN}＜2.7V



Negative LCD Bias Generator

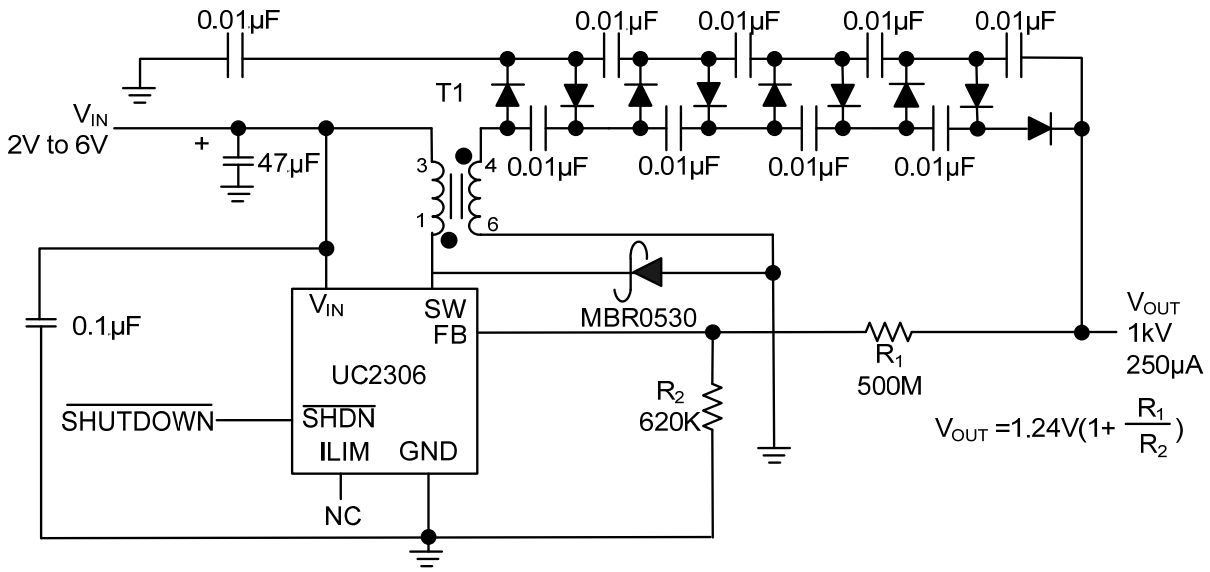


Electroluminescent Panel Driver with 200Hz Oscillator

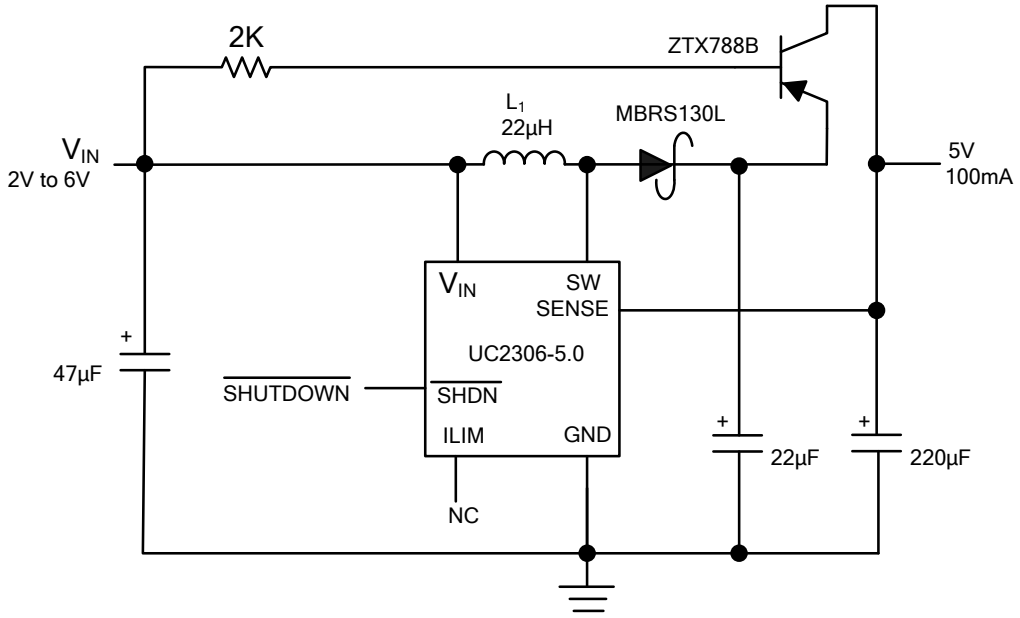


■ TYPICAL APPLICATION(Cont.)

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

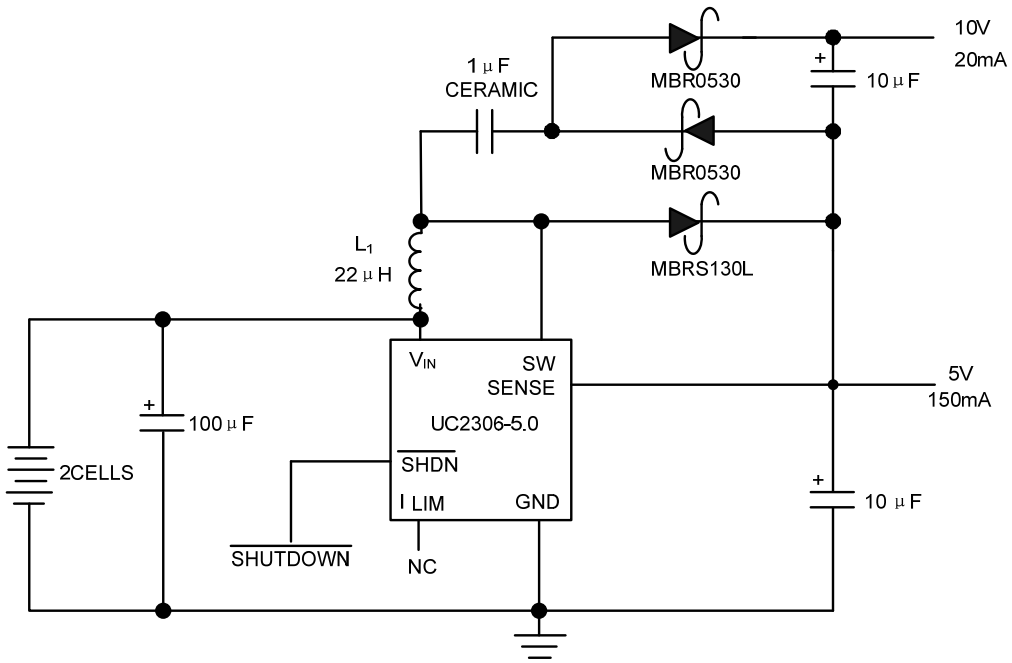


2- TO 4- Cell to 5V Converter with Output Disconnect

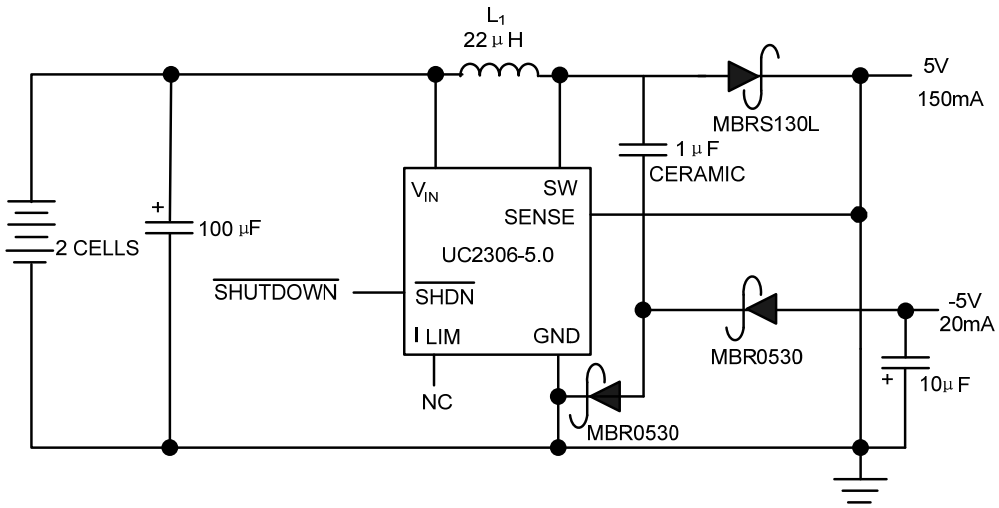


■ TYPICAL APPLICATION(Cont.)

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

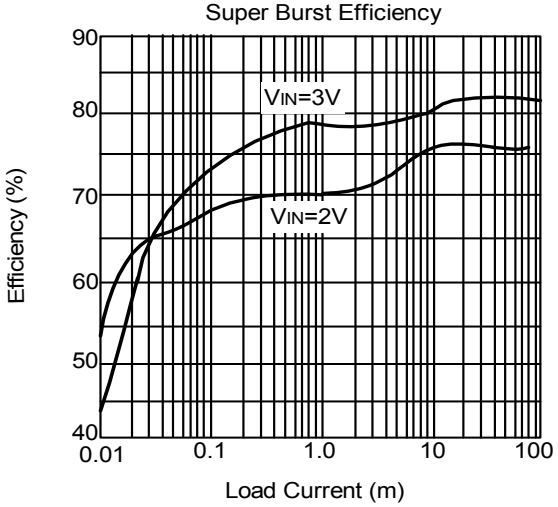


2- Cell to 5V Converter with Auxiliary -5V Output

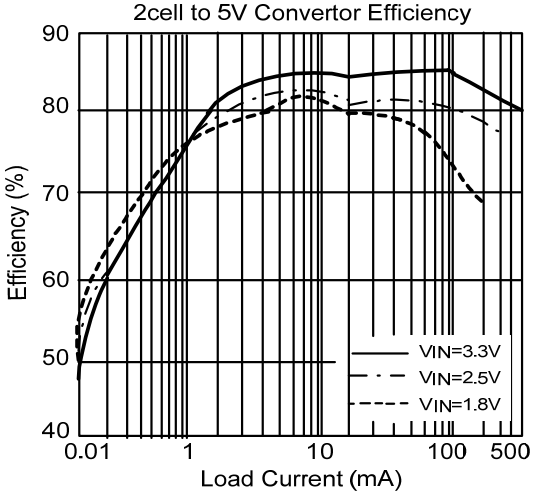


■ TYPICAL CHARACTERISTICS

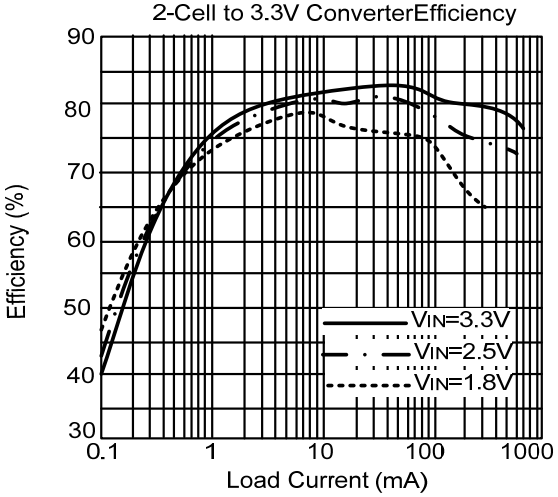
Super Burst Efficiency



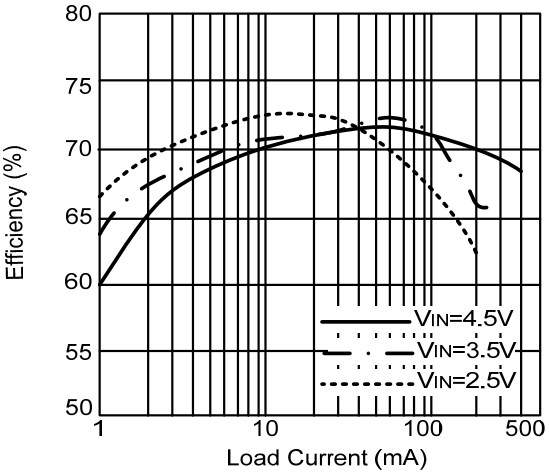
2cell to 5V Convertor Efficiency



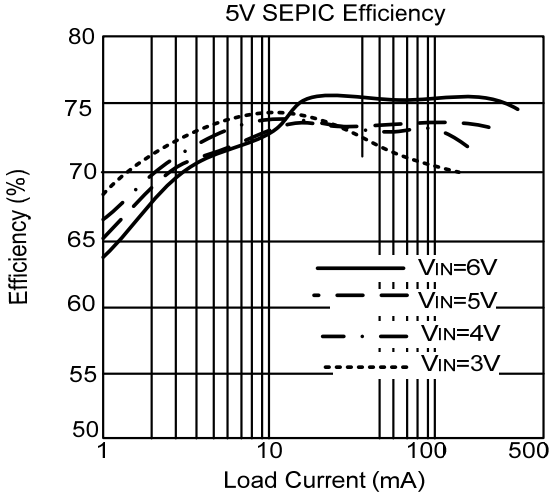
2-Cell to 3.3V ConverterEfficiency



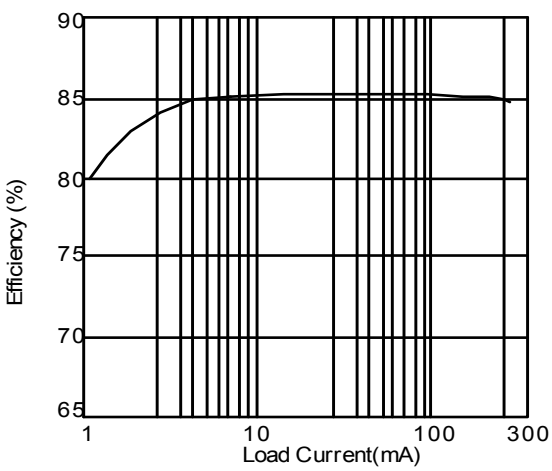
3.3V SEPIC Efficiency



5V SEPIC Efficiency

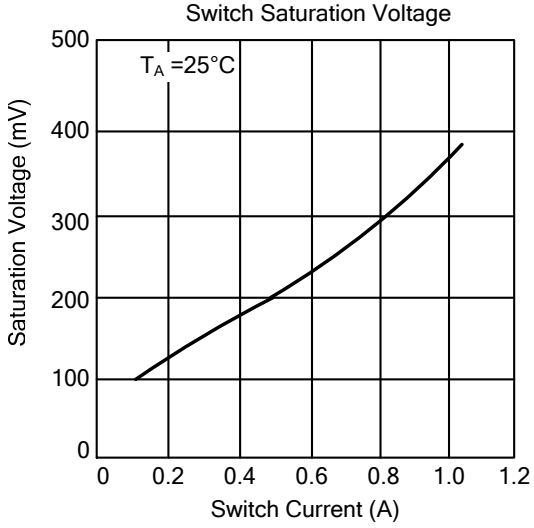


5V to 12V Converter Efficiency

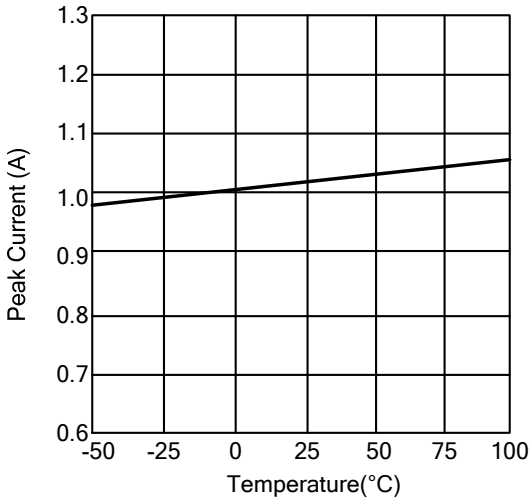


■ TYPICAL CHARACTERISTICS(Cont.)

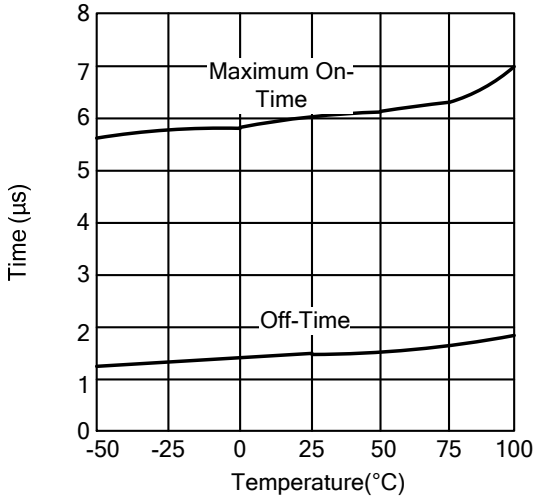
Switch Saturation Voltage



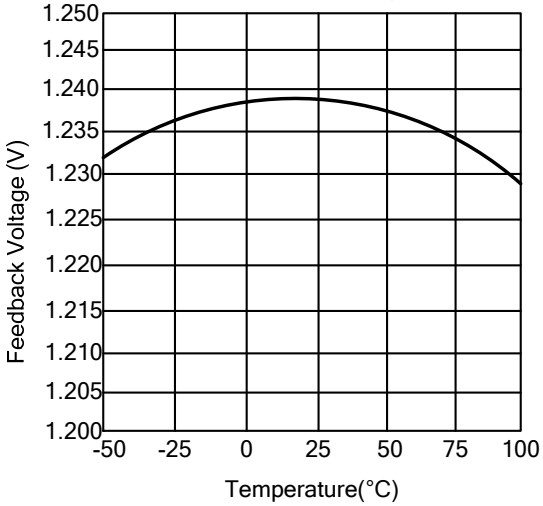
Peak Switch Current Limit



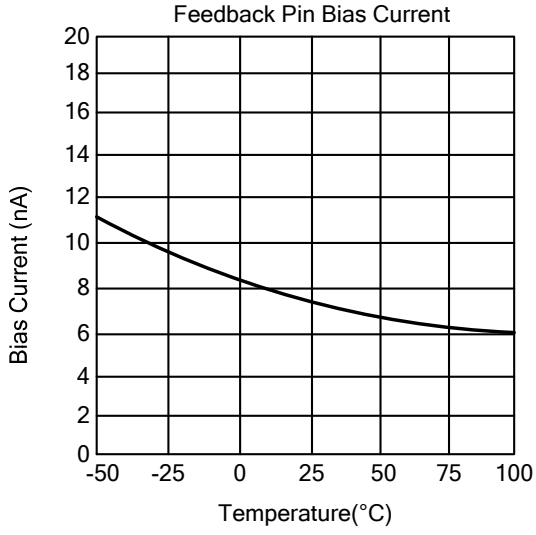
On-and Off-times



Feedback Voltage



Feedback Pin Bias Current



Supply Current