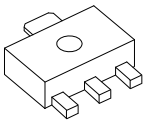
UC8383

CMOS IC

STEP-UP DC/DC CONVERTER



SOT-89

■ DESCRIPTION

The UTC **UC8383** is a high efficiency VFM controlled step-up DC/DC converter. The UTC **UC8383** is designed to have low start up voltage and low quiescent current: The UTC **UC8383** can realize the conversion from the input voltage to the selected output voltage (2.5V ~ 5.0V) only using an inductor, a diode and an output capacitor.

Its typical applications include: cellular telephones, pagers, video camera, PDA and hand held instruments, palmtop, notebook computer, portable equipment and battery powered equipment.

■ FEATURES

* 0.8V Start-Up Voltage
* Low Supply Current of Typical be18μA
* Wide Output Voltage Range of 2.5V~5.0V
* Output Voltage Accuracy ±2%
* Output Current Up to 100mA
* Low Ripple and Low Noise
* High Efficiency Up to 85%
* Low Profile and Minimum External Components

■ ORDERING INFORMATION

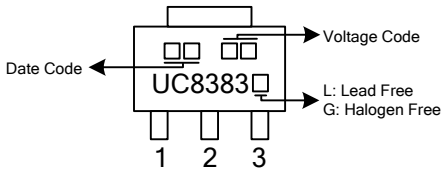
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
UC8383L-xx-AB3-R	UC8383G-xx-AB3-R	SOT-89	V_{SS}	V_{OUT}	L_X	Tape Reel

UC8383L-xx-AB3-R

(1)Packing Type
(2)Package Type
(3)Voltage Code
(4)Lead Free

(1) R: Tape Reel
(2) AB3: SOT-89
(3) xx: refer to Marking Information
(4) G: Halogen Free, L: Lead Free

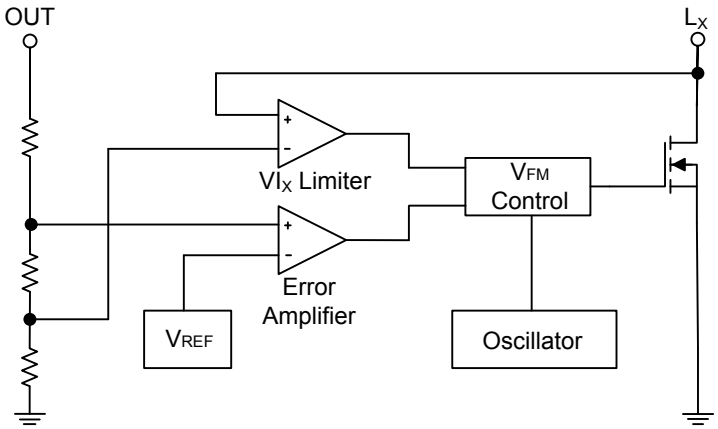
■ MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	25:2.5V 27:2.7V 28:2.8V 30:3.0V 33:3.3V 36:3.6V 50:5.0V	

■ PIN DESCRIPTION

PIN NO	PIN NAME	DESCRIPTION
1	V_{SS}	GND.
2	V_{OUT}	Output voltage monitor, IC internal supply voltage
3	L_X	Switch pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Output Voltage	V_{OUT}	5.5	V
Input Voltage	V_{IN}	5.5	V
LX Pin Voltage	V_{LX}	5.5	V
LX Pin Output Current	I_{LX}	Internally limited	
Power Dissipation (Ta=25°C)	P_D	170	mW
Derating Rate over Ta=25°C		1.7	°C/mW
Operating Junction Temperature	T_J	-25 ~ +85	°C
Storage Temperature	T_{STG}	-55 ~ +125	°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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	θ_{JC}	17	°C/W

■ ELECTRICAL CHARACTERISTICS (I_{OUT} = 10mA, Ta = 25°C, unless otherwise specified.)

UC8383-2.5V (V_{IN} = 1.5V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		2.45	2.5	2.55	V
Start-up Voltage (V_{IN}-V_F) (Note 1)	V_{START}	I_{OUT} = 1mA		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	I_{OUT} = 1mA	0.6			V
Supply Current	I_{SUPPLY}	I_{OUT} = 0		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	I_{LX} = 150mA		850		mΩ
Internal Leakage Current	$I_{LX(LEAK)}$	V_{LX} = 4V, V_{OUT} = 3V			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			120		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	I_{OUT} = 50mA		82		%

UC8383-2.7V (V_{IN} =1.6V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		2.646	2.7	2.754	V
Start-up Voltage (V_{IN}-V_F) (Note)	V_{START}	I_{OUT} = 1mA		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	I_{OUT} = 1mA	0.6			V
Supply Current	I_{SUPPLY}	I_{OUT} = 0		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	I_{LX} = 150mA		850		mΩ
Internal Leakage Current	$I_{LX(LEAK)}$	V_{LX} = 4V, V_{OUT} = 3.3V			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			120		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	I_{OUT} = 50mA		82		%

UC8383-2.8V (V_{IN} =1.7V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		2.744	2.8	2.856	V
Start-up Voltage (V_{IN}-V_F) (Note)	V_{START}	I_{OUT} = 1mA		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	I_{OUT} = 1mA	0.6			V
Supply Current	I_{SUPPLY}	I_{OUT} = 0		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	I_{LX} = 150mA		850		mΩ
Internal Leakage Current	$I_{LX(LEAK)}$	V_{LX} = 4V, V_{OUT} = 3.3V			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			120		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	I_{OUT} = 50mA		82		%

■ ELECTRICAL CHARACTERISTICS(Cont.)

UC8383-3.0V (V_{IN} = 1.8V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		2.94	3	3.06	V
Start-up Voltage (V_{IN}-V_F) (Note)	V_{START}	I_{OUT} = 1mA		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	I_{OUT} = 1mA	0.6			V
Supply Current	I_{SUPPLY}	I_{OUT} = 0		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	I_{LX} = 150mA		850		mΩ
Internal Leakage Current	$I_{LX(LEAK)}$	V_{LX} = 4V, V_{OUT} = 3.5V		0.1	0.5	μA
Maximum Oscillator Frequency	f_{OSC}			120		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	I_{OUT} = 50mA		82		%

UC83830-3.3V (V_{IN} = 2V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		3.234	3.3	3.366	V
Start-up Voltage (V_{IN}-V_F) (Note)	V_{START}	I_{OUT} = 1mA		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	I_{OUT} = 1mA	0.6			V
Supply Current	I_{SUPPLY}	I_{OUT} = 0		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	I_{LX} = 150mA		850		mΩ
Internal Leakage Current	$I_{LX(LEAK)}$	V_{LX} = 4V, V_{OUT} = 3.8V			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			120		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	I_{OUT} = 50mA		84		%

UC83830-3.6V (V_{IN} = 2V)

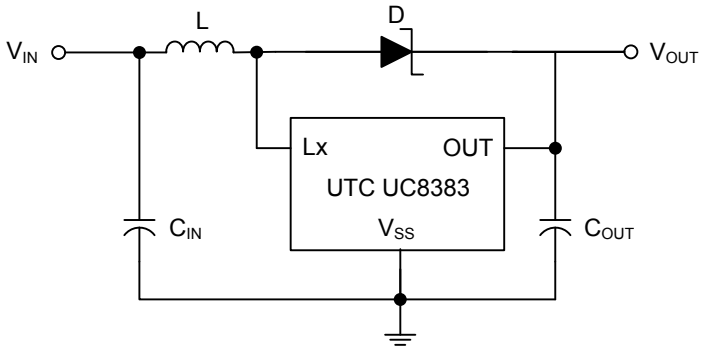
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		3.528	3.6	3.672	V
Start-up Voltage (V_{IN}-V_F) (Note)	V_{START}	I_{OUT} = 1mA		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	I_{OUT} = 1mA	0.6			V
Supply Current	I_{SUPPLY}	I_{OUT} = 0		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	I_{LX} = 150mA		850		mΩ
Internal Leakage Current	$I_{LX(LEAK)}$	V_{LX} = 4V, V_{OUT} = 3.8V			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			120		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	I_{OUT} = 50mA		84		%

UC83830-5.0V (V_{IN} = 3V)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		4.9	5.0	5.1	V
Start-up Voltage (V_{IN}-V_F) (Note)	V_{START}	I_{OUT} = 1mA		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	I_{OUT} = 1mA	0.6			V
Supply Current	I_{SUPPLY}	I_{OUT} = 0		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	I_{LX} = 150mA		700		mΩ
Internal Leakage Current	$I_{LX(LEAK)}$	V_{LX} = 4V, V_{OUT} = 5.5V		0.1	0.5	μA
Maximum Oscillator Frequency	f_{OSC}			120		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	I_{OUT} = 50mA		85		%

Note: The minimum value of the device start-up voltage is strictly a function of the forward voltage (V_F) of the diode.

■ TYPICAL APPLICATION



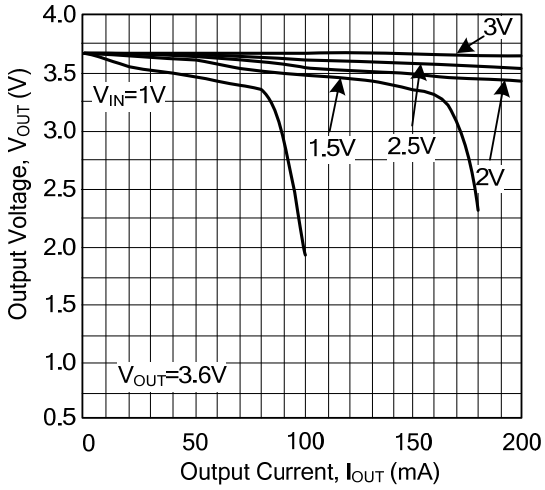
Application Circuit

Application Circuit Notes:

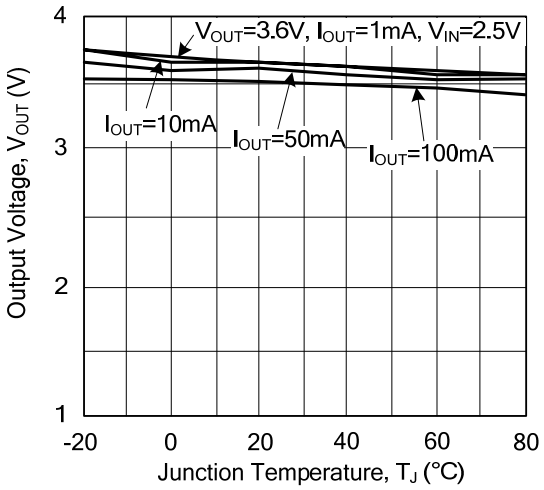
1. The inductors: an inductor value of 47μH performs well in this application.
2. The diode: an high switching speed and low forward voltage diode.
3. The input capacitor: A value of 4.7μF tantalum capacitor is enough to guarantee stability.
4. The output capacitor: The best choice for the value of the output capacitance is 47μF tantalum capacitor. And the capacitance value should be in the range of about 10μF-100μF.

■ TYPICAL CHARACTERISTICS

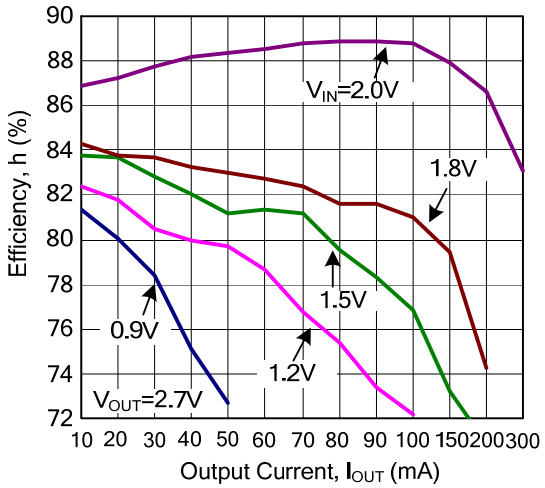
Output Voltage vs. Output Current



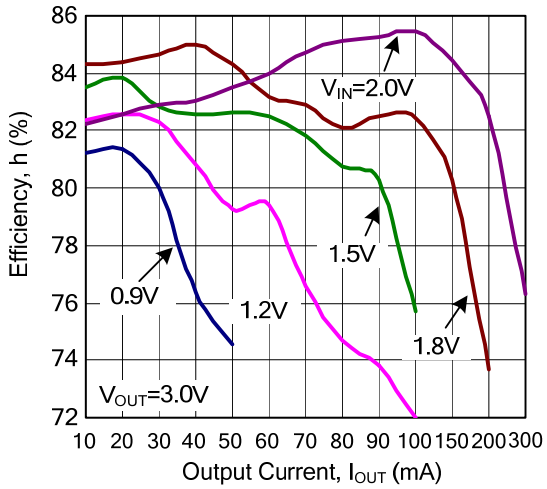
Output Voltage vs. Temperature



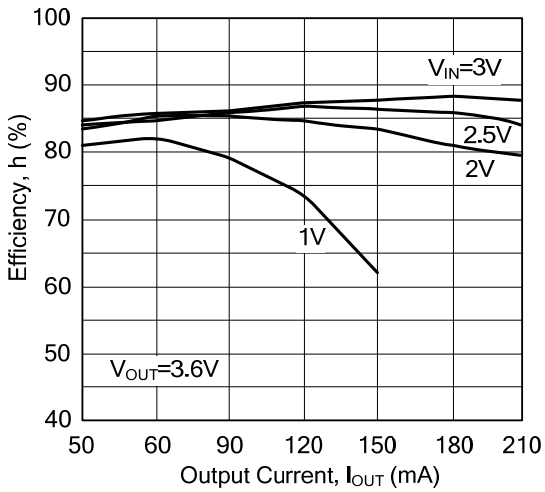
Efficiency vs. Output Current



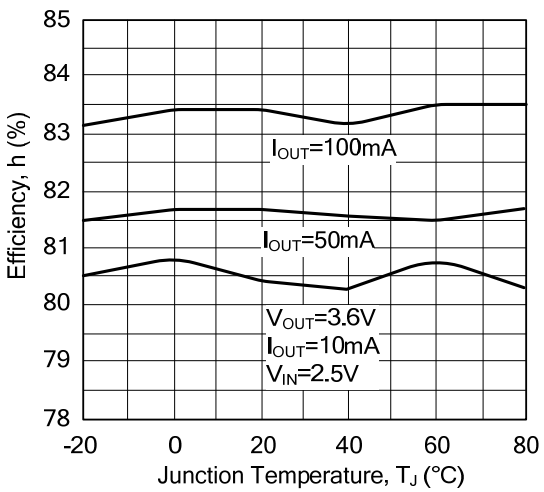
Efficiency vs. Output Current



Efficiency vs. Output Current

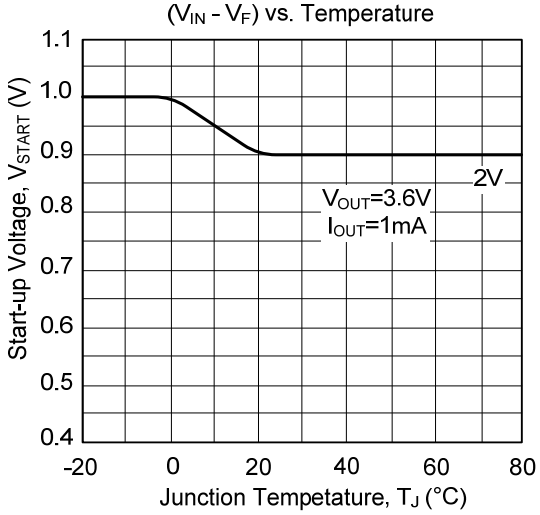


Efficiency vs. Temperature

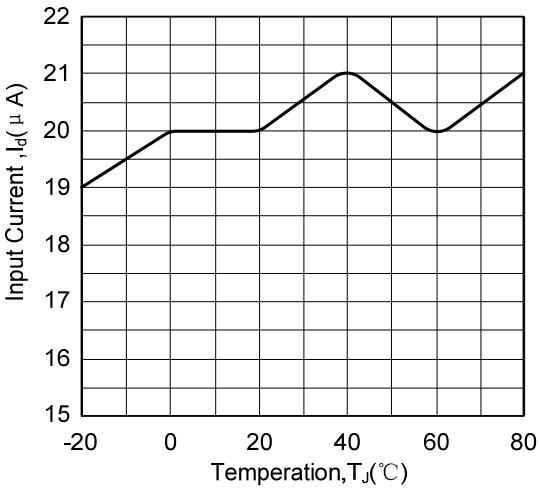


■ TYPICAL CHARACTERISTICS(Cont.)

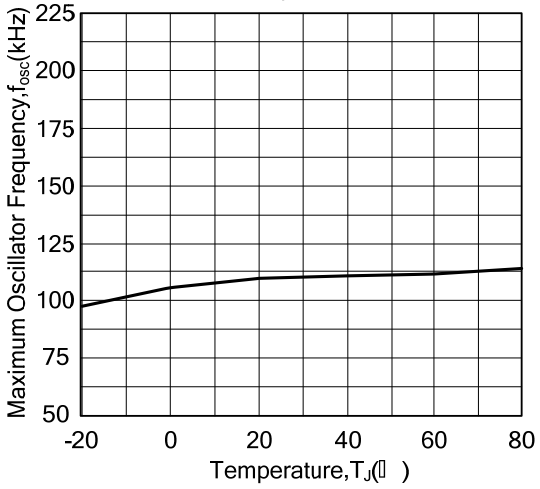
Start-up Voltage
(V_{IN} - V_F) vs. Temperature



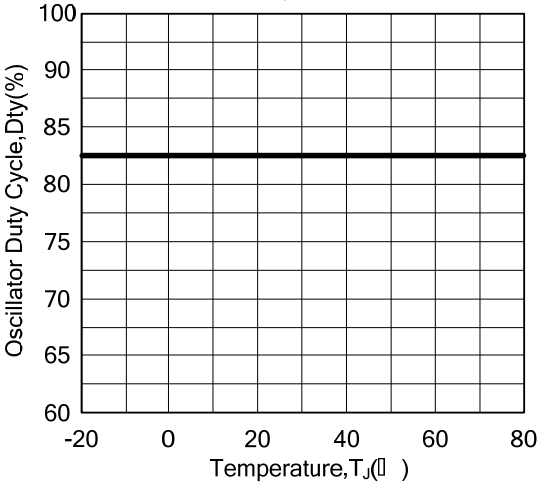
No Load Input Current vs Temperation



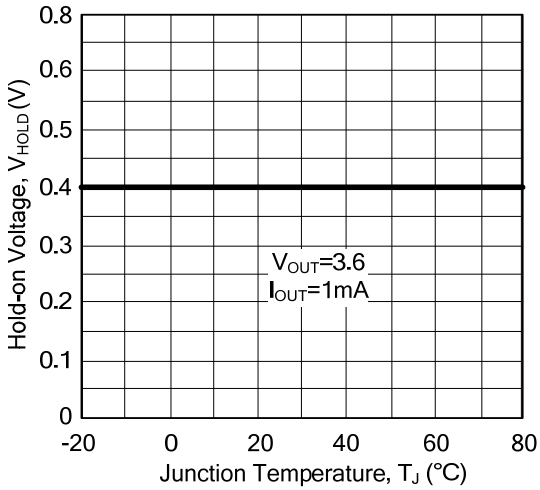
Maximum Oscillator Frequency vs Temperature



Oscillator Duty Cycle (@ MAX Freq.) vs Temperature

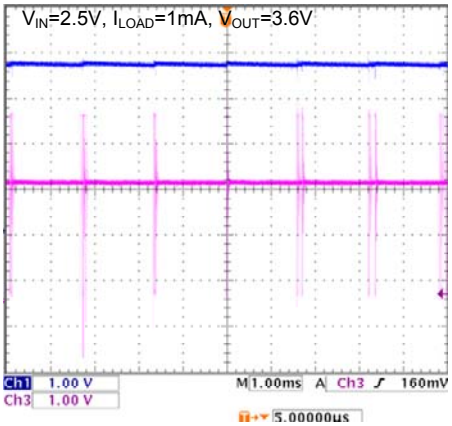


Hold-on Voltage vs. Temperature



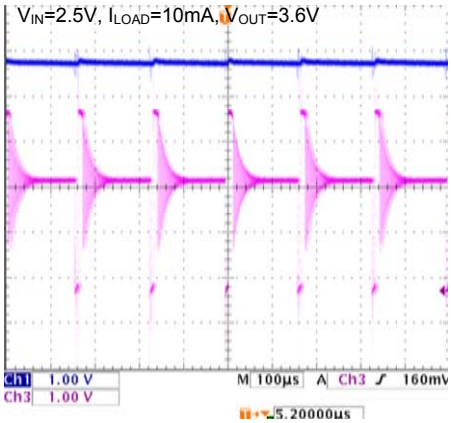
■ TYPICAL CHARACTERISTICS(Cont.)

Output Waveform of LX



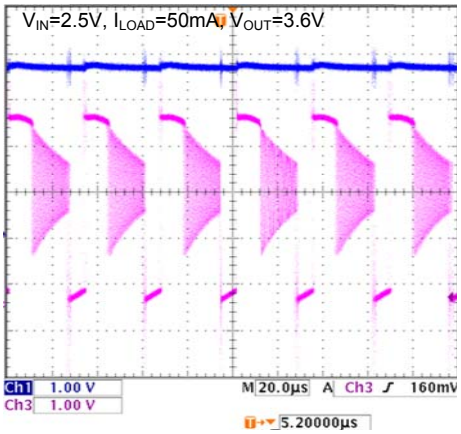
Upper Trace: Output Voltage, 1V/Division
Lower Trace: LX Mode Voltage, 1V/Division

Output Waveform of LX



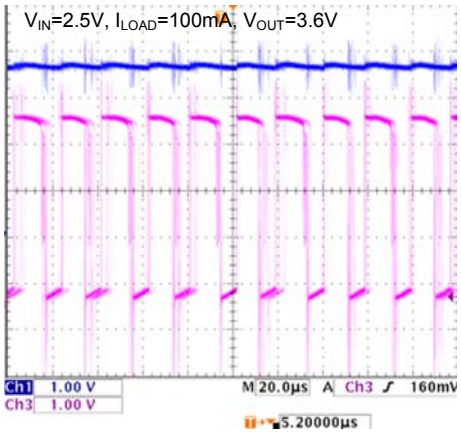
Upper Trace: Output Voltage, 1V/Division
Lower Trace: LX Mode Voltage, 1V/Division

Output Waveform of LX



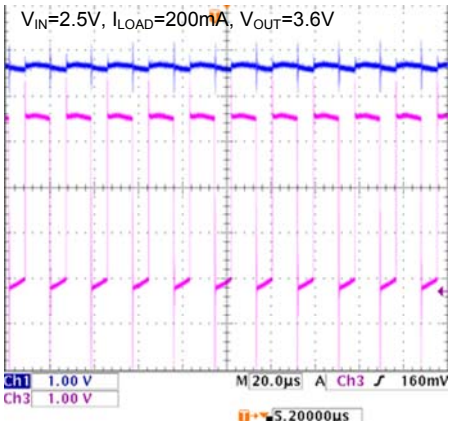
Upper Trace: Output Voltage, 1V/Division
Lower Trace: LX Mode Voltage, 1V/Division

Output Waveform of LX



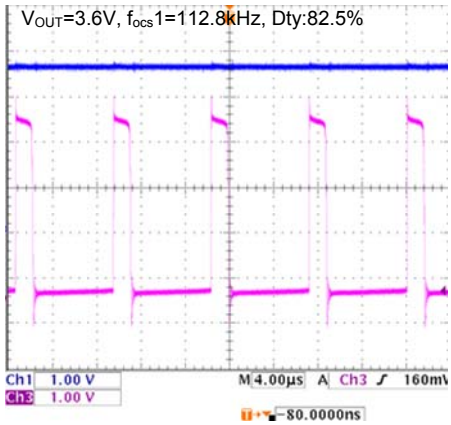
Upper Trace: Output Voltage, 1V/Division
Lower Trace: LX Mode Voltage, 1V/Division

Output Waveform of LX



Upper Trace: Output Voltage, 1V/Division
Lower Trace: LX Mode Voltage, 1V/Division

Output Waveform of LX Under Maximum Frequency



Upper Trace: Output Voltage, 1V/Division
Lower Trace: LX Mode Voltage, 1V/Division