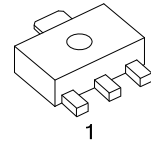


**UC8383****CMOS IC****STEP-UP DC/DC CONVERTER****DESCRIPTION**

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.



SOT-89

FEATURES

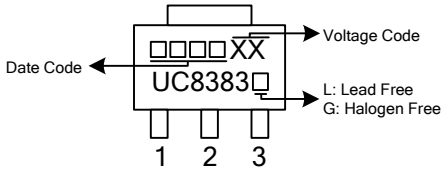
- * 0.8V Start-Up Voltage
- * Low Supply Current of Typical $18\mu\text{A}$
- * Wide Output Voltage Range of 2.5V~5.0V
- * Output Voltage Accuracy $\pm 2\%$
- * Output Current Up to 100mA
- * Low Ripple and Low Noise
- * High Efficiency Up to 85%
- * Low Profile and Minimum External Components

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) L: Lead Free, G: Halogen Free
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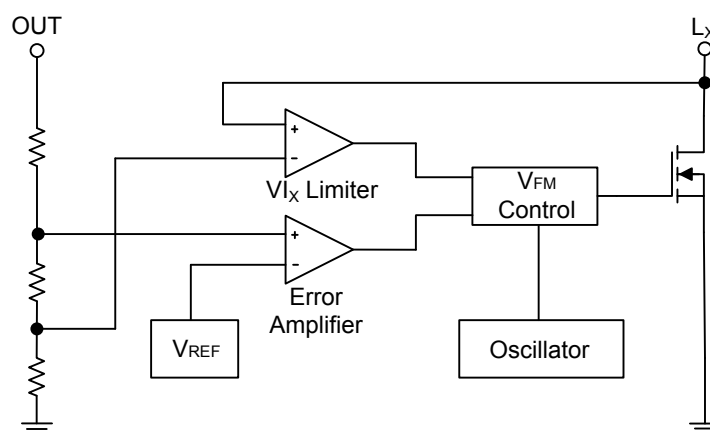
MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-89	25:2.5V	 Date Code Voltage Code L: Lead Free G: Halogen Free 1 2 3
	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 ($T_A=25^{\circ}\text{C}$)	P_D	170	mW
Derating Rate over $T_A=25^{\circ}\text{C}$		1.7	$^{\circ}\text{C}/\text{mW}$
Operating Junction Temperature	T_J	$-25 \sim +85$	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	$-55 \sim +125$	$^{\circ}\text{C}$

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	$^{\circ}\text{C}/\text{W}$

■ ELECTRICAL CHARACTERISTICS ($I_{OUT} = 10\text{mA}$, $T_A = 25^{\circ}\text{C}$, unless otherwise specified.)

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

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}	$I_{OUT} = 1\text{mA}$		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	$I_{OUT} = 1\text{mA}$	0.25	0.5		V
Supply Current	I_{SUPPLY}	$I_{OUT} = 0$		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	$I_{LX} = 150\text{mA}$		850		$\text{m}\Omega$
Internal Leakage Current	$I_{LX(LEAK)}$	$V_{LX} = 4\text{V}$, $V_{OUT} = 3\text{V}$			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			165		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	$I_{OUT} = 50\text{mA}$		82		%

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

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}	$I_{OUT} = 1\text{mA}$		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	$I_{OUT} = 1\text{mA}$	0.25	0.5		V
Supply Current	I_{SUPPLY}	$I_{OUT} = 0$		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	$I_{LX} = 150\text{mA}$		850		$\text{m}\Omega$
Internal Leakage Current	$I_{LX(LEAK)}$	$V_{LX} = 4\text{V}$, $V_{OUT} = 3.3\text{V}$			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			165		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	$I_{OUT} = 50\text{mA}$		82		%

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

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}	$I_{OUT} = 1\text{mA}$		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	$I_{OUT} = 1\text{mA}$	0.25	0.5		V
Supply Current	I_{SUPPLY}	$I_{OUT} = 0$		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	$I_{LX} = 150\text{mA}$		850		$\text{m}\Omega$
Internal Leakage Current	$I_{LX(LEAK)}$	$V_{LX} = 4\text{V}$, $V_{OUT} = 3.3\text{V}$			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			165		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	$I_{OUT} = 50\text{mA}$		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}	$I_{OUT} = 1mA$	0.25	0.5		V
Supply Current	I_{SUPPLY}	$I_{OUT} = 0$		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	$I_{LX} = 150mA$		850		m Ω
Internal Leakage Current	$I_{LX(LEAK)}$	$V_{LX} = 4V, V_{OUT} = 3.5V$		0.1	0.5	μA
Maximum Oscillator Frequency	f_{OSC}			165		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}	$I_{OUT} = 1mA$	0.25	0.5		V
Supply Current	I_{SUPPLY}	$I_{OUT} = 0$		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	$I_{LX} = 150mA$		850		m Ω
Internal Leakage Current	$I_{LX(LEAK)}$	$V_{LX} = 4V, V_{OUT} = 3.8V$			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			165		KHz
Oscillator Duty Cycle	D_{ty}			80		%
Efficiency	η	$I_{OUT} = 50mA$		84		%

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

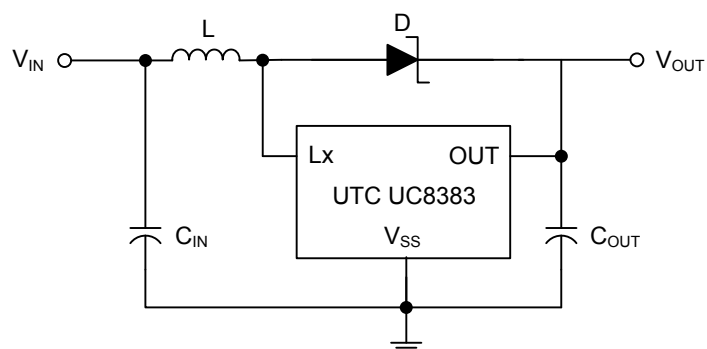
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V_{OUT}		3.528	3.6	3.672	V
Start-up Voltage ($V_{IN}-V_F$) (Note)	V_{START}	$I_{OUT} = 1mA$		0.8	1.2	V
Hold-on Voltage	V_{HOLD}	$I_{OUT} = 1mA$	0.25	0.5		V
Supply Current	I_{SUPPLY}	$I_{OUT} = 0$		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	$I_{LX} = 150mA$		850		m Ω
Internal Leakage Current	$I_{LX(LEAK)}$	$V_{LX} = 4V, V_{OUT} = 3.8V$			0.5	μA
Maximum Oscillator Frequency	f_{OSC}			165		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}	$I_{OUT} = 1mA$	0.25	0.5		V
Supply Current	I_{SUPPLY}	$I_{OUT} = 0$		18		μA
Internal Switch $R_{DS(ON)}$	R_{LX}	$I_{LX} = 150mA$		700		m Ω
Internal Leakage Current	$I_{LX(LEAK)}$	$V_{LX} = 4V, V_{OUT} = 5.5V$		0.1	0.5	μA
Maximum Oscillator Frequency	f_{OSC}			165		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



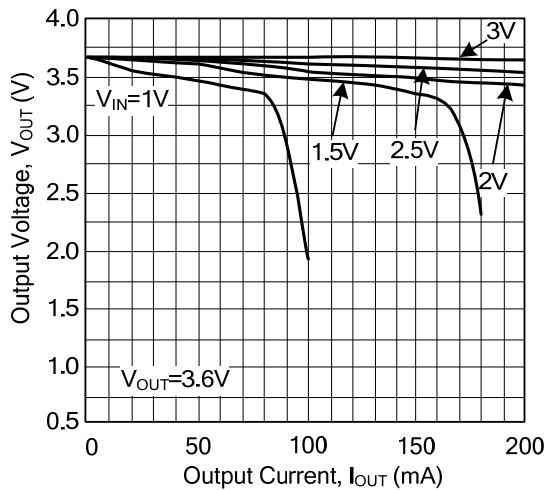
Application Circuit

Application Circuit Notes:

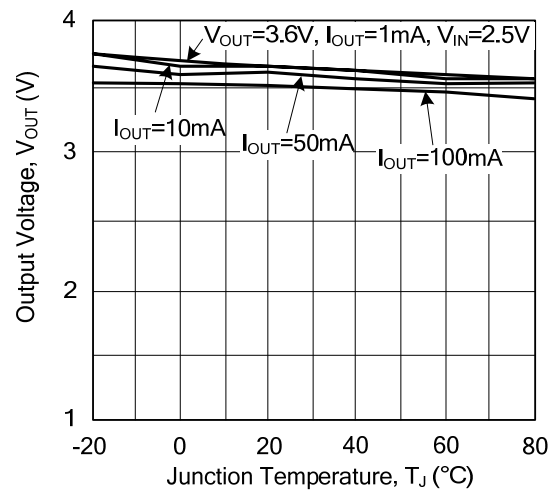
1. The inductors: an inductor value of $47\mu H$ performs well in this application.
2. The diode: an high switching speed and low forward voltage diode.
3. The input capacitor: A value of $4.7\mu F$ tantalum capacitor is enough to guarantee stability.
4. The output capacitor: The best choice for the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

■ TYPICAL CHARACTERISTICS

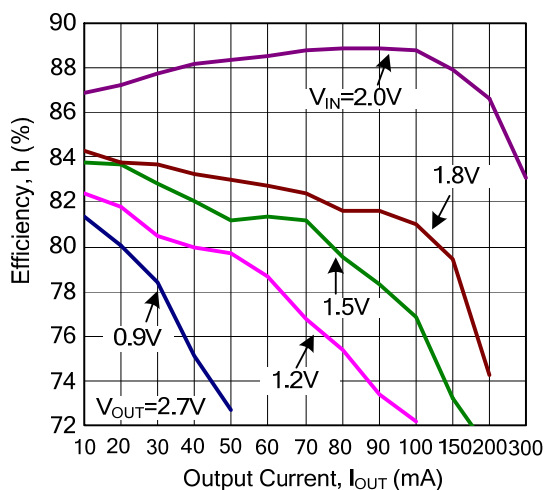
Output Voltage vs. Output Current



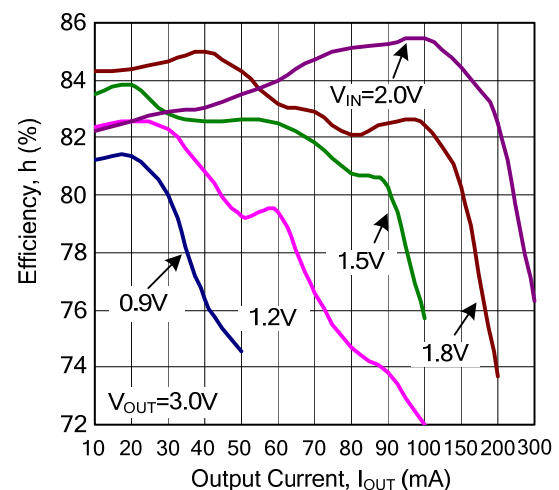
Output Voltage vs. Temperature



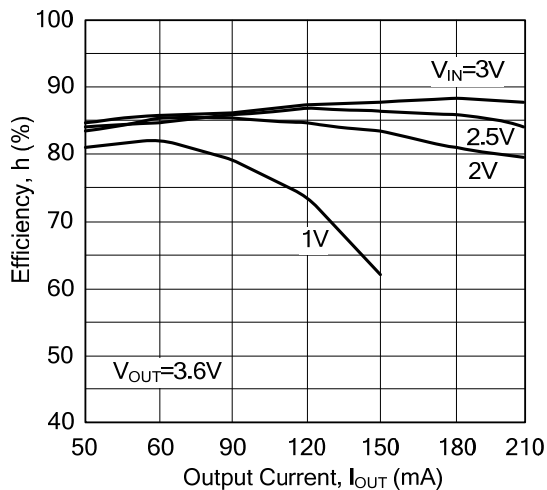
Efficiency vs. Output Current



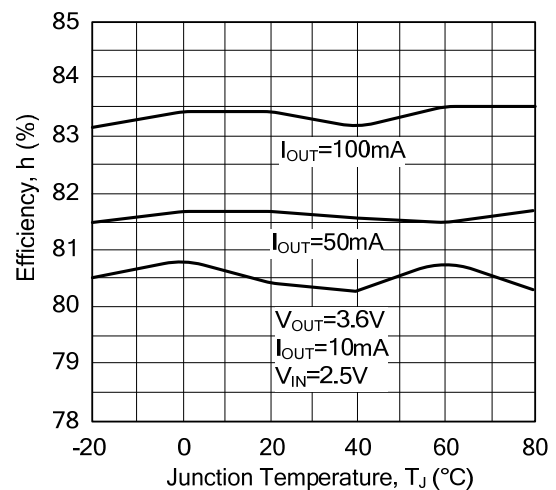
Efficiency vs. Output Current



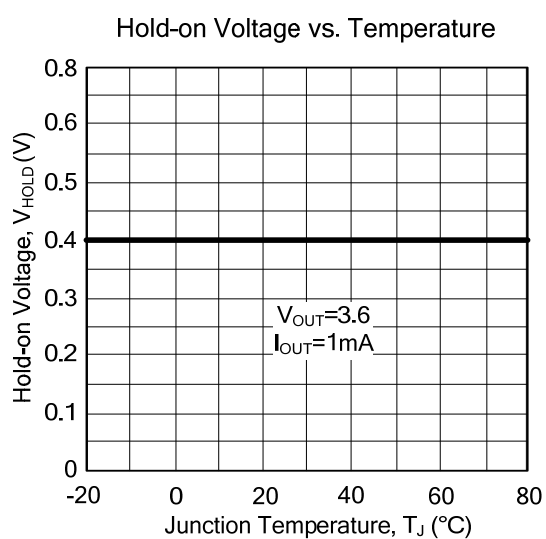
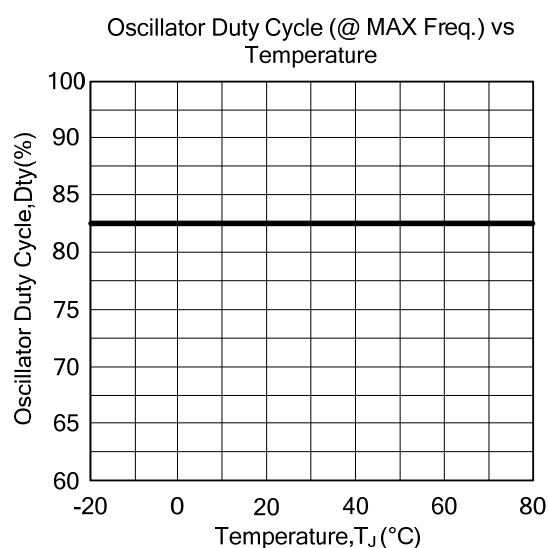
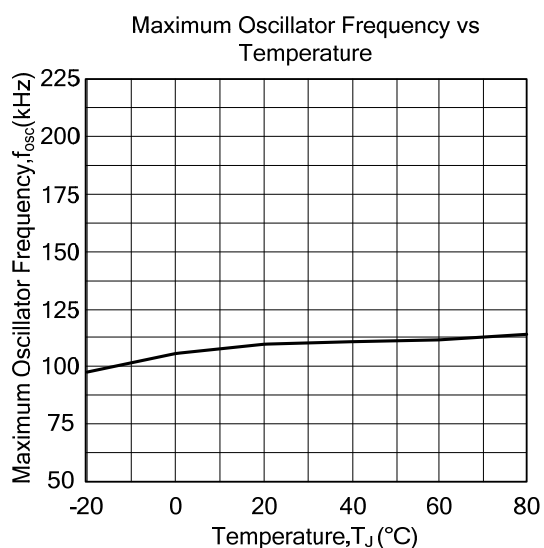
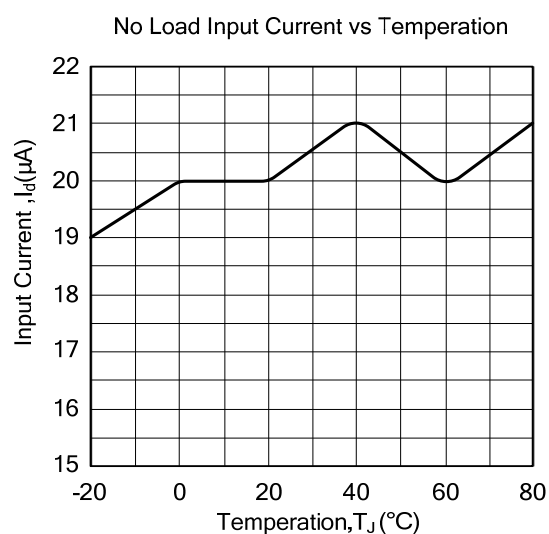
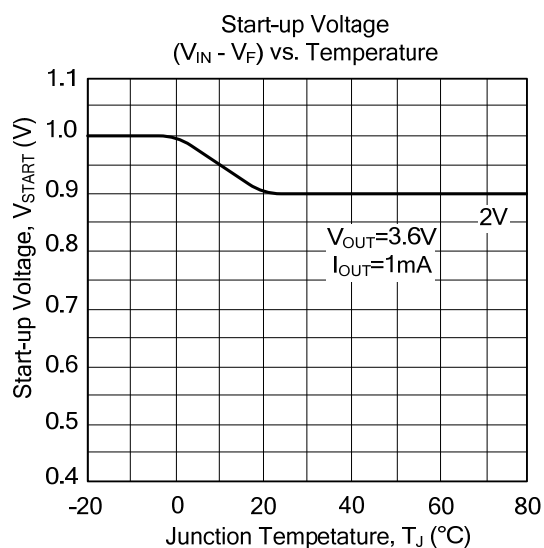
Efficiency vs. Output Current



Efficiency vs. Temperature

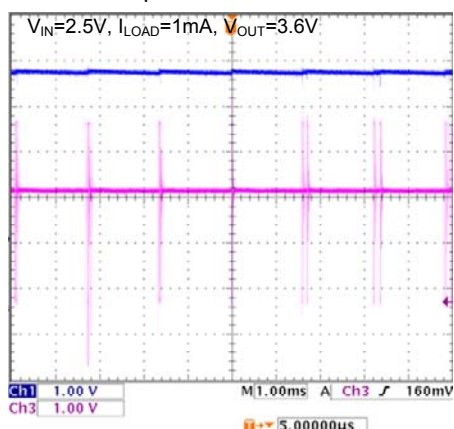


■ TYPICAL CHARACTERISTICS(Cont.)

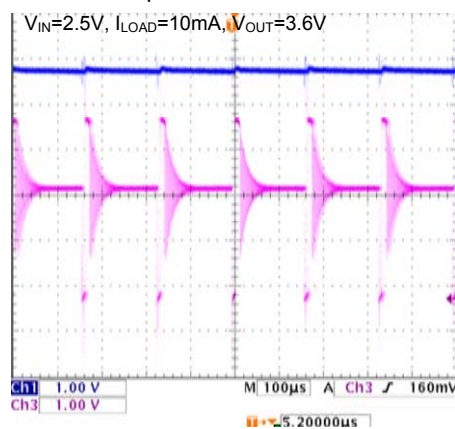


■ TYPICAL CHARACTERISTICS(Cont.)

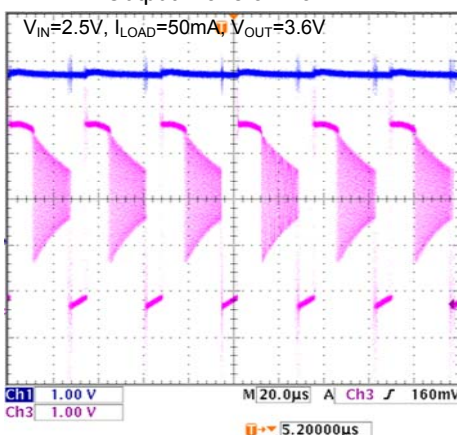
Output Waveform of LX



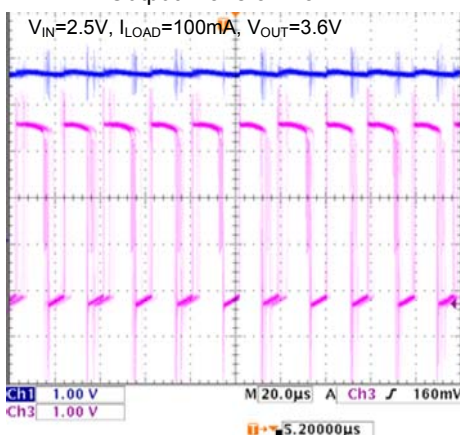
Output Waveform of LX



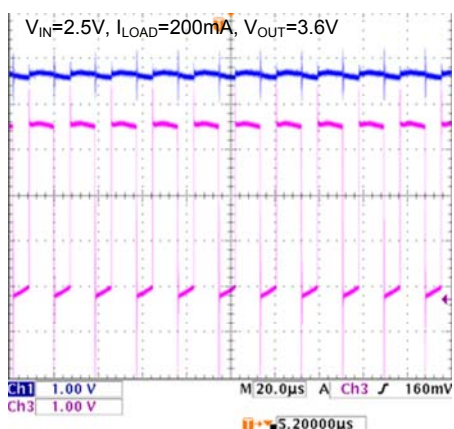
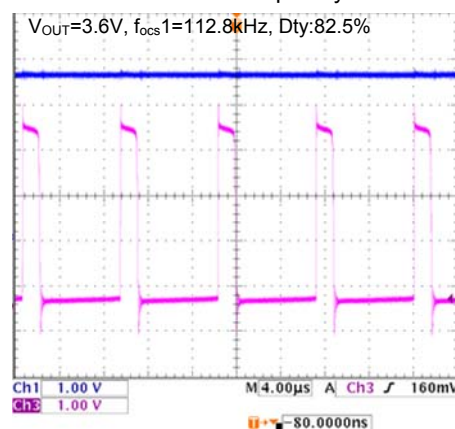
Output Waveform of LX



Output Waveform of LX



Output Waveform of LX

Output Waveform of LX Under
Maximum Frequency

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