

- ◆ **Variable Duty Ratio: 55%/75%**
- ◆ **CMOS Low Power Consumption**
- ◆ **Operating Voltage: 0.9V~10.0V**
- ◆ **Output Voltage Range: 2.0V~7.0V**
- ◆ **Output Voltage Accuracy:  $\pm 2.5\%$**

### ■ Applications

- Cellular phones, pagers
- Palmtops
- Cameras, video recorders
- Portable equipment

### ■ General Description

The XC6383 Series is a group of PFM controlled step-up DC/DC converters. Unlike conventional PFMs, the XC6383 automatically switches duty ratio (55%/75%) when it senses changes in load and can support both large and small currents.

The XC6383 series employs CMOS process and laser trimming technologies so as to attain low power and high accuracy. Max. oscillator frequency is trimmed to 100kHz (accuracy:  $\pm 15\%$ ).

Every built-in switching transistor type enables a step-up circuit to be configured using only three external components ; a coil, a diode, and a capacitor. External transistor versions are available to accommodate high output current applications.

Both built-in and external transistor types include 5-pin and 3-pin packages, which are provided with either a CE (chip enable) function that reduces power consumption during shut-down mode, or a V<sub>DD</sub> pin function (separated power and voltage detect pins).

SOT-23, SOT-25, and SOT-89-5 super mini-mold packages.

### ■ Features

**Operating (start-up) voltage range:** 0.9V~10V

**Output voltage range: 2.0V~7.0V in 0.1V increments**

**Highly accurate:** Set-up voltage  $\pm 2.5\%$

**Maximum oscillator frequency:** 100kHz ( $\pm 15\%$ )

**Variable Duty Ratio:** 55%/75% ( $\pm 5\%$ )

**Both switching transistor built-in and external types are available**

**Five-lead packaged units offer either Chip Enable or independent V<sub>out</sub> pin option.**

**Small package:** SOT-23, 25 mini-mold (3-pin, 5-pin)

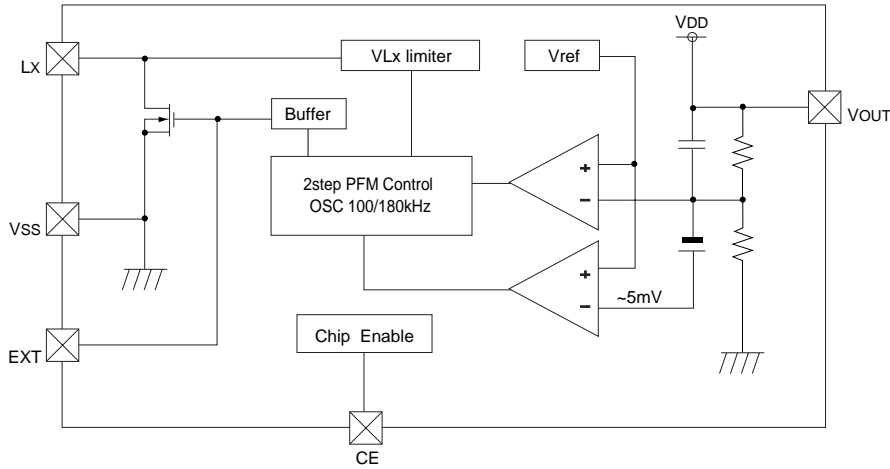
SOT-89, 89-5 mini-power mold (3-pin, 5-pin)

### ■ Selection Guide

PART TYPE	DUTY RATIO	PACKAGE	SWITCHING RELATED	ADDITIONAL FUNCTION	FEATURES
XC6383A	Switchable	SOT-23, SOT-89-3	Built-in Transistor "Lx" lead		<ul style="list-style-type: none"> <li>• Automatic duty ratio switch.</li> <li>• Low ripple and highly efficient from low current to high current.</li> </ul>
XC6383B	Switchable	SOT-23, SOT-89-3	External Transistor "EXT" lead		<ul style="list-style-type: none"> <li>• Automatic duty ratio switch.</li> <li>• Adding an external transistor can improve the output capability by up to several hundred mA.</li> </ul>
XC6383C	Switchable	SOT-25, SOT-89-5	Built-in Transistor "Lx" lead	Chip Enable(CE)	<ul style="list-style-type: none"> <li>• Stand-by (CE) function added version to the XC6383A.</li> <li>• Stand-by current: 0.5<math>\mu</math>A max.</li> </ul>
XC6383D	Switchable	SOT-25, SOT-89-5	External Transistor "EXT" lead	Chip Enable(CE)	<ul style="list-style-type: none"> <li>• Stand-by (CE) function added version to the XC6383B.</li> <li>• Stand-by current: 0.5<math>\mu</math>A max.</li> </ul>
XC6383E	Switchable	SOT-25, SOT-89-5	Built-in Transistor "Lx" lead	Separated "V <sub>DD</sub> " and "V <sub>OUT</sub> " leads	<ul style="list-style-type: none"> <li>• Independent power supply and set-up voltage sensing leads allow designing of PFM controllers.</li> </ul>
XC6383F	Switchable	SOT-25, SOT-89-5	External Transistor "EXT" lead	Separated "V <sub>DD</sub> " and "V <sub>OUT</sub> " leads	<ul style="list-style-type: none"> <li>• Independent power supply and set-up voltage sensing leads allow designing of PFM controllers.</li> </ul>

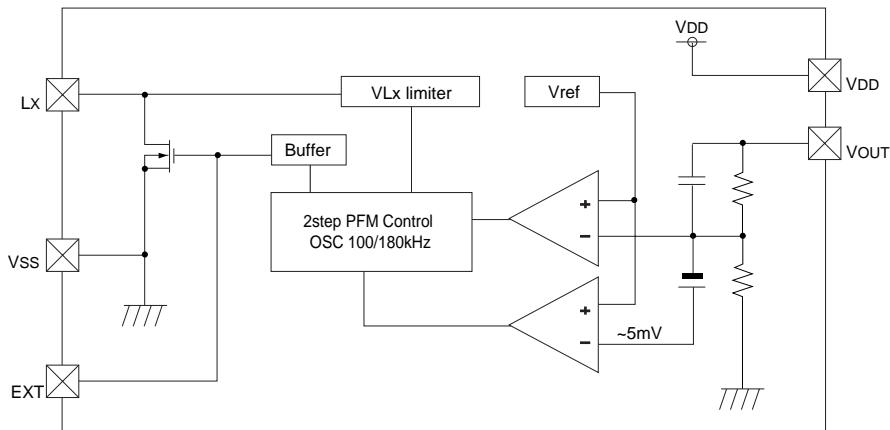
### Block Diagram

XC6383A~XC6383D (V<sub>DD</sub> is internally connected to the V<sub>OUT</sub> pin.)



Note: Built-in Tr types use the Lx pin, external Tr types use the EXT pin.  
The CE pin is only used with the XC6381C and XC6381D.

### XC6383E and XC6383F



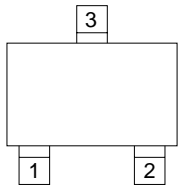
Note: The V<sub>DD</sub> pin is only used with the XC6383E and XC6383F.  
Built-in Tr types use the Lx pin, external Tr types use the EXT pin.

### Absolute Maximum Ratings

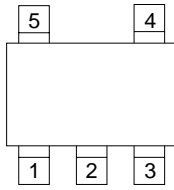
T<sub>a</sub>=25°C

PARAMETER	SYMBOL	RATINGS	UNITS
V <sub>OUT</sub> Input Voltage	V <sub>OUT</sub>	12	V
Lx pin Voltage	V <sub>Lx</sub>	12	V
Lx pin Current	I <sub>Lx</sub>	400	mA
EXT pin Voltage	V <sub>EXT</sub>	V <sub>SS</sub> -0.3 ~ V <sub>OUT</sub> +0.3	V
EXT pin Current	I <sub>EXT</sub>	±50	mA
CE Input Voltage	V <sub>CE</sub>	12	V
V <sub>DD</sub> Input Voltage	V <sub>DD</sub>	12	V
Continuous Total Power Dissipation	SOT-23	Pd	mW
	SOT-89		
Operating Ambient Temperature	T <sub>opr</sub>	-30 ~ +80	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +125	°C

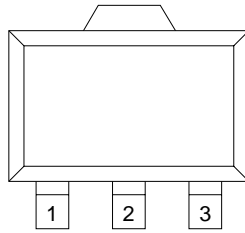
## Pin Configuration



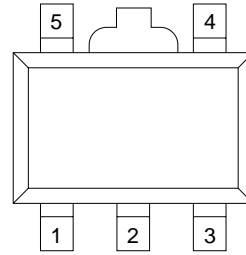
SOT-23  
(TOP VIEW)



SOT-25  
(TOP VIEW)



SOT-89  
(TOP VIEW)



SOT-89-5  
(TOP VIEW)

## Pin Assignment

(XC6383A, XC6383B)

PIN NUMBER				PIN NAME	FUNCTION
XC6383A		XC6383B			
SOT-23	SOT-89-3	SOT-23	SOT-89-3		
1	1	1	1	V <sub>SS</sub>	Ground
3	2	3	2	V <sub>OUT</sub>	Output voltage monitor, IC internal power supply
2	3	--	--	Lx	Switch
--	--	2	3	EXT	External switch transistor drive

(XC6383C, XC6383D)

PIN NUMBER				PIN NAME	FUNCTION
XC6383C		XC6383D			
SOT-25	SOT-89-5	SOT-25	SOT-89-5		
4	5	4	5	V <sub>SS</sub>	Ground
2	2	2	2	V <sub>OUT</sub>	Output voltage monitor, IC internal power supply
5	4	--	--	Lx	Switch
--	--	5	4	EXT	External switch transistor drive
1	3	1	3	CE	Chip enable
3	1	3	1	NC	No Connection

(XC6383E, XC6383F)

PIN NUMBER				PIN NAME	FUNCTION
XC6383E		XC6383F			
SOT-25	SOT-89-5	SOT-25	SOT-89-5		
4	5	4	5	V <sub>SS</sub>	Ground
2	2	2	2	V <sub>DD</sub>	IC internal power supply
5	4	--	--	Lx	Switch
--	--	5	4	EXT	External switch transistor drive
1	3	1	3	V <sub>OUT</sub>	Output voltage monitor
3	1	3	1	NC	No Connection

### Electrical Characteristics

XC6383A201MR  $V_{OUT}=2.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	1.950	2.000	2.050	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		4.3	8.6	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		13.6	27.3	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		1.9	3.9	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$ .		9.1	13.7	$\Omega$
Lx Leakage Current	$I_{LXL}$	No external components. $V_{OUT}=V_{LX}=0.4V$ .			1.0	$\mu A$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc1} \times 2$	0.7		1.1	V
Efficiency	EFFI	L, SD, $C_L$ etc. connected		70		%

Measuring conditions: Unless otherwise specified,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=10mA$ . See Typical Application Circuits, Fig.1.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ( $I_R$ ) < 1.0 $\mu A$  at reverse voltage ( $V_R$ )=10.0V

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

XC6383A301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	2.925	3.000	3.075	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		4.6	9.3	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		19.7	39.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5$		2.1	4.2	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$ .		5.2	7.9	$\Omega$
Lx Leakage Current	$I_{LXL}$	No external components. $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of Lxg waveform.	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty	153	180	207	kHz
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc1} \times 2$	0.7		1.1	V
Efficiency	EFFI	L, SD, $C_L$ etc. connected		80		%

Measuring conditions: Unless otherwise specified,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=30mA$ . See Typical Application Circuits, Fig.1.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ( $I_R$ ) < 1.0 $\mu A$  at reverse voltage ( $V_R$ )=10.0V

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

## Electrical Characteristics

XC6383A501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	4.875	5.000	5.125	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		5.3	10.6	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		31.7	63.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.4	4.8	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$ .		2.8	4.3	$\Omega$
Lx Leakage Current	$I_{LXL}$	No external components. $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of Lx on-time	50	55	60	%
Maximum Oscillation Frequency1	MAX $F_{osc1}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX $F_{osc2}$	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc1} \times 2$	0.7		1.1	V
Efficiency	EFFI	L, SD, $C_L$ etc. connected		85		%

Measuring conditions: Unless otherwise specified,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=50mA$ . See Typical Application Circuits, Fig.1.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current (IR) < 1.0 $\mu A$  at reverse voltage (VR)=10.0V

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

XC6383B201MR  $V_{OUT}=2.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, $C_L$ , Tr., etc. connected	1.950	2.000	2.050	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note 1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		13.6	27.3	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		1.9	3.9	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		140	210	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=0.4V$ .		140	210	$\Omega$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of EXT on-time.	50	55	60	%
Maximum Oscillation Frequency1	MAX $F_{osc1}$	Same as $I_{DD1}$ . 75% duty	85	100	115	kHz
Maximum Oscillation Frequency2	MAX $F_{osc2}$	Same as $I_{DD1}$ . 55% duty	153	180	207	kHz
Efficiency	EFFI	L, SD, $C_L$ , Tr., etc. connected		70		%

Measuring conditions: Unless otherwise specified,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=10mA$ . See Typical Application Circuits, Fig.2.

Note: 1. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption.

### Electrical Characteristics

XC6383B301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL, Tr., etc. connected	2.925	3.000	3.075	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note 1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		19.7	39.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.1	4.2	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		76	114	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=0.4V$ .		76	114	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of EXT on-time.	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Efficiency	EFFI	L, SD, CL, Tr., etc. connected		80		%

Measuring conditions: Unless otherwise specified,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=30mA$ . See Typical Application Circuits, Fig.2.

Note: 1. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption.

XC6383B501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL, Tr., etc. connected	4.875	5.000	5.125	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note 1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		31.7	63.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.4	4.8	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		50	75	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=0.4V$ .		50	75	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of EXT on-time.	55	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Efficiency	EFFI	L, SD, CL, Tr., etc. connected		85		%

Measuring conditions: Unless otherwise specified,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=50mA$ . See Typical Application Circuits, Fig.2.

Note: 1. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption.

## Electrical Characteristics

XC6383C201MR  $V_{OUT}=2.0V$

$T_a=25^{\circ}C$

Output Voltage	$V_{OUT}$	L, SD, CL etc. connected	1.950	2.000	2.050	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		4.3	8.6	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		13.6	27.3	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		1.9	3.9	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{Lx}=0.4V$ .		9.1	13.7	$\Omega$
Lx Leakage Current	$I_{LxL}$	No external components. $V_{OUT}=V_{Lx}=10V$ .			1.0	$\mu A$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of Lx on-time.	50	55	60	%
Maximum Oscillation Frequency1	$MAX F_{osc1}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	$MAX F_{osc2}$	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .			0.5	$\mu A$
CE "High" Voltage	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75			V
CE "Low" Voltage	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation.			0.20	V
CE "High" Current	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT} \times 0.95$			0.25	$\mu A$
CE "Low" Current	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$ .			-0.25	$\mu A$
Lx Limit Voltage	$V_{LxLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc1} \times 2$	0.7		1.1	V
Efficiency	$EFFI$	L, SD, CL etc. connected		70		%

Measuring conditions: Unless otherwise specified, connect CE to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=10mA$ . See Typical Application Circuits, Fig.3.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ( $I_R$ ) <  $1.0\mu A$  at reverse voltage ( $V_R$ )=10.0V

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

### Electrical Characteristics

XC6383C301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, $C_L$ etc. connected	2.925	3.000	3.075	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		4.6	9.3	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		19.7	39.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.1	4.2	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$ .		5.2	7.9	$\Omega$
Lx Leakage Current	$I_{LXL}$	No external components. $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of Lx on-time.	50	55	60	%
Maximum Oscillation Frequency1	$MAX\ F_{osc1}$	Same as $I_{DD1}$ . 75% duty	85	100	115	kHz
Maximum Oscillation Frequency2	$MAX\ F_{osc2}$	Same as $I_{DD1}$ . 55% duty	153	180	207	kHz
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .			0.5	$\mu A$
CE "High" Voltage	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75			V
CE "Low" Voltage	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation.			0.20	V
CE "High" Current	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT} \times 0.95$ .			0.25	$\mu A$
CE "Low" Current	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$ .			-0.25	$\mu A$
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc1} \times 2$	0.7		1.1	V
Efficiency	$EFFI$	L, SD, $C_L$ etc. connected		80		%

Measuring conditions: Unless otherwise specified, connect CE to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=30mA$ . See Typical Application Circuits, Fig.3.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ( $I_R$ ) < 1.0 $\mu A$  at reverse voltage ( $V_R$ )=10.0V

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".



## Electrical Characteristics

XC6383C501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL etc. connected	4.875	5.000	5.125	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		5.3	10.6	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		31.7	63.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.4	4.8	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$ .		2.8	4.3	$\Omega$
Lx Leakage Current	$I_{LXL}$	No external components. $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of Lx on-time.	50	55	60	%
Maximum Oscillation Frequency1	$MAX\ F_{osc1}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	$MAX\ F_{osc2}$	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .			0.5	$\mu A$
CE "High" Voltage	$V_{CEH}$	Same as $I_{DD1}$ . Existence of Lx Oscillation.	0.75			V
CE "Low" Voltage	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of Lx Oscillation.			0.20	V
CE "High" Current	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT} \times 0.95$ .			0.25	$\mu A$
CE "Low" Current	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$ .			-0.25	$\mu A$
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc1} \times 2$	0.7		1.1	V
Efficiency	$EFFI$	L, SD, CL etc. connected		85		%

Measuring conditions: Unless otherwise specified, connect CE to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=50mA$ . See Typical Application Circuits, Fig.3.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ( $I_R$ ) <  $1.0\mu A$  at reverse voltage ( $V_R$ )=10.0V

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

### Electrical Characteristics

XC6383D201MR  $V_{OUT}=2.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL, Tr., etc. connected	1.950	2.000	2.050	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		13.6	27.3	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		1.9	3.9	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		140	210	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=4.0V$ .		140	210	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of EXT on-time	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .			0.5	$\mu A$
CE "High" Voltage	$V_{CEH}$	Same as $I_{DD1}$ . Existence of EXT Oscillation.	0.75			V
CE "Low" Voltage	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of EXT Oscillation.			0.20	V
CE "High" Current	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT} \times 0.95$ .			0.25	$\mu A$
CE "Low" Current	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$ .			-0.25	$\mu A$
Efficiency	EFFI	L, SD, CL, Tr., etc. connected		70		%

Measuring conditions: Unless otherwise specified, connect CE to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=10mA$ . See Typical Application Circuits, Fig.4.  
 Note: 1."Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current (I<sub>IN</sub>)".

XC6383D301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL, Tr., etc. connected	2.925	3.000	3.075	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		19.7	39.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.1	4.2	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		76	114	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=4.0V$ .		76	114	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of EXT on-time	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .			0.5	$\mu A$
CE "High" Voltage	$V_{CEH}$	Same as $I_{DD1}$ . Existence of EXT Oscillation.	0.75			V
CE "Low" Voltage	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of EXT Oscillation.			0.20	V
CE "High" Current	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT} \times 0.95$ .			0.25	$\mu A$
CE "Low" Current	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$ .			-0.25	$\mu A$
Efficiency	EFFI	L, SD, CL, Tr., etc. connected		80		%

Measuring conditions: Unless otherwise specified, connect CE to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=30mA$ . See Typical Application Circuits, Fig.4.  
 Note: 1."Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current (I<sub>IN</sub>)".

## Electrical Characteristics

XC6383D501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL, Tr., etc. connected	4.875	5.000	5.125	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		31.7	63.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.4	4.8	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		50	75	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=4.0V$ .		50	75	$\Omega$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of EXT on-time	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .			0.5	$\mu A$
CE "High" Voltage	$V_{CEH}$	Same as $I_{DD1}$ . Existence of EXT Oscillation.	0.75			V
CE "Low" Voltage	$V_{CEL}$	Same as $I_{DD1}$ . Disappearance of EXT Oscillation.			0.20	V
CE "High" Current	$I_{CEH}$	Same as $I_{DD1}$ . $V_{CE}=V_{OUT} \times 0.95$ .			0.25	$\mu A$
CE "Low" Current	$I_{CEL}$	Same as $I_{DD1}$ . $V_{CE}=0V$ .			-0.25	$\mu A$
Efficiency	EFFI	L, SD, CL, Tr., etc. connected		85		%

Measuring conditions: Unless otherwise specified, connect CE to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=50mA$ . See Typical Application Circuits, Fig.4.  
Note: 1. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

XC6383E201MR  $V_{OUT}=2.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL etc. connected	1.950	2.000	2.050	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$ .		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$ .	0.70			V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.3	8.6	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		13.6	27.3	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		1.9	3.9	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$ .		9.1	13.7	$\Omega$
Lx Leakage Current	$I_{LXL}$	No external components. $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Duty Ratio 1	DTY1	Same as $I_{DD1}$ Measuring of Lx waveform.	70	75	80	%
Duty Ratio 2	DTY2	$I_{OUT}=1mA$ . Measuring of Lx on-time	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc} \times 2$	0.7		1.1	V
Efficiency	EFFI	L, SD, CL etc. connected		70		%

Measuring conditions: Unless otherwise specified, connect  $V_{DD}$  to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=10mA$ . See Typical Application Circuits, Fig.5.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ( $I_R$ ) < 1.0 $\mu A$  at reverse voltage ( $V_R$ )=10.0V.

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

※When the  $V_{DD}$  and  $V_{OUT}$  pins are independently used, the voltage range at the  $V_{DD}$  pin should be 2.2V to 10V. The IC operates from  $V_{DD}=0.8V$ . However, output voltage and oscillator frequency are properly stabilized when  $V_{DD}=2.2V$  or higher.

### Electrical Characteristics

XC6383E301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL etc. connected	2.925	3.000	3.075	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$ .		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$ .	0.70			V
No-Load Input Current	$V_{IN}$	$I_{OUT}=0mA$ (Note 1)		4.6	9.3	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		19.7	39.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.1	4.2	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$ .		5.2	7.9	$\Omega$
Lx Leakage Current	$I_{LxL}$	No external components. $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ Measuring of Lx waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of Lx on-time	50	55	60	%
Maximum Oscillation Frequency1	$MAX F_{osc1}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	$MAX F_{osc2}$	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Lx Limit Voltage	$V_{LxLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc} \times 2$	0.7		1.1	V
Efficiency	$EFFI$	L, SD, CL etc. connected		80		%

Measuring conditions: Unless otherwise specified, connect  $V_{DD}$  to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=30mA$ . See Typical Application Circuits, Fig.5.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ( $I_R$ ) < 1.0 $\mu A$  at reverse voltage ( $V_R$ )=10.0V.

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

※When the  $V_{DD}$  and  $V_{OUT}$  pins are independently used, the voltage range at the  $V_{DD}$  pin should be 2.2V to 10V. The IC operates from  $V_{DD}=0.8V$ . However, output voltage and oscillator frequency are properly stabilized when  $V_{DD}=2.2V$  or higher.

XC6383E501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL etc. connected	4.875	5.000	5.125	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$ .		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$ .	0.70			V
No-Load Input Current	$I_{IN}$	$I_{OUT}=0mA$ (Note 1)		5.3	10.6	$\mu A$
Supply Current 1(Note2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		31.7	63.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.4	4.8	$\mu A$
Lx Switch-On Resistance	$R_{SWON}$	Same as $I_{DD1}$ . $V_{LX}=0.4V$ .		2.8	4.3	$\Omega$
Lx Leakage Current	$I_{LxL}$	No external components. $V_{OUT}=V_{LX}=10V$ .			1.0	$\mu A$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ Measuring of Lx waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of Lx on-time	50	55	60	%
Maximum Oscillation Frequency1	$MAX F_{osc1}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	$MAX F_{osc2}$	Same as $I_{DD1}$ . 55% duty.	153		207	kHz
Lx Limit Voltage	$V_{LxLMT}$	Same as $I_{DD1}$ . $F_{osc}>MAXF_{osc} \times 2$	0.7		1.1	V
Efficiency	$EFFI$	L, SD, CL etc. connected		85		%

Measuring conditions: Unless otherwise specified, connect  $V_{DD}$  to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=50mA$ . See Typical Application Circuits, Fig.5.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ( $I_R$ ) < 1.0 $\mu A$  at reverse voltage ( $V_R$ )=10.0V.

2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption. The current actually provided by an external  $V_{IN}$  source is represented by "No-Load Input Current ( $I_{IN}$ )".

※When the  $V_{DD}$  and  $V_{OUT}$  pins are independently used, the voltage range at the  $V_{DD}$  pin should be 2.2V to 10V. The IC operates from  $V_{DD}=0.8V$ . However, output voltage and oscillator frequency are properly stabilized when  $V_{DD}=2.2V$  or higher.

## Electrical Characteristics

XC6383F201MR  $V_{OUT}=2.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL, Tr., etc. connected	1.950	2.000	2.050	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		13.6	27.3	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		1.9	3.9	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		140	210	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=0.4V$ .		140	210	$\Omega$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of EXT on-time.	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Efficiency	EFFI	L, SD, CL, Tr., etc. connected		70		%

Measuring conditions: Unless otherwise specified, connect  $V_{DD}$  to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=10mA$ . See Typical Application Circuits, Fig.6.

Note: 1. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption.

※When the  $V_{DD}$  and  $V_{OUT}$  pins are independently used, the voltage range at the  $V_{DD}$  pin should be 2.2V to 10V. The IC operates from  $V_{DD}=0.8V$ . However, output voltage and oscillator frequency are properly stabilized when  $V_{DD}=2.2V$  or higher.

XC6383F301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL, Tr., etc. connected	2.925	3.000	3.075	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		19.7	39.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.1	4.2	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		76	114	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=0.4V$ .		76	114	$\Omega$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of EXT on-time.	50	55	60	%
Maximum Oscillation Frequency1	MAX Fosc1	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	MAX Fosc2	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Efficiency	EFFI	L, SD, CL, Tr., etc. connected		80		%

Measuring conditions: Unless otherwise specified, connect  $V_{DD}$  to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=30mA$ . See Typical Application Circuits, Fig.6.

Note: 1. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption.

※When the  $V_{DD}$  and  $V_{OUT}$  pins are independently used, the voltage range at the  $V_{DD}$  pin should be 2.2V to 10V. The IC operates from  $V_{DD}=0.8V$ . However, output voltage and oscillator frequency are properly stabilized when  $V_{DD}=2.2V$  or higher.

### Electrical Characteristics

XC6383F501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

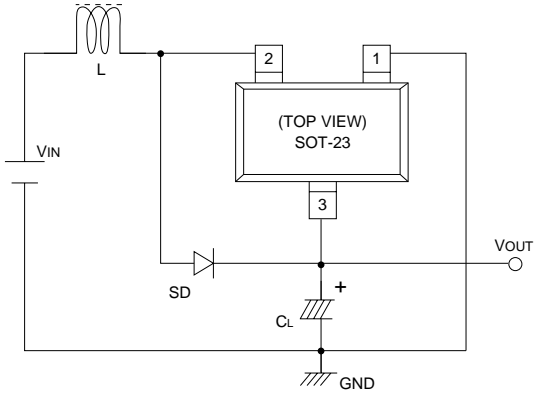
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	L, SD, CL, Tr., etc. connected	4.875	5.000	5.125	V
Maximum Input Voltage	$V_{IN}$		10			V
Oscillation Start-up Voltage	$V_{ST}$	$I_{OUT}=1mA$		0.80	0.90	V
Oscillation Hold Voltage	$V_{HLD}$	$I_{OUT}=1mA$	0.70			V
Supply Current 1(Note1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		31.7	63.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5V$		2.4	4.9	$\mu A$
EXT "High" On Resistance	$R_{EXTH}$	Same as $I_{DD1}$ . $V_{EXT}=V_{OUT}-0.4V$ .		50	75	$\Omega$
EXT "Low" On Resistance	$R_{EXTL}$	Same as $I_{DD1}$ . $V_{EXT}=0.4V$ .		50	75	$\Omega$
Duty Ratio 1	$DTY1$	Same as $I_{DD1}$ Measuring of EXT waveform.	70	75	80	%
Duty Ratio 2	$DTY2$	$I_{OUT}=1mA$ . Measuring of EXT on-time.	50	55	60	%
Maximum Oscillation Frequency1	$MAX F_{OSC1}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Maximum Oscillation Frequency2	$MAX F_{OSC2}$	Same as $I_{DD1}$ . 55% duty.	153	180	207	kHz
Efficiency	$EFFI$	L, SD, CL, Tr., etc. connected		85		%

Measuring conditions: Unless otherwise specified, connect  $V_{DD}$  to  $V_{OUT}$ ,  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=50mA$ . See Typical Application Circuits, Fig.6.

Note: 1. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average power consumption.

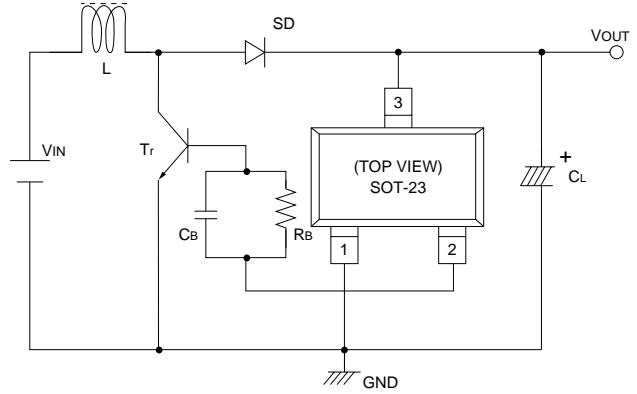
※When the  $V_{DD}$  and  $V_{OUT}$  pins are independently used, the voltage range at the  $V_{DD}$  pin should be 2.2V to 10V. The IC operates from  $V_{DD}=0.8V$ . However, output voltage and oscillator frequency are properly stabilized when  $V_{DD}=2.2V$  or higher.

## Typical Application Circuits



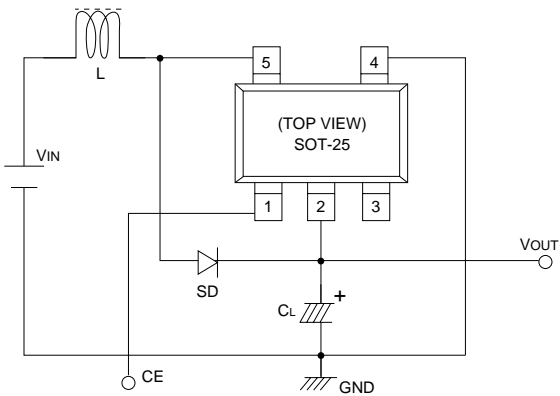
L: 100 $\mu$ H (SUMIDA, CD-54)  
 SD: MA735 (Schottky diode; MATSUSHITA)  
 CL: 16V 47 $\mu$ F (Tantalum capacitor, NICHICON, F93)

Fig.1 XC6383A Application



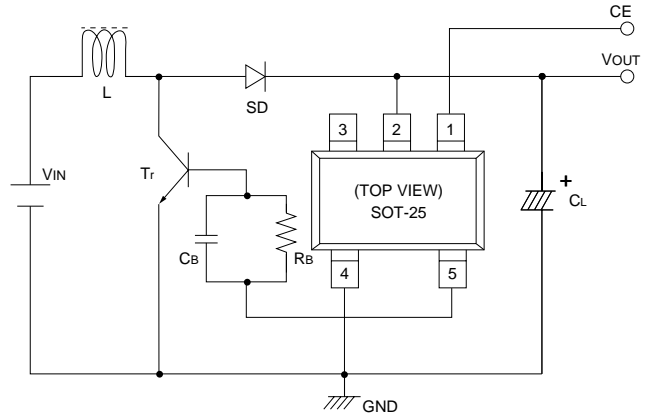
L: 47 $\mu$ H (SUMIDA, CD-54)  
 SD: MA735 (Schottky diode; MATSUSHITA)  
 CL: 16V 47 $\mu$ F (Tantalum capacitor, NICHICON, F93)  
 RB: 1k $\Omega$ , CB: 3300pF  
 Tr: 2SC3279, 2SD1628G

Fig.2 XC6383B Application



L: 100 $\mu$ H (SUMIDA, CD-54)  
 SD: MA735 (Schottky diode; MATSUSHITA)  
 CL: 16V 47 $\mu$ F (Tantalum capacitor, NICHICON, F93)

Fig.3 XC6383C Application

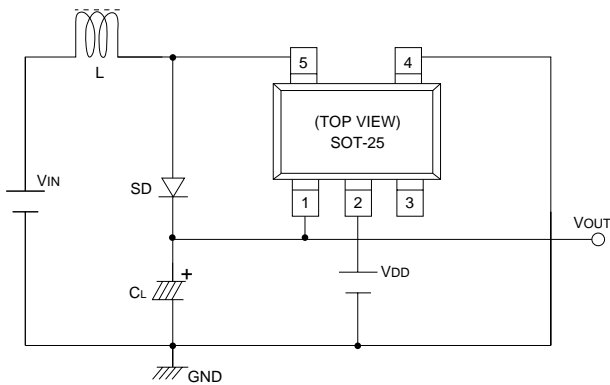


L: 47 $\mu$ H (SUMIDA, CD-54)  
 SD: MA735 (Schottky diode; MATSUSHITA)  
 CL: 16V 47 $\mu$ F (Tantalum capacitor, NICHICON, F93)  
 RB: 1k $\Omega$ , CB: 3300pF  
 Tr: 2SC3279, 2SD1628G

Fig.4 XC6383D Application

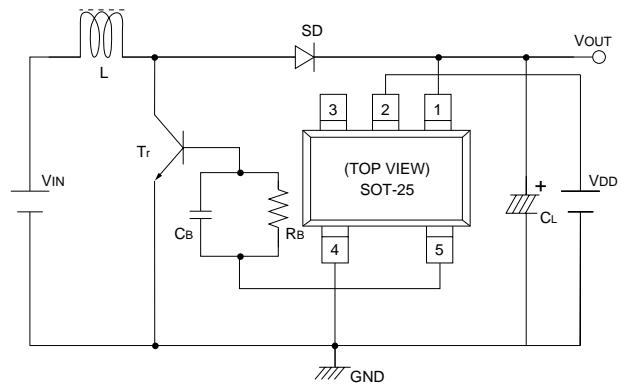
### Typical Application Circuits

3



- L: 100 $\mu$ H (SUMIDA, CD-54)
- SD: MA735 (Schottky diode; MATSUSHITA)
- CL: 16V 47 $\mu$ F (Tantalum capacitor, NICHICON, F93)

Fig.5 XC6383E Application



- L: 47 $\mu$ H (SUMIDA, CD-54)
- SD: MA735 (Schottky diode; MATSUSHITA)
- CL: 16V 47 $\mu$ F (Tantalum capacitor, NICHICON, F93)
- RB: 1k $\Omega$ , CB: 3300pF
- Tr: 2SC3279, 2SD1628G

Fig.6 XC6383F Application

(Step-Down circuit.....built-in switching transistor type)

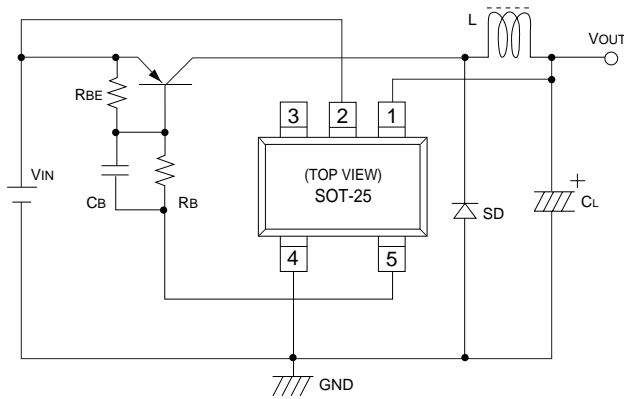


Fig.7 XC6383E Application

(High Output Voltage circuit.....external switching transistor type)

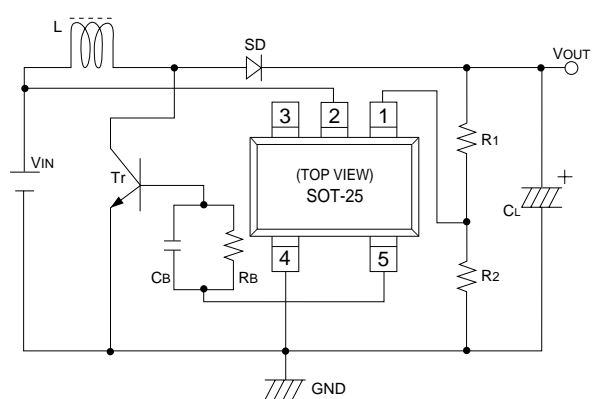


Fig.8 XC6383F Application



## ■ Typical Application Circuits

(Polarity Reverse circuit.....built-in switching transistor type)

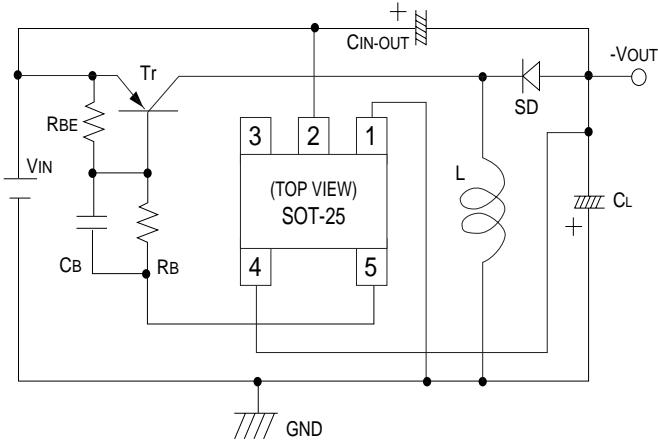


Fig.9 XC6383E Application

Note: It is recommended that the max. input voltage between the  $V_{DD}$  and  $V_{SS}$  pins should not exceed 10V.

(Low Output Voltage step-up circuit..... external switching transistor type)

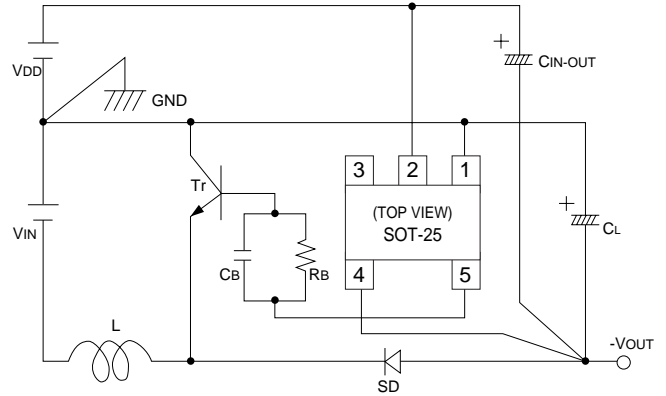


Fig.10 XC6383F Application

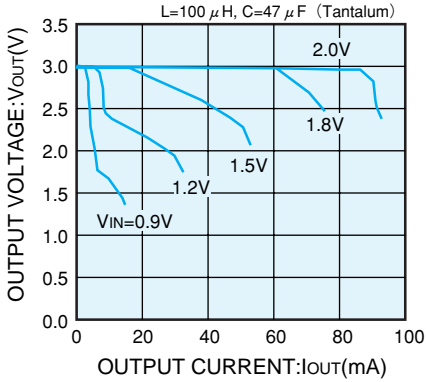
Note: It is recommended that the max. input voltage between the  $V_{DD}$  and  $V_{SS}$  pins should not exceed 10V.

※Also applicable to the XC6381 and XC6382 series.

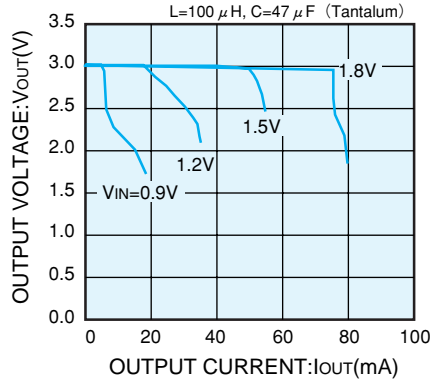
## XC638xA (Built-in Switching Transistor)

### (1) OUTPUT VOLTAGE vs. OUTPUT CURRENT

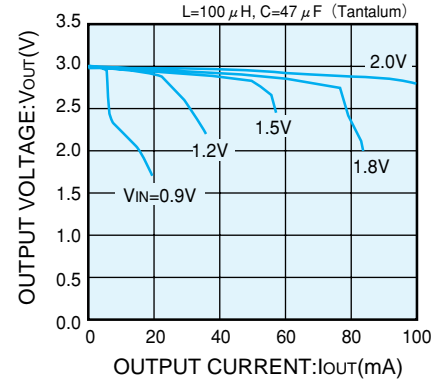
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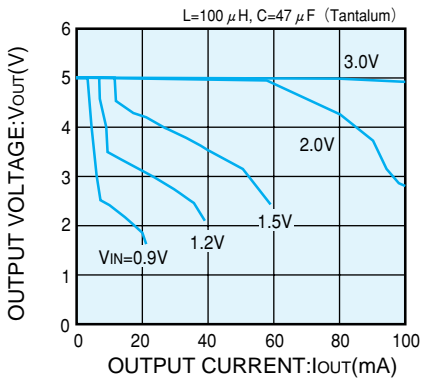
XC6382A301



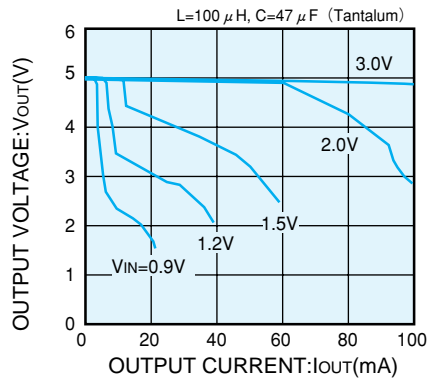
XC6383A301



XC6382A501

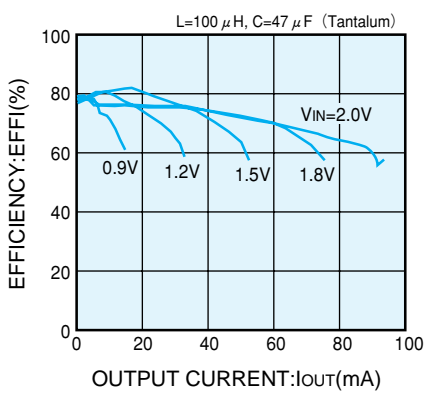


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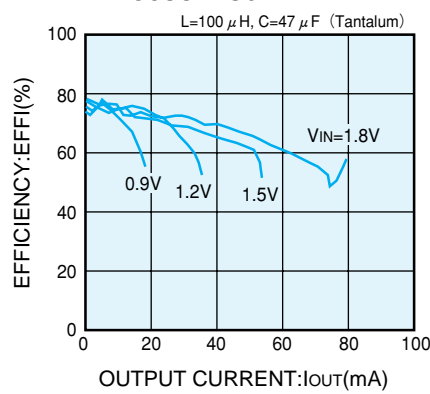


### (2) EFFICIENCY vs. OUTPUT CURRENT

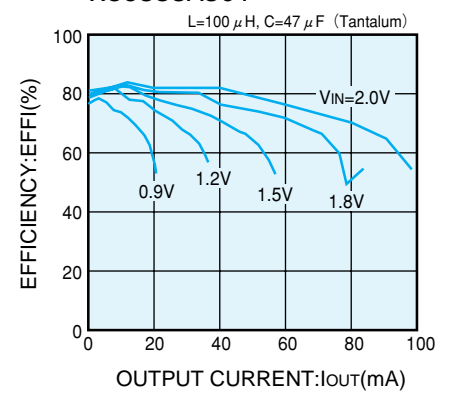
XC6381A301



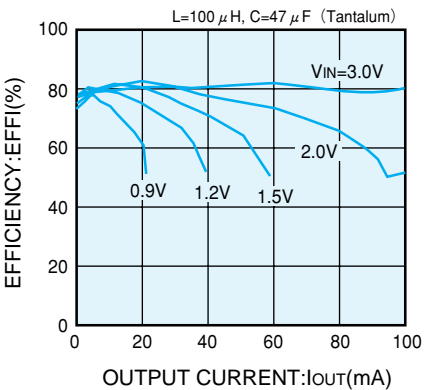
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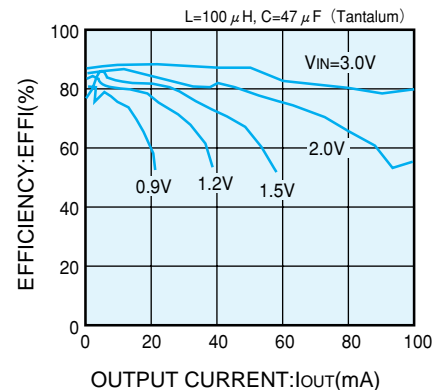
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XC6382A501

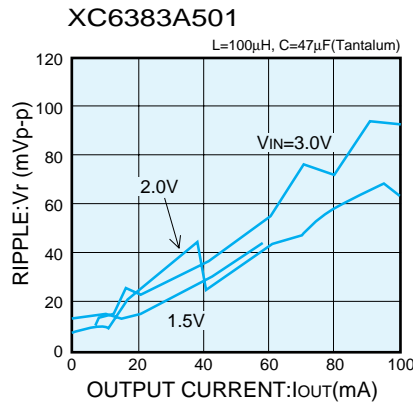
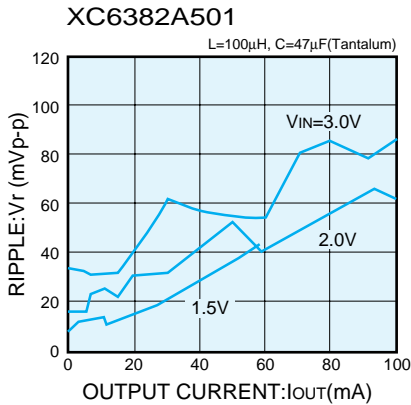
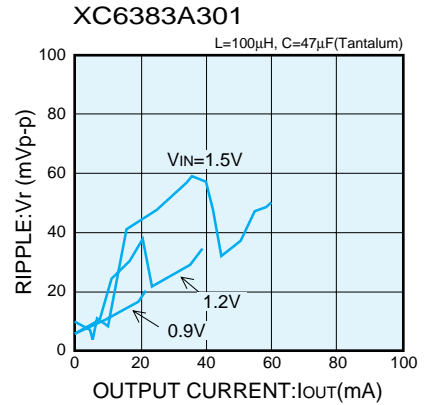
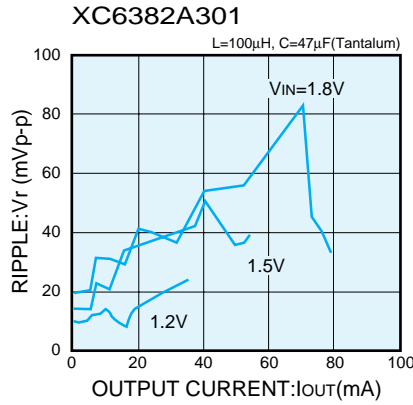
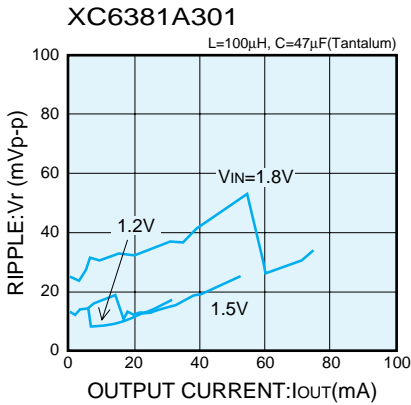


XC6383A501



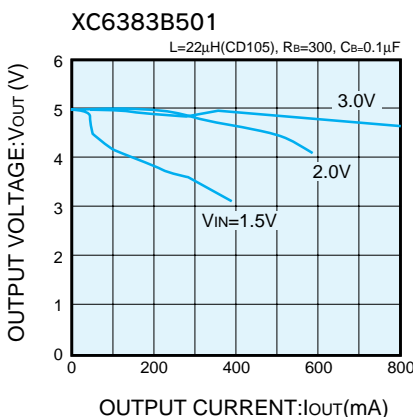
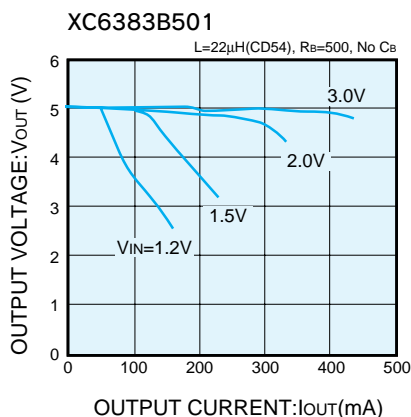
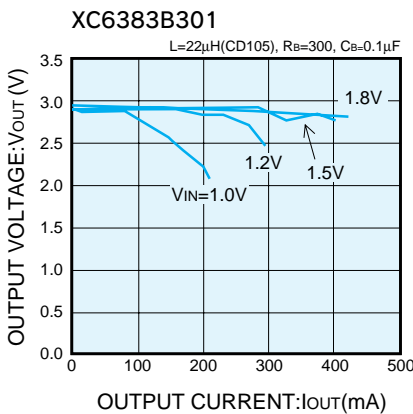
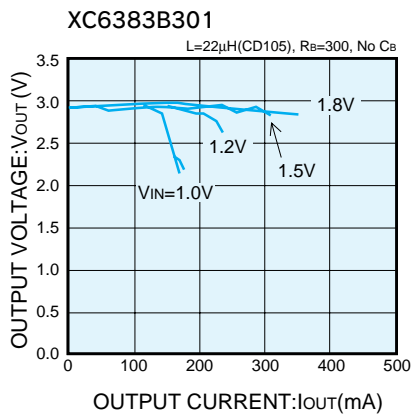
### XC638xA (Built-in Switching Transistor)

#### (3) RIPPLE VOLTAGE vs. OUTPUT CURRENT



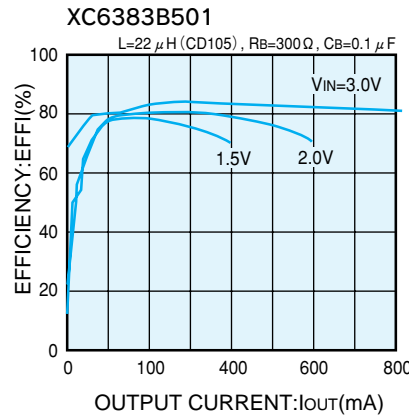
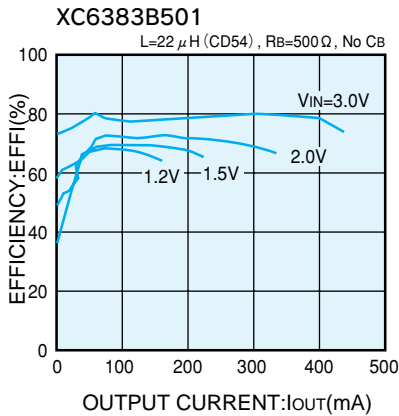
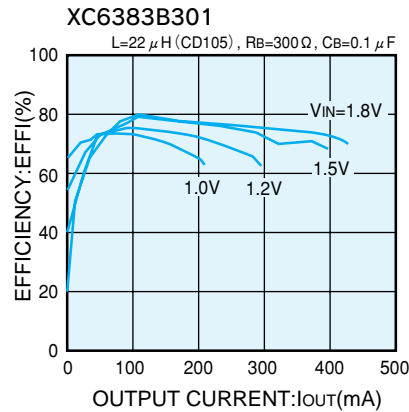
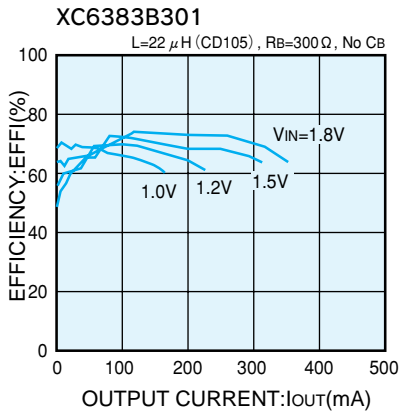
### XC638xB (External Switching Transistor)

#### (1) TYPICAL OUTPUT VOLTAGE vs. OUTPUT CURRENT

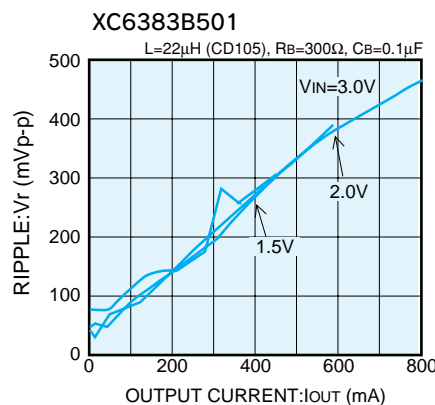
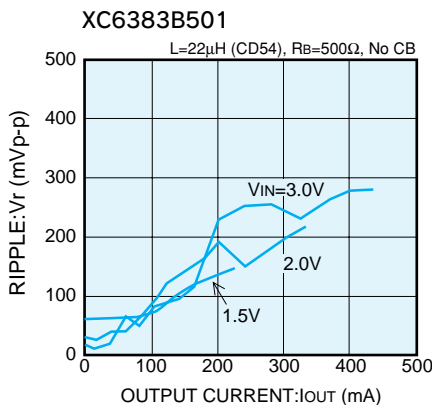
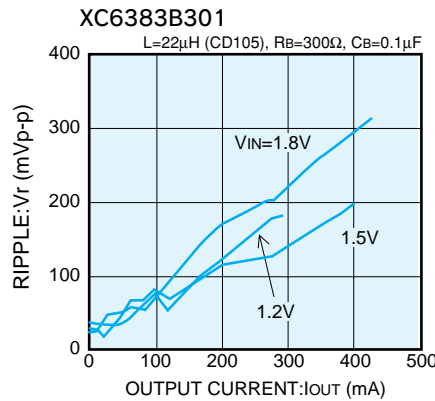
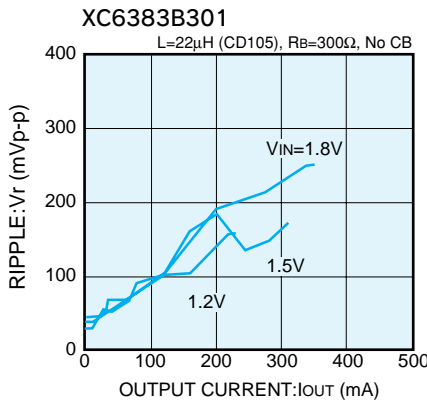


### XC638xB (External Switching Transistor)

#### (2) EFFICIENCY vs. OUTPUT CURRENT



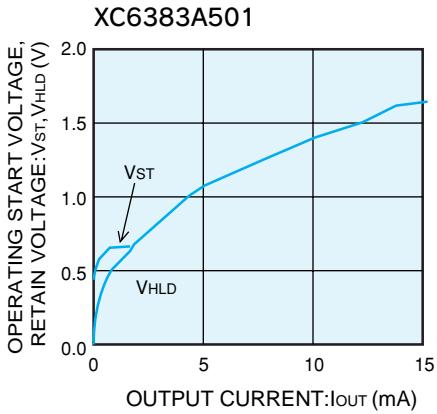
#### (3) RIPPLE VOLTAGE vs. OUTPUT CURRENT



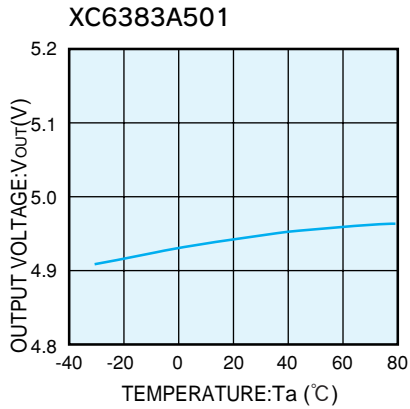
3

## XC6383A501 Characteristics

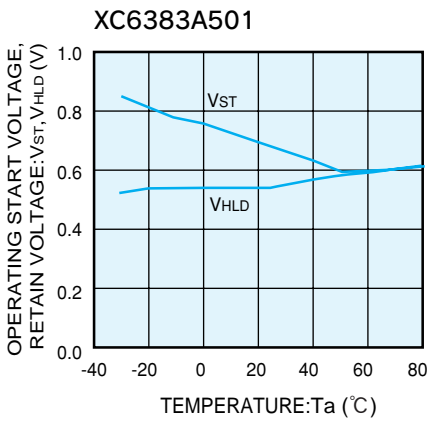
(1) OPERATING START VOLTAGE, RETAIN VOLTAGE vs. OUTPUT CURRENT



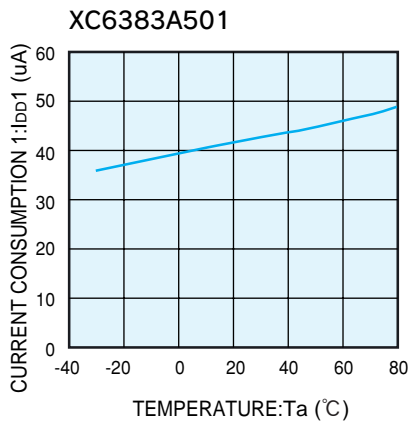
(2) OUTPUT VOLTAGE vs. TEMPERATURE



(3) OPERATING START VOLTAGE, RETAIN VOLTAGE vs. TEMPERATURE

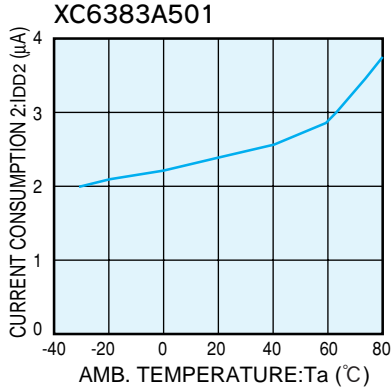


(4) CURRENT CONSUMPTION 1 vs. TEMPERATURE

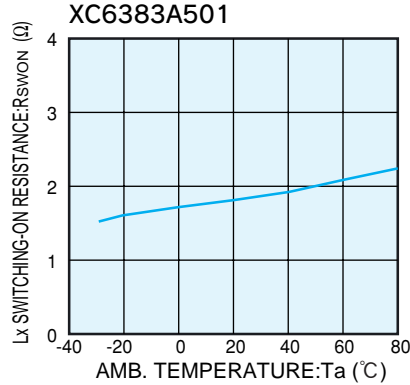


## XC6383A501 Characteristics

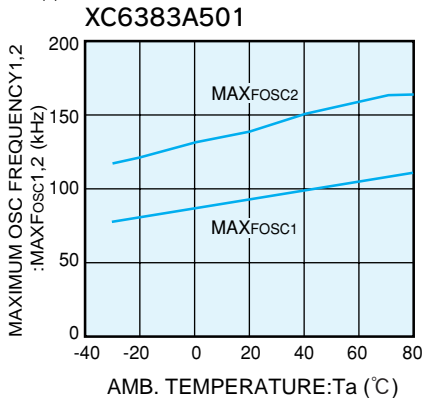
(5) CURRENT CONSUMPTION 2 vs. TEMPERATURE



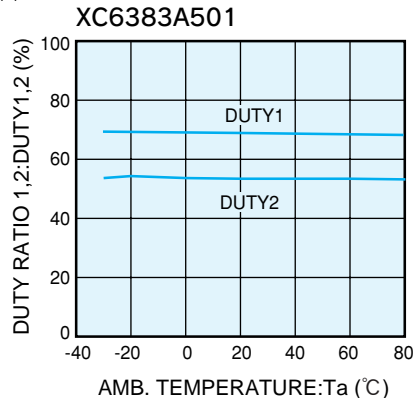
(6) Lx SWITCHING-ON RESISTANCE vs. TEMPERATURE



(7) MAX. OSC FREQUENCY 1,2 vs. AMB. TEMPERATURE



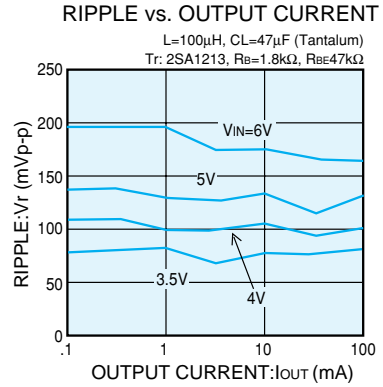
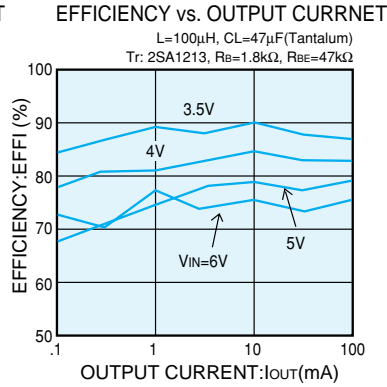
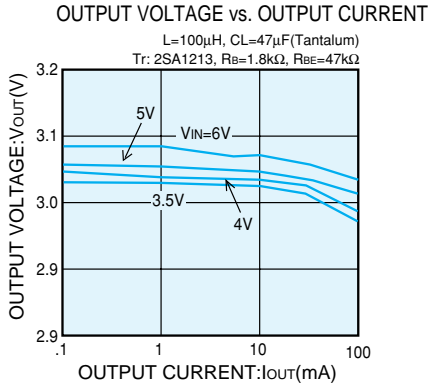
(8) DUTY RATIO 1,2 vs. AMB. TEMPERATURE



3

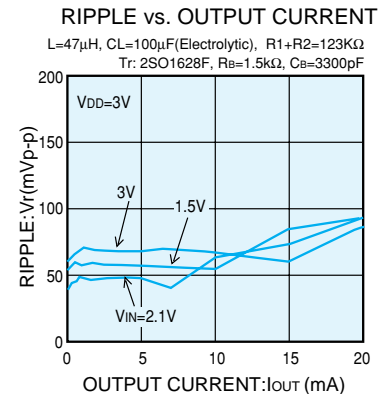
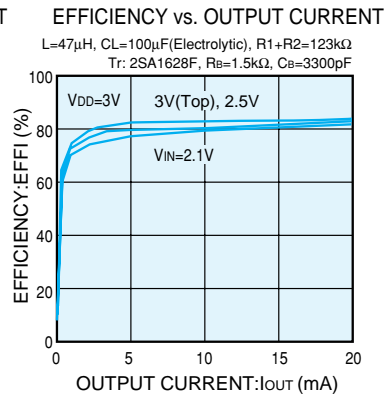
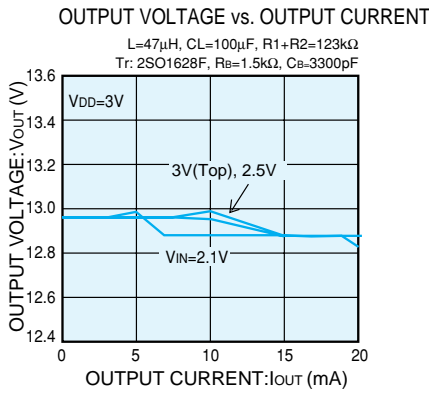
### ■ HIGH VOLTAGE OUTPUT CIRCUIT MEASUREMENT (XC6383F APPLICATIONS)

XC6383E301



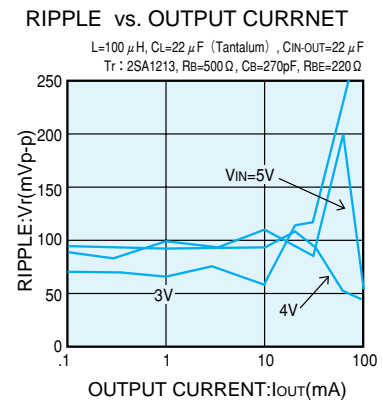
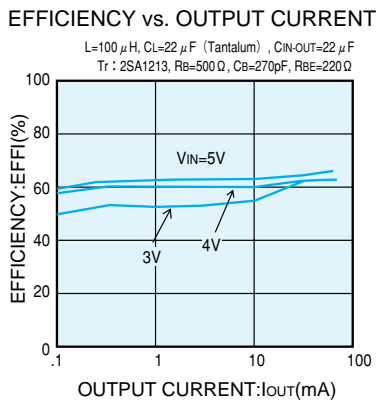
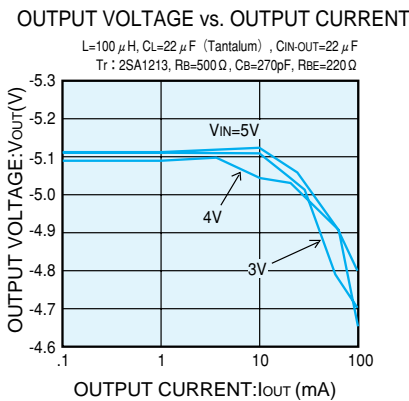
### ■ HIGH VOLTAGE OUTPUT CIRCUIT MEASUREMENT (XC6383F APPLICATIONS)

XC6383F501



### ■ POLARITY REVERSE CIRCUIT MEASUREMENT (XC6383E APPLICATIONS)

XC6383E501



### ■ NEGATIVE VOLTAGE STEP-UP CIRCUIT CHARACTERISTICS (XC6383F APPLICATIONS)

XC6383F501

