

# XC6382

## Series



PFM Controlled, Step - Up DC/DC Converters (Duty Ratio 75%)

- ◆Duty 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 XC6382 series is a group of PFM controlled step-up DC/DC converters.

The XC6382 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 (separating 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 ( $\pm 15\%$ )

**Duty ratio**

: 75% ( $\pm 5\%$ )

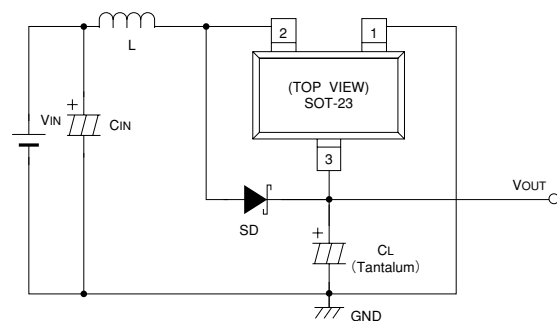
**Both switching transistor built-in and external types are available.**

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

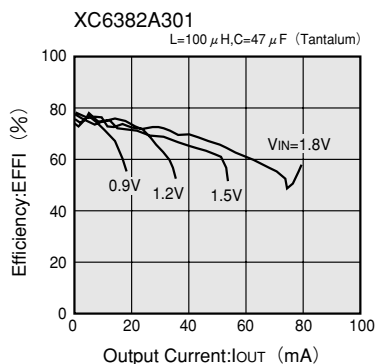
**Small package**

: SOT-23, 25 mini-mold (3-pin, 5-pin)  
SOT-89, 89-5 mini-power mold  
(3-pin, 5-pin)

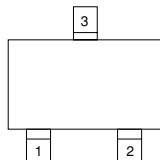
### Typical Application Circuit



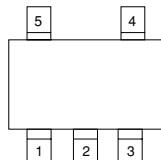
### Typical Performance Characteristic



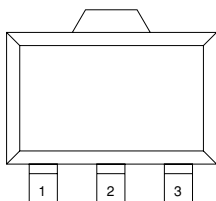
## Pin Configuration



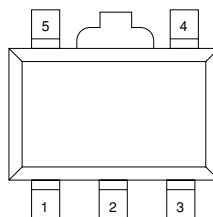
SOT-23  
(TOP VIEW)



SOT-25  
(TOP VIEW)



SOT-89  
(TOP VIEW)



SOT-89-5  
(TOP VIEW)

## Pin Assignment

(XC6382A, XC6382B)

PIN NUMBER				PIN NAME	FUNCTION
XC6382A		XC6382B			
SOT-23	SOT-89	SOT-23	SOT-89		
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	–	–	L <sub>x</sub>	Switch
–	–	2	3	EXT	External switch transistor drive

(XC6382C, XC6382D)

PIN NUMBER				PIN NAME	FUNCTION
XC6382C		XC6382D			
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>	Output voltage monitor, IC internal power supply
5	4	–	–	L <sub>x</sub>	Switch
–	–	5	4	EXT	External switch transistor drive
1	3	1	3	CE	Chip enable
3	1	3	1	NC	No connection

(XC6382E, XC6382F)

PIN NUMBER				PIN NAME	FUNCTION
XC6382E		XC6382F			
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	–	–	L <sub>x</sub>	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

## Product Classification

### Selection Guide

PART TYPE	DUTY RATIO	PACKAGE	SWITCHING RELATED	ADDITIONAL FUNCTION	FEATURES
XC6382A	75%	SOT-23, SOT-89	Built-in Transistor "Lx" lead	—	• Accommodates a duty ratio of 75%.
XC6382B	75%	SOT-23, SOT-89	External Transistor "EXT" lead	—	• Accommodates a duty ratio of 75%. • Adding an external transistor can improve the output capability by up to several hundred mA.
XC6382C	75%	SOT-25, SOT-89-5	Built-in Transistor "Lx" lead	Chip Enable(CE)	• Stand-by (CE) function added version to the XC6382A. • Stand-by current: 0.5μA max.
XC6382D	75%	SOT-25, SOT-89-5	External Transistor "EXT" lead	Chip Enable(CE)	• Stand-by (CE) function added version to the XC6382B. • Stand-by current: 0.5μA max.
XC6382E	75%	SOT-25, SOT-89-5	Built-in Transistor "Lx" lead	Separated "V <sub>DD</sub> " and "V <sub>OUT</sub> " leads	• Independent power supply and set-up voltage sensing leads allow designing of PFM controllers.
XC6382F	75%	SOT-25, SOT-89-5	External Transistor "EXT" lead	Separated "V <sub>DD</sub> " and "V <sub>OUT</sub> " leads	• Independent power supply and set-up voltage sensing leads allow designing of PFM controllers.

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### Ordering Information

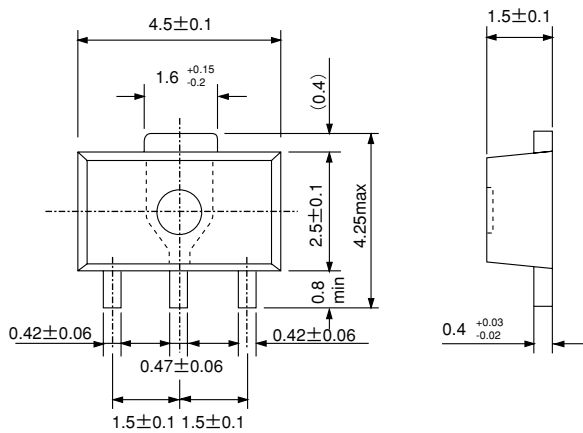
#### XC6382①②③④⑤⑥

XC6382 Series PFM Controlled Duty 75%

①	A	3-pin. Built-in switching transistor	
	B	3-pin. External switching transistor	
	C	Stand-by capability. (5-pin) Built-in switching transistor	
	D	Stand-by capability. (5-pin) External switching transistor	
	E	Separated V <sub>DD</sub> and V <sub>OUT</sub> . (5-pin) Built-in switching transistor	
	F	Separated V <sub>DD</sub> and V <sub>OUT</sub> . (5-pin) External switching transistor	
② ③	Output Voltage e.g. V <sub>OUT</sub> =3.5V → ②=3, ③=5		
④	1	Maximum Oscillator Frequency 100kHz	
⑤	M	Package	①=A~B SOT-23 ①=C~F SOT-25
	P	Package	①=A~B SOT-89 ①=C~F SOT-89-5
⑥	R	Embossed tape : Standard Feed	
	L	Embossed tape : Reverse Feed	

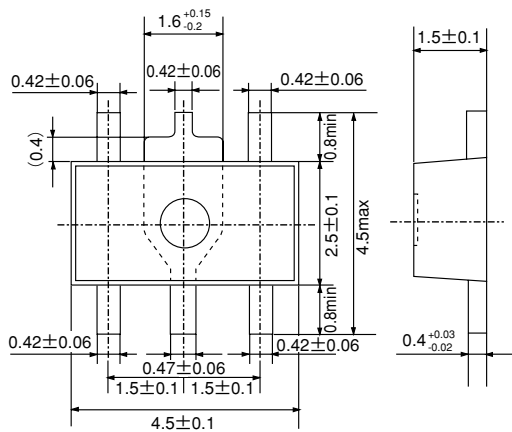


●SOT-89

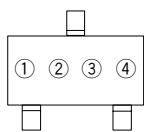


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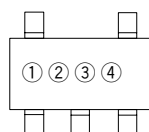
●SOT-89-5



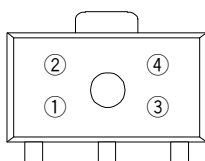
## Marking



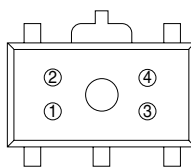
SOT-23  
(TOP VIEW)



SOT-25  
(TOP VIEW)



SOT-89  
(TOP VIEW)



SOT-89-5  
(TOP VIEW)

① Represents the Product Classification

DESIGNATOR	FUNCTION	PRODUCT NAME
$\bar{E}$	—	Built-in Transistor
$\bar{F}$	—	External Transistor
$\bar{L}$	CE	Built-in Transistor
$\bar{M}$	CE	External Transistor
$\bar{N}$	VDD/VIN	Built-in Transistor
$\bar{P}$	VDD/VIN	External Transistor

② Represents the integer of the Output Voltage and Oscillator Frequency

INTEGER OF THE OUTPUT VOLTAGE	OSCILLATOR FREQUENCY (kHz)
	100
1	1
2	2
3	3
4	4
5	5
6	6
7	7

③ Represents the decimal number of the Output Voltage and Oscillator Frequency

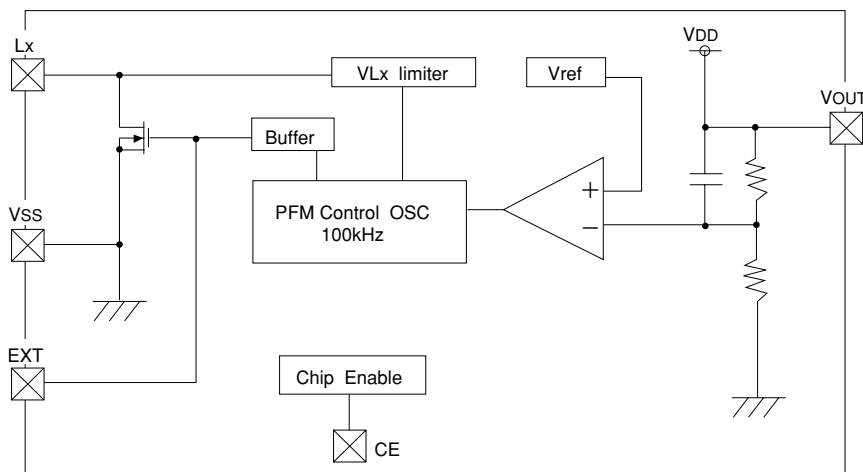
OUTPUT VOLTAGE	OSCILLATOR FREQUENCY (kHz)
	100
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

④ Denotes the production lot number

0 to 9, A to Z repeated(G.I.J.O.Q.W excepted)

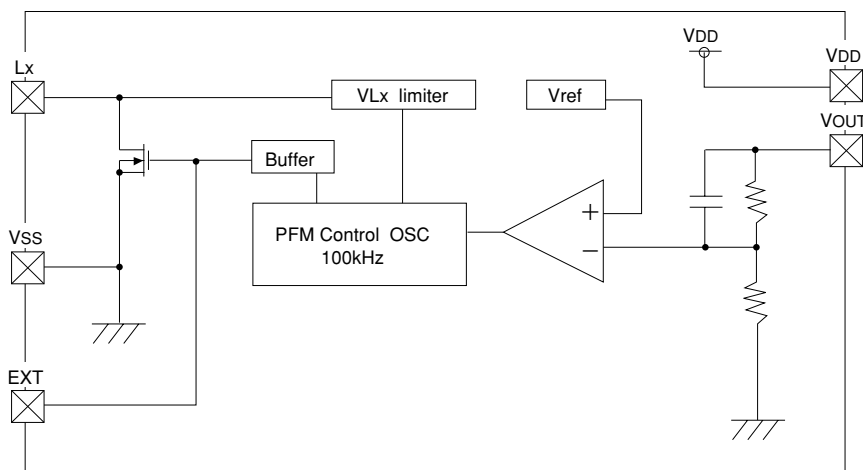
## ■ Block Diagram

- XC6382A~XC6382D (Vout pin serves as V<sub>DD</sub> also.)



Note: Built-in Tr types use the Lx pin, external Tr types use the EXT pin.  
The CE pin is only used with the XC6382C and XC6382D.

- XC6382E and XC6382F



Note: The VDD pin is only used with the XC6382E and XC6382F.  
Built-in Tr types use the Lx pin, external Tr types use the EXT pin.

## Absolute Maximum Ratings

Ta=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	150	mW
	SOT-89		500	
Operating Ambient Temperature		T <sub>opr</sub>	-30~+80	°C
Storage Temperature		T <sub>stg</sub>	-40~+125	°C

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## Electrical Characteristics

XC6382A301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

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	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		4.6	9.3	$\mu A$
Supply Current 1 (Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		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	DTY	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAX_{Fosc}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .				
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ , $F_{osc} > MAX_{Fosc} \times 2$	0.7		1.1	V
Efficiency	EFFI	L,SD,CL 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 ( $I_{IN}$ )".

XC6382A501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

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 (Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		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	DTY	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAX_{Fosc}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Stand-by Current	$I_{STB}$	Same as $I_{DD1}$ .				
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ , $F_{osc} > MAX_{Fosc} \times 2$	0.7		1.1	V
Efficiency	EFFI	L,SD,CL 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 ( $I_R$ )  $< 1.0\mu A$  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 ( $I_{IN}$ )".

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XC6382B301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

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
Supply Current 1 (Note 1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		19.7	39.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5$		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	$DTY$	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAXF_{OSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	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.

XC6382B501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

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
Supply Current 1 (Note 1)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		31.7	63.4	$\mu A$
Supply Current 2	$I_{DD2}$	$V_{IN}=V_{OUT}+0.5$		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	$DTY$	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAXF_{OSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	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.

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**XC6382C301MR**  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

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	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		4.6	9.3	$\mu A$
Supply Current 1 (Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		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	$DTY$	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAX_{FOSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	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 $I_{DD1}$ .	0.7		1.1	V
Efficiency	$EFFI$	L,SD,CL 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 ( $I_{IN}$ )".

**XC6382C501MR**  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

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 (Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		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	$DTY$	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAX_{FOSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	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 $I_{DD1}$ .	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 ( $I_{IN}$ )".

4

XC6382D301MR  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

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	$DTY$	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAX_{FOSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	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. 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 ( $I_{IN}$ )".

XC6382D501MR  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

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 $I_{DD1}$ . $V_{EXT}=0.4V$ .		50	75	$\Omega$
Duty Ratio	$DTY$	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAX_{FOSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	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. 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 ( $I_{IN}$ )".

**XC6382E301MR**  $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

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	$I_{IN}$	$I_{OUT}=0mA$ (Note1)		4.6	9.3	$\mu A$
Supply Current 1 (Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		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	DTY	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAX_{FOSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{OSC} > MAX_{FOSC} \times 2$	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.

4

**XC6382E501MR**  $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

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 (Note 2)	$I_{DD1}$	$V_{IN}=V_{OUT} \times 0.95$		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	DTY	Same as $I_{DD1}$ . Measuring of Lx waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAX_{FOSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Lx Limit Voltage	$V_{LXLMT}$	Same as $I_{DD1}$ . $F_{OSC} > MAX_{FOSC} \times 2$	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.

## XC6382F301MR $V_{OUT}=3.0V$

$T_a=25^{\circ}C$

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
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	$DTY$	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAXF_{OSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
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.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.

4

## XC6382F501MR $V_{OUT}=5.0V$

$T_a=25^{\circ}C$

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
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 $I_{DD1}$ . $V_{EXT}=0.4V$ .		50	75	$\Omega$
Duty Ratio	$DTY$	Same as $I_{DD1}$ . Measuring of EXT waveform.	70	75	80	%
Maximum Oscillation Frequency	$MAXF_{OSC}$	Same as $I_{DD1}$ . 75% duty.	85	100	115	kHz
Efficiency	$EFFI$	L, SD, CL etc. connected		85		%

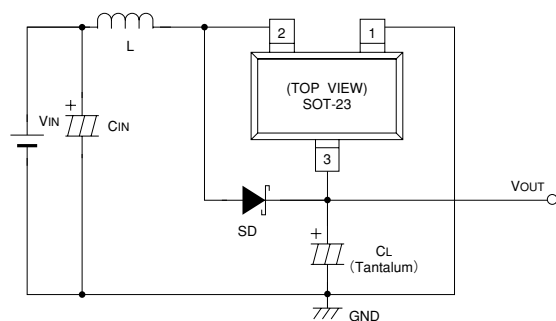
Measuring conditions: Unless otherwise specified, connect  $V_{DD}$  to  $V_{OUT}$ .  $V_{IN}=V_{OUT} \times 0.6$ ,  $I_{OUT}=50mA$ . See Typical Application Circuits, Fig.6.

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.

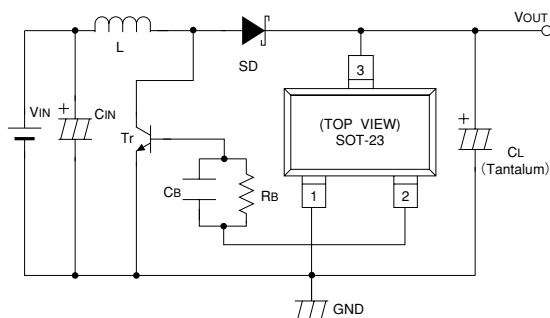
The IC operates from  $V_{DD}=0.8V$ . However, output voltage and oscillator frequency are properly stabilized when  $V_{DD}=2.2V$  or higher.

## Typical Application Circuits



L : 100 $\mu$ H (SUMIDA, CR-54)  
SD : MA2Q735 (Schottky diode; MATSUSHITA)  
CL : 16V 47 $\mu$ F (Tantalum capacitor; NICHICON, MCE)  
CIN : 16V 220 $\mu$ F (Aluminium Electrolytic Capacitor)

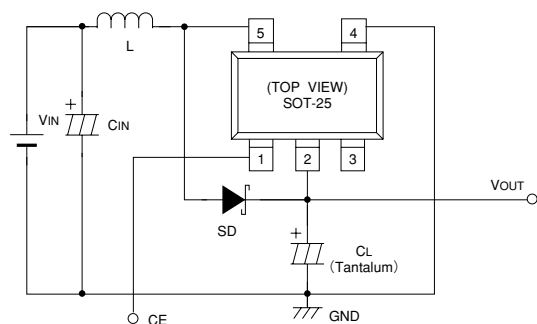
Fig.1 XC6382A Application



L : 47 $\mu$ H (SUMIDA, CR-54)  
SD : MA2Q735 (Schottky diode; MATSUSHITA)  
CL : 16V 47 $\mu$ F (Tantalum capacitor; NICHICON, MCE)  
CIN : 16V 220 $\mu$ F (Aluminium Electrolytic Capacitor)  
RB : 1k $\Omega$ , CB: 3300pF  
Tr : 2SC3279, 2SD1628G

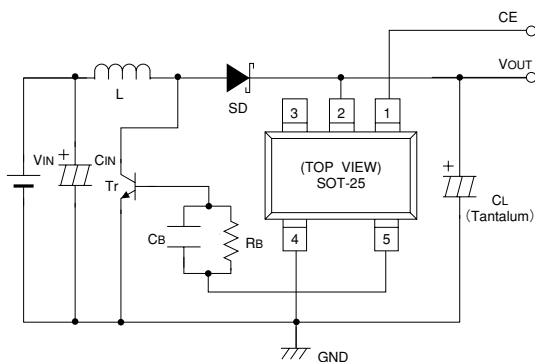
Fig.2 XC6382B Application

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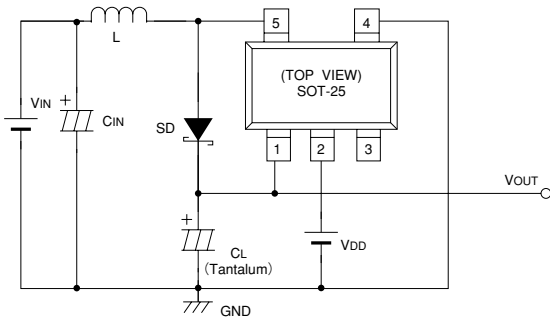
L : 100 $\mu$ H (SUMIDA, CR-54)  
SD : MA2Q735 (Schottky diode; MATSUSHITA)  
CL : 16V 47 $\mu$ F (Tantalum capacitor; NICHICON, MCE)  
CIN : 16V 220 $\mu$ F (Aluminium Electrolytic Capacitor)

Fig.3 XC6382C Application



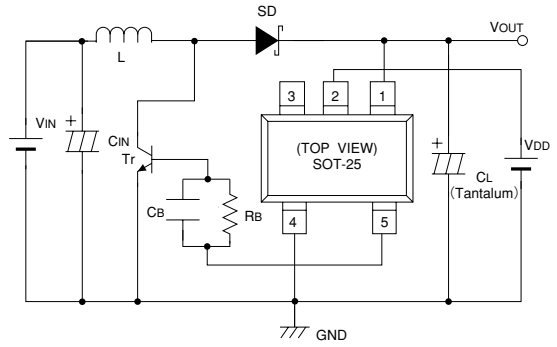
L : 47 $\mu$ H (SUMIDA, CR-54)  
SD : MA2Q735 (Schottky diode; MATSUSHITA)  
CL : 16V 47 $\mu$ F (Tantalum capacitor; NICHICON, MCE)  
CIN : 16V 220 $\mu$ F (Aluminium Electrolytic Capacitor)  
RB : 1k $\Omega$ , CB: 3300pF  
Tr : 2SC3279, 2SD1628G

Fig.4 XC6382D Application



- L : 100µH (SUMIDA, CR-54)
- SD : MA2Q735 (Schottky diode; MATSUSHITA)
- CL : 16V 47µF (Tantalum capacitor; NICHICON, MCE)
- CIN : 16V 220µF (Aluminium Electrolytic Capacitor)

Fig.5 XC6382E Application



- L : 47µH (SUMIDA, CR-54)
- SD : MA2Q735 (Schottky diode; MATSUSHITA)
- CL : 16V 47µF (Tantalum capacitor; NICHICON, MCE)
- CIN : 16V 220µF (Aluminium Electrolytic Capacitor)
- RB : 1kΩ, CB: 3300pF
- Tr : 2SC3279, 2SD1628G

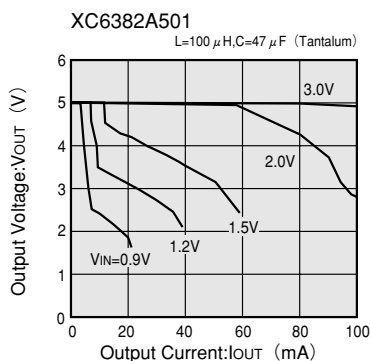
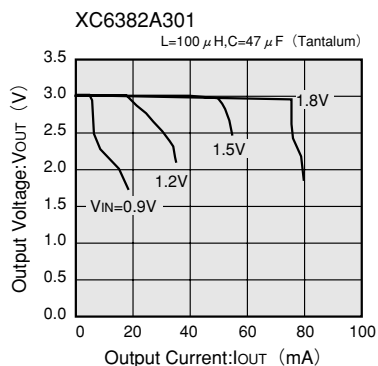
Fig.6 XC6382F Application

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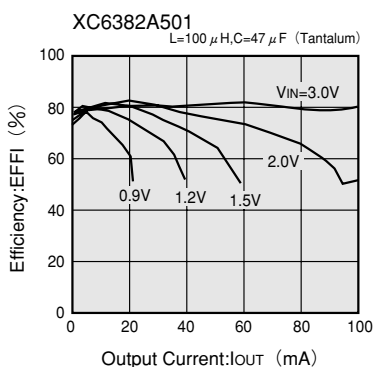
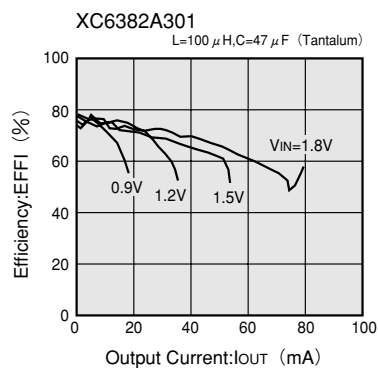


## ■ Typical Performance Characteristics

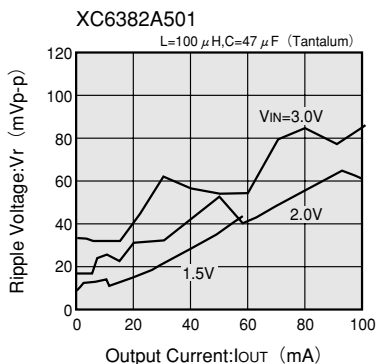
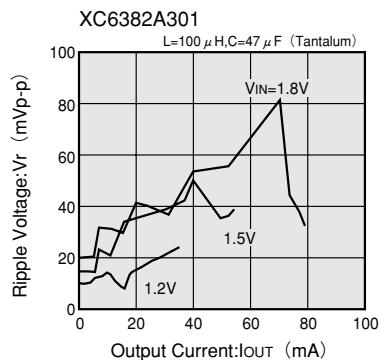
### (1) OUTPUT VOLTAGE vs. OUTPUT CURRENT



### (2) EFFICIENCY vs. OUTPUT CURRENT



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



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