# XC6381 Series

## PFM Controlled, Step - Up DC/DC Converters (Duty Ratio 58%)

◆**Duty 58%**
◆**CMOS Low Power Consumption**
◆**Operating Voltage : 0.9V~10.0V**
◆**Output Voltage Range : 2.0V~7.0V**
◆**Output Voltage Accuracy : ±2.5%**

## ■Applications

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

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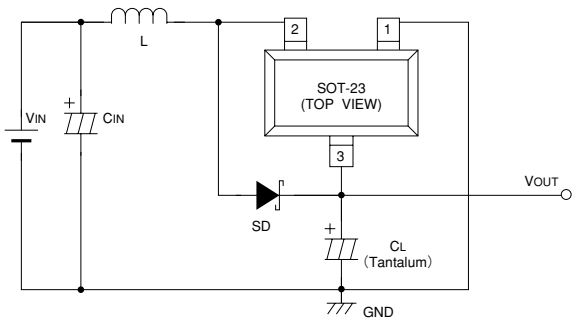
## ■General Description

The XC6381 series is a group of PFM controlled step-up DC/DC converters.
The XC6381 series employs CMOS process and laser trimming technologies so as to attain low power and high accuracy.
Max. oscillator frequency is trimmed to 155kHz (accuracy: ±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 $V_{DD}$ pin function (separated power and voltage detect pins).
SOT-23, SOT-25, and SOT-89-5 super mini-mold packages.

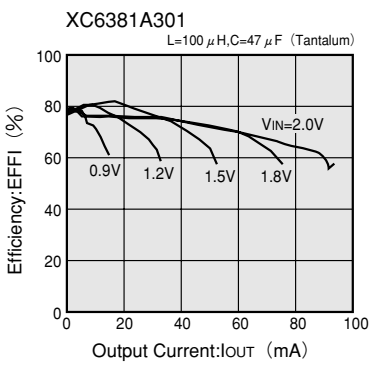
## ■Features

**Operating (start-up) voltage range** : 0.9V~10V
**Output voltage range** : 2.0V~7.0V in 0.1V increments
**Highly accurate** : Set-up voltage ±2.5%
**Maximum oscillator frequency** : 155kHz (±15%)
**Duty Ratio** : 58% (±5%)
**Both built-in switching transistor and external types are available**
**Five-lead packaged units offer either Chip Enable or independent $V_{OUT}$ pin option.**
**Small package** : SOT-23, 25 mini-mold (3-pin, 5-pin)
SOT-89, 89-5 mini-power mold (3-pin, 5-pin)

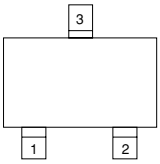
## ■Typical Application Circuit



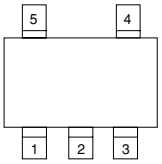

## ■Typical Performance Characteristic



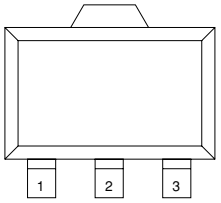
## ■Pin Configuration



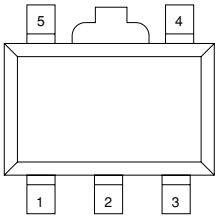

SOT-23
(TOP VIEW)




SOT-25
(TOP VIEW)




SOT-89
(TOP VIEW)




SOT-89-5
(TOP VIEW)

## ■Pin Assignment

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(XC6381A)

| PIN NUMBER | | PIN NAME | FUNCTION |
|---|---|---|---|
| XC6381A | | | |
| SOT-23 | SOT-89 | | |
| 1 | 1 | VSS | Ground |
| 3 | 2 | VOUT | Output voltage monitor, IC internal power supply |
| 2 | 3 | LX | Switch |

(XC6381C)

| PIN NUMBER | | PIN NAME | FUNCTION |
|---|---|---|---|
| XC6381C | | | |
| SOT-25 | SOT-89-5 | | |
| 4 | 5 | VSS | Ground |
| 2 | 2 | VOUT | Output voltage monitor, IC internal power supply |
| 5 | 4 | LX | Switch |
| 1 | 3 | CE | Chip enable |
| 3 | 1 | NC | No connection |

(XC6381E)

| PIN NUMBER | | PIN NAME | FUNCTION |
|---|---|---|---|
| XC6381E | | | |
| SOT-25 | SOT-89-5 | | |
| 4 | 5 | VSS | Ground |
| 2 | 2 | VDD | IC internal power supply |
| 5 | 4 | LX | Switch |
| 1 | 3 | VOUT | Output voltage monitor |
| 3 | 1 | NC | No connection |

# ■Product Classification

●Selection Guide

| PART TYPE | DUTY RATIO | PACKAGE | SWITCHING RELATED | ADDITIONAL FUNCTION | FEATURES |
|---|---|---|---|---|---|
| XC6381A | 58% | SOT-23, SOT-89 | Built-in Transistor "Lx" lead | —— | • Accommodates a duty ratio of 58%. |
| XC6381C | 58% | SOT-25, SOT-89-5 | Built-in Transistor "Lx" lead | Chip enable(CE) | • Stand-by (CE) function added version to the XC6381A.<br>• Stand-by current: 0.5μA max. |
| XC6381E | 58% | SOT-25, SOT-89-5 | Built-in Transistor "Lx" lead | Separated "$V_{DD}$" and "$V_{OUT}$" leads | • Independent power supply and set-up voltage sensing leads allow designing of PFM controllers. |

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●Ordering Information

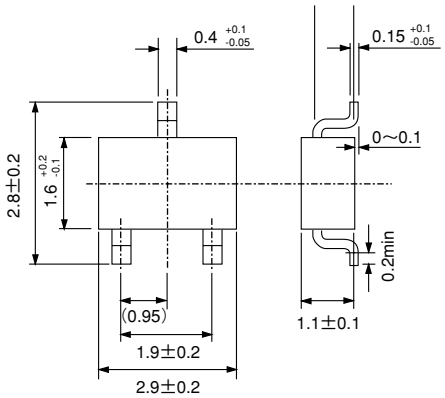
**XC6381①②③④⑤⑥**

XC6381 Series PFM Controlled Duty 58%

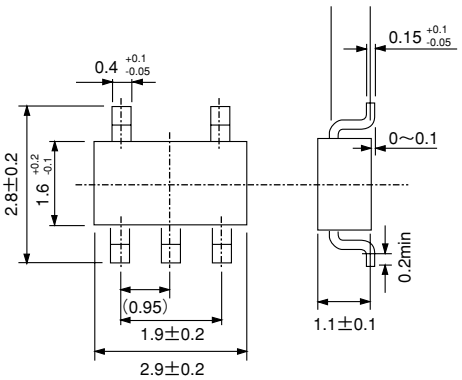
| | | | | |
|---|---|---|---|---|
| ① | A | 3-pin. Built-in switching transistor | | |
| | C | Stand-by capability. (5-pin) Built-in switching transistor | | |
| | E | Separated $V_{DD}$ and $V_{OUT}$. (5-pin) Built-in switching transistor | | |
| ②<br>③ | Output Voltage<br>e.g.$V_{OUT}$=3.5V ➔ ②=3, ③=5 | | | |
| ④ | 1 | Maximum Oscillator Frequency 155kHz | | |
| ⑤ | M | Package | ①=A~B<br>①=C~F | SOT-23<br>SOT-25 |
| | P | Package | ①=A~B<br>①=C~F | SOT-89<br>SOT-89-5 |
| ⑥ | R | Embossed tape : Standard Feed | | |
| | L | Embossed tape : Reverse Feed | | |

## ■Packaging Information

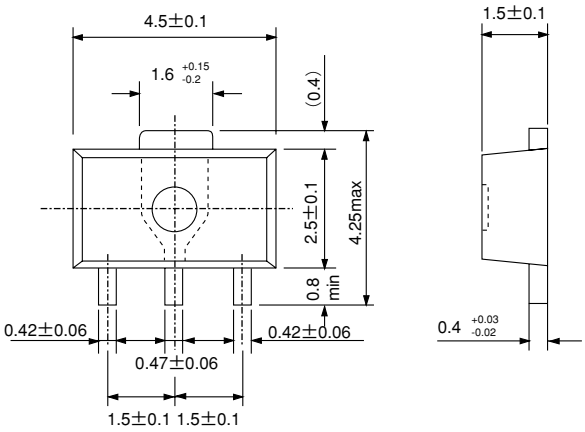
●SOT-23



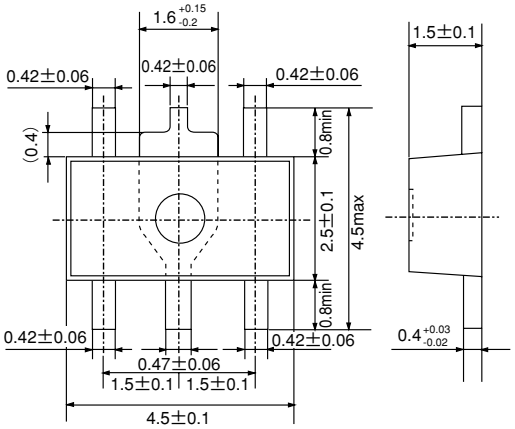

●SOT-25



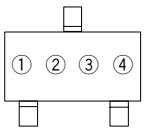
●SOT-89



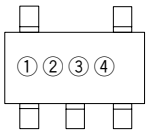

●SOT-89-5



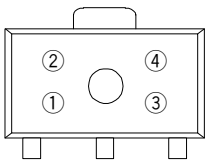
## ■Marking



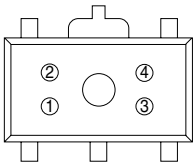

SOT-23
(TOP VIEW)




SOT-25
(TOP VIEW)




SOT-89
(TOP VIEW)




SOT-89-5
(TOP VIEW)

① Represents the Product Classification

| DESIGNATOR | FUNCTION | | PRODUCT NAME |
|---|---|---|---|
| $\overline{C}$ | — | Built-in Transistor | XC6381A＊＊＊＊＊ |
| $\overline{C}$ | CE | Built-in Transistor | XC6381C＊＊＊＊＊ |
| $\overline{Y}$ | VDD/VIN | Built-in Transistor | XC6381E＊＊＊＊＊ |

② Represents the integer of the Output Voltage and Oscillator Frequency

| INTEGER OF THE OUTPUT VOLTAGE | OSCILLATOR FREQUENCY（kHz） |
|---|---|
| | 155 |
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |
| 6 | 6 |

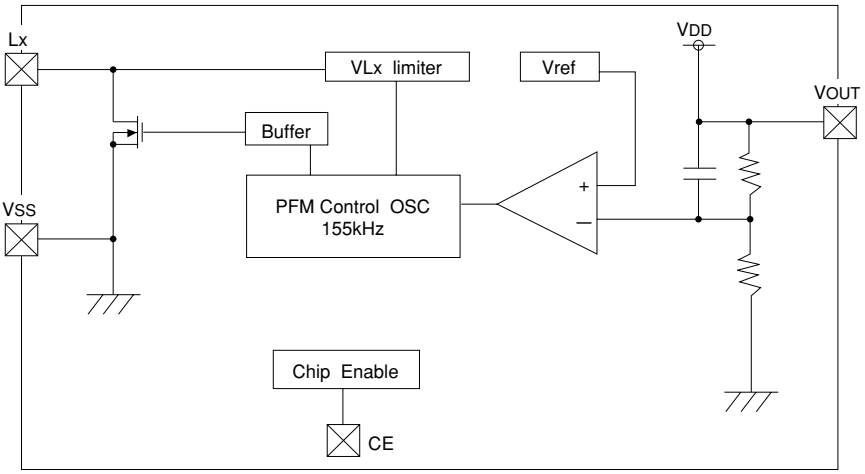
③ Represents the decimal number of the Output Voltage and Oscillator Frequency

| OUTPUT VOLTAGE | OSCILLATOR FREQUENCY（kHz） |
|---|---|
| | 155 |
| 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)

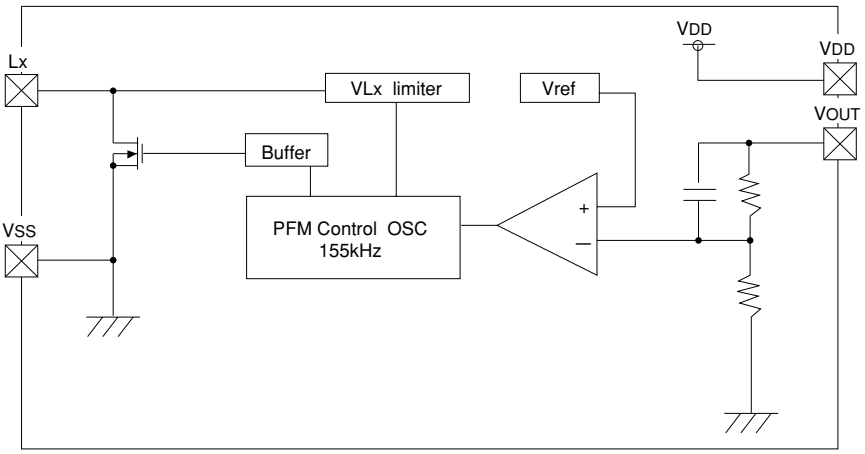
## ■Block Diagram

●XC6381A, XC6381C (VOUT pin can also be used for VDD 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.

●XC6381E




Note: The VDD pin is only used with the XC6381E.
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 |
|---|---|---|---|---|
| VOUT Input Voltage | | VOUT | 12 | V |
| Lx pin Voltage | | VLX | 12 | V |
| Lx pin Current | | ILX | 400 | mA |
| EXT pin Voltage | | VEXT | VSS−0.3~VOUT+0.3 | V |
| EXT pin Current | | IEXT | ±50 | mA |
| CE Input Voltage | | VCE | 12 | V |
| VDD Input Voltage | | VDD | 12 | V |
| Continuous Total Power Dissipation | SOT-23 | PD | 150 | mW |
| | SOT-89 | | 500 | |
| Operating Ambient Temperature | | Topr | −30~+80 | °C |
| Storage Temperature | | Tstg | −40~+125 | °C |

## ■Electrical Characteristics

XC6381A301 $V_{OUT}$=3.0V Ta=25°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 | μA |
| Supply Current 1 (Note 2) | $I_{DD}1$ | $V_{IN}$=$V_{OUT}$ × 0.95 | | 29.3 | 58.7 | μA |
| Supply Current 2 | $I_{DD}2$ | $V_{IN}$=$V_{OUT}$+0.5V | | 2.1 | 4.2 | μA |
| Lx Switch On-Resistance | $R_{SWON}$ | Same as $I_{DD}1$, $V_{LX}$=0.4V | | 5.2 | 7.9 | Ω |
| Lx Leakage Current | $I_{LXL}$ | No external components, $V_{OUT}$=$V_{LX}$=10V | | | 1.0 | μA |
| Duty Ratio | DTY | Same as $I_{DD}1$<br>Measuring of Lx waveform | 53 | 58 | 63 | % |
| Maximum Oscillation Frequency | MAXFOSC | Same as $I_{DD}1$, 58% duty. | 131.75 | 155 | 178.25 | kHz |
| Lx Limit Voltage | VLxLMT | Same as $I_{DD}1$, Fosc ≥MAXFOSC × 2 | 0.7 | | 1.1 | V |
| Efficiency | EFFI | L,SD,$C_L$, etc. connected | | 80 | | % |

Measuring conditions: Unless otherwise specified, $V_{IN}$=$V_{OUT}$ × 0.6, $I_{OUT}$= 30mA. See Typical application circuits, Fig.1.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ($I_R$) <1.0μA 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 ($I_{IN}$)".

XC6381A501 $V_{OUT}$=5.0V Ta=25°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 | μA |
| Supply Current 1 (Note 2) | $I_{DD}1$ | $V_{IN}$=$V_{OUT}$ × 0.95 | | 47.8 | 95.7 | μA |
| Supply Current 2 | $I_{DD}2$ | $V_{IN}$=$V_{OUT}$+0.5V | | 2.4 | 4.8 | μA |
| Lx Switch On-Resistance | $R_{SWON}$ | Same as $I_{DD}1$, $V_{LX}$=0.4V | | 2.8 | 4.3 | Ω |
| Lx Leakage Current | $I_{LXL}$ | No external components, $V_{OUT}$=$V_{LX}$=10V | | | 1.0 | μA |
| Duty Ratio | DTY | Same as $I_{DD}1$<br>Measuring of Lx waveform | 53 | 58 | 63 | % |
| Maximum Oscillation Frequency | MAXFOSC | Same as $I_{DD}1$, 58% duty. | 131.75 | 155 | 178.25 | kHz |
| Lx Limit Voltage | VLxLMT | Same as $I_{DD}1$, Fosc≥MAXFOSC × 2 | 0.7 | | 1.1 | V |
| Efficiency | EFFI | L,SD,$C_L$, etc. connected | | 85 | | % |

Measuring conditions: Unless otherwise specified, $V_{IN}$=$V_{OUT}$ × 0.6, $I_{OUT}$=50mA. See Typical application circuits, Fig.1.

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ($I_R$) <1.0μA 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 ($I_{IN}$)".

XC6381C301MR $V_{OUT}$=3.0V Ta=25°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 | μA |
| Supply Current 1 (Note 2) | $I_{DD1}$ | $V_{IN}$=$V_{OUT}$ × 0.95 | | 29.3 | 58.7 | μA |
| Supply Current 2 | $I_{DD2}$ | $V_{IN}$=$V_{OUT}$+0.5V | | 2.1 | 4.2 | μA |
| Lx Switch-On Resistance | $R_{SWON}$ | Same as $I_{DD1}$. $V_{LX}$=0.4V | | 5.2 | 7.9 | Ω |
| Lx Leakage Current | $I_{LXL}$ | No external components. $V_{OUT}$=$V_{LX}$=10V. | | | 1.0 | μA |
| Duty Ratio | DTY | Same as $I_{DD1}$. Measuring of Lx waveform. | 53 | 58 | 63 | % |
| Maximum Oscillation Frequency | MAXFOSC | Same as $I_{DD1}$. 58% duty. | 131.75 | 155 | 178.25 | kHz |
| Stand-by Current | $I_{STB}$ | Same as $I_{DD1}$. | | | 0.5 | μA |
| 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 $I_{DD1}$. $V_{CE}$=$V_{OUT}$ × 0.95. | | | 0.25 | μA |
| CE "Low" Current | $I_{CEL}$ | Same as $I_{DD1}$. $V_{CE}$=0V. | | | −0.25 | μA |
| Lx Limit Voltage | VLxLMT | | 0.7 | | 1.1 | V |
| Efficiency | EFFI | L,SD,$C_L$ etc. connected | | 80 | | % |

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

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ($I_R$)<1.0μA 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 ($I_{IN}$)".

XC6381C501MR $V_{OUT}$=5.0V Ta=25°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 | μA |
| Supply Current 1 (Note 2) | $I_{DD1}$ | $V_{IN}$=$V_{OUT}$ × 0.95 | | 47.8 | 95.7 | μA |
| Supply Current 2 | $I_{DD2}$ | $V_{IN}$=$V_{OUT}$+0.5V | | 2.4 | 4.8 | μA |
| Lx Switch-On Resistance | $R_{SWON}$ | Same as $I_{DD1}$. $V_{LX}$=0.4V. | | 2.8 | 4.3 | Ω |
| Lx Leakage Current | $I_{LXL}$ | No external components. $V_{OUT}$=$V_{LX}$=10V. | | | 1.0 | μA |
| Duty Ratio | DTY | Same as $I_{DD1}$. Measuring of Lx waveform. | 53 | 58 | 63 | % |
| Maximum Oscillation Frequency | MAXFOSC | Same as $I_{DD1}$. 58% duty. | 131.75 | 155 | 178.25 | kHz |
| Stand-by Current | $I_{STB}$ | Same as $I_{DD1}$. | | | 0.5 | μA |
| CE "High" Voltage | $V_{CEH}$ | Same as $I_{DD1}$. Existence of Lx Oscillation. | 0.75 | | | V |
| CE "Low" Voltage | $V_{CEL}$ | Same as $I_{DD1}$. Disapperance of Lx Oscillation. | | | 0.20 | V |
| CE "High" Current | $I_{CEH}$ | Same as $I_{DD1}$. $V_{CE}$=$V_{OUT}$ × 0.95. | | | 0.25 | μA |
| CE "Low" Current | $I_{CEL}$ | Same as $I_{DD1}$. $V_{CE}$=0V. | | | −0.25 | μA |
| Lx Limit Voltage | VLxLMT | Same as $I_{DD1}$. FOSC>MAXFOSC × 2 | 0.7 | | 1.1 | V |
| Efficiency | EFFI | L,SD,$C_L$ etc. connected | | 85 | | % |

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

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ($I_R$)<1.0μA 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 ($I_{IN}$)".

XC6381E301MR $V_{OUT}$=3.0V Ta=25°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 | μA |
| Supply Current 1 (Note 2) | $I_{DD1}$ | $V_{IN}$=$V_{OUT}$ × 0.95 | | 29.3 | 58.7 | μA |
| Supply Current 2 | $I_{DD2}$ | $V_{IN}$=$V_{OUT}$+0.5V | | 2.1 | 4.2 | μA |
| Lx Switch-On Resistance | $R_{SWON}$ | Same as $I_{DD1}$. $V_{LX}$=0.4V | | 5.2 | 7.9 | Ω |
| Lx Leakage Current | $I_{LXL}$ | No external components. $V_{OUT}$=$V_{LX}$=10V | | | 1.0 | μA |
| Duty Ratio | DTY | Same as $I_{DD1}$<br>Measuring of Lx waveform. | 53 | 58 | 63 | % |
| Maximum Oscillation Frequency | MAXFOSC | Same as $I_{DD1}$. 58% duty. | 131.75 | 155 | 178.25 | kHz |
| Lx Limit Voltage | VLxLMT | Same as $I_{DD1}$. $F_{OSC}$>MAXFOSC × 2 | 0.7 | | 1.1 | V |
| Efficiency | EFFI | L,SD,$C_L$ etc. connected | | 80 | | % |

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

Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ($I_R$)<1.0μA 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.

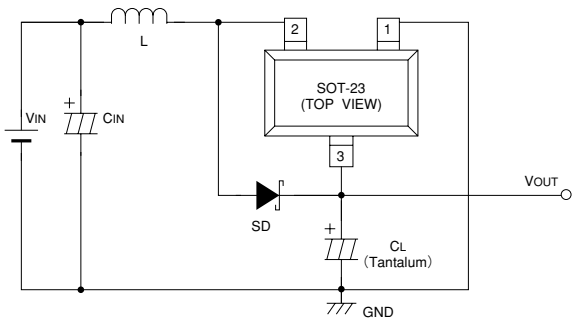
XC6381E501MR $V_{OUT}$=5.0V Ta=25°C

| 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 | μA |
| Supply Current 1 (Note 2) | $I_{DD1}$ | $V_{IN}$=$V_{OUT}$ × 0.95 | | 47.8 | 95.7 | μA |
| Supply Current 2 | $I_{DD2}$ | $V_{IN}$=$V_{OUT}$+0.5V | | 2.4 | 48 | μA |
| Lx Switch-On Resistance | $R_{SWON}$ | Same as $I_{DD1}$. $V_{LX}$=0.4V. | | 2.8 | 4.3 | Ω |
| Lx Leakage Current | $I_{LXL}$ | No external components. $V_{OUT}$=$V_{LX}$=10V. | | | 1.0 | μA |
| Duty Ratio | DTY | Same as $I_{DD1}$.<br>Measuring of Lx waveform. | 53 | 58 | 63 | % |
| Maximum Oscillation Frequency | MAXFOSC | Same as $I_{DD1}$. 58% duty. | 131.75 | 155 | 178.25 | kHz |
| Lx Limit Voltage | VLxLMT | Same as $I_{DD1}$. $F_{OSC}$>MAXFOSC × 2 | 0.7 | | 1.1 | V |
| Efficiency | EFFI | L,SD,$C_L$ etc. connected | | 85 | | % |

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

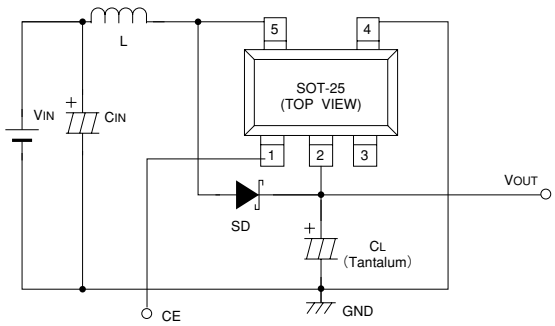
Note: 1. The Schottky diode (SD) must be type MA735, with reverse current ($I_R$)<1.0μA at reverse voltage ($V_R$)=10.0V.
2. "Supply Current 1" is the supply current while the oscillator is continuously oscillating. In actual operation the oscillator periodically operates which results in less average 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.

## ■Typical Application Circuits



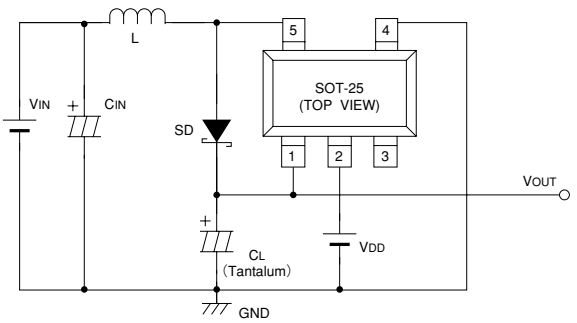

L : 100µH (SUMIDA, CR-54)
SD : MA2Q735 (Schottky diode; MATSUSHITA)
$C_L$ : 16V 47µF (Tantalum capacitor, NICHICON, MCE)
$C_{IN}$ : 16V 220µF (Aluminium Electrolytic Capacitor)

Fig.1 XC6381A Application




L : 100µH (SUMIDA, CR-54)
SD : MA2Q735 (Schottky diode; MATSUSHITA)
$C_L$ : 16V 47µF (Tantalum capacitor, NICHICON, MCE)
$C_{IN}$ : 16V 220µF (Aluminium Electrolytic Capacitor)

Fig.2 XC6381C Application

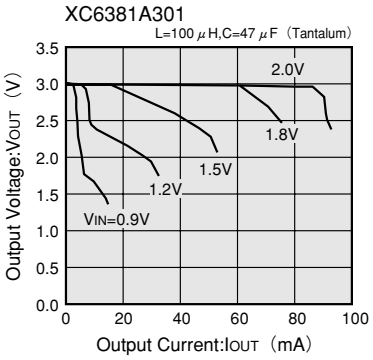



L : 100µH (SUMIDA, CR-54)
SD : MA2Q735 (Schottky diode; MATSUSHITA)
$C_L$ : 16V 47µF (Tantalum capacitor, NICHICON, MCE)
$C_{IN}$ : 16V 220µF (Aluminium Electrolytic Capacitor)

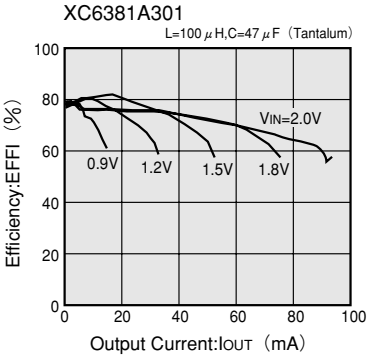
Fig.3 XC6381E Application

## ■Typical Performance Characteristics

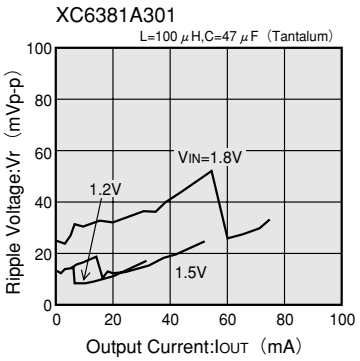
(1) OUTPUT VOLTAGE vs. OUTPUT CURRENT




(2) EFFICIENCY vs. OUTPUT CURRENT




(3) RIPPLE VOLTAGE vs. OUTPUT CURRENT

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