

- ◆ CMOS Low Power Consumption
- ◆ Operating Voltage: 2.2V~10.0V
- ◆ Output Voltage Range: 2.0V~7.0V
- ◆ Output Voltage Accuracy: $\pm 2.5\%$
- ◆ Oscillator Frequency: 100kHz

General Description

The XC6375 series are PWM controlled step down DC/DC converters. The XC6375 series is produced by CMOS process and laser trimming technologies to attain low-power and high-accuracy. Built-in phase compensation and slow start-up circuits ensure excellent transient response and improved electrical characteristics. Output voltage can be determined from 2.0V to 7.0V in 0.1V increments (accuracy: $\pm 2.5\%$) by means of laser trimming technology. The internal oscillator is trimmed to a fixed frequency of 100kHz (accuracy: $\pm 15\%$). The duty ratio varies up to 100% according to loads. A step-down convert can be easily configured with only a switching element (a transistor), a coil, a diode, and a capacitor. The products are available in small SOT-89-5 packages.

Applications

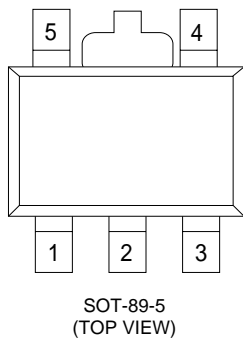
- Cellular phones, pagers
- Palmtops
- Cameras, video recorders
- Portable equipment

Features

- Operating (start-up) voltage range:** 2.2V~10V
- Output voltage range:** 2.0V~7.0V in 0.1V increments
- Highly accurate:** Set-up voltage $\pm 2.5\%$
- Oscillator frequency:** 100kHz (15%)
- Maximum output current:** 500mA (MIN.) at $V_{IN}=5.0V$, $V_{OUT}=3.0V$
- High efficiency:** Typ.88% at $V_{IN}=3.6V$, $V_{OUT}=3.0V$, $I_{OUT}=100mA^*$
- Built-in phase compensation and slow start-up circuits.**
- Small package:** SOT-89-5 (5-pin) mini-power mold

*NOTE: Performance depends on external components, PCB layout, etc.

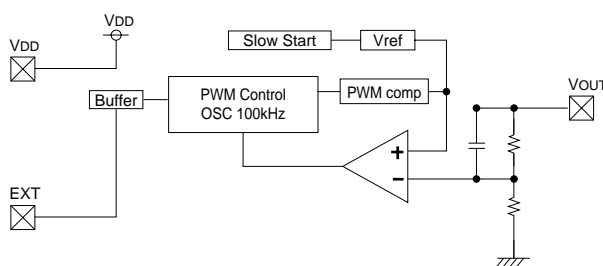
Pin Configuration



Pin Assignment

PIN NUMBER	PIN NAME	FUNCTION
1	NC	No Connection
2	V _{DD}	IC Internal power supply
3	V _{OUT}	Output voltage monitor
4	EXT	External switch transistor drive
5	V _{SS}	Ground

Block Diagram



Absolute Maximum Ratings

T_a=25°C

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V _{in}	12	V
EXT pin Voltage	V _{EXT}	-0.3~V _{OUT} +0.3	V
EXT pin Current	I _{EXT}	± 50	mA
Continuous total Power Dissipation	P _d	500	mW
Operating Ambient Temperature	T _{opr}	-30~+80	°C
Storage Temperature	T _{stg}	-40~+125	°C

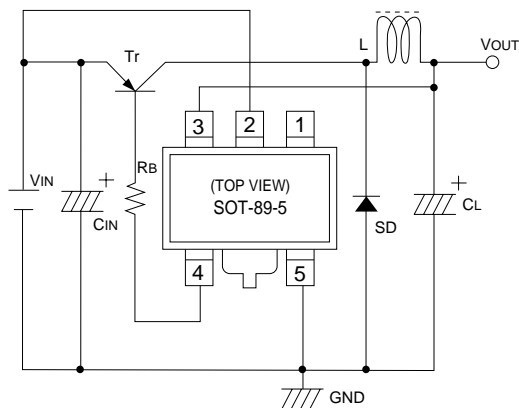
Electrical Characteristics

XC6375A501PR $V_{out}=5.0V$, $F_{osc}=100kHz$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	External Components Connected	4.875	5.000	5.125	V
Maximum Input Voltage	V_{IN}		10			V
Supply Voltage Range	V_{DD}		2.2		10	V
Supply Current 1	I_{DD1}	No external components. Apply output voltage $\times 0.95$ to V_{OUT} .		24.9	41.6	μA
Supply Current 2	I_{DD2}	Same as I_{DD1} . Apply output voltage $\times 1.1$ to V_{OUT} .		19.9	33.2	μA
EXT"High" On Resistance	R_{EXTH}	Same as I_{DD2} . $V_{EXT}=V_{OUT}-0.4V$.		37.5	62.5	Ω
EXT"Low" On Resistance	R_{EXTL}	Same as I_{DD1} . $V_{EXT}=0.4V$.		30	50	Ω
Oscillator Frequency	F_{OSC}	Same as V_{OUT} . Measuring of EXT waveform.	85	100	115	kHz
Maximum Duty Ratio	$MAXDTY$	Same as I_{DD1} . Measuring of EXT waveform.	100			%
Efficiency	$EFFI$			90		%
Slow-Start Time	T_{SS}		4.0	10.0	20.0	ms

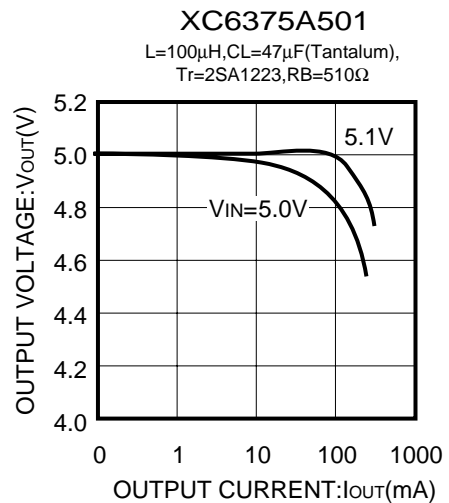
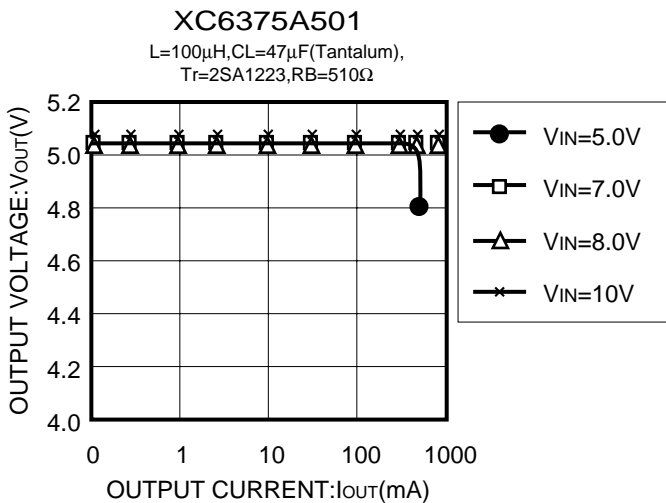
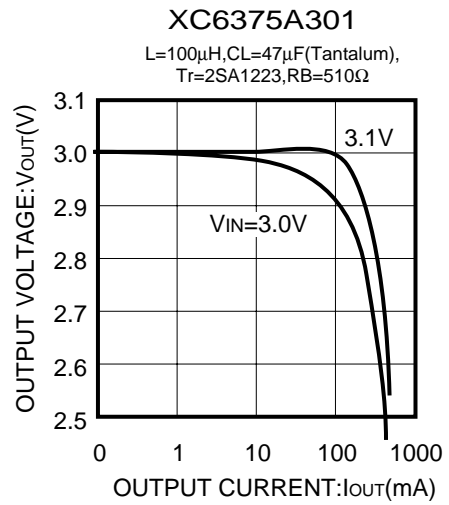
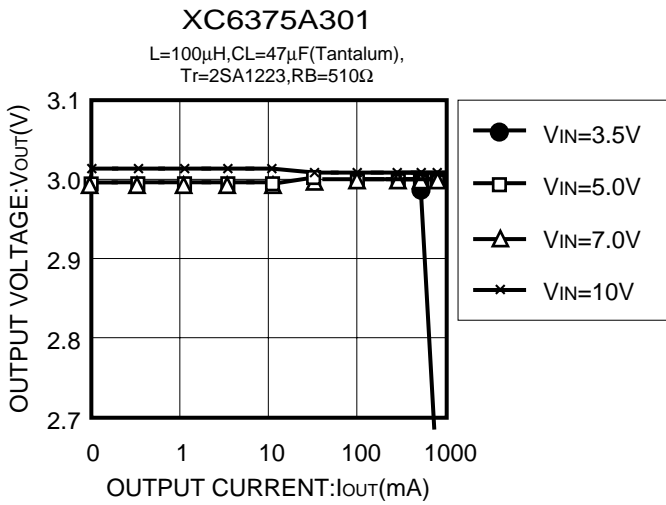
Measuring conditions: Unless otherwise specified, $V_{IN}=V_{DD}=V_{OUT} \times 1.2$ (V_{DD} should be another voltage source), $I_{out}=100mA$.
See Typical Application Circuit.

Typical Application Circuit

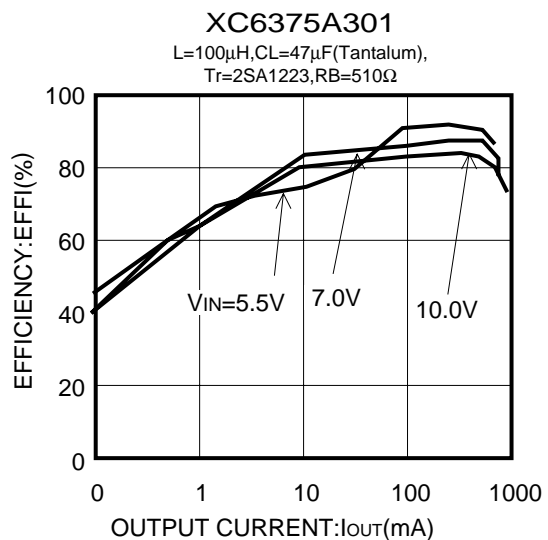
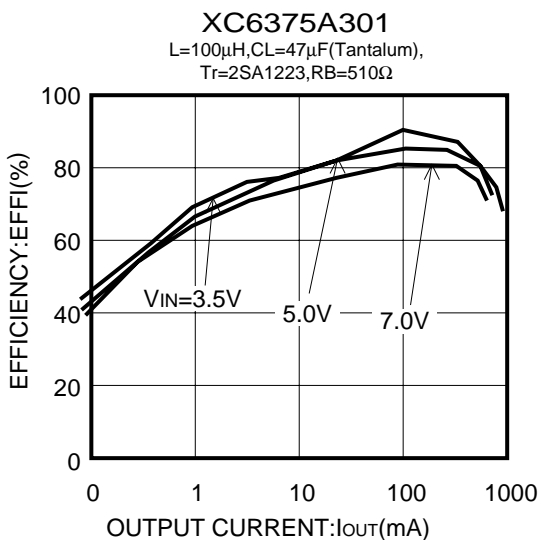


- L: 100 μH (SUMIDA, CD-54)
- SD: MA735 (Schottky diode; MATUSHITA)
- CL: 10V 47 μF (Tantalum capacitor, NICHICON, F93)
- CIN: 16V 10 μF (Tantalum capacitor, NICHICON, F93)
- Tr: 2SA1213
- RB: 1.0k Ω

(1) OUTPUT VOLTAGE vs. OUTPUT CURRENT



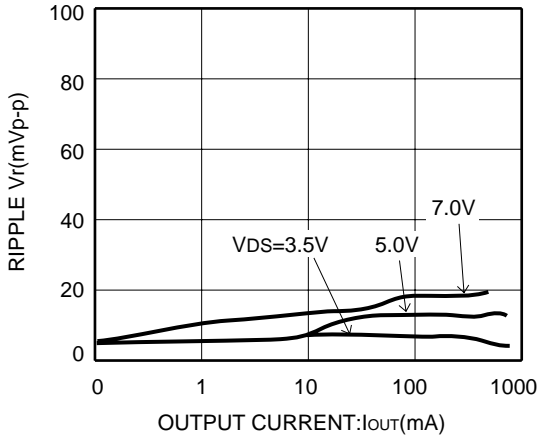
(2) EFFICIENCY vs. OUTPUT CURRENT



(3) RIPPLE VOLTAGE vs. OUTPUT CURRENT

XC6375A301

L=100 μ H, C_L=47 μ F(Tantalum),
Tr=2SA1223, R_B=510 Ω



XC6375A501

L=100 μ H, C_L=47 μ F(Tantalum),
Tr=2SA1223, R_B=510 Ω

