

- ◆ CMOS Low Power Consumption
- ◆ Input-Output Voltage Differential: 140mV at 300 $\mu$ A
- ◆ Maximum Output Current: 6.0mA (2.0V)
- ◆ Highly Accurate:  $\pm 2\%$ ( $\pm 1\%$ )
- ◆ Output Voltage Range: 1.5V~3.5V
- ◆ No Load Power Consumption: 3.2 $\mu$ A (2.0V)
- ◆ SOT-23/SOT-89 Package

### General Description

The XC62RP series are highly precise, low power consumption, positive voltage regulators, for voltage reference source, manufactured using CMOS and laser trimming technologies. SOT-23 (150mW) and SOT-89 (500mW) packages are available.

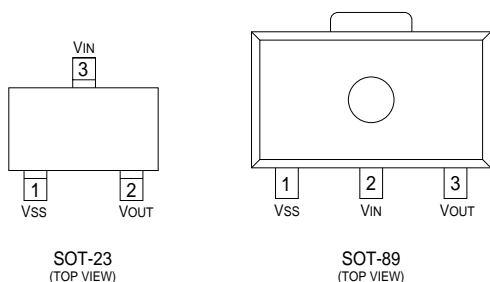
### Applications

- Battery Powered Equipment
- Reference Voltage Sources
- Cameras and Video Recorders
- Palmtops

### Features

- Max. Output Current:** 6.0mA (within max. power dissipation,  $V_{OUT}=2.0V$ )
- Output Voltage Range:** 1.5V to 3.5V in 0.1V increments
- Highly Accurate:** Set-up Voltage  $\pm 2\%$  ( $\pm 1\%$  for semi-custom products)
- Low power consumption:** TYP 3.2 $\mu$ A ( $V_{OUT}=2.0$ )
- Output voltage temperature characteristics:** TYP  $\pm 100$ ppm/ $^{\circ}$ C
- Input stability:** TYP 0.2%/V
- Ultra small package:** SOT-23 (150mW) mini-mold  
SOT-89 (500mW) mini-power mold

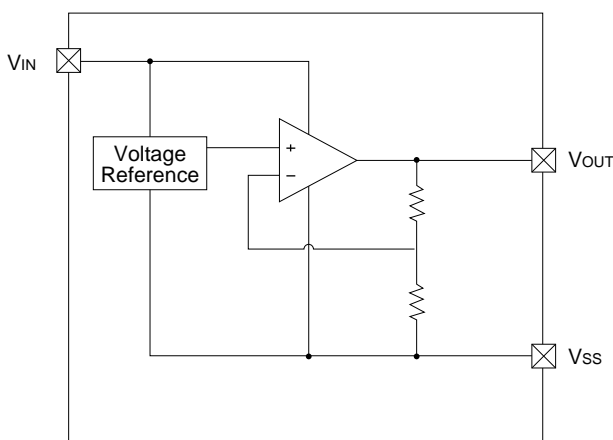
### Pin Configuration



### Pin Assignment

PIN NUMBER		PIN NAME	FUNCTION
SOT-23	SOT-89		
1	1	VSS	Ground
3	2	VIN	Supply Voltage Input
2	3	VOUT	Output

### Block Diagram



### Absolute Maximum Ratings

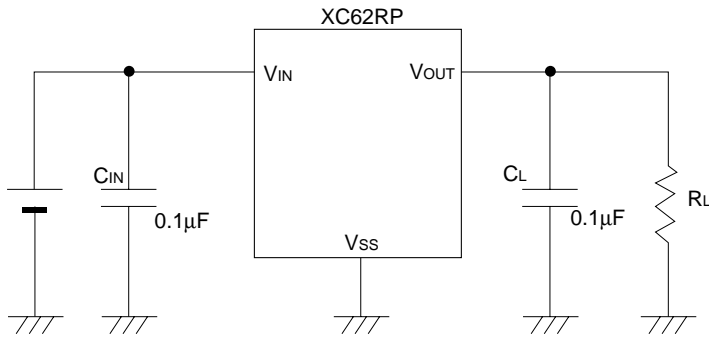
Ta=25 $^{\circ}$ C

PARAMETER	SYMBOL	RATINGS	UNITS
Input Voltage	VIN	12	V
Output Current	IOUT	50	mA
Output Voltage	VOUT	VSS-0.3 ~ VIN+0.3	V
Continuous Total Power Dissipation	SOT-23	Pd	150
	SOT-89		500
Operating Ambient Temperature	Topr	-30 ~ +80	$^{\circ}$ C
Storage Temperature	Tstg	-40 ~ +125	$^{\circ}$ C

Note: IOUT must be less than Pd / (VIN-VOUT).

2

### Standard Circuit



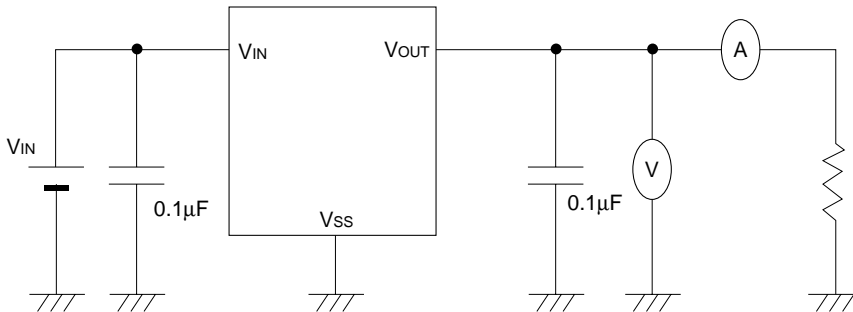
Please use with a load capacitance (CL) of less than 0.1µF.

### Notes on Use

1. Please use with a load capacitance, CL, of less than 0.1µF and in 0.01µF steps.
2. Since short-circuit protection is not built-in, the IC may be damaged by rush current should the output pin be connected to the Ground pin.
3. When the load capacitance, CL, is small, overshoot will be produced when the power is switched on.
4. As the output pin's current is only a few µA, output voltage will increase should output be pulled-up by means of a resistor.

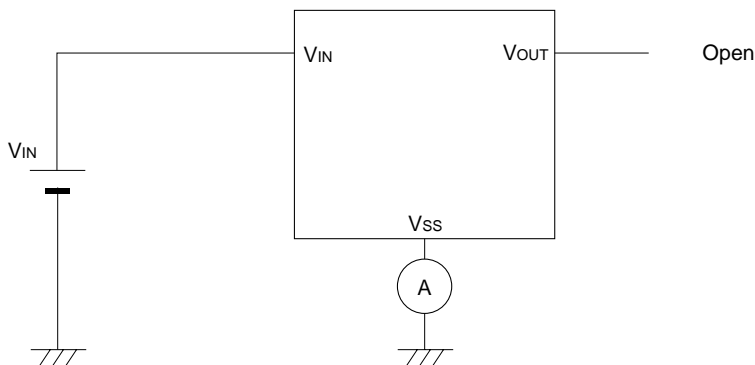
### Typical Application Circuit

Circuit 1



### Typical Application Circuit

Circuit 2



## Electrical Characteristics

XC62RP1602  $V_{OUT}(T)=1.6V$ (Note1)

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	$V_{OUT}(E)$ (Note2)	$I_{OUT}=100\mu A$ $V_{IN}=2.6V$	1.568	1.600	1.632	V	1
Maximum Output Current	$I_{OUT\ max}$	$V_{IN}=2.6V, V_{OUT}(E) \geq V_{OUT}(T) \times 0.95$	4.0			mA	1
Load Stability	$\Delta V_{OUT}$	$V_{IN}=2.6V$ $100\mu A \leq I_{OUT} \leq 300\mu A$		20	40	mV	1
Input -Output Voltage Differential (Note3)	$V_{dif1}$	$I_{OUT}=100\mu A$		30	80	mV	1
	$V_{dif2}$	$I_{OUT}=300\mu A$		50	140	mV	1
Supply Current	$I_{SS}$	$V_{IN}=2.6V$		3.0	5.8	$\mu A$	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=100\mu A$ $2.6V \leq V_{IN} \leq 6.0V$		0.2	0.3	%/V	1
Input Voltage	$V_{IN}$				6.0	V	—
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	$I_{OUT}=100\mu A$ $-30^{\circ}C \leq T_{opr} \leq 80^{\circ}C$		$\pm 100$		ppm/ $^{\circ}C$	1

XC62RP2002  $V_{OUT}(T)=2.0V$ (Note1)

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	$V_{OUT}(E)$ (Note2)	$I_{OUT}=100\mu A$ $V_{IN}=3.0V$	1.960	2.000	2.040	V	1
Maximum Output Current	$I_{OUT\ max}$	$V_{IN}=3.0V, V_{OUT}(E) \geq V_{OUT}(T) \times 0.95$	6.0			mA	1
Load Stability	$\Delta V_{OUT}$	$V_{IN}=3.0V$ $100\mu A \leq I_{OUT} \leq 300\mu A$		20	40	mV	1
Input -Output Voltage Differential (Note3)	$V_{dif1}$	$I_{OUT}=100\mu A$		30	80	mV	1
	$V_{dif2}$	$I_{OUT}=300\mu A$		50	140	mV	1
Supply Current	$I_{SS}$	$V_{IN}=3.0V$		3.2	6.2	$\mu A$	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=100\mu A$ $3.0V \leq V_{IN} \leq 6.0V$		0.2	0.3	%/V	1
Input Voltage	$V_{IN}$				6.0	V	—
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	$I_{OUT}=100\mu A$ $-30^{\circ}C \leq T_{opr} \leq 80^{\circ}C$		$\pm 100$		ppm/ $^{\circ}C$	1

### Electrical Characteristics

XC62RP2502  $V_{OUT}(T)=2.5V$ (Note1)

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	$V_{OUT}(E)$ (Note2)	$I_{OUT}=100\mu A$ $V_{IN}=3.5V$	2.450	2.500	2.550	V	1
Maximum Output Current	$I_{OUT\ max}$	$V_{IN}=3.5V, V_{OUT}(E) \geq V_{OUT}(T) \times 0.95$	8.0			mA	1
Load Stability	$\Delta V_{OUT}$	$V_{IN}=3.5V$ $100\mu A \leq I_{OUT} \leq 300\mu A$		20	40	mV	1
Input -Output Voltage Differential (Note3)	$V_{dif1}$	$I_{OUT}=100\mu A$		30	80	mV	1
	$V_{dif2}$	$I_{OUT}=300\mu A$		50	140	mV	1
Supply Current	$I_{SS}$	$V_{IN}=3.5V$		3.5	6.8	$\mu A$	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=100\mu A$ $3.5V \leq V_{IN} \leq 6.0V$		0.2	0.3	%/V	1
Input Voltage	$V_{IN}$				6.0	V	—
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	$I_{OUT}=100mA$ $-30^{\circ}C \leq T_{opr} \leq 80^{\circ}C$		$\pm 100$		ppm/ $^{\circ}C$	1

XC62RP3002  $V_{OUT}(T)=3.0V$ (Note1)

$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	$V_{OUT}(E)$ (Note2)	$I_{OUT}=100\mu A$ $V_{IN}=4.0V$	2.940	3.000	3.060	V	1
Maximum Output Current	$I_{OUT\ max}$	$V_{IN}=4.0V, V_{OUT}(E) \geq V_{OUT}(T) \times 0.95$	10.0			mA	1
Load Stability	$\Delta V_{OUT}$	$V_{IN}=4.0V$ $100\mu A \leq I_{OUT} \leq 300\mu A$		20	40	mV	1
Input -Output Voltage Differential (Note3)	$V_{dif1}$	$I_{OUT}=100\mu A$		30	80	mV	1
	$V_{dif2}$	$I_{OUT}=300\mu A$		50	140	mV	1
Supply Current	$I_{SS}$	$V_{IN}=4.0V$		3.8	7.3	$\mu A$	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=100\mu A$ $4.0V \leq V_{IN} \leq 6.0V$		0.2	0.3	%/V	1
Input Voltage	$V_{IN}$				6.0	V	—
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	$I_{OUT}=100mA$ $-30^{\circ}C \leq T_{opr} \leq 80^{\circ}C$		$\pm 100$		ppm/ $^{\circ}C$	1

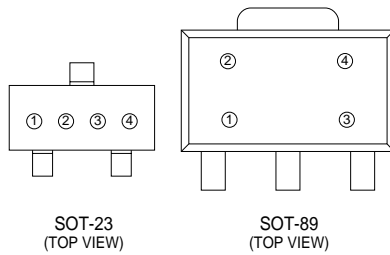
- Note:
- $V_{OUT}(T)$ =Specified Output Voltage .
  - $V_{OUT}(E)$ =Effective Output Voltage (i.e. the output voltage when " $V_{OUT}(T)+1.0V$ " is provided at the  $V_{IN}$  pin while maintaining a certain  $I_{OUT}$  value).
  - $V_{dif}$ =  $\{V_{IN1}$  (Note5)- $V_{OUT1}$  (Note4)}
  - $V_{OUT1}$ = A voltage equal to 98% of the Output Voltage whenever an amply stabilised  $I_{OUT}$  ( $V_{OUT}(T)+1.0V$ ) is input.
  - $V_{IN1}$ = The Input Voltage when  $V_{OUT1}$  appears as Input Voltage is gradually decreased.

## Ordering Information

XC62Rxxxxxx  
 ↑ ↑ ↑ ↑ ↑ ↑  
 a b c d e f

DESIGNATOR	DESCRIPTION	DESIGNATOR	DESCRIPTION
a	Polarity of Output Voltage: P: + (Positive)	e	Package Type M=SOT-23 P=SOT-89
b	Output Voltage 15=1.5V 30=3.0V		
c	Temperature Coefficients: 0=±100ppm (typical)	f	Device Orientation R=Embossed Tape (Orientation of Device:Right) L=Embossed Tape (Orientation of Device:Left)
d	Output Voltage Accuracy: 1=±1.0%(Semi-custom) 2=±2.0%		

## Marking



① Not Used.

② Represents the integer of the Output Voltage

SYMBOL	VOLTAGE(V)
A	0.③
B	1.③
C	2.③
D	3.③

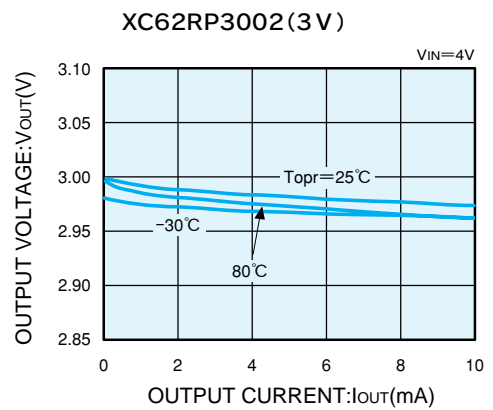
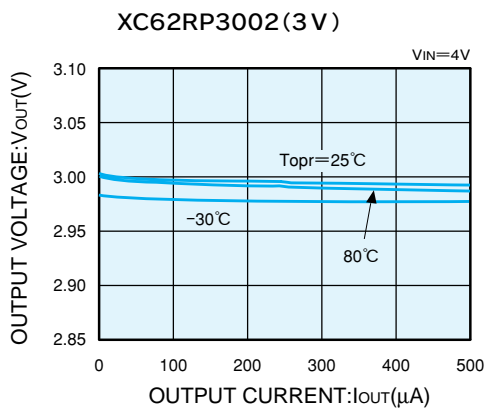
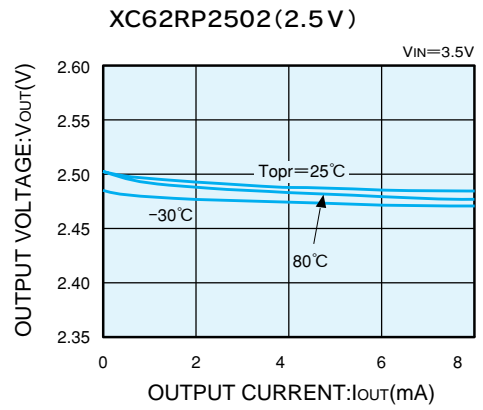
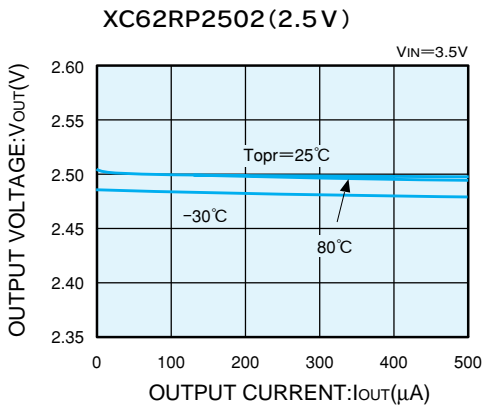
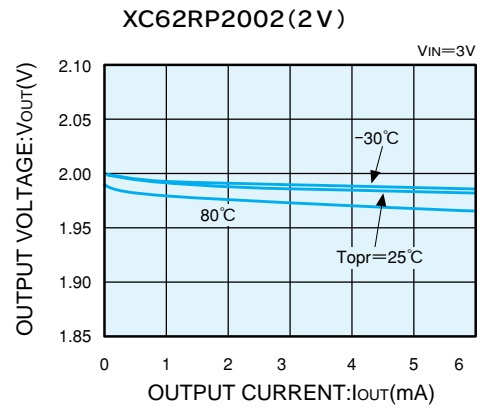
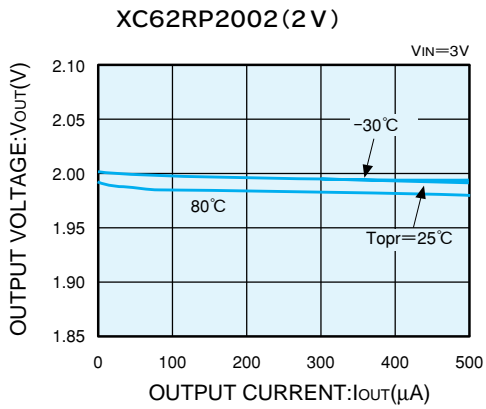
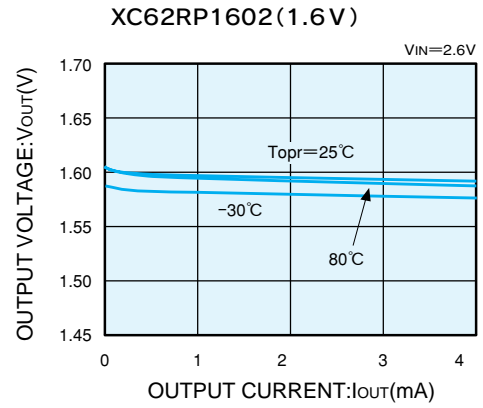
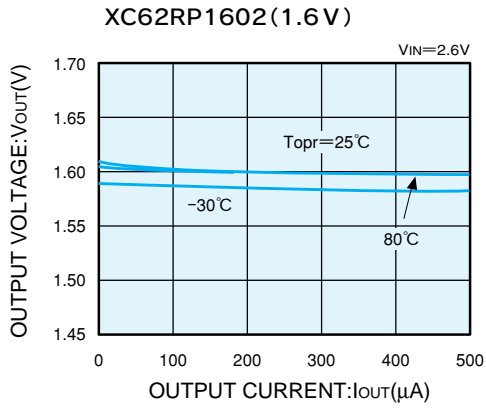
③ Represents the decimal point of the Output Voltage

SYMBOL	VOLTAGE(V)	SYMBOL	VOLTAGE(V)
A	②.0	F	②.5
B	②.1	H	②.6
C	②.2	K	②.7
D	②.3	L	②.8
E	②.4	M	②.9

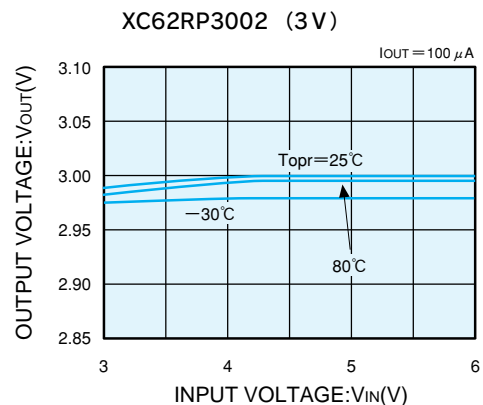
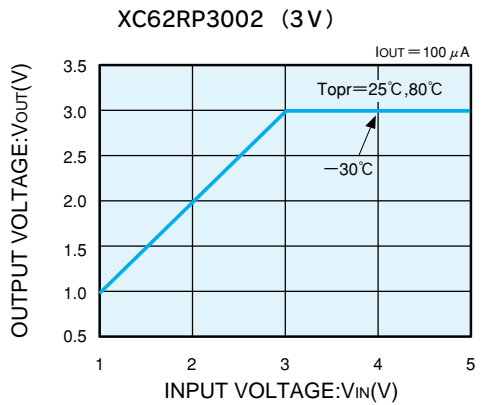
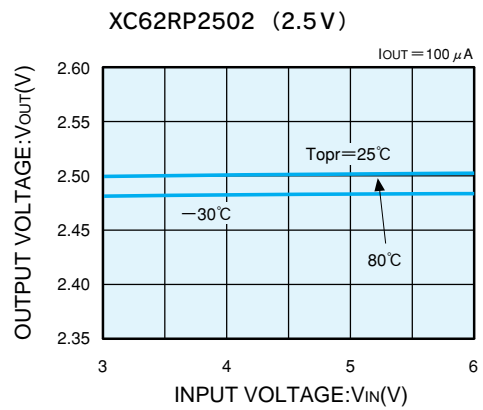
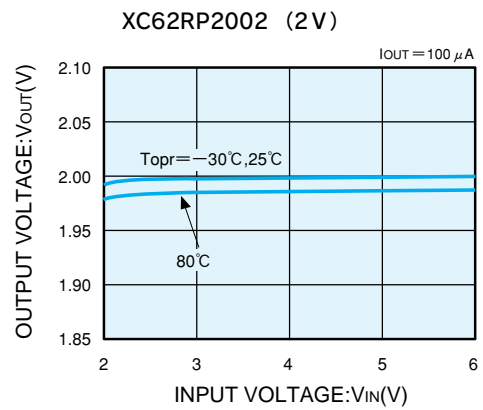
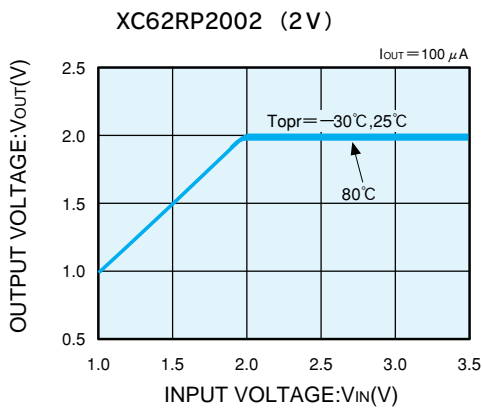
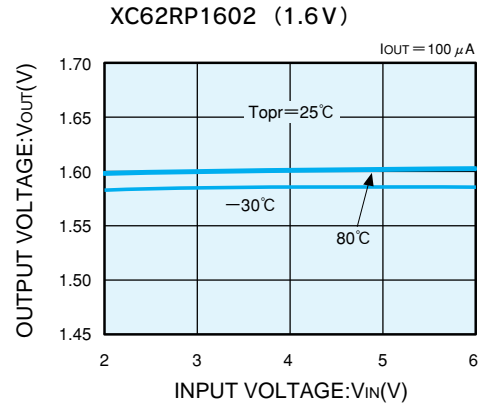
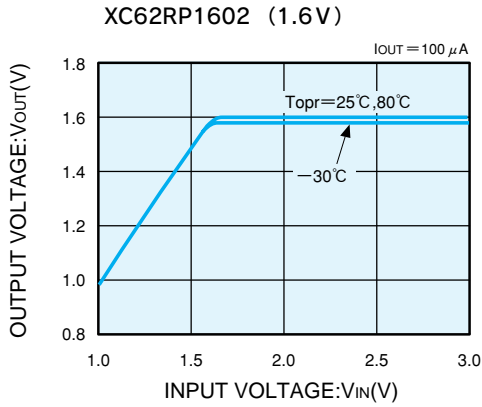
④ Represents the assembly lot no.  
Based on internal standards

### XC62RP Electrical Characteristics

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

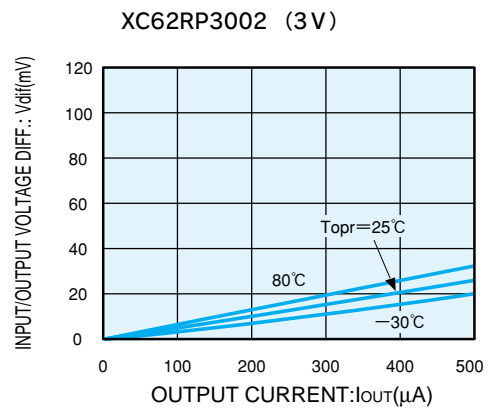
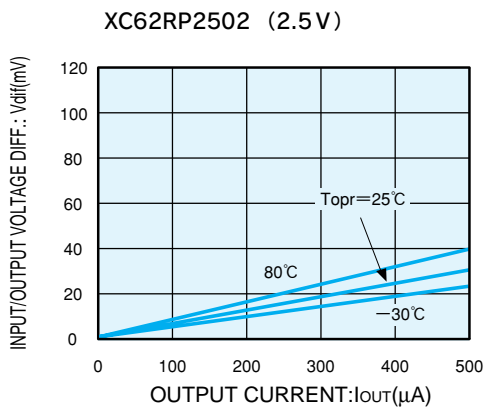
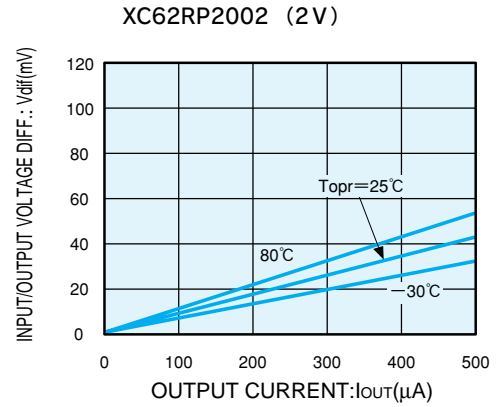
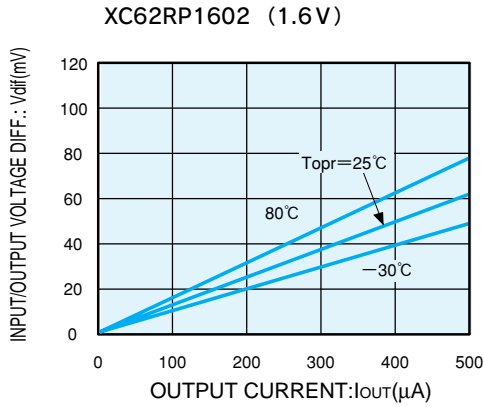


(2) OUTPUT VOLTAGE vs. INPUT VOLTAGE

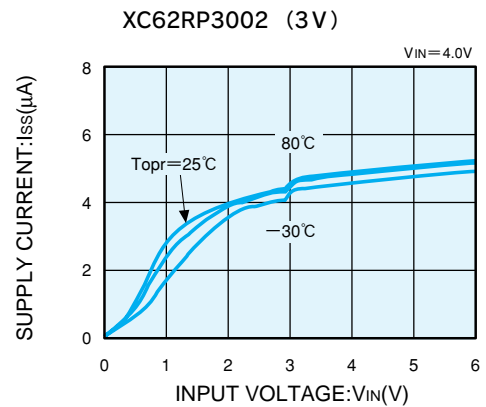
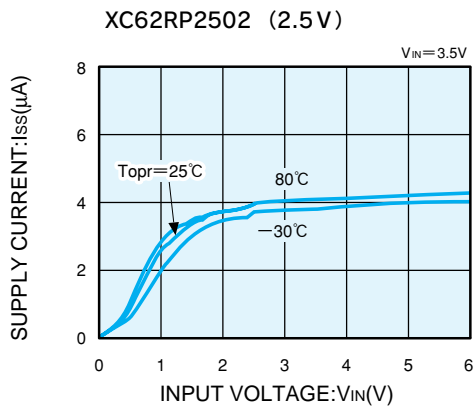
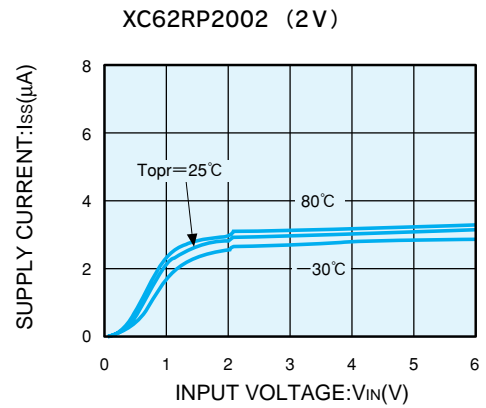
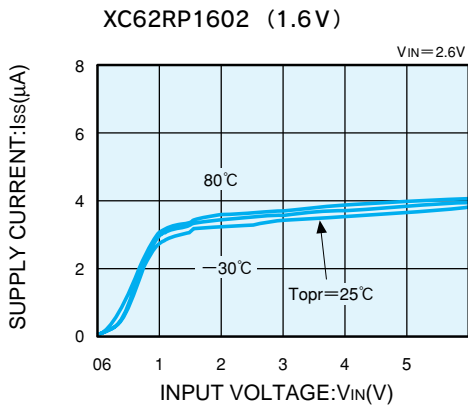


2

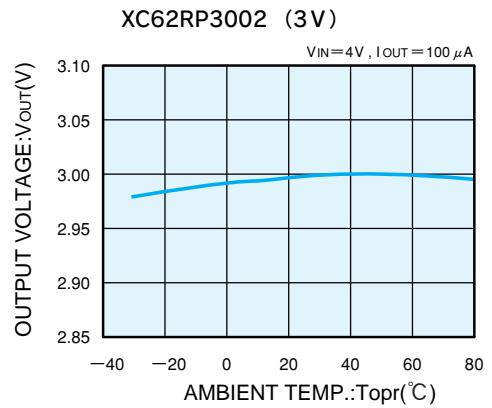
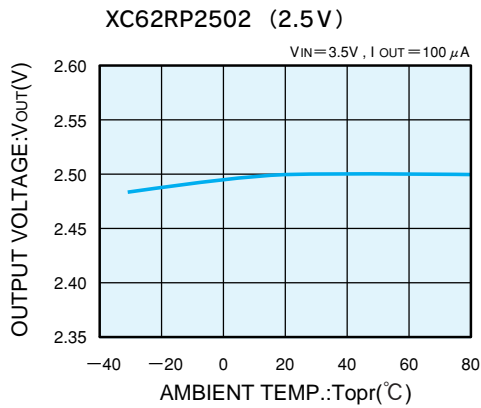
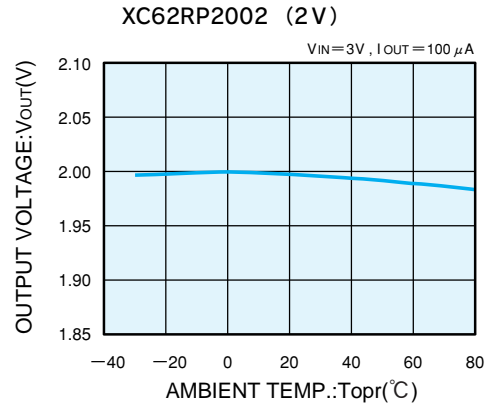
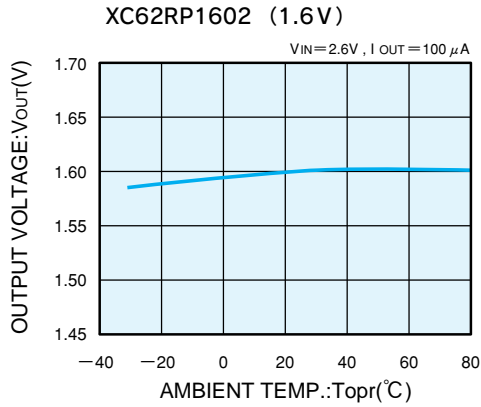
### (3) INPUT/OUTPUT VOLTAGE DIFFERENTIAL vs. OUTPUT CURRENT



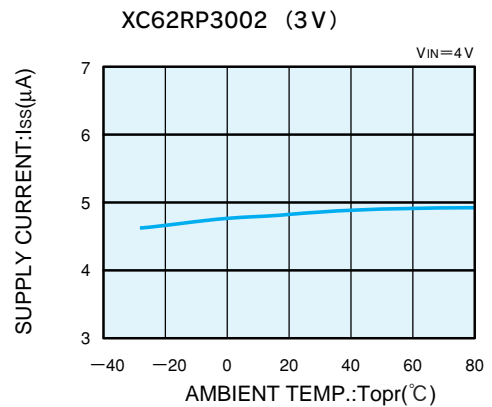
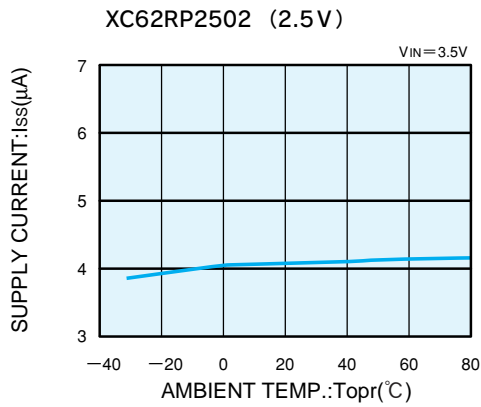
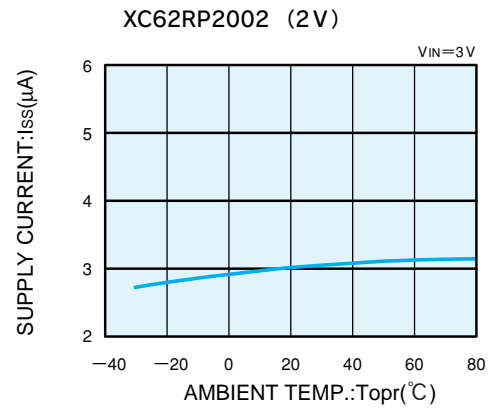
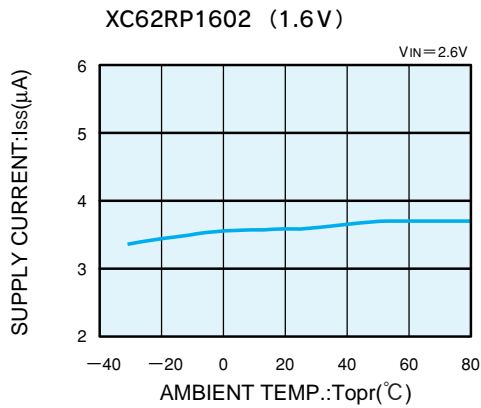
### (4) SUPPLY CURRENT vs. INPUT VOLTAGE



(5) OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE

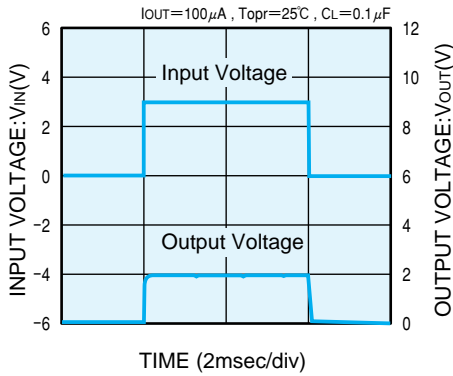


(6) SUPPLY CURRENT vs. AMBIENT TEMPERATURE

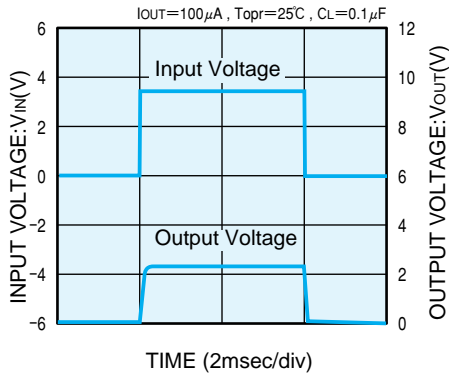


2

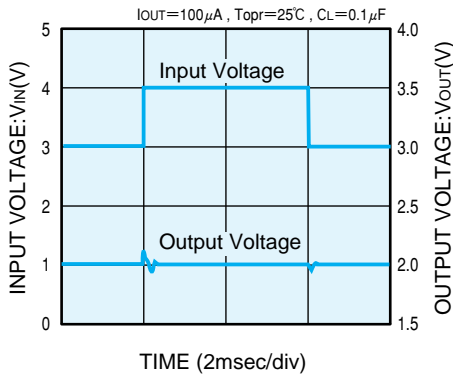
### (7) INPUT TRANSIENT RESPONSE 1 XC62RP2002 (2V)



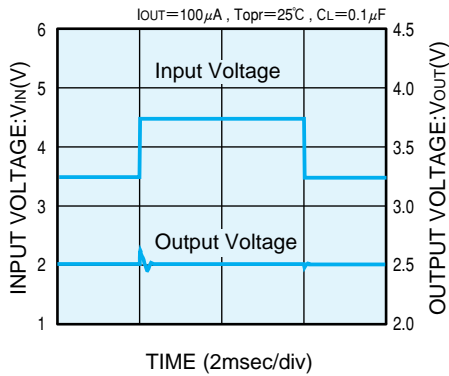
### XC62RP2502 (2.5V)



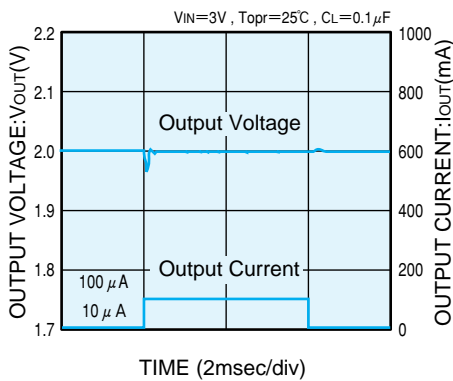
### (8) INPUT TRANSIENT RESPONSE 2 XC62RP2002 (2V)



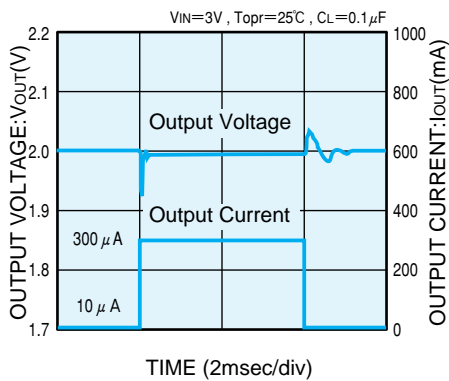
### XC62RP2502 (2.5V)



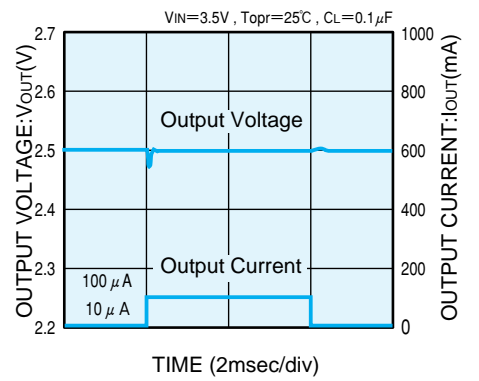
### (9) LOAD TRANSIENT RESPONSE XC62RP2002 (2V)



### XC62RP2002 (2V)



### XC62RP2502 (2.5V)



### (10) RIPPLE REJECTION XC62RP2502 (2.5V)

