

# XC62G

## Series

Positive Voltage Regulators (Output On/Off)



- ◆CMOS Low Power Consumption
- ◆Small Input-Output Voltage Differential
  - : 0.2V @ 80mA,
  - 0.38V @ 160mA
- ◆Maximum Output Current
  - : 150mA ( $V_{OUT} = 3.0V$ )
- ◆Highly Accurate :  $\pm 2\%$  ( $\pm 1\%$ )
- ◆Output Voltage Range
  - : 2.1V ~ 5.0V
- ◆Stand-by Supply Current
  - : 0.1 $\mu A$  ( $V_{OUT} = 3.0V$ )
- ◆SOT-25 / SOT-89-5 Package

### General Description

The XC62G series are highly precise, low power consumption positive voltage regulators, manufactured using CMOS and laser trimming technologies. The series achieves high output currents, with low input-output voltage differentials, and consists of a high precision voltage reference, an error correction circuit, and an output driver with current limitation. With good transient responses, output remains stable even during load changes. Also, having high ripple rejection ratios, the series can be used with low power supply noise. The CE input enables the output to be turned off, resulting in reduced power consumption. SOT-25 (150mW) and SOT-89-5 (500mW) packages are available. With regards to the CE function, as well as the positive logic XC62GR series, a negative logic XC62GP series (custom) is also available.

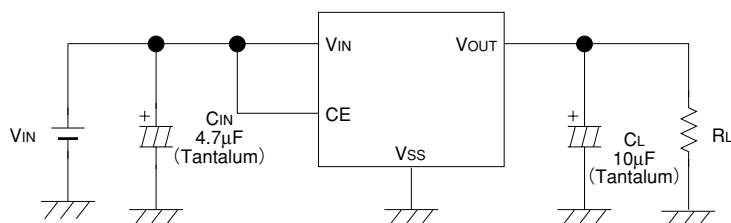
### Applications

- Battery-powered Equipment
- Voltage supplies for cellular phones
- Cameras, Video Recorders
- Palmtops

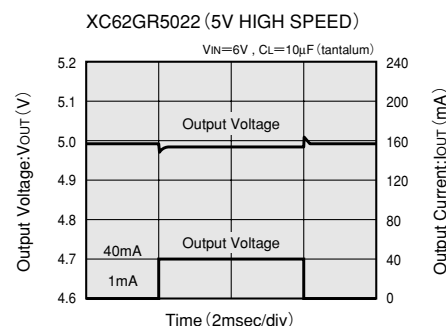
### Features

- Maximum Output Current** : 150mA (within max. power dissipation,  $V_{OUT}=3.0V$ )
- Output Voltage Range** : 2.1V~5.0V in 0.1V increments
- Highly Accurate** : Set-up voltage  $\pm 2\%$   
( $\pm 1\%$  for semi-custom products)
- Low Power Consumption** : TYP. 13 $\mu A$  ( $V_{OUT}=3.0V$ ),  
TYP 23 $\mu A$  ( $V_{OUT}=3.0V$  semi-custom, high-speed versions),  
TYP 0.1 $\mu A$  (Stand-by mode)
- Output Voltage Temperature Characteristics** : TYP  $\pm 100ppm/^{\circ}C$
- Input Stability** : TYP 0.2%/V
- Ultra Small Packages** : SOT-25 (150mW) mini-mold  
SOT-89-5 (500mW) mini-power mold

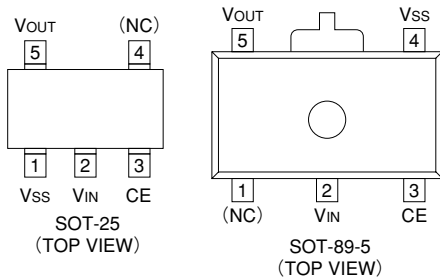
### Typical Application Circuit



### Typical Performance Characteristic



## Pin Configuration



## Pin Assignment

PIN NUMBER		PIN NAME	FUNCTION
SOT-25	SOT-89-5		
1	4	VSS	Ground
2	2	VIN	Supply Voltage input
3	3	CE	Chip Enable
4	1	(NC)	No Connection
5	5	VOUT	Regulated Output Voltage

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## Function List

SERIES	CE	VOLTAGE OUTPUT
XC62GR	H	ON
	L	OFF
XC62GP	H	OFF
	L	ON

H=High, L=Low

## Product Classification

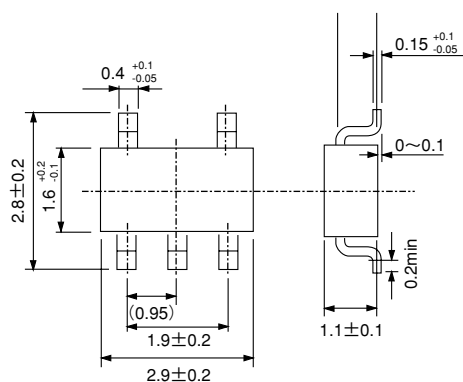
### Ordering Information

X C 6 2 G X X X X X X X  
↑ ↑ ↑ ↑ ↑ ↑  
a b c d e f

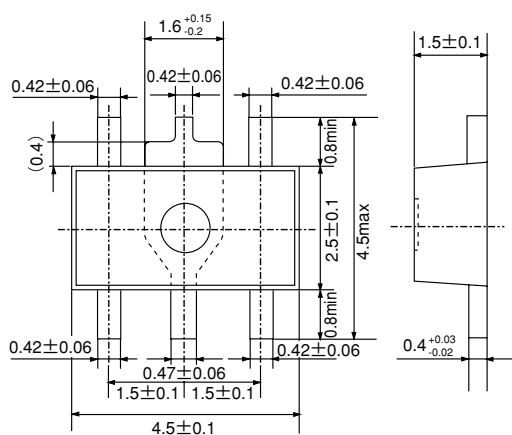
DESIGNATOR	DESCRIPTION	DESIGNATOR	DESCRIPTION
a	True Logic Level at CE Pin: R=Positive P=Negative(Custom)	e	Package Type M=SOT-25 P=SOT-89-5
b	Output Voltage 30=3.0V 50=5.0V		
c	Response: 1=Standard 2=High Speed (Semi-Custom)	f	Device Orientation R=Embossed Tape (Standard Feed) L=Embossed Tape (Reverse Feed)
d	Output Voltage Accuracy: 1=±1.0%(Semi-custom) 2=±2.0%		

## ■ Packaging Information

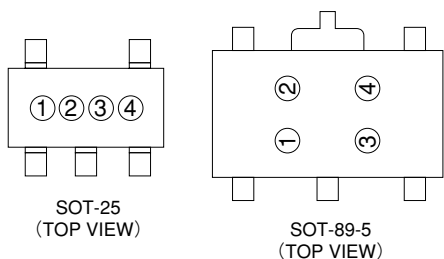
### ● SOT-25



### ● SOT-89-5



## ■ Marking



① Represents the integer of the Output Voltage

R TYPE POSITIVE VOLTAGE LOGIC SYMBOL	VOLTAGE(V)	P TYPE NEGATIVE VOLTAGE LOGIC SYMBOL	VOLTAGE(V)
A	0.②	$\bar{A}$	0.②
B	1.②	$\bar{B}$	1.②
C	2.②	$\bar{C}$	2.②
D	3.②	$\bar{D}$	3.②
E	4.②	$\bar{E}$	4.②
F	5.②	$\bar{F}$	5.②
H	6.②	$\bar{H}$	6.②

② Represents the decimal number of the Output Voltage

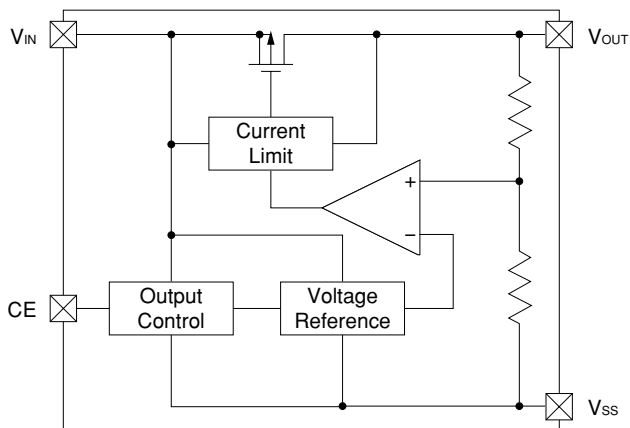
SYMBOL	VOLTAGE(V)	SYMBOL	VOLTAGE(V)
A	①.0	F	①.5
B	①.1	H	①.6
C	①.2	K	①.7
D	①.3	L	①.8
E	①.4	M	①.9

③ Represents the transition response

SYMBOL	TRANSITION RESPONSE
-	REGULAR
+	HIGH SPEED

④ Represents the assembly lot no.  
0-9,A-Z repeated (G, I, J, O, Q, W excepted)

## ■ Block Diagram



### ■ Absolute Maximum Ratings

 $T_a = 25^\circ\text{C}$ 

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V <sub>IN</sub>	12	V
Output Current		I <sub>OUT</sub>	500	mA
Output Voltage		V <sub>OUT</sub>	V <sub>SS</sub> -0.3~V <sub>IN</sub> +0.3	V
CE Input Voltage		V <sub>CE</sub>	V <sub>SS</sub> -0.3~V <sub>IN</sub> +0.3	V
Continuous Total Power Dissipation	SOT-25	P <sub>d</sub>	150	mW
	SOT-89-5	P <sub>d</sub>	500	
Operating Ambient Temperature		T <sub>opr</sub>	-30~+80	°C
Storage Temperature		T <sub>stg</sub>	-40~+125	°C

Note:  $I_{OUT}$  must be less than  $P_d/(V_{IN}-V_{OUT})$

## Electrical Characteristics

XC62GR30  $V_{OUT}(T)=3.0V$  (Note1) $T_a=25^{\circ}C$ 

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	$V_{OUT}(E)$ (Note2)	$I_{OUT}=40mA$ $V_{IN}=4.0V$	2.940	3.000	3.060	V	1
Maximum Output Current	$I_{OUT\ max.}$	$V_{IN}=4.0V$ $V_{OUT}(E) \geq 2.7V$	150			mA	1
Load Stability	$\Delta V_{OUT}$	$V_{IN}=4.0V$ $1mA \leq I_{OUT} \leq 80mA$		45	90	mV	1
Input-Output Voltage Differential (Note3)	$V_{DIF1}$	$I_{OUT}=80mA$		200	395	mV	1
	$V_{DIF2}$	$I_{OUT}=160mA$		380	770	mV	1
Supply Current1	$I_{SS1}$	$V_{IN}=V_{CE}=4.0V$ (Note6)	Standard	11	19	$\mu A$	2
			High Speed	23	31	$\mu A$	2
Supply Current2	$I_{SS2}$	$V_{IN}=4.0V, V_{CE}=V_{SS}$			0.1	$\mu A$	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $4.0V \leq V_{IN} \leq 10.0V$		0.2	0.3	%/V	1
Input Voltage	$V_{IN}$				10.0	V	–
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	$I_{OUT}=10mA$ $-30^{\circ}C \leq T_{opr} \leq 80^{\circ}C$		$\pm 100$		ppm/ $^{\circ}C$	
CE Input Voltage "High"	$V_{CEH}$		1.5			V	1
CE Input Voltage "Low"	$V_{CEL}$				0.25	V	1
CE Input Current "High"	$I_{CEH}$	$V_{CE}=V_{IN}$			5.0	$\mu A$	2
CE Input Current "Low"	$I_{CEL}$	$V_{CE}=V_{SS}$	-0.2	-0.05	0	$\mu A$	2

- Note:
1.  $V_{OUT}(T)$ =Specified Output Voltage .
  2.  $V_{OUT}(E)$ =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).
  3.  $V_{dif} = (V_{IN1} \text{ (Note5)} - V_{OUT1} \text{ (Note4)})$
  4.  $V_{OUT1}$ = A voltage equal to 98% of the Output Voltage whenever an amply stabilised  $I_{OUT}$  ( $V_{OUT}(T)+1.0V$ ) is input.
  5.  $V_{IN1}$ = The Input Voltage when  $V_{OUT1}$  appears as Input Voltage is gradually decreased.
  6. High Speed is Semi-custom.

XC62GR50  $V_{OUT}(T)=5.0V$  (Note1)

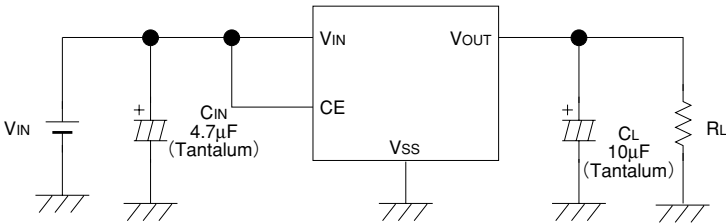
$T_a=25^{\circ}C$

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	$V_{OUT}(E)$ (Note2)	$I_{OUT}=40mA$ $V_{IN}=6.0V$	4.900	5.000	5.100	V	1
Maximum Output Current	$I_{OUT\ max.}$	$V_{IN}=6.0V$ $V_{OUT}(E) \geq 4.5V$	180			mA	1
Load Stability	$\Delta V_{OUT}$	$V_{IN}=6.0V$ $1mA \leq I_{OUT} \leq 100mA$		40	80	mV	1
Input-Output Voltage Differential (Note3)	$V_{DIF1}$	$I_{OUT}=100mA$		165	330	mV	1
	$V_{DIF2}$	$I_{OUT}=200mA$		330	660	mV	1
Supply Current1	$I_{SS1}$	$V_{IN}=V_{CE}=6.0V$ (Note6)	Standard	13	21	$\mu A$	2
			High Speed	27	35	$\mu A$	2
Supply Current2	$I_{SS2}$	$V_{IN}=6.0V, V_{CE}=V_{SS}$			0.1	$\mu A$	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $6.0V \leq V_{IN} \leq 10.0V$		0.2	0.3	%/V	1
Input Voltage	$V_{IN}$				10.0	V	-
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $-30^{\circ}C \leq T_{opr} \leq 80^{\circ}C$		$\pm 100$		ppm/ $^{\circ}C$	
CE Input Voltage "High"	$V_{CEH}$		1.5			V	1
CE Input Voltage "Low"	$V_{CEL}$				0.25	V	1
CE Input Current "High"	$I_{CEH}$	$V_{CE}=V_{IN}$			5.0	$\mu A$	2
CE Input Current "Low"	$I_{CEL}$	$V_{CE}=V_{SS}$	-0.2	-0.05	0	$\mu A$	2

- Note:
1.  $V_{OUT}(T)$ =Specified Output Voltage .
  2.  $V_{OUT}(E)$ =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).
  3.  $V_{dif} = \{V_{IN1} \text{ (Note5)} - V_{OUT1} \text{ (Note4)}\}$
  4.  $V_{OUT1}$ = A voltage equal to 98% of the Output Voltage whenever an amply stabilised  $I_{OUT}$  ( $V_{OUT}(T)+1.0V$ ) is input.
  5.  $V_{IN1}$ = The Input Voltage when  $V_{OUT1}$  appears as Input Voltage is gradually decreased.
  6. High Speed is Semi-custom.

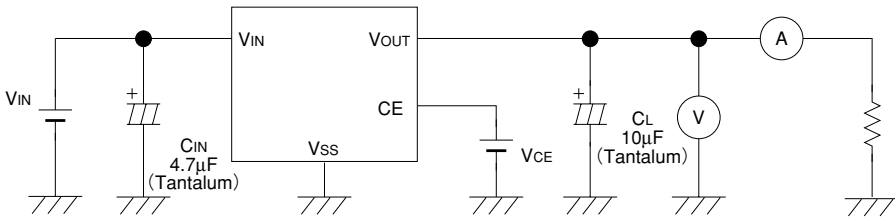
# ■ Typical Application Circuit

● Standard Circuit

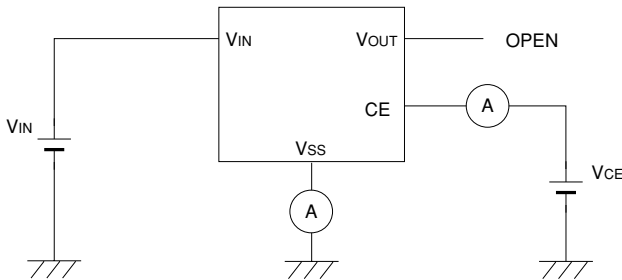


# ■ Test Circuits

Circuit 1

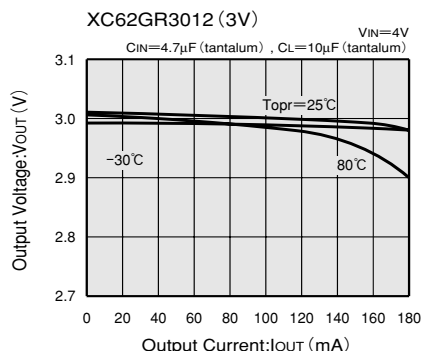
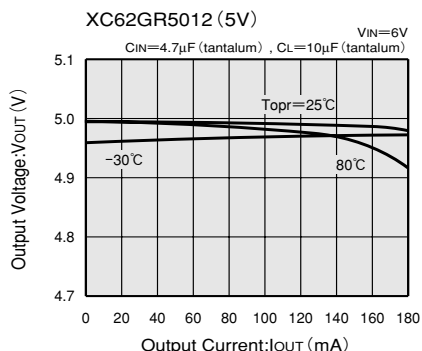


Circuit 2

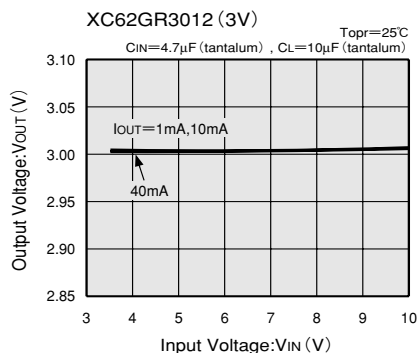
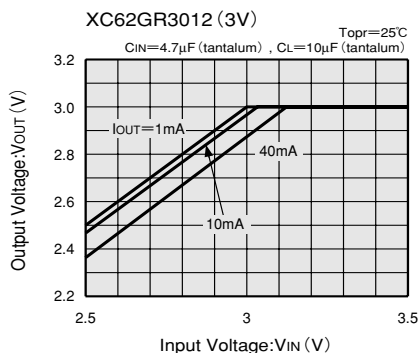
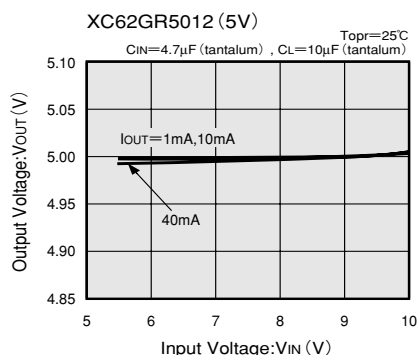
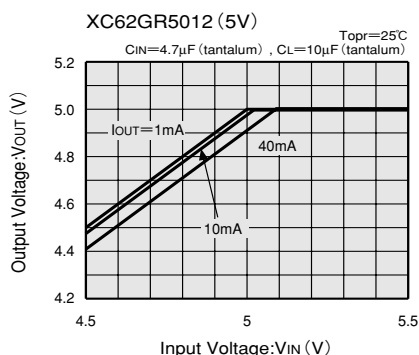


## ■ Typical Performance Characteristics

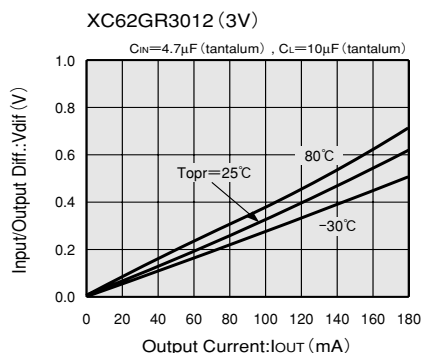
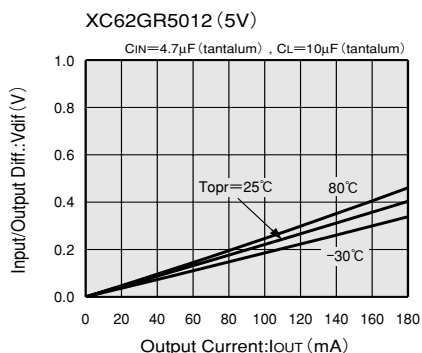
### (1) OUTPUT VOLTAGE vs. OUTPUT CURRENT



### (2) OUTPUT VOLTAGE vs. INPUT VOLTAGE

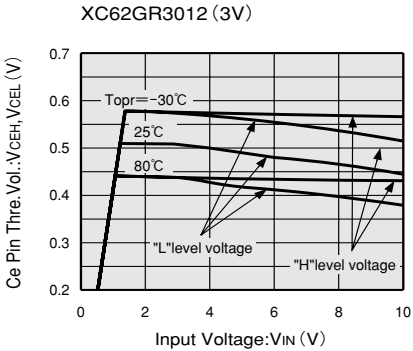
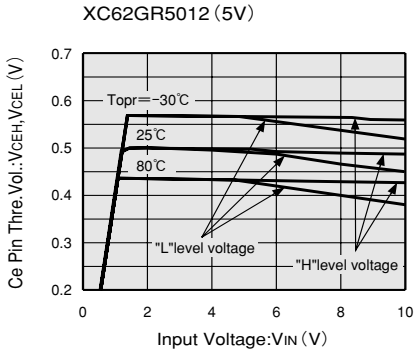


### (3) INPUT/OUTPUT VOLTAGE DIFFERENTIAL vs. OUTPUT CURRENT

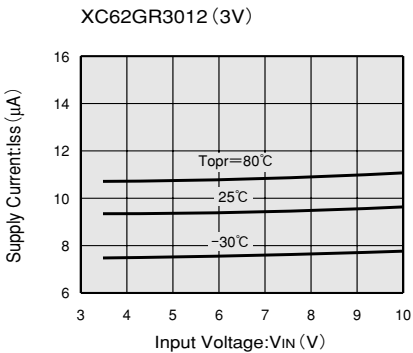
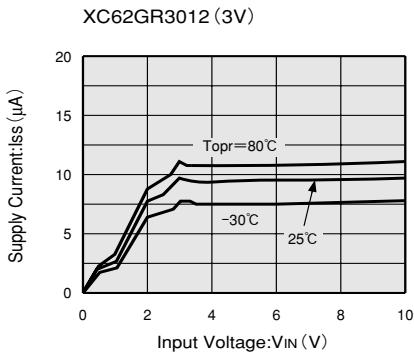
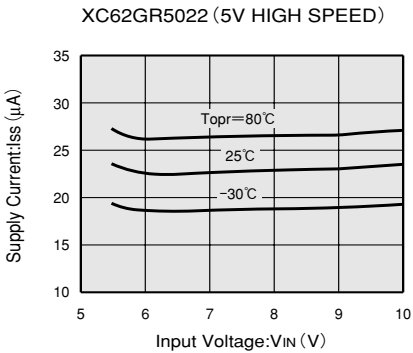
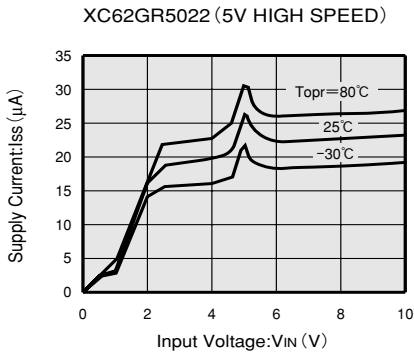
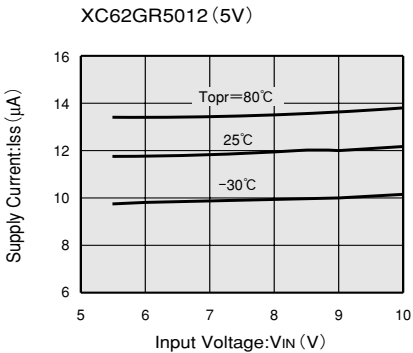
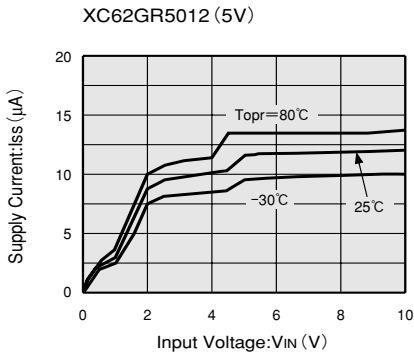




(4) CE PIN THRESHOLD VOLTAGE vs. INPUT VOLTAGE

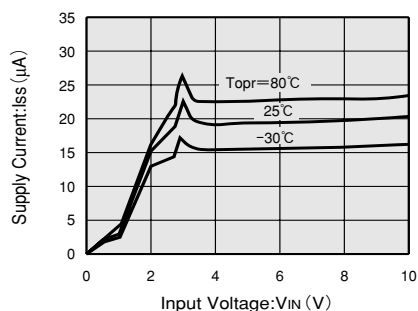


(5) SUPPLY CURRENT vs. INPUT VOLTAGE

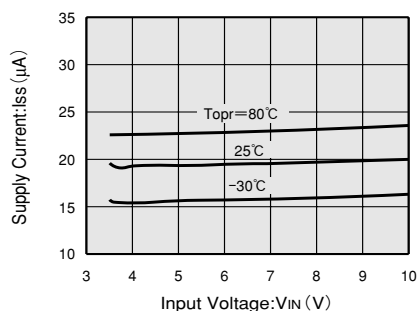


## (5) SUPPLY CURRENT vs. INPUT VOLTAGE

XC62GR3022 (3V HIGH SPEED)

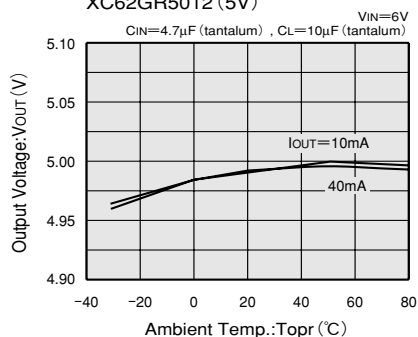


XC62GR3022 (3V HIGH SPEED)

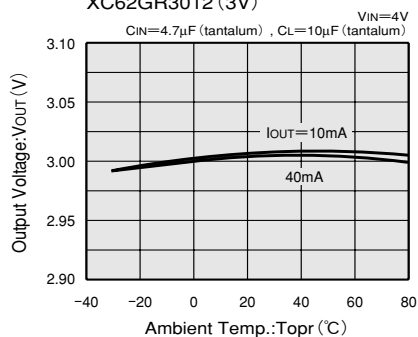


## (6) OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE

XC62GR5012 (5V)

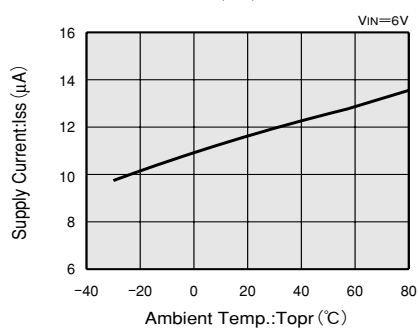


XC62GR3012 (3V)

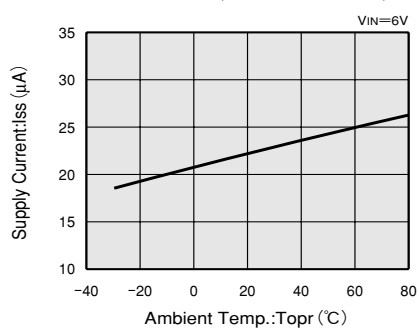


## (7) SUPPLY CURRENT vs. AMBIENT TEMPERATURE

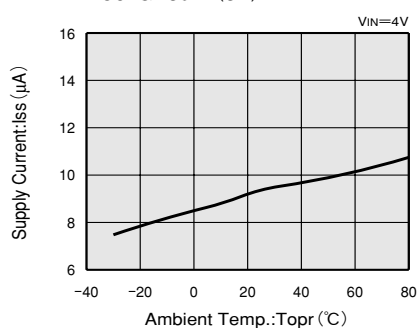
XC62GR5012 (5V)



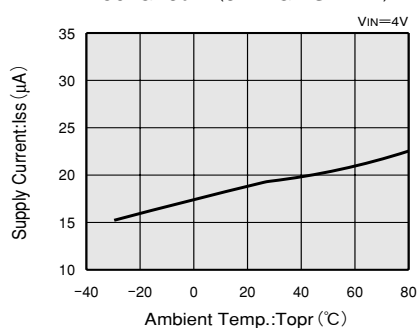
XC62GR5022 (5V HIGH SPEED)



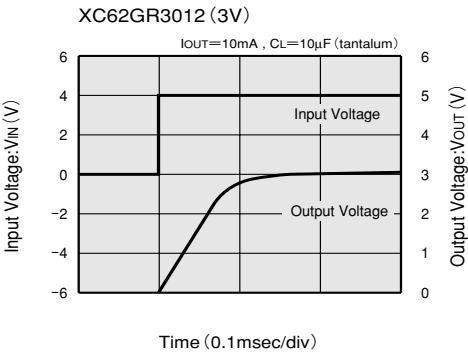
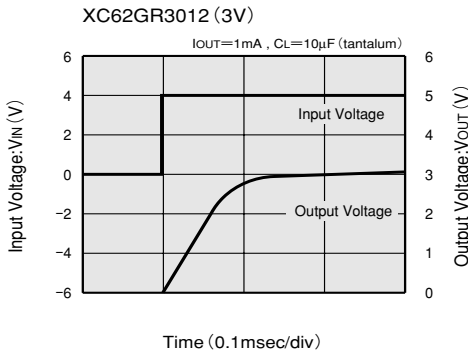
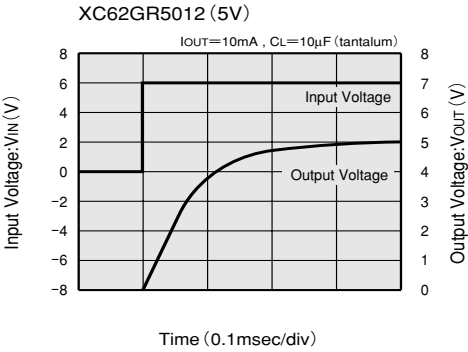
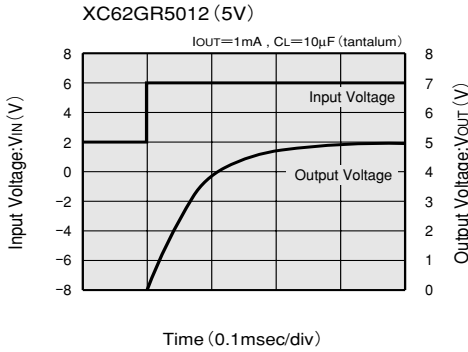
XC62GR3012 (3V)



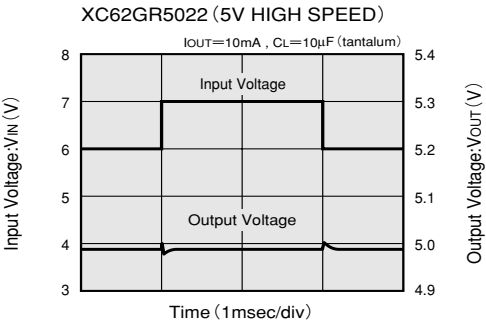
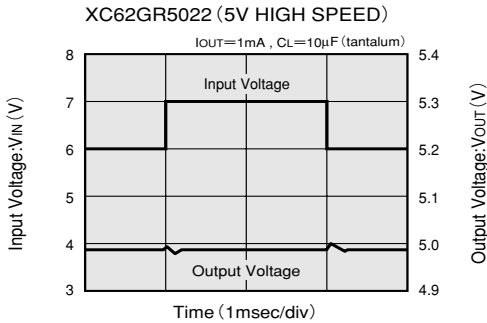
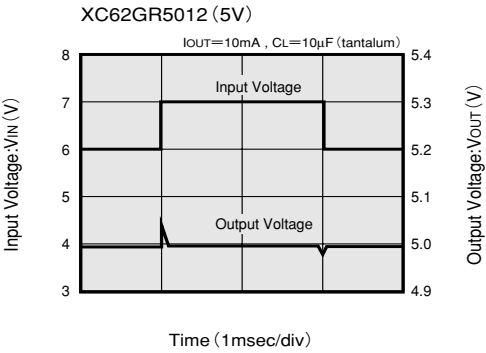
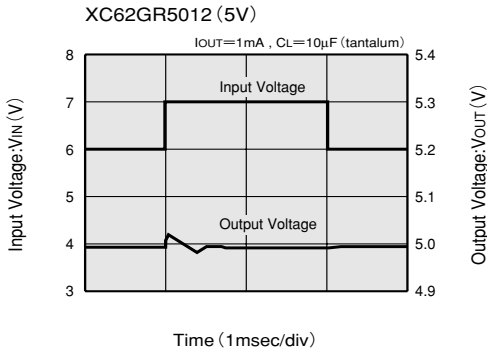
XC62GR3022 (3V HIGH SPEED)



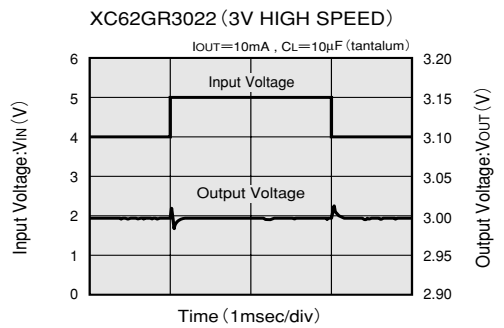
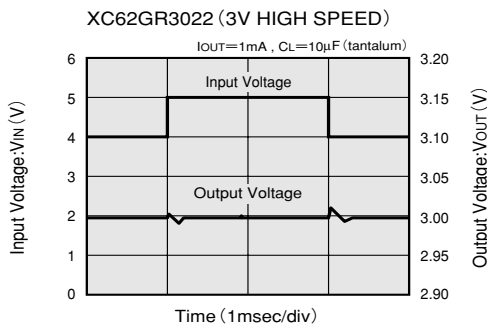
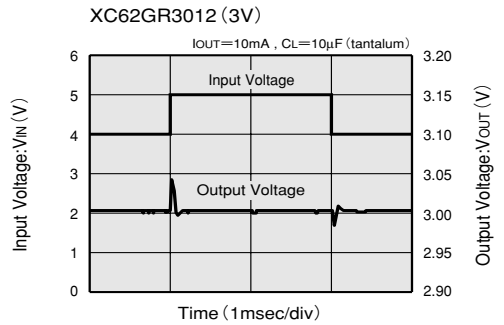
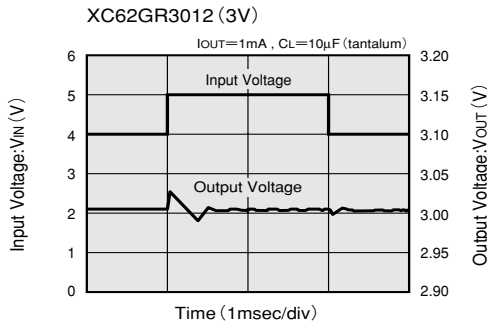
(8) INPUT TRANSIENT RESPONSE 1



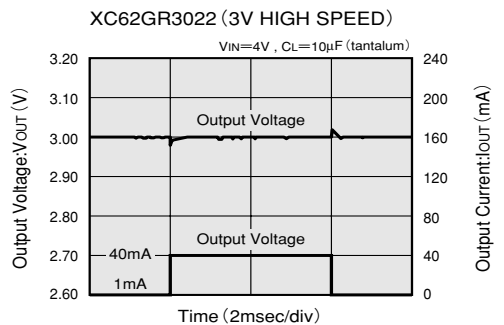
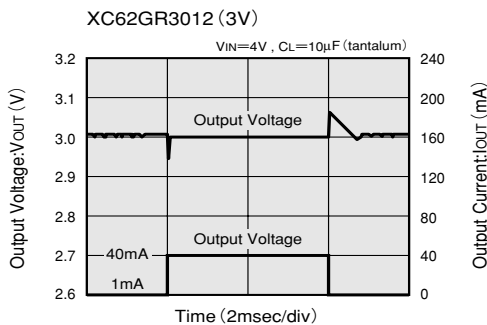
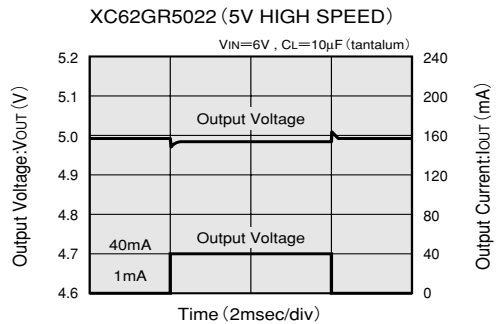
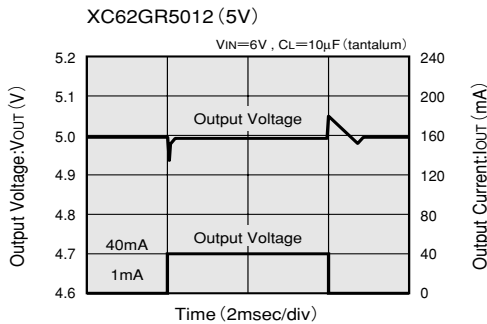
(9) INPUT TRANSIENT RESPONSE 2



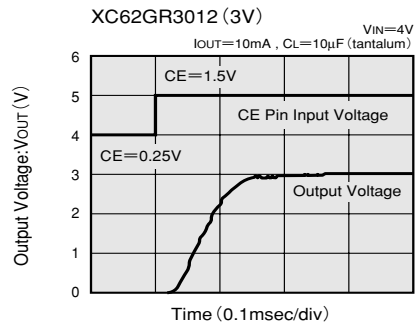
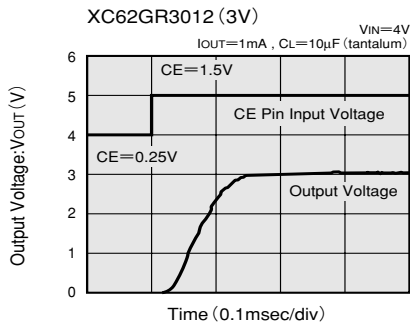
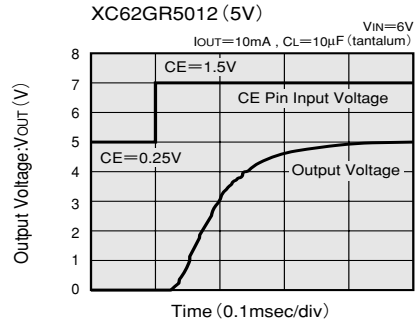
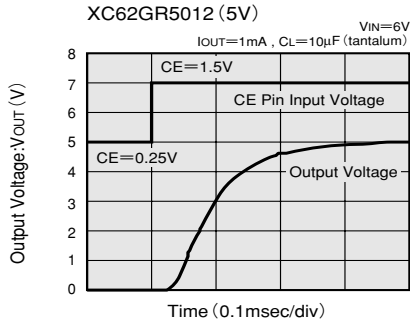
## (9) INPUT TRANSIENT RESPONSE 2



## (10) LOAD TRANSIENT RESPONSE



### (11) CE PIN TRANSIENT RESPONSE



### (12) RIPPLE REJECTION RATE

