XC62G Series

Positive Voltage Regulators (Output On/Off)

TOREX

◆**CMOS Low Power Consumption**

◆**Small Input-Output Voltage Differential**
: 0.2V @ 80mA,
0.38V @ 160mA

◆**Maximum Output Current**
: 150mA (VOUT = 3.0V)

◆**Highly Accurate : ±2% (±1%)**

◆**Output Voltage Range**
: 2.1V ~ 5.0V

◆**Stand-by Supply Current**
: 0.1μA (VOUT = 3.0V)

◆**SOT-25 / SOT-89-5 Package**

■Applications

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

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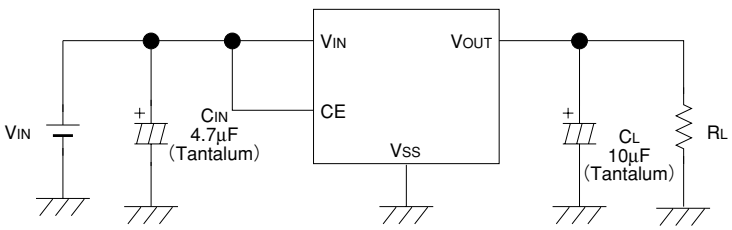
■General Description

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.

■Features

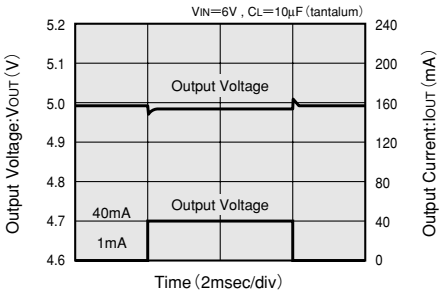
Maximum Output Current
: 150mA (within max. power dissipation,VOUT=3.0V)
Output Voltage Range : 2.1V~5.0V in 0.1V increments
Highly Accurate : Set-up voltage ±2%
(±1% for semi-custom products)
Low Power Consumption
: TYP. 13μA (VOUT= 3.0V),
TYP 23μA (VOUT=3.0V semi-custom, high-speed versions),
TYP 0.1μA (Stand-by mode)
Output Voltage Temperature Characteristics
: TYP ±100ppm/°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

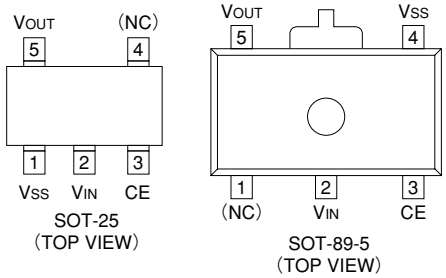


■Typical Performance Characteristic

XC62GR5022 (5V HIGH SPEED)



■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

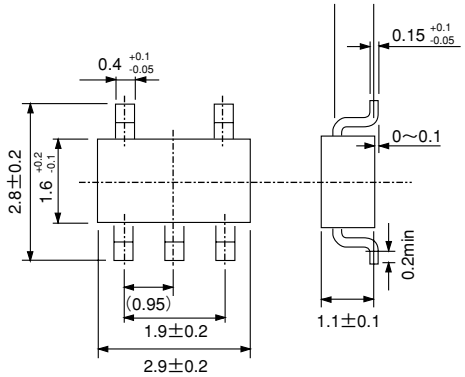
X C 6 2 G X X X X X X X

a b c d e f

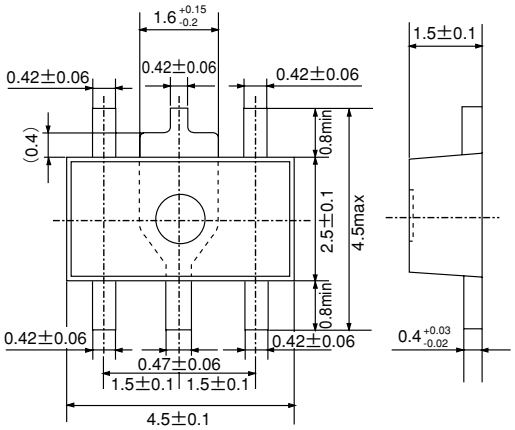
DESIGNATOR	DESCRIPTION	DESIGNATOR	DESCRIPTION
a	True Logic Level at CE Pin: R=Positive P=Negative(Custom)	e	Package Type M=SOT-25 P=SOT-89-5
b	Output Voltage 30=3.0V 50=5.0V	f	Device Orientation R=Embossed Tape (Standard Feed) L=Embossed Tape (Reverse Feed)
c	Response: 1=Standard 2=High Speed (Semi-Custom)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

■Packaging Information

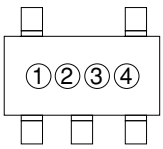
●SOT-25



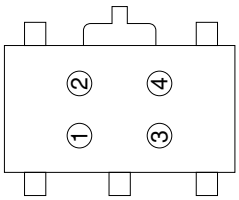
●SOT-89-5



■Marking



SOT-25
(TOP VIEW)



SOT-89-5
(TOP VIEW)

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

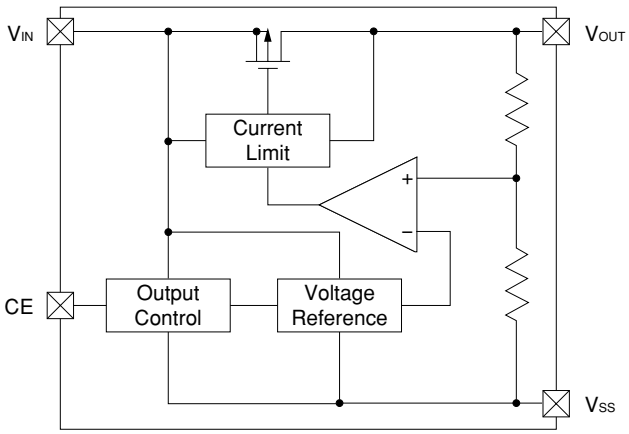
SYMBOL	VOLTAGE(V)	SYMBOL	VOLTAGE(V)
A	①.0	F	①.5
B	①.1	H	①.6
C	①.2	K	①.7
D	①.3	L	①.8
E	①.4	M	①.9

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

Ta=25°C

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	12	V
Output Current		I_{OUT}	500	mA
Output Voltage		V_{OUT}	V_{SS}-0.3~V_{IN}+0.3	V
CE Input Voltage		V_{CE}	V_{SS}-0.3~V_{IN}+0.3	V
Continuous Total Power Dissipation	SOT-25	Pd	150	mW
	SOT-89-5	Pd	500	
Operating Ambient Temperature		Topr	-30~+80	°C
Storage Temperature		Tstg	-40~+125	°C

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

■Electrical Characteristics

XC62GR30 $V_{OUT}(T)$=3.0V(Note1) Ta=25°C

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS	CIRCUT
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}=4.0 $V_{OUT(E)}$≥2.7V		150			mA	1
Load Stability	ΔV_{OUT}	V_{IN}=4.0V 1mA≤I_{OUT}≤80mA			45	90	mV	1
Input-Output Voltage Differential (Note3)	$V_{DIF}1$	I_{OUT}=80mA			200	395	mV	1
	$V_{DIF}2$	I_{OUT}=160mA			380	770	mV	1
Supply Current1	Iss1	V_{IN}=V_{CE}=4.0V (Note6)	Standard		11	19	μA	2
			High Speed		23	31	μA	2
Supply Current2	$I_{SS}2$	V_{IN}=4.0V,V_{CE}=V_{SS}				0.1	μA	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA 4.0V≤V_{IN}≤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°C≤Topr≤80°C			±100		ppm/°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	μA	2
CE Input Current "Low"	I_{CEL}	V_{CE}=V_{SS}		–0.2	–0.05	0	μA	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. Vdif= {$V_{IN}1$ (Note5)-$V_{OUT}1$ (Note4)}
4. $V_{OUT}1$= A voltage equal to 98% of the Output Voltage whenever an amply stabilised I_{OUT} {$V_{OUT}(T)$+1.0V} is input.
5. $V_{IN}1$= The Input Voltage when $V_{OUT}1$ appears as Input Voltage is gradually decreased.
6. High Speed is Semi-custom.

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

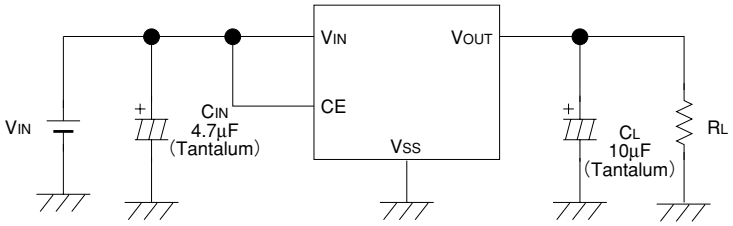
Ta=25°C

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS	CIRCUT
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}=6.0 $V_{OUT(E)}$≥4.5V		180			mA	1
Load Stability	ΔV_{OUT}	V_{IN}=6.0V 1mA≤I_{OUT}≤100mA			40	80	mV	1
Input-Output Voltage Differential (Note3)	V_{DIF}1	I_{OUT}=100mA			165	330	mV	1
	V_{DIF}2	I_{OUT}=200mA			330	660	mV	1
Supply Current1	I_{SS}1	V_{IN}=V_{CE}=6.0V (Note6)	Standard		13	21	μA	2
			High Speed		27	35	μA	2
Supply Current2	I_{SS}2	V_{IN}=6.0V,V_{CE}=V_{SS}				0.1	μA	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA 6.0V≤V_{IN}≤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°C≤Topr≤80°C			±100		ppm/°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	μA	2
CE Input Current "Low"	I_{CEL}	V_{CE}=V_{SS}		–0.2	–0.05	0	μA	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. Vdif= {V_{IN1} (Note5)-V_{OUT1} (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.

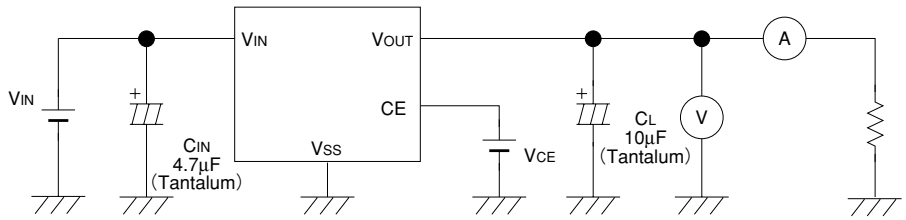
■Typical Application Circuit

●Standard Circuit

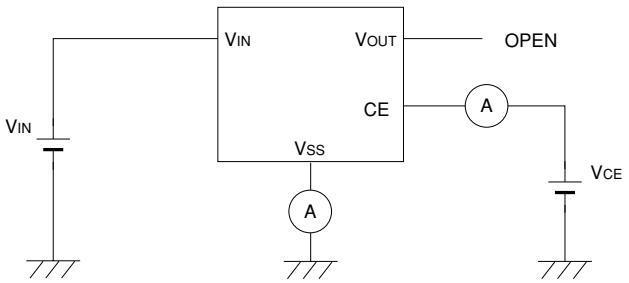


■Test Circuits

Circuit 1

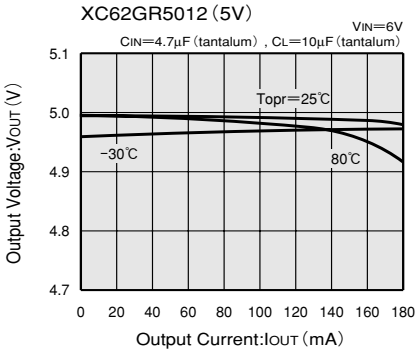


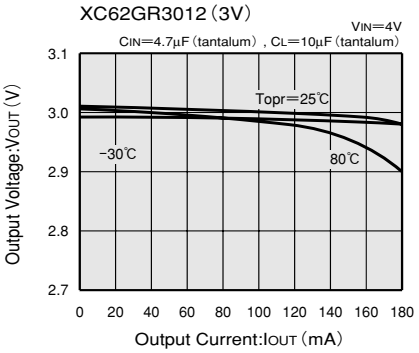
Circuit 2



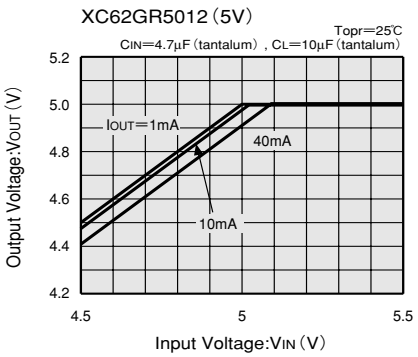
■Typical Performance Characteristics

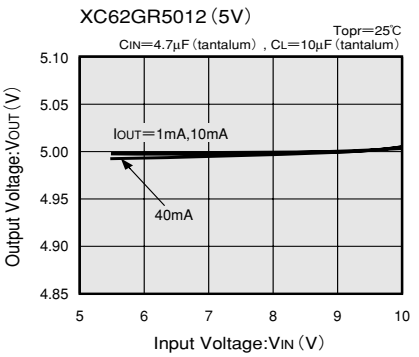
(1) OUTPUT VOLTAGE vs. OUTPUT CURRENT

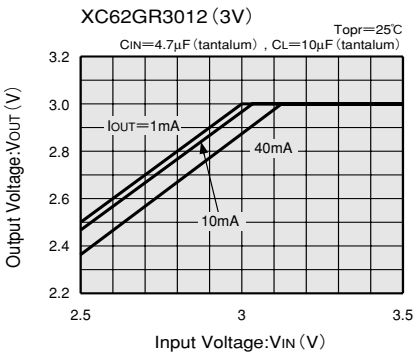


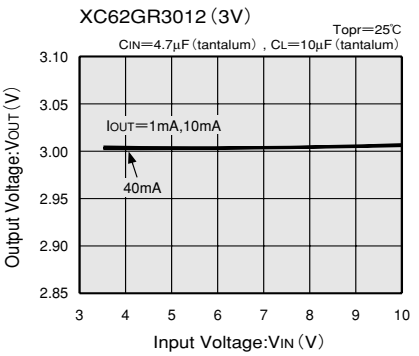


(2) OUTPUT VOLTAGE vs. INPUT VOLTAGE

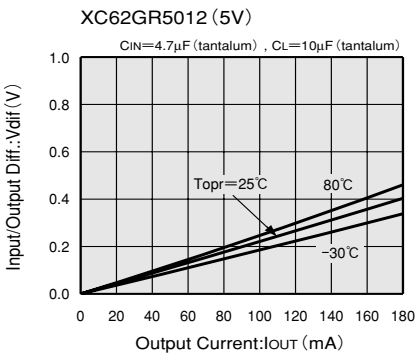


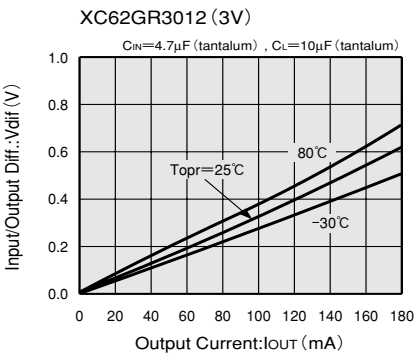






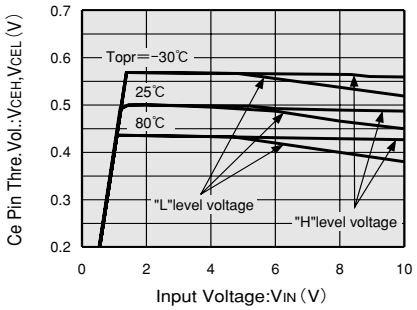
(3) INPUT/OUTPUT VOLTAGE DIFFERENTIAL vs. OUTPUT CURRENT



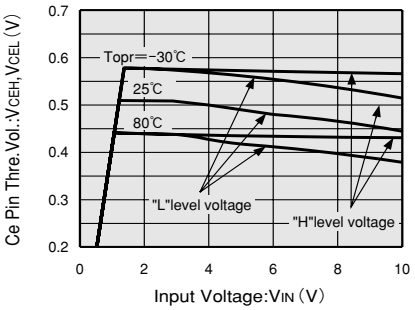


(4) CE PIN THRESHOLD VOLTAGE vs. INPUT VOLTAGE

XC62GR5012（5V）

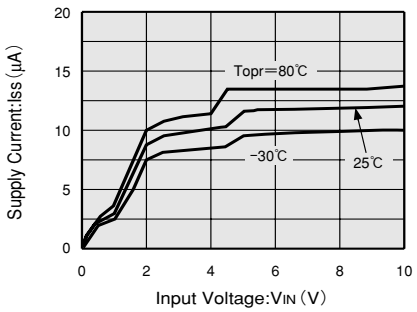


XC62GR3012（3V）

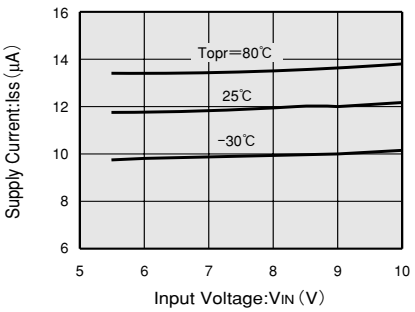


(5) SUPPLY CURRENT vs. INPUT VOLTAGE

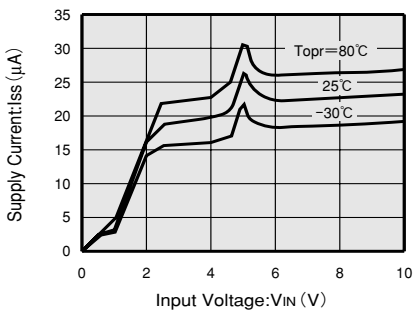
XC62GR5012（5V）



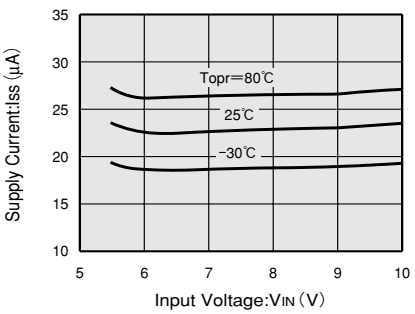
XC62GR5012（5V）



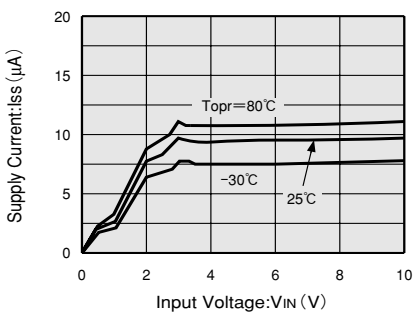
XC62GR5022（5V HIGH SPEED）



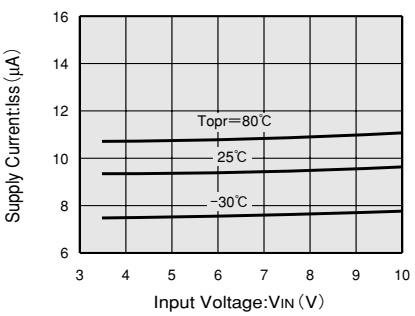
XC62GR5022（5V HIGH SPEED）



XC62GR3012（3V）

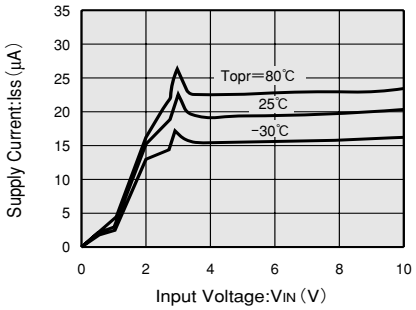


XC62GR3012（3V）

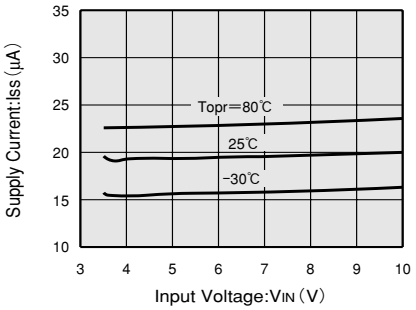


(5) SUPPLY CURRENT vs. INPUT VOLTAGE

XC62GR3022 (3V HIGH SPEED)

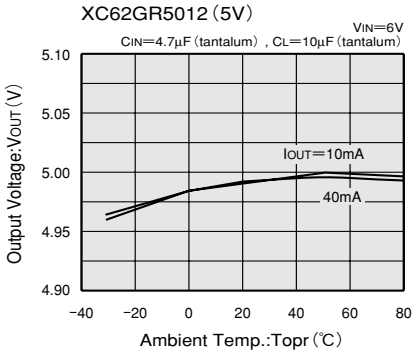


XC62GR3022 (3V HIGH SPEED)

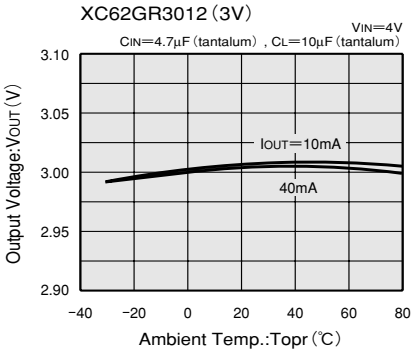


(6) OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE

XC62GR5012 (5V)

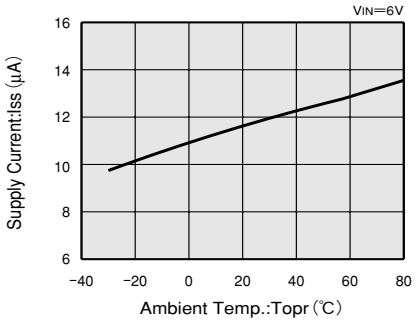


XC62GR3012 (3V)

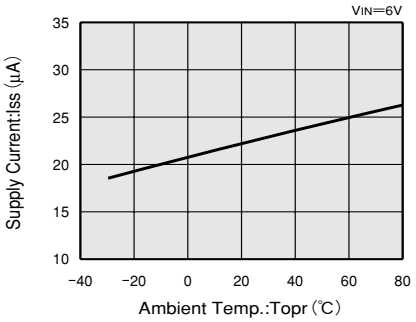


(7) SUPPLY CURRENT vs. AMBIENT TEMPERATURE

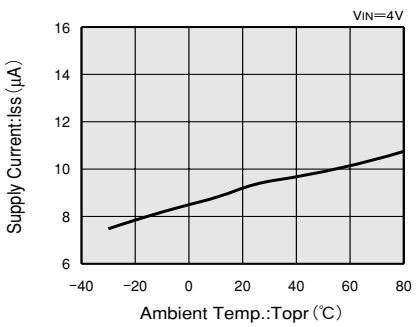
XC62GR5012 (5V)



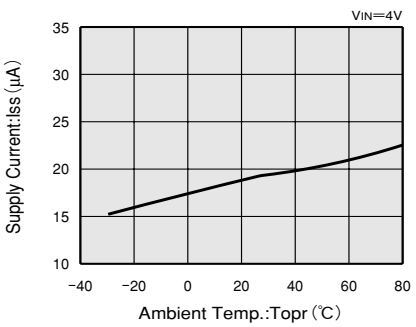
XC62GR5022 (5V HIGH SPEED)



XC62GR3012 (3V)

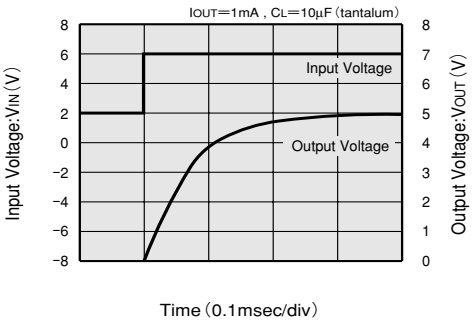


XC62GR3022 (3V HIGH SPEED)



(8) INPUT TRANSIENT RESPONSE 1

XC62GR5012 (5V)



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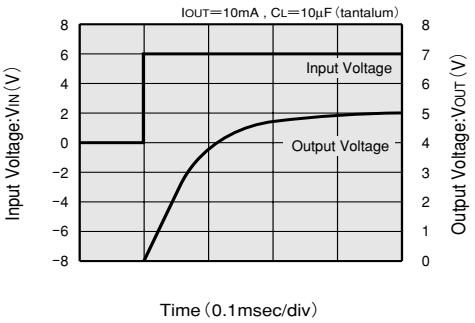

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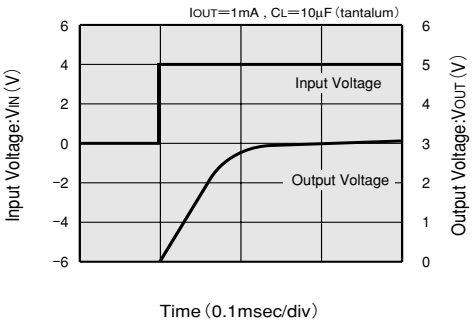

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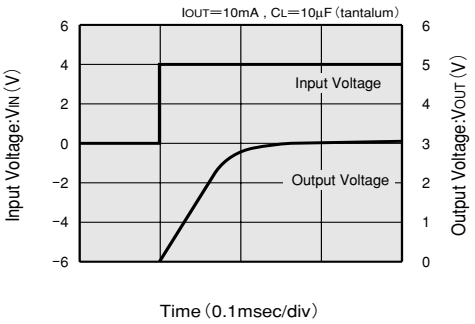

(9) INPUT TRANSIENT RESPONSE 2

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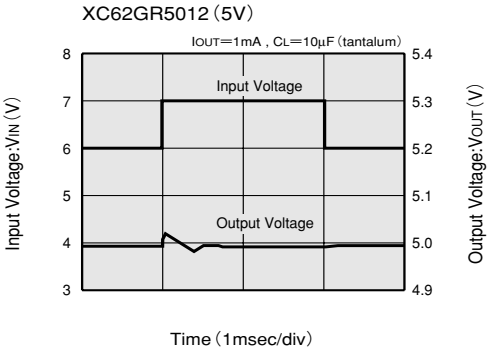

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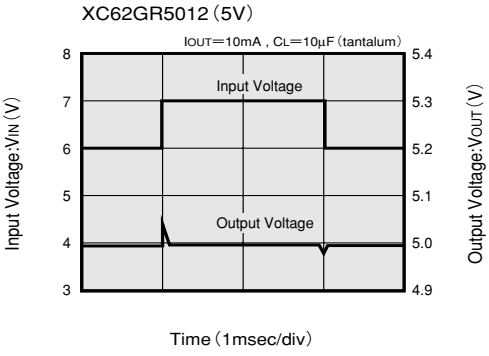
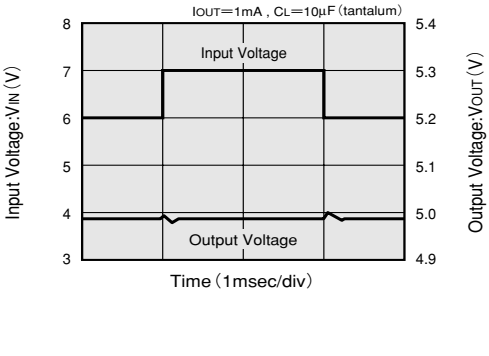
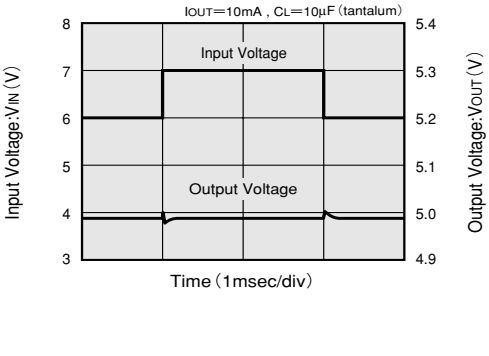


XC62GR5022 (5V HIGH SPEED)

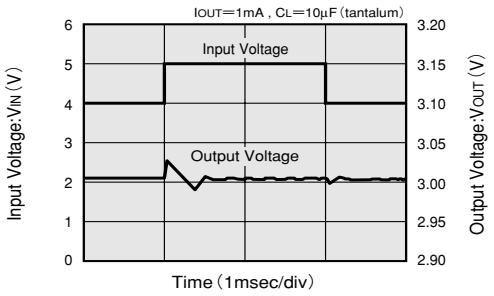


XC62GR5022 (5V HIGH SPEED)



(9) INPUT TRANSIENT RESPONSE 2

XC62GR3012 (3V)



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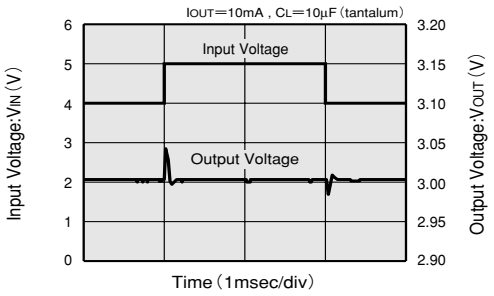
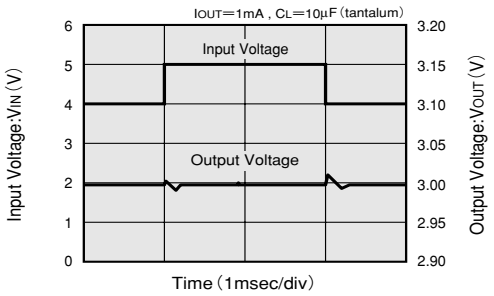
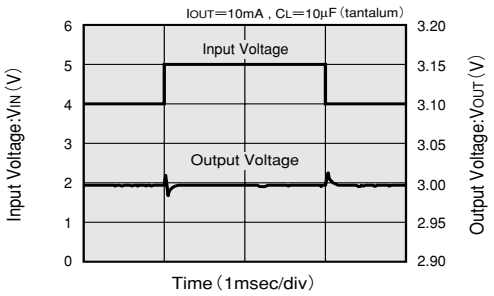


XC62GR3022 (3V HIGH SPEED)

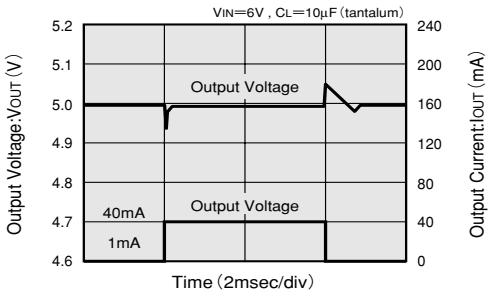


XC62GR3022 (3V HIGH SPEED)

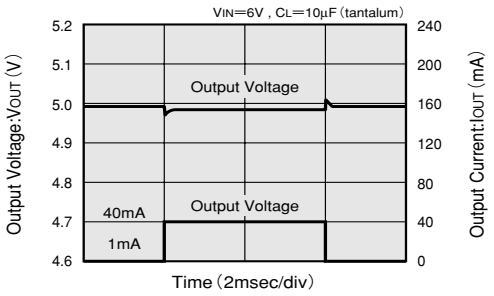


(10) LOAD TRANSIENT RESPONSE

XC62GR5012 (5V)



XC62GR5022 (5V HIGH SPEED)



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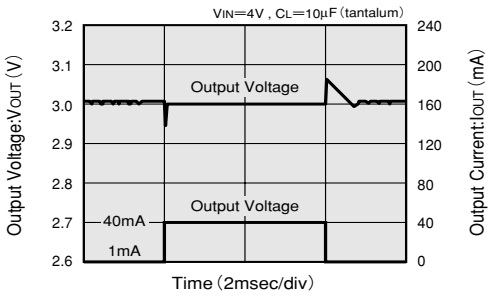

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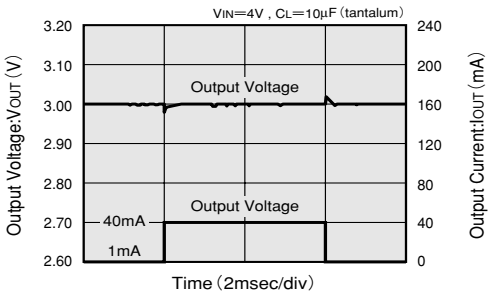
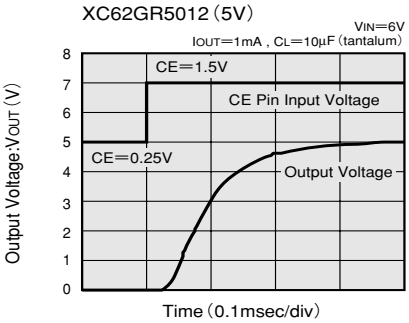
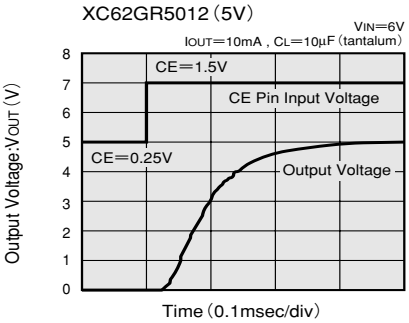
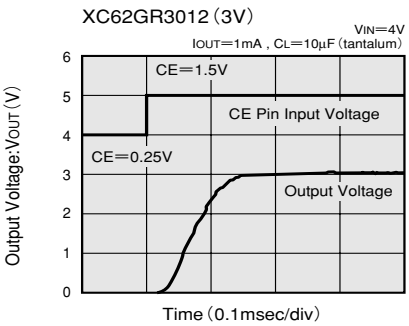
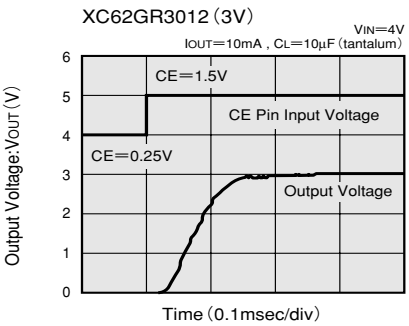


(11) CE PIN TRANSIENT RESPONSE









(12) RIPPLE REJECTION RATE