- **CMOS Low Power Consumption**
- **Small Input-Output Voltage Differential: 0.18V at 60mA, 0.58V at 160mA**
- **Maximum Output Current: 165mA (VOUT=3.0V)**
- **Highly Accurate: ±2%(±1%)**
- **Output Voltage Range: 2.0V~6.0V**
- **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 and Video Recorders
- Palmtops

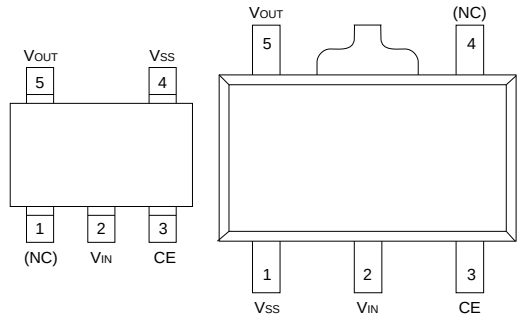
General Description

The XC62H series are highly precise, low power consumption, positive voltage regulators, manufactured using CMOS and laser trimming technologies. The series consists of a high precision voltage reference, an error correction circuit, and an output driver with current limitation.
By way of the CE function, with output turned off, the series enters stand-by. In the stand-by mode, power consumption is greatly reduced.
SOT-25 (150mW) and SOT-89-5 (500mW) packages are available.
In relation to the CE function, as well as the positive logic XC62HR series, a negative logic XC62HP series (custom) is also available.

Features

Max. Output Current: 165mA (within max. power dissipation, VOUT=3.0V)
Output Voltage Range: 2.0V ~ 6.0V in 0.1V increments
(1.1V to 1.9V semi-custom)
Highly Accurate: Set-up Voltage ±2% (±1% for semi-custom products)
Low power consumption: TYP 3.0μA (VOUT=3.0, Output enabled)
TYP 0.1μA (Output disabled)
Output voltage temperature characteristics: TYP ±100ppm/°C
Input stability: TYP 0.2%/V
Ultra small package: SOT-25 (150mW) mini-mold
SOT-89-5 (500mW) mini-power mold

Pin Configuration



SOT-25
(TOP VIEW)

SOT-89-5
(TOP VIEW)

Pin Assignment

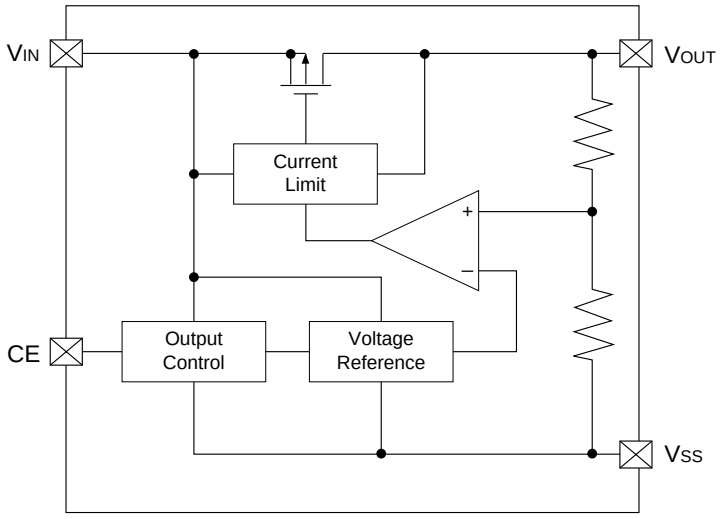
PIN NUMBER		PIN NAME	FUNCTION
SOT-25	SOT-89-5		
1	4	(NC)	No Connection
2	2	VIN	Supply Voltage Input
3	3	CE	Chip Enable
4	1	VSS	Ground
5	5	VOUT	Regulated Output Voltage

Function

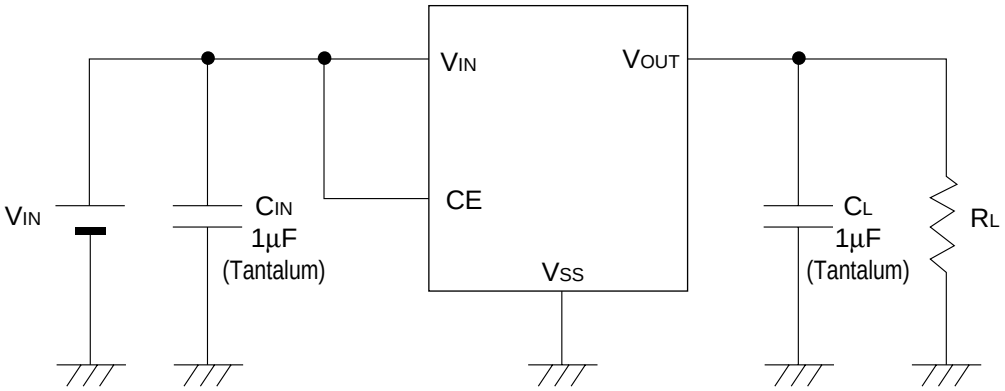
SERIES	CE	VOLTAGE OUTPUT
XC62HR	H	ON
	L	OFF
XC62HP	H	OFF
	L	ON

H=High, L=Low

Block Diagram

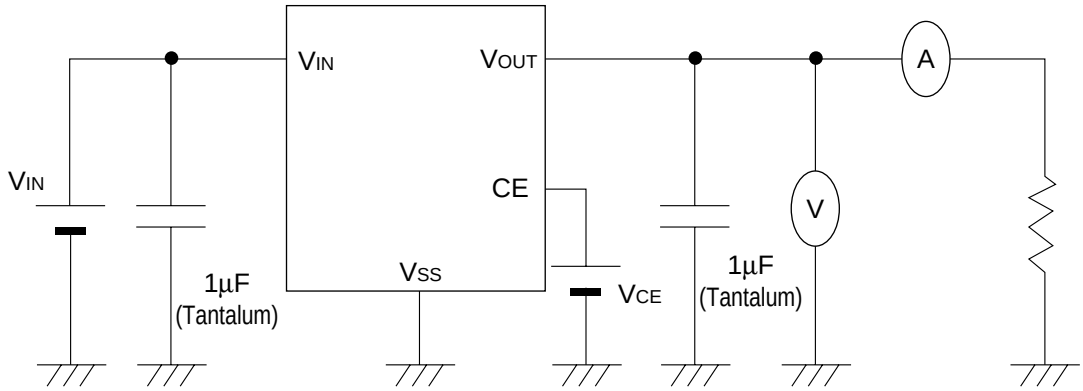


■ Standard Circuit



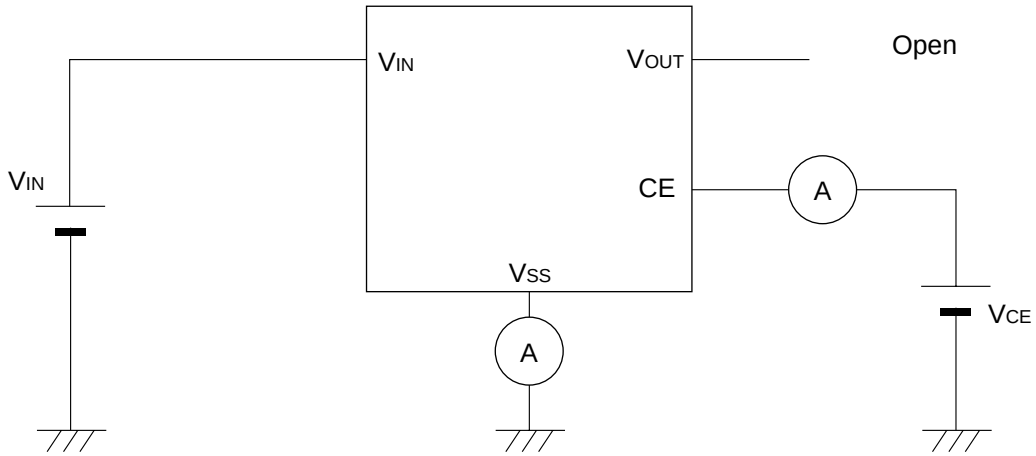
■ Typical Application Circuit

Circuit 1



■ Typical Application Circuit

Circuit 2



■ Absolute Maximum Ratings

Ta=25℃

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		V_{IN}	12	V
Output Current		I_{OUT}	500	mA
Output Voltage		V_{OUT}	VSS-0.3 ~ V_{IN}+0.3	V
CE Input Voltage		VCE	VSS-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	℃
Storage Temperature		Tstg	-40 ~ +25	℃

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

■ Electrical Characteristics

XC62HR2002 V_{OUT}(T)=2.0V(Note1)

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	V_{OUT} (E) (Note2)	I_{OUT}=40mA 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) ≧ 1.8V	115			mA	1
Load Stability	ΔVOUT	V_{IN}=3.0V 1mA ≦ I_{OUT} ≦ 60mA		45	90	mV	1
Input -Output Voltage Differential (Note3)	Vdif1	I_{OUT}=40mA		180	360	mV	1
	Vdif2	I_{OUT}=100mA		580	880	mV	1
Supply Current1	Iss1	V_{IN}=V_{CE}=3.0V		2.9	7.9	μA	2
Supply Current2	Iss2	V_{IN}=3.0V, V_{CE}=V_{SS}			0.1	μA	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA 3.0V ≦ V_{IN} ≦ 10.0V		0.2	0.3	%/V	1
Input Voltage	V_{IN}				10.0	V	—
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta Topr \cdot V_{OUT}}$	I_{OUT}=40mA -30℃ ≦ Topr ≦ 80℃		±100		ppm/℃	1
CE "High" Voltage	V_{CEH}		1.5			V	1
CE "Low" Voltage	V_{CEL}				0.25	V	1
CE "High" Current	I_{CEH}	V_{CE}=V_{IN}			5.0	μA	2
CE "Low" Current	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 ceratain 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.

■ Electrical Characteristics

XC62HR3002 $V_{OUT}(T)$=3.0V(Note1) Ta=25℃

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)≧2.7V	165			mA	1
Load Stability	ΔVOUT	V_{IN}=4.0V 1mA ≦ I_{OUT} ≦ 80mA		45	90	mV	1
Input -Output Voltage Differential (Note3)	Vdif1	I_{OUT}=60mA		180	360	mV	1
	Vdif2	I_{OUT}=160mA		580	880	mV	1
Supply Current1	I_{SS}1	V_{IN}=V_{CE}=4.0V		3.0	8.0	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	$\frac{\Delta V_{OUT}}{\Delta Topr \cdot V_{OUT}}$	I_{OUT}=40mA -30℃ ≦ Topr ≦ 80℃		±100		ppm/℃	1
CE "High" Voltage	V_{CEH}		1.5			V	1
CE "Low" Voltage	V_{CEL}				0.25	V	1
CE "High" Current	I_{CEH}	V_{CE}=V_{IN}			5.0	μA	2
CE "Low" Current	I_{CEL}	V_{CE}=V_{SS}	-0.2	-0.05	0	μA	2

XC62HR4002 $V_{OUT}(T)$=4.0V(Note1) Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	V_{OUT} (E) (Note2)	I_{OUT}=40mA V_{IN}=5.0V	3.920	4.000	4.080	V	1
Maximum Output Current	I_{OUT} max	V_{IN}=5.0V, V_{OUT}(E) ≧ 3.6V	200			mA	1
Load Stability	ΔVOUT	V_{IN}=5.0V 1mA ≦ I_{OUT} ≦ 100mA		45	90	mV	1
Input -Output Voltage Differential (Note3)	Vdif1	I_{OUT}=80mA		170	340	mV	1
	Vdif2	I_{OUT}=180mA		560	840	mV	1
Supply Current1	I_{SS}1	V_{IN}=V_{CE}=5.0V		3.1	8.1	μA	2
Supply Current2	I_{SS}2	V_{IN}=5.0V, V_{CE}=V_{SS}			0.1	μA	2
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I_{OUT}=40mA 5.0V ≦ V_{IN} ≦ 10.0V		0.2	0.3	%/V	1
Input Voltage	V_{IN}				10.0	V	—
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta Topr \cdot V_{OUT}}$	I_{OUT}=40mA -30℃ ≦ Topr ≦ 80℃		±100		ppm/℃	1
CE "High" Voltage	V_{CEH}		1.5			V	1
CE "Low" Voltage	V_{CEL}				0.25	V	1
CE "High" Current	I_{CEH}	V_{CE}=V_{IN}			5.0	μA	2
CE "Low" Current	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 ceratain 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. Semi-custom.

■ Electrical Characteristics

XC62HR5002 V_{OUT}(T)=5.0V(Note1) Ta=25℃

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) ≧ 4.5V	220			mA	1
Load Stability	ΔVOUT	V_{IN}=6.0V 1mA ≦ I_{OUT} ≦ 100mA		40	80	mV	1
Input -Output Voltage Differential (Note3)	Vdif1	I_{OUT}=100mA		165	320	mV	1
	Vdif2	I_{OUT}=200mA		540	820	mV	1
Supply Current1	I_{SS}1	V_{IN}=V_{CE}=6.0V		3.1	8.1	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	$\frac{\Delta V_{OUT}}{\Delta Topr \cdot V_{OUT}}$	I_{OUT}=40mA -30℃ ≦ Topr ≦ 80℃		±100		ppm/℃	1
CE "High" Voltage	V_{CEH}		1.5			V	1
CE "Low" Voltage	V_{CEL}				0.25	V	1
CE "High" Current	I_{CEH}	V_{CE}=V_{IN}			5.0	μA	2
CE "Low" Current	I_{CEL}	V_{CE}=V_{SS}	-0.2	-0.05	0	μA	2

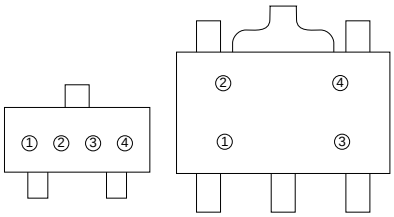
Note:
1. V_{OUT}(T)=Specified Output Voltage .
2. V_{OUT}(E)=Effective Output Voltage (i.e. the output voltage when "V_{OUT}(T)+1.0V" is provided at the V_{IN} pin while maintaining a ceratain I_{OUT} value).
3. Vdif= {V_{IN}1 (Note5)-V_{OUT}1 (Note4)}
4. V_{OUT}1= A voltage equal to 98% of the Output 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. Semi-custom.

■ Ordering Information

XC62Hxxxxxxx
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	0	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



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)
0	0.②	$\overline{0}$	0.②
1	1.②	$\overline{1}$	1.②
2	2.②	$\overline{2}$	2.②
3	3.②	$\overline{3}$	3.②
4	4.②	$\overline{4}$	4.②
5	5.②	$\overline{5}$	5.②
6	6.②	$\overline{6}$	6.②
7	7.②	$\overline{7}$	7.②
8	8.②	$\overline{8}$	8.②
9	9.②	$\overline{9}$	9.②

② Represents the decimal point of the Output Voltage

SYMBOL	VOLTAGE(V)	SYMBOL	VOLTAGE(V)
0	①.0	$\overline{0}$	①.0
1	①.1	$\overline{1}$	①.1
2	①.2	$\overline{2}$	①.2
3	①.3	$\overline{3}$	①.3
4	①.4	$\overline{4}$	①.4
5	①.5	$\overline{5}$	①.5
6	①.6	$\overline{6}$	①.6
7	①.7	$\overline{7}$	①.7
8	①.8	$\overline{8}$	①.8
9	①.9	$\overline{9}$	①.9

③ Based on internal standards

SYMBOL
-

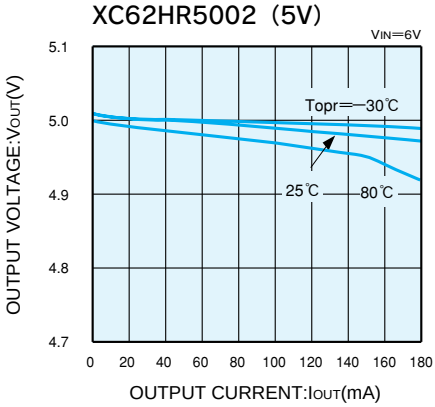
④ Represents the assembly lot no.

0-9,A-Z repeated (G, I, J, O, Q, W excepted)

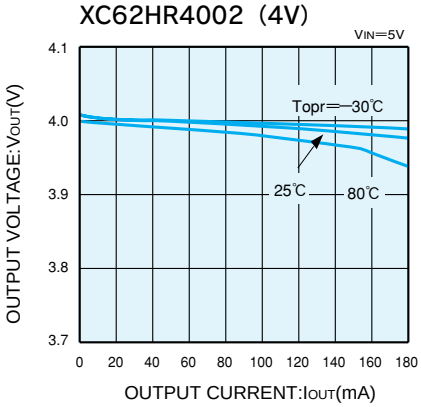
■ XC62H Electrical Characteristics

(1) OUTPUT VOLTAGE vs. OUTPUT CURRENT

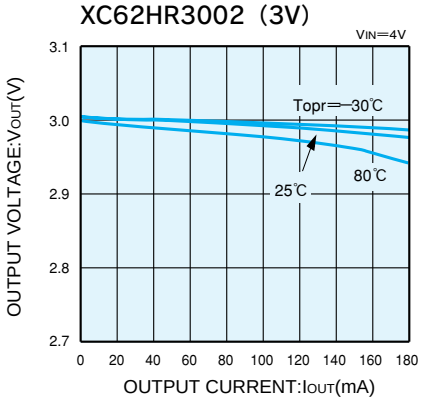
XC62HR5002（5V）



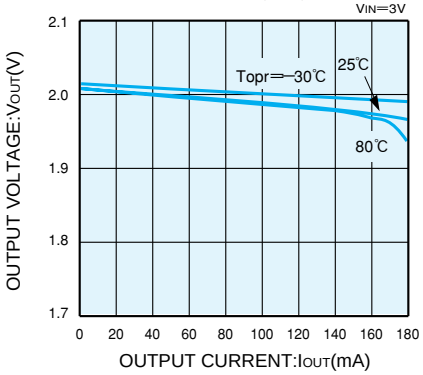
XC62HR4002（4V）



XC62HR3002（3V）

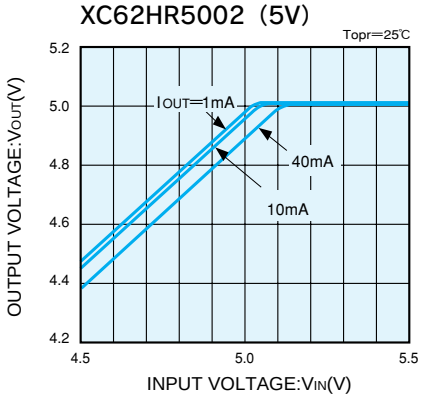


XC62HR2002（2V）

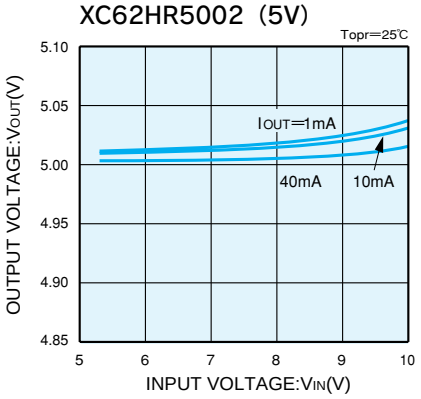


(2) OUTPUT VOLTAGE vs. INPUT VOLTAGE

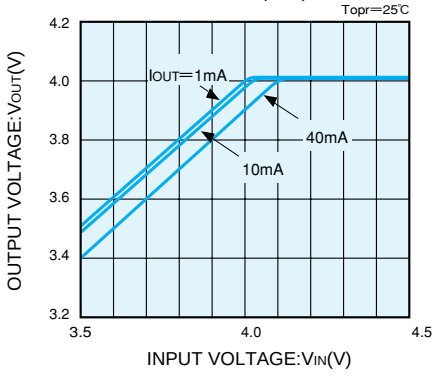
XC62HR5002（5V）



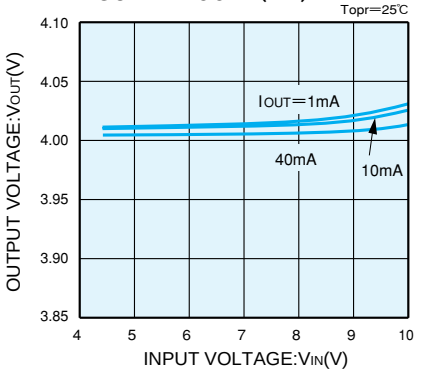
XC62HR5002（5V）



XC62HR4002（4V）

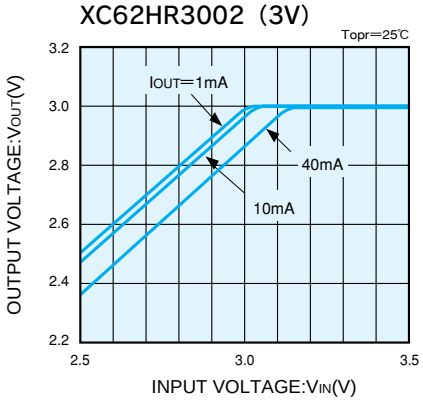


XC62HR4002（4V）

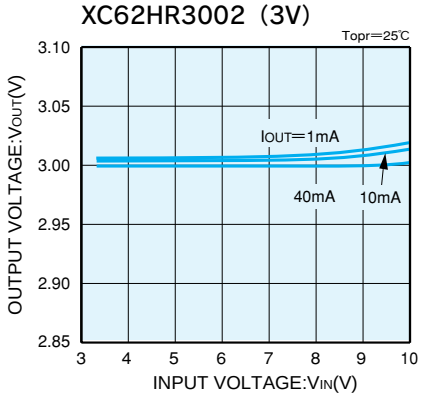


(2) OUTPUT VOLTAGE vs. INPUT VOLTAGE (CONTINUED)

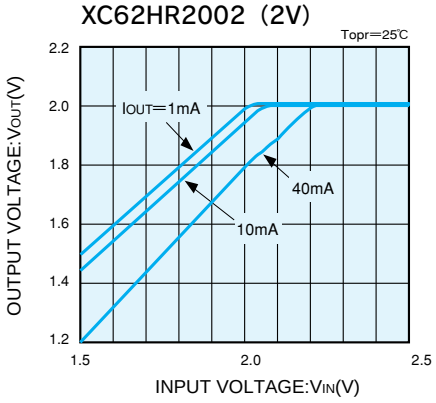
XC62HR3002（3V）



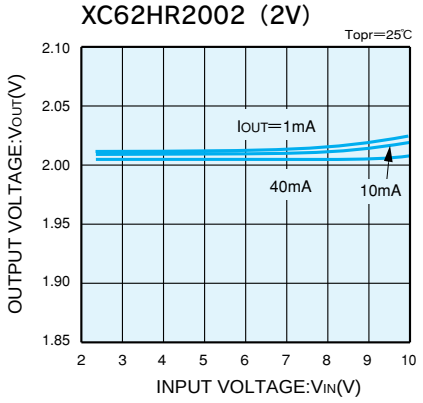
XC62HR3002（3V）



XC62HR2002（2V）

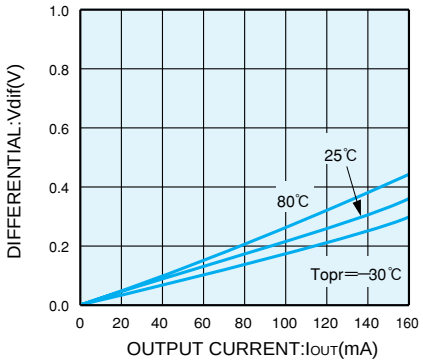


XC62HR2002（2V）

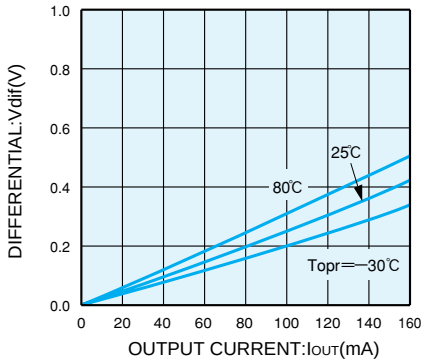


(3) INPUT/OUTPUT VOLTAGE DIFFERENTIAL vs. OUTPUT CURRENT

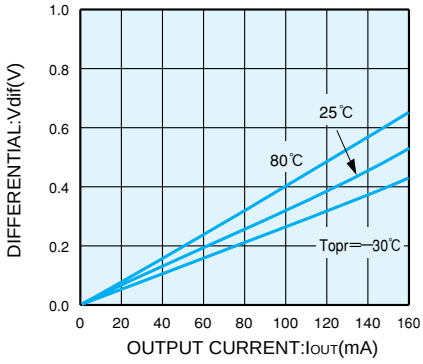
XC62HR5002（5V）



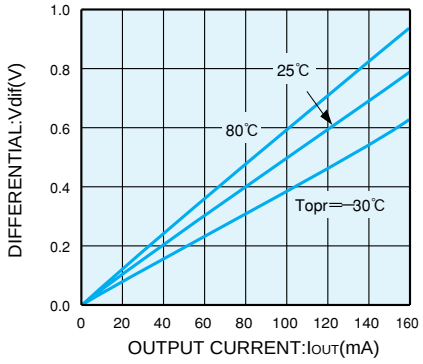
XC62HR4002（4V）



XC62HR3002（3V）

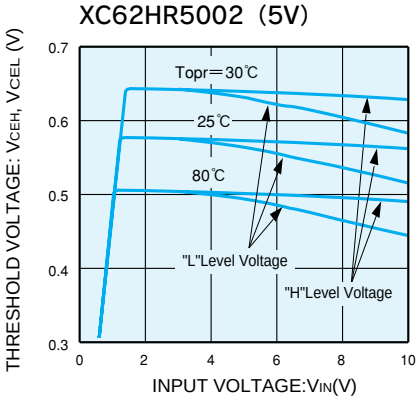


XC62HR2002（2V）

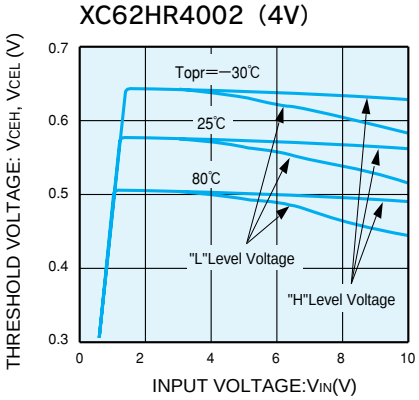


(4) CE PIN THRESHOLD VOLTAGE vs. INPUT VOLTAGE

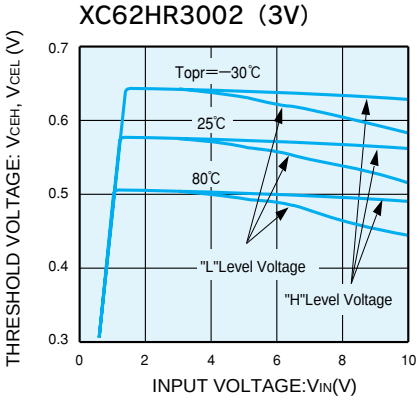
XC62HR5002（5V）



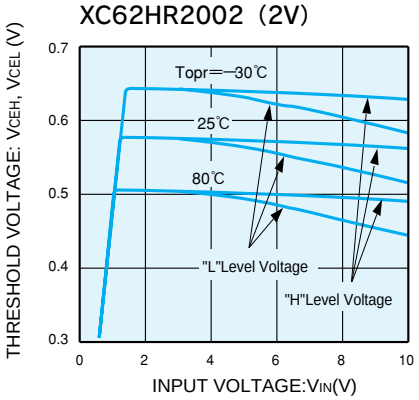
XC62HR4002（4V）



XC62HR3002（3V）

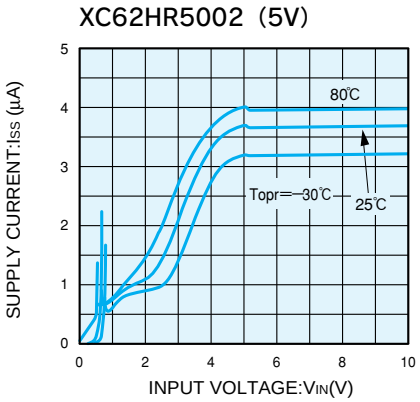


XC62HR2002（2V）

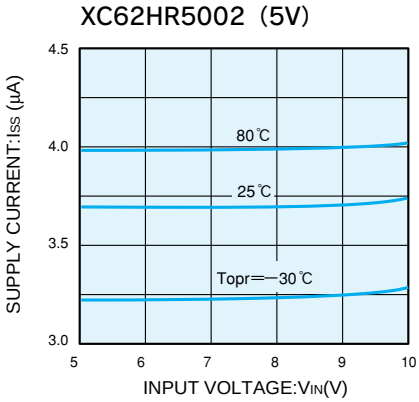


(5) SUPPLY CURRENT vs. INPUT VOLTAGE

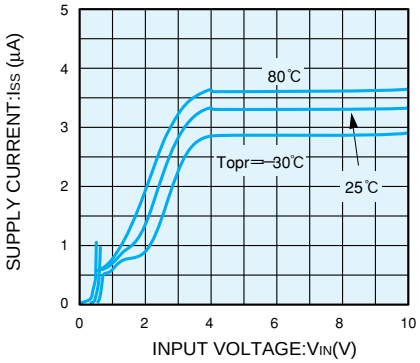
XC62HR5002（5V）



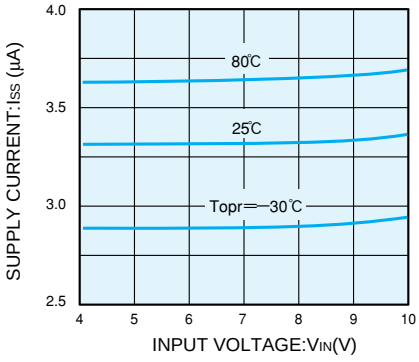
XC62HR5002（5V）



XC62HR4002（4V）

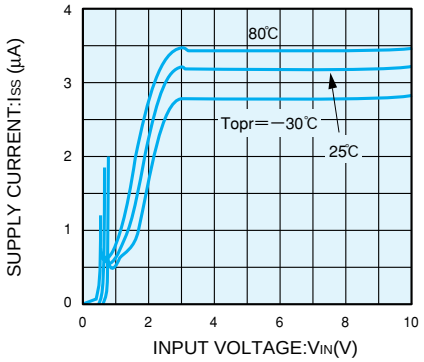


XC62HR4002（4V）

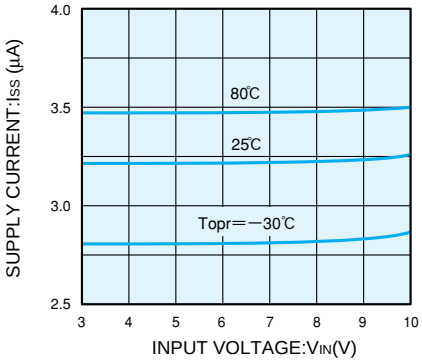


(5) SUPPLY CURRENT vs. INPUT VOLTAGE (CONTINUED)

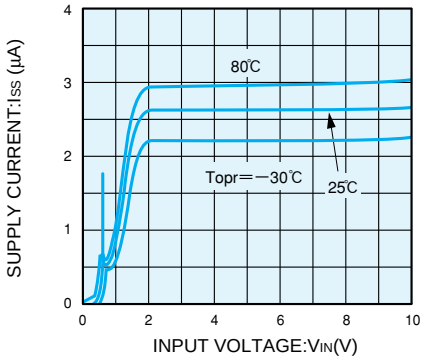
XC62HR3002 (3V)



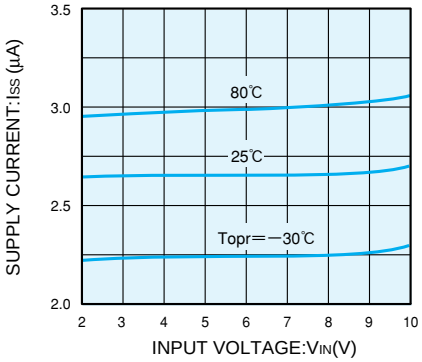
XC62HR3002 (3V)



XC62HR2002 (2V)

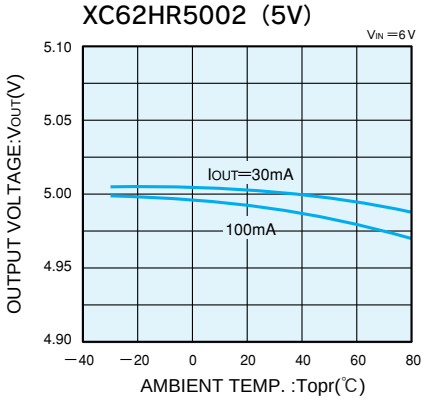


XC62HR2002 (2V)

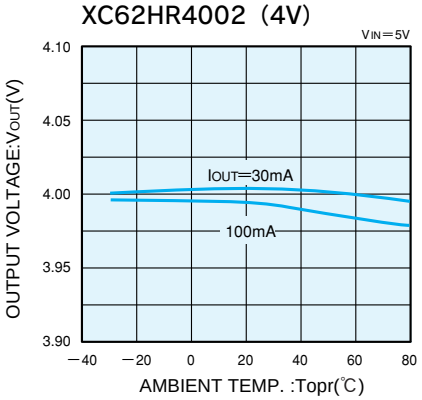


(6) OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE

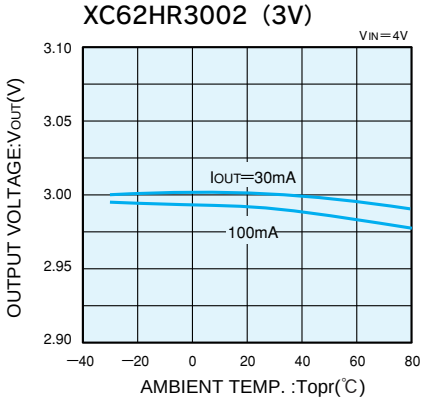
XC62HR5002 (5V)



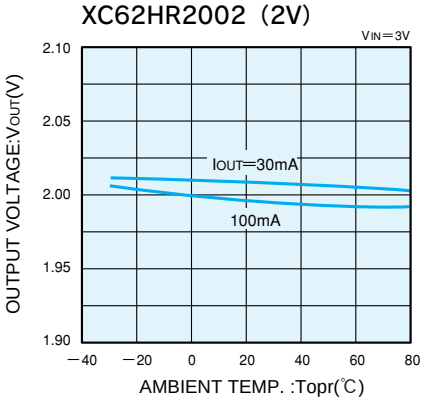
XC62HR4002 (4V)



XC62HR3002 (3V)

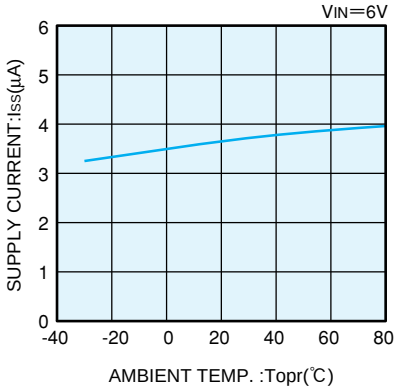


XC62HR2002 (2V)

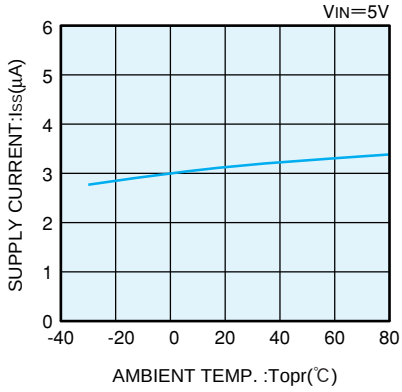


(7) SUPPLY CURRENT vs. AMBIENT TEMPERATURE

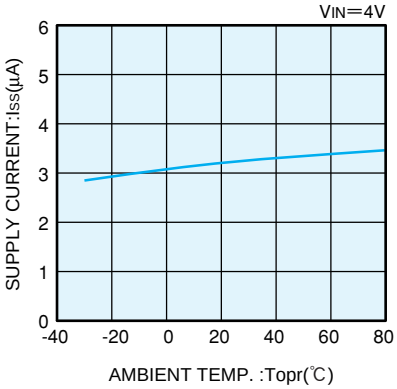
XC62HR5002（5V）



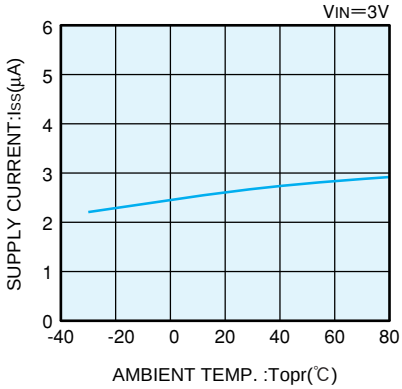
XC62HR4002（4V）



XC62HR3002（3V）

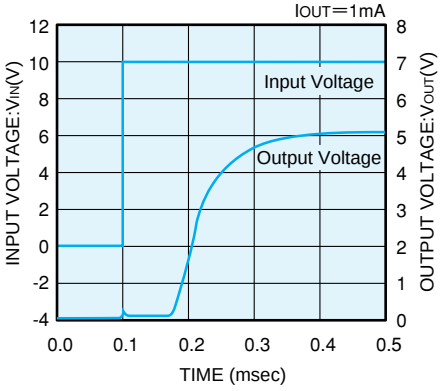


XC62HR2002（2V）

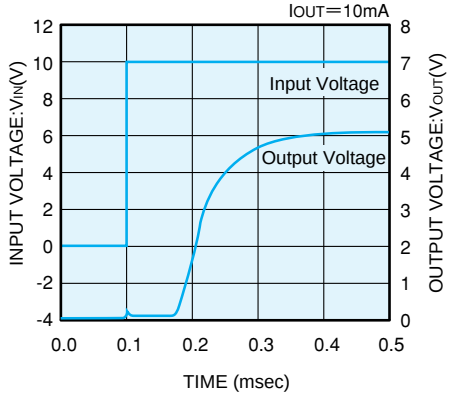


(8) INPUT TRANSIENT RESPONSE 1

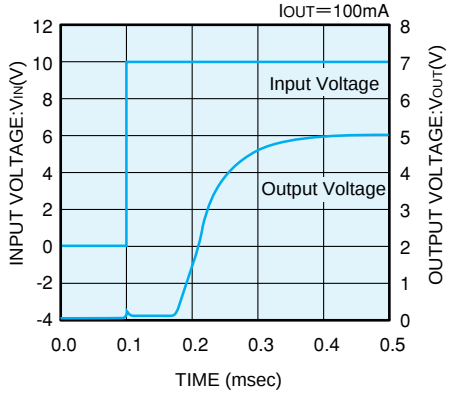
XC62HR5002（5V）



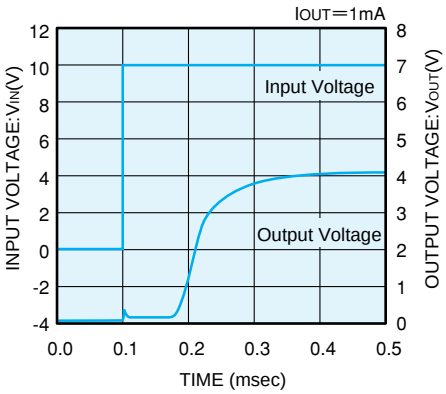
XC62HR5002（5V）



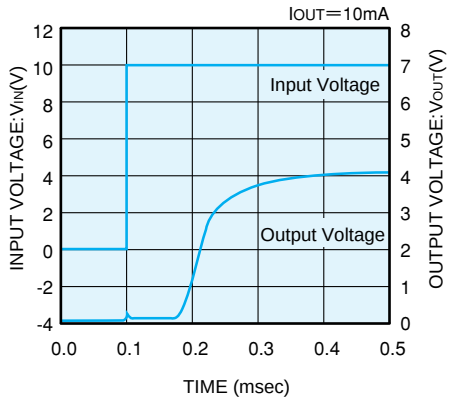
XC62HR5002（5V）



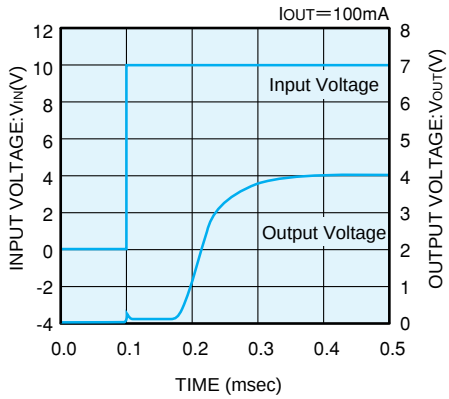
XC62HR4002（4V）



XC62HR4002（4V）

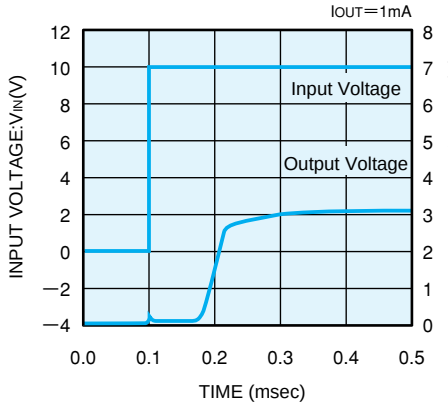


XC62HR4002（4V）

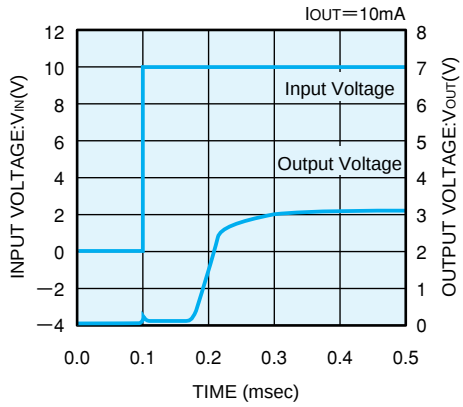


(8) INPUT TRANSIENT RESPONSE 1 (CONTINUED)

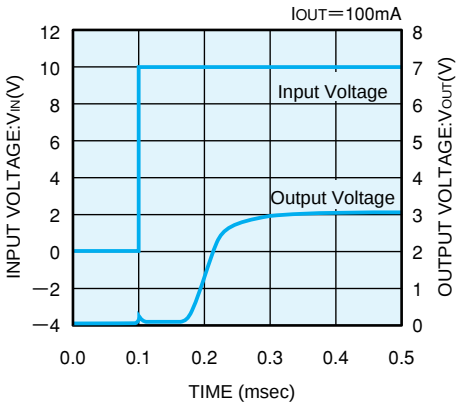
XC62HR3002(3V)



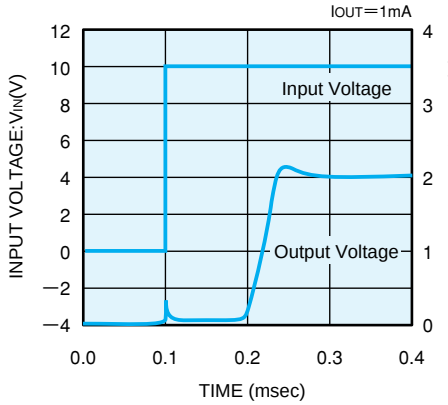
XC62HR3002(3V)



XC62HR3002(3V)



XC62HR2002(2V)



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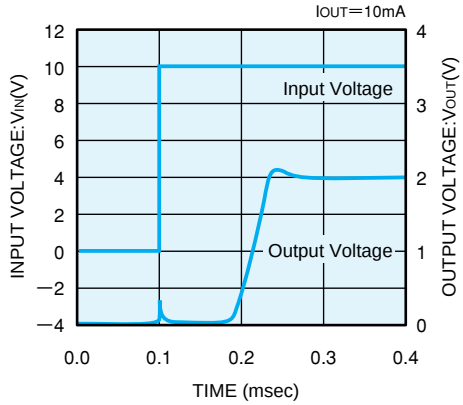

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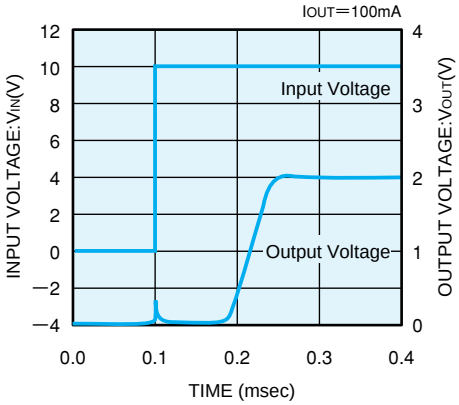
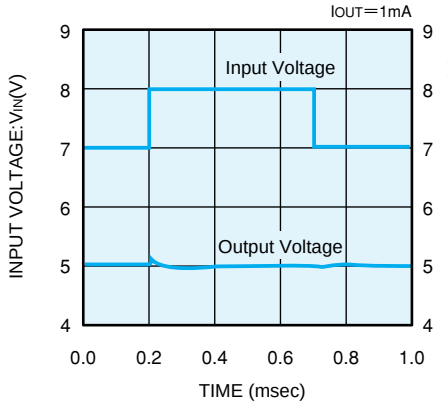
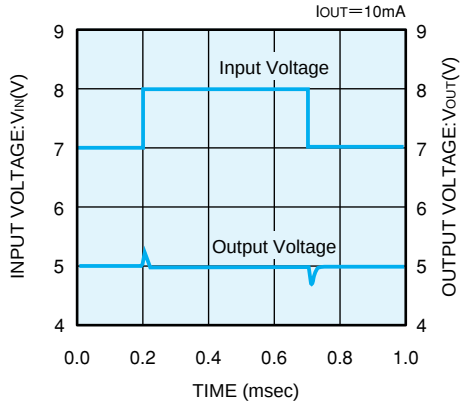


(9) INPUT TRANSIENT RESPONSE 2

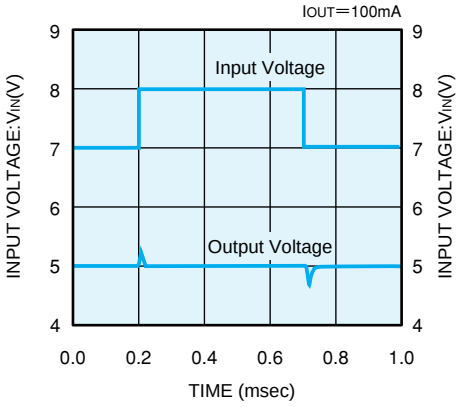
XC62HR5002(5V)



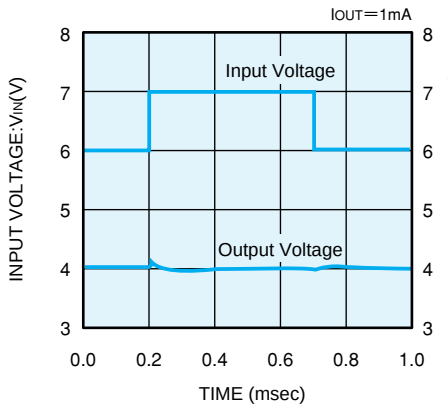
XC62HR5002(5V)



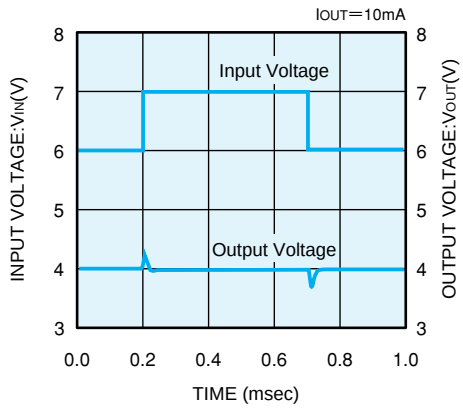
XC62HR5002(5V)



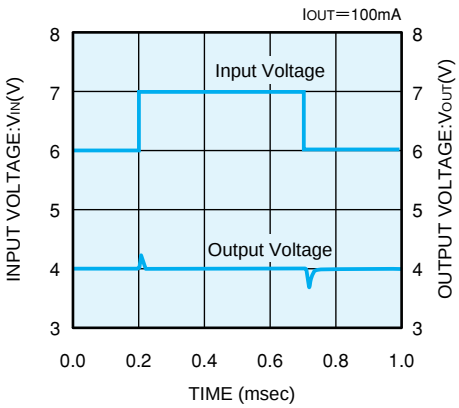
XC62HR4002(4V)



XC62HR4002(4V)

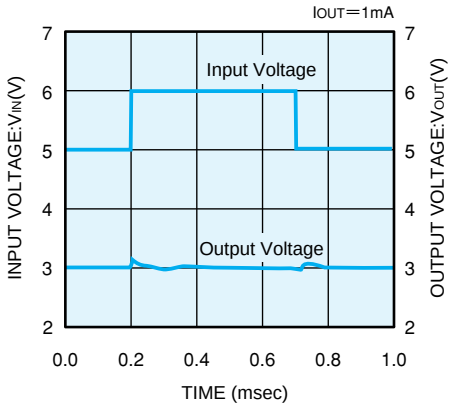


XC62HR4002(4V)

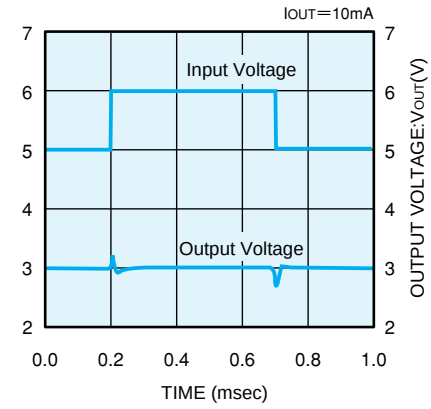


(9) INPUT TRANSIENT RESPONSE 2 (CONTINUED)

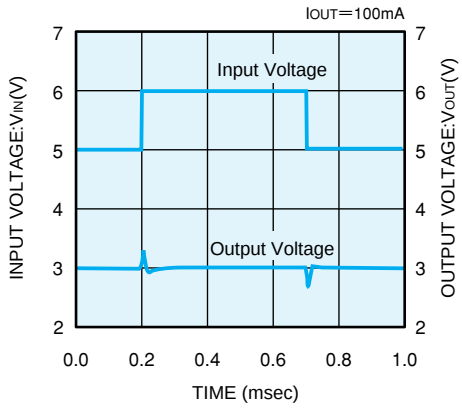
XC62HR3002(3V)



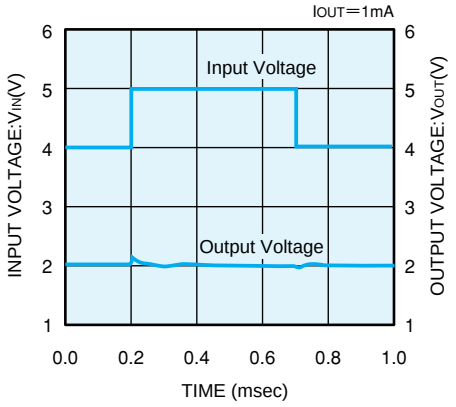
XC62HR3002(3V)



XC62HR3002(3V)



XC62HR2002(2V)



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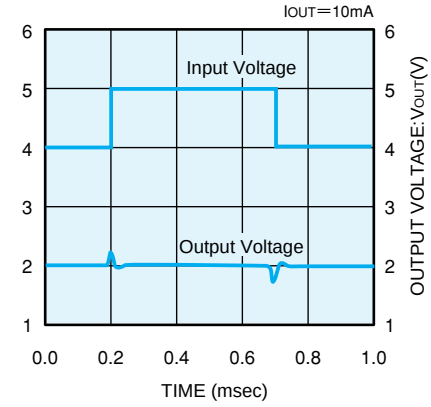
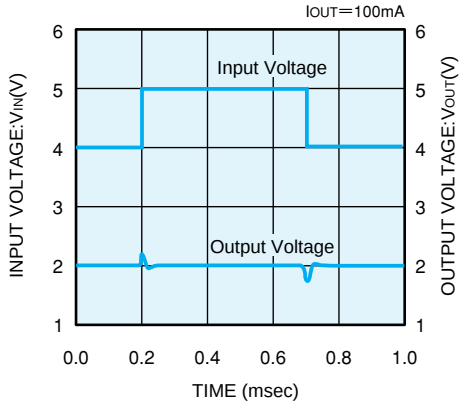
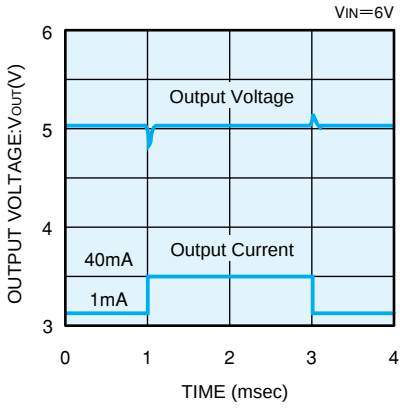


XC62HR2002(2V)

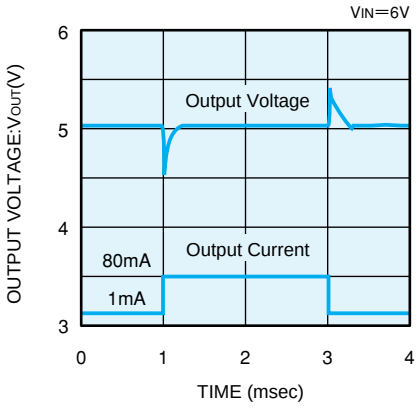


(10) LOAD TRANSIENT RESPONSE

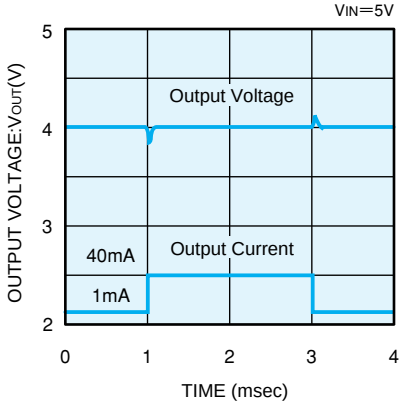
XC62HR5002(5V)



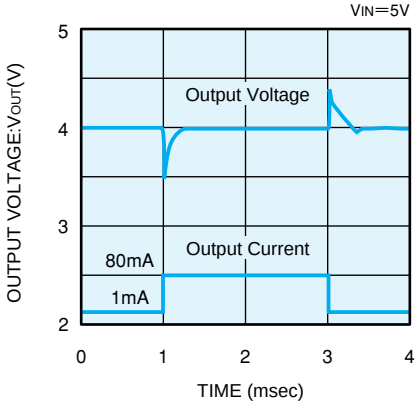
XC62HR5002(5V)



XC62HR4002(4V)

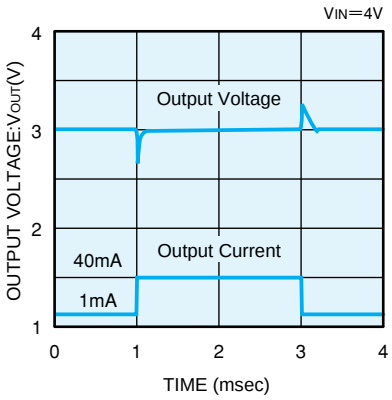


XC62HR4002(4V)

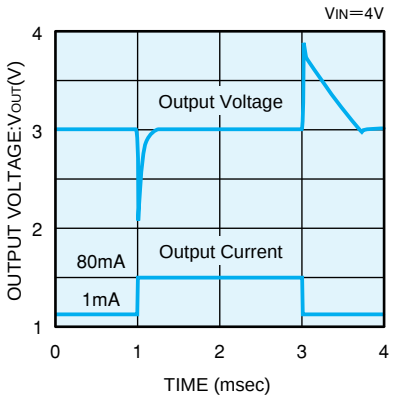


(10) LOAD TRANSIENT RESPONSE (CONTINUED)

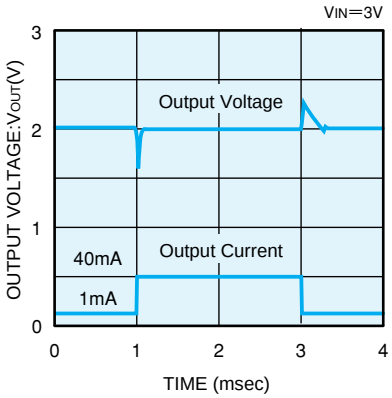
XC62HR3002(3V)



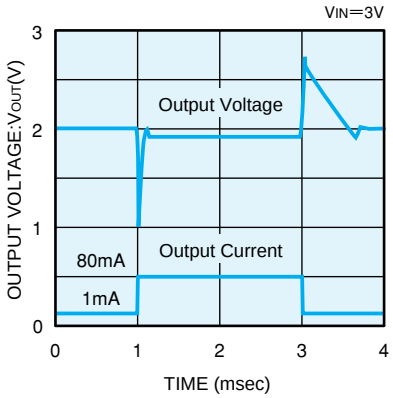
XC62HR3002(3V)



XC62HR2002(2V)

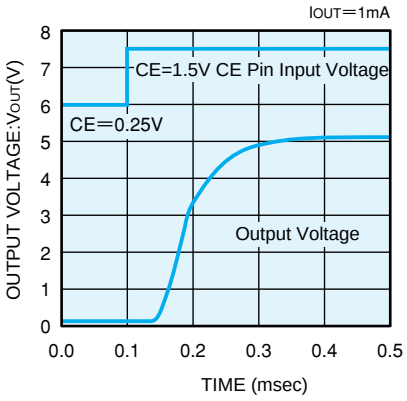


XC62HR2002(2V)

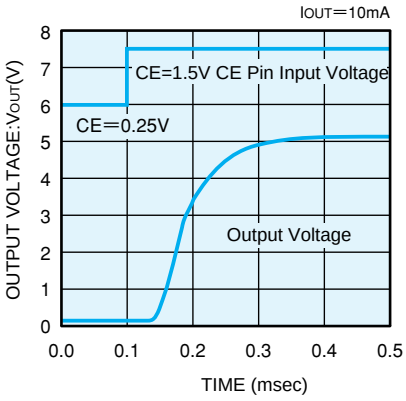


(11) CE PIN TRANSIENT RESPONSE

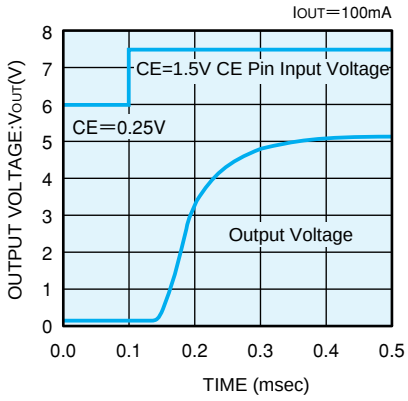
XC62HR5002(5V)



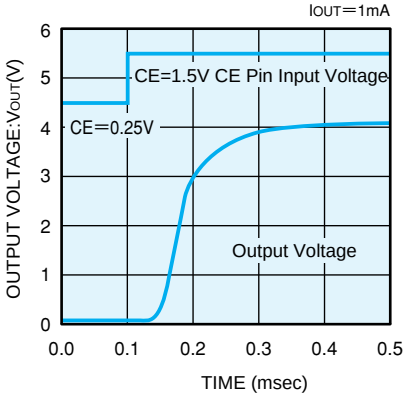
XC62HR5002(5V)



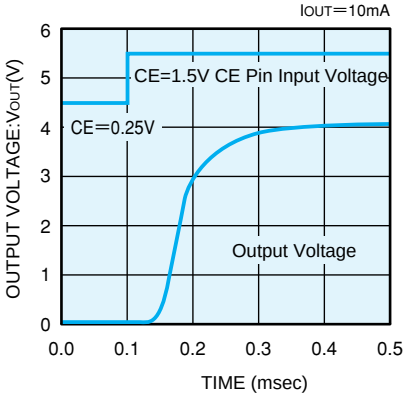
XC62HR5002(5V)



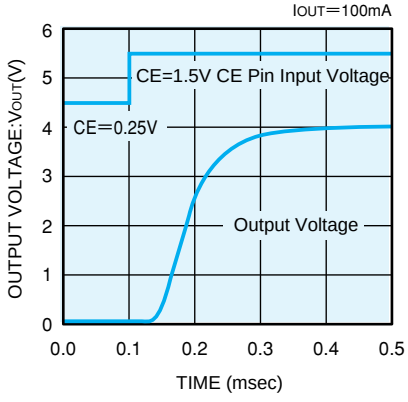
XC62HR4002(4V)



XC62HR4002(4V)

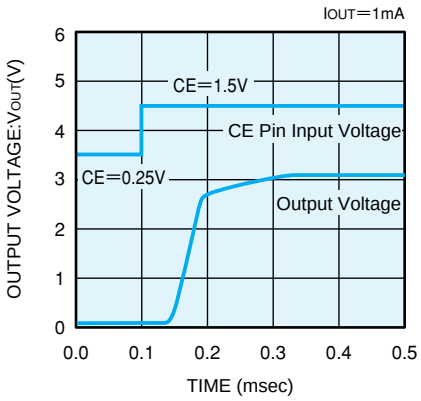


XC62HR4002(4V)



(11) CE PIN TRANSIENT RESPONSE (CONTINUED)

XC62HR3002(3V)



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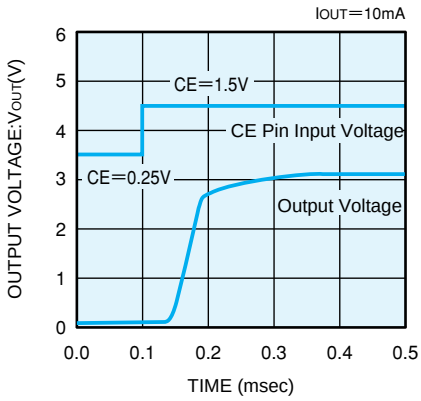

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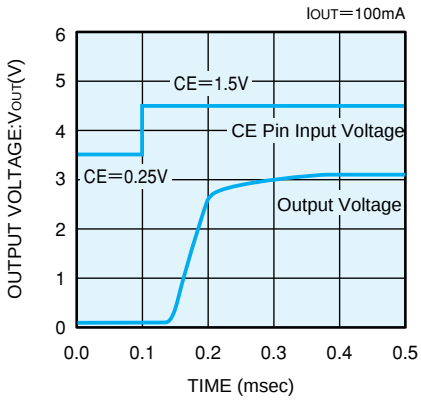
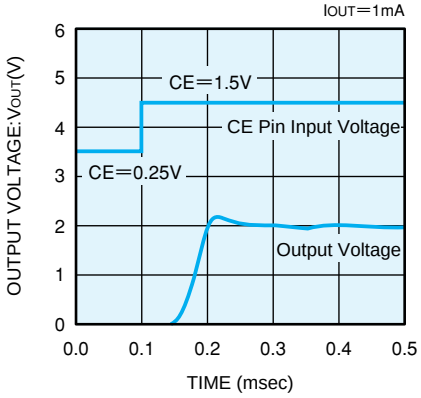


XC62HR2002(2V)



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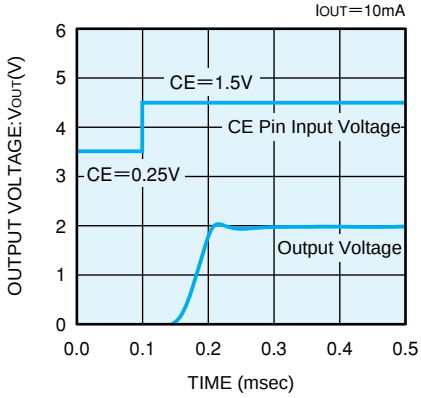

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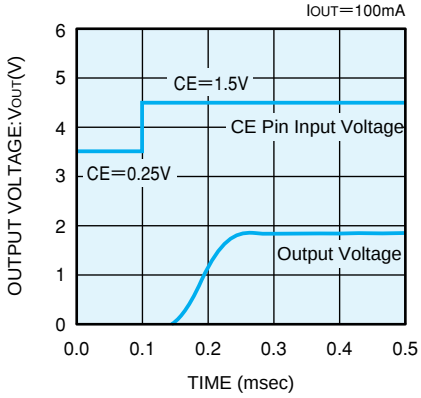
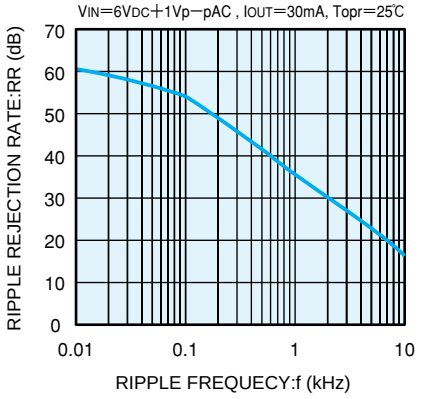


(12) RIPPLE REJECTION RATE

XC62HR5002



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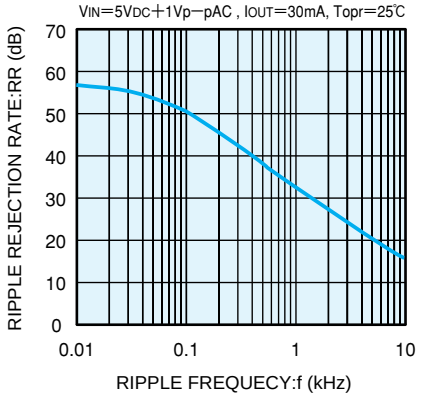

XC62HR3002