HP010199

Preliminary

Output On/Off Control

- **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**
- **Standby Supply Current 0.1μA(VOUT=3.0V)**
- **SOT-25/SOT-89-5 Package**

■ Applications

- Battery Powered Instruments
- Voltage supplies for cellular phones
- Cameras and Video Recorders
- Palmtops

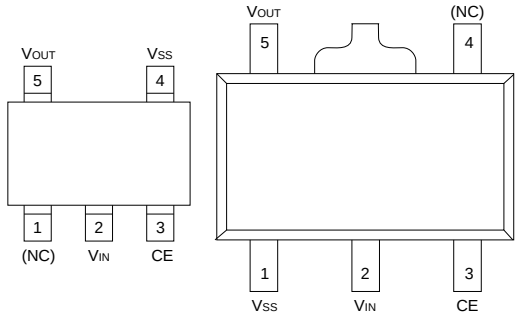
■ General Description

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

Maximum Output Current: 165mA (within Maximum 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/℃
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

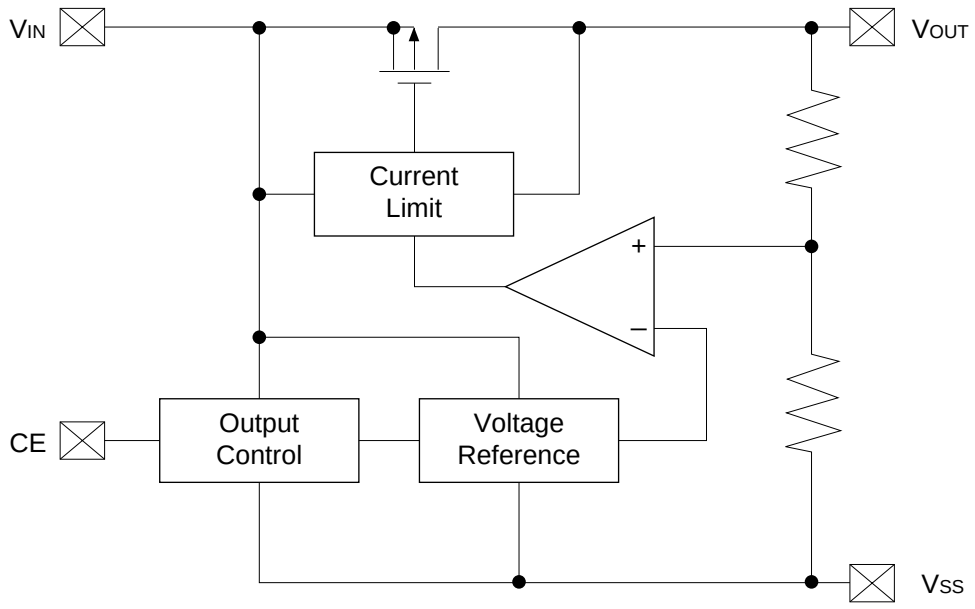
PIN NUMBER		PIN NAME	FUNCTION
SOT-25	SOT-89-5		
1	4	(NC)	No Connection
2	2	VIN	Supply Voltage Input
3	3	CE	Chip Enable
4	1	VSS	Ground
5	5	VOUT	Regulated Output Voltage

■ Function

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

H=High, L=Low

Block Diagram



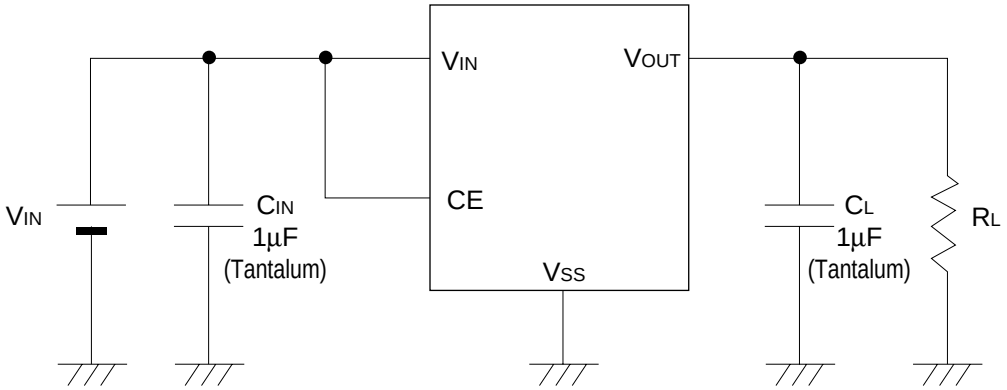
Absolute Maximum Ratings

Ta=25℃

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		VIN	12	V
Output Current		IOUT	500	mA
Output Voltage		VOUT	VSS-0.3 ~ VIN+0.3	V
CE Input Voltage		VCE	VSS-0.3 ~ VIN+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: IOUT must be less than Pd / (VIN-VOUT).

Standard Circuit



■ 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	VCEH		1.5			V	1
CE "Low" Voltage	VCEL				0.25	V	1
CE "High" Current	ICEH	V_{CE}=V_{IN}			5.0	μA	2
CE "Low" Current	ICEL	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)\geq$2.7V	165			mA	1
Load Stability	ΔV_{OUT}	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	ISS1	V_{IN}=V_{CE}=4.0V		3.0	8.0	μA	2
Supply Current2	ISS2	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	VCEH		1.5			V	1
CE "Low" Voltage	VCEL				0.25	V	1
CE "High" Current	ICEH	V_{CE}=V_{IN}			5.0	μA	2
CE "Low" Current	ICEL	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

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	ISS1	V_{IN}=V_{CE}=5.0V		3.1	8.1	μA	2
Supply Current2	ISS2	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	VCEH		1.5			V	1
CE "Low" Voltage	VCEL				0.25	V	1
CE "High" Current	ICEH	V_{CE}=V_{IN}			5.0	μA	2
CE "Low" Current	ICEL	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, $V_{OUT}(E) \geqq$ 4.5V	220			mA	1
Load Stability	ΔV_{OUT}	V_{IN}=6.0V 1mA $\leqq I_{OUT} \leqq$ 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	ISS1	V_{IN}=V_{CE}=6.0V		3.1	8.1	μA	2
Supply Current2	ISS2	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 $\leqq V_{IN} \leqq$ 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℃ $\leqq$ Topr $\leqq$ 80℃		±100		ppm/℃	1
CE "High" Voltage	VCEH		1.5			V	1
CE "Low" Voltage	VCEL				0.25	V	1
CE "High" Current	ICEH	V_{CE}=V_{IN}			5.0	μA	2
CE "Low" Current	ICEL	V_{CE}=V_{SS}	-0.2	-0.05	0	μA	2

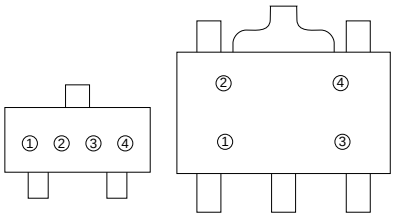
Note:
1. $V_{OUT}(T)$=Specified Output Voltage .
2. $V_{OUT}(E)$=Effective Output Voltage (i.e. the output voltage when "$V_{OUT}(T)$+1.0V" is provided at the V_{IN} pin while maintaining a ceratain I_{OUT} value).
3. Vdif= {V_{IN}1 (Note5)-V_{OUT}1 (Note4)}
4. V_{OUT}1= A voltage equal to 98% of the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

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)

①Represents 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

②Represents 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

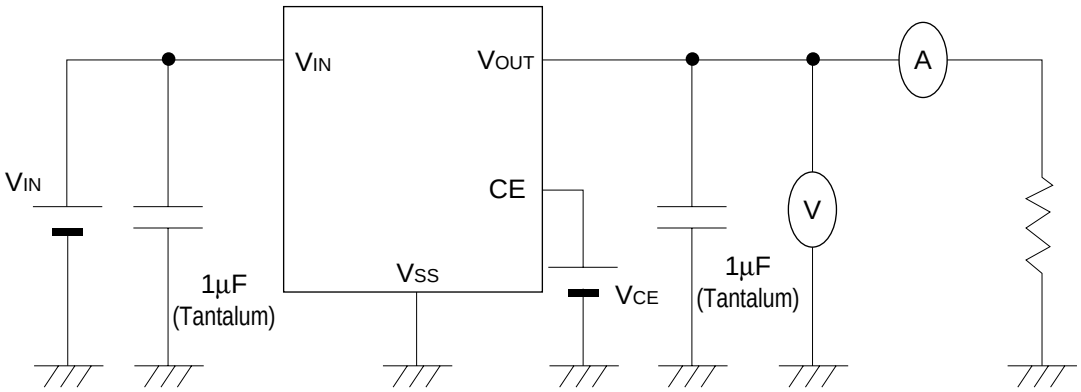
③Based on internal standards

SYMBOL
-

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

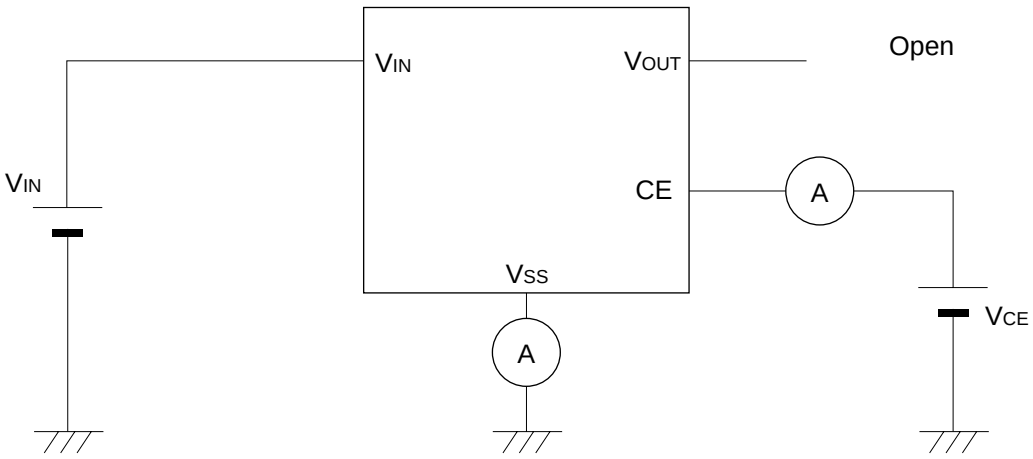
■ Typical Application Circuit

Circuit 1



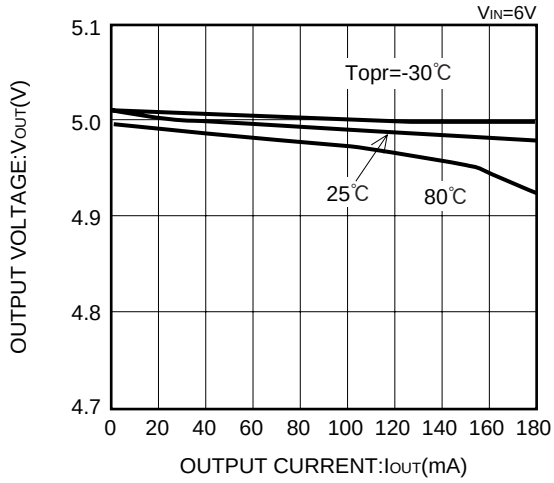
■ Typical Application Circuit

Circuit 2

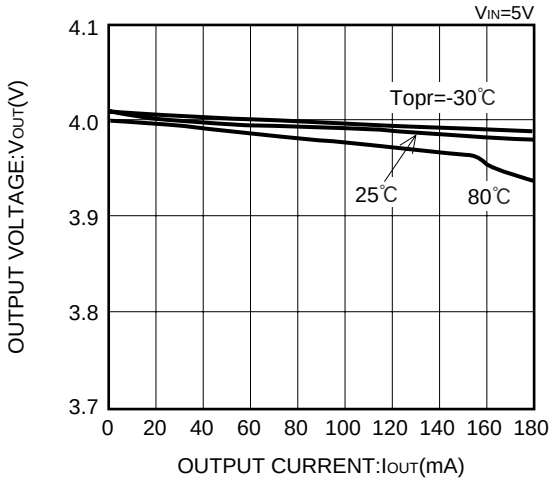


(1) OUTPUT VOLTAGE vs. OUTPUT CURRENT

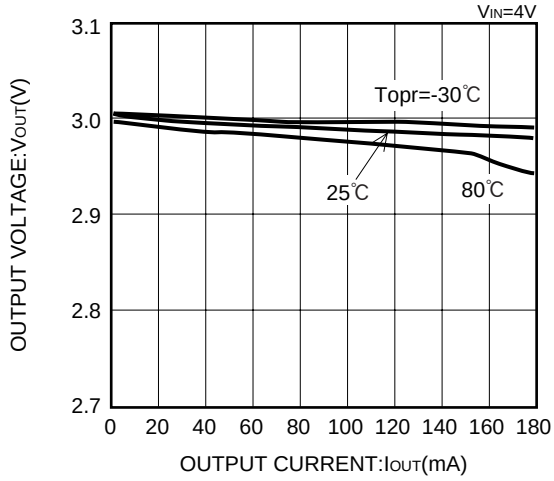
XC62HR5002 (5V)



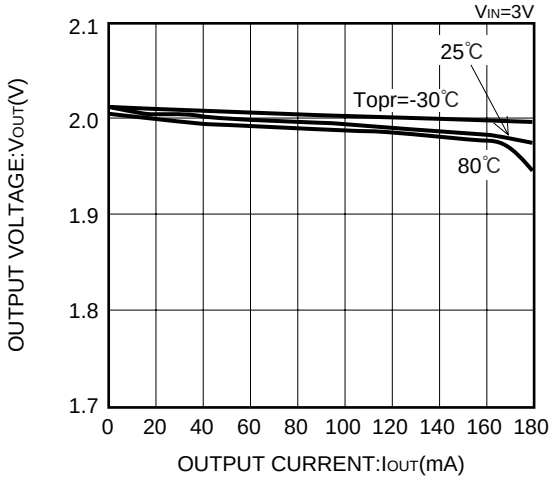
XC62HR4002 (4V)



XC62HR3002 (3V)

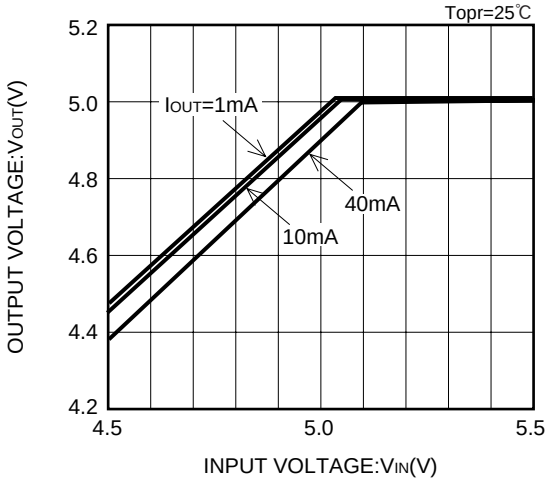


XC62HR2002 (2V)

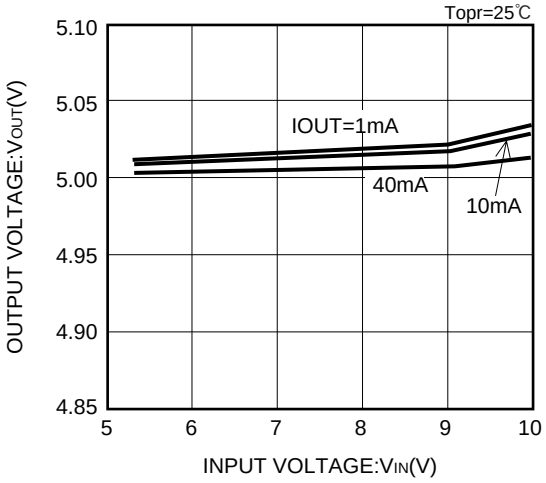


(2) OUTPUT VOLTAGE vs. INPUT VOLTAGE

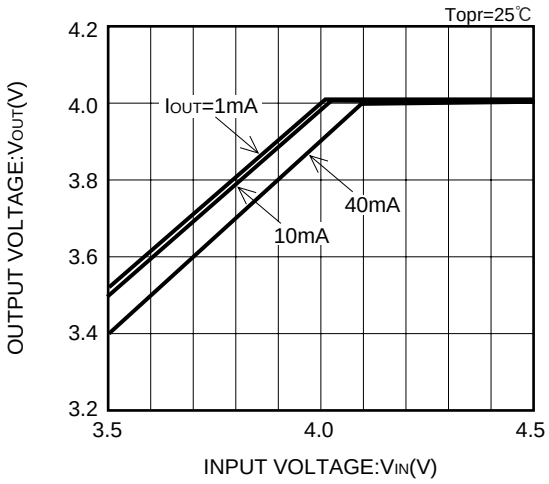
XC62HR5002 (5V)



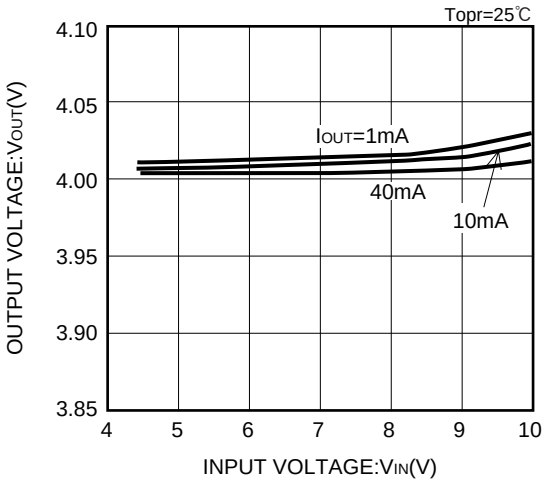
XC62HR5002 (5V)



XC62HR4002 (4V)

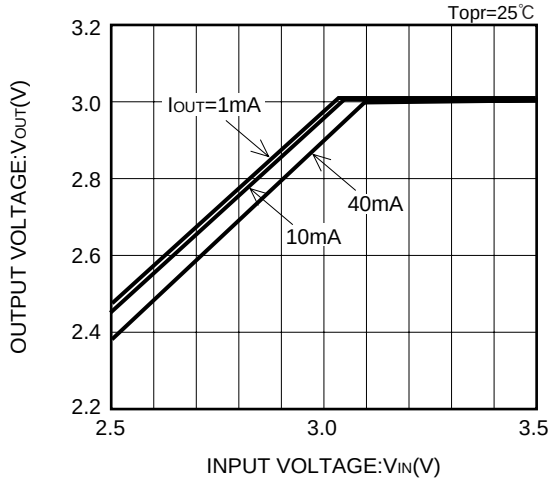


XC62HR4002 (4V)

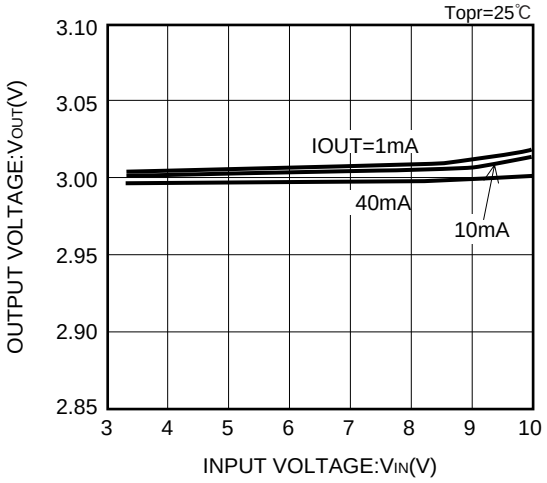


(2) OUTPUT VOLTAGE vs. INPUT VOLTAGE (CONTINUED)

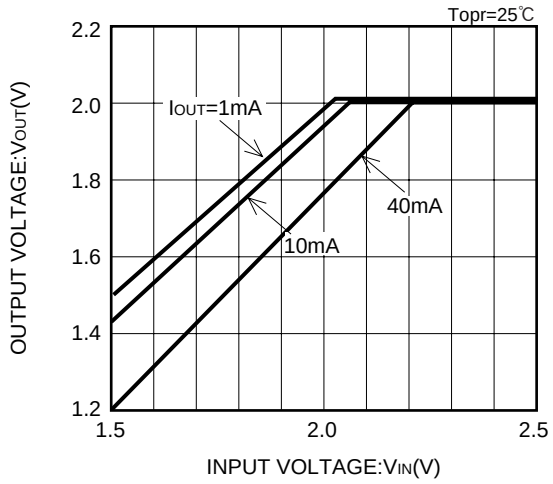
XC62HR3002 (3V)



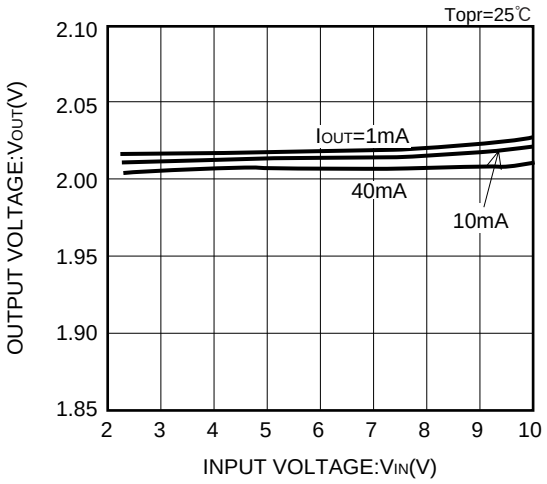
XC62HR3002 (3V)



XC62HR2002 (2V)

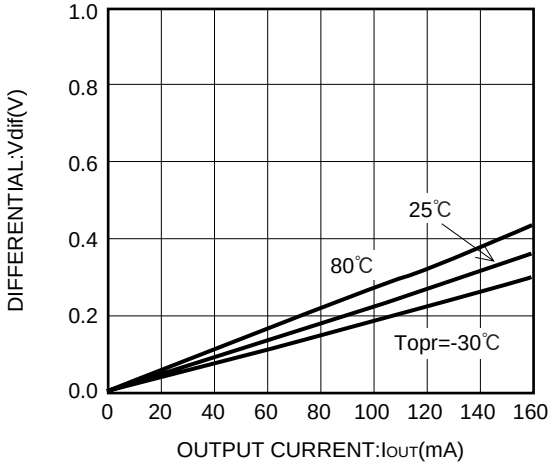


XC62HR2002 (2V)

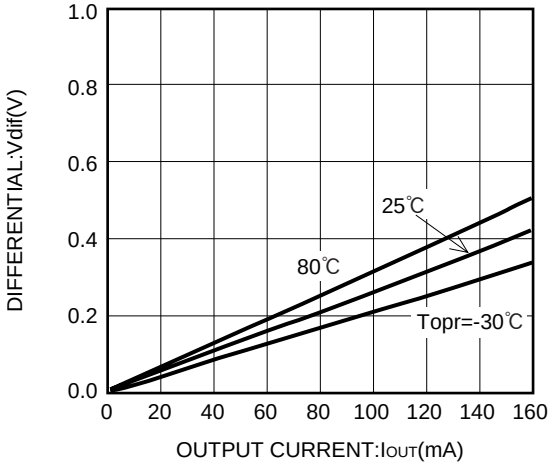


(3) INPUT/OUTPUT VOLTAGE DIFFERENTIAL vs. OUTPUT CURRENT

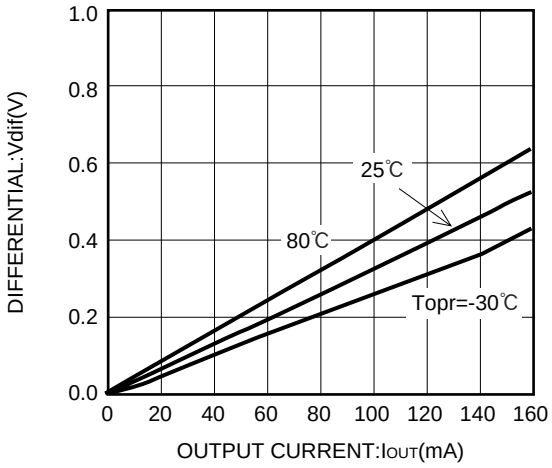
XC62HR5002 (5V)



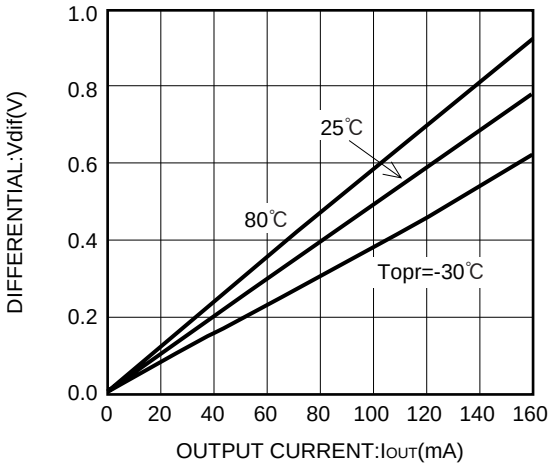
XC62HR4002 (4V)



XC62HR3002 (3V)

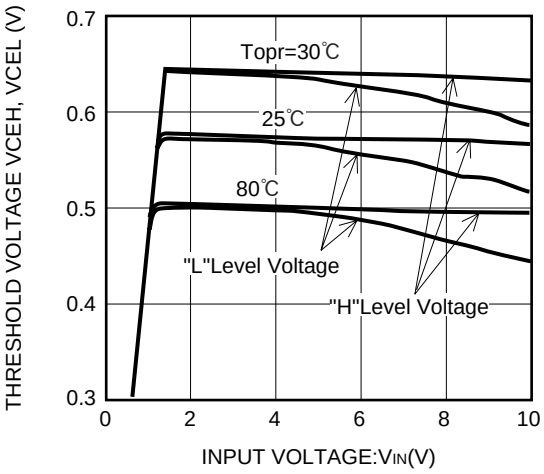


XC62HR2002 (2V)

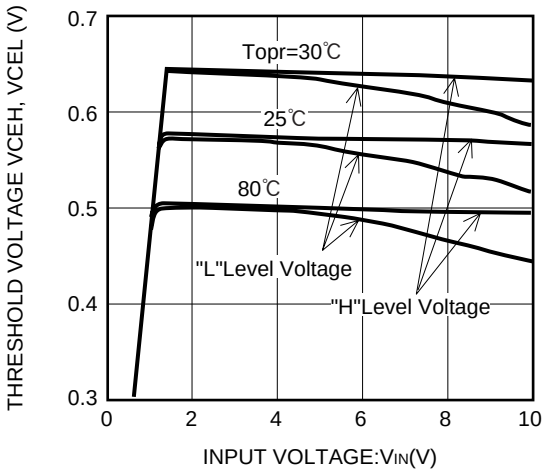


(4) CE PIN THRESHOLD VOLTAGE vs. INPUT VOLTAGE

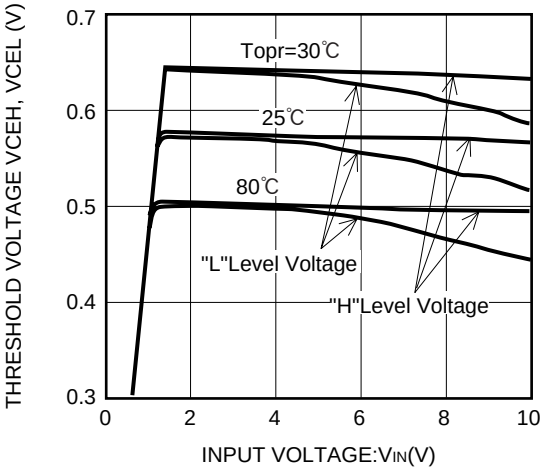
XC62HR5002 (5V)



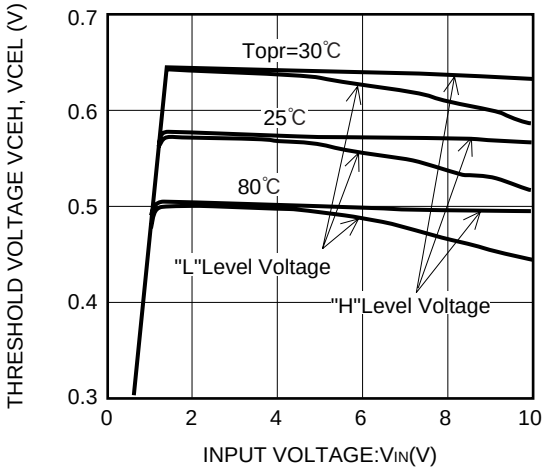
XC62HR4002 (4V)



XC62HR3002 (3V)

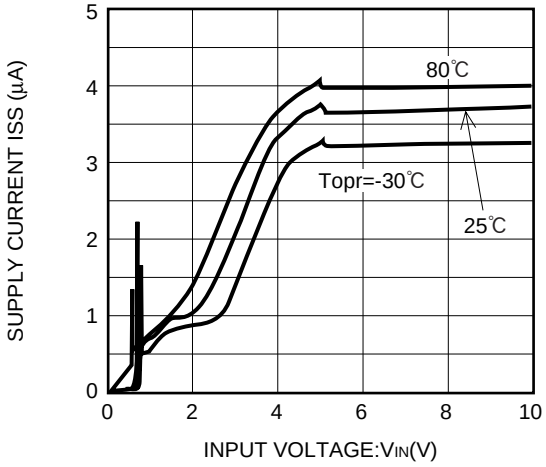


XC62HR2002 (2V)

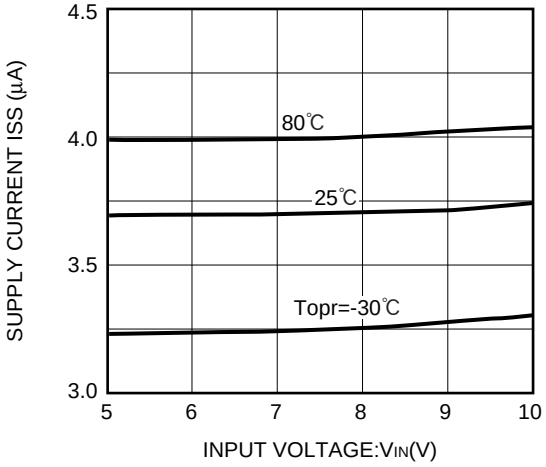


(5) SUPPLY CURRENT vs. INPUT VOLTAGE

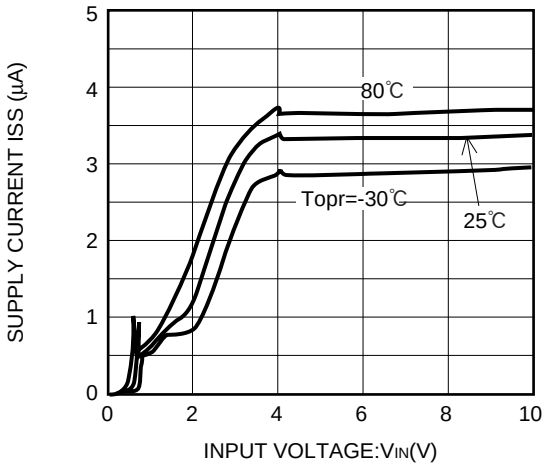
XC62HR5002 (5V)



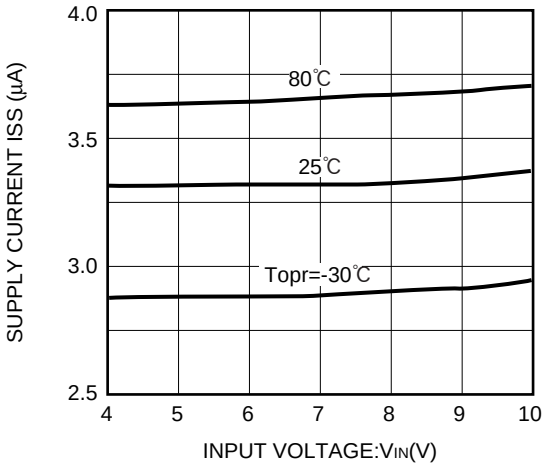
XC62HR5002 (5V)



XC62HR4002 (4V)

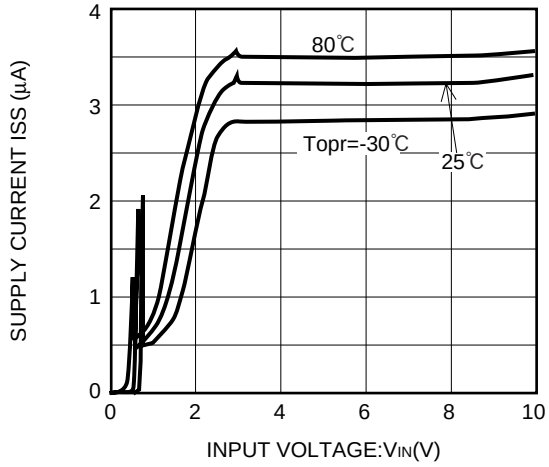


XC62HR4002 (4V)

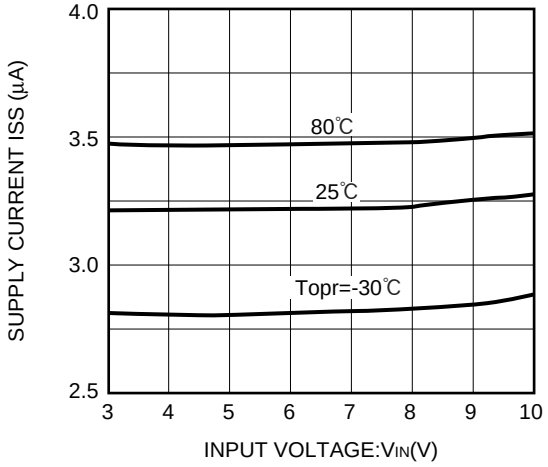


(5) SUPPLY CURRENT vs. INPUT VOLTAGE (CONTINUED)

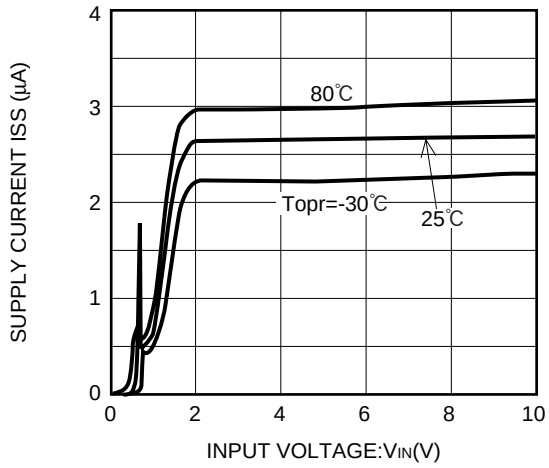
XC62HR3002 (3V)



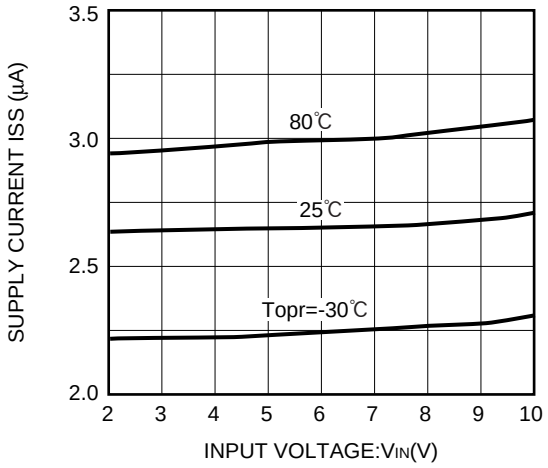
XC62HR3002 (3V)



XC62HR2002 (2V)

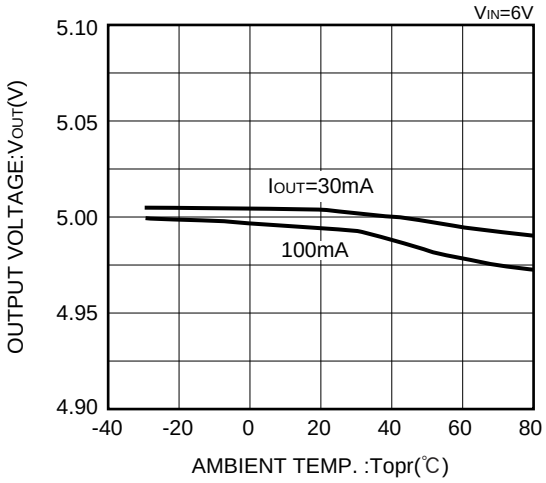


XC62HR2002 (2V)

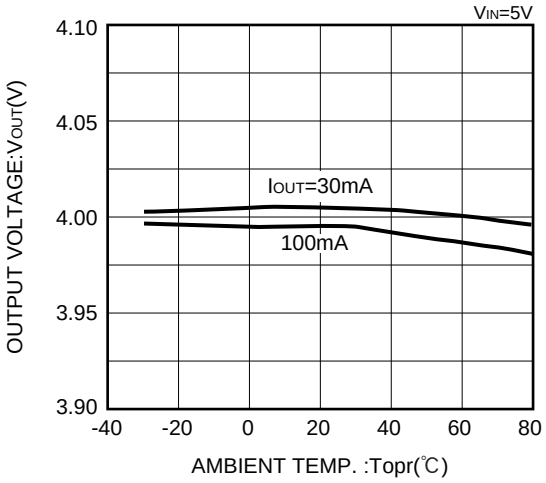


(6) OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE

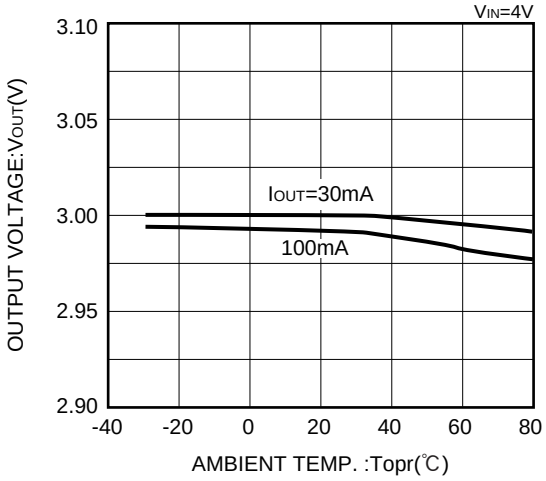
XC62HR5002 (5V)



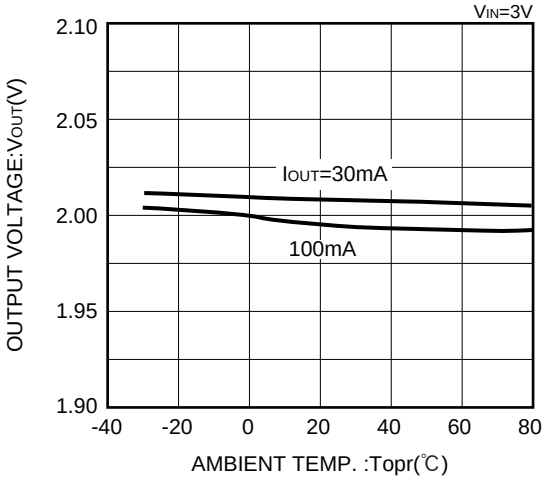
XC62HR4002 (4V)



XC62HR3002 (3V)

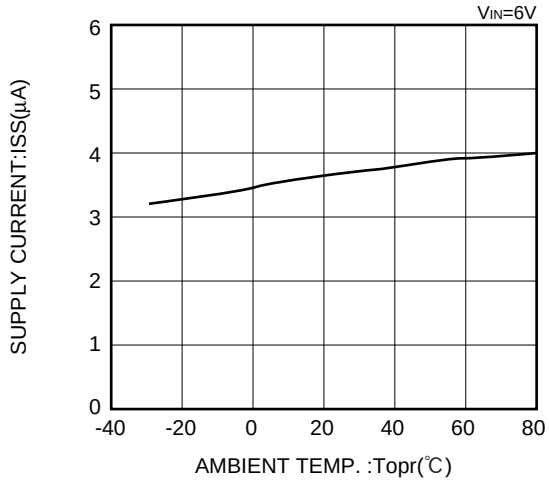


XC62HR2002 (2V)

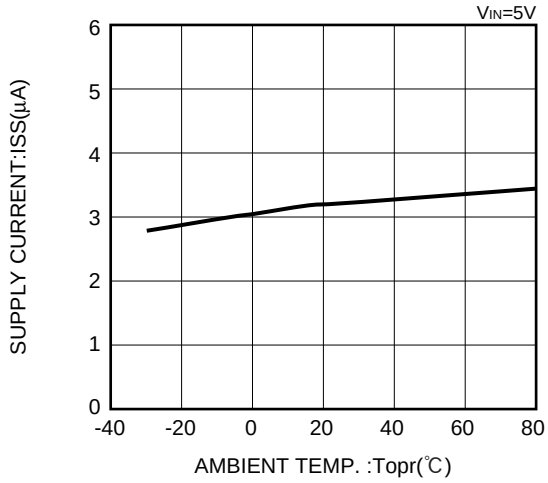


(7) SUPPLY CURRENT vs. AMBIENT TEMPERATURE

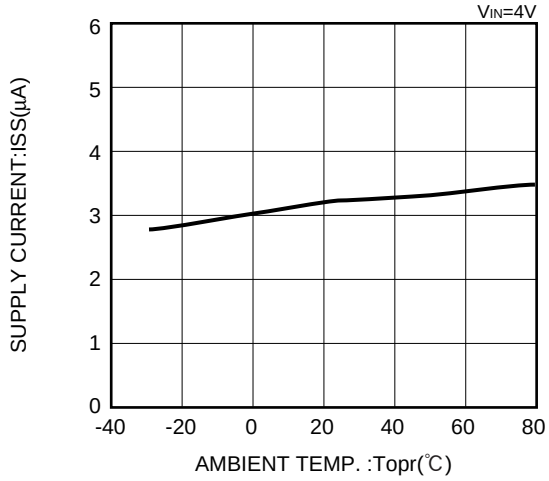
XC62HR5002 (5V)



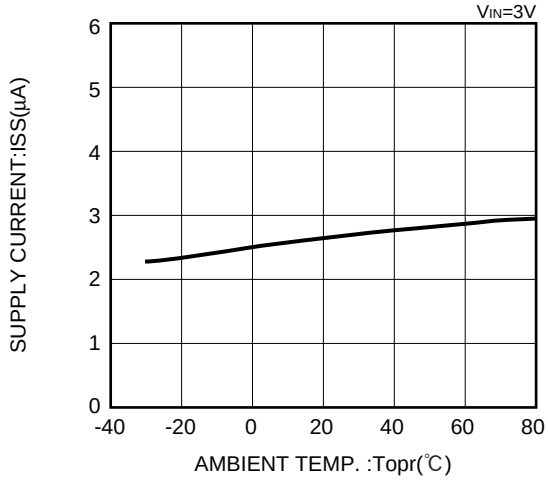
XC62HR4002 (4V)



XC62HR3002 (3V)

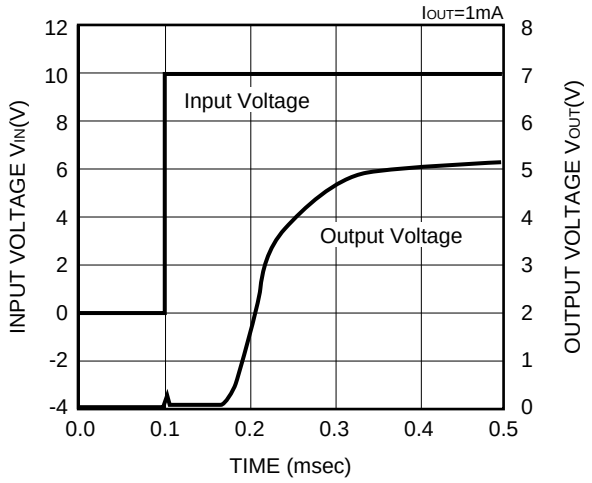


XC62HR2002 (2V)

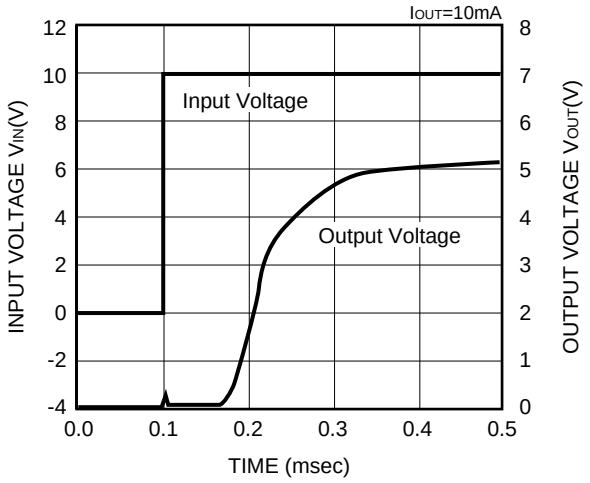


(8) INPUT TRANSIENT RESPONSE 1

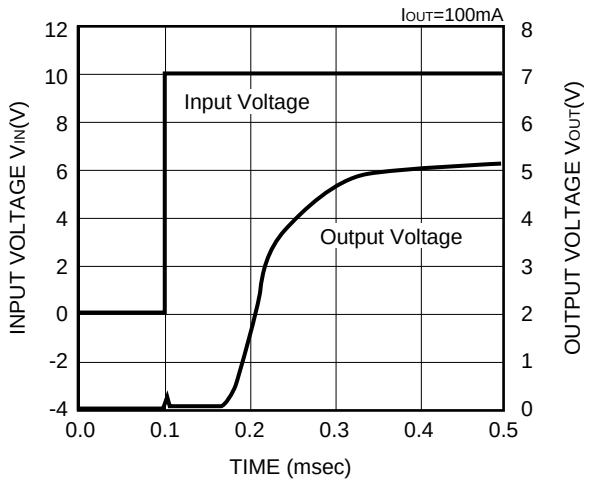
XC62HR5002 (5V)



XC62HR5002 (5V)

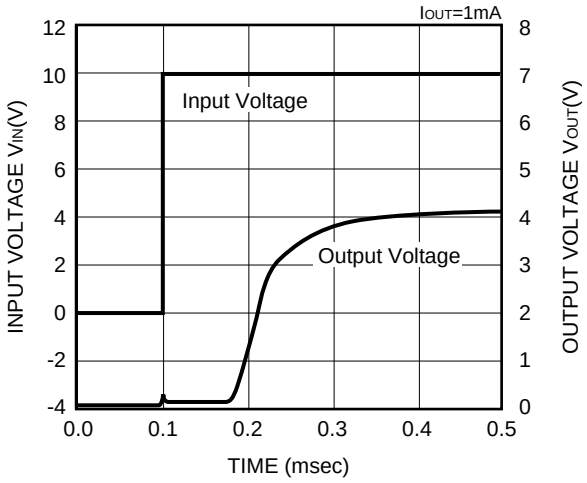


XC62HR5002 (5V)

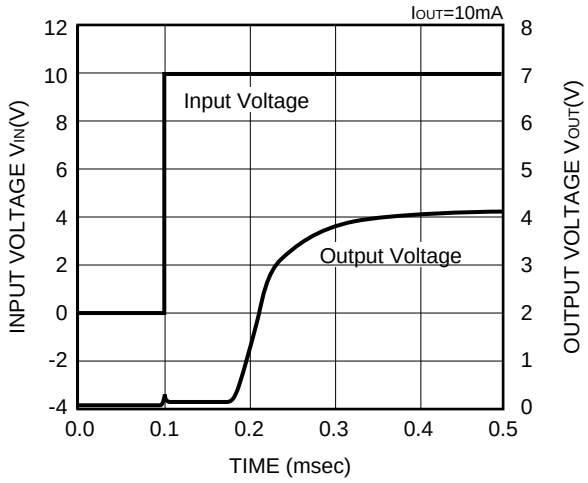


(8) INPUT TRANSIENT RESPONSE 1 (CONTINUED)

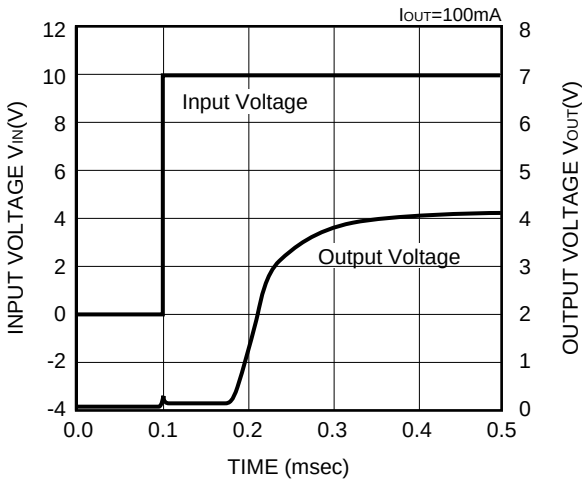
XC62HR4002 (4V)



XC62HR4002 (4V)

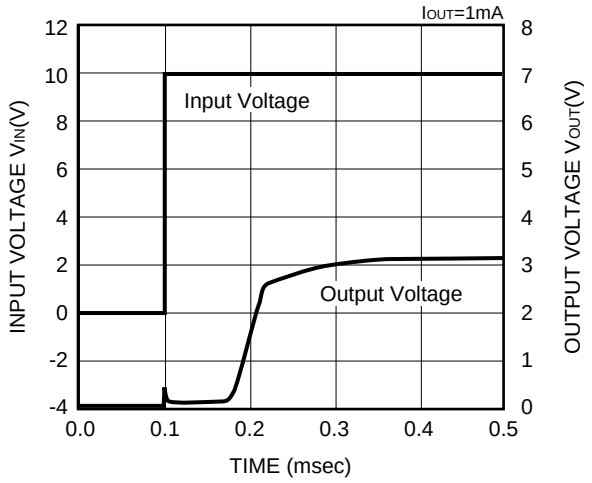


XC62HR4002 (4V)

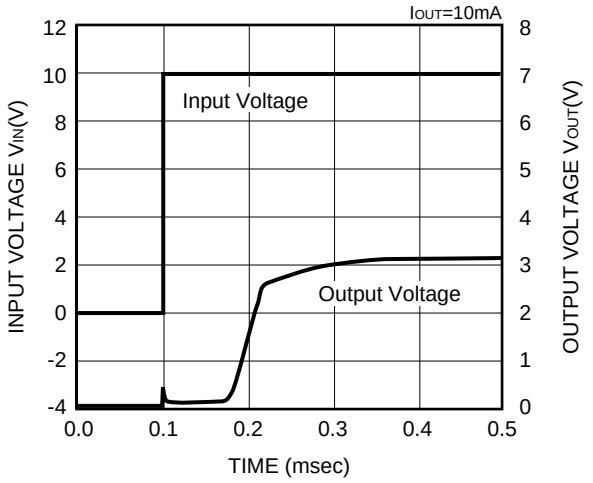


(8) INPUT TRANSIENT RESPONSE 1 (CONTINUED)

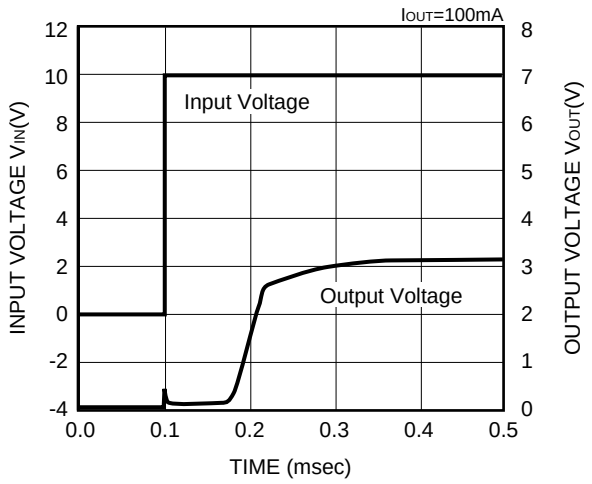
XC62HR3002 (3V)



XC62HR3002 (3V)

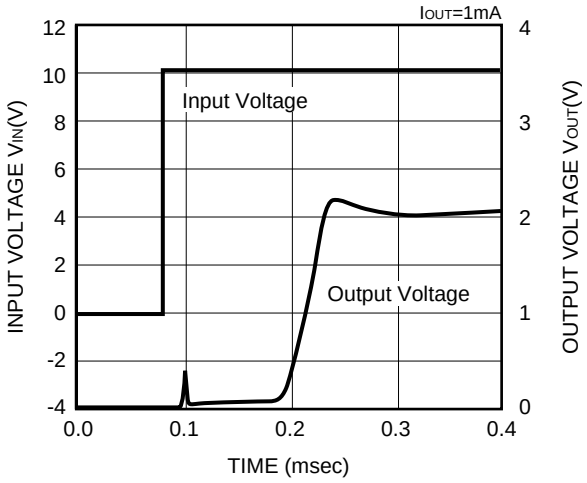


XC62HR3002 (3V)

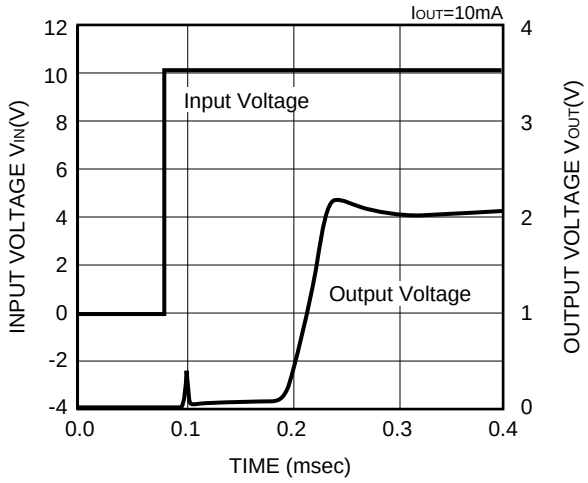


(8) INPUT TRANSIENT RESPONSE 1 (CONTINUED)

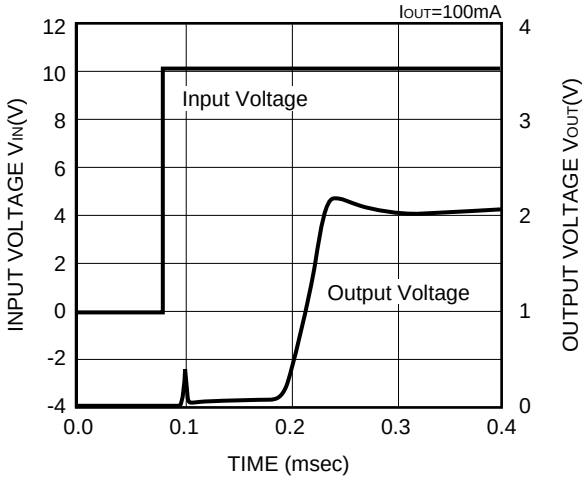
XC62HR2002 (2V)



XC62HR2002 (2V)

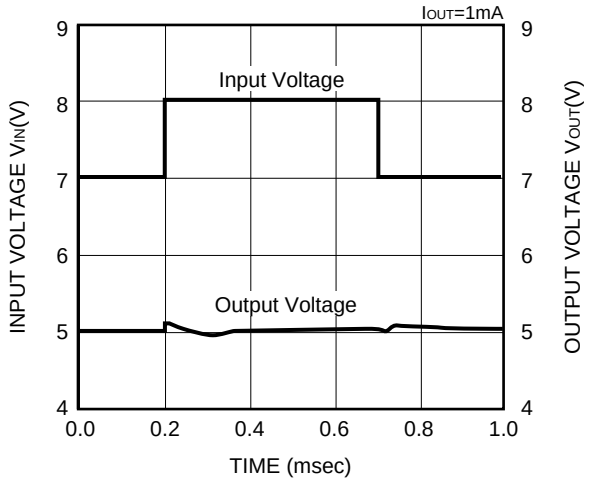


XC62HR2002 (2V)

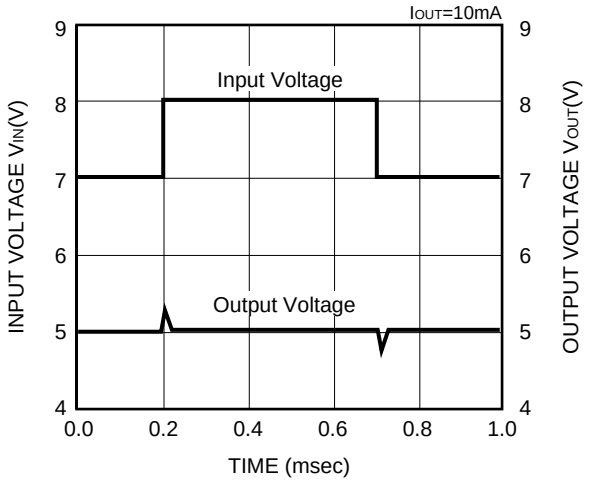


(9) INPUT TRANSIENT RESPONSE 2

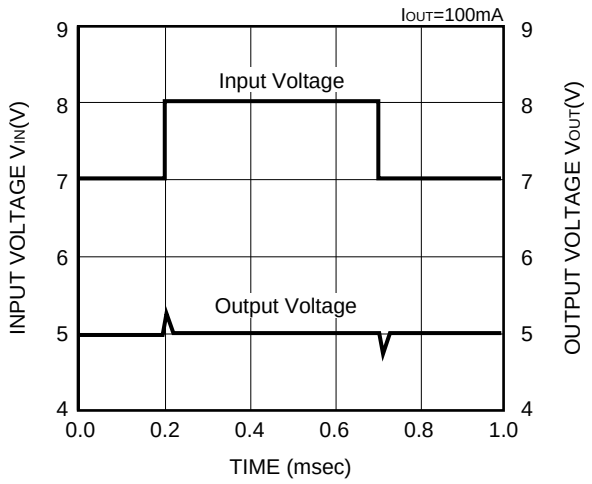
XC62HR5002 (5V)



XC62HR5002 (5V)

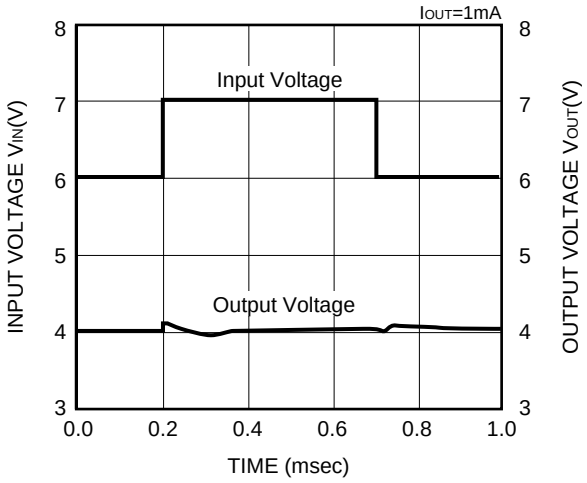


XC62HR5002 (5V)

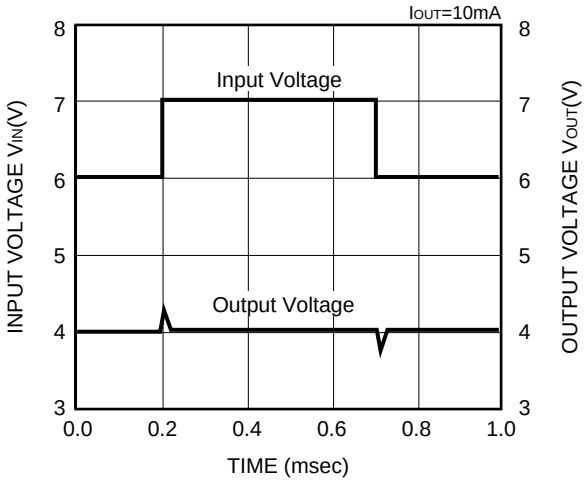


(9) INPUT TRANSIENT RESPONSE 2 (CONTINUED)

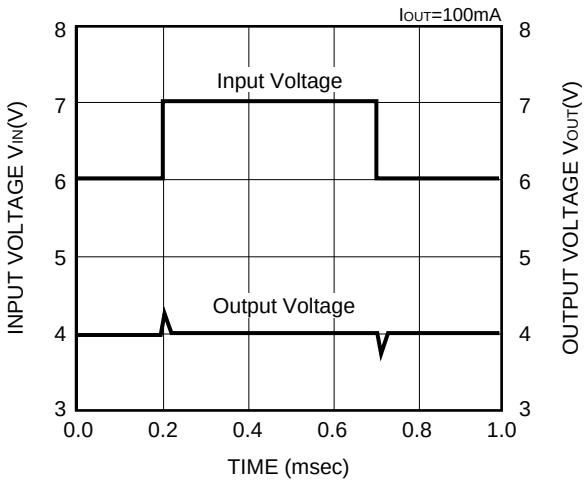
XC62HR4002 (4V)



XC62HR4002 (4V)

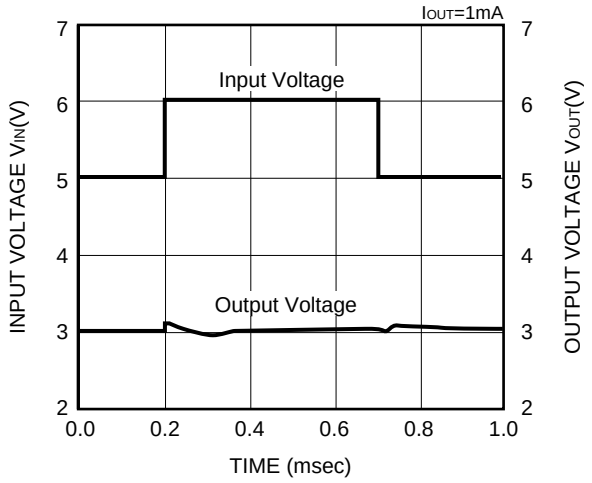


XC62HR4002 (4V)

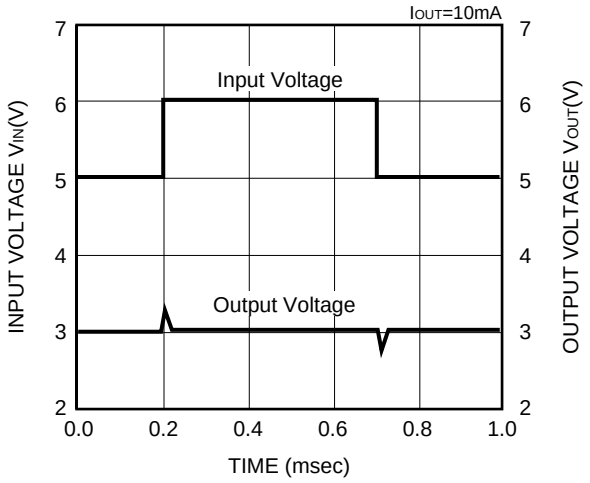


(9) INPUT TRANSIENT RESPONSE 2 (CONTINUED)

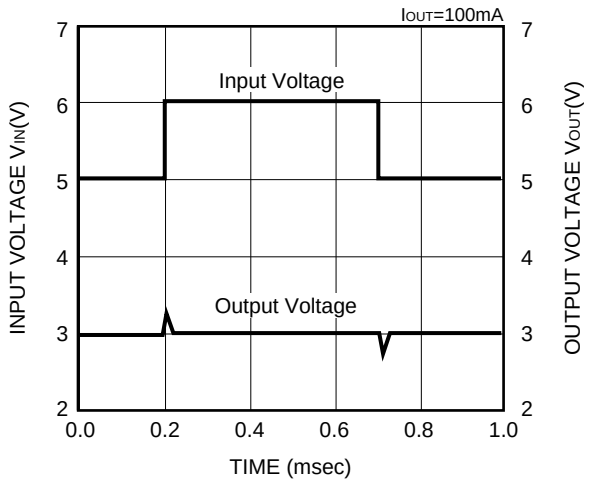
XC62HR3002 (3V)



XC62HR3002 (3V)

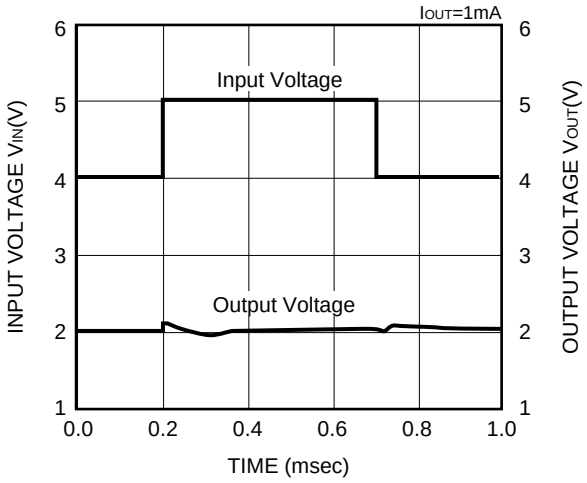


XC62HR3002 (3V)

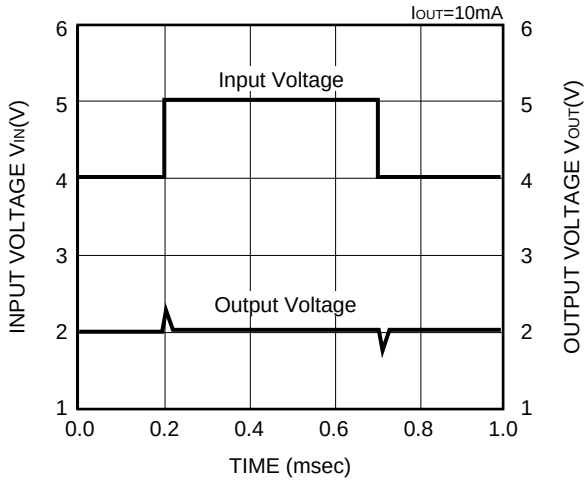


(9) INPUT TRANSIENT RESPONSE 2 (CONTINUED)

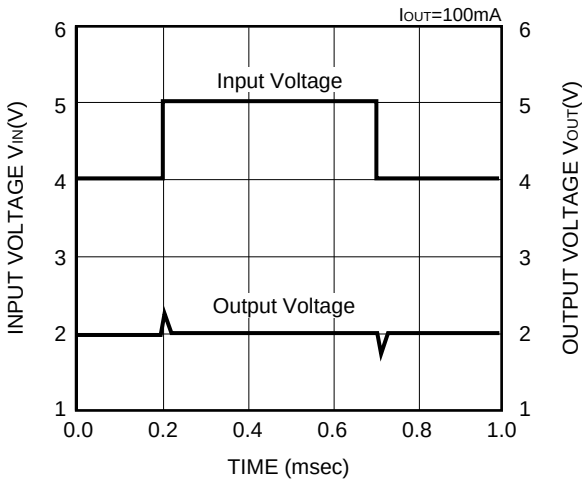
XC62HR2002 (2V)



XC62HR2002 (2V)

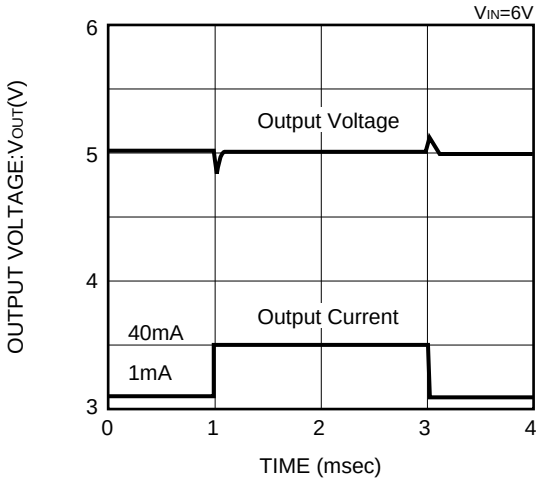


XC62HR2002 (2V)

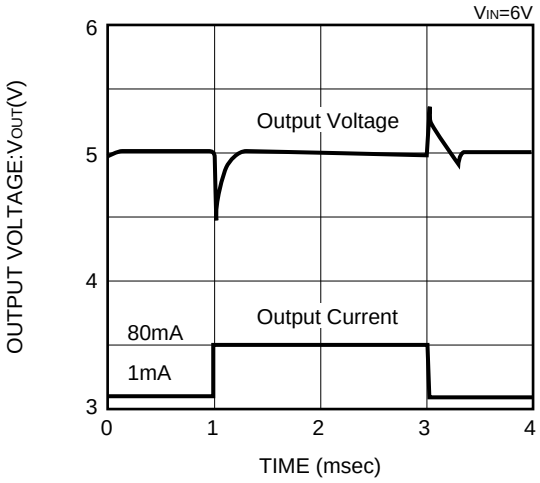


(10) LOAD TRANSIENT RESPONSE

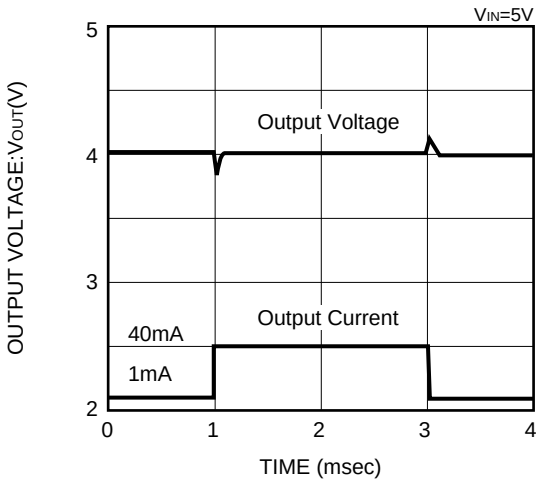
XC62HR5002 (5V)



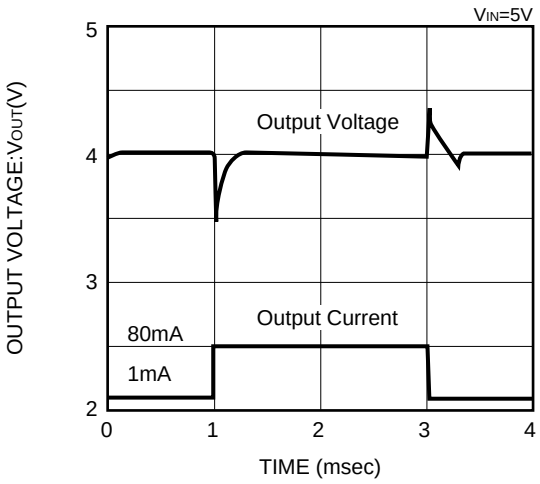
XC62HR5002 (5V)



XC62HR4002 (4V)

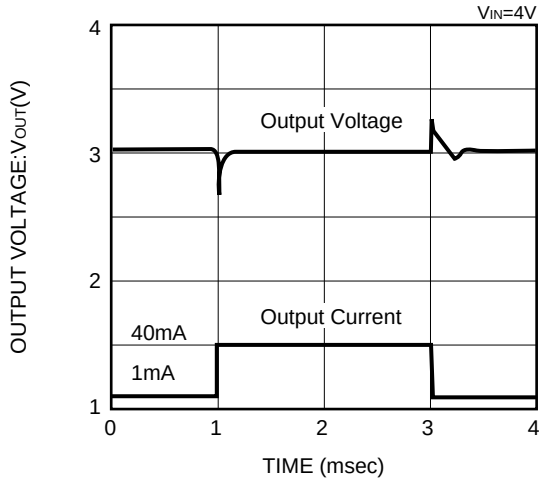


XC62HR4002 (4V)

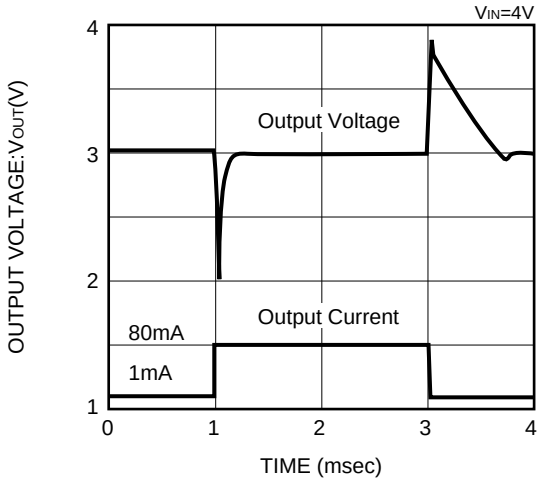


(10) LOAD TRANSIENT RESPONSE (CONTINUED)

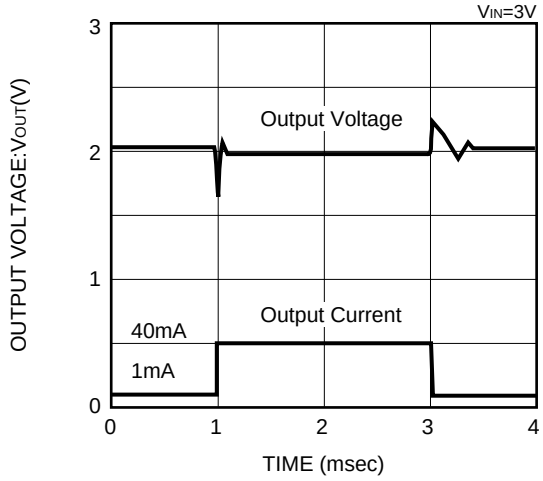
XC62HR3002 (3V)



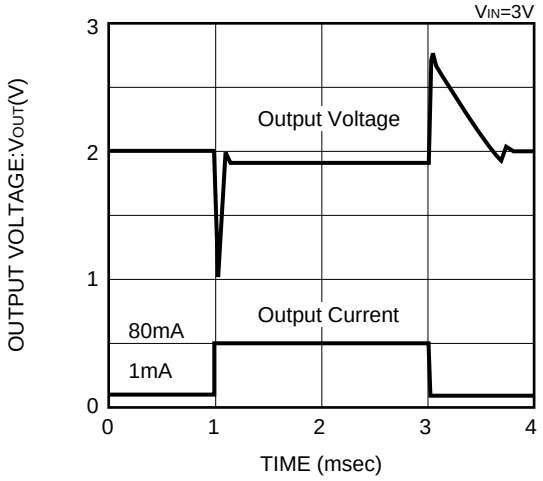
XC62HR3002 (3V)



XC62HR2002 (2V)

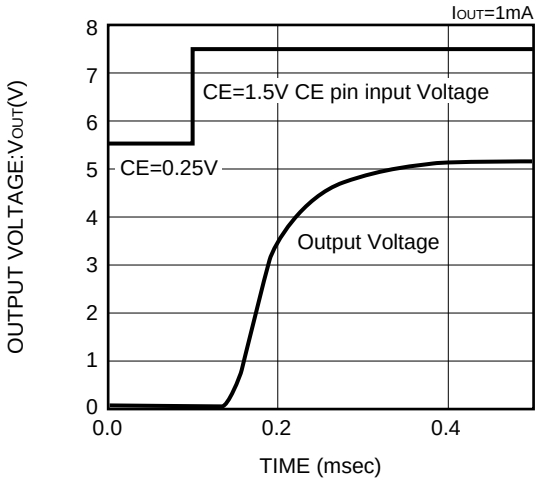


XC62HR2002 (2V)

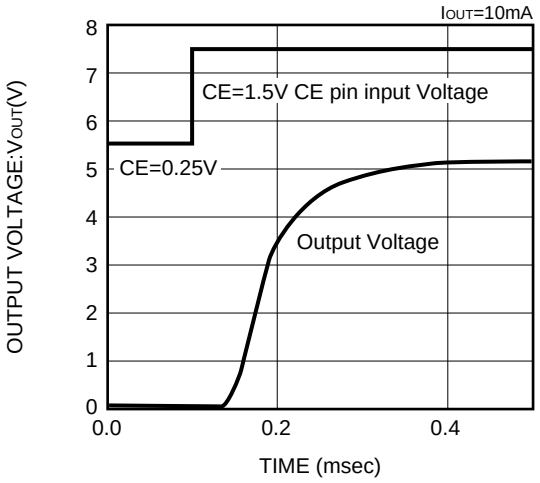


(11) CE PIN TRANSIENT RESPONSE

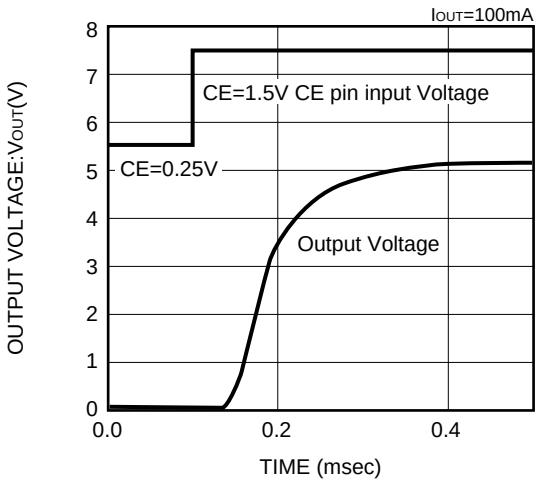
XC62HR5002 (5V)



XC62HR5002 (5V)

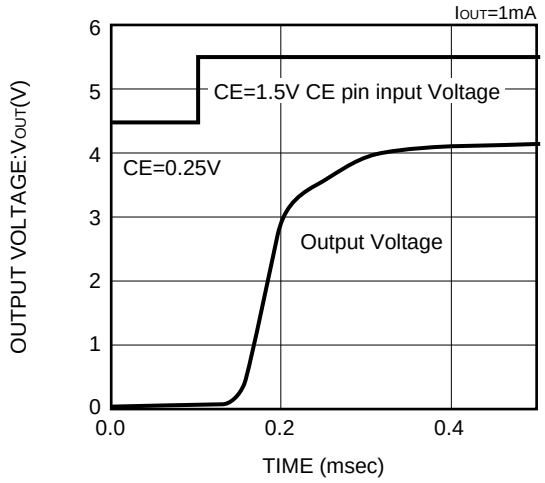


XC62HR5002 (5V)

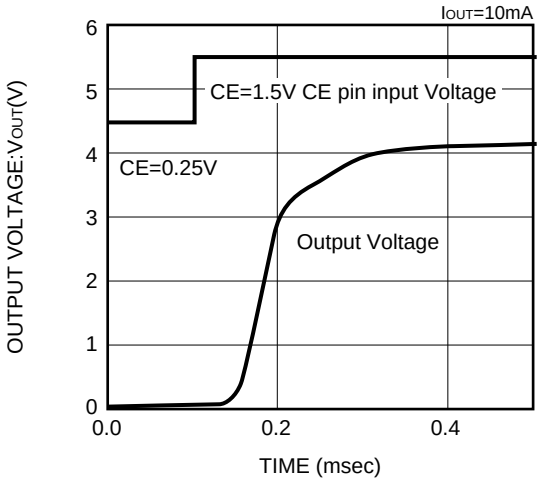


(11) CE PIN TRANSIENT RESPONSE (CONTINUED)

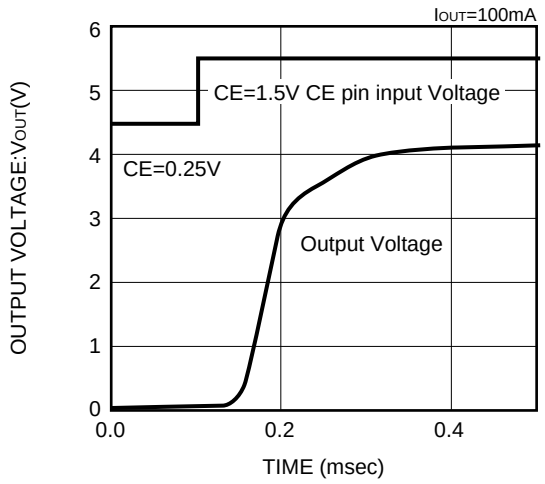
XC62HR4002 (4V)



XC62HR4002 (4V)

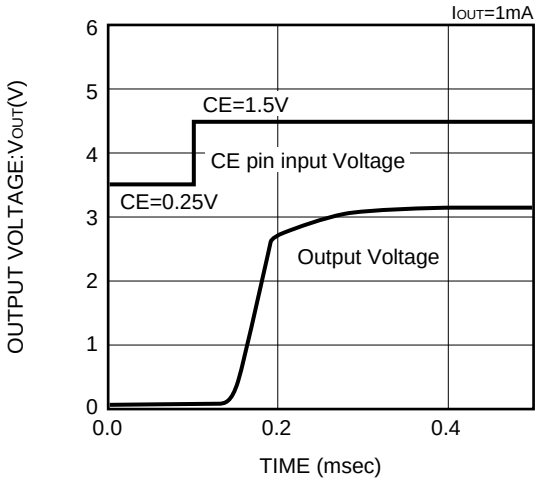


XC62HR4002 (4V)

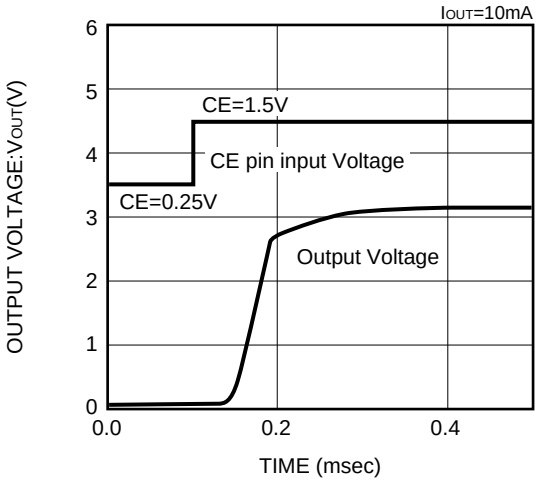


(11) CE PIN TRANSIENT RESPONSE (CONTINUED)

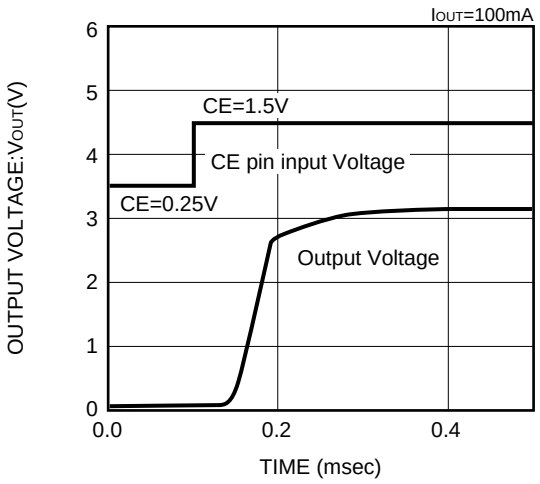
XC62HR3002 (3V)



XC62HR3002 (3V)

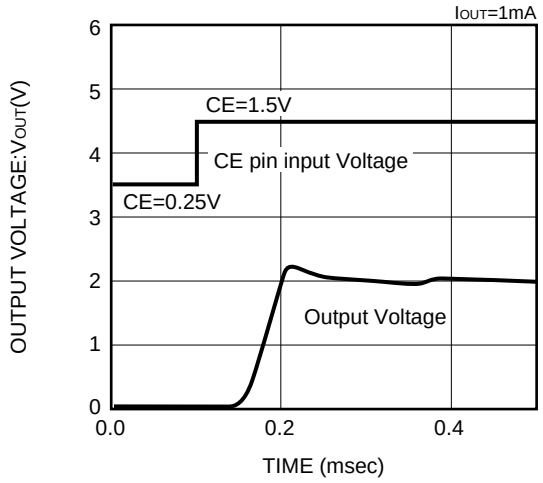


XC62HR3002 (3V)

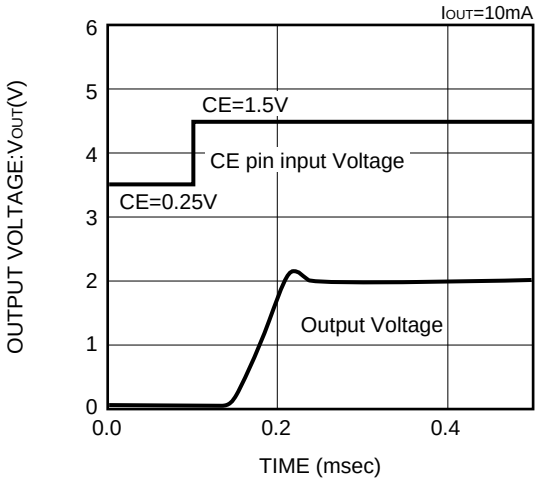


(11) CE PIN TRANSIENT RESPONSE (CONTINUED)

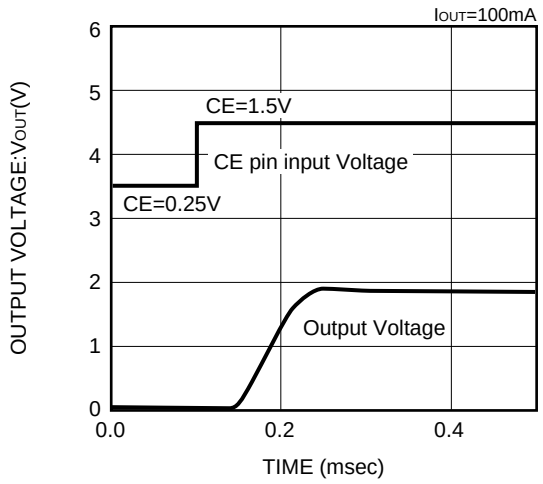
XC62HR2002 (2V)



XC62HR2002 (2V)

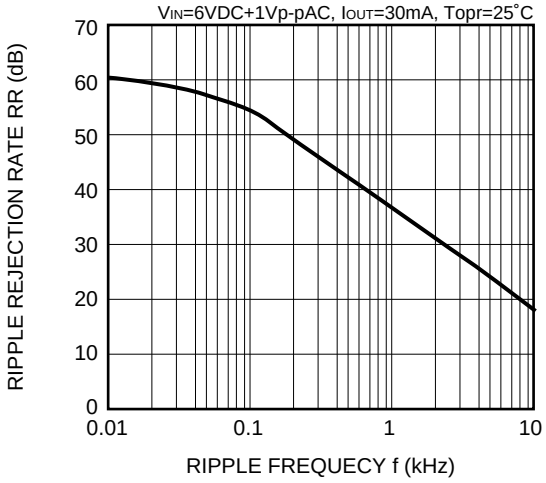


XC62HR2002 (2V)

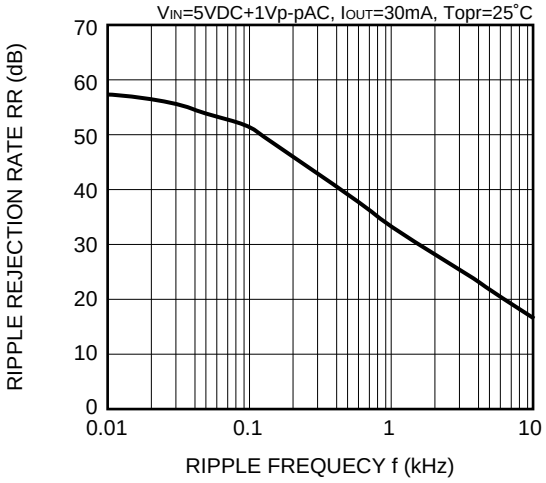


(12) RIPPLE REJECTION RATE

XC62HR5002



XC62HR4002



XC62HR3002