- **CMOS Low Power Consumption**
- **Small Input-Output Voltage Differential: 0.12V at 50mA, 0.38V at 100mA**
- **Maximum Output Current: 100mA(VOUT=–5.0V)**
- **Highly Accurate: ±2% (±1%)**
- **Output Voltage Range: –2.1V~ –6.0V**
- **Supply Current: 3.0μA (VOUT=-5.0V)**
- **SOT-23/SOT-89 Package**

Applications

- Battery Powered Equipment
- Portable & Cellular Phones
- Various Portable Equipment
- Power Supply for GaAs Applications

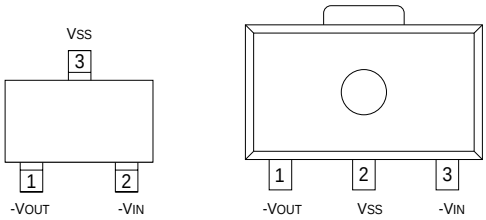
General Description

The XC62K series are highly precise, low power consumption, negative voltage regulators, manufactured using CMOS and laser trimming technologies. The series achieves high output currents with small input-output voltage differentials, and consists of a high precision voltage reference, an error correction circuit, and an output driver with current limitation.
SOT-23 (150mW) and SOT-89 (500mW) packages are available.

Features

Small input/output voltage differential:
50mA output possible with a 0.12V differential (VOUT=-5.0V).
Max. output current: 100mA (within max. power dissipation, VOUT= –5.0V)
Output voltage: –2.1V to –6.0V in 0.1V increments.
–5.0, –4.0, –3.0V, -2.5V standard.
(All other voltages are semi-custom)
Highly accurate: Output voltage ±2% (±1% for semi-custom products)
Low power consumption: Typ. 3.0μA at VOUT= –5.0V
Output voltage temperature coefficients: Typ. ±100ppm/℃
Input stability: Typ. 0.1%/V
Ultra small package: SOT- 23 (150mW) mini-mold and
SOT-89 (500mW) mini-power mold

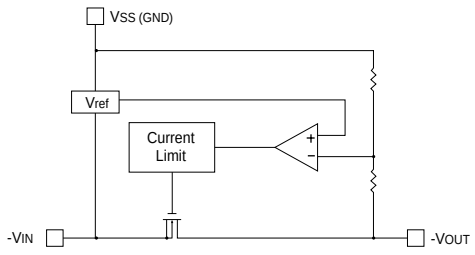
Pin Configuration



Pin Assignment

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

Block Diagram



Absolute Maximum Ratings

Ta=25℃

PARAMETER		SYMBOL	RATINGS	UNITS
Input Voltage		VIN	–12	V
Output Current		IOUT	200	mA
Output Voltage		VOUT	–VDD–0.3 ~ VIN+0.3	V
Continuous Total Power Dissipation	SOT-23	Pd	150	mW
	SOT-89		500	
Operating Ambient Temperature		Topr	–30 ~ +80	℃
Storage Temperature		Tstg	–40 ~ +125	℃

Note: Please ensure that IOUT is less than Pd ÷ (VOUT - VIN)

■ Electrical Characteristics

1. XC62KN5002 $V_{OUT}(T)$=–5.0V

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}(E)$	I_{OUT}=20mA V_{IN}=–6.0V	×0.98 –4.90	$V_{OUT}(T)$ –5.0	×1.02 –5.10	V
Maximum Output Current	I_{OUT} max.	V_{IN}=–6.0V, $V_{OUT}(E)$ ≧ –4.5V	100			mA
Load Stability	ΔV_{OUT}	V_{IN}=–6.0V 1mA ≦ I_{OUT} ≦ 50mA		40	80	mV
Input/Output Voltage Differential	Vdif	I_{OUT}=50mA I_{OUT}=100mA		120 380	300 600	mV
Supply Current	Iss	V_{IN}=–6.0V		3.0	7.0	μA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I_{OUT}=20mA –6.0V ≦ V_{IN} ≦ –10.0V		0.1	0.3	%/V
Input Voltage	V_{IN}				–10.0	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta Topr \cdot V_{OUT}}$	I_{OUT}=20mA –30℃ ≦ Topr ≦ 80℃		±100		ppm/℃

2. XC62KN4002 $V_{OUT}(T)$=–4.0V

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}(E)$	I_{OUT}=20mA V_{IN}=–5.0V	×0.98 –3.92	$V_{OUT}(T)$ –4.0	×1.02 –4.08	V
Maximum Output Current	I_{OUT} max.	V_{IN}=–5.0V, $V_{OUT}(E)$ ≧ –3.6V	80			mA
Load Stability	ΔV_{OUT}	V_{IN}=-5.0V 1mA ≦ I_{OUT} ≦ 45mA		40	80	mV
Input/Output Voltage Differential	Vdif	I_{OUT}=45mA I_{OUT}=90mA		120 380	300 600	mV
Supply Current	Iss	V_{IN}=–5.0V		3.0	6.5	μA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I_{OUT}=20mA –5.0V ≦ V_{IN} ≦ –10.0V		0.1	0.3	%/V
Input Voltage	V_{IN}				–10.0	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta Topr \cdot V_{OUT}}$	I_{OUT}=20mA –30℃ ≦ Topr ≦ 80℃		±100		ppm/℃

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 ceratin I_{OUT} value).
3. Vdif = {V_{IN}1 - V_{OUT}1}
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 a voltage equal to 98% of $V_{OUT}(E)$ appears. (Input Voltage is gradually decreased.)
6. I_{OUT}max=Please ensure that output current is within the values given for power dissipation.

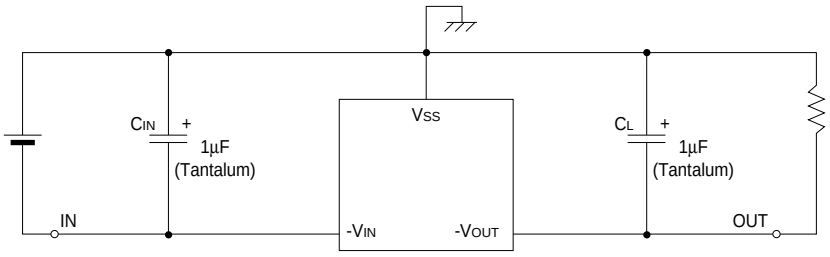
■ Electrical Characteristics

3. XC62KN3002 $V_{OUT}(T)=-3.0V$ Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}(E)$	I_{OUT}=20mA V_{IN}=–4.0V	×0.98 –2.94	$V_{OUT}(T)$ –3.0	×1.02 –3.06	V
Maximum Output Current	I_{OUT} max.	V_{IN}=–4.0V, $V_{OUT}(E)$≧–2.7V	60			mA
Load Stability	ΔV_{OUT}	V_{IN}=–4.0V 1mA ≦ I_{OUT} ≦ 40mA		40	80	mV
Input/Output Voltage Differential	Vdif	I_{OUT}=40mA I_{OUT}=80mA		120 380	300 600	mV
Supply Current	I_{SS}	V_{IN}=–4.0V		2.5	6.0	μA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I_{OUT}=20mA –4.0V ≦ V_{IN} ≦ –10.0V		0.1	0.3	%/V
Input Voltage	V_{IN}				–10.0	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta Topr \cdot V_{OUT}}$	I_{OUT}=20mA –30℃ ≦ Topr ≦ 80℃		±100		ppm/℃

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 ceratin I_{OUT} value).
3. Vdif = {$V_{IN}1$ - $V_{OUT}1$}
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 a voltage equal to 98% of $V_{OUT}(E)$ appears. (Input Voltage is gradually decreased.)
6. I_{OUT}max=Please ensure that output current is within the values given for power dissipation.

■ Standard Circuit



■ Notes on Use

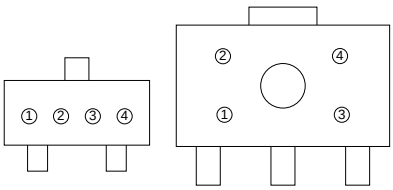
Please ensure that values for C_{IN} and C_L are more than 1μF (Tantalum).

■ Ordering Information

XC62Kxxxxxxx
a b cde f

DESIGNATOR	DESCRIPTION	DESIGNATOR	DESCRIPTION
a	Polarity of Output Voltage N=Negative	e	Package Type M=SOT-23 P=SOT-89
b	Output Voltage 30=3.0V 50=5.0V		
c	Temperature Characteristics 0=±100ppm/℃(typical)	f	Device Orientation R=Embossed Tape (Orientation of Device:Right) L=Embossed Tape (Orientation of Device:Left)
d	Accuracy 1=±1.0%(Semi-custom products) 2=±2.0%		

■ Marking



SOT-23 (TOP VIEW)　　SOT-89 (TOP VIEW)

① Integral Number of Output Voltage

DESIGNATOR	VOLTAGE(V)	DESIGNATOR	VOLTAGE(V)
2	2.②	5	5.②
3	3.②	6	6.②
4	4.②		

② Decimal Point of Output Voltage

DESIGNATOR	VOLTAGE(V)	DESIGNATOR	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 Polarity of Output Voltage

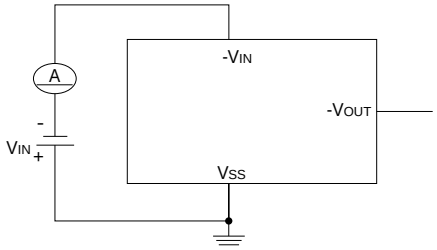
DESIGNATOR	POLARITY
5	Negative

④ Assembly Lot Number

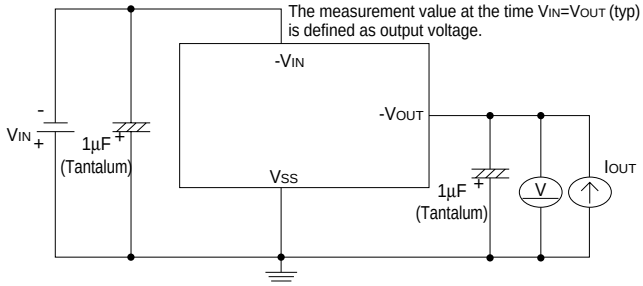
Based on internal standards.

■ Measuring Circuits

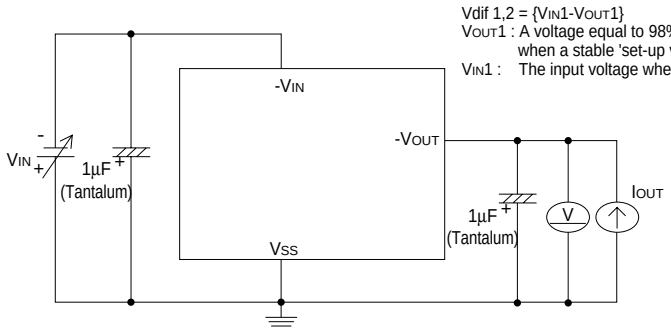
1. Supply Current



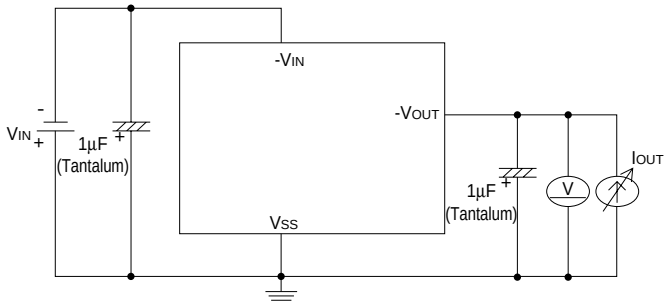
2. Outpt Voltage



3. Input stability, Input/Output voltage differential



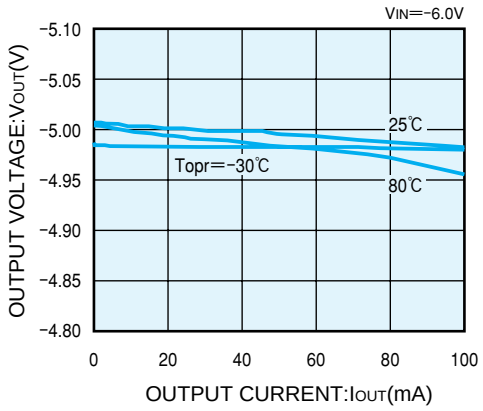
4. Load stability, Maximum output current



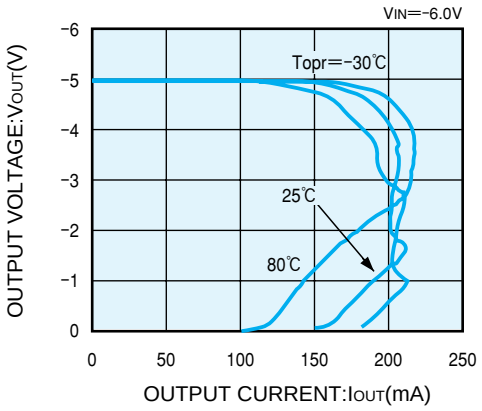
■ XC62K Electrical Characteristics

(1) OUTPUT VOLTAGE vs. OUTPUT CURRENT

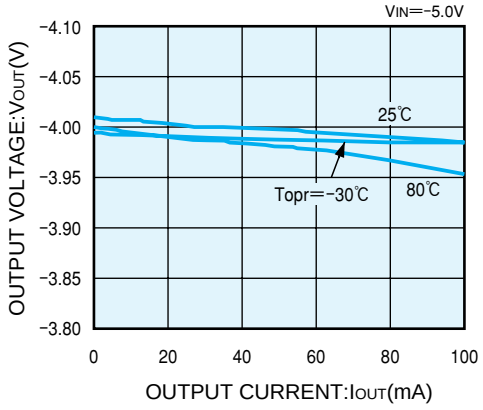
XC62KN5002(-5.0V)



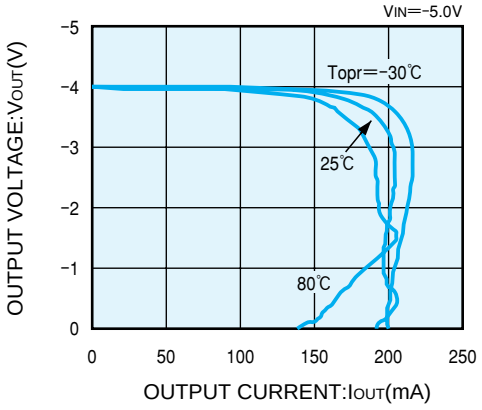
XC62KN5002(-5.0V)



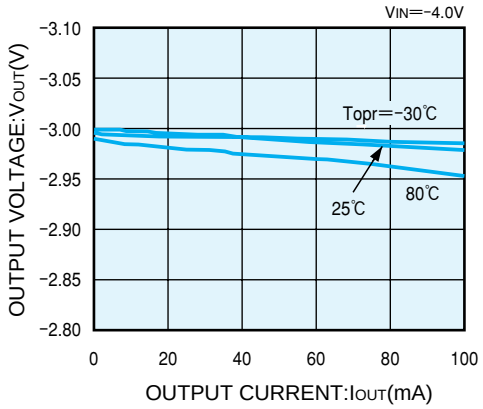
XC62KN4002(-4.0V)



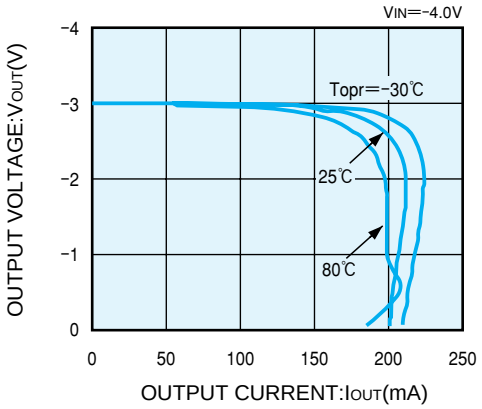
XC62KN4002(-4.0V)



XC62KN3002(-3.0V)



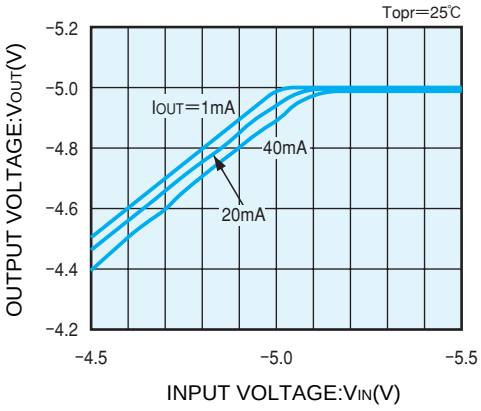
XC62KN3002(-3.0V)



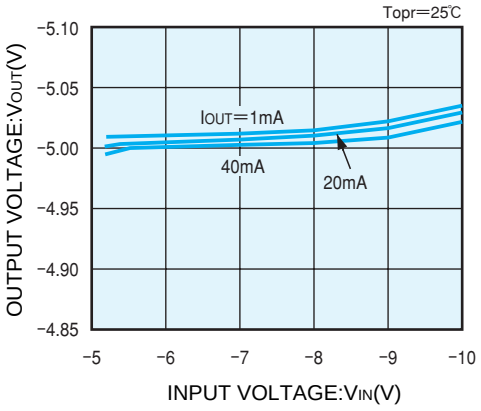
■ XC62K Electrical Characteristics

(2) OUTPUT VOLTAGE vs. INPUT VOLTAGE

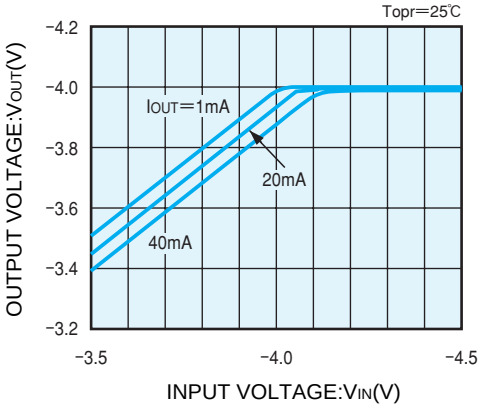
XC62KN5002(-5.0V)



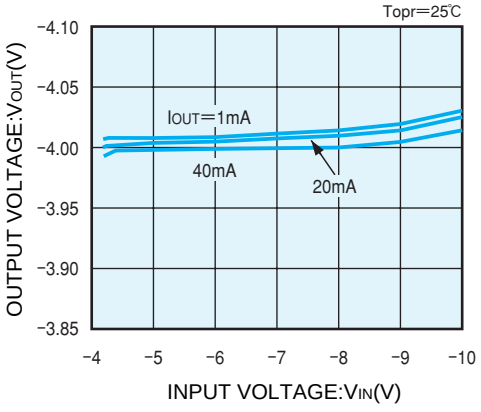
XC62KN5002(-5.0V)



XC62KN4002(-4.0V)



XC62KN4002(-4.0V)



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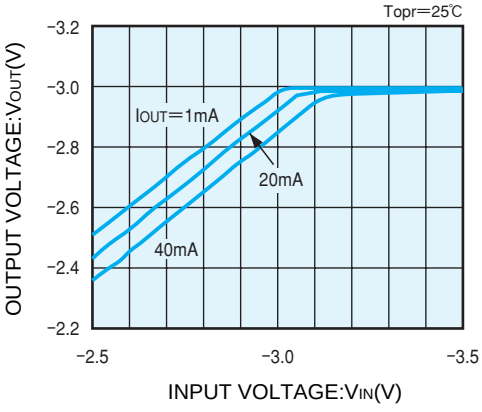

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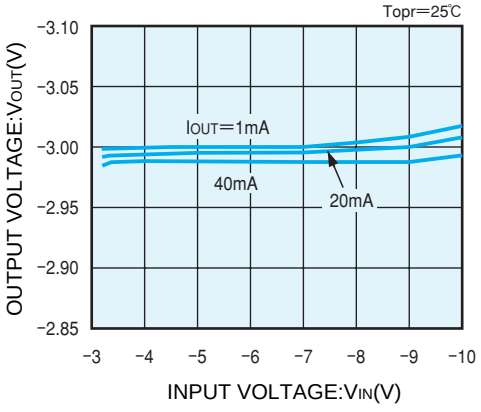
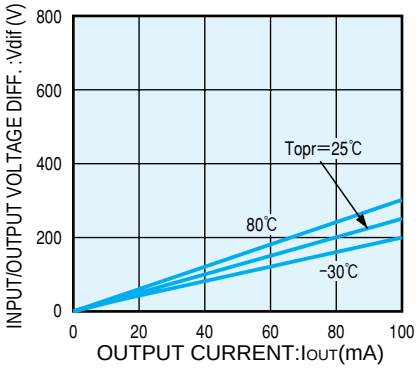


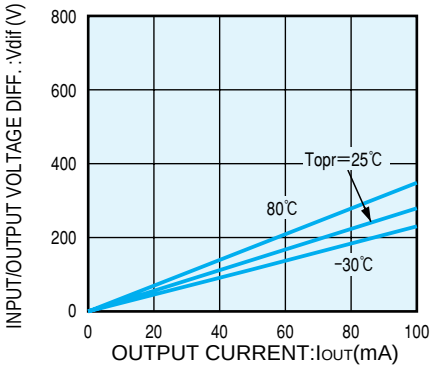
■ XC62K Electrical Characteristics

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

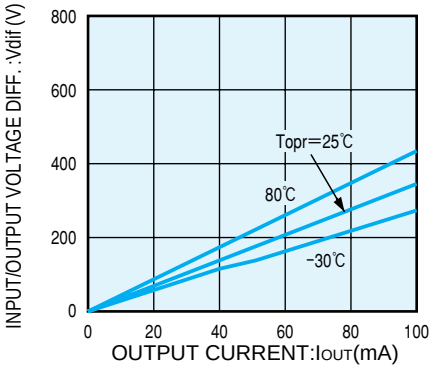
XC62KN5002(−5.0V)



XC62KN4002(−4.0V)

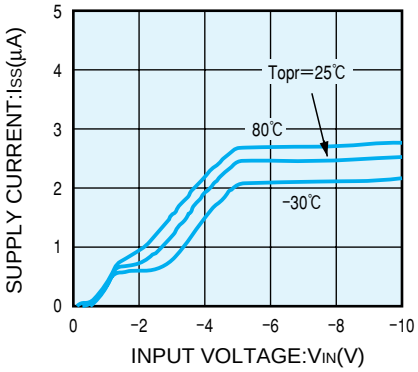


XC62KN3002(−3.0V)

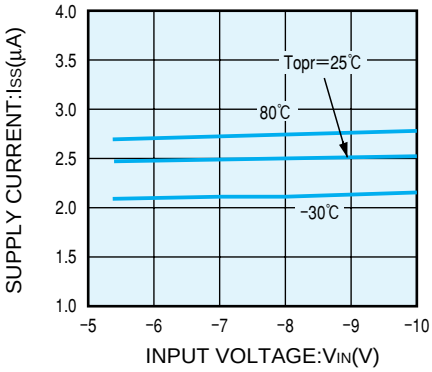


(4) SUPPLY CURRENT vs. INPUT VOLTAGE

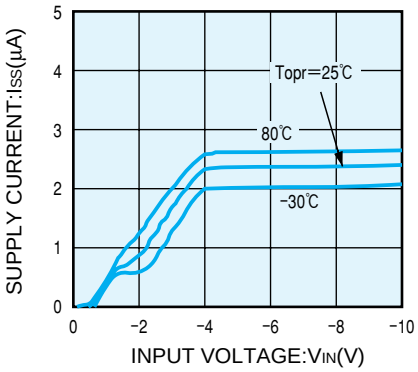
XC62KN5002(−5.0V)



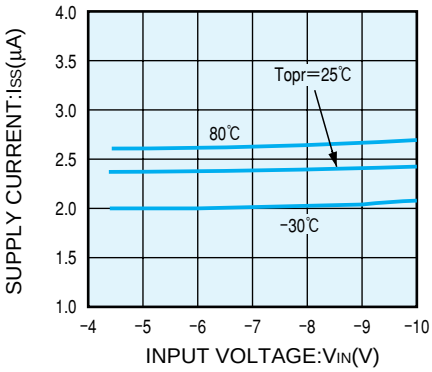
XC62KN5002(−5.0V)



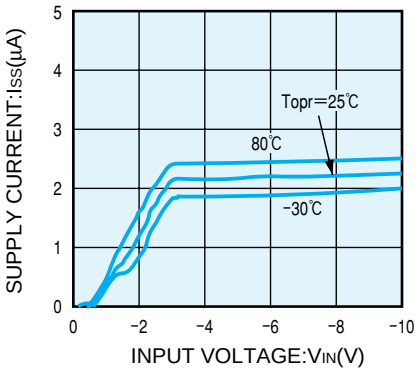
XC62KN4002(−4.0V)



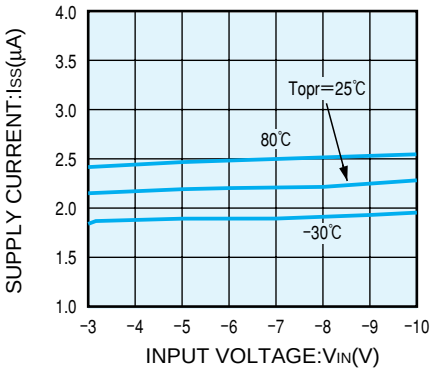
XC62KN4002(−4.0V)



XC62KN3002(−3.0V)

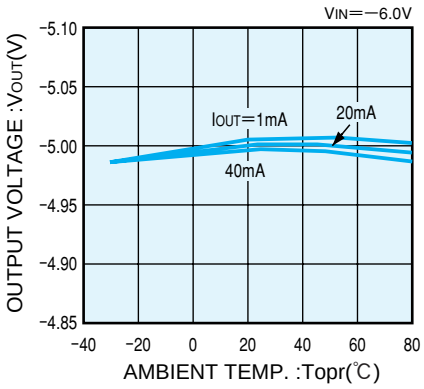


XC62KN3002(−3.0V)

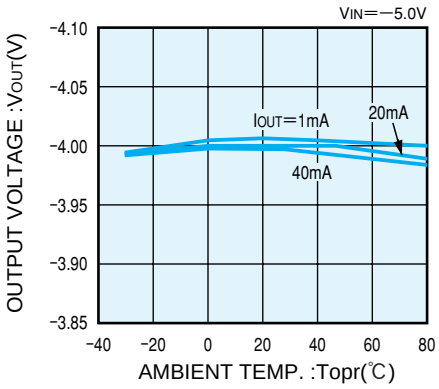


(5) OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE

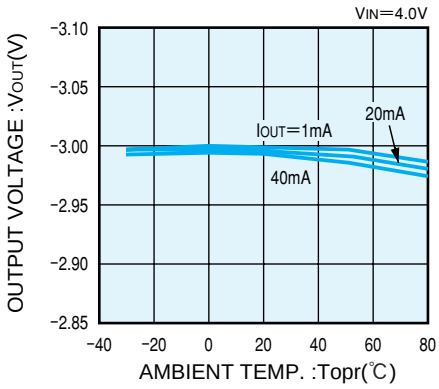
XC62KN5002(-5.0V)



XC62KN4002(-4.0V)

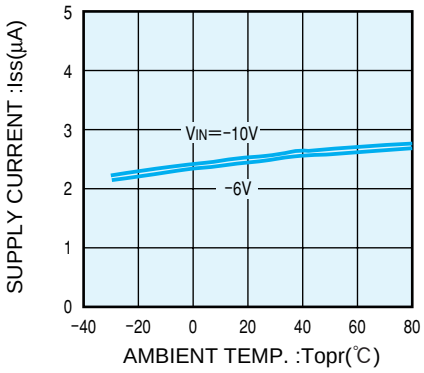


XC62KN3002(-3.0V)

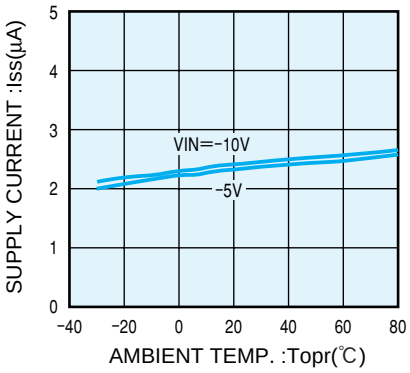


(6) SUPPLY CURRENT vs. AMBIENT TEMPERATURE

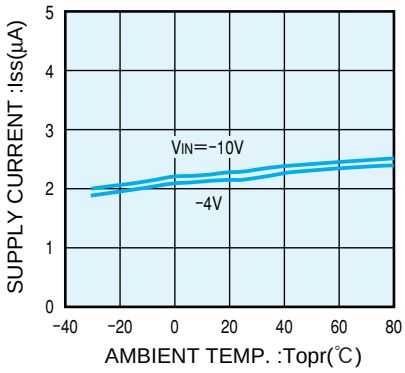
XC62KN5002(-5.0V)



XC62KN4002(-4.0V)

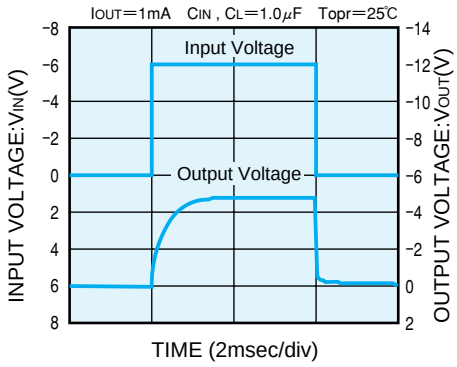


XC62KN3002(-3.0V)

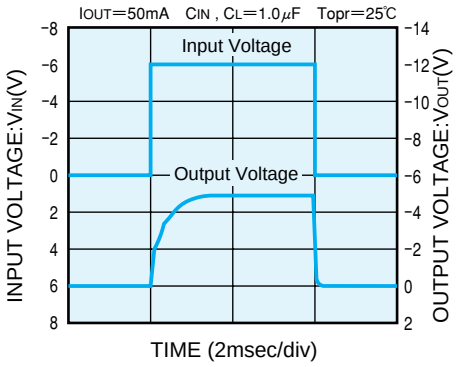


(7) INPUT TRANSIENT RESPONSE 1

XC62KN5002(-5.0V)



XC62KN5002(-5.0V)



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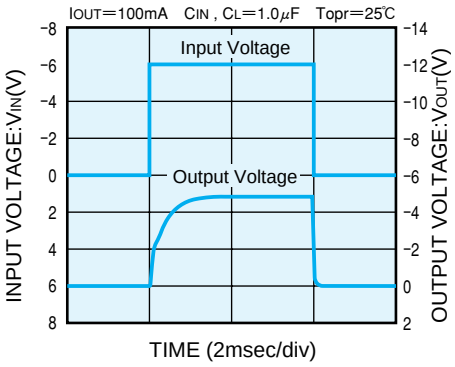

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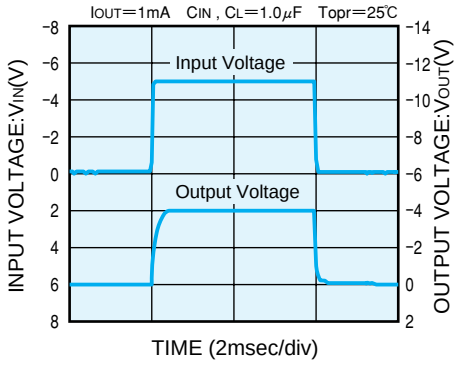

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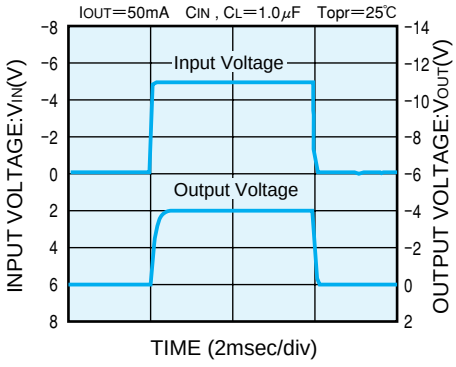

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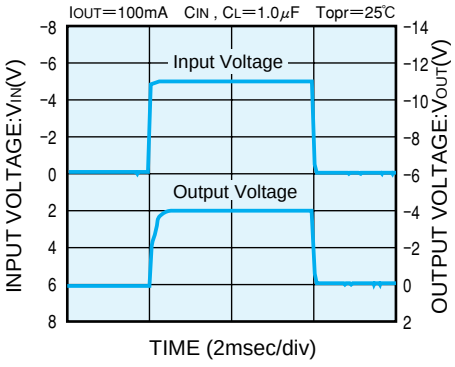

(7) INPUT TRANSIENT RESPONSE 1 (CONTINUED)

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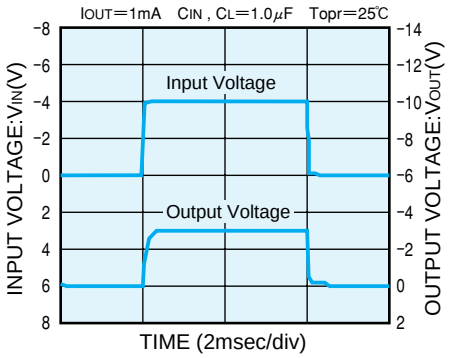

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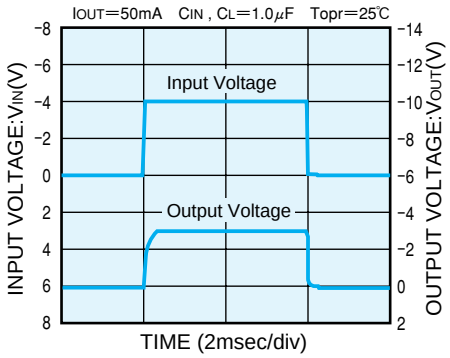

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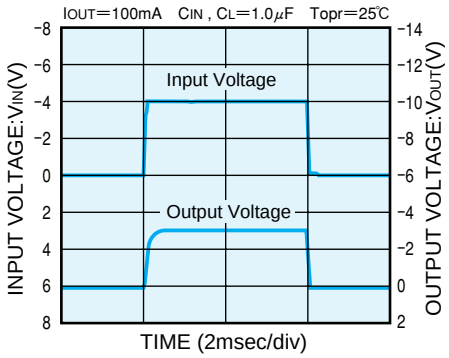

(8) INPUT TRANSIENT RESPONSE 2

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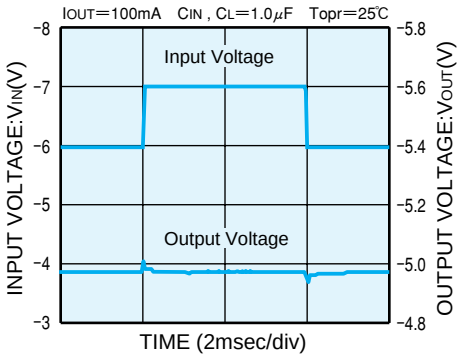

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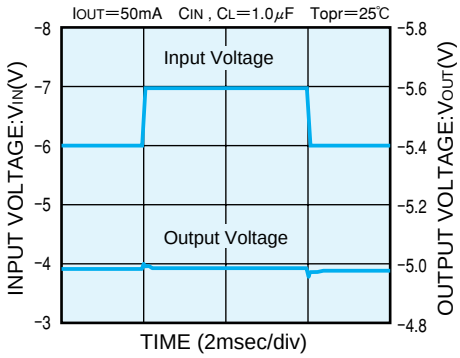

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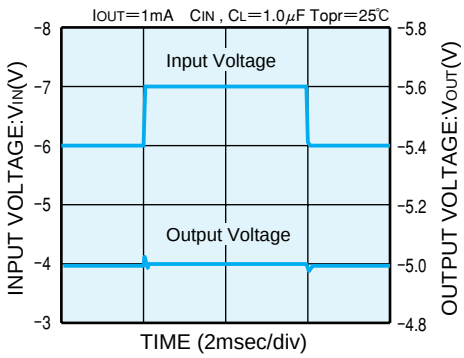

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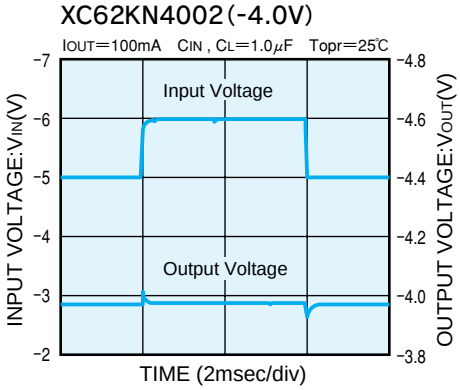

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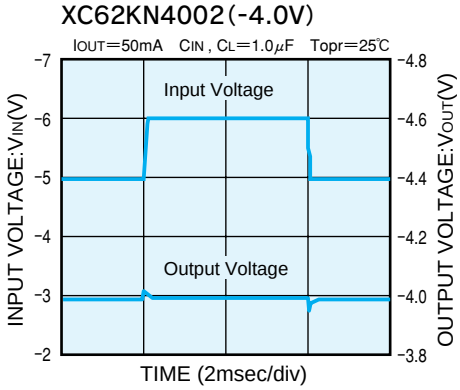

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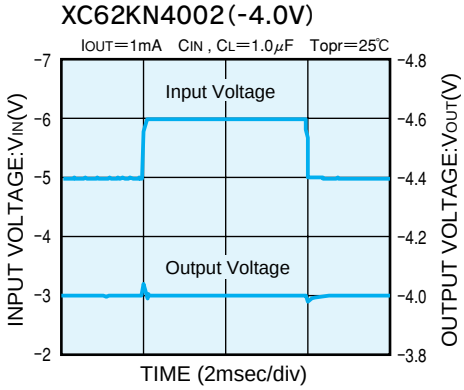

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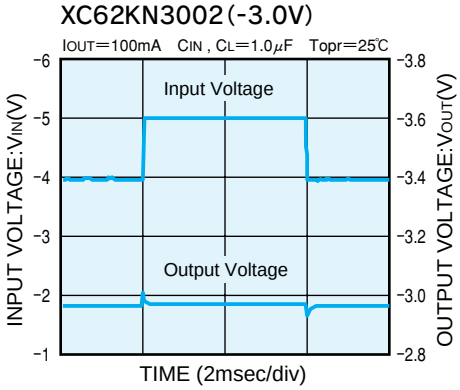

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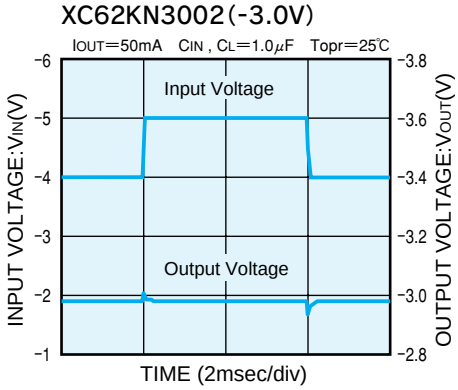

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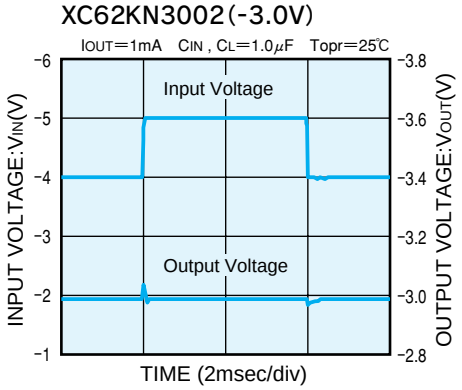
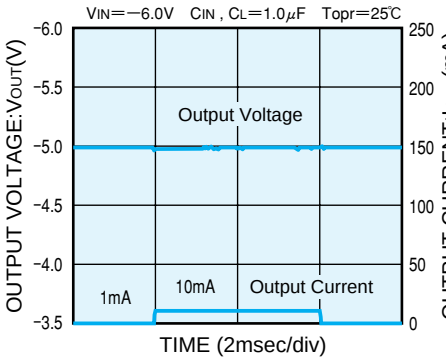


■ XC62K Electrical Characteristics

(9) LOAD TRANSIENT RESPONSE

XC62KN5002(-5.0V)



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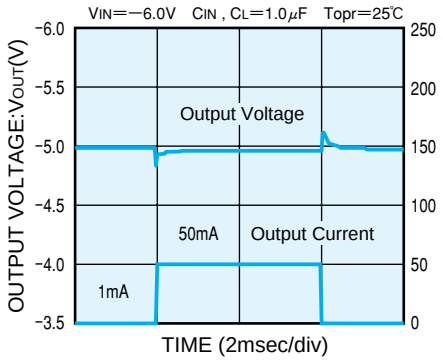

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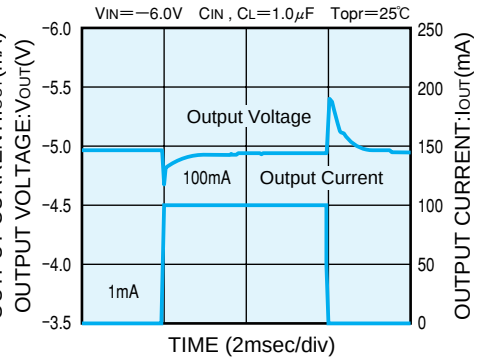

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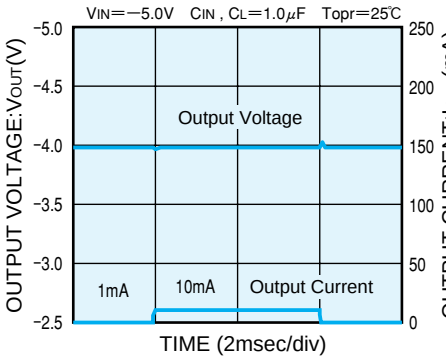

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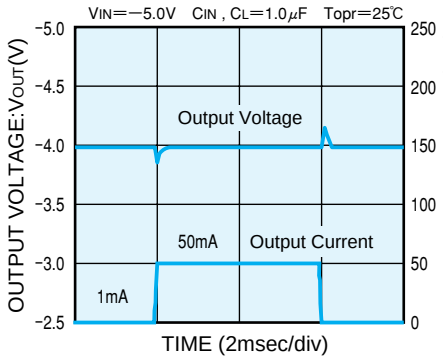

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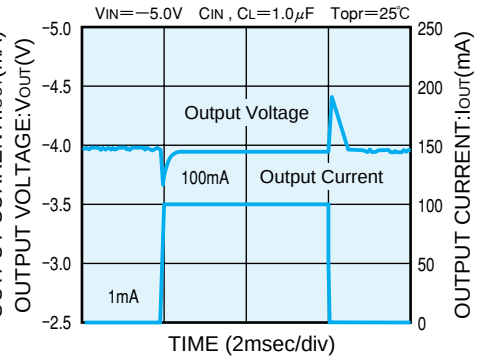

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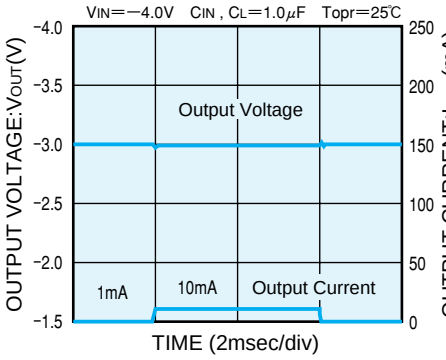

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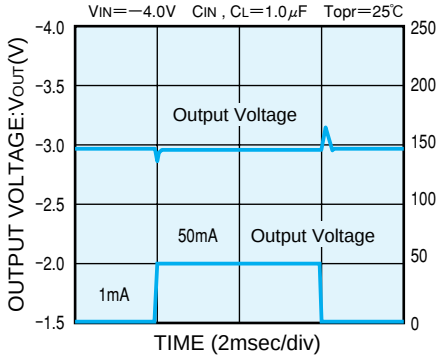

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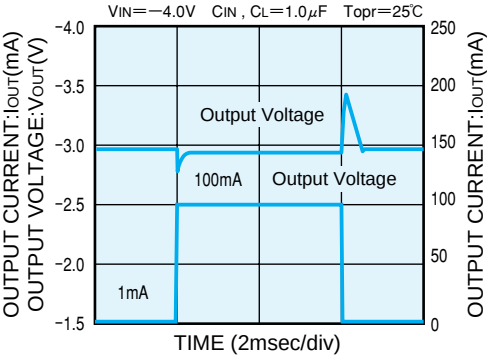
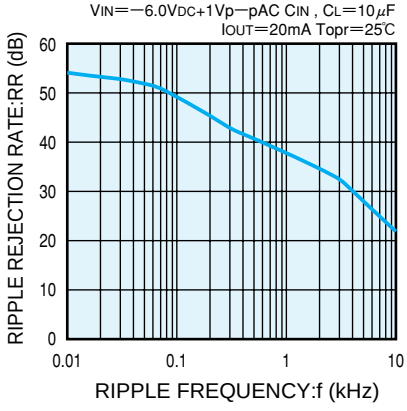


(10) RIPPLE REJECTION RATE

XC62KN5002(-5.0V)



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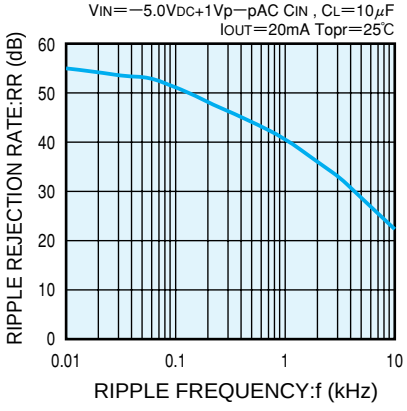

XC62KN3002(-3.0V)