

- ◆ CMOS Low Power Consumption
- ◆ Dropout Voltage : 200mV @ 80mA
- ◆ Output Current : 150mA (Minimum)
- ◆ Highly Accurate : $\pm 2\%$
- ◆ Output Voltage Range : 1.7V ~ 6.0V
- ◆ SOT-25 / SOT-89 Package
- ◆ Capacitors can be Tantalum or Ceramic

■ Applications

- Mobile phones
- Cordless phones
- Cameras, video recorders
- Portable games
- Portable AV equipment
- Reference voltage
- Battery powered equipment

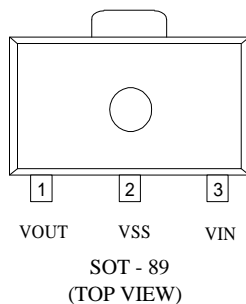
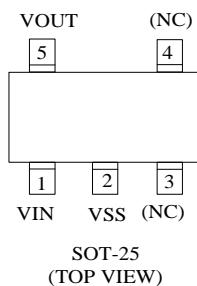
■ General Description

The XC6201 series are highly precise, low power consumption, positive voltage regulators manufactured using CMOS and laser trimming technologies. The series provides large currents with a significantly small dropout voltage. The XC6201 consists of a current limiter circuit, a driver transistor, a precision reference voltage and an error amplifier. Output voltage is selectable in 0.1V steps between 1.7V ~ 6.0V. SOT-25 (150mW) and SOT-89 (500mW) packages are available.

■ Features

- Maximum Output Current** : 150mA (MIN.)
- Dropout Voltage** : 200mV @ 80mA
- Maximum Operating Voltage** : 10V
- Output Voltage Range** : 1.7V ~ 6.0V (selectable in 0.1V steps)
- Highly Accurate** : $\pm 2\%$
- Low Power Consumption** : TYP 2.0 μ A
- Operational Temperature Range** : $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$
- Ultra Small Packages** : SOT-25 (150mW), SOT-89 (500mW)
- Capacitors can be Tantalum or Ceramic**

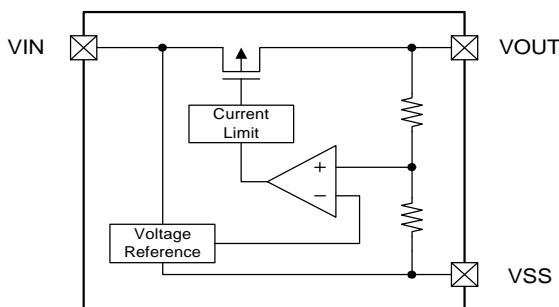
■ Pin Configuration



■ Pin Assignment

PIN NUMBER		PIN NAME	FUNCTION
SOT-25	SOT-89		
5	1	VOUT	Output
2	2	VSS	Ground
1	3	VIN	Power Input
3	-	(NC)	No Connection
4	-	(NC)	No Connection

■ Block Diagram



■ Absolute Maximum Ratings

Ta = 25°C

PARAMETER	SYMBOL	RATINGS	UNITS
Input Voltage	VIN	12	V
Output Current	IOUT	500	mA
Output Voltage	VOUT	VSS - 0.3 ~ VIN + 0.3	V
Power Dissipation	SOT-23	Pd	150
	SOT-89	Pd	500
Operating Temp.	Topr	- 40 ~ + 85	°C
Storage Temp.	Tstg	- 40 ~ + 125	°C

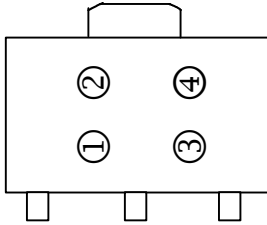
Ordering Information

XC6201P c d e f
 ↑ ↑
 a b

DESIGNATOR	SYMBOL	DESCRIPTION	DESIGNATOR	SYMBOL	DESCRIPTION
a	1	Indicates the product number	d	1/2	Output Voltage Accuracy e.g.1 : ±1.0% 2 : ±2.0%
b	P	Type of regulator 3-pin	e	M	Package Type M=SOT-25
				P	P=SOT-89
c	17~60	Output Voltage e.g. 30 : 3.0V 50 : 5.0V	f	R	Device Orientation Embossed Tape:standard loading
				L	Embossed Tape:reverse loading

Marking Rule

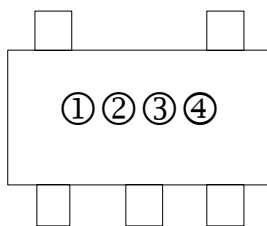
SOT-89



① Represents the product name

SYMBOL	PRODUCT NAME
1	XC6201PXXXXXX

SOT-25



② Represents the type of regulator

VOLTAGE(V)	0.1~3.0	3.1~6.0	6.1~9.0		
SYMBOL	5	6	7	NAME	XC6201PXXXXXX

③ Represents the Output Voltage

SYMBOL	OUTPUT VOLTAGE (V)			SYMBOL	OUTPUT VOLTAGE (V)		
	5	6	7		5	6	7
0	-	3.1	-	F	-	4.6	-
1	-	3.2	-	H	1.7	4.7	-
2	-	3.3	-	K	1.8	4.8	-
3	-	3.4	-	L	1.9	4.9	-
4	-	3.5	-	M	2.0	5.0	-
5	-	3.6	-	N	2.1	5.1	-
6	-	3.7	-	P	2.2	5.2	-
7	-	3.8	-	R	2.3	5.3	-
8	-	3.9	-	S	2.4	5.4	-
9	-	4.0	-	T	2.5	5.5	-
A	-	4.1	-	Y	2.6	5.6	-
B	-	4.2	-	V	2.7	5.7	-
C	-	4.3	-	X	2.8	5.8	-
D	-	4.4	-	Y	2.9	5.9	-
E	-	4.5	-	Z	3.0	6.0	-

④ Represents the assembly lot no.

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

■ Electrical Characteristics

XC6201P272 V_{OUT(T)} = 2.7V

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	V _{OUT(E)} (Note2)	I _{OUT} =40mA V _{IN} =3.7V	2.646	2.700	2.754	V	2
Maximum Output Current	I _{OUT max}	V _{IN} =4.0V, V _{OUT(E)} ≥ 2.43V	100			mA	2
Load Regulation	ΔV _{OUT}	V _{IN} =4.0V 1mA ≤ I _{OUT} ≤ 80mA		15	40	mV	2
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =80mA		200	370	mV	2
	V _{dif2}	I _{OUT} =160mA		450	710	mV	2
Supply Current	I _{SS}	V _{IN} =4.0V		2.0	5.0	μA	1
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =40mA 4.0V ≤ V _{IN} ≤ 10.0V		0.2	0.3	%/V	2
Input Voltage	V _{IN}				10	V	-
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	I _{OUT} =40mA -40°C ≤ T _{opr} ≤ 85°C		±100		ppm/°C	2

XC6201P332 V_{OUT(T)} = 3.3V

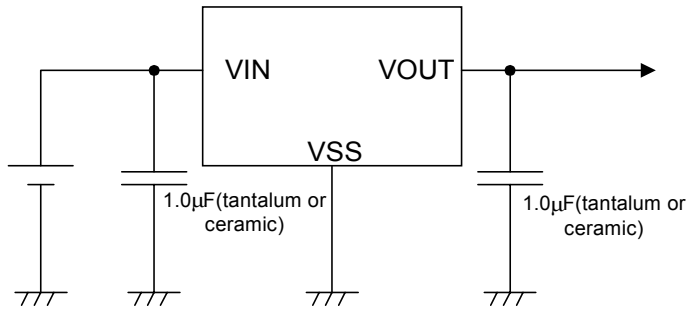
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS	CIRCUIT
Output Voltage	V _{OUT(E)} (Note2)	I _{OUT} =40mA V _{IN} =4.3V	3.234	3.300	3.366	V	2
Maximum Output Current	I _{OUT max}	V _{IN} =4.3V, V _{OUT(E)} ≥ 2.97V	150			mA	2
Load Regulation	ΔV _{OUT}	V _{IN} =4.3V 1mA ≤ I _{OUT} ≤ 80mA		20	50	mV	2
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =80mA		200	360	mV	2
	V _{dif2}	I _{OUT} =160mA		450	700	mV	2
Supply Current	I _{SS}	V _{IN} =4.3V		2.0	5.0	μA	1
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =40mA 4.3V ≤ V _{IN} ≤ 10.0V		0.2	0.3	%/V	2
Input Voltage	V _{IN}				10	V	-
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	I _{OUT} =40mA -40°C ≤ T _{opr} ≤ 85°C		±100		ppm/°C	2

XC6201P502 V_{OUT(T)} = 5.0V

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	2
Maximum Output Current	I _{OUT max}	V _{IN} =6.0V, V _{OUT(E)} ≥ 4.5V	200			mA	2
Load Regulation	ΔV _{OUT}	V _{IN} =6.0V 1mA ≤ I _{OUT} ≤ 100mA		30	70	mV	2
Dropout Voltage (Note 3)	V _{dif1}	I _{OUT} =100mA		160	340	mV	2
	V _{dif2}	I _{OUT} =200mA		400	600	mV	2
Supply Current	I _{SS}	V _{IN} =6.0V		2.0	6.0	μA	1
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =40mA 6.0V ≤ V _{IN} ≤ 10.0V		0.2	0.3	%/V	2
Input Voltage	V _{IN}				10	V	-
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	I _{OUT} =40mA -40°C ≤ T _{opr} ≤ 85°C		±100		ppm/°C	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 while maintaining a certain I_{OUT} value).3. V_{dif} = { V_{IN1} (Note5) - V_{OUT1} (Note4) }4. V_{OUT1} = A voltage equal to 98% of the output voltage when a stabilised (V_{OUT} (T) + 1.0V) is input.5. V_{IN1} = The input voltage at the time V_{OUT1} is output (input voltage has been gradually reduced).

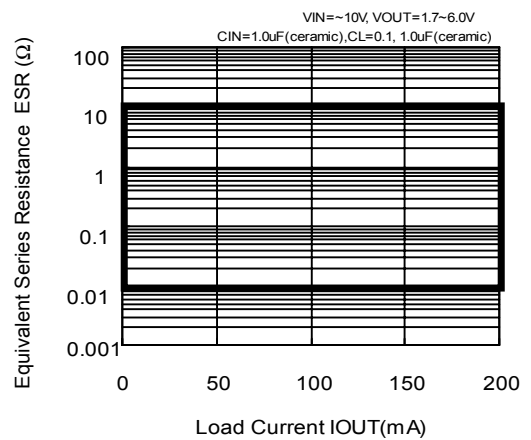
■ **Typical Application**



< External Capacitors >

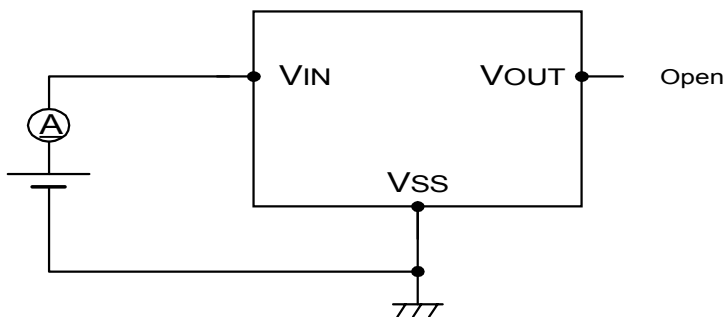
XC6201 requires an output capacitor between VOUT pin and VSS pin, in order to obtain stable output voltage. The output capacitor should be greater than 0.1µF except when using low ESR capacitor (e.g. ceramic capacitors) which should be lower than 10µF. In addition, an input capacitor is required between VIN pin and VSS pin to stabilize the input power supply.

Capacitors	Conditions
tantalum capacitor	greater than 0.1µF
low ESR capacitor (e.g. ceramic capacitor)	0.1µF ~ 10µF

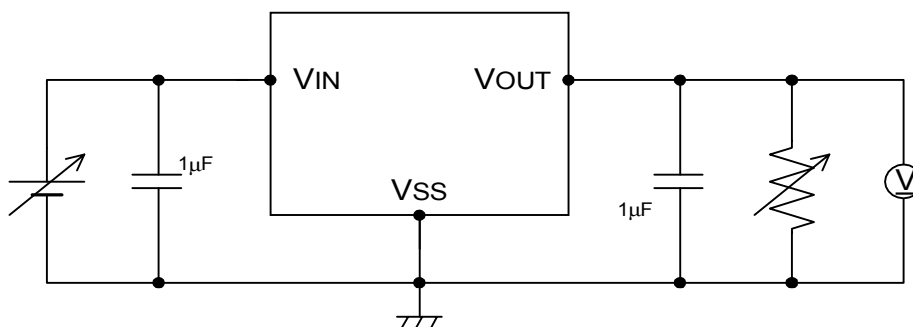


■ **Measuring Circuits**

Measuring Circuit 1 : Supply Current

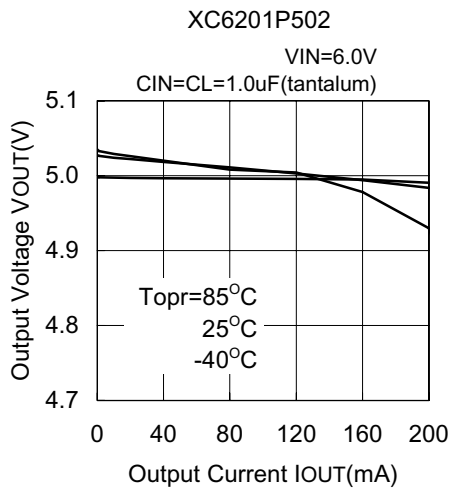
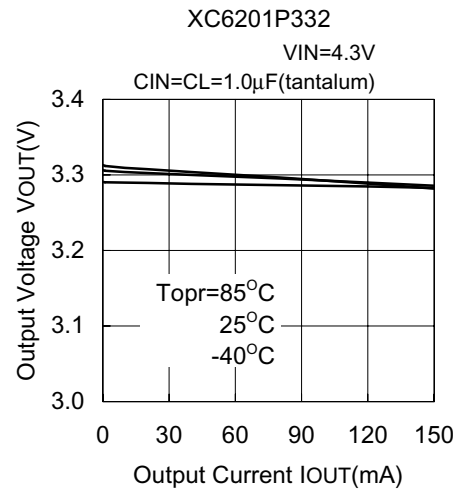
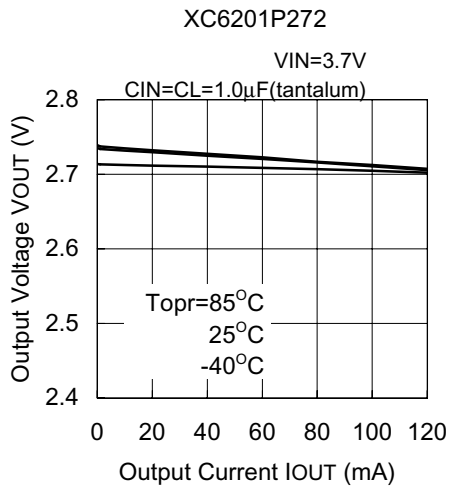


Measuring Circuit 2 : Output Voltage, Oscillation Check, Line Regulation, Dropout Voltage, Load Regulation

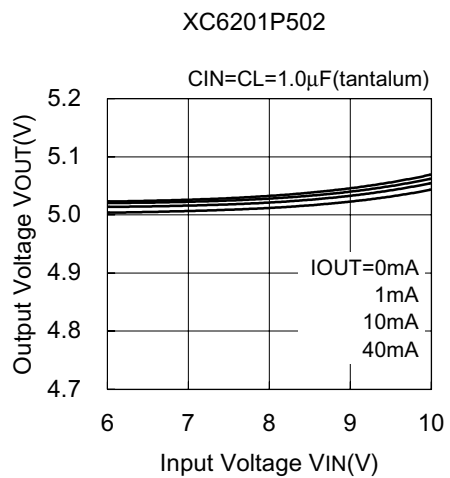
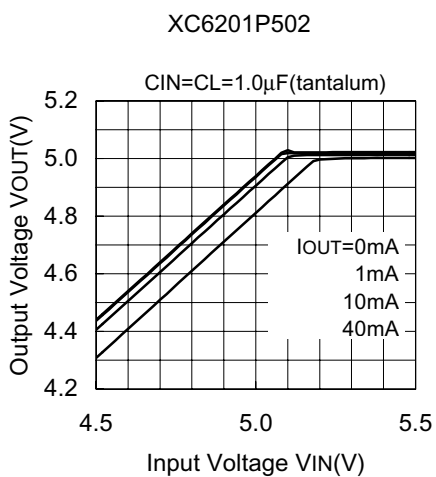
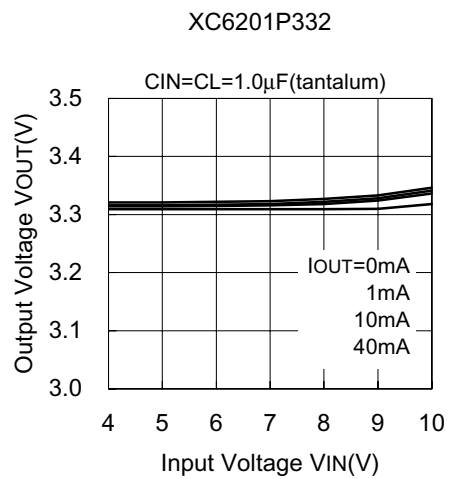
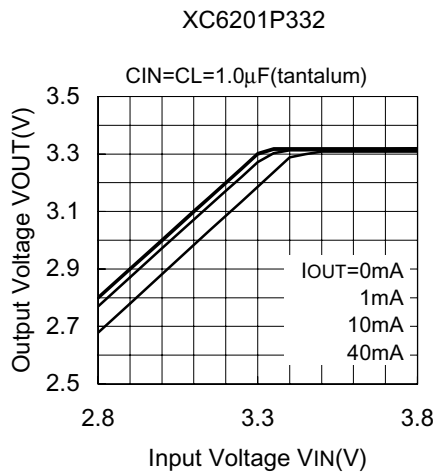
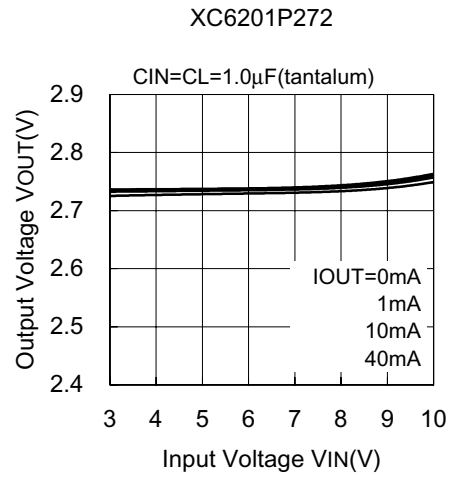
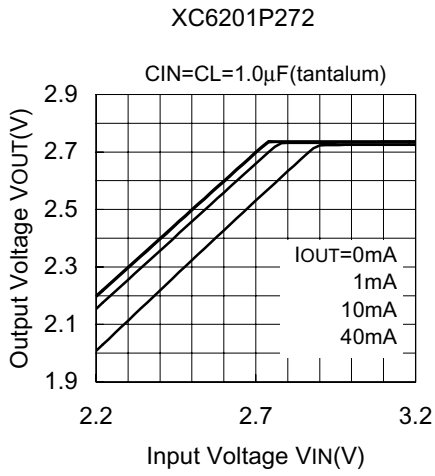


■ XC6201P

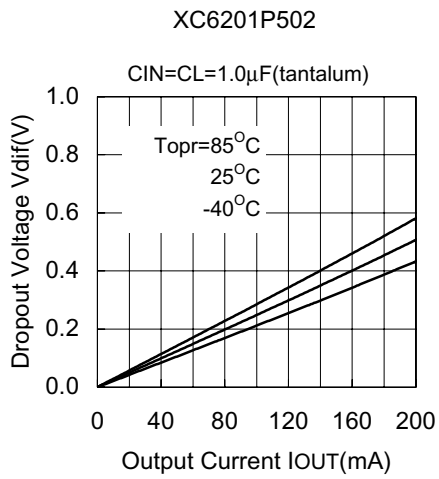
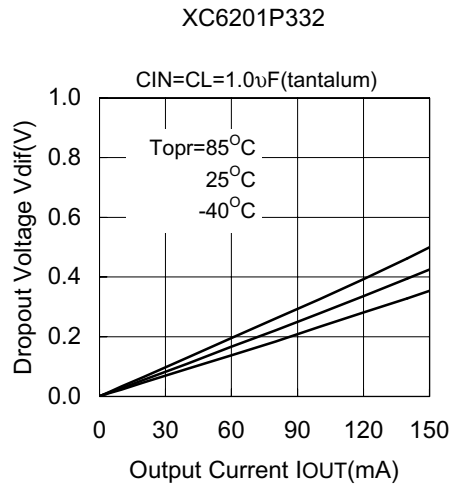
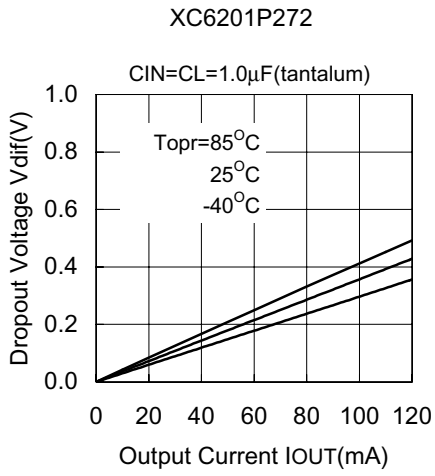
(1) Output Voltage vs. Output Current



(2) Output Voltage vs. Input Voltage

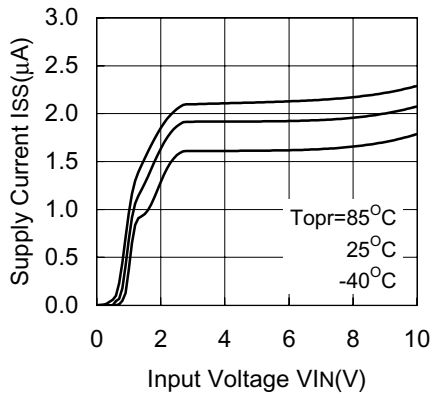


(3) Dropout Voltage vs. Output Current

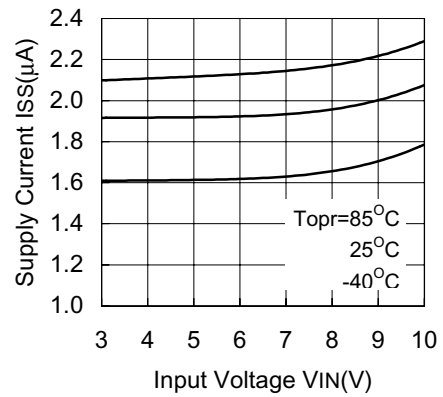


(4) Supply Current vs. Input Voltage

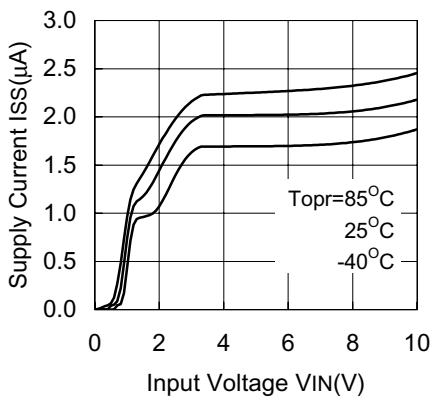
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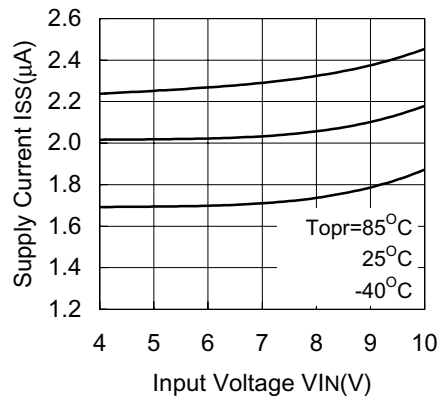
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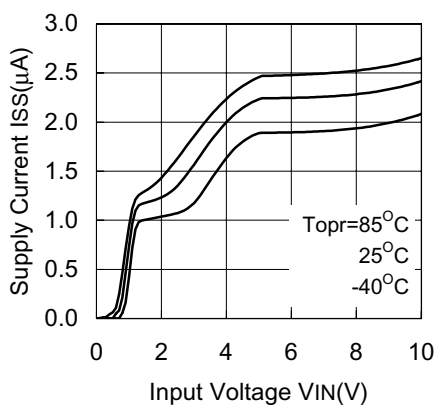
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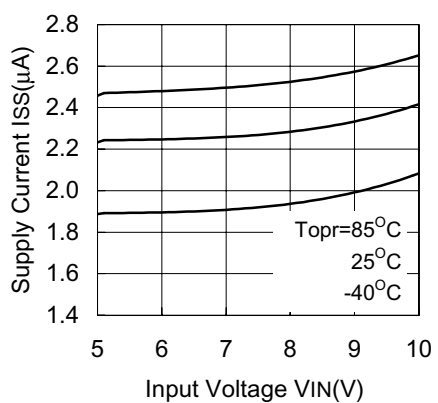
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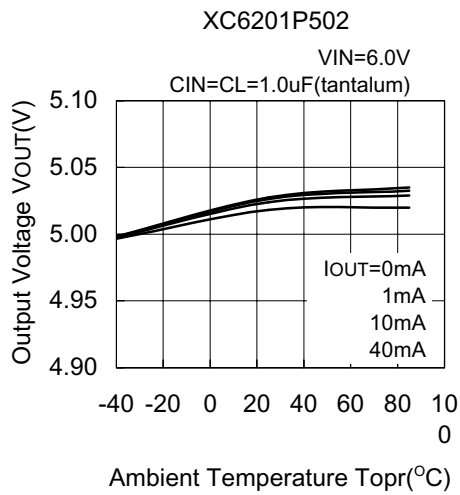
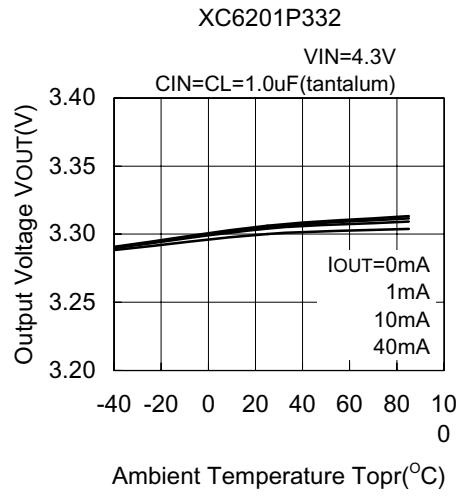
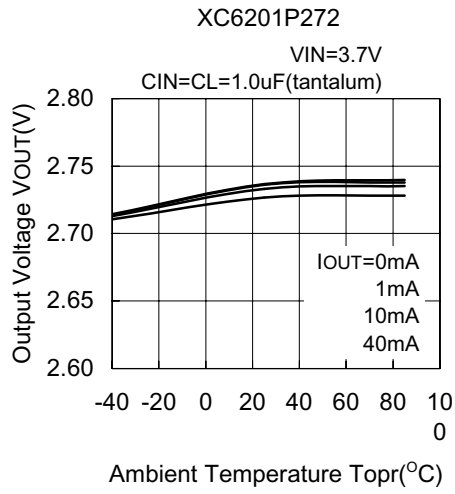
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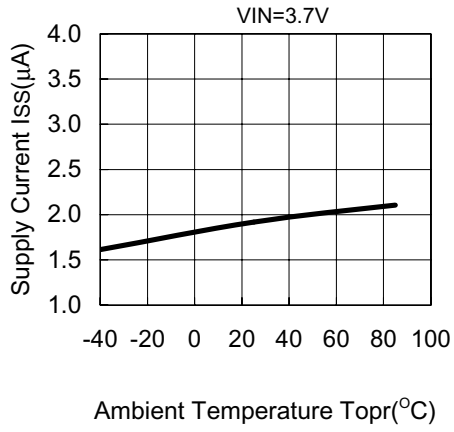


(5) Output Voltage vs. Ambient Temperature

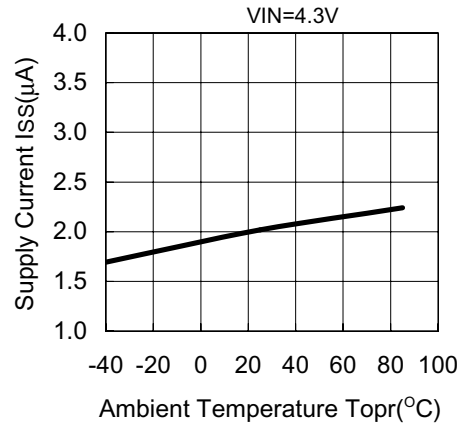


(6) Supply Current vs. Ambient Temperature

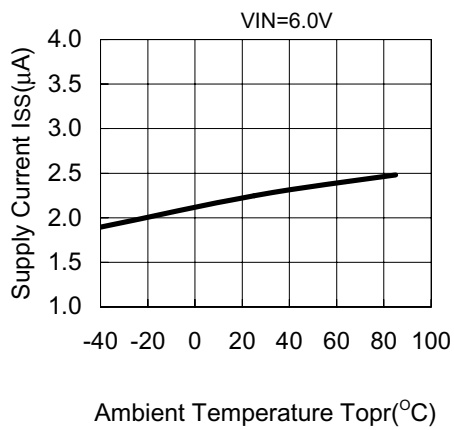
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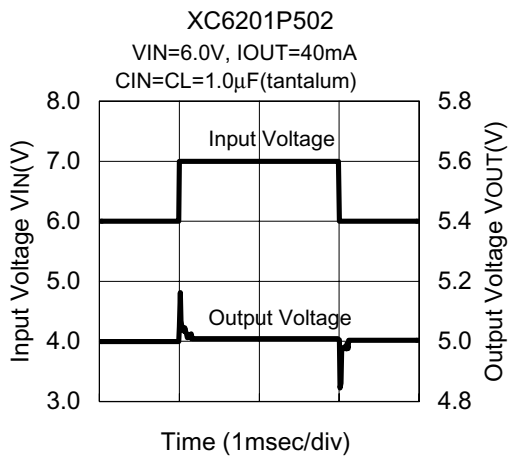
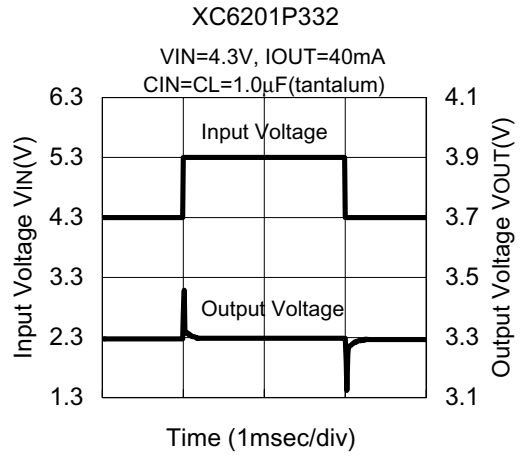
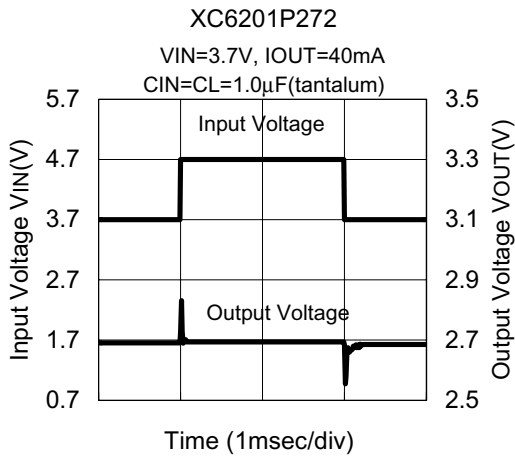
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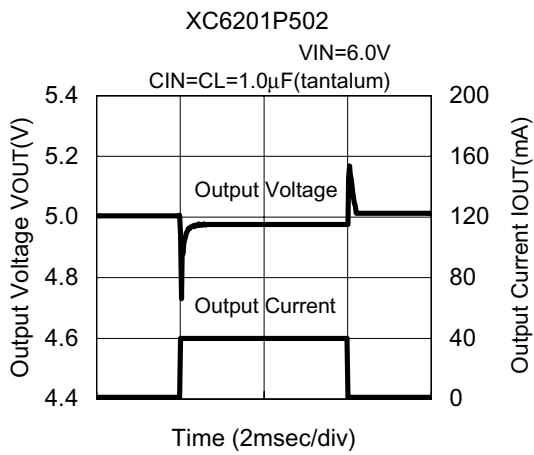
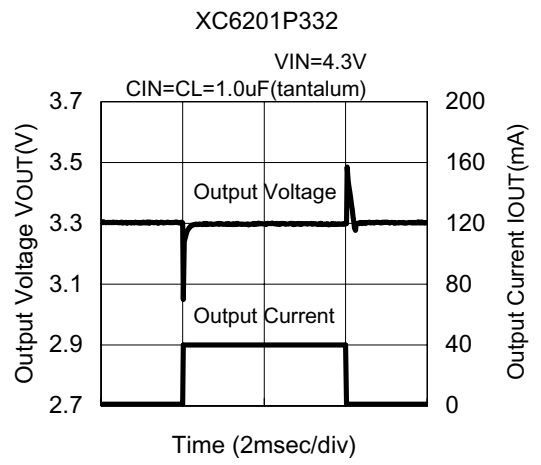
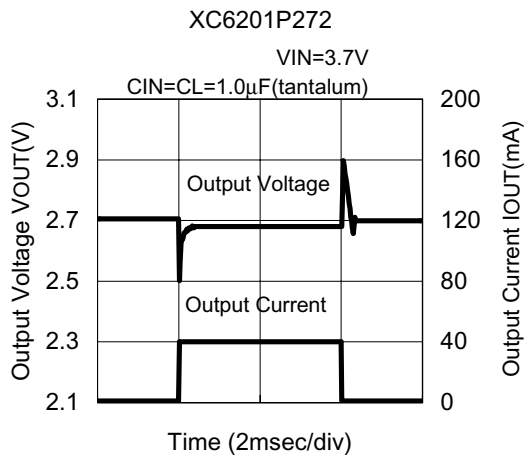
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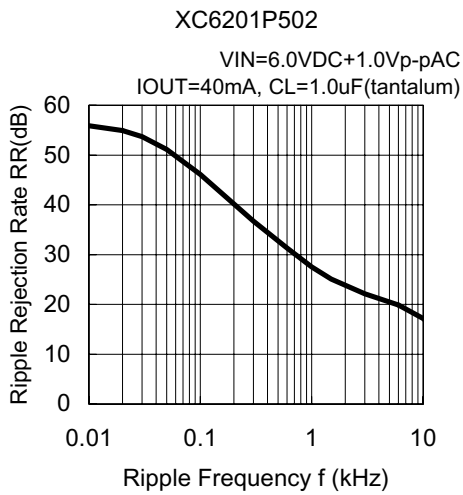
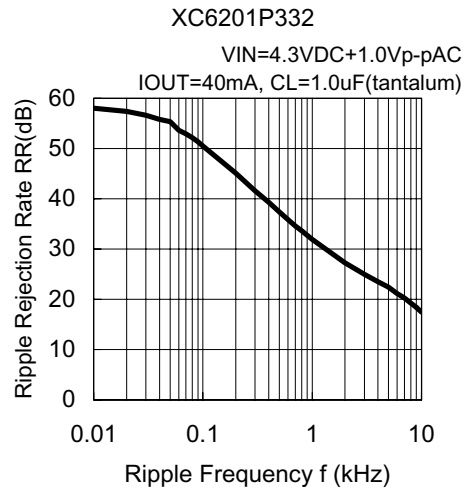
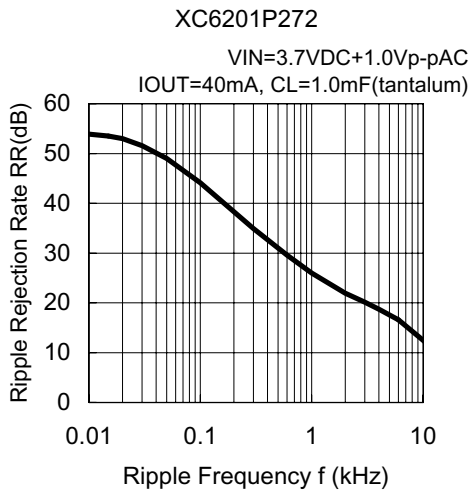
(7) Input Transient Response



(8) Load Transient Response



(9)Ripple Rejection Rate



(10)Output Noise Density

