

## LOW DROPOUT VOLTAGE REGULATOR

### ■ GENERAL DESCRIPTION

The NJM2860 is a low dropout voltage regulator. Advanced Bipolar technology achieves low noise, high ripple rejection and low quiescent current. It features small SC-88A package.

### ■ PACKAGE OUTLINE

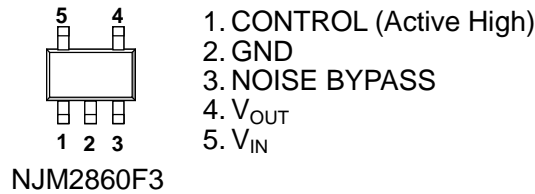


NJM2860F3

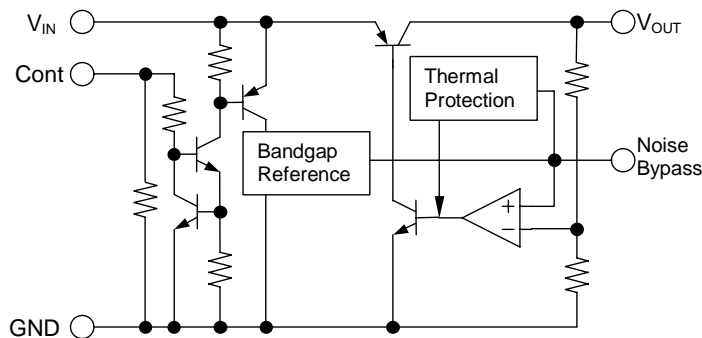
### ■ FEATURES

- High Ripple Rejection 70dB typ. (f=1kHz, Vo=3V Version)
- Output Noise Voltage Vno=30μVrms typ. (Cp=0.01μF)
- Output capacitor with 1.0uF ceramic capacitor (Vo≥2.7V)
- Output Current Io(max.)=100mA
- High Precision Output Vo±1.0%
- Low Dropout Voltage 0.10V typ. (Io=60mA)
- ON/OFF Control (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline SC88A

### ■ PIN CONFIGURATION



### ■ EQUIVALENT CIRCUIT



### ■ OUTPUT VOLTAGE RANK LIST

Device Name	V <sub>OUT</sub>
NJM2860F3-15	1.5V
NJM2860F3-18	1.8V
NJM2860F3-19	1.9V
NJM2860F3-21	2.1V
NJM2860F3-25	2.5V
NJM2860F3-26	2.6V
NJM2860F3-27	2.7V

Device Name	V <sub>OUT</sub>
NJM2860F3-28	2.8V
NJM2860F3-285	2.85V
NJM2860F3-03	3.0V
NJM2860F3-31	3.1V
NJM2860F3-32	3.2V
NJM2860F3-33	3.3V
NJM2860F3-35	3.5V

Device Name	V <sub>OUT</sub>
NJM2860F3-355	3.55V
NJM2860F3-38	3.8V
NJM2860F3-04	4.0V
NJM2860F3-46	4.6V
NJM2860F3-47	4.7V
NJM2860F3-05	5.0V

## ■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	+14	V
Control Voltage	V <sub>CONT</sub>	+14(*1)	V
Power Dissipation	P <sub>D</sub>	250(*2)	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +125	°C

(\*1): When input voltage is less than +14V, the absolute maximum control voltage is equal to the input voltage.

(\*2): Mounted on glass epoxy board based on EIA/JEDEC. (114.3x76.2x1.6mm: 2Layers)

## ■ Operating voltage

V<sub>IN</sub>=+2.3V ~ +14.0V (In case of Vo<2.1V)

## ■ ELECTRICAL CHARACTERISTICS

(V<sub>IN</sub>=Vo+1V, C<sub>IN</sub>=0.1μF, Co=1.0μF: Vo≥2.7V (Co=2.2μF: Vo≤2.6V), Cp=0.01μF, Ta=25°C)

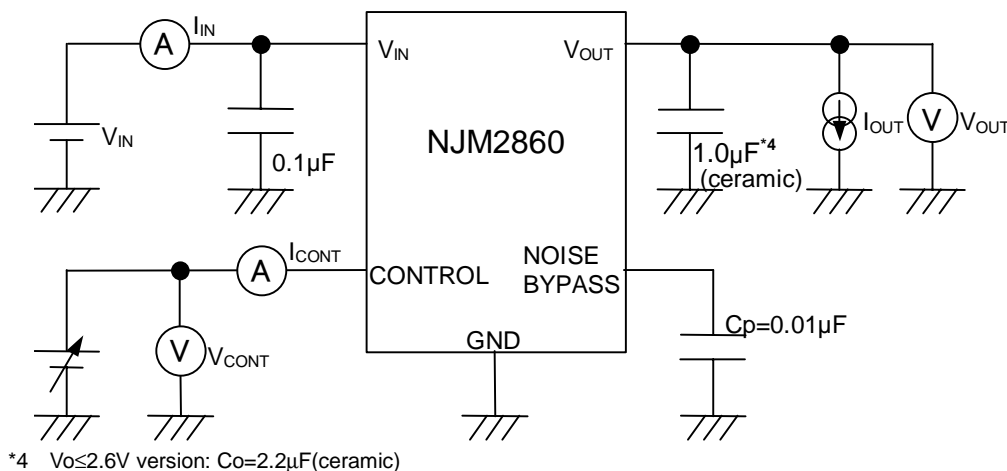
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	-	+1.0%	V
Quiescent Current	I <sub>Q</sub>	Io=0mA, expect I <sub>cont</sub>	-	120	180	μA
Quiescent Current at Control OFF	I <sub>Q(OFF)</sub>	V <sub>CONT</sub> =0V	-	-	100	nA
Output Current	Io	Vo=0.3V	100	130	-	mA
Line Regulation	ΔVo/ΔV <sub>IN</sub>	V <sub>IN</sub> =Vo+1V ~ Vo+6V, Io=30mA	-	-	0.10	%/V
Load Regulation	ΔVo/ΔIo	Io=0 ~ 60mA	-	-	0.03	%/mA
Dropout Voltage(*3)	ΔV <sub>L-O</sub>	Io=60mA	-	0.10	0.18	V
Ripple Rejection	RR	e <sub>in</sub> =200mVrms, f=1kHz, Io=10mA, Vo=3V Version	-	70	-	dB
Average Temperature Coefficient of Output Voltage	ΔVo/ΔTa	Ta=0~85°C, Io=10mA	-	±50	-	ppm/°C
Output Noise Voltage	V <sub>NO</sub>	f=10Hz~80kHz, Io=10mA, Vo=3V Version	-	30	-	μVrms
Control Voltage for ON-state	V <sub>CONT(ON)</sub>		1.6	-	-	V
Control Voltage for OFF-state	V <sub>CONT(OFF)</sub>		-	-	0.6	V

(\*3): The output voltage excludes under 2.1V.

The above specification is a common specification for all output voltages.

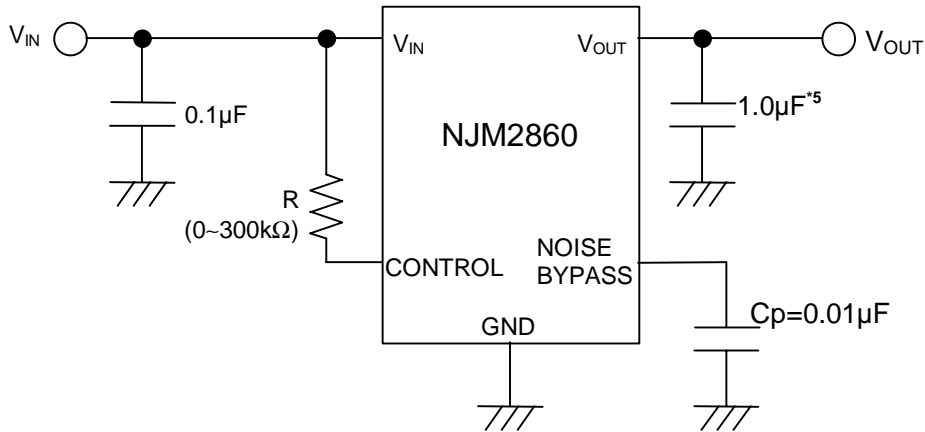
Therefore, it may be different from the individual specification for a specific output voltage.

## ■ TEST CIRCUIT



■ TYPICAL APPLICATION

① In the case where ON/OFF Control is not required:

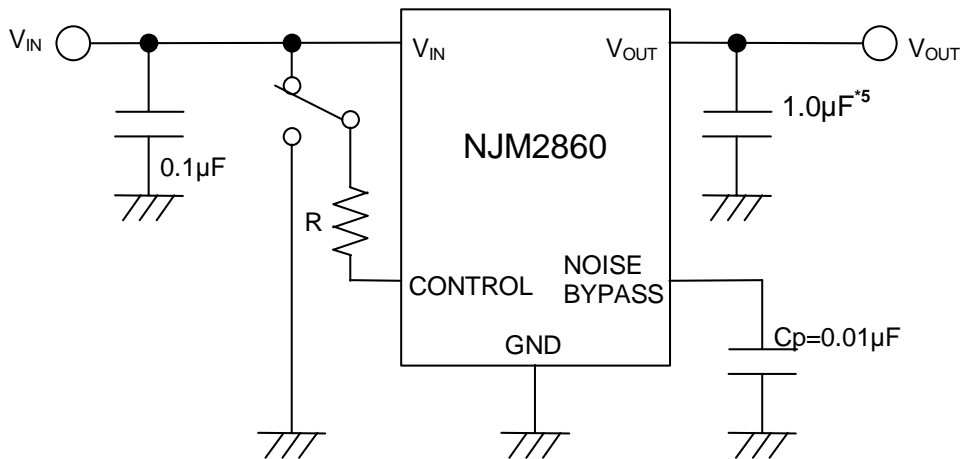


\*5  $V_o \leq 2.6V$  version:  $C_o = 2.2\mu F$

Connect control terminal to  $V_{IN}$  terminal

The quiescent current can be reduced by using a resistance “R”. Instead, it increases the minimum operating voltage. For further information, please refer to Figure “Output Voltage vs. Control Voltage”.

② In use of ON/OFF CONTROL:



\*5  $V_o \leq 2.6V$  version:  $C_o = 2.2\mu F$

State of control terminal:

- “H” → output is enabled.
- “L” or “open” → output is disabled.

\*Noise bypass Capacitance  $C_p$

Noise bypass capacitance  $C_p$  reduces noise generated by band-gap reference circuit.

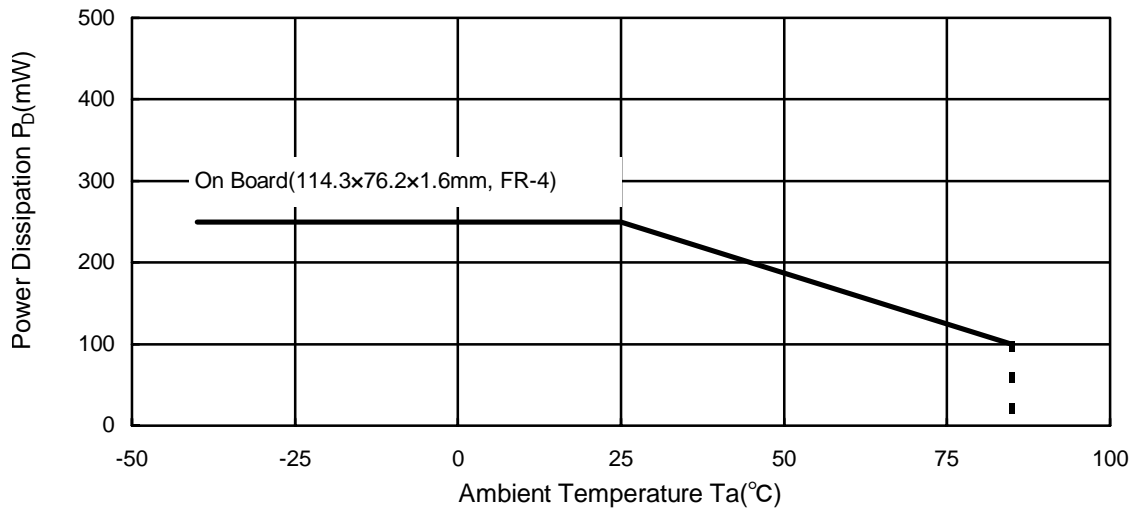
Noise level and ripple rejection will be improved when larger  $C_p$  is used.

Use of smaller  $C_p$  value may cause oscillation.

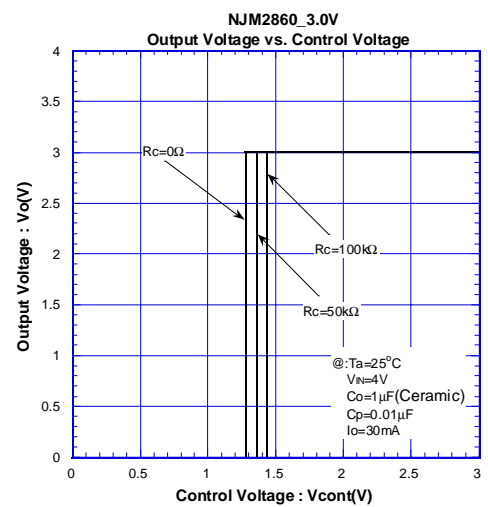
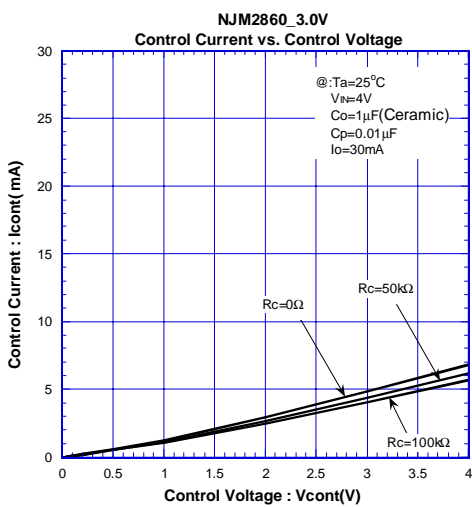
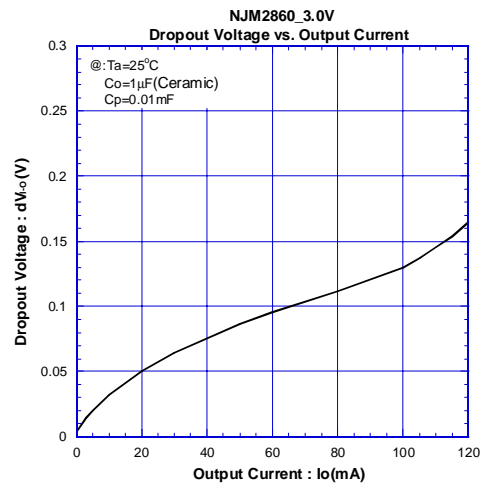
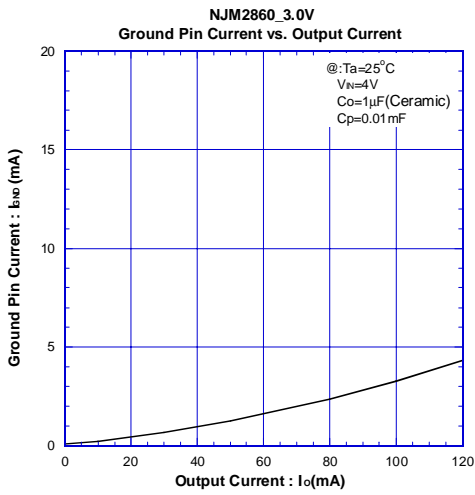
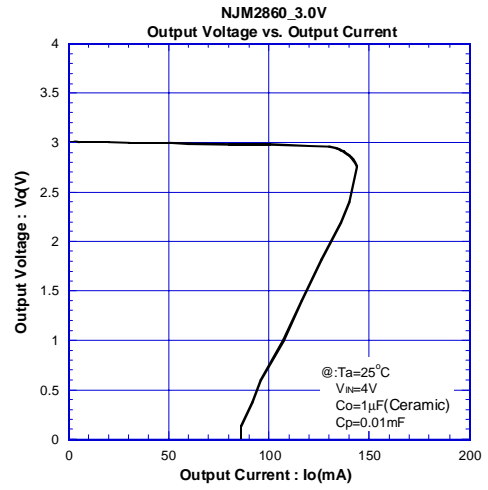
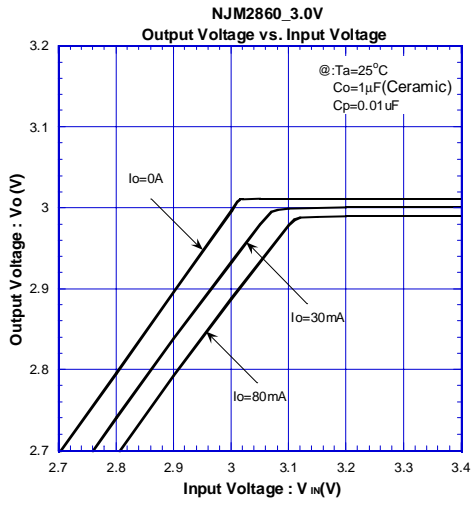
Use the  $C_p$  value of 0.01µF greater to avoid the problem.

## ■ POWER DISSIPATION vs. AMBIENT TEMPERATURE

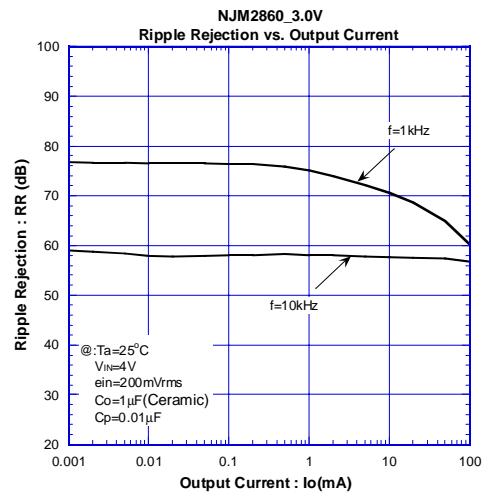
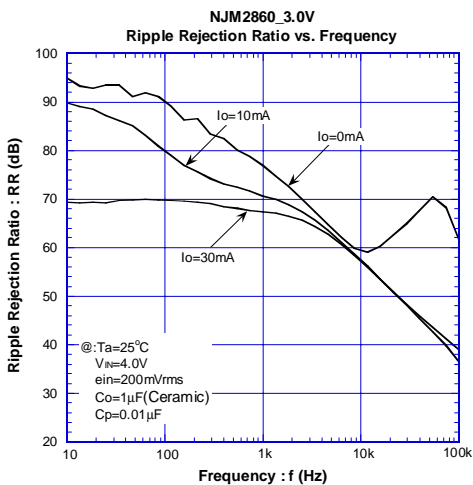
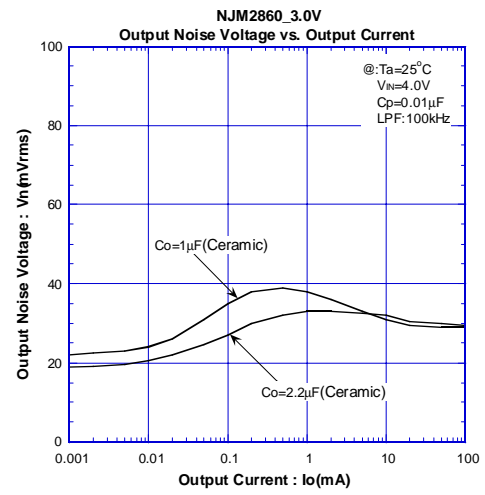
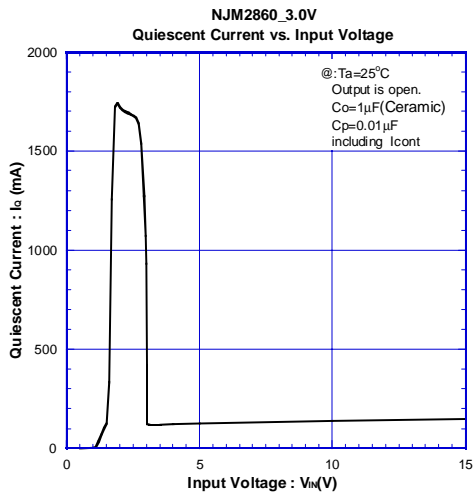
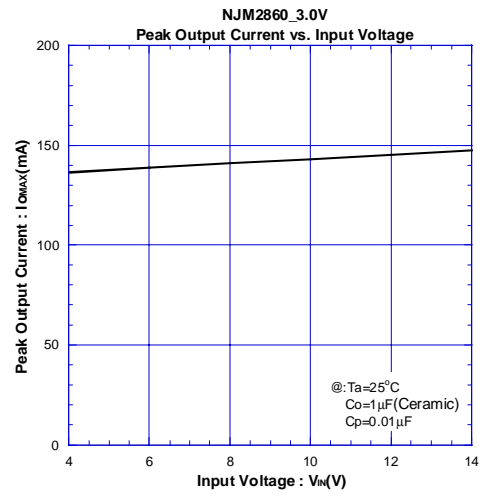
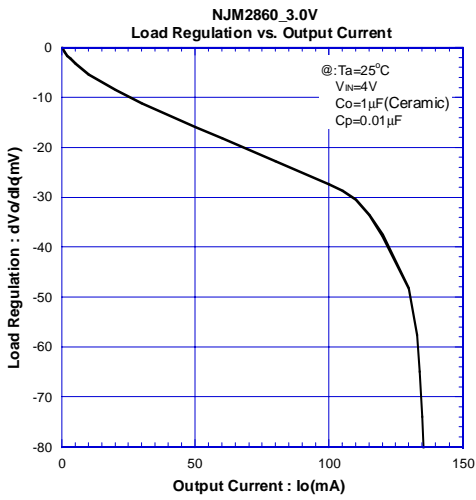
NJM2860F3 Power Dissipation  
( $T_{opr} = -40 \sim +85^{\circ}\text{C}$ ,  $T_j = 125^{\circ}\text{C}$ )



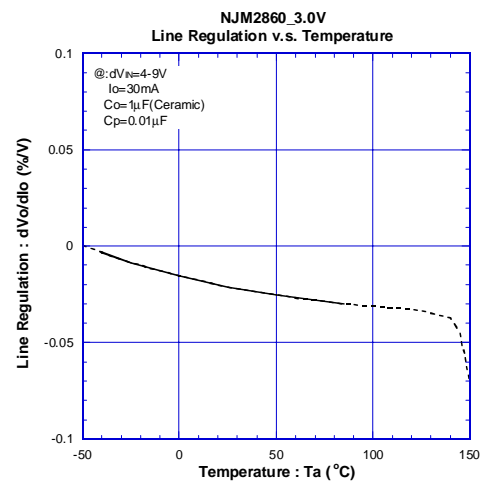
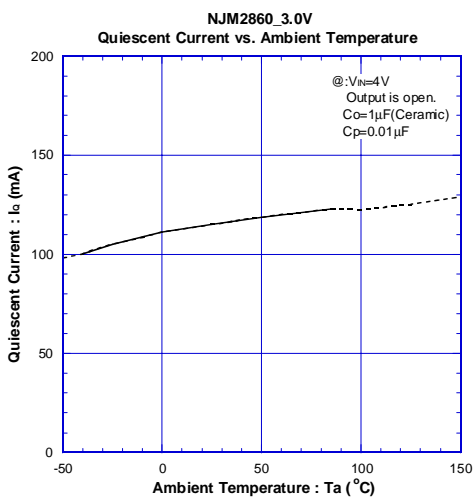
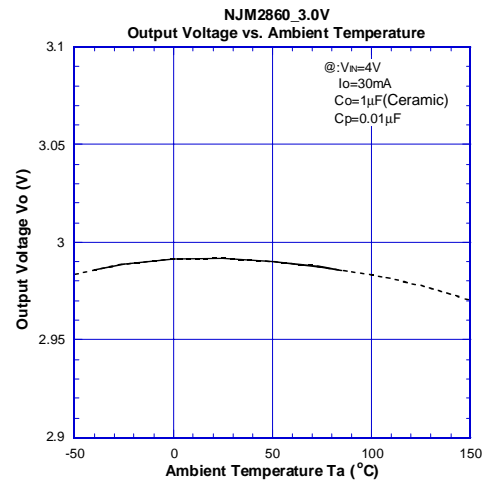
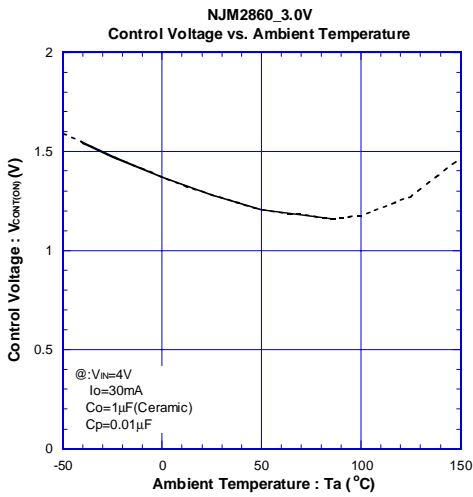
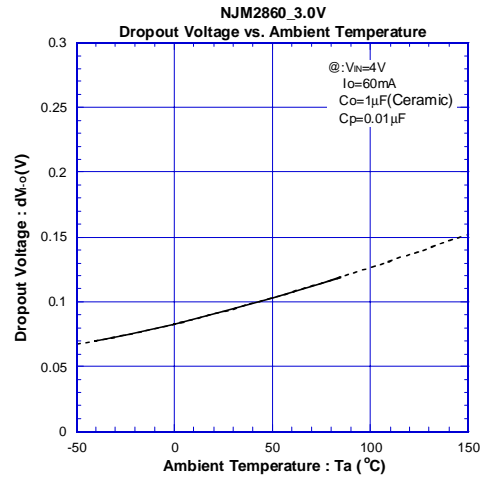
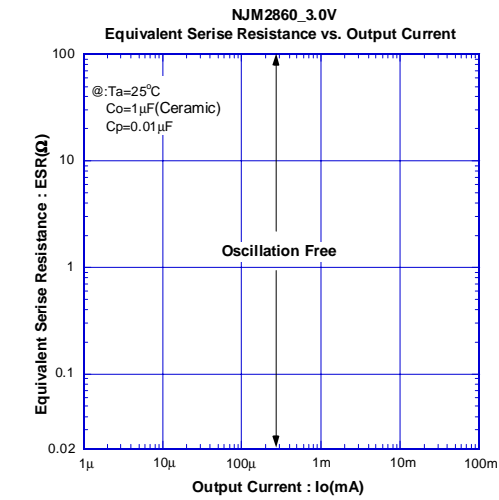
## TYPICAL CHARACTERISTICS



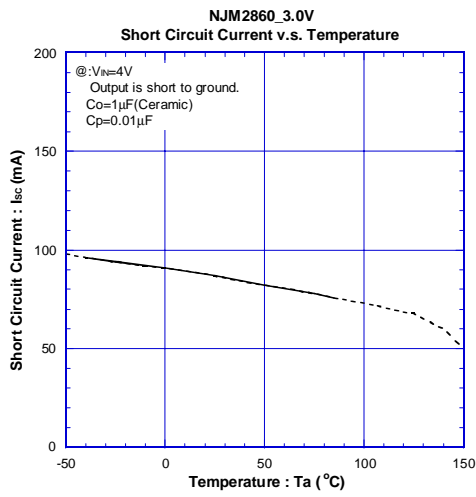
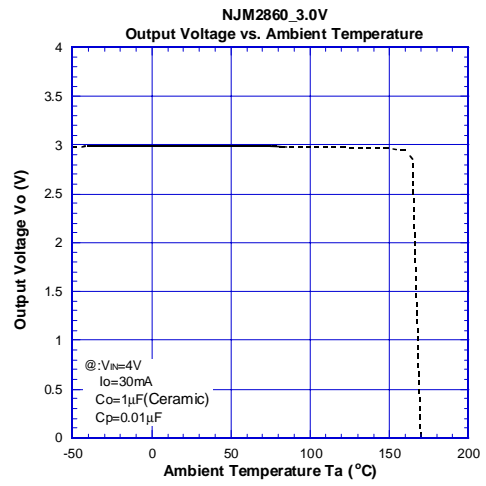
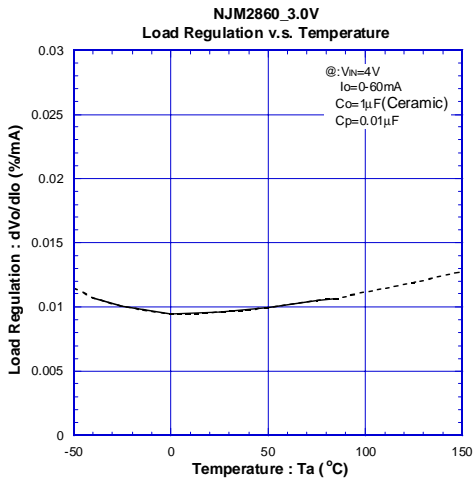
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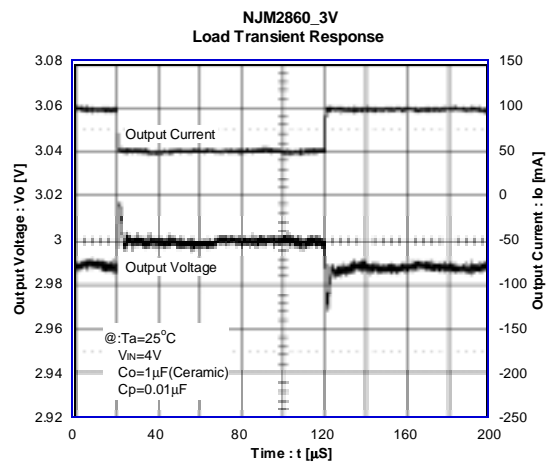
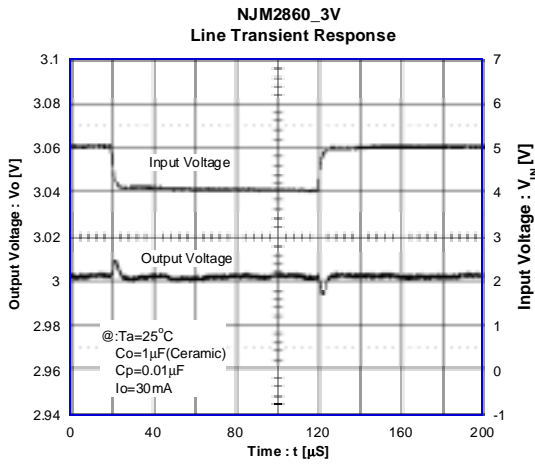
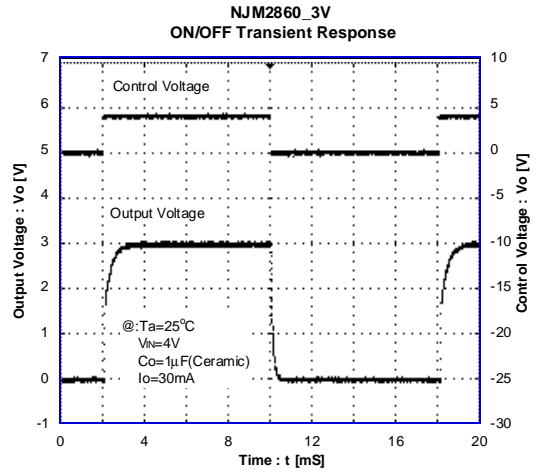
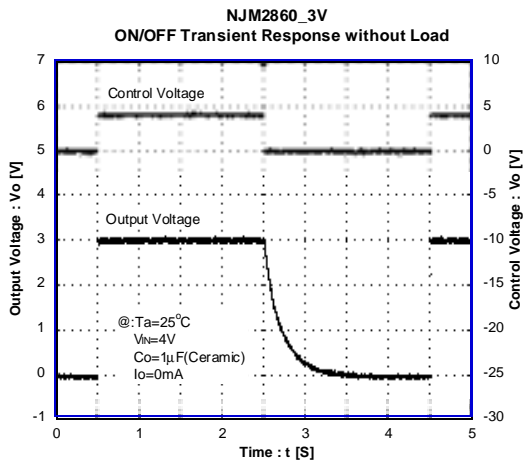


## TYPICAL CHARACTERISTICS





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**[CAUTION]**

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