

## 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

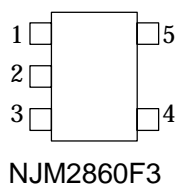


NJM2860F3

### ■ FEATURES

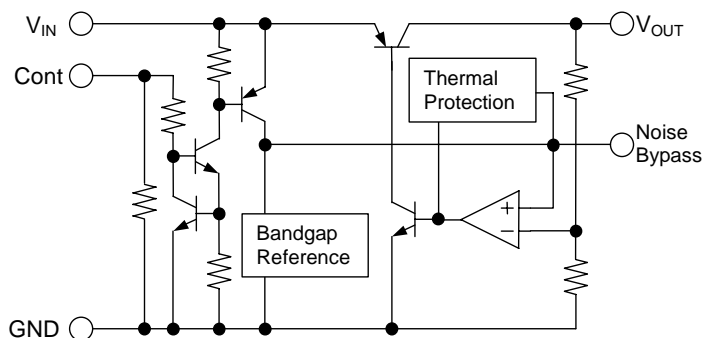
- High Ripple Rejection 70dB typ. ( $f=1\text{kHz}$ )
- Output Noise Voltage  $V_{no}=30\mu\text{V}_{rms}$  ( $C_p=0.01\mu\text{F}$ )
- Output capacitor with 1.0 $\mu\text{F}$  ceramic capacitor ( $V_o\geq 2.7\text{V}$ )
- Output Current  $I_o(\text{max.})=100\text{mA}$
- High Precision Output  $V_o\pm 1.0\%$
- Low Dropout Voltage 0.10V typ. ( $I_o=60\text{mA}$ )
- ON/OFF Control (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline SC88A

### ■ PIN CONFIGURATION



- PIN FUNCTION**
- 1. CONTROL (Active High)
  - 2. GND
  - 3. NOISE BYPASS
  - 4.  $V_{OUT}$
  - 5.  $V_{IN}$

### ■ EQUIVALENT CIRCUIT



### ■ OUTPUT VOLTAGE RANK LIST

Device Name	$V_{OUT}$
NJM2860F3-21	2.1V
NJM2860F3-25	2.5V
NJM2860F3-26	2.6V
NJM2860F3-27	2.7V
NJM2860F3-28	2.8V
NJM2860F3-285	2.85V
NJM2860F3-03	3.0V

Device Name	$V_{OUT}$
NJM2860F3-31	3.1V
NJM2860F3-33	3.3V
NJM2860F3-35	3.5V
NJM2860F3-38	3.8V
NJM2860F3-04	4.0V
NJM2860F3-46	4.6V
NJM2860F3-47	4.7V

Device Name	$V_{OUT}$
NJM2860F3-05	5.0V

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

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	$V_{IN}$	+14	V
Control Voltage	$V_{CONT}$	+14(note 1)	V
Power Dissipation	$P_D$	250(note 2)	mW
Operating Temperature	$T_{opr}$	-40 ~ +85	°C
Storage Temperature	$T_{stg}$	-40 ~ +125	°C

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

(note 2) On glass epoxy board. (50×50×1.6mm)

## ■ ELECTRICAL CHARACTERISTICS

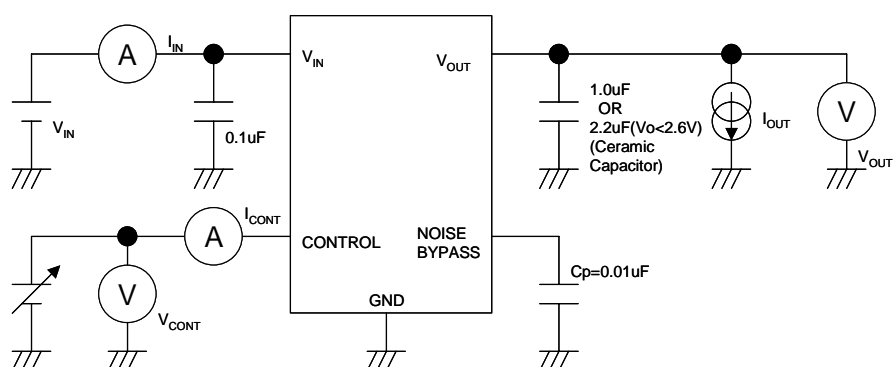
( $V_{IN}=V_O+1V$ ,  $C_{IN}=0.1\mu F$ ,  $C_O=1.0\mu F$ :  $V_O \geq 2.7V$  ( $C_O=2.2\mu F$ :  $V_O \leq 2.6V$ ),  $C_P=0.01\mu F$ ,  $T_a=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_O$	$I_O=30mA$	-1.0%	—	+1.0%	V
Quiescent Current	$I_Q$	$I_O=0mA$ , expect $I_{cont}$	—	120	180	$\mu A$
Quiescent Current at Control OFF	$I_{Q(OFF)}$	$V_{CONT}=0V$	—	—	100	nA
Output Current	$I_O$	$V_O=0.3V$	100	130	—	mA
Line Regulation	$\Delta V_O / \Delta V_{IN}$	$V_{IN}=V_O+1V \sim V_O+6V$ , $I_O=30mA$	—	—	0.10	%/V
Load Regulation	$\Delta V_O / \Delta I_O$	$I_O=0 \sim 60mA$	—	—	0.03	%/mA
Dropout Voltage	$\Delta V_{I-O}$	$I_O=60mA$	—	0.10	0.18	V
Ripple Rejection	RR	$e_{in}=200mV_{rms}$ , $f=1kHz$ , $I_O=10mA$ , $V_O=3V$ Version	—	70	—	dB
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T_a$	$T_a=0 \sim 85^\circ C$ , $I_O=10mA$	—	$\pm 50$	—	ppm/°C
Output Noise Voltage	$V_{NO}$	$f=10Hz \sim 80kHz$ , $I_O=10mA$ , $V_O=3V$ Version	—	30	—	$\mu V_{rms}$
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	—	—	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		—	—	0.6	V

(note 3) The above specification is a common specification for all output voltages.

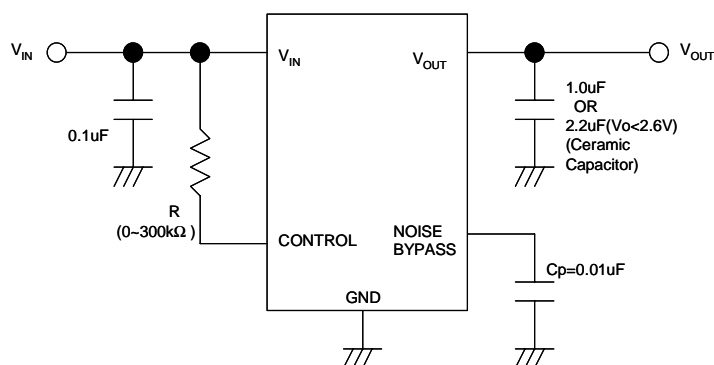
Therefore, it may be different from the individual specification for a specific output voltage.

## ■ TEST CIRCUIT



## ■ TYPICAL APPLICATION

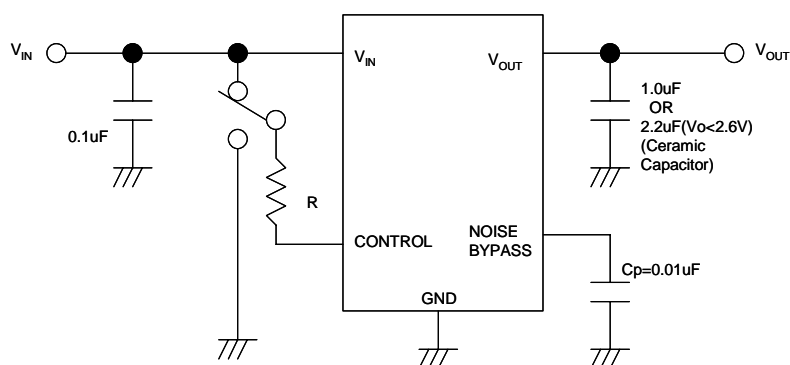
① In the case where ON/OFF Control is not required:



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:



State of control terminal:

- "H" → output is enabled.
- "L" or "open" → output is disabled.

### ★ Noise bypass Capacitance $C_p$

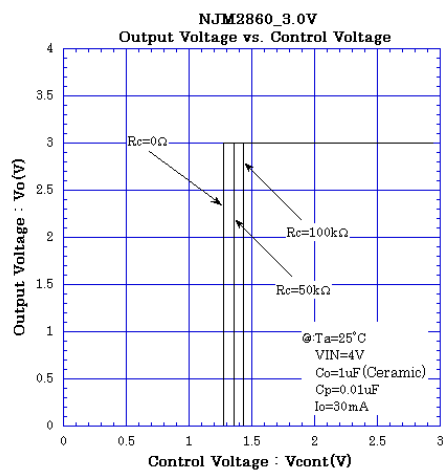
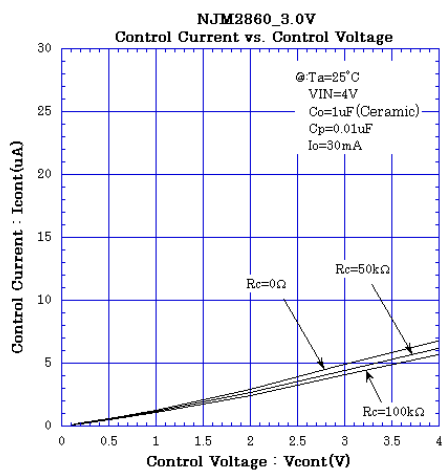
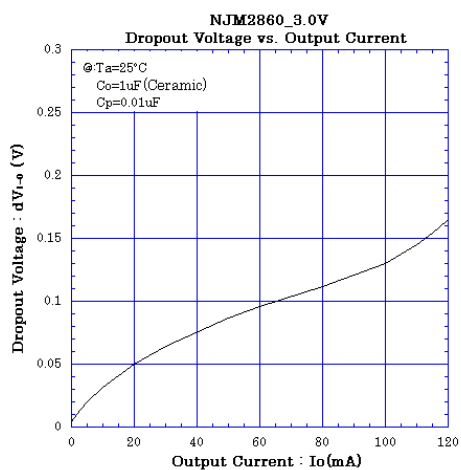
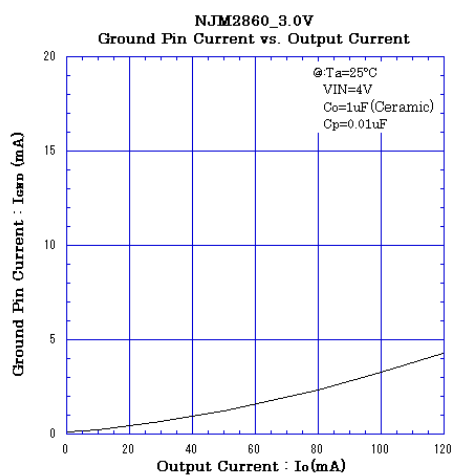
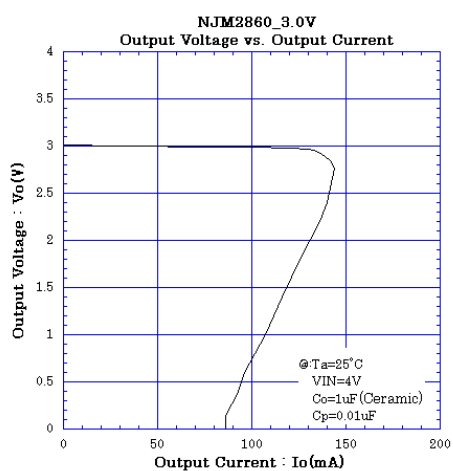
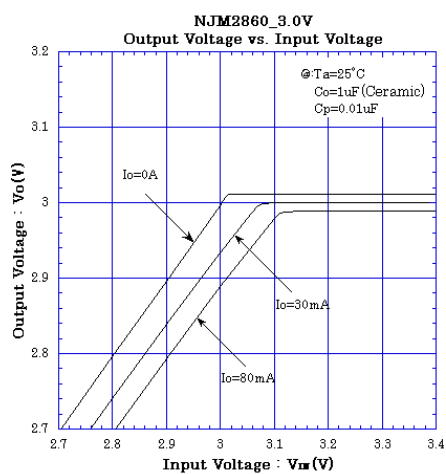
Noise bypass capacitance  $C_p$  reduces noise generated by band-gap reference circuit.

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

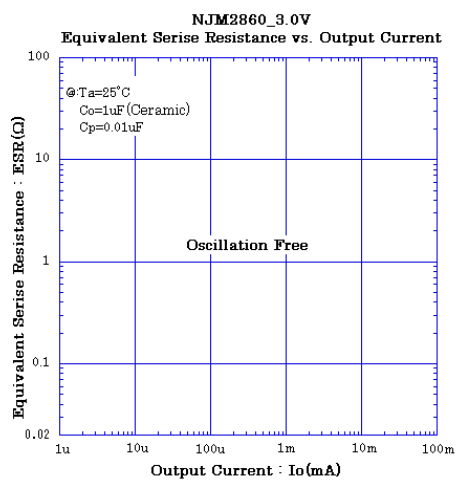
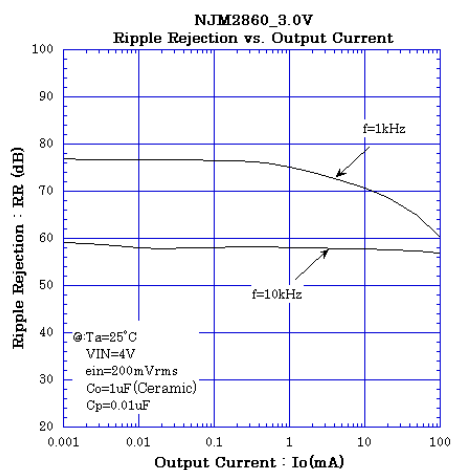
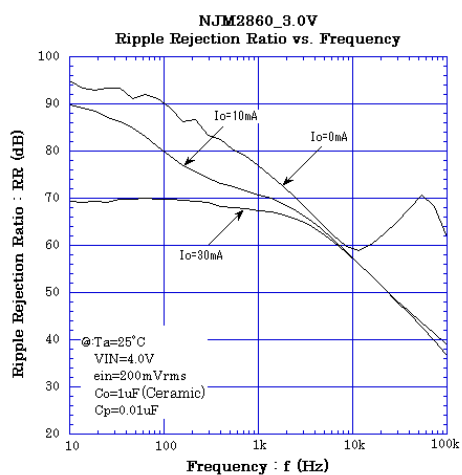
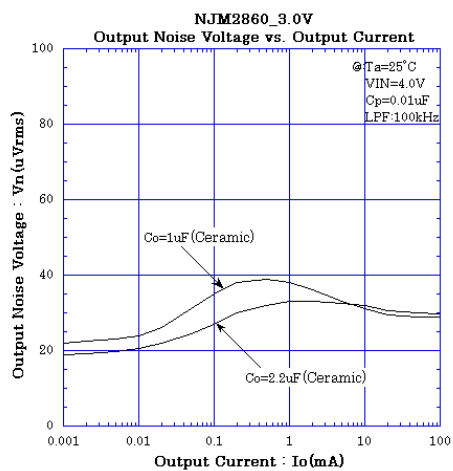
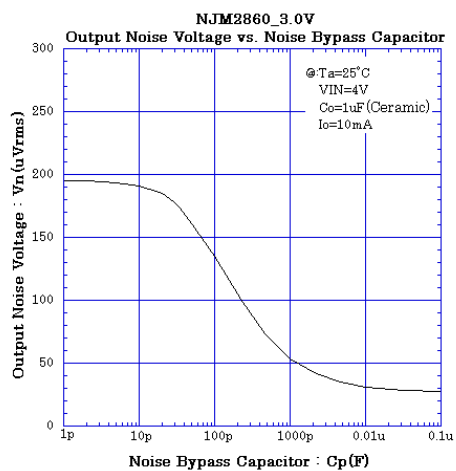
Use of smaller  $C_p$  value may cause oscillation.

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

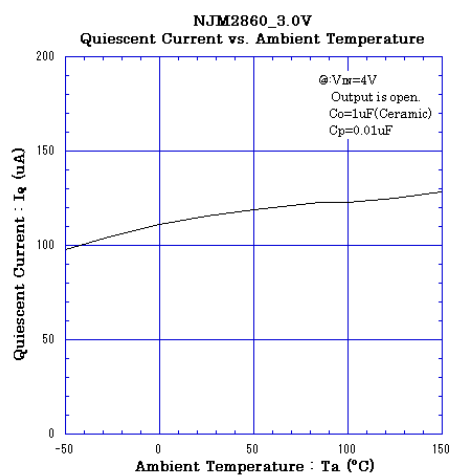
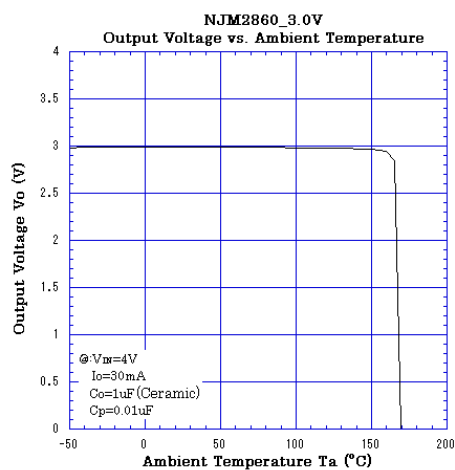
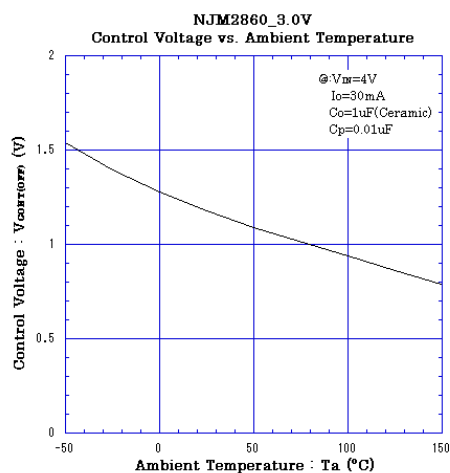
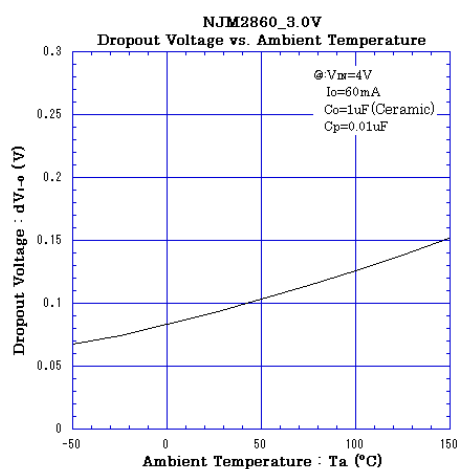
## ■ TYPICAL CHARACTERISTICS



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## TYPICAL CHARACTERISTICS



[CAUTION]

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