

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

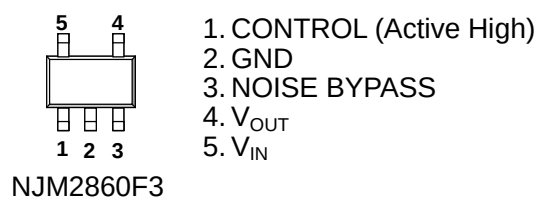


NJM2860F3

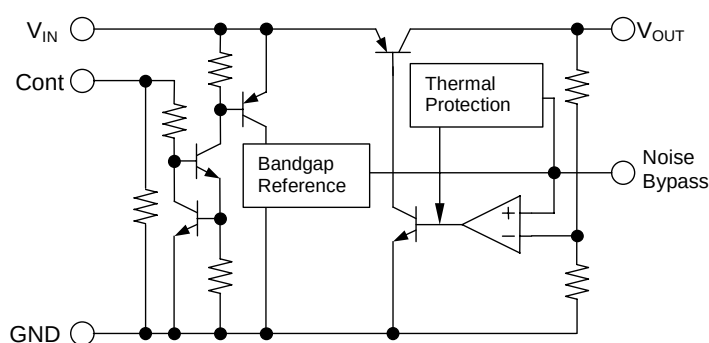
■ FEATURES

- High Ripple Rejection 70dB typ. ($f=1\text{kHz}$, $V_o=3\text{V}$ Version)
- Output Noise Voltage $V_{no}=30\mu\text{V}_{\text{rms}}$ typ. ($C_p=0.01\mu\text{F}$)
- 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



■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST

Device Name	V _{OUT}
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 _{OUT}
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 _{OUT}
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 _{IN}	+14	V
Control Voltage	V _{CONT}	+14(*1)	V
Power Dissipation	P _D	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_{IN}=+2.5V ~ +14.0V (In case of Vo<2.1V)

■ ELECTRICAL CHARACTERISTICS

(V_{IN}=Vo+1V, C_{IN}=0.1μF, Co=1.0uF: Vo≥2.7V (Co=2.2uF: Vo≤2.6V), Cp=0.01μF, Ta=25°C)

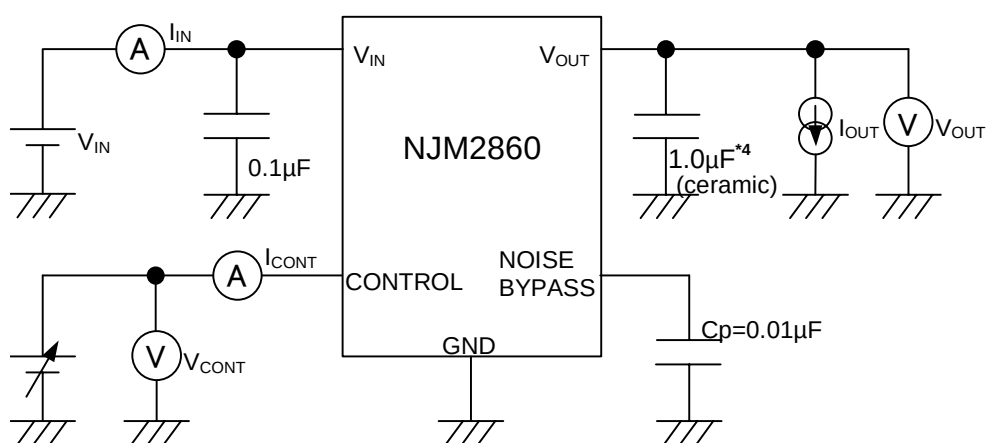
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	—	+1.0%	V
Quiescent Current	I _Q	Io=0mA, expect I _{cont}	—	120	180	μA
Quiescent Current at Control OFF	I _{Q(OFF)}	V _{CONT} =0V	—	—	100	nA
Output Current	Io	Vo=0.3V	100	130	—	mA
Line Regulation	ΔVo/ΔV _{IN}	V _{IN} =Vo+1V ~ Vo+6V, Io=30mA	—	—	0.10	%/V
Load Regulation	ΔVo/ΔIo	Io=0 ~ 60mA	—	—	0.03	%/mA
Dropout Voltage(*3)	ΔV _{I-O}	Io=60mA	—	0.10	0.18	V
Ripple Rejection	RR	e _{in} =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 _{NO}	f=10Hz~80kHz, Io=10mA, Vo=3V Version	—	30	—	μVrms
Control Voltage for ON-state	V _{CONT(ON)}		1.6	—	—	V
Control Voltage for OFF-state	V _{CONT(OFF)}		—	—	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.

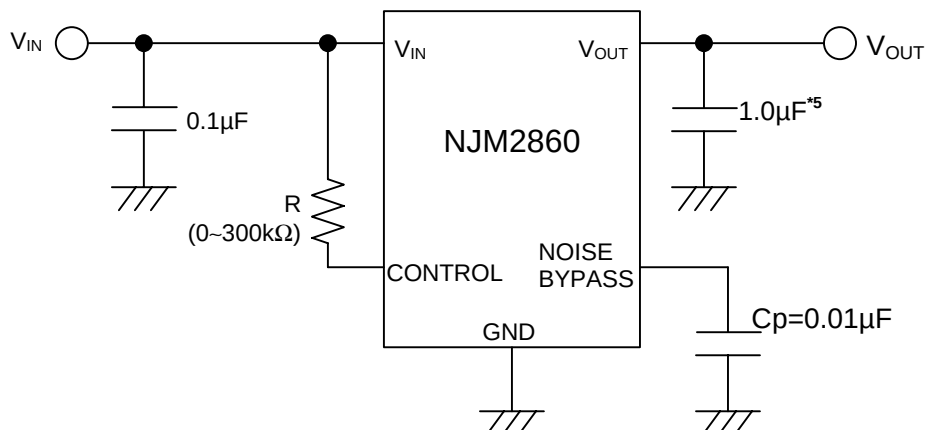
■ TEST CIRCUIT



*4 $V_o \leq 2.6V$ version: $C_o = 2.2\mu F$ (ceramic)

■ TYPICAL APPLICATION

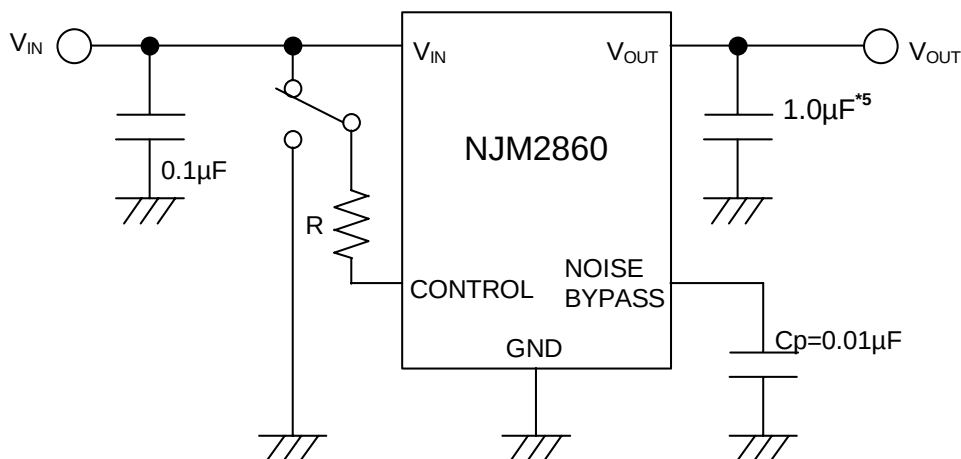
① In the case where ON/OFF Control is not required:



*5 $V_O \leq 2.6V$ version: $C_O = 2.2\mu F$

Connect control terminal to V_{IN} terminal

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

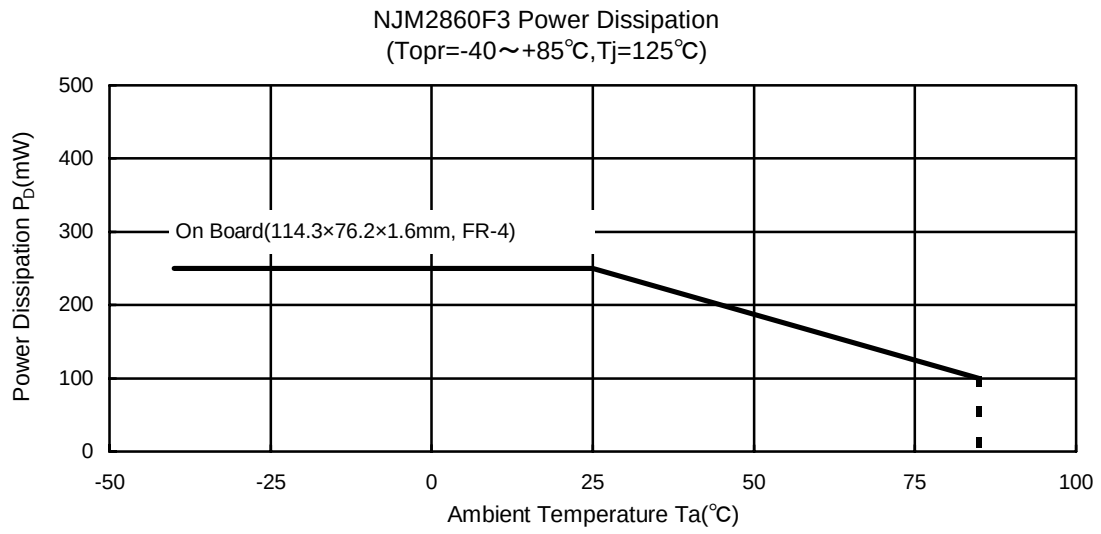
Noise bypass capacitance C_p reduces noise generated by band-gap reference circuit. Noise level and ripple rejection will be improved when larger C_p is used. Use of smaller C_p value may cause oscillation. Use the C_p value of $0.01\mu F$ greater to avoid the problem.

*In the case of using a resistance "R" between V_{IN} and control.

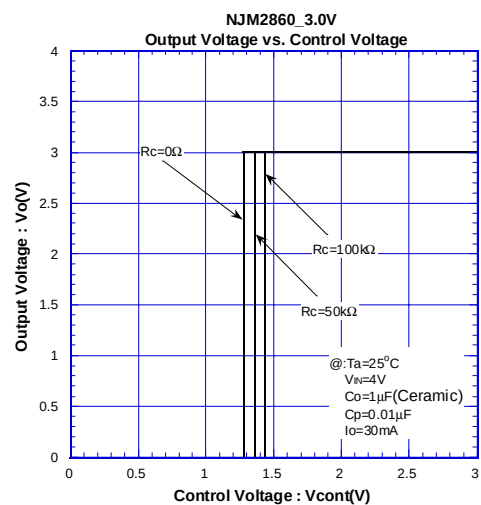
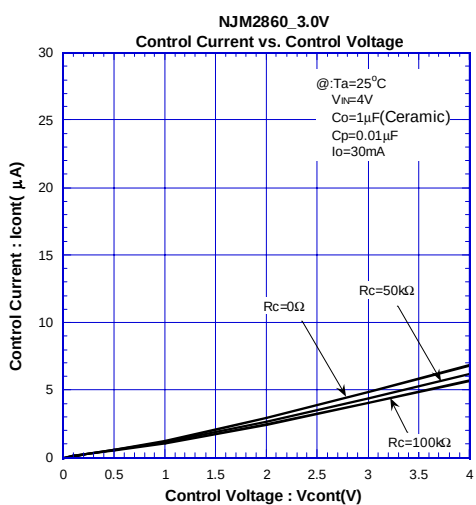
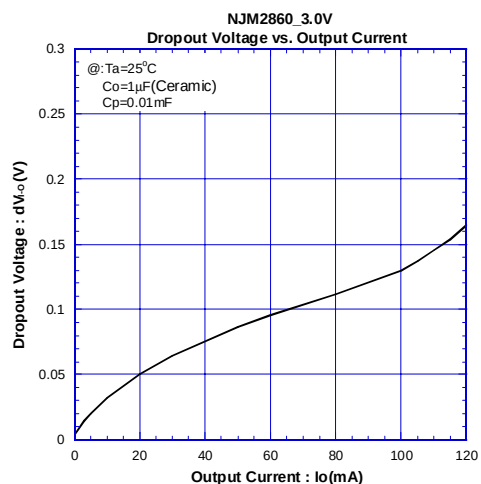
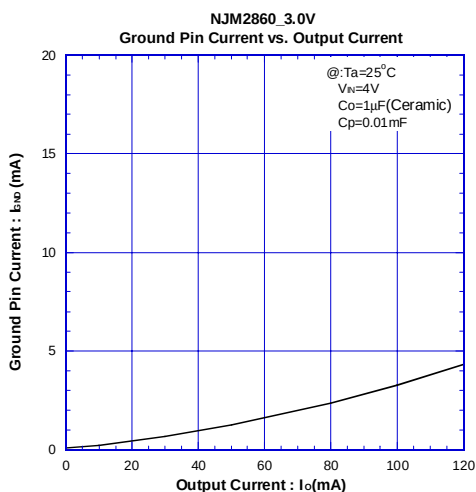
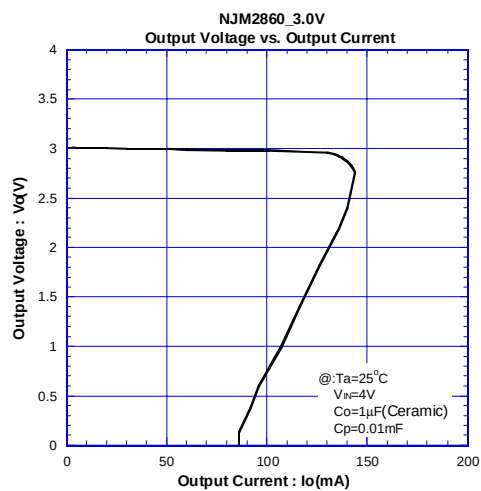
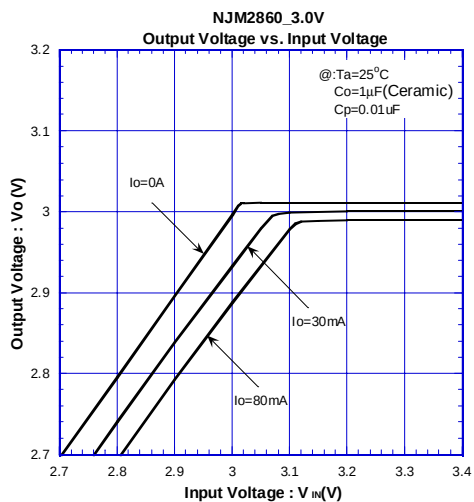
The current flow into the control terminal while the IC is ON state (I_{CONT}) can be reduced when a pull up resistance "R" is inserted between V_{IN} and the control terminal.

The minimum control voltage for ON state ($V_{CONT(ON)}$) is increased due to the voltage drop caused by I_{CONT} and the resistance "R". The I_{CONT} is temperature dependence as shown in the "Control Current vs. Temperature" characteristics. Therefore, the resistance "R" should be carefully selected to ensure the control voltage exceeds the $V_{CONT(ON)}$ over the required temperature range.

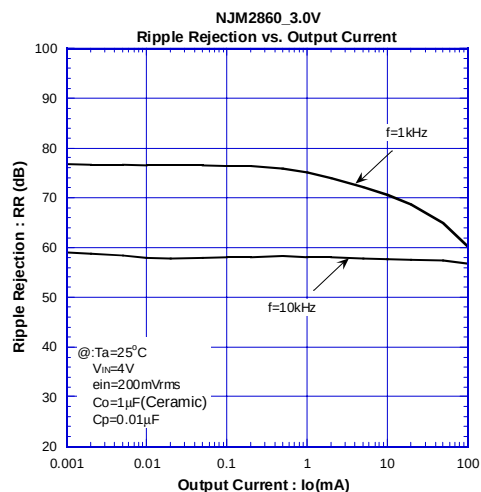
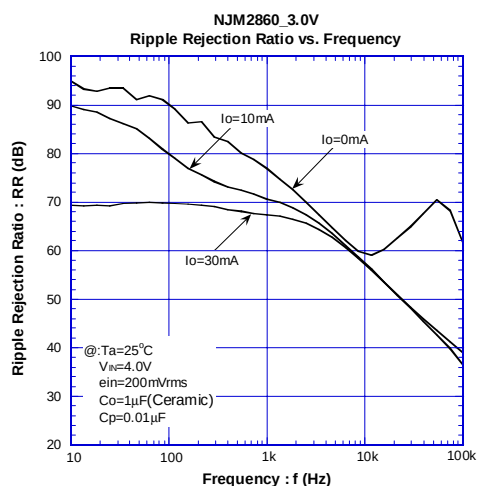
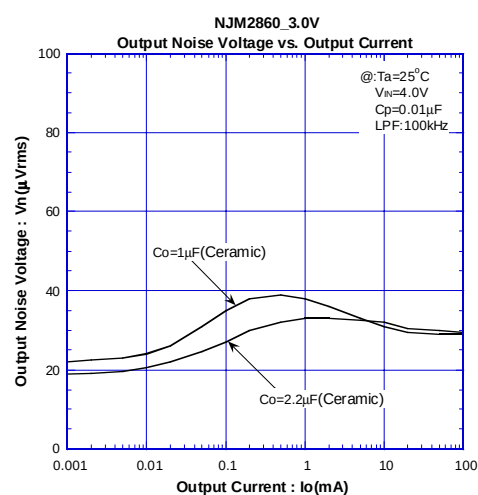
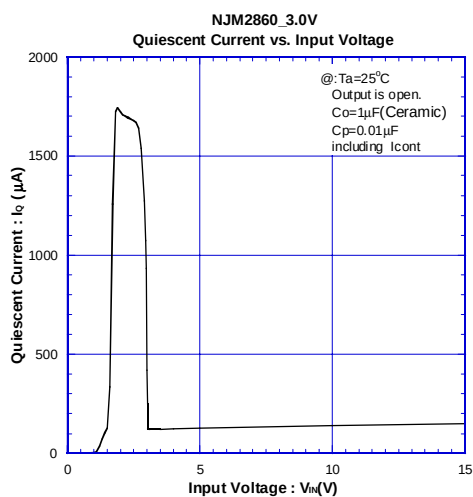
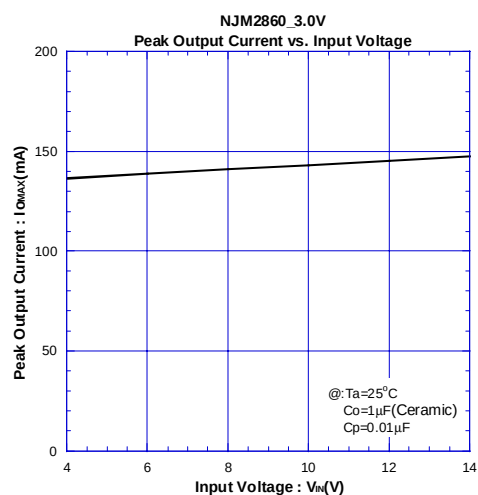
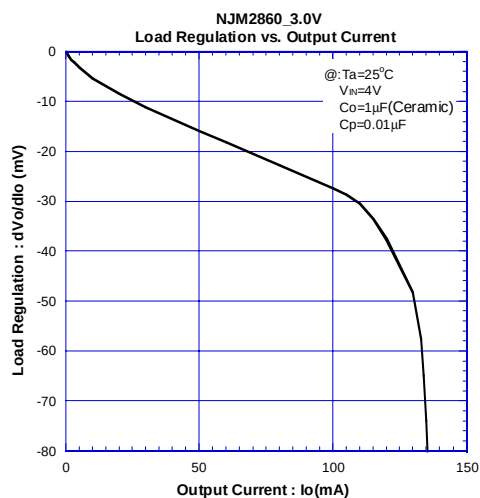
■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



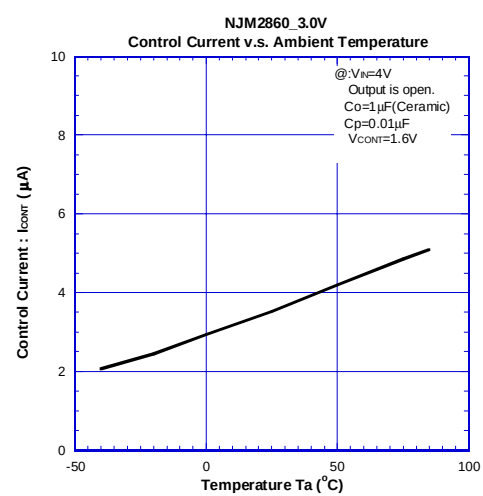
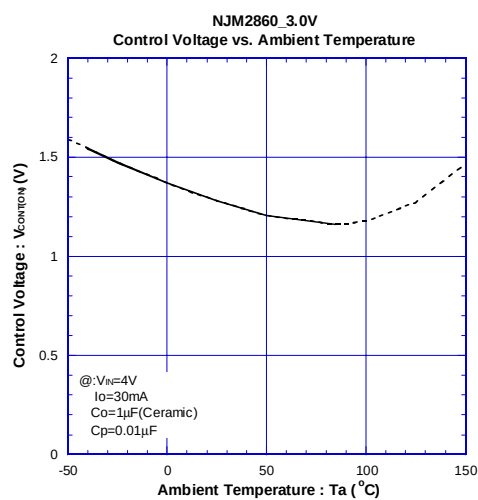
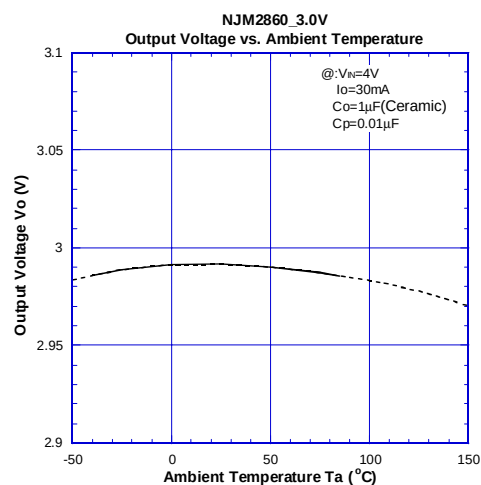
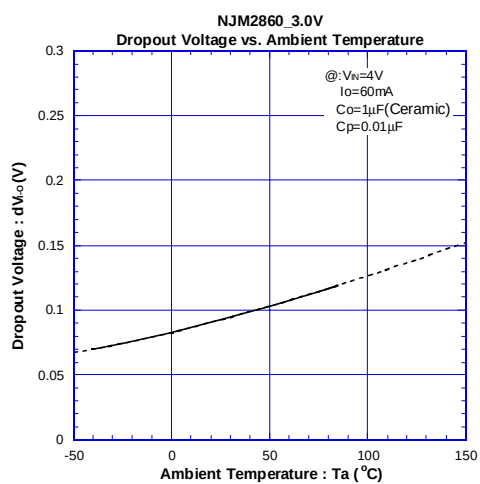
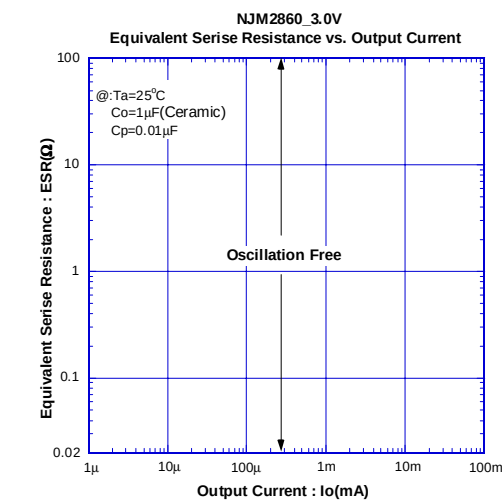
TYPICAL CHARACTERISTICS



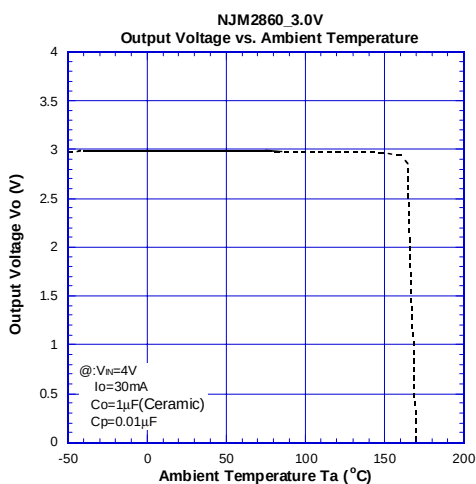
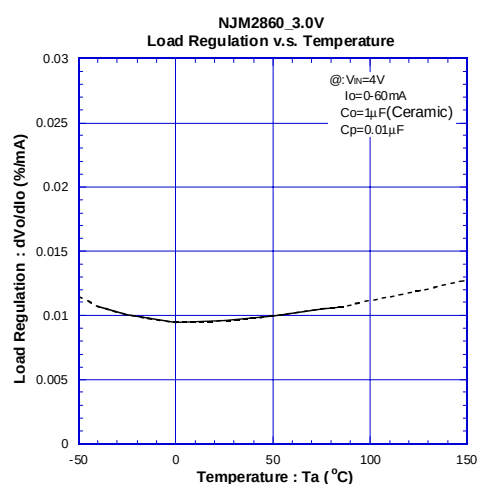
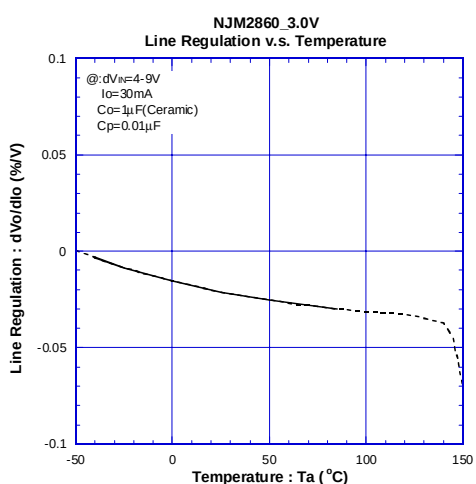
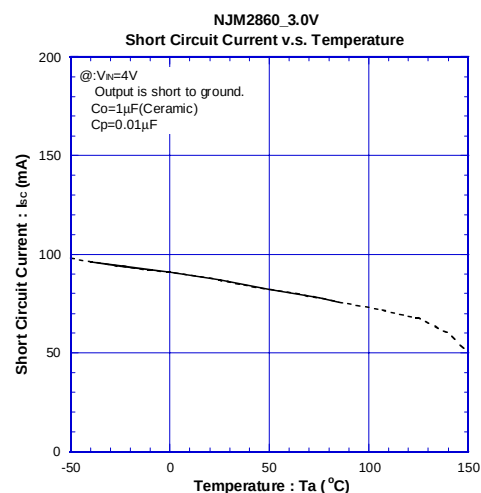
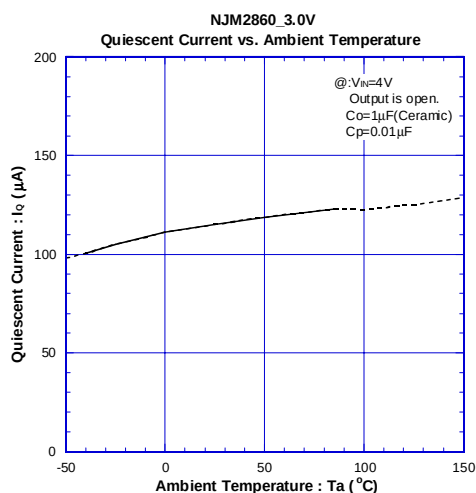
TYPICAL CHARACTERISTICS



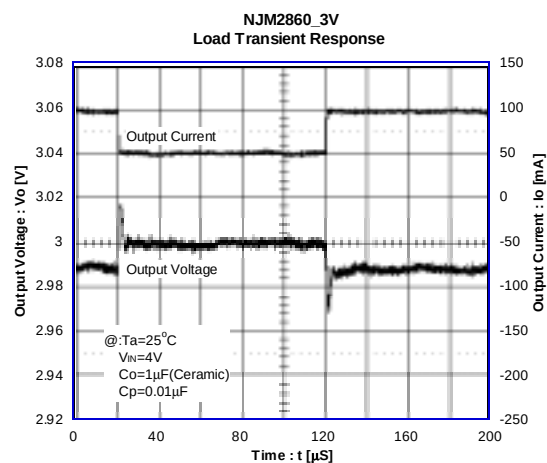
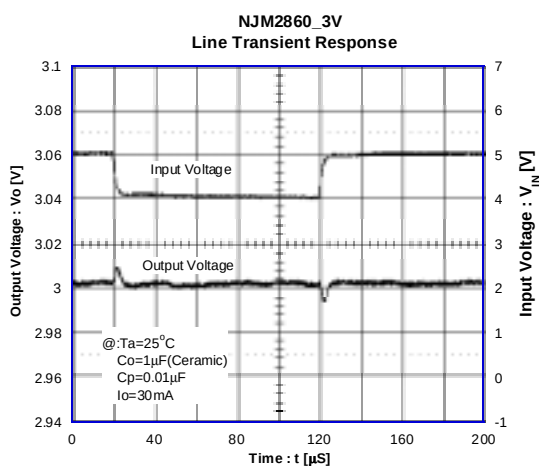
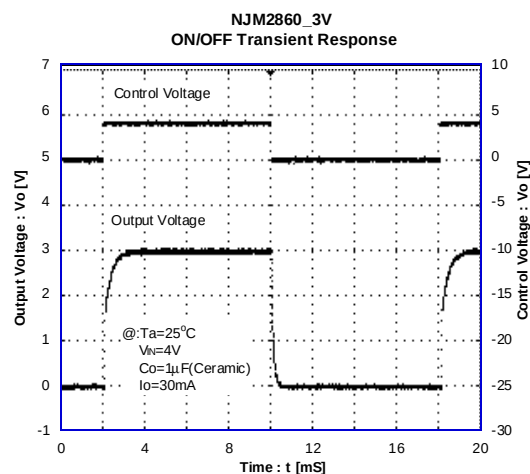
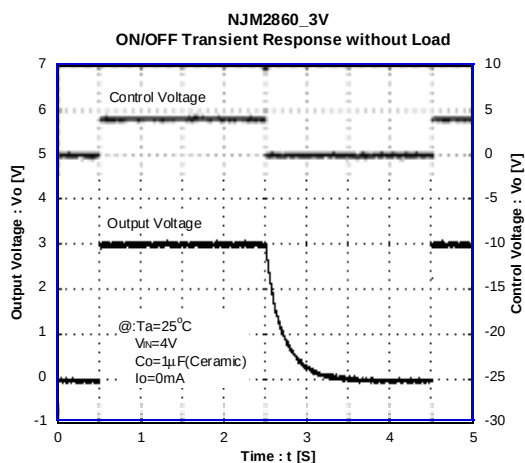
TYPICAL CHARACTERISTICS



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TYPICAL CHARACTERISTICS



[CAUTION]

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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