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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.

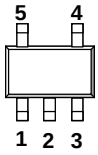
■ PACKAGE OUTLINE

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

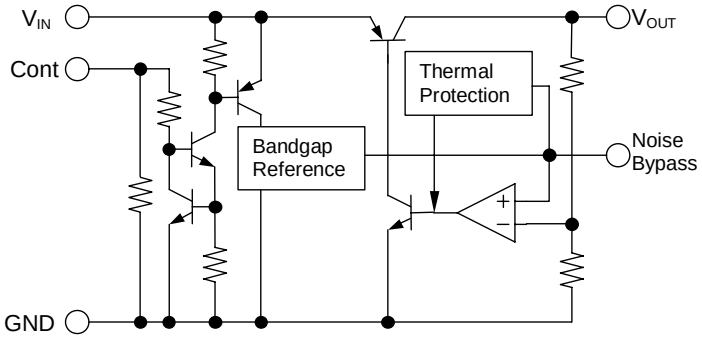
■ PIN CONFIGURATION



NJM2860F3

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}
NJM2860F3-15	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

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■ 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}=+2.3V ~ +14.0V (In case of Vo<2.1V)

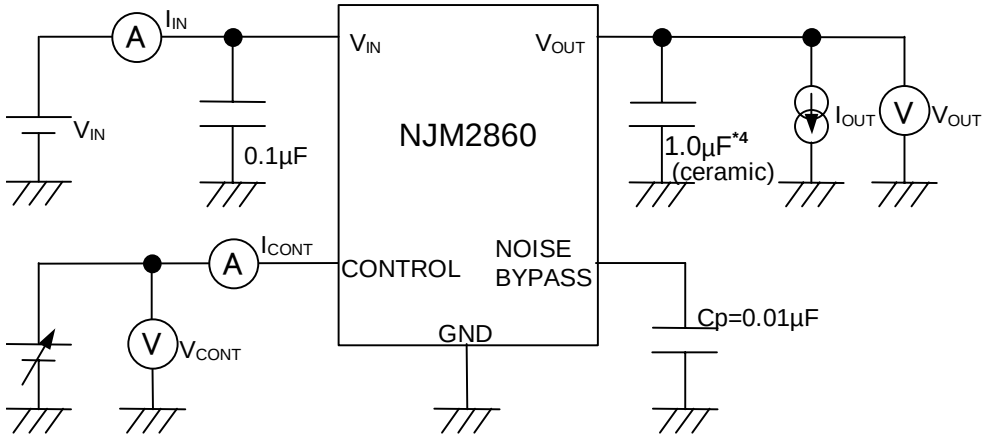
■ ELECTRICAL CHARACTERISTICS

(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 Icont	–	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	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6V, Io=30mA	–	–	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 60mA	–	–	0.03	%/mA
Dropout Voltage(*3)	ΔV_{I-O}	Io=60mA	–	0.10	0.18	V
Ripple Rejection	RR	ein=200mVrms,f=1kHz, Io=10mA, Vo=3V Version	–	70	–	dB
Average Temperature Coefficient of Output Voltage	$\Delta Vo/\Delta Ta$	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 Vo≤2.6V version: Co=2.2µF(ceramic)

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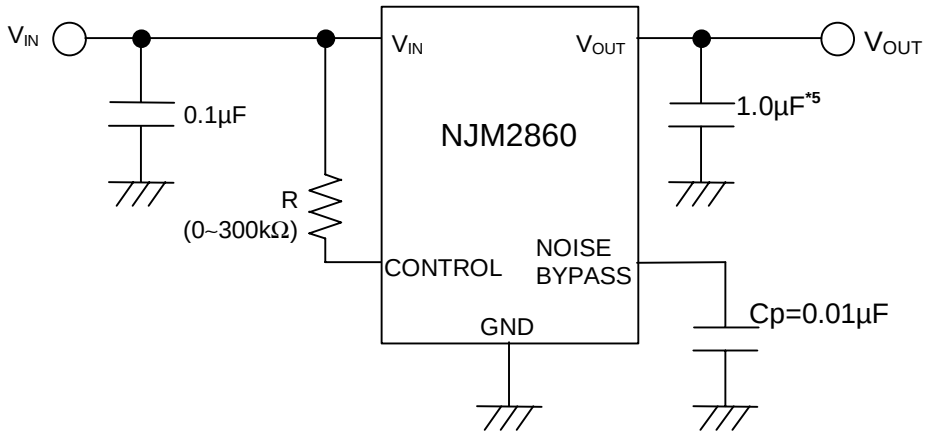
■ TYPICAL APPLICATION

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

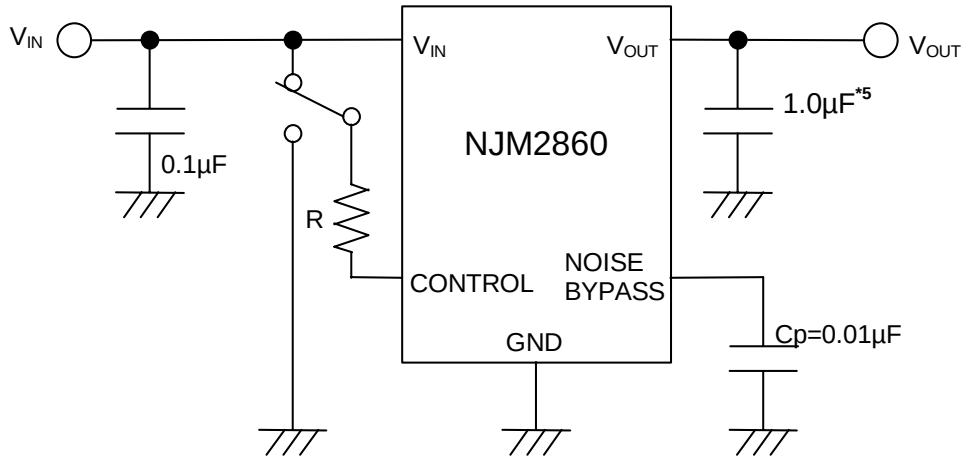


*5 Vo≤2.6V version: Co=2.2µF

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 Vo≤2.6V version: Co=2.2µF

State of control terminal:

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

∗Noise bypass Capacitance Cp

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

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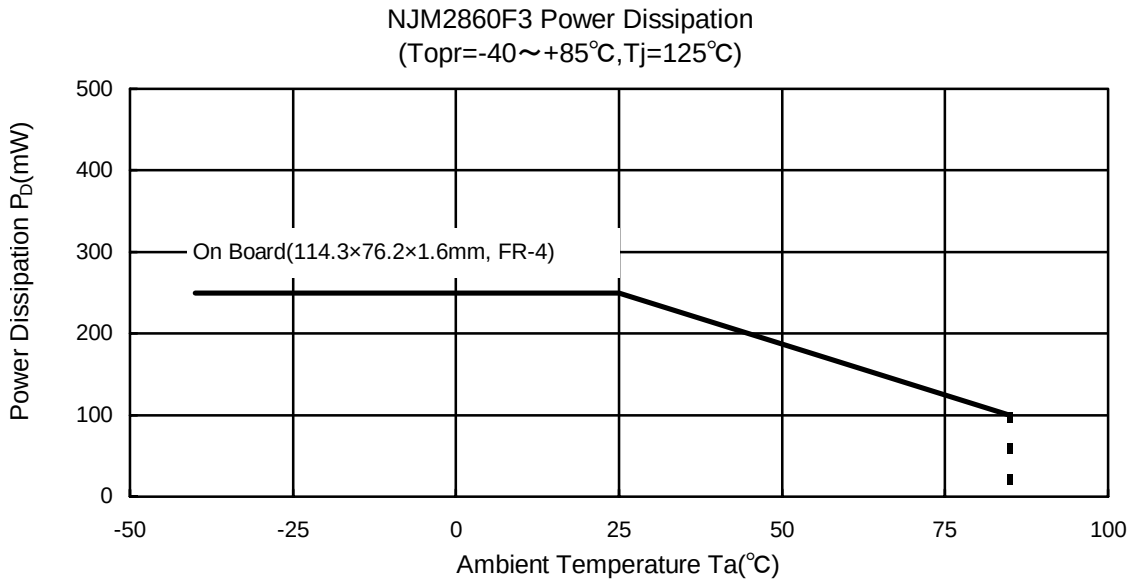
■ POWER DISSIPATION vs. AMBIENT TEMPERATURE



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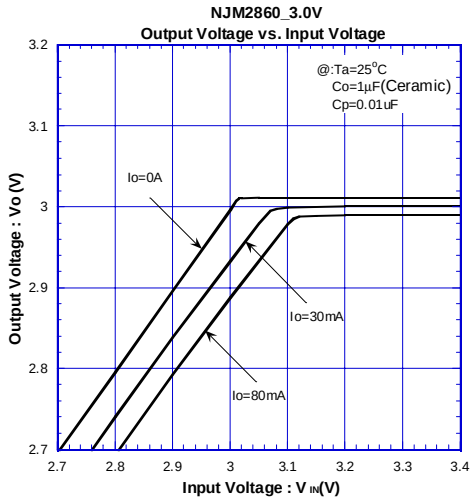
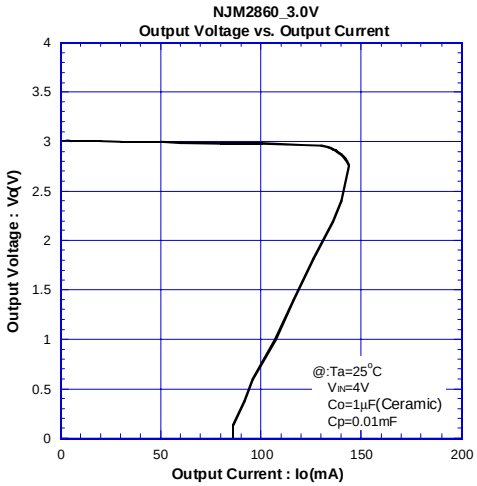
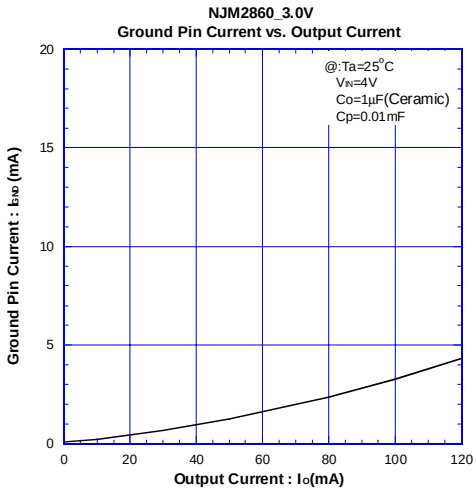
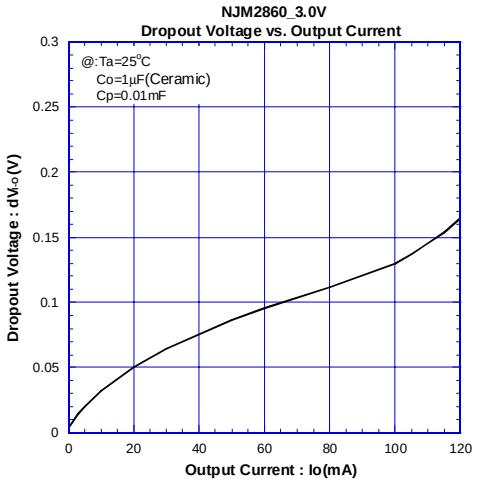
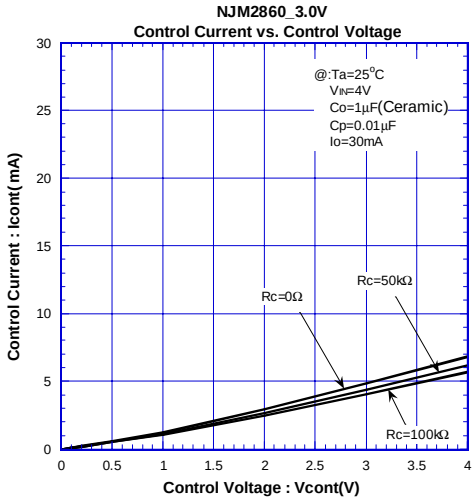
■ TYPICAL CHARACTERISTICS

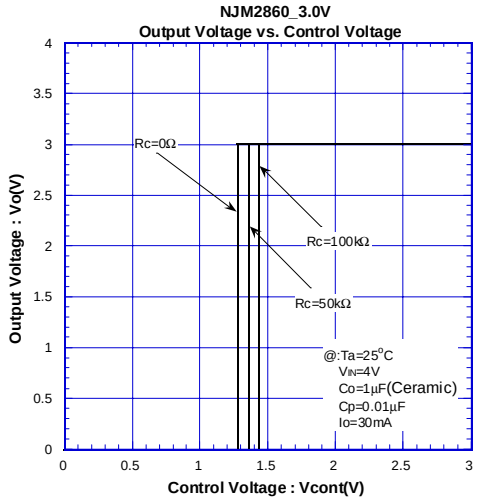












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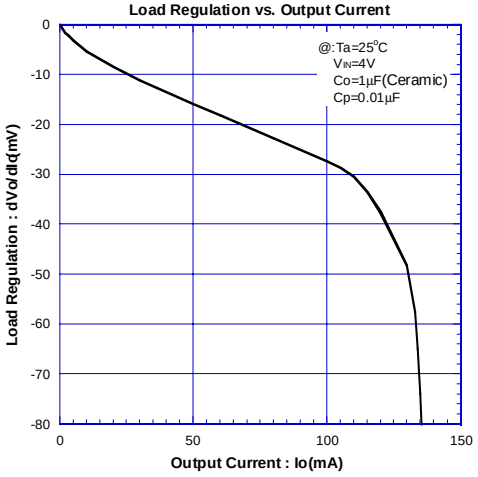
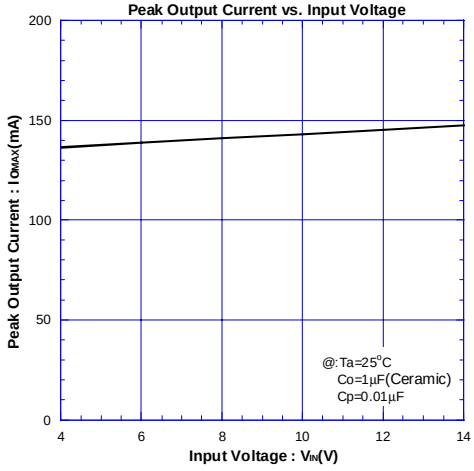
■ TYPICAL CHARACTERISTICS

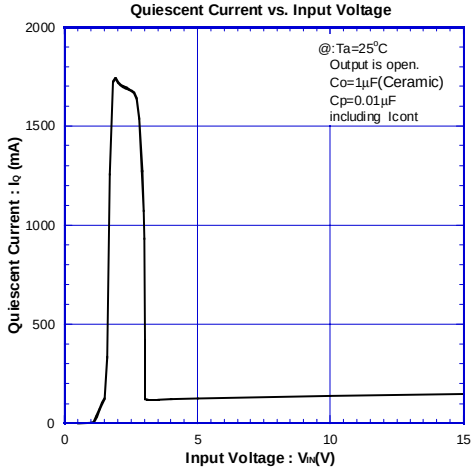
NJM2860_3.0V
Load Regulation vs. Output Current



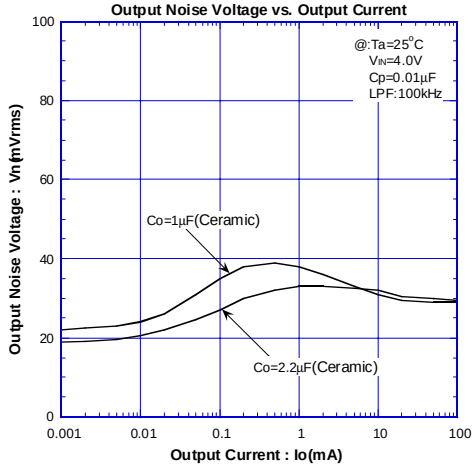
NJM2860_3.0V
Peak Output Current vs. Input Voltage



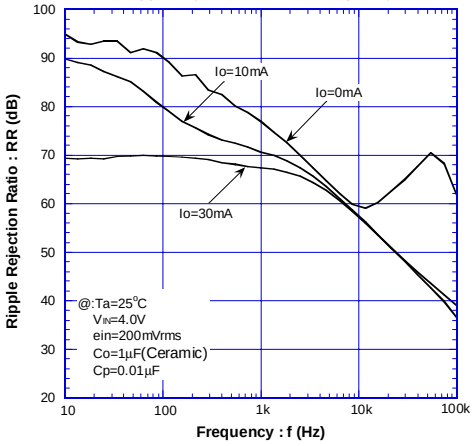
NJM2860_3.0V
Quiescent Current vs. Input Voltage



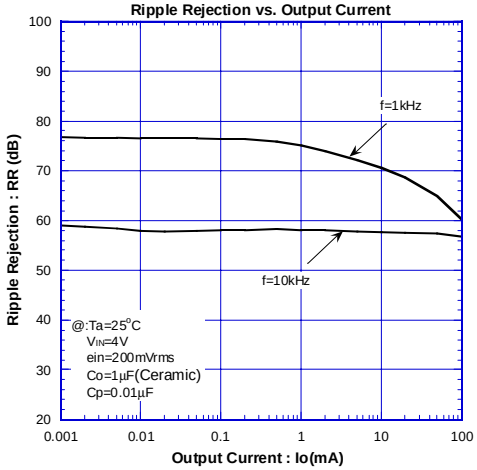
NJM2860_3.0V
Output Noise Voltage vs. Output Current



NJM2860_3.0V
Ripple Rejection Ratio vs. Frequency



NJM2860_3.0V
Ripple Rejection vs. Output Current



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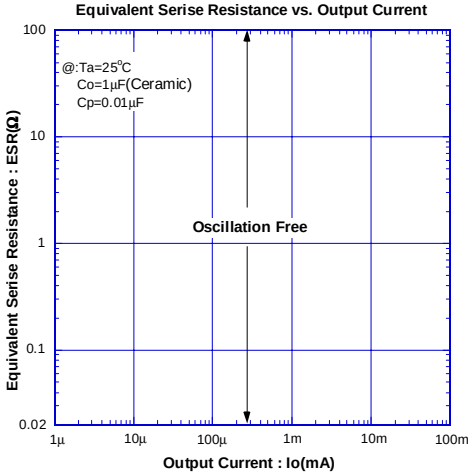
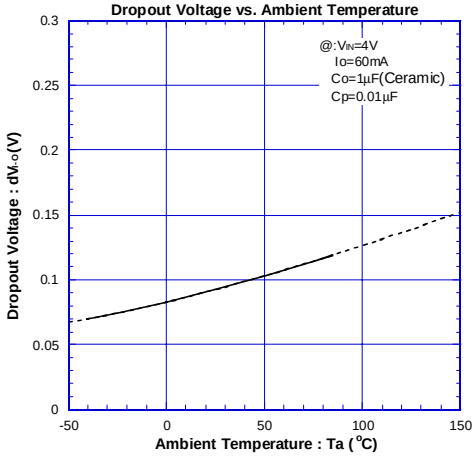
■ TYPICAL CHARACTERISTICS

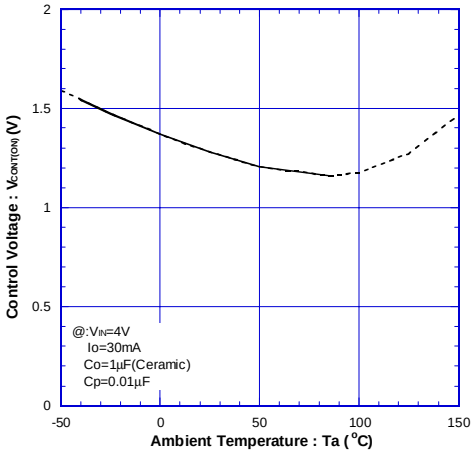
NJM2860_3.0V
Equivalent Serise Resistance vs. Output Current



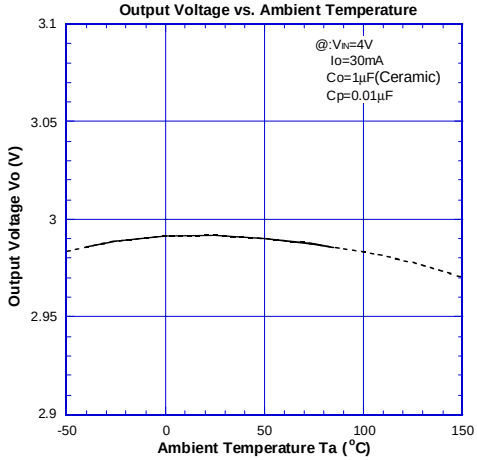
NJM2860_3.0V
Dropout Voltage vs. Ambient Temperature



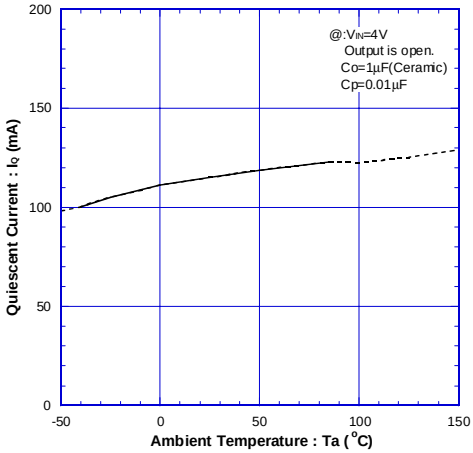
NJM2860_3.0V
Control Voltage vs. Ambient Temperature



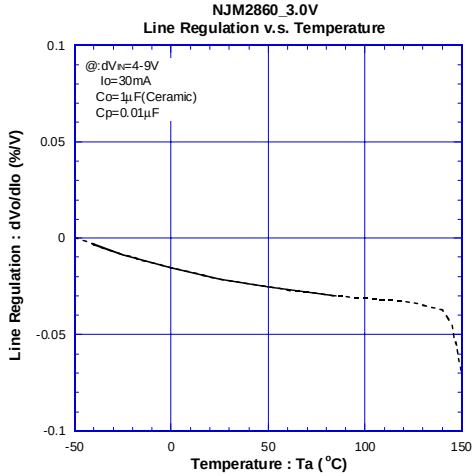
NJM2860_3.0V
Output Voltage vs. Ambient Temperature



NJM2860_3.0V
Quiescent Current vs. Ambient Temperature



NJM2860_3.0V
Line Regulation v.s. Temperature



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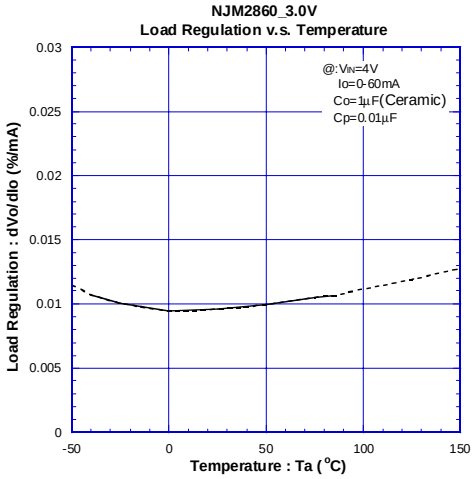
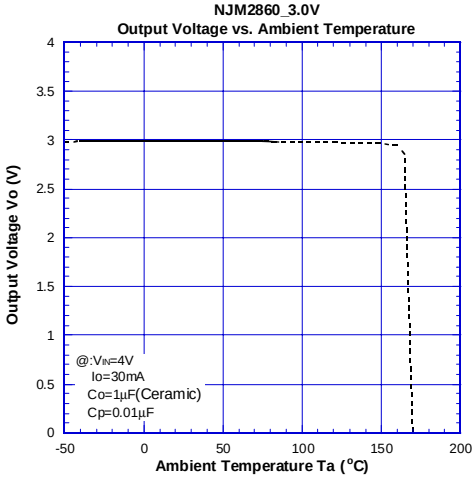
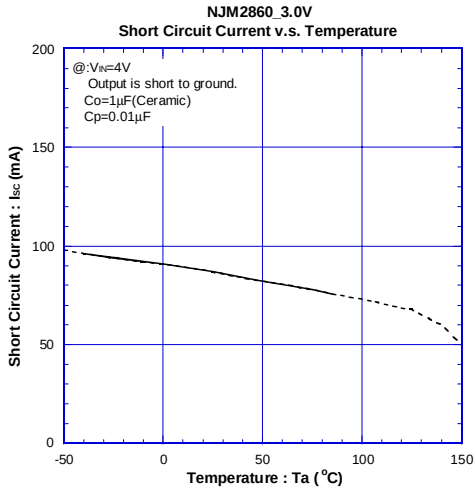
■ TYPICAL CHARACTERISTICS







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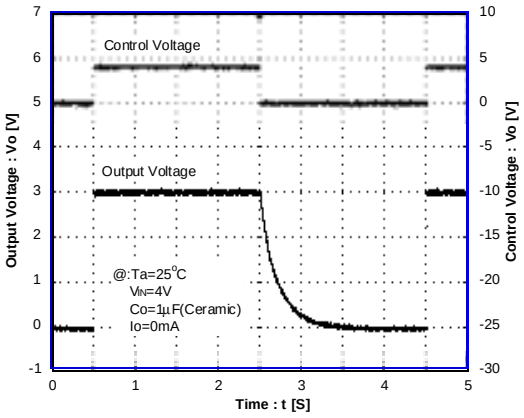
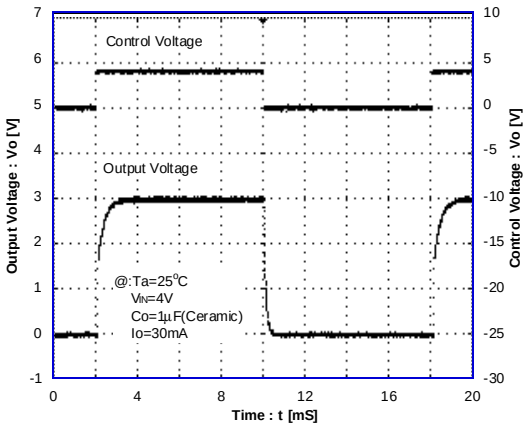
■ TYPICAL CHARACTERISTICS

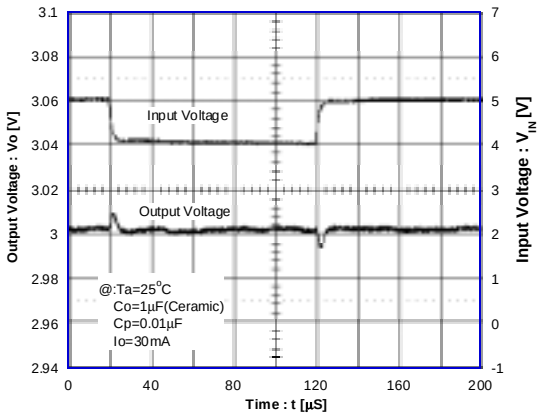
NJM2860_3V
ON/OFF Transient Response without Load



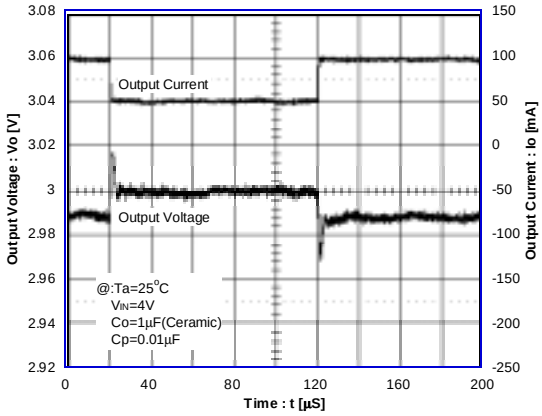
NJM2860_3V
ON/OFF Transient Response



NJM2860_3V
Line Transient Response



NJM2860_3V
Load Transient Response



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