

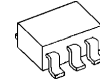
## Ultra Low Noise Low Dropout Voltage Regulator

### ■ GENERAL DESCRIPTION

The NJM2863/64 is a low dropout voltage regulator designed for VCO Applications.

Advanced Bipolar technology achieves ultra low noise, high ripple rejection and low quiescent current.

### ■ PACKAGE OUTLINE

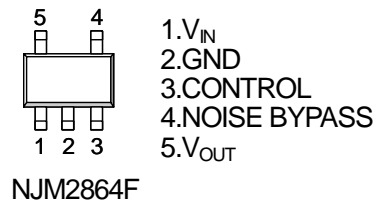
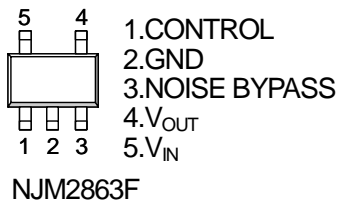


NJM2863F/64F

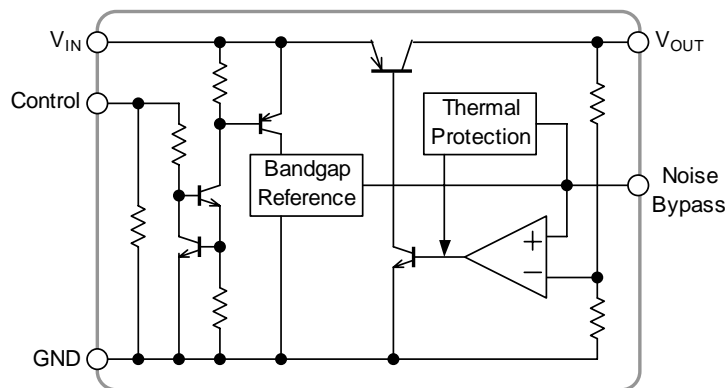
### ■ FEATURES

- High Ripple Rejection      75dB typ. (f=1kHz, Vo=3V Version)
- Output capacitor with 1.0 $\mu$ F ceramic capacitor
- Output Noise Voltage      Vno=19 $\mu$ Vrms typ. (Cp=0.01 $\mu$ F, Co=1.0 $\mu$ F(Ceramic))  
Vno=12 $\mu$ Vrms typ. (Cp=0.1 $\mu$ F, Co=10 $\mu$ F(Tantalum))
- Output Current              Io(max.)=100mA
- High Precision Output      Vo $\pm$ 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            SOT-23-5

### ■ PIN CONFIGURATION



### ■ EQUIVALENT CIRCUIT



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## ■ OUTPUT VOLTAGE RANK LIST

Device Name	V <sub>OUT</sub>	Device Name	V <sub>OUT</sub>
NJM286×F21	2.1V	NJM286×F29	2.9V
NJM286×F25	2.5V	NJM286×F03	3.0V
NJM286×F27	2.7V	NJM286×F33	3.3V
NJM286×F28	2.8V	NJM286×F05	5.0V
NJM286×F285	2.85V		

## ■ 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>	SOT-23-5 350(*2) 200(*3)	mW
Operating Temperature	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>stg</sub>	-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)

(\*3): Device itself.

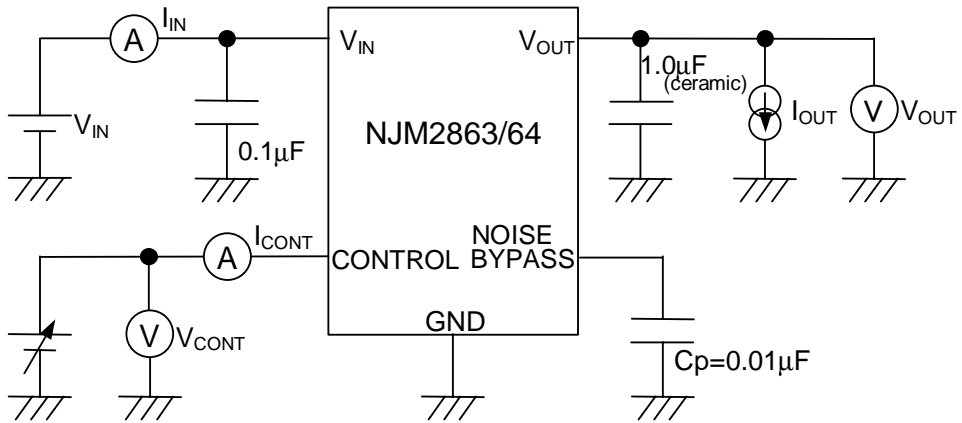
## ■ ELECTRICAL CHARACTERISTICS (V<sub>IN</sub>=V<sub>o</sub>+1V, C<sub>IN</sub>=0.1μF, C<sub>o</sub>=1.0μF, C<sub>p</sub>=0.01μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>o</sub>	I <sub>o</sub> =30mA	-1.0%	—	+1.0%	V
Quiescent Current	I <sub>Q</sub>	I <sub>o</sub> =0mA, except 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	I <sub>o</sub>	V <sub>o</sub> -0.3V	100	130	—	mA
Line Regulation	ΔV <sub>o</sub> /ΔV <sub>IN</sub>	V <sub>IN</sub> =V <sub>o</sub> +1V ~ V <sub>o</sub> +6V, I <sub>o</sub> =30mA	—	—	0.10	%/V
Load Regulation	ΔV <sub>o</sub> /ΔI <sub>o</sub>	I <sub>o</sub> =0 ~ 100mA	—	—	0.03	%/mA
Dropout Voltage	ΔV <sub>I-O</sub>	I <sub>o</sub> =60mA	—	0.10	0.18	V
Ripple Rejection	RR	e <sub>in</sub> =200mVrms, f=1kHz, I <sub>o</sub> =10mA, V <sub>o</sub> =3V Version	—	75	—	dB
Average Temperature Coefficient of Output Voltage	ΔV <sub>o</sub> /ΔTa	Ta=0~85°C, I <sub>o</sub> =10mA	—	± 50	—	ppm/°C
Output Noise Voltage1	V <sub>NO1</sub>	f=10Hz~80kHz, I <sub>o</sub> =10mA, C <sub>p</sub> =0.01μF, C <sub>o</sub> =1.0μF (Ceramic), V <sub>o</sub> =3V Version	—	19	—	μVrms
Output Noise Voltage2	V <sub>NO2</sub>	f=10Hz~80kHz, I <sub>o</sub> =10mA, C <sub>p</sub> =0.1μF, C <sub>o</sub> =10μF (Tantalum), V <sub>o</sub> =3V Version	—	12	—	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

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.

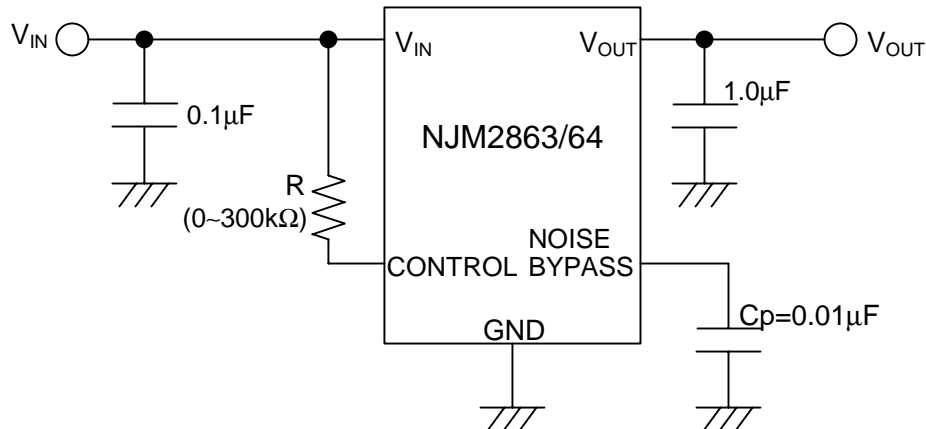
## ■ TEST CIRCUIT



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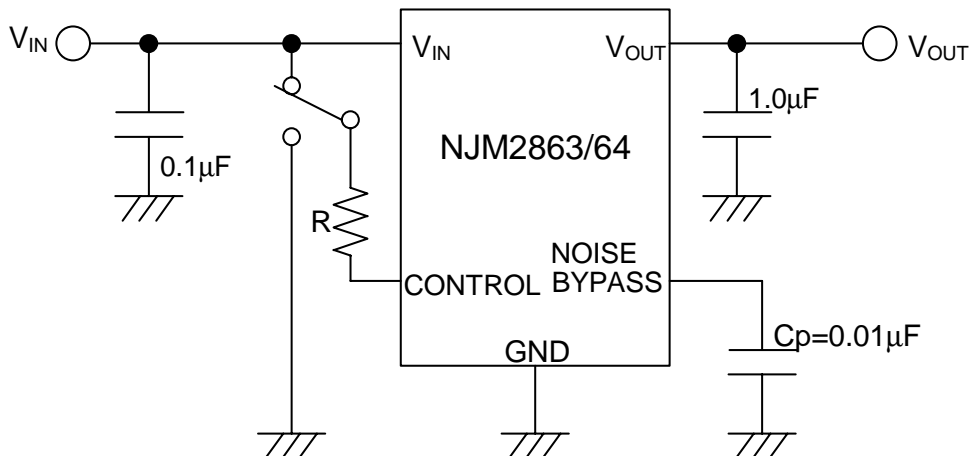
## ■ TYPICAL APPLICATION

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



Connect control terminal to  $V_{IN}$  terminal

② In use of ON/OFF CONTROL:



State of control terminal:

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

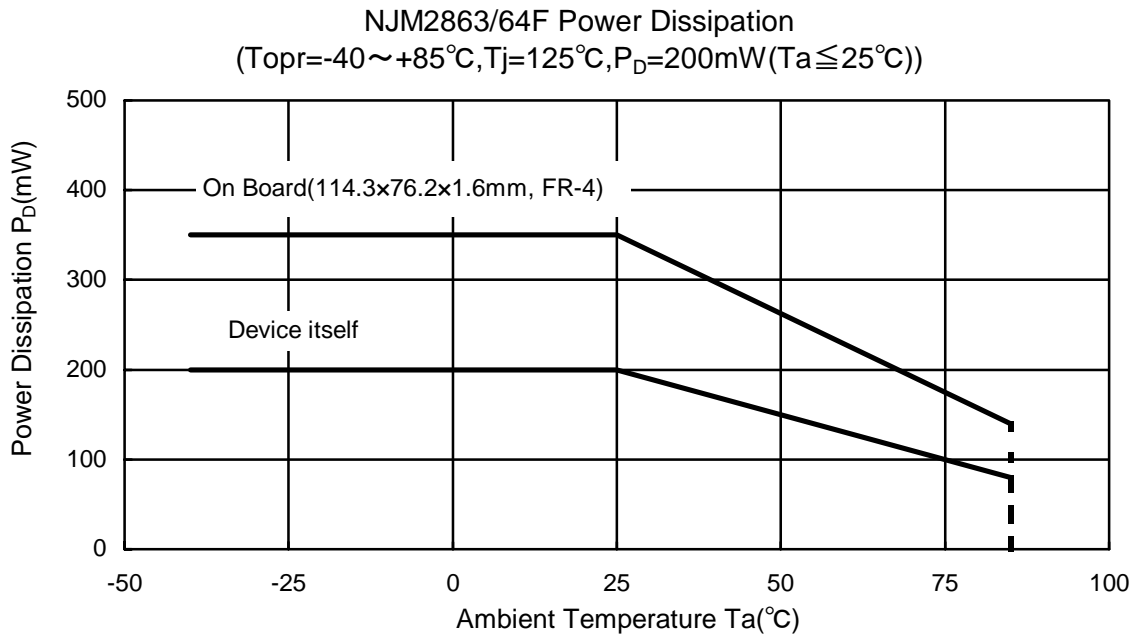
### \*Noise bypass Capacitance $C_p$

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  $0.01\mu\text{F}$  greater to avoid the problem.

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

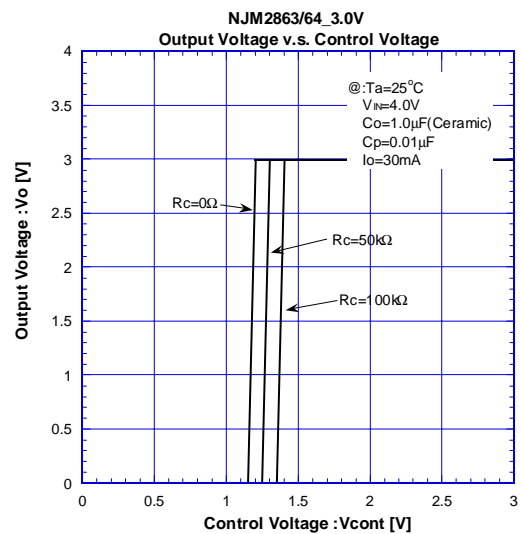
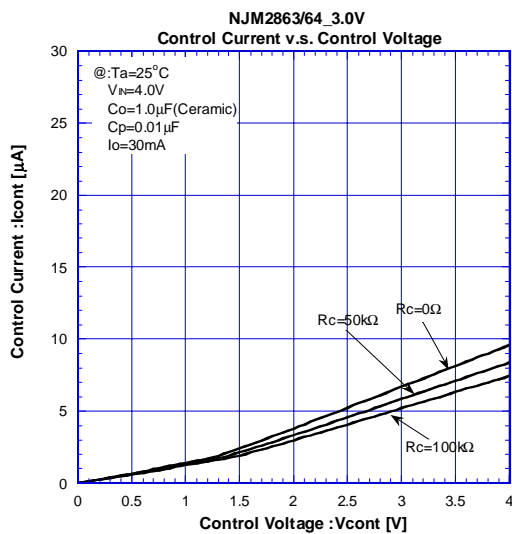
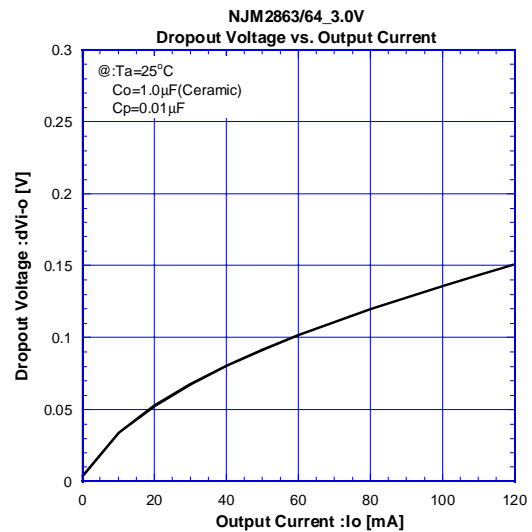
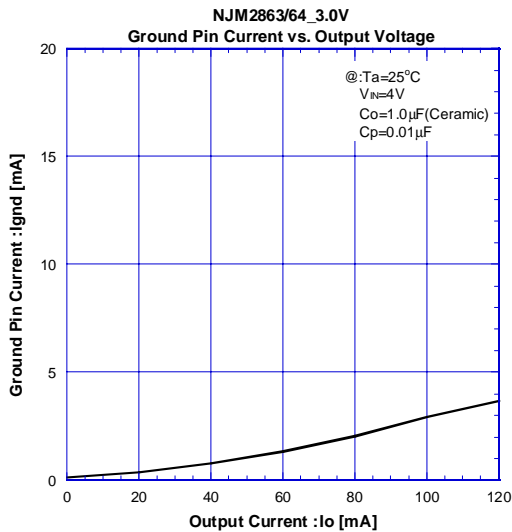
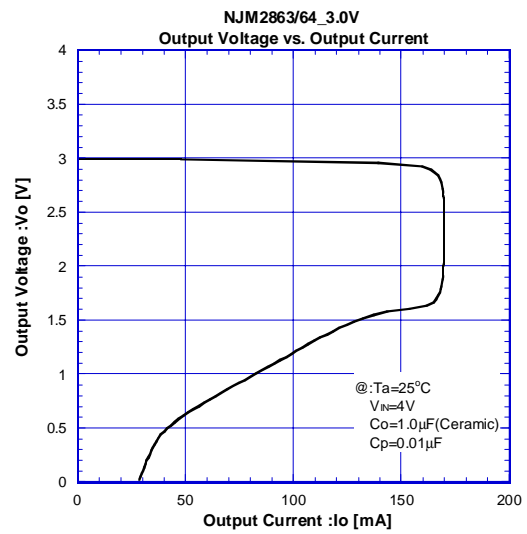
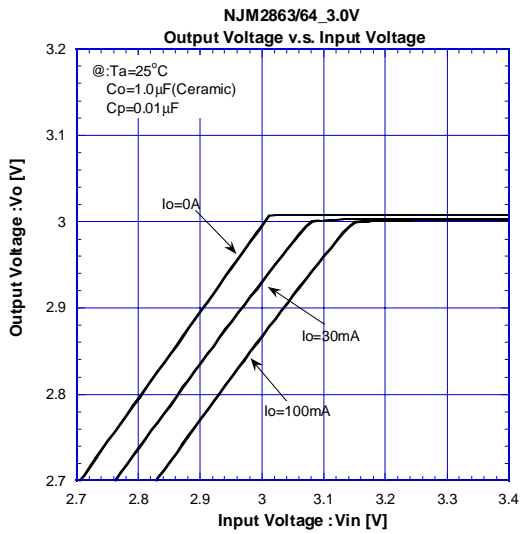
The current flow into the control terminal while the IC is ON state ( $I_{CONT}$ ) can be reduced when a pull up resistance "R" is inserted between  $V_{IN}$  and the control terminal. The minimum control voltage for ON state ( $V_{CONT(ON)}$ ) is increased due to the voltage drop caused by  $I_{CONT}$  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

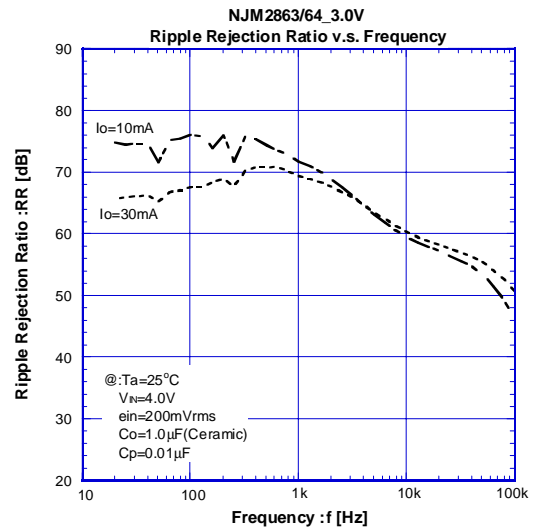
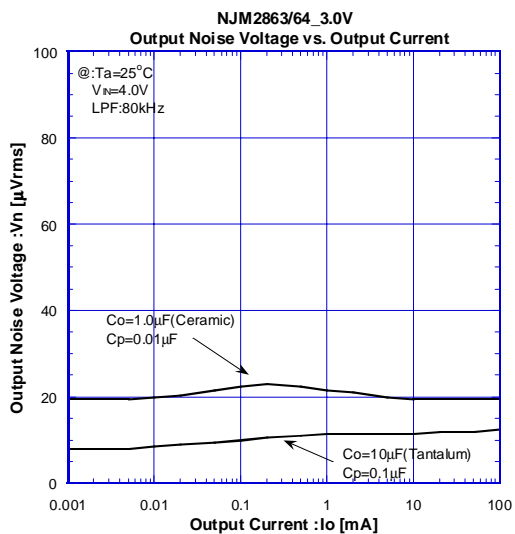
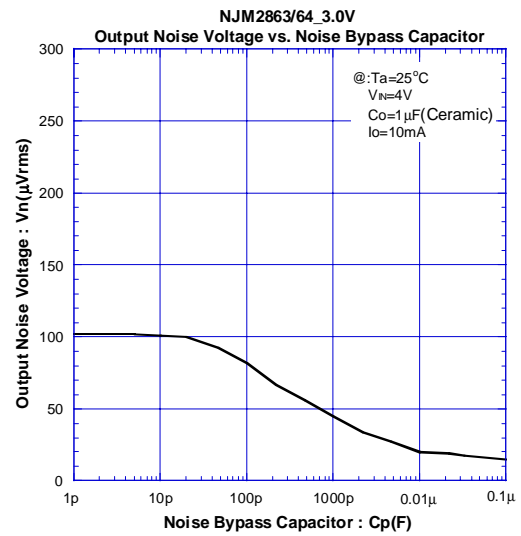
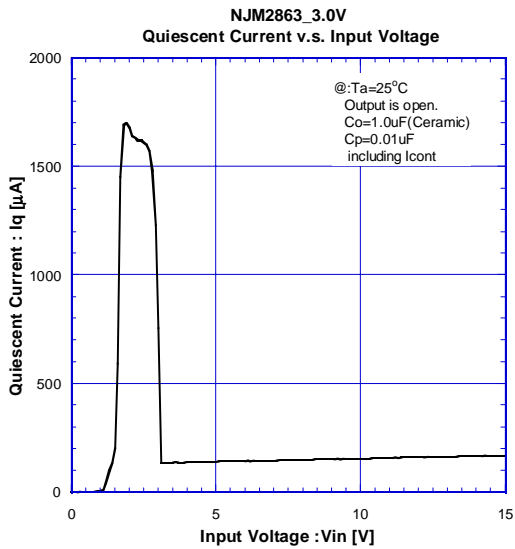
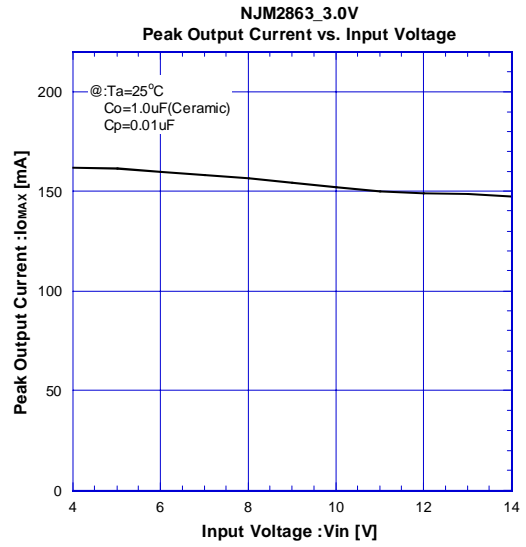
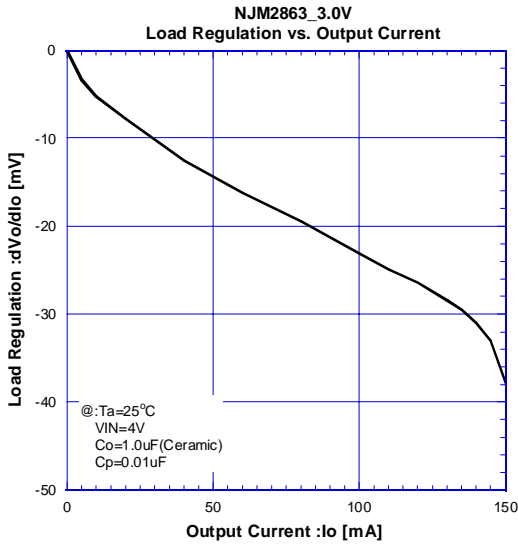


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## ELECTRICAL CHARACTERISTICS

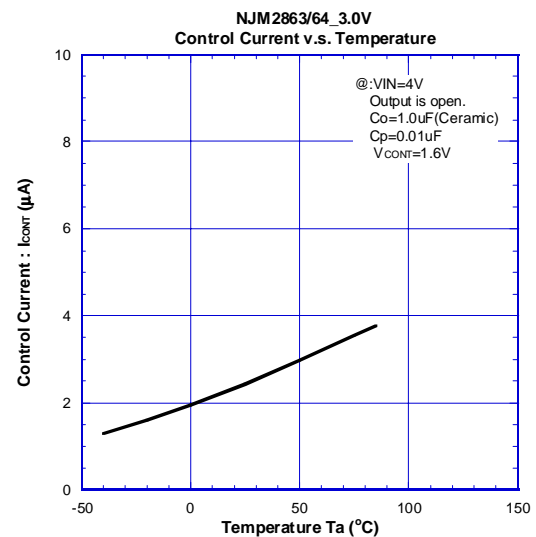
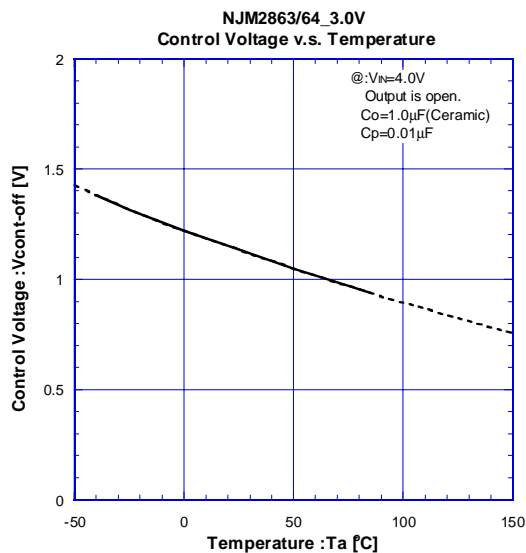
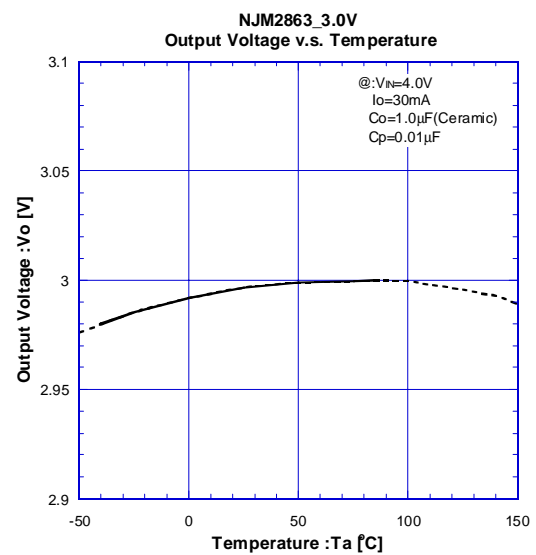
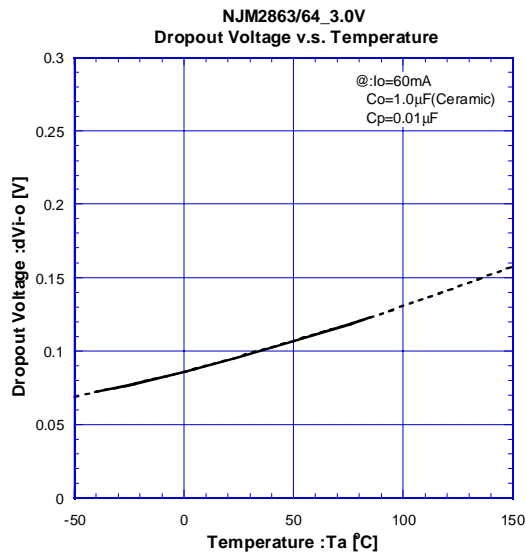
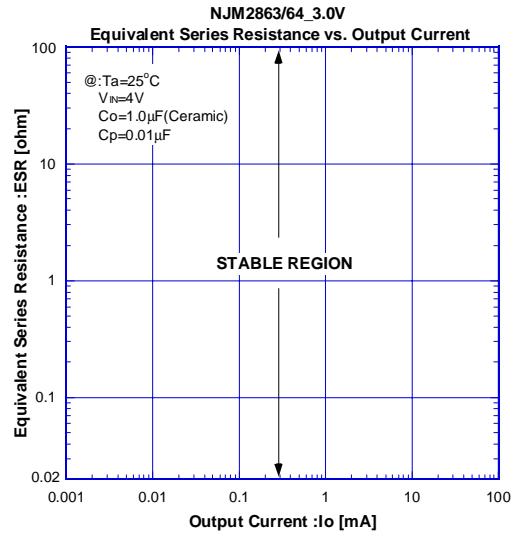
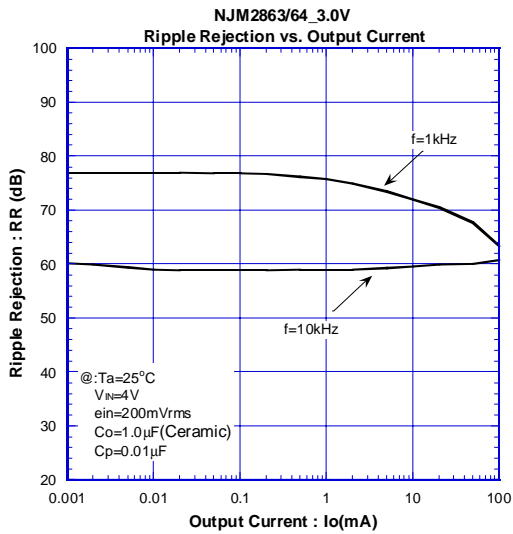


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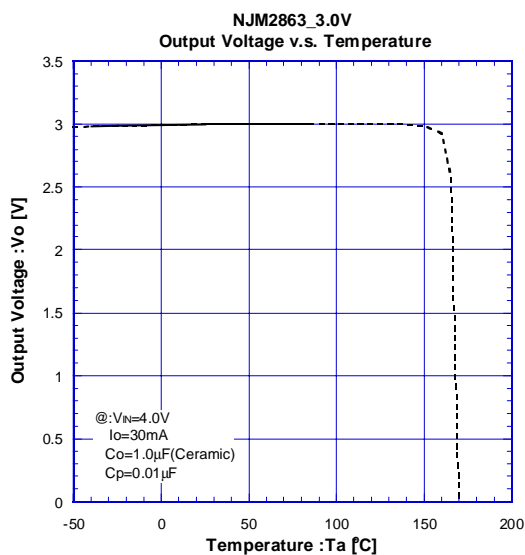
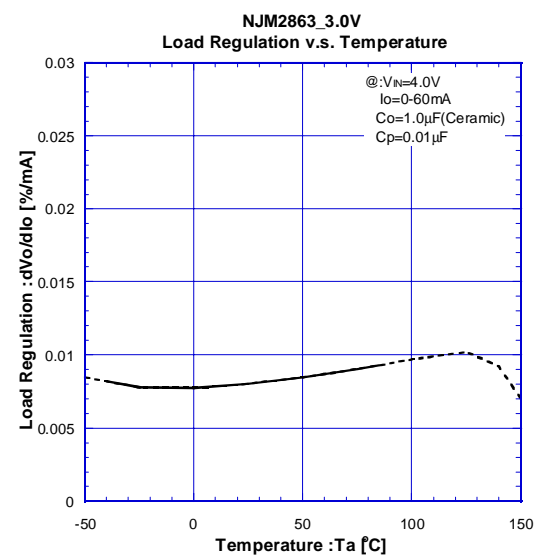
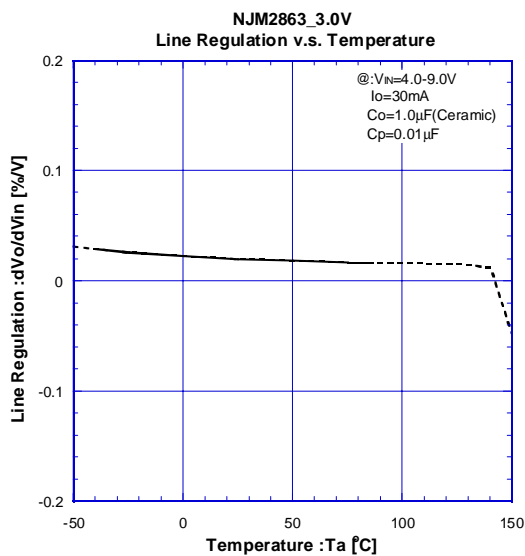
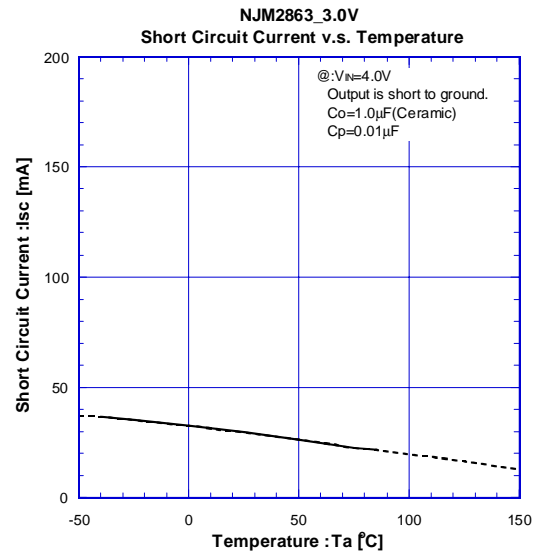
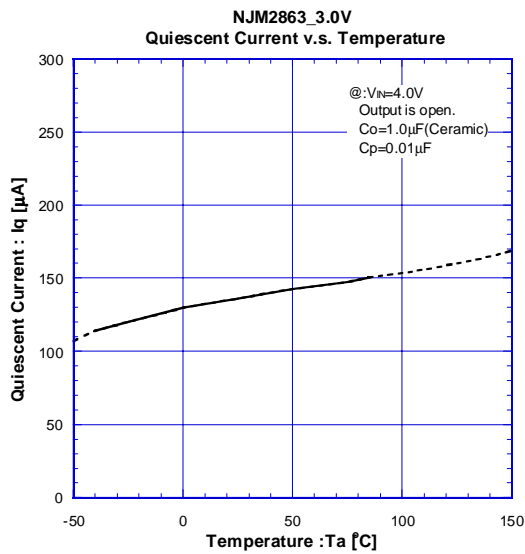
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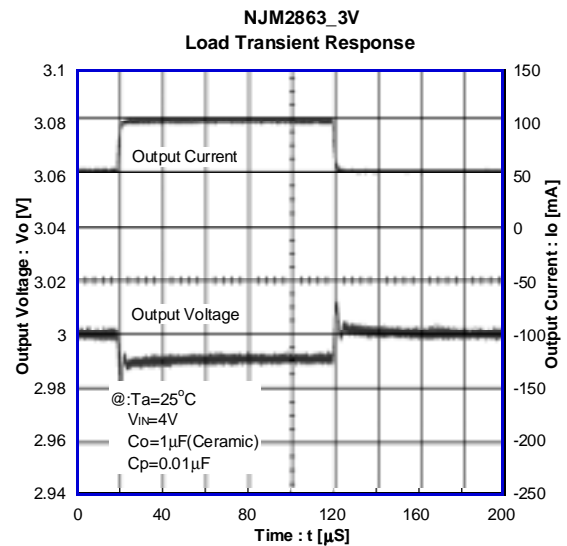
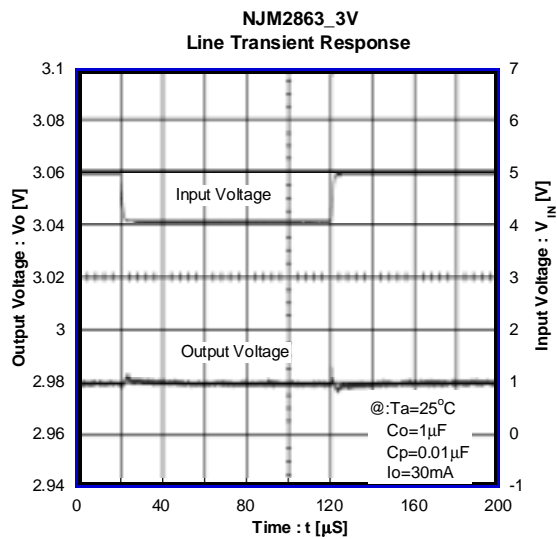
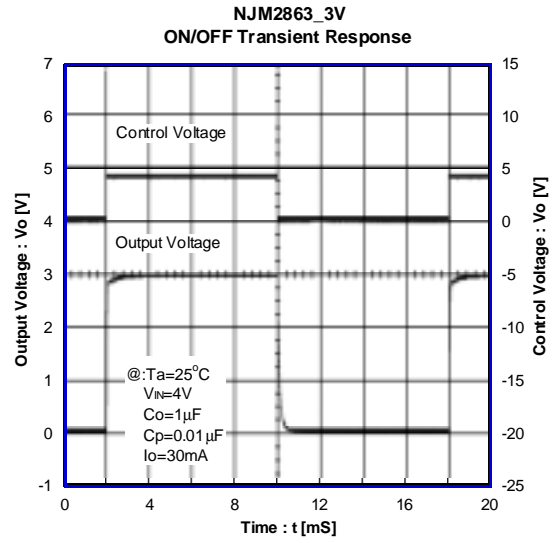
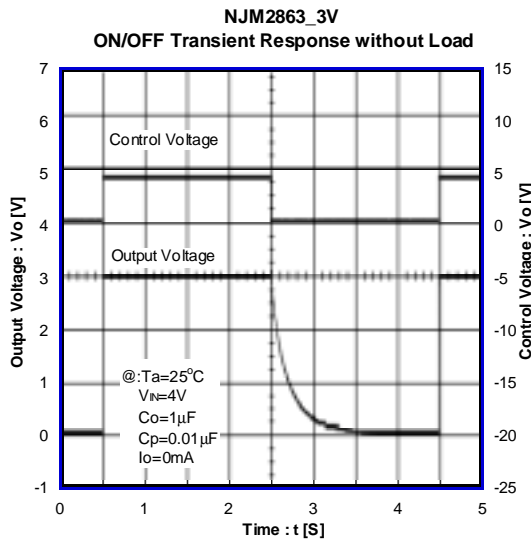


## ■ ELECTRICAL CHARACTERISTICS



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## ELECTRICAL CHARACTERISTICS



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