

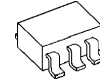
## Ultra Low Noise Low Dropout Voltage Regulator

### ■ 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

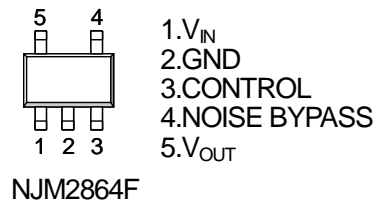
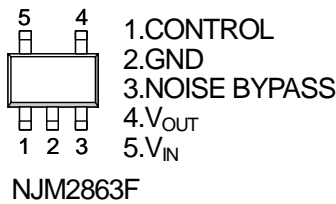


NJM2863F/64F

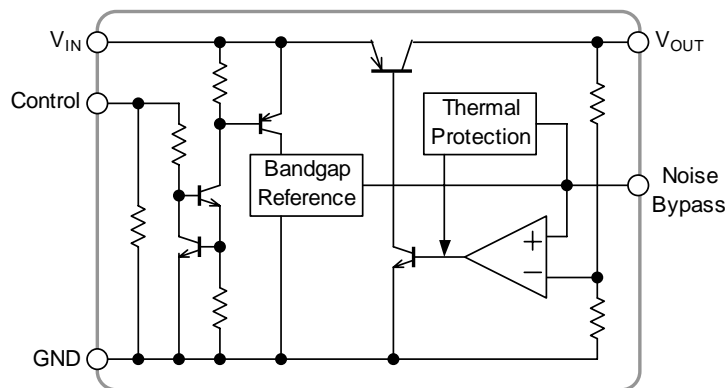
### ■ FEATURES

- 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



# NJM2863/64

## ■ 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<br>350(*2)<br>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.

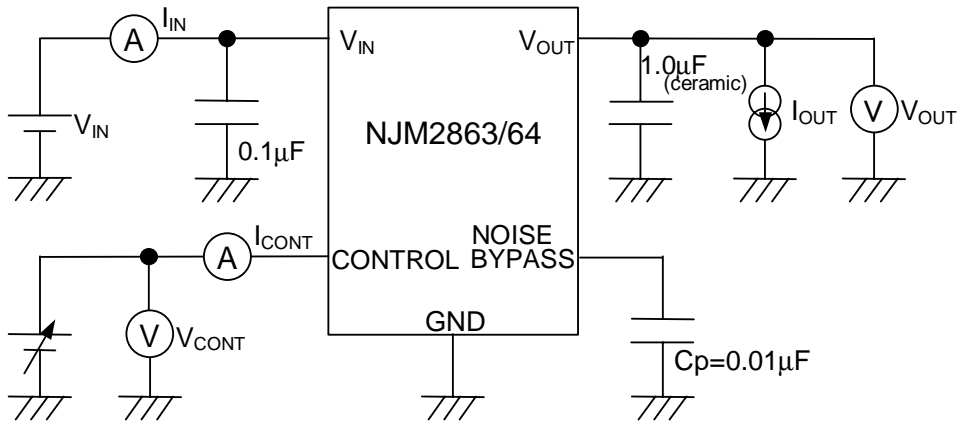
## ■ ELECTRICAL CHARACTERISTICS (V<sub>IN</sub>=V<sub>o</sub>+1V, C<sub>IN</sub>=0.1μF, C<sub>o</sub>=1.0μF, C<sub>p</sub>=0.01μF, Ta=25°C)

| 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.

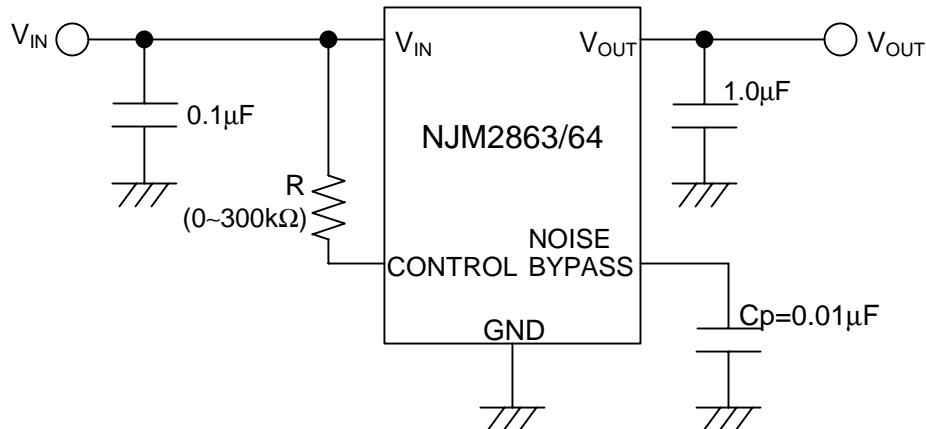
## ■ TEST CIRCUIT



# NJM2863/64

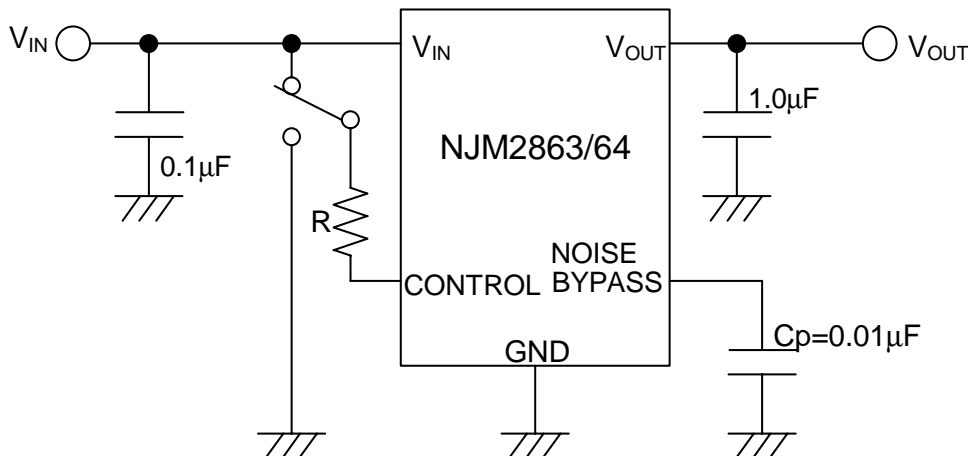
## ■ TYPICAL APPLICATION

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.

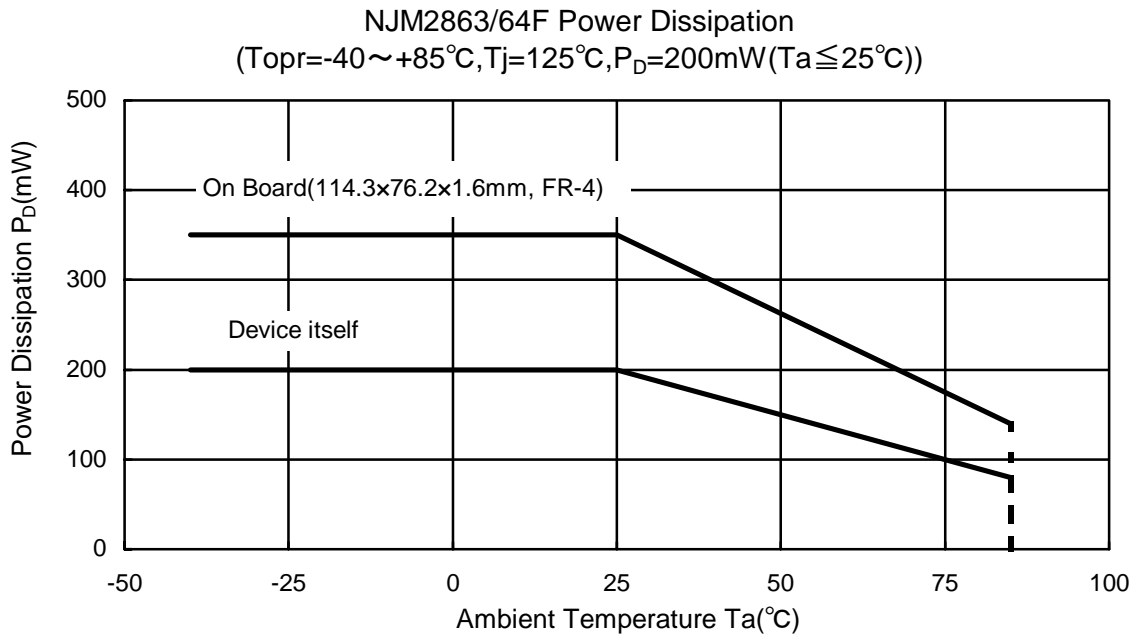
### \*Noise bypass Capacitance $C_p$

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.

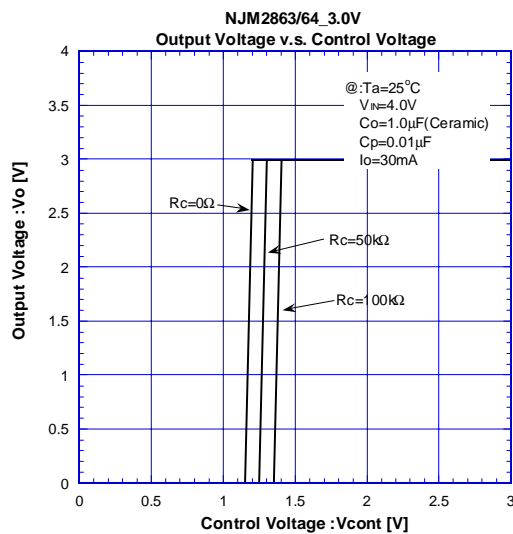
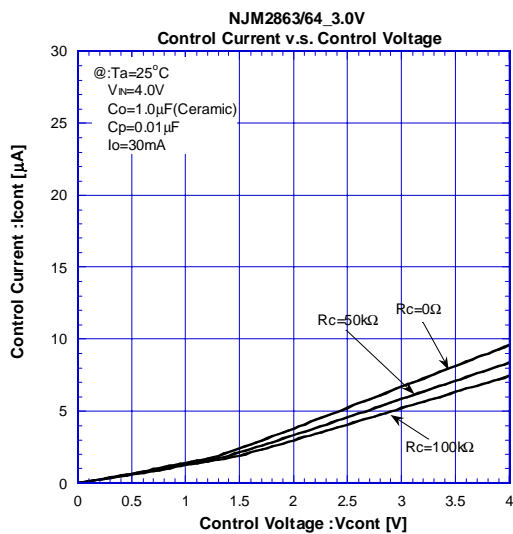
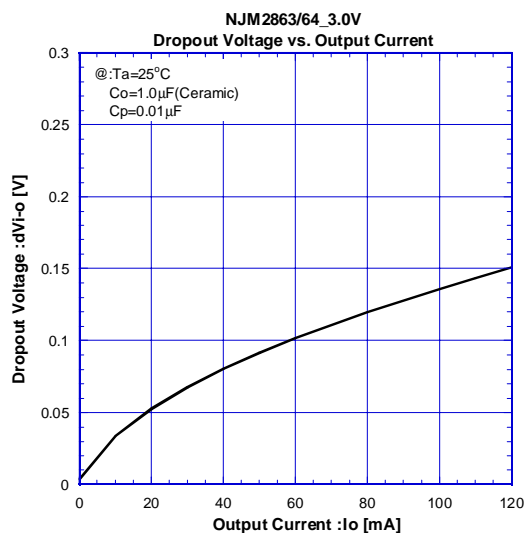
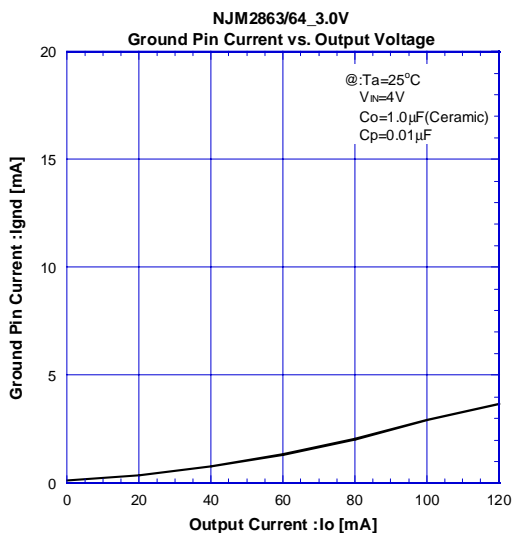
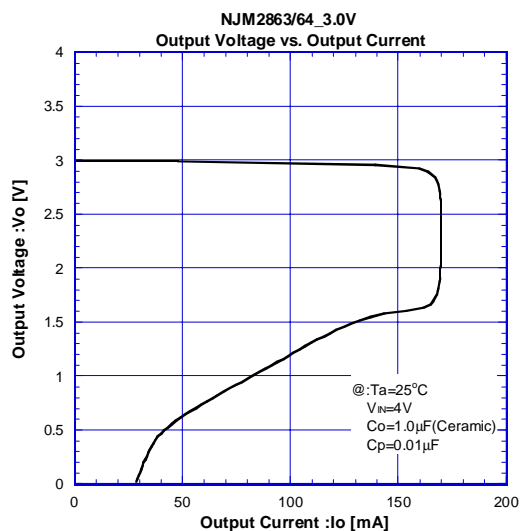
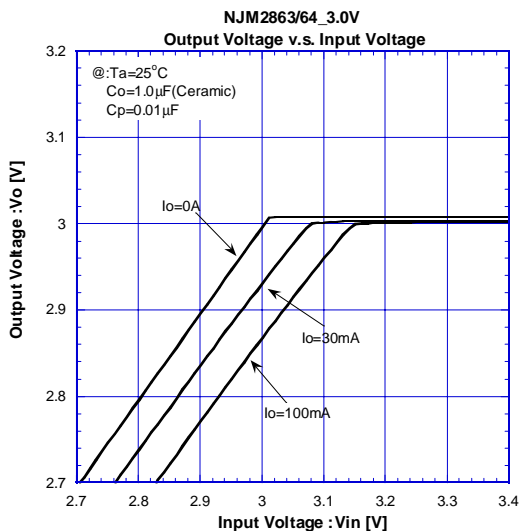
The current flow into the control terminal while the IC is ON state ( $I_{CONT}$ ) can be reduced when a pull up resistance "R" is inserted between  $V_{IN}$  and the control terminal. The minimum control voltage for ON state ( $V_{CONT(ON)}$ ) is increased due to the voltage drop caused by  $I_{CONT}$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

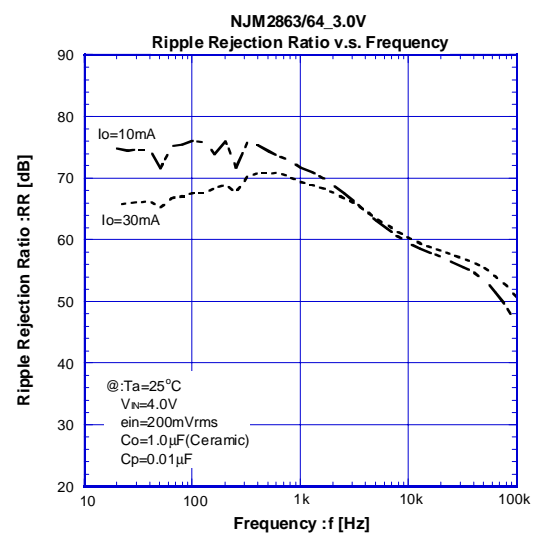
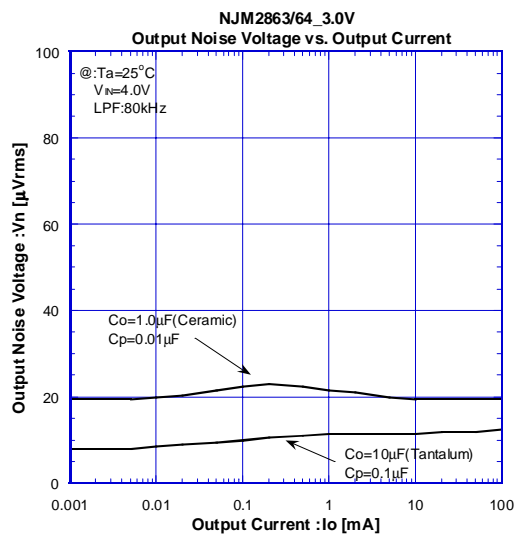
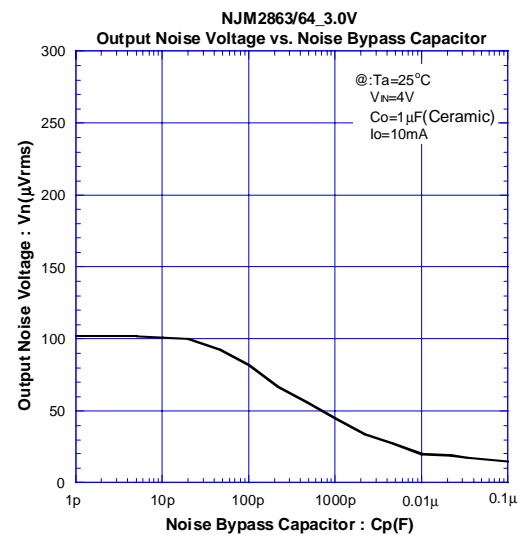
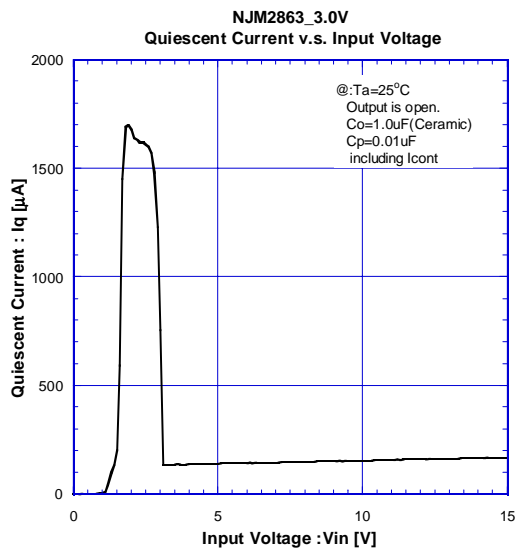
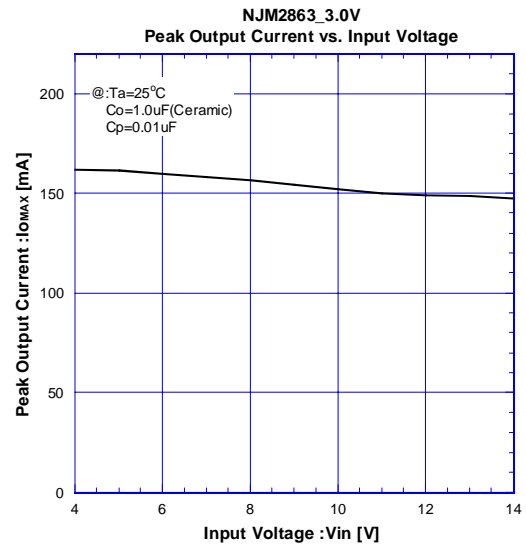
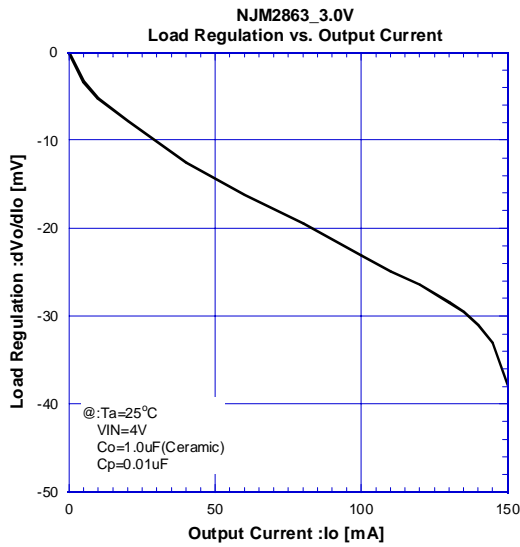


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## ELECTRICAL CHARACTERISTICS

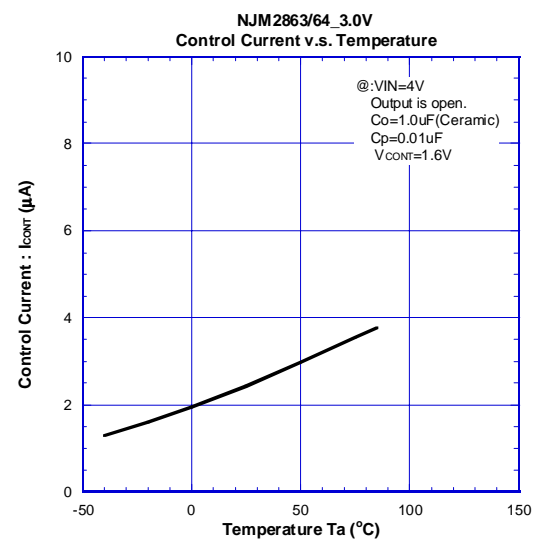
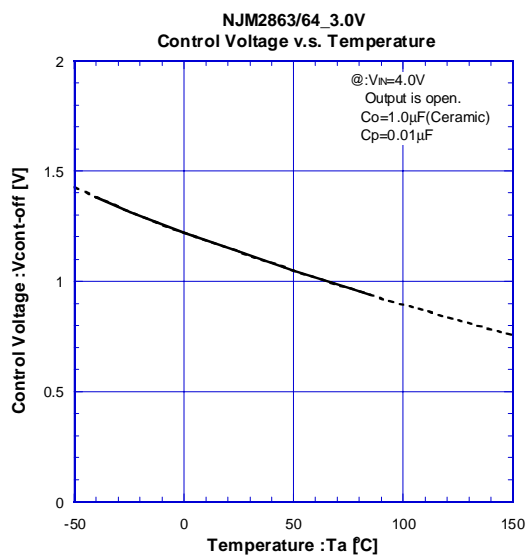
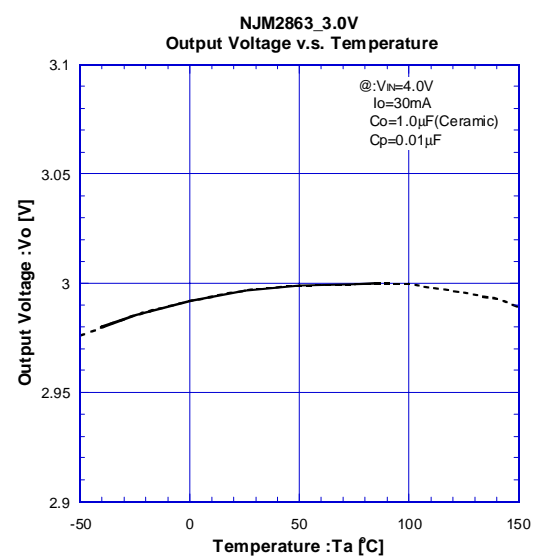
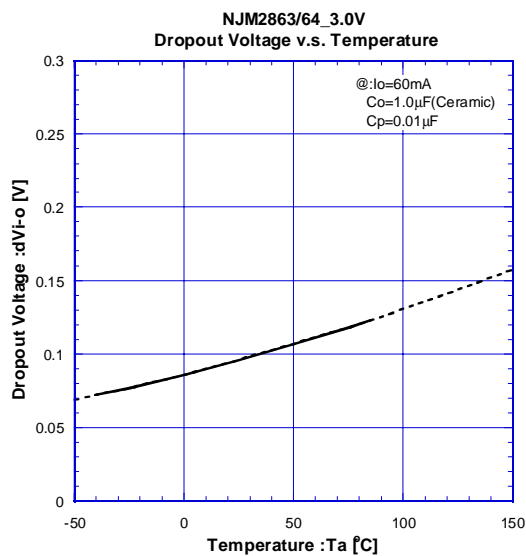
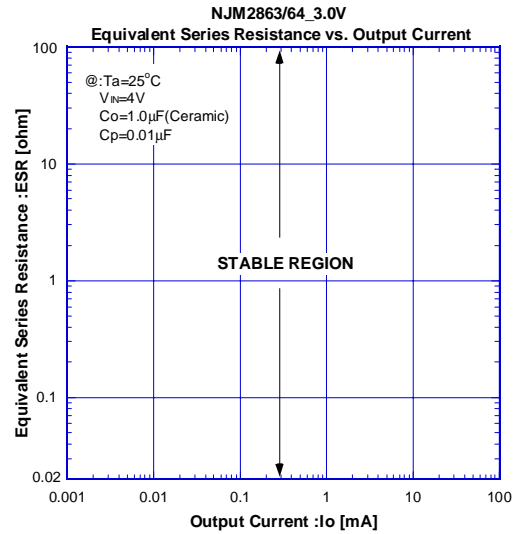
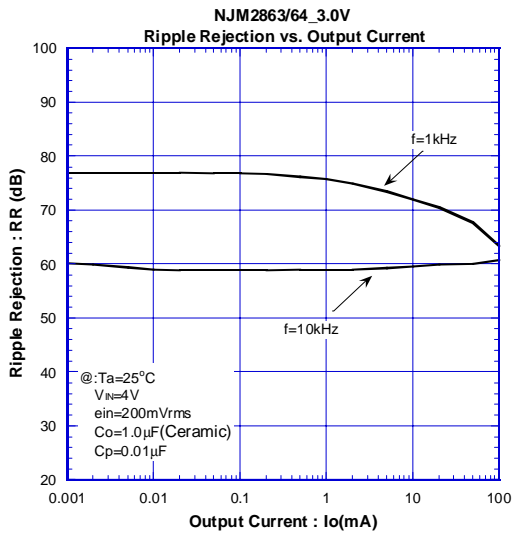


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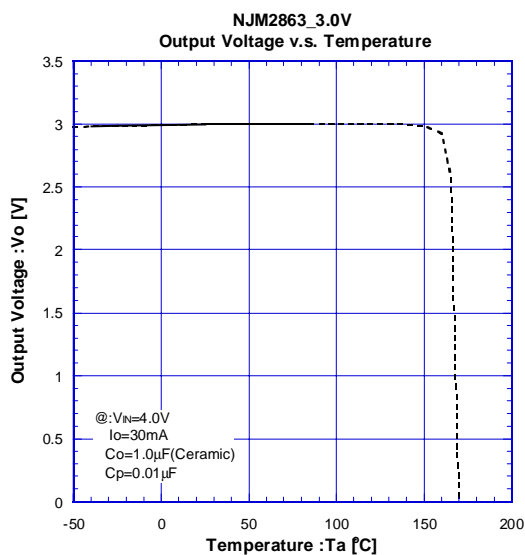
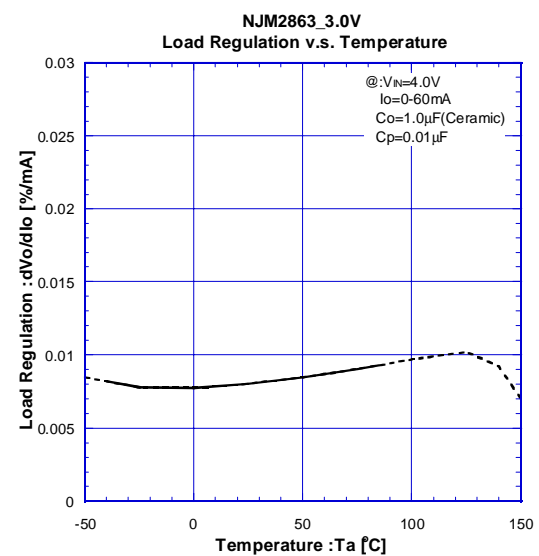
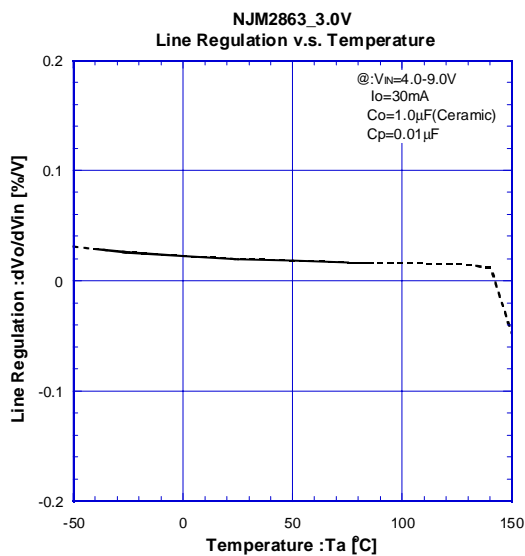
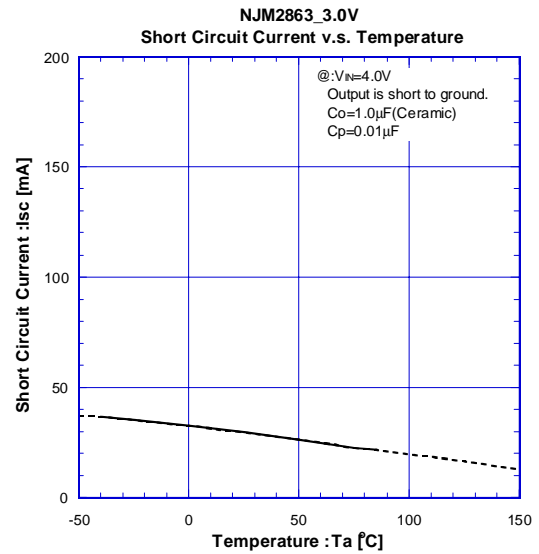
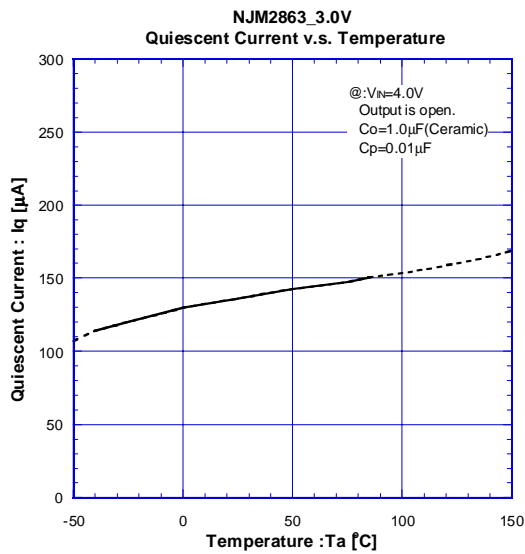
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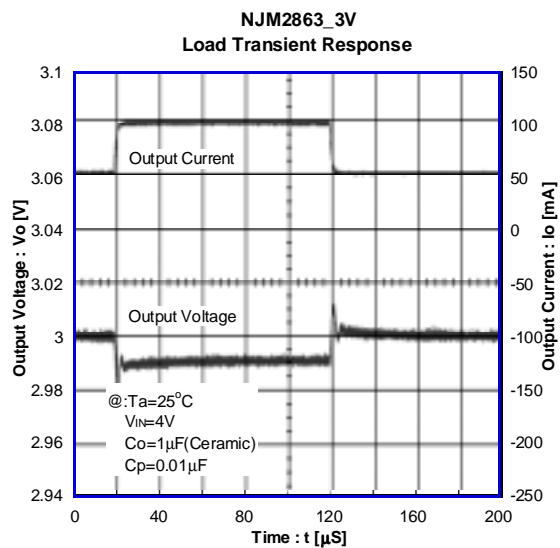
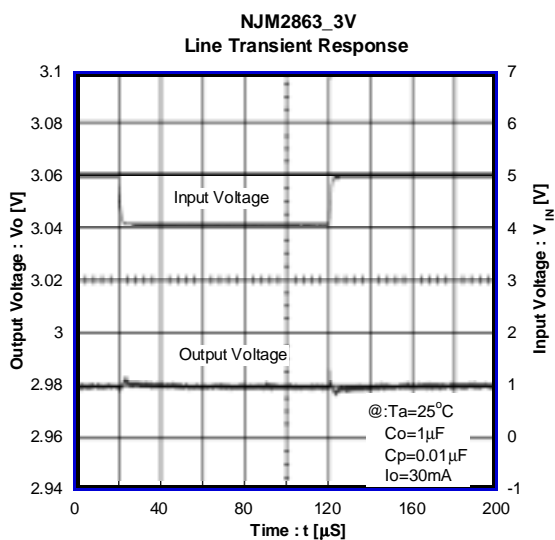
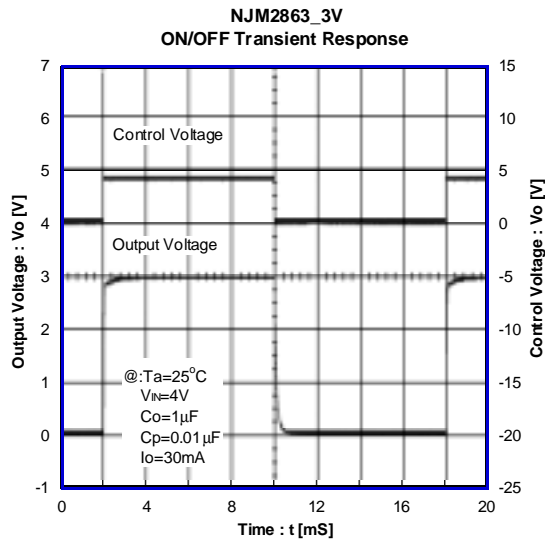
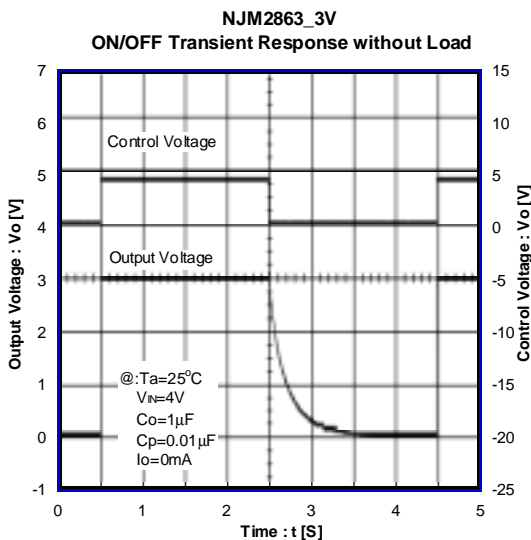




## ELECTRICAL CHARACTERISTICS



## ■ ELECTRICAL CHARACTERISTICS



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