

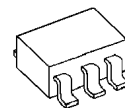
## Low Dropout Voltage Regulator

### ■ GENERAL DESCRIPTION

The NJM2871B/72B are low dropout voltage regulator designed for cellular phone applications.

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

### ■ PACKAGE OUTLINE

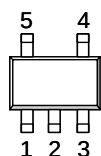


NJM2871BF/72BF

### ■ FEATURES

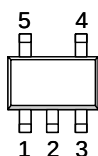
- High Ripple Rejection      75dB typ. (f=1kHz  $V_o=3V$  version)
- Output Noise Voltage       $V_{no}=30\mu V_{rms}$  typ. ( $C_p=0.01\mu F$ )
- Output capacitor with 1.0uF ceramic capacitor ( $V_o \geq 2.7V$ : Version)
- Output Current       $I_o(max.)=150mA$
- High Precision Output       $V_o \pm 1.0\%$
- Low Dropout Voltage      0.10V typ. ( $I_o=60mA$ )
- Input Voltage Range      +2.3 ~ +14V ( $V_o \leq 2.0V$  version)
- ON/OFF Control      (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline      SOT-23-5 (MTP5)

### ■ PIN CONFIGURATION



NJM2871BF

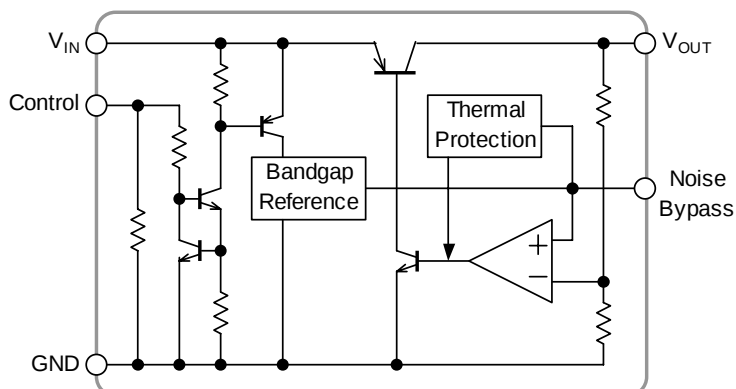
1. CONTROL (Active High)
2. GND
3. NOISE BYPASS
4.  $V_{OUT}$
5.  $V_{IN}$



NJM2872BF

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

### ■ EQUIVALENT CIRCUIT



# NJM2871B/72B

## ■ OUTPUT VOLTAGE RANK LIST

| Device Name | V <sub>OUT</sub> | Device Name | V <sub>OUT</sub> | Device Name | V <sub>OUT</sub> |
|-------------|------------------|-------------|------------------|-------------|------------------|
| NJM287*BF15 | 1.5V             | NJM287*BF26 | 2.6V             | NJM287*BF33 | 3.3V             |
| NJM287*BF18 | 1.8V             | NJM287*BF27 | 2.7V             | NJM287*BF34 | 3.4V             |
| NJM287*BF19 | 1.9V             | NJM287*BF28 | 2.8V             | NJM287*BF35 | 3.5V             |
| NJM287*BF02 | 2.0V             | NJM287*BF29 | 2.9V             | NJM287*BF38 | 3.8V             |
| NJM287*BF21 | 2.1V             | NJM287*BF03 | 3.0V             | NJM287*BF04 | 4.0V             |
| NJM287*BF23 | 2.3V             | NJM287*BF31 | 3.1V             | NJM287*BF48 | 4.8V             |
| NJM287*BF25 | 2.5V             | NJM287*BF32 | 3.2V             | NJM287*BF05 | 5.0V             |

## ■ 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 | 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)

(\*3) : Device itself

## ■ Operating voltage

V<sub>IN</sub>=+2.3 ~ +14V (In case of Vo<2.1V version)

## ■ ELECTRICAL CHARACTERISTICS

(V<sub>IN</sub>=Vo+1V, C<sub>IN</sub>=0.1μF, Co=1.0μF: Vo≥2.7V (Co=2.2μF : 1.8V<Vo≤2.6V, Co=4.7μF : Vo≤1.8V), Cp=0.01μF, Ta=25°C)

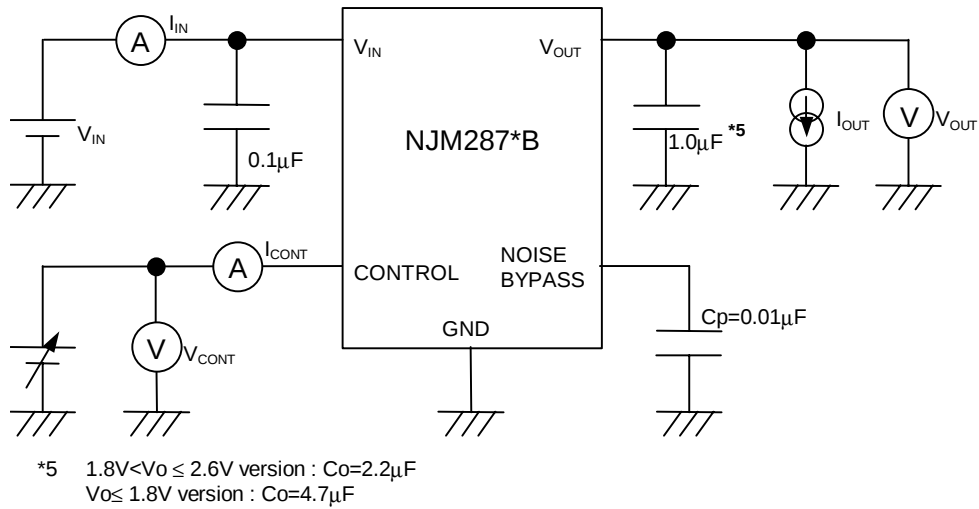
| PARAMETER                                         | SYMBOL                 | TEST CONDITION                                                         | MIN.  | TYP. | MAX.  | UNIT   |
|---------------------------------------------------|------------------------|------------------------------------------------------------------------|-------|------|-------|--------|
| Output Voltage                                    | Vo                     | 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>         | Vo-0.3V                                                                | 150   | 200  | —     | mA     |
| Line Regulation                                   | ΔVo/ΔV <sub>IN</sub>   | V <sub>IN</sub> =Vo+1V ~ Vo+6V, I <sub>o</sub> =30mA                   | —     | —    | 0.10  | %/V    |
| Load Regulation                                   | ΔVo/ΔI <sub>o</sub>    | I <sub>o</sub> =0 ~ 100mA                                              | —     | —    | 0.03  | %/mA   |
| Dropout Voltage (*4)                              | ΔV <sub>L-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, Vo=3V version | —     | 75   | —     | dB     |
| Average Temperature Coefficient of Output Voltage | ΔVo/ΔTa                | Ta=0 ~ +85°C, I <sub>o</sub> =10mA                                     | —     | ± 50 | —     | ppm/°C |
| Output Noise Voltage                              | V <sub>NO1</sub>       | f=10Hz~80kHz, I <sub>o</sub> =10mA, Vo=3V Version                      | —     | 30   | —     | 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      |

(\*4): The output voltage excludes under 2.1V.

The above specification is a common specification for all output voltages.

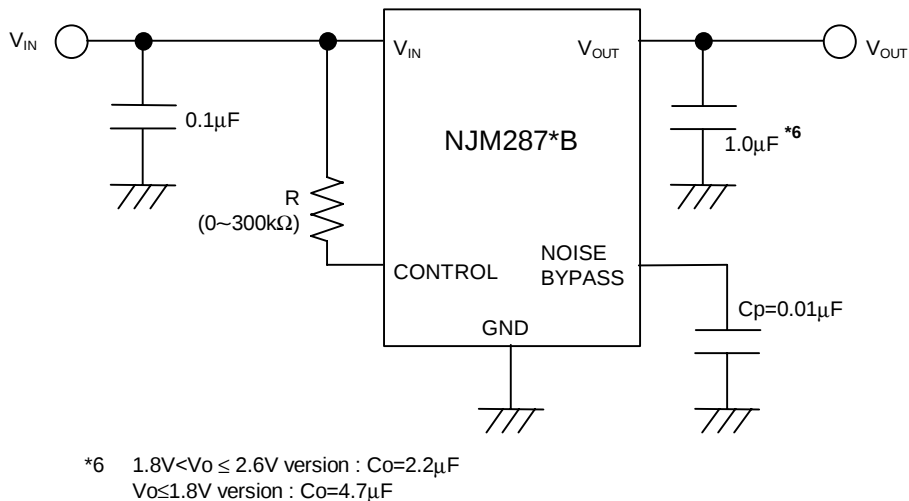
Therefore, it may be different from the individual specification for a specific output voltage.

## ■ TEST CIRCUIT



## ■ TYPICAL APPLICATION

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

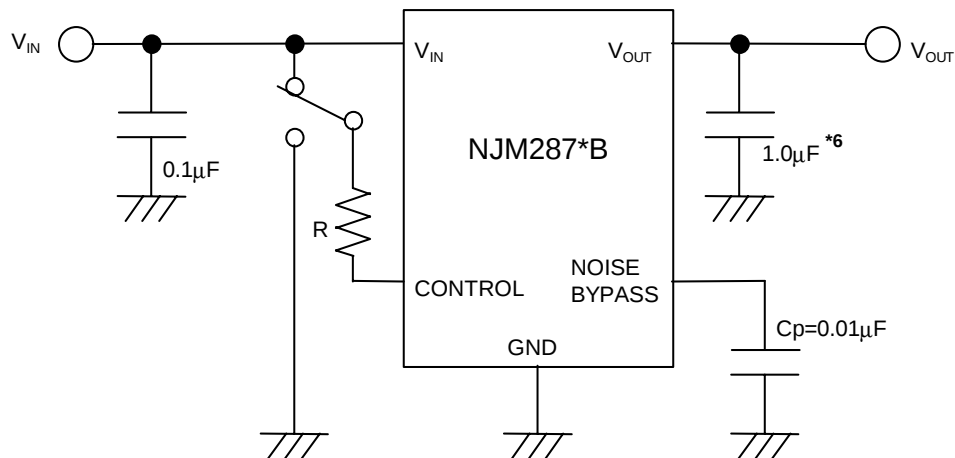


Connect control terminal to V<sub>IN</sub> terminal

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".

# NJM2871B/72B

② In use of ON/OFF CONTROL:



\*6 1.8V<Vo ≤ 2.6V version : Co=2.2μF(ceramic)  
Vo≤1.8V version : Co=4.7μF(ceramic)

State of control terminal:

- “H”→ output is enabled.
- “L” or “open” → output is disabled.

## \*Noise bypass Capacitance Cp

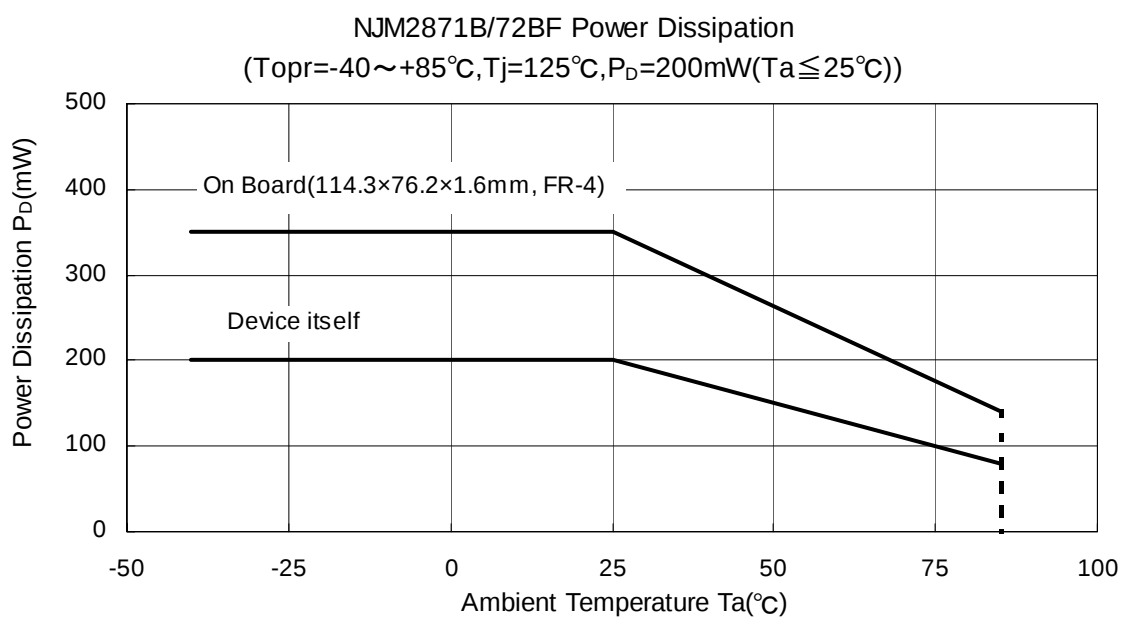
Noise bypass capacitance Cp reduces noise generated by band-gap reference circuit.

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

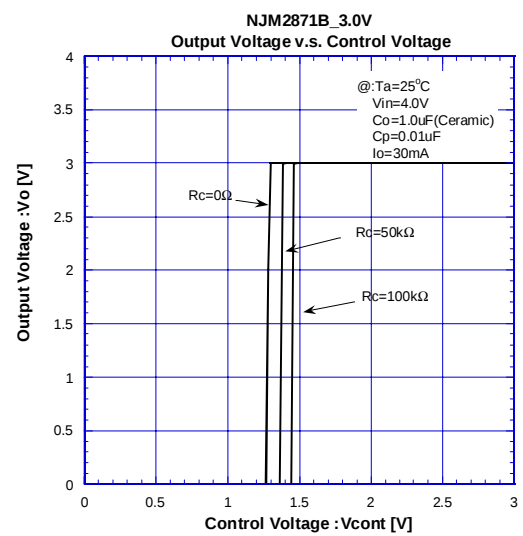
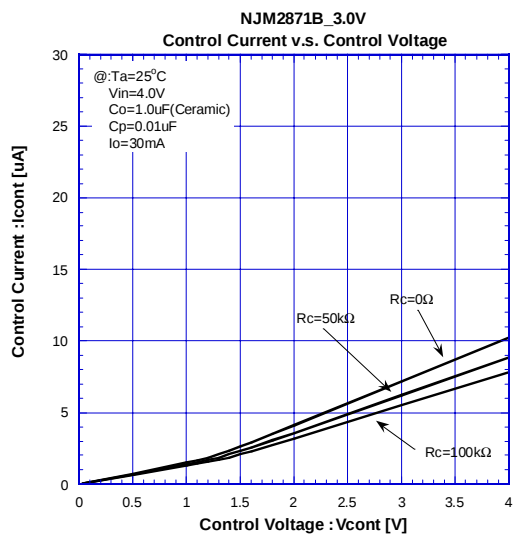
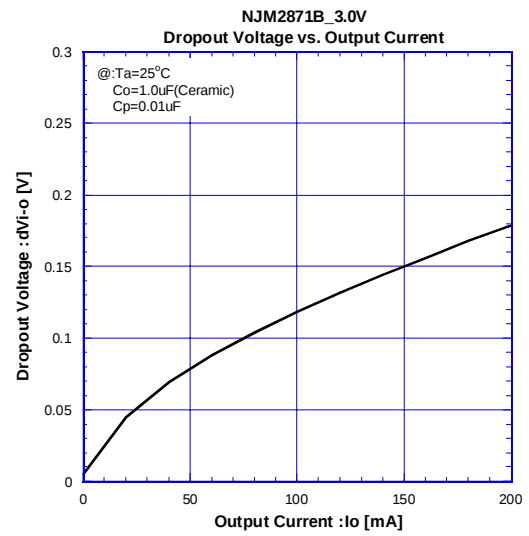
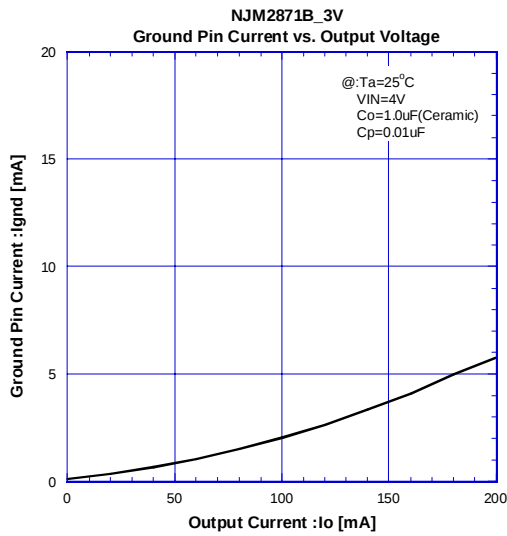
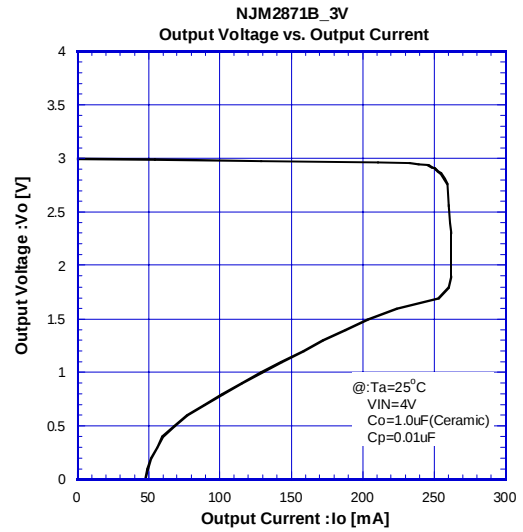
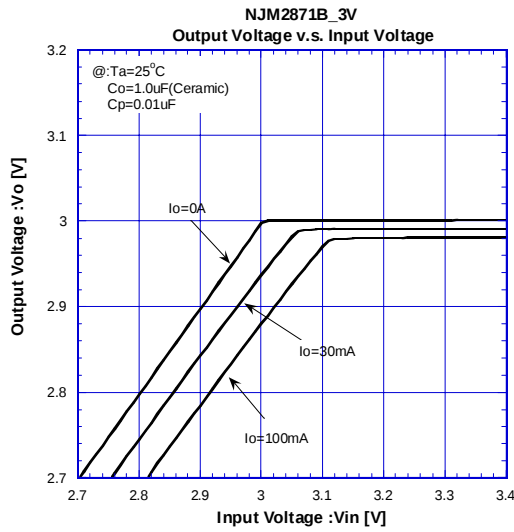
Use of smaller Cp value may cause oscillation.

Use the Cp value of 0.01uF greater to avoid the problem.

## ■ POWER DISSIPATION vs. AMBIENT TEMPERATURE

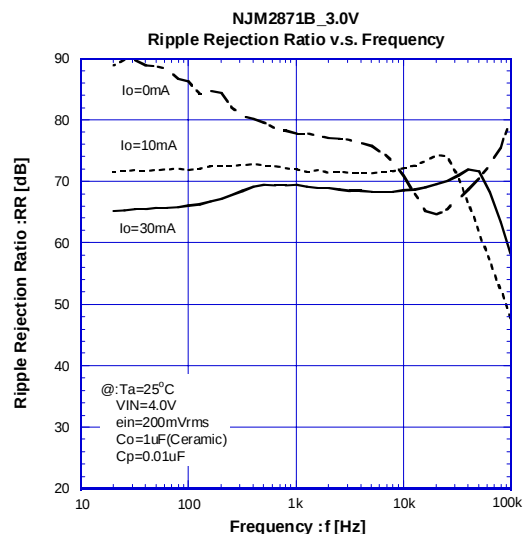
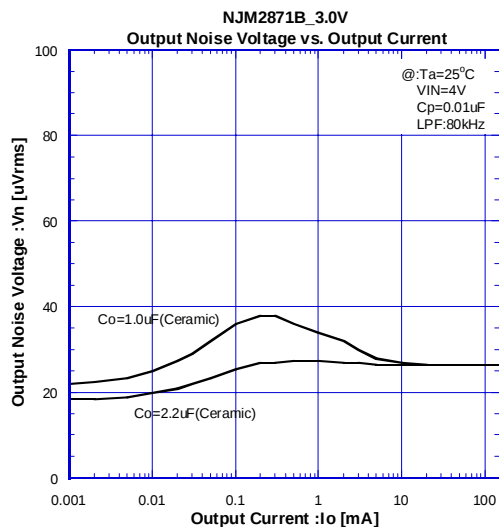
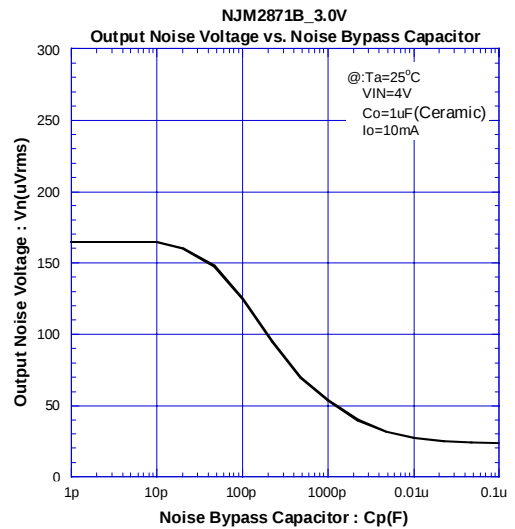
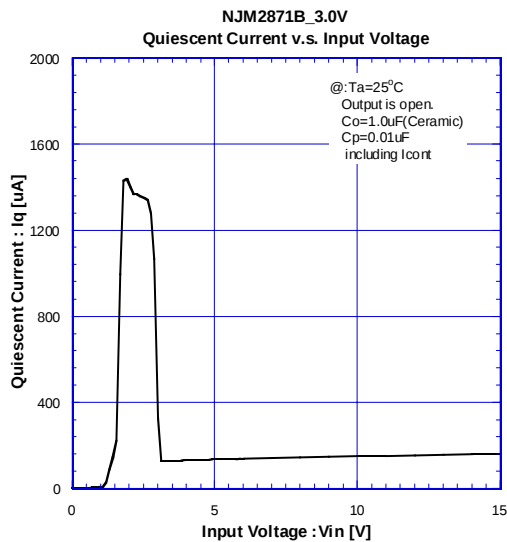
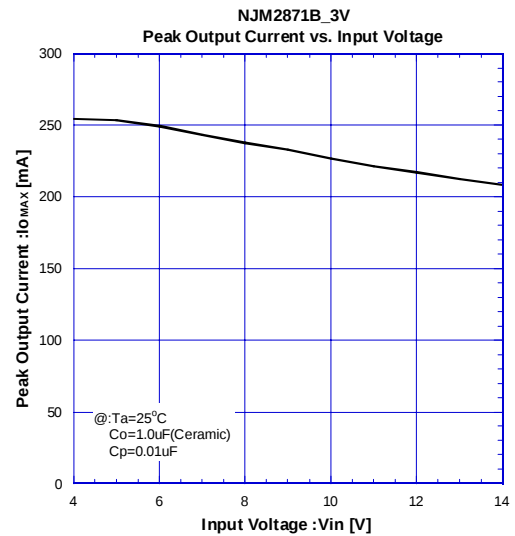
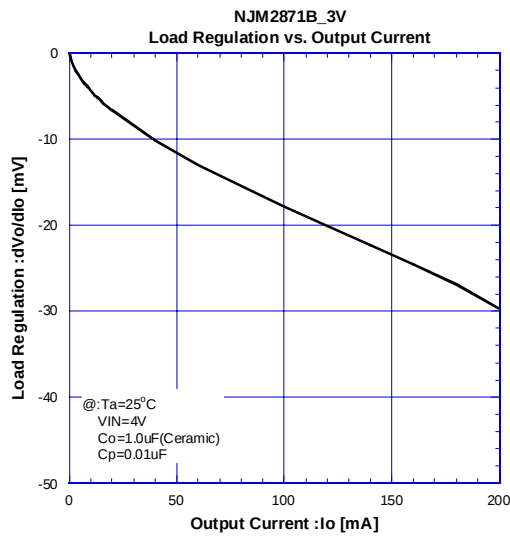


## ELECTRICAL CHARACTERISTICS

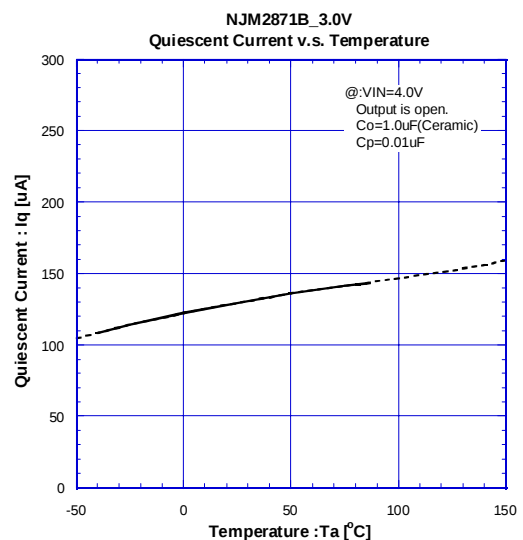
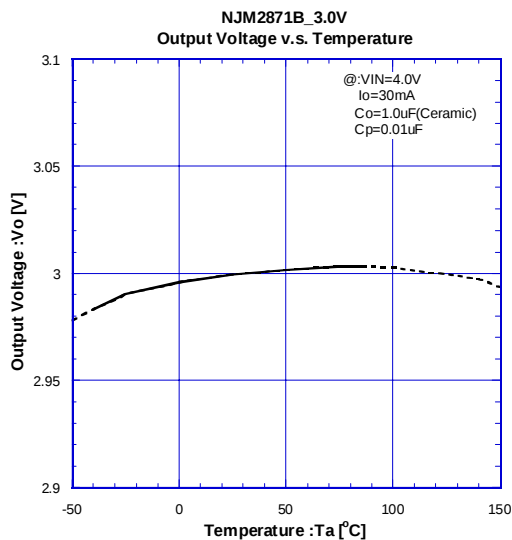
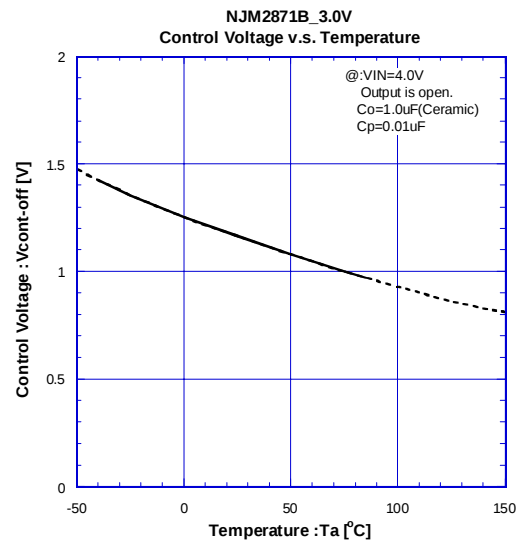
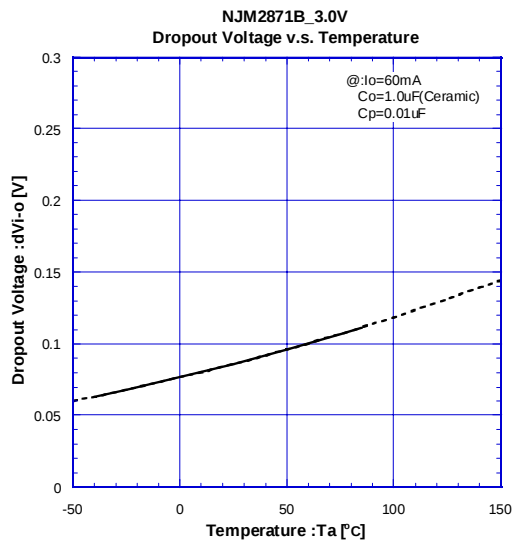
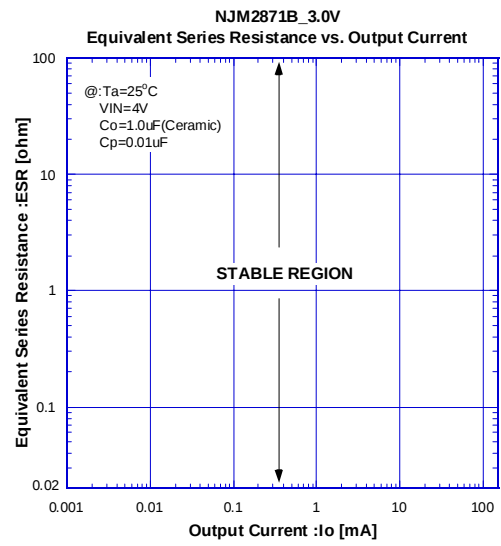
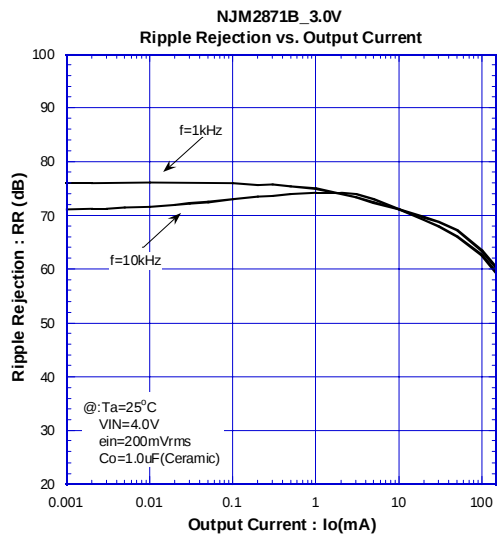


# NJM2871B/72B

## ELECTRICAL CHARACTERISTICS

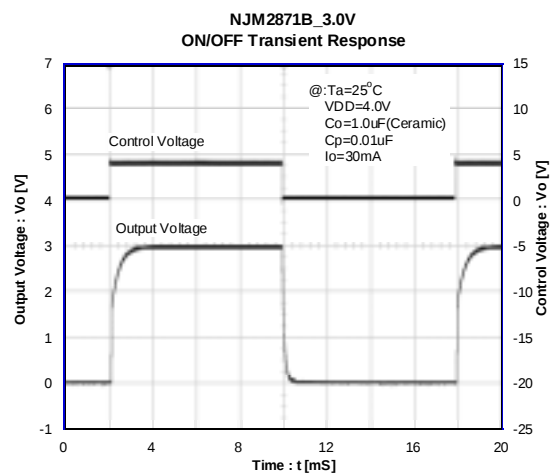
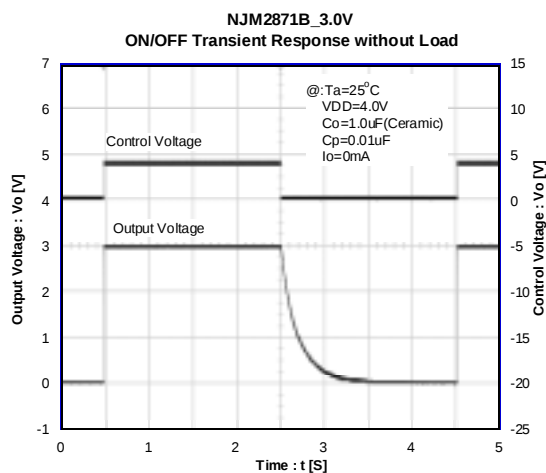
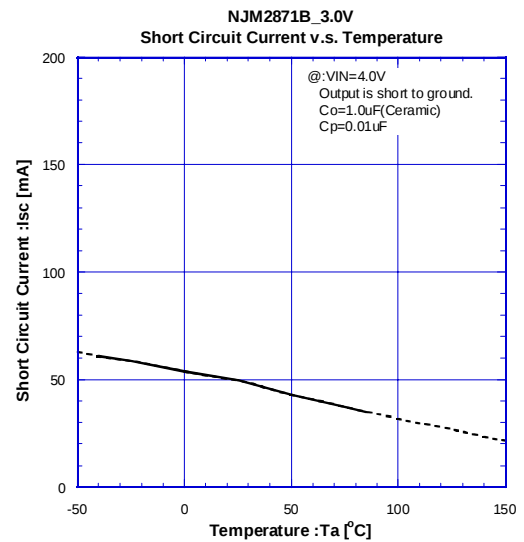
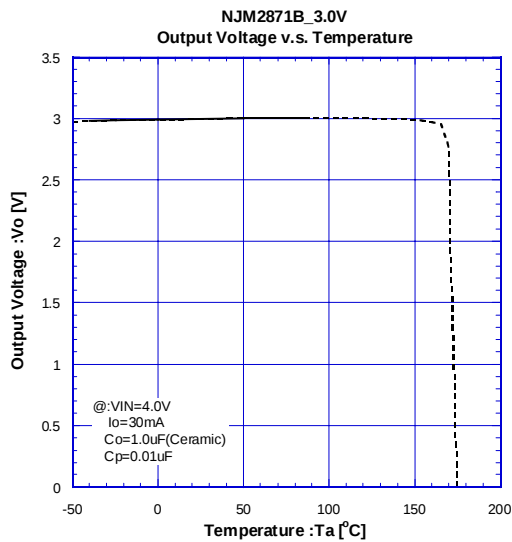
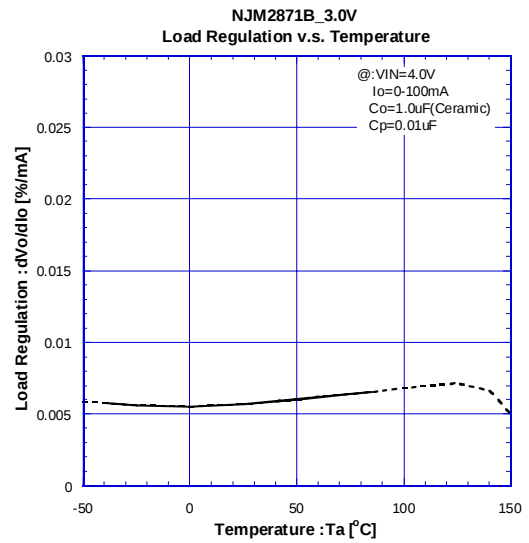
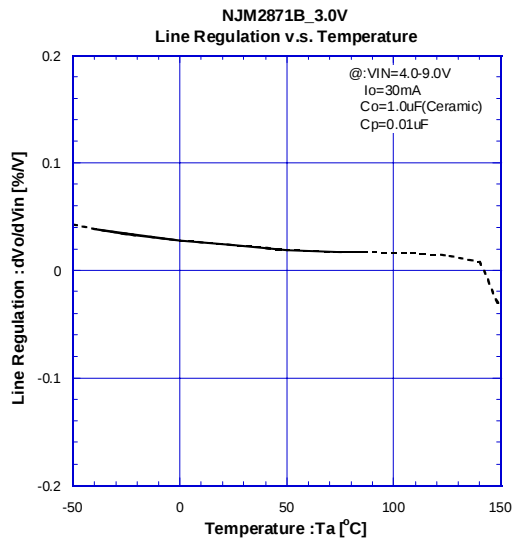


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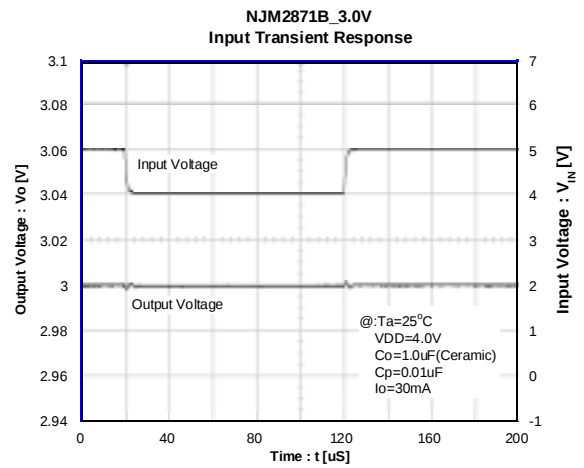
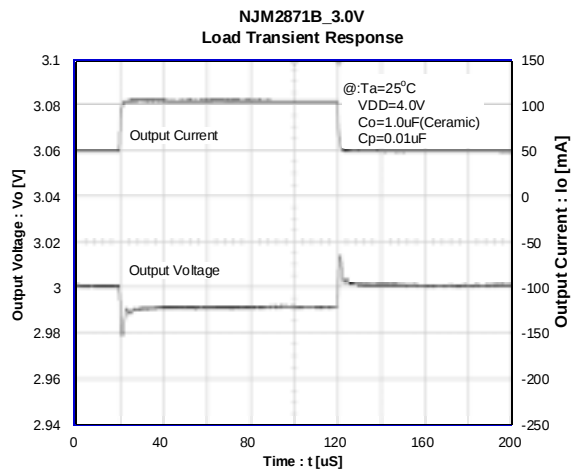


# NJM2871B/72B

## ELECTRICAL CHARACTERISTICS



## ■ ELECTRICAL CHARACTERISTICS



**[CAUTION]**

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