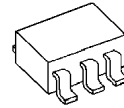


LOW DROPOUT VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

The NJM2871/A, NJM2872/A are low dropout voltage regulators designed for cellular phone application. Advanced Bipolar technology achieves low noise, high ripple rejection and low quiescent current.

■ PACKAGE OUTLINE

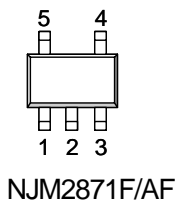


NJM2871F/AF
NJM2872F/AF

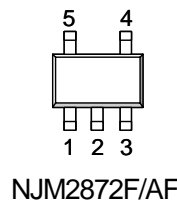
■ FEATURES

- High Ripple Rejection 70dB typ. (f=1kHz, Vo=3V Version)
- Output Noise Voltage Vno=30μVrms typ.(Cp=0.01μF)
- Output capacitor with 1.0μF ceramic capacitor (Vo≥2.7V)
- Output Current Io(max.)=150mA
- High Precision Output Vo±2%
Vo±1%:A Version
- Low Dropout Voltage 0.10V typ. (Io=60mA)
- ON/OFF Control (Active High)
- Operating Voltage Range +2.5V~+14V (Vo≤2.0V version)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline SOT-23-5

■ PIN CONFIGURATION

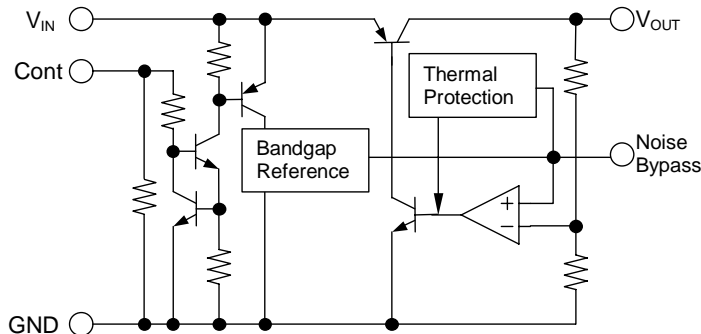


- PIN FUNCTION
1. CONTROL (Active High)
 2. GND
 3. NOISE BYPASS
 4. V_{OUT}
 5. V_{IN}



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

■ EQUIVALENT CIRCUIT



NJM2871/A, NJM2872/A

■ 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 | SOT-23-5 | 350(*2) | mW |
| | | | 200(*3) | |
| 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_{IN}=+2.5 ~ +14V (In case of Vo<2.1V version)

■ ELECTRICAL CHARACTERISTICS

(Vo>2.0V version : V_{IN}=Vo+1V, C_{IN}=0.1μF, Co=1.0μF: Vo≥2.7V (Co=2.2μF: Vo≤2.6V), Cp=0.01μF, Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|------------------------|--|------|------|------|--------|
| Output Voltage | Vo | Io=30mA | -2% | - | +2% | V |
| | | Io=30mA, A Version | -1% | - | +1% | 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 | 150 | 200 | - | mA |
| Line Regulation | ΔVo/ΔV _{IN} | V _{IN} =Vo+1V ~ Vo+6V, Io=30mA | - | - | 0.10 | %/V |
| Load Regulation | ΔVo/ΔIo | Io=0 ~ 100mA | - | - | 0.03 | %/mA |
| Dropout Voltage | ΔV _{LO} | 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 | ΔVo/ΔTa | Ta=0~85°C, Io=10mA, Vo=3V Version | - | ±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 |

NJM2871/A, NJM2872/A

($V_o \leq 2.0V$ version : $V_{IN}=V_o+1V$, $C_{IN}=0.1\mu F$, $C_o=4.7\mu F$, $C_p=0.01\mu F$, $T_a=25^\circ C$)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|----------------------------|--|------|----------|------|-----------------|
| Output Voltage | V_o | $I_o=30mA$ | -2% | - | +2% | V |
| | | $I_o=30mA$, A Version | -1% | - | +1% | V |
| Quiescent Current | I_Q | $I_o=0mA$, expect I_{cont} | - | 120 | 180 | μA |
| Quiescent Current at Control OFF | $I_{Q(OFF)}$ | $V_{CONT}=0V$ | - | - | 100 | nA |
| Output Current | I_o | $V_o=0.3V$ | 150 | 200 | - | mA |
| Line Regulation | $\Delta V_o/\Delta V_{IN}$ | $V_{IN}=V_o+1V \sim V_o+6V$, $I_o=30mA$ | - | - | 0.10 | %/V |
| Load Regulation | $\Delta V_o/\Delta I_o$ | $I_o=0 \sim 100mA$ | - | - | 0.03 | %/mA |
| Ripple Rejection | RR | $e_{in}=200mV_{rms}$, $f=1kHz$, $I_o=10mA$ $V_o=1.8V$ Version | - | 75 | - | dB |
| Average Temperature Coefficient of Output Voltage | $\Delta V_o/\Delta T_a$ | $T_a=0 \sim 85^\circ C$, $I_o=10mA$, $V_o=1.8V$ Version | - | ± 50 | - | ppm/ $^\circ C$ |
| Output Noise Voltage | V_{NO} | $f=10Hz \sim 80kHz$, $I_o=10mA$, $V_o=1.8V$ Version | - | 22 | - | μV_{rms} |
| Control Voltage for ON-state | $V_{CONT(ON)}$ | | 1.6 | - | - | V |
| Control Voltage for OFF-state | $V_{CONT(OFF)}$ | | - | - | 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.

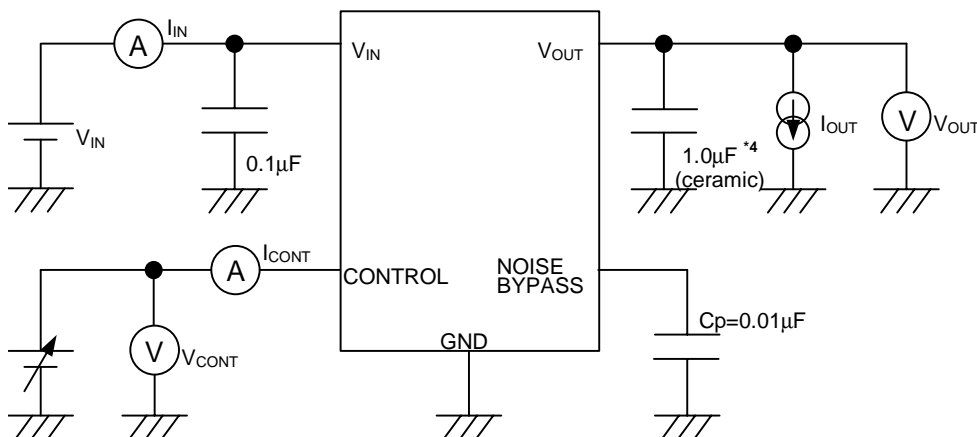
OUTPUT VOLTAGE RANK LIST

| Device Name | V_{OUT} |
|-------------|-----------|
| NJM287×15 | 1.5V |
| NJM287×18 | 1.8V |
| NJM287×21 | 2.1V |
| NJM287×23 | 2.3V |
| NJM287×25 | 2.5V |
| NJM287×26 | 2.6V |
| NJM287×27 | 2.7V |
| NJM287×28 | 2.8V |

| Device Name | V_{OUT} |
|-------------|-----------|
| NJM287×285 | 2.85V |
| NJM287×29 | 2.9V |
| NJM287×03 | 3.0V |
| NJM287×31 | 3.1V |
| NJM287×32 | 3.2V |
| NJM287×33 | 3.3V |
| NJM287×34 | 3.4V |
| NJM287×35 | 3.5V |

| Device Name | V_{OUT} |
|-------------|-----------|
| NJM287×355 | 3.55V |
| NJM287×38 | 3.8V |
| NJM287×04 | 4.0V |
| NJM287×45 | 4.5V |
| NJM287×46 | 4.6V |
| NJM287×47 | 4.7V |
| NJM287×05 | 5.0V |

TEST CIRCUIT

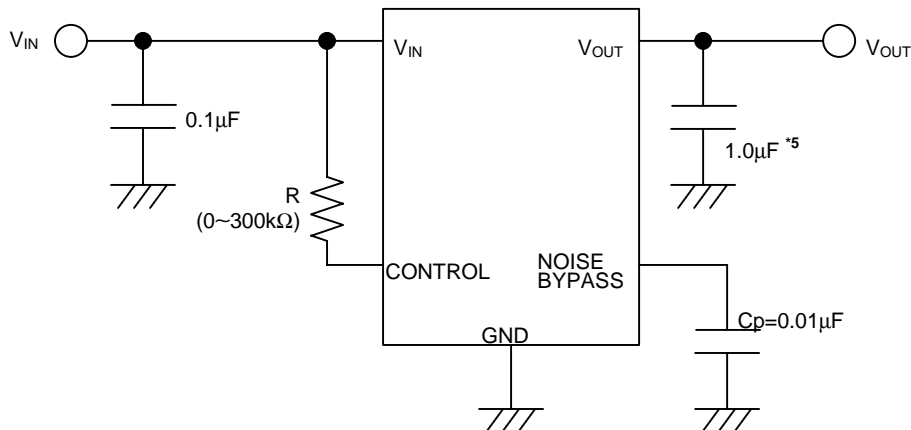


*4 $2.0V < V_o \leq 2.6V$ version : $C_o=2.2\mu F$ (ceramic)
 $V_o \leq 2.0V$ version : $C_o=4.7\mu F$ (ceramic)

NJM2871/A, NJM2872/A

■ TYPICAL APPLICATION

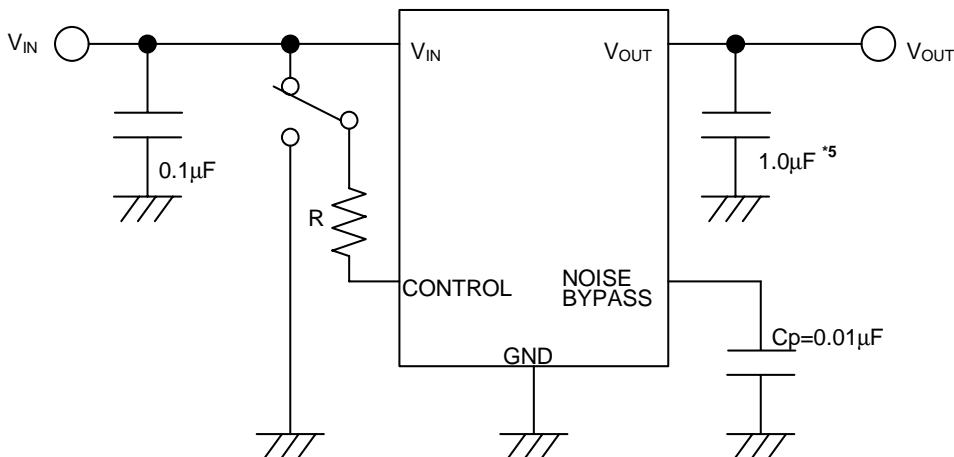
① In case that ON/OFF Control is not required:



*5 2.0V < Vo ≤ 2.6V version : Co=2.2µF
Vo ≤ 2.0V version : Co=4.7µF

Connect control terminal to VIN terminal

② In use of ON/OFF CONTROL:



*5 2.0V < Vo ≤ 2.6V version : Co=2.2µF
Vo ≤ 2.0V version : Co=4.7µF

State of control terminal:

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

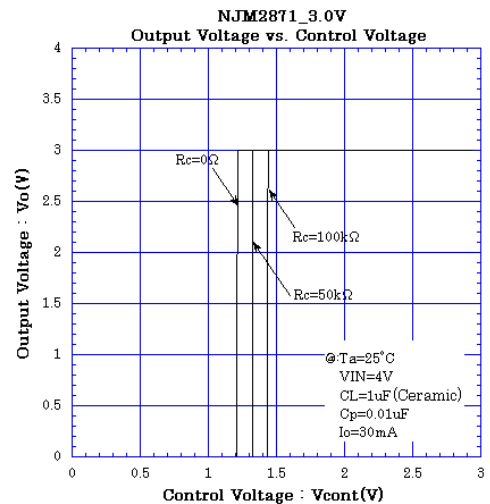
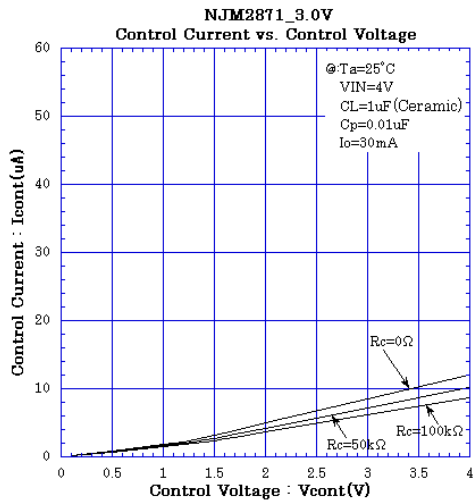
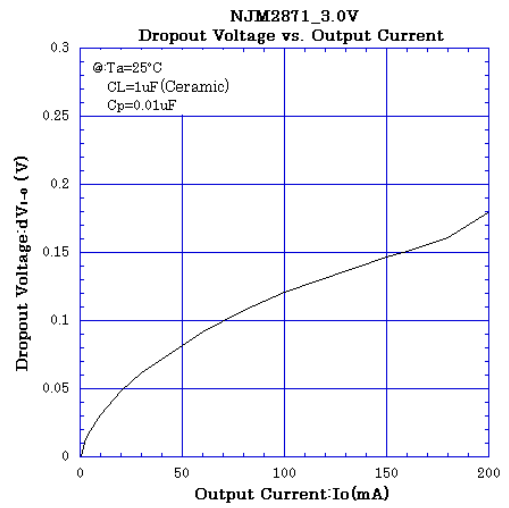
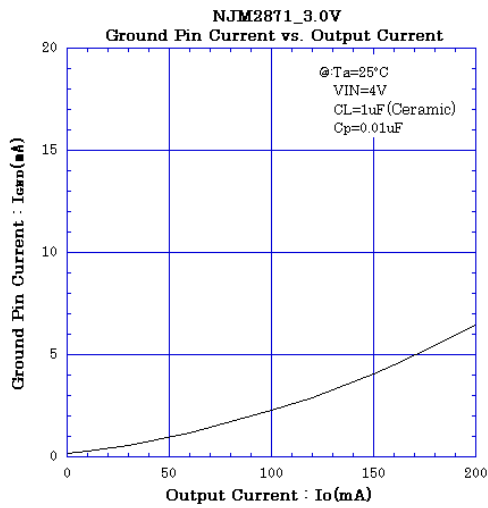
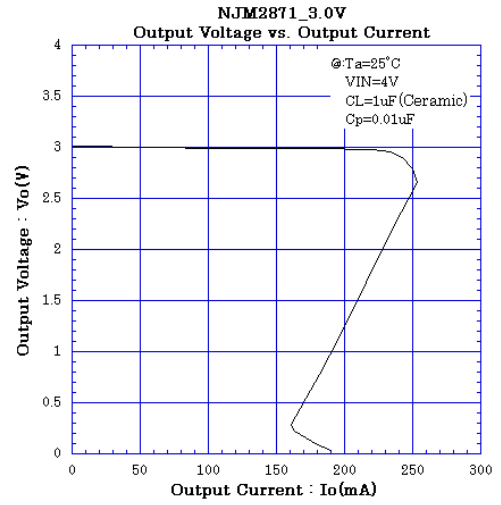
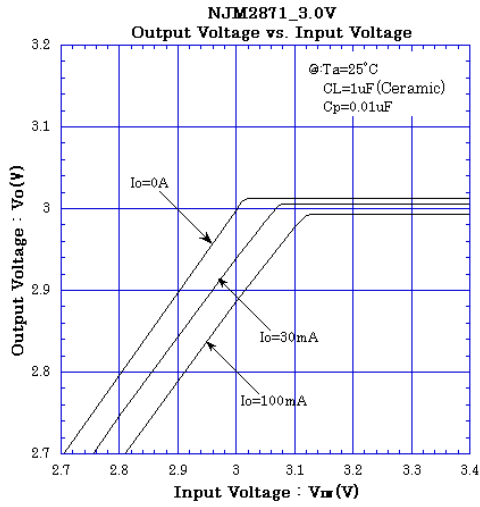
*Noise bypass Capacitance Cp

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 0.01µF greater to avoid the problem.

*In the case of using a resistance "R" between VIN and control.

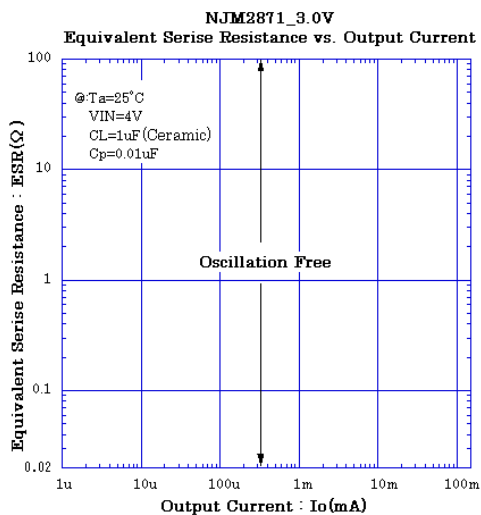
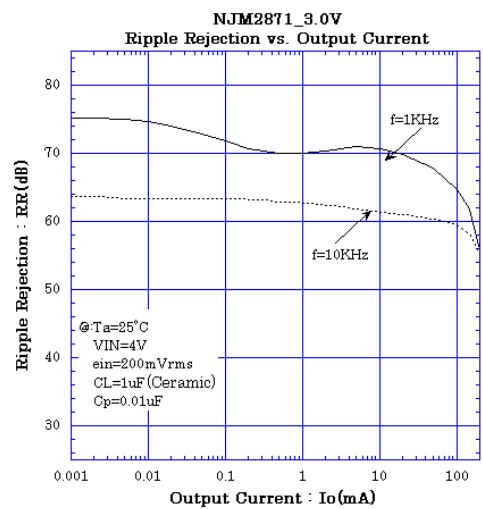
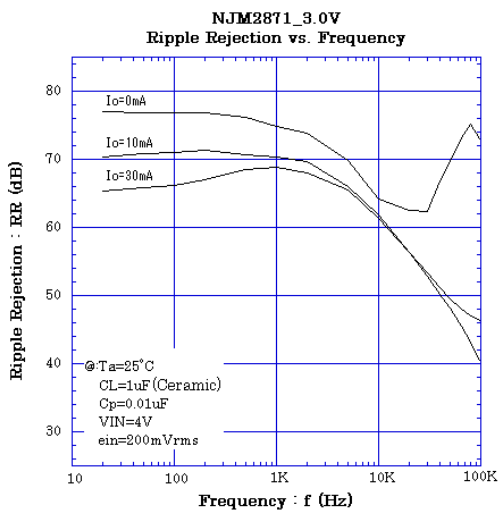
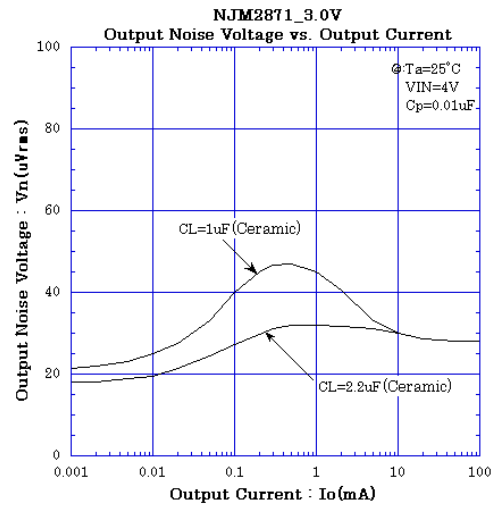
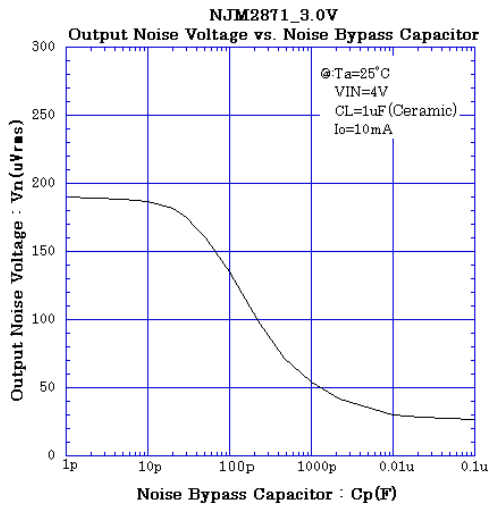
The current flow into the control terminal while the IC is ON state (I_{CONT}) can be reduced when a pull up resistance "R" is inserted between VIN and the control terminal. The minimum control voltage for ON state ($V_{\text{CONT(ON)}}$) is increased due to the voltage drop caused by I_{CONT} and the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

■ ELECTRICAL CHARACTERISTICS

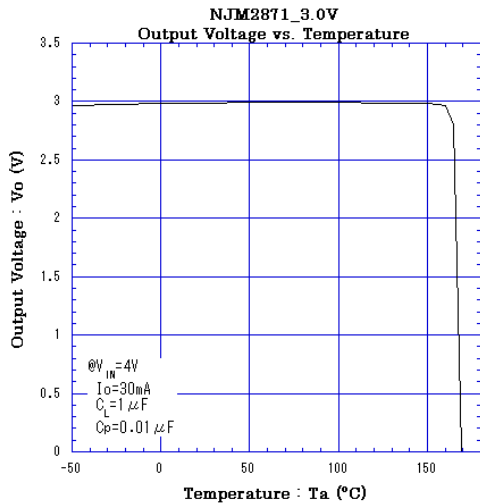
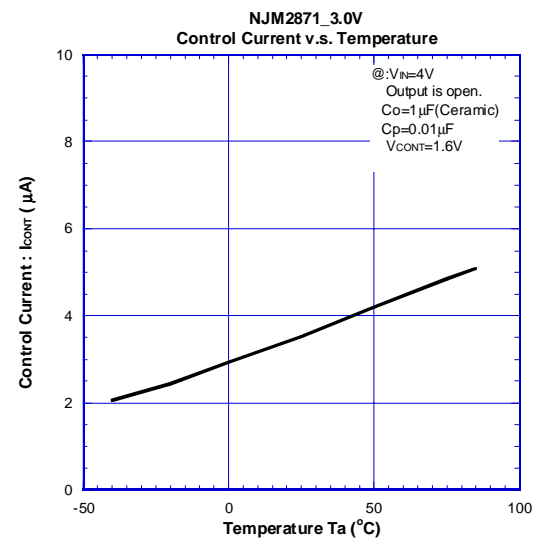
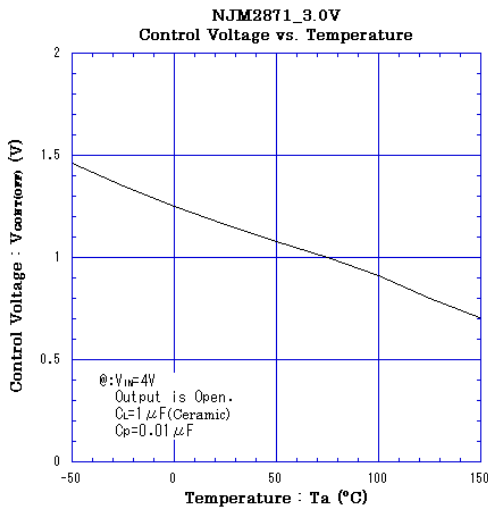
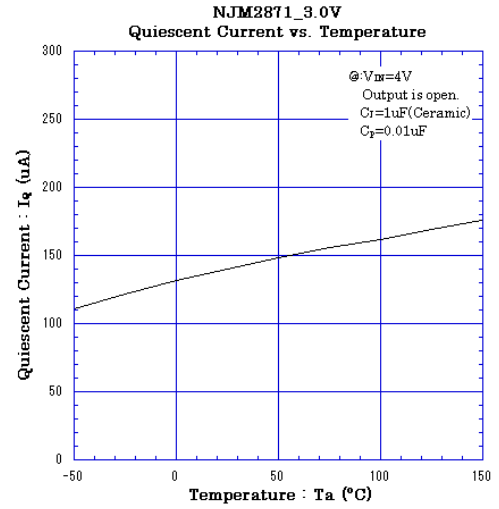
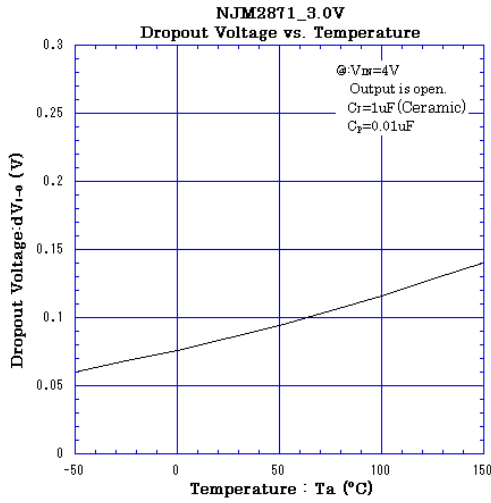


NJM2871/A, NJM2872/A

■ ELECTRICAL CHARACTERISTICS



■ ELECTRICAL CHARACTERISTICS



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