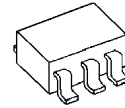


## LOW DROPOUT VOLTAGE REGULATOR

### ■ 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

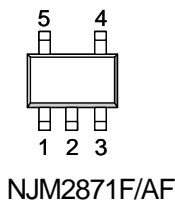


NJM2871F/AF  
NJM2872F/AF

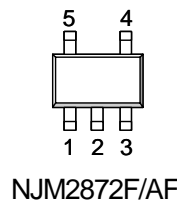
### ■ FEATURES

- 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

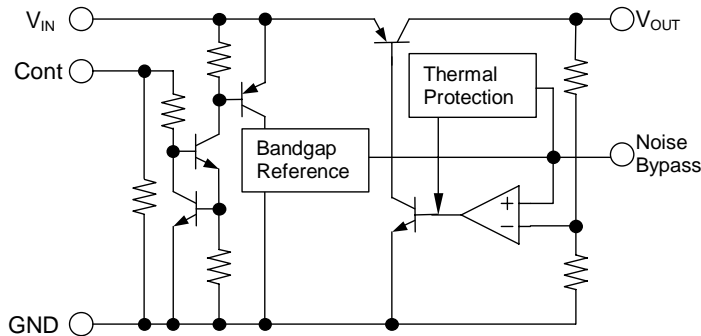


- PIN FUNCTION
1. CONTROL (Active High)
  2. GND
  3. NOISE BYPASS
  4. V<sub>OUT</sub>
  5. V<sub>IN</sub>



- PIN FUNCTION
1. V<sub>IN</sub>
  2. GND
  3. CONTROL (Active High)
  4. NOISE BYPASS
  5. V<sub>OUT</sub>

### ■ EQUIVALENT CIRCUIT



# NJM2871/A, NJM2872/A

## ■ 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)	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<sub>IN</sub>=+2.5 ~ +14V (In case of Vo<2.1V version)

## ■ ELECTRICAL CHARACTERISTICS

(Vo>2.0V version : V<sub>IN</sub>=Vo+1V, C<sub>IN</sub>=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 <sub>Q</sub>	Io=0mA, expect Icont	-	120	180	μA
Quiescent Current at Control OFF	I <sub>Q(OFF)</sub>	V <sub>CONT</sub> =0V	-	-	100	nA
Output Current	Io	Vo=0.3V	150	200	-	mA
Line Regulation	ΔVo/ΔV <sub>IN</sub>	V <sub>IN</sub> =Vo+1V ~ Vo+6V, Io=30mA	-	-	0.10	%/V
Load Regulation	ΔVo/ΔIo	Io=0 ~ 100mA	-	-	0.03	%/mA
Dropout Voltage	ΔV <sub>LO</sub>	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 <sub>NO</sub>	f=10Hz~80kHz, Io=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

# 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	$\mu A$
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	-	$\pm 50$	-	ppm/ $^\circ C$
Output Noise Voltage	$V_{NO}$	$f=10Hz \sim 80kHz$ , $I_o=10mA$ , $V_o=1.8V$ Version	-	22	-	$\mu V_{rms}$
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.

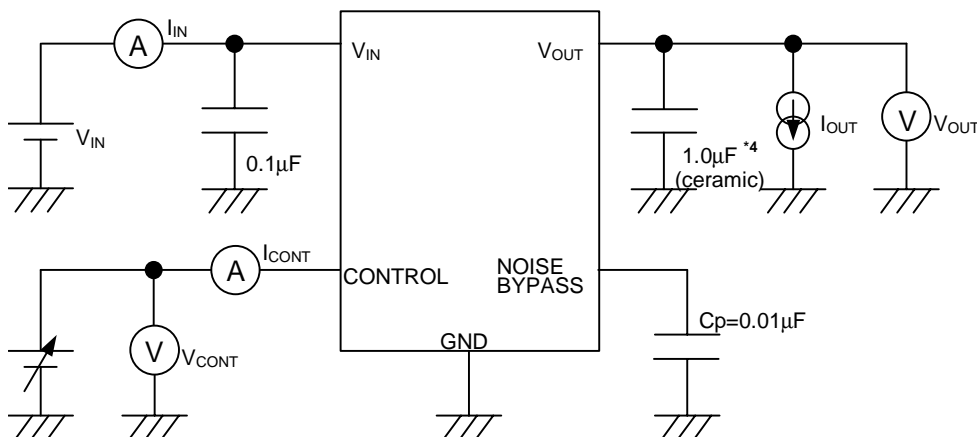
## OUTPUT VOLTAGE RANK LIST

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

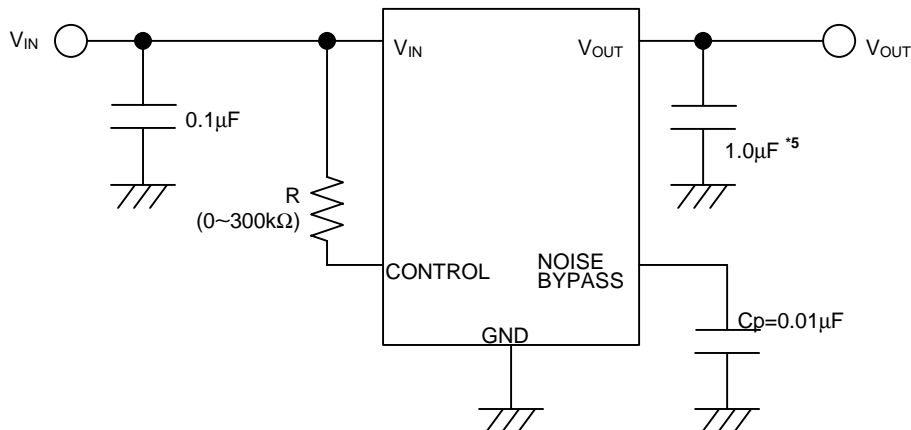


\*4  $2.0V < V_o \leq 2.6V$  version :  $C_o=2.2\mu F$ (ceramic)  
 $V_o \leq 2.0V$  version :  $C_o=4.7\mu F$ (ceramic)

# NJM2871/A, NJM2872/A

## ■ TYPICAL APPLICATION

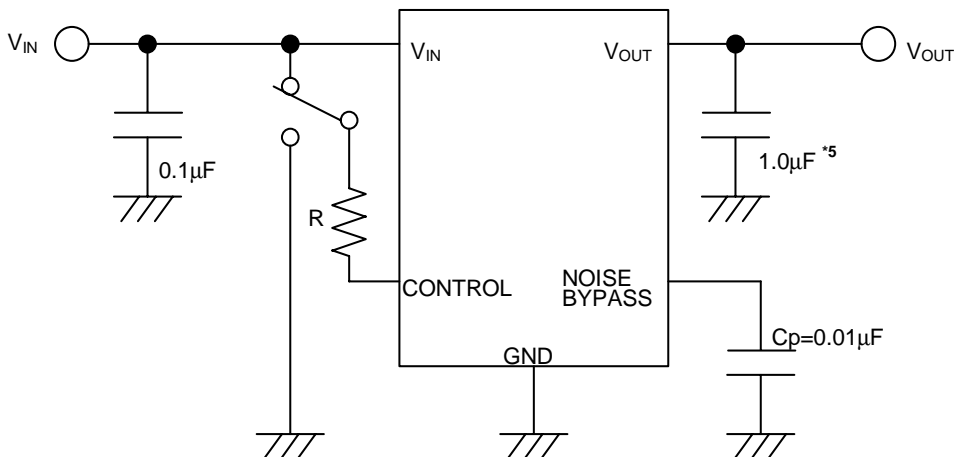
① In case that ON/OFF Control is not required:



\*5 2.0V < V<sub>o</sub> ≤ 2.6V version : C<sub>o</sub>=2.2µF  
 V<sub>o</sub> ≤ 2.0V version : C<sub>o</sub>=4.7µF

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

② In use of ON/OFF CONTROL:



\*5 2.0V < V<sub>o</sub> ≤ 2.6V version : C<sub>o</sub>=2.2µF  
 V<sub>o</sub> ≤ 2.0V version : C<sub>o</sub>=4.7µF

State of control terminal:

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

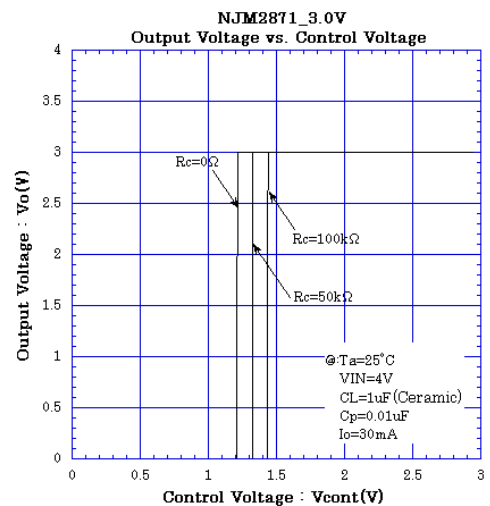
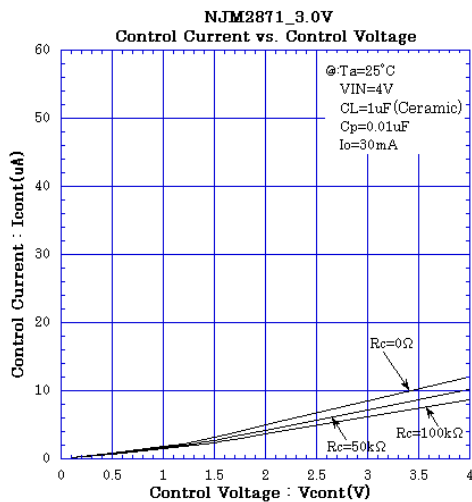
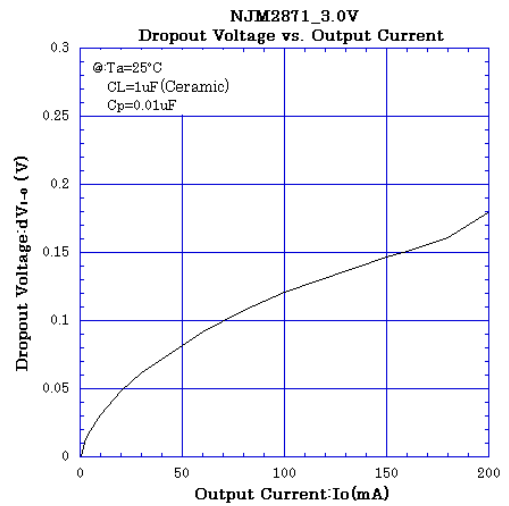
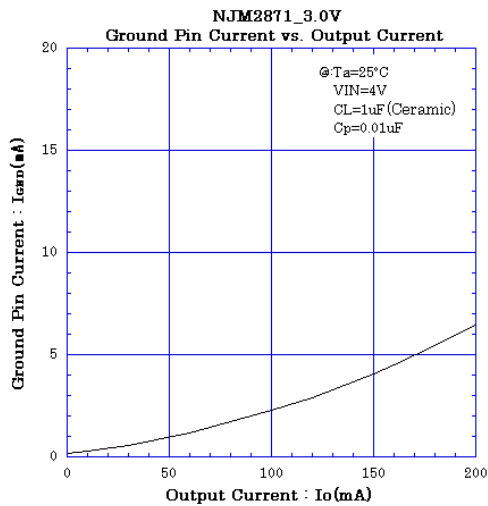
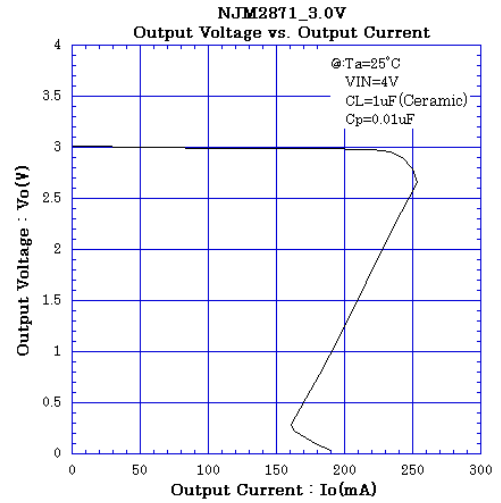
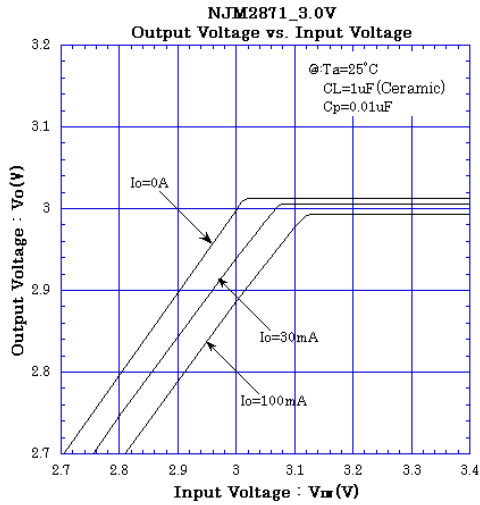
### \*Noise bypass Capacitance C<sub>p</sub>

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

### \*In the case of using a resistance "R" between V<sub>IN</sub> and control.

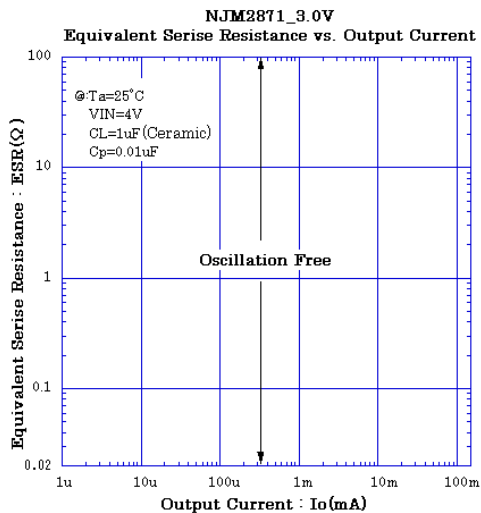
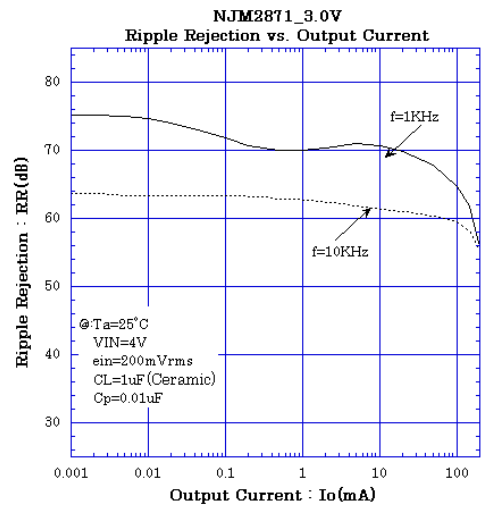
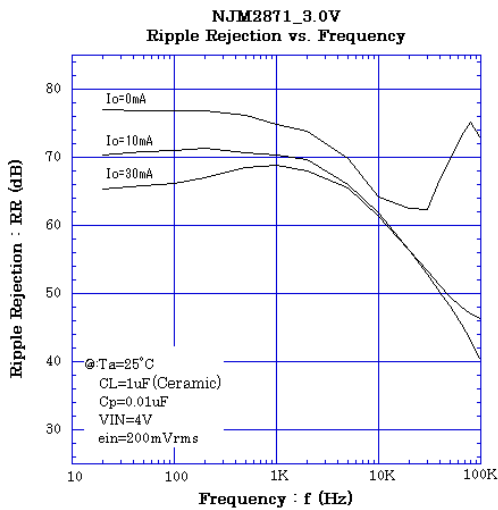
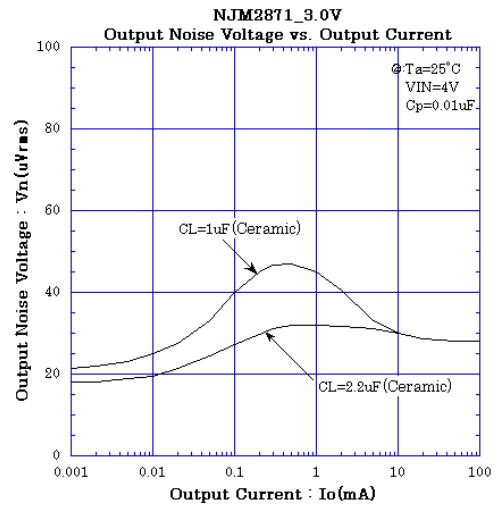
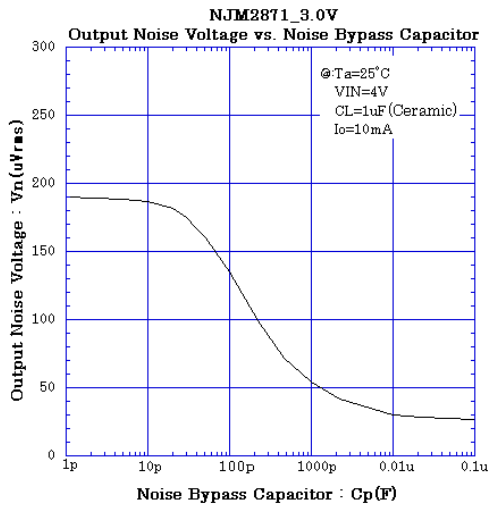
The current flow into the control terminal while the IC is ON state (I<sub>CONT</sub>) can be reduced when a pull up resistance "R" is inserted between V<sub>IN</sub> and the control terminal. The minimum control voltage for ON state (V<sub>CONT(ON)</sub>) is increased due to the voltage drop caused by I<sub>CONT</sub> and the resistance "R". The I<sub>CONT</sub> 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<sub>CONT(ON)</sub> over the required temperature range.

## ■ ELECTRICAL CHARACTERISTICS

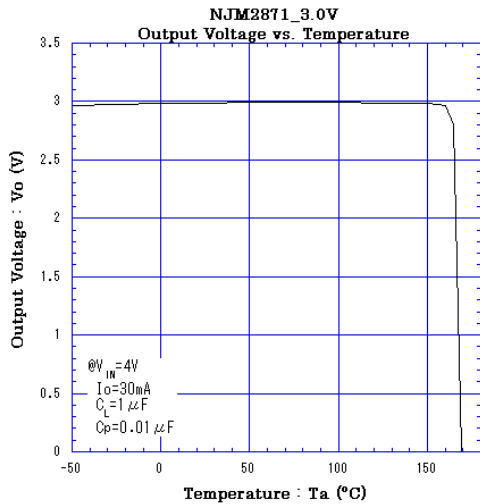
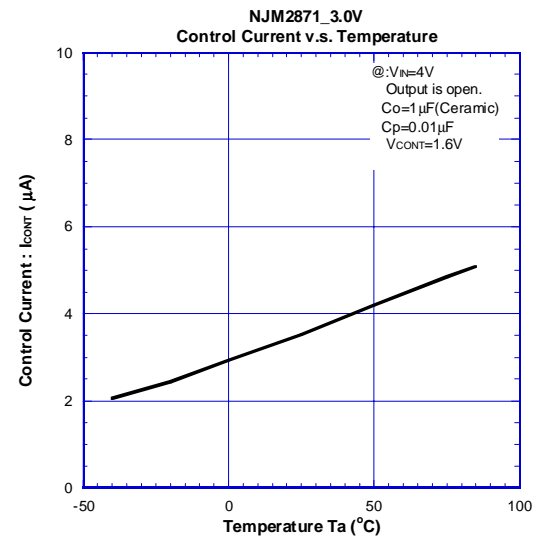
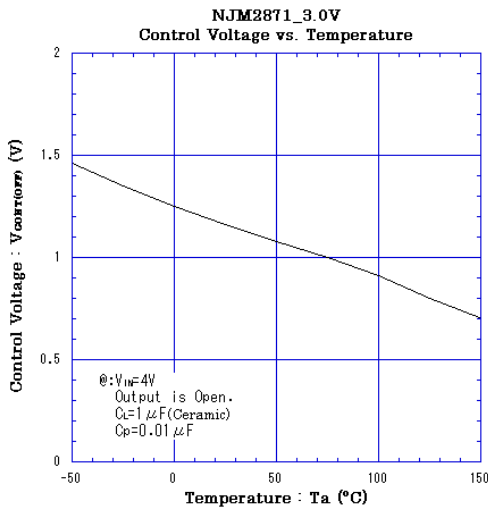
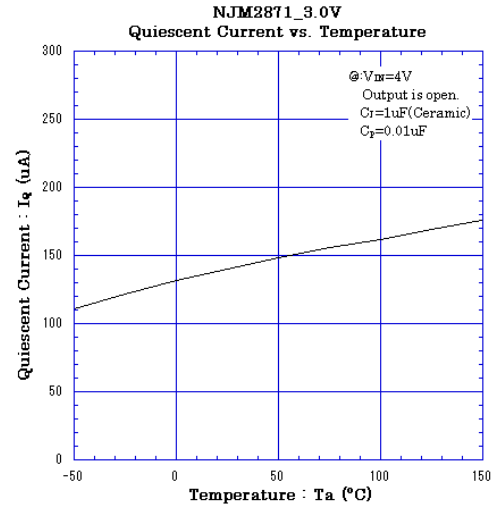
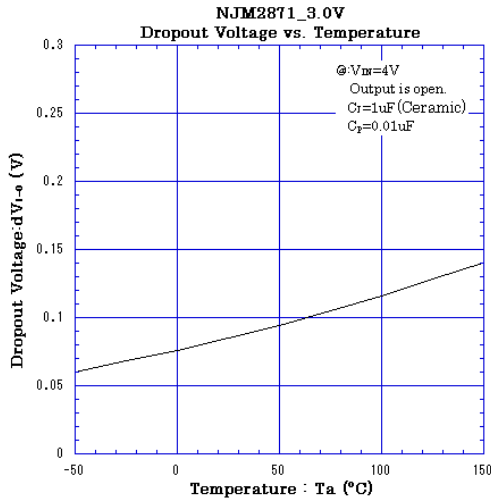


# NJM2871/A, NJM2872/A

## ■ ELECTRICAL CHARACTERISTICS



## ■ ELECTRICAL CHARACTERISTICS



[CAUTION]

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