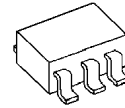


## LOW DROPOUT VOLTAGE REGULATOR

### ■ 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

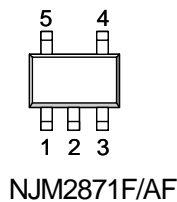


NJM2871F/AF  
NJM2872F/AF

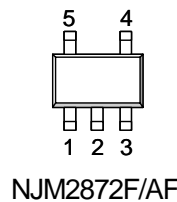
### ■ FEATURES

- 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

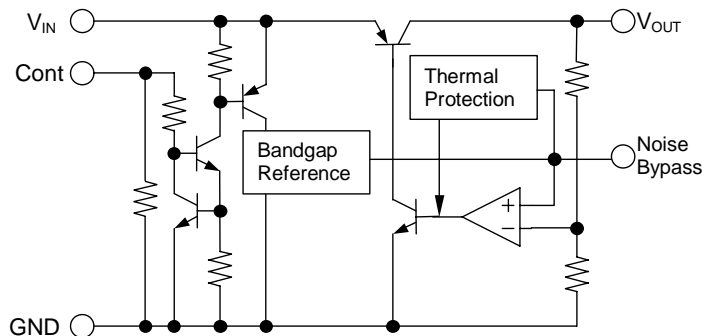


- PIN FUNCTION
1. CONTROL (Active High)
  2. GND
  3. NOISE BYPASS
  4. V<sub>OUT</sub>
  5. V<sub>IN</sub>



- 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

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## ■ 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.

## ■ 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 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	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

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( $V_o \leq 2.0V$  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.

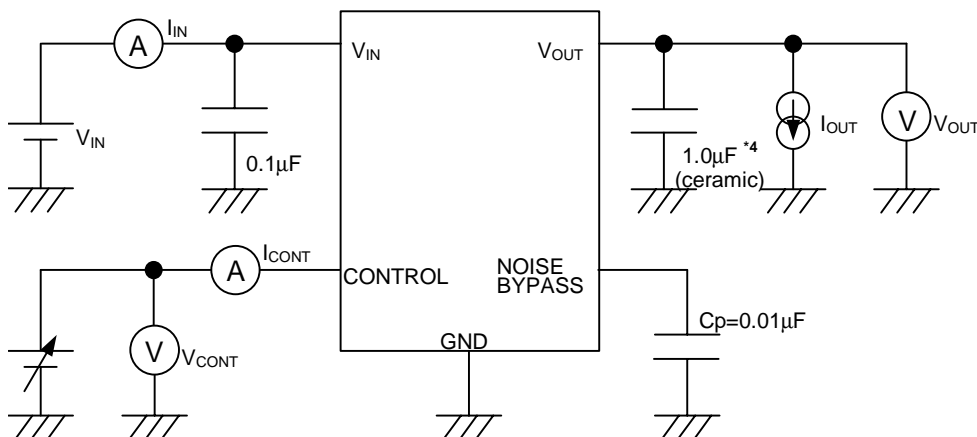
## OUTPUT VOLTAGE RANK LIST

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



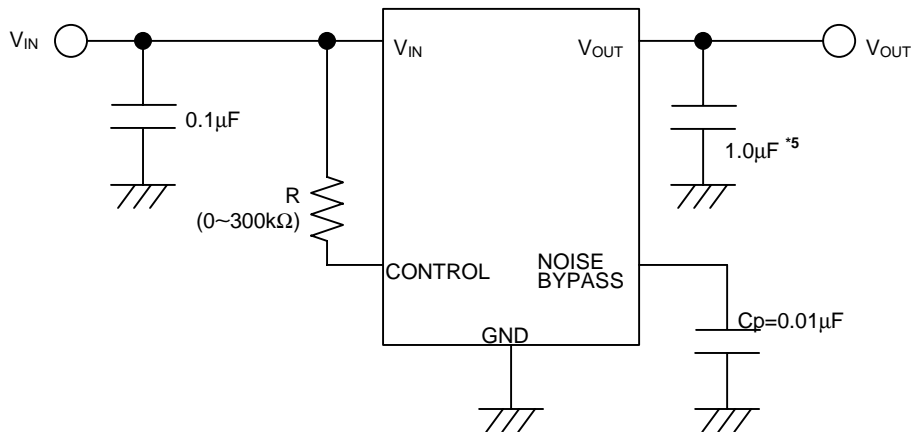
\*4  $2.0V < V_o \leq 2.6V$  version :  $C_o = 2.2\mu F$ (ceramic)  
 $V_o \leq 2.0V$  version :  $C_o = 4.7\mu F$ (ceramic)

# NJM2871/A, NJM2872/A

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## ■ TYPICAL APPLICATION

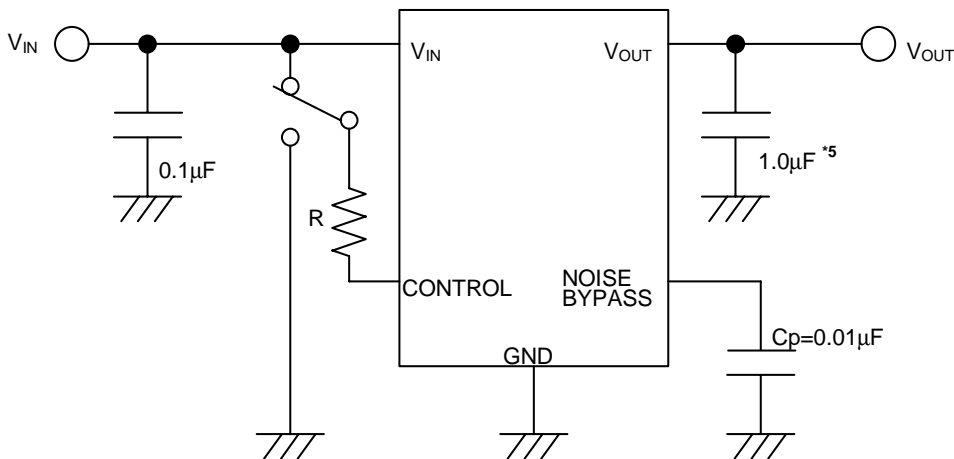
① In case that ON/OFF Control is not required:



\*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.

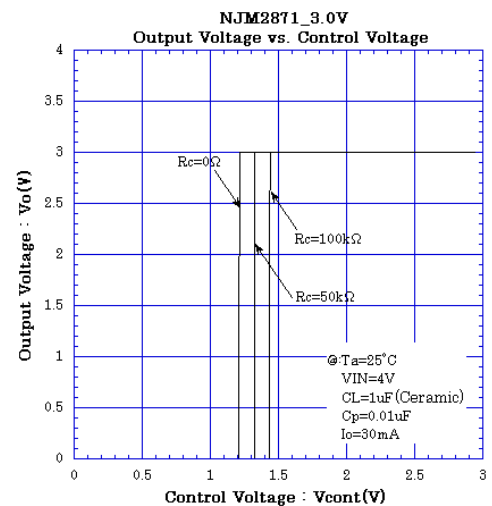
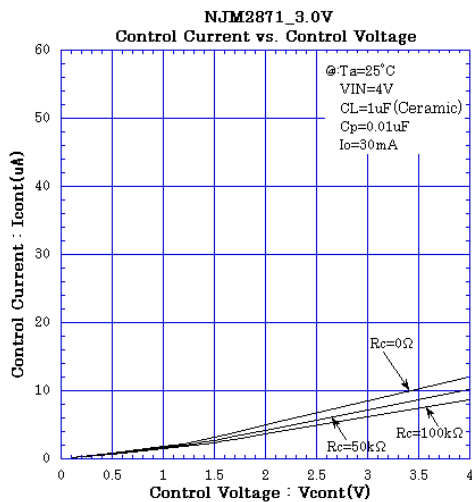
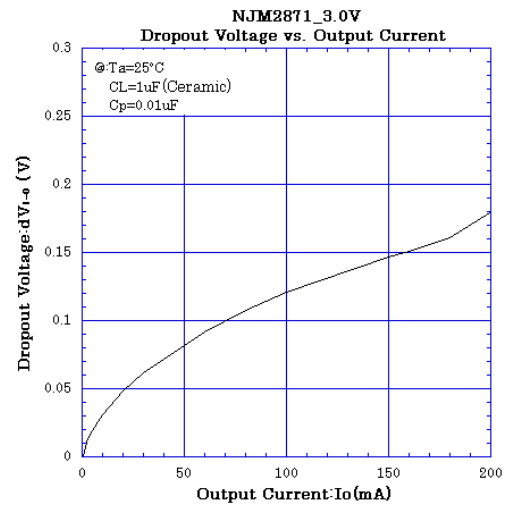
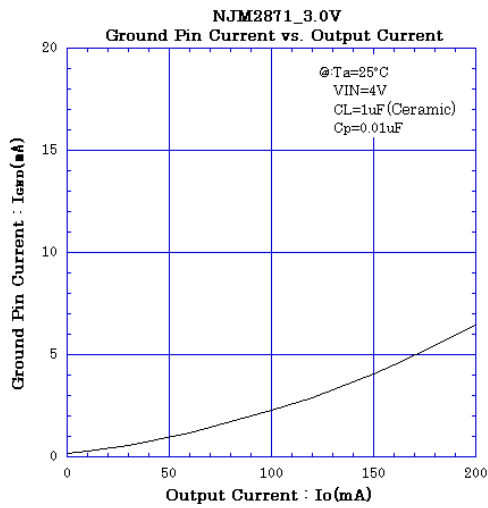
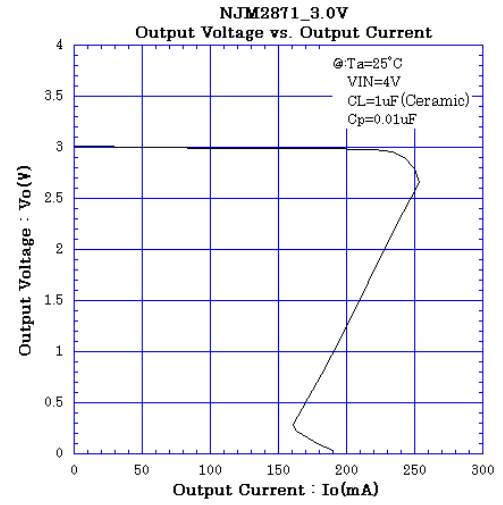
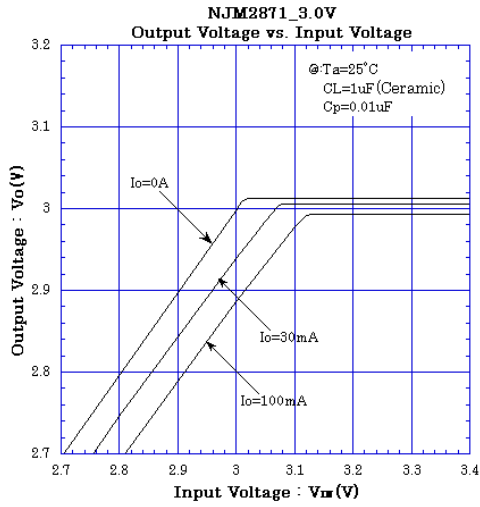
### \*Noise bypass Capacitance Cp

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 ( $V_{CONT(ON)}$ ) 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.

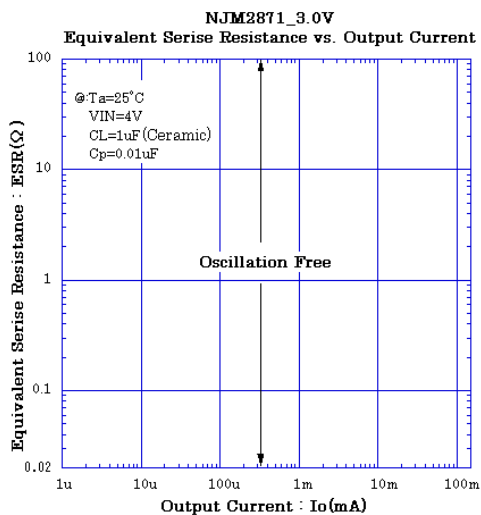
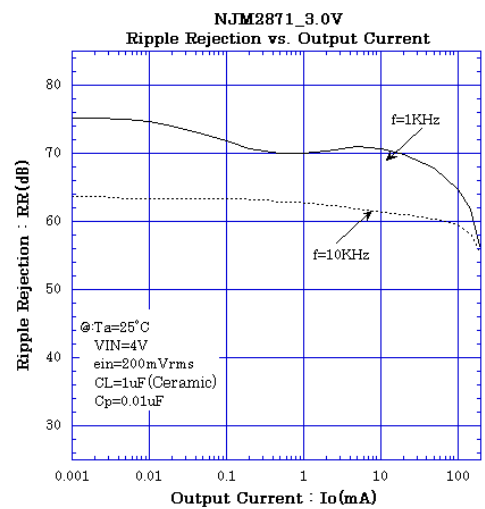
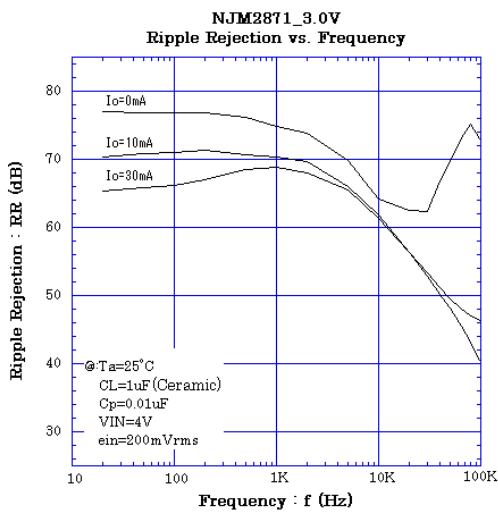
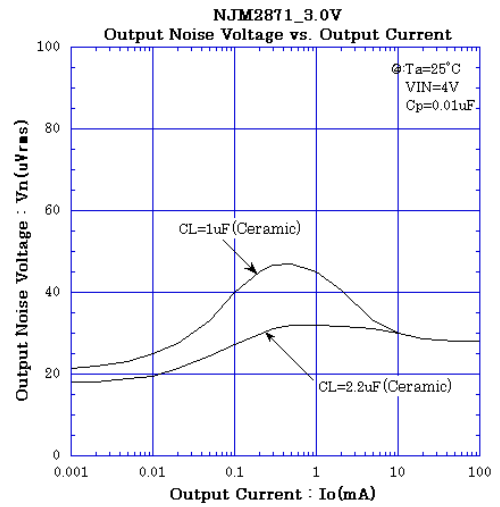
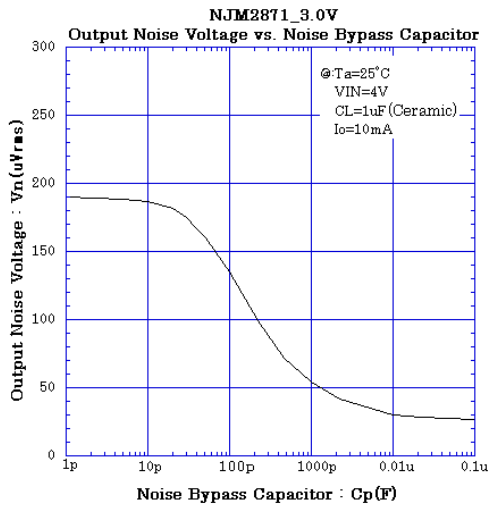
## ■ ELECTRICAL CHARACTERISTICS



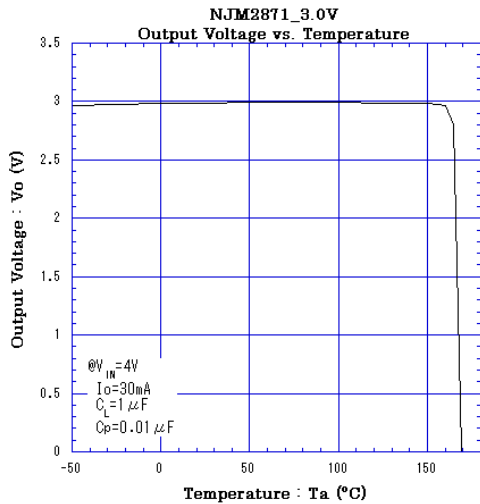
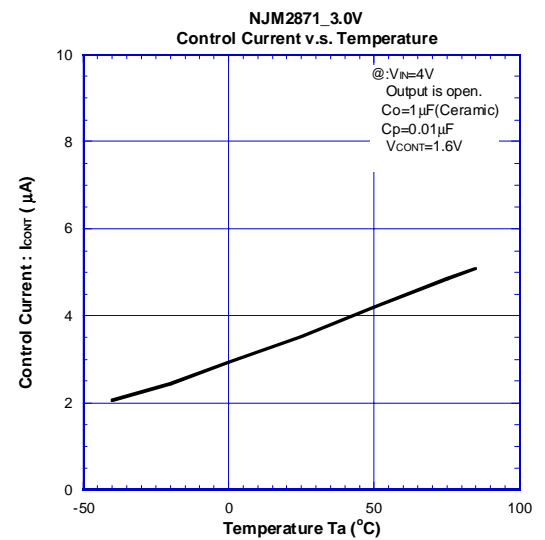
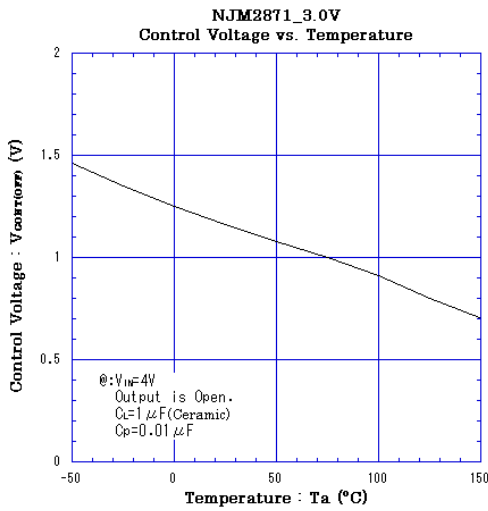
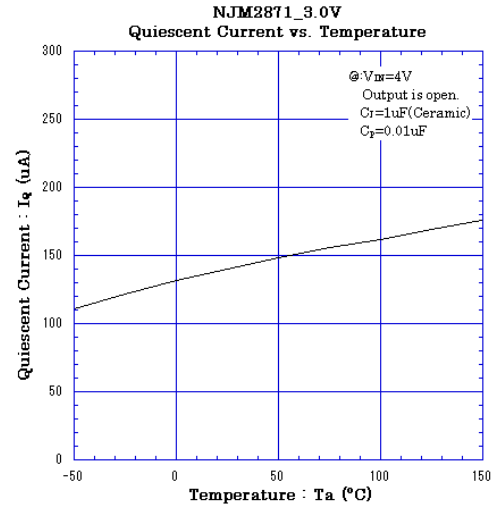
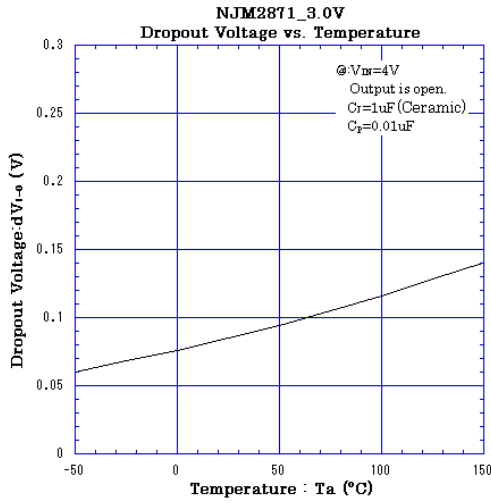
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## ■ ELECTRICAL CHARACTERISTICS



## ■ ELECTRICAL CHARACTERISTICS



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