

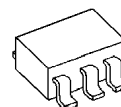
LOW DROPOUT VOLTAGE REGULATOR

■ 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



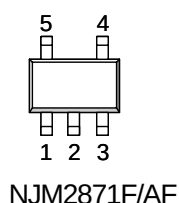
NJM2871F/AF

NJM2872F/AF

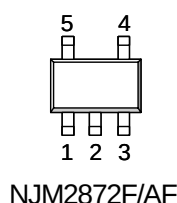
■ FEATURES

- 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

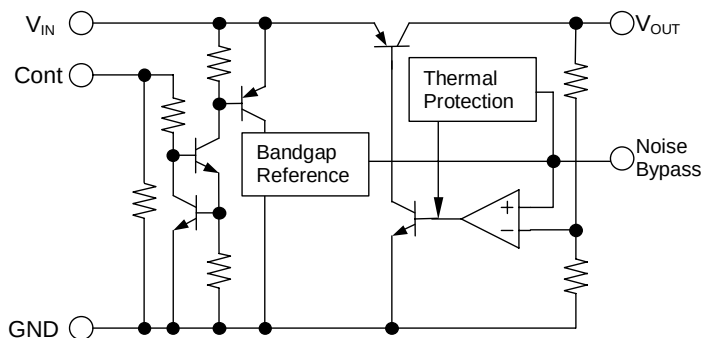


- PIN FUNCTION
1. CONTROL (Active High)
 2. GND
 3. NOISE BYPASS
 4. V_{OUT}
 5. V_{IN}



- PIN FUNCTION
1. V_{IN}
 2. GND
 3. CONTROL (Active High)
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 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) 200(*3)
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-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

$V_{IN}=+2.5 \sim +14V$ (In case of $V_O<2.1V$ version)

■ ELECTRICAL CHARACTERISTICS

($V_O>2.0V$ version : $V_{IN}=V_O+1V$, $C_{IN}=0.1\mu F$, $C_O=1.0\mu F$: $V_O\geq 2.7V$ ($C_O=2.2\mu F$: $V_O\leq 2.6V$), $C_P=0.01\mu F$, $T_a=25^\circ C$)

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
Dropout Voltage	ΔV_{I-O}	$I_O=60mA$	—	0.10	0.18	V
Ripple Rejection	RR	$e_{in}=200mV_{rms}$, $f=1kHz$, $I_O=10mA$ $V_O=3V$ Version	—	70	—	dB
Average Temperature Coefficient of Output Voltage	$\Delta V_O/\Delta T_a$	$T_a=0\sim 85^\circ C$, $I_O=10mA$, $V_O=3V$ Version	—	± 50	—	ppm/°C
Output Noise Voltage	V_{NO}	$f=10Hz\sim 80kHz$, $I_O=10mA$, $V_O=3V$ Version	—	30	—	μV_{rms}
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.

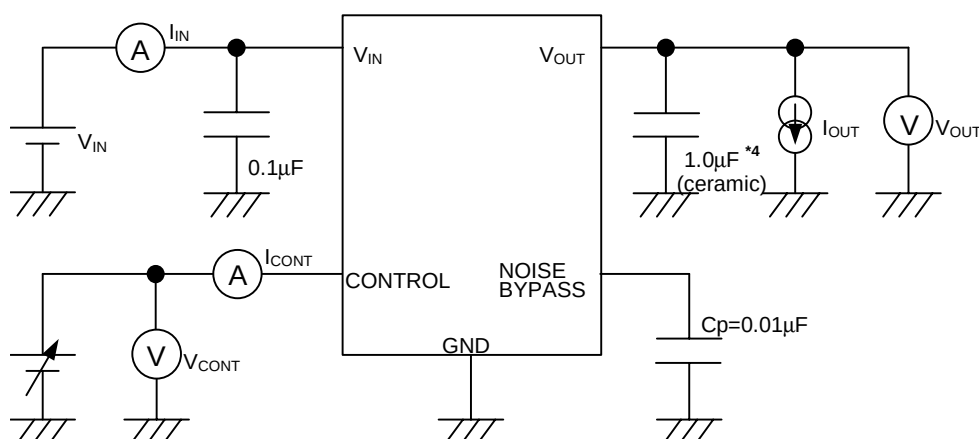
■ OUTPUT VOLTAGE RANK LIST

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

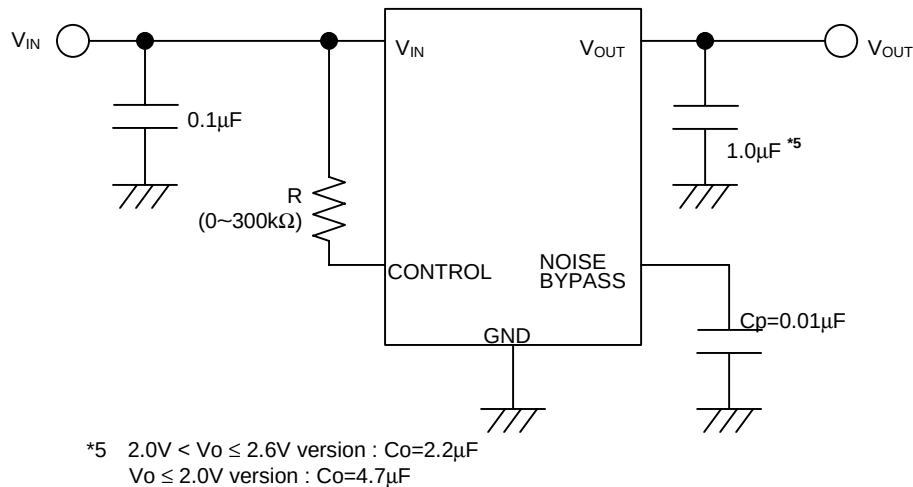


*4 $2.0V < V_o \leq 2.6V$ version : $C_o = 2.2\mu F$ (ceramic)
 $V_o \leq 2.0V$ version : $C_o = 4.7\mu F$ (ceramic)

NJM2871/A, NJM2872/A

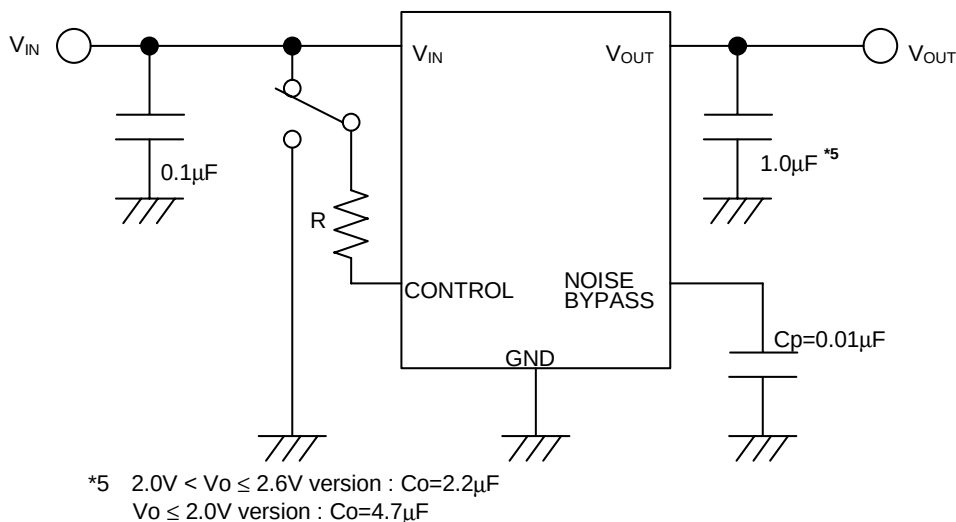
■ TYPICAL APPLICATION

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



Connect control terminal to VIN terminal

② In use of ON/OFF CONTROL:



State of control terminal:

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

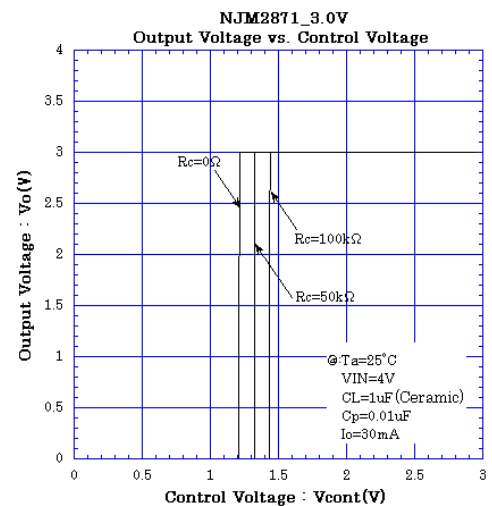
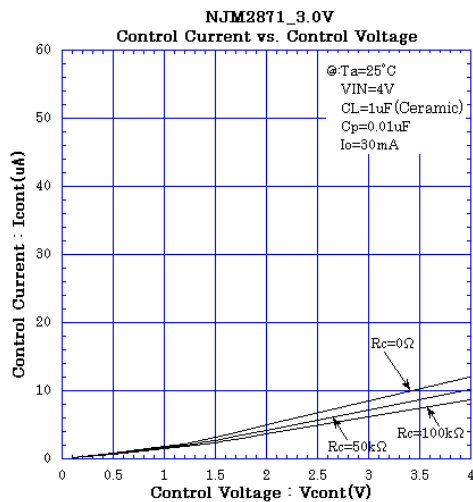
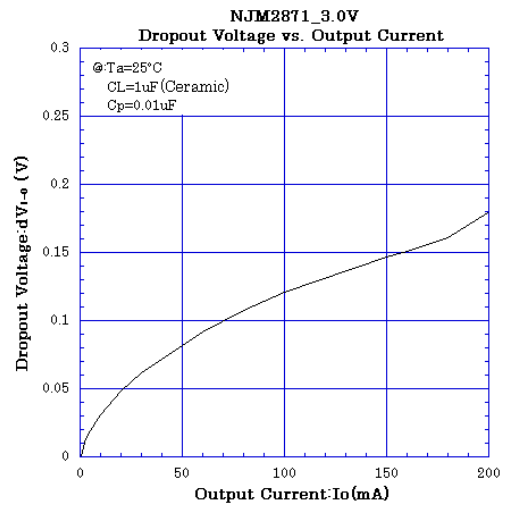
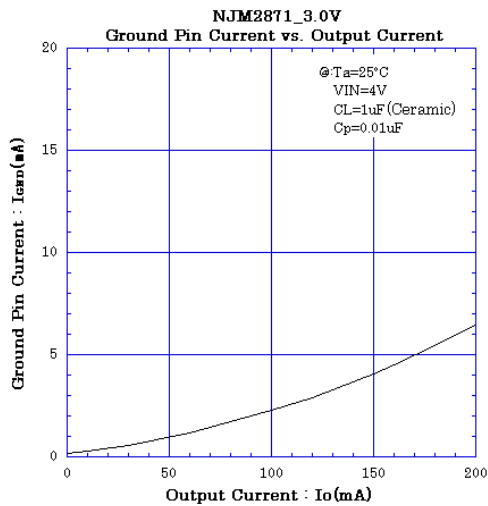
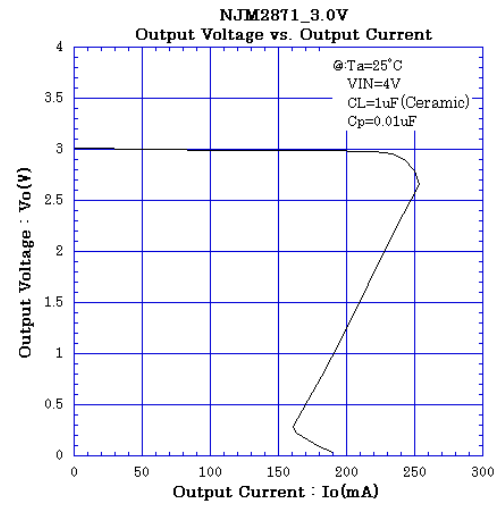
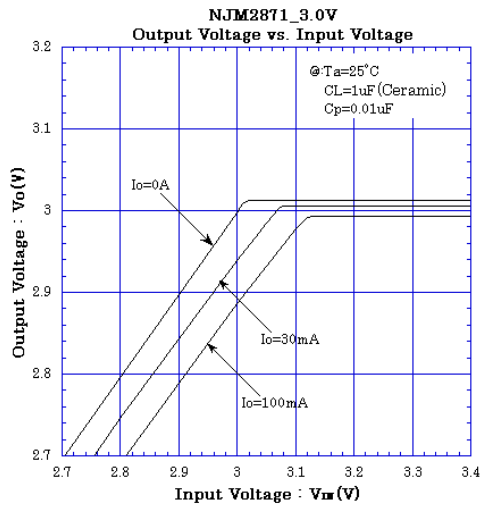
*Noise bypass Capacitance Cp

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.

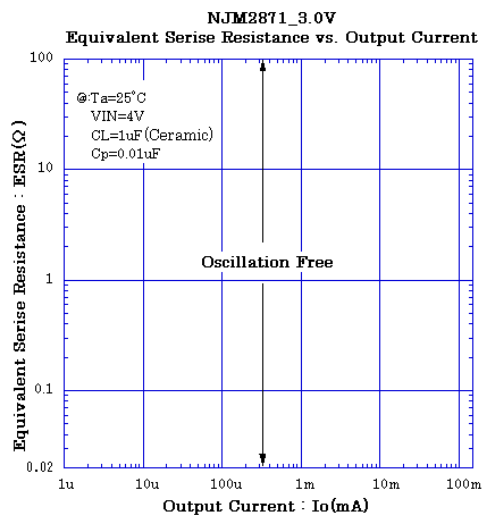
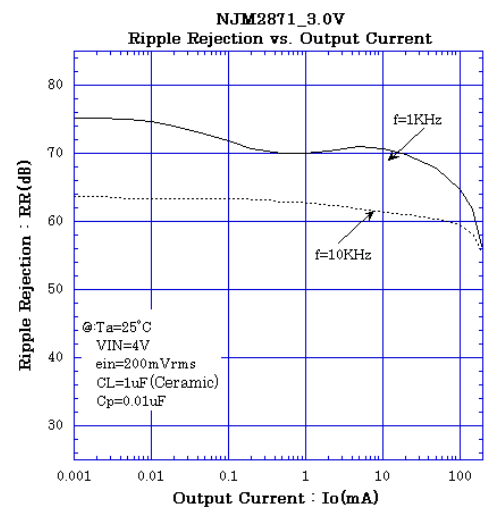
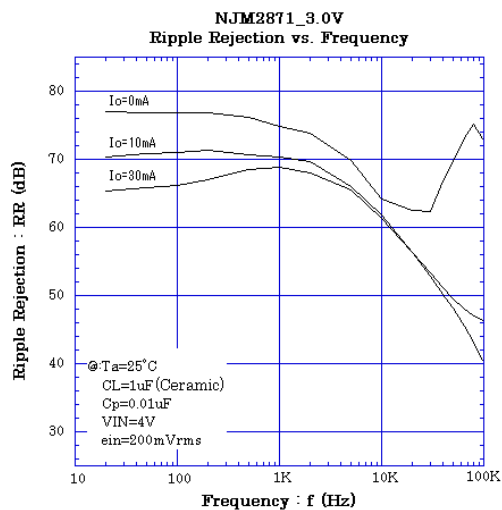
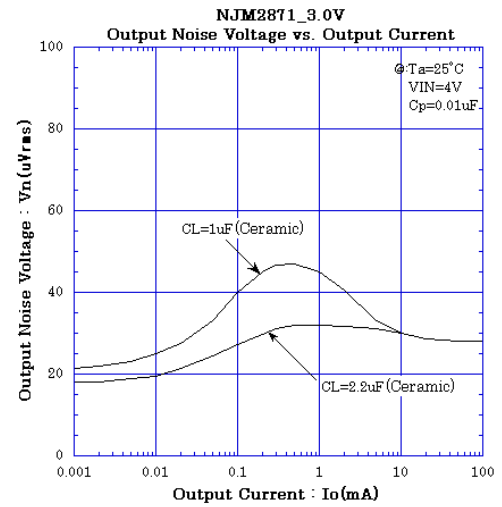
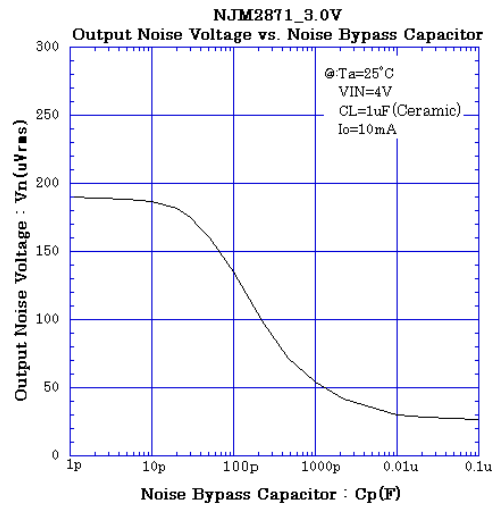
The current flow into the control terminal while the IC is ON state (I_{CONT}) can be reduced when a pull up resistance "R" is inserted between VIN and the control terminal. The minimum control voltage for ON state ($V_{\text{CONT(ON)}}$) is increased due to the voltage drop caused by I_{CONT} and the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

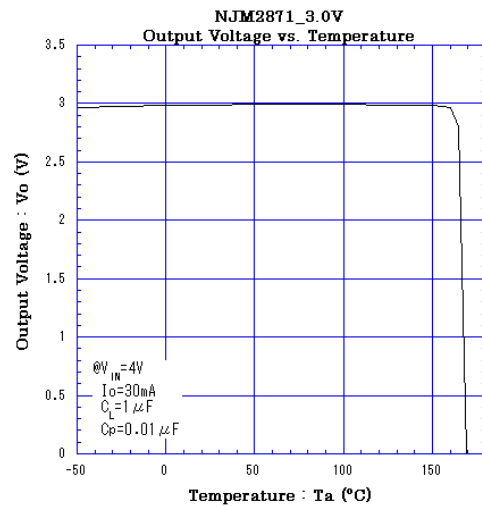
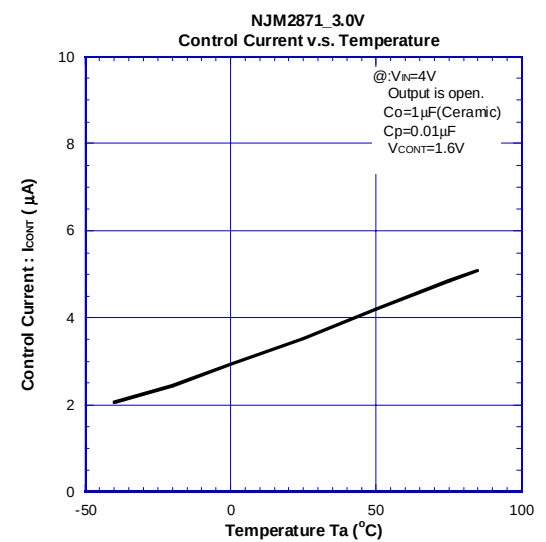
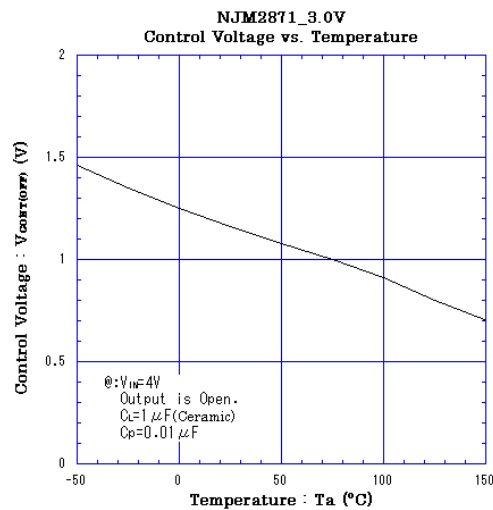
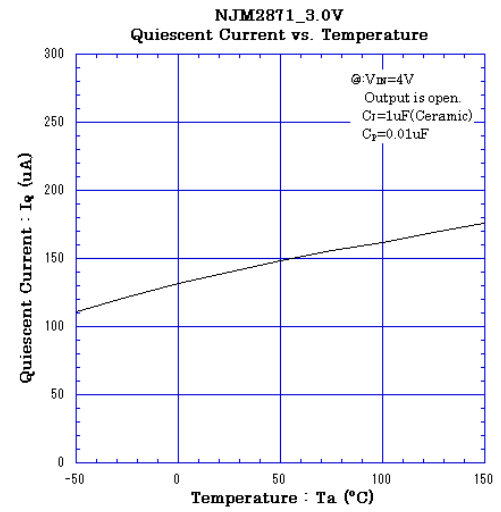
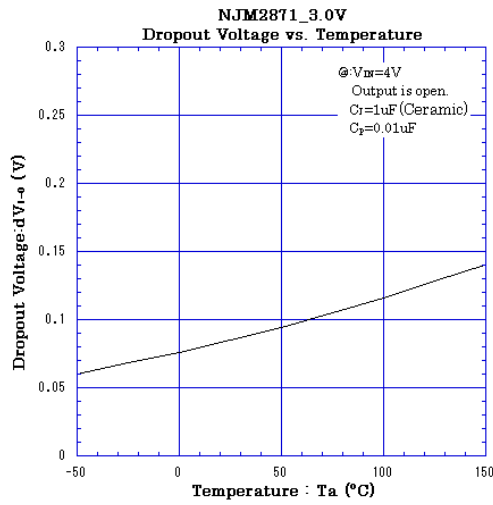


NJM2871/A, NJM2872/A

■ ELECTRICAL CHARACTERISTICS



ELECTRICAL CHARACTERISTICS



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