

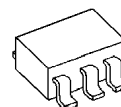
LOW DROPOUT VOLTAGE REGULATOR

■ 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



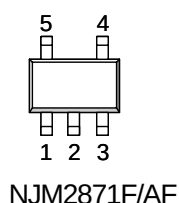
NJM2871F/AF

NJM2872F/AF

■ FEATURES

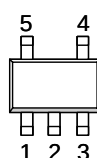
- High Ripple Rejection 70dB typ. (f=1kHz, Vo=3V Version)
- Output Noise Voltage Vno=30μVrms typ. (Cp=0.01μF)
- Output capacitor with 1.0μF ceramic capacitor (Vo≥2.7V)
- Output Current Io(max.)=150mA
- High Precision Output Vo±2%
- Vo±1%:A Version
- Low Dropout Voltage 0.10V typ. (Io=60mA)
- ON/OFF Control (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



NJM2871F/AF

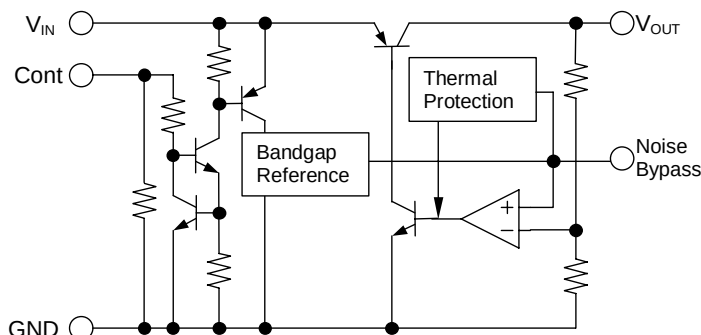
PIN FUNCTION
 1. CONTROL (Active High)
 2. GND
 3. NOISE BYPASS
 4. V_{OUT}
 5. V_{IN}



NJM2872F/AF

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) 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_{L-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

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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	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.

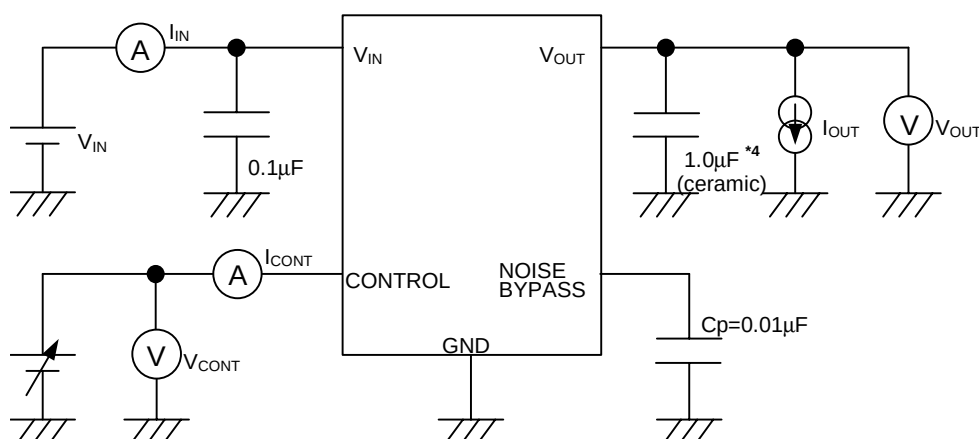
■ OUTPUT VOLTAGE RANK LIST

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

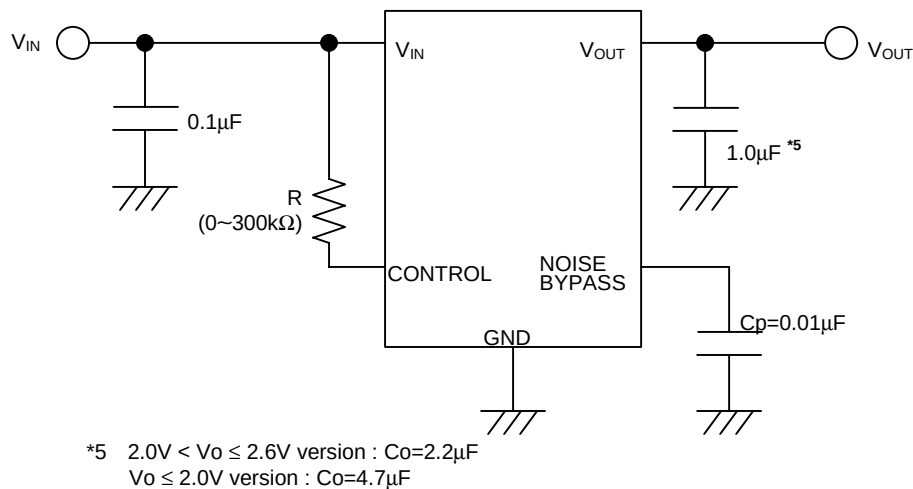


*4 $2.0V < V_o \leq 2.6V$ version : $C_o = 2.2\mu F$ (ceramic)
 $V_o \leq 2.0V$ version : $C_o = 4.7\mu F$ (ceramic)

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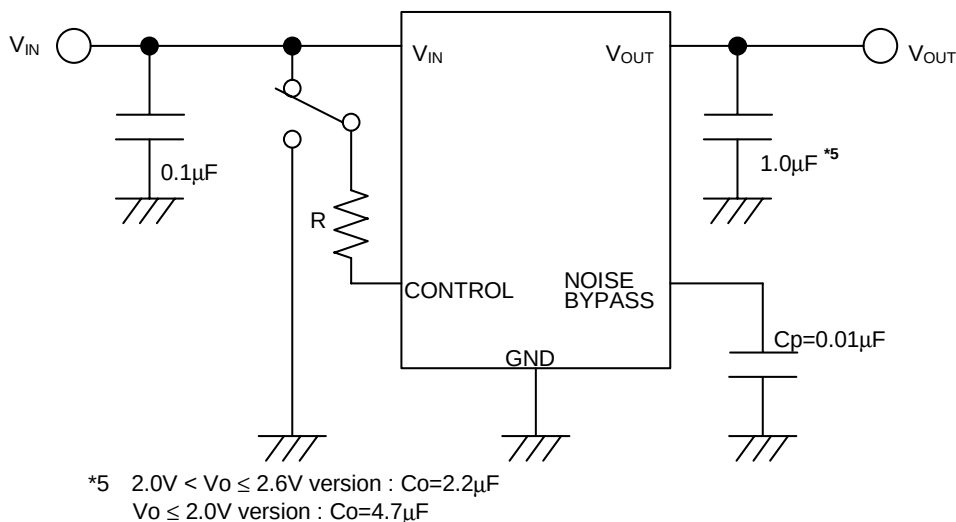
■ TYPICAL APPLICATION

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



Connect control terminal to V_{IN} terminal

② In use of ON/OFF CONTROL:



State of control terminal:

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

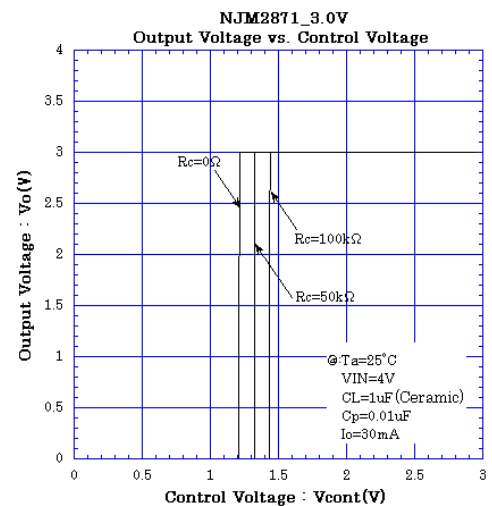
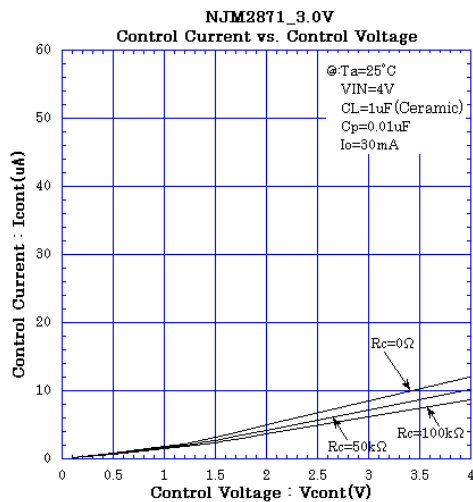
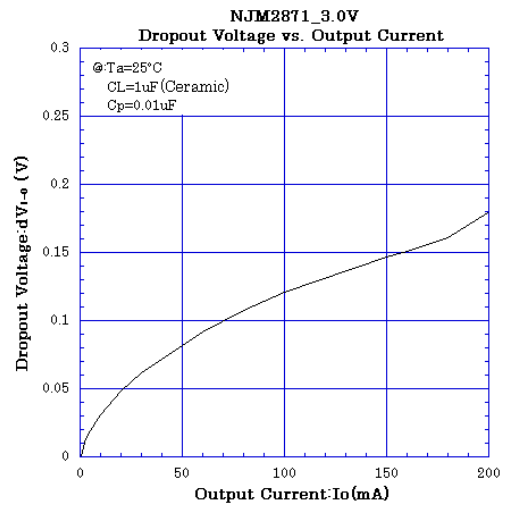
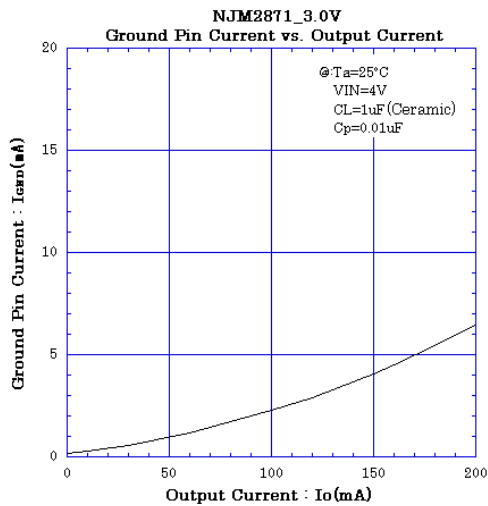
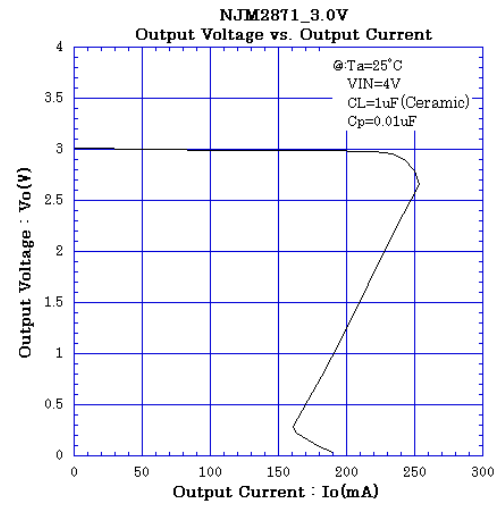
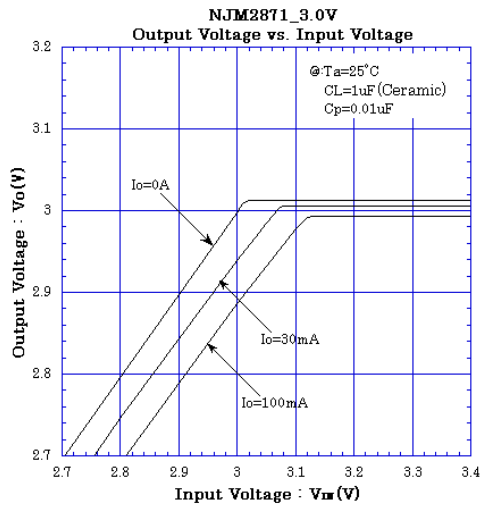
*Noise bypass Capacitance C_p

Noise bypass capacitance C_p reduces noise generated by band-gap reference circuit. Noise level and ripple rejection will be improved when larger C_p is used. Use of smaller C_p value may cause oscillation. Use the C_p value of $0.01\mu\text{F}$ greater to avoid the problem.

*In the case of using a resistance "R" between V_{IN} and control.

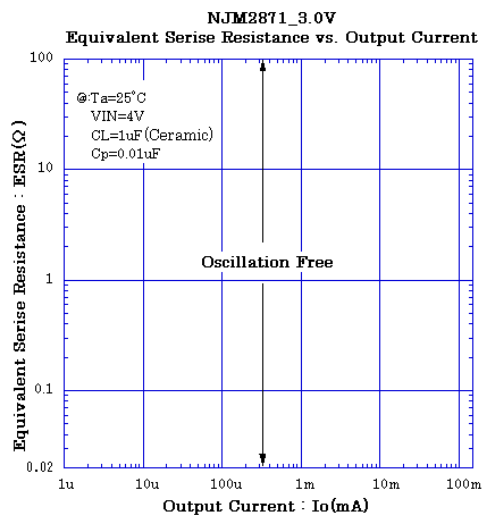
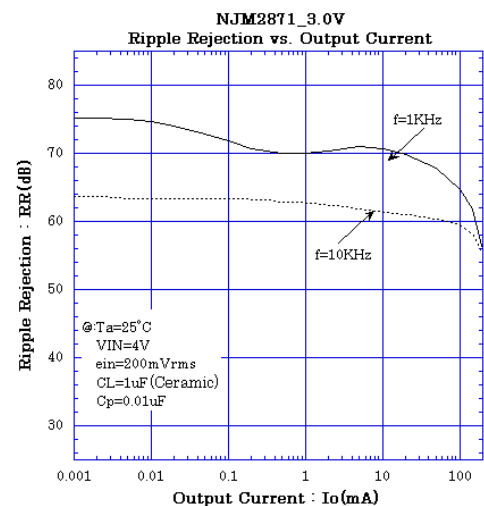
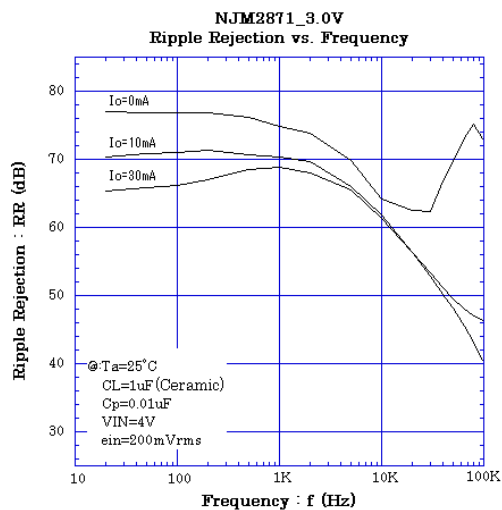
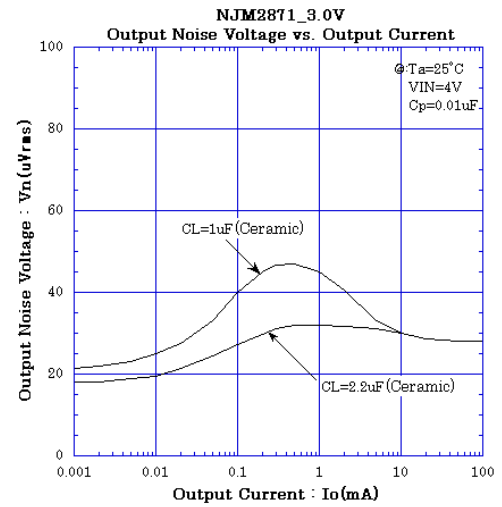
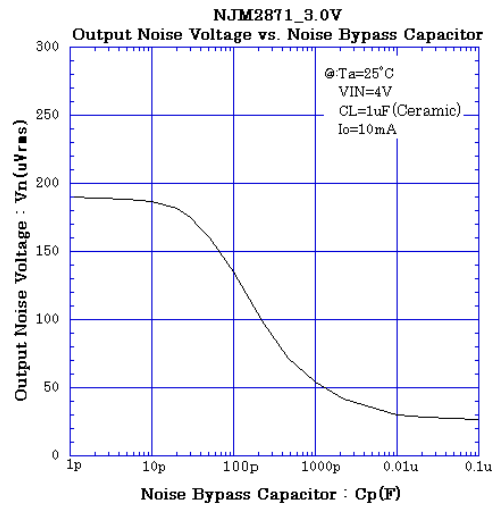
The current flow into the control terminal while the IC is ON state (I_{CONT}) can be reduced when a pull up resistance "R" is inserted between V_{IN} and the control terminal. The minimum control voltage for ON state ($V_{CONT(ON)}$) is increased due to the voltage drop caused by I_{CONT} and the resistance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

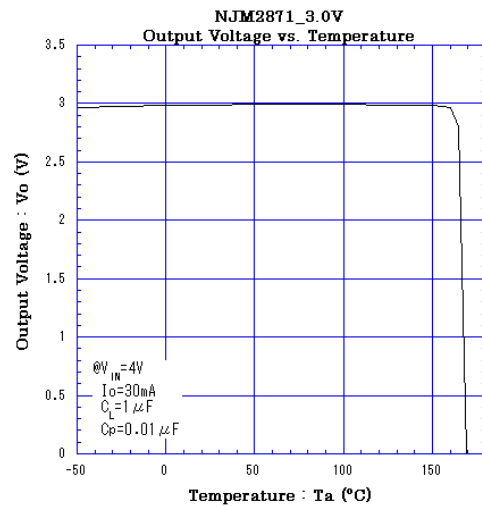
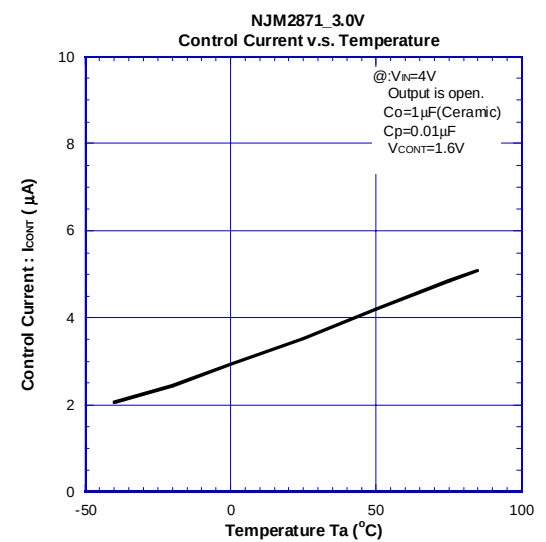
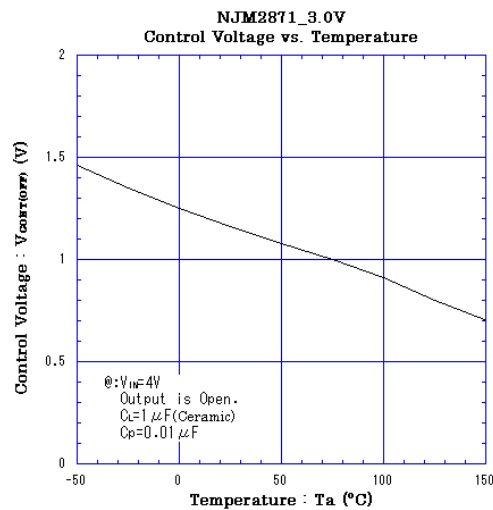
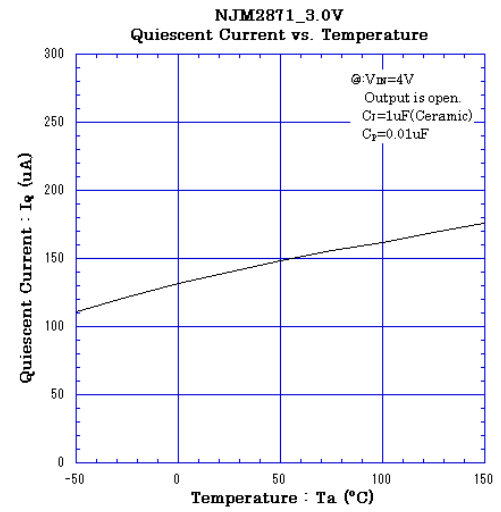
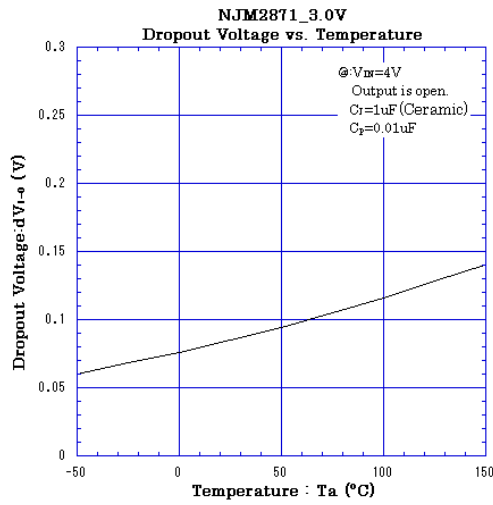


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■ ELECTRICAL CHARACTERISTICS



ELECTRICAL CHARACTERISTICS



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