

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



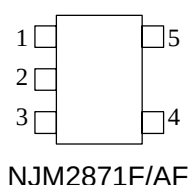
NJM2871F/AF

NJM2872F/AF

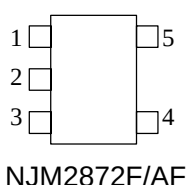
■ FEATURES

- High Ripple Rejection 70dB typ. (f=1kHz)
- Output Noise Voltage $V_{no}=30\mu V_{rms}$ ($C_p=0.01\mu F$)
- Output capacitor with 1.0uF ceramic capacitor ($V_o \geq 2.7V$)
- Output Current $I_o(max.)=150mA$
- High Precision Output $V_o \pm 2\%$
 $V_o \pm 1\%$: A Version
- Low Dropout Voltage 0.10V typ. ($I_o=60mA$)
- ON/OFF Control (Active High)
- Operating Voltage Range +2.5V~+14V ($V_o \leq 2.0V$ version)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline MTP5 (MTP5:2.8×2.9×1.1mm)

■ PIN CONFIGURATION

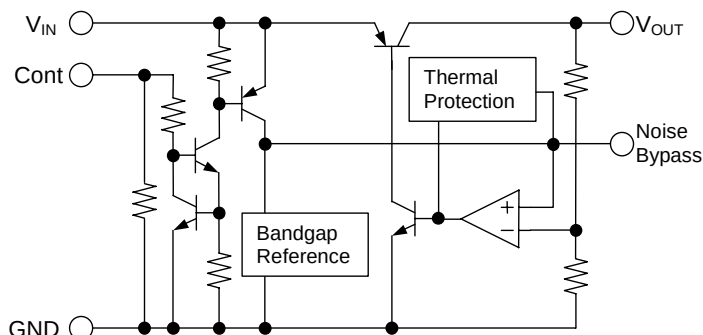


PIN FUNCTION
 1. CONTROL (Active High)
 2. GND
 3. NOISE BYPASS
 4. V_{OUT}
 5. V_{IN}



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

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+14	V
Control Voltage	V_{CONT}	+14(note 1)	V
Power Dissipation	P_D	200	mW
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C

(note 1) When input voltage is less than +14V, the absolute maximum control voltage is equal to the input voltage.

■ ELECTRICAL CHARACTERISTICS

(Vo>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	$e_{in}=200mV_{rms}$, $f=1kHz$, $I_o=10mA$ $V_{IN}=V_o+1V$, $V_o=3V$ 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	—	0.2	—	mV/°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

(Vo≤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	$e_{in}=200mV_{rms}$, $f=1kHz$, $I_o=10mA$ $V_{IN}=V_o+1V$, $V_o=1.8V$ 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	—	0.13	—	mV/°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

(note 2) 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.

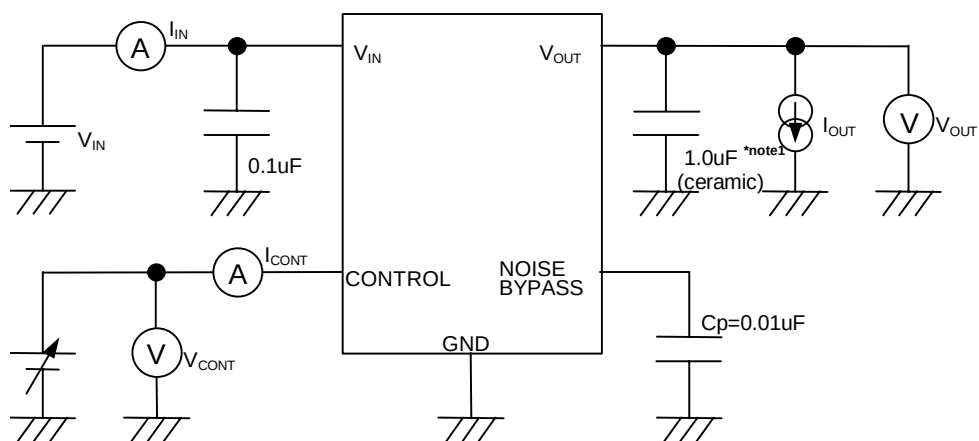
■ OUTPUT VOLTAGE RANK LIST

Device Name	V _{OUT}
NJM287××15	1.5V
NJM287××18	1.8V
NJM287××21	2.1V
NJM287××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

Device Name	V _{OUT}
NJM287××35	3.5V
NJM287××38	3.8V
NJM287××04	4.0V
NJM287××05	5.0V

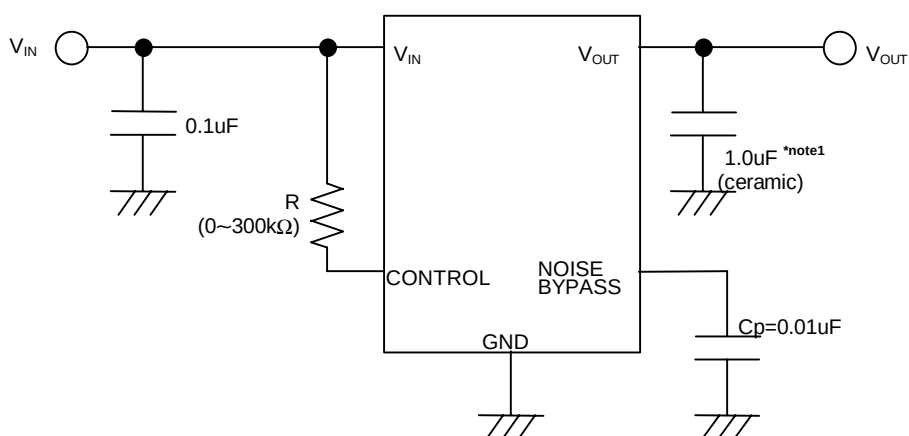
■ TEST CIRCUIT



*note1 2.0V < V_o ≤ 2.6V version : C_o=2.2uF(ceramic)
V_o ≤ 2.0V version : C_o=4.7uF(ceramic)

■ TYPICAL APPLICATION

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

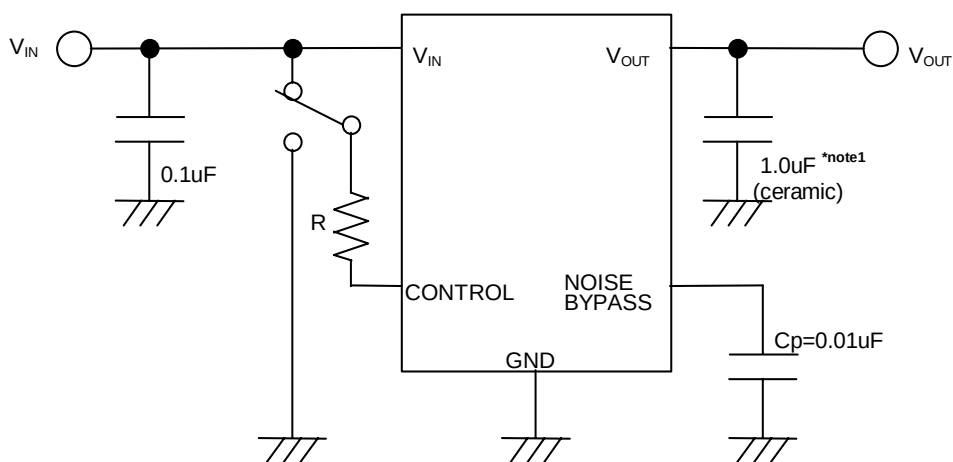


*note1 2.0V < V_o ≤ 2.6V version : C_o =2.2uF(ceramic)
 V_o ≤ 2.0V version : C_o =4.7uF(ceramic)

Connect control terminal to V_{IN} terminal

The quiescent current can be reduced by using a resistance “R”. Instead, it increases the minimum operating voltage. For further information, please refer to Figure “Output Voltage vs. Control Voltage”.

② In use of ON/OFF CONTROL:



*note1 2.0V < V_o ≤ 2.6V version : C_o =2.2uF(ceramic)
 V_o ≤ 2.0V version : C_o =4.7uF(ceramic)

State of control terminal:

- “H” → output is enabled.
- “L” or “open” → output is disabled.

★Noise bypass Capacitance C_p

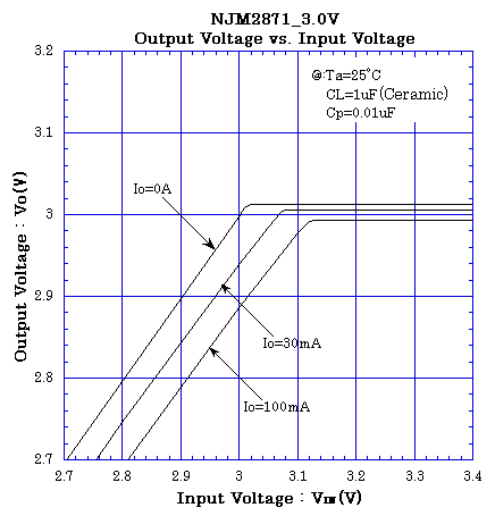
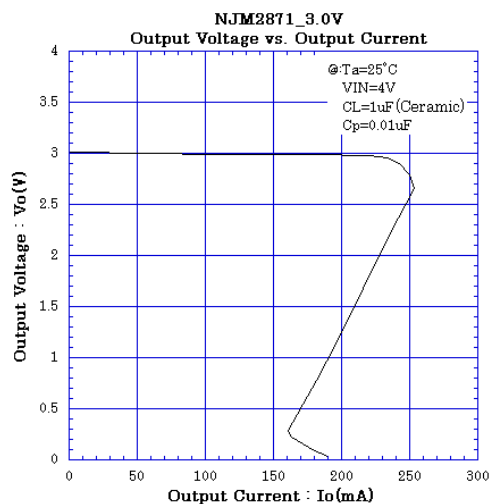
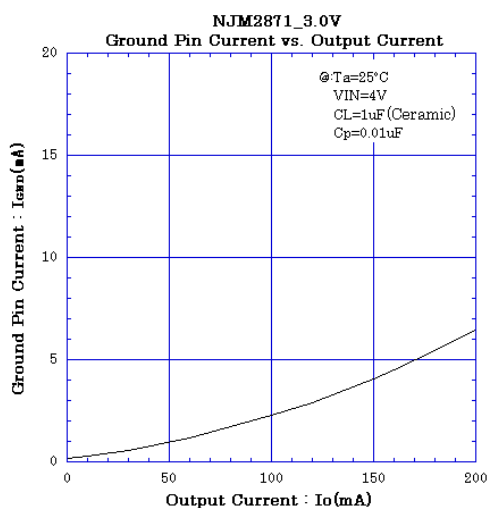
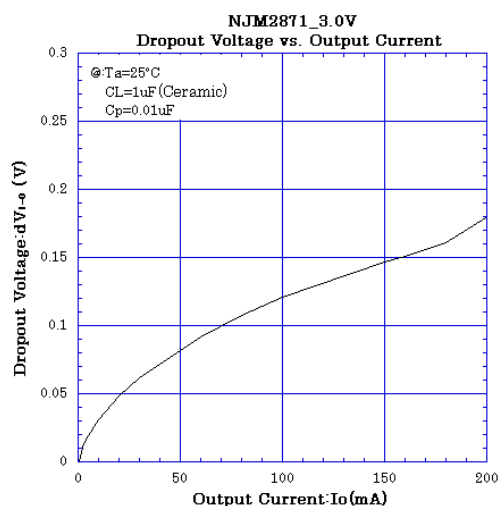
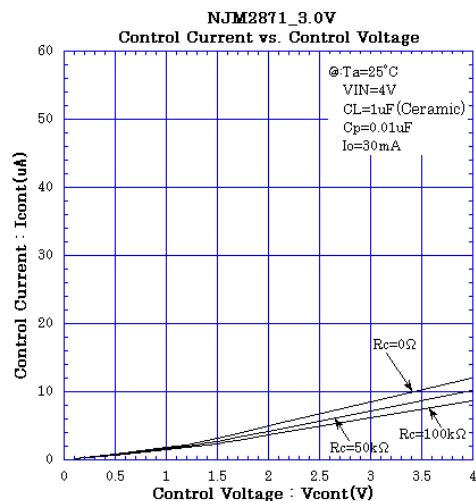
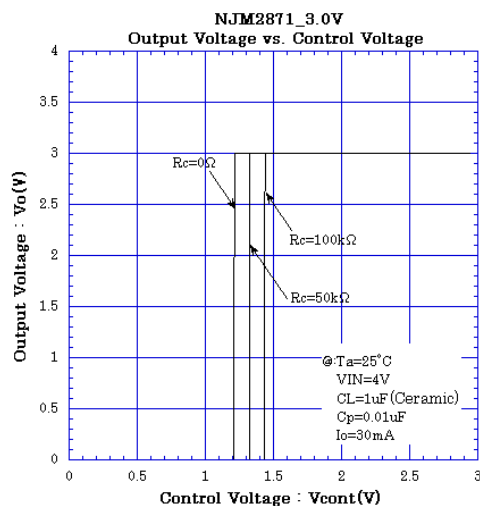
Noise bypass capacitance C_p reduces noise generated by band-gap reference circuit.

Noise level and ripple rejection will be improved when larger C_p is used.

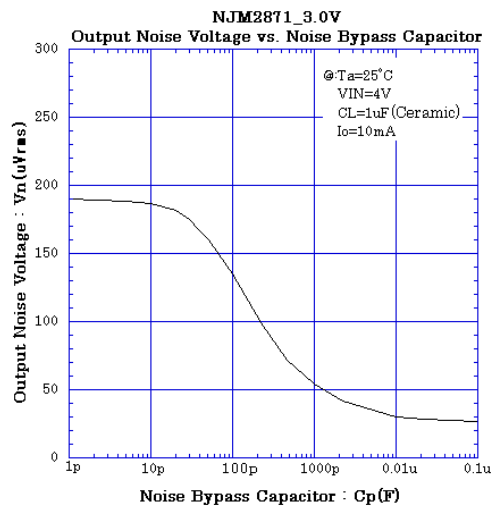
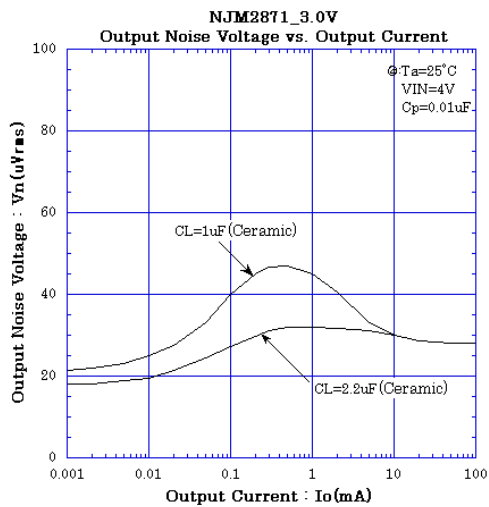
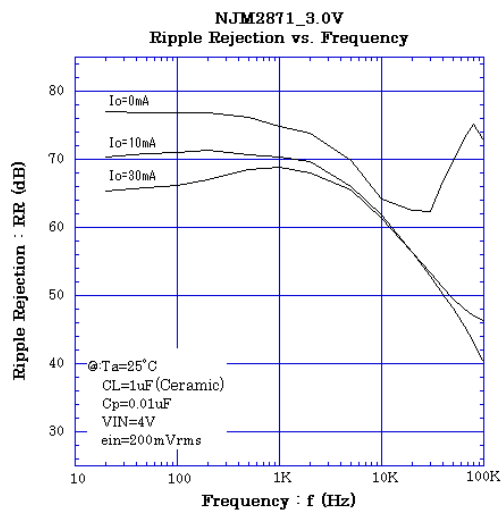
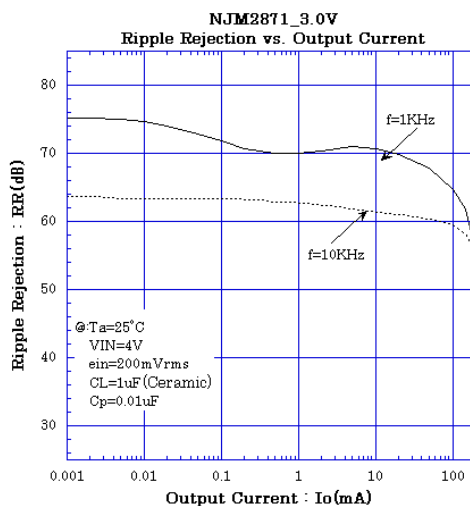
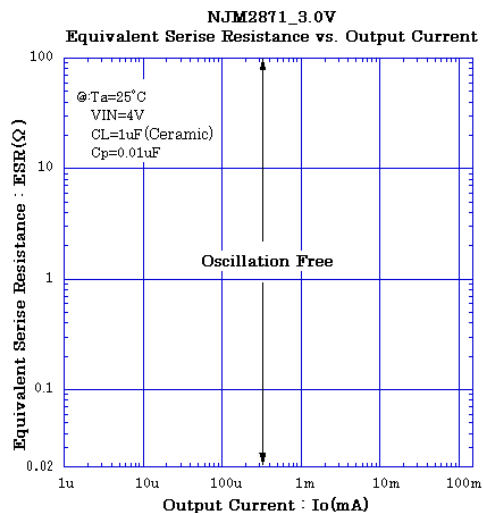
Use of smaller C_p value may cause oscillation.

Use the C_p value of 0.01uF greater to avoid the problem.

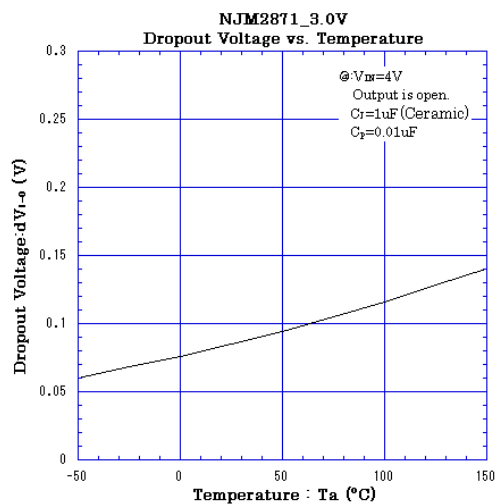
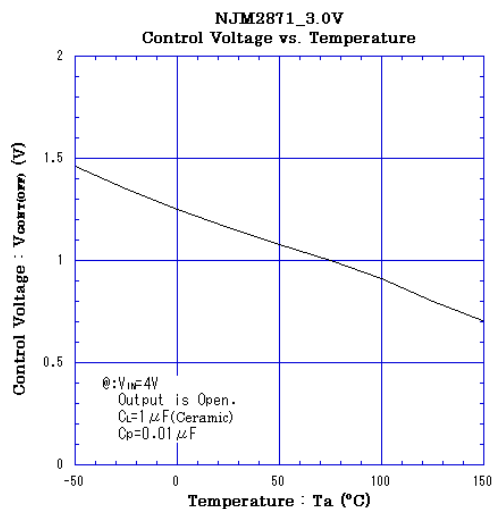
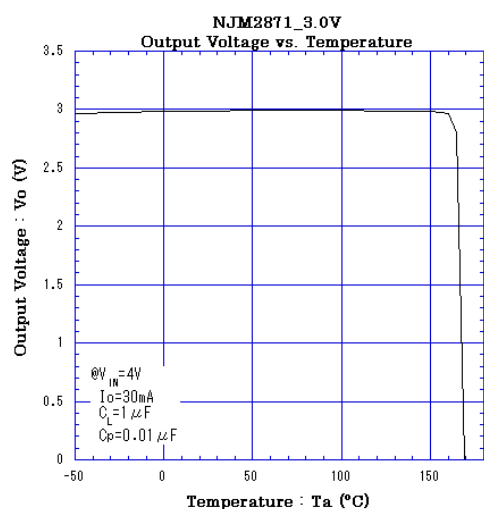
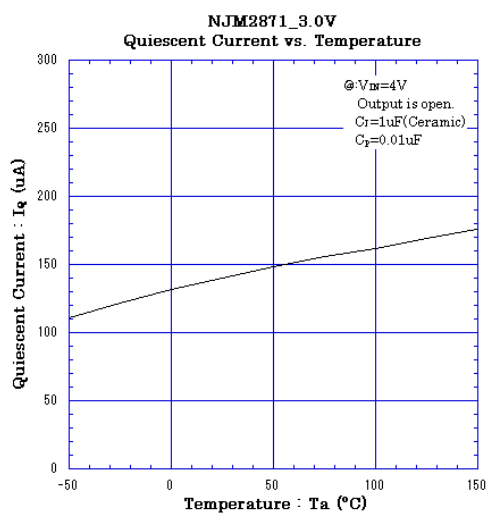
■ ELECTRICAL CHARACTERISTICS



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