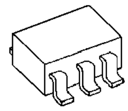
Low Dropout Voltage Regulator

■ GENERAL DESCRIPTION

The NJM2871B/72B are low dropout voltage regulator designed for cellular phone applications.

Advanced Bipolar technology achieves low noise, high ripple rejection and low quiescent current.

■ PACKAGE OUTLINE

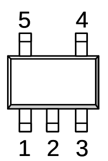


NJM2871BF/72BF

■ FEATURES

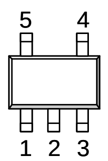
- High Ripple Rejection — 75dB typ. (f=1kHz Vo=3V version)
- Output Noise Voltage — Vno=30µVrms typ. (Cp=0.01µF)
- Output capacitor with 1.0uF ceramic capacitor(Vo≥2.7V: Version)
- Output Current — Io(max.)=150mA
- High Precision Output — Vo ±1.0%
- Low Dropout Voltage — 0.10V typ. (Io=60mA)
- Input Voltage Range — +2.3 ~ +14V(Vo≤2.0V version)
- ON/OFF Control — (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline — SOT-23-5 (MTP5)

■ PIN CONFIGURATION



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

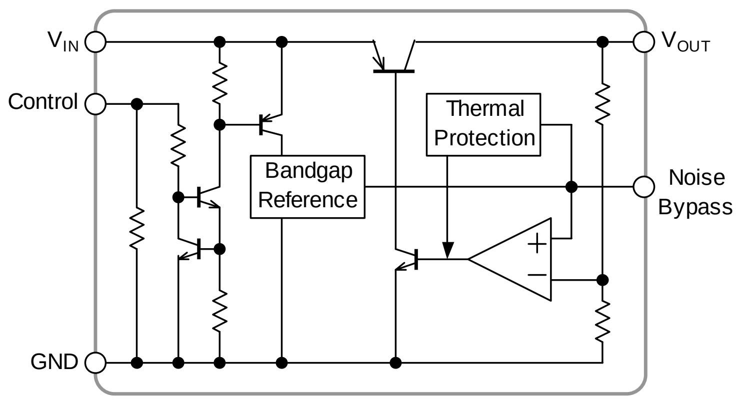
NJM2871BF



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

NJM2872BF

■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST

Device Name	V_{OUT}	Device Name	V_{OUT}	Device Name	V_{OUT}
NJM287*BF15	1.5V	NJM287*BF26	2.6V	NJM287*BF34	3.4V
NJM287*BF18	1.8V	NJM287*BF27	2.7V	NJM287*BF35	3.5V
NJM287*BF19	1.9V	NJM287*BF28	2.8V	NJM287*BF38	3.8V
NJM287*BF02	2.0V	NJM287*BF29	2.9V	NJM287*BF04	4.0V
NJM287*BF21	2.1V	NJM287*BF03	3.0V	NJM287*BF48	4.8V
NJM287*BF23	2.3V	NJM287*BF31	3.1V	NJM287*BF05	5.0V
NJM287*BF24	2.4V	NJM287*BF32	3.2V		
NJM287*BF25	2.5V	NJM287*BF33	3.3V		

■ 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)	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_{IN}=+2.3 ~ +14V (In case of Vo<2.1V version)

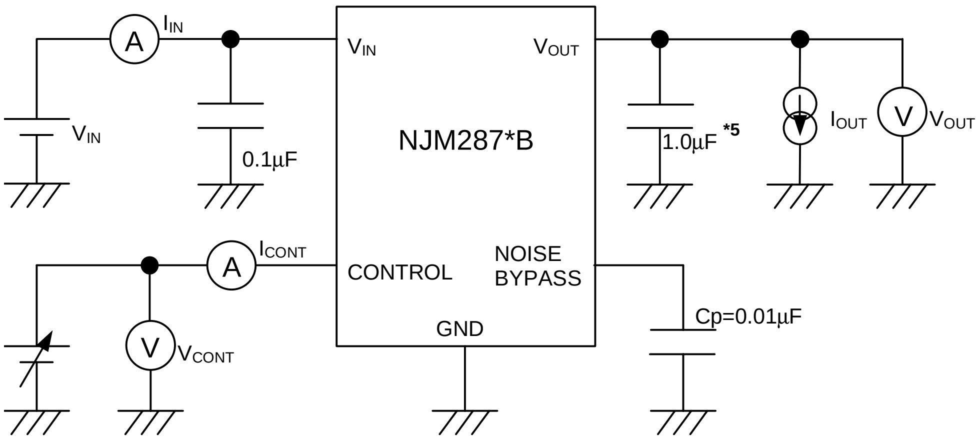
■ ELECTRICAL CHARACTERISTICS

(V_{IN}=Vo+1V, C_{IN}=0.1µF, Co=1.0µF: Vo≥2.7V (Co=2.2µF : 1.8V<Vo≤2.6V:, Co=4.7µF : Vo≤1.8V), Cp=0.01µF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	–	+1.0%	V
Quiescent Current	I_Q	Io=0mA, except Icont	–	120	180	µA
Quiescent Current at Control OFF	$I_{Q(OFF)}$	V_{CONT}=0V	–	–	100	nA
Output Current	Io	Vo-0.3V	150	200	–	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6V, Io=30mA	–	–	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 100mA	–	–	0.03	%/mA
Dropout Voltage (*4)	ΔV_{I-O}	Io=60mA	–	0.10	0.18	V
Ripple Rejection	RR	ein=200mVrms, f=1kHz, Io=10mA, Vo=3V version	–	75	–	dB
Average Temperature Coefficient of Output Voltage	$\Delta Vo/\Delta Ta$	Ta=0 ~ +85°C, Io=10mA	–	±50	–	ppm/°C
Output Noise Voltage	V_{NO1}	f=10Hz~80kHz, Io=10mA, Vo=3V Version	–	30	–	µVrms
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	–	–	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		–	–	0.6	V

(*4): The output voltage excludes under 2.1V.
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.

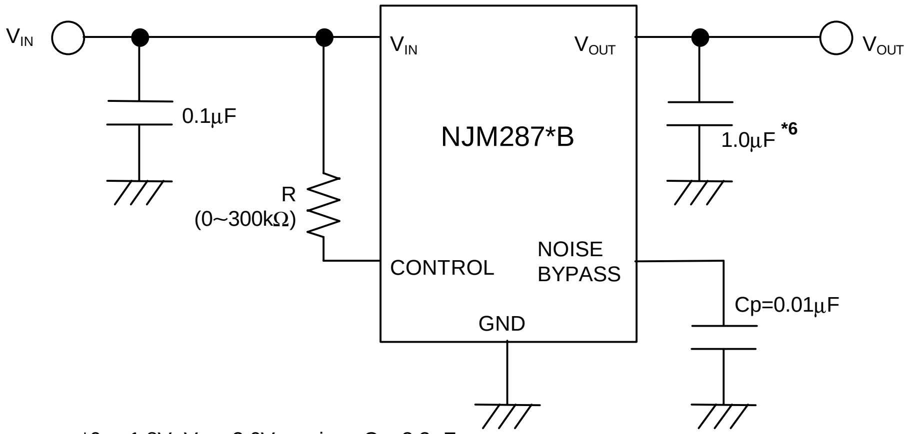
■ TEST CIRCUIT



*5 1.8V<Vo ≤ 2.6V version : Co=2.2µF
Vo≤ 1.8V version : Co=4.7µF

■ TYPICAL APPLICATION

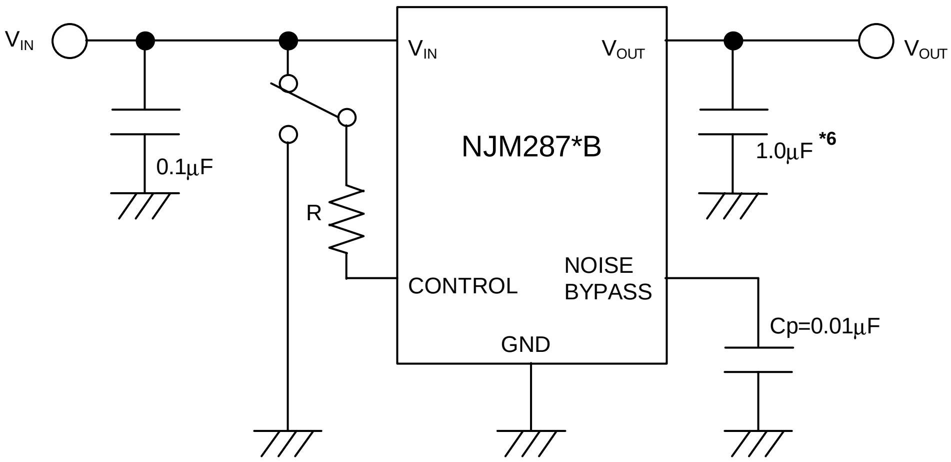
① In the case where ON/OFF Control is not required:



*6 1.8V<Vo ≤ 2.6V version : Co=2.2µF
Vo≤1.8V version : Co=4.7µF

Connect control terminal to V_{IN} terminal

② In use of ON/OFF CONTROL:



*6 1.8V<Vo ≤ 2.6V version : Co=2.2µF(ceramic)
Vo≤1.8V version : Co=4.7µF(ceramic)

State of control terminal:

•“H”→ output is enabled.

•“L” or “open” → output is disabled.

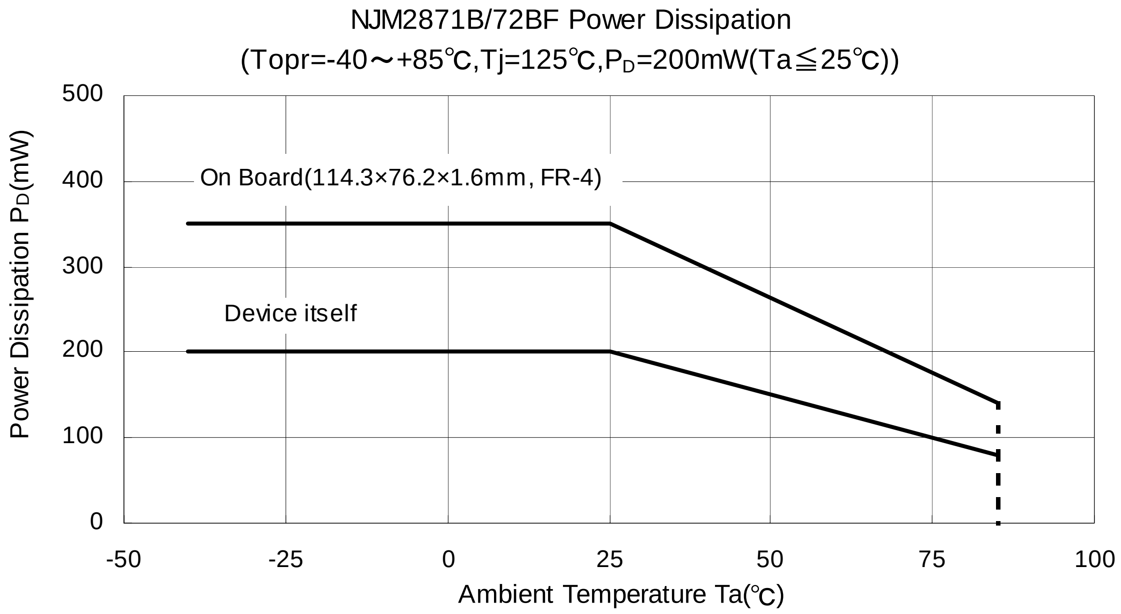
∗Noise bypass Capacitance Cp

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.

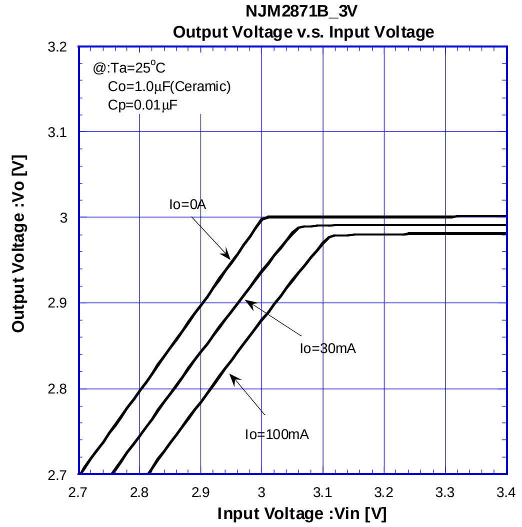
∗In the case of using a resistance "R" between V_{IN} and control.

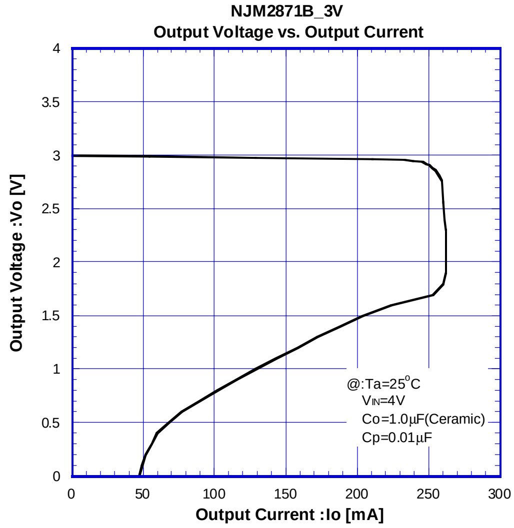
The current flow into the control terminal while the IC is ON state (I_{CONT}) can be reduced when a pull up resistance "R" is inserted between V_{IN} and the control terminal.
The minimum control voltage for ON state ($V_{CONT\,(ON)}$) is increased due to the voltage drop caused by I_{CONT} and the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

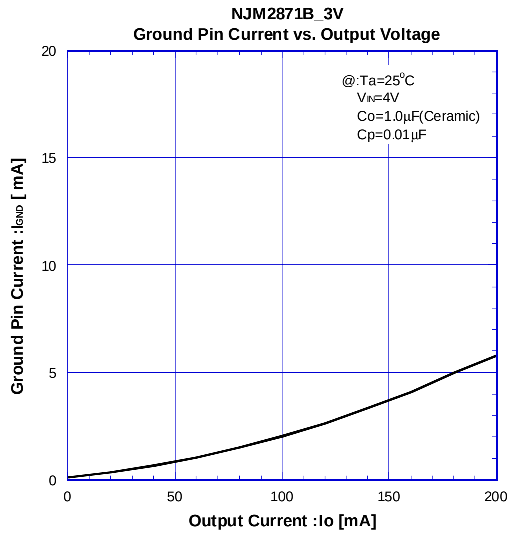
■ POWER DISSIPATION vs. AMBIENT TEMPERATURE

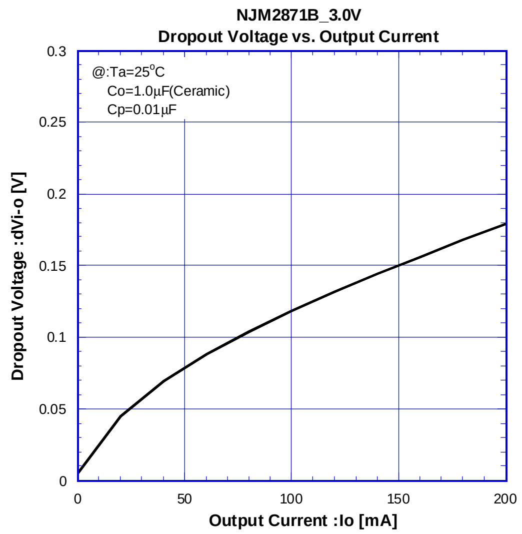


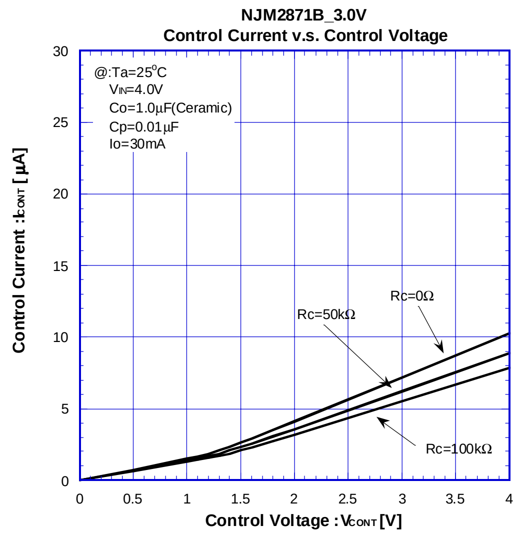
■ ELECTRICAL CHARACTERISTICS

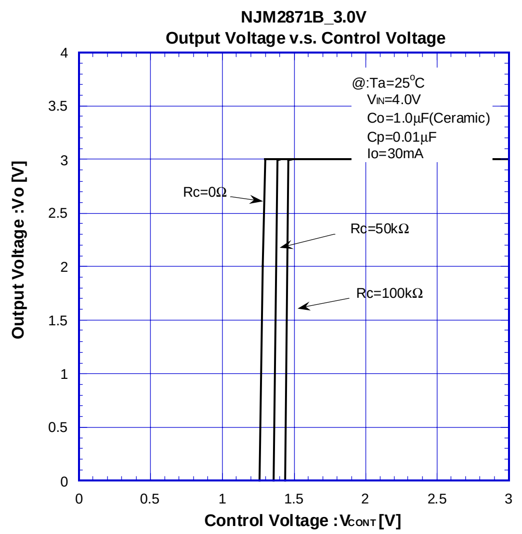












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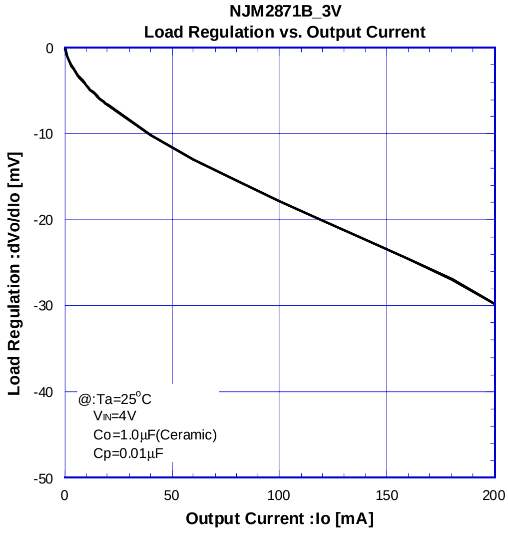
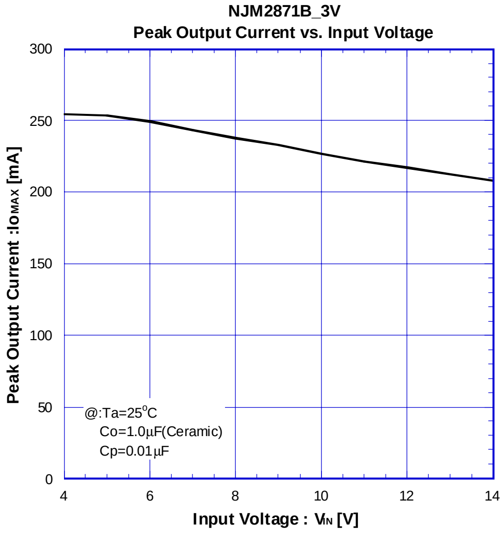
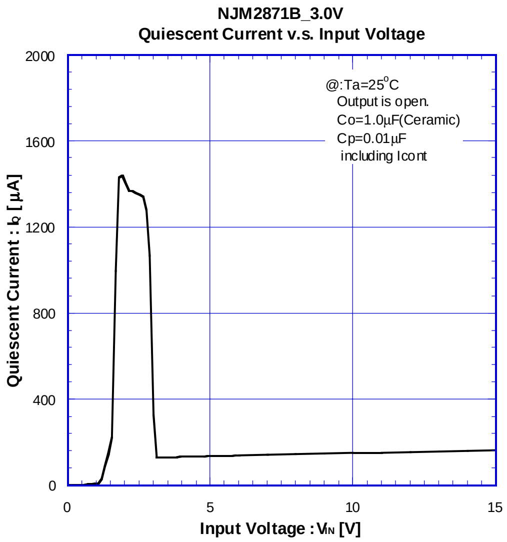
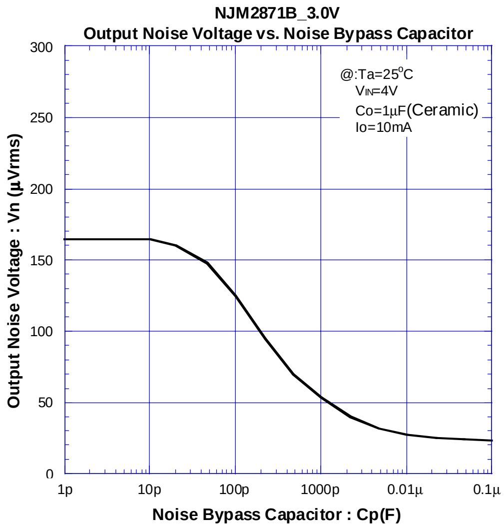
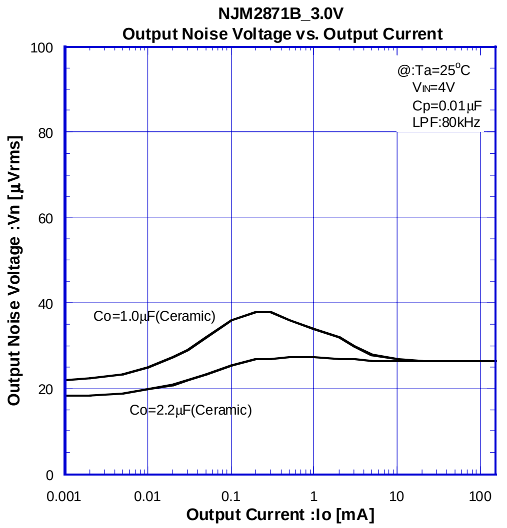
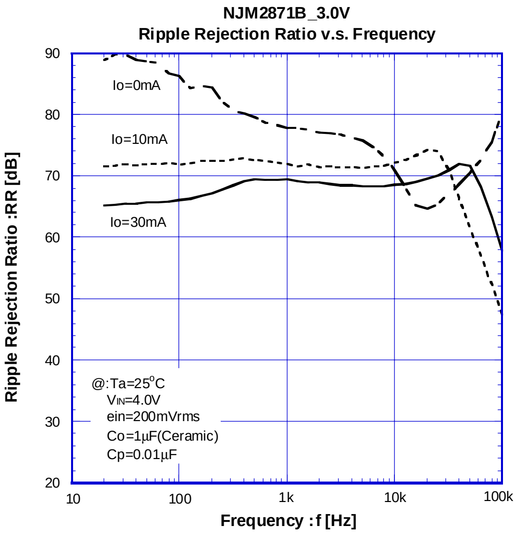






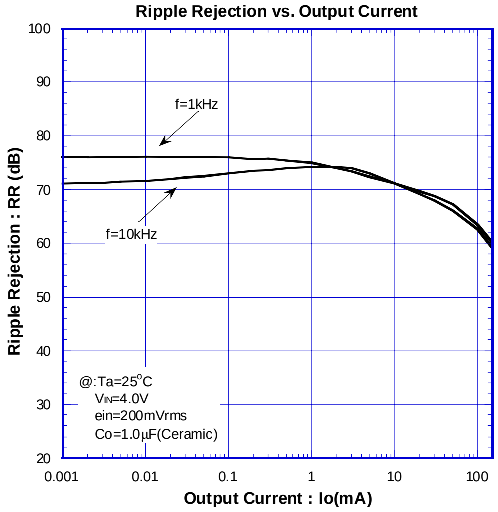




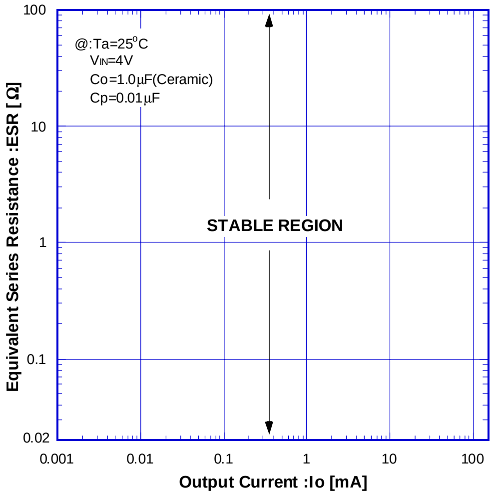


■ ELECTRICAL CHARACTERISTICS

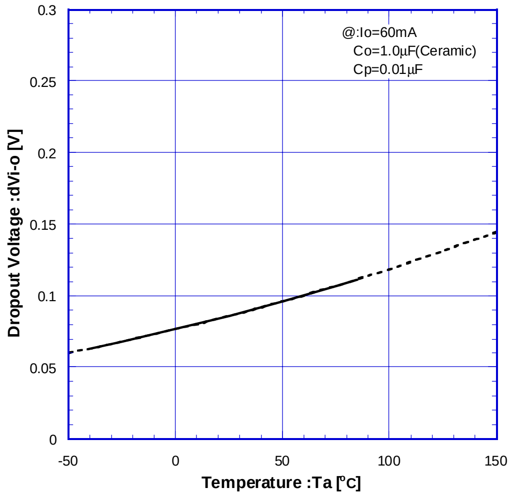
NJM2871B_3.0V
Ripple Rejection vs. Output Current



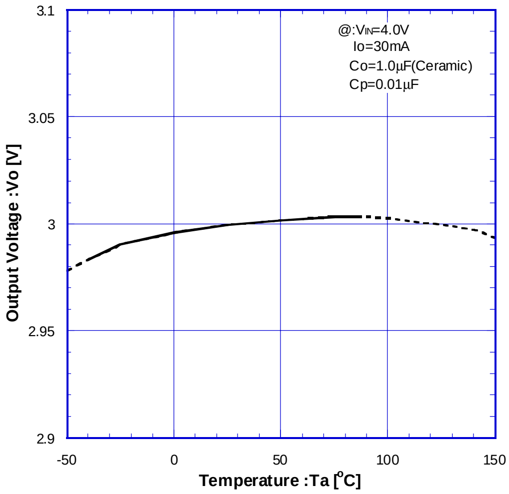
NJM2871B_3.0V
Equivalent Series Resistance vs. Output Current



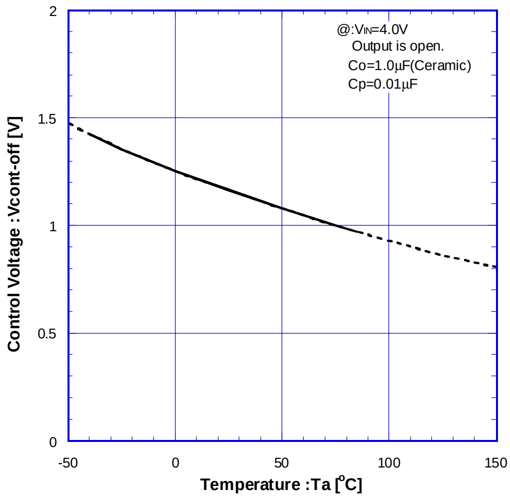
NJM2871B_3.0V
Dropout Voltage v.s. Temperature



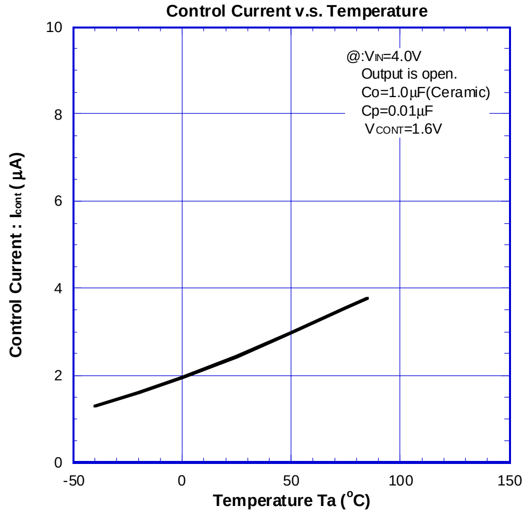
NJM2871B_3.0V
Output Voltage v.s. Temperature



NJM2871B_3.0V
Control Voltage v.s. Temperature



NJM2871B_3.0V
Control Current v.s. Temperature



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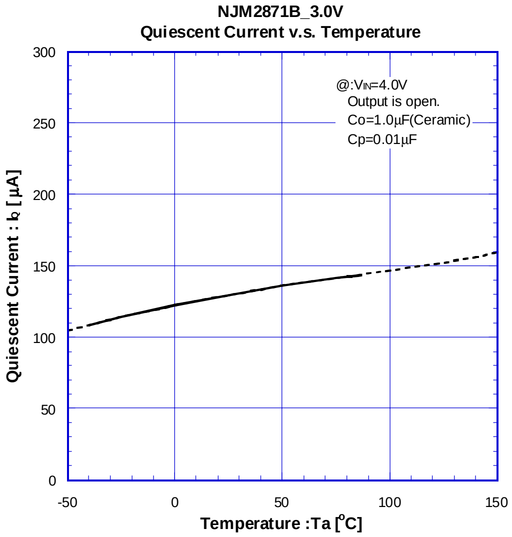

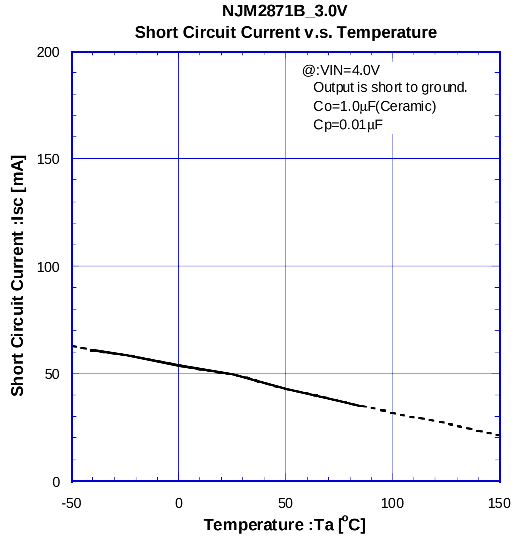

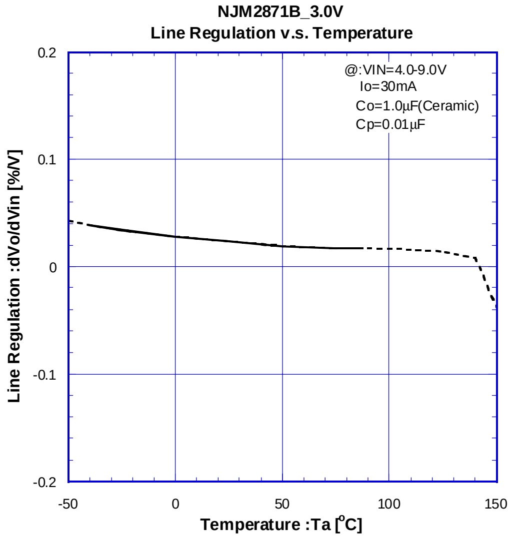

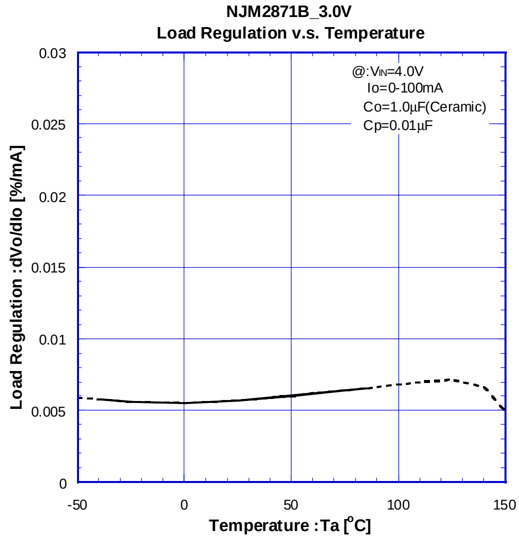

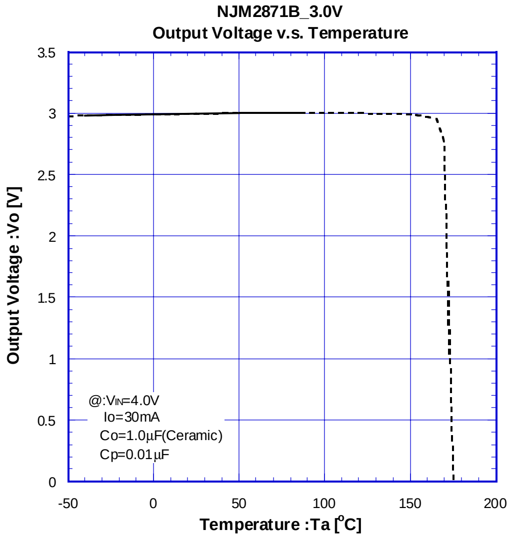

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