

## LOW DROPOUT VOLTAGE REGULATOR

### ■ GENERAL DESCRIPTION

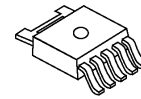
The NJM2819A is a low dropout voltage regulator with ON/OFF control.

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

It delivers up to 7V/2A output power with the maximum input voltage of 10V.

The NJM2819A is suitable for audio/video and digital applications.

### ■ PACKAGE OUTLINE

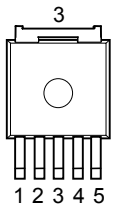


NJM2819ADL3

### ■ FEATURES

- High Ripple Rejection      65dB typ. (f=1kHz,3V Version)
- Output Noise Voltage       $V_{no}=42\mu V_{rms}$  typ. ( $V_o=3V$  Version)
- Output capacitor with 4.7 $\mu F$  ceramic capacitor ( $V_o\geq 2.1V$ )
- Output Current               $I_o(max.)=2.0A$
- High Precision Output       $V_o \pm 1.0\%$
- Low Dropout Voltage      0.1V typ. ( $I_o=1.0A$ , 3.0V Version)
- ON/OFF Control
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Package Outline              TO-252-5

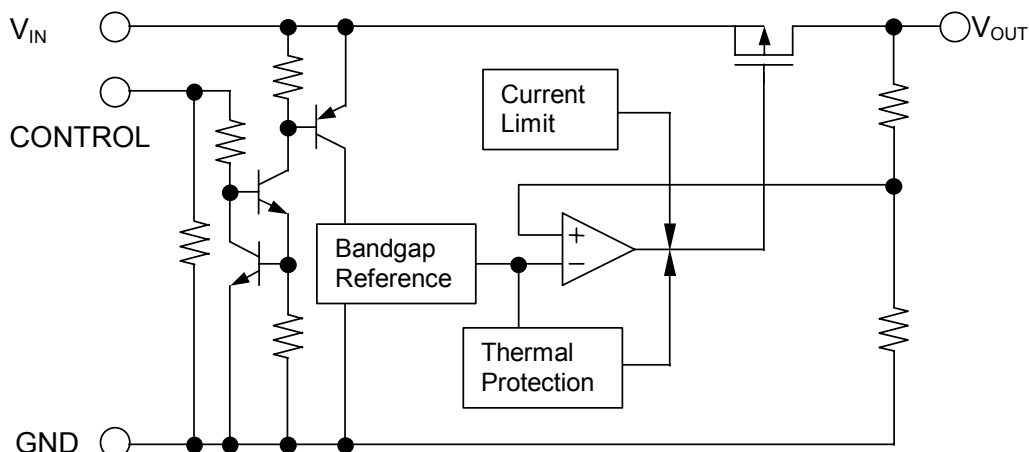
### ■ PIN CONFIGURATION



1.  $V_{IN}$
2. CONTROL
3.  $V_o$
4. N.C.
5. GND

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### ■ EQUIVALENT CIRCUIT



# NJM2819A

## ■ OUTPUT VOLTAGE RANK LIST

Device Name	V <sub>OUT</sub>
NJM2819ADL3-18	1.8V
NJM2819ADL3-21	2.1V
NJM2819ADL3-03	3.0V
NJM2819ADL3-33	3.3V
NJM2819ADL3-05	5.0V
NJM2819ADL3-52	5.2V
NJM2819ADL3-07	7.0V

Output voltage options available : 1.8 ~ 7.0V

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	V <sub>O</sub> > 6.0V: +10 5.0V < V <sub>O</sub> ≤ 6.0V: +9V V <sub>O</sub> ≤ 5.0V: +8	V
Control Voltage	V <sub>CONT</sub>	V <sub>O</sub> > 6.0V: +10 5.0V < V <sub>O</sub> ≤ 6.0V: +9V V <sub>O</sub> ≤ 5.0V: +8	V
Power Dissipation	P <sub>D</sub>	1190(*1) 3125(*2)	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +150	°C

(\*1) : Mounted on glass epoxy board. (76.2×114.3×1.6mm:EIA/JDEC standard size, 2Layers, copper area 100mm<sup>2</sup>)

(\*2) : Mounted on glass epoxy board. (76.2×114.3×1.6mm:EIA/JDEC standard size, 4Layers, copper area 100mm<sup>2</sup>)

(4Layers inner foil : 74.2 x 74.2mm Applying a thermal beer hall to a board based on JEDEC standard JESD51-5)

## ■ OPERATING VOLTAGE

V<sub>IN</sub>=V<sub>O</sub> + ΔV<sub>I-O</sub> ~ 9V (In case of V<sub>O</sub> > 6.0V version)

V<sub>IN</sub>=V<sub>O</sub> + ΔV<sub>I-O</sub> ~ 8V (In case of 5.0V < V<sub>O</sub> ≤ 6.0V version)

V<sub>IN</sub>=V<sub>O</sub> + ΔV<sub>I-O</sub> ~ 7V (In case of 2.1V ≤ V<sub>O</sub> ≤ 5.0V version)

V<sub>IN</sub>=2.3V ~ 7V (In case of V<sub>O</sub> < 2.1V version)

■ ELECTRICAL CHARACTERISTICS ( $V_{IN}=V_O+1V$ ,  $C_{IN}=4.7\mu F$ ,  $C_O=4.7\mu F$ ( $C_O=10\mu F$  :  $1.8V \leq V_O < 2.1V$ ),  $T_a=25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Output Voltage	$V_O$	$I_O=100mA$	-1.0%	-	+1.0%	V	
Quiescent Current	$I_Q$	$I_O=0mA$ , exclude $I_{CONT}$	-	500	800	$\mu A$	
Quiescent Current at Control OFF	$I_{Q(OFF)}$	$V_{CONT}=0V$	-	-	1	$\mu A$	
Output Current	$I_O$	$V_O - 0.3V$	2	3	-	A	
Line Regulation	$\Delta V_O / \Delta V_{IN}$	$V_O > 5.0V$ : $V_{IN}=V_O+1V \sim 9V$ , $5.0V < V_O \leq 6.0V$ : $V_{IN}=V_O+1V \sim 8V$ , $V_O \leq 5.0V$ : $V_{IN}=V_O+1V \sim 7V$ , $I_O=100mA$	-	-	0.1	%/V	
Load Regulation	$\Delta V_O / \Delta I_O$	$I_O=0 \sim 2.0A$	-	0.05	0.4	%/A	
Dropout Voltage(*2)	$\Delta V_{I-O}$	$I_O=1.0A$	$2.1V \leq V_O < 2.5V$	-	0.14	0.25	V
			$2.5V \leq V_O < 2.8V$	-	0.11	0.20	
			$2.8V \leq V_O < 3.4V$	-	0.10	0.18	
			$3.4V \leq V_O \leq 7.0V$	-	0.09	0.16	
Ripple Rejection	RR	$e_{in}=200mV_{rms}$ , $f=1kHz$ , $I_O=100mA$ , $V_O=3V$ Version	-	65	-	dB	
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T_a$	$T_a=0 \sim 85^\circ C$ , $I_O=100mA$	-	$\pm 50$	-	ppm/ $^\circ C$	
Output Noise Voltage	$V_{NO}$	$f=10Hz \sim 80kHz$ , $I_O=100mA$ , $V_O=3V$ Version	-	42	-	$\mu V_{rms}$	
Control Current	$I_{CONT}$	$V_{CONT}=1.6V$	-	3	12	$\mu A$	
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	-	-	V	
Control Voltage for OFF-state	$V_{CONT(OFF)}$		-	-	0.6	V	
Minimum Input Voltage	$V_{IN(MIN)}$	$V_O < 2.1V$	$I_O \leq 1.5A$ , $V_O \times 0.96$	2.3	-	-	V
			$1.5A < I_O \leq 2.0A$ , $V_O \times 0.96$	2.4	-	-	V

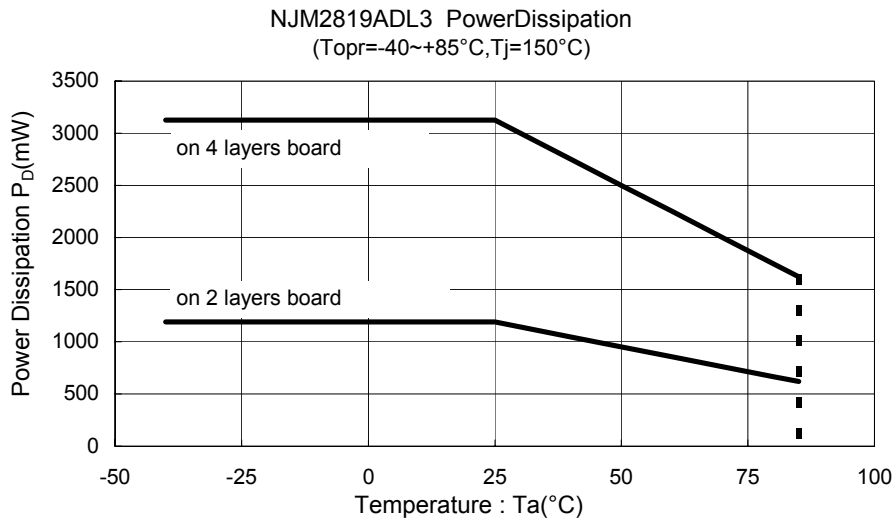
(\*2): The output voltage excludes under 2.1V.

The above specification is a common specification for all output voltages.

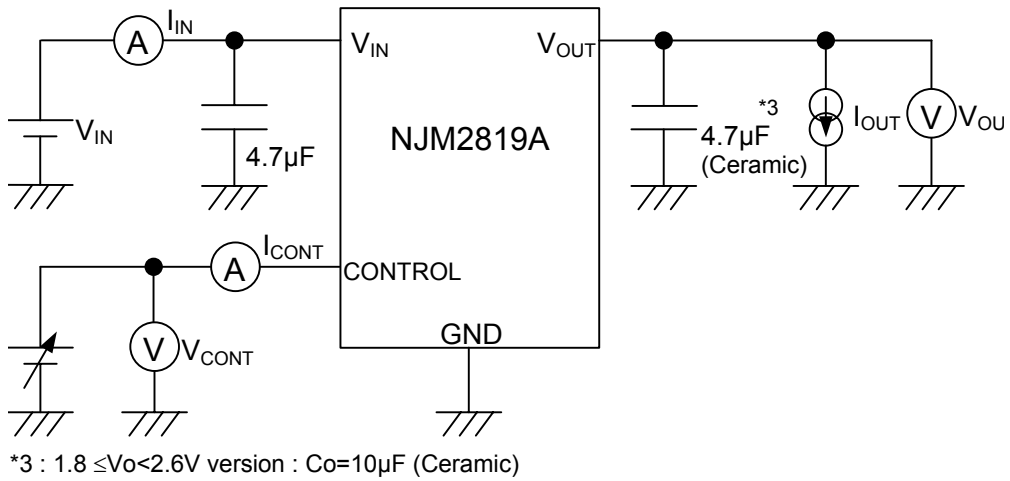
Therefore, it may be different from the individual specification for a specific output voltage.

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## POWER DISSIPATION vs. AMBIENT TEMPERATURE

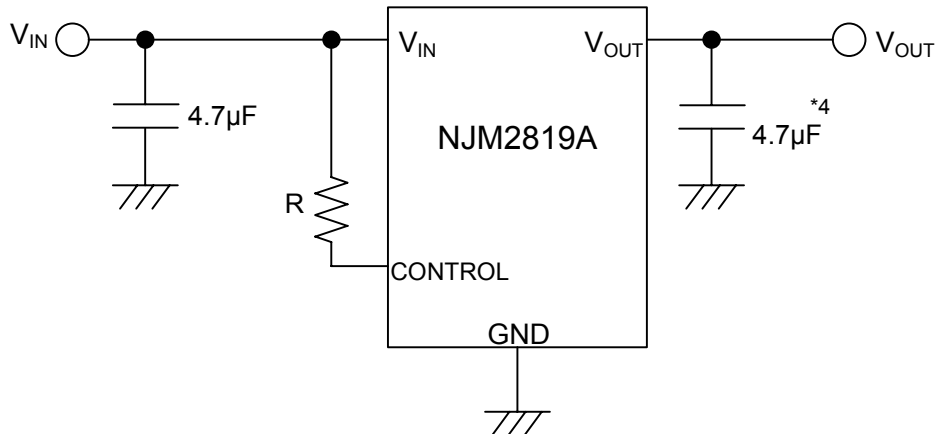


## TEST CIRCUIT



## ■ TYPICAL APPLICATION

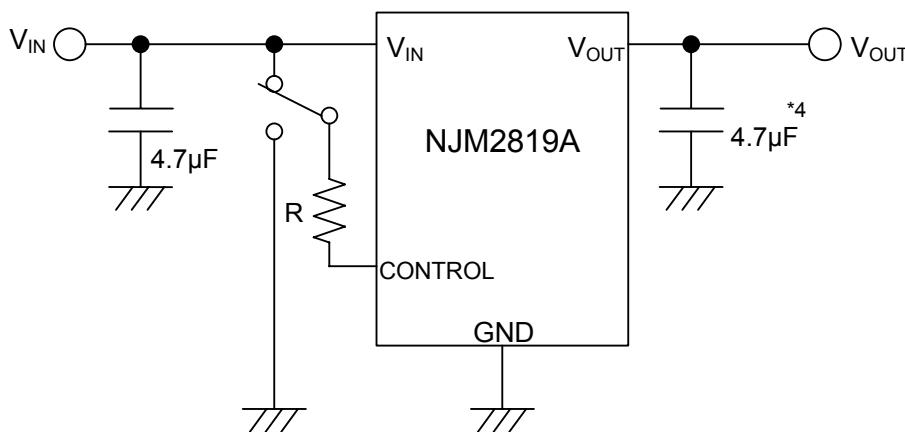
① In the case where ON/OFF Control is not required:



\*4 :  $1.8 \leq V_o < 2.6V$  version :  $C_o = 10\mu F$

Connect control terminal to  $V_{IN}$  terminal

② In use of ON/OFF CONTROL:



\*4 :  $1.8 \leq V_o < 2.6V$  version :  $C_o = 10\mu F$

State of control terminal:

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

\*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.

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## \*Input Capacitance $C_{IN}$

Input Capacitance  $C_{IN}$  is required to prevent oscillation and reduce power supply ripple for applications with high power supply impedance or a long power supply line.

Use the  $C_{IN}$  value of 4.7 $\mu$ F greater to avoid the problem.

$C_{IN}$  should connect between GND and  $V_{IN}$  as short as possible.

## \*Output Capacitance $C_O$

Output capacitor ( $C_O$ ) is required for a phase compensation of the internal error amplifier. The capacitance and the equivalent series resistance (ESR) influence stability of the regulator.

If use a smaller  $C_O$ , it may cause excess output noise or oscillation of the regulator due to lack of the phase compensation. Therefore, use  $C_O$  with the recommended capacitance or greater value and connect between  $V_O$  terminal and GND terminal with minimal wiring.

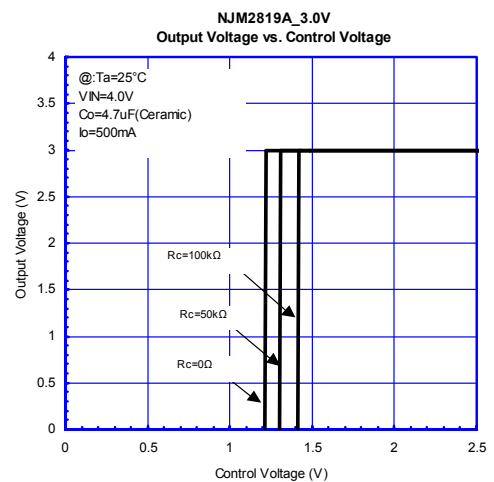
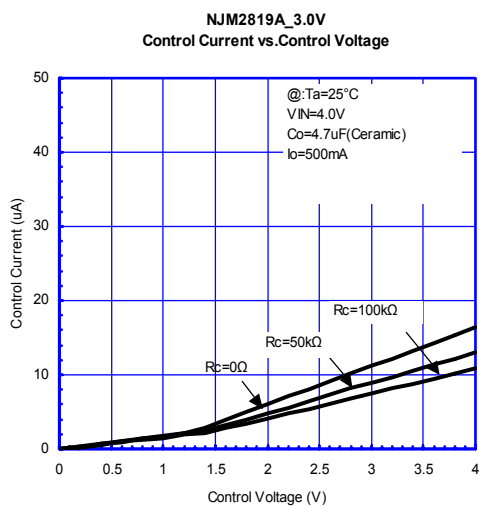
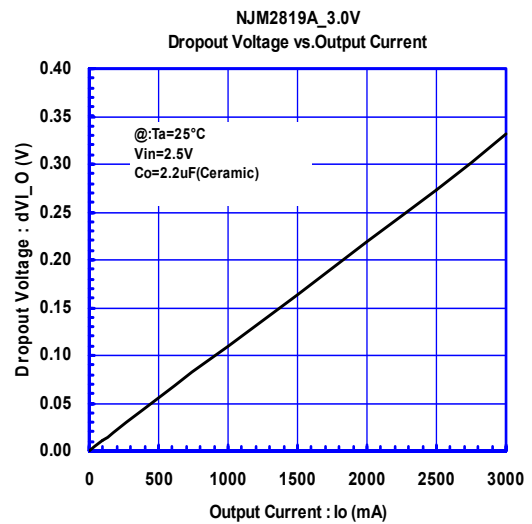
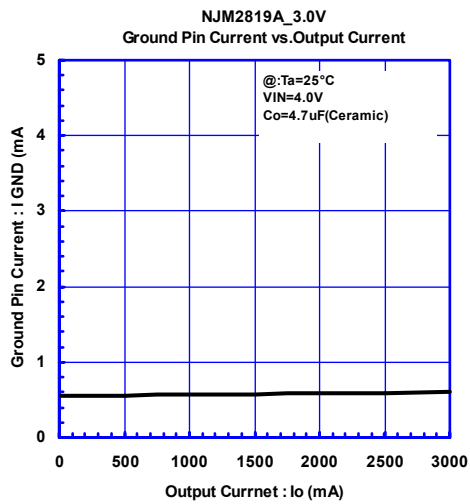
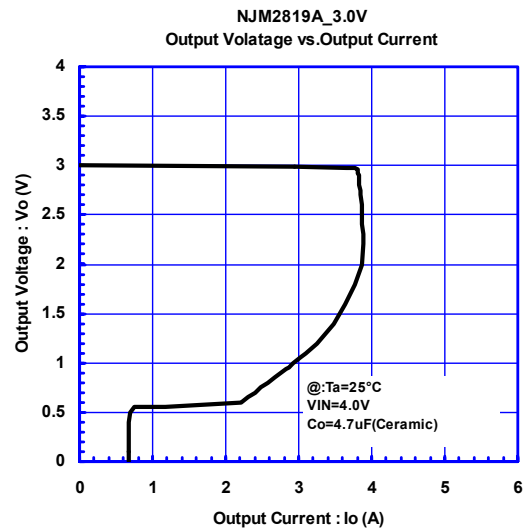
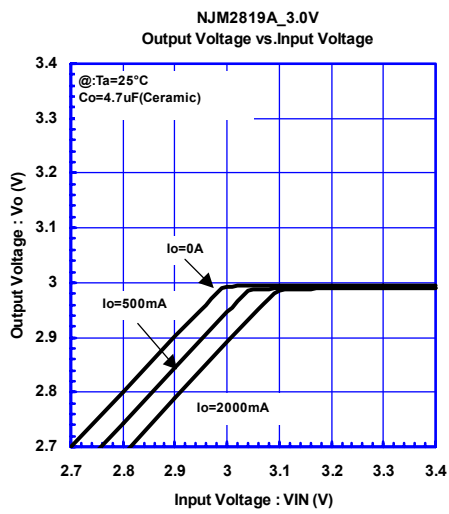
The recommended capacitance depends on the output voltage. Low voltage regulator requires greater value of the  $C_O$ . Thus, check the recommended capacitance for each output voltage.

Use of a greater  $C_O$  reduces output noise and ripple output, and also improves transient response of the output voltage against rapid load change.

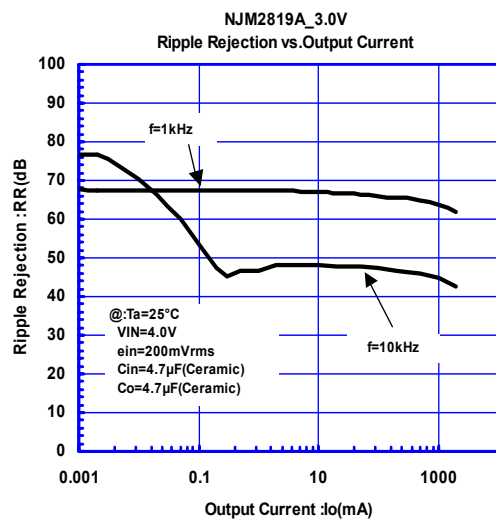
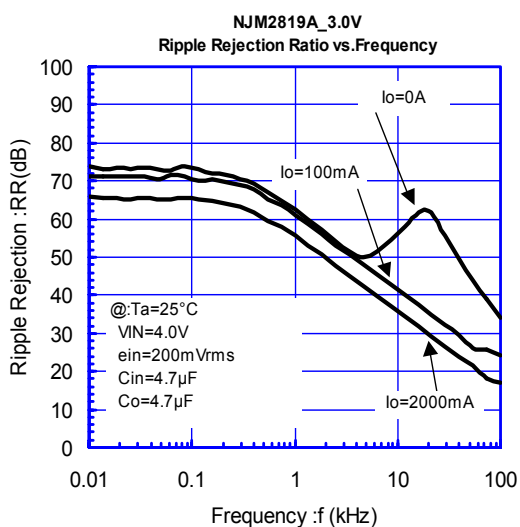
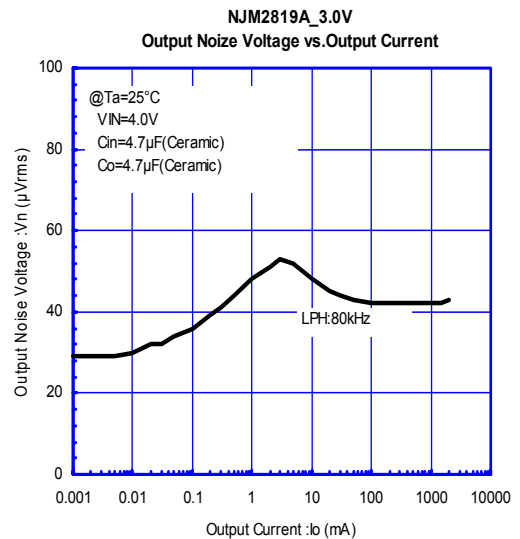
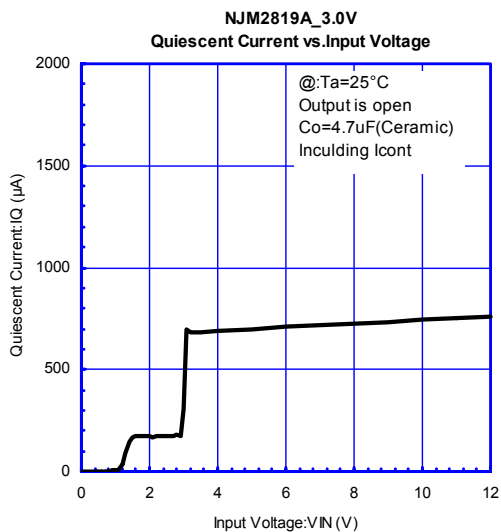
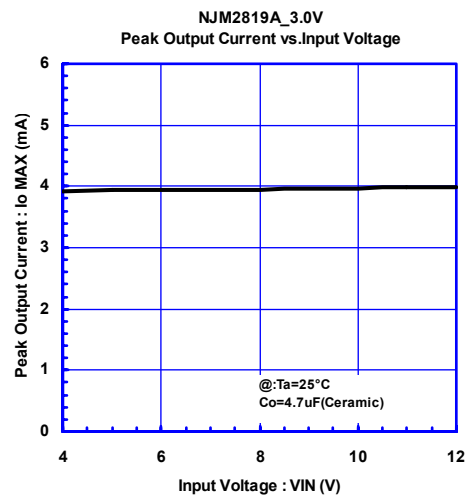
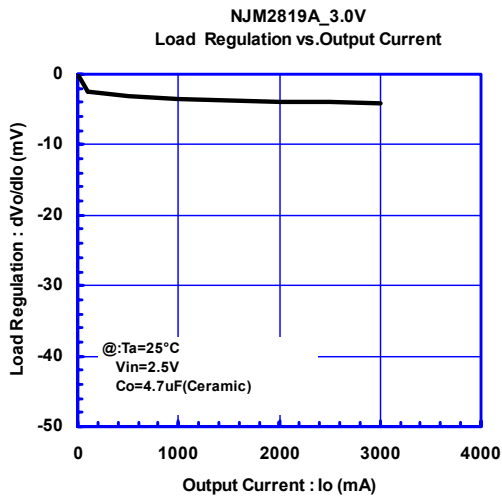
This product is designed to work with any capacitor including a low ESR capacitor for the  $C_O$ ; however, refer "Equivalent Series Resistance vs. Output Current" and choose suitable capacitor.

- \* When distance from an IC to load is long, an IC may cause malfunction by wiring capacity and an L ingredient  
Please use it after having evaluated it enough.

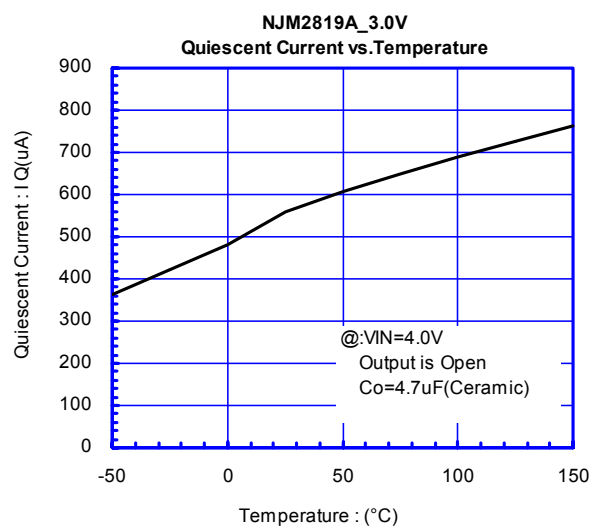
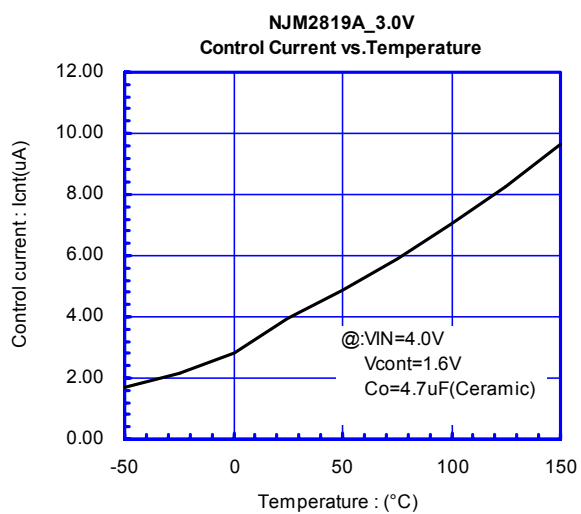
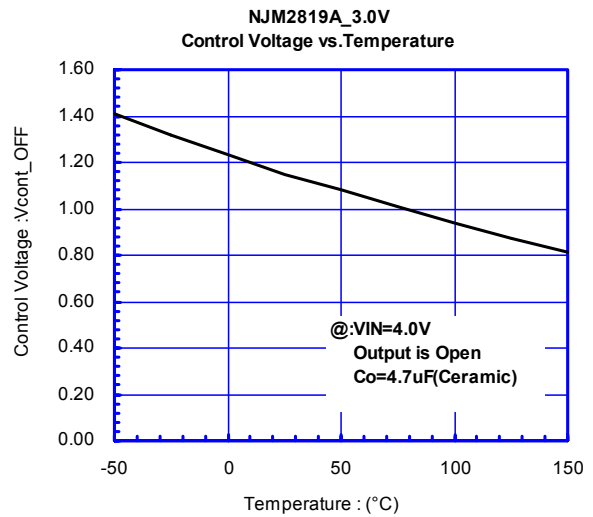
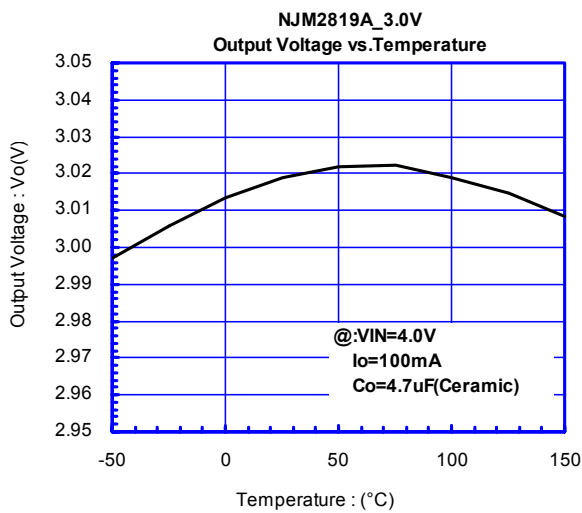
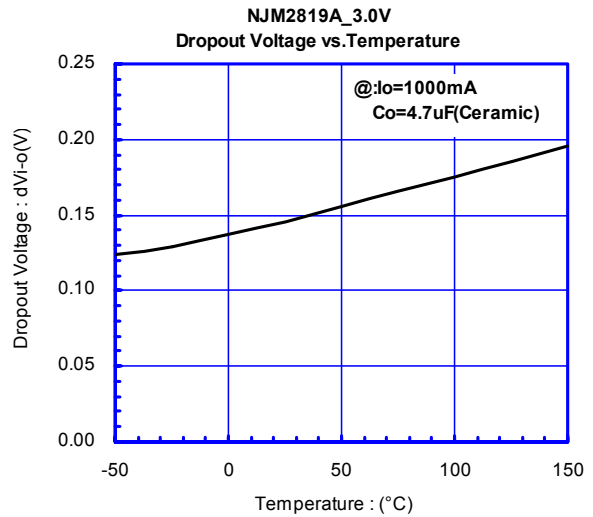
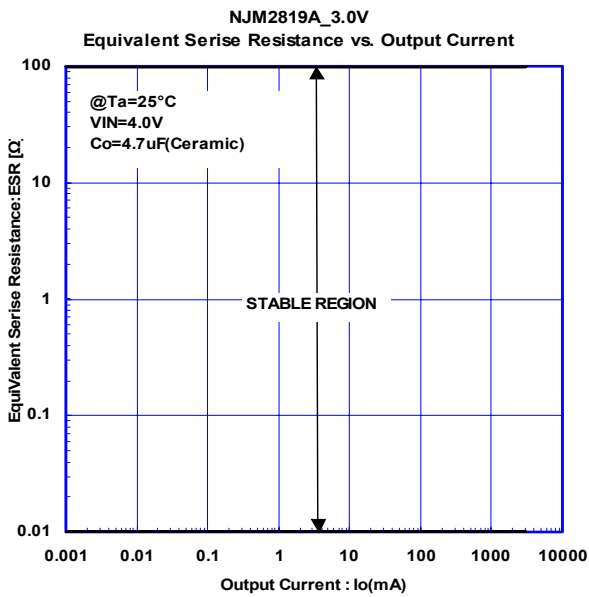
## TYPICAL CHARACTERISTICS



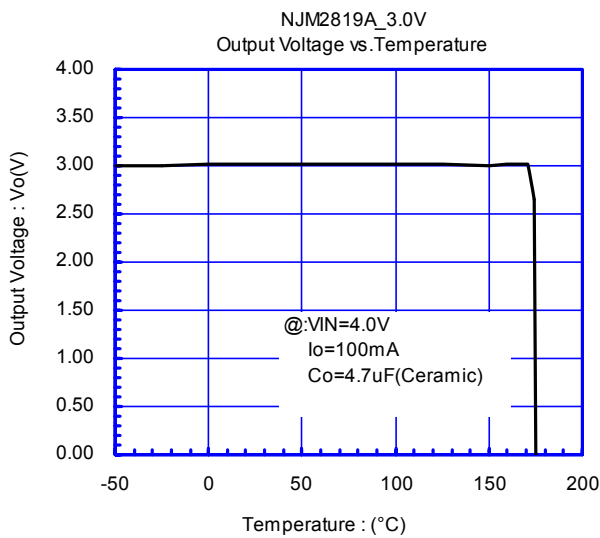
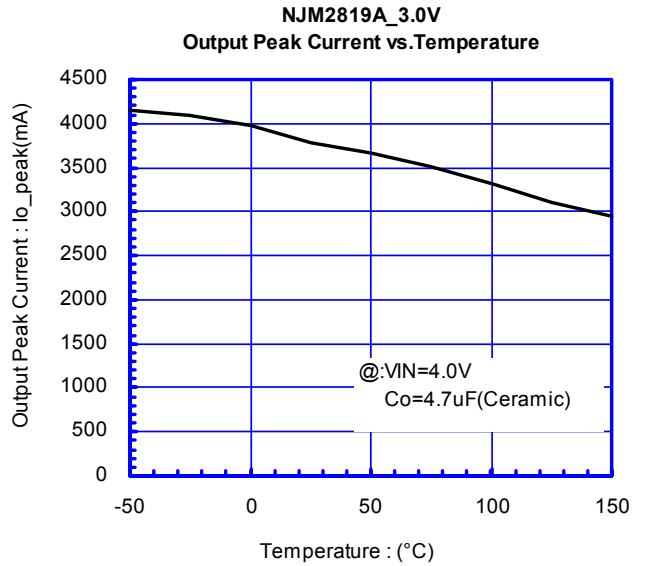
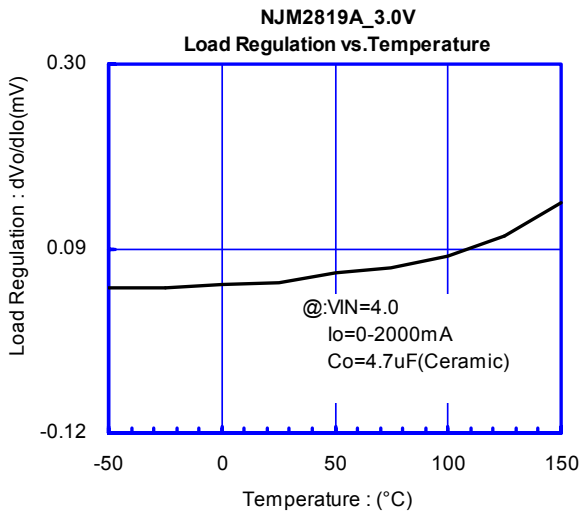
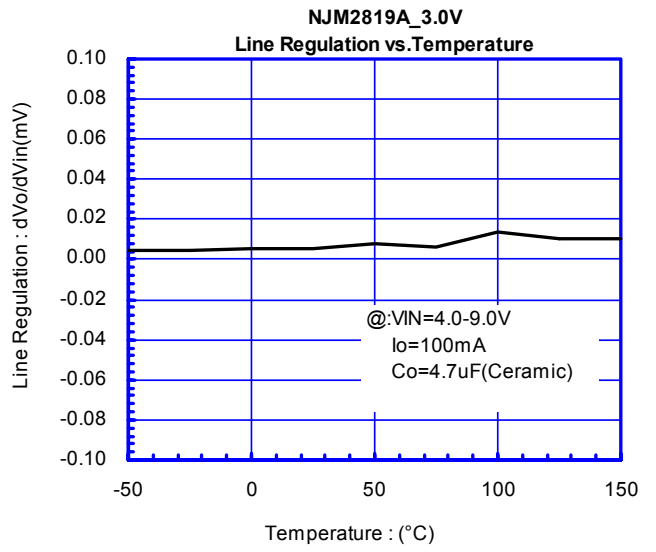
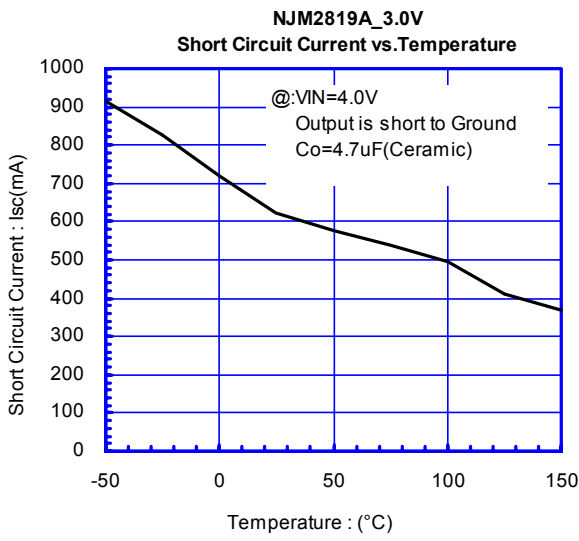
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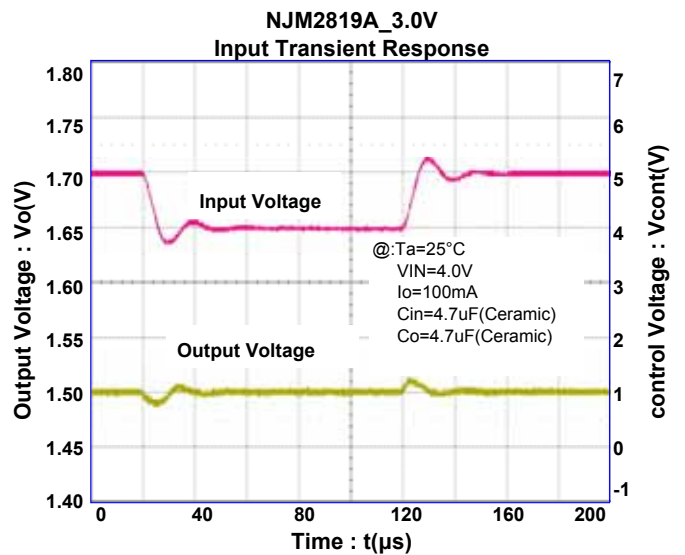
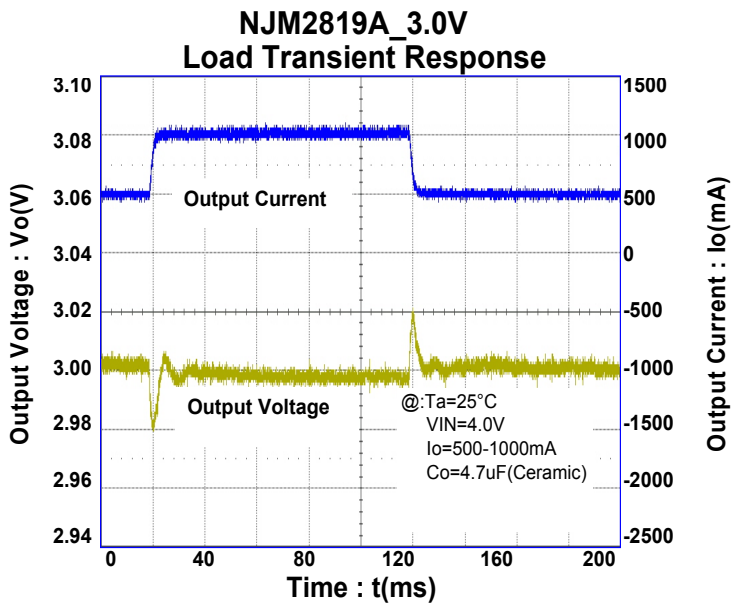
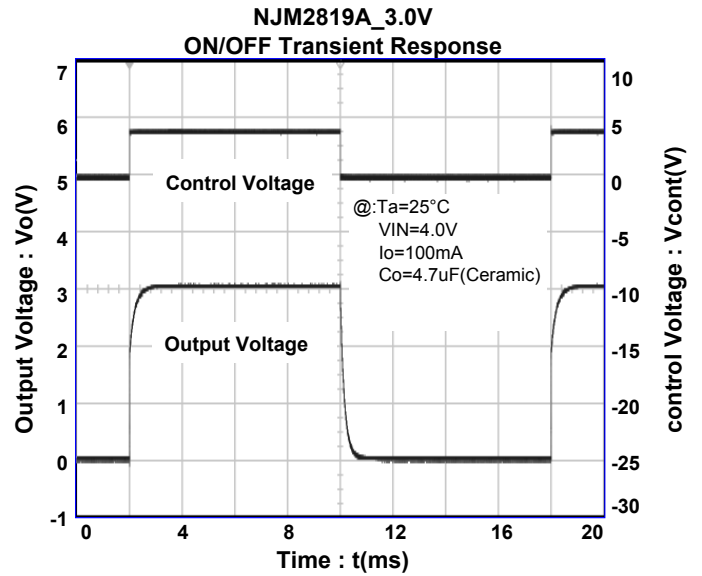
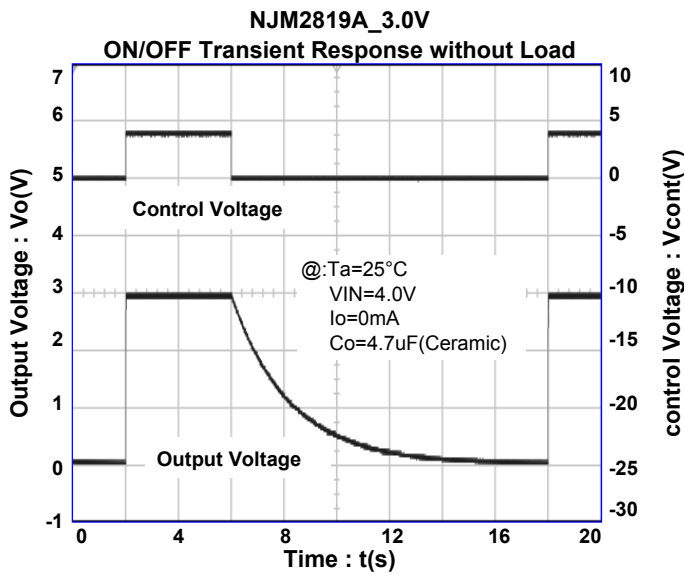






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**[CAUTION]**

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