

## 3OUTPUT LOW DROPOUT VOLTAGE REGULATOR

### ■ GENERAL DESCRIPTION

The NJM2893 is a 3-channel low dropout voltage regulator featuring a low noise, high precision of  $\pm 1.0\%$ , high ripple rejection ratio of 75dB, and 100mA output current (all outputs). It has an ON/OFF function which reduces the quiescent current on stand-by mode. Further the NJM2893 is available in a small and thin surface mount 8-lead MSOP (TVSP) package, and it can use ceramic capacitor of  $1\mu\text{F}$  as an output capacitor. Therefore it can achieve a high-density mounting and is suitable for small precision devices, portable devices and others.

### ■ PACKAGE OUTLINE

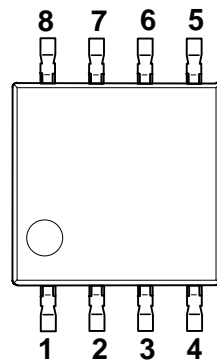


**NJM2893RB1**  
**(MSOP8 (TVSP8))**

### ■ FEATURES

- High Ripple Rejection      75dB typ. (f=1kHz, Vo=3V Version)
- Output Noise Voltage      Vno=45 $\mu\text{V}$  rms typ.
- Output capacitor with 1.0 $\mu\text{F}$  ceramic capacitor (Vo $\geq$ 2.7V)
- Output Current              Io(max.)=100mA x3
- High Precision Output      Vo $\pm$ 1.0%
- Low Dropout Voltage        0.10V typ. (Io=60mA)
- ON/OFF Control            (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline            MSOP8 (TVSP8)\*      \*MEET JEDEC MO-187-DA / THIN TYPE

### ■ PIN CONFIGURATION

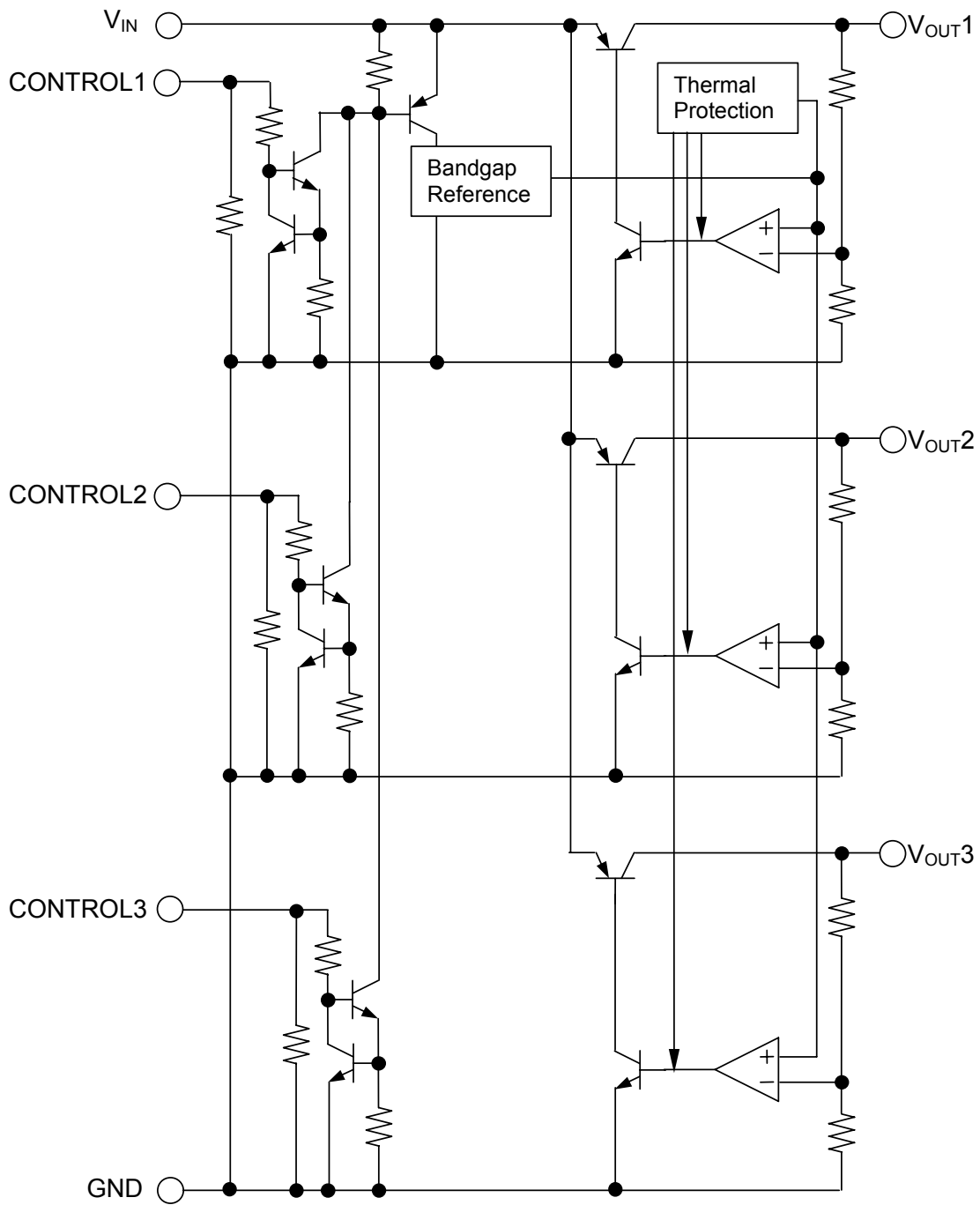


#### PIN FUNCTION

- 1. V<sub>OUT1</sub>
- 2. V<sub>OUT2</sub>
- 3. V<sub>OUT3</sub>
- 4. GND
- 5. CONTROL3
- 6. CONTROL2
- 7. CONTROL1
- 8. V<sub>IN</sub>

**NJM2893RB1**

■ EQUIVALENT CIRCUIT



**■ OUTPUT VOLTAGE RANK LIST**

Device Name	Vout		
	CH1	CH2	CH3
NJM2893RB1-CCC	2.1V	2.1V	2.1V
NJM2893RB1-LLL	3.0V	3.0V	3.0V
NJM2893RB1-YLC	5.0V	3.0V	2.1V

**■ ABSOLUTE MAXIMUM RATINGS** (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	+14	V
Control Voltage	V <sub>CONT</sub>	+14(*1)	V
Power Dissipation	P <sub>D</sub>	320	mW
Operating Temperature	Topr	-40 to +85	°C
Storage Temperature	Tstg	-40 to +125	°C

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

**■ ELECTRICAL CHARACTERISTICS**

(V<sub>IN</sub>=Vo+1V, C<sub>IN</sub>=0.1μF, Co=1.0uF: Vo≥2.7V (Co=2.2uF: Vo≤2.6V), Ta=25°C)

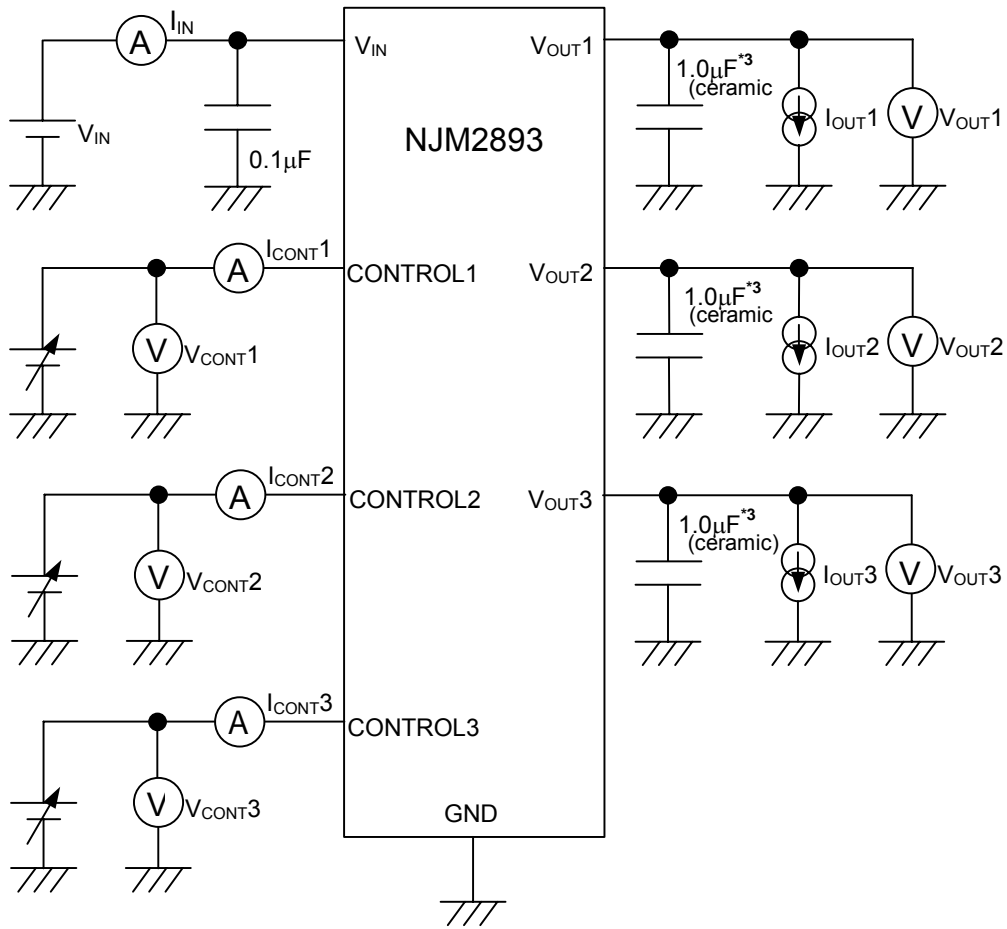
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	-	+1.0%	V
Quiescent Current1	I <sub>Q1</sub>	V <sub>CONT1</sub> =V <sub>IN</sub> , V <sub>CONT2</sub> =V <sub>CONT3</sub> =0V *1ch ON Io=0mA, expect Icont	-	150	220	μA
Quiescent Current2	I <sub>Q2</sub>	V <sub>CONT1</sub> =V <sub>CONT2</sub> =V <sub>IN</sub> , V <sub>CONT3</sub> =0V *2ch ON Io=0mA, expect Icont	-	270	400	μA
Quiescent Current3	I <sub>Q3</sub>	V <sub>CONT1</sub> =V <sub>CONT2</sub> =V <sub>CONT3</sub> =V <sub>IN</sub> Io=0mA, expect Icont	-	390	580	μA
Quiescent Current at Control OFF	I <sub>Q(OFF)</sub>	V <sub>CONT</sub> =0V	-	-	100	nA
Output Current	Io	Vo-0.3V	150	200	-	mA
Line Regulation	ΔVo/ΔV <sub>IN</sub>	V <sub>IN</sub> =Vo+1V to Vo+6V, Io=30mA	-	-	0.10	%/V
Load Regulation	ΔVo/ΔIo1	Io=0 to 100mA	-	-	0.03	%/mA
Dropout Voltage	ΔV <sub>L-O1</sub>	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	ΔVo/ΔTa	Ta=0 to 85°C, Io=10mA	-	±50	-	ppm/°C
Output Noise Voltage	V <sub>NO</sub>	f=10Hz to 80kHz, Io=10mA, Vo=3V Version	-	45	-	μVrms
Control Voltage for ON-state	V <sub>CONT(ON)</sub>		1.6	-	-	V
Control Voltage for OFF-state	V <sub>CONT(OFF)</sub>		-	-	0.6	V

(\*2) V<sub>IN</sub> =Vo+1V means add 1V to higher output voltage.

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.

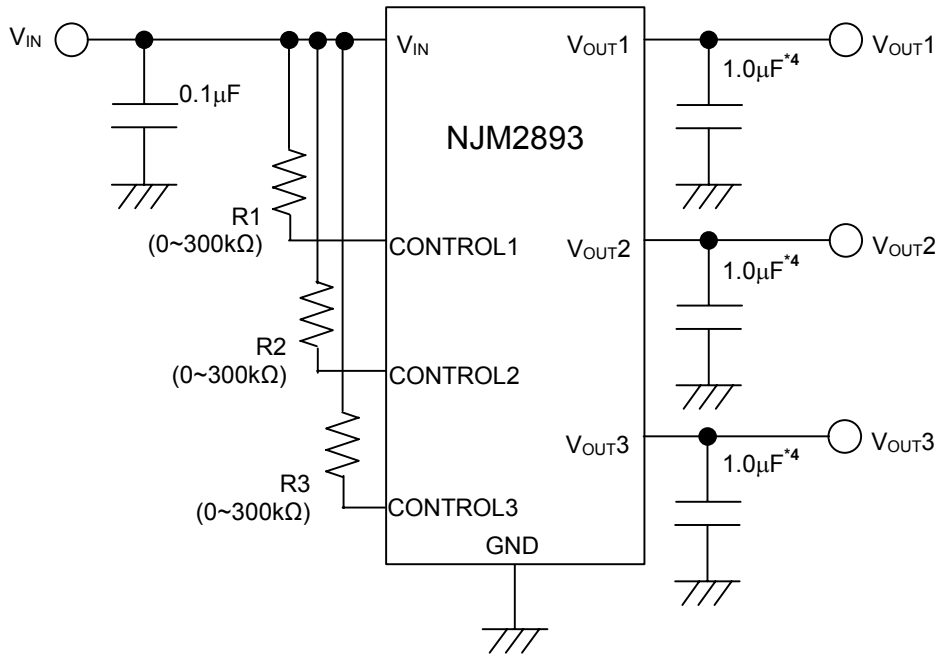
■ TEST CIRCUIT



\*3  $V_o \leq 2.6V$  version:  $C_o = 2.2\mu F$  (ceramic)

■ TYPICAL APPLICATION

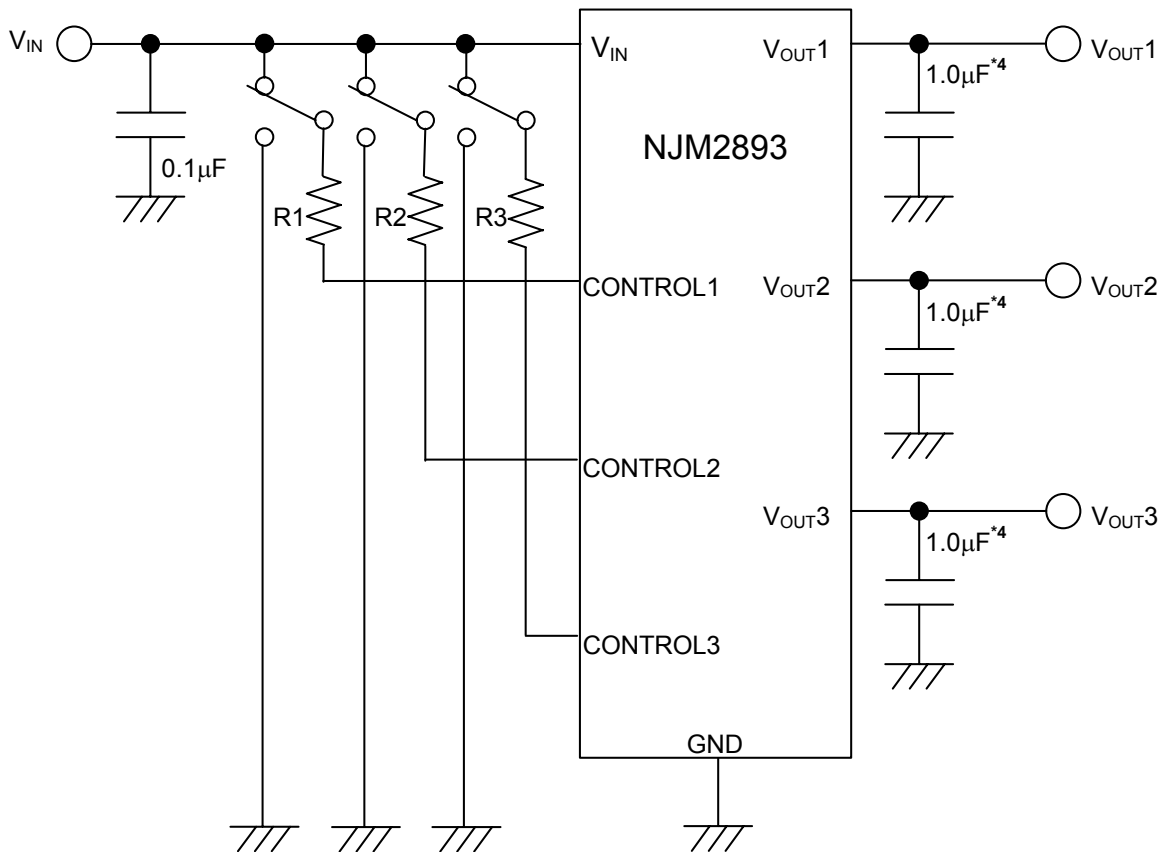
① In the case where ON/OFF Control is not required:



\*4  $V_o \leq 2.6V$  version:  $C_o = 2.2 \mu F$

Connect control terminal to  $V_{IN}$  terminal

② In use of ON/OFF CONTROL:



\*4  $V_o \leq 2.6V$  version:  $C_o = 2.2\mu F$

State of control terminal:

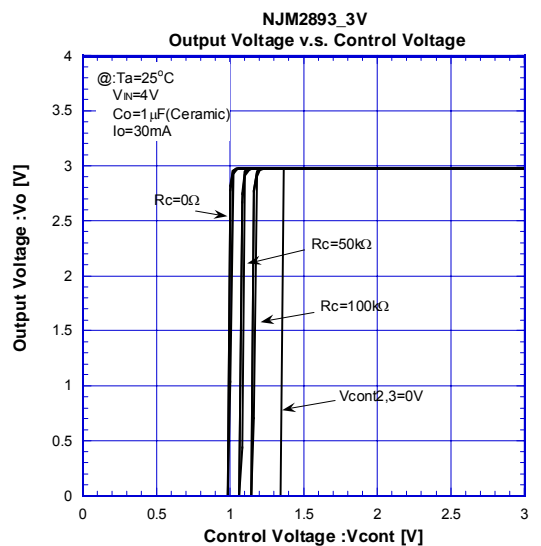
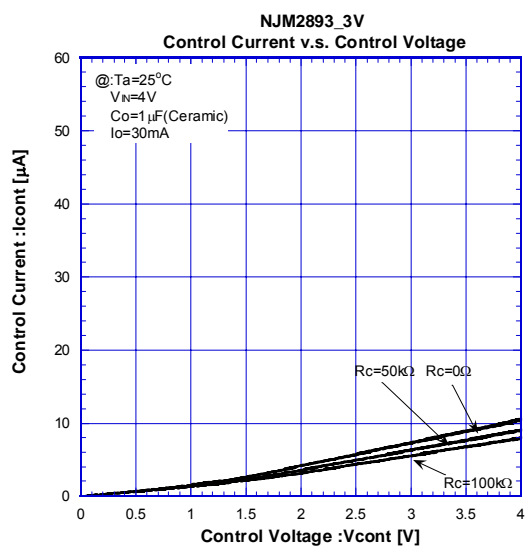
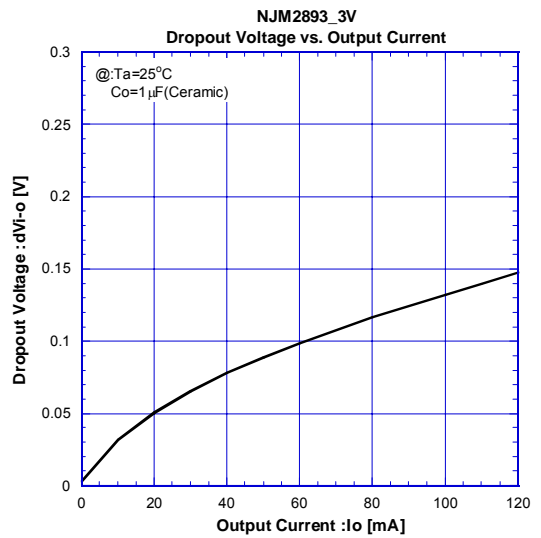
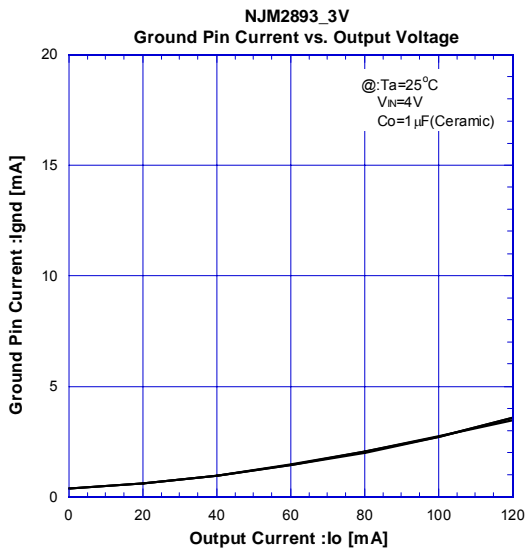
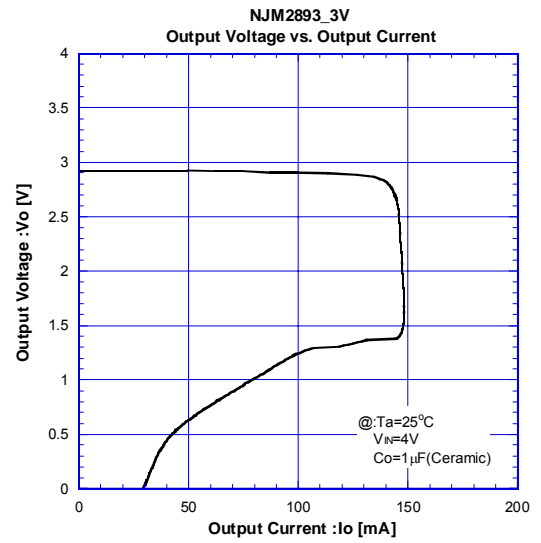
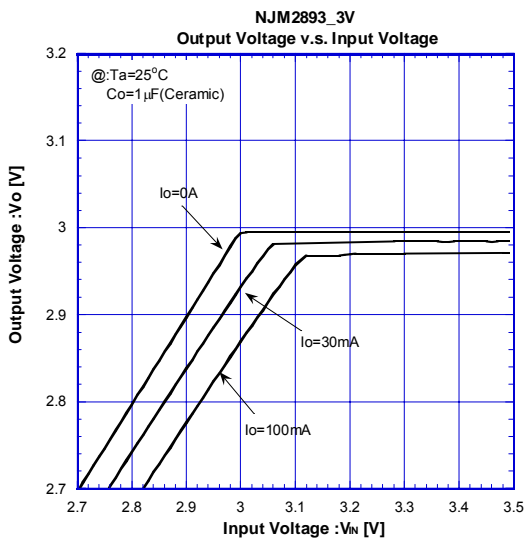
- “H” → output is enabled.
- “L” or “open” → output is disabled.

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

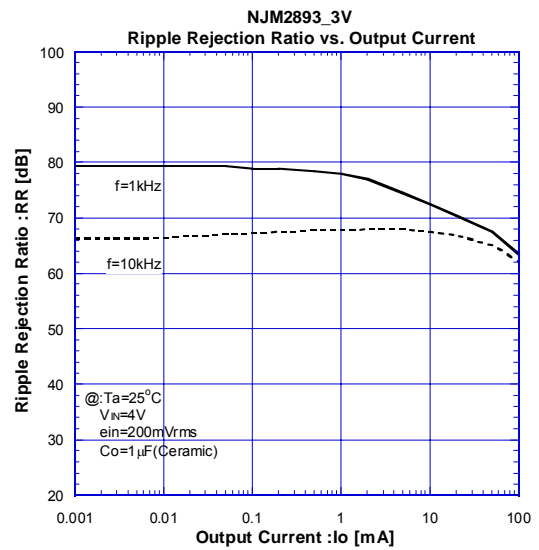
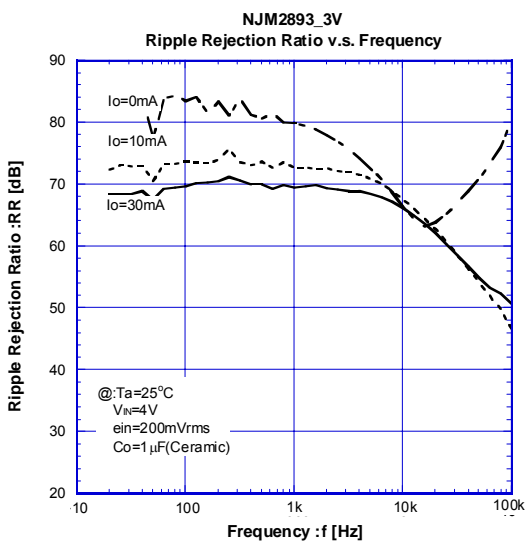
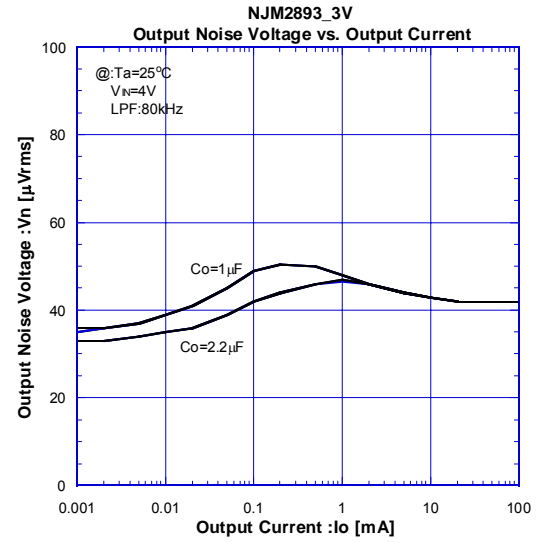
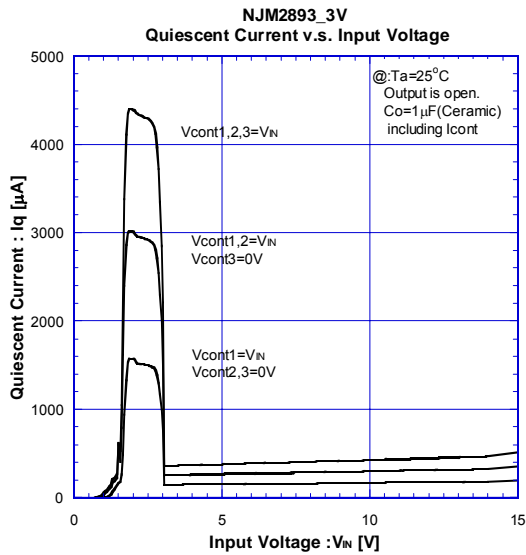
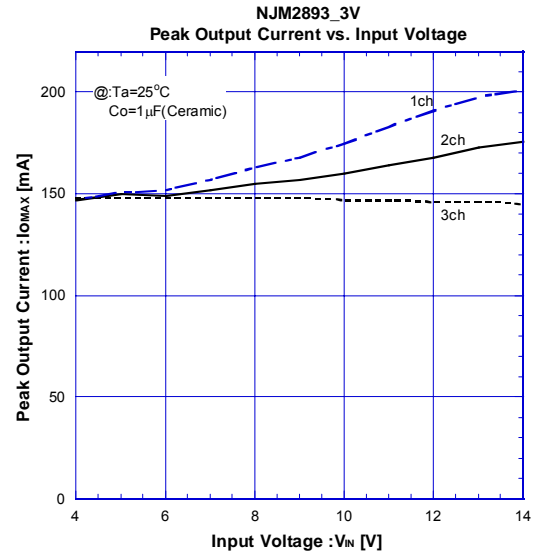
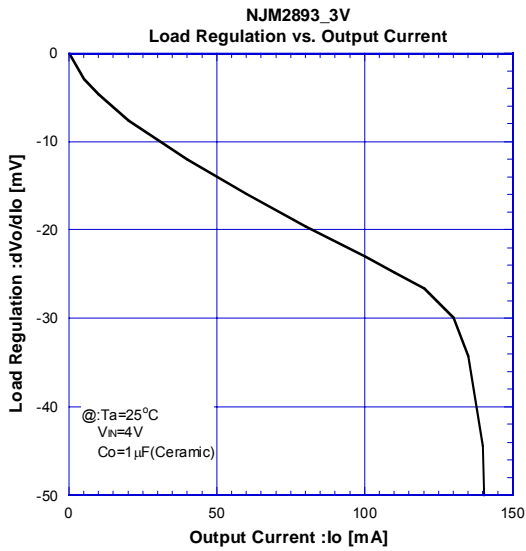
The current flow into the control terminal while the IC is ON state ( $I_{CONT}$ ) can be reduced when a pull up resistance "R" is inserted between  $V_{IN}$  and the control terminal.

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.

## ELECTRICAL CHARACTERISTICS

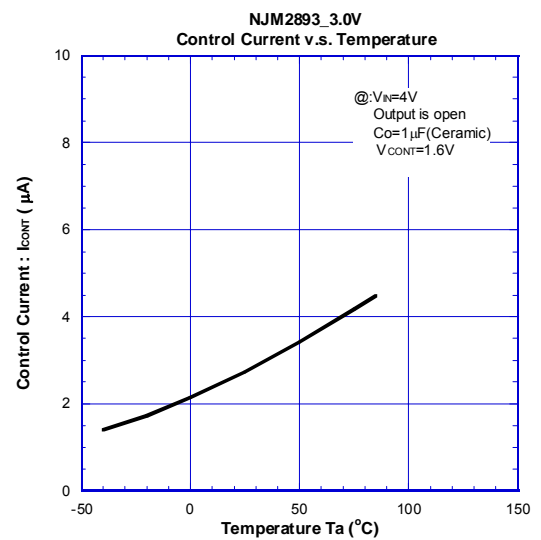
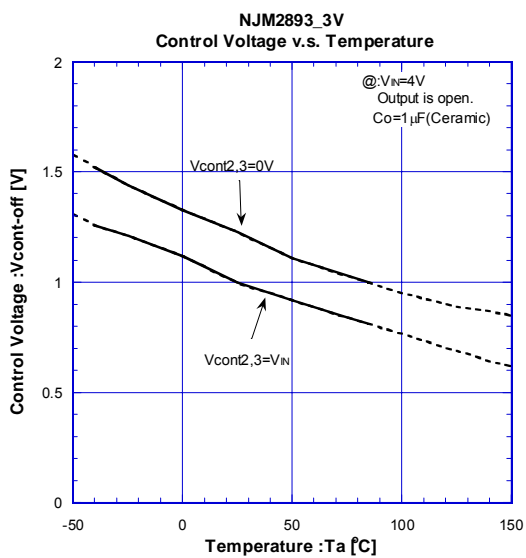
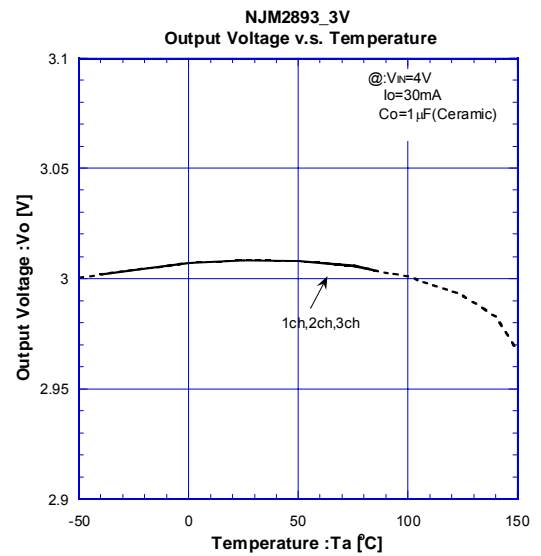
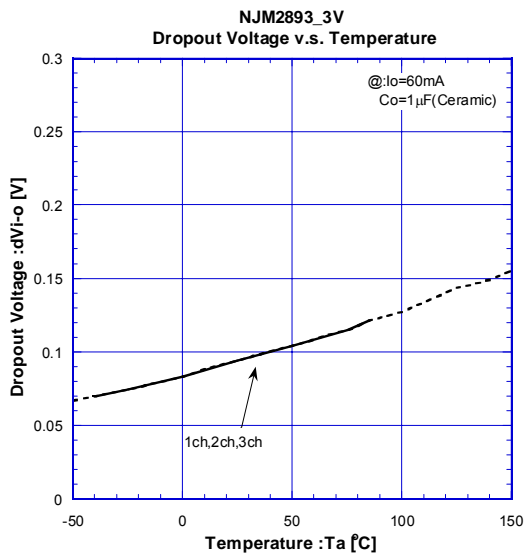
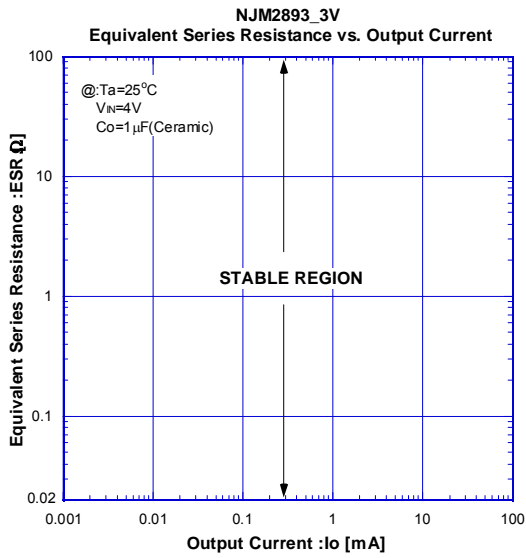


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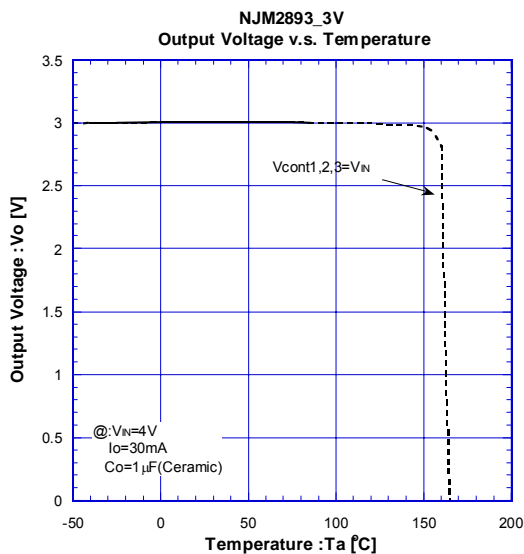
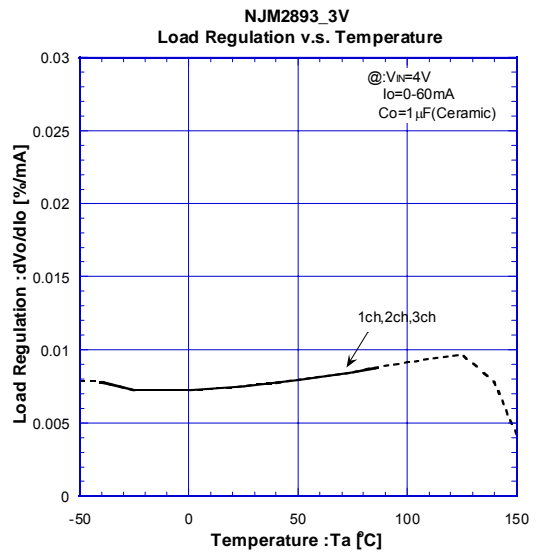
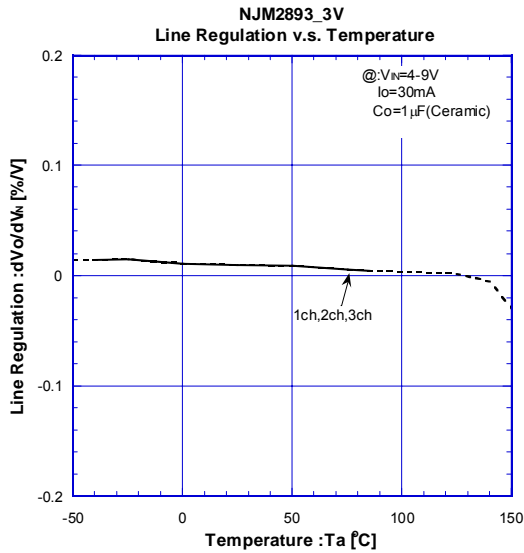
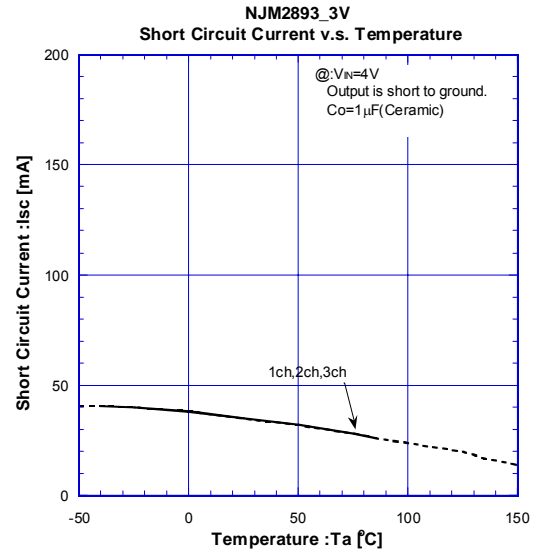
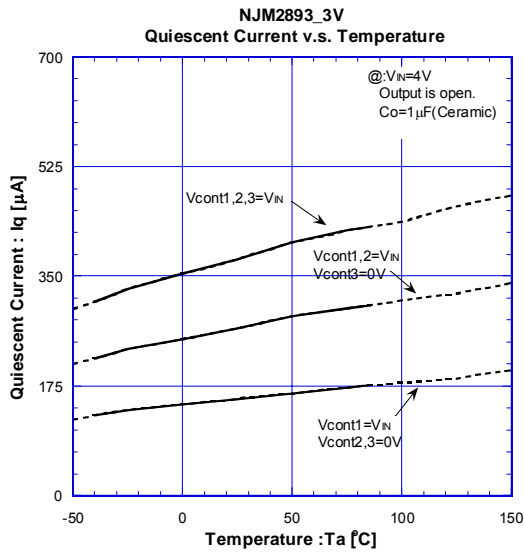




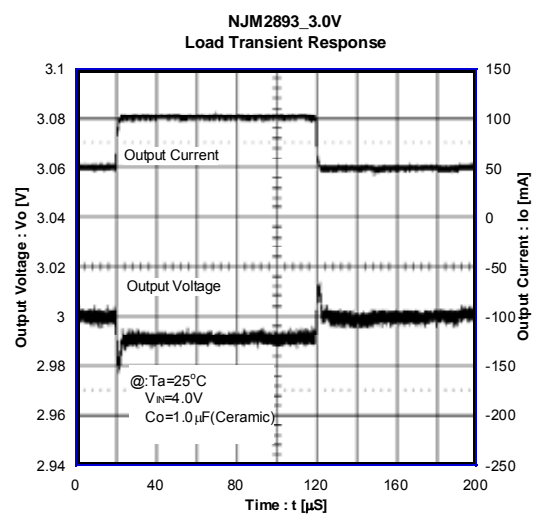
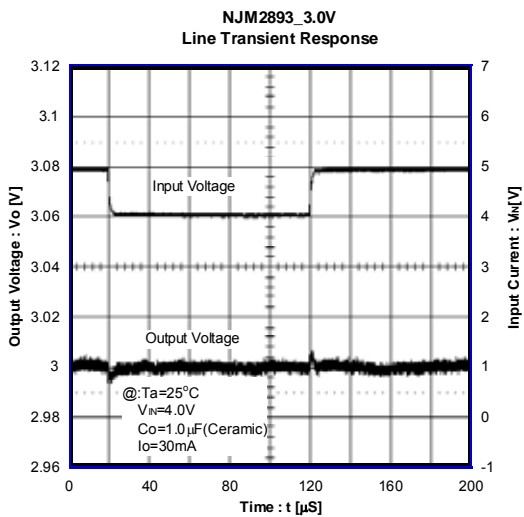
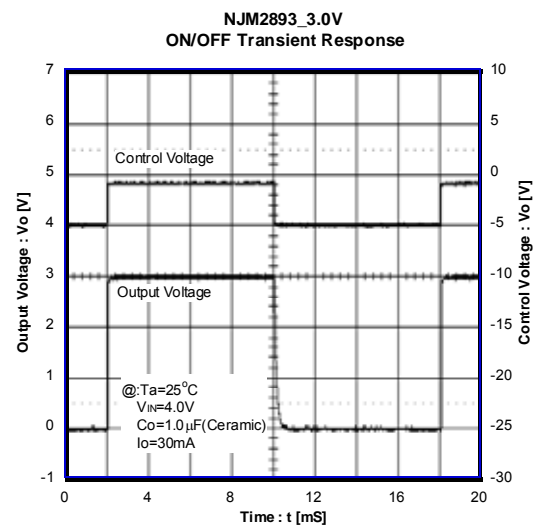
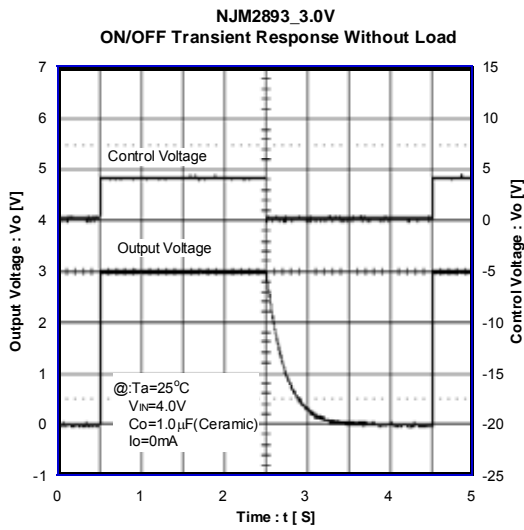
## ELECTRICAL CHARACTERISTICS



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**[CAUTION]**

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