

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

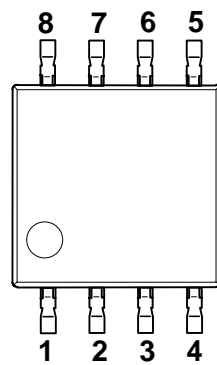


NJM2893RB1
(MSOP8 (TVSP8))

■ FEATURES

- High Ripple Rejection 75dB typ. (f=1kHz, Vo=3V Version)
- Output Noise Voltage Vno=45 μV rms typ.
- Output capacitor with 1.0 μF 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

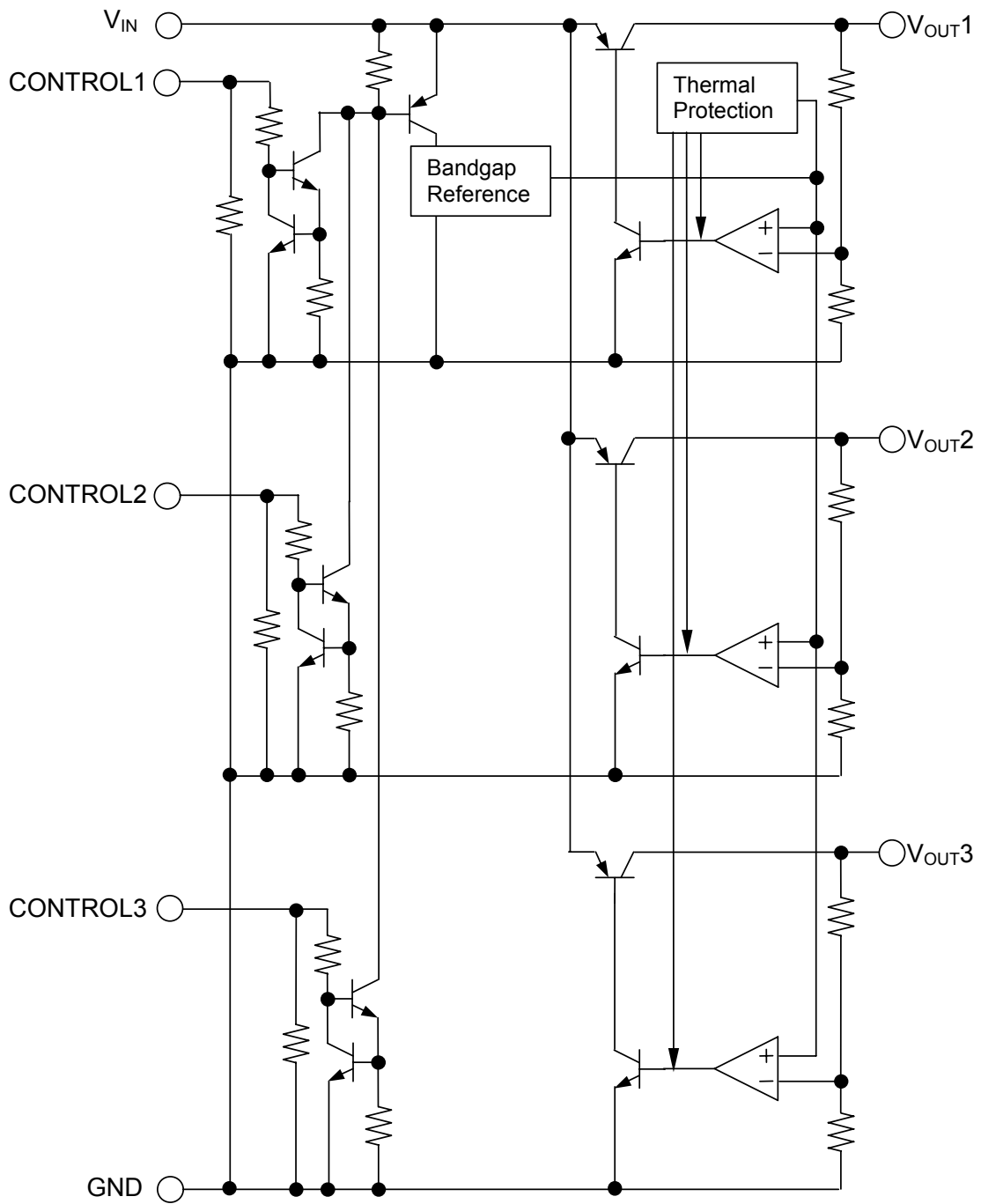


PIN FUNCTION

- 1. V_{OUT1}
- 2. V_{OUT2}
- 3. V_{OUT3}
- 4. GND
- 5. CONTROL3
- 6. CONTROL2
- 7. CONTROL1
- 8. V_{IN}

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 _{IN}	+14	V
Control Voltage	V _{CONT}	+14(*1)	V
Power Dissipation	P _D	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_{IN}=Vo+1V, C_{IN}=0.1μF, Co=1.0uF: Vo≥2.7V (Co=2.2uF: Vo≤2.6V), Ta=25°C)

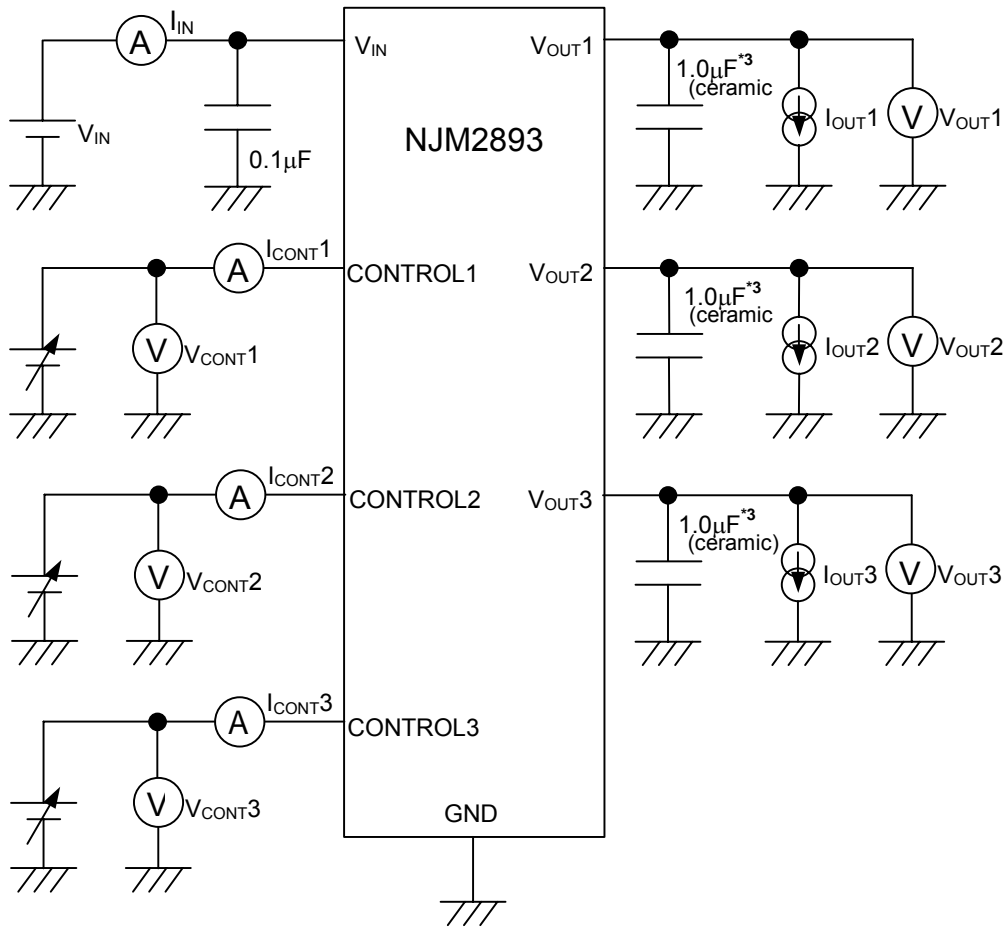
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	-	+1.0%	V
Quiescent Current1	I _{Q1}	V _{CONT1} =V _{IN} , V _{CONT2} =V _{CONT3} =0V *1ch ON Io=0mA, expect Icont	-	150	220	μA
Quiescent Current2	I _{Q2}	V _{CONT1} =V _{CONT2} =V _{IN} , V _{CONT3} =0V *2ch ON Io=0mA, expect Icont	-	270	400	μA
Quiescent Current3	I _{Q3}	V _{CONT1} =V _{CONT2} =V _{CONT3} =V _{IN} Io=0mA, expect Icont	-	390	580	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	ΔVo/ΔV _{IN}	V _{IN} =Vo+1V to Vo+6V, Io=30mA	-	-	0.10	%/V
Load Regulation	ΔVo/ΔIo1	Io=0 to 100mA	-	-	0.03	%/mA
Dropout Voltage	ΔV _{L-O1}	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 _{NO}	f=10Hz to 80kHz, Io=10mA, Vo=3V Version	-	45	-	μVrms
Control Voltage for ON-state	V _{CONT(ON)}		1.6	-	-	V
Control Voltage for OFF-state	V _{CONT(OFF)}		-	-	0.6	V

(*2) V_{IN} =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.

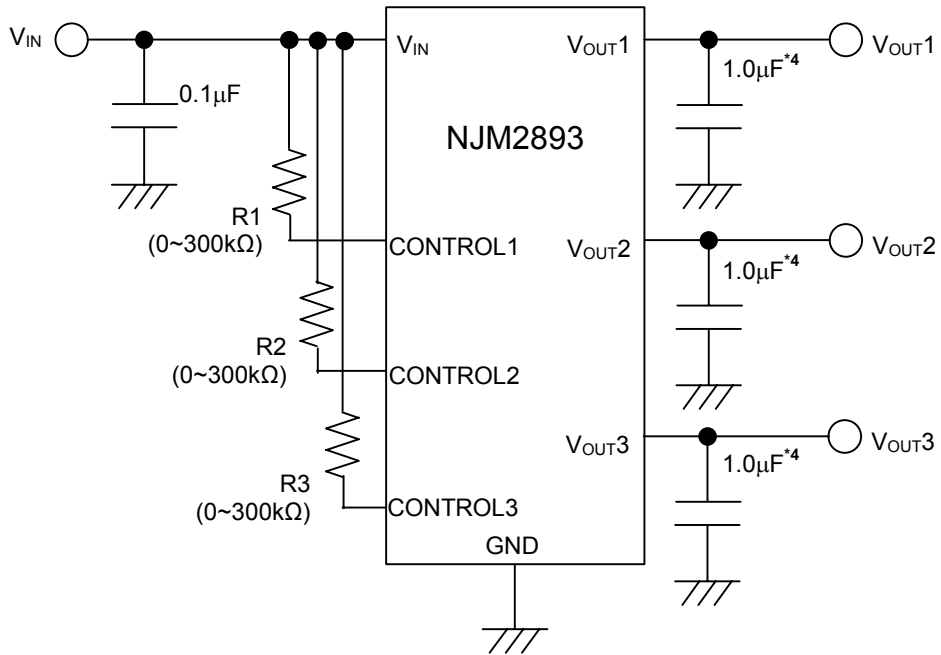
■ TEST CIRCUIT



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

■ TYPICAL APPLICATION

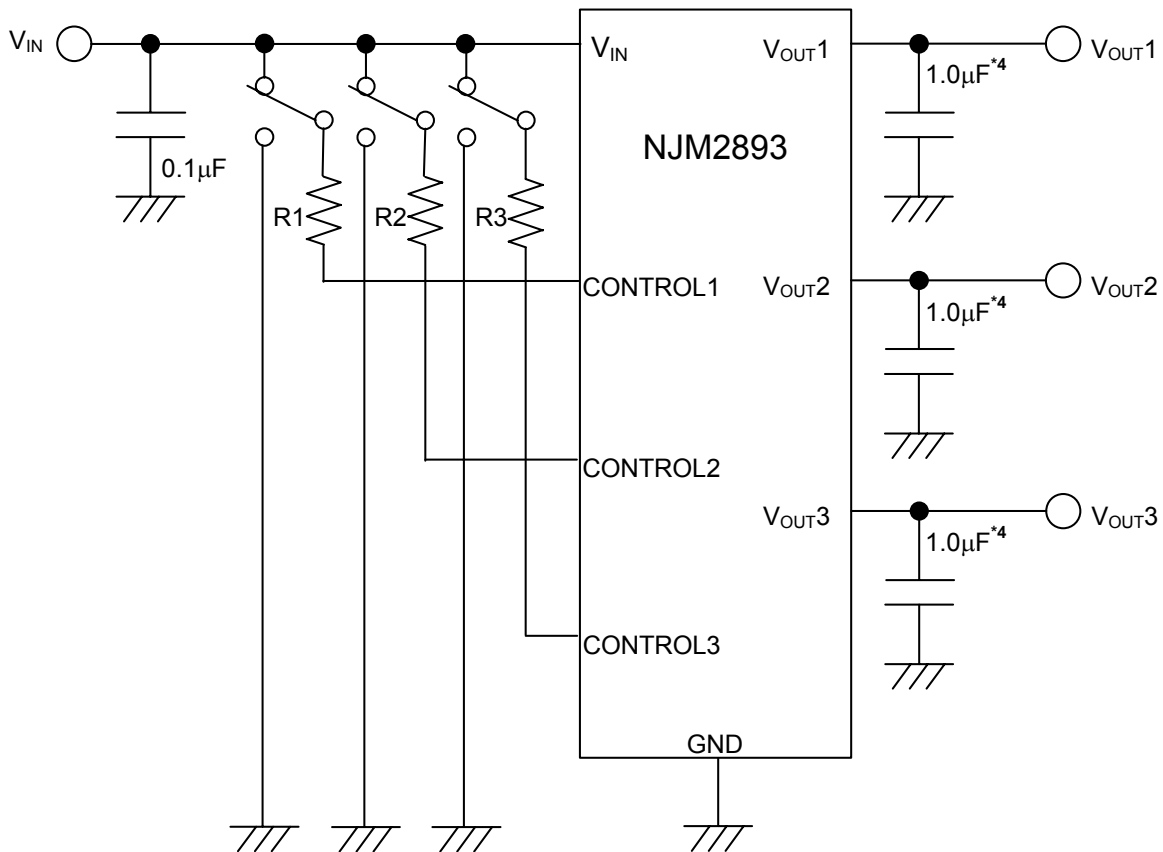
① In the case where ON/OFF Control is not required:



*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:

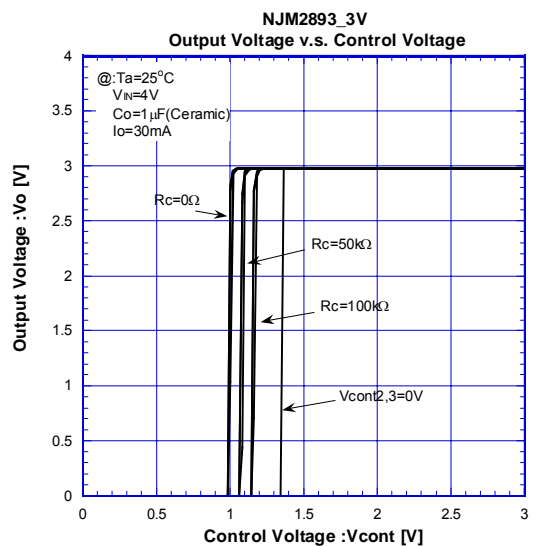
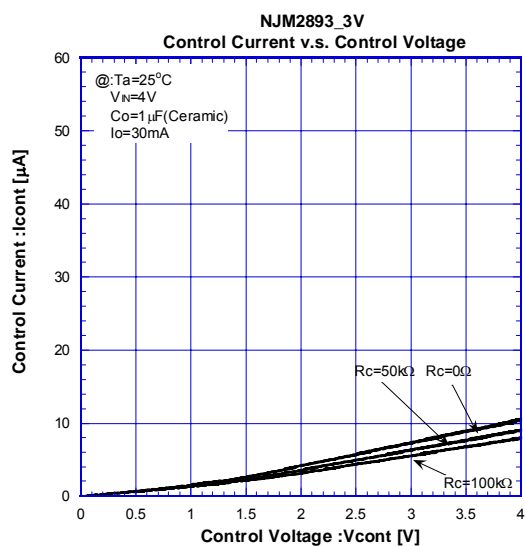
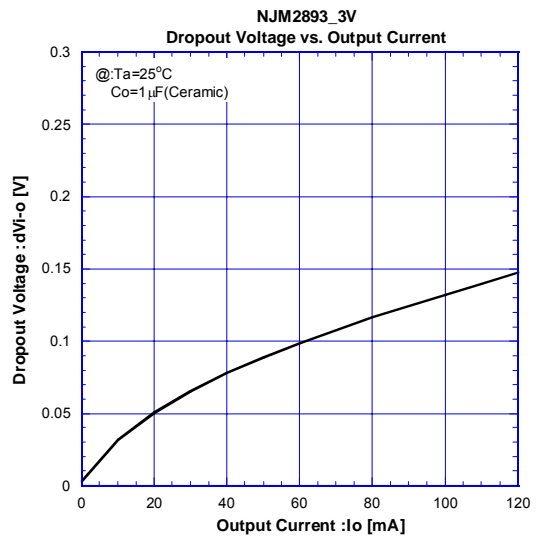
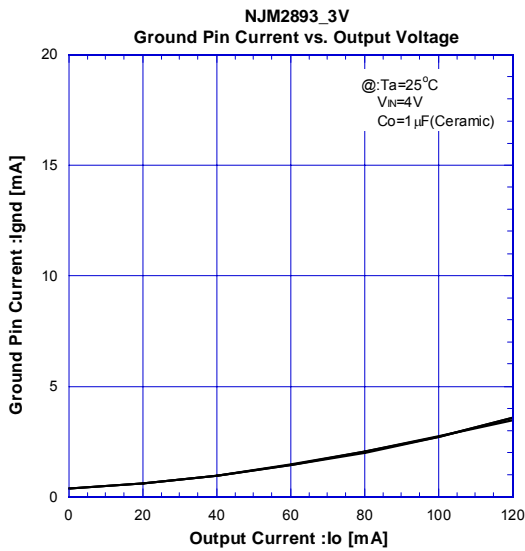
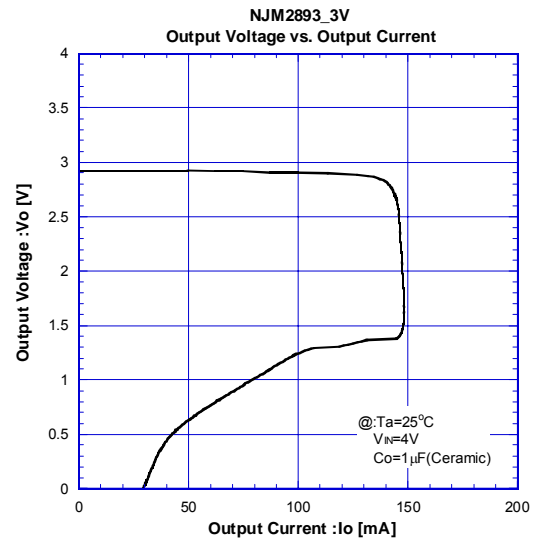
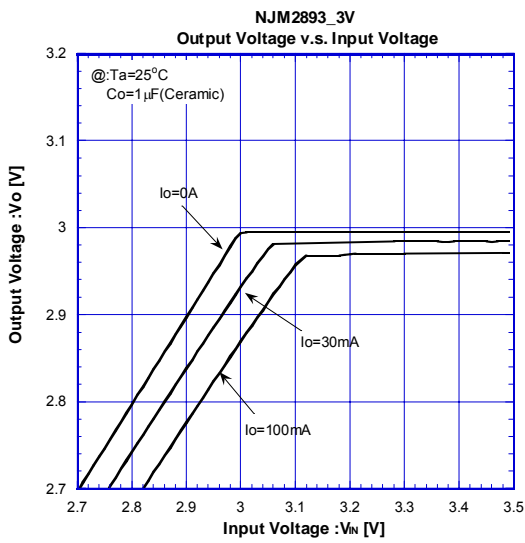
- “H” → output is enabled.
- “L” or “open” → output is disabled.

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

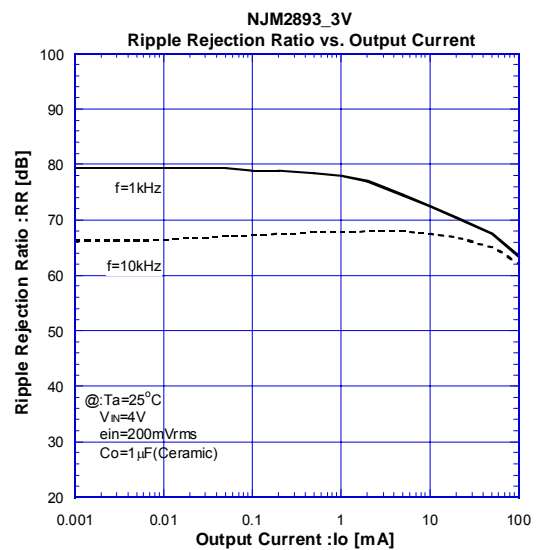
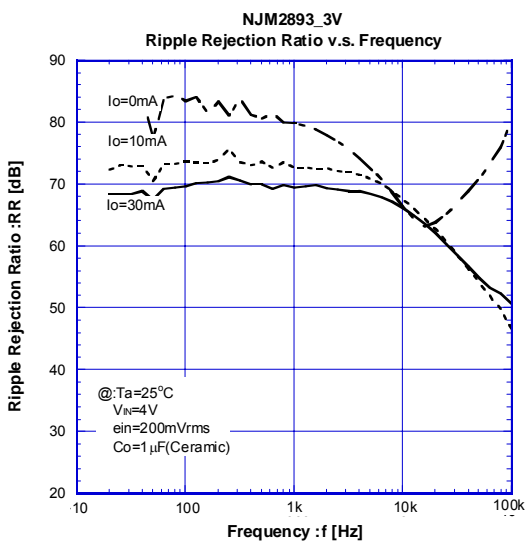
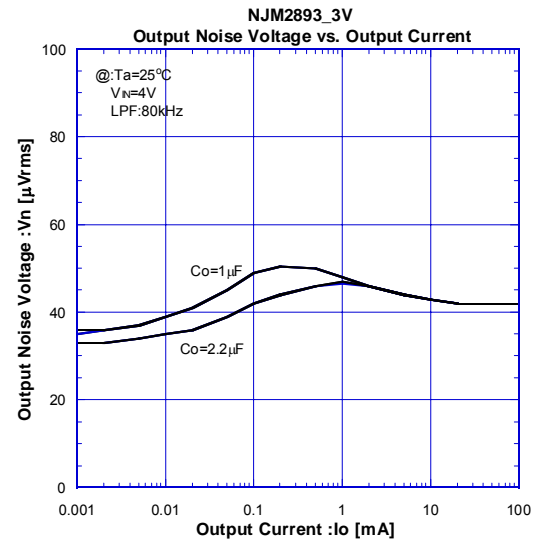
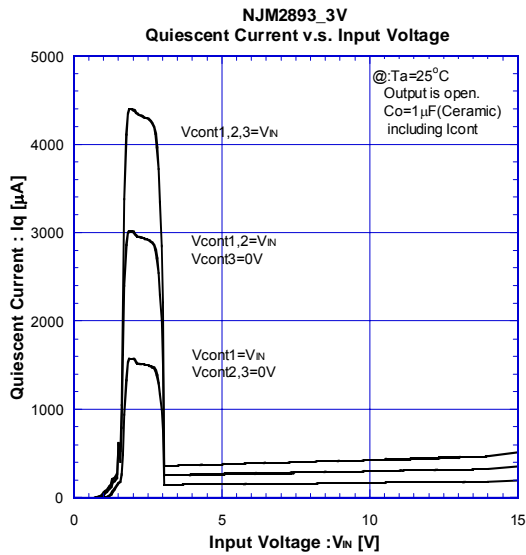
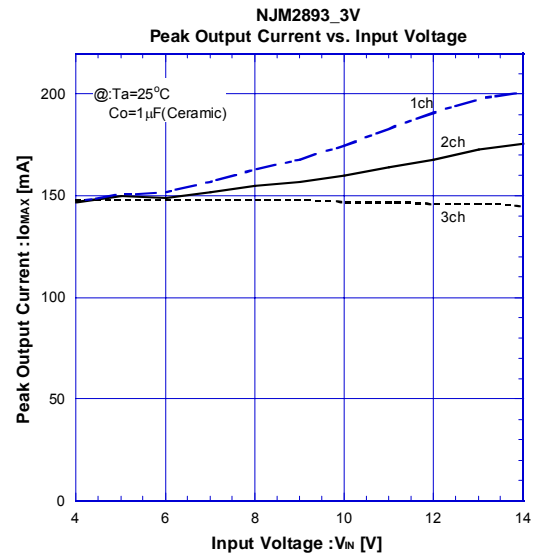
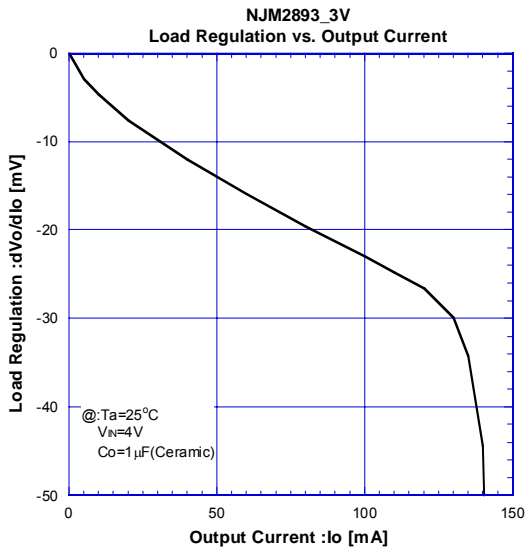
The current flow into the control terminal while the IC is ON state (I_{CONT}) can be reduced when a pull up resistance "R" is inserted between V_{IN} and the control terminal.

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.

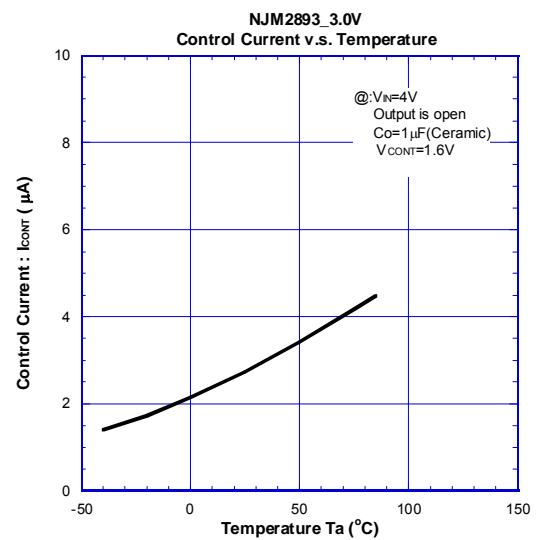
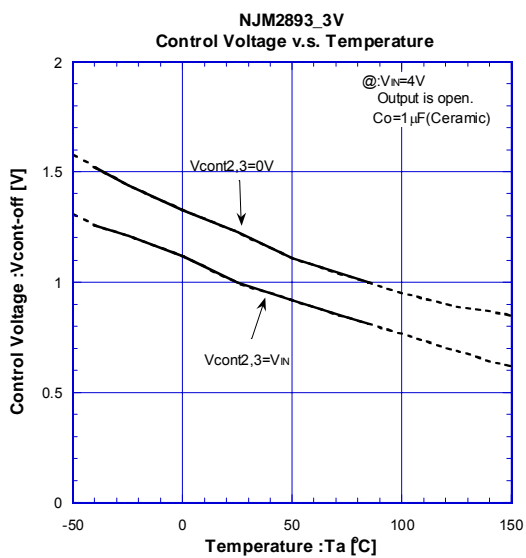
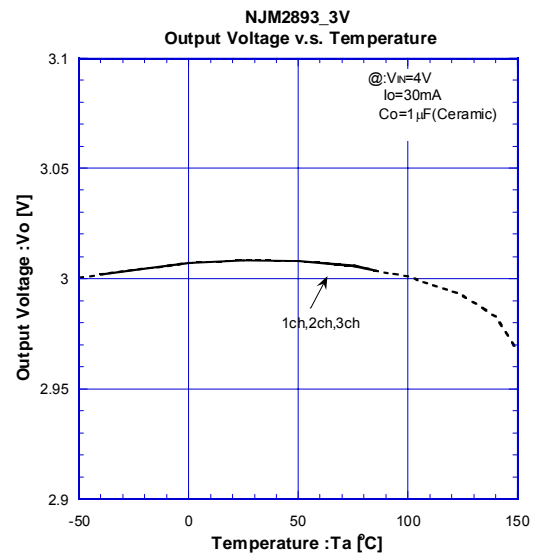
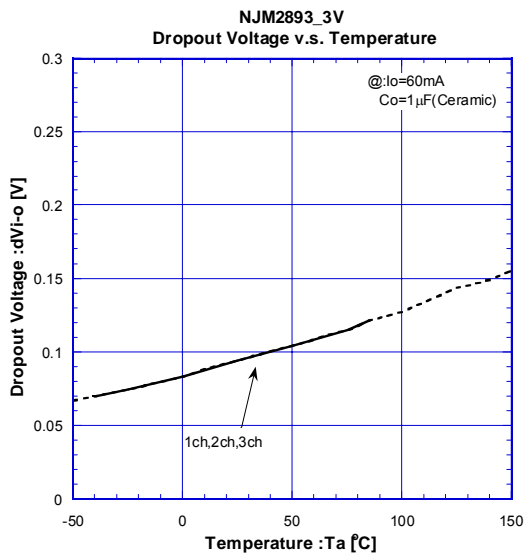
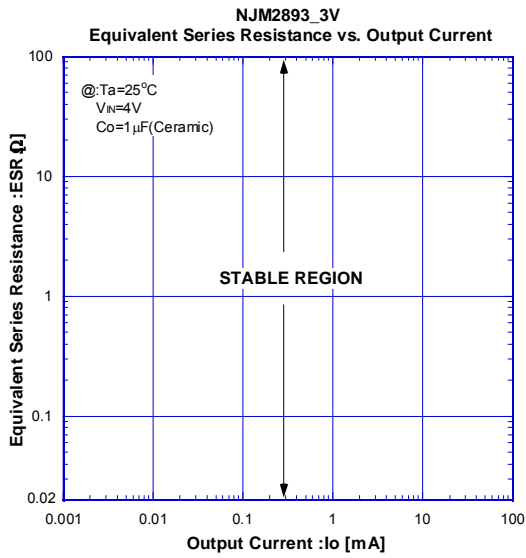
ELECTRICAL CHARACTERISTICS



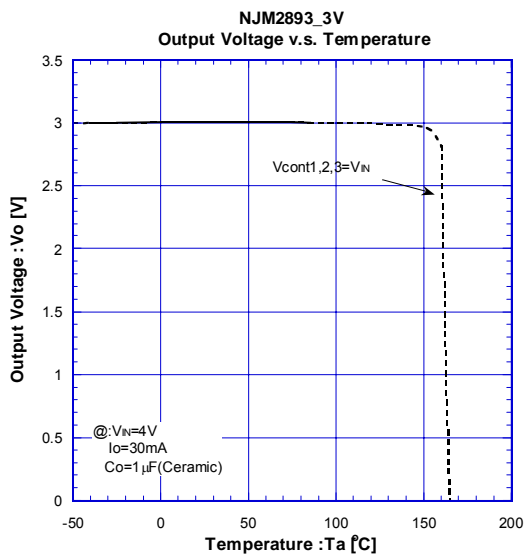
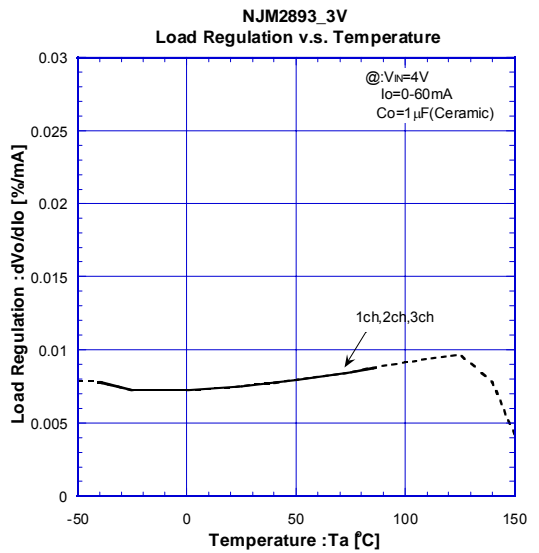
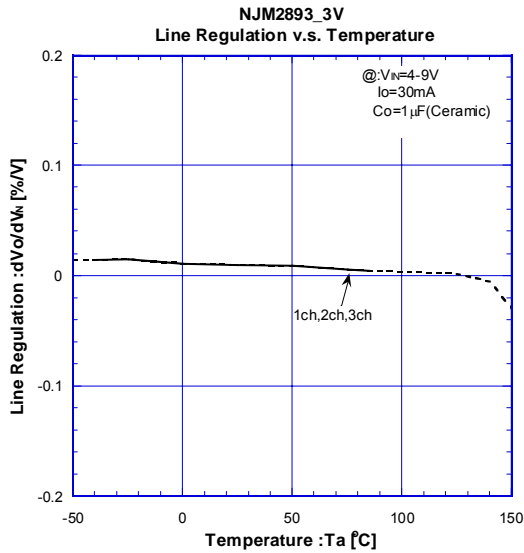
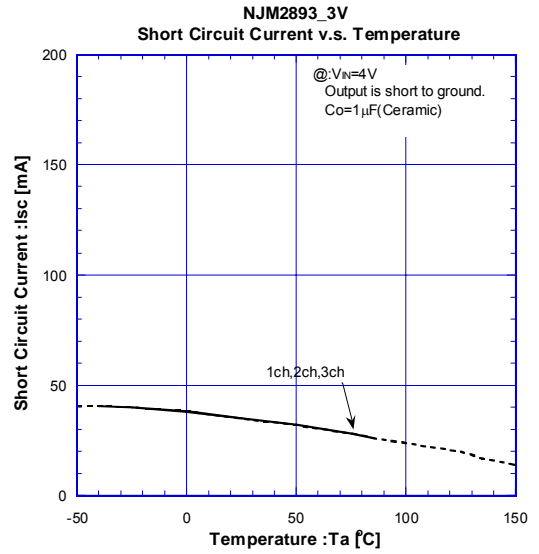
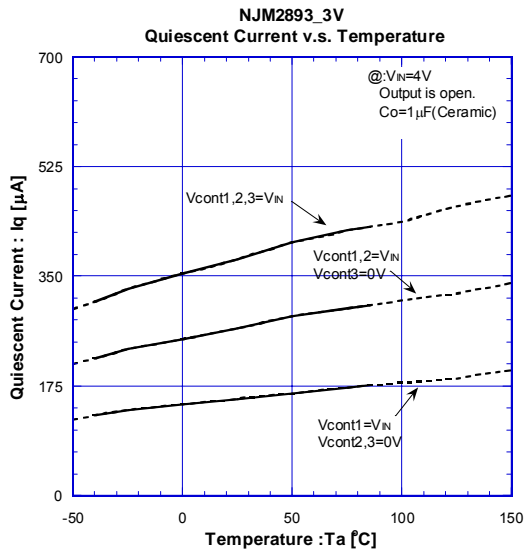
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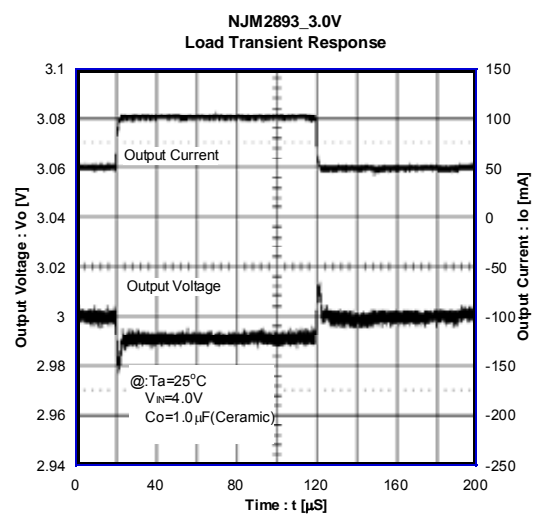
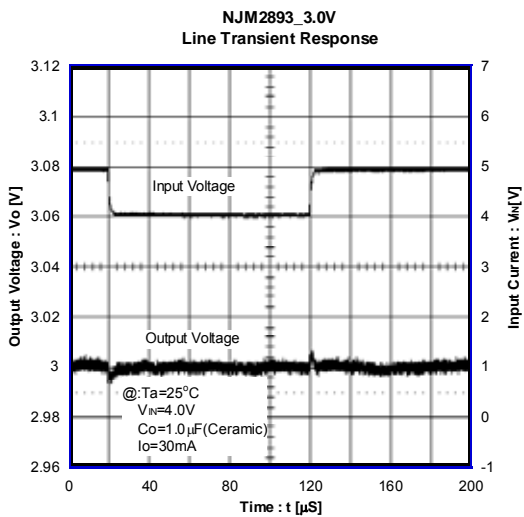
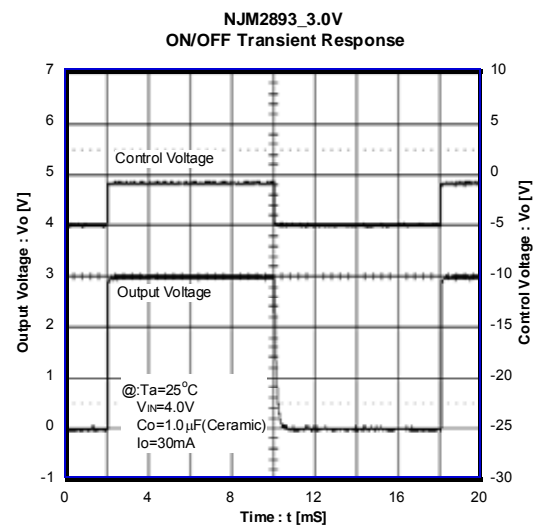
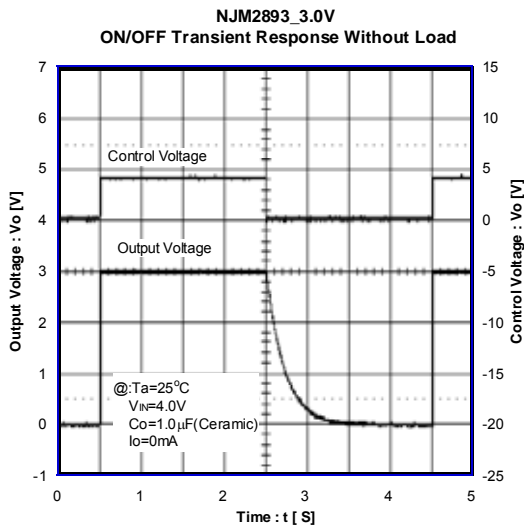
ELECTRICAL CHARACTERISTICS



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■ ELECTRICAL CHARACTERISTICS



[CAUTION]

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