# 3OUTPUT LOW DROPOUT VOLTAGE REGULATOR

## ■ GENERAL DESCRIPTION

The NJM2894 is a 3ch low dropout voltage regulator with ON/OFF control in TVSP-8 package.
It is suitable for camcorder, IC decoder, camera and other portable items.

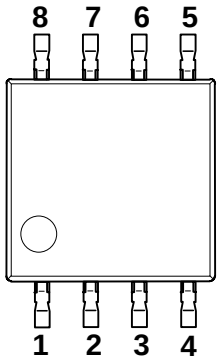
## ■ PACKAGE OUTLINE

NJM2894RB1

## ■ FEATURES

- High Ripple Rejection 75dB typ. (f=1kHz,Vo=3V Version)
- Output Noise Voltage Vno=45μVrms typ.
- Output capacitor with 1.0uF ceramic capacitor (Vo≥2.7V)
- Output Current Io(max.)=ch1=150mA ch2,ch3=80mA
- High Precision Output Vo±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 TVSP-8

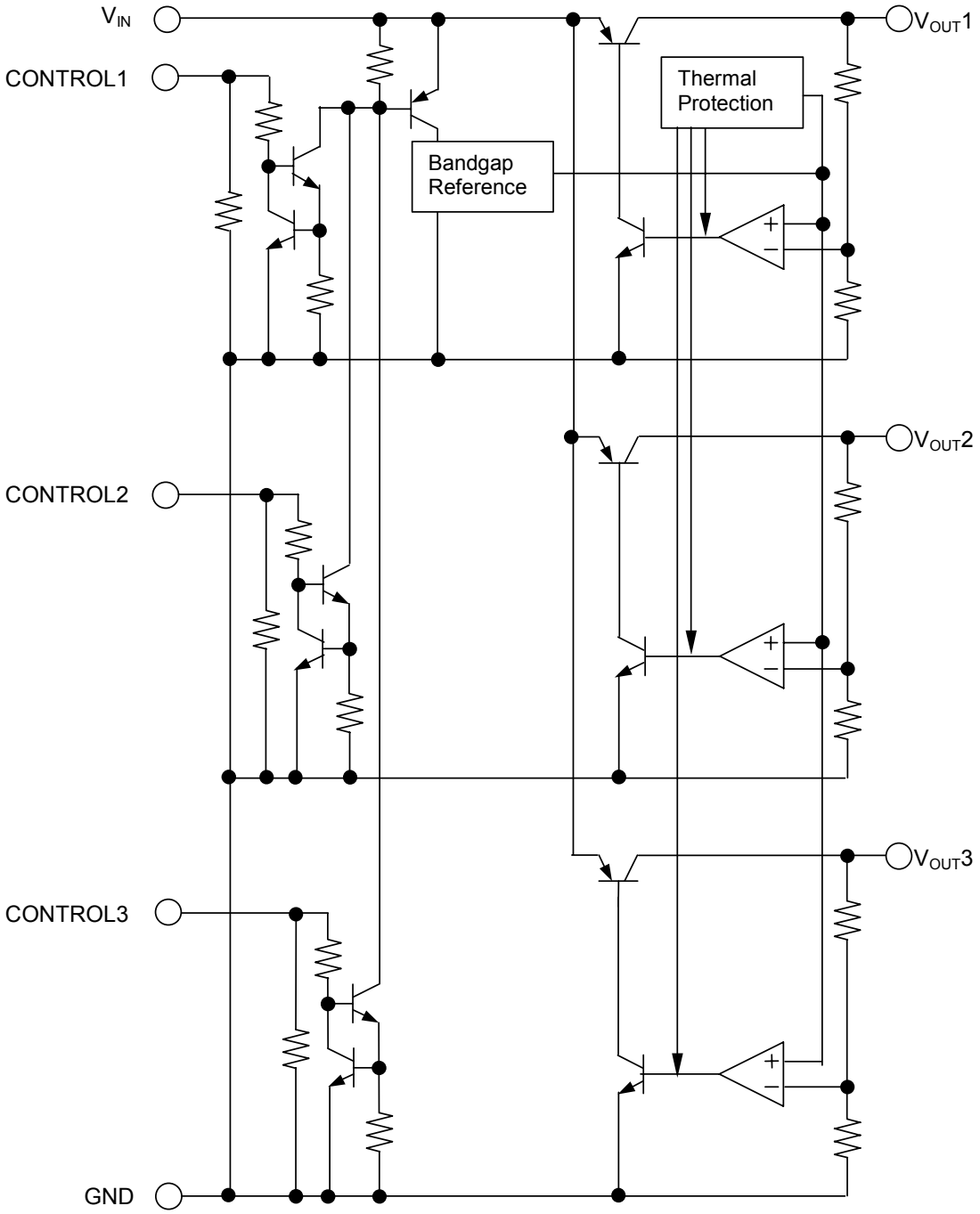
## ■ PIN CONFIGURATION




PIN FUNCTION
1.$V_{OUT}1$
2.$V_{OUT}2$
3.$V_{OUT}3$
4.GND
5.CONTROL3
6.CONTROL2
7.CONTROL1
8.$V_{IN}$

NJM2894RB1-xxx

■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST

| Device Name | Vout | | |
|---|---|---|---|
| | CH1 | CH2 | CH3 |
| NJM2894RB1-CCC | 2.1V | 2.1V | 2.1V |
| NJM2894RB1-LLL | 3.0V | 3.0V | 3.0V |
| NJM2894RB1-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)

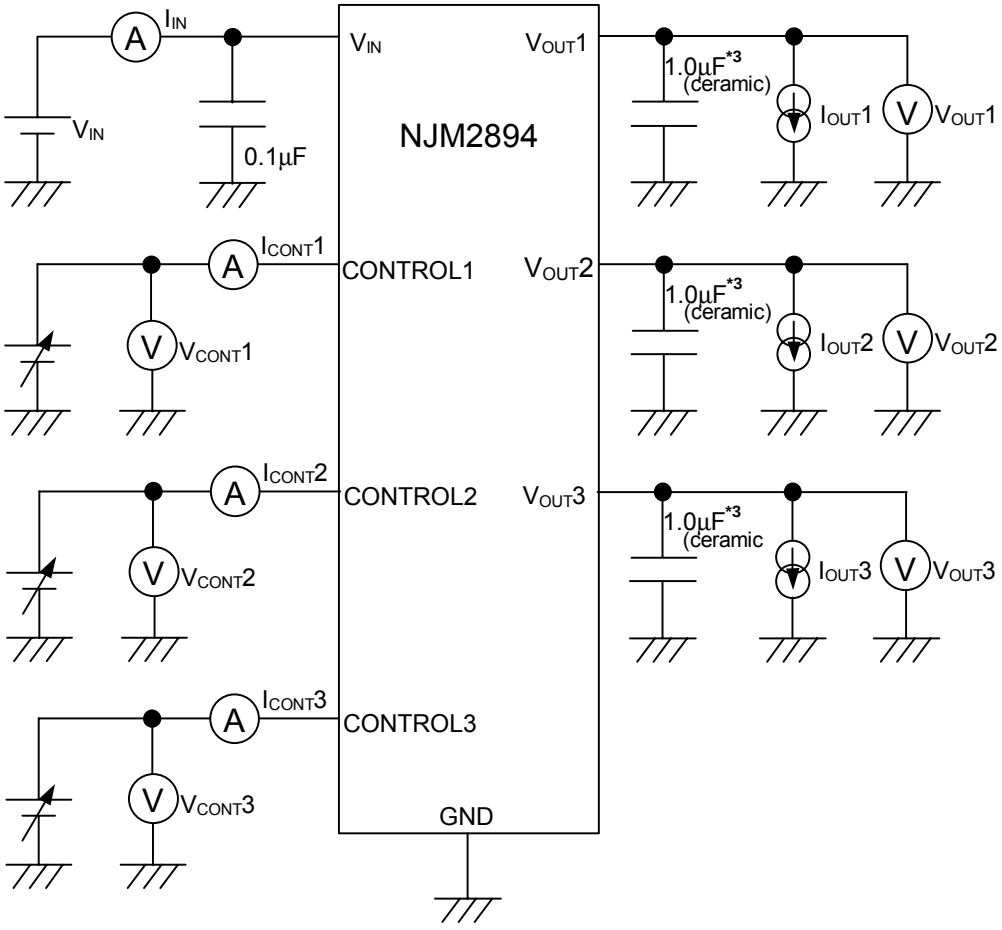
| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage | Vo | Io=30mA | -1.0% | – | +1.0% | V |
| Quiescent Current1 | $I_{Q1}$ | $V_{CONT1}$=$V_{IN}$, $V_{CONT2}$=$V_{CONT3}$=0V *1ch ON Io=0mA, expect Icont | – | 150 | 220 | μA |
| Quiescent 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 Current1 | Io | Ch1 : Vo–0.3V | 150 | 200 | - | mA |
| Output Current2 | Io | Ch2,3 : Vo–0.3V | 80 | 100 | - | mA |
| Line Regulation | $\Delta Vo/\Delta V_{IN}$ | $V_{IN}$=Vo+1V to Vo+6V, Io=30mA | – | – | 0.10 | %/V |
| Load Regulation1 | $\Delta Vo/\Delta Io1$ | Ch1 : Io=0 to 100mA | – | – | 0.03 | %/mA |
| Load Regulation2 | $\Delta Vo/\Delta Io2$ | Ch2,3 : Io=0 to 60mA | – | – | 0.03 | %/mA |
| Dropout Voltage1 | $\Delta V_{I-O1}$ | Io=60mA | – | 0.10 | 0.18 | V |
| Dropout Voltage2 | $\Delta V_{I-O2}$ | Io=40mA | – | 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 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.

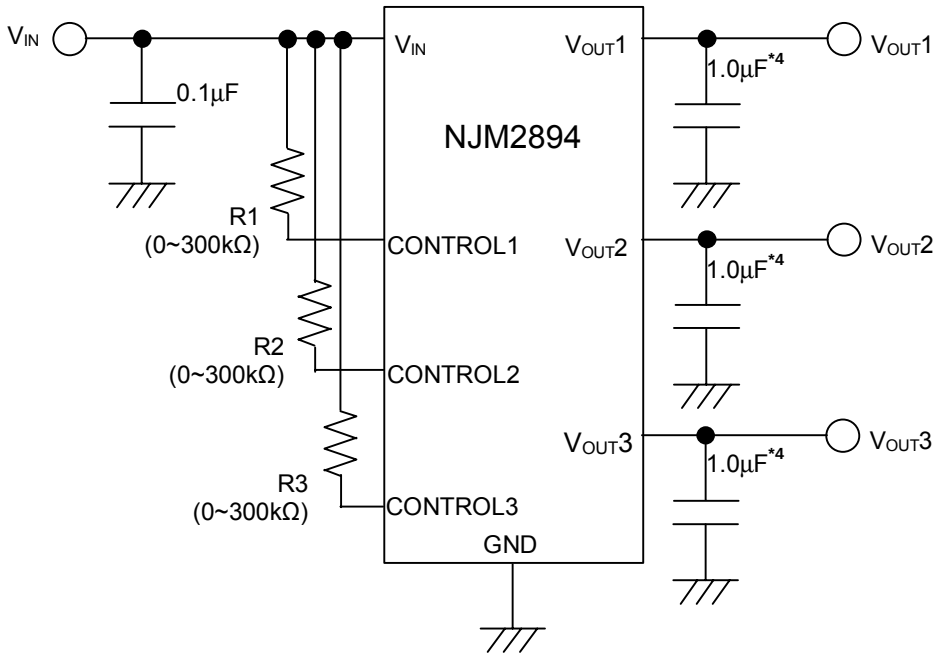
■ TEST CIRCUIT




*3 Vo≤2.6V version: Co=2.2μF(ceramic)

■ TYPICAL APPLICATION

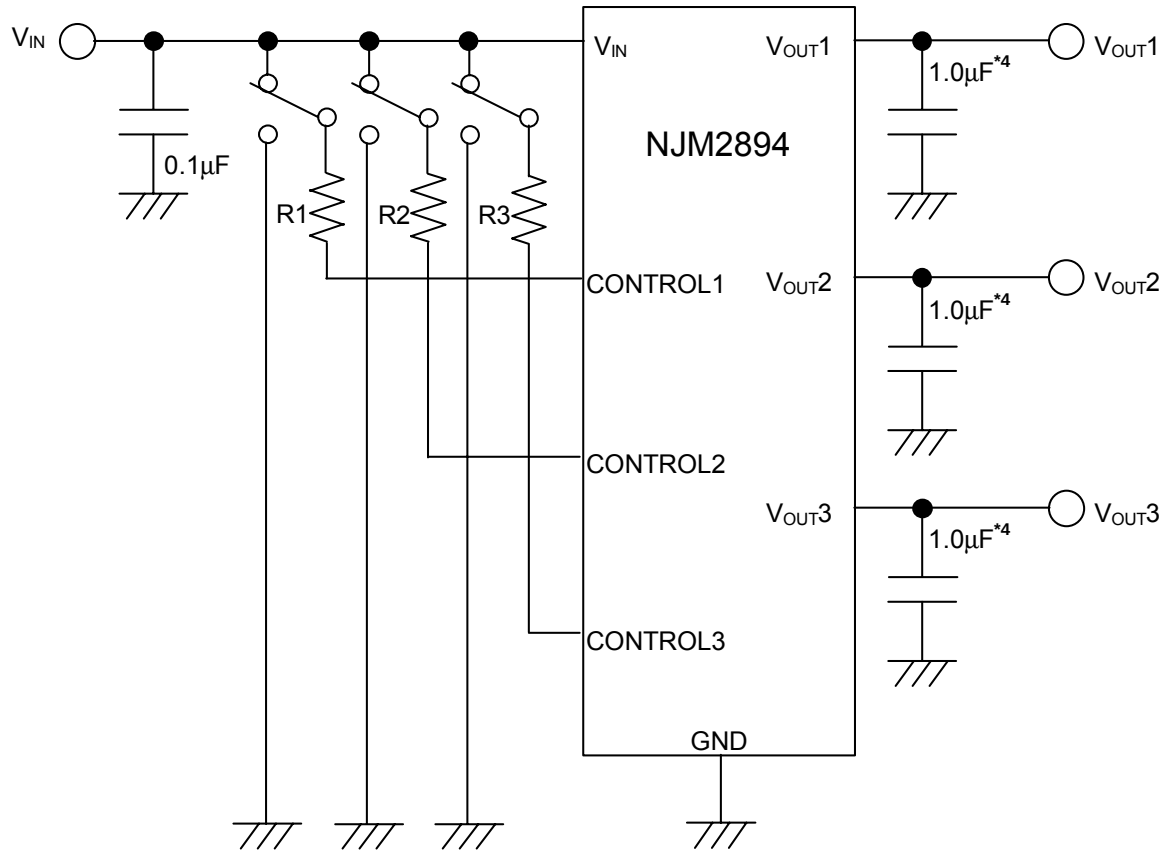
① In the case where ON/OFF Control is not required:




*4 Vo≤2.6V version: Co=2.2μF

Connect control terminal to $V_{IN}$ terminal

② In use of ON/OFF CONTROL:




*4 Vo≤2.6V version: Co=2.2μF

State of control terminal:

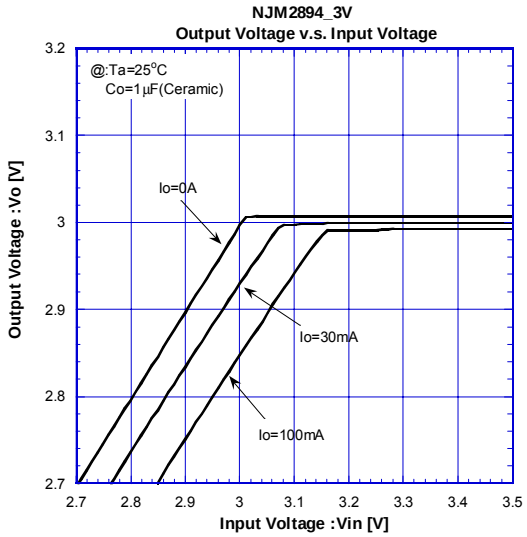
- "H"→ output is enabled.
- "L" or "open" → output is disabled.

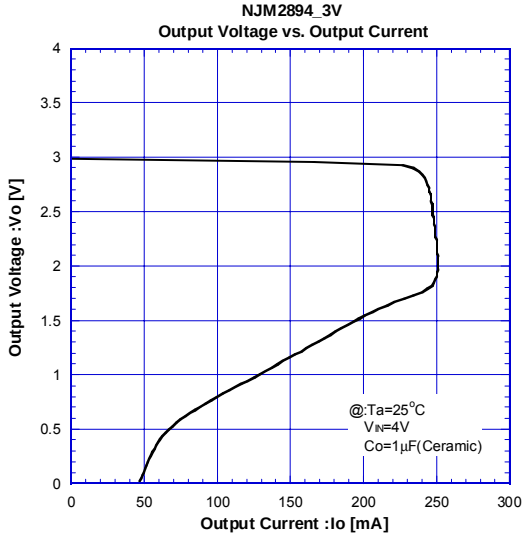
∗In the case of using a resistance "R" between $V_{IN}$ and control.

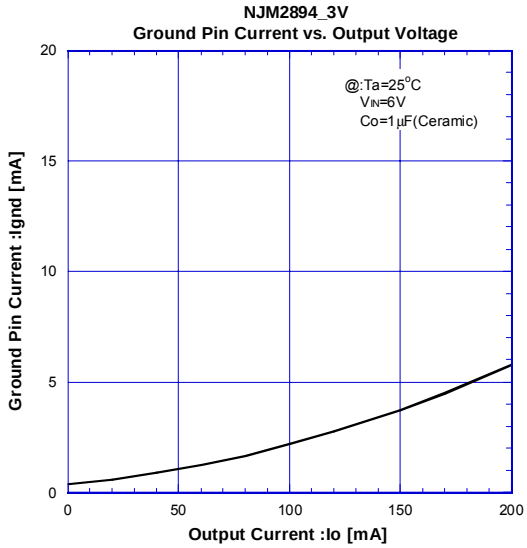
The current flow into the control terminal while the IC is ON state ($I_{CONT}$) can be reduced when a pull up resistance "R" is inserted between $V_{IN}$ and the control terminal.

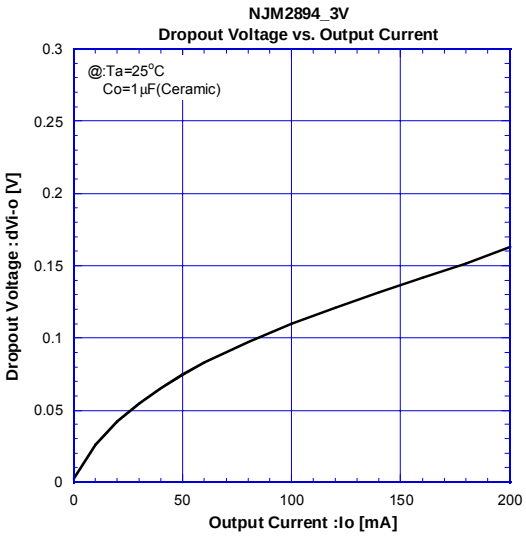
The minimum control voltage for ON state ($V_{CONT\ (ON)}$) is increased due to the voltage drop caused by $I_{CONT}$ and the resistance "R". The $I_{CONT}$ is temperature dependence as shown in the "Control Current vs. Temperature" characteristics. Therefore, the resistance "R" should be carefully selected to ensure the control voltage exceeds the $V_{CONT\ (ON)}$ over the required temperature range.

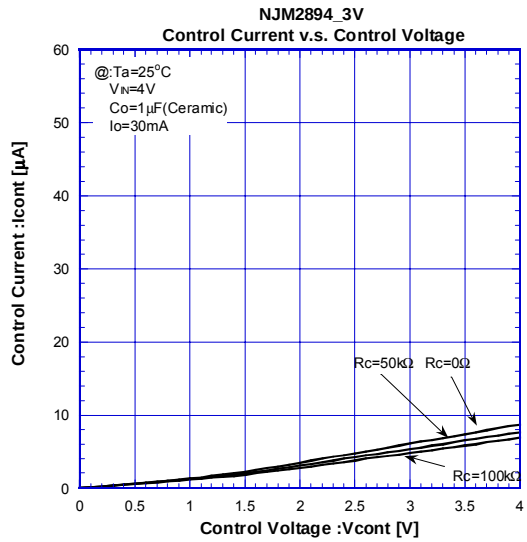
## ■ ELECTRICAL CHARACTERISTICS

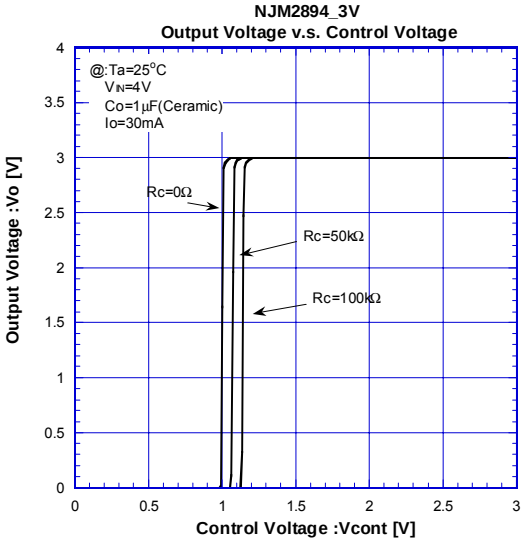


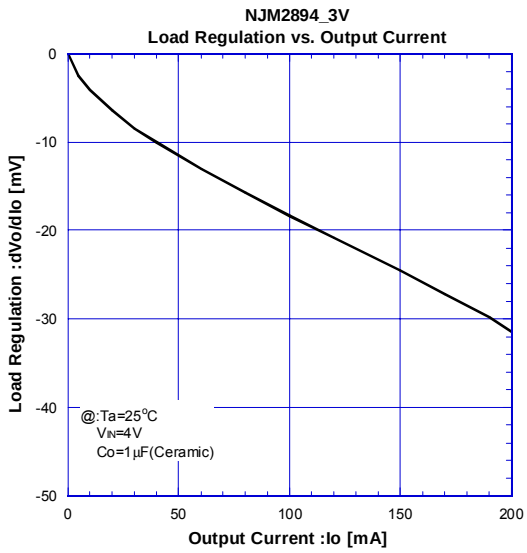



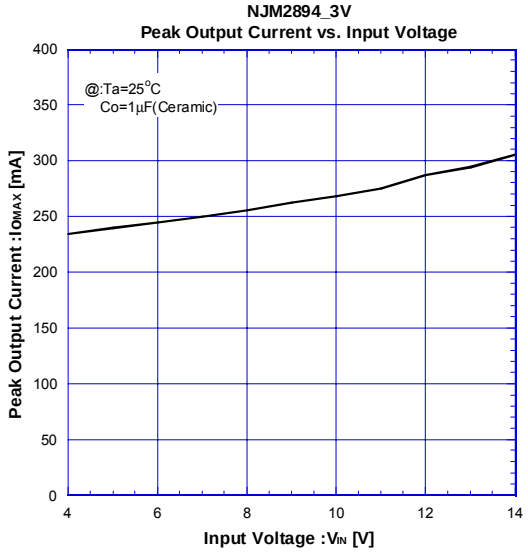



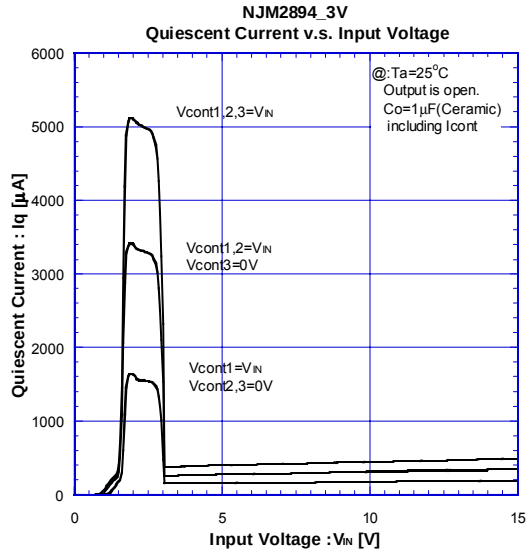



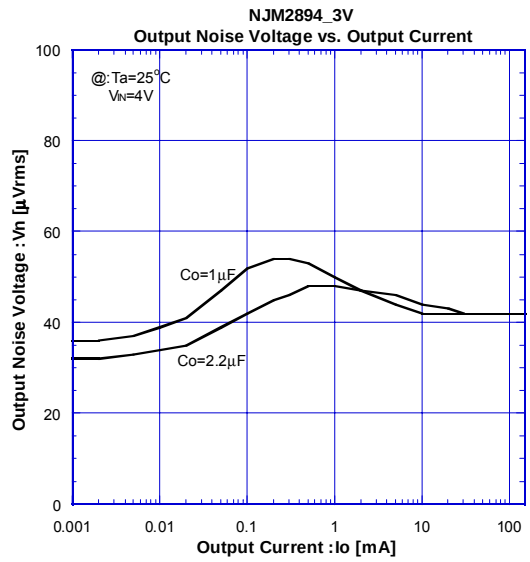



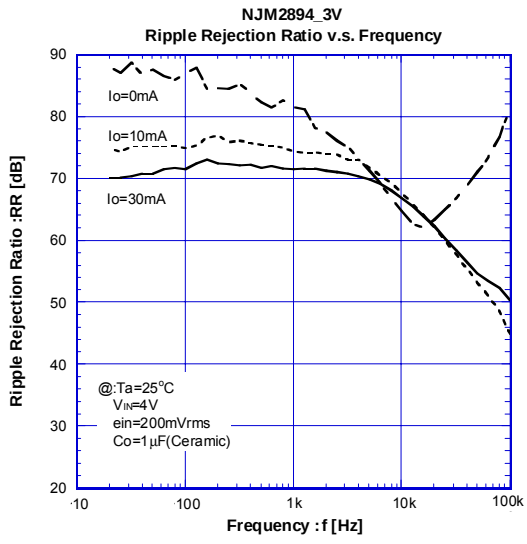
## ■ ELECTRICAL CHARACTERISTICS

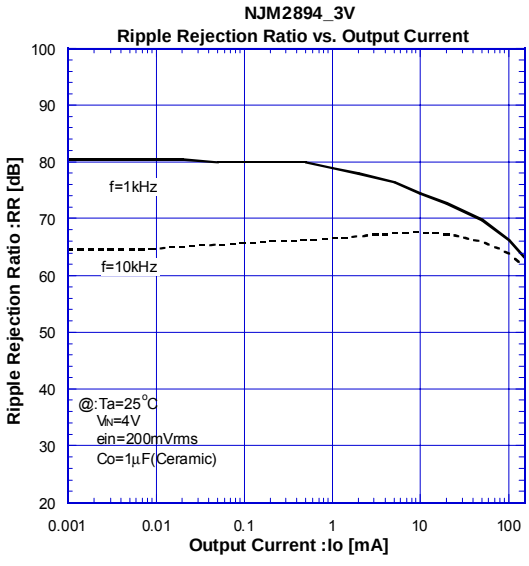


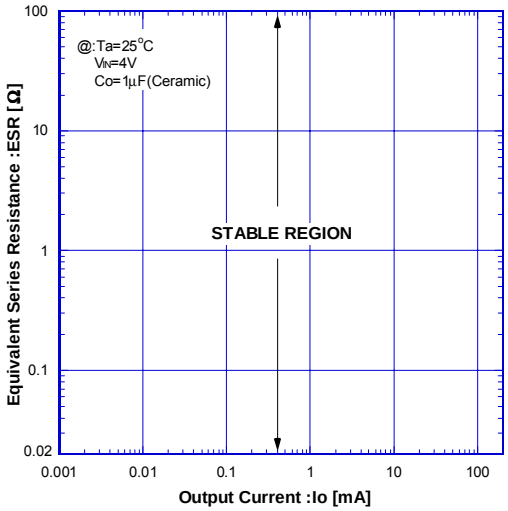



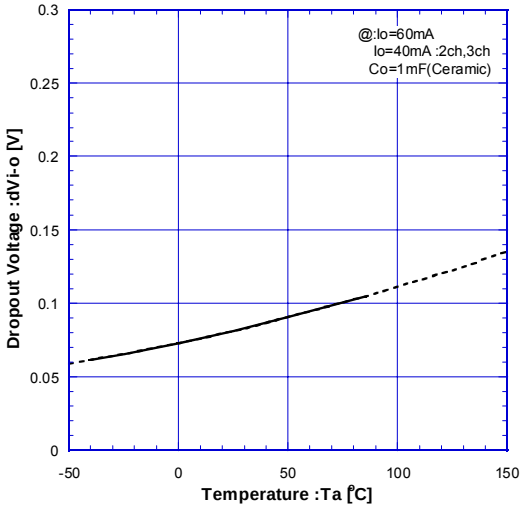



## ■ ELECTRICAL CHARACTERISTICS

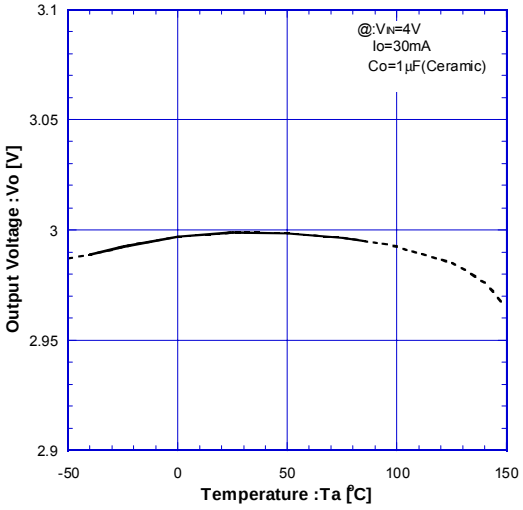
NJM2894_3V
Equivalent Series Resistance vs. Output Current



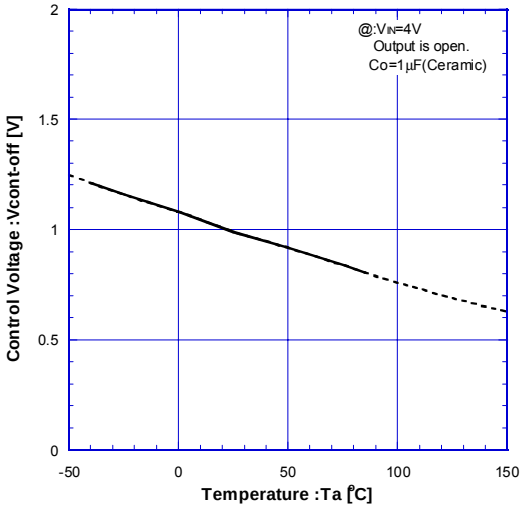

NJM2894_3V
Dropout Voltage v.s. Temperature



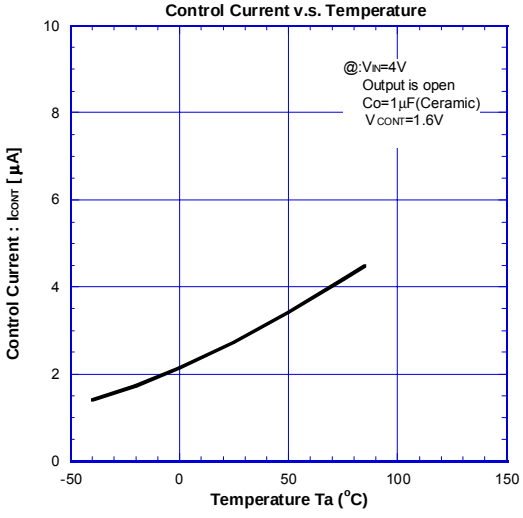

NJM2894_3V
Output Voltage v.s. Temperature




NJM2894_3V
Control Voltage v.s. Temperature

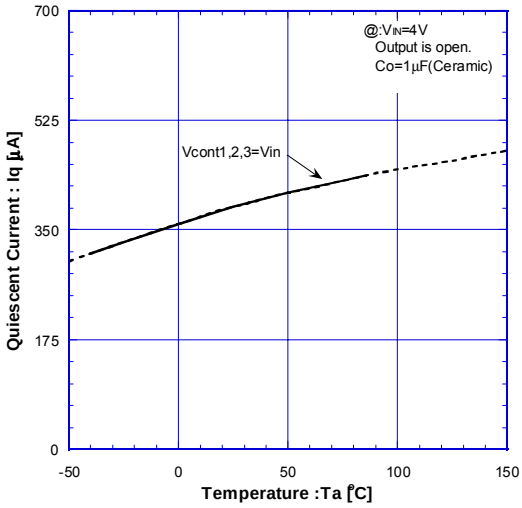



NJM2894_3.0V
Control Current v.s. Temperature

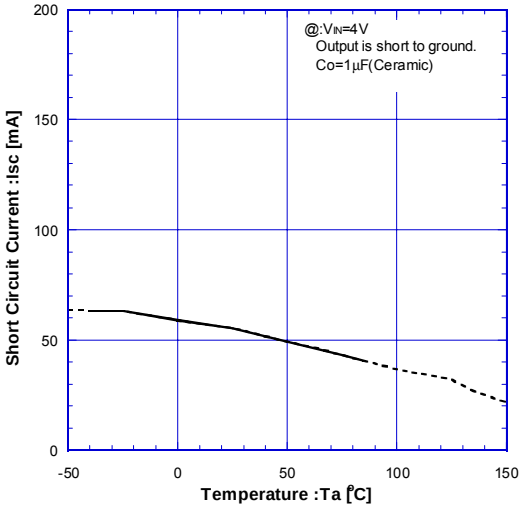


## ■ ELECTRICAL CHARACTERISTICS

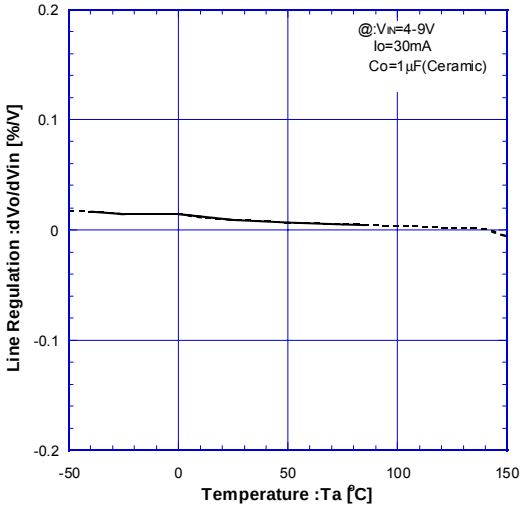
NJM2894_3V
Quiescent Current v.s. Temperature



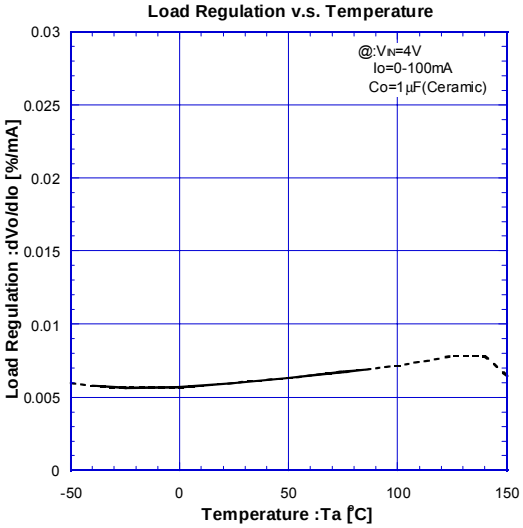

NJM2894_3V
Short Circuit Current v.s. Temperature



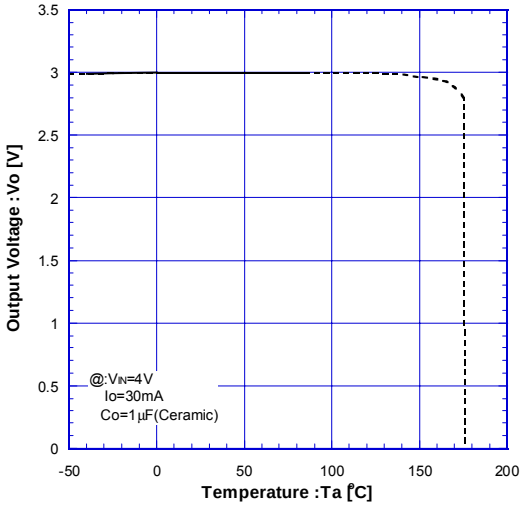

NJM2894_3V
Line Regulation v.s. Temperature




NJM2894_3V
Load Regulation v.s. Temperature

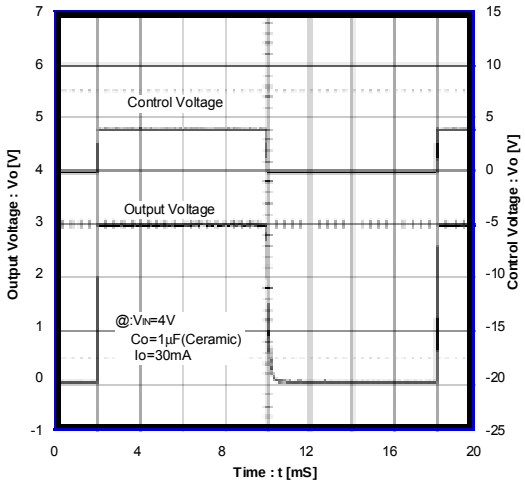



NJM2894_3V
Output Voltage v.s. Temperature

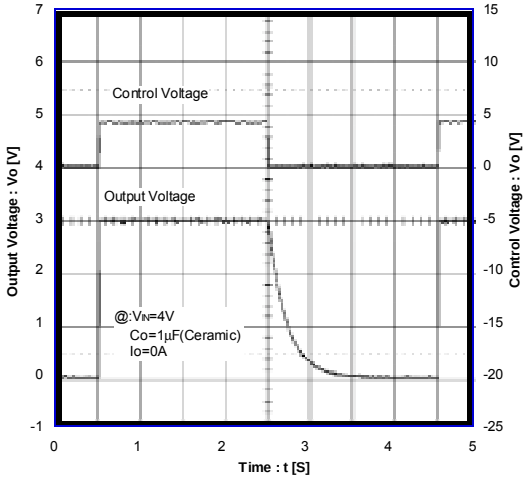


## ■ ELECTRICAL CHARACTERISTICS

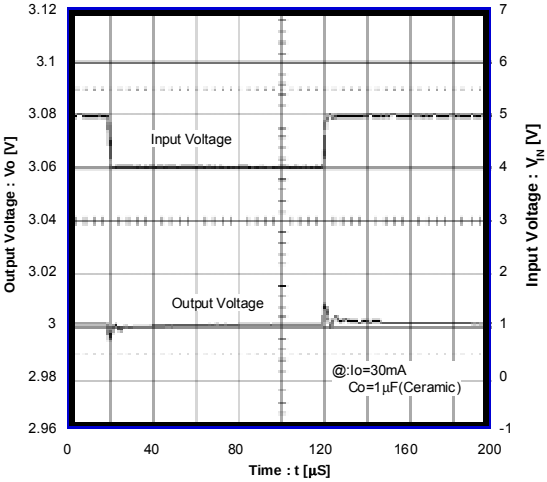
NJM2894_3V
ON/OFF Transient Response



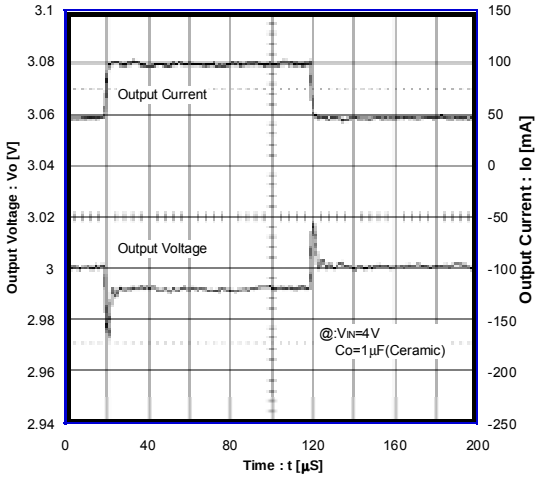

NJM2894_3V
ON/OFF Transient Response without Load




NJM2894_3V
Line Transient Response




NJM2894_3V
Load Transient Response

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