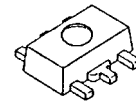


## LOW DROPOUT VOLTAGE REGULATOR

### ■ GENERAL DESCRIPTION

The NJM2880 is a low dropout voltage regulator. Advanced Bipolar technology achieves low noise, high ripple rejection and low quiescent current.

### ■ PACKAGE OUTLINE

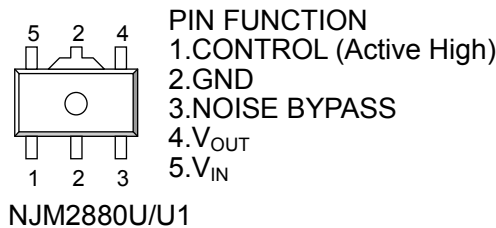


NJM2880U/U1

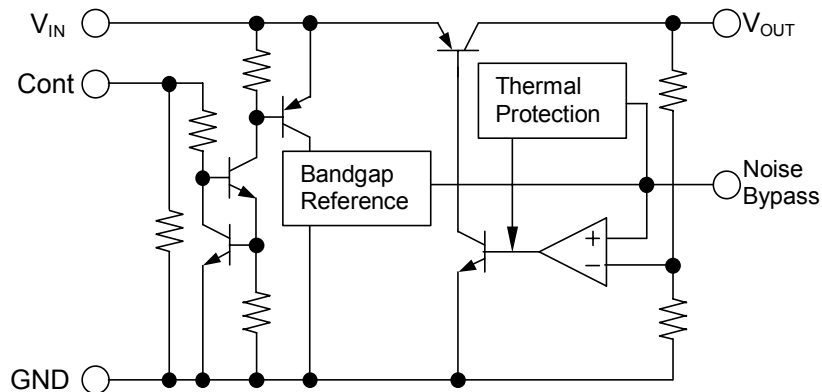
### ■ FEATURES

- High Ripple Rejection 70dB typ. (f=1kHz,Vo=3V Version)
- Output Noise Voltage  $V_{no}=30\mu V_{rms}$  typ.(Cp=0.01 $\mu$ F)
- Output capacitor with 1.0 $\mu$ F ceramic capacitor
- Output Current  $I_o(max.)=300mA$
- High Precision Output  $V_o\pm 1.0\%$
- Low Dropout Voltage 0.10V typ. ( $I_o=100mA$ )
- ON/OFF Control (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline SOT-89-5

### ■ PIN CONFIGURATION



### ■ EQUIVALENT CIRCUIT



## ■ OUTPUT VOLTAGE RANK LIST

Device Name	Vout	Device Name	Vout	Device Name	Vout
NJM2880U/U1-15	1.5V	NJM2880U/U1-28	2.8V	NJM2880U/U1-44	4.4V
NJM2880U/U1-16	1.6V	NJM2880U/U1-285	2.85V	NJM2880U/U1-45	4.5V
NJM2880U/U1-18	1.8V	NJM2880U/U1-03	3.0V	NJM2880U/U1-48	4.8V
NJM2880U/U1-21	2.1V	NJM2880U/U1-32	3.2V	NJM2880U/U1-05	5.0V
NJM2880U/U1-25	2.5V	NJM2880U/U1-33	3.3V		
NJM2880U/U1-26	2.6V	NJM2880U/U1-38	3.8V		
NJM2880U/U1-27	2.7V	NJM2880U/U1-04	4.0V		

## ■ 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>	350	mW
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.

## ■ Operating voltage

V<sub>IN</sub>=+2.3 ~ +14V (In case of Vo<2.1V version)

## ■ ELECTRICAL CHARACTERISTICS

(Vo>2.0V version:

V<sub>IN</sub>=Vo+1V, Co=0.1μF: Vo≥2.7V (Co=2.2μF: Vo≤2.6V), 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 <sub>Q</sub>	Io=0mA, expect I <sub>cont</sub>	-	120	180	μA
Quiescent Current at Control OFF	I <sub>Q(OFF)</sub>	V <sub>CONT</sub> =0V	-	-	100	nA
Output Current	Io	Vo-0.3V	300	400	-	mA
Line Regulation	ΔVo/ΔV <sub>IN</sub>	V <sub>IN</sub> =Vo+1V ~ Vo+6V, Io=30mA	-	-	0.10	%/V
Load Regulation	ΔVo/ΔIo	Io=0 ~ 300mA	-	-	0.03	%/mA
Dropout Voltage	ΔV <sub>I-O</sub>	Io=100mA	-	0.10	0.18	V
Ripple Rejection	RR	e <sub>in</sub> =200mVrms, f=1kHz, Io=10mA Vo=3V Version	-	70	-	dB
Average Temperature Coefficient of Output Voltage	ΔVo/ΔTa	Ta=0~85°C, Io=10mA	-	±50	-	ppm/°C
Output Noise Voltage	V <sub>NO</sub>	f=10Hz~80kHz, Io=10mA, Vo=3V Version	-	30	-	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

( $V_o \leq 2.0V$  version:

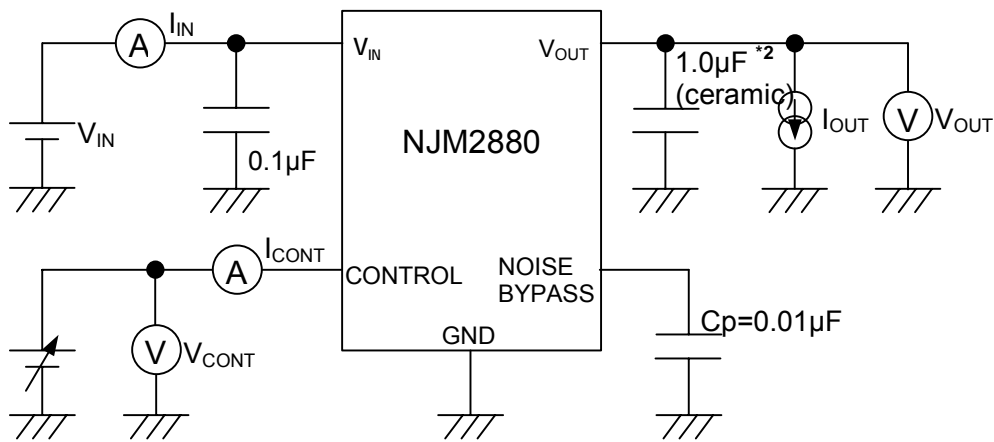
$V_{IN} = V_o + 1V$ ,  $C_{IN} = 0.1\mu F$ ,  $C_o = 2.2\mu F$ :  $V_o \geq 1.9V$  ( $C_o = 4.7\mu F$ :  $V_o \leq 1.8V$ ),  $C_p = 0.01\mu F$ ,  $T_a = 25^\circ C$ )

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_o$	$I_o = 30mA$	-1.0%	-	+1.0%	V
Quiescent Current	$I_Q$	$I_o = 0mA$ , expect $I_{cont}$	-	120	180	$\mu A$
Quiescent Current at Control OFF	$I_{Q(OFF)}$	$V_{CONT} = 0V$	-	-	100	nA
Output Current	$I_o$	$V_o - 0.3V$	300	400	-	mA
Line Regulation	$\Delta V_o / \Delta V_{IN}$	$V_{IN} = V_o + 1V \sim V_o + 6V$ , $I_o = 30mA$	-	-	0.10	%/V
Load Regulation	$\Delta V_o / \Delta I_o$	$I_o = 0 \sim 300mA$	-	-	0.03	%/mA
Ripple Rejection	RR	$e_{in} = 200mV_{rms}$ , $f = 1kHz$ , $I_o = 10mA$ $V_o = 1.8V$ Version	-	74	-	dB
Average Temperature Coefficient of Output Voltage	$\Delta V_o / \Delta T_a$	$T_a = 0 \sim 85^\circ C$ , $I_o = 10mA$	-	$\pm 50$	-	ppm/ $^\circ C$
Output Noise Voltage	$V_{NO}$	$f = 10Hz \sim 80kHz$ , $I_o = 10mA$ , $V_o = 1.8V$ Version	-	18	-	$\mu V_{rms}$
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	-	-	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		-	-	0.6	V

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.

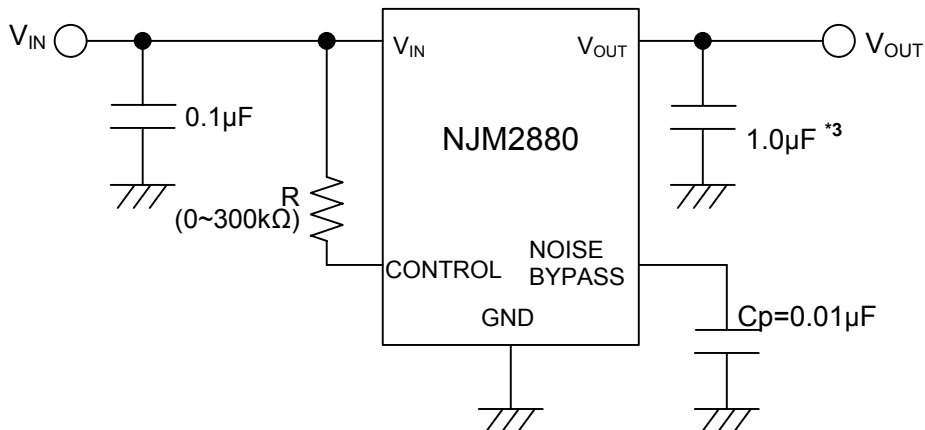
## ■ TEST CIRCUIT



\*2  $1.9V \leq V_o \leq 2.6V$  version :  $C_o = 2.2\mu F$  (ceramic)  
 $V_o \leq 1.8V$  version :  $C_o = 4.7\mu F$  (ceramic)

## ■ TYPICAL APPLICATION

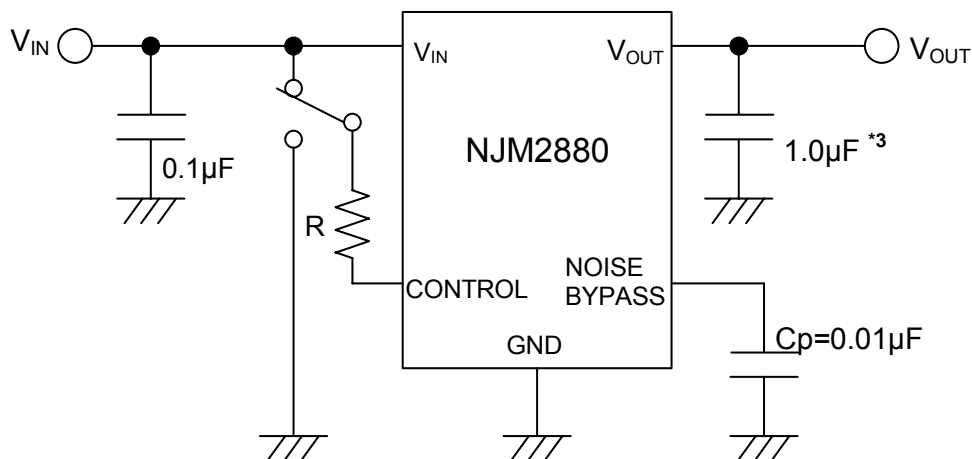
① In the case where ON/OFF Control is not required:



\*3 1.9V ≤ V<sub>o</sub> ≤ 2.6V version : C<sub>o</sub> = 2.2µF  
 V<sub>o</sub> ≤ 1.8V version : C<sub>o</sub> = 4.7µF

Connect control terminal to V<sub>IN</sub> terminal

② In use of ON/OFF CONTROL:



\*3 1.9V ≤ V<sub>o</sub> ≤ 2.6V version : C<sub>o</sub> = 2.2µF  
 V<sub>o</sub> ≤ 1.8V version : C<sub>o</sub> = 4.7µF

State of control terminal:

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

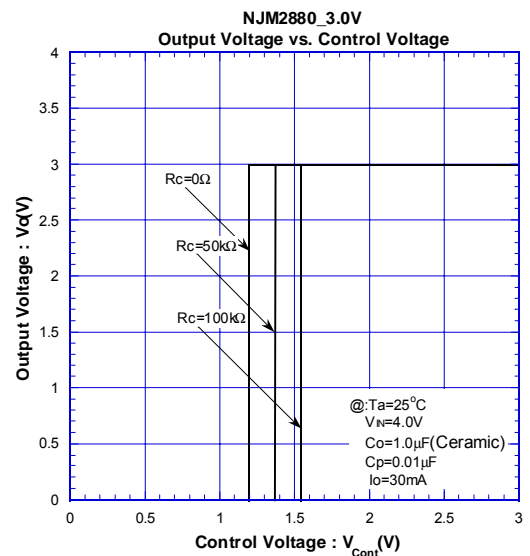
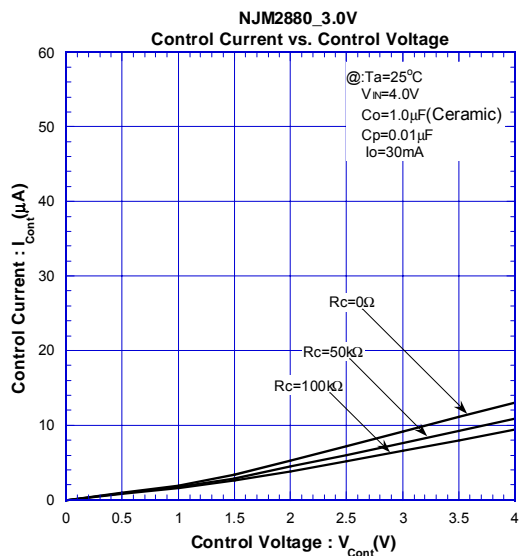
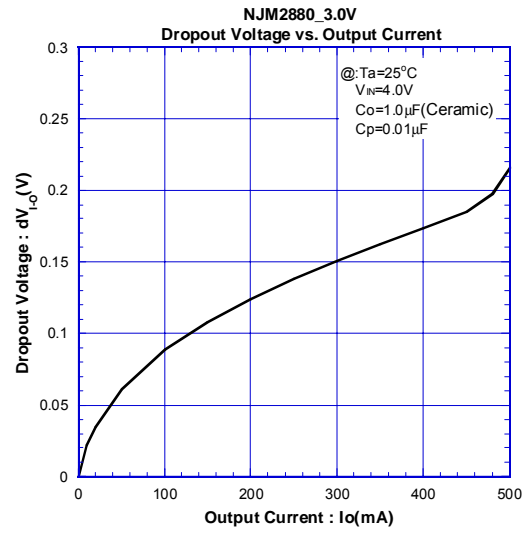
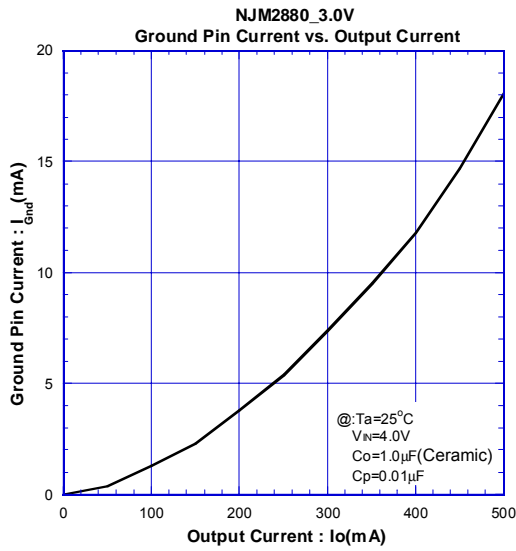
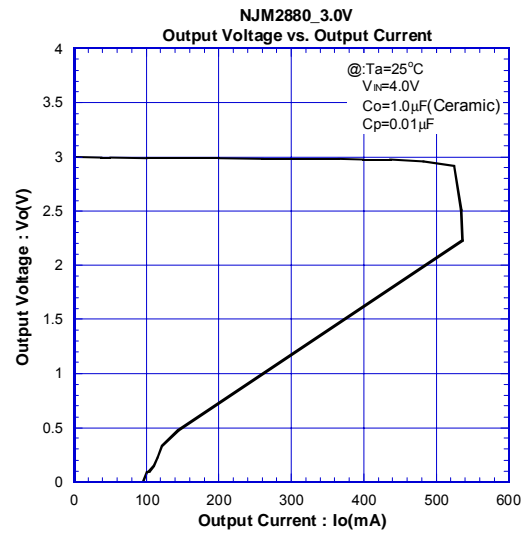
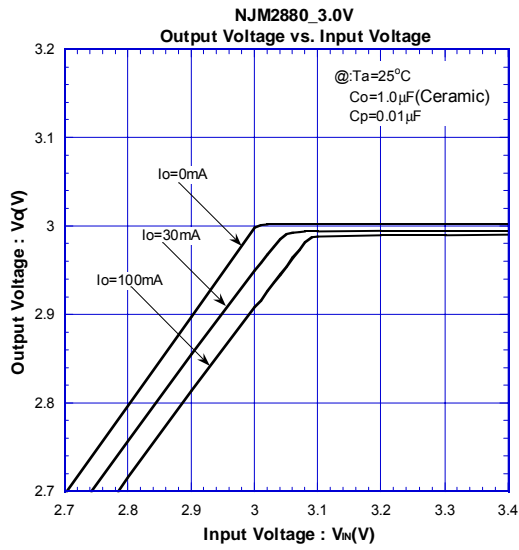
### \*Noise bypass Capacitance C<sub>p</sub>

Noise bypass capacitance C<sub>p</sub> reduces noise generated by band-gap reference circuit. Noise level and ripple rejection will be improved when larger C<sub>p</sub> is used. Use of smaller C<sub>p</sub> value may cause oscillation. Use the C<sub>p</sub> value of 0.01µF greater to avoid the problem.

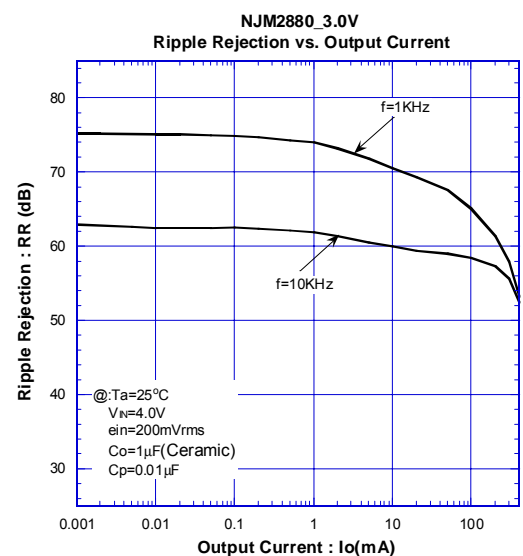
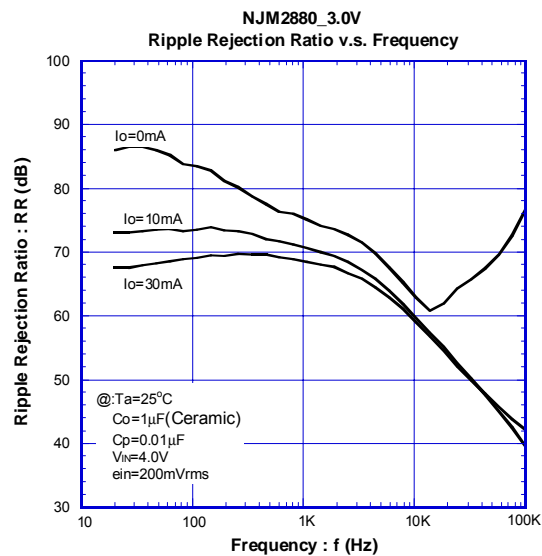
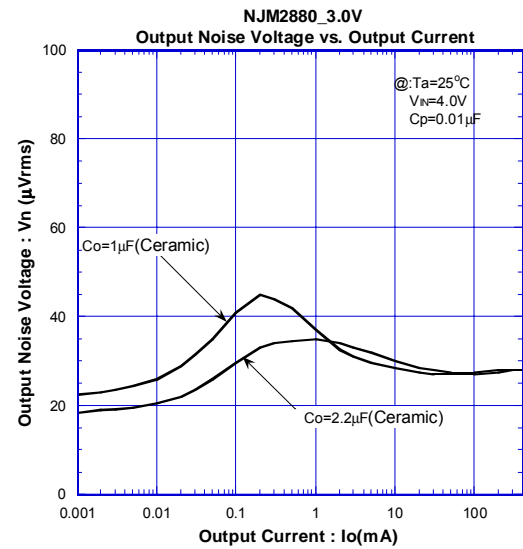
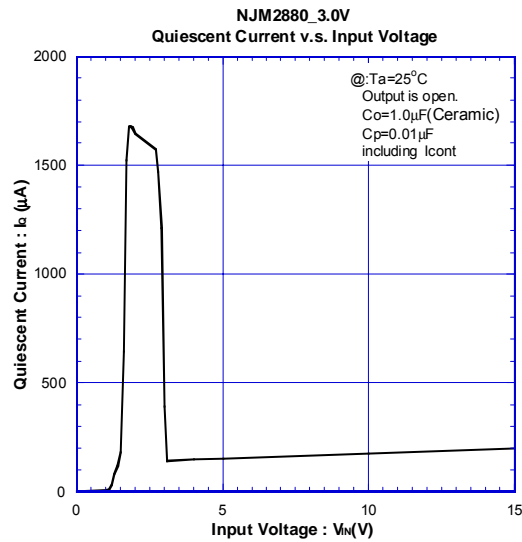
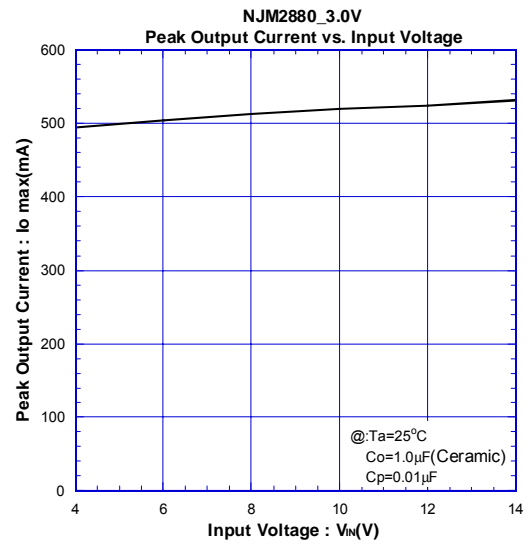
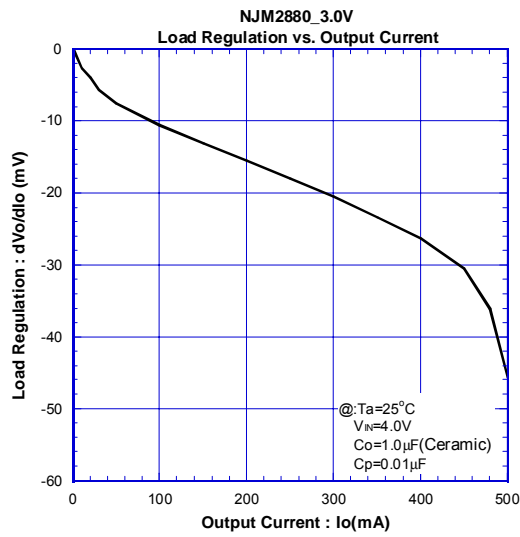
### \*In the case of using a resistance "R" between V<sub>IN</sub> and control.

The current flow into the control terminal while the IC is ON state (I<sub>CONT</sub>) can be reduced when a pull up resistance "R" is inserted between V<sub>IN</sub> and the control terminal. The minimum control voltage for ON state (V<sub>CONT(ON)</sub>) is increased due to the voltage drop caused by I<sub>CONT</sub> and the resistance "R". The I<sub>CONT</sub> 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<sub>CONT(ON)</sub> over the required temperature range.

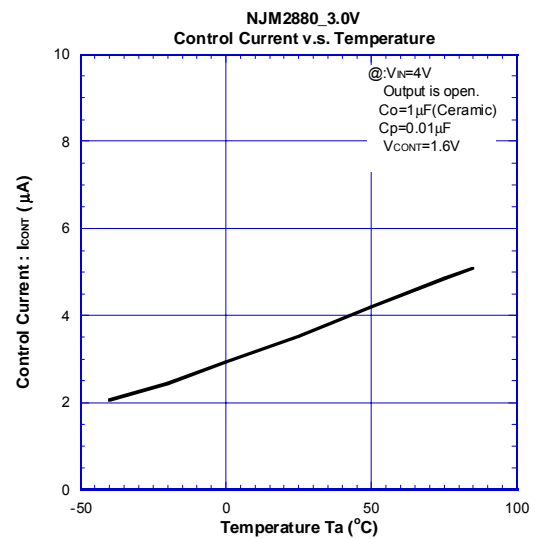
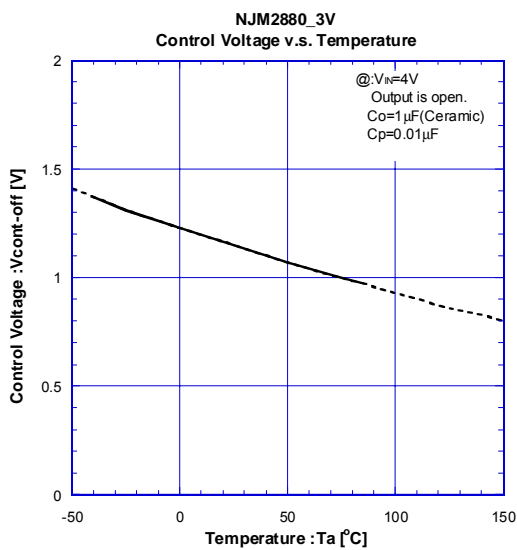
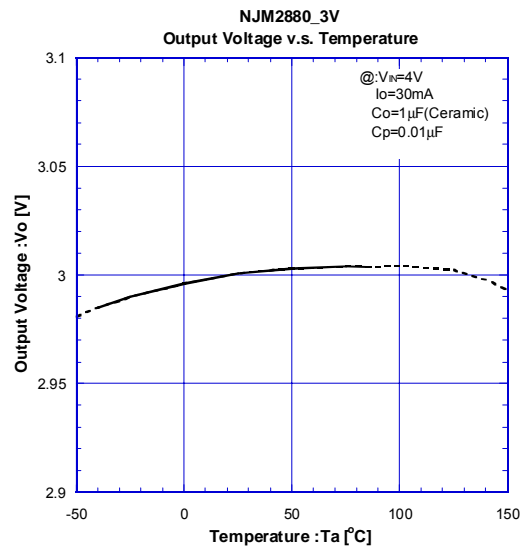
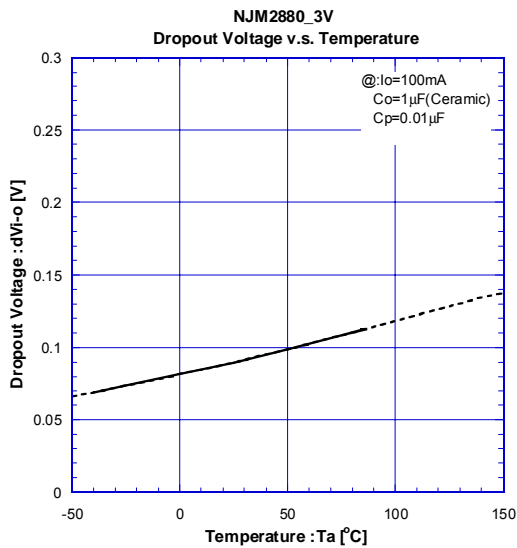
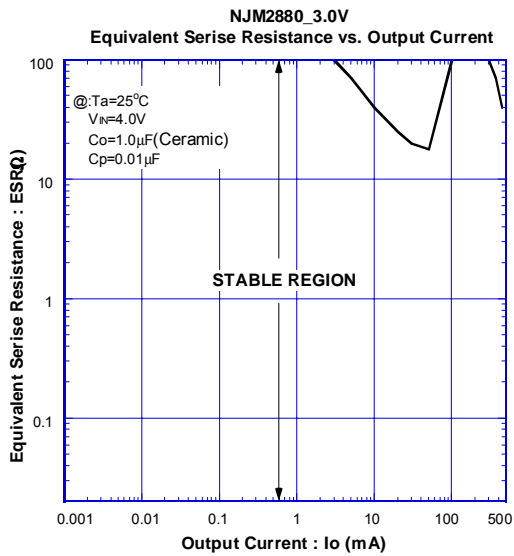
## ■ ELECTRICAL CHARACTERISTICS



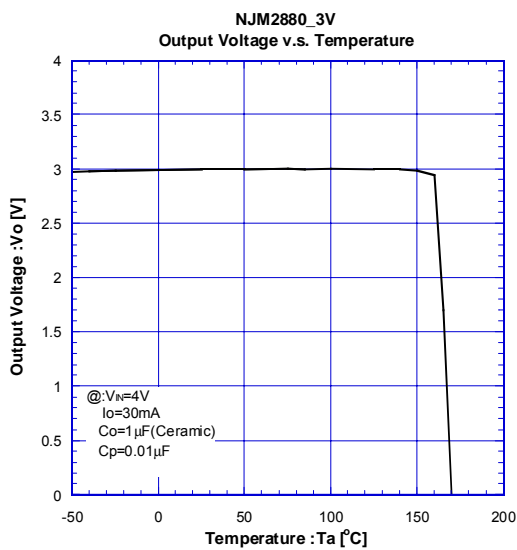
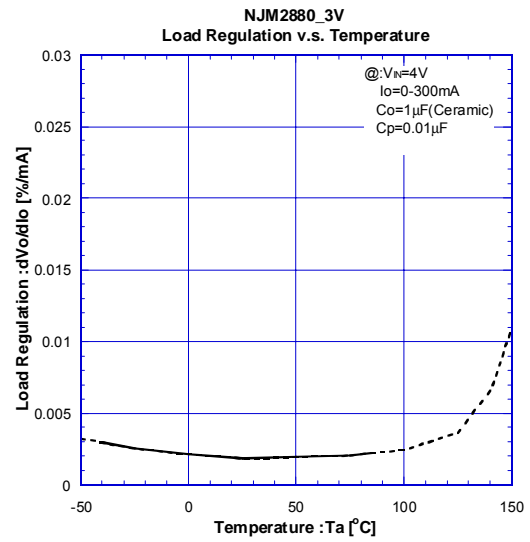
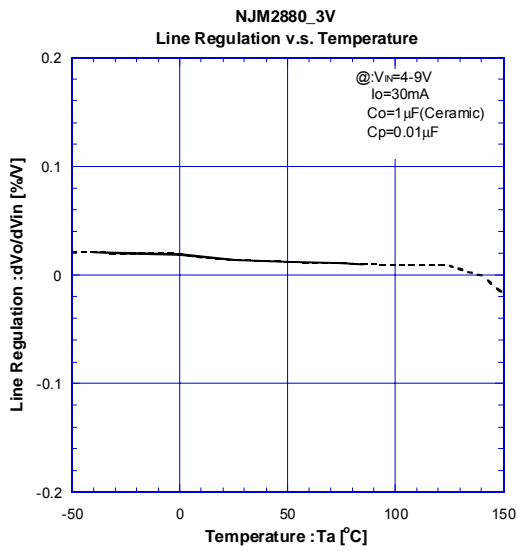
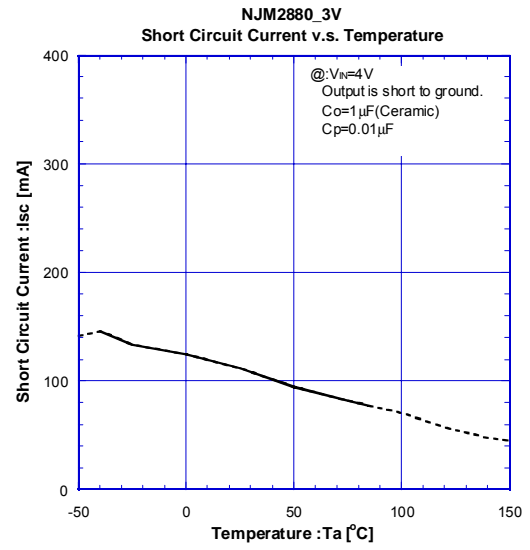
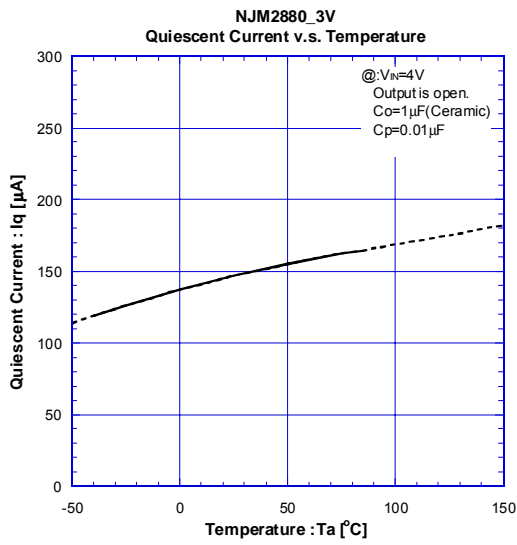
## ELECTRICAL CHARACTERISTICS



## ELECTRICAL CHARACTERISTICS

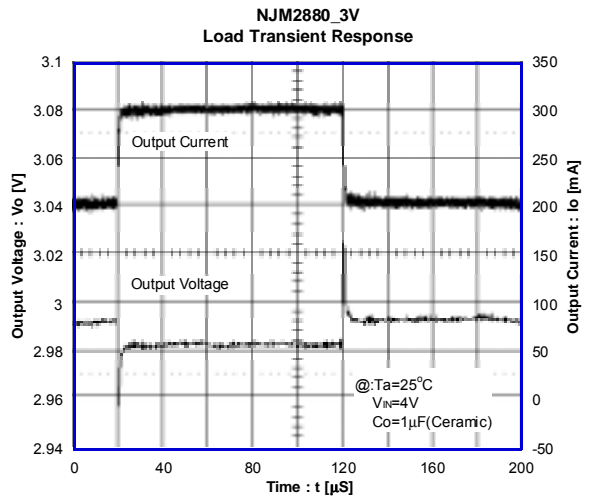
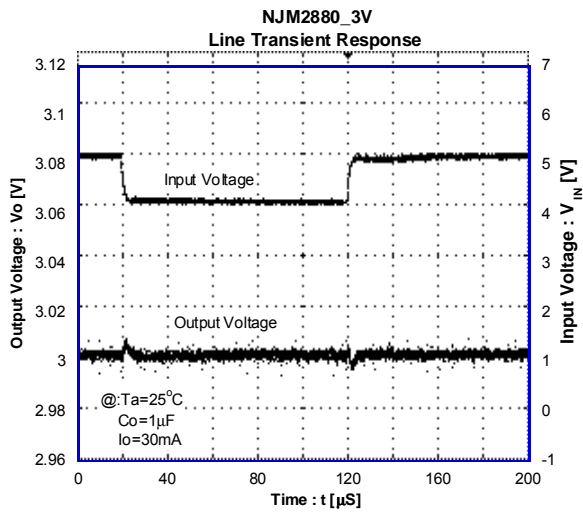
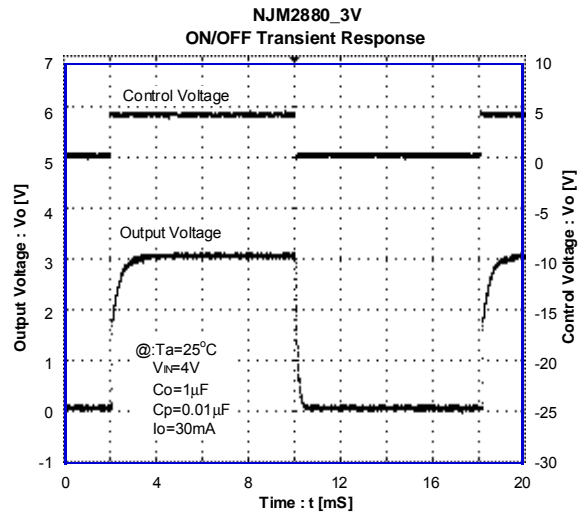
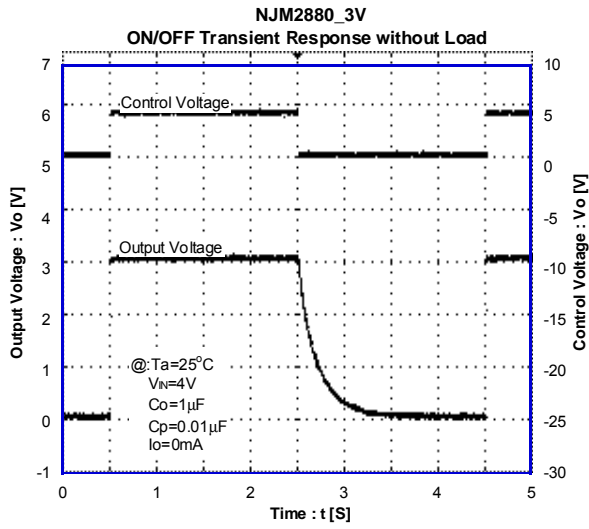


## ■ ELECTRICAL CHARACTERISTICS





## ■ ELECTRICAL CHARACTERISTICS



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