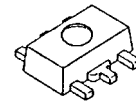


LOW DROPOUT VOLTAGE REGULATOR

■ 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

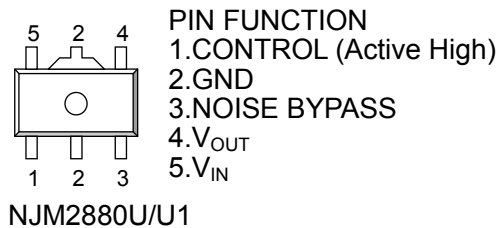


NJM2880U/U1

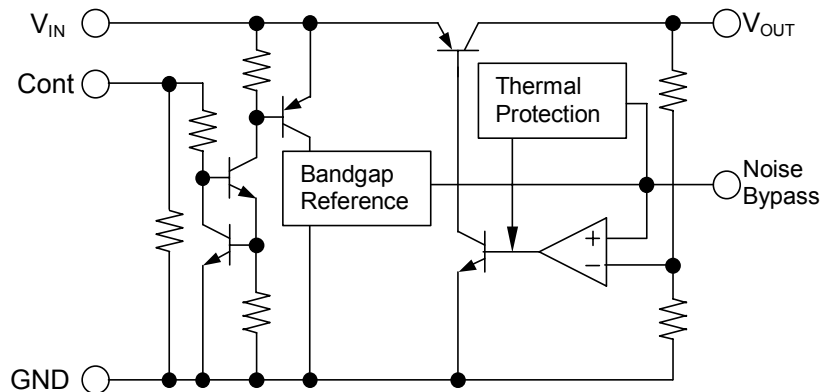
■ FEATURES

- High Ripple Rejection 70dB typ. (f=1kHz,Vo=3V Version)
- Output Noise Voltage $V_{no}=30\mu V_{rms}$ typ.(Cp=0.01 μ F)
- Output capacitor with 1.0 μ 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_{IN}	+14	V
Control Voltage	V_{CONT}	+14(*1)	V
Power Dissipation	P_D	350	mW
Operating Temperature	T_{opr}	-40 ~ +85	°C
Storage Temperature	T_{stg}	-40 ~ +125	°C

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

■ Operating voltage

$V_{IN}=+2.3 \sim +14V$ (In case of $V_o < 2.1V$ version)

■ ELECTRICAL CHARACTERISTICS

($V_o > 2.0V$ version:

$V_{IN}=V_o+1V$, $C_o=0.1\mu F$: $V_o \geq 2.7V$ ($C_o=2.2\mu F$: $V_o \leq 2.6V$), $C_p=0.01\mu F$, $T_a=25^\circ C$)

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	μA
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
Dropout Voltage	ΔV_{I-O}	$I_o=100mA$	-	0.10	0.18	V
Ripple Rejection	RR	$e_{in}=200mV_{rms}$, $f=1kHz$, $I_o=10mA$ $V_o=3V$ Version	-	70	-	dB
Average Temperature Coefficient of Output Voltage	$\Delta V_o/\Delta T_a$	$T_a=0 \sim 85^\circ C$, $I_o=10mA$	-	± 50	-	ppm/°C
Output Noise Voltage	V_{NO}	$f=10Hz \sim 80kHz$, $I_o=10mA$, $V_o=3V$ Version	-	30	-	μV_{rms}
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	-	-	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		-	-	0.6	V

($V_o \leq 2.0V$ version:

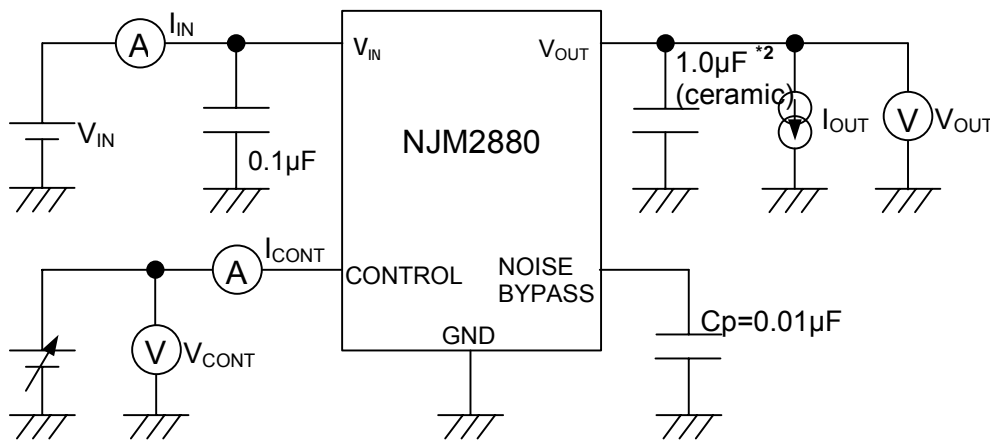
$V_{IN} = V_o + 1V$, $C_{IN} = 0.1\mu F$, $C_o = 2.2\mu F$: $V_o \geq 1.9V$ ($C_o = 4.7\mu F$: $V_o \leq 1.8V$), $C_p = 0.01\mu F$, $T_a = 25^\circ C$)

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	μA
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	$\Delta V_o / \Delta T_a$	$T_a = 0 \sim 85^\circ C$, $I_o = 10mA$	-	± 50	-	ppm/ $^\circ C$
Output Noise Voltage	V_{NO}	$f = 10Hz \sim 80kHz$, $I_o = 10mA$, $V_o = 1.8V$ Version	-	18	-	μV_{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.

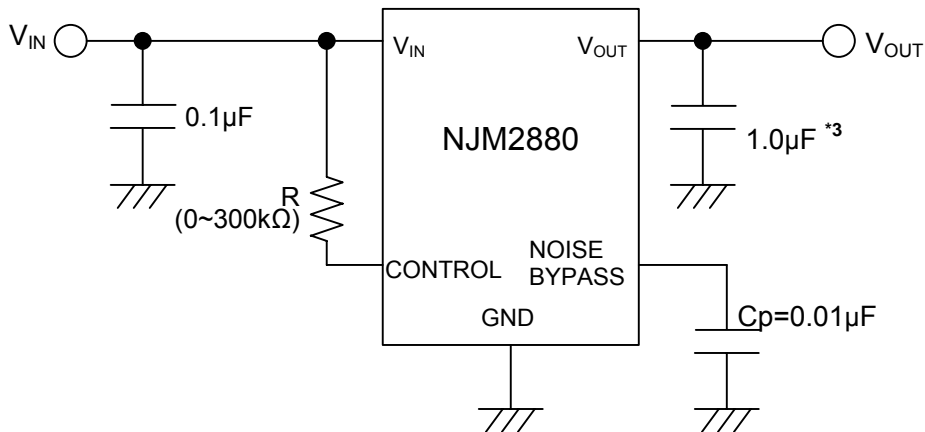
■ TEST CIRCUIT



*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

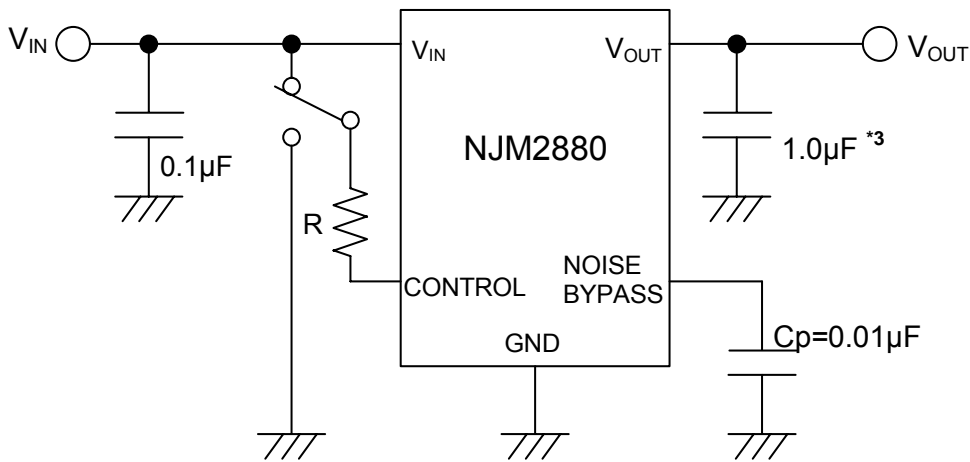
① In the case where ON/OFF Control is not required:



*3 1.9V ≤ V_O ≤ 2.6V version : C_O = 2.2µF
 V_O ≤ 1.8V version : C_O = 4.7µF

Connect control terminal to V_{IN} terminal

② In use of ON/OFF CONTROL:



*3 1.9V ≤ V_O ≤ 2.6V version : C_O = 2.2µF
 V_O ≤ 1.8V version : C_O = 4.7µF

State of control terminal:

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

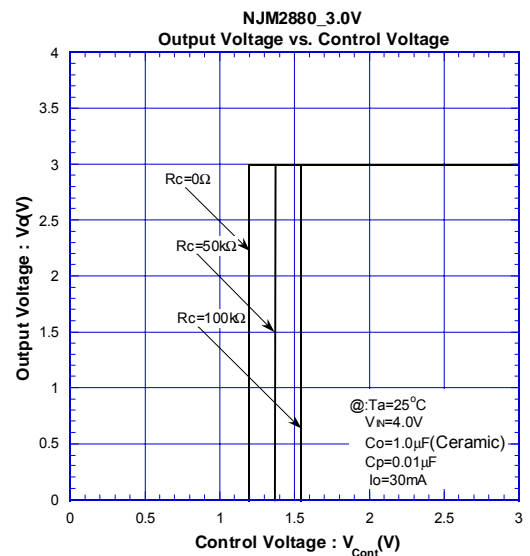
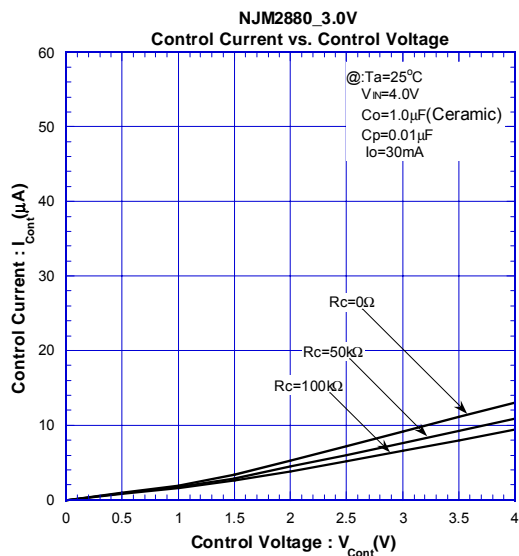
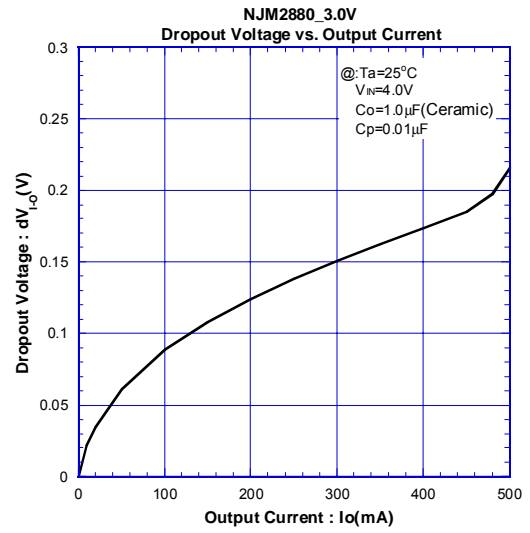
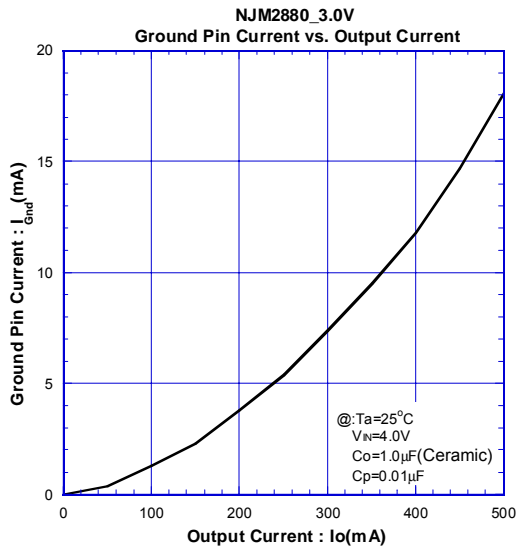
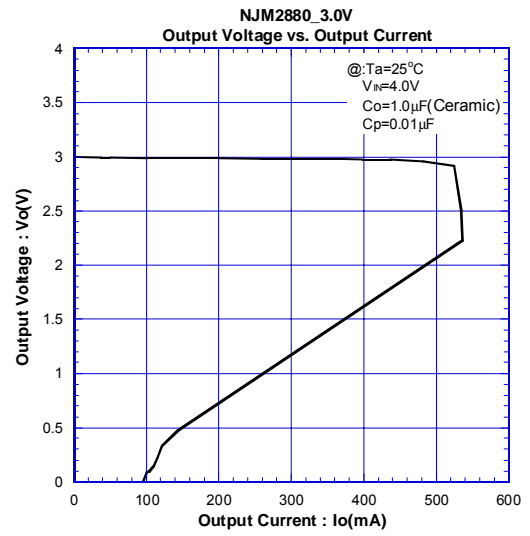
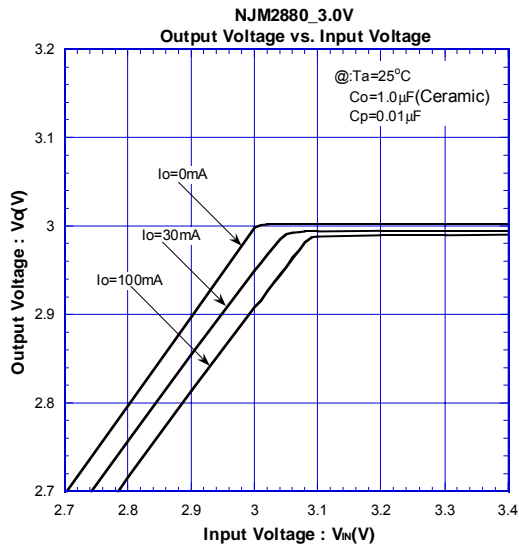
*Noise bypass Capacitance C_p

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

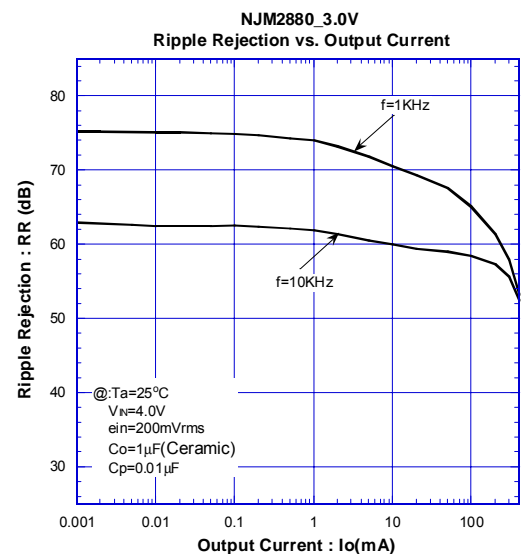
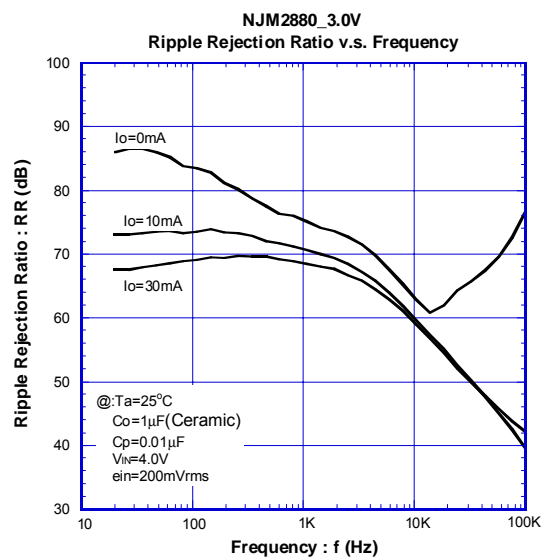
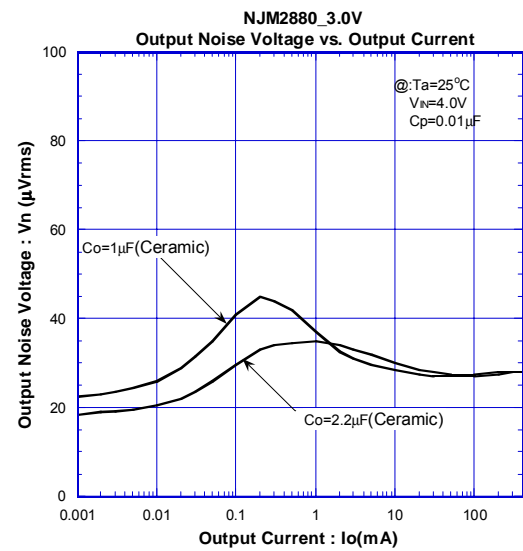
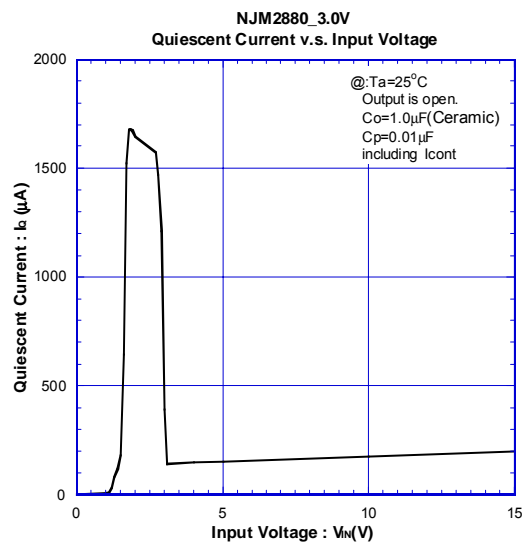
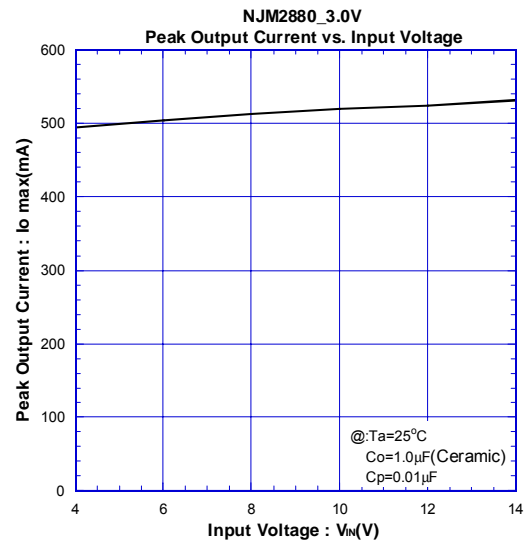
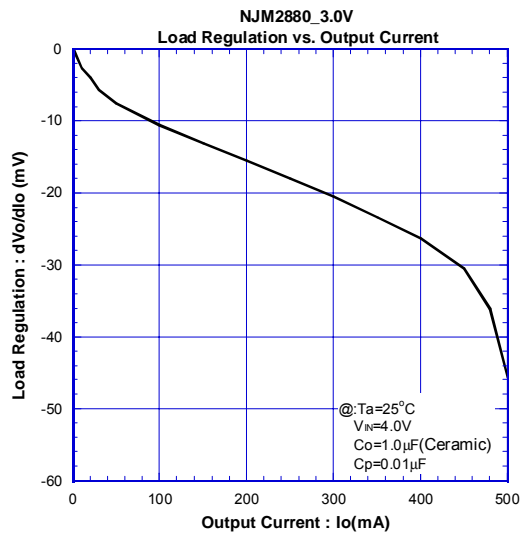
*In the case of using a resistance "R" between V_{IN} and control.

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.

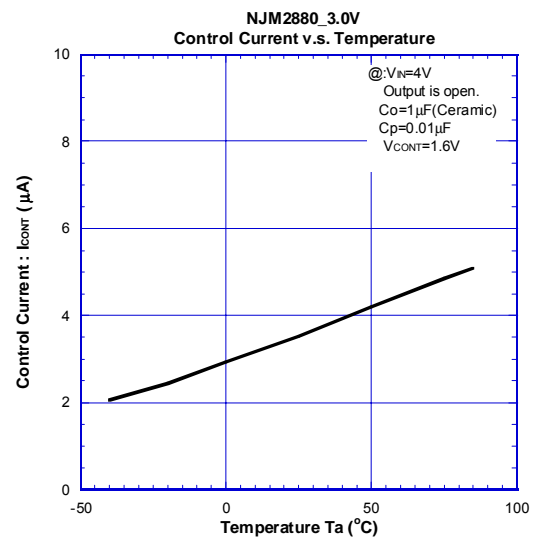
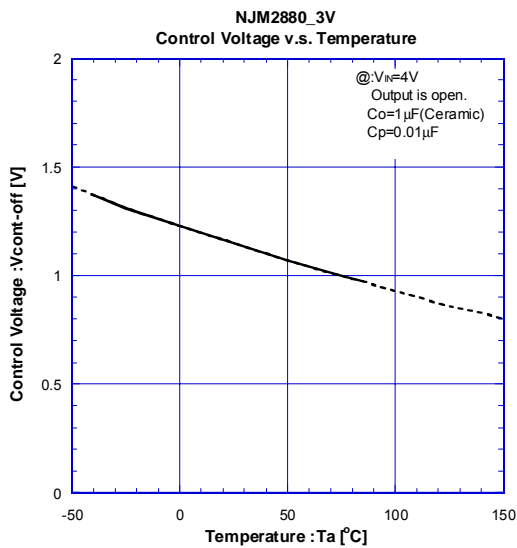
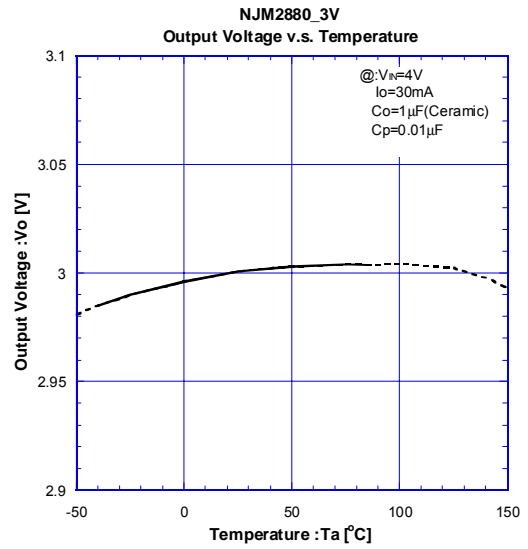
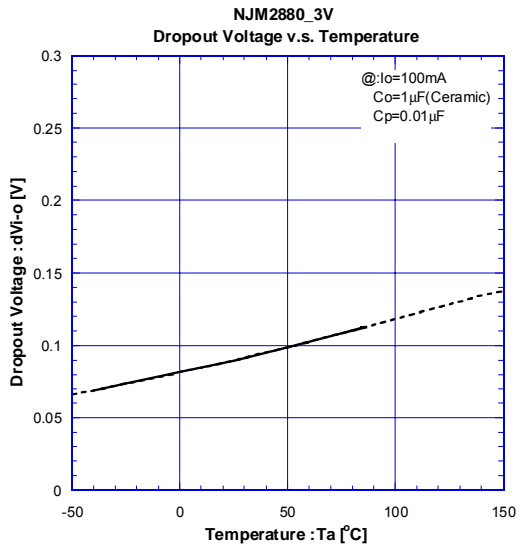
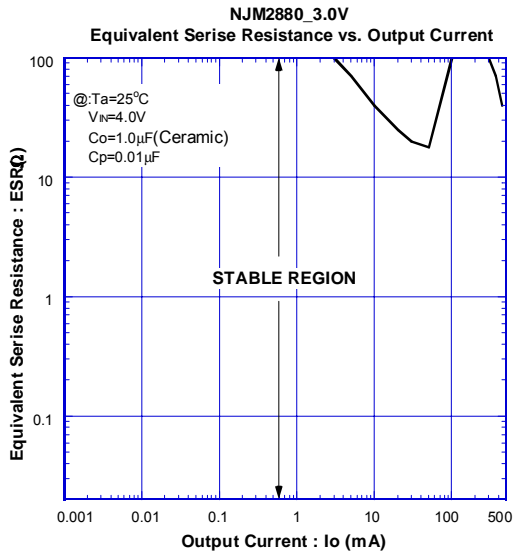
■ ELECTRICAL CHARACTERISTICS



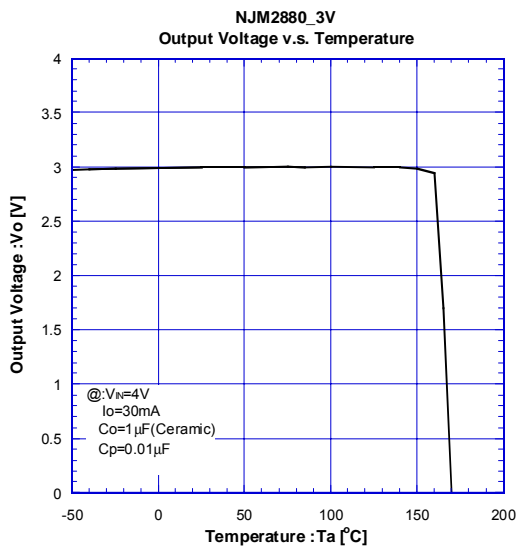
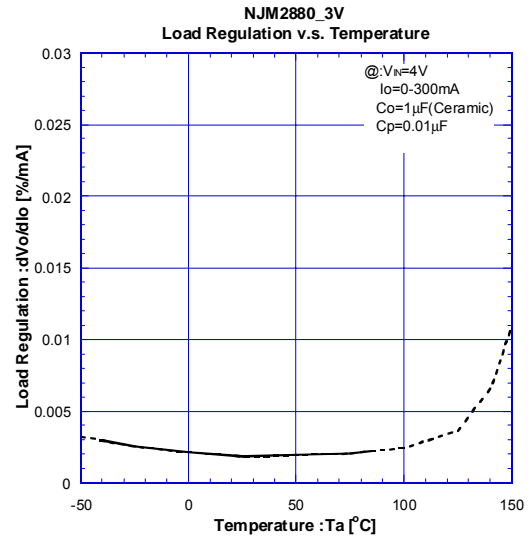
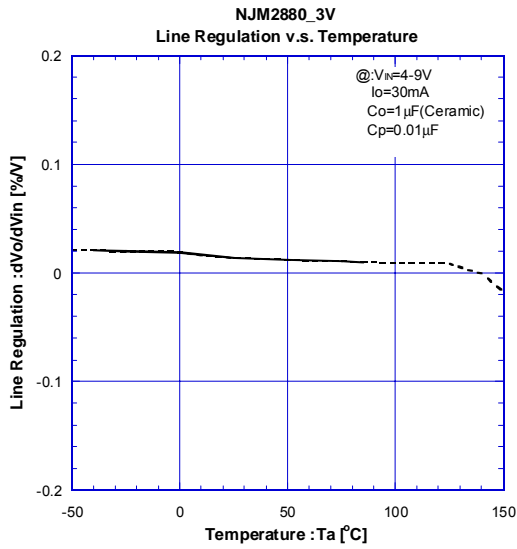
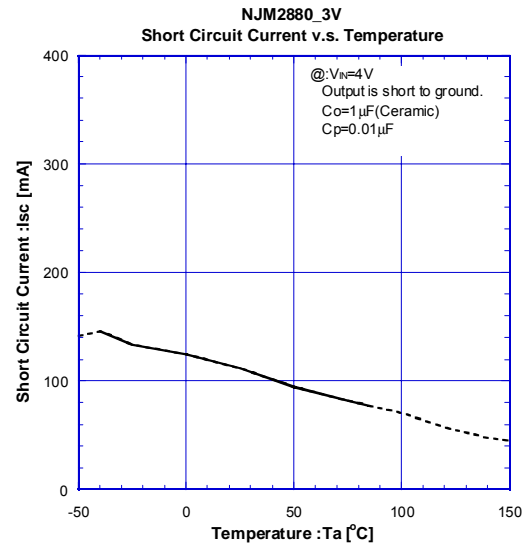
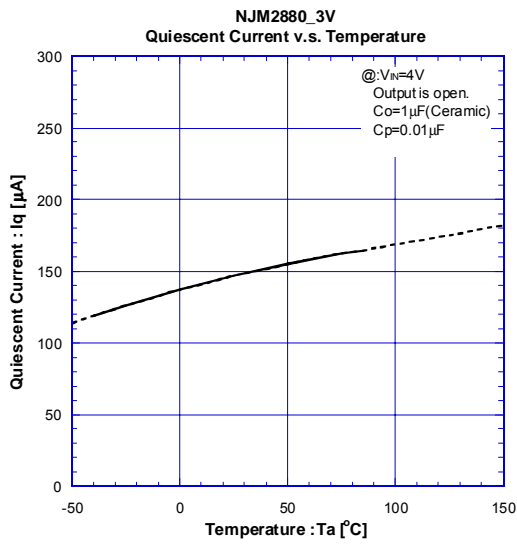
ELECTRICAL CHARACTERISTICS



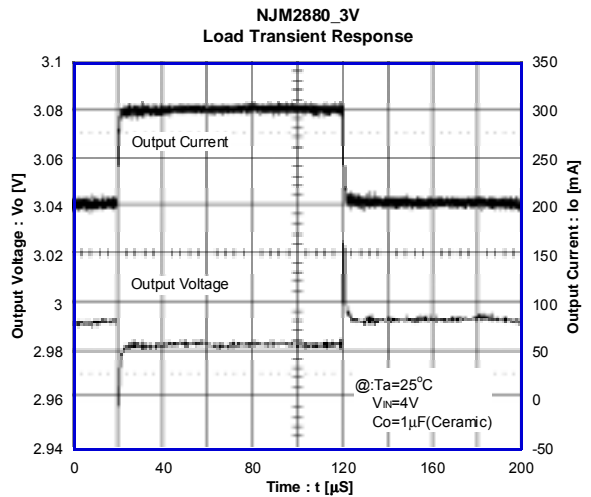
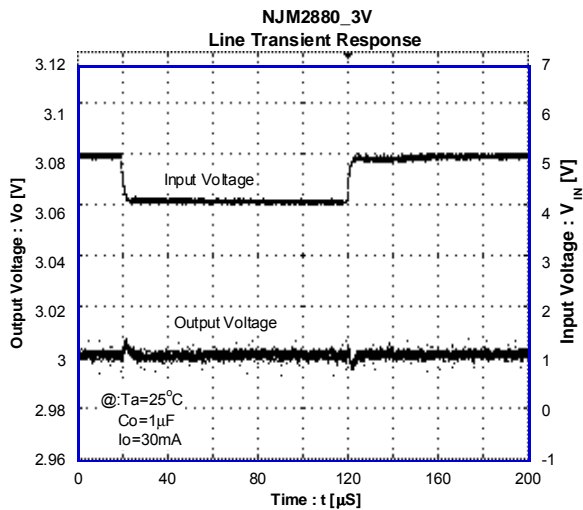
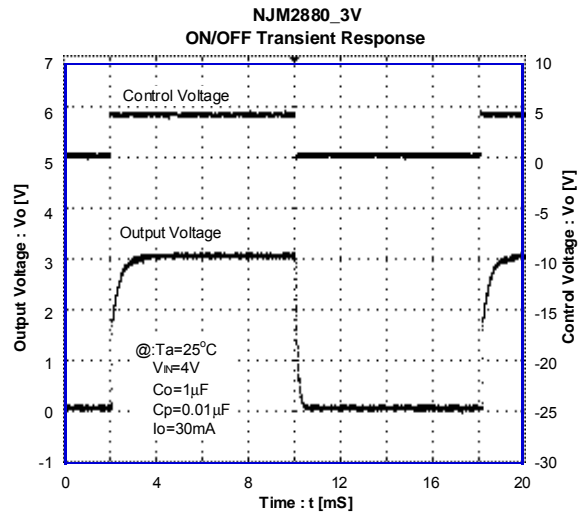
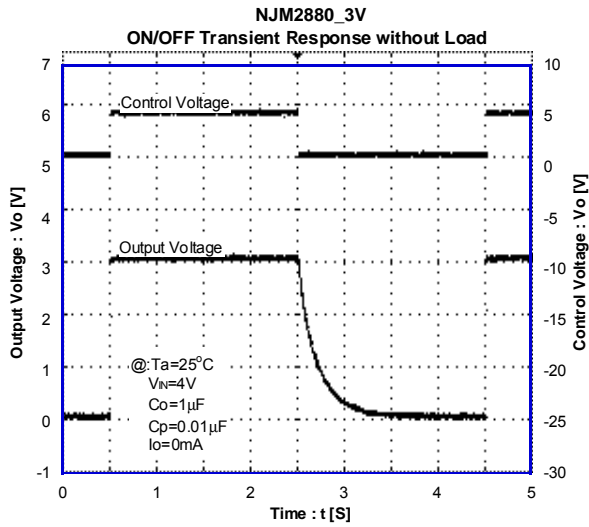
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ELECTRICAL CHARACTERISTICS



■ ELECTRICAL CHARACTERISTICS



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