

## LOW DROPOUT VOLTAGE REGULATOR

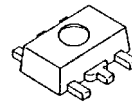
### ■ GENERAL DESCRIPTION

The NJM2830 is a 300mA output low dropout voltage regulator with ON/OFF control.

Advanced Bipolar technology achieves low noise, high ripple rejection and low quiescent current.

2.0V to 15.5V output voltage range, 1 $\mu$ F small decoupling capacitor, built-in noise bypass capacitor make the NJM2830 suitable for various applications.

### ■ PACKAGE OUTLINE

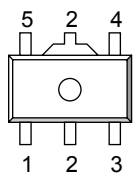


NJM2830U1

### ■ FEATURES

- Output voltage options available      2.1 ~ 15.5V (0.1V step)
- High Ripple Rejection                      75dB typ. (f=1kHz Vo=3V Version)
- Output Noise Voltage                      Vno=50 $\mu$ Vrms typ.
- Output capacitor with 1.0 $\mu$ F ceramic capacitor (Vo $\geq$ 5.1V)
- Output Current                                Io(max.)=300mA
- High Precision Output                      Vo $\pm$ 1.0%
- Low Dropout Voltage                        0.10V typ. (Io=100mA)
- ON/OFF Control                              (Active High)
- Internal Thermal Overload Protection
- Internal Over Current Protection
- Bipolar Technology
- Package Outline                              SOT-89-5

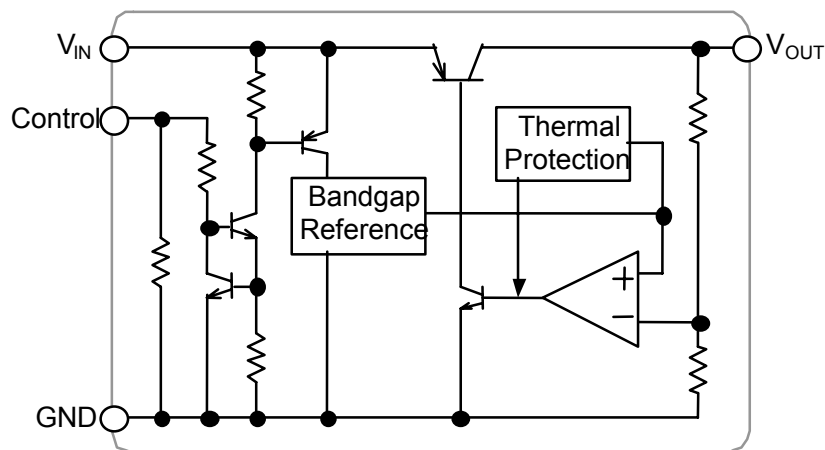
### ■ PIN CONFIGURATION



NJM2830U1

1. CONTROL
2. GND
3. NC
4. V<sub>OUT</sub>
5. V<sub>IN</sub>

### ■ EQUIVALENT CIRCUIT



# NJM2830

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## ■ OUTPUT VOLTAGE

The WHITE column shows applicable Voltage Rank(s)

Device Name	Vout
NJM2830U1-21	2.1V
NJM2830U1-25	2.5V
NJM2830U1-03	3.0V
NJM2830U1-33	3.3V
NJM2830U1-05	5.0V
NJM2830U1-58	5.8V
NJM2830U1-06	6.0V
NJM2830U1-85	8.5V
NJM2830U1-09	9.0V
NJM2830U1-12	12.0V
NJM2830U1-15	15.0V

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	+20	V
Control Voltage	V <sub>CONT</sub>	+20	V
Power Dissipation	P <sub>D</sub>	440	mW
Operating Temperature	Topr	-40~+85	°C
Storage Temperature	Tstg	-40~+150	°C

■ ELECTRICAL CHARACTERISTICS

(V<sub>IN</sub>=Vo+1V, C<sub>IN</sub>=0.1μF, Co=1.0μF (4.9V<Vo≤5.5V:Co=2.2μF, 2.9V<Vo≤4.9V:Co=4.7μF, Vo≤2.9V: Co=10μF), Ta=25°C)

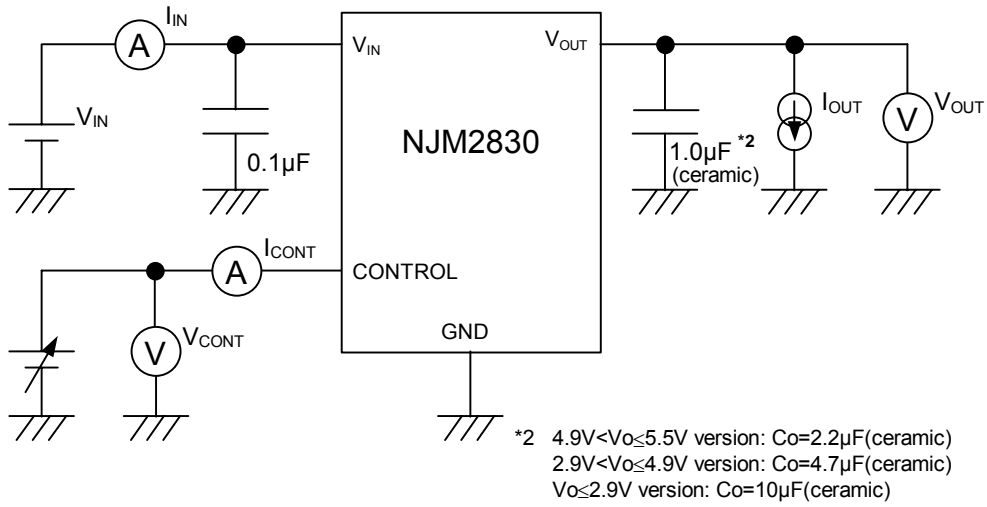
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Output Voltage	Vo	Io=30mA	-1.0%	–	+1.0%	V	
Quiescent Current	I <sub>Q</sub>	Io=0mA, except I <sub>cont</sub>	Vo≤5V Version	–	130	180	μA
			5V<Vo≤10V Version	–	145	195	μA
			10V<Vo≤15V Version	–	160	210	μA
Quiescent Current at Control OFF	I <sub>Q(OFF)</sub>	V <sub>CONT</sub> =0V	–	–	100	nA	
Output Current	Io	Vo=0.3V	300	400	–	mA	
Line Regulation	ΔVo/ΔVIN	V <sub>IN</sub> =Vo+1V ~ Vo+6V(Vo≤12V Version) V <sub>IN</sub> =Vo+1V ~ 18V(Vo>12V Version), Io=30mA	–	–	0.10	%/V	
Load Regulation	ΔVo/ΔIo	Io=0 ~ 300mA	–	–	0.009	%/mA	
Dropout Voltage(*1)	ΔV <sub>I-O</sub>	Io=100mA	–	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 ~ 85°C, Io=10mA	–	± 50	–	ppm/°C	
Output Noise Voltage	V <sub>NO</sub>	f=10Hz ~ 80kHz, Io=10mA Vo=3V Version	–	50	–	μVrms	
Control Current	I <sub>CONT</sub>	V <sub>CONT</sub> =1.6V	–	3	12	μA	
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	
Input Voltage	V <sub>IN</sub>		–	–	18	V	

(\*1): 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.

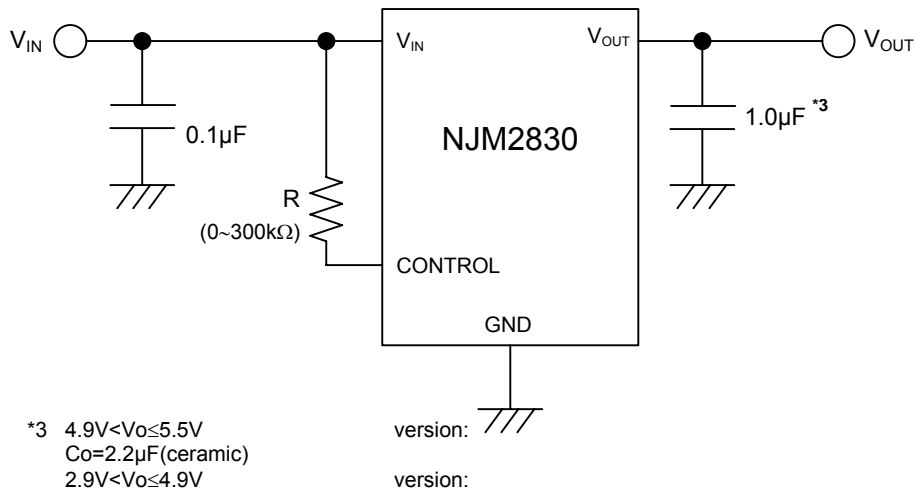
# NJM2830

## TEST CIRCUIT



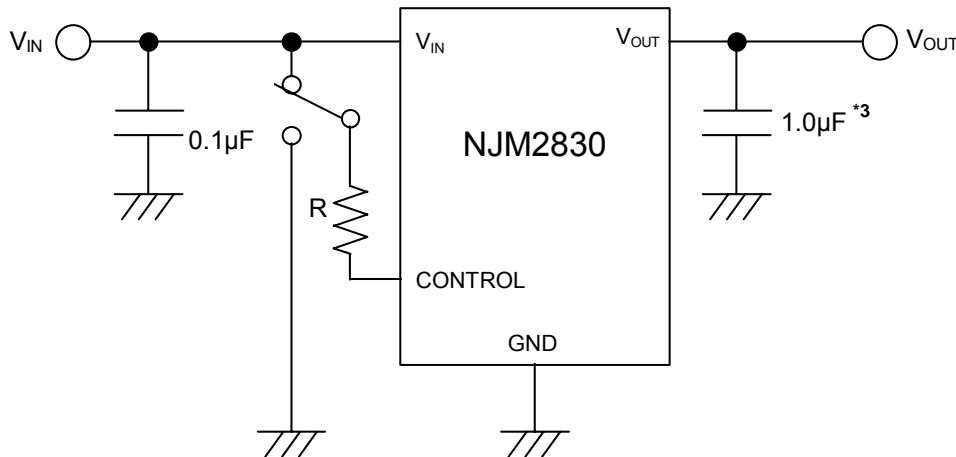
## TYPICAL APPLICATIONS

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



Connect control terminal to  $V_{IN}$  terminal

## ② In use of ON/OFF CONTROL:



\*3 4.9V<V<sub>o</sub>≤5.5V version: C<sub>o</sub>=2.2µF(ceramic)  
 2.9V<V<sub>o</sub>≤4.9V version: C<sub>o</sub>=4.7µF(ceramic)  
 V<sub>o</sub>≤2.9V version: C<sub>o</sub>=10µF(ceramic)

State of control terminal:

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

### \*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.

### \*Input Capacitance C<sub>IN</sub>

Input capacitance C<sub>IN</sub> is required to prevent oscillation and reduce power supply ripple for applications with high power supply impedance or a long power supply line.

Use the C<sub>IN</sub> value of 0.1µF greater to avoid the problem.

C<sub>IN</sub> should connect between GND and V<sub>IN</sub> as short as possible.

### \*Output Capacitance C<sub>O</sub>

Output capacitor (C<sub>o</sub>) is required for a phase compensation of the internal error amplifier. The capacitance and the equivalent series resistance (ESR) influences stability of the regulator.

This product is designed to work with a low ESR capacitor for the C<sub>o</sub>; however, use of recommended capacitance or greater value is essential for stable operation.

Use of a smaller C<sub>o</sub> may cause excess output noise or oscillation of the regulator due to lack of the phase compensation.

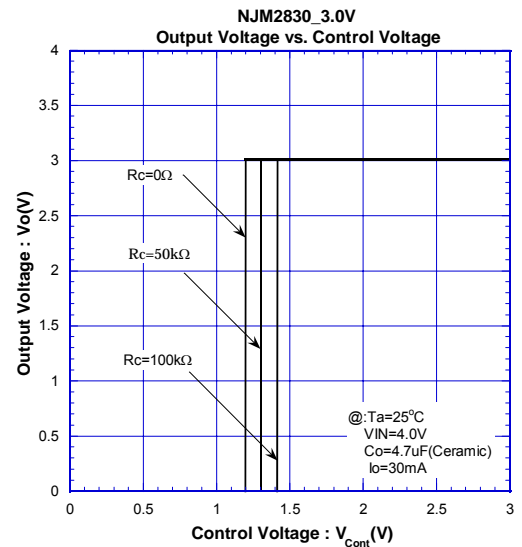
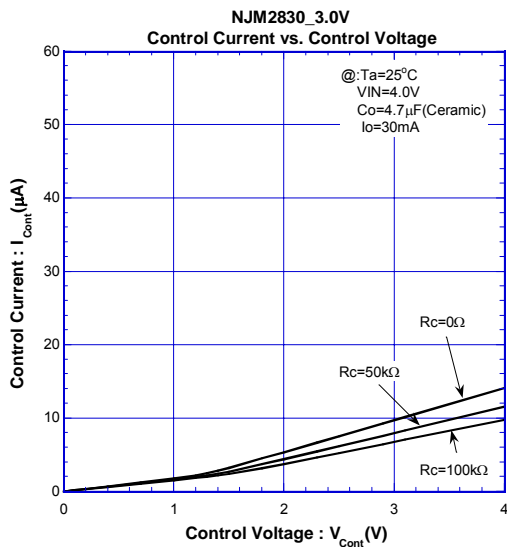
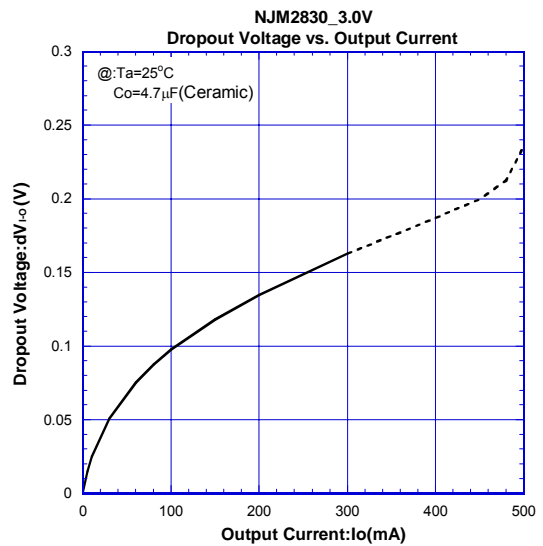
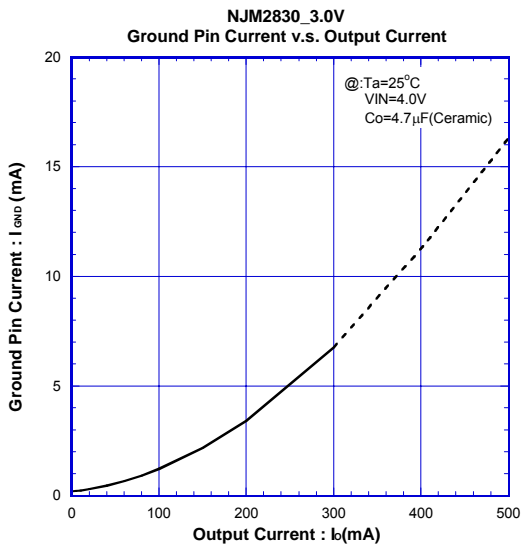
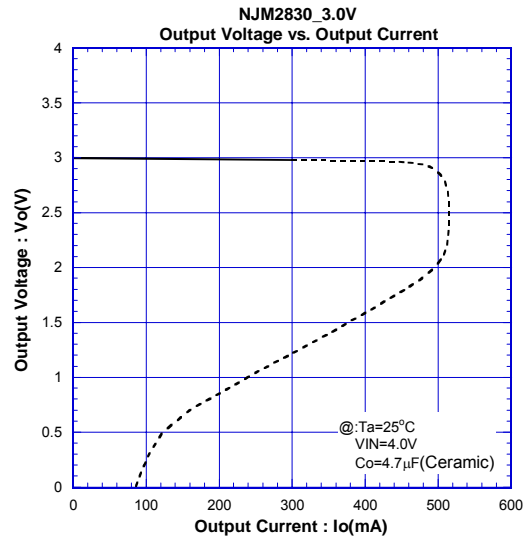
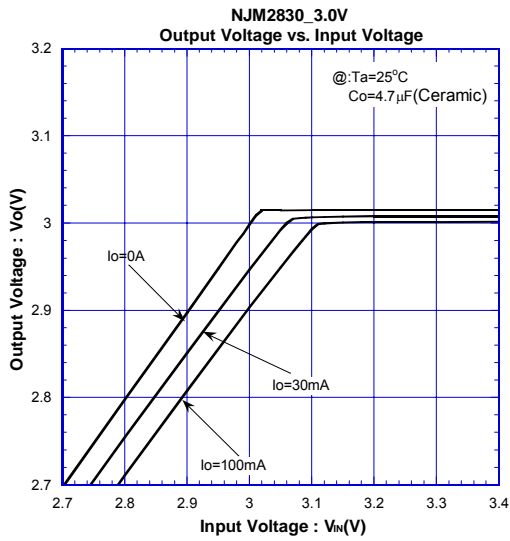
Therefore, use C<sub>o</sub> with the recommended capacitance or greater value and connect between V<sub>o</sub> terminal and GND terminal with minimal wiring. The recommended capacitance depends on the output voltage. Low voltage regulator requires greater value of the C<sub>o</sub>. Thus, check the recommended capacitance for each output voltage.

Use of a greater C<sub>o</sub> reduces output noise and ripple output, and also improves transient response of the output voltage against rapid load change.

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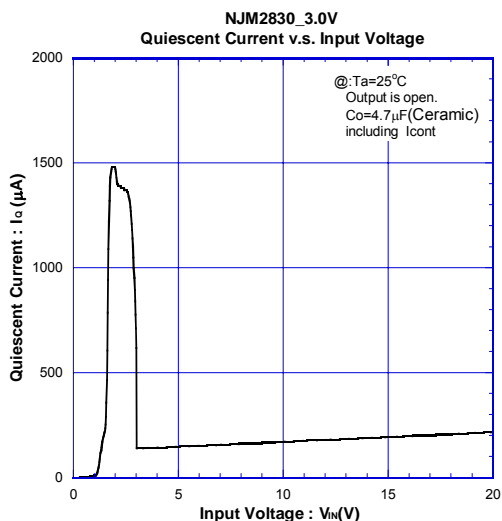
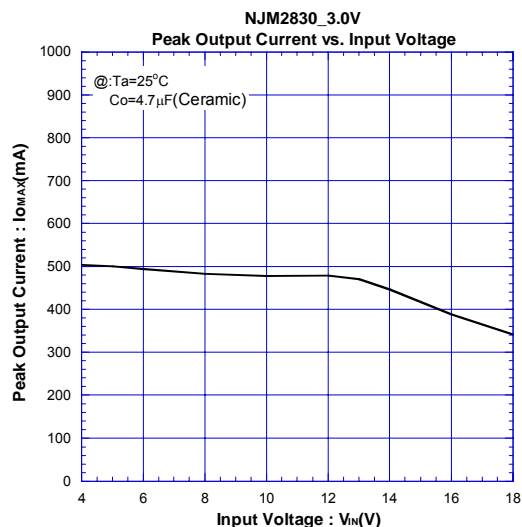
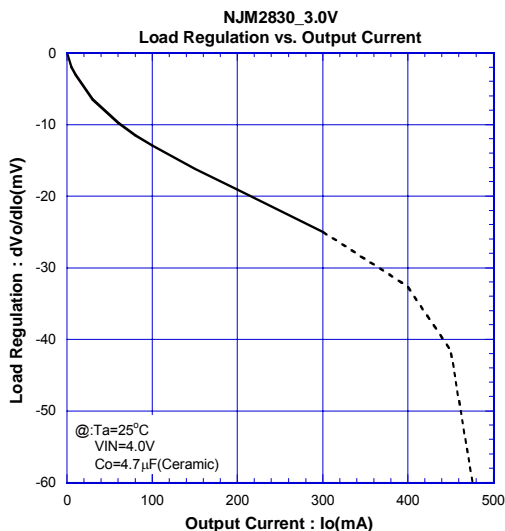
## ■ TYPICAL CHARACTERISTICS

### ● DC CHARACTERISTICS (3V Version)



## TYPICAL CHARACTERISTICS

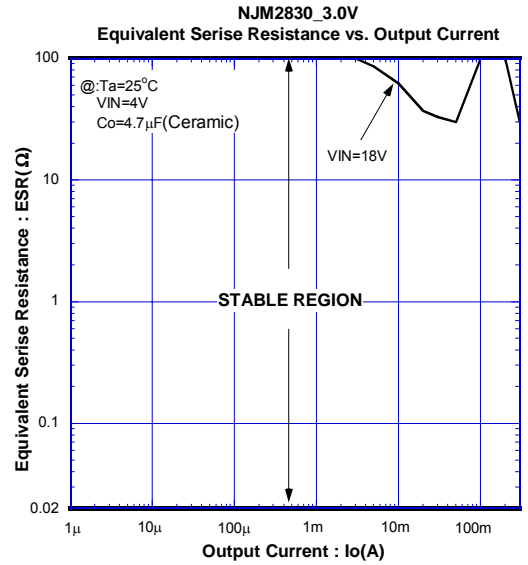
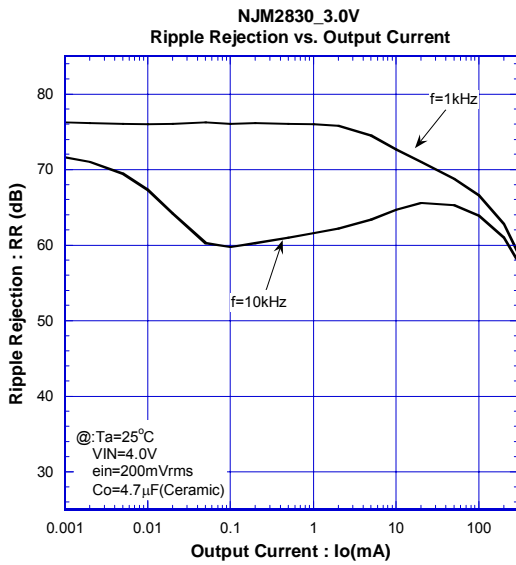
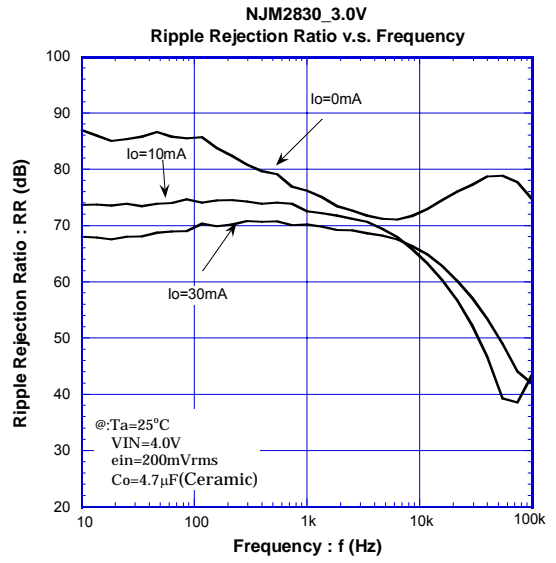
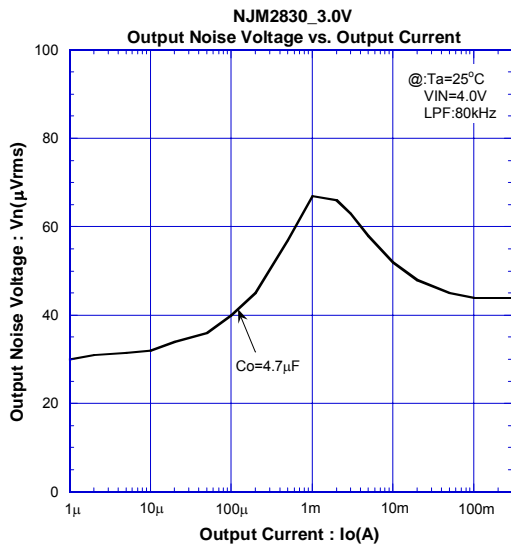
### DC CHARACTERISTICS (3V Version)



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## TYPICAL CHARACTERISTICS

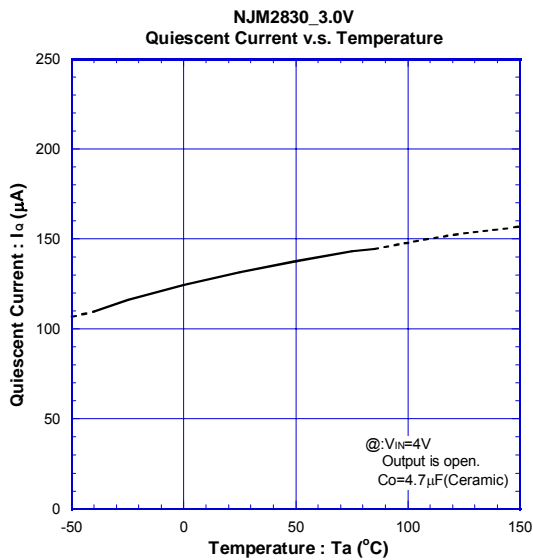
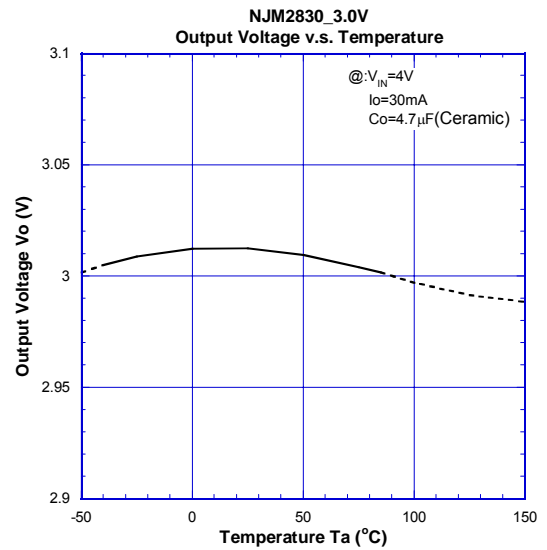
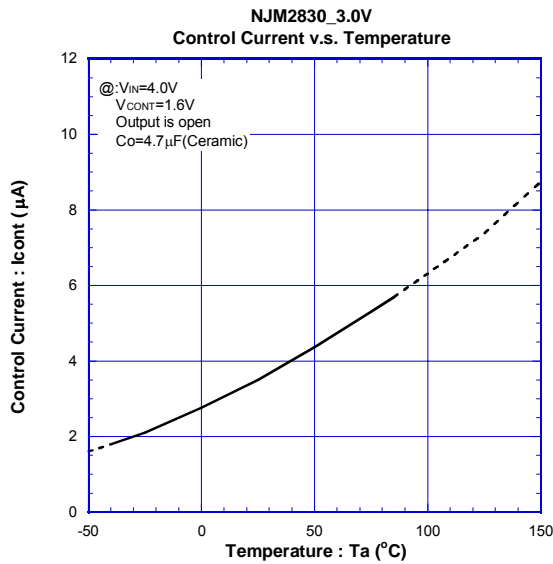
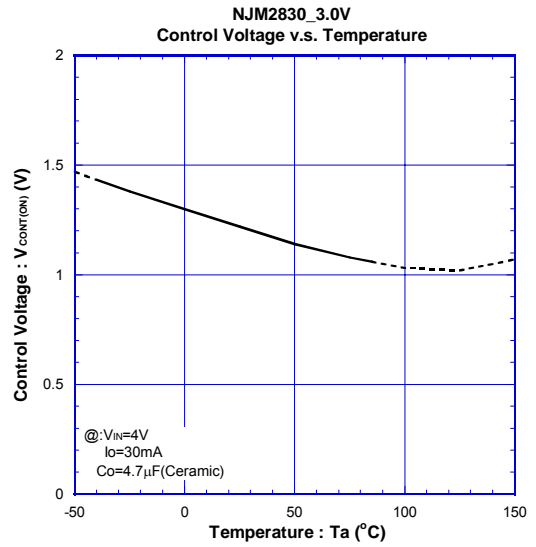
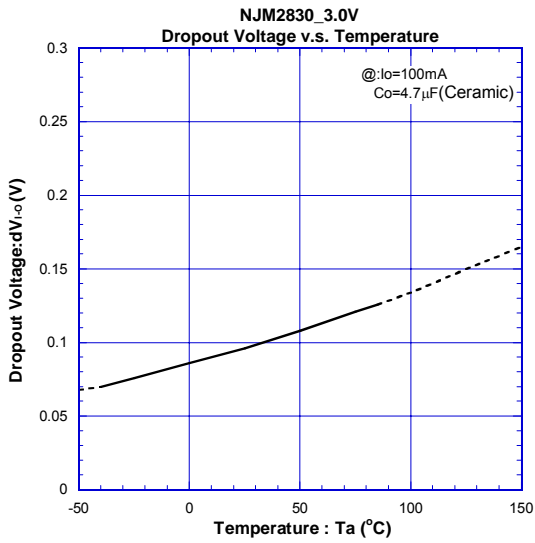
### AC CHARACTERISTICS (3V Version)





## TYPICAL CHARACTERISTICS

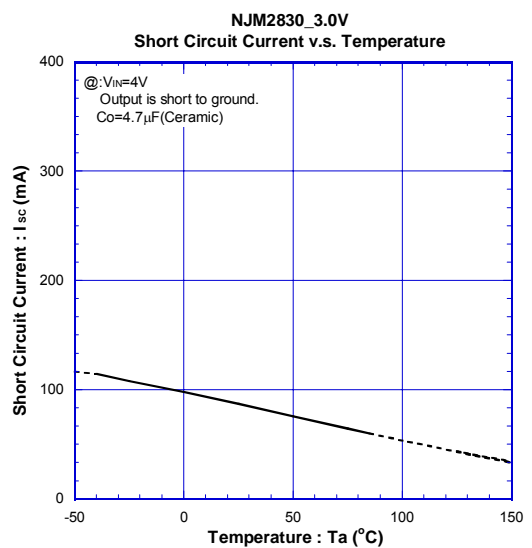
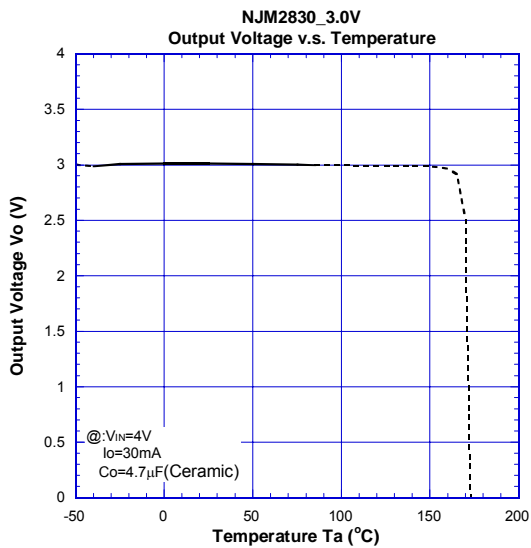
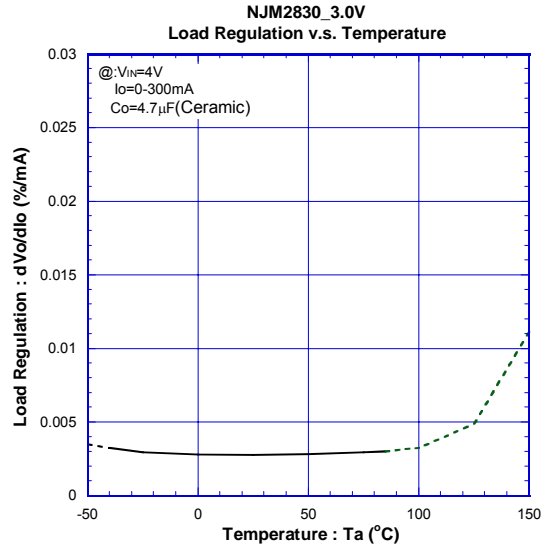
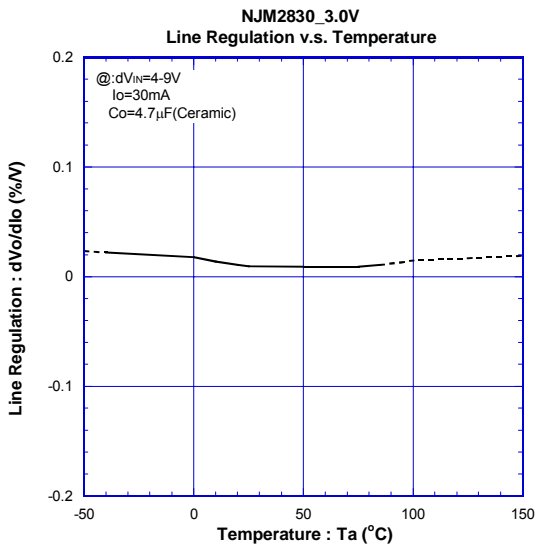
### ● TEMPERATURE CHARACTERISTICS (3V Version)



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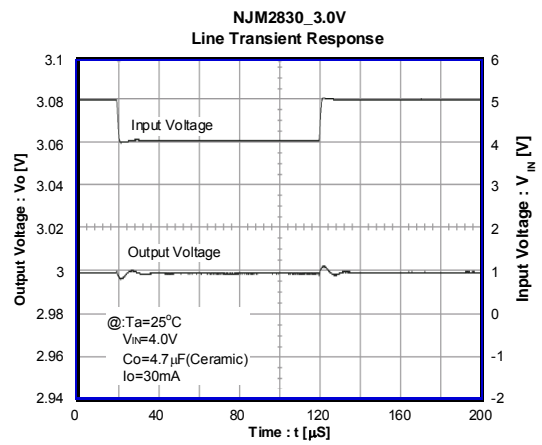
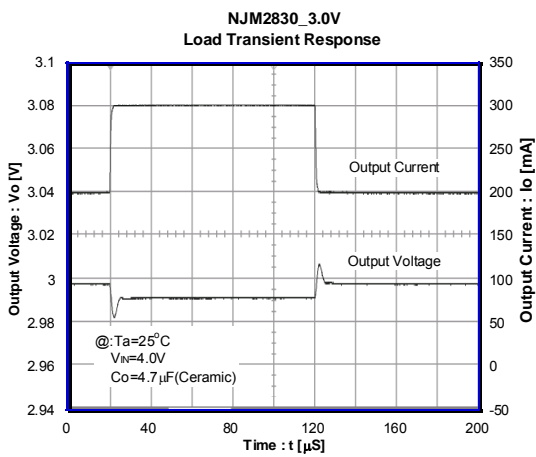
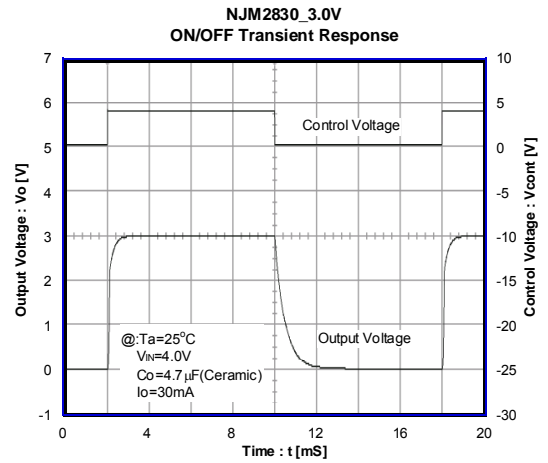
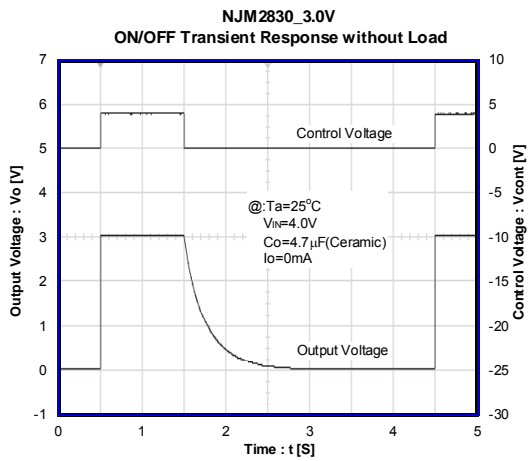
## TYPICAL CHARACTERISTICS

### TEMPERATURE CHARACTERISTICS (3V Version)



## TYPICAL CHARACTERISTICS

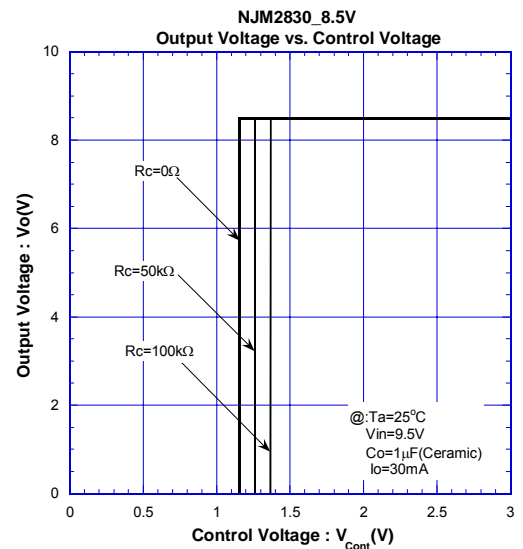
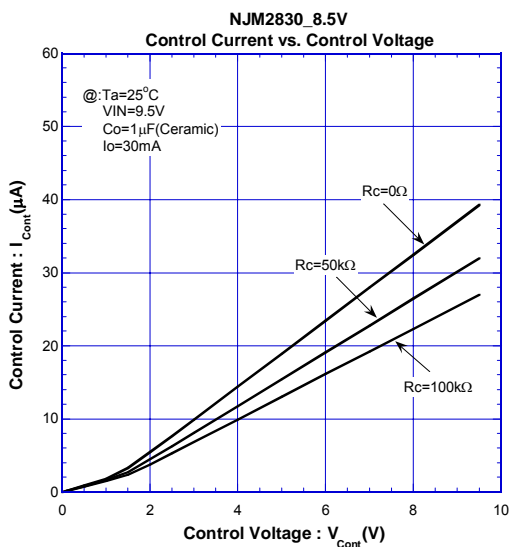
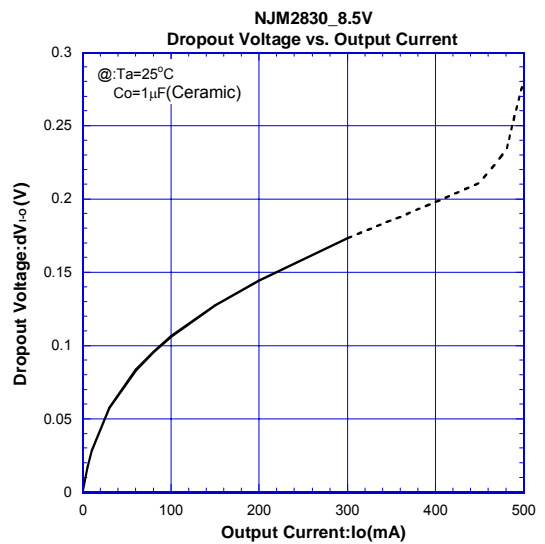
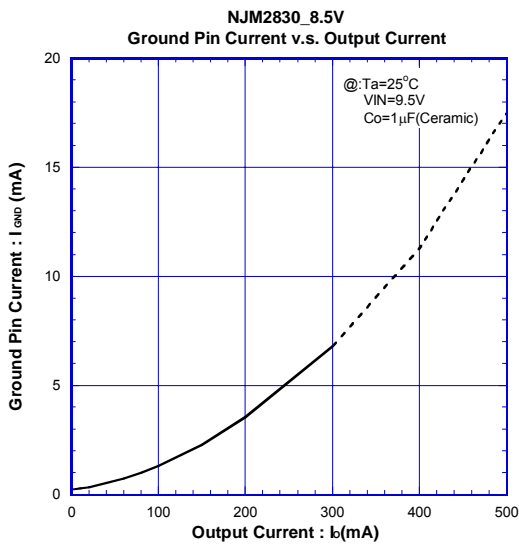
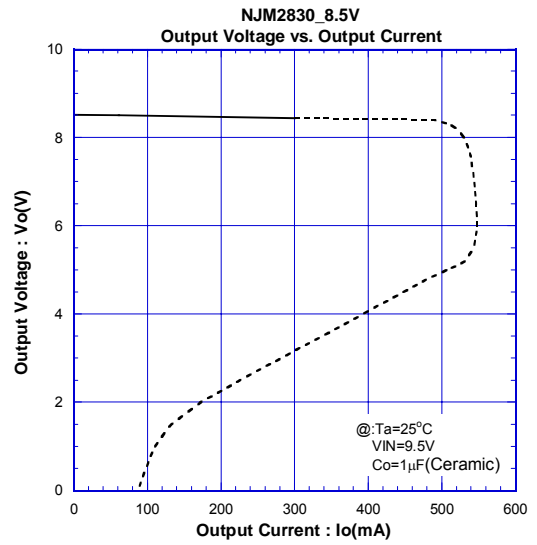
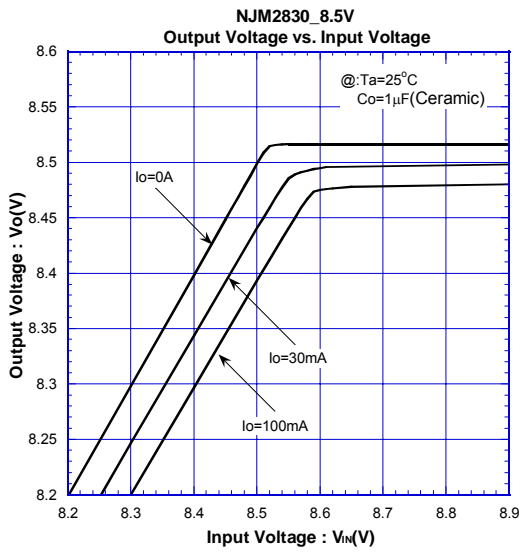
### ● TRANSIENT RESPONSE (3V Version)



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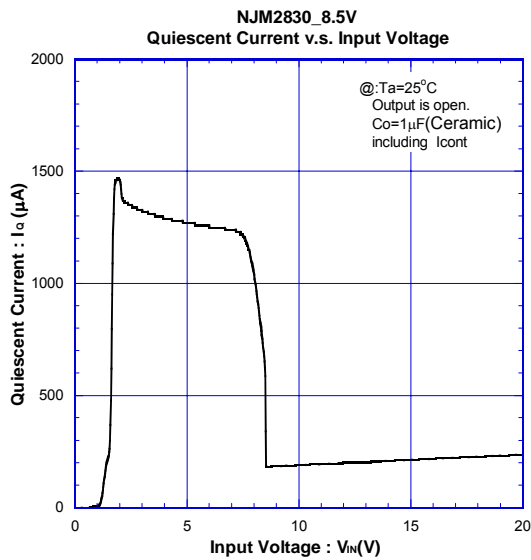
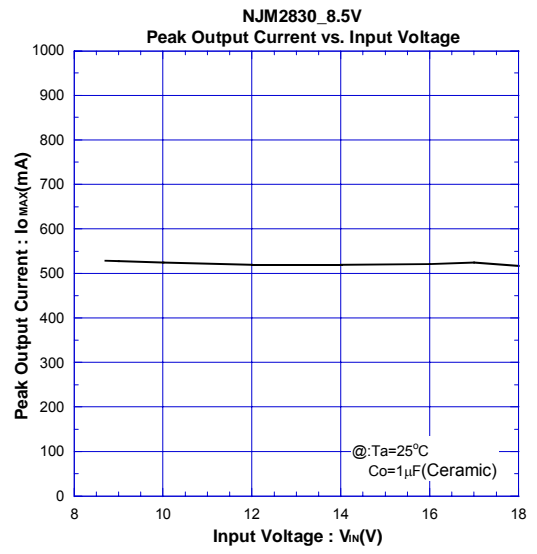
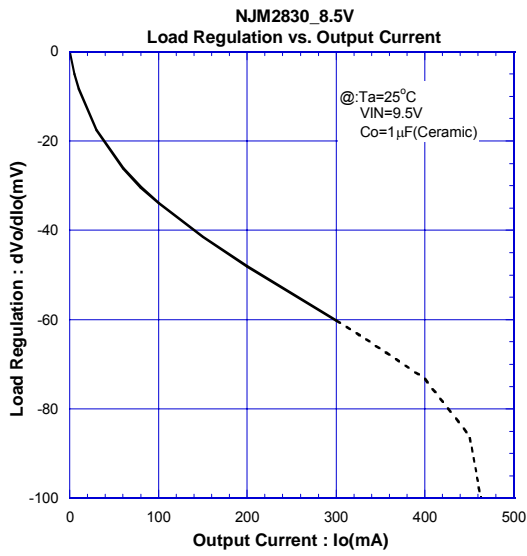
## ■ TYPICAL CHARACTERISTICS

### ● DC CHARACTERISTICS (8.5V Version)



## ■ TYPICAL CHARACTERISTICS

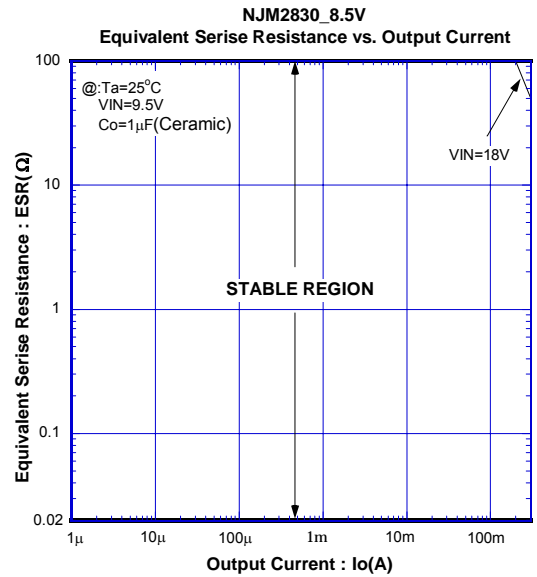
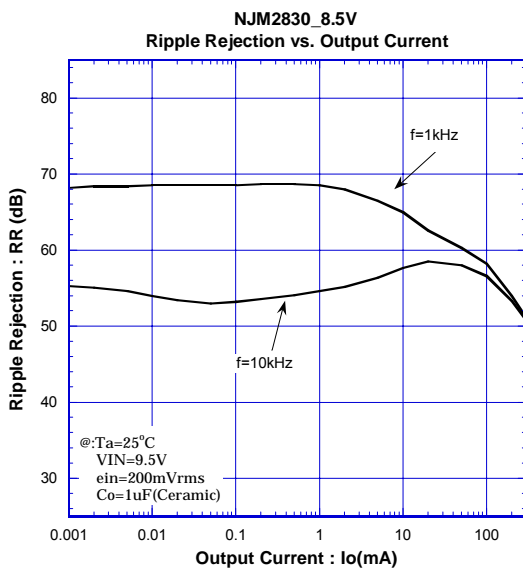
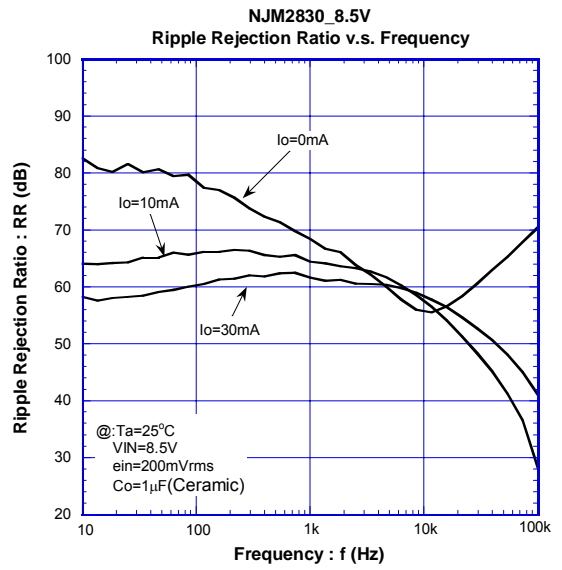
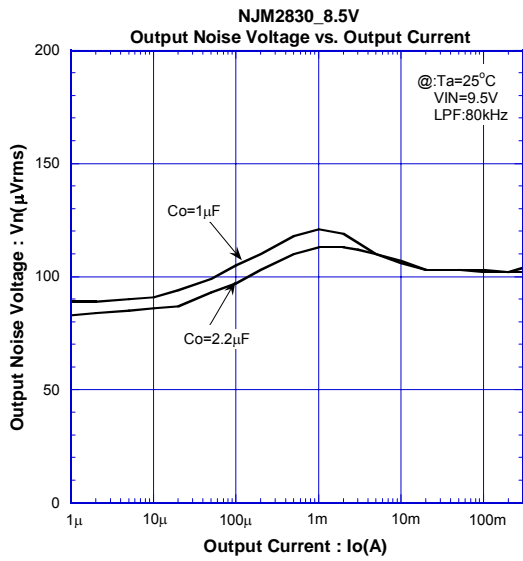
### ● DC CHARACTERISTICS (8.5V Version)



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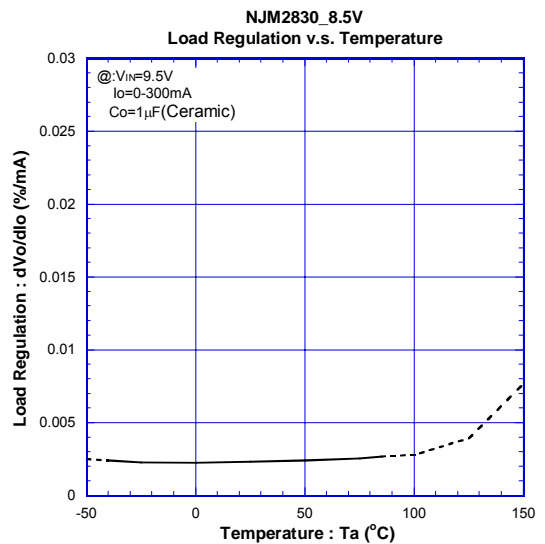
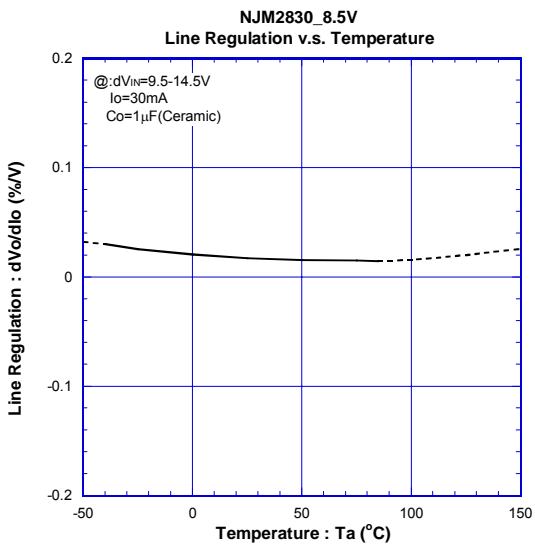
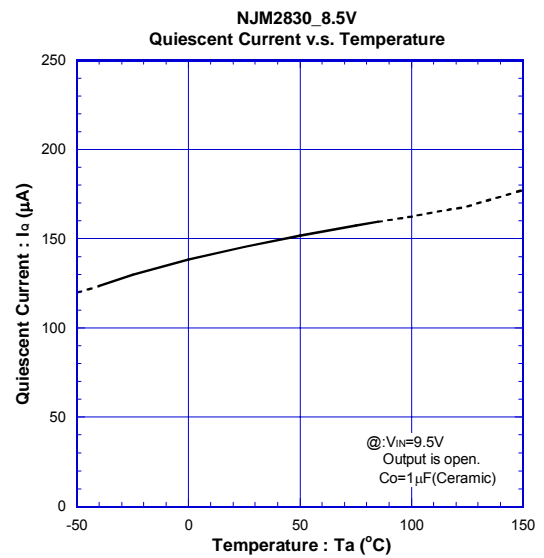
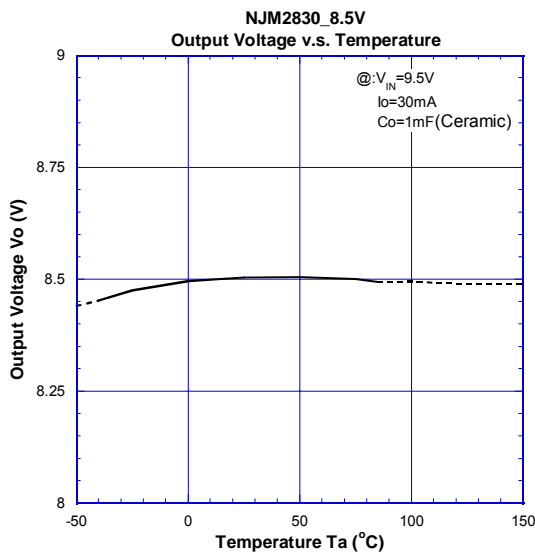
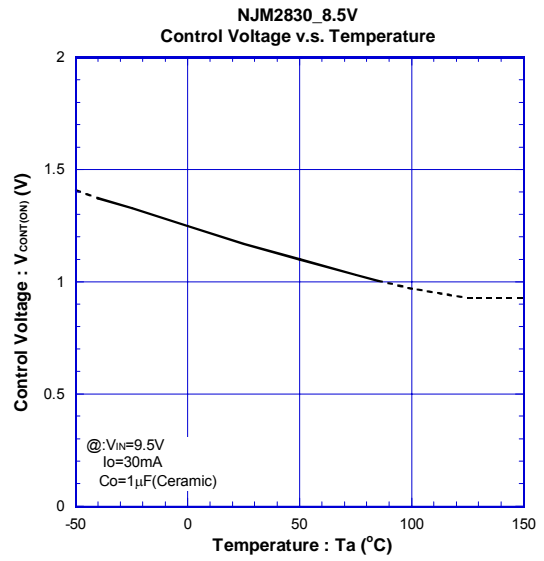
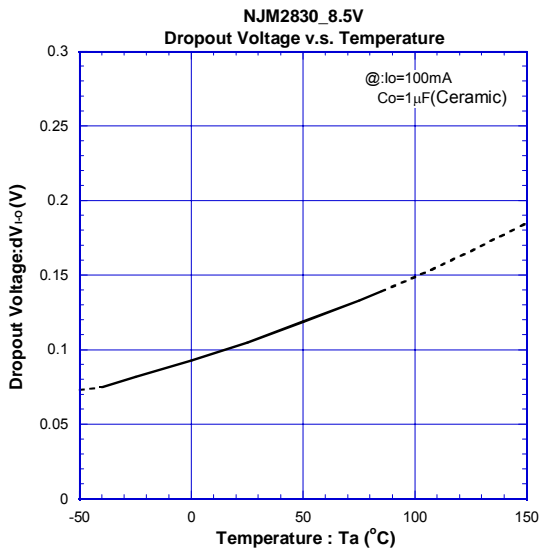
## TYPICAL CHARACTERISTICS

### AC CHARACTERISTICS (8.5V Version)



## TYPICAL CHARACTERISTICS

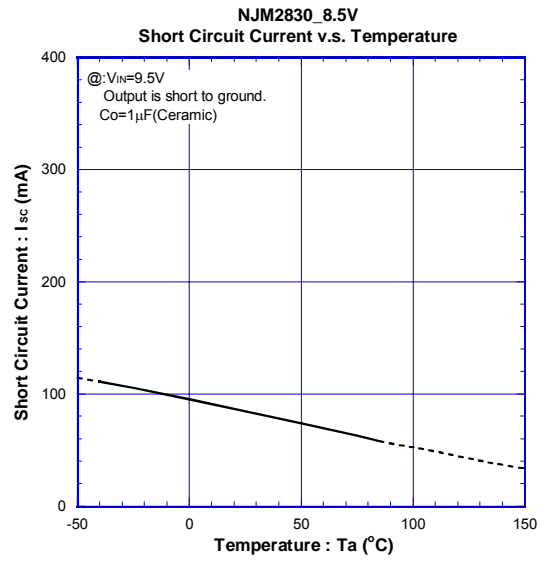
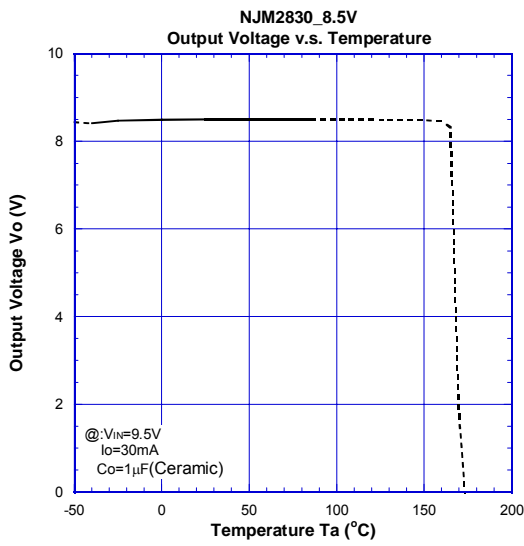
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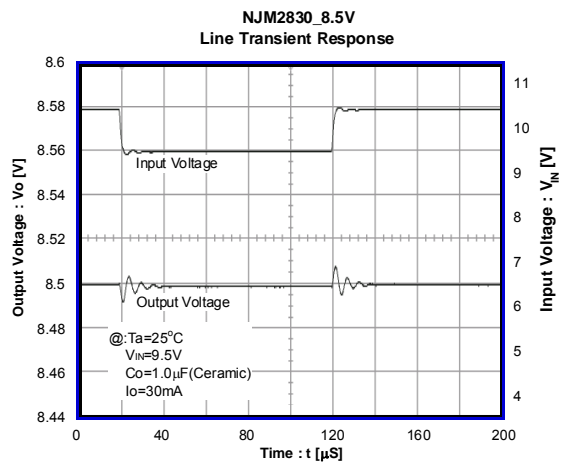
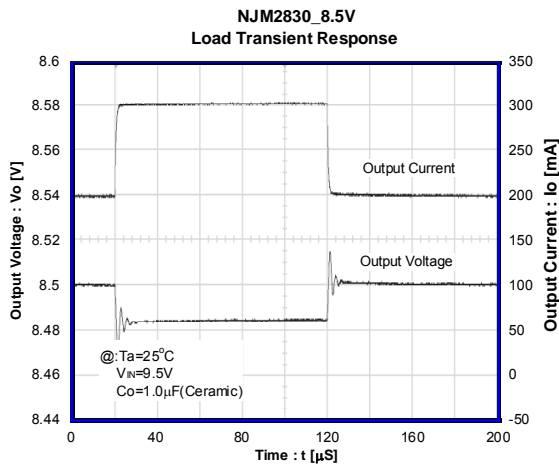
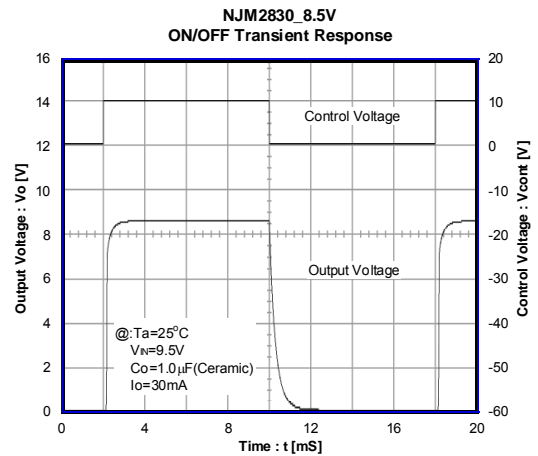
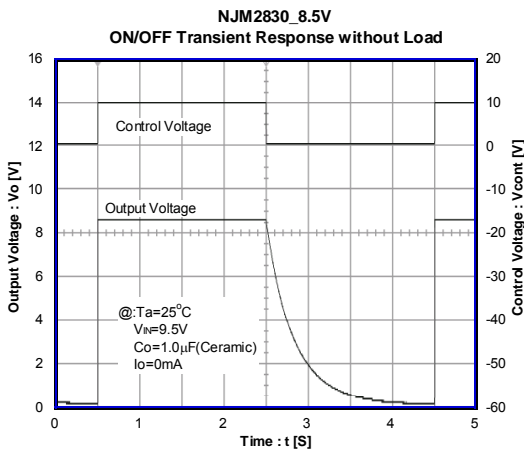
# NJM2830

## ■ TYPICAL CHARACTERISTICS

### ● TEMPERATURE CHARACTERISTICS (8.5V Version)



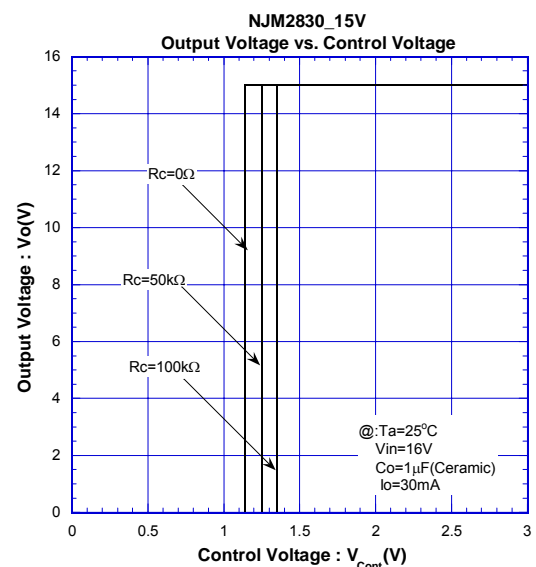
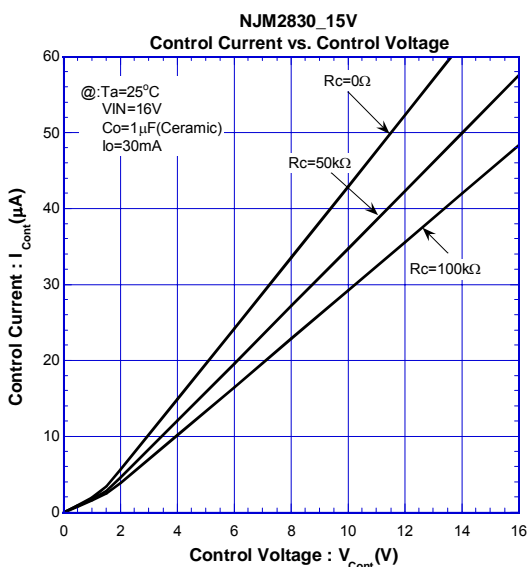
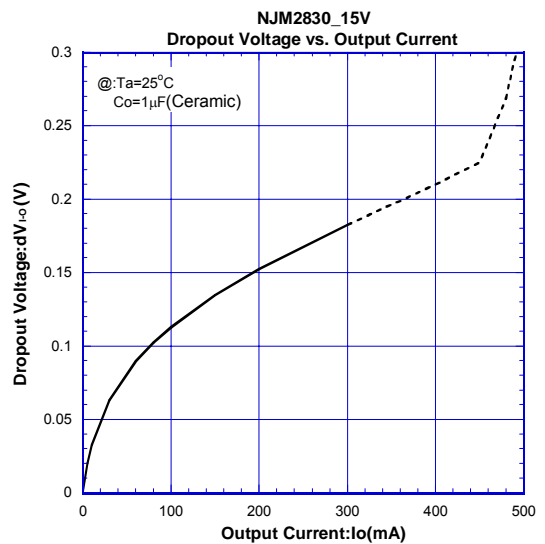
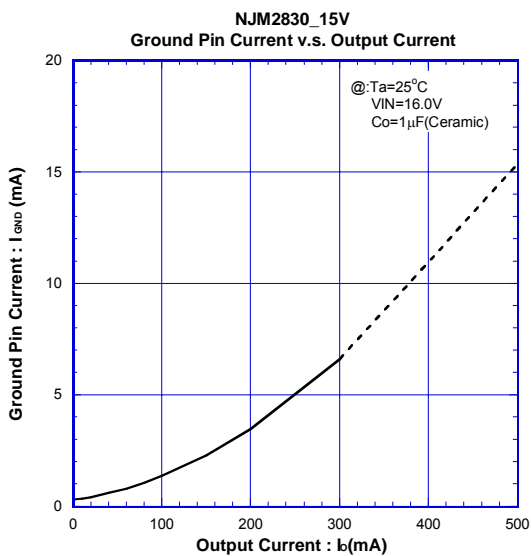
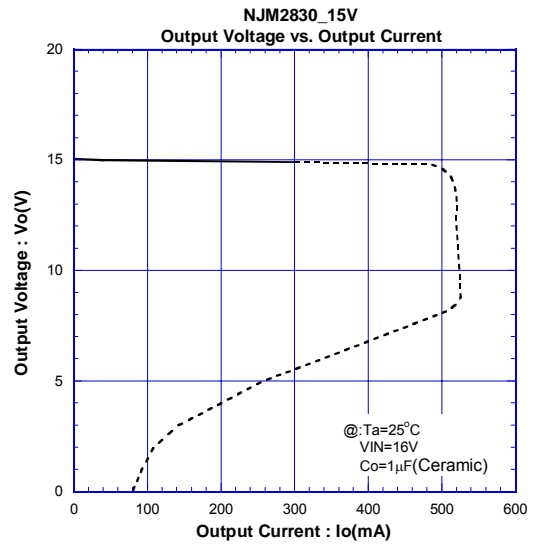
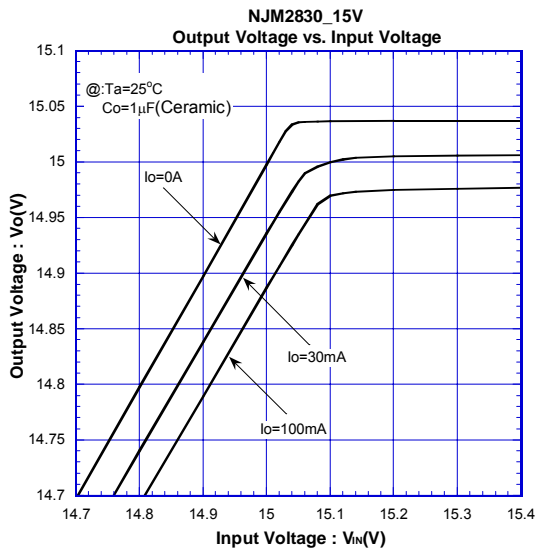
### ● TRANSIENT RESPONSE (8.5V Version)





## ■ TYPICAL CHARACTERISTICS

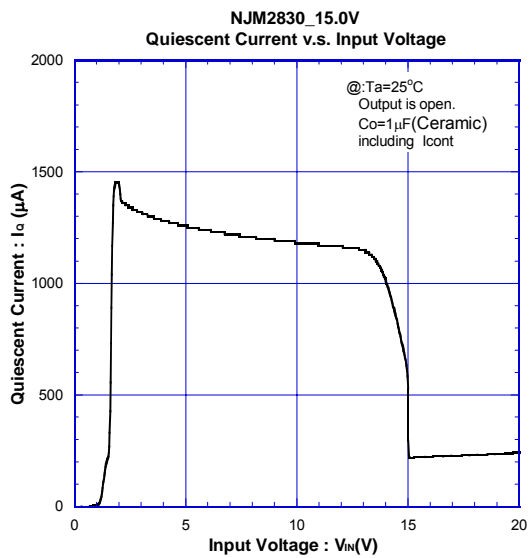
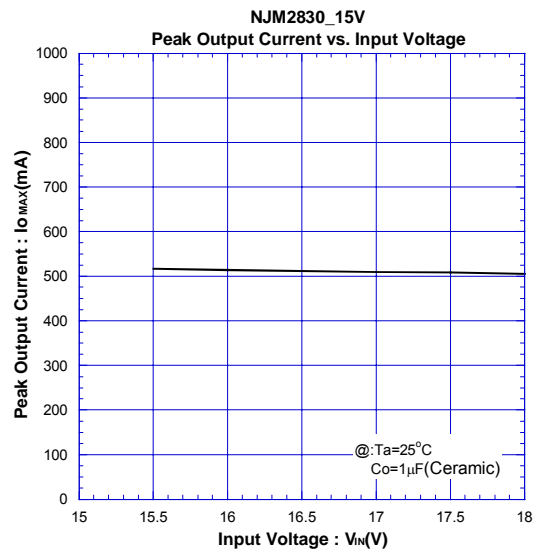
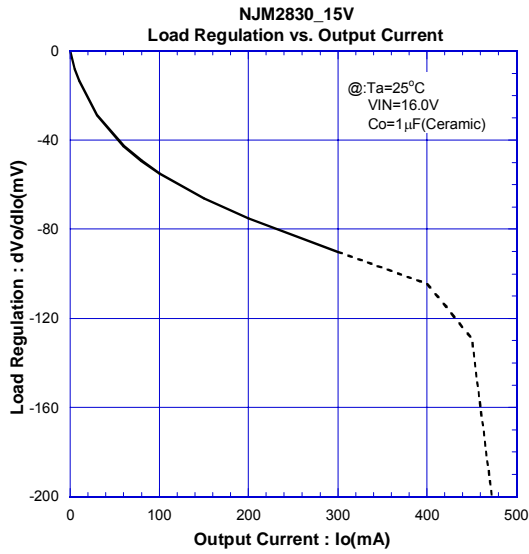
### ● DC CHARACTERISTICS (15V Version)



# NJM2830

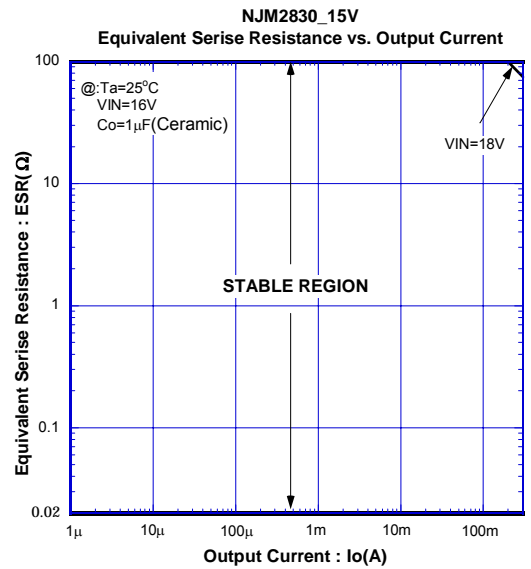
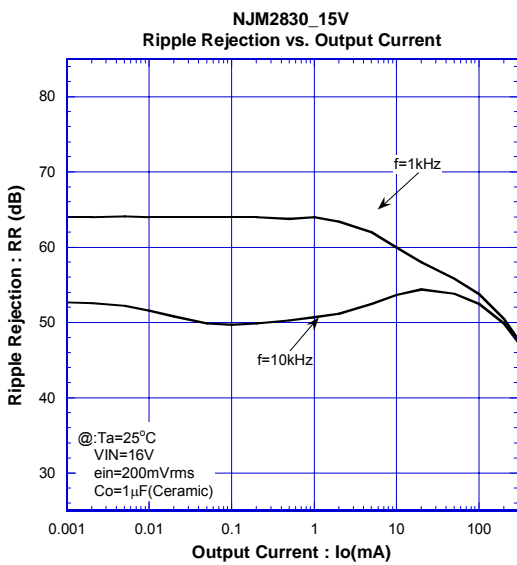
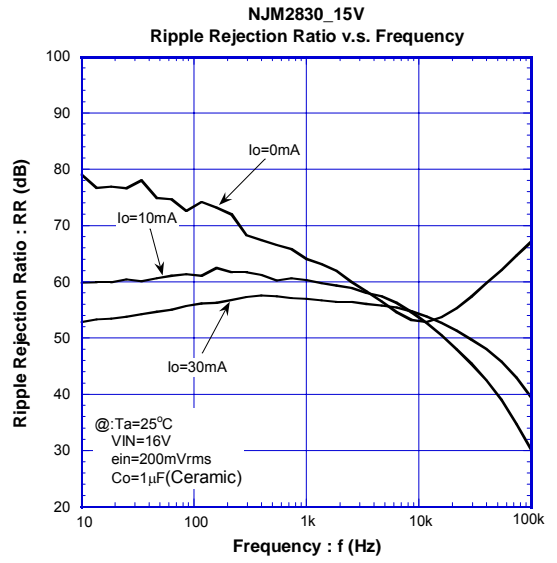
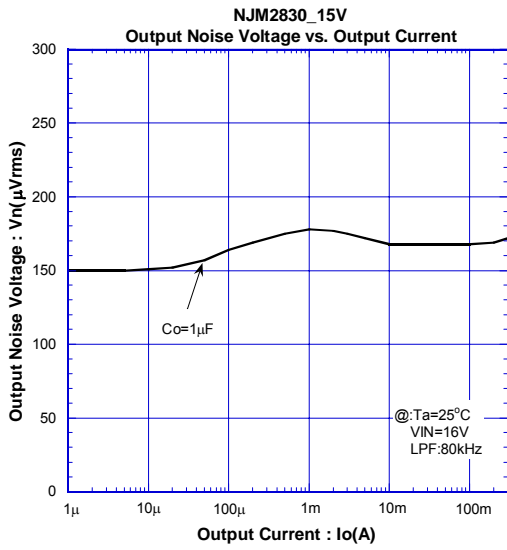
## TYPICAL CHARACTERISTICS

### DC CHARACTERISTICS (15V Version)



## TYPICAL CHARACTERISTICS

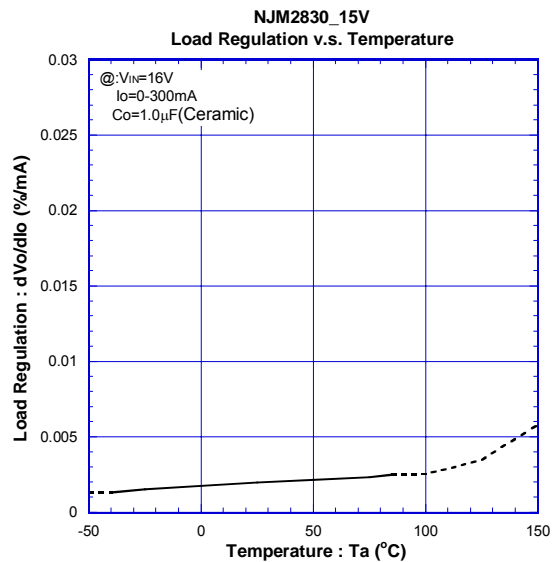
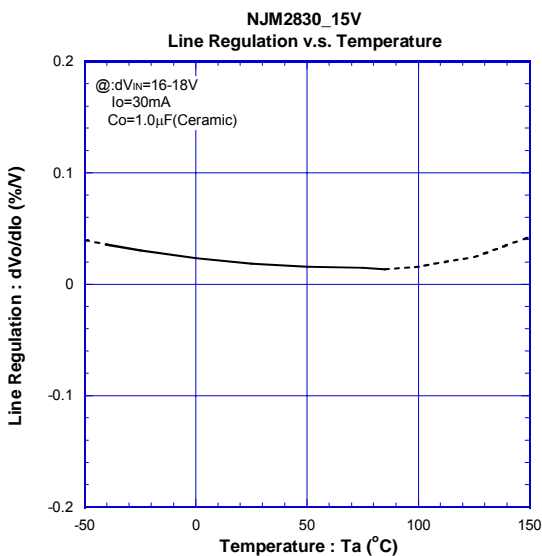
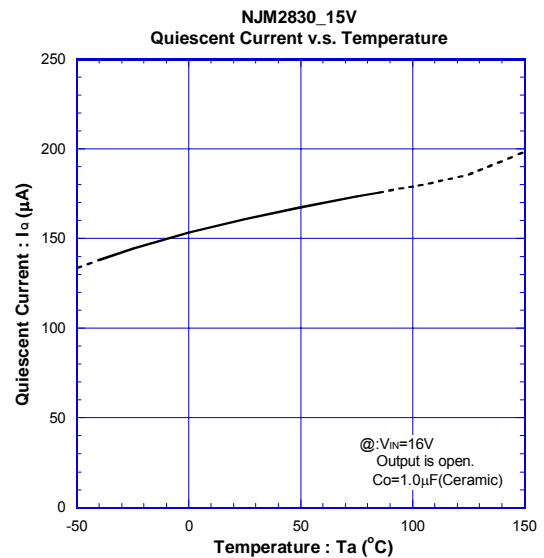
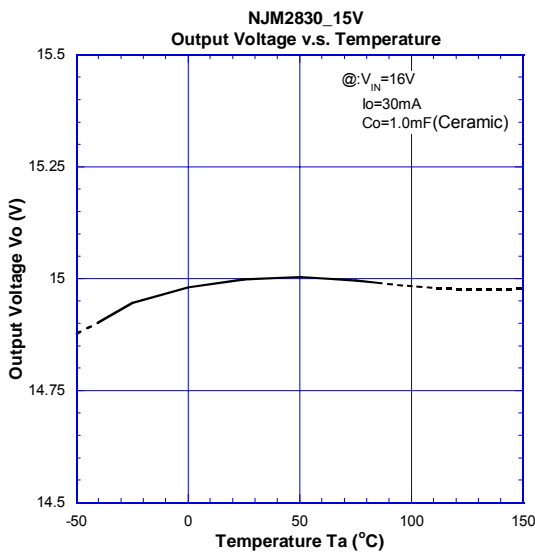
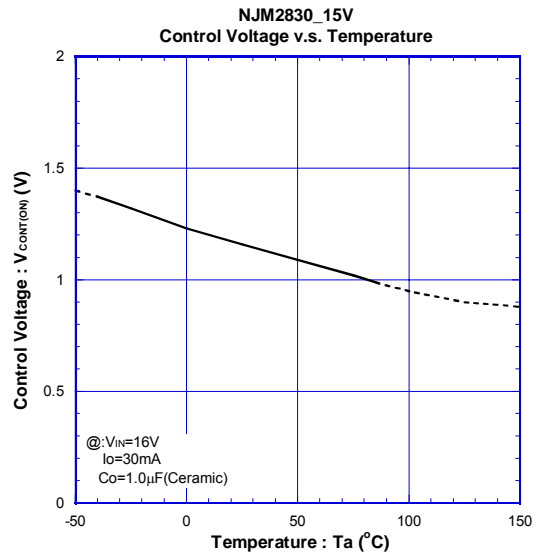
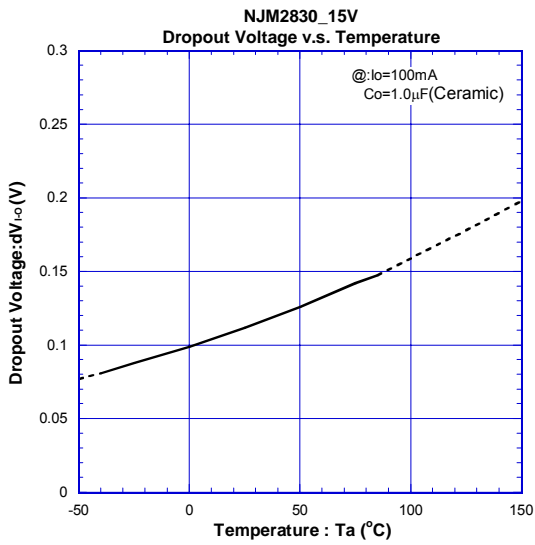
### AC CHARACTERISTICS (15V Version)



# NJM2830

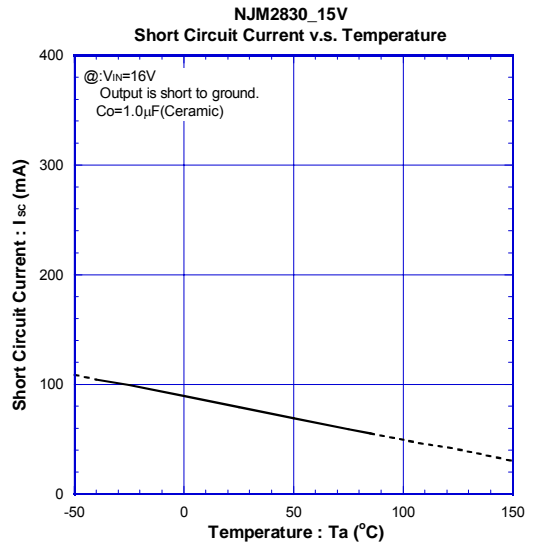
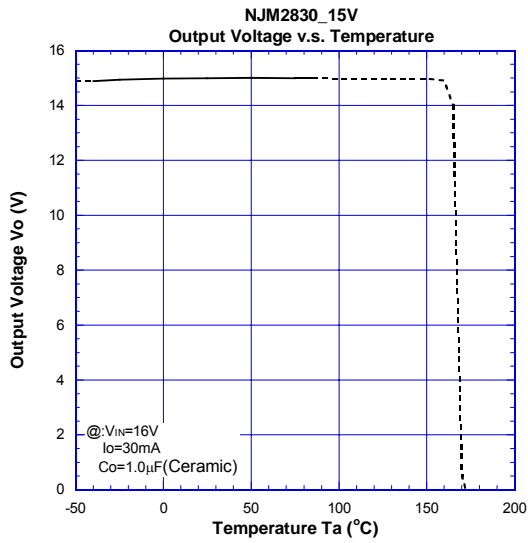
## ■ TYPICAL CHARACTERISTICS

### ● TEMPERATURE CHARACTERISTICS (15V Version)

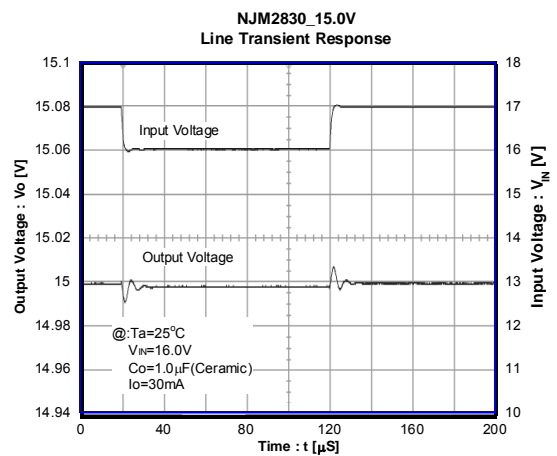
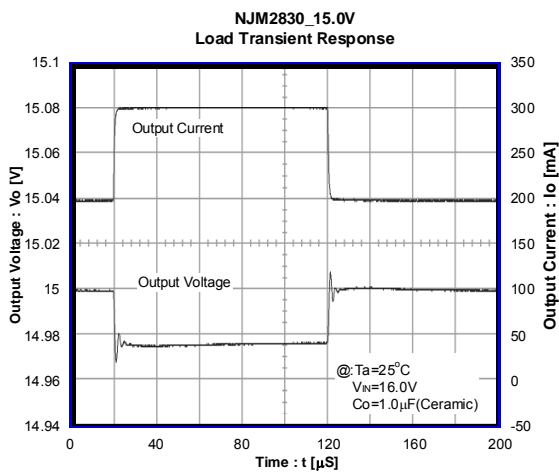
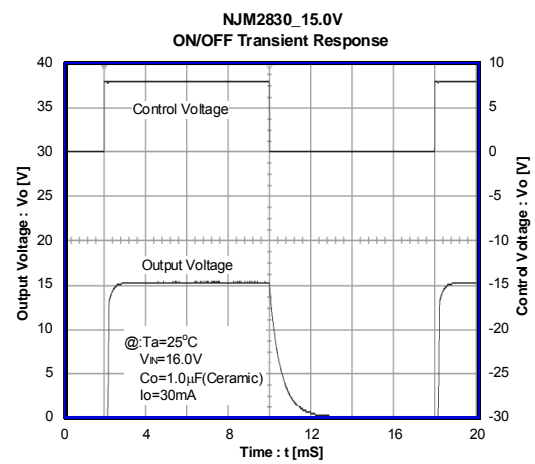
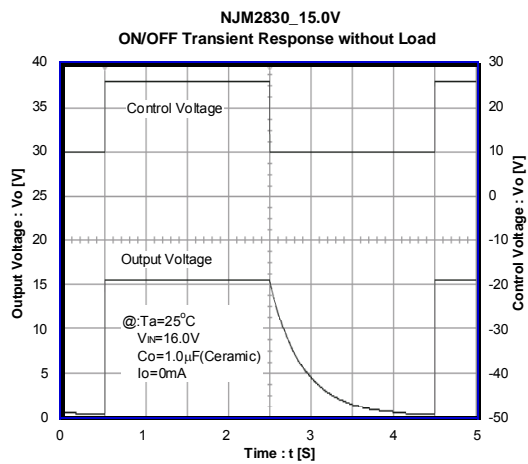


## ■ TYPICAL CHARACTERISTICS

### ● TEMPERATURE CHARACTERISTICS (15V Version)



### ● TRANSIENT RESPONSE (15V Version)



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