LOW DROPOUT VOLTAGE REGULATOR

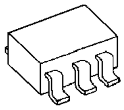
■ GENERAL DESCRIPTION

The NJM2888 is a low dropout voltage regulator with ON/OFF control.

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

Small packaging, 1.0µF small decoupling capacitor and built-in noise bypass capacitor less make the NJM2888 suitable for space conscious applications.

■ PACKAGE OUTLINE

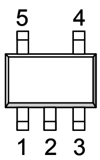


NJM2888F

■ FEATURES

- High Ripple Rejection 75dB typ. (f=1kHz, Vo=3V Version)
- Low Output Noise Voltage Vno=45µVrms typ.
- Output capacitor with 1.0µF ceramic capacitor (Vo≥2.7V)
- Output Current Io(max.)=300mA
- High Precision Output Vo±1.0%
- Low Dropout Voltage 0.10V typ. (Io=100mA)
- ON/OFF Control
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limit
- Bipolar Technology
- Package Outline SOT-23-5

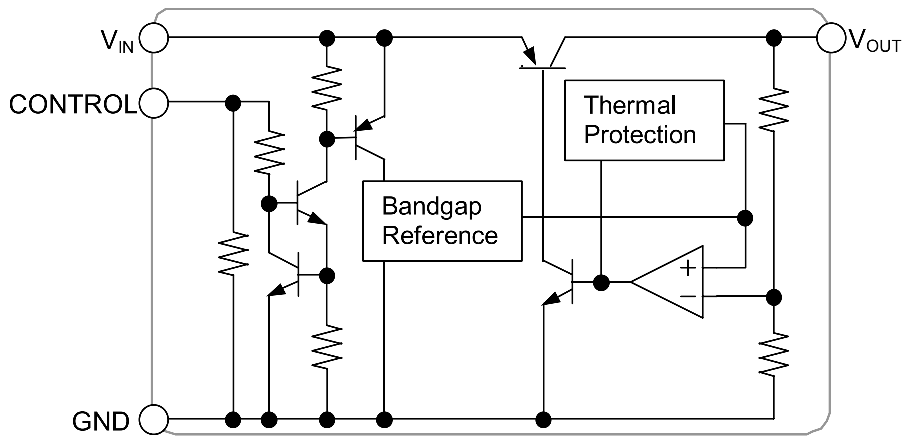
■ PIN CONFIGURATION



1. CONTROL (Active High)
2. GND
3. N.C.
4. V_{OUT}
5. V_{IN}

NJM2888F

■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST

Device Name	V_{OUT}	Device Name	V_{OUT}	Device Name	V_{OUT}
NJM2888F15	1.5V	NJM2888F28	2.8V	NJM2888F34	3.4V
NJM2888F18	1.8V	NJM2888F29	2.9V	NJM2888F35	3.5V
NJM2888F19	1.9V	NJM2888F03	3.0V	NJM2888F46	4.7V
NJM2888F21	2.1V	NJM2888F32	3.2V	NJM2888F48	4.8V
NJM2888F25	2.5V	NJM2888F33	3.3V	NJM2888F05	5.0V

Output voltage options available : 1.5 ~ 5.0V (0.1V step)

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS		UNIT
Input Voltage	V_{IN}	+10		V
Control Voltage	V_{CONT}	+10		V
Power Dissipation	P_D	SOT-23-5	350(*1)	mW
			200(*2)	
Operating Temperature	Topr	-40 ~ +85		°C
Storage Temperature	Tstg	-40 ~ +125		°C

(*1): Mounted on glass epoxy board based on EIA/JEDEC. (114.3x76.2x1.6mm: 2Layers)
(*2): Device itself.

■ Operating voltage

V_{IN}=+2.3 ~ +6V (In case of Vo<2.1V version)

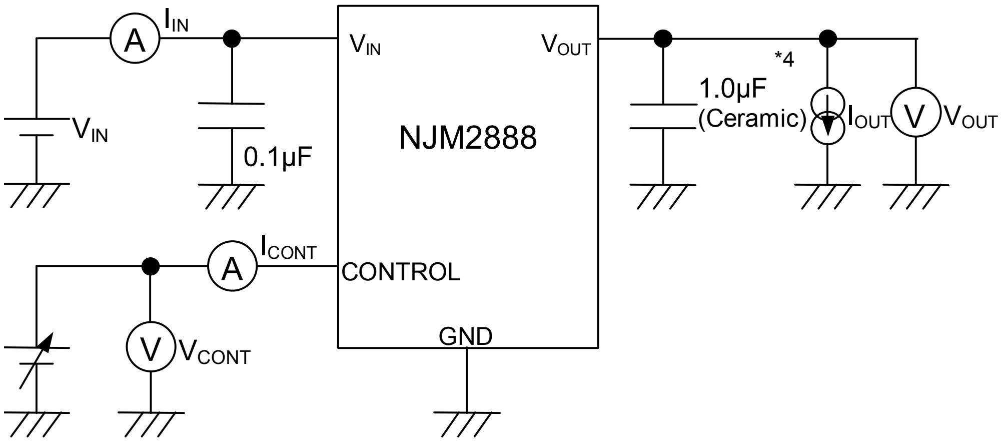
■ ELECTRICAL CHARACTERISTICS

(V_{IN}=Vo+1V, C_{IN}=0.1µF, Co=1.0µF: Vo≥2.7V (Co=2.2µF : 1.8V<Vo≤2.6V, Co=4.7µF : Vo≤1.8V), Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-1.0%	–	+1.0%	V
Quiescent Current	I_Q	Io=0mA, Except I_{CONT}	–	130	195	µA
Quiescent Current at Control OFF	$I_{Q(OFF)}$	V_{CONT}=0V	–	–	100	nA
Output Current	Io	Vo - 0.3V	300	400	–	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6V (Vo≤3V Version), V_{IN}=Vo+1V ~ 9V (Vo>3V Version), Io=30mA	–	–	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 300mA	–	–	0.009	%/mA
Dropout Voltage(*3)	ΔV_{I-O}	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	$\Delta Vo/\Delta Ta$	Ta=0 ~ 85°C, Io=10mA	–	±50	–	ppm/°C
Output Noise Voltage	V_{NO}	f=10Hz ~ 80kHz, Io=10mA, Vo=3V Version	–	45	–	µVrms
Control Current	I_{CONT}	V_{CONT}=1.6V	–	3	12	µA
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	–	–	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		–	–	0.6	V
Input Voltage	V_{IN}		–	–	9	V

(*3): The output voltage excludes under 2.1V.
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.

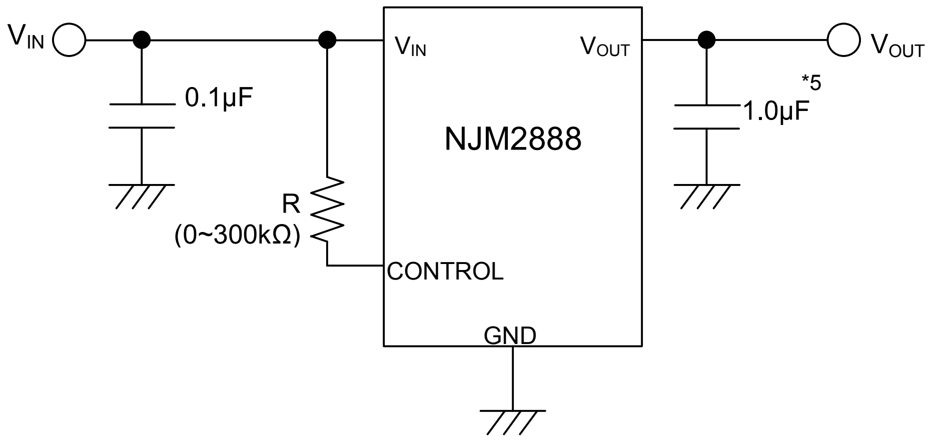
■ TEST CIRCUIT



*4 : 1.8<Vo≤ 2.6V version : Co=2.2µF (Ceramic)
Vo ≤ 1.8V version : Co=4.7µF (Ceramic)

■ TYPICAL APPLICATION

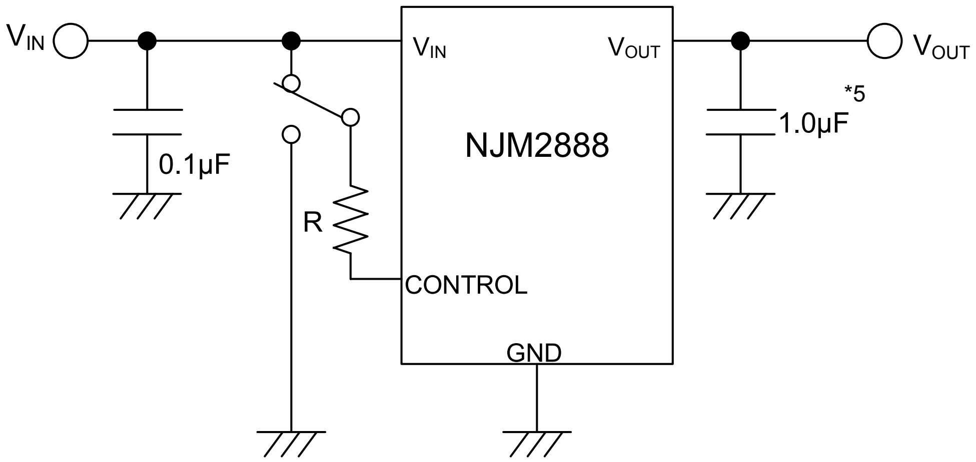
① In the case where ON/OFF Control is not required:



*5 : 1.8<Vo≤ 2.6V version : Co=2.2µF
Vo ≤ 1.8V version : Co=4.7µF

Connect control terminal to V_{IN} terminal

② In use of ON/OFF CONTROL:



*5 : 1.8<Vo≤ 2.6V version : Co=2.2µF
Vo ≤ 1.8V version : Co=4.7µF

State of control terminal:
•"H"→ output is enabled.
•"L" or "open" → output is disabled.

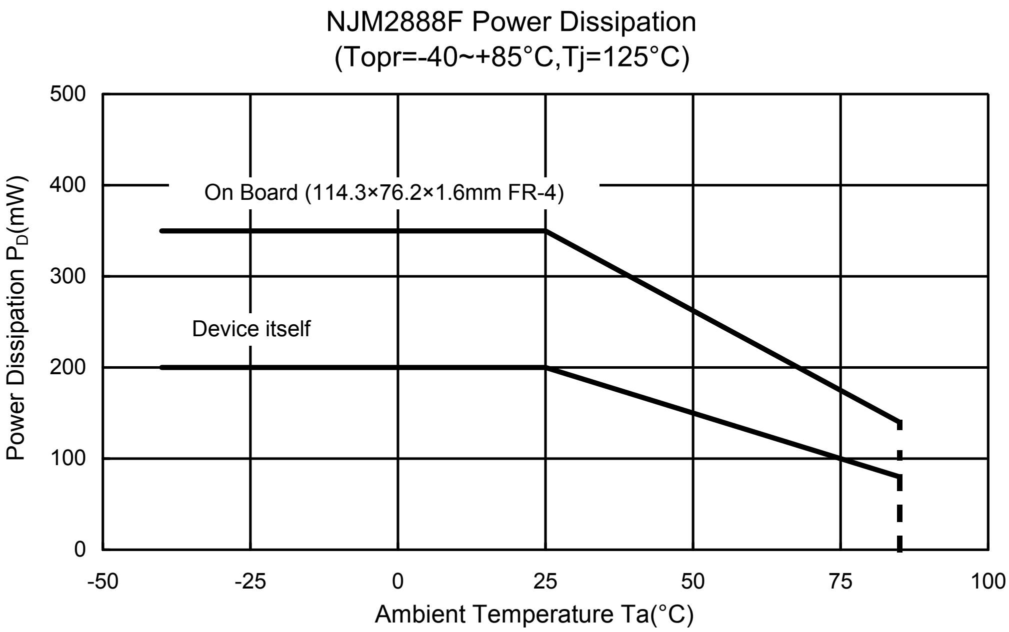
∗Input Capacitance C_{IN}

Input Capacitance C_{IN} 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_{IN} value of 0.1µF greater to avoid the problem.
C_{IN} should connect between GND and V_{IN} as short as possible.

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

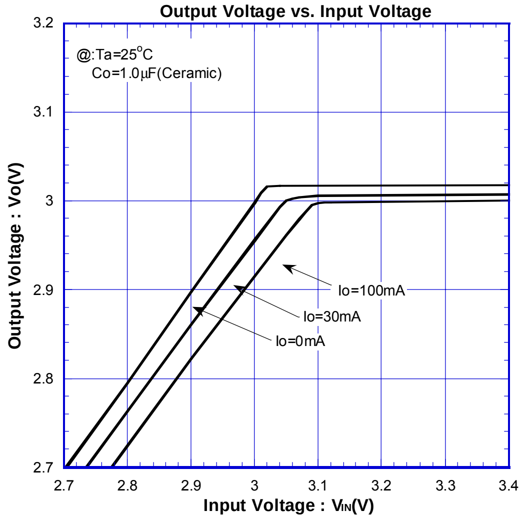
The current flow into the control terminal while the IC is ON state (I_{CONT}) can be reduced when a pull up resistance "R" is inserted between V_{IN} and the control terminal.
The minimum control voltage for ON state ($V_{CONT(ON)}$) is increased due to the voltage drop caused by I_{CONT} and the resistance "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.

■ POWER DISSIPATION vs. AMBIENT TEMPERATURE

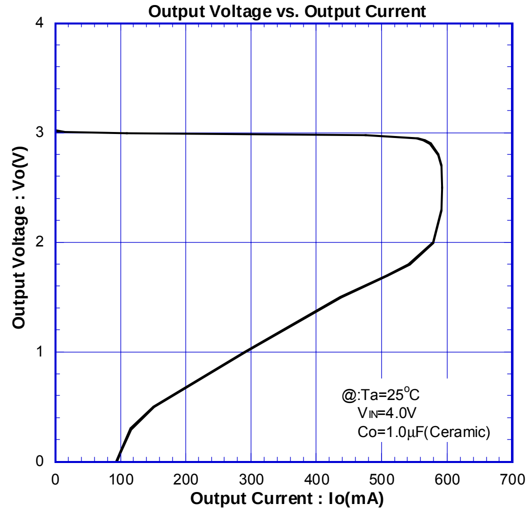


■ TYPICAL CHARACTERISTICS

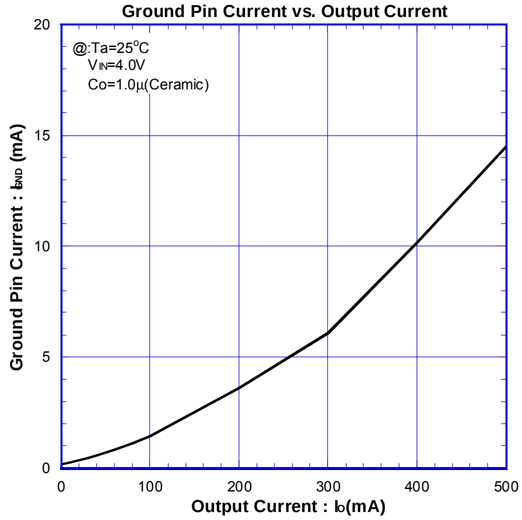
NJM2888_3.0V
Output Voltage vs. Input Voltage



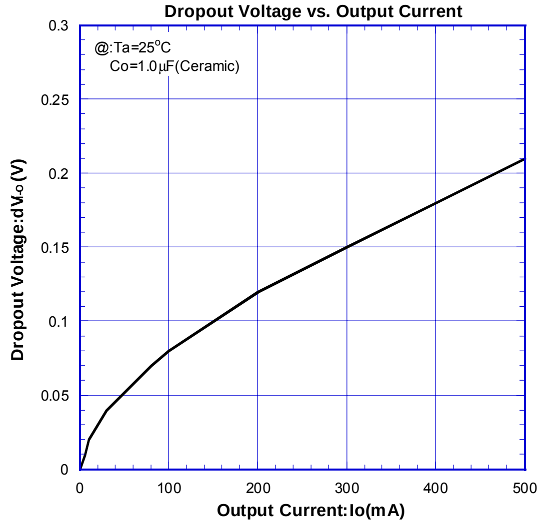
NJM2888_3.0V
Output Voltage vs. Output Current



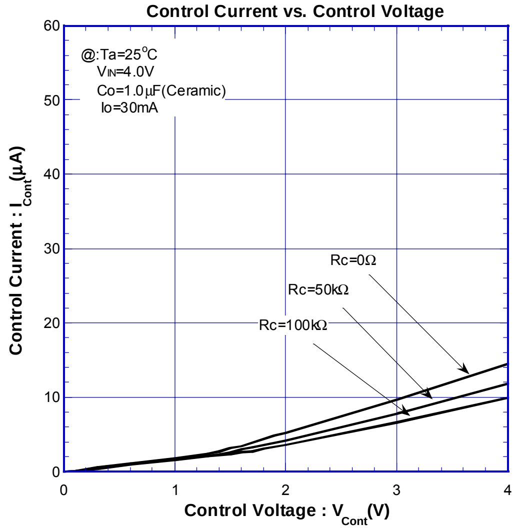
NJM2888_3.0V
Ground Pin Current vs. Output Current



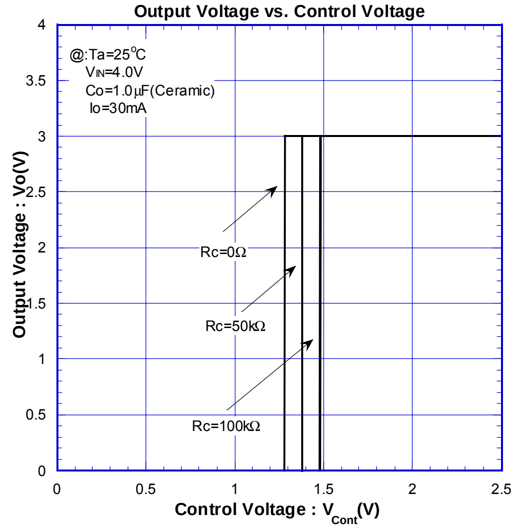
NJM2888_3.0V
Dropout Voltage vs. Output Current



NJM2888_3.0V
Control Current vs. Control Voltage



NJM2888_3.0V
Output Voltage vs. Control Voltage



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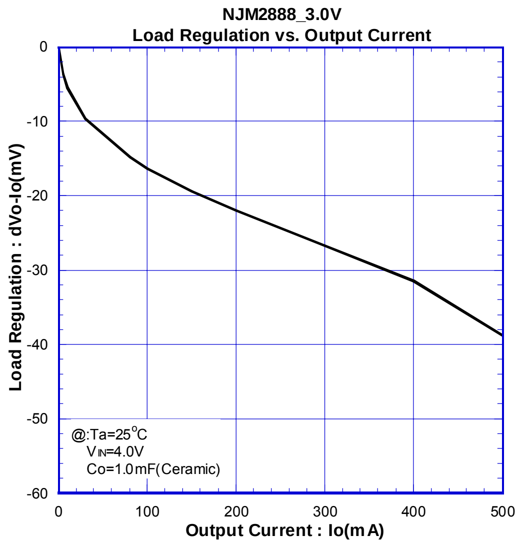

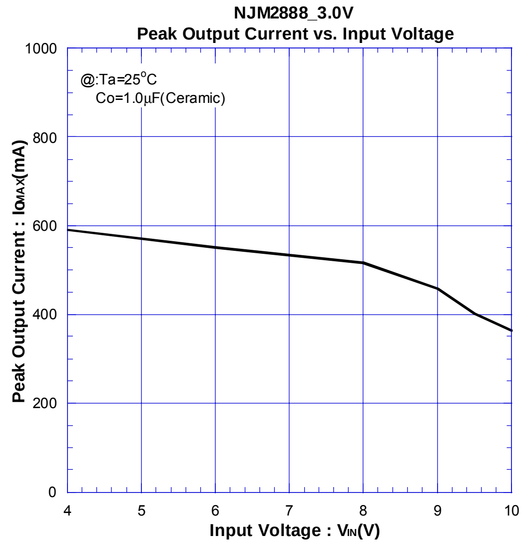

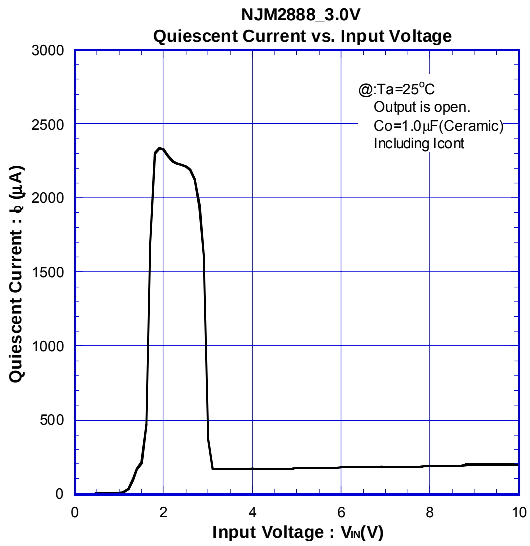

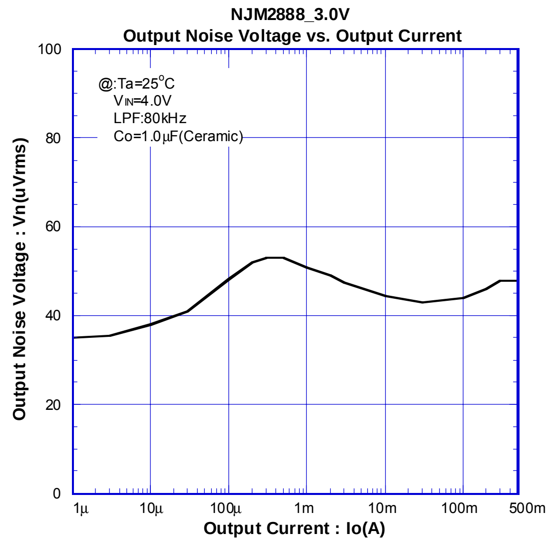

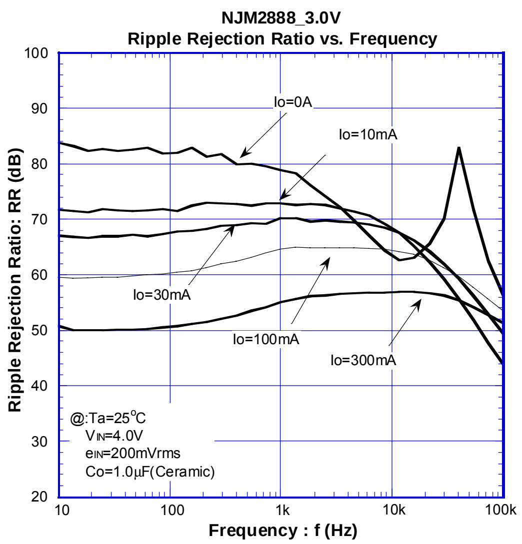

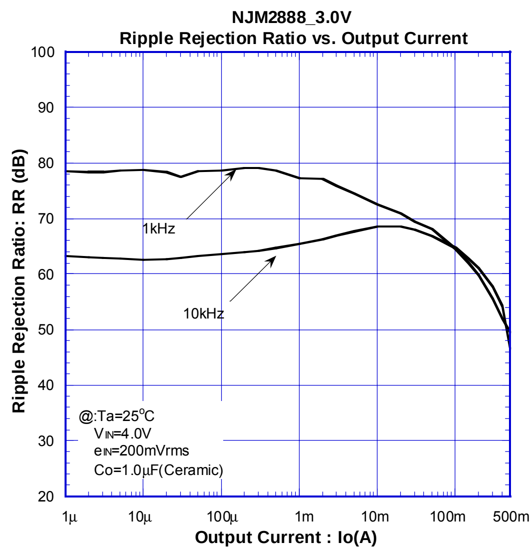

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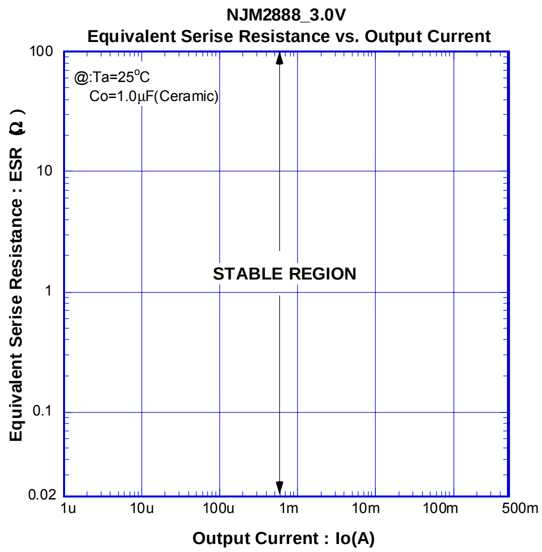

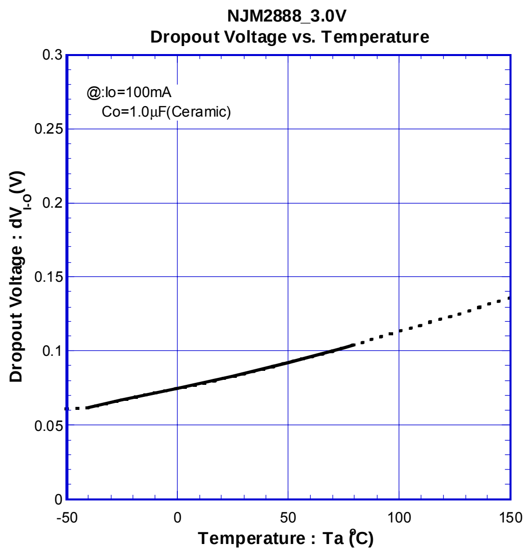

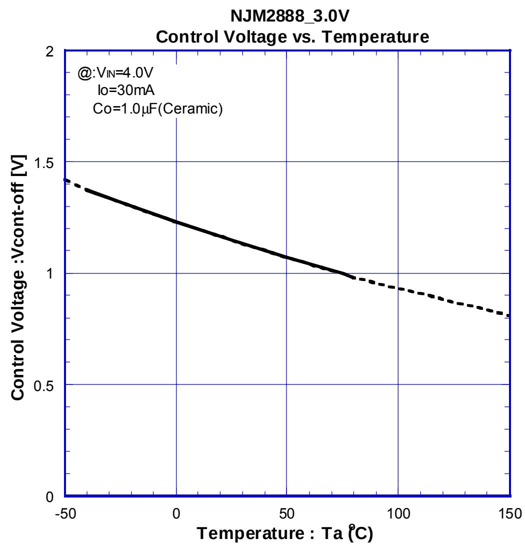

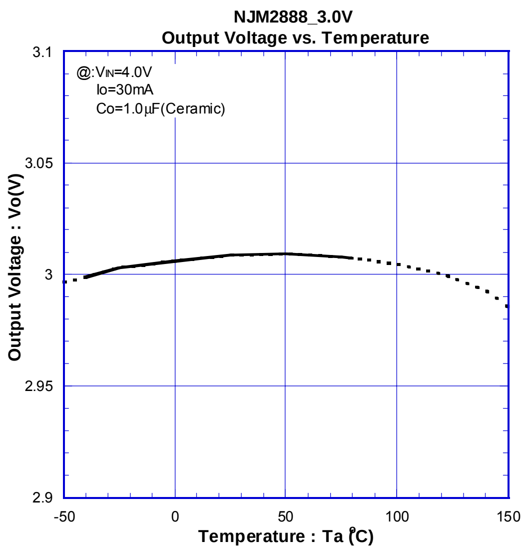

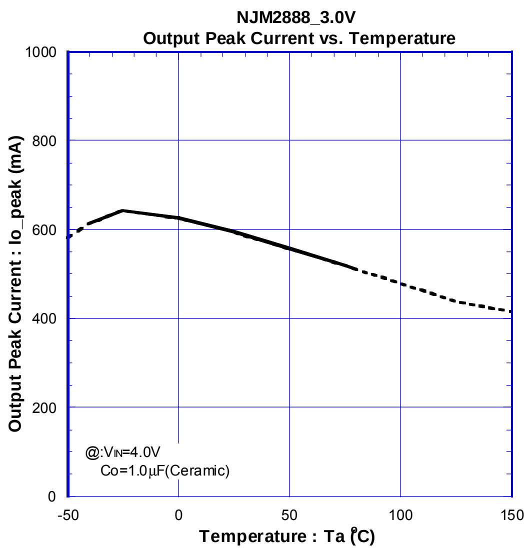

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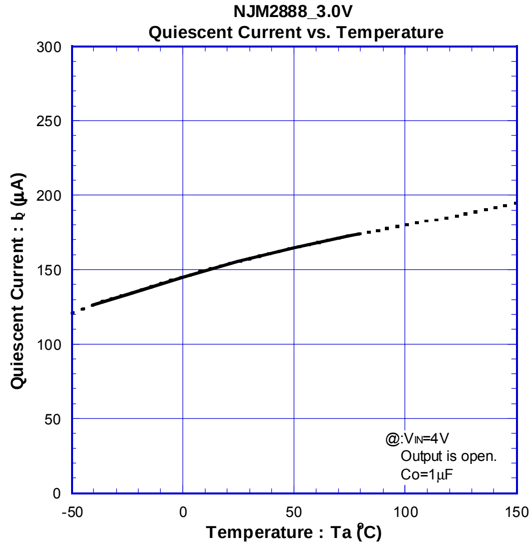
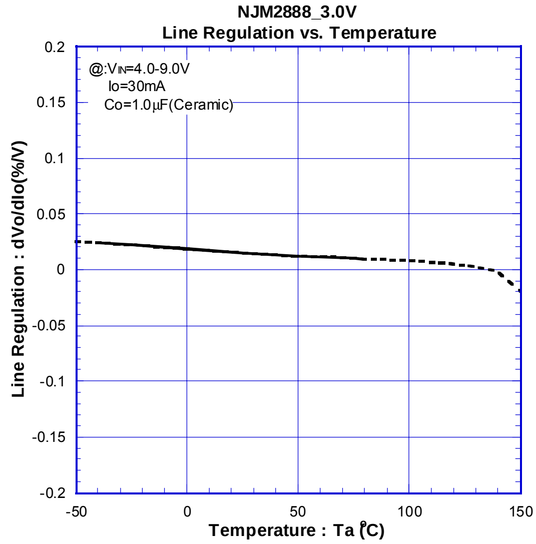
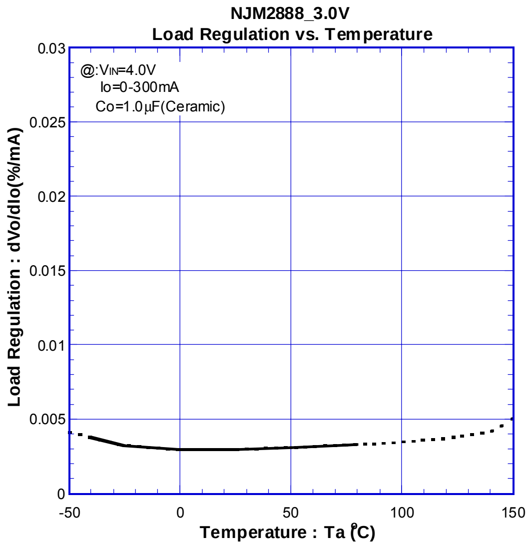
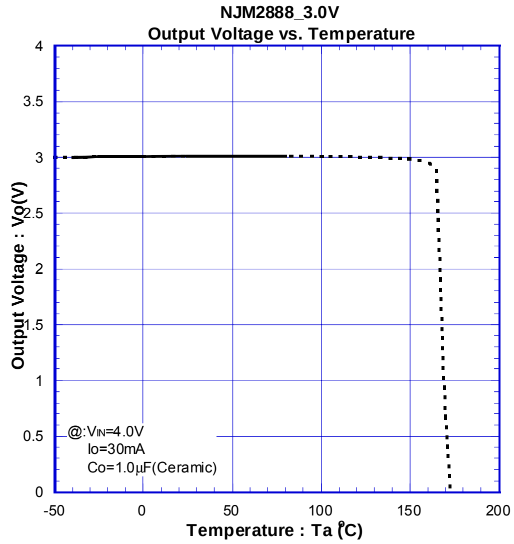
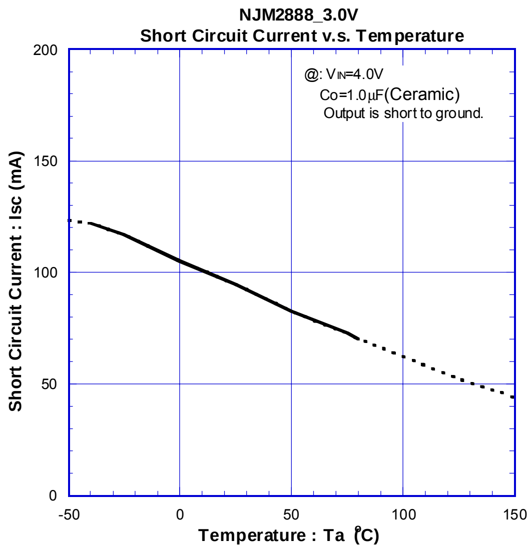




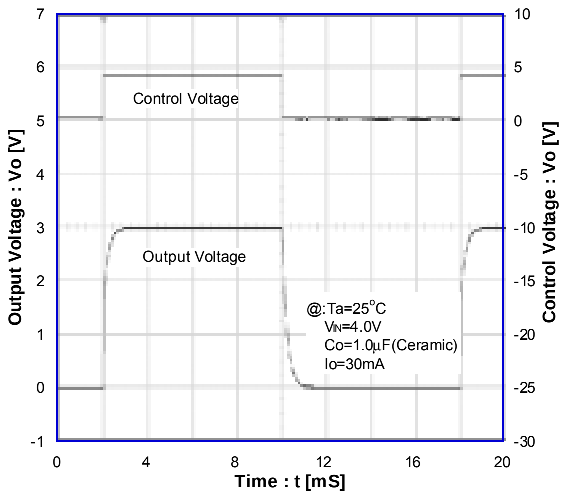




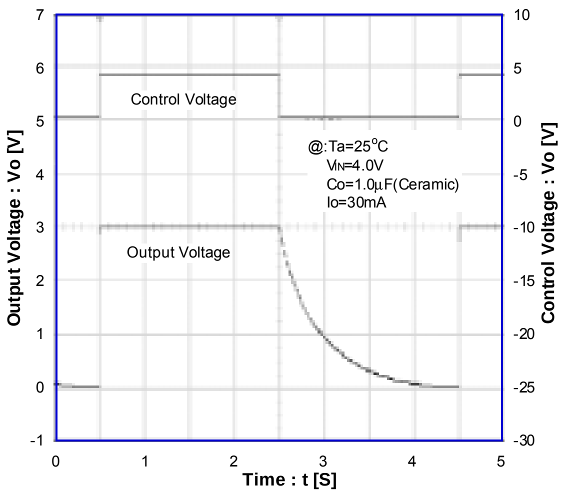


■ TYPICAL CHARACTERISTICS

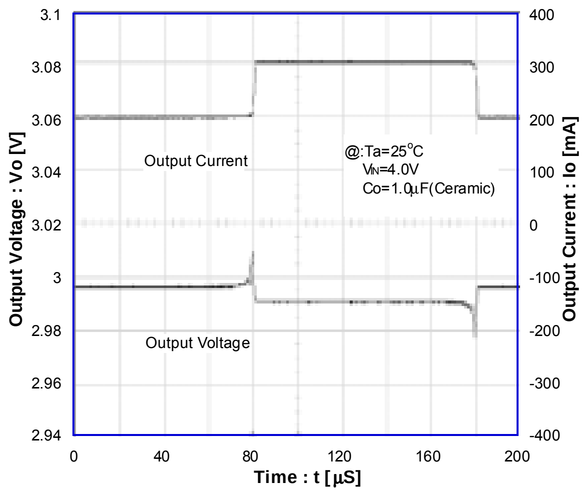
NJM2888_3.0V
ON/OFF Transient Response



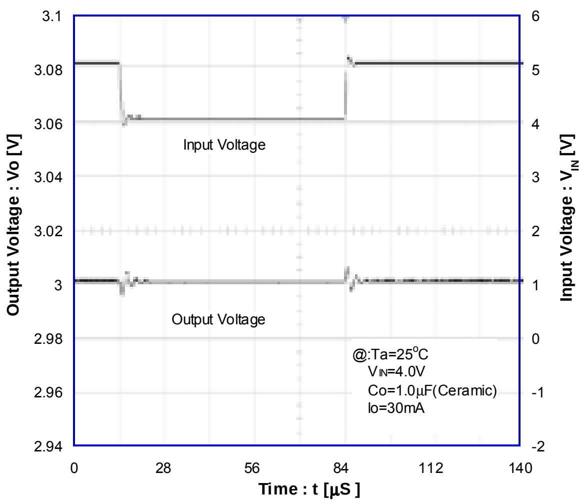
NJM2888_3.0V
ON/OFF Transient Response Without Load



NJM2888_3.0V
Load Transient Response



NJM2888_3.0V
Line Transient Response



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