ADJUSTABLE LOW DROPOUT VOLTAGE REGULATOR

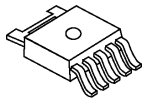
■ GENERAL DESCRIPTION

The NJM2887 is an adjustable low dropout voltage regulator with ON/OFF control.

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

It is suitable for DVD, FAX and Car Audio.

■ PACKAGE OUTLINE

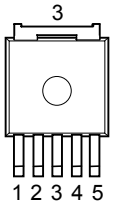


NJM2887DL3

■ FEATURES

- High Ripple Rejection 70dB typ. (f=1kHz,Vo=3V Version)
- Output Noise Voltage Vno=50μVrms typ.
- Output capacitor with 2.2μF ceramic capacitor
- Output Current Io(max.)=500mA
- High Precision Output Vref=1.29V±1.0%
- Low Dropout Voltage 0.18V typ. (Io=300mA)
- ON/OFF Contorol
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline TO-252-5(DL3)

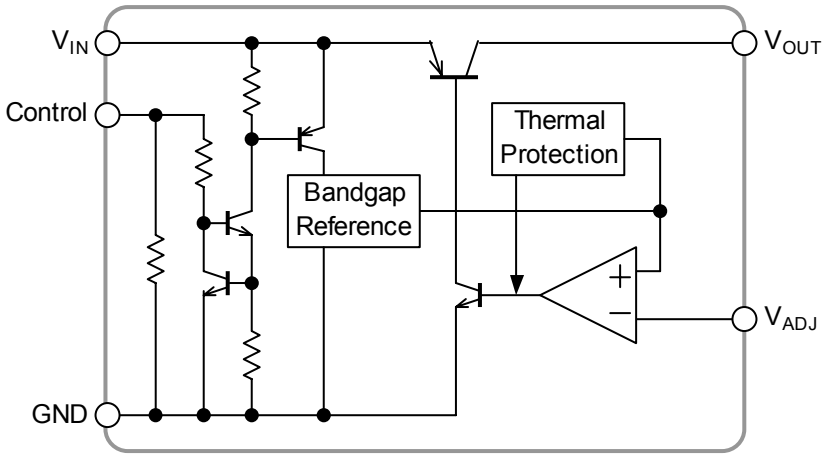
■ PIN CONFIGURATION



NJM2887DL3

PIN FUNCTION
1.CONTROL
2. V_{IN}
3.GND
4.V_{OUT}
5.V_{ADJ}

■ EQUIVALENT CIRCUIT



■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+14	V
Control Voltage	V_{CONT}	+14(*1)	V
Output Adjust Voltage	V_{ADJ}	+4	V
Power Dissipation	P_D	8(Tc=25°C) 0.8(Ta≤25°C)	W
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.

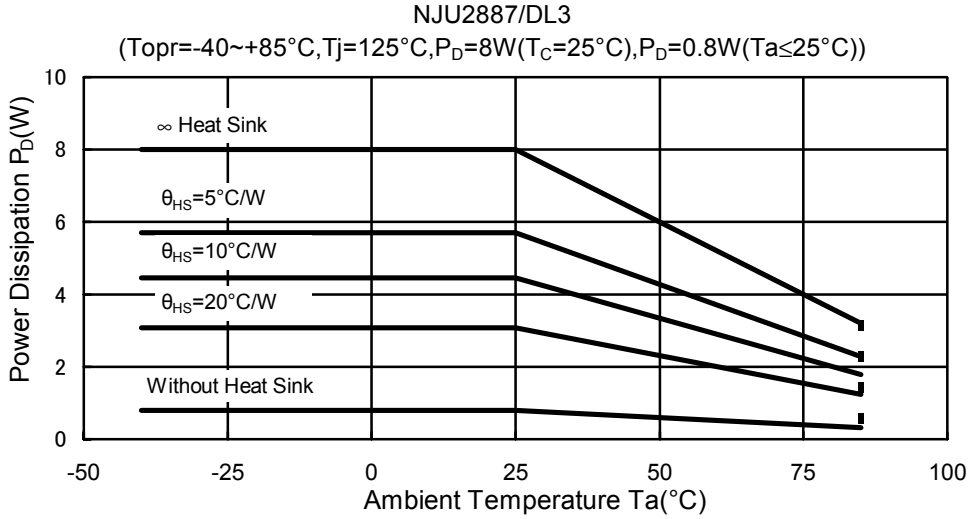
■ ELECTRICAL CHARACTERISTICS

(V_{IN}=Vo+1V, R1=100kΩ, C_{IN}=0.33μF, Co=2.2μF:Vo (Co=4.7μF: Vo≤2.6V), Ta=25°C)

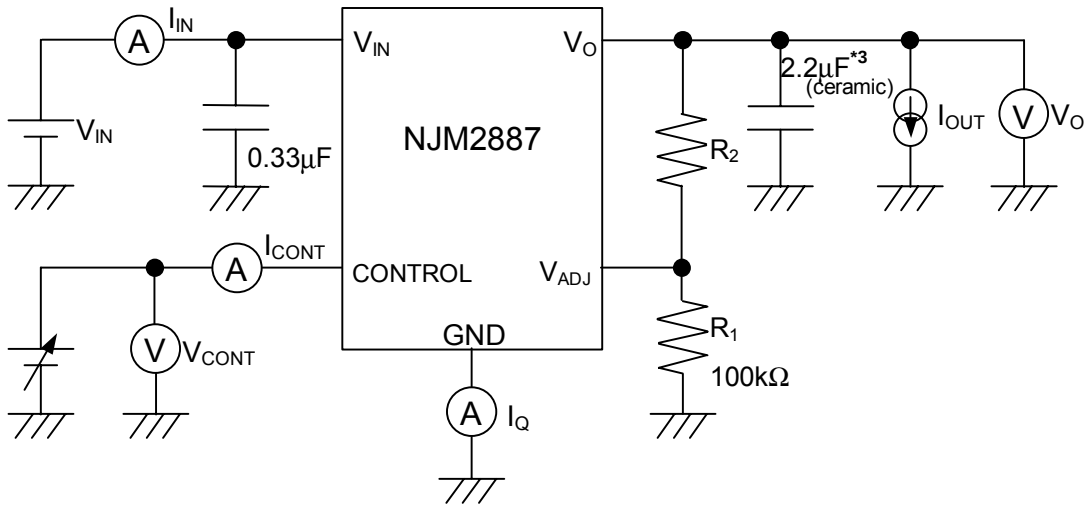
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	1.5	–	6	V
Reference Voltage	Vref	Io=30mA	1.277	1.29	1.303	V
Quiescent Current	I_Q	Io=0mA,Vo=3.0V	–	200	300	μA
Quiescent Current at Control OFF	$I_{Q(OFF)}$	V_{CONT}=0V	–	–	100	nA
Output Current	Io	Vo–0.3V	500	650	–	mA
Line Regulation	$\Delta Vo/\Delta V_{IN}$	V_{IN}=Vo+1V ~ Vo+6.0V, Io=30mA	–	–	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 500mA	–	–	0.03	%/mA
Dropout Voltage(*2)	ΔV_{I-O}	Io=300mA	–	0.18	0.28	V
Ripple Rejection	RR	ein=200mVrms,f=1kHz, Io=10mA Vo=3.0V Version	–	70	–	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=3.0V Version	–	50	–	μVrms
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	–	–	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		–	–	0.6	V

(*2): Except output voltage less than 2.1V.

■ POWER DISSIPATION VS. AMBIENT TEMPERATURE



■ TEST CIRCUIT



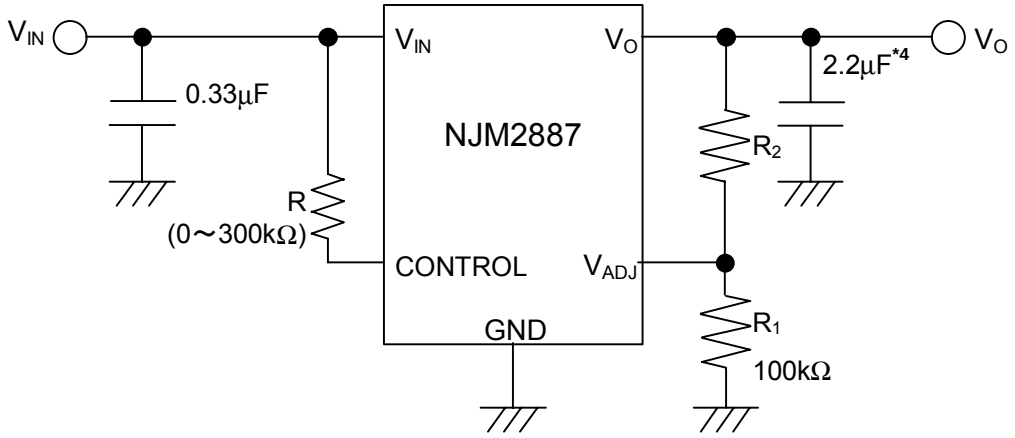
*3 Vo≤2.6V version: Co=4.7µF(ceramic)

Vo = Vref × (1 + R_2 / R_1)

The ceramic capacitor used by the output recommend the B characteristic.

■ TYPICAL APPLICATION

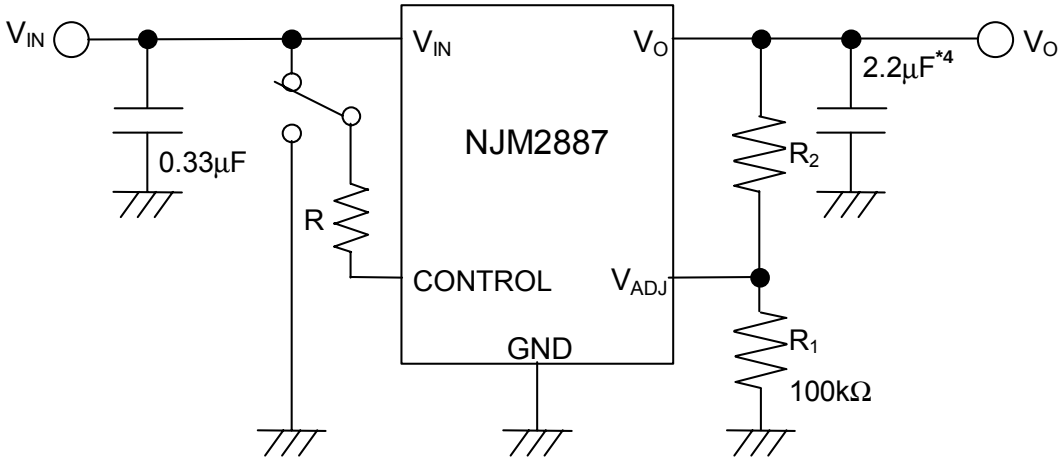
① In the case where ON/OFF Control is not required:



*4 Vo≤2.6V version: Co=4.7μF

Connect control terminal to V_{IN} terminal

② In use of ON/OFF CONTROL:



*4 Vo≤2.6V version: Co=4.7μF

State of control terminal:

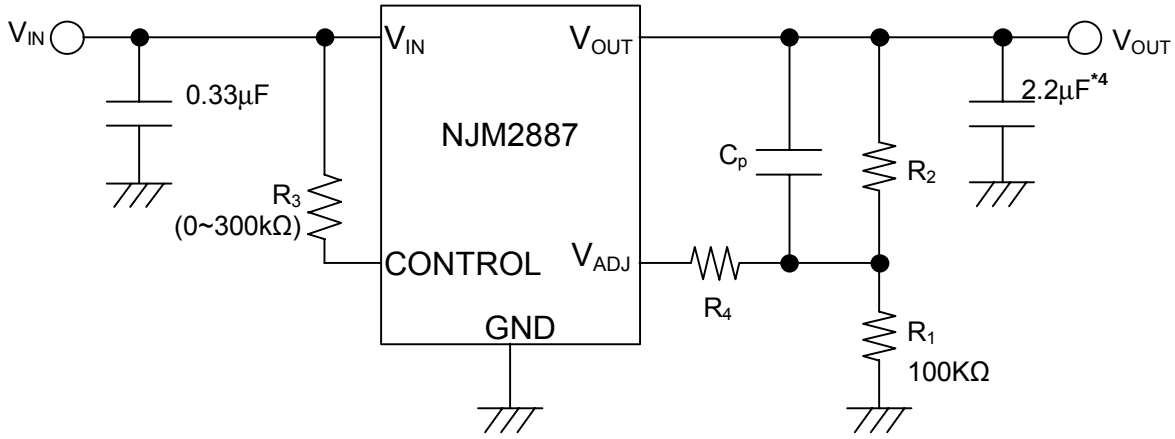
- "H"→ output is enabled.
- "L" or "open" → output is disabled.

∗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.

③ Reduction of output noise voltage:



*4 Vo≤2.6V version: Co=4.7μF

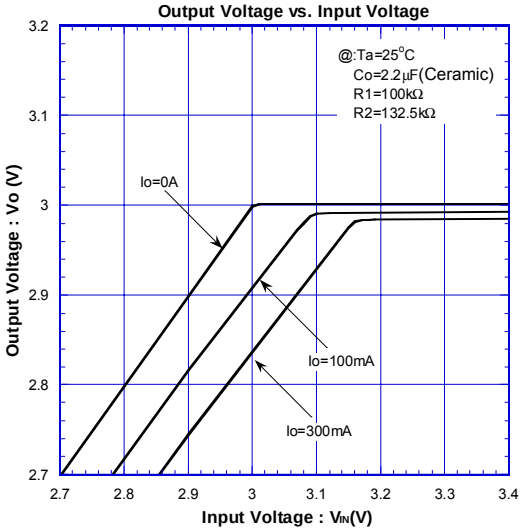
Output feedback resistance: R_1, should connect near V_{ADJ} terminal.
For reduce output noise voltage, connect C_p and R_4 refer to the following table.

The example of use of Cp and R4

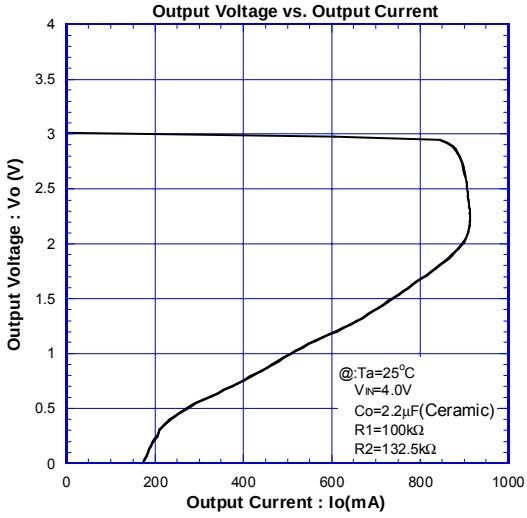
Output capacity value	R_1=10kΩ	R_1=1kΩ	R_1=100Ω	R_4
Co=2.2μF	C_p=100pF	C_p=1nF	C_p=0.01μF	10kΩ or less
Co=4.7μF	C_p=680pF	C_p=6.8nF	C_p=0.068μF	

■ ELECTRICAL CHARACTERISTICS

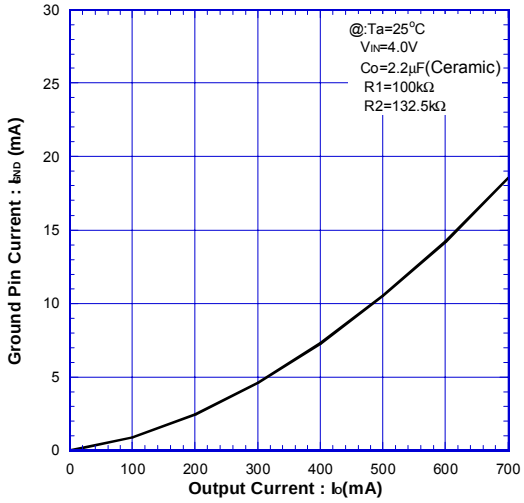
NJM2887_3.0V
Output Voltage vs. Input Voltage



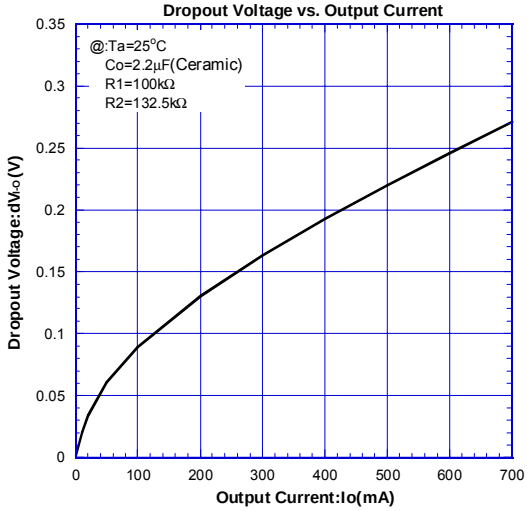
NJM2887_3.0V
Output Voltage vs. Output Current



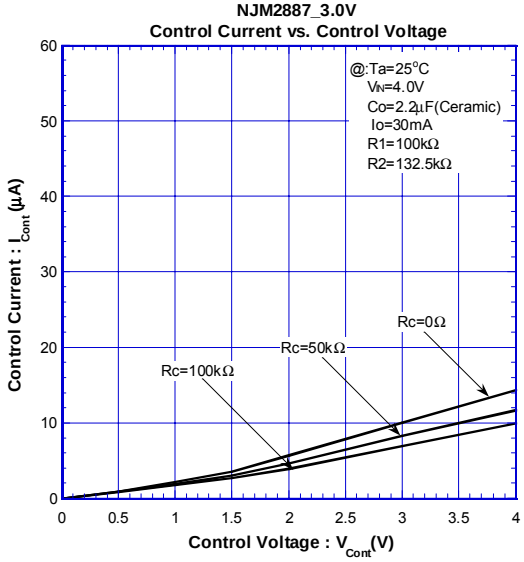
NJM2887_3.0V
Ground Pin Current v.s. Output Current



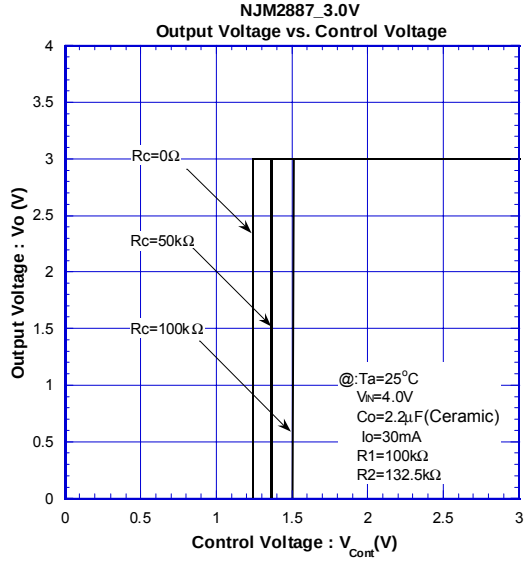
NJM2887_3.0V
Dropout Voltage vs. Output Current



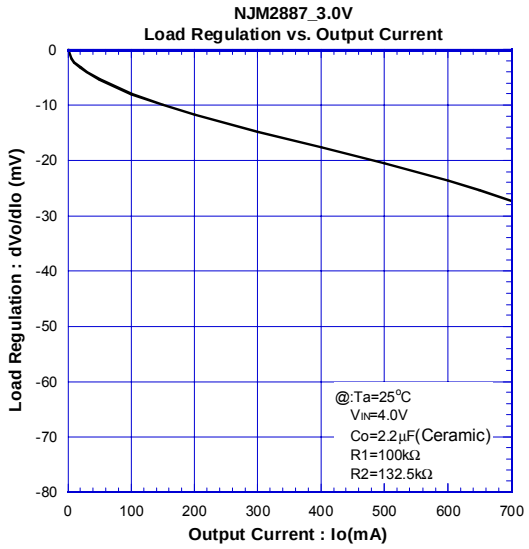
NJM2887_3.0V
Control Current vs. Control Voltage

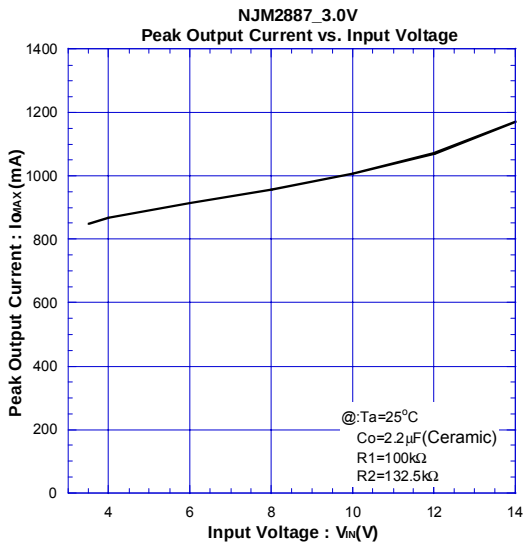


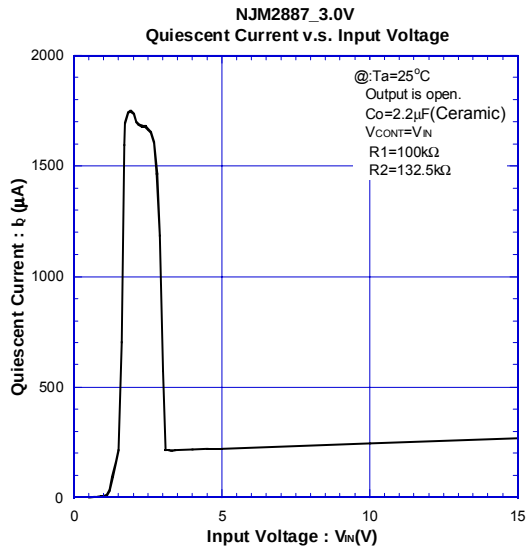
NJM2887_3.0V
Output Voltage vs. Control Voltage

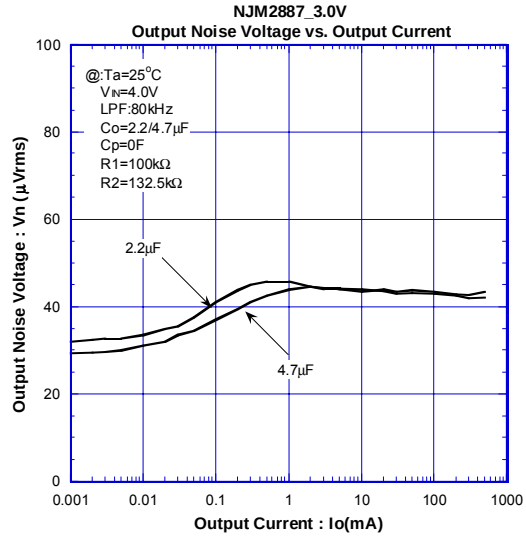


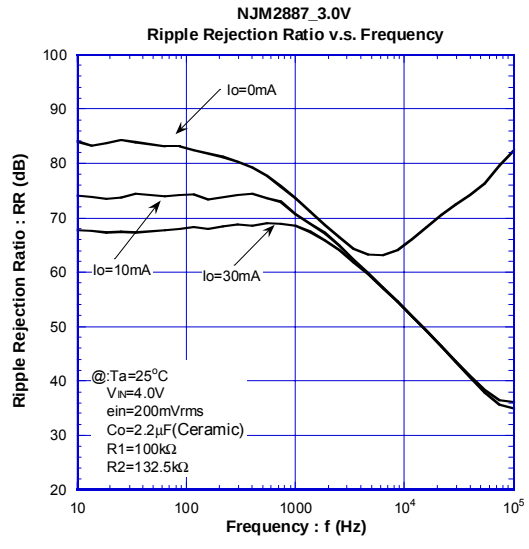
■ ELECTRICAL CHARACTERISTICS

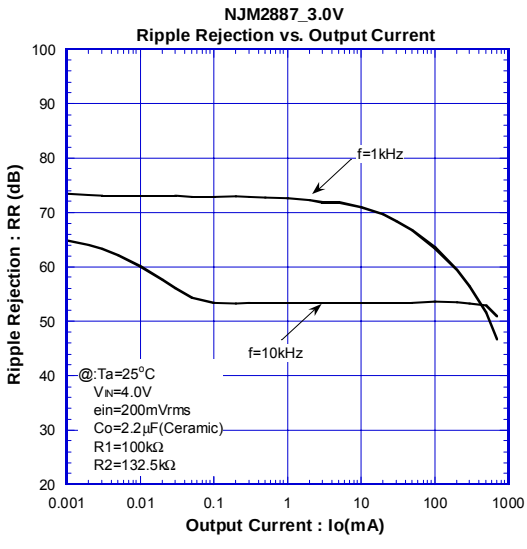












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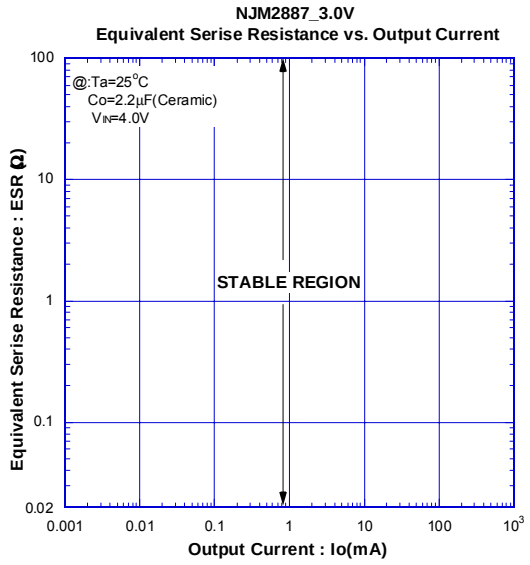

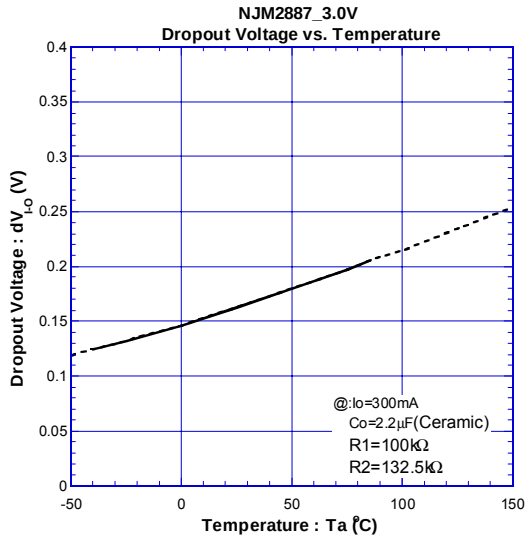

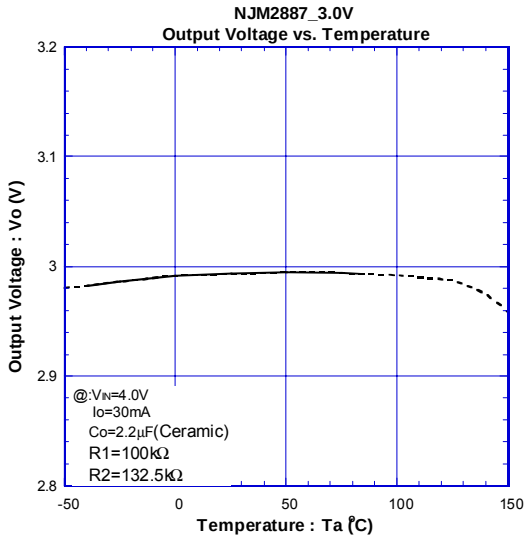

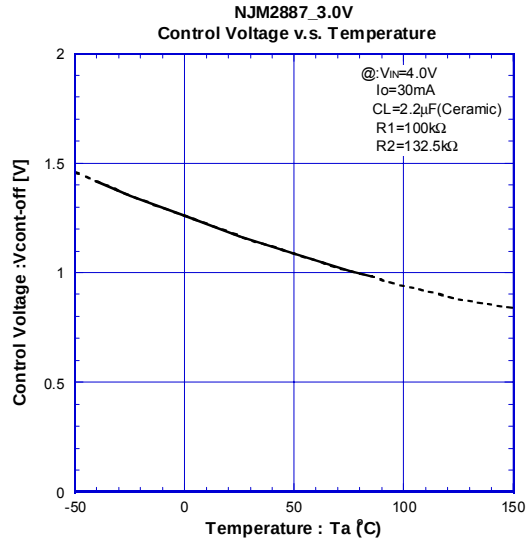

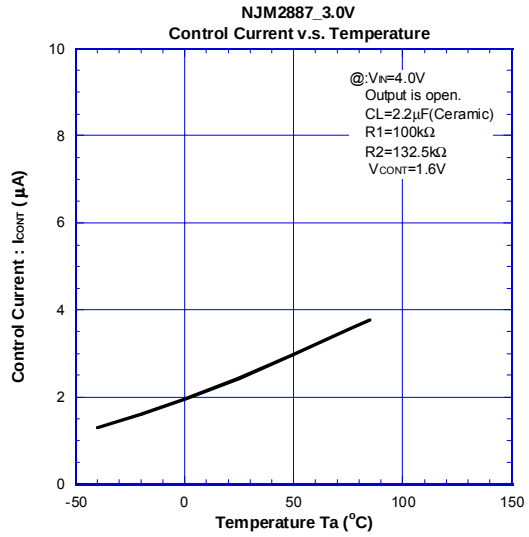

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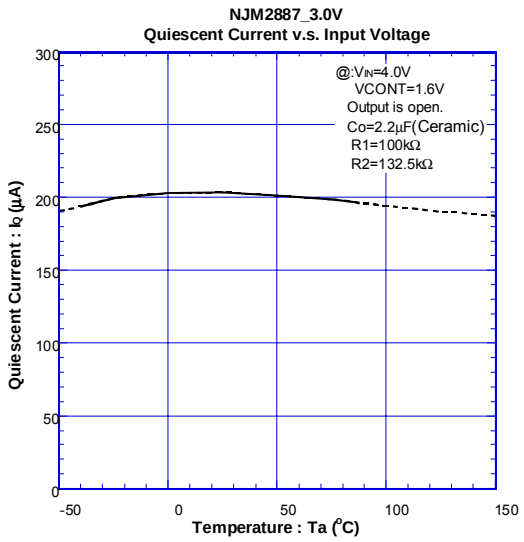

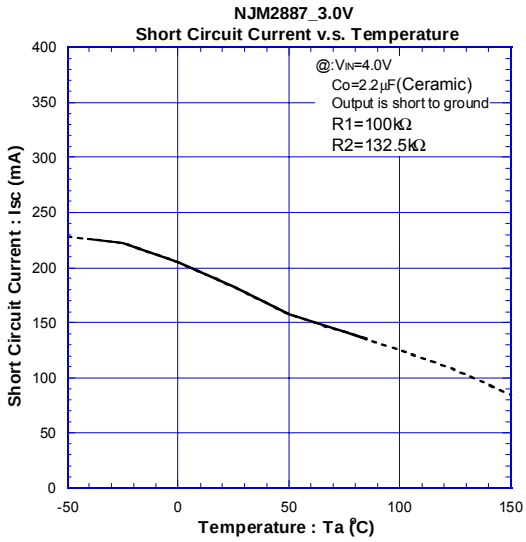

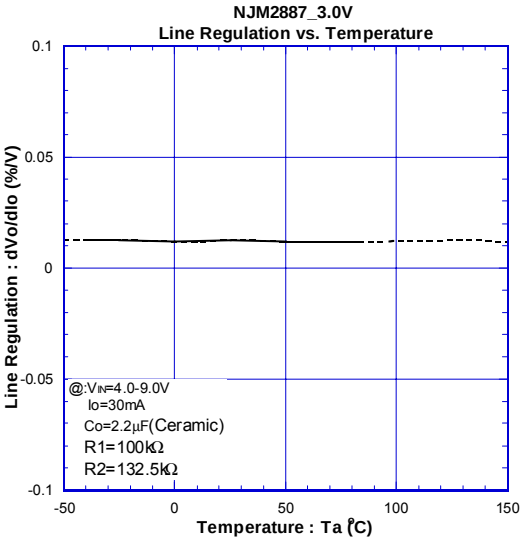

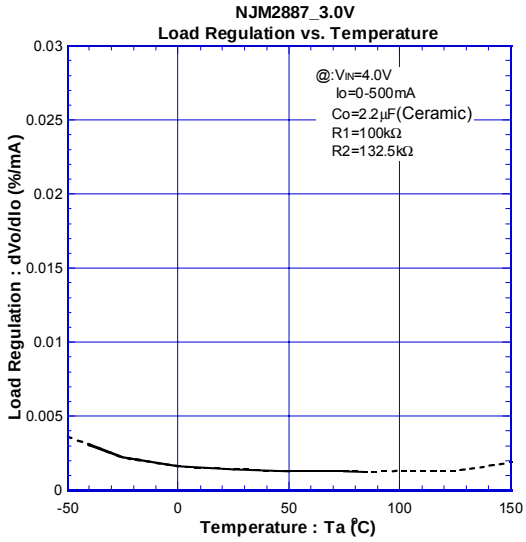

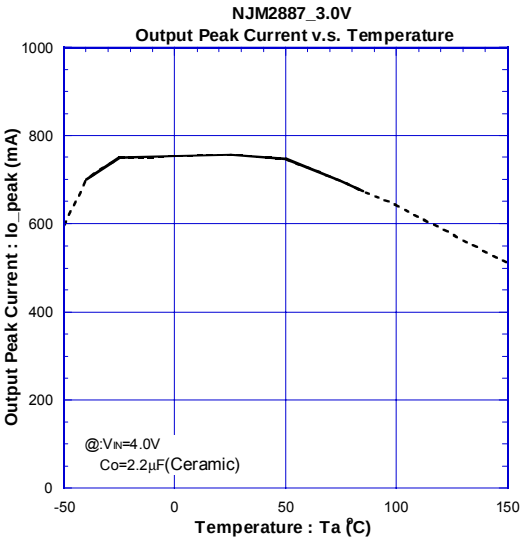

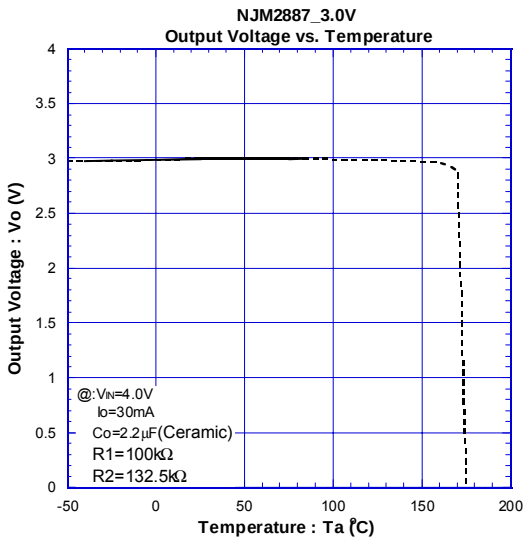

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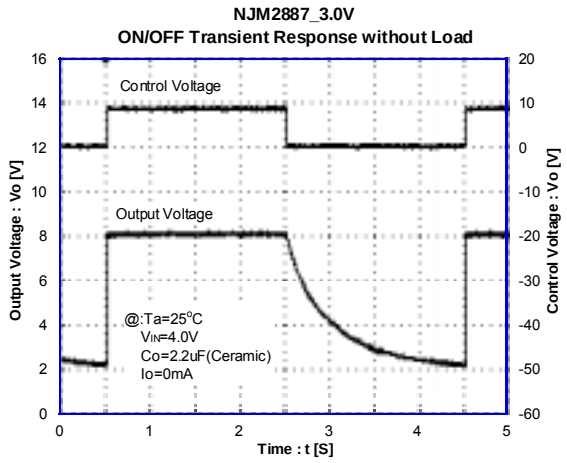

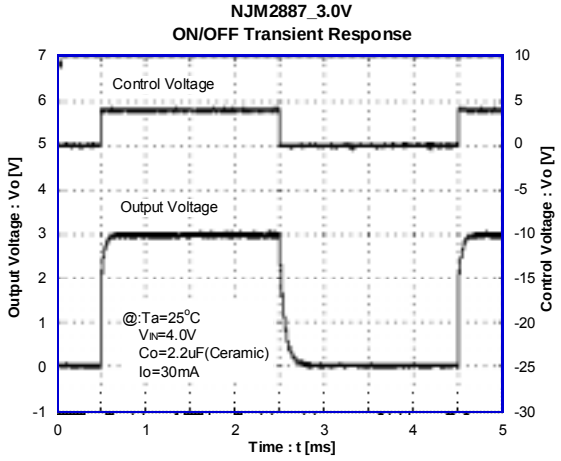

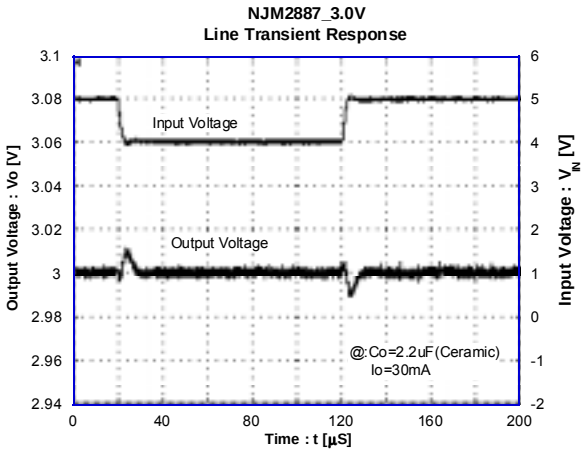

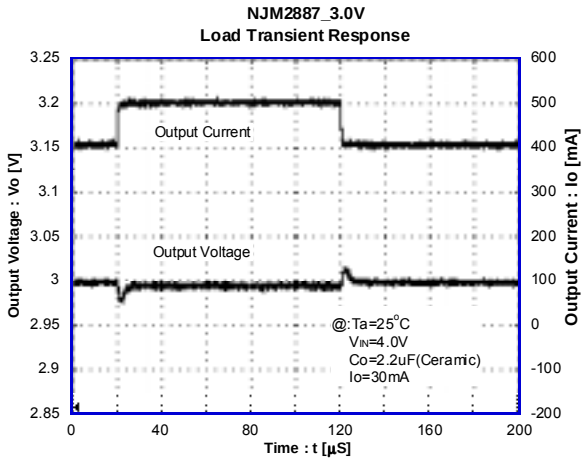

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