LOW DROPOUT VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

NJM2881/82 is a low dropout voltage regulator with ON/OFF control.

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

It is mounted on SOT-23-5 as small package and 1.0μF ceramic capacitor is available. Therefore it is suitable for cellular phone, camcorder, IC decoder, camera, and other portable items.

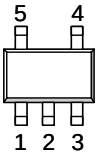
■ PACKAGE OUTLINE

NJM2881/82F

■ FEATURES

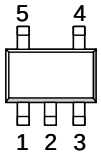
- High Ripple Rejection 75dB typ. (f=1kHz @Vo=3V version)
- Low Output Noise Voltage Vno=30μVrms (Cp=0.01μF)
- Output capacitor with 1.0μF ceramic capacitor (Vo≥2.7V)
- Output Current Io(max.)=300mA
- High Precision Output Vo±1.0%
- Low Dropout Voltage 0.10V typ. (Io=100mA)
- ON/OFF Control (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline SOT-23-5

■ PIN CONFIGURATION



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

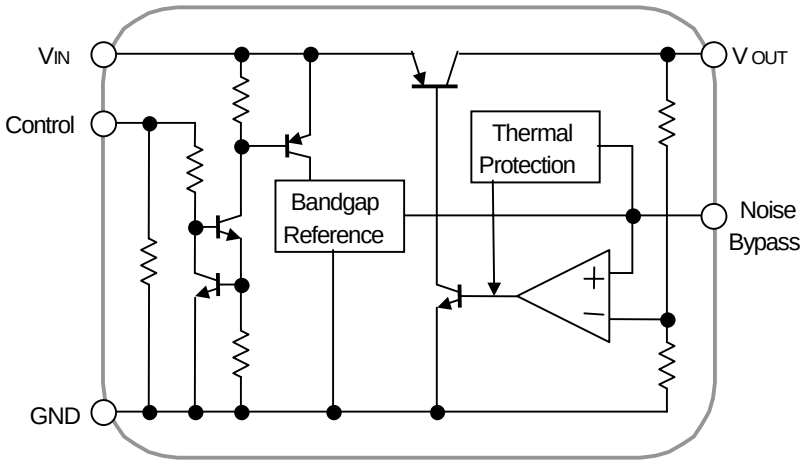
NJM2881F



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

NJM2882F

■ EQUIVALENT CIRCUIT



■ OUTPUT VOLTAGE RANK LIST

Device Name	V_{OUT}	Device Name	V_{OUT}
NJM288*F17	1.7V	NJM288*F33	3.3V
NJM288*F18	1.8V	NJM288*F345	3.45V
NJM288*F25	2.5V	NJM288*F35	3.5V
NJM288*F28	2.8V	NJM288*F43	4.3V
NJM288*F29	2.9V	NJM288*F05	5.0V
NJM288*F03	3.0V		

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	+14	V
Control Voltage	V_{CONT}	+14(note 1)	V
Power Dissipation	P_D	200(note 2) 350(note 3)	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +125	°C

(note 1): When input voltage is less than +14V, the absolute maximum control voltage is equal to the input voltage.
(note 2): Device itself.
(note 3): Mounted on glass epoxy board. (114.3x76.2x1.6mm: 2Layer, FR-4)

■ Operating voltage

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

■ ELECTRICAL CHARACTERISTICS

(Vo>2.0V version: V_{IN}=Vo+1V, C_{IN}=0.1µF, Co=1.0µF: 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_Q	Io=0mA, except Icont	-	120	180	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, Io=30mA	-	-	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 300mA	-	-	0.03	%/mA
Dropout Voltage	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	-	30	-	µVrms
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	-	-	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		-	-	0.6	V

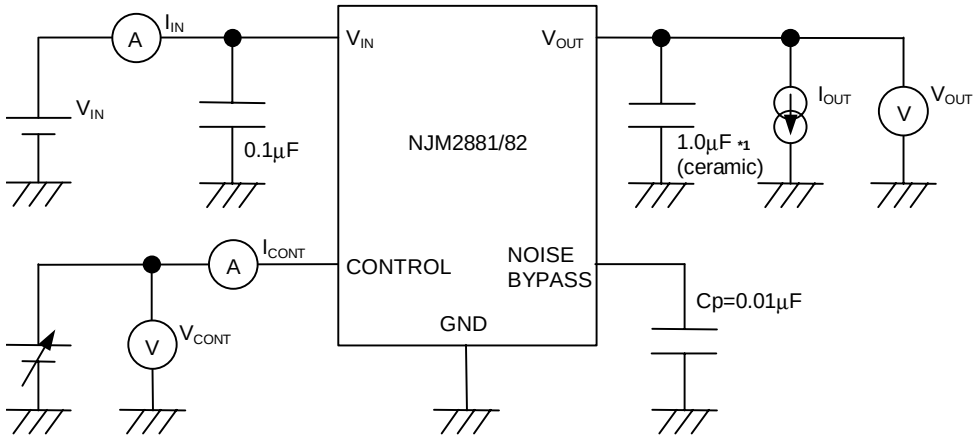
■ ELECTRICAL CHARACTERISTICS

(Vo≤2.0V version: V_{IN}=Vo+1V, C_{IN}=0.1µF, Co=2.2µF: Vo≥1.9V (Co=4.7µF: Vo≤1.8V), 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_Q	Io=0mA, except I_{CONT}	-	120	180	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, Io=30mA	-	-	0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 300mA	-	-	0.03	%/mA
Ripple Rejection	RR	ein=200mVrms,f=1kHz,Io=10mA, Vo=1.8V version	-	80	-	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=1.8V version	-	20	-	µVrms
Control Voltage for ON-state	$V_{CONT(ON)}$		1.6	-	-	V
Control Voltage for OFF-state	$V_{CONT(OFF)}$		-	-	0.6	V

(note 4): 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.

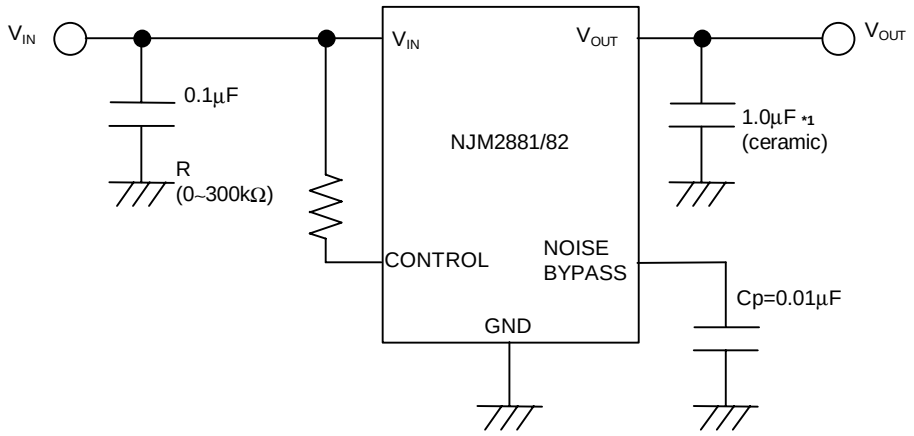
■ TEST CIRCUIT



*1 1.9V ≤ Vo ≤ 2.6V version: Co=2.2µF(ceramic)
Vo ≤ 1.8V version: Co=4.7µF(ceramic)

■ TEST CIRCUIT

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

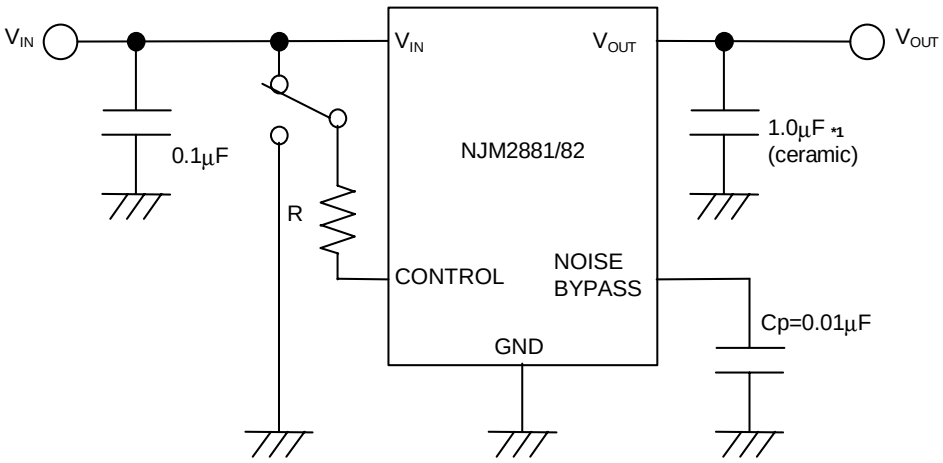


*1 1.9V ≤ Vo ≤ 2.6V version: Co=2.2μF(ceramic)
Vo ≤ 1.8V version: Co=4.7μF(ceramic)

Connect control terminal to V_{IN} terminal

The quiescent current can be reduced by using a resistance "R". Instead, it increases the minimum operating voltage. For further information, please refer to Figure "Output Voltage vs. Control Voltage".

② In use of ON/OFF CONTROL:



*1 1.9V ≤ Vo ≤ 2.6V version: Co=2.2μF(ceramic)
Vo ≤ 1.8V version: Co=4.7μF(ceramic)

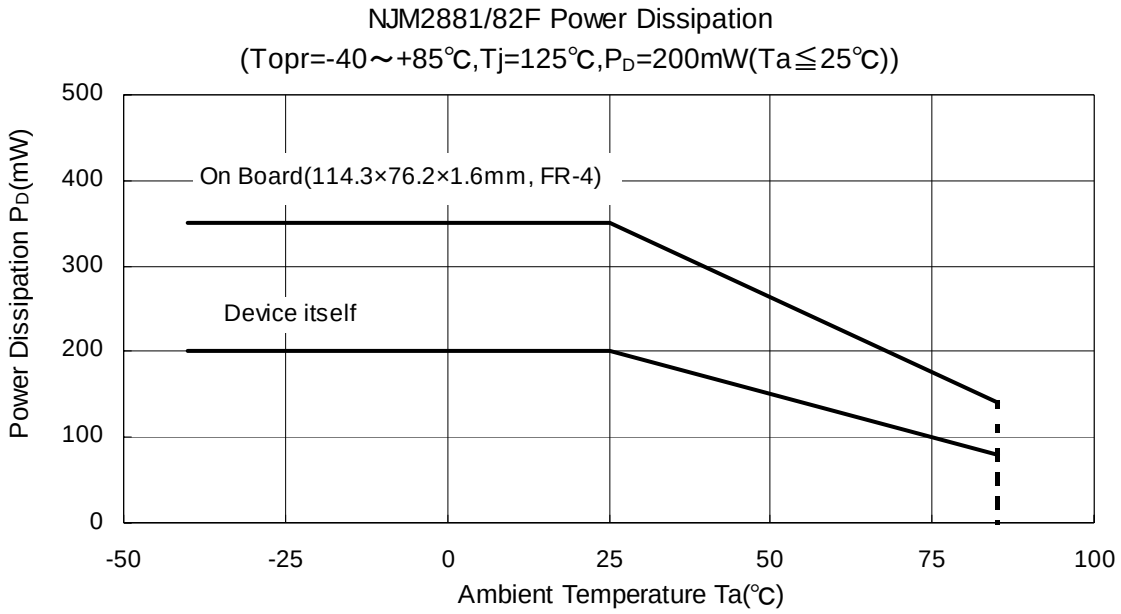
State of control terminal:

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

✱Noise bypass Capacitance Cp

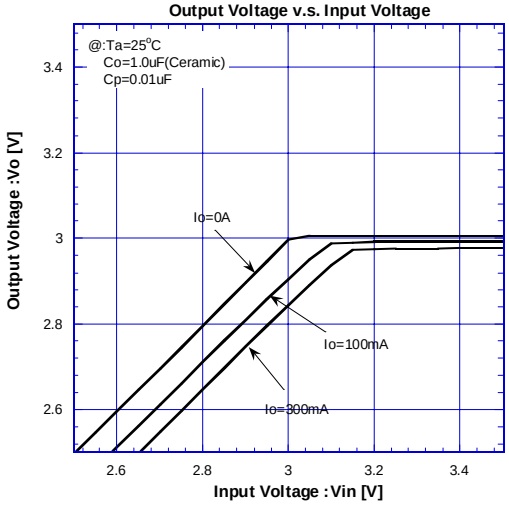
Noise bypass capacitance Cp reduces noise generated by band-gap reference circuit.
Noise level and ripple rejection will be improved when larger Cp is used.
Use of smaller Cp value may cause oscillation.
Use the Cp value of 0.01uF greater to avoid the problem.

■ **POWER DISSIPATION vs. AMBIENT TEMPERATURE**

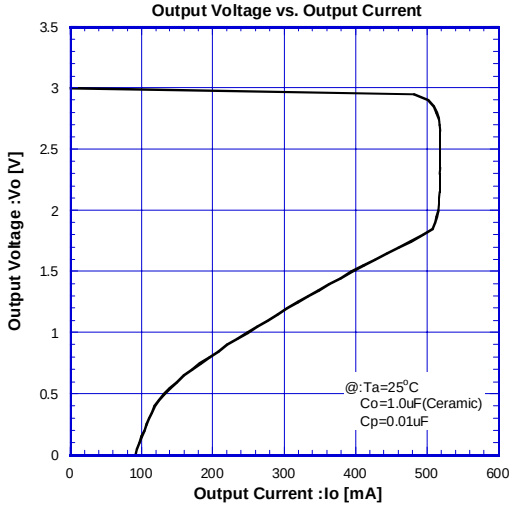


■ ELECTRICAL CHARACTERISTICS

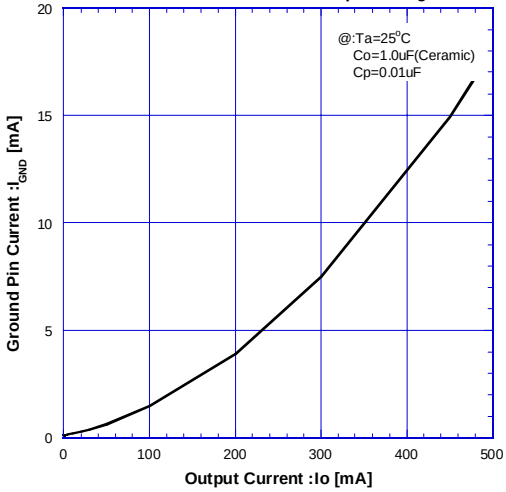
NJM2881/82_3.0V
Output Voltage v.s. Input Voltage



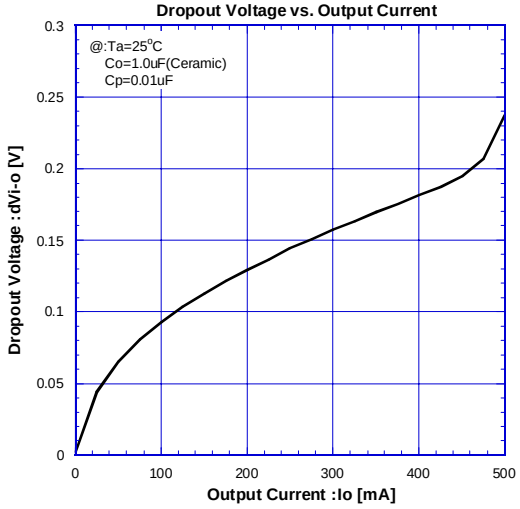
NJM2881/82_3.0V
Output Voltage vs. Output Current



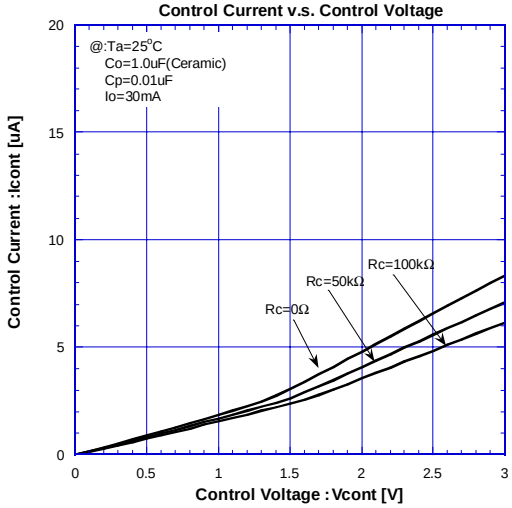
NJM2881/82_3.0V
Ground Pin Current vs. Output Voltage



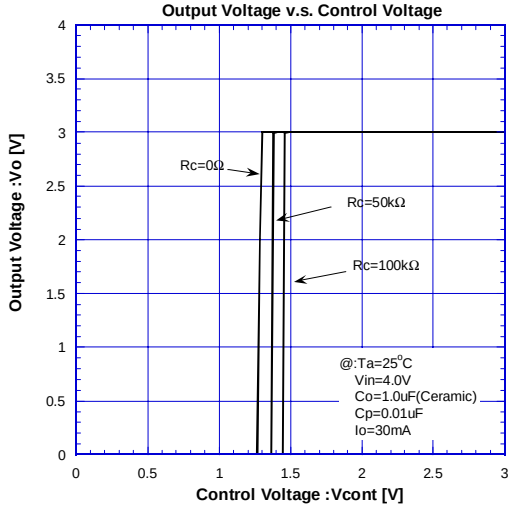
NJM2881/82_3.0V
Dropout Voltage vs. Output Current



NJM2881/82_3.0V
Control Current v.s. Control Voltage

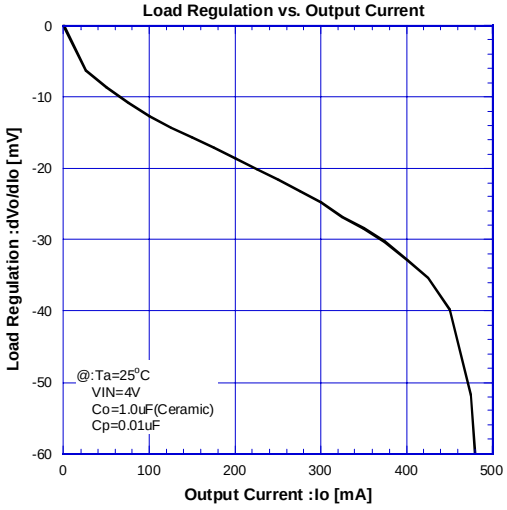


NJM2881/82_3.0V
Output Voltage v.s. Control Voltage

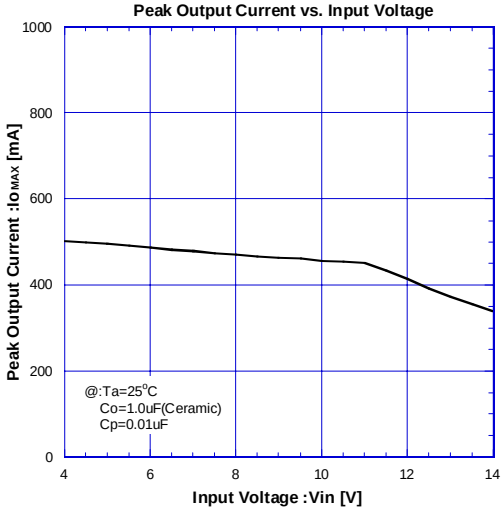


■ ELECTRICAL CHARACTERISTICS

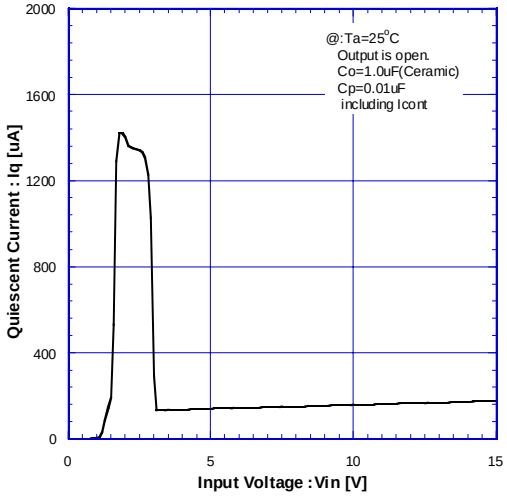
NJM2881/82_3.0V
Load Regulation vs. Output Current



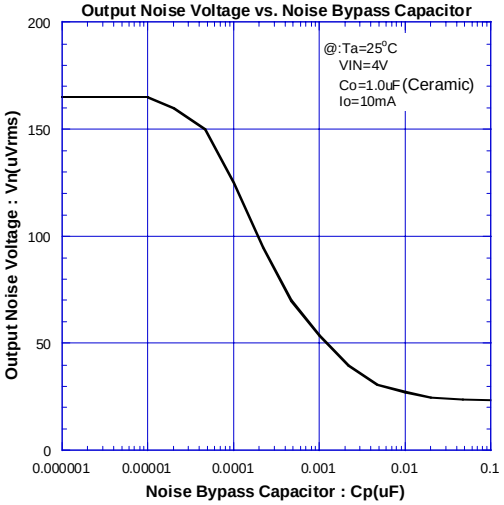
NJM2881/82_3.0V
Peak Output Current vs. Input Voltage



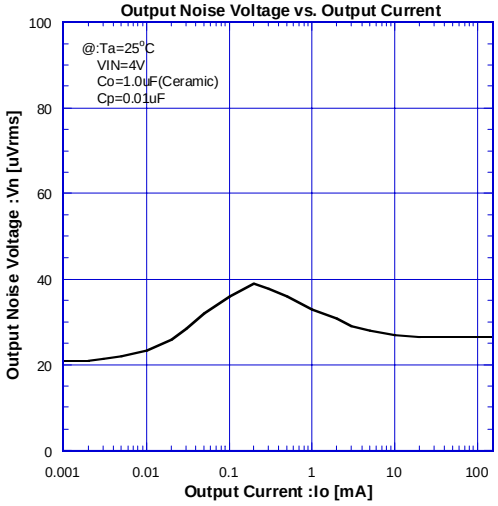
NJM2881/82_3.0V
Quiescent Current v.s. Input Voltage



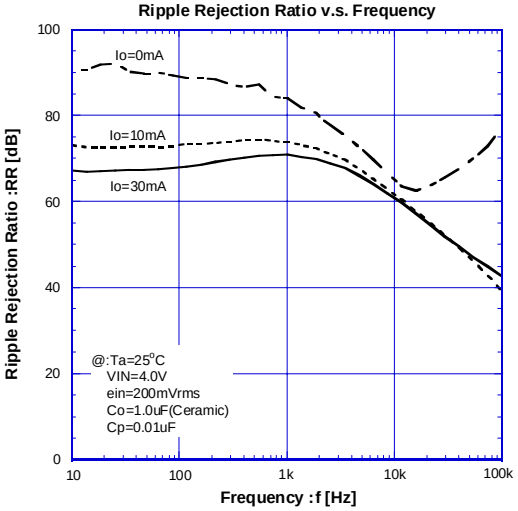
NJM2881/82_3.0V
Output Noise Voltage vs. Noise Bypass Capacitor



NJM2881/82_3.0V
Output Noise Voltage vs. Output Current

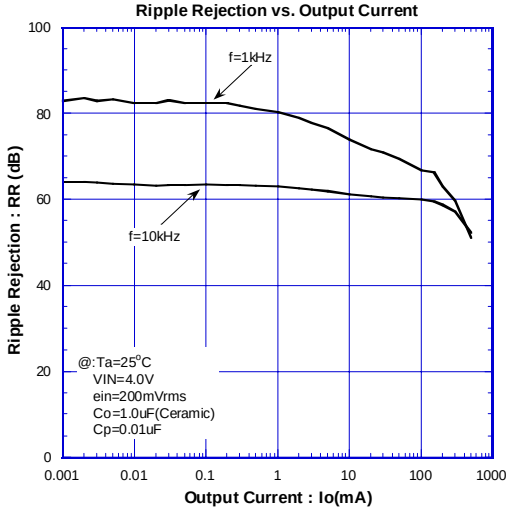


NJM2881/82_3.0V
Ripple Rejection Ratio v.s. Frequency

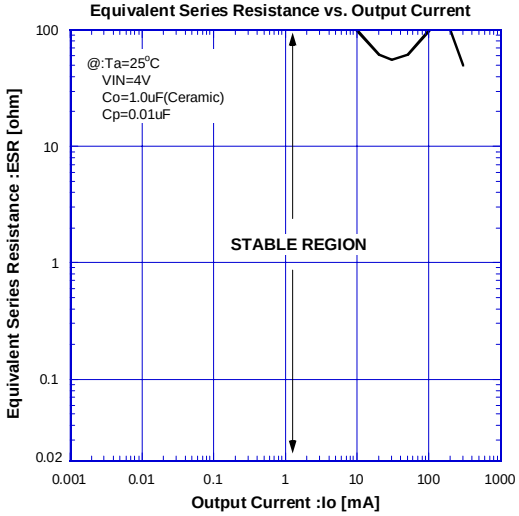


■ ELECTRICAL CHARACTERISTICS

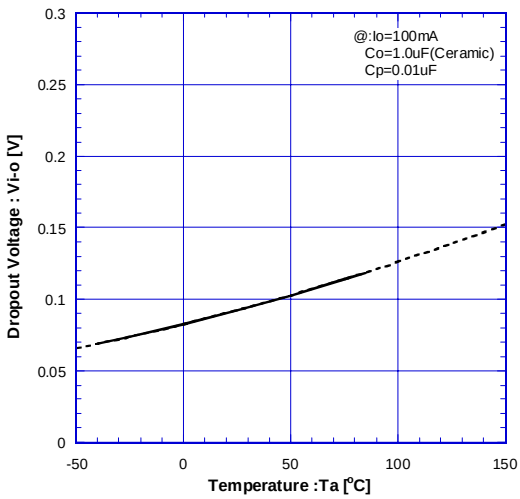
NJM2881/82_3.0V
Ripple Rejection vs. Output Current



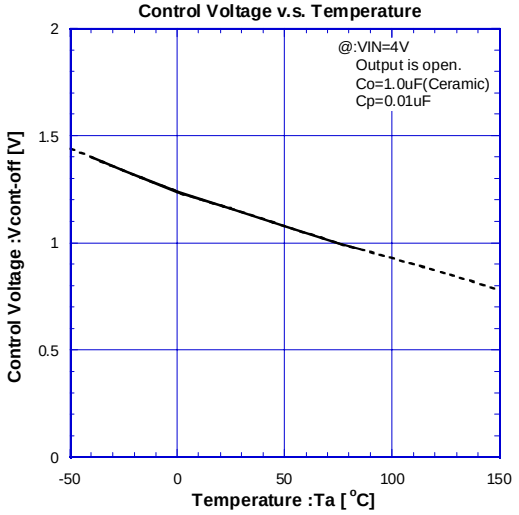
NJM2881/82_3.0V
Equivalent Series Resistance vs. Output Current



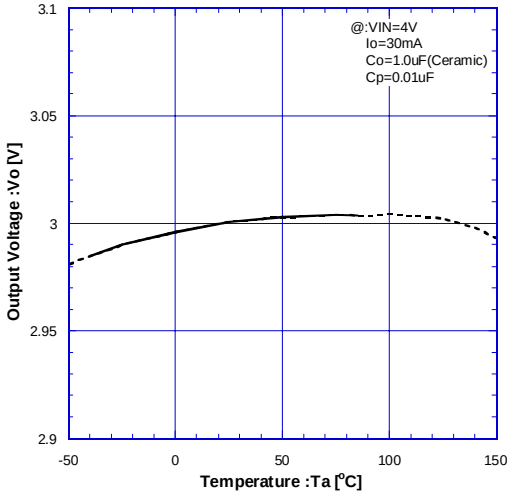
NJM2881/82_3.0V
Dropout Voltage v.s. Temperature



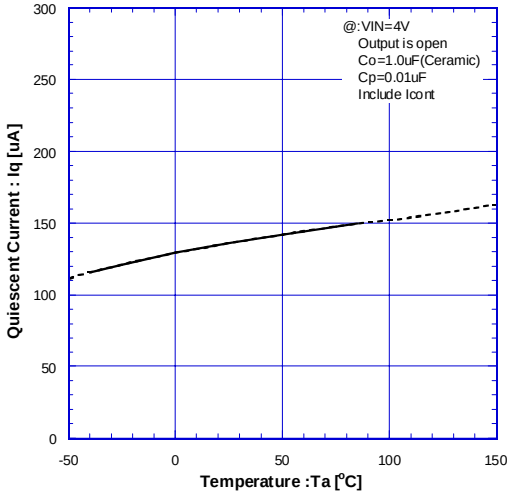
NJM2881/82_3.0V
Control Voltage v.s. Temperature



NJM2881/82_3.0V
Output Voltage v.s. Temperature

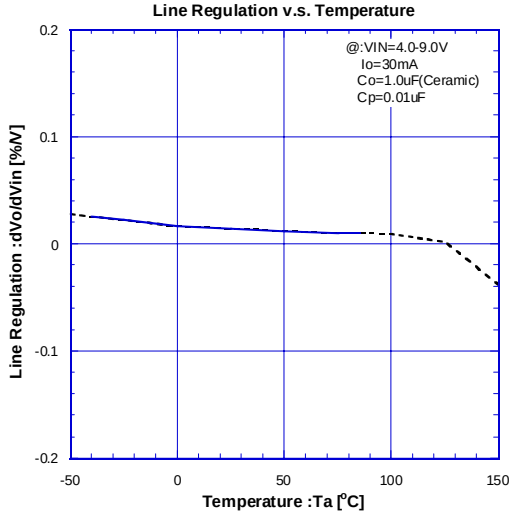


NJM2881/82_3.0V
Quiescent Current v.s. Temperature

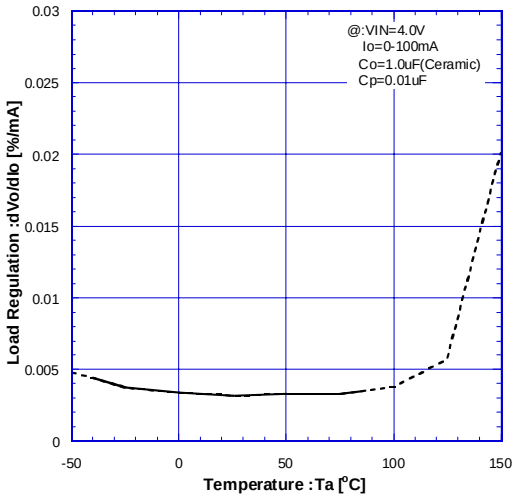


■ ELECTRICAL CHARACTERISTICS

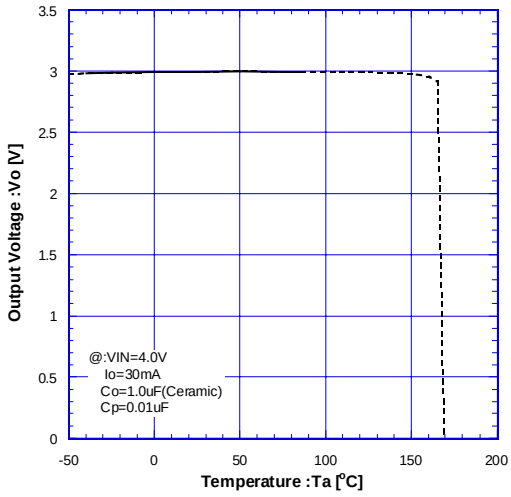
NJM2881/82_3.0V
Line Regulation v.s. Temperature



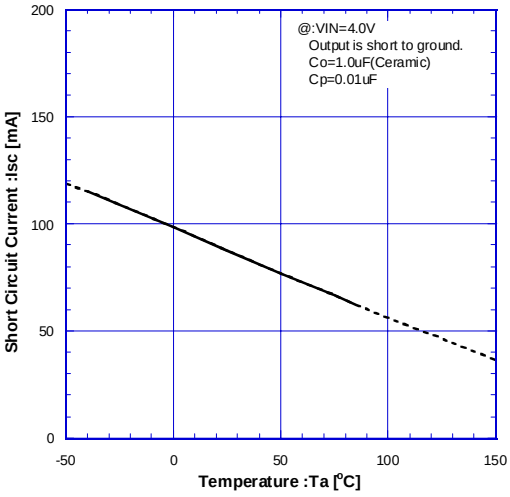
NJM2881/82_3.0V
Load Regulation v.s. Temperature



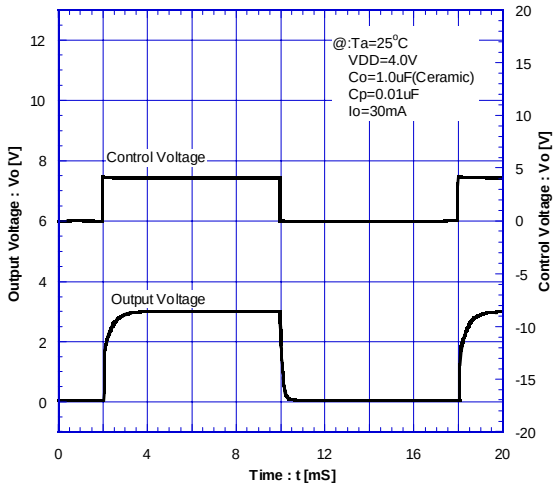
NJM2881/82_3.0V
Output Voltage v.s. Temperature



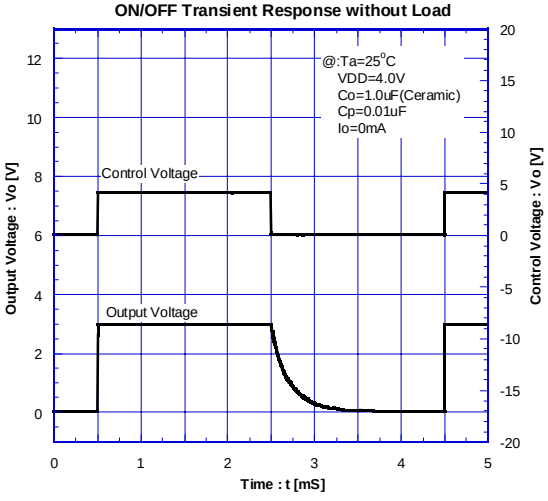
NJM2881/82_3.0V
Short Circuit Current v.s. Temperature



NJM2881_3.0V
ON/OFF Transient Response



NJM2881_3.0V
ON/OFF Transient Response without Load



■ ELECTRICAL CHARACTERISTICS