

## LOW DROPOUT VOLTAGE REGULATOR

### ■ GENERAL DESCRIPTION

The NJM2881/82 is a low dropout voltage regulator designed for portable applications.

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

### ■ PACKAGE OUTLINE



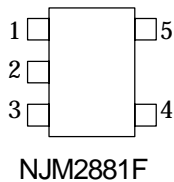
NJM2881F

NJM2882F

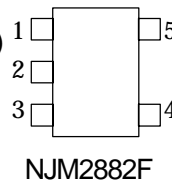
### ■ FEATURES

- High Ripple Rejection      75dB typ. (f=1kHz)
- Output Noise Voltage       $V_{no}=30\mu V_{rms}$  ( $C_p=0.01\mu F$ )
- Output capacitor with 1.0uF ceramic capacitor ( $V_o \geq 2.7V$ )
- Output Current               $I_o(max.)=300mA$
- High Precision Output       $V_o \pm 1\%$
- Low Dropout Voltage        0.10V typ. ( $I_o=100mA$ )
- ON/OFF Control            (Active High)
- Operating Voltage Range    +2.3V~+6V ( $V_o \leq 2.0V$  version)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline              MTP5 (MTP5:2.8x2.9x1.1mm)

### ■ PIN CONFIGURATION

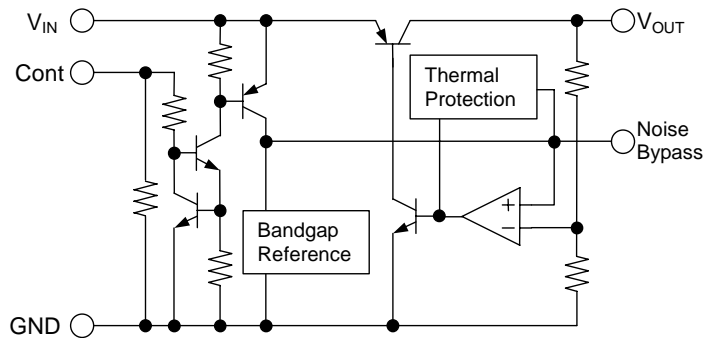


- PIN FUNCTION
1. CONTROL (Active High)
  2. GND
  3. NOISE BYPASS
  4.  $V_{OUT}$
  5.  $V_{IN}$



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

### ■ EQUIVALENT CIRCUIT



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## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	+14	V
Control Voltage	V <sub>CONT</sub>	+14(note 1)	V
Power Dissipation	P <sub>D</sub>	200(note 2) 350(note 3)	mW
Operating Temperature	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>stg</sub>	-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) On board. 76.2×114.3×1.6mm (Double layer, FR-4)

## ■ ELECTRICAL CHARACTERISTICS

(V<sub>o</sub>>2.0V version : V<sub>IN</sub>=V<sub>o</sub>+1V, C<sub>IN</sub>=0.1μF, C<sub>o</sub>=1.0μF: V<sub>o</sub>≥2.7V (C<sub>o</sub>=2.2μF: V<sub>o</sub>≤2.6V), C<sub>p</sub>=0.01μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>o</sub>	I <sub>o</sub> =30mA	-1.0%	-	+1.0%	V
Quiescent Current	I <sub>Q</sub>	I <sub>o</sub> =0mA, expect I <sub>cont</sub>	-	120	180	μA
Quiescent Current at Control OFF	I <sub>Q(OFF)</sub>	V <sub>CONT</sub> =0V	-	-	100	nA
Output Current	I <sub>o</sub>	V <sub>o</sub> -0.3V	300	400	-	mA
Line Regulation	ΔV <sub>o</sub> /ΔV <sub>IN</sub>	V <sub>IN</sub> =V <sub>o</sub> +1V ~ V <sub>o</sub> +6V, I <sub>o</sub> =30mA	-	-	0.10	%/V
Load Regulation	ΔV <sub>o</sub> /ΔI <sub>o</sub>	I <sub>o</sub> =0 ~ 300mA	-	-	0.03	%/mA
Dropout Voltage	ΔV <sub>F-O</sub>	I <sub>o</sub> =100mA	-	0.10	0.18	V
Ripple Rejection	RR	e <sub>in</sub> =200mVrms, f=1kHz, I <sub>o</sub> =10mA, V <sub>o</sub> =3V Version	-	75	-	dB
Average Temperature Coefficient of Output Voltage	ΔV <sub>o</sub> /ΔTa	Ta=0~+85°C, I <sub>o</sub> =10mA	-	±50	-	ppm/°C
Output Noise Voltage	V <sub>NO</sub>	f=10Hz~80kHz, I <sub>o</sub> =10mA, V <sub>o</sub> =3V Version	-	30	-	μVrms
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

(V<sub>o</sub>≤2.0V version : V<sub>IN</sub>=V<sub>o</sub>+1V, C<sub>IN</sub>=0.1μF, C<sub>o</sub>=2.2μF: V<sub>o</sub>≥1.9V (C<sub>o</sub>=4.7μF: V<sub>o</sub>≤1.8V), C<sub>p</sub>=0.01μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V <sub>o</sub>	I <sub>o</sub> =30mA	-1.0%	-	+1.0%	V
Quiescent Current	I <sub>Q</sub>	I <sub>o</sub> =0mA, expect I <sub>cont</sub>	-	120	180	μA
Quiescent Current at Control OFF	I <sub>Q(OFF)</sub>	V <sub>CONT</sub> =0V	-	-	100	nA
Output Current	I <sub>o</sub>	V <sub>o</sub> -0.3V	300	400	-	mA
Line Regulation	ΔV <sub>o</sub> /ΔV <sub>IN</sub>	V <sub>IN</sub> =V <sub>o</sub> +1V ~ V <sub>o</sub> +6V, I <sub>o</sub> =30mA	-	-	0.10	%/V
Load Regulation	ΔV <sub>o</sub> /ΔI <sub>o</sub>	I <sub>o</sub> =0 ~ 300mA	-	-	0.03	%/mA
Ripple Rejection	RR	e <sub>in</sub> =200mVrms, f=1kHz, I <sub>o</sub> =10mA, V <sub>o</sub> =1.8V Version	-	80	-	dB
Average Temperature Coefficient of Output Voltage	ΔV <sub>o</sub> /ΔTa	Ta=0~85°C, I <sub>o</sub> =10mA	-	±50	-	ppm/°C
Output Noise Voltage	V <sub>NO</sub>	f=10Hz~80kHz, I <sub>o</sub> =10mA, V <sub>o</sub> =1.8V Version	-	20	-	μVrms
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

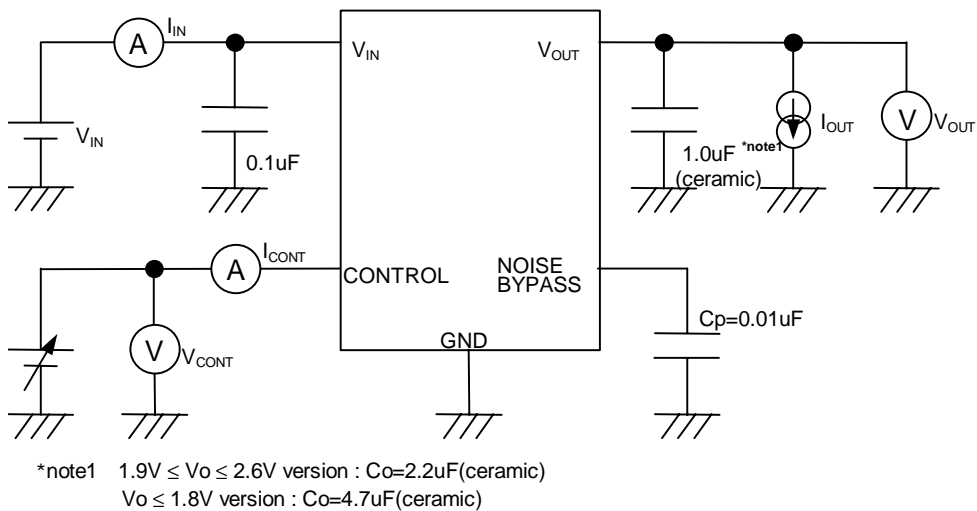
(note 4) The above specification is a common specification for all output voltages.

Therefore, it may be different from the individual specification for a specific output voltage.

## OUTPUT VOLTAGE RANK LIST

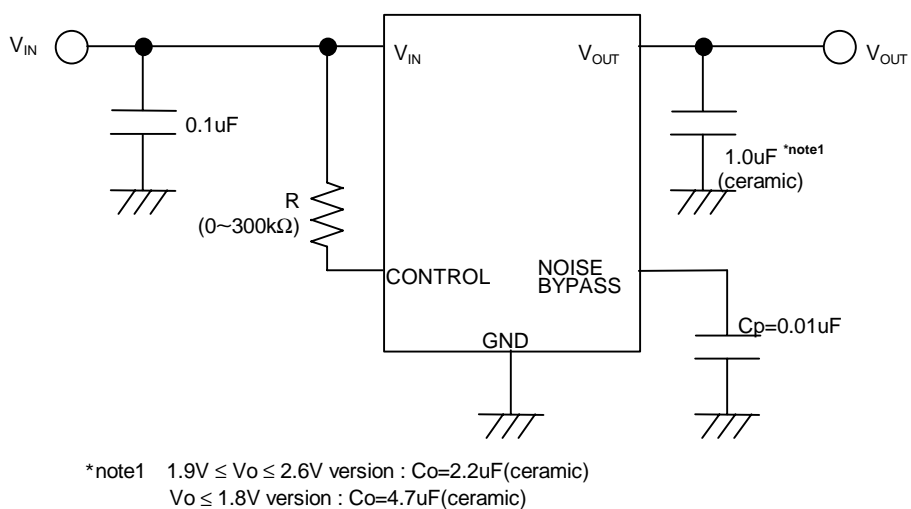
Device Name	V <sub>OUT</sub>
NJM288×F18	1.8V
NJM288×F25	2.5V
NJM288×F28	2.8V
NJM288×F03	3.0V
NJM288×F33	3.3V

## TEST CIRCUIT



## TYPICAL APPLICATION

① In case that ON/OFF Control is not required:

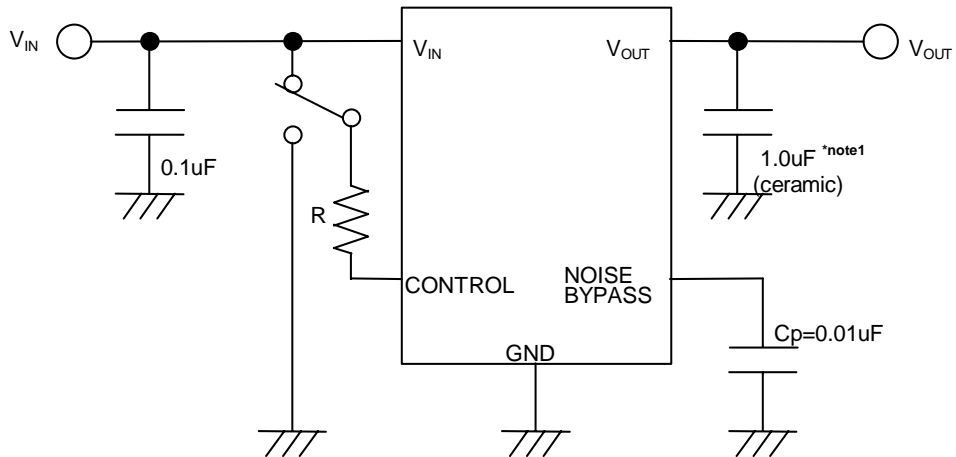


Connect control terminal to V<sub>IN</sub> terminal

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”.

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② In use of ON/OFF CONTROL:



\*note1  $1.9V \leq V_o \leq 2.6V$  version :  $C_o=2.2\mu F$ (ceramic)  
 $V_o \leq 1.8V$  version :  $C_o=4.7\mu F$ (ceramic)

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  $0.01\mu F$  greater to avoid the problem.

[CAUTION]  
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