

## LOW DROPOUT VOLTAGE REGULATOR

### ■ GENERAL DESCRIPTION

The NJM2870 is low dropout voltage regulator designed for cellular phone application.

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

### ■ PACKAGE OUTLINE

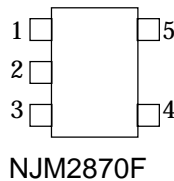


NJM2870F

### ■ FEATURES

- High Ripple Rejection       $56\text{dB} \leq \text{RR} \text{ (DC} < f < 60\text{kHz)}$   
66dB typ. (f=100Hz)  
60dB typ. (f=1kHz)
- Output Noise Voltage       $V_{no}=30\mu\text{V} \text{ (Cp}=0.01\mu\text{F)}$
- Output Current               $I_o(\text{max.})=150\text{mA}$
- High Precision Output       $V_o \pm 2\%$
- Low Dropout Voltage         $\Delta V_{I-O}=0.12\text{V typ. At } I_o=60\text{mA}$
- ON/OFF Control              (Active High)
- Internal Short Circuit Current Limit
- Internal Thermal Overload Protection
- Bipolar Technology
- Package Outline              MTP5 (MTP5:2.8x2.9x1.1)

### ■ PIN CONFIGURATION

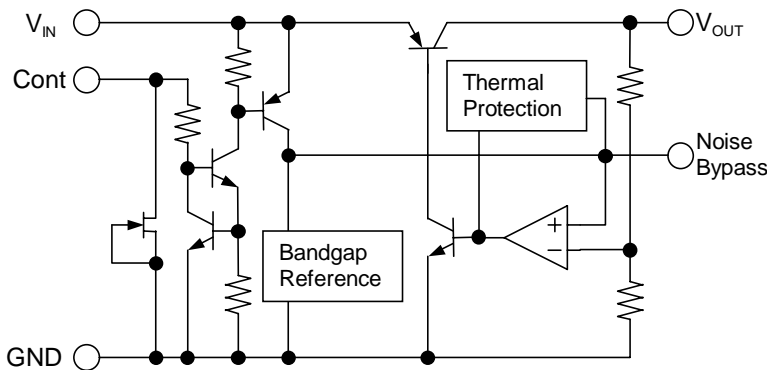


NJM2870F

#### PIN FUNCTION

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

### ■ EQUIVALENT CIRCUIT



### ■ OUTPUT VOLTAGE RANK LIST

Device Name	$V_{OUT}$
NJM2870F18	1.8V
NJM2870F19	1.9V
NJM2870F02	2.0V
NJM2870F21	2.1V
NJM2870F25	2.5V
NJM2870F27	2.7V
NJM2870F28	2.8V

Device Name	$V_{OUT}$
NJM2870F285	2.85V
NJM2870F29	2.9V
NJM2870F03	3.0V
NJM2870F31	3.1V
NJM2870F32	3.2V
NJM2870F33	3.3V
NJM2870F34	3.4V

Device Name	$V_{OUT}$
NJM2870F35	3.5V
NJM2870F38	3.8V
NJM2870F04	4.0V
NJM2870F45	4.5V
NJM2870F46	4.6V
NJM2870F05	5.0V

■ 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	mW
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +125	°C

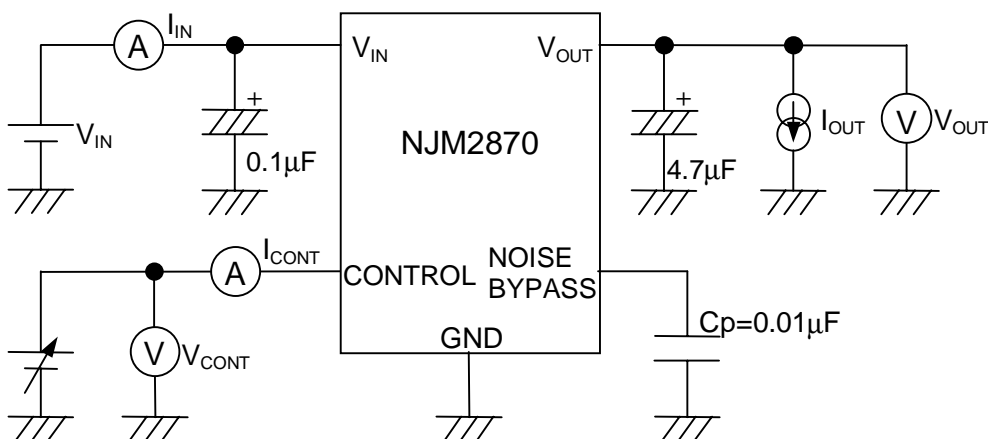
(note 1)When input voltage is less than +14V, the absolute maximum control voltage is equal to the input voltage.

■ ELECTRICAL CHARACTERISTICS (V<sub>IN</sub>=V<sub>O</sub>+1V, C<sub>IN</sub>=0.1μF, C<sub>O</sub>=4.7μF, 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	-2%	-	+2%	V
Quiescent Current	I <sub>Q</sub>	I <sub>O</sub> =0mA, expect I <sub>cont</sub>	-	200	300	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	150	200	-	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 ~ 100mA	-	-	0.03	%/mA
Dropout Voltage	ΔV <sub>I-O</sub>	I <sub>O</sub> =60mA	-	0.12	0.2	V
Ripple Rejection	RR	e <sub>in</sub> =200mVrms, f=1kHz, I <sub>O</sub> =10mA V <sub>IN</sub> =V <sub>O</sub> +2V, V <sub>O</sub> =3V Version	-	60	-	dB
Average Temperature Coefficient of Output Voltage	ΔV <sub>O</sub> /ΔTa	Ta=0~85°C, I <sub>O</sub> =10mA	-	0.2	-	mV/°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

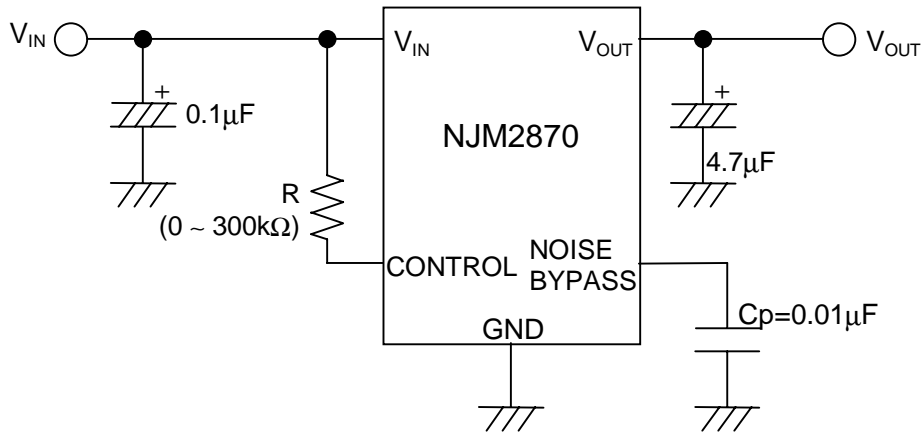
(note 2)Please confirm the specification separately because some parameters depend on output voltage.

■ TEST CIRCUIT



■ TYPICAL APPLICATION

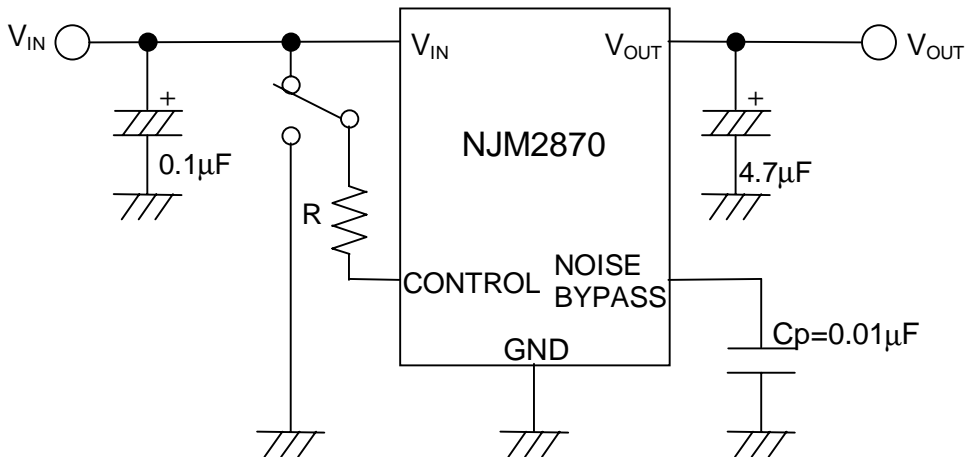
① In the case where ON/OFF Control is not required:



Connect control terminal(1Pin) to  $V_{IN}$  terminal(5Pin)

In case a resistance "R" is used, the quiescent current will be decreased. However, the but minimum operating voltage will be increase as well. Please refer to a figure of Output Voltage vs. Control Voltage.

② In use of ON/OFF CONTROL:



In case the control terminal is "H", the output is enabled.

The control terminal is "L" or "open", the 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. Please refer to the typical characteristics to determine the value.

Use of smaller  $C_p$  value may induce oscillation.

Please make sure to use  $C_p$  value of greater than 0.01uF to avoid the problem.

**[CAUTION]**

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