

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

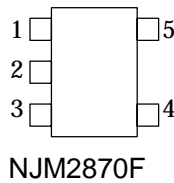


NJM2870F

FEATURES

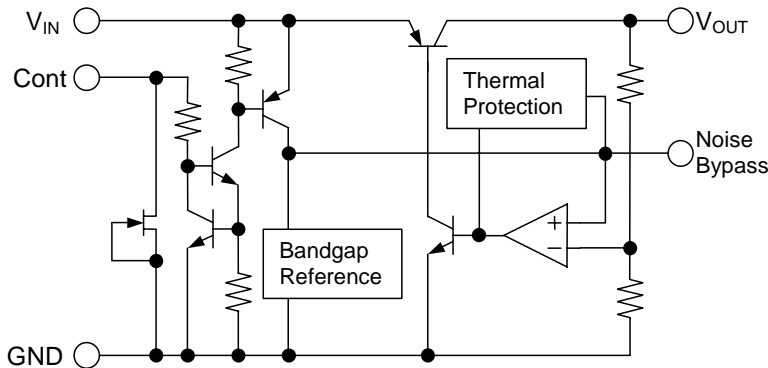
- High Ripple Rejection $56\text{dB} \leq \text{RR} (\text{DC} < f < 60\text{kHz})$
66dB typ. (f=100Hz)
60dB typ. (f=1kHz)
- Output Noise Voltage $V_{\text{no}}=30\mu\text{V} (C_p=0.01\mu\text{F})$
- Output Current $I_{\text{o(max)}}=150\text{mA}$
- High Precision Output $V_{\text{o}}\pm 2\%$
- Low Dropout Voltage $\Delta V_{\text{I-O}}=0.12\text{V typ.} (I_{\text{o}}=60\text{mA}, V_{\text{o}}\geq 1.8\text{V})$
- Input Voltage range $+2\sim+14\text{V} (V_{\text{o}}=1.5\text{V Version})$
- 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



- 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}
NJM2870F15	1.5V
NJM2870F18	1.8V
NJM2870F19	1.9V
NJM2870F02	2.0V
NJM2870F21	2.1V
NJM2870F25	2.5V
NJM2870F27	2.7V

Device Name	V_{OUT}
NJM2870F28	2.8V
NJM2870F285	2.85V
NJM2870F29	2.9V
NJM2870F03	3.0V
NJM2870F31	3.1V
NJM2870F32	3.2V
NJM2870F33	3.3V

Device Name	V_{OUT}
NJM2870F34	3.4V
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 _{IN}	+14	V
Control Voltage	V _{CONT}	+14(note 1)	V
Power Dissipation	P _D	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_{IN}=V_o+1V, C_{IN}=0.1μF, C_o=4.7μF, C_p=0.01μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V _o	I _o =30mA	-2%	-	+2%	V
Quiescent Current	I _Q	I _o =0mA, expect I _{cont}	-	200	300	μA
Quiescent Current at Control OFF	I _{Q(OFF)}	V _{CONT} =0V	-	-	100	nA
Output Current	I _o	V _o -0.3V	150	200	-	mA
Line Regulation	ΔV _o /ΔV _{IN}	V _{IN} =V _o +1V ~ V _o +6V, I _o =30mA	-	-	0.10	%/V
Load Regulation	ΔV _o /ΔI _o	I _o =0 ~ 100mA	-	-	0.03	%/mA
Dropout Voltage	ΔV _{I-TO}	I _o =60mA	-	0.12	0.2	V
Ripple Rejection	RR	e _{in} =200mVrms, f=1kHz, I _o =10mA V _{IN} =V _o +2V, V _o =3V Version	-	60	-	dB
Average Temperature Coefficient of Output Voltage	ΔV _o /ΔTa	Ta=0~85°C, I _o =10mA, V _o =3V Version	-	0.2	-	mV/°C
Output Noise Voltage	V _{NO}	f=10Hz~80kHz, I _o =10mA, V _o =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

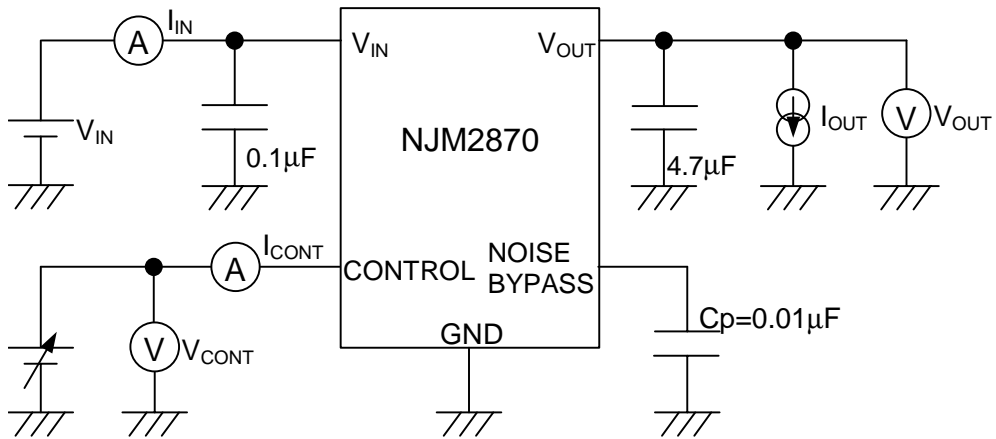
(note 2)Please confirm the specification separately because some parameters depend on output voltage.

■ ELECTRICAL CHARACTERISTICS

(V_o=1.5V Version, V_{IN}=2.4V, C_{IN}=0.1μF, C_o=4.7μF, C_p=0.01μF, Ta=25°C)

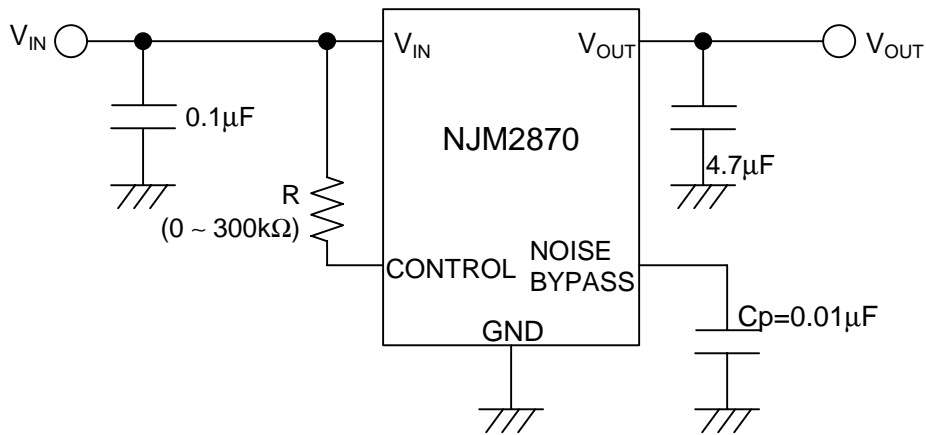
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Voltage	V _o	I _o =30mA	-2%	-	+2%	V
Quiescent Current	I _Q	I _o =0mA, expect I _{cont}	-	200	300	μA
Quiescent Current at Control OFF	I _{Q(OFF)}	V _{CONT} =0V	-	-	100	nA
Output Current	I _o	V _o -0.3V	150	200	-	mA
Line Regulation	ΔV _o /ΔV _{IN}	V _{IN} =V _o +1V ~ V _o +6V, I _o =30mA	-	-	0.10	%/V
Load Regulation	ΔV _o /ΔI _o	I _o =0 ~ 100mA	-	-	0.03	%/mA
Ripple Rejection	RR	e _{in} =200mVrms, f=1kHz, I _o =10mA V _{IN} =V _o +2V	-	64	-	dB
Average Temperature Coefficient of Output Voltage	ΔV _o /ΔTa	Ta=0~85°C, I _o =10mA	-	0.13	-	mV/°C
Output Noise Voltage	V _{NO}	f=10Hz~80kHz, I _o =10mA,	-	15	-	μVrms
Control Voltage for ON-state	V _{CONT(ON)}		1.6	-	-	V
Control Voltage for OFF-state	V _{CONT(OFF)}		-	-	0.6	V

■ TEST CIRCUIT



■ TYPICAL APPLICATION

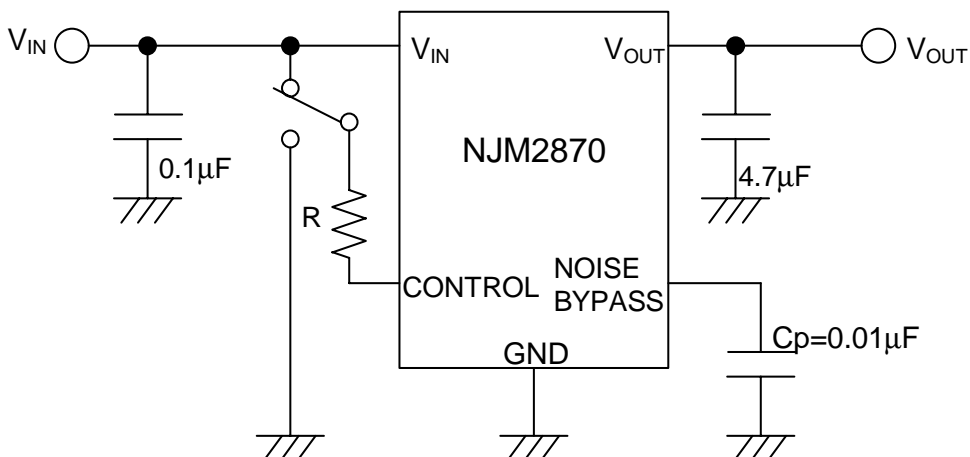
① In the case where ON/OFF Control is not required:



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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