

UTC LD3870 LINEAR INTEGRATED CIRCUIT

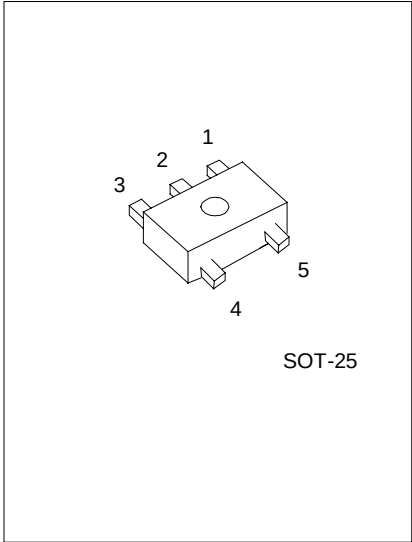
LOW DROPOUT VOLTAGE REGULATOR

DESCRIPTION

The UTC LD3870 is low dropout voltage regulator designed for cellular phone application.

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: $V_{\text{no}}=30\text{mV}$, $C_p=0.01\mu\text{F}$
- * 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
- * Output capacitor with 4.7uF ceramic capacitor
- * Internal Short Circuit Current Limit
- * Internal Thermal Overload Protection



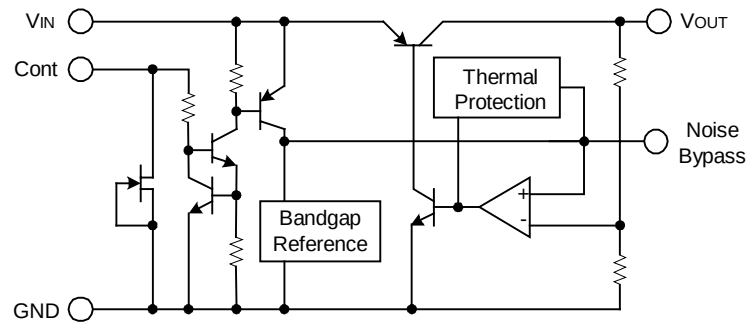
1:CONTROL(Active High) 2:GND
3:NOISE BYPASS 4:Vout 5:VIN

MARKING INFORMATION

PART NUMBER	VOLTAGE	VOLATGE CODE	PART NUMBER	VOLTAGE	VOLATGE CODE	MARKING
LD3870-1.5V	1.5V	15	LD3870-3.1V	3.1V	31	VOLTAGE CODE
LD3870-1.8V	1.8V	18	LD370-3.2V	3.2V	32	
LD3870-1.9V	1.9V	19	LD3870-3.3V	3.3V	33	
LD3870-2.0V	2.0V	20	LD3870-3.4V	3.4V	34	
LD3870-2.1V	2.1V	21	LD3870-3.5V	3.5V	35	
LD3870-2.3V	2.3V	23	LD3870-3.6V	3.6V	36	
LD3870-2.4V	2.4V	24	LD3870-3.8V	3.8V	38	
LD3870-2.5V	2.5V	25	LD3870-4.0V	4.0V	40	
LD3870-2.6V	2.6V	26	LD3870-4.5V	4.5V	45	
LD3870-2.7V	2.7V	27	LD3870-4.6V	4.6V	46	
LD3870-2.8V	2.8V	28	LD3870-4.7V	4.7V	47	
LD3870-2.85V	2.85V	2J	LD3870-4.8V	4.8V	48	
LD3870-2.9V	2.9V	29	LD3870-5.0V	5.0V	50	
LD3870-3.0V	3.0V	30				

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BLOCK DIAGRAM



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	T _{opr}	-40 ~ +85	°C
Storage Temperature	T _{stg}	-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}=0.1 μF, C_O=4.7 μF, C_p=0.01 μF, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITONS	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-O}	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 /ΔT _a	T _a =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: 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.

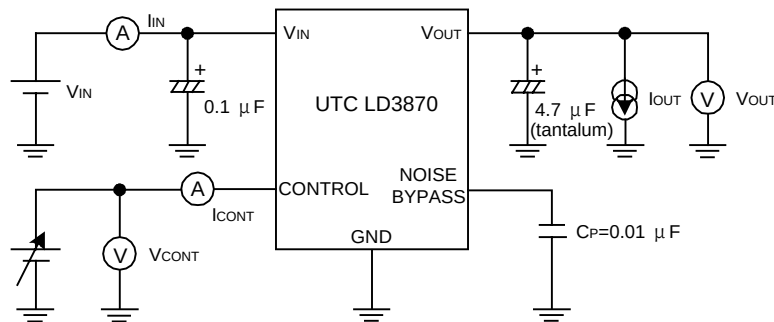
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ELECTRICAL CHARACTERISTICS

(Vo=1.5V Version, VIN=2.4V, CIN=0.1 μ F, Co=4.7 μ F, Cp=0.01 μ F, Ta=25°C)

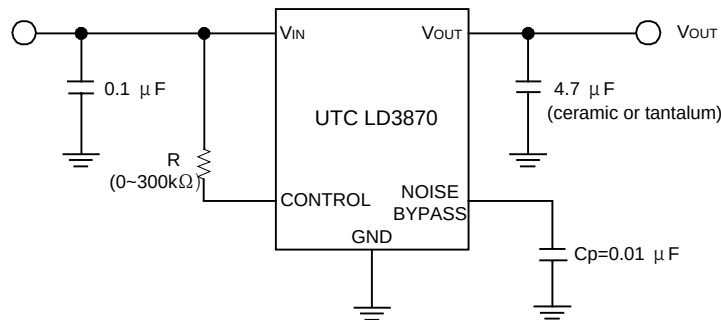
PARAMETER	SYMBOL	TEST CONDITONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	Vo	Io=30mA	-2%		+2%	V
Quiescent Current	Iq	Io=0mA, expect Icont		200	300	μ A
Quiescent Current At Control OFF	Iq(OFF)	VCONT=0V			100	nA
Output Current	Io	Vo=0.3V	150	200		mA
Line Regulation	$\Delta Vo/\Delta VIN$	VIN=Vo+1V ~ Vo+6V, Io=30mA			0.10	%/V
Load Regulation	$\Delta Vo/\Delta Io$	Io=0 ~ 100mA			0.03	%/mA
Ripple Rejection	RR	ein=200mVrms, f=1kHz, Io=10mA, VIN=Vo+2V		64		dB
Average Temperature Coefficient of Output Voltage	$\Delta Vo/\Delta Ta$	Ta=0 ~ 85°C, Io=10mA		0.13		mV/°C
Output Noise Voltage	VNO	f=10Hz ~ 80kHz, Io=10mA		15		μ Vrms
Control Voltage for ON-state	VCONT(ON)		1.6			V
Control Voltage for OFF-state	VCONT(OFF)				0.6	V

TEST CIRCUIT



TYPICAL APPLICATION

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

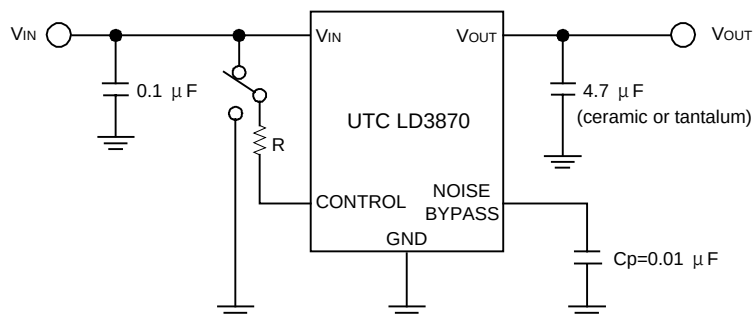


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Connect control terminal to V_{IN} terminal

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:



State of control terminal:

* "H" $\rightarrow$ Output is enables.

* "L" or "open" $\rightarrow$ Output is disabled.

* Noise bypass Capacitance C_p

Noise bypass capacitance C_p reduces noise generated by hand-gap reference circuit.

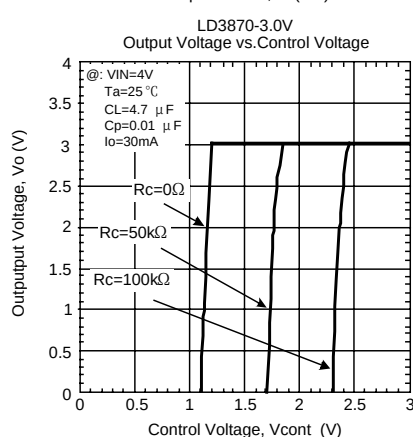
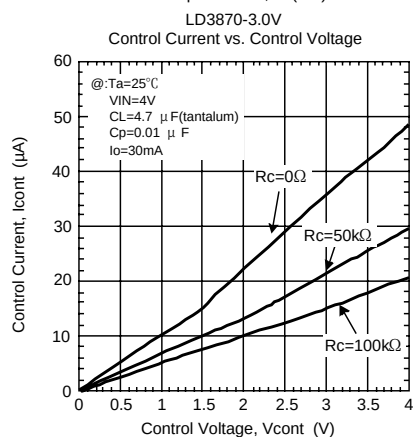
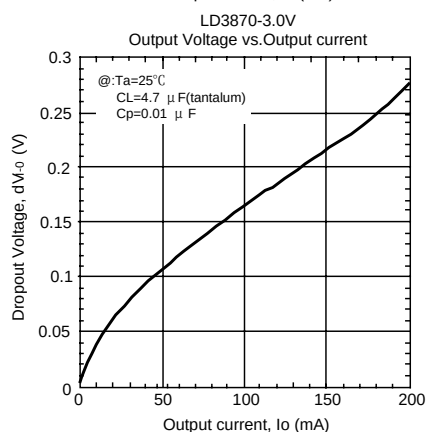
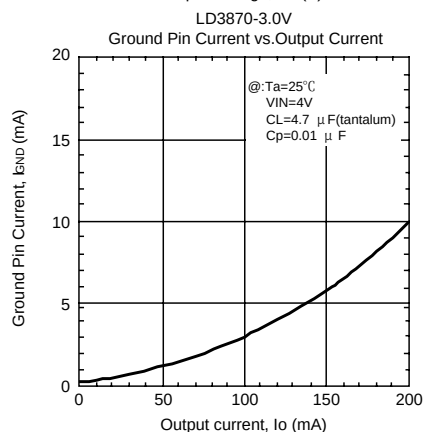
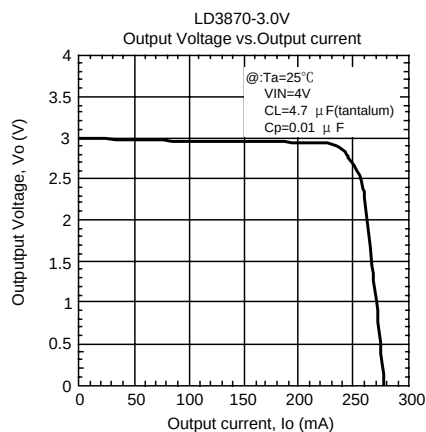
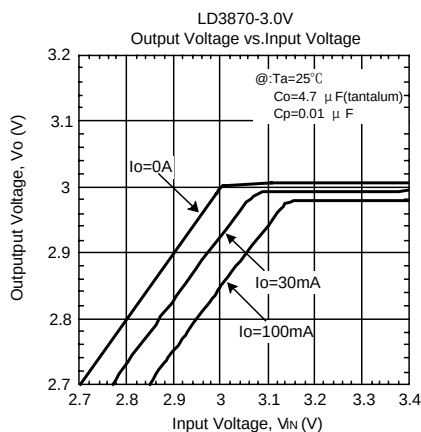
Noise level and ripple rejection will be improved when larger C_p is used.

Use of smaller C_p value may cause oscillation.

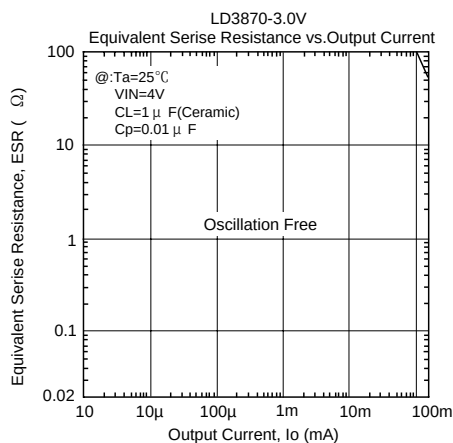
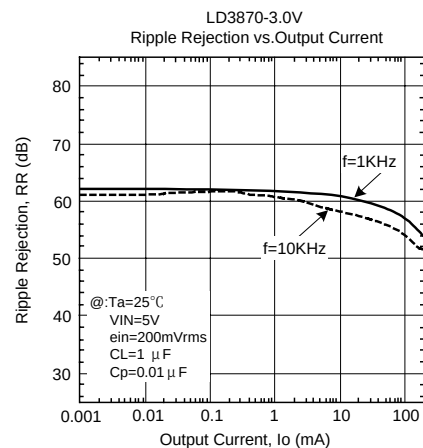
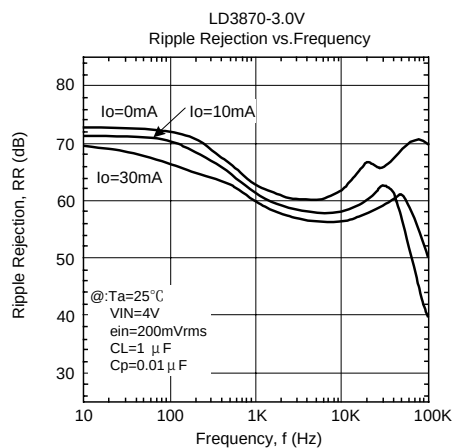
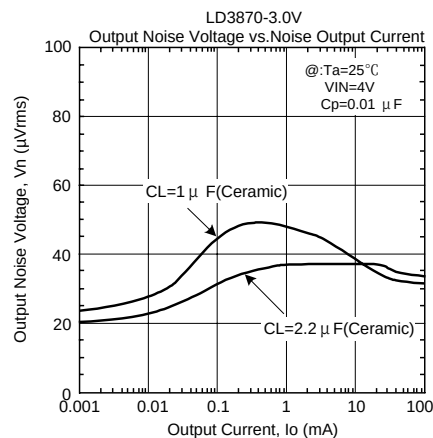
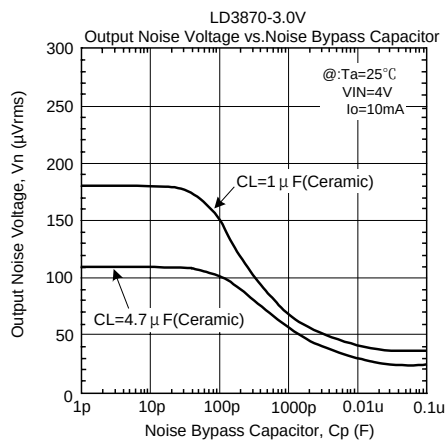
Use the C_p value of 0.01 μF greater to avoid the problem.

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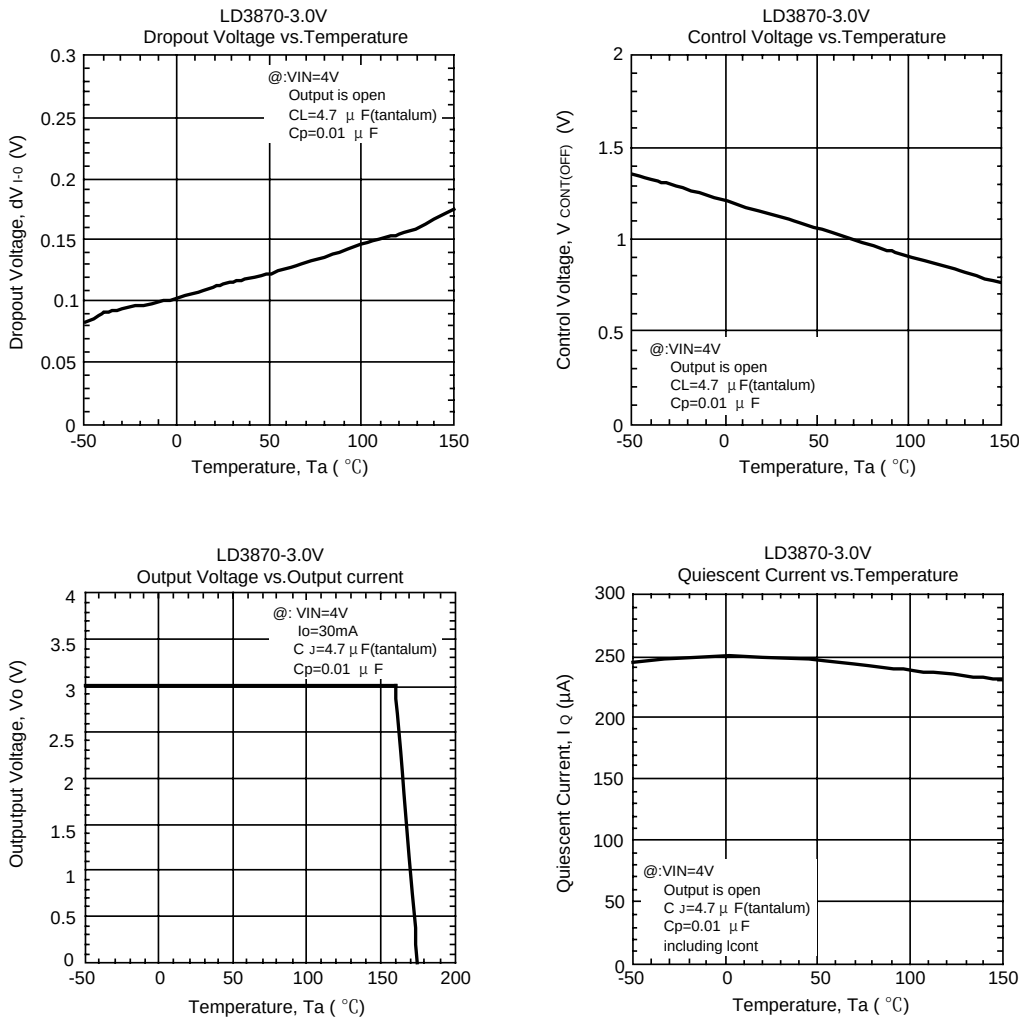
TYPICAL CHARACTERISTICS



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