



## LD3870

## LINEAR INTEGRATED CIRCUIT

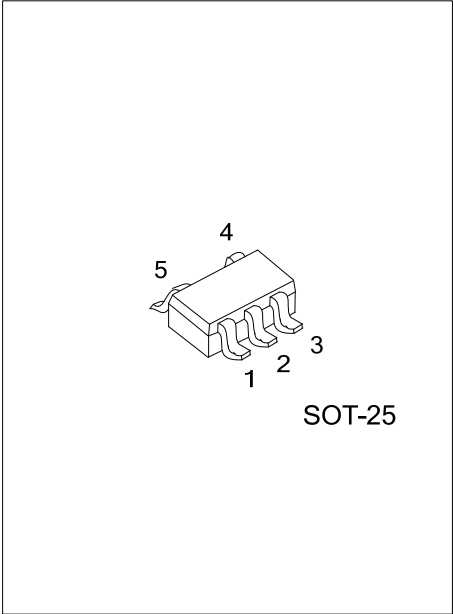
### LOW DROPOUT VOLTAGE REGULATOR

#### 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:  $e_N = 30\text{mV}$ ,  $C_p = 0.01\mu\text{F}$
- \* Output Current:  $I_{O(\text{MAX})} = 150\text{mA}$
- \* High Precision Output:  $V_O \pm 2\%$
- \* Low Dropout Voltage:  $V_D = 0.12\text{V}$  typ.  
( $I_O = 60\text{mA}, V_O \geq 1.8\text{V}$ )
- \* Input Voltage range:  $+2 \sim +14\text{V}$  ( $V_O = 1.5\text{V}$  Version)
- \* ON/OFF Control: Active High
- \* Output capacitor with 4.7uF ceramic capacitor
- \* Internal Short Circuit Current Limit
- \* Internal Thermal Overload Protection

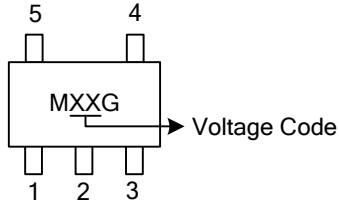


#### ORDERING INFORMATION

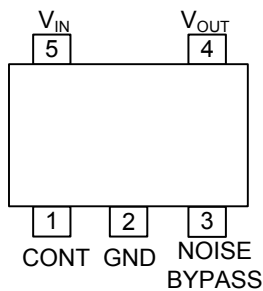
Ordering Number	Package	Packing
LD3870G-xx-AF5-R	SOT-25	Tape Reel

<p>LD3870G-xx-AF5-R</p>	<p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Output Voltage Code</p> <p>(4) Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) AF5: SOT-25</p> <p>(3) xx: refer to Marking Information</p> <p>(4) G: Halogen Free and Lead Free</p>
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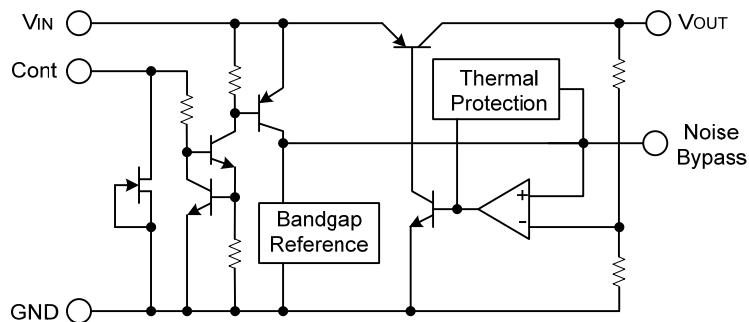
### MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-25	15:1.5V	
	18:1.8V	
	25:2.5V	
	27:2.7V	
	30:3.0V	
	33:3.3V	
	50:5.0V	

### PIN CONFIGURATION



### BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Input Voltage	V <sub>IN</sub>	+14	V
Control Voltage	V <sub>CONT</sub>	+14(Note 2)	V
Power Dissipation	P <sub>D</sub>	200	mW
Operating Temperature	T <sub>OPR</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>STG</sub>	-40 ~ +125	°C

Note 1: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. When input voltage is less than +14V, the absolute maximum control voltage is equal to the input voltage.

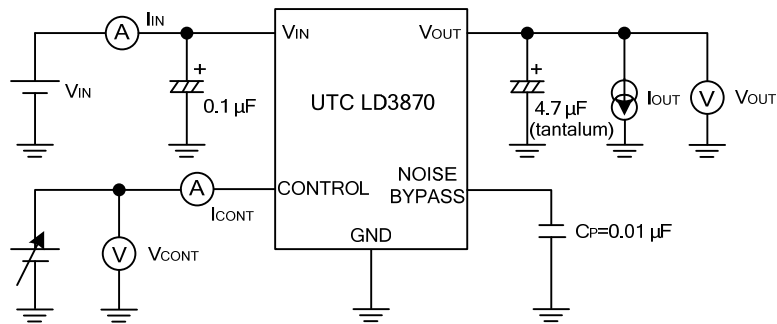
■ ELECTRICAL CHARACTERISTICS

(V<sub>IN</sub>=V<sub>OUT</sub>+1V, C<sub>IN</sub>=0.1μF, C<sub>OUT</sub>=4.7μF, C<sub>p</sub>=0.01μF, T<sub>A</sub>=25°C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	I <sub>OUT</sub> =30mA	-2%		+2%	V
Quiescent Current	I <sub>Q</sub>	I <sub>OUT</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			1000	nA
Output Current	I <sub>OUT</sub>	V <sub>OUT</sub> =0.3V	150	200		mA
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	V <sub>IN</sub> =V <sub>OUT</sub> +1V ~ V <sub>OUT</sub> +6V, I <sub>OUT</sub> =30mA			0.10	%/V
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	I <sub>OUT</sub> =0 ~ 100mA			0.03	%/mA
Dropout Voltage	V <sub>D</sub>	I <sub>OUT</sub> =60mA		0.12	0.2	V
Ripple Rejection	RR	e <sub>IN</sub> =200mVrms, f=1kHz, I <sub>OUT</sub> =10mA, V <sub>IN</sub> =V <sub>OUT</sub> +2V, V <sub>OUT</sub> =3V Version		60		dB
Average Temperature Coefficient of Output Voltage	$\Delta V_{OUT}/\Delta T_A$	T <sub>A</sub> =0~85°C, I <sub>OUT</sub> =10mA, V <sub>OUT</sub> =3V Version		0.2		mV/°C
Output Noise Voltage	e <sub>N</sub>	f=10Hz ~ 80kHz, I <sub>OUT</sub> =10mA, V <sub>OUT</sub> =3V Version		30		μVrms
Control Voltage	ON	V <sub>CONT(ON)</sub>	1.6			V
	OFF	V <sub>CONT(OFF)</sub>			0.6	V

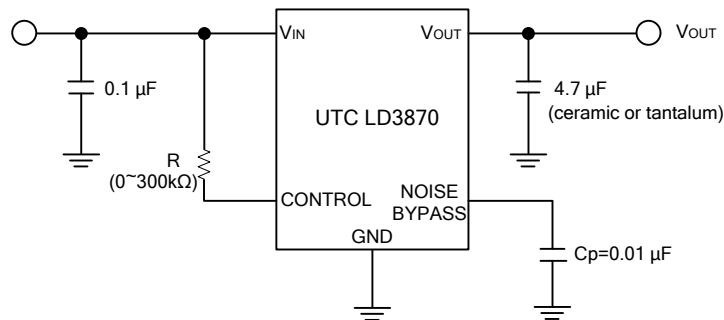
Note: The above specification is a common specification for all output voltages. Therefore, it may be different from the individual specification for a specific output voltage.

## ■ TEST CIRCUIT



## ■ TYPICAL APPLICATION

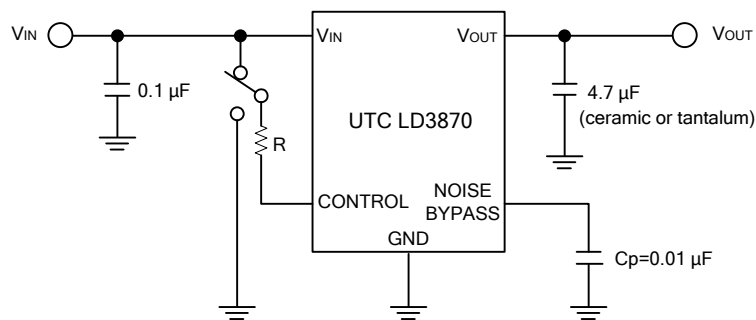
For ON/OFF Control is not required:



### 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".

For In use of ON/OFF CONTROL:



### State of control terminal:

- \* "H" → Output is enables.
- \* "L" or "open" → 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 $\mu$ F greater to avoid the problem.

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