

150mA Low Power LDO

Features

- Low power consumption
- Low voltage drop
- Low temperature coefficient
- High input voltage (up to 15V)
- Output voltage accuracy: tolerance $\pm 2\%$
- SOT23, SOT23-3, SOT89 package

Applications

- Battery-powered equipment
- Communication equipment
- Audio/Video equipment

General Description

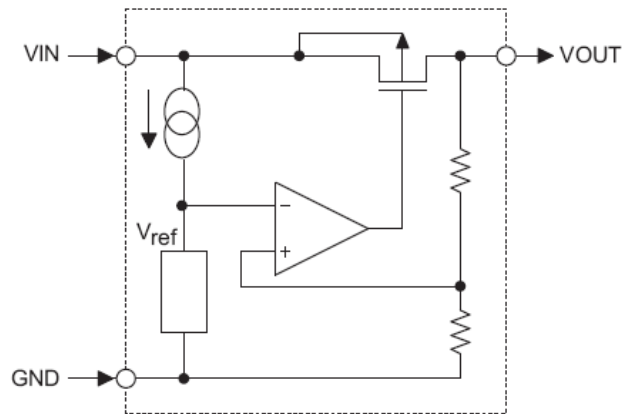
The HT71XXS series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 15V. They are available with several fixed output voltages ranging from 2.1V to 5.0V. CMOS technology ensures low voltage drop and low quiescent current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain variable voltages and currents.

Selection Table

Part No.	Output Voltage	Package
HT7121S	2.1V	SOT23 SOT23-3 SOT89
HT7123S	2.3V	
HT7125S	2.5V	
HT7127S	2.7V	
HT7130S	3.0V	
HT7133S	3.3V	
HT7136S	3.6V	
HT7144S	4.4V	
HT7150S	5.0V	

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Block Diagram



Pin Assignment

SOT23 and SOT23-3 (Top View)

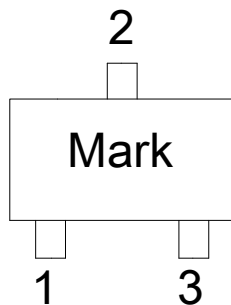


Table1: HT71XXS series (SOT23/SOT23-3)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

SOT89 (Top View)

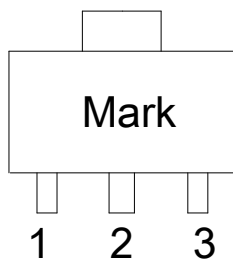


Table2: HT71XXS series (SOT89)

PIN NO.	PIN NAME	FUNCTION
1	GND	GND pin
2	VIN	Input voltage pin
3	VOUT	Output voltage pin

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Absolute Maximum Ratings

Supply Voltage-0.3V to 18V Storage Temperature-50°C to 125°C
 Operating Temperature-40°C to 85°C

Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Thermal Information

Symbol	Parameter	Package	Max.	Unit
θ_{JA}	Thermal Resistance (Junction to Ambient) (Assume no ambient airflow, no heat sink)	SOT89	200	°C/W
		SOT23-3	500	°C/W
		SOT23	500	°C/W
P_D	Power Dissipation	SOT89	0.50	W
		SOT23-3	0.20	W
		SOT23	0.20	W

Note: P_D is measured at $T_a = 25^\circ\text{C}$

Electrical Characteristics

HT7121S , +2.1V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{IN}	Conditions				
V_{OUT}	Output Voltage	4.1V	$I_{OUT}=10\text{mA}$	2.058	2.100	2.142	V
I_{OUT}	Output Current	4.1V	-	130	150	-	mA
ΔV_{OUT}	Load Regulation	4.1V	$1\text{mA} \leq I_{OUT} \leq 20\text{mA}$	-	60	100	mV
V_{DIF}	Voltage Drop(Note)	-	$I_{OUT}=1\text{mA}$	-	100	-	mV
I_{SS}	Current Consumption	4.1V	No load	-	1.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	$3.1\text{V} \leq V_{IN} \leq 16\text{V}$ $I_{OUT}=1\text{mA}$	-	0.2	-	%/V
V_{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	4.1V	$I_{OUT}=10\text{mA}$ $0^\circ\text{C} < T_a < 70^\circ\text{C}$	-	± 0.37	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at $V_{IN} = V_{OUT} + 2\text{V}$ with a fixed load.

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HT7123S , +2.3V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	4.3V	I _{OUT} =10mA	2.254	2.300	2.346	V
I _{OUT}	Output Current	4.3V	-	130	150	-	mA
ΔV _{OUT}	Load Regulation	4.3V	1mA≤I _{OUT} ≤20mA	-	60	100	mV
V _{DIF}	Voltage Drop(Note)	-	I _{OUT} =1mA	-	100	-	mV
I _{SS}	Current Consumption	4.3V	No load	-	1.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.3V≤V _{IN} ≤16V I _{OUT} =1mA	-	0.2	-	%/V
V _{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	4.3V	I _{OUT} =10mA 0°C<T _a <70°C	-	±0.39	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7125S , +2.5V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	4.5V	I _{OUT} =10mA	2.45	2.500	2.55	V
I _{OUT}	Output Current	4.5V	-	130	150	-	mA
ΔV _{OUT}	Load Regulation	4.5V	1mA≤I _{OUT} ≤20mA	-	60	100	mV
V _{DIF}	Voltage Drop(Note)	-	I _{OUT} =1mA	-	100	-	mV
I _{SS}	Current Consumption	4.5V	No load	-	1.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.5V≤V _{IN} ≤16V I _{OUT} =1mA	-	0.2	-	%/V
V _{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	4.5V	I _{OUT} =10mA 0°C<T _a <70°C	-	±0.41	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

150mA Low Power LDO**HT7127S , +2.7V Output Type**

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	4.7V	I _{OUT} =10mA	2.646	2.700	2.754	V
I _{OUT}	Output Current	4.7V	-	130	150	-	mA
ΔV _{OUT}	Load Regulation	4.7V	1mA≤I _{OUT} ≤20mA	-	60	100	mV
V _{DIF}	Voltage Drop(Note)	-	I _{OUT} =1mA, ΔV _{OUT} =2%	-	100	-	mV
I _{SS}	Current Consumption	4.7V	No load	-	1.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	3.7V≤V _{IN} ≤16V I _{OUT} =1mA	-	0.2	-	%/V
V _{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	4.7V	I _{OUT} =10mA 0°C<T _a <70°C	-	±0.43	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7130S , +3.0V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	5V	I _{OUT} =10mA	2.94	3.00	3.06	V
I _{OUT}	Output Current	5V	-	130	150	-	mA
ΔV _{OUT}	Load Regulation	5V	1mA≤I _{OUT} ≤20mA	-	20	100	mV
V _{DIF}	Voltage Drop(Note)	-	I _{OUT} =1mA	-	30	-	mV
I _{SS}	Current Consumption	5V	No load	-	1.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4V≤V _{IN} ≤16V I _{OUT} =1mA	-	0.02	-	%/V
V _{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5V	I _{OUT} =10mA 0°C<T _a <70°C	-	±0.45	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

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HT7133S , +3.3V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	5.3V	I _{OUT} =10mA	3.234	3.300	3.366	V
I _{OUT}	Output Current	5.3V	-	130	150	-	mA
ΔV _{OUT}	Load Regulation	5.3V	1mA≤I _{OUT} ≤20mA	-	40	100	mV
V _{DIF}	Voltage Drop(Note)	-	I _{OUT} =1mA	-	30	-	mV
I _{SS}	Current Consumption	5.3V	No load	-	1.5	3	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4.5V≤V _{IN} ≤16V I _{OUT} =1mA	-	0.06	-	%/V
V _{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.3V	I _{OUT} =10mA 0°C<T _a <70°C	-	±0.5	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7136S , +3.6V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	5.6V	I _{OUT} =10mA	3.528	3.600	3.672	V
I _{OUT}	Output Current	5.6V	-	130	150	-	mA
ΔV _{OUT}	Load Regulation	5.6V	1mA≤I _{OUT} ≤20mA	-	30	100	mV
V _{DIF}	Voltage Drop(Note)	-	I _{OUT} =1mA	-	25	-	mV
I _{SS}	Current Consumption	5.6V	No load	-	1.5	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	4.6V≤V _{IN} ≤16V I _{OUT} =1mA	-	0.02	-	%/V
V _{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	5.6V	I _{OUT} =10mA 0°C<T _a <70°C	-	±0.6	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

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HT7144S , +4.4V Output Type

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	6.4V	I _{OUT} =10mA	4.312	4.400	4.488	V
I _{OUT}	Output Current	6.4V	-	130	150	-	mA
ΔV _{OUT}	Load Regulation	6.4V	1mA≤I _{OUT} ≤20mA	-	20	100	mV
V _{DIF}	Voltage Drop(Note)	-	I _{OUT} =1mA	-	20	-	mV
I _{SS}	Current Consumption	6.4V	No load	-	1.5	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	5.4V≤V _{IN} ≤16V I _{OUT} =1mA	-	0.02	-	%/V
V _{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	6.4V	I _{OUT} =10mA 0°C<T _a <70°C	-	±0.7	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

HT7150S , +5.0V Output Type

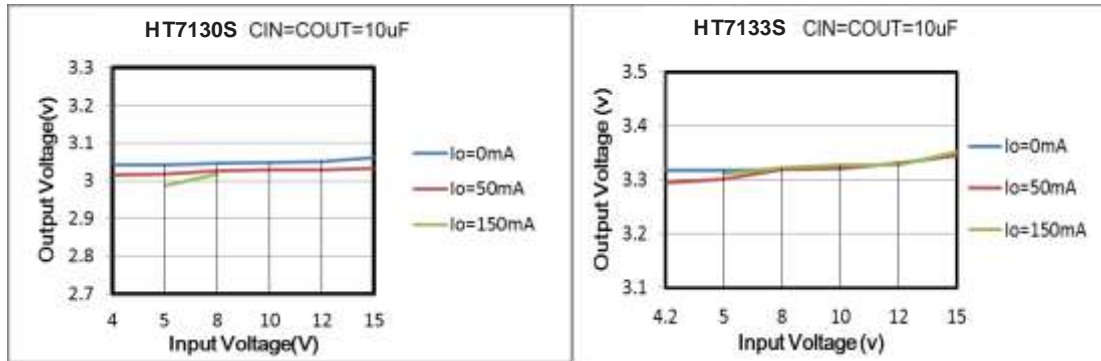
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V _{IN}	Conditions				
V _{OUT}	Output Voltage	7V	I _{OUT} =10mA	4.9	5.00	5.1	V
I _{OUT}	Output Current	7V	-	130	150	-	mA
ΔV _{OUT}	Load Regulation	7V	1mA≤I _{OUT} ≤20mA	-	25	100	mV
V _{DIF}	Voltage Drop(Note)	-	I _{OUT} =1mA	-	20	-	mV
I _{SS}	Current Consumption	7V	No load	-	1.5	3.0	μA
$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	Line Regulation	-	6V≤V _{IN} ≤16V I _{OUT} =1mA	-	0.04	-	%/V
V _{IN}	Input Voltage	-	-	-	-	15	V
$\frac{\Delta V_{OUT}}{\Delta T_a}$	Temperature Coefficient	7V	I _{OUT} =10mA 0°C<T _a <70°C	-	±0.75	-	mV/°C

Note: Dropout voltage is defined as the input voltage minus the output voltage that produces a 2% change in the output voltage from the value at V_{IN} = V_{OUT}+2V with a fixed load.

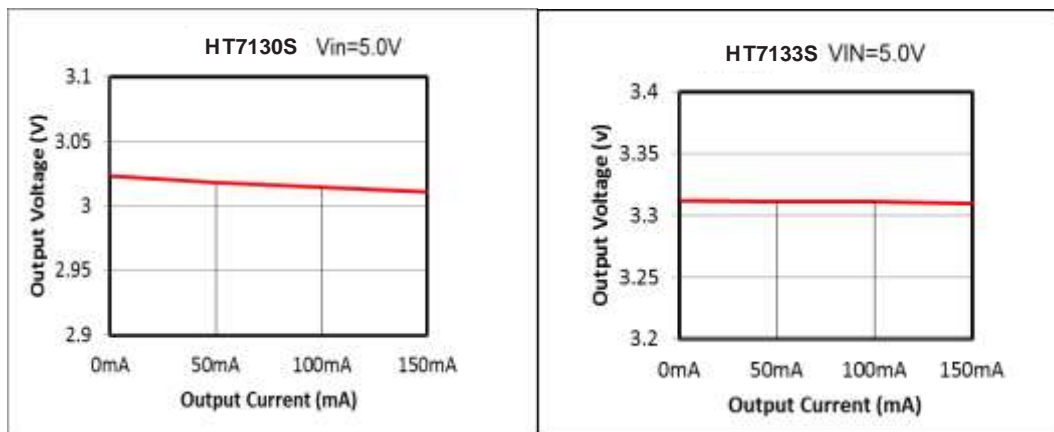
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Typical Performance Characteristics

(1) Output Voltage vs Input voltage

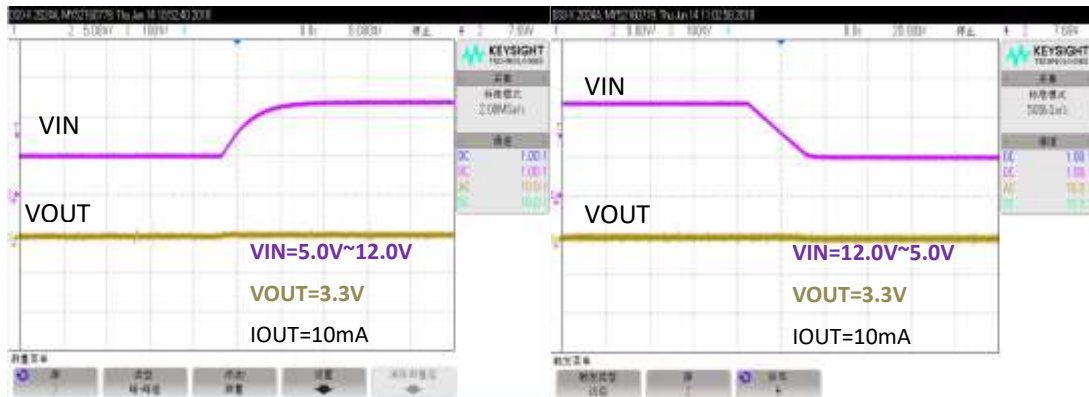


(2) Output Voltage vs. Output Current

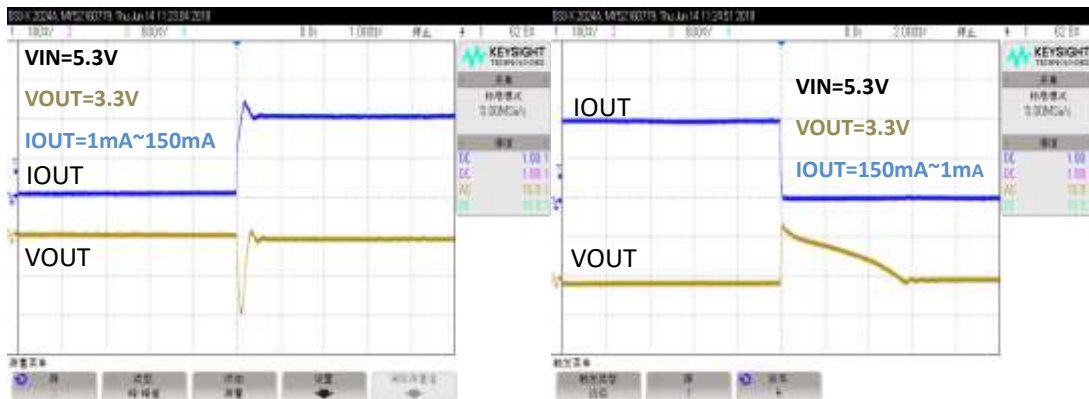


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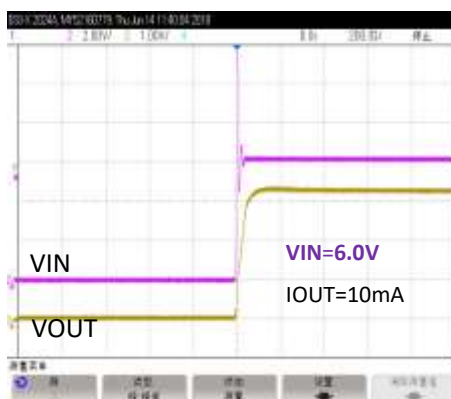
(3) Input Transient Response



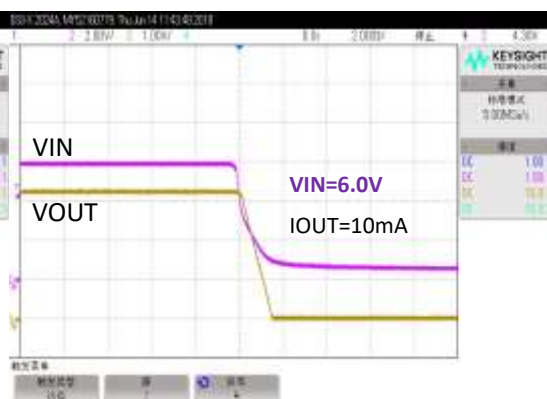
(4) Load Transient Response



(5) Power On

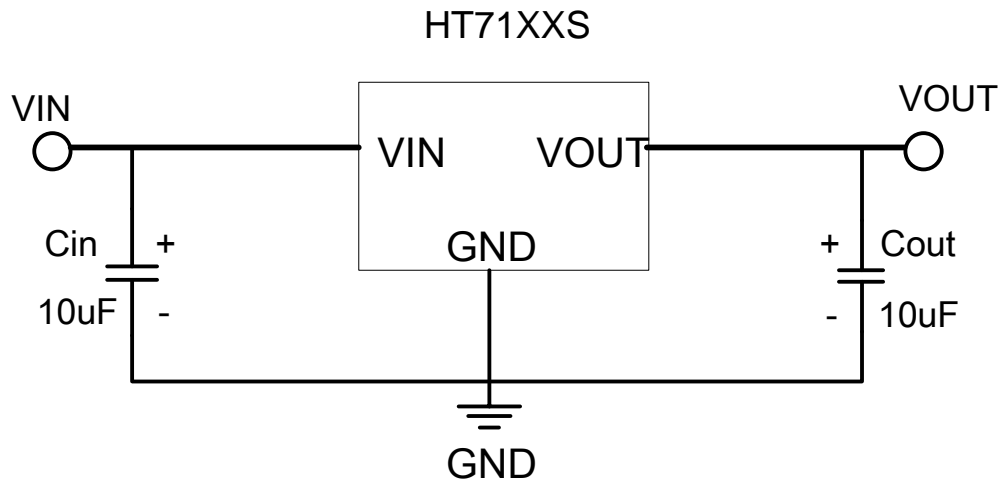


(6) Power Off



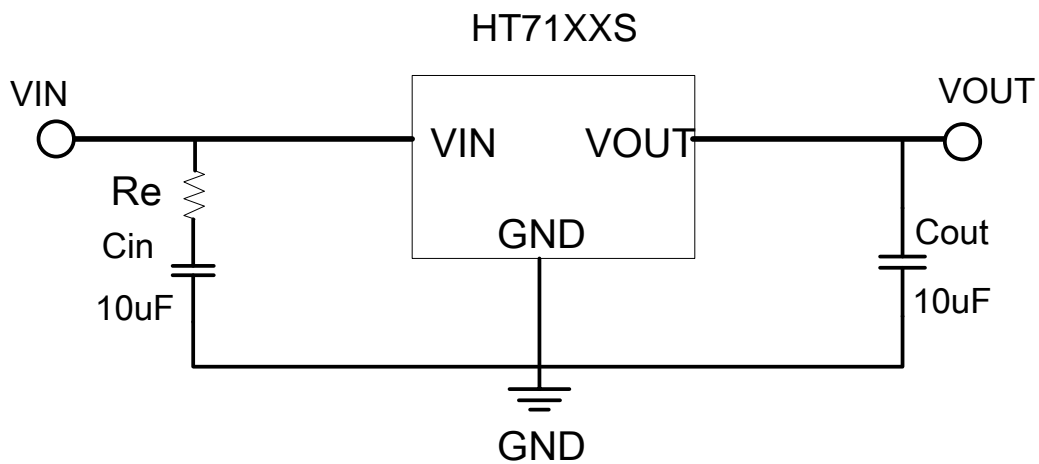
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Application Circuits



Note1: $C_{in}=C_{out}=10\mu\text{F}$. (10uF Electrolytic capacitor is recommended).

Note2: If the input and output capacitors are ceramic, add a resistor at the input, as follows.



Note: $R_e = (1.2 \sim 1.8) \Omega$.