100mA LOW POWER LDO

Overview

SL75xx is a low drop-out linear voltage regulator with the CMOS technology. The maximum output current is 100mA, and the allowed maximum input withstanding voltage is 36V. The device has several fixed output voltage values, with ranges from 2.5V to 5.0V. The COMS technology can ensure the characteristics of low drop-out and low quiescent current.

Functional characteristics and application fields

- ★ Low power consumption
- ★ Low dropout
- ★ Relatively low temperature coefficient
- ★ A device with power supply of batteries
- ★ Communication device
- ★ An audio/video device

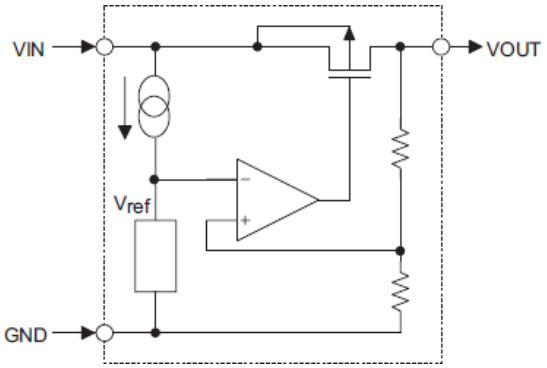
- ★ Maximum input voltage: 36V
- ★ Typical quiescent current: 2uA
- ★ Maximum output current: 100mA
- ★ Output voltage accuracy: ±2%
- ★ Package type: SOT23-3，TO92，SOT89

Table of model selection

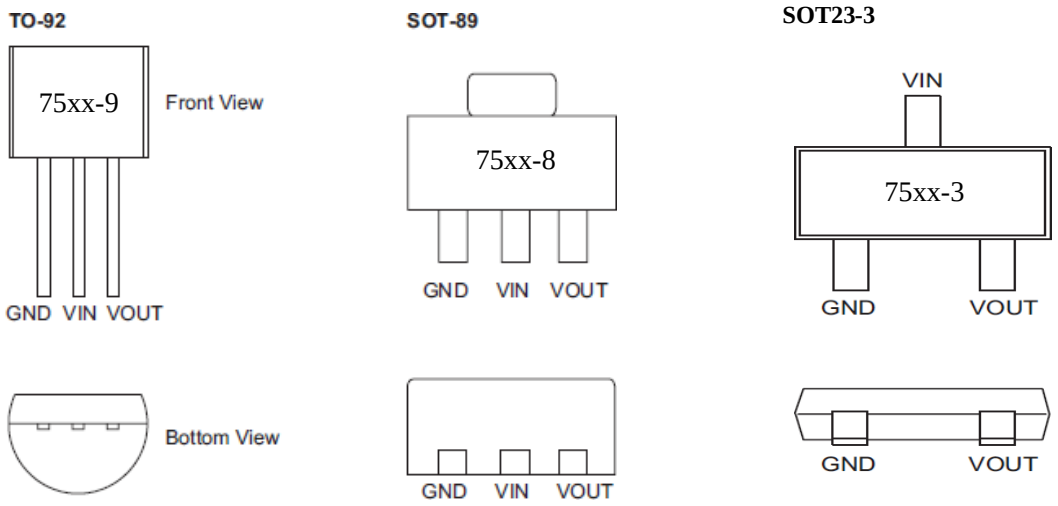
Model	Output voltage	Package type	Positive printing
SL 7525-x	2.5V	SOT23-3 TO92 SOT89	75xx-3(packaged as SOT23 -3) 75xx-9(packaged as TO92 -3) 75xx-8(packaged as SOT89 -3)
SL 7530-x	3.0V		
SL 7533-x	3.3V		
SL 7536-x	3.6V		
SL 7544-x	4.4V		
SL 7550-x	5.0V		

Notes: "xx" represents for the output voltage.

Circuit functional block diagram



Pin drawing



Pin instruction

No. of pins	Name of pins	Description
1	GND	Ground
2	VIN	input pin
3	VOUT	Output pin,

Absolute parameters

Power supply voltage ----------0.3V ~+36V Working environment temperature-------- 40℃~+85℃
Storage temperature ranges: ---------- -40℃~85℃

Notes: Only rated power is emphasized here; working with the power out of the ranges of the absolute parameters will lead to damages to the chip, and it is difficult to expect the working state of the chip out of the ranges marked above; in addition, long-term working out of the marked ranges may lead to influences on reliability of the chip.

Thermal energy information

Symbols	Parameters	Package type	Max. value	Units
θ_{JA}	Thermal resistance (connecting with environment) (assumed with no environment airflow or cooling fin)	SOT23-3	500	℃/W
		SOT89	200	℃/W
		TO92	200	℃/W
P_D	Power consumption	SOT23-3	0.2	W
		SOT89	0.5	W
		TO92	0.5	W

Notes: The P_D value is measured at Ta=25℃.

Electrical characteristics

SL 7525-x，+2.5V Output Ta=25℃

Symbols	Parameters	Testing conditions	Min.	Typical	Max.	Units
V_{IN}	Input voltage	—	—	—	36	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	2.450	2.500	2.550	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	$I_{OUT}=1mA$, $\Delta Vo=2\%$	—	2	4	mV
I_{SS}	Quiescent current	No load	—	2	3.0	uA
$\frac{\triangle VOUT}{\triangle VIN \times VOUT}$	Input voltage regulation ratio	$Vo+1V \le V_{IN} \le 36V$ $I_{OUT}=1mA$	—	—	0.2	%/V
$\frac{\triangle VOUT}{\triangle Ta \times VOUT}$	Temperature coefficient	$I_{OUT}=10mA$ $-40℃<Ta<85℃$	—	100	—	ppm/℃

Notes: Make the output voltage drop by 2% in the condition of VIN=VOUT+2V and a fixed load; the difference of the input voltage and the output voltage at this time is the Dropout voltage.

SL 7530-x，+3.0V Output Ta=25℃

Symbols	Parameters	Testing conditions	Min.	Typical	Max.	Units
V_{IN}	Input voltage	—	—	—	36	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	2.940	3.000	3.060	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	$I_{OUT}=1mA$, $\Delta Vo=2\%$	—	2	4	mV
I_{SS}	Quiescent current	No load	—	2.0	3.0	uA
$\frac{\triangle VOUT}{\triangle VIN \times VOUT}$	Input voltage regulation ratio	$Vo+1V \le V_{IN} \le 36V$ $I_{OUT}=1mA$	—	—	0.2	%/V
$\frac{\triangle VOUT}{\triangle Ta \times VOUT}$	Temperature coefficient	$I_{OUT}=10mA$ $-40℃<Ta<85℃$	—	100	—	ppm/℃

Notes: Make the output voltage drop by 2% in the condition of VIN=VOUT+2V and a fixed load; the difference of the input voltage and the output voltage at this time is the Dropout voltage.

SL 7533-x，+3.3V Output Ta=25℃

Symbols	Parameters	Testing conditions	Min.	Typical	Max.	Units
V_{IN}	Input voltage	—	—	—	36	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	3.234	3.300	3.366	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	$I_{OUT}=1mA$ $\Delta Vo=2\%$	—	2	4	mV
I_{SS}	Quiescent current	No load	—	2.0	3.0	uA
$\frac{\triangle VOUT}{\triangle VIN \times VOUT}$	Input voltage regulation ratio	$Vo+1V \le V_{IN} \le 36V$ $I_{OUT}=1mA$	—	—	0.2	%/V
$\frac{\triangle VOUT}{\triangle Ta \times VOUT}$	Temperature coefficient	$I_{OUT}=10mA$ $-40℃<Ta<85℃$	—	100	—	ppm/℃

Notes: Make the output voltage drop by 2% in the condition of VIN=VOUT+2V and a fixed load; the difference of the input voltage and the output voltage at this time is the Dropout voltage.

SL 7536-x，+3.6V Output Ta=25℃

Symbols	Parameters	Testing conditions	Min.	Typical	Max.	Units
V_{IN}	Input voltage	—	—	—	36	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	3.528	3.600	3.672	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	$I_{OUT}=1mA$, $\Delta Vo=2\%$	—	2	4	mV
I_{SS}	Quiescent current	No load	—	2.0	3.0	uA
$\frac{\triangle VOUT}{\triangle VIN \times VOUT}$	Input voltage regulation ratio	$Vo+1V \le V_{IN} \le 36V$ $I_{OUT}=1mA$	—	—	0.2	%/V
$\frac{\triangle VOUT}{\triangle Ta \times VOUT}$	Temperature coefficient	$I_{OUT}=10mA$ $-40℃<Ta<85℃$	—	100	—	ppm/℃

Notes: Make the output voltage drop by 2% in the condition of VIN=VOUT+2V and a fixed load; the difference of the input voltage and the output voltage at this time is the Dropout voltage.

S L7544-x，+4.4V Output Ta=25℃

Symbols	Parameters	Testing conditions	Min.	Typical	Max.	Units
V_{IN}	Input voltage	—	—	—	36	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	4.312	4.400	4.488	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	70	100	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	$I_{OUT}=1mA$, $\Delta Vo=2\%$	—	2	4	mV
I_{SS}	Quiescent current	No load	—	2.0	3.0	uA
$\frac{\triangle VOUT}{\triangle VIN \times VOUT}$	Input voltage regulation ratio	$Vo+1V \le V_{IN} \le 36V$ $I_{OUT}=1mA$	—	—	0.2	%/V
$\frac{\triangle VOUT}{\triangle Ta \times VOUT}$	Temperature coefficient	$I_{OUT}=10mA$ $-40℃<Ta<85℃$	—	100	—	ppm/℃

Notes: Make the output voltage drop by 2% in the condition of VIN=VOUT+2V and a fixed load; the difference of the input voltage and the output voltage at this time is the Dropout voltage.

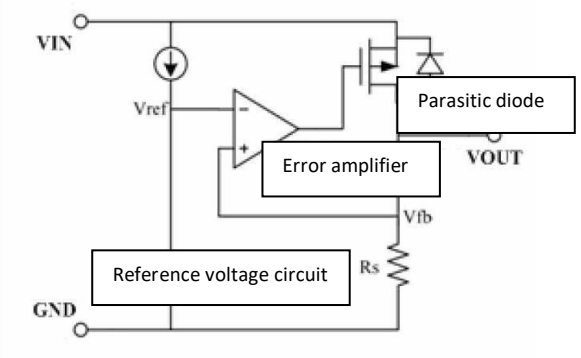
SL 7550-x，+5.0V Output Ta=25℃

Symbols	Parameters	Testing conditions	Min.	Typical	Max.	Units
V_{IN}	Input voltage	—	—	—	36	V
V_{OUT}	Output voltage	$V_{IN}=V_{OUT}+2V$ $I_{OUT}=10mA$	4.900	5.000	5.100	V
I_{OUT}	Output current	$V_{IN}=V_{OUT}+2V$	100	150	—	mA
ΔV_{OUT}	Load regulation rate	$V_{IN}=V_{OUT}+2V$ $1mA \le I_{OUT} \le 50mA$	—	25	60	mV
V_{DIF}	Dropout Voltage	$I_{OUT}=1mA$ $\Delta Vo=2\%$	—	2	4	mV
I_{SS}	Quiescent current	No load	—	2.0	3.0	uA
$\frac{\triangle VOUT}{\triangle VIN \times VOUT}$	Input voltage regulation ratio	$Vo+1V \le V_{IN} \le 36V$ $I_{OUT}=1mA$	—	—	0.2	%/V
$\frac{\triangle VOUT}{\triangle Ta \times VOUT}$	Temperature coefficient	$I_{OUT}=10mA$ $-40℃<Ta<85℃$	—	100	—	ppm/℃

Notes: Make the output voltage drop by 2% in the condition of VIN=VOUT+2V and a fixed load; the difference of the input voltage and the output voltage at this time is the Dropout voltage.

Functional description

The error amplifier compares the input voltage Vfb, which is the divider resistance composed by the feedback resistance Rs and Rf, with the reference voltage Vref. Provide necessary gate pole voltage to the output transistor through the error amplifier, to prevent the output voltage from influences of the input voltage or the temperature, to kept it unchanged.



Matters needing attention:

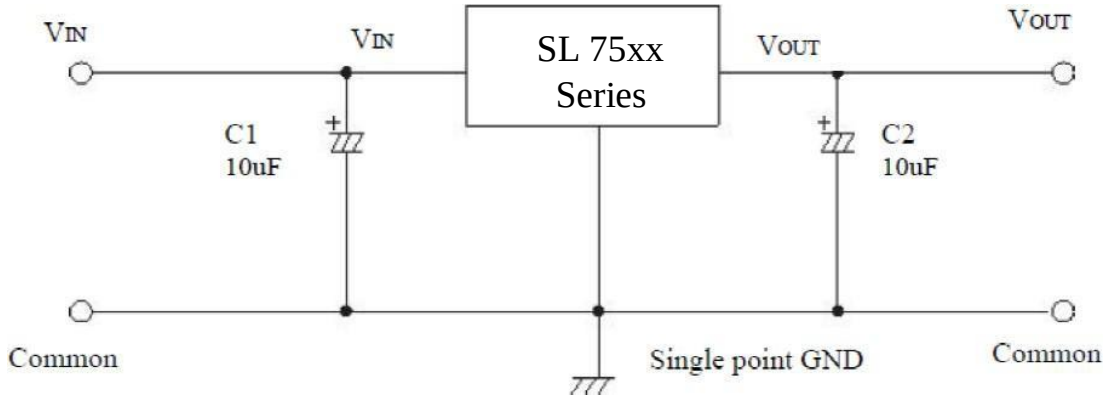
1) The phase compensation and the ESR of the output capacitor are utilized in the circuit for compensation; therefore, must be connect a capacitor larger than 2.2uF between the output and the ground.
2) It is suggested to use a polar capacitor of 10uF for the input and the output, and try to make the capacitor get closer to the pins of VIN and VOUT of LDO.
3) Pay attention to using conditions of the input and output voltage and the loading current, to prevent the condition that the internal power consumption (PD) of IC exceeds the allowed maximum power consumption by package.

   The calculation method of PD: PD=(VIN－VOUT)×IOUT

   For example: SL 7550-8, SOT89 package, when VIN=12V, IOUT=100mA, PD=（12-5）×100mA=0.7W，

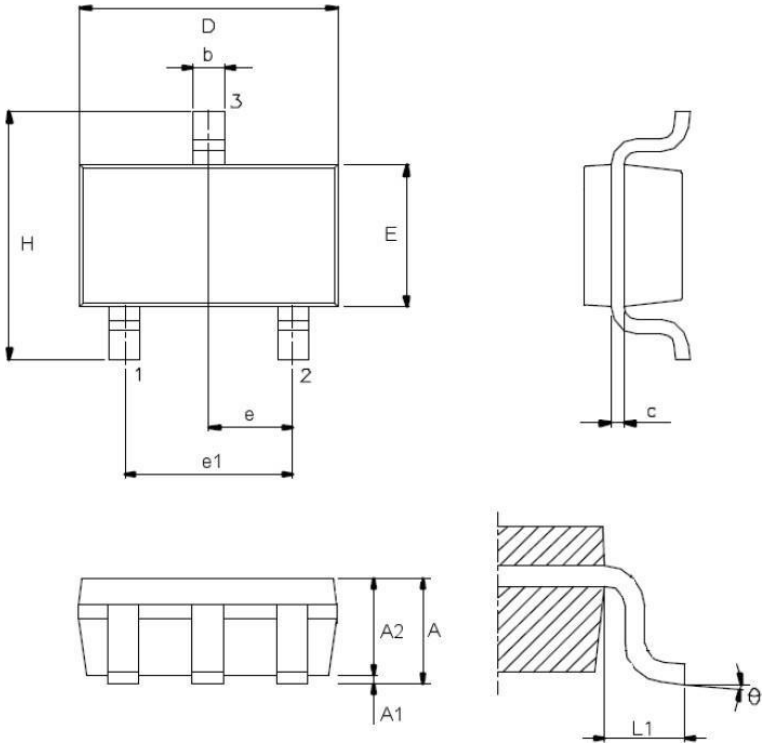
   It may lead to damage to IC if it exceeds 0.5W than the specified value. With respect to the PD value of different package modes, please refer to the column of "thermal energy information".

Typical application circuit



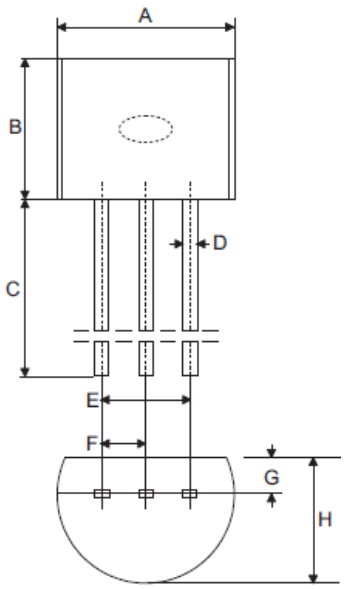
Package information

SOT23-3 package dimension



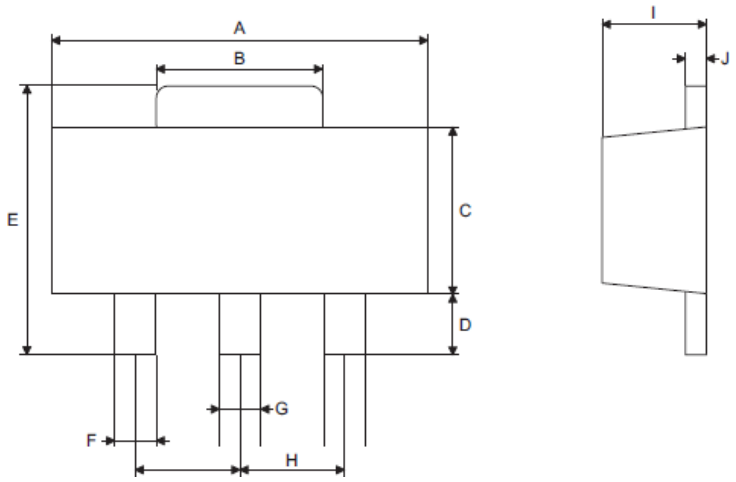
Symbols	Dimension (nits: mm)		
	Min.	Typical	Max.
A	—	—	1.45
A1	—	—	0.15
A2	0.90	1.15	1.30
b	0.30	—	0.50
C	0.08	—	0.22
D	—	2.90	—
E	—	1.60	—
e	—	0.95	—
e1	—	1.90	—
H	—	2.80	—
L1	—	0.60	
θ	0°	—	9°

TO92 package dimension



Symbols	Size (nits: mm)		
	Min.	Typical	Max.
A	4.39	4.57	5.21
B	4.32	—	5.33
C	12.70	14.73	—
D	—	0.38	—
E	—	2.54	—
F	—	1.27	—
G	—	0.89	—
H	3.18	3.61	4.19

SOT89 package size



Symbols	Size (nits: mm)		
	Min.	Typical	Max.
A	4.40	—	4.60
B	1.35	—	1.83
C	2.29	—	2.60
D	0.89	—	1.20
E	3.94	—	4.25
F	0.36	—	0.48
G	0.44	—	0.56
H	—	1.50	—
I	1.40	—	1.60
J	0.35	—	0.44

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