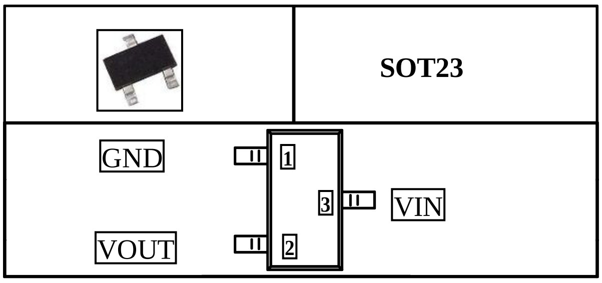
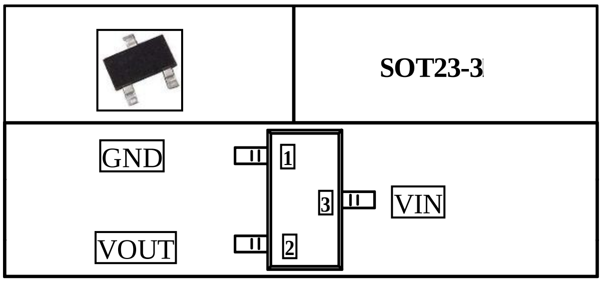
Low dropout linear regulator

Description

- The SL75xx series is a low dropout linear regulator utilizing CMOS technology. It operates at a maximuminput voltage of 24V and offers several fixed output voltage options ranging from 2.8V to 9.0V.
- Known for its low quiescent current, it is widely employed inpower supply applications for various audio, video, and communication devices.

Pin configuration





Features

- Low power dissipation
- Low dropout voltage
- Low temperature coefficient
- The maximum operating voltage can reach 24V
- Quiescent Current1.5μA
- Output voltage accuracy:± 2%
- High output current:100mA

Typical Application

- Various power supplies
- Communication equipment
- Audio, video

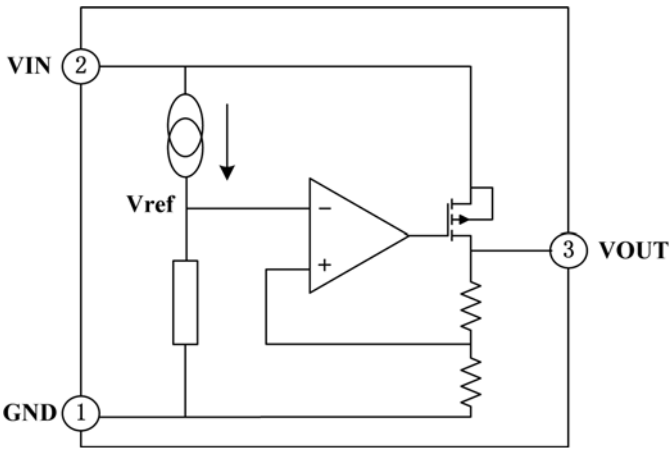
Output Voltage Selection

Part Number	Output Voltage	Package
SL7528-3	2.8V	SOT23 SOT23-3L
SL7530-3	3.0V	
SL7533-3	3.3V	
SL7536-3	3.6V	
SL7540-3	4.0V	
SL7550-3	5.0V	

Pin Function

Pin Number	Pin Name	Description
1	GND	Ground
3	VIN	Input
2	VOUT	Output

Block Diagram



Maximum Ratings

Parameter	Symbol	Value	Unit
Operating Voltage	V_{IN}	－0.3～+26	V
Storage temperature	T_{STG}	－50～＋125	℃
Ambient temperature	T_A	－40～＋85	℃

Note: Operating the device beyond the specified maximum ratings may cause permanent damage.The listed parameters represent the absolute maximum operating conditions, and we do not recommend operating the device outside this specification range. Prolonged operation at or near the absolute maximum limits may compromise stability.

Heat dissipation information

Parameter	Symbol	Package	Value	Unit
Thermal resistance	θ_{JA}	SOT23	500	℃/W
		SOT23-3L	400	℃/W
Power dissipation	P_D	SOT23	200	mW
		SOT23-3L	250	mW

Electrical Characteristics (Unless otherwise specified, T_A = +25°C)

Output Model SL7528-3

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_{OUT}	VIN=V_{OUT}+2.0V, I_{OUT}=10mA	2.744	2.80	2.856	V
Output current	I_{OUT}	V_{IN}=V_{OUT}+2.0V	70	100	—	mA
Load regulation	ΔV_{OUT}	V_{IN}=V_{OUT}+2.0V 1mA≤I_{OUT}≤50mA	—	25	60	mV
Low dropout	V_{DIF}	I_{OUT}=1mA，ΔV_{OUT}=2%	—	30	100	mV
Quiescent current	I_{SS}	No load	—	1.5	3.0	μA
Line regulation	ΔV_{OUT}/ V_{OUT}* ΔV_{IN}	V_{OUT}+1.0V≤V_{IN}≤24V, I_{OUT}=1mA	—	—	0.2	%/V
Input voltage	V_{IN}	—	—	—	24	V
Temperature coefficient	ΔV_{OUT}/ ΔT_A*V_{OUT}	V_{OUT}+2.0V, I_{OUT}=10mA, -40℃≤T_A≤85℃	—	100	—	ppm/℃

Note: When V_{IN}=V_{OUT}+2.0V under fixed load conditions causing a 2% decrease in output voltage, the voltage difference between input and output is referred to as the dropout voltage V_{DIF}.

Output Model SL 7530-3

Parameter	Symbol	Conditions	Min.	Type	Max.	Unit
Output voltage	V_{OUT}	V_{IN}=V_{OUT}+2.0V，I_{OUT}=10mA	2.94	3.00	3.06	V
Output current	I_{OUT}	V_{IN}=V_{OUT}+2.0V	70	100	—	mA
Load regulation	ΔV_{OUT}	V_{IN}=V_{OUT}+2.0V 1mA≤I_{OUT}≤50mA	—	25	60	mV
Low dropout	V_{DIF}	I_{OUT}=1mA，ΔV_{OUT}=2%	—	30	100	mV
Quiescent current	I_{SS}	No load	—	1.5	3.0	μA
Line regulation	ΔV_{OUT}/ V_{OUT}* ΔV_{IN}	V_{OUT}+1.0V≤V_{IN}≤24V， I_{OUT}=1mA	—	—	0.2	%/V
Input voltage	V_{IN}	—	—	—	24	V
Temperature coefficient	ΔV_{OUT}/ ΔT_A*V_{OUT}	V_{IN}= V_{OUT}+2.0V，I_{OUT}=10mA， -40℃≤T_A≤85℃	—	100	—	ppm/℃

Note: When V_{IN}=V_{OUT}+2.0V under fixed load conditions causing a 2% decrease in output voltage, the voltage difference between input and output is referred to as the dropout voltage V_{DI}F.

Output Model SL 7533-3

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$， $I_{OUT}=10mA$	3.234	3.30	3.366	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Low dropout	V_{DIF}	$I_{OUT}=1mA$， $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent current	I_{SS}	No load	—	1.5	3.0	μA
Line regulation	$\Delta V_{OUT}/$ $V_{OUT}{}^{*}\ \Delta V_{IN}$	$V_{OUT}+1.0V \leq V_{IN} \leq 24V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input voltage	V_{IN}	—	—	—	24	V
Temperature coefficient	$\Delta V_{OUT}/$ $\Delta T_A{}^{*}V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$， $I_{OUT}=10mA$, $-40℃ \leq T_A \leq 85℃$	—	100	—	ppm/℃

Note: When $V_{IN}=V_{OUT}+2.0V$ under fixed load conditions causing a 2% decrease in output voltage, the voltage difference between input and output is referred to as the dropout voltage V_{DIF}.

Output Model SL 7536-3

Parameter	Symbol	Conditions	Min.	Type	Max.	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$ ， $I_{OUT}=10mA$	3.528	3.60	3.672	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 50mA$	—	25	60	mV
Low dropout	V_{DIF}	$I_{OUT}=1mA$， $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent current	I_{SS}	No load	—	1.5	3.0	μA
Line regulation	$\Delta V_{OUT}/$ $V_{OUT}{}^{*}\ \Delta V_{IN}$	$V_{OUT}+1.0V \leq V_{IN} \leq 24V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input voltage	V_{IN}	—	—	—	24	V
Temperature coefficient	$\Delta V_{OUT}/$ $\Delta T_A{}^{*}V_{OUT}$	$V_{IN}= V_{OUT}+2.0V$， $I_{OUT}=10mA$, $-40℃ \leq T_A \leq 85℃$	—	100	—	ppm/℃

Note: When $V_{IN}=V_{OUT}+2.0V$ under fixed load conditions causing a 2% decrease in output voltage, the voltage difference between input and output is referred to as the dropout voltage V_{DIF}.

Output Model SL 7540-3

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	3.92	4.0	4.08	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	70	100	—	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA\le I_{OUT}\le 50mA$	—	25	60	mV
Low dropout	V_{DIF}	$I_{OUT}=1mA$, $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent current	I_{SS}	No load	—	1.5	3.0	μA
Line regulation	$\Delta V_{OUT}/V_{OUT}*\Delta V_{IN}$	$V_{OUT}+1.0V\le V_{IN}\le 24V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input voltage	V_{IN}	—	—	—	24	V
Temperature coefficient	$\Delta V_{OUT}/\Delta T_A*V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃\le T_A\le 85℃$	—	100	—	ppm/℃

Note: When $V_{IN}=V_{OUT}+2.0V$ under fixed load conditions causing a 2% decrease in output voltage, the voltage difference between input and output is referred to as the dropout voltage V_{DIF}.

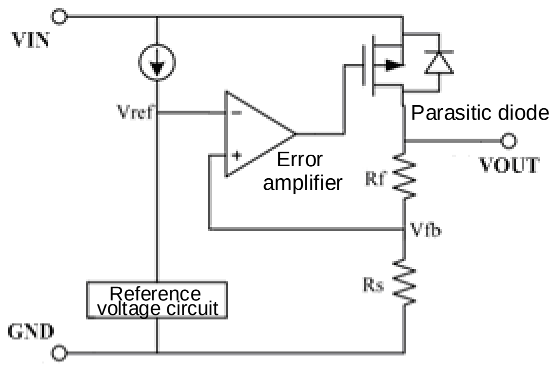
Output Model SL 7550-3

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$	4.9	5.0	5.1	V
Output current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	100	150	—	mA
Load regulation	ΔV_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA\le I_{OUT}\le 70mA$	—	25	60	mV
Low dropout	V_{DIF}	$I_{OUT}=1mA$, $\Delta V_{OUT}=2\%$	—	25	55	mV
Quiescent current	I_{SS}	No load	—	1.5	3.0	μA
Line regulation	$\Delta V_{OUT}/V_{OUT}*\Delta V_{IN}$	$V_{OUT}+1.0V\le V_{IN}\le 24V$, $I_{OUT}=1mA$	—	—	0.2	%/V
Input voltage	V_{IN}	—	—	—	24	V
Temperature coefficient	$\Delta V_{OUT}/\Delta T_A*V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=10mA$, $-40℃\le T_A\le 85℃$	—	100	—	ppm/℃

Note: When $V_{IN}=V_{OUT}+2.0V$ under fixed load conditions causing a 2% decrease in output voltage, the voltage difference between input and output is referred to as the dropout voltage V_{DIF}.

Functional description

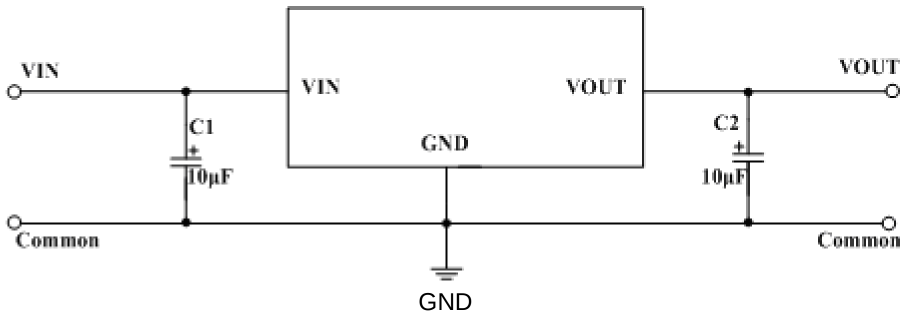
The error amplifier compares the input voltage Vfb, derived from the voltage divider formed by feedbackresistors Rs and Rf, with a reference voltage (Vref). It provides the necessary gate voltage to the outputtransistor, ensuring that the output voltage remains stable despite changes in input voltage or tempera- ture.



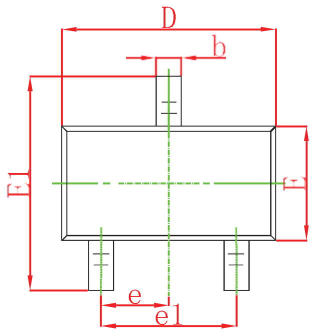
1. Place capacitors as close as possible to the VIN and VOUT pins during application.
2. Internal circuitry includes phase compensation and utilizes the equivalent series resistance (ESR) of output capacitors for compensation. Therefore, a capacitor greater than 2.2 μF is required at theoutput to ground, with tantalum capacitors recommended.
3. Pay attention to the operating conditions of input and output voltages, as well as load currents, to avoid exceeding the maximum allowable power dissipation within the IC package.

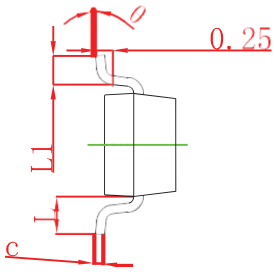
Circuit diagram

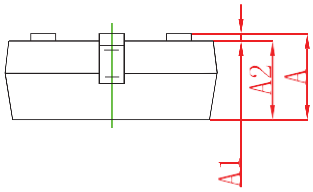
Basic application diagram



SOT-23 Package Outline Dimensions

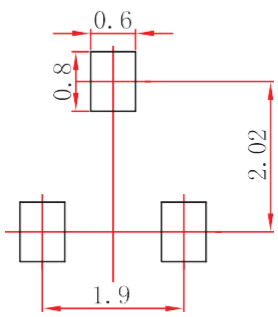






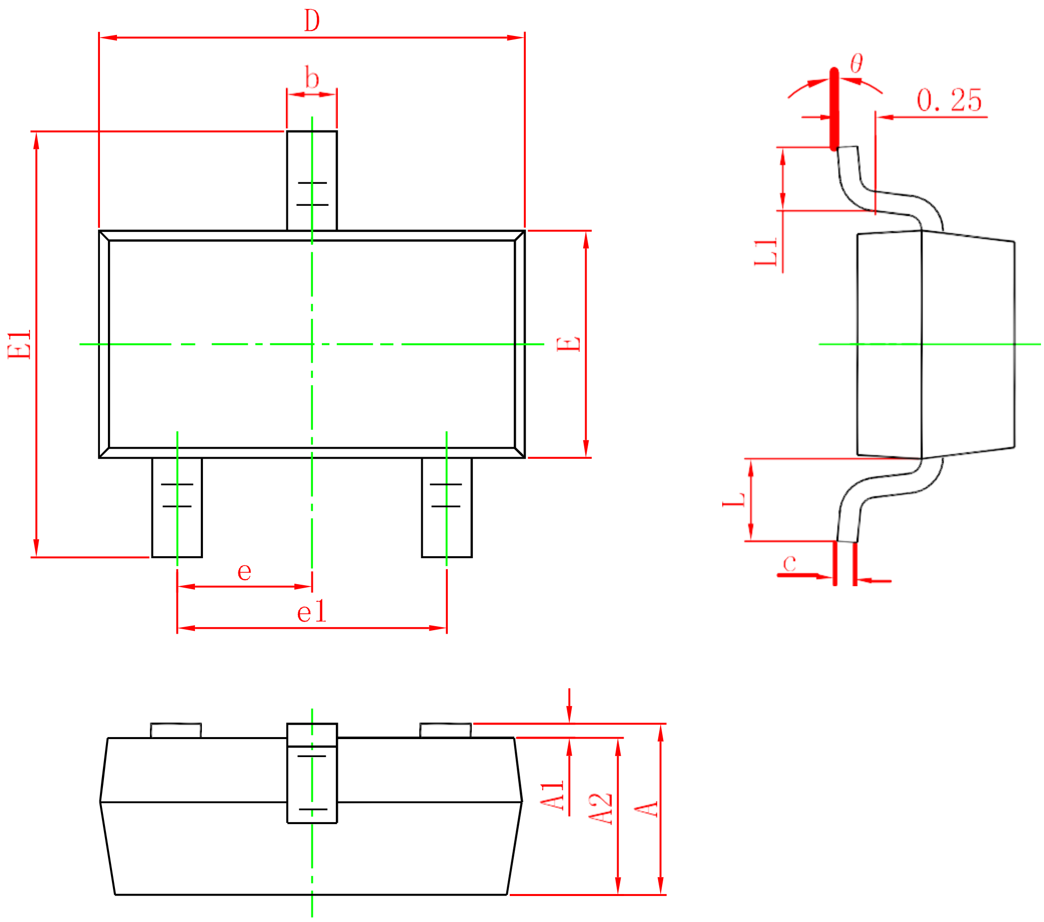
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

SOT23-3 Package outline dimensions



Symbol	Dimensions (Unit: inch)		Dimensions (Unit: inch)	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°