DESCRIPTION

RLCP75HXX is a high voltage (up to 45V) ultra-low quiescent current low dropout voltage regulator (LDO) using CMOS technology.This regulator can deliver up to 250mA of current, with several fixed output voltage. This device has output short-circuit protection circuit and reduces output current under high temperature to prevent system collapse. It is widely used for power supply of various audio,video equipment and communication devices.

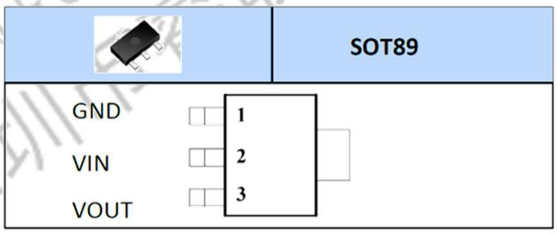
FEATURES

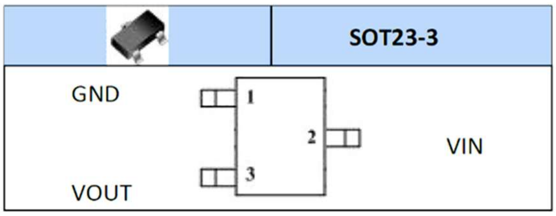
- Low Power current: 2.5μA (Typ.);
- Low Voltage Drop;
- Low Temperature-drif Coefficient of Vout:±60ppm/℃;
- High output voltage accuracy:±1% (Typ.);
- Withstanding voltage of 45V;
- 100mA Built-in Output Short-circuit protection circuit;
- The output current decreases when the temperature exceeds 120℃.

TYPICAL APPLICATION

- Battery-powered Equipments
- Communication Equipments
- Communication Equipments

PIN CONFIGURATION





PIN DESCRIPTION

PIN	SYMBOL	DESCRIPTION
1	GND	ground
2	VIN	input
3	VOUT	output

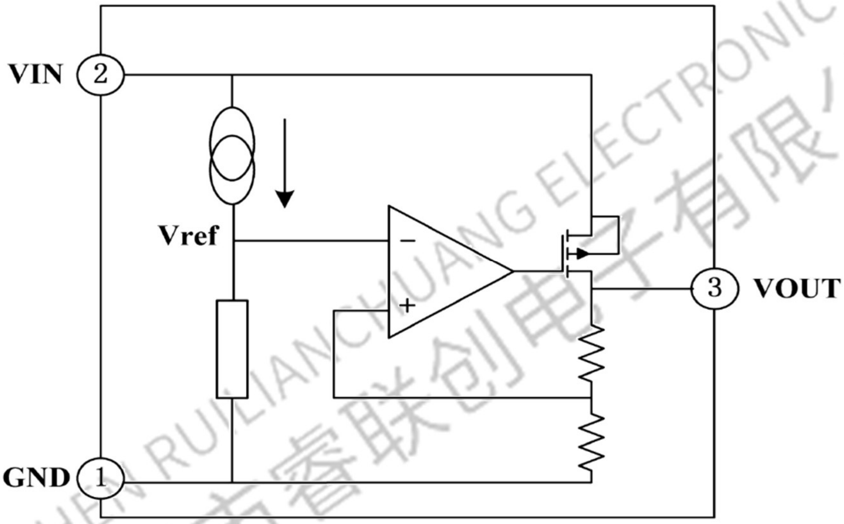
Order Information

RLCP75H①②M③④⑤/R⑥

Designator	Symbol	Description
①②	/	Output Voltage(28 output 2.8V，Vout Could Select 2.8V、3.0V、3.3V、3.6V、4V、4.4V、5V、9V)
③④	ST	Package：SOT23 (3K/Reel)
	SP	Package：SOT89 (1K/Reel)
⑤	3	Pin Number：3
⑥	6	Quantity per Reel： 6*500=3000

Note：RLCP7533MSP3/R2 Output：3.3V，Package：SOT89-3，Quantity：1000PCS。

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

（TA=25°C Without special instructions）

Parameter	Symbol	Range	Unit
Supply Voltage	V_{IN}	－0.3～+48	V
Storage temperature	T_{STG}	－50～＋125	℃
Operating Free-air Temperature Range	T_A	－40～＋85	℃
Virtual junction temperature (1)	T_j	150	℃

Note : Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device.

(1) When the junction temperature reaches 150℃, the system can work, but IC has over-temperature protection. The junction temperature exceeds 120℃, and the output current decreases.

HEAT DISSIPATION

Description	Symbol	Package	Value range	Unit
Thermal resistance	θ_{JA}	SOT89	200	℃/W
		SOT23-3	500	℃/W
Power dissipation	P_W	SOT89	500	mW
		SOT23-3	200	mW

ELECTRICAL CHARACTERISTICS (unless otherwise noted TA =＋25° C)

Series RLCP75H20

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=1mA$	1.980	2.00	2.020	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	△V_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \leqslant I_{OUT} \leqslant 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$, $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	△V_{OUT}/ V_{OUT}*△V_{IN}	$V_{OUT}+1.0V \leqslant V_{IN} \leqslant 45V$, $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	△V_{OUT}/ △T_A*V_{OUT}	$V_{OUT}+2.0V$, $I_{OUT}=1mA$, $-40℃ \leqslant T_A \leqslant 125℃$	—	60	—	ppm/℃

Note :

(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.

(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

Series RLCP75H24

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=1mA$	2.376	2.40	2.424	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	△V_{OUT}	$V_{IN}=V_{OUT}+2.0V$ $1mA \leqslant I_{OUT} \leqslant 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$, $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	△V_{OUT}/ V_{OUT}*△V_{IN}	$V_{OUT}+1.0V \leqslant V_{IN} \leqslant 45V$, $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	△V_{OUT}/ △T_A*V_{OUT}	$V_{OUT}+2.0V$, $I_{OUT}=1mA$, $-40℃ \leqslant T_A \leqslant 125℃$	—	60	—	ppm/℃

Note :

(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.

(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

Series RLCP75H28

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$， $I_{OUT}=1mA$	2.772	2.80	2.828	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$， $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	$\triangle V_{OUT}/V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V \leq V_{IN} \leq 45V$， $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$， $I_{OUT}=1mA$， $-40℃ \leq T_A \leq 125℃$	—	60	—	ppm/℃

Note :

(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.

(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

Series RLCP75H30

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$， $I_{OUT}=1mA$	2.970	3.00	3.030	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$， $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	$\triangle V_{OUT}/V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V \leq V_{IN} \leq 45V$， $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$， $I_{OUT}=1mA$， $-40℃ \leq T_A \leq 125℃$	—	60	—	ppm/℃

Note :

(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.

(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

Series RLCP75H33

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=1mA$	3.267	3.30	3.333	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leq I_{OUT}\leq 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$, $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	$\triangle V_{OUT}/V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leq V_{IN}\leq 45V$, $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$, $I_{OUT}=1mA$, $-40℃\leq T_A\leq 125℃$	—	60	—	ppm/℃

Note :
(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.
(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

Series RLCP75H36

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=1mA$	3.564	3.60	3.636	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leq I_{OUT}\leq 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$, $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	$\triangle V_{OUT}/V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leq V_{IN}\leq 45V$, $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$, $I_{OUT}=1mA$, $-40℃\leq T_A\leq 125℃$	—	60	—	ppm/℃

Note :
(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.
(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

Series RLCP75H40

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=1mA$	3.960	4.00	4.040	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leq I_{OUT}\leq 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$, $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	$\triangle V_{OUT}/V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leq V_{IN}\leq 45V$, $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$, $I_{OUT}=1mA$, $-40℃\leq T_A\leq 125℃$	—	60	—	ppm/℃

Note :
(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.
(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

Series RLCP75H44

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=1mA$	4.356	4.40	4.444	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA\leq I_{OUT}\leq 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$, $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	$\triangle V_{OUT}/V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V\leq V_{IN}\leq 45V$, $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$, $I_{OUT}=1mA$, $-40℃\leq T_A\leq 125℃$	—	60	—	ppm/℃

Note :
(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.
(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

Series RLCP75H50

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+2.0V$, $I_{OUT}=1mA$	4.950	5.00	5.050	V
Output Current	I_{OUT}	$V_{IN}=V_{OUT}+2.0V$	—	250	—	mA
Load Regulation	$\triangle V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1mA \leq I_{OUT} \leq 200mA$	—	10	72	mV
Voltage Drop	V_{DIF}	$I_{OUT}=100mA$, $\triangle V_{OUT}=2\%$	—	550	—	mV
Quiescent Current	I_{SS}	No Load	—	2.5	3.4	μA
Line Regulation	$\triangle V_{OUT}/V_{OUT}*\triangle V_{IN}$	$V_{OUT}+1.0V \leq V_{IN} \leq 45V$, $I_{OUT}=1mA$	—	0.01	0.2	%/V
Input Voltage	V_{IN}	—	—	—	45	V
Temperature Coefficient	$\triangle V_{OUT}/\triangle T_A*V_{OUT}$	$V_{OUT}+2.0V$, $I_{OUT}=1mA$, $-40℃ \leq T_A \leq 125℃$	—	60	—	ppm/℃

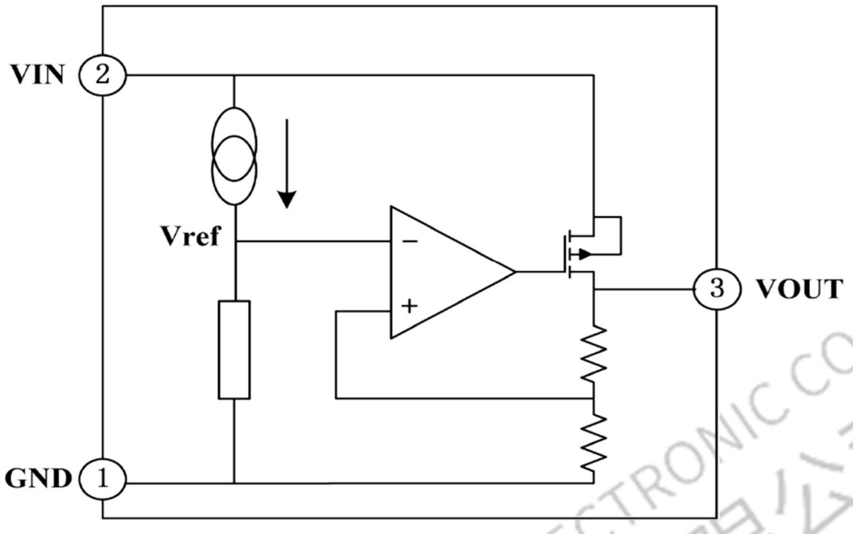
Note :

(1) At a fixed output current, decrease the input voltage, and when the output voltage decreases to 0.98 VOUT, at this time the dropout is the difference between VIN and VOUT. That is VDIF=VIN-VOUT.

(2) The input Pin VIN can withstand voltage of 45V. That does not mean that the circuit can operate normally at 45V voltage. Because at starting up, shutdown or other unusual condition,there is a surge on VIN, much bigger than 45V, causing permanent damage to the chip. Place a resistor with appropriate resistance in series before the VIN, which can help the regulator share part of the energy in case of surge.

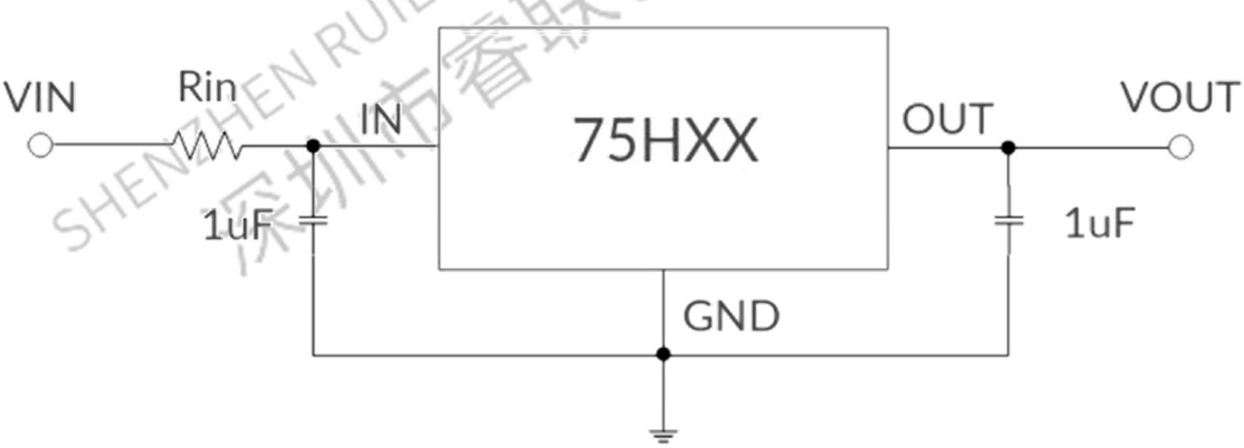
FUNCTIONAL DESCRIPTION

The error amplifier samples the output voltage through Rs and Rf, and then the sampling voltage Vfb is compared with the reference voltage Vref. The output of the error amplifier provides the necessary gate voltage for the transistor PMOS, which depends on the input voltage. The output voltage is kept unchanged by means of the negative feedback of the circuit.



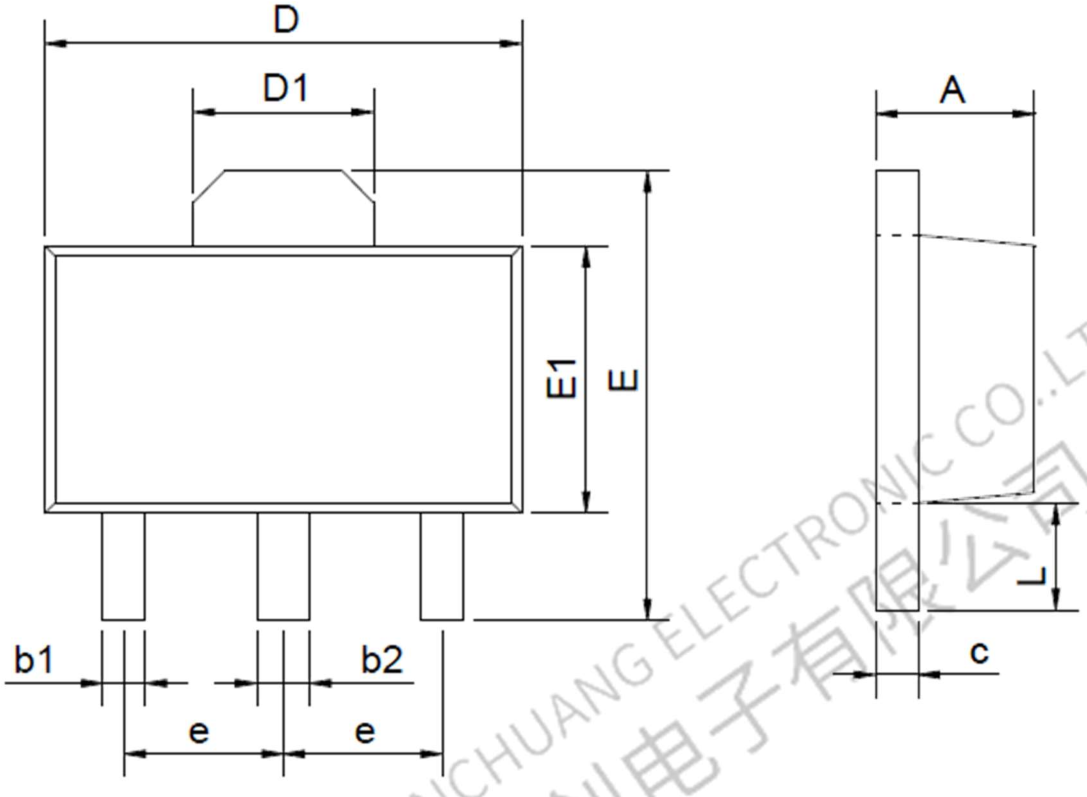
1.VIN PIN and VOUT PIN connect capacitances as close as possible.
2.Please pay attention to the application condition of input voltage, output voltage and load current, avoiding that IC internal power consumption exceeds the allowable maximum of package.

TYPICAL APPLICATION CIRCUIT



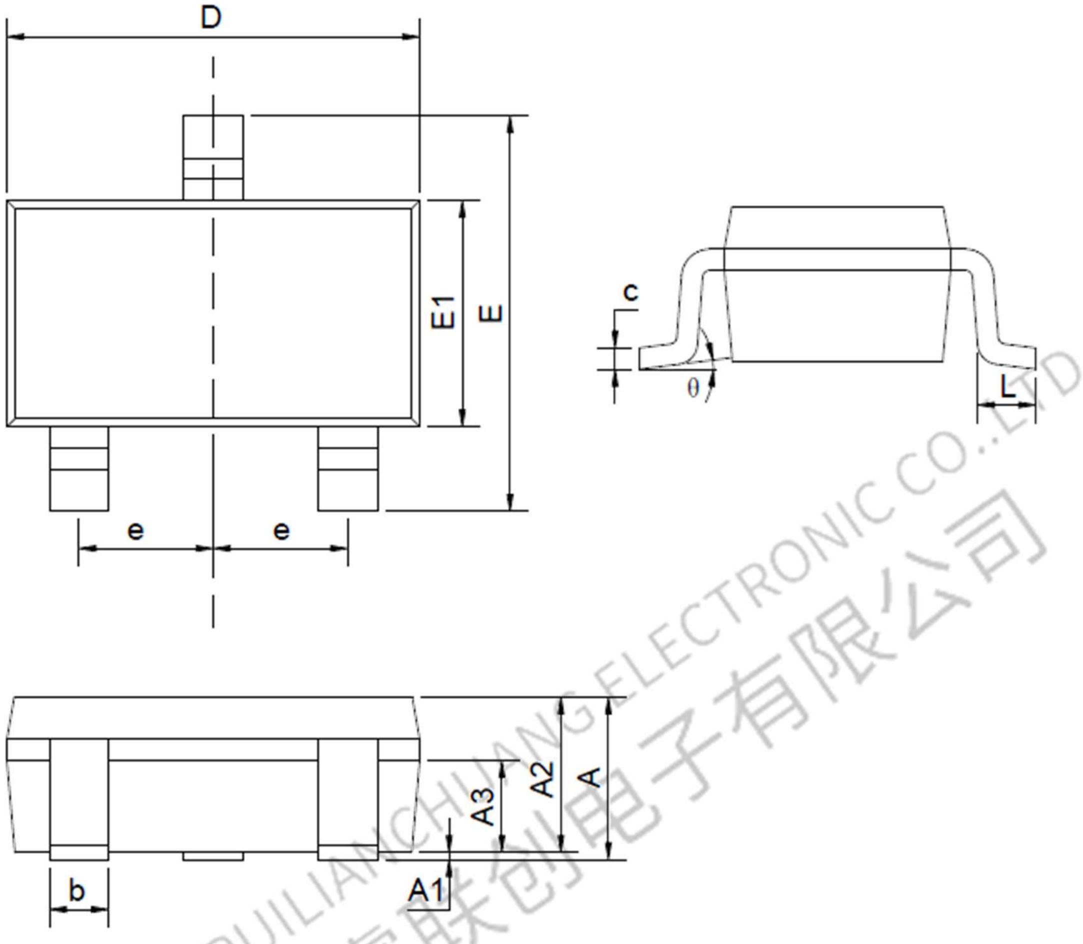
PACKAGE INFORMATION

SOT89



SYMBOL	mm	
	min	max
A	1.40	1.60
b1	0.35	0.50
b2	0.45	0.60
c	0.36	0.46
D	4.30	4.70
D1	1.40	1.80
E	4.00	4.40
E1	2.30	2.70
e	1.50BSC	
L	0.80	1.20

SOT23-3



SYMBOL	mm	
	min	max
A		1.35
A1	0.00	0.15
A2	0.90	1.20
b	0.30	0.50
c	0.05	0.25
D	2.70	3.10
E	2.20	2.80
E1	1.10	1.50
e	0.85	1.05
e1	1.70	2.10
L	0.40	0.80

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