

General Description

MCP1700T series are a set of Low Dropout Linear Regulator ICs implemented in CMOS technology. They can withstand voltage 6V. And they are available with low voltage drop and low quiescent current, widely used in audio, video and communication appliances.

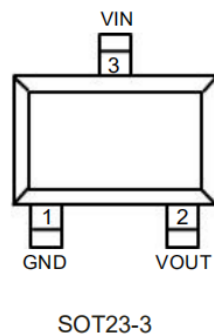
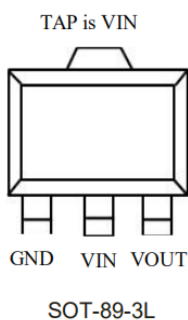
Features

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 6V
- Quiescent Current 1.5 μ A
- Output Voltage Accuracy: tolerance $\pm 2\%$
- High output current: 300mA

Application

- Battery-powered Equipments
- Communication Equipments
- Audio/Video Equipments
- Smart Battery Packs
- Smoke Detectors
- CO₂ DETECTORS

Pin Configuration And Descriptions



No.	Name	Functions Description
	GND	Ground
	V _{IN}	Input
	V _{OUT}	Output

Order Information

Orderable Device	Package	Output Voltage	Packing Option
MCP1700T-xxxxE/TT	SOT-23	2.5V, 2.8V, 3.0V, 3.3V, 5.0V	3000/Reel
MCP1700T-xxxxE/MB	SOT-89	2.5V, 2.8V, 3.0V, 3.3V, 5.0V	1000/Reel

Note: xxxx is 2502, 2802, 3002, 3302, 5002

Absolute Maximum Ratings

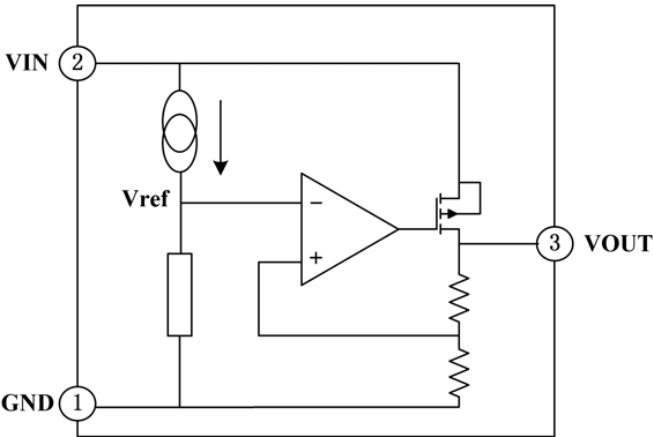
Description	Symbol	Value Range	Unit
Limit Power Voltage	V _{IN}	-0.3~+7	V
Storage Temperature Range	T _{STG}	-50~+125	°C
Operating Free-air Temperature Range	T _A	-40~+85	°C

Note:Stresses greater than those listed under “Absolute Maximum Ratingsmay” cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditionsis” not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Heat Dissipation

Description	Symbol	Package	Value Range	Unit
Thermal resistance	θ _{JA}	SOT-89	200	°C/W
			200	°C/W
		SOT-23	500	°C/W
Power dissipation	P _W	SOT-89	500	mW
			500	mW
		SOT-23	200	mW

Block Diagram



DC Characteristics (unless otherwise noted $T_A = 25^\circ\text{C}$)

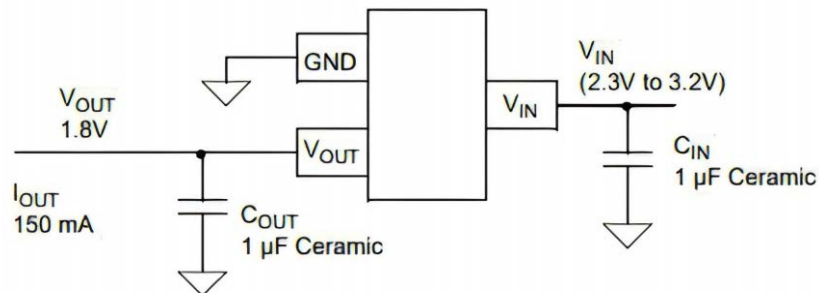
($V_{IN} = V_{OUT} + 1.0\text{V}$, $C_{IN} = C_L = 10\mu\text{F}$, $T_A = 25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$V_{IN} = V_{OUT} + 1.0\text{V}$, $I_{OUT} = 10\text{mA}$	2.5		5.0	V
Output Current	I_{OUT}	$V_{IN} = V_{OUT} + 1.0\text{V}$	250			mA
Load Regulation	ΔV_{OUT}	$V_{IN} = V_{OUT} + 1.0\text{V}$ $1\text{mA} \leq I_{OUT} \leq 250\text{mA}$		37	100	mV
Voltage Drop	V_{DIF}	$I_{OUT} = 100\text{mA}$, $\Delta V_{OUT} = 2\%$		195	300	mV
Quiescent Current	I_{SS}			1.5	3.0	μA
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$	$V_{OUT} + 1.0\text{V} \leq V_{IN} \leq 6\text{V}$, $I_{OUT} = 1\text{mA}$			0.6	%/V
Input Voltage	V_{IN}				6.0	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{IN} = V_{OUT} + 1.0\text{V}$, $I_{OUT} = 10\text{mA}$, $-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		± 90		ppm/ $^\circ\text{C}$
Output Short Circuit Current	I_{lim}	$V_{OUT} = 0\text{V}$		400		mA

Note: When $V_{IN} = V_{OUT} + 1.0\text{V}$, as the output voltage declined 2%, the $V_{DIF} = V_{IN} - V_{OUT}$.

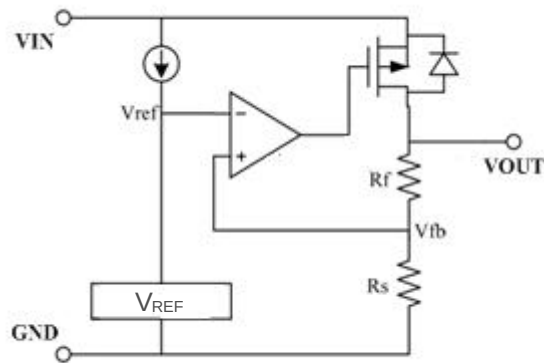
Application Circuit

Basic Circuits



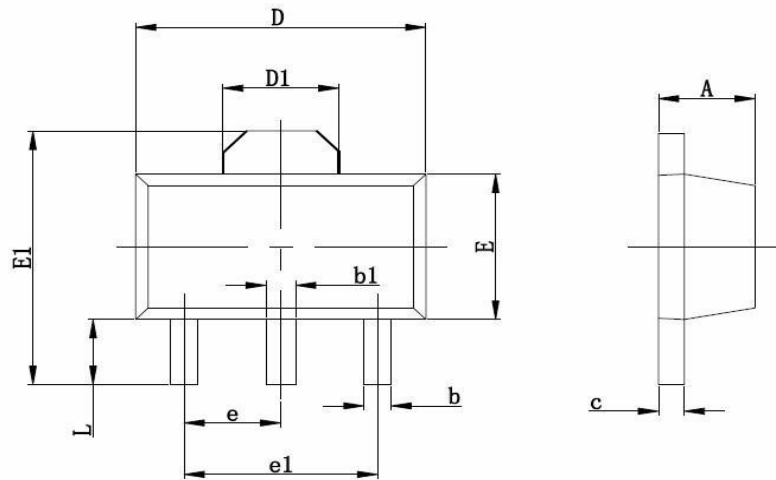
Function Description

The error amplifier compares the input voltage V_{fb} of the voltage dividing resistor formed by the feedback resistors R_s and R_f with the reference voltage (v_{ref}). This error amplifier provides the necessary gate voltage to the output transistor so that the output voltage remains constant regardless of input voltage or temperature changes.



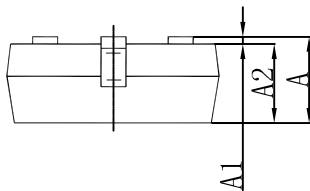
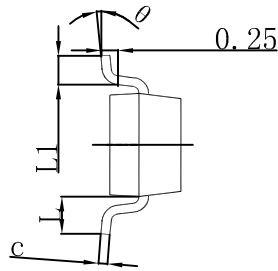
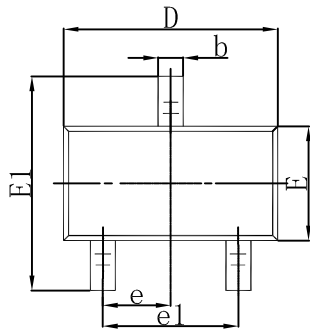
- 1、When applying, try to connect the capacitor near the V_{IN} and V_{OUT} pins. Pay attention to the usage.
- 2、conditions of input/output voltage and load current to avoid the internal power consumption of the IC exceeding the maximum power consumption allowed by the package.

SOT-89 Package Outline Dimensions



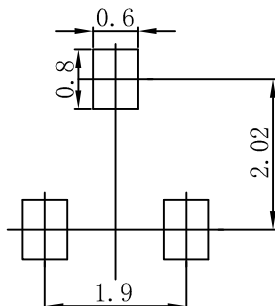
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

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: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.