



## General Description

HMCP1703T series are a set of Low Dropout Linear Regulator ICs implemented in CMOS technology. They can withstand voltage 18V. And they are available with low voltage drop and low quiescent current, widely used in audio, video and communication appliances. 9V alkaline and one or two cell Li-Ion-powered, audio, video and communication appliances.

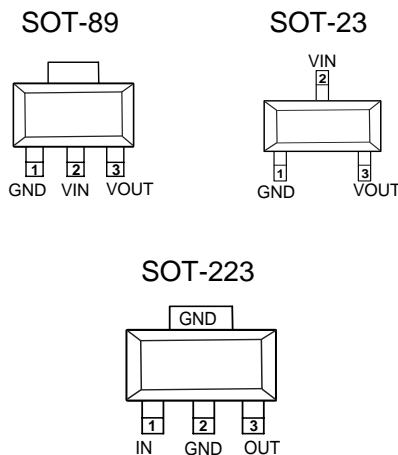
## Features

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 18V
- Quiescent Current 1.8 $\mu$ 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
- CO<sub>2</sub> DETECTORS

## Pin Configuration And Descriptions



No.		Name	Functions Description
SOT-223	SOT-23/ SOT-89		
2	1	GND	Ground
1	2	V <sub>IN</sub>	Input
3	3	V <sub>OUT</sub>	Output

## Order Information

Orderable Device	Package	Output Voltage	Packing Option
HMCP1703T-xx02E/CB	SOT-23	2.5V, 2.8V, 3.0V, 3.3V, 5.0V	3000/Reel
HMCP1703T-xx02E/MB	SOT-89	2.5V, 2.8V, 3.0V, 3.3V, 5.0V	1000/Reel
HMCP1703T-xx02E/DB	SOT-223	2.5V, 2.8V, 3.0V, 3.3V, 5.0V	1000/Reel

Note: xx is 25, 28, 30, 33, 50



## Absolute Maximum Ratings

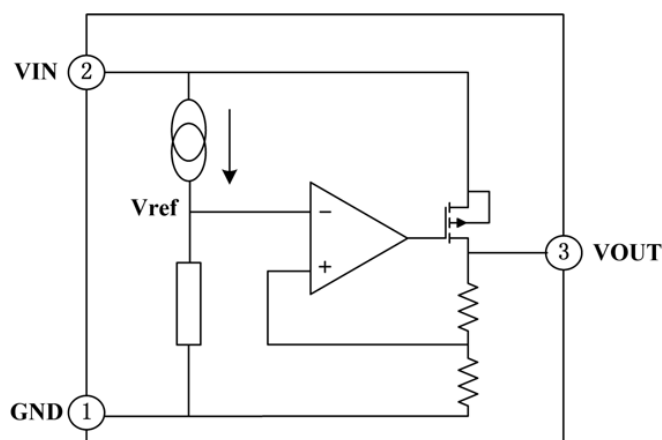
Description	Symbol	Value Range	Unit
Limit Power Voltage	$V_{IN}$	-0.3~+20	V
Storage Temperature Range	$T_{STG}$	-50~+125	°C
Operating Free-air Temperature Range	$T_A$	-40~+85	°C

Note: Stresses greater than those listed under “Absolute Maximum Ratings” may 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 Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

## Heat Dissipation

Description	Symbol	Package	Value Range	Unit
Thermal resistance	$\theta_{JA}$	SOT-89	200	°C/W
		SOT-223	150	°C/W
		SOT-23	500	°C/W
Power dissipation	$P_W$	SOT-89	500	mW
		SOT-223	600	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	$I_{OUT}$	$V_{IN} = V_{OUT} + 1.0\text{V}$	300			mA
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = V_{OUT} + 1.0\text{V}$ $1\text{mA} \leq I_{OUT} \leq 300\text{mA}$		37	100	mV
Voltage Drop	$V_{DIF}$	$I_{OUT} = 100\text{mA}$ , $\Delta V_{OUT} = 2\%$		195	300	mV
Quiescent Current	$I_{SS}$			1.8	3.0	$\mu\text{A}$
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \cdot \Delta V_{IN}$	$V_{OUT} + 1.0\text{V} \leq V_{IN} \leq 6\text{V}$ , $I_{OUT} = 1\text{mA}$			0.2	%/V
Input Voltage	$V_{IN}$				18	V
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A} \cdot V_{OUT}$	$V_{IN} = V_{OUT} + 1.0\text{V}$ , $I_{OUT} = 10\text{mA}$ , $-40^\circ\text{C} \leq T_A \leq 85^\circ\text{C}$		$\pm 100$		ppm/ $^\circ\text{C}$
Output Short Circuit Current	$I_{lim}$	$V_{OUT} = 0\text{V}$		400		mA

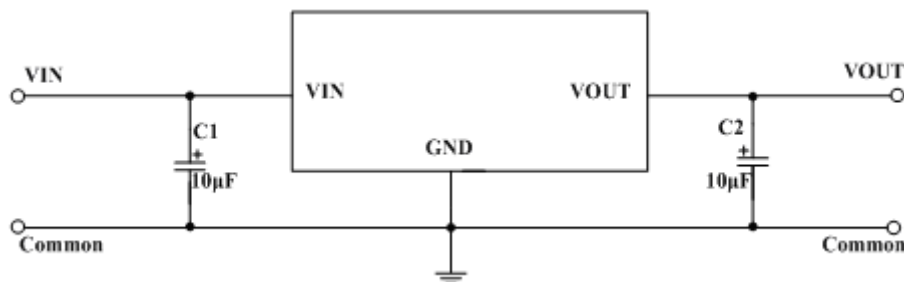
Note: When  $V_{IN} = V_{OUT} + 1.0\text{V}$ , as the output voltage declined 2%, the  $V_{DIF} = V_{IN} - V_{OUT}$ .

## Function Description

HMCP1703T series are linear voltage regulator ICs withstanding 20V voltage. The series IC consists of a voltage reference, an error amplifier, a current limiter and a phase compensation circuit plus a driver transistor. The output stabilization capacitor is also compatible with low ESR ceramic capacitors. The over current protection circuit and the over voltage protection circuit are built-in. The protection circuit will operate when the output current or input voltage reaches limit level.

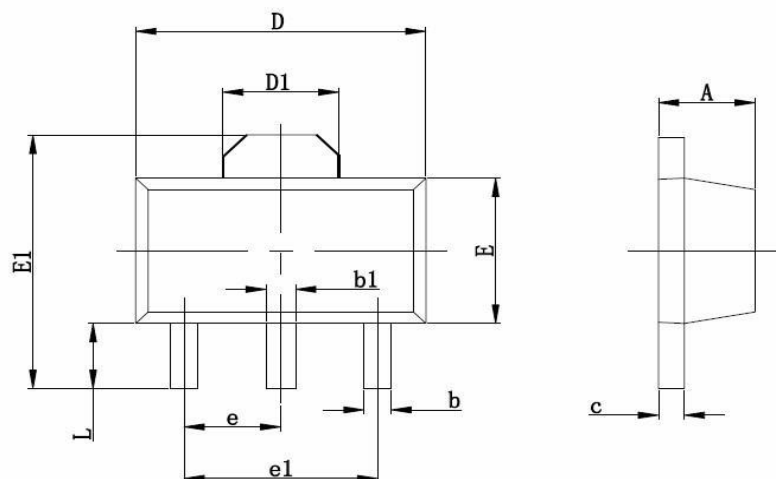
## Application Circuit

### Basic Circuits





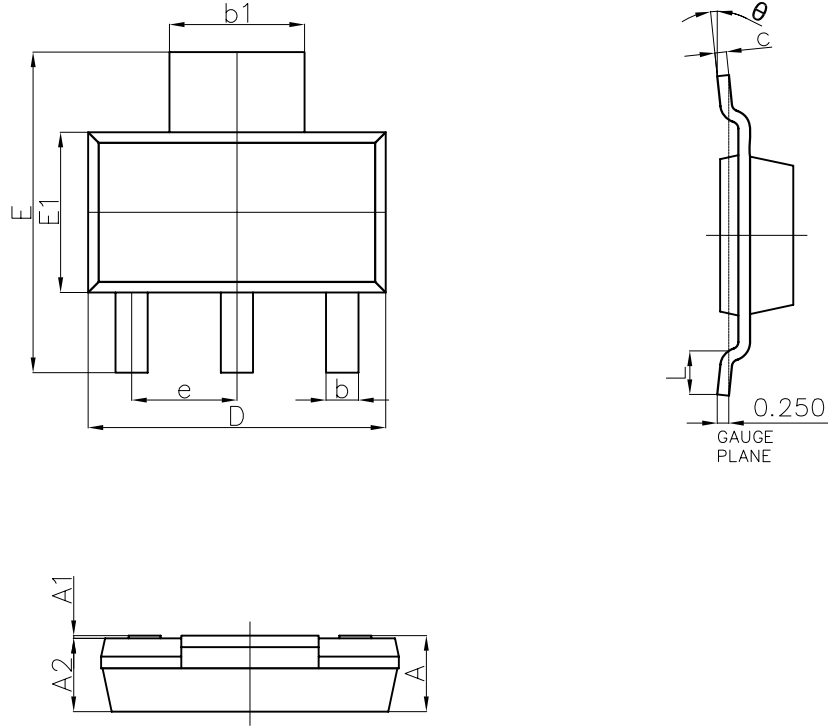
Package Dimensions  
SOT-89



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



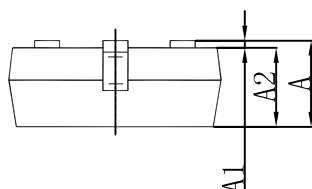
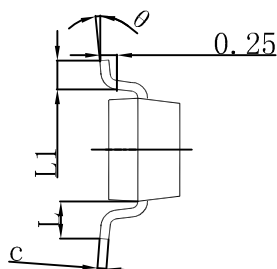
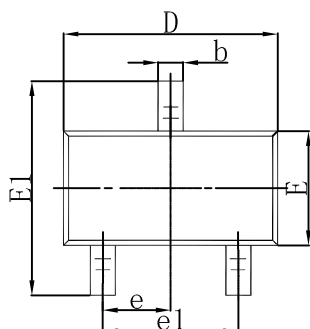
Package Dimensions  
SOT-223



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	—	1.800	—	0.071
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.840	0.026	0.033
b1	2.900	3.100	0.114	0.122
c	0.230	0.350	0.009	0.014
D	6.300	6.700	0.248	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300(BSC)		0.091(BSC)	
L	0.750	—	0.030	—
θ	0°	10°	0°	10°

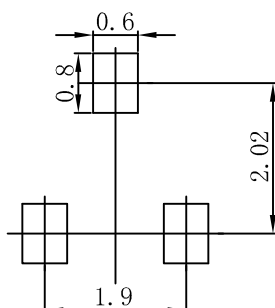


## Package Dimensions SOT-23



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
$\theta$	0°	8°	0°	8°

## 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.



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