



## General Description

HMCP1700T 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.

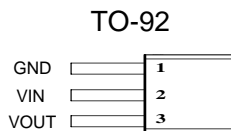
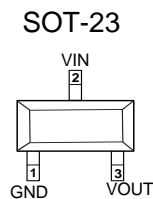
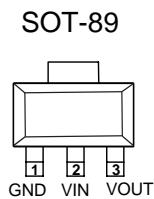
## Features

- Low Power Consumption
- Low Voltage Drop
- Low Temperature Coefficient
- Withstanding Voltage 6V
- Quiescent Current 1.5 $\mu$ 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
- CO2 DETECTORS

## Pin Configuration



## Pin Descriptions

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

## Order Information

| Orderable Device   | Package | Output Voltage           | Packing Option |
|--------------------|---------|--------------------------|----------------|
| HMCP1700T-xxxxE/TT | SOT-23  | 2.5V,2.8V,3.0V,3.3V,5.0V | 3000/Reel      |
| HMCP1700T-xxxxE/MB | SOT-89  | 2.5V,2.8V,3.0V,3.3V,5.0V | 1000/Reel      |
| HMCP1700T-xxxxE/TO | TO-92   | 2.5V,2.8V,3.0V,3.3V,5.0V | 1000/Bag       |

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



## Absolute Maximum Ratings

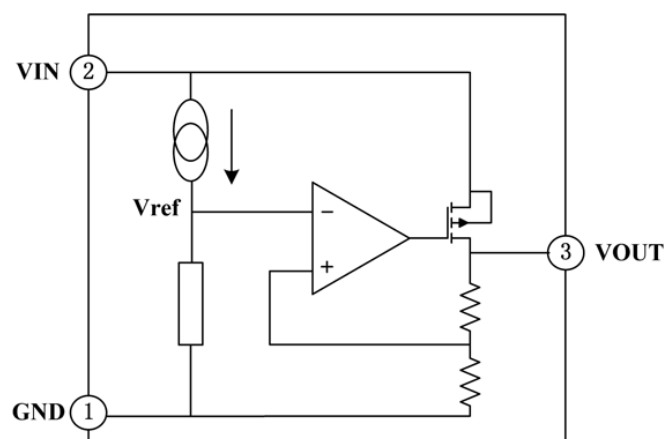
| Description                          | Symbol    | Value Range | Unit |
|--------------------------------------|-----------|-------------|------|
| Limit Power Voltage                  | $V_{IN}$  | -0.3~+7     | V    |
| Storage Temperature Range            | $T_{STG}$ | -50~+125    | °C   |
| Operating Free-air Temperature Range | $T_A$     | -40~+85     | °C   |

Note: Stresses greater than those listed under “Absolute Maximum Ratings” 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” 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 |
|                    |               | TO-92   | 200         | °C/W |
|                    |               | SOT-23  | 500         | °C/W |
| Power dissipation  | $P_W$         | SOT-89  | 500         | mW   |
|                    |               | TO-92   | 500         | mW   |
|                    |               | SOT-23  | 200         | mW   |

## Block Diagram





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

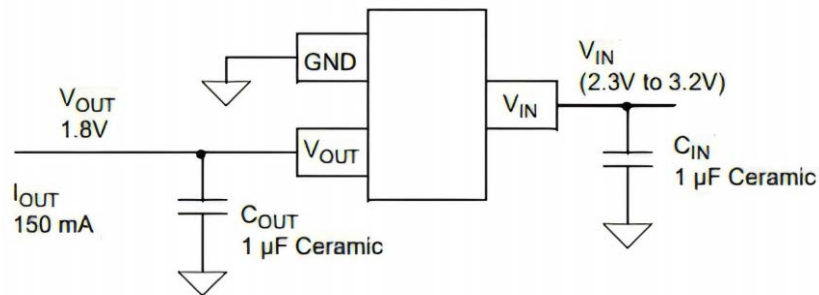
( $V_{IN}=V_{OUT}+1.0\text{V}$ ,  $C_{IN}=C_L=10\mu\text{F}$ ,  $T_a=25^\circ\text{C}$ , unless otherwise noted)

| 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              | $\Delta V_{OUT}$                                 | $V_{IN}=V_{OUT}+1.0\text{V}$<br>$1\text{mA}\leq I_{OUT}\leq 250\text{mA}$                                 |     | 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 | $\mu\text{A}$            |
| Line Regulation              | $\frac{\Delta V_{OUT}}{V_{OUT}} / \Delta V_{IN}$ | $V_{OUT}+1.0\text{V}\leq V_{IN}\leq 6\text{V}$ ,<br>$I_{OUT}=1\text{mA}$                                  |     |          | 0.6 | %/V                      |
| Input Voltage                | $V_{IN}$   |   |     |          | 6.0 | V                        |
| Temperature Coefficient      | $\frac{\Delta V_{OUT}}{\Delta T_A} / V_{OUT}$    | $V_{IN}=V_{OUT}+1.0\text{V}$ , $I_{OUT}=10\text{mA}$ ,<br>$40^\circ\text{C}\leq T_A\leq 85^\circ\text{C}$ |     | $\pm 90$ |     | ppm/<br>$^\circ\text{C}$ |
| 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

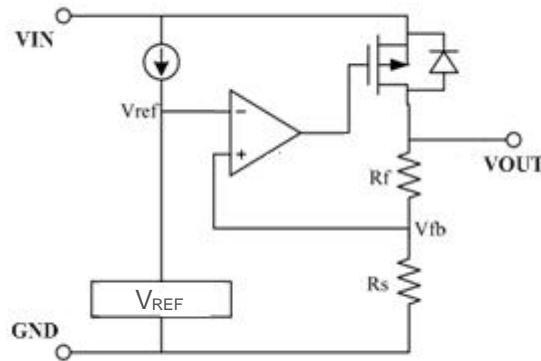
#### Basic Circuits





## Function Description

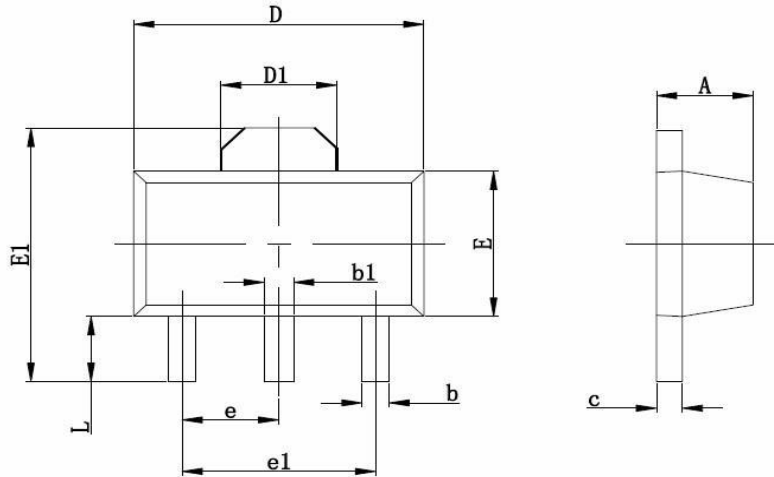
The error amplifier compares the input voltage  $V_{fb}$  of the voltage dividing resistor formed by the feedback resistors  $R_s$  and  $R_f$  with the reference voltage ( $v_{ref}$ ). This error amplifier provides the necessary gate voltage to the output transistor so that the output voltage remains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



1. When applying, try to connect the capacitor near the VIN and VOUT 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.



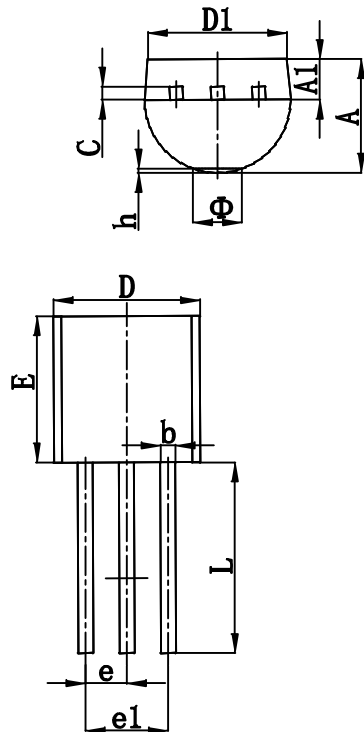
### SOT-89 Package Outline Dimensions



| 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 |



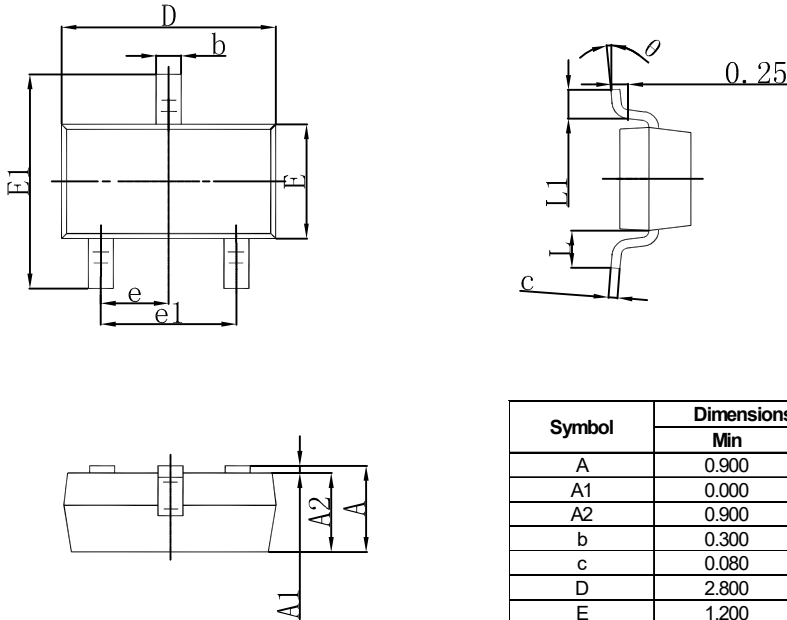
### TO-92 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 3.300                     | 3.700  | 0.130                | 0.146 |
| A1     | 1.100                     | 1.400  | 0.043                | 0.055 |
| b      | 0.380                     | 0.550  | 0.015                | 0.022 |
| c      | 0.360                     | 0.510  | 0.014                | 0.020 |
| D      | 4.300                     | 4.700  | 0.169                | 0.185 |
| D1     | 3.430                     |        | 0.135                |       |
| E      | 4.300                     | 4.700  | 0.169                | 0.185 |
| e      | 1.270 TYP                 |        | 0.050 TYP            |       |
| e1     | 2.440                     | 2.640  | 0.096                | 0.104 |
| L      | 14.100                    | 14.500 | 0.555                | 0.571 |
| $\Phi$ |                           | 1.600  |                      | 0.063 |
| h      | 0.000                     | 0.380  | 0.000                | 0.015 |

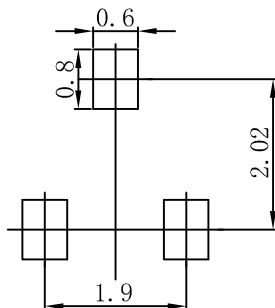


### SOT-23 Package Outline Dimensions



| 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 |
| theta  | 0°                        | 8°    | 0°                   | 8°    |

### SOT-23 Suggested Pad Layout



**Note:**

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



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