

**Product introduction**

MCP1702T-xxxxE series is a positive voltage regulator circuit with low voltage difference, high precision output voltage and ultra-low power consumption current developed by practical CMOS technology. Due to the built-in low on state resistance transistor, so the output voltage difference is low, and it has high input voltage bearing capacity. The maximum working voltage can reach 14V, which is suitable for the application circuit requiring high voltage withstand.

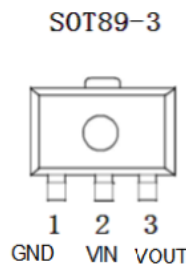
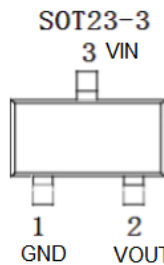
**Product features**

- High accuracy of output voltage: accuracy  $\pm 2\%$
- Ultra low power consumption current: typical value 3ua
- Low output voltage temperature drift: 50 ppm / °C
- High input withstand voltage: increase to 14V and keep output voltage stable

**Product use**

- Regulated power supply using battery powered equipment
- Stabilized power supply for toys
- Stabilized power supply for portable medical instruments
- Stabilized power supply of communication equipment
- Regulated power supply for mobile phone

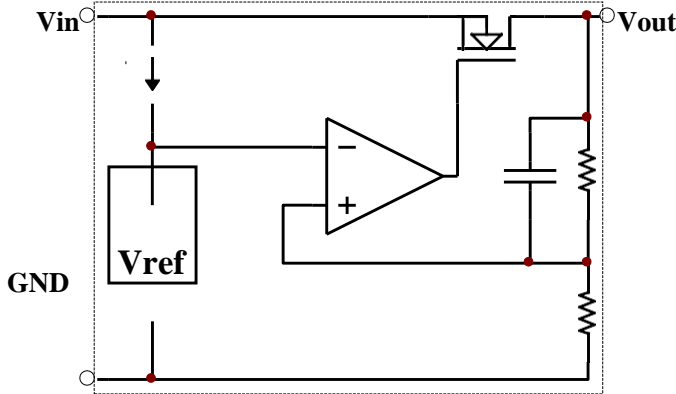
**Package form and pin function definition**



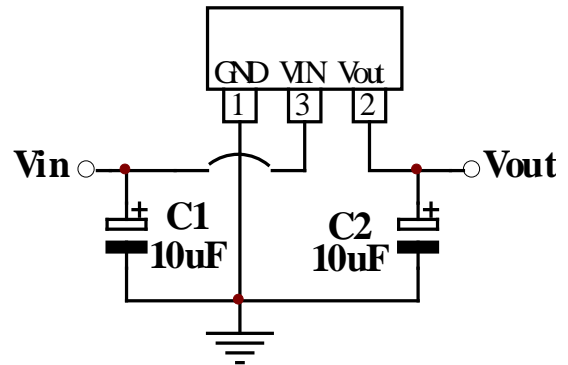
**Model selection**

Name	Maximum input voltage (V)	Output voltage (V)	Tolerance	Packaging
MCP1702T-xxxxE	14	1.8	$\pm 2\%$	SOT23-3 SOT89-3
	14	2.5	$\pm 2\%$	
	14	2.7	$\pm 2\%$	
	14	3.0	$\pm 2\%$	
	14	3.3	$\pm 2\%$	
	14	3.6	$\pm 2\%$	
	14	5.0	$\pm 2\%$	

■ Principle block diagram



■ Application circuit



■ Limit parameter

Project	Symbol	Parameter	Limit value	Company
Voltage	VIN	Maximum input voltage	16	V
Power waste	PD	power waste	400	mW
Temperature	Tw	working temperature	-40 - 105	°C
	Tc	Storage temperature	-40 - 125	°C
	Th	welding temperature	260	°C,10s

■ electrical properties

◆ 1.8V (T<sub>OUT</sub>=25°C)

Symbol	Parameter	Test conditions	Minimum value	Typical value	Maximum	Company
V <sub>OUT</sub>	output voltage	V <sub>IN</sub> =2.8V, I <sub>OUT</sub> =40mA	1.764	1.8	1.836	V
I <sub>OUT</sub>	Output current	V <sub>IN</sub> =2.8V, V <sub>OUT</sub> ≥1.62V		250		mA
ΔV <sub>OUT</sub>	Load regulation	V <sub>IN</sub> =2.8V, 1mA≤I <sub>OUT</sub> ≤60mA	—	45	90	mV
V <sub>DIF</sub>	Drop voltage	I <sub>OUT</sub> =40mA	—	170	—	mV
I <sub>SS</sub>	Quiescent current	V <sub>IN</sub> = 2.8V, no load	—	2	3	μA
ΔV <sub>OUT</sub> /(ΔV <sub>IN</sub> *V <sub>OUT</sub> )	Line Regulation	2.8V≤V <sub>IN</sub> ≤14V, I <sub>OUT</sub> =40mA	—	0.2	0.3	%/V
V <sub>IN</sub>	input voltage	—	—	—	14	V
ΔV <sub>OUT</sub> /ΔTa	temperature coefficient	V <sub>IN</sub> =2.8V, I <sub>OUT</sub> =40mA, 0°C≤Ta≤85°C	—	±0.7	—	mV/°C

## 250 mA Low Quiescent Current LDO Regulator

### ◆ 2.5V (T<sub>OPT</sub>=25°C)

Symbol	Parameter	Test conditions	Minimum value	Typical value	Maximum	Company
V <sub>OUT</sub>	output voltage	V <sub>IN</sub> =3.5V, I <sub>OUT</sub> =40mA	2.45	2.5	2.55	V
I <sub>OUT</sub>	Output current	V <sub>IN</sub> =3.5V, V <sub>OUT</sub> ≥2.25V		250		mA
ΔV <sub>OUT</sub>	Load regulation	V <sub>IN</sub> =3.5V, 1mA≤I <sub>OUT</sub> ≤60mA	—	45	90	mV
V <sub>DIF</sub>	Drop voltage	I <sub>OUT</sub> =40mA	—	110	—	mV
I <sub>SS</sub>	Quiescent current	V <sub>IN</sub> = 3.5V, no load	—	2	3	μA
ΔV <sub>OUT</sub> /(ΔV <sub>IN</sub> *V <sub>OUT</sub> )	Line Regulation	3.5V≤V <sub>IN</sub> ≤14V, I <sub>OUT</sub> =40mA	—	0.2	0.3	%/V
V <sub>IN</sub>	input voltage	—	—	—	14	V
ΔV <sub>OUT</sub> /ΔTa	temperature coefficient	V <sub>IN</sub> =3.5V, I <sub>OUT</sub> =40mA, 0°C≤Ta≤85°C	—	±0.7	—	mV/°C

### ◆ 2.7V (T<sub>OPT</sub>=25°C)

Symbol	Parameter	Test conditions	Minimum value	Typical value	Maximum	Company
V <sub>OUT</sub>	output voltage	V <sub>IN</sub> =3.7V, I <sub>OUT</sub> =40mA	2.646	2.7	2.754	V
I <sub>OUT</sub>	Output current	V <sub>IN</sub> =3.7V, V <sub>OUT</sub> ≥2.43V		250		mA
ΔV <sub>OUT</sub>	Load regulation	V <sub>IN</sub> =3.7V, 1mA≤I <sub>OUT</sub> ≤60mA	—	45	90	mV
V <sub>DIF</sub>	Drop voltage	I <sub>OUT</sub> =40mA	—	100	—	mV
I <sub>SS</sub>	Quiescent current	V <sub>IN</sub> = 3.7V, no load	—	2	3	μA
ΔV <sub>OUT</sub> /(ΔV <sub>IN</sub> *V <sub>OUT</sub> )	Line Regulation	3.7V≤V <sub>IN</sub> ≤14V, I <sub>OUT</sub> =40mA	—	0.2	0.3	%/V
V <sub>IN</sub>	input voltage	—	—	—	14	V
ΔV <sub>OUT</sub> /ΔTa	temperature coefficient	V <sub>IN</sub> =3.7V, I <sub>OUT</sub> =40mA, 0°C≤Ta≤85°C	—	±0.7	—	mV/°C

### ◆ 3.0V (T<sub>OPT</sub>=25°C)

Symbol	Parameter	Test conditions	Minimum value	Typical value	Maximum	Company
V <sub>OUT</sub>	output voltage	V <sub>IN</sub> =4V, I <sub>OUT</sub> =40mA	2.94	3	3.06	V
I <sub>OUT</sub>	Output current	V <sub>IN</sub> =4V, V <sub>OUT</sub> ≥2.7V		250		mA
ΔV <sub>OUT</sub>	Load regulation	V <sub>IN</sub> =4V, 1mA≤I <sub>OUT</sub> ≤60mA	—	45	90	mV
V <sub>DIF</sub>	Drop voltage	I <sub>OUT</sub> =40mA	—	95	—	mV
I <sub>SS</sub>	Quiescent current	No load, V <sub>IN</sub> = 4V	—	2	3	μA
ΔV <sub>OUT</sub> /(ΔV <sub>IN</sub> *V <sub>OUT</sub> )	Line Regulation	4V≤V <sub>IN</sub> ≤14V, I <sub>OUT</sub> =40mA	—	0.2	0.3	%/V
V <sub>IN</sub>	input voltage	—	—	—	14	V
ΔV <sub>OUT</sub> /ΔTa	temperature coefficient	V <sub>IN</sub> =4V, I <sub>OUT</sub> =40mA, 0°C≤Ta≤85°C	—	±0.7	—	mV/°C

## 250 mA Low Quiescent Current LDO Regulator

### ◆ 3.3V (T<sub>OPT</sub>=25°C)

Symbol	Parameter	Test conditions	Minimum value	Typical value	Maximum	Company
V <sub>OUT</sub>	output voltage	V <sub>IN</sub> =4.3V, I <sub>OUT</sub> =40mA	3.234	3.3	3.366	V
I <sub>OUT</sub>	Output current	V <sub>IN</sub> =4.3V, V <sub>OUT</sub> ≥2.97V		250		mA
ΔV <sub>OUT</sub>	Load regulation	V <sub>IN</sub> =4.3V, 1mA≤I <sub>OUT</sub> ≤60mA	—	45	90	mV
V <sub>DIF</sub>	Drop voltage	I <sub>OUT</sub> =40mA	—	90	—	mV
I <sub>SS</sub>	Quiescent current	V <sub>IN</sub> = 4.3v, no load	—	2	3	μA
ΔV <sub>OUT</sub> /(ΔV <sub>IN</sub> * V <sub>OUT</sub> )	Line Regulation	4.3V≤V <sub>IN</sub> ≤14V, I <sub>OUT</sub> =40mA	—	0.2	0.3	%/V
V <sub>IN</sub>	input voltage	—	—	—	14	V
ΔV <sub>OUT</sub> /ΔTa	temperature coefficient	V <sub>IN</sub> =4.3V, I <sub>OUT</sub> =40mA, 0°C≤Ta≤85°C	—	±0.7	—	mV/°C

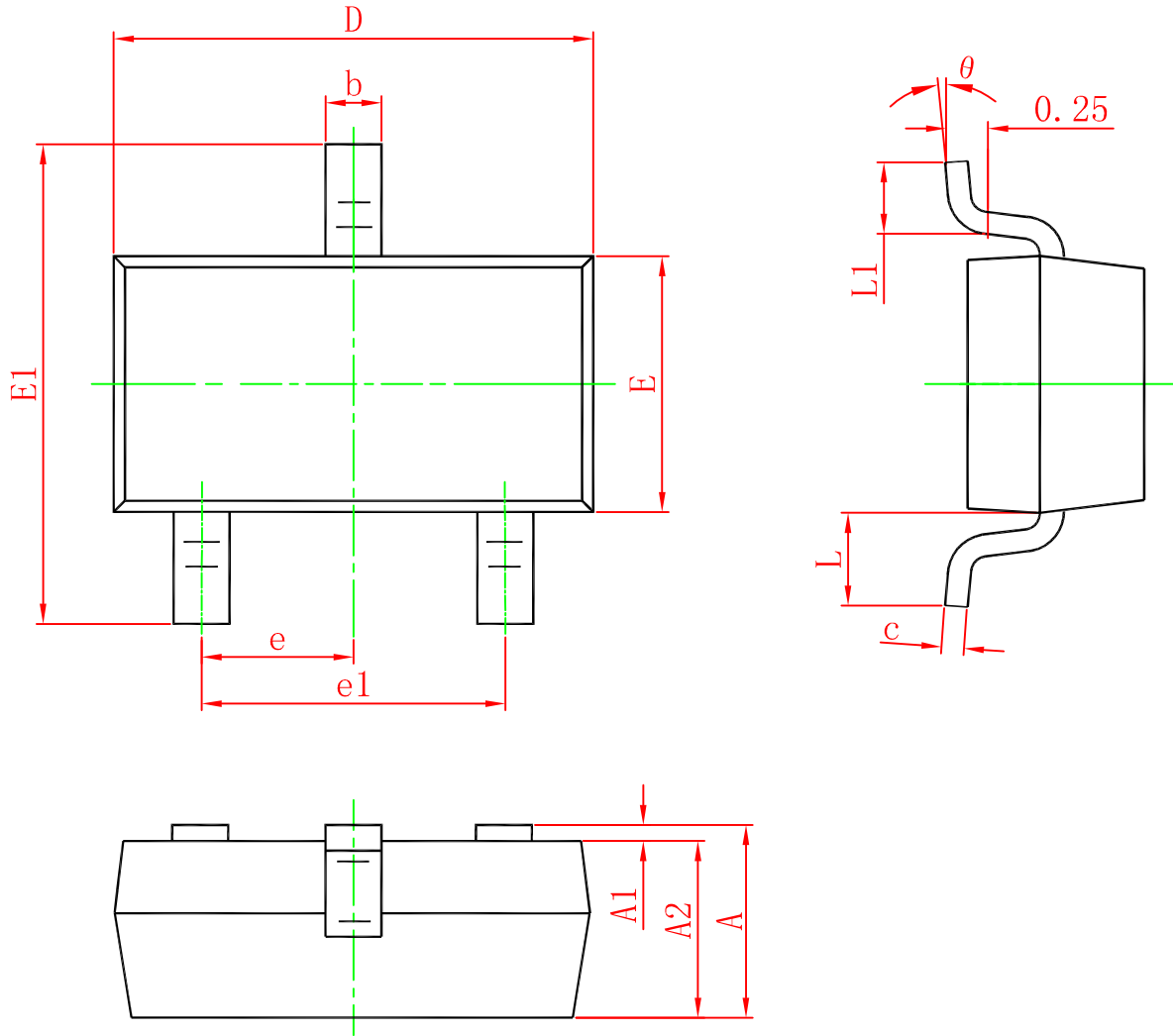
### ◆ 3.6V (T<sub>OPT</sub>=25°C)

Symbol	Parameter	Test conditions	Minimum value	Typical value	Maximum	Company
V <sub>OUT</sub>	output voltage	V <sub>IN</sub> =4.5V, I <sub>OUT</sub> =40mA	3.528	3.6	3.672	V
I <sub>OUT</sub>	Output current	V <sub>IN</sub> =4.5V, V <sub>OUT</sub> ≥3.15V		250		mA
ΔV <sub>OUT</sub>	Load regulation	V <sub>IN</sub> =4.5V, 1mA≤I <sub>OUT</sub> ≤60mA	—	45	90	mV
V <sub>DIF</sub>	Drop voltage	I <sub>OUT</sub> =40mA	—	80	—	mV
I <sub>SS</sub>	Quiescent current	V <sub>IN</sub> = 4.5V, no load	—	2	3	μA
ΔV <sub>OUT</sub> /(ΔV <sub>IN</sub> *V <sub>OUT</sub> )	Line Regulation	4.5V≤V <sub>IN</sub> ≤14V, I <sub>OUT</sub> =40mA	—	0.2	0.3	%/V
V <sub>IN</sub>	input voltage	—	—	—	14	V
ΔV <sub>OUT</sub> /ΔTa	temperature coefficient	V <sub>IN</sub> =4.5V, I <sub>OUT</sub> =40mA, 0°C≤Ta≤85°C	—	±0.7	—	mV/°C

### ◆ 5.0V (T<sub>OPT</sub>=25°C)

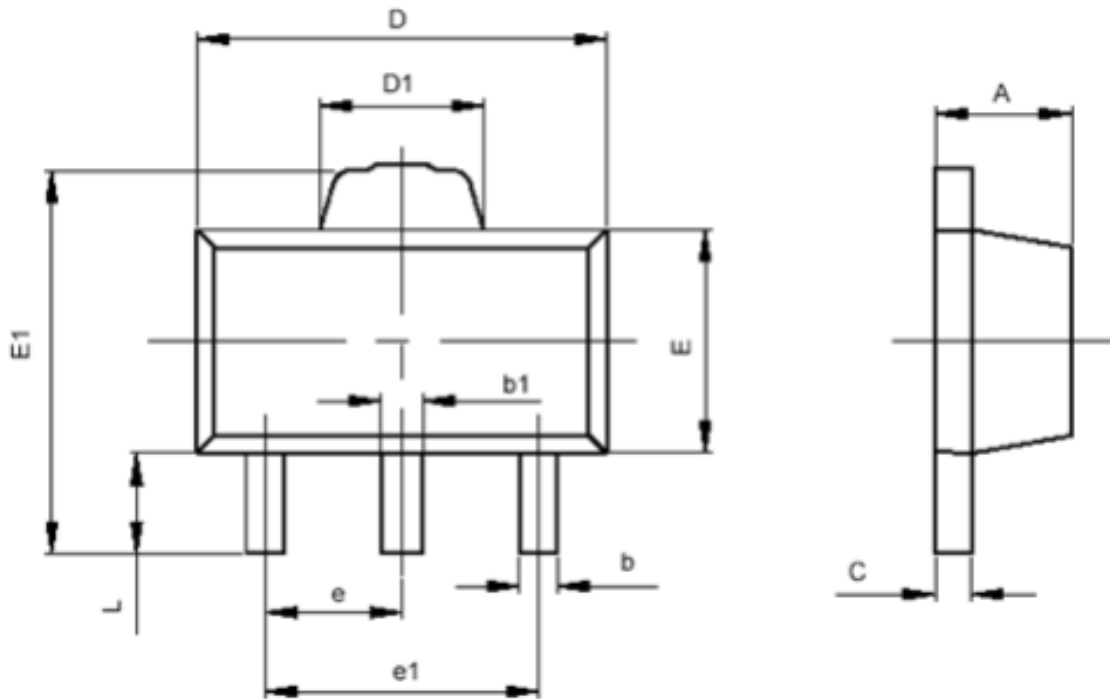
Symbol	Parameter	Test conditions	Minimum value	Typical value	Maximum	Company
V <sub>OUT</sub>	output voltage	V <sub>IN</sub> =6V, I <sub>OUT</sub> =40mA	4.9	5	5.1	V
I <sub>OUT</sub>	Output current	V <sub>IN</sub> =6V, V <sub>OUT</sub> ≥4.5V		250		mA
ΔV <sub>OUT</sub>	Load regulation	V <sub>IN</sub> =6V, 1mA≤I <sub>OUT</sub> ≤60mA	—	45	90	mV
V <sub>DIF</sub>	Drop voltage	I <sub>OUT</sub> =40mA	—	60	—	mV
I <sub>SS</sub>	Quiescent current	V <sub>IN</sub> = 6V, no load	—	2	3	μA
ΔV <sub>OUT</sub> /(ΔV <sub>IN</sub> *V <sub>OUT</sub> )	Line Regulation	6V≤V <sub>IN</sub> ≤14V, I <sub>OUT</sub> =40mA	—	0.2	0.3	%/V
V <sub>IN</sub>	input voltage	—	—	—	14	V
ΔV <sub>OUT</sub> /ΔTa	temperature coefficient	V <sub>IN</sub> =6V, I <sub>OUT</sub> =40mA, 0°C≤Ta≤85°C	—	±0.7	—	mV/°C

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
θ	0°	8°	0°	8°

SOT-89-3

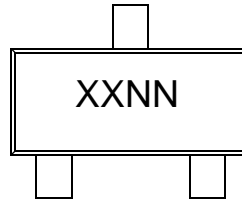


symbol	minimum value ( mm )	maiximum value ( mm )
A	1.400	1.600
b	0.320	0.520
b1	0.360	0.560
c	0.350	0.440
D	4.400	4.600
D1	1.400	1.800
E	2.300	2.600
E1	3.940	4.250
e	1.500TYP	
e1	2.900	3.100
L	0.900	1.100

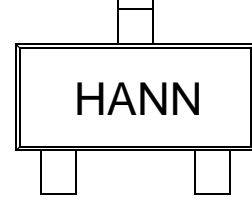
**Marking information**

Standard Options for SOT-23-3 and SOT-89			
Symbol	Voltage	Symbol	Voltage
HA	1.2	HF	3.0
HB	1.5	HG	3.3
HC	1.8	HH	4.0
HD	2.5	HJ	5.0
HE	2.8	—	—
GD	4.1	—	—

3 Pin SOT-23

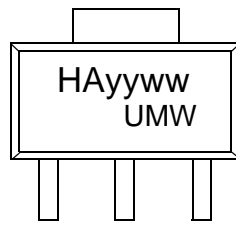
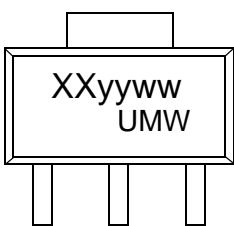


Example: 1.2V



3 Pin SOT-89

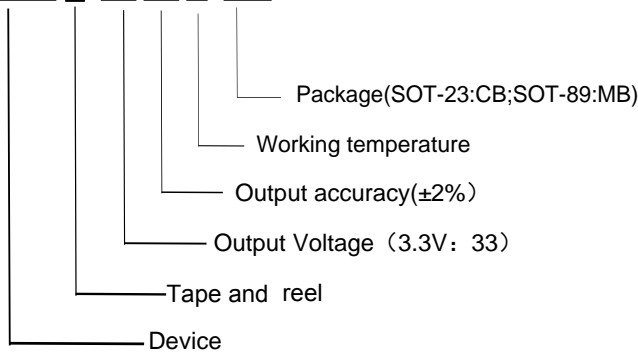
Example: 1.2V



XX: Voltage code  
 NN: Alphanumeric traceability code  
 yy: Year Code  
 ww: Week Code

**Product Naming System**

MCP1702 I- 33 02 E /MB



**Ordering information**

Order code	Package	Baseqty	Deliverymode
UMW MCP1702T-xxxxE/CB	SOT-23	3000	Tape and reel
UMW MCP1702T-xxxxE/MB	SOT-89	1000	Tape and reel