

1.Description

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.

3.Product use

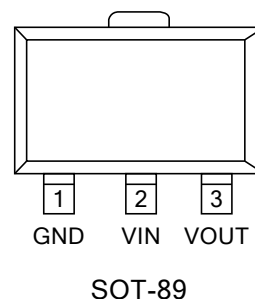
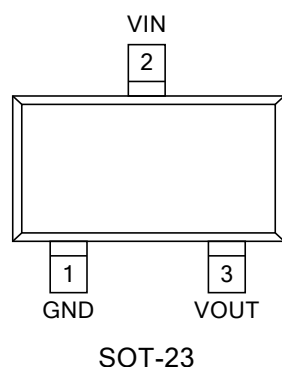
- Regulated power supply using battery powered equipment
- Stabilized power supply for portable medical instruments

2.Features

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

- Stabilized power supply for toys
- Stabilized power supply of communication equipment
- Regulated power supply for mobile phone

4.Pinning information

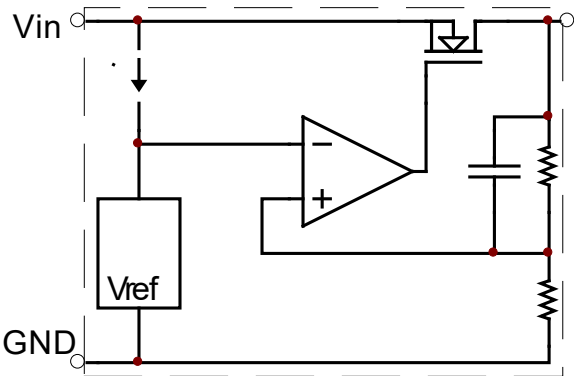




5.Model selection

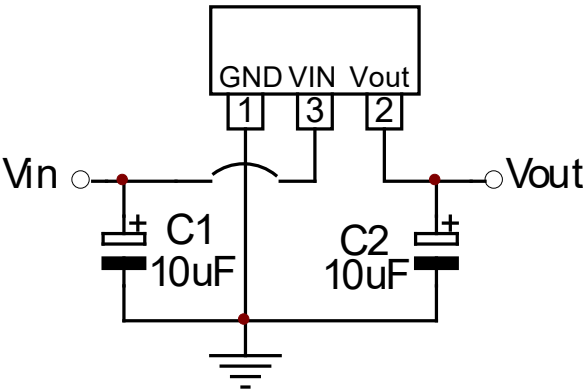
Name	Maximum input voltage (V)	Output voltage (V)	Tolerance	Packaging
MCP1702T-xxxxE	14	1.8	±2%	SOT-23-3 SOT89-3
	14	2.5	±2%	
	14	2.7	±2%	
	14	3	±2%	
	14	3.3	±2%	
	14	3.6	±2%	
	14	5	±2%	

6.Principle block diagram





7.Application circuit



8.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	-25 to 70	°C
	Tc	Storage temperature	-40 to 85	°C
	Th	welding temperature	260	°C,10s



9.1 Electrical properties (1.8V, $T_{OPT}=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output voltage	V_{OUT}	$V_{IN}=2.8\text{V}$, $I_{OUT}=40\text{mA}$	1.764	1.8	1.836	V
Output current	I_{OUT}	$V_{IN}=2.8\text{V}$, $V_{OUT}\geq 1.62\text{V}$		250		mA
Load regulation	ΔV_{OUT}	$V_{IN}=2.8\text{V}$, $1\text{mA}\leq I_{OUT}\leq 60\text{mA}$		45	90	mV
Drop voltage	V_{DIF}	$I_{OUT}=40\text{mA}$		170		mV
Quiescent current	I_{SS}	$V_{IN}=2.8\text{V}$, no load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}\cdot V_{OUT})$	$2.8\text{V}\leq V_{IN}\leq 14\text{V}$, $I_{OUT}=40\text{mA}$		0.2	0.3	%/V
input voltage	V_{IN}				14	V
temperature coefficient	$\Delta V_{OUT}/\Delta T_A$	$V_{IN}=2.8\text{V}$, $I_{OUT}=40\text{mA}$, $0^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$		± 0.7		$\text{mV}/^{\circ}\text{C}$

9.2 Electrical properties (2.5V, $T_{OPT}=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output voltage	V_{OUT}	$V_{IN}=3.5\text{V}$, $I_{OUT}=40\text{mA}$	2.45	2.5	2.55	V
Output current	I_{OUT}	$V_{IN}=3.5\text{V}$, $V_{OUT}\geq 2.25\text{V}$		250		mA
Load regulation	ΔV_{OUT}	$V_{IN}=3.5\text{V}$, $1\text{mA}\leq I_{OUT}\leq 60\text{mA}$		45	90	mV
Drop voltage	V_{DIF}	$I_{OUT}=40\text{mA}$		110		mV
Quiescent current	I_{SS}	$V_{IN}=3.5\text{V}$, no load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}\cdot V_{OUT})$	$3.5\text{V}\leq V_{IN}\leq 14\text{V}$, $I_{OUT}=40\text{mA}$		0.2	0.3	%/V
input voltage	V_{IN}				14	V
temperature coefficient	$\Delta V_{OUT}/\Delta T_A$	$V_{IN}=3.5\text{V}$, $I_{OUT}=40\text{mA}$, $0^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$		± 0.7		$\text{mV}/^{\circ}\text{C}$



9.3 Electrical properties (2.7V, $T_{OPT}=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output voltage	V_{OUT}	$V_{IN}=3.7\text{V}$, $I_{OUT}=40\text{mA}$	2.646	2.7	2.754	V
Output current	I_{OUT}	$V_{IN}=3.7\text{V}$, $V_{OUT}\geq 2.43\text{V}$		250		mA
Load regulation	ΔV_{OUT}	$V_{IN}=3.7\text{V}$, $1\text{mA}\leq I_{OUT}\leq 60\text{mA}$		45	90	mV
Drop voltage	V_{DIF}	$I_{OUT}=40\text{mA}$		100		mV
Quiescent current	I_{SS}	$V_{IN}=3.7\text{V}$, no load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}\cdot V_{OUT})$	$3.7\text{V}\leq V_{IN}\leq 14\text{V}$, $I_{OUT}=40\text{mA}$		0.2	0.3	%/V
input voltage	V_{IN}				14	V
temperature coefficient	$\Delta V_{OUT}/\Delta T_A$	$V_{IN}=3.7\text{V}$, $I_{OUT}=40\text{mA}$, $0^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$		± 0.7		$\text{mV}/^{\circ}\text{C}$

9.4 Electrical properties (3V, $T_{OPT}=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output voltage	V_{OUT}	$V_{IN}=4\text{V}$, $I_{OUT}=40\text{mA}$	2.94	3	3.06	V
Output current	I_{OUT}	$V_{IN}=4\text{V}$, $V_{OUT}\geq 2.7\text{V}$		250		mA
Load regulation	ΔV_{OUT}	$V_{IN}=4\text{V}$, $1\text{mA}\leq I_{OUT}\leq 60\text{mA}$		45	90	mV
Drop voltage	V_{DIF}	$I_{OUT}=40\text{mA}$		95		mV
Quiescent current	I_{SS}	$V_{IN}=4\text{V}$, no load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}\cdot V_{OUT})$	$4\text{V}\leq V_{IN}\leq 14\text{V}$, $I_{OUT}=40\text{mA}$		0.2	0.3	%/V
input voltage	V_{IN}				14	V
temperature coefficient	$\Delta V_{OUT}/\Delta T_A$	$V_{IN}=4\text{V}$, $I_{OUT}=40\text{mA}$, $0^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$		± 0.7		$\text{mV}/^{\circ}\text{C}$



9.5 Electrical properties (3.3V, $T_{OPT}=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output voltage	V_{OUT}	$V_{IN}=4.3\text{V}$, $I_{OUT}=40\text{mA}$	3.234	3.3	3.366	V
Output current	I_{OUT}	$V_{IN}=4.3\text{V}$, $V_{OUT}\geq 2.97\text{V}$		250		mA
Load regulation	ΔV_{OUT}	$V_{IN}=4.3\text{V}$, $1\text{mA}\leq I_{OUT}\leq 60\text{mA}$		45	90	mV
Drop voltage	V_{DIF}	$I_{OUT}=40\text{mA}$		90		mV
Quiescent current	I_{SS}	$V_{IN}=4.3\text{V}$, no load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}\cdot V_{OUT})$	$4.3\text{V}\leq V_{IN}\leq 14\text{V}$, $I_{OUT}=40\text{mA}$		0.2	0.3	%/V
input voltage	V_{IN}				14	V
temperature coefficient	$\Delta V_{OUT}/\Delta T_A$	$V_{IN}=4.3\text{V}$, $I_{OUT}=40\text{mA}$, $0^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$		± 0.7		$\text{mV}/^{\circ}\text{C}$

9.6 Electrical properties (3.6V, $T_{OPT}=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output voltage	V_{OUT}	$V_{IN}=4.5\text{V}$, $I_{OUT}=40\text{mA}$	3.528	3.6	3.672	V
Output current	I_{OUT}	$V_{IN}=4.5\text{V}$, $V_{OUT}\geq 3.15\text{V}$		250		mA
Load regulation	ΔV_{OUT}	$V_{IN}=4.5\text{V}$, $1\text{mA}\leq I_{OUT}\leq 60\text{mA}$		45	90	mV
Drop voltage	V_{DIF}	$I_{OUT}=40\text{mA}$		80		mV
Quiescent current	I_{SS}	$V_{IN}=4.5\text{V}$, no load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}\cdot V_{OUT})$	$4.5\text{V}\leq V_{IN}\leq 14\text{V}$, $I_{OUT}=40\text{mA}$		0.2	0.3	%/V
input voltage	V_{IN}				14	V
temperature coefficient	$\Delta V_{OUT}/\Delta T_A$	$V_{IN}=4.5\text{V}$, $I_{OUT}=40\text{mA}$, $0^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$		± 0.7		$\text{mV}/^{\circ}\text{C}$

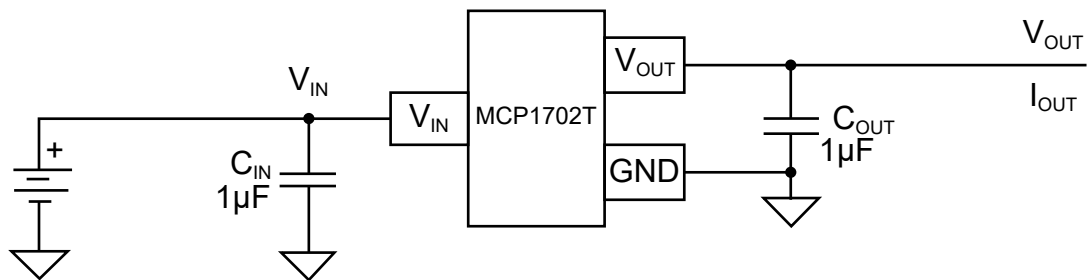


9.7 Electrical properties (5V, $T_{OPT}=25^{\circ}\text{C}$)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Output voltage	V_{OUT}	$V_{IN}=6\text{V}$, $I_{OUT}=40\text{mA}$	4.9	5	5.1	V
Output current	I_{OUT}	$V_{IN}=6\text{V}$, $V_{OUT}\geq 4.5\text{V}$		250		mA
Load regulation	ΔV_{OUT}	$V_{IN}=6\text{V}$, $1\text{mA}\leq I_{OUT}\leq 60\text{mA}$		45	90	mV
Drop voltage	V_{DIF}	$I_{OUT}=40\text{mA}$		60		mV
Quiescent current	I_{SS}	$V_{IN}=6\text{V}$, no load		2	3	μA
Line Regulation	$\Delta V_{OUT}/(\Delta V_{IN}\cdot V_{OUT})$	$6\text{V}\leq V_{IN}\leq 14\text{V}$, $I_{OUT}=40\text{mA}$		0.2	0.3	%/V
input voltage	V_{IN}				14	V
temperature coefficient	$\Delta V_{OUT}/\Delta T_A$	$V_{IN}=6\text{V}$, $I_{OUT}=40\text{mA}$, $0^{\circ}\text{C}\leq T_A\leq 85^{\circ}\text{C}$		± 0.7		$\text{mV}/^{\circ}\text{C}$

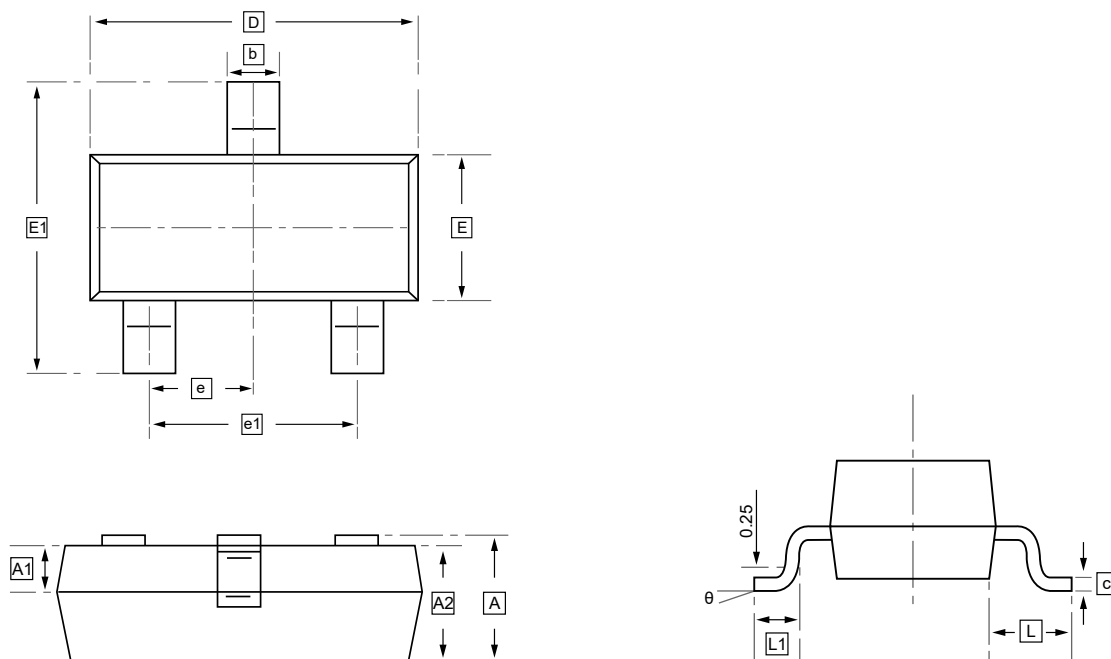


10. Typical Application





11.1 SOT-23 Package Outline Dimensions

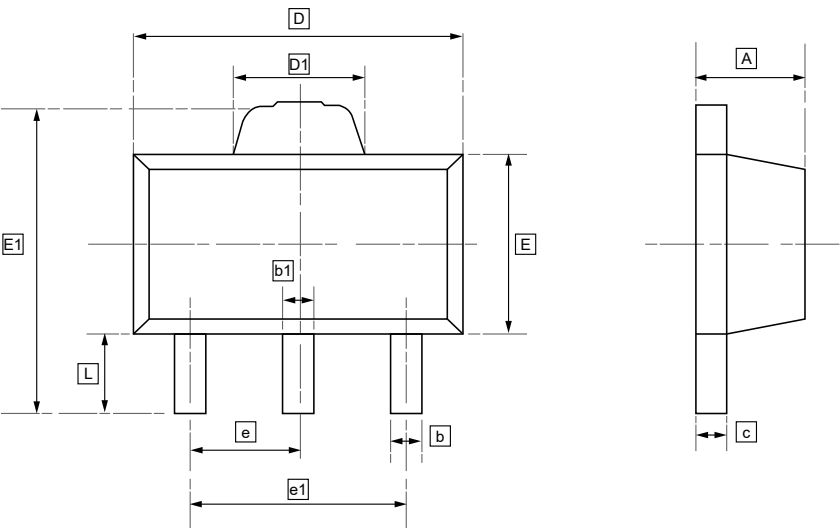


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	e1	L	L1	θ
Min	0.900	0.000	0.900	0.300	0.080	2.800	1.200	2.250	0.950	1.800	0.550	0.300	0°
Max	1.150	0.100	1.050	0.500	0.150	3.000	1.400	2.550	TYP.	2.000	REF.	0.500	8°



11.2SOT-89-3 Package Outline Dimensions

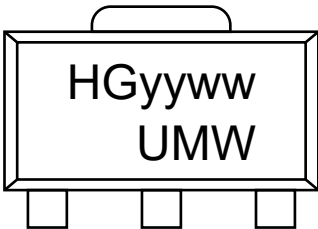


DIMENSIONS (mm are the original dimensions)

Symbol	A	b	b1	c	D	D1	E	E1	e	e1	L
Min	1.400	0.320	0.360	0.350	4.400	1.400	2.300	3.940	1.500	2.900	0.900
Max	1.600	0.520	0.560	0.440	4.600	1.800	2.600	4.250	TYP	3.100	1.100



12.Ordering information



yy: Year Code
ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW MCP1702T-xxxxE/CB	SOT-23	3000	Tape and reel
UMW MCP1702T-xxxxE/MB	SOT-89	1000	Tape and reel



13.Disclaimer

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