



## LM39102

Preliminary

CMOS IC

### 1A LOW-VOLTAGE LOW-DROPOUT REGULATOR

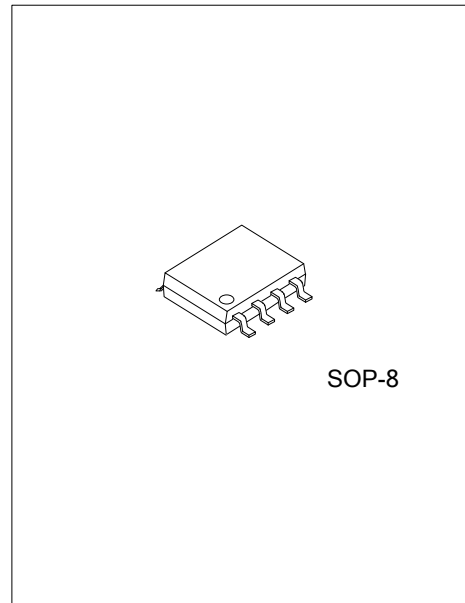
#### DESCRIPTION

The UTC **LM39102** is a low-dropout linear voltage regulator that provide low-voltage, high-current output.

The UTC **LM39102** can be used in a wide field because of Adjustable Output. UTC **LM39102** is fully protected with over current limiting, thermal shutdown, and reversed-battery protection.

#### FEATURES

- \* Adjustable output voltages refer to 1.24V
- \* Dropout Voltage 410mV at 1A output  
Ideal for 3.0V~2.5V conversion  
Ideal for 2.5V~1.8V or 1.5V conversion
- \* A very low ground current (typically 12mA at 1A)
- \* ON/OFF control function
- \* 1% initial accuracy
- \* Built-in current limiting and thermal shutdown
- \* Reversed-battery protection
- \* Reversed-leakage protection
- \* Fast transient response

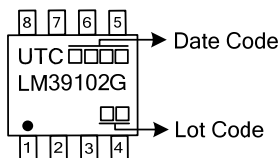


#### ORDERING INFORMATION

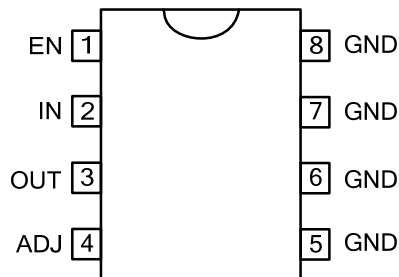
Ordering Number	Package	Packing
LM39102G-S08-R	SOP-8	Tape Reel

<p>LM39102G-S08-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) S08: SOP-8</p> <p>(3) G: Halogen Free and Lead Free</p>
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#### MARKING



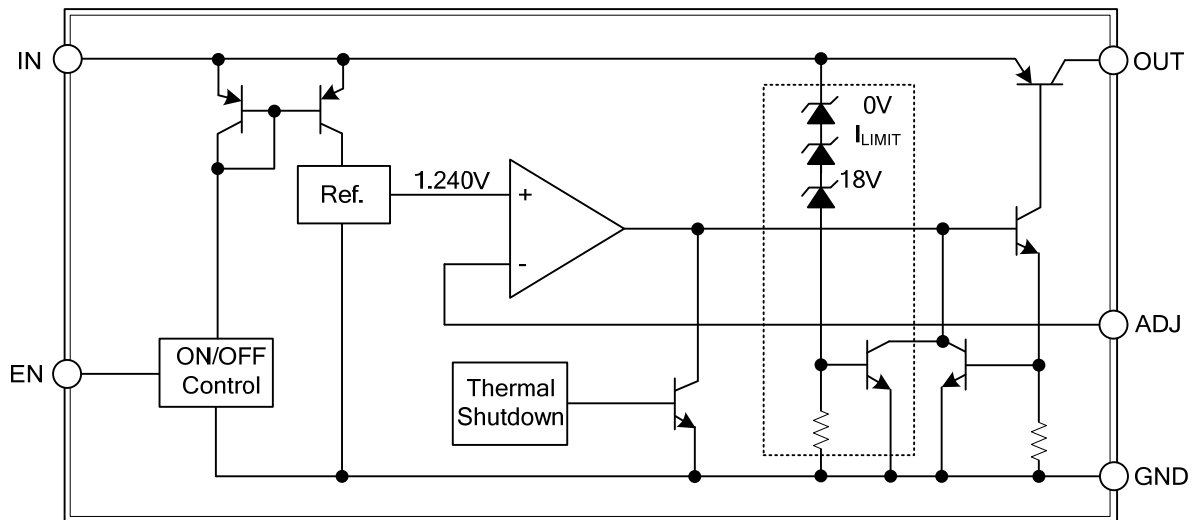
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	EN	ON/OFF control terminal
2	IN	Power Supply
3	OUT	Regulator output
4	ADJ	Adjustment terminal: feedback input
5, 6, 7, 8	GND	Ground

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{IN}$	18V	V
Enable Voltage	$V_{EN}$	+20	V
Junction Temperature	$T_J$	-40~+125	°C
Storage Temperature	$T_{STG}$	-65~+150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.  
 Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ OPERATING RATINGS (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{IN}$	+2.25~+16	V
Enable Voltage	$V_{EN}$	+16	V
Maximum Power Dissipation	$P_D$	Note 2	

Notes: 1. The device is not guaranteed to function outside its operating rating.  
 2.  $P_{D(max)} = (T_J(max) - T_A) / \theta_{JA}$ , where  $\theta_{JA}$  - junction-to-ambient thermal resistance.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Case	$\theta_{JC}$	25	°C/W

## ■ ELECTRICAL CHARACTERISTICS

( $V_{IN}=V_{OUT}+1V$ ,  $V_{EN}=2.25V$ ,  $T_J=25^\circ C$ , bold values indicate  $0^\circ C \leq T_J \leq +125^\circ C$ , unless noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	10mA	-1		1	%
		$10mA \leq I_{OUT} \leq 1A$ , $V_{OUT}+1V \leq V_{IN} \leq 8V$	-2		2	%
Line Regulation		$I_{OUT}=10mA$ , $V_{OUT}+1V \leq V_{IN} \leq 16V$		0.06	0.5	%
Load Regulation		$V_{IN}=V_{OUT}+1V$ , $10mA \leq I_{OUT} \leq 1A$		0.2	1	%
Output Voltage Temperature Coefficient (Note 1)	$\Delta V_{OUT}/\Delta T$			40	100	ppm/ $^\circ C$
Dropout Voltage (Note 2)	$V_{DO}$	$I_{OUT}=100mA$ , $\Delta V_{OUT}=-1\%$		150	200	mV
					250	mV
		$I_{OUT}=500mA$ , $\Delta V_{OUT}=-1\%$		275		mV
		$I_{OUT}=750mA$ , $\Delta V_{OUT}=-1\%$		330	500	mV
		$I_{OUT}=1A$ , $\Delta V_{OUT}=-1\%$		410	550	mV
					630	mV
Ground Current (Note 3)	$I_{GND}$	$I_{OUT}=100mA$ , $V_{IN}=V_{OUT}+1V$		700		$\mu A$
		$I_{OUT}=500mA$ , $V_{IN}=V_{OUT}+1V$		4		mA
		$I_{OUT}=750mA$ , $V_{IN}=V_{OUT}+1V$		7		mA
		$I_{OUT}=1A$ , $V_{IN}=V_{OUT}+1V$		12	20	mA
Current Limit	$I_{OUT(lim)}$	$V_{OUT}=0V$ , $V_{IN}=V_{OUT}+1V$		1.8	2.5	A
<b>Enable Input</b>						
Enable Input Voltage	$V_{EN}$	Logic Low (Off)			0.8	V
		Logic High (On)	2.25			V
Enable Input Current	$I_{EN}$	$V_{EN}=2.25V$	1	15	30	$\mu A$
					75	$\mu A$
		$V_{EN}=0.8V$			2	$\mu A$
					4	$\mu A$
Reference Voltage			1.228	1.240	1.252	V
			1.215		1.265	V
	Note 4		1.203		1.277	V
Adjust Pin Bias Current				40	80	nA
					120	nA
Reference Voltage Temperature Coefficient (Note 1)				20		ppm/ $^\circ C$
Adjust Pin Bias Current Temperature Coefficient				0.1	99.2	nA/ $^\circ C$

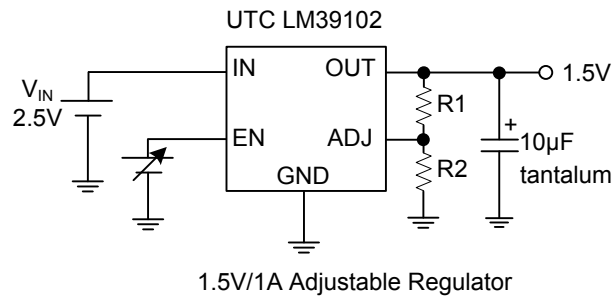
Notes: 1. Output voltage temperature coefficient is  $\Delta V_{OUT(worst\ case)} + (T_{J(max)} - T_{J(min)})$  where  $T_{J(max)}$  is  $+125^\circ C$  and  $T_{J(min)}$  is  $0^\circ C$ .

2.  $V_{DO}=V_{IN}-V_{OUT}$  when  $V_{OUT}$  decreases to 99% of its nominal output voltage with  $V_{IN}=V_{OUT}+1V$ . For output voltages below 2.25V, dropout voltage is the input-to-output voltage differential with the minimum input voltage being 2.25V. Minimum input operating voltage is 2.25V.

3.  $I_{GND}$  is the quiescent current.  $I_{IN}=I_{GND}+I_{OUT}$ .

4.  $V_{REF} \leq V_{OUT} \leq (V_{IN}-1V)$ ,  $2.25V \leq V_{IN} \leq 16V$ ,  $10mA \leq I_L \leq 1A$ .

## ■ TYPICAL APPLICATION CIRCUIT



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