

# UNISONIC TECHNOLOGIES CO., LTD

LM39102 Preliminary CMOS IC

# 1A LOW-VOLTAGE LOW-DROPOUT REGULATOR

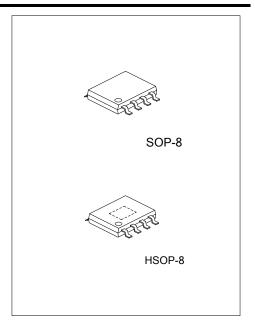
# ■ DESCRIPTION

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.

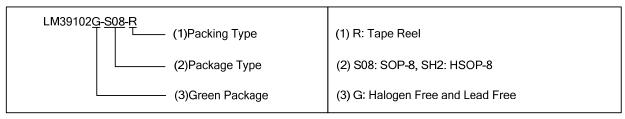
#### ■ FEATURES

- \* 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

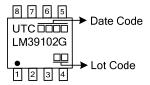


#### **■ ORDERING INFORMATION**

Ordering Number	Package	Packing
LM39102G-S08-R	SOP-8	Tape Reel
LM39102G-SH2-R	HSOP-8	Tape Reel

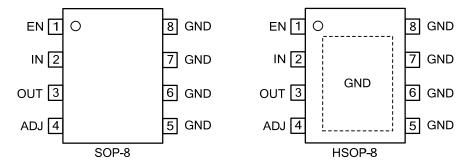


#### MARKING



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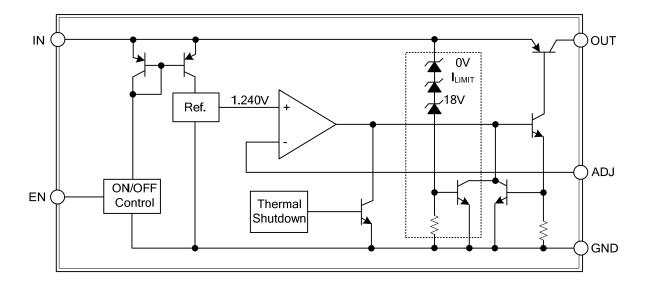
# ■ PIN CONFIGURATION



# **■ 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 <sub>STG</sub>	-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 <sub>D</sub>	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	SOP-8	$\theta_{JC}$	50	°C/W
	HSOP-8		45	°C/W

#### **■ ELECTRICAL CHARACTERISTICS**

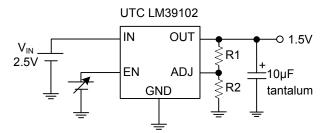
 $(V_{IN}=V_{OUT}+1V, V_{EN}=2.25V, T_J=25^{\circ}C, bold values indicate 0^{\circ}C \le T_J \le +125^{\circ}C, unless noted)$ 

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage	V <sub>OUT</sub>	10mA	-1		1	%
		10mA≤I <sub>OUT</sub> ≤1A, V <sub>OUT</sub> +1V≤V <sub>IN</sub> ≤8V	-2		2	%
Line Regulation		I <sub>OUT</sub> =10mA, V <sub>OUT</sub> +1V≤V <sub>IN</sub> ≤16V		0.06	0.5	%
Load Regulation		V <sub>IN</sub> =V <sub>OUT</sub> +1V, 10mA≤I <sub>OUT</sub> ≤1A		0.2	1	%
Output Voltage Temperature Coefficient (Note 1)	$\Delta V_{OUT}/\Delta T$			40	100	ppm/°C
		1 =100m \ \ \\\ = 10/		150	200	mV
		Ι <sub>Ουτ</sub> =100mA, ΔV <sub>Ουτ</sub> =-1%			250	mV
Drangut Valtage (Note 2)	\ <i>/</i>	I <sub>OUT</sub> =500mA, ΔV <sub>OUT</sub> =-1%		275		mV
Dropout Voltage (Note 2)	$V_{DO}$	I <sub>OUT</sub> =750mA, ΔV <sub>OUT</sub> =-1%		330	500	mV
		1 -10 01 - 10/		410	550	mV
		Ι <sub>Ουτ</sub> =1Α, ΔV <sub>Ουτ</sub> =-1%			630	mV
		I <sub>OUT</sub> =100mA, V <sub>IN</sub> =V <sub>OUT</sub> +1V		700		μA
Craying Compant (Nata 2)		I <sub>OUT</sub> =500mA, V <sub>IN</sub> =V <sub>OUT</sub> +1V		4		mA
Ground Current (Note 3)	$I_{GND}$	I <sub>OUT</sub> =750mA, V <sub>IN</sub> =V <sub>OUT</sub> +1V		7		mA
		I <sub>OUT</sub> =1A, V <sub>IN</sub> =V <sub>OUT</sub> +1V		12	20	mA
Current Limit	$I_{OUT(lim)}$	V <sub>OUT</sub> =0V, V <sub>IN</sub> =V <sub>OUT</sub> +1V		1.8	2.5	Α
Enable Input						
Enable Input Valtage	V <sub>EN</sub>	Logic Low (Off)			0.8	V
Enable Input Voltage		Logic High (On)	2.25			V
	I <sub>EN</sub>	V <sub>EN</sub> =2.25V	1	15	30	μA
Enable Input Current		V <sub>EN</sub> -2.23V			75	μA
Enable input Current		V -0.0V			2	μA
		V <sub>EN</sub> =0.8V			4	μA
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/°C
Adjust Pin Bias Current Temperature Coefficient				0.1	99.2	nA/°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°C and  $T_{J(min)}$  is 0°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.  $V_{REF} \le V_{OUT} \le (V_{IN}-1V)$ , 2.25 $V \le V_{IN} \le 16V$ , 10mA $\le I_L \le 1A$ .

#### **■ TYPICAL APPLICATION CIRCUIT**



1.5V/1A Adjustable Regulator

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