



## LM2954

## LINEAR INTEGRATED CIRCUIT

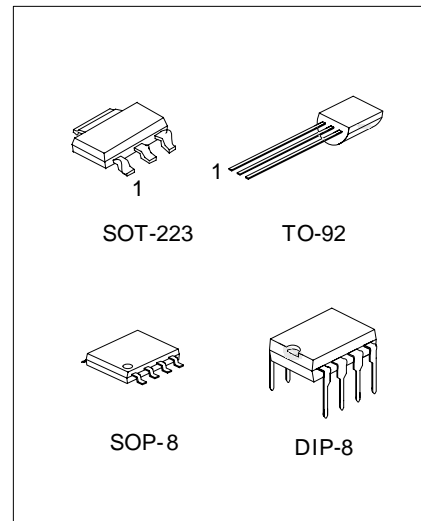
### 300 mA LOW-DROPOUT VOLTAGE REGULATOR

#### DESCRIPTION

The UTC **LM2954** is a monolithic integrated voltage regulator with low dropout voltage, and low quiescent current. It includes many features that suitable for different applications with TO-92, DIP-8, SOP-8 and SOT-223 packages.

#### FEATURES

- \*High accuracy fixed output.
- \*Output voltage programmable and Logic controlled shutdown and error flag available for DIP and SOP package.
- \*Extremely low quiescent current and dropout voltage.
- \*Extremely tight load and line regulation.
- \*Current and thermal limiting.
- \*Very low temperature coefficient.



\*Pb-free plating product number: LM2954L

#### ORDERING INFORMATION

Order Number		Package	Pin assignment			Packing
Normal	Lead Free Plating		1	2	3	
LM2954-xx-AA3-R	LM2954L-xx-AA3-R	SOT-223	I	G	O	Tape Reel
LM2954-xx-D08-T	LM2954L-xx-D08-T	DIP-8	refer to Pin Configurations			Tube
LM2954-xx-S08-R	LM2954L-xx-S08-R	SOP-8				Tape Reel
LM2954-xx-S08-T	LM2954L-xx-S08-T	SOP-8				Tube
LM2954-xx-T92-B	LM2954L-xx-T92-B	TO-92	O	G	I	Tape Box
LM2954-xx-T92-K	LM2954L-xx-T92-K	TO-92	O	G	I	Bulk

Note: 1. Pin assignment: I:Vin O:Vout G:Ground  
2.xx: Output Voltage

	<p>(1) B: Tape Box, K: Bulk, R: Tape Reel, T: Tube</p> <p>(2) AA3: SOT-223, D08: DIP-08, S08: SOP-8, T92: TO-92</p> <p>(3) xx: 3.3V:33, 5.0V:50, ADJ:AD</p> <p>(4) L: Lead Free Plating Blank: Pb/Sn</p>
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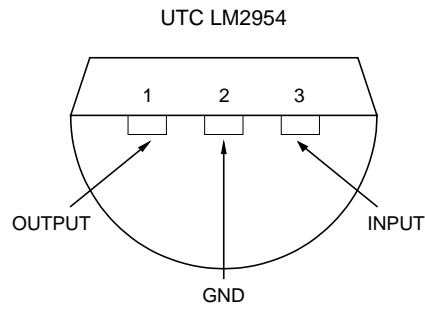
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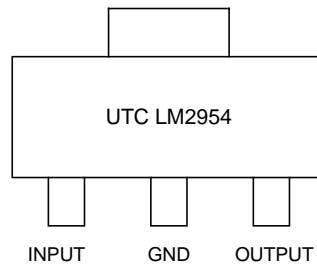
### MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-223	33:3.3V 50:5.0V	
TO-92	3.3:3.3V 5.0:5.0V	
SOP-8/DIP-8	3.3:3.3V 5.0:5.0V	
	ADJ	

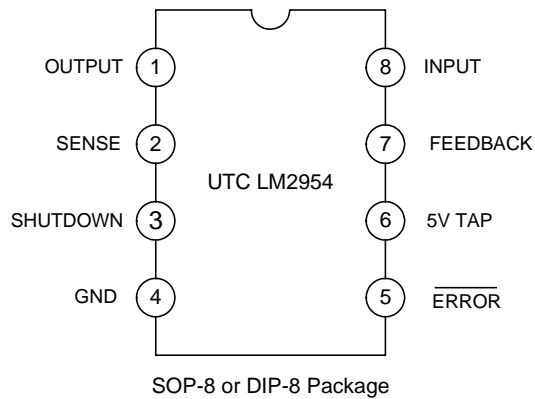
### ■ PIN CONFIGURATIONS



TO-92 Plastic Package Bottom View



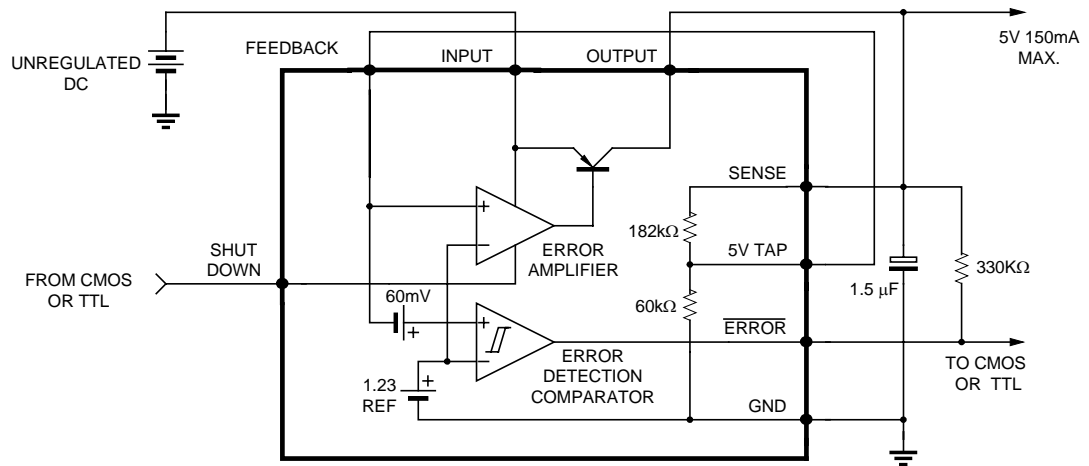
SOT-223 Package



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### ■ BLOCK DIAGRAM



## ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{CC}$	-0.3 ~ +30	V
Feedback Voltage	$V_{FB}$	-1.5 ~ +30	V
Shutdown Voltage	$V_{SHDN}$	-0.3 ~ +30	V
Comparator Output Voltage	$V_{OUT}$	-0.3 ~ +30	V
Junction Temperature	$T_J$	+125	°C
Operating Temperature	$T_{OPR}$	-20 ~ +85	°C
Storage temperature	$T_{STG}$	-40 ~ +150	°C

Note: 1. Absolute maximum ratings are those values beyond which the device which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. The device is guaranteed to meet performance specification within 0 ~ +70 operating temperature range and assured by design from -20 ~ +85, characteristic and correlation with static process control.

■ ELECTRICAL CHARACTERISTICS ( $T_J=25^\circ\text{C}$ ,  $V_{IN}=6\text{V}$ ,  $I_L=100\mu\text{A}$ ,  $C_L=1\mu\text{F}$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^\circ\text{C}$	3.23	3.3	3.37	V
			4.90	5.0	5.10	
Output Voltage Temperature Coefficient	$T_C V_O$		20		100	ppm/°C
Line Regulation	$V_{OUT}$	6V $V_{IN}$ 30V		0.1	0.2	%
Load Regulation	$V_{OUT}$	100 $\mu\text{A}$ $I_L$ 300 mA		0.2	0.5	
Dropout Voltage	$V_D$	$I_L=100\text{mA}$			400	mV
		$I_L=200\text{mA}$ (note 2)	380	450	600	
Ground Current	$I_{GND}$	$I_L=100\mu\text{A}$	0.075	0.12	0.14	mA
		$I_L=200\text{mA}$	8	12	14	
Dropout Ground Current	$I_D$	$V_{IN}=4.5\text{V}$ , $I_L=100\mu\text{A}$	110	170	200	$\mu\text{A}$
Current Limit	$I_{LIMIT}$	$V_{OUT}=0$	300			mA
Output Noise (10Hz to 100KHz)	eN	$C_L=1\mu\text{F}$			430	$\mu\text{V}$
		$C_L=200\mu\text{F}$			160	
		$C_L=3.3\mu\text{F}$			100	
<b>LM2954-ADJ For 8-Pin Version Only</b>						
Reference Voltage	$V_{REF}$		1.22	1.235	1.25	V
Reference Voltage	$V_{REF}$	$V_{REF} \leq V_{OUT} \leq (V_{IN}-1\text{V})$ , $2.3\text{V} \leq V_{IN} \leq 30\text{V}$ , $100\mu\text{A} \leq I_L \leq 100\text{mA}$ , $T_J \leq T_{JMAX}$	1.19		1.27	V
Feedback Pin Bias Current	$I_{B(FB)}$			20	40	nA
Reference Voltage Temperature Coefficient	$T_C V_{REF}$			50		ppm/°C
Feedback Bias Current Temperature Coefficient	$T_{C I_O}$			0.1		nA/°C

## ■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Error Comparator</b>						
Output Leakage Current	$I_{LEAK}$	$V_{OH}=30V$			1	$\mu A$
Output Low Voltage	$V_{OL}$	$V_{IN}=4.5V, I_{OL}=400\mu A$			250	mV
Upper Threshold Voltage	$V_{THD(UP)}$	(Note 3)	3.2			% $V_{OUT}$
Lower Threshold Voltage	$V_{THD(LOW)}$	(Note 3)			7.6	% $V_{OUT}$
Hysteresis	$V_{HYS}$	(Note 3)		15		mV
<b>Shutdown Input</b>						
Input Logic Voltage	$V_{I(LOG)}$	Low (Regulator ON)		1.3	0.70	V
		High (Regulator OFF)	2.0			
Shutdown Pin Input Current	$I_{I(SHDN)}$	$V_{SHDN}=2.4V$		30	50	$\mu A$
		$V_{SHDN}=30V$		450	600	$\mu A$
Regulator Output Current Shutdown	$I_{O(SHDN)}$	$V_{SHDN} = 2V, V_{IN} = 30V, V_{OUT}=0,$ Feedback pin tied to 5V Tap.		3	10	$\mu A$

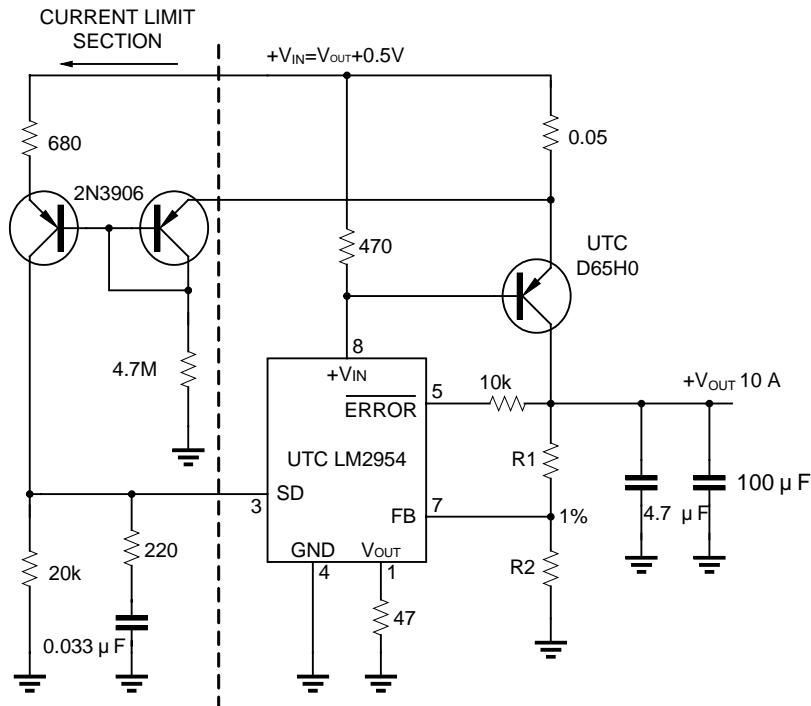
Note 1: Additional conditions for 8-pin versions are feedback tied to 5V Tap and Output tied to Output Sense ( $V_{OUT}=5V$ ) and  $V_{SHDN} = 0.8V$ .

Note 2: Dropout voltage is defined as the input to output differential at which the output voltage drops 100mV below its nominal value measured at 1V differential.

Note 3: Comparator thresholds are expressed in terms of percentage value of voltage output.

## ■ APPLICATION CIRCUIT (10A Low Dropout Regulator)

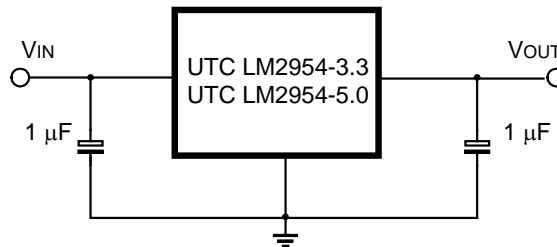
### For 8 Pins



$$V_{OUT} = 1.23V * (1 + R1/R2)$$

For 5V output use internal resistors. Wire pin 6 to 7 and wire pin 2 to +Vout

### For 3 Pins



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