



## LM2954

## LINEAR INTEGRATED CIRCUIT

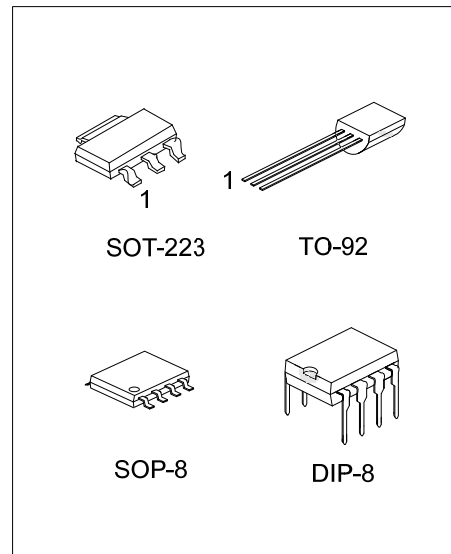
### 300 mA LOW-DROPOUT VOLTAGE REGULATOR

#### 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.



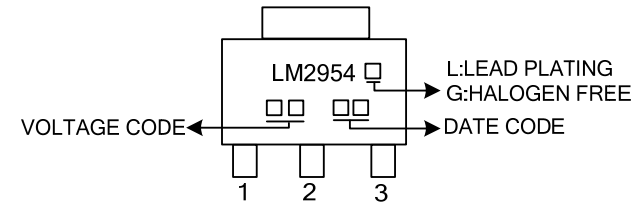
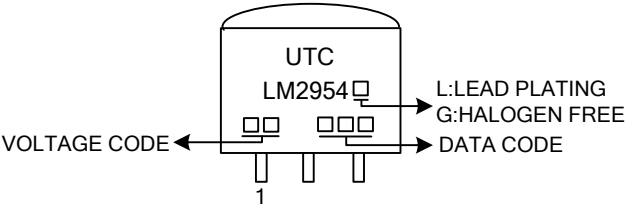
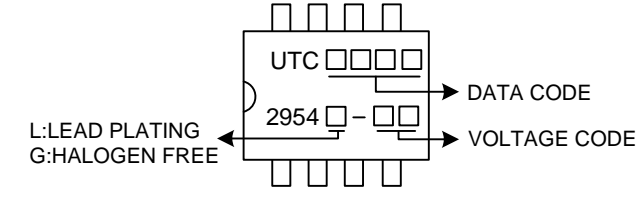
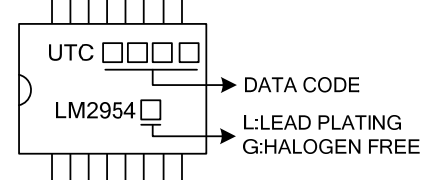
#### ORDERING INFORMATION

Order Number			Package	Pin assignment			Packing
Normal	Lead Free Plating	Halogen Free		1	2	3	
LM2954-xx-AA3-R	LM2954L-xx-AA3-R	LM2954G-xx-AA3-R	SOT-223	I	G	O	Tape Reel
LM2954-xx-D08-T	LM2954L-xx-D08-T	LM2954G-xx-D08-T	DIP-8	refer to Pin Configurations			Tube
LM2954-xx-S08-R	LM2954L-xx-S08-R	LM2954G-xx-S08-R	SOP-8				Tape Reel
LM2954-xx-S08-T	LM2954L-xx-S08-T	LM2954G-xx-S08-T	SOP-8				Tube
LM2954-xx-T92-B	LM2954L-xx-T92-B	LM2954G-xx-T92-B	TO-92	O	G	I	Tape Box
LM2954-xx-T92-K	LM2954L-xx-T92-K	LM2954G-xx-T92-K	TO-92	O	G	I	Bulk

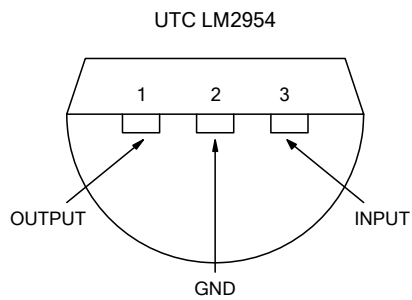
Note: 1. Pin assignment: I: Vin O: V<sub>OUT</sub> G: GND  
2. xx: Output Voltage

<p>LM2954L-xx-AA3-R</p>	<p>(1) B: Tape Box, K: Bulk, R: Tape Reel, T: Tube  (2) AA3: SOT-223, D08: DIP-08, S08: SOP-8, T92: TO-92  (3) xx: 3.3V:33, 5.0V:50, ADJ:AD  (4) L: Lead Free Plating, Blank: Pb/Sn  G: Halogen Free</p>
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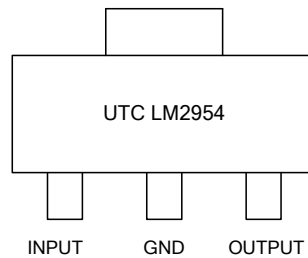
### MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-223	33:3.3V 50:5.0V	 <p>Diagram of SOT-223 package marking. The top surface is labeled 'LM2954'. On the left side, there are two small squares representing the voltage code. On the right side, there are two small squares representing the date code. Arrows point from the text 'L:LEAD PLATING', 'G:HALOGEN FREE', and 'DATE CODE' to their respective locations. The pins are numbered 1, 2, and 3.</p>
TO-92	3.3:3.3V 5.0:5.0V	 <p>Diagram of TO-92 package marking. The top surface is labeled 'UTC' and 'LM2954'. On the left side, there are two small squares representing the voltage code. On the right side, there are two small squares representing the date code. Arrows point from the text 'L:LEAD PLATING', 'G:HALOGEN FREE', and 'DATE CODE' to their respective locations. Pin 1 is indicated at the bottom.</p>
SOP-8/DIP-8	3.3:3.3V 5.0:5.0V	 <p>Diagram of SOP-8/DIP-8 package marking (top). The top surface is labeled 'UTC' and '2954'. On the left side, there are two small squares representing the voltage code. On the right side, there are two small squares representing the date code. Arrows point from the text 'L:LEAD PLATING', 'G:HALOGEN FREE', 'DATE CODE', and 'VOLTAGE CODE' to their respective locations.</p>
	ADJ	 <p>Diagram of SOP-8/DIP-8 package marking (bottom). The top surface is labeled 'UTC' and 'LM2954'. On the left side, there are two small squares representing the date code. On the right side, there are two small squares representing the voltage code. Arrows point from the text 'DATE CODE', 'L:LEAD PLATING', and 'G:HALOGEN FREE' to their respective locations.</p>

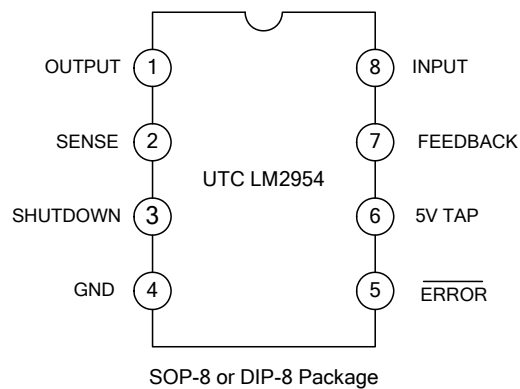
## ■ PIN CONFIGURATIONS



TO-92 Plastic Package Bottom View

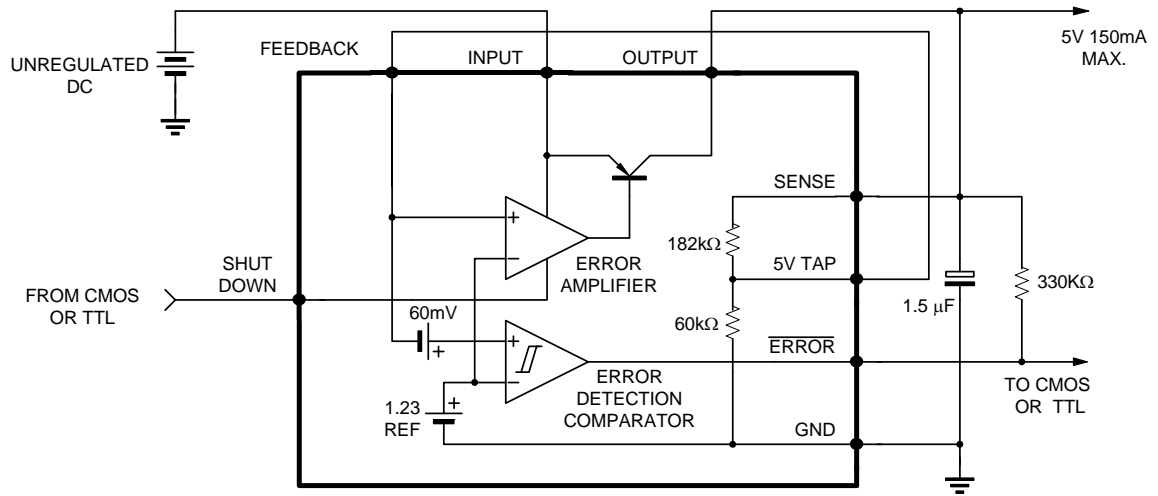


SOT-223 Package



SOP-8 or DIP-8 Package

■ 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°C~+70°C operating temperature range and assured by design from -20°C~+85°C, 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	LM2954-3.3	$V_{OUT}$ $T_J=25^\circ\text{C}$	3.23	3.3	3.37	V
	LM2954-5.0		4.90	5.0	5.10	
Output Voltage Temperature Coefficient	$T_C V_O$		20		100	ppm/°C
Line Regulation	$\Delta V_{OUT}$	$6\text{V} \leq V_{IN} \leq 30\text{V}$		0.1	0.2	%
Load Regulation	$\Delta V_{OUT}$	$100\mu\text{A} \leq I_L \leq 300\text{mA}$		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	0.23	mA
		$I_L=200\text{mA}$	8	12	14	
Dropout Ground Current	$I_D$	$V_{IN}=4.5\text{V}, I_L=100\mu\text{A}$			230	$\mu\text{A}$
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	$V_{REF}$	$V_{REF} \leq V_{OUT} \leq (V_{IN}-1\text{V})$ , $2.3\text{V} \leq V_{IN} \leq 18\text{V}$ , $100\mu\text{A} \leq I_L \leq 100\text{mA}$ , $T_J \leq T_{JMAX}$	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	$I_{O(LEAK)}$	$V_{OH}=30V$			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	$I_{O(SHDN)}$	$V_{SHDN} \cong 2V, V_{IN} \cong 30V, V_{OUT}=0,$ Feedback pin tied to 5V Tap.		3	10	$\mu A$

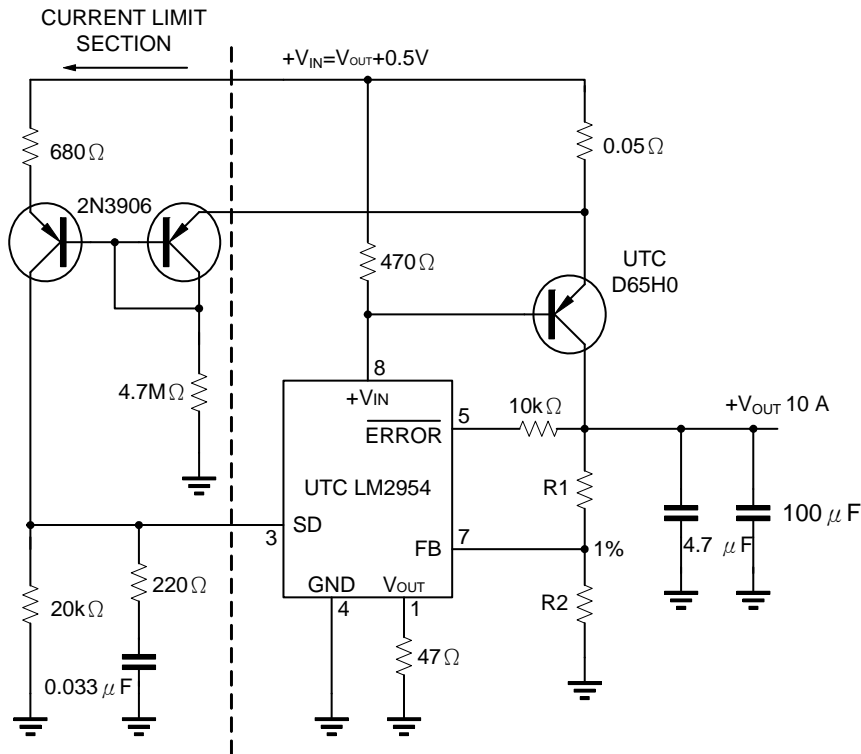
Note 1: Additional conditions for 8-pin versions are feedback tied to 5V Tap an Output tied to Output Sense ( $V_{OUT}=5V$ ) and  $V_{SHDN} \cong 0.8V$ .

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)

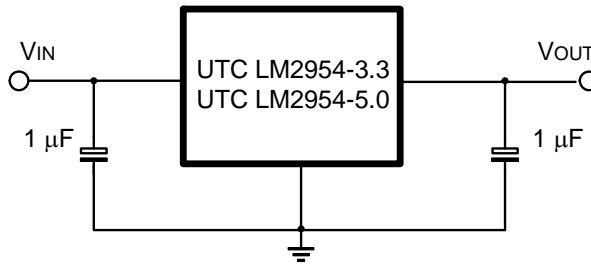
### For 8 Pins



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

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

### For 3 Pins



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