



LM2954

LINEAR INTEGRATED CIRCUIT

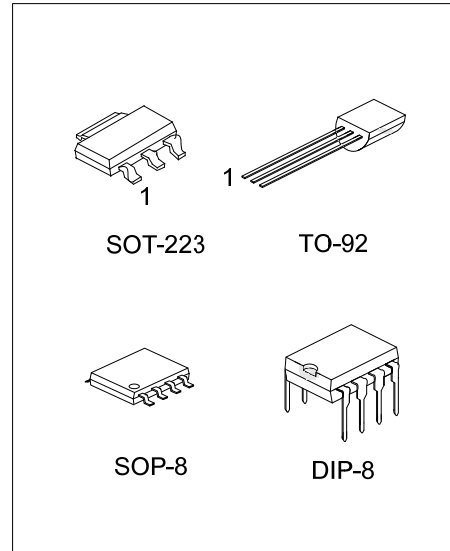
300mA LOW-DROPOUT VOLTAGE REGULATOR

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.



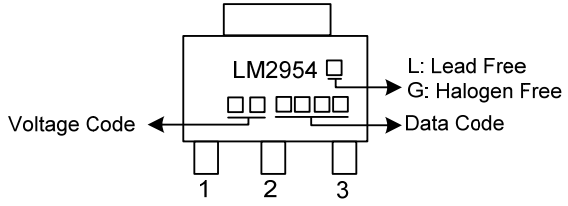
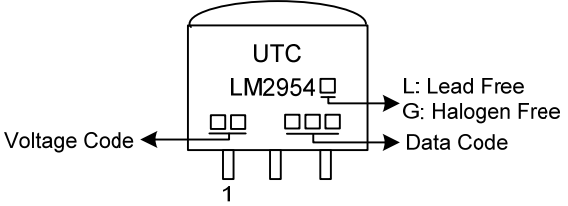
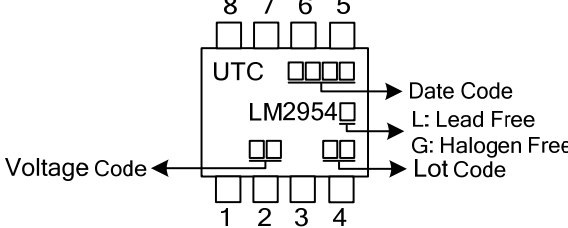
ORDERING INFORMATION

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

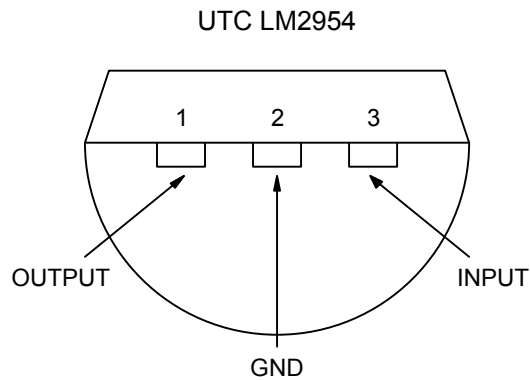
Note: Pin assignment: I: V_{IN} O: V_{OUT} G: GND

<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: refet to MARKING INFORMATION (4) L: Lead Free, G: Halogen Free</p>
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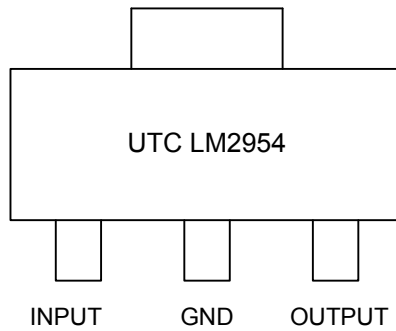
MARKING INFORMATION

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'. Below it are two rows of three small squares each. An arrow labeled 'Voltage Code' points to the first square of the bottom row. An arrow labeled 'Data Code' points to the last square of the bottom row. The bottom edge has three pins labeled 1, 2, and 3. To the right, 'L: Lead Free' and 'G: Halogen Free' are indicated.</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'. Below are two rows of two small squares each. An arrow labeled 'Voltage Code' points to the first square of the bottom row. An arrow labeled 'Data Code' points to the last square of the bottom row. The bottom edge has three pins, with the first labeled '1'. To the right, 'L: Lead Free' and 'G: Halogen Free' are indicated.</p>
SOP-8/DIP-8	3.3:3.3V 5.0:5.0V AD: ADJ	 <p>Diagram of SOP-8/DIP-8 package marking. The top surface is labeled 'UTC' and 'LM2954'. The top edge has pins 8, 7, 6, 5. Below are two rows of four small squares each. An arrow labeled 'Voltage Code' points to the first square of the bottom row. An arrow labeled 'Data Code' points to the last square of the top row. An arrow labeled 'Lot Code' points to the last square of the bottom row. The bottom edge has pins 1, 2, 3, 4. To the right, 'L: Lead Free', 'G: Halogen Free', and 'Lot Code' are indicated.</p>

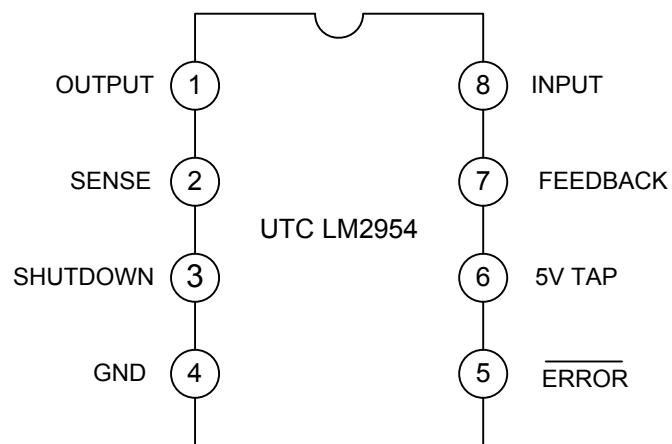
■ PIN CONFIGURATIONS



TO-92 Plastic Package Bottom View

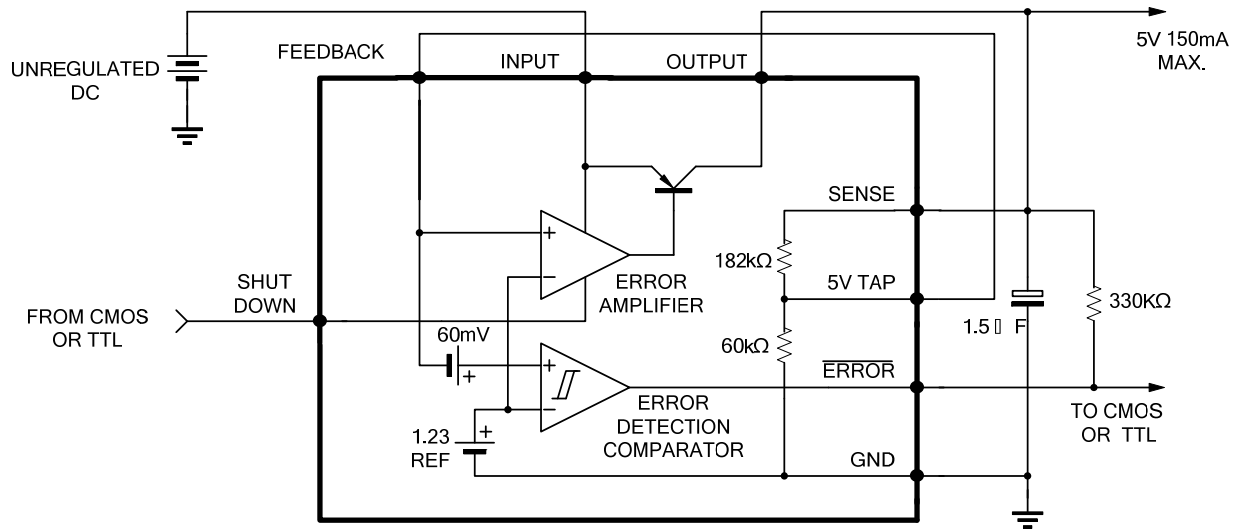


SOT-223 Package



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}	-40 ~ +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	$T_J=25^\circ\text{C}$	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	ΔV_{OUT}	$6\text{V} \leq V_{IN} \leq 30\text{V}$		0.1	0.2	%
Load Regulation	ΔV_{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	IGND	$I_L=100\mu\text{A}$		0.12	0.23	mA
		$I_L=200\mu\text{A}$		12	14	
Dropout Ground Current	I_D	$V_{IN}=4.5\text{V}$, $I_L=100\mu\text{A}$		560	650	μA
Current Limit	I_{LIMIT}	$V_{OUT}=0$	300			mA
Output Noise (10Hz to 100KHz)	e_N	$C_L=1\mu\text{F}$			430	μV
		$C_L=200\mu\text{F}$			160	
		$C_L=3.3\mu\text{F}$			100	

■ ELECTRICAL CHARACTERISTICS(Cont.)

LM2954-ADJ FOR 8-PIN VERSION ONLY

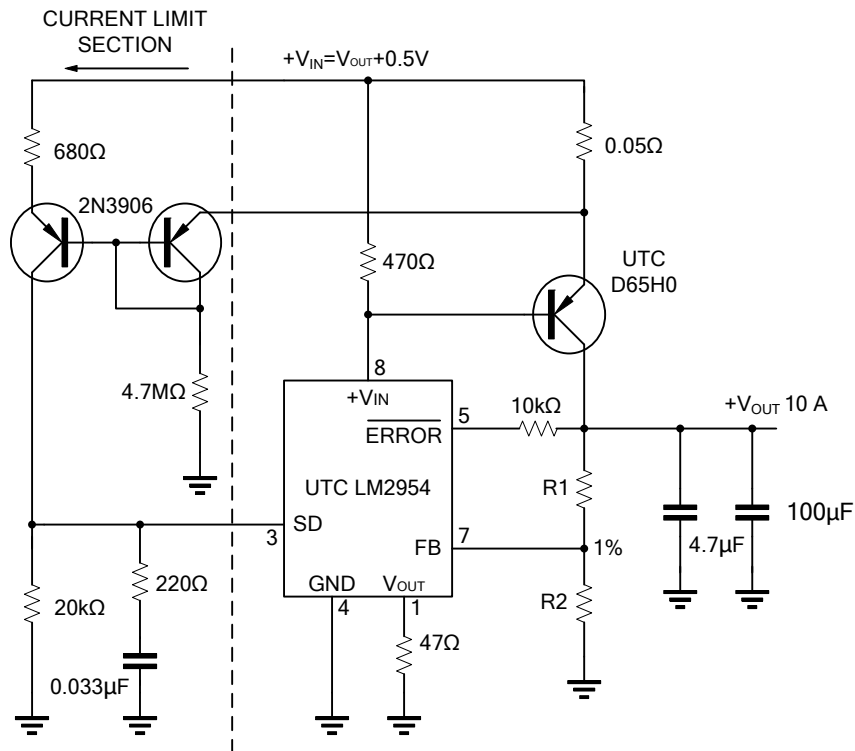
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Reference Voltage	V_{REF}		1.22	1.235	1.25	V
Reference Voltage	V_{REF}	$V_{REF} \leq V_{OUT} \leq (V_{IN} - 1V)$, $2.3V \leq V_{IN} \leq 18V$, $100\mu A \leq I_L \leq 100mA$, $T_J \leq T_{JMAX}$	1.19		1.27	V
Feedback Pin Bias Current	$I_{B(FB)}$			20	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
ERROR COMPARATOR						
Output Leakage Current	$I_{O(LEAK)}$	$V_{OH} = 30V$			1	μA
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
SHUTDOWN INPUT						
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	μA
		$V_{SHDN} = 30V$		450	600	μA
Regulator Output Current Shutdown	$I_{O(SHDN)}$	$V_{SHDN} \geq 2V$, $V_{IN} \leq 30V$, $V_{OUT} = 0$, Feedback pin tied to 5V Tap.		3	10	μA

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

- 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.
- Comparator thresholds are expressed in terms of percentage value of voltage output.

■ APPLICATION CIRCUIT (10A Low Dropout Regulator)

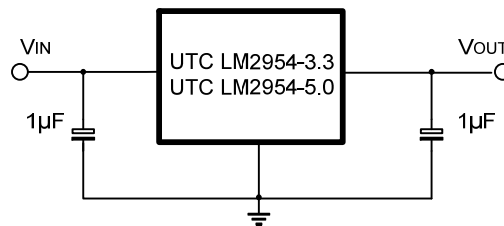
For 8 Pins



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

For 5V output use internal resistors. Wire pin 6 to 7 and wire pin 2 to +V_{OUT}

For 3 Pins



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