



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.

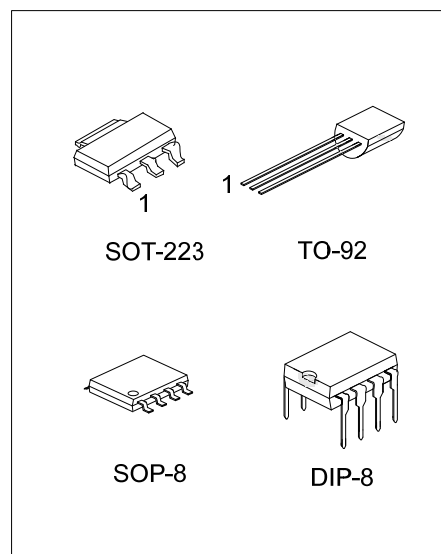
ORDERING INFORMATION

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-R	LM2954G-xx-S08-R	SOP-8				Tape Reel
LM2954L-xx-S08-T	LM2954G-xx-S08-T	SOP-8				Tube
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

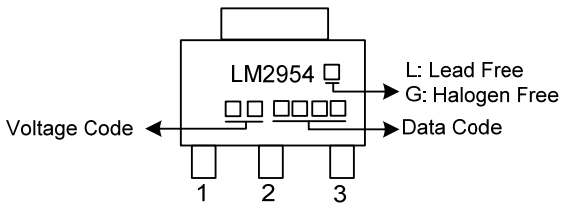
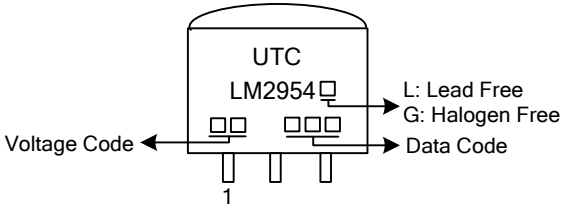
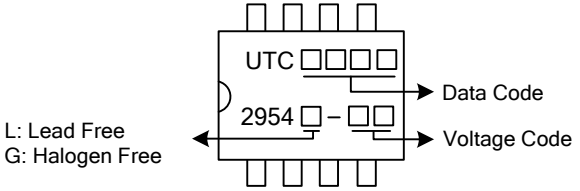
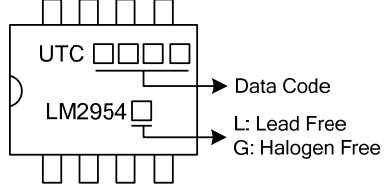
Note: 1. Pin assignment: I: V_{IN} O: V_{OUT} G: GND

2. xx: Output Voltage

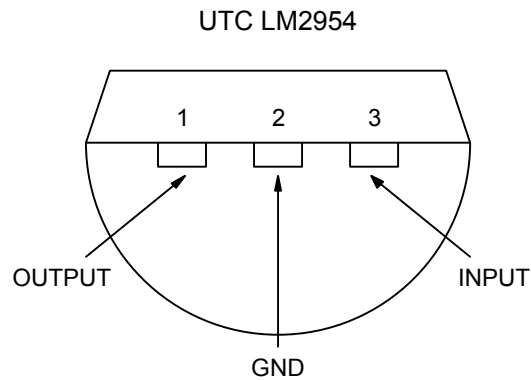
LM2954L-xx-AA3-R	(1)Packing Type (2)Package Type (3)Output Voltage Code (4)Lead Free	(1) B: Tape Box, K: Bulk, R: Tape Reel, T: Tube (2) AA3: SOT-223, D08: DIP-08, S08: SOP-8, T92: TO-92 (3) xx: 3.3V:33, 5.0V:50, ADJ:AD (4) G: Halogen Free, L: Lead Free
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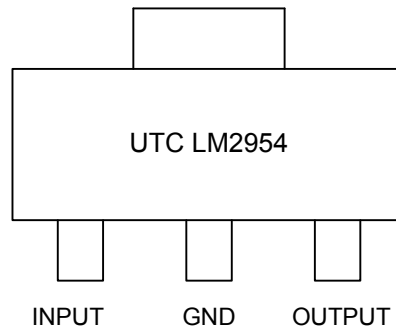
MARKING INFORMATION

PACKAGE	VOLTAGE CODE	MARKING
SOT-223	33:3.3V 50:5.0V	 <p>Diagram of SOT-223 package marking. The package is labeled LM2954. The marking area contains a Voltage Code (left), a Data Code (right), and a Halogen Free code (G). The package has three pins labeled 1, 2, and 3.</p>
TO-92	3.3:3.3V 5.0:5.0V	 <p>Diagram of TO-92 package marking. The package is labeled UTC and LM2954. The marking area contains a Voltage Code (left), a Data Code (right), and a Halogen Free code (G). The package has one pin labeled 1.</p>
SOP-8/DIP-8	3.3:3.3V 5.0:5.0V	 <p>Diagram of SOP-8/DIP-8 package marking (top). The package is labeled UTC and 2954. The marking area contains a Data Code (right), a Voltage Code (left), and a Halogen Free code (G). The package has eight pins.</p>
	ADJ	 <p>Diagram of SOP-8/DIP-8 package marking (bottom). The package is labeled UTC and LM2954. The marking area contains a Data Code (right), a Halogen Free code (G), and a Lead Free code (L). The package has eight pins.</p>

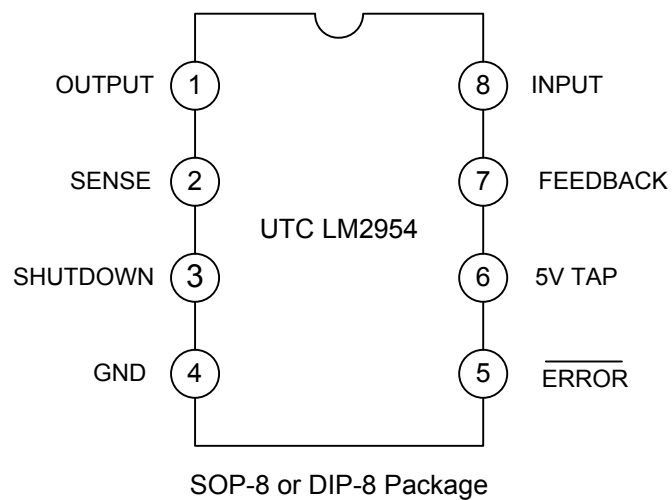
■ PIN CONFIGURATIONS



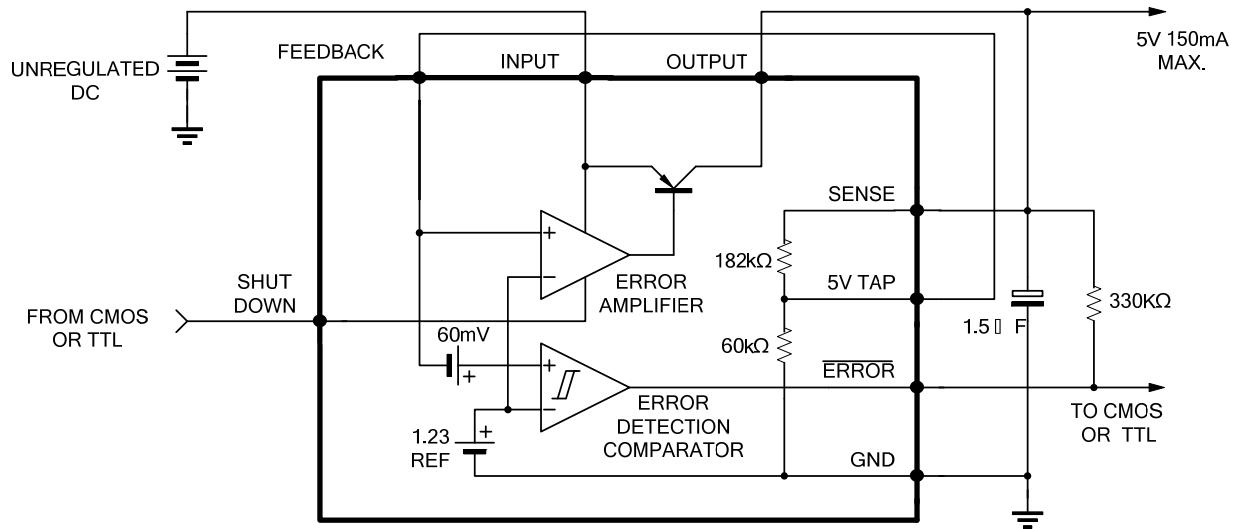
TO-92 Plastic Package Bottom View



SOT-223 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	V _{OUT}	T _J =25°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		△V _{OUT}	6V ≤ V _{IN} ≤ 30V		0.1	0.2	%
Load Regulation		△V _{OUT}	100μA ≤ I _L ≤ 300mA		0.2	0.5	
Dropout Voltage		V _D	I _L =100mA			400	mV
			I _L =200mA (note 2)	380	450	600	
Ground Current		I _{GND}	I _L =100μA	0.075	0.12	0.23	mA
			I _L =200mA	8	12	14	
Dropout Ground Current		I _D	V _{IN} =4.5V, I _L =100μA			230	μA
Current Limit		I _{LIMIT}	V _{OUT} =0	300			mA
Output Noise (10Hz to 100KHz)		e _N	C _L =1μF			430	μV
			C _L =200μF			160	
			C _L =3.3μF			100	
LM2954-ADJ FOR 8-PIN VERSION ONLY							
Reference Voltage		V _{REF}		1.22	1.235	1.25	V
Reference Voltage		V _{REF}	V _{REF} ≤ V _{OUT} ≤ (V _{IN} -1V), 2.3V ≤ V _{IN} ≤ 18V, 100μA ≤ I _L ≤ 100mA, T _J ≤ 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
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

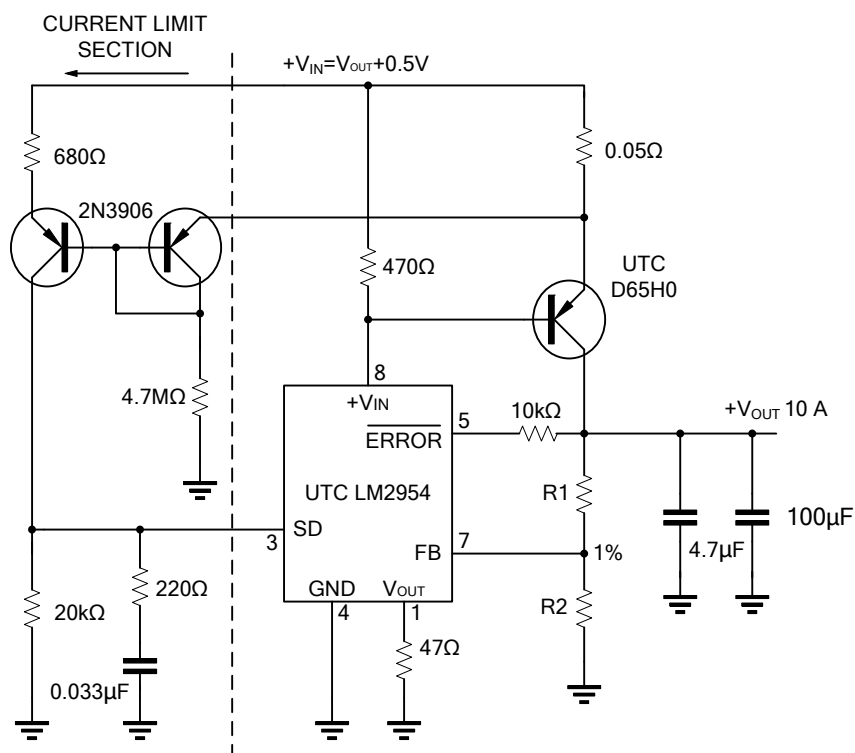
Note 1: Additional conditions for 8-pin versions are feedback tied to 5V Tap and Output tied to Output Sense ($V_{OUT}=5V$) and $V_{SHDN} \leq 0.8V$.

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)

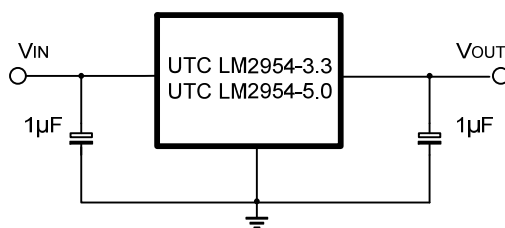
For 8 Pins



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

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

For 3 Pins



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