



## LP2950/2951

## LINEAR INTEGRATED CIRCUIT

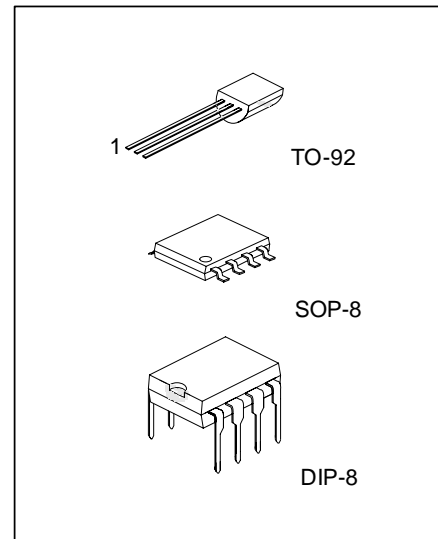
### 100 mA LOW-DROPOUT VOLTAGE REGULATOR

#### DESCRIPTION

The UTC **LP2950/2951** are monolithic integrated voltage regulators with low dropout voltage, and low quiescent current. It includes many features that suitable for different applications.

#### FEATURES

- \* Fixed output versions, 2.5V, 3V, 3.3V, 3.6V and 5V, are available.
- \* High accuracy output voltage.
- \* Extremely low quiescent current and dropout voltage.
- \* Extremely tight load and line regulation.
- \* Current and thermal limiting.
- \* Very low temperature coefficient.
- \* Logic controlled shutdown and err flog available for 8 pin package.
- \* Output voltage programmable for LP2951.



\*Pb-free plating product number:  
LP2950L-XX/LP2951L

#### ORDERING INFORMATION

Ordering Number		Package	Packing
Normal	Lead Free Plating		
LP2950-xx-D08-T	LP2950L-xx-D08-T	DIP-8	Tube
LP2950-xx-S08-T	LP2950L-xx-S08-T	SOP-8	Tube
LP2950-xx-S08-R	LP2950L-xx-S08-R	SOP-8	Tape Reel
LP2950-xx-T92-B	LP2950L-xx-T92-B	TO-92	Tape Box
LP2950-xx-T92-K	LP2950L-xx-T92-K	TO-92	Bulk
LP2951-D08-T	LP2951L-D08-T	DIP-8	Tube
LP2951-S08-T	LP2951L-S08-T	SOP-8	Tube
LP2951-S08-R	LP2951L-S08-R	SOP-8	Tape Reel

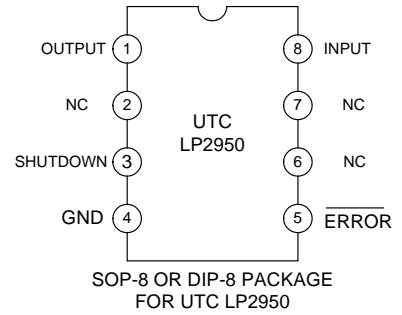
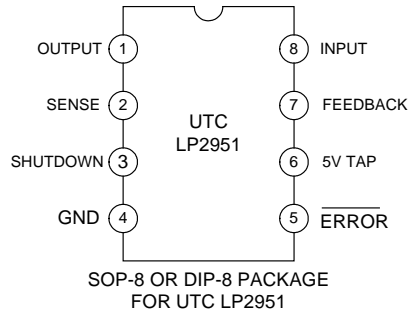
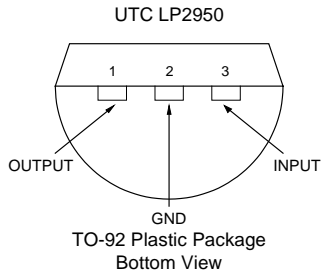
Note: xx: Output Voltage Code (For LP2950 only)

<p>LP2950L-xx-S08-R</p>	<p>(1)Packing Type (2)Package Type (3)Output Voltage Code (4)Lead Plating</p>	<p>(1) B: Tape Box, K: Bulk, R: Tape Reel, T: Tube (2) D08: DIP-8, S08: SOP-8, T92: TO-92 (3) xx: refer to Output Voltage Code (4) L: Lead Free Plating, Blank: Pb/Sn</p>
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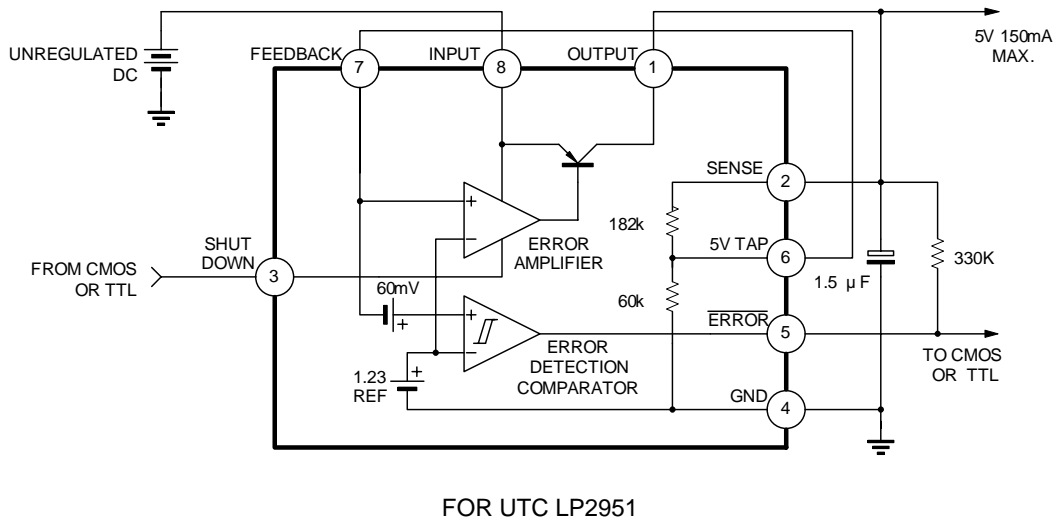
#### OUTPUT VOLTAGE CODE(For LP2950)

OUTPUT VOLTAGE	CODE
2.5V	25
3.0V	30
3.3V	33
3.6V	36
5.0V	50

## PIN CONFIGURATIONS



## BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	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
Operation Junction Temperature	$T_J$	-40 ~ +125	°C
Storage Temperature	$T_{STG}$	-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.

### ■ 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.)

#### For All Version:

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Output Voltage	$V_{OUT}$	$T_J=25^\circ\text{C}$ (Note 1)	$V_{OUT}\times 0.98$	$V_{OUT}$	$V_{OUT}\times 1.02$	V
		$-25^\circ\text{C}$ $T_J$ $+85^\circ\text{C}$ (Note 1)	$V_{OUT}\times 0.98$	$V_{OUT}$	$V_{OUT}\times 1.02$	V
Output Voltage	$V_{OUT}$	$100\mu\text{A}$ $I_L$ $100\text{mA}$ , $T_J$ $T_J(\text{max})$	$V_{OUT}\times 0.98$	$V_{OUT}$	$V_{OUT}\times 1.02$	V
Output Voltage Temperature Coefficient	$TcVo$		20		100	ppm/°C
Line Regulation	$V_{OUT}$	$6\text{V}$ $V_{IN}$ $30\text{V}$	0.03	0.1	0.2	%
Load Regulation	$V_{OUT}$	$100\mu\text{A}$ $I_L$ $100\text{mA}$	0.04	0.1	0.2	%
Dropout Voltage	$V_D$	$I_L=100\mu\text{A}$	50	80	150	mV
		$I_L=100\text{mA}$ (Note 2)	380	450	600	
Ground Current	$I_G$	$I_L=100\mu\text{A}$	75	120	140	$\mu\text{A}$
		$I_L=100\text{mA}$	8	12	14	mA
Dropout Ground Current		$V_{IN}=4.5\text{V}$ , $I_L=100\mu\text{A}$	110	170	200	$\mu\text{A}$
Current Limit	$I_{LIMIT}$	$V_{OUT}=0$	160	200	220	mA
Output Noise (10Hz ~ 100KHz) (Bypass= $0.01\mu\text{F}$ pins 7 to 1 (LP2951))	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	

#### For UTC LP2951 8-Pin Version Only

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Reference Voltage	$V_{REF}$		1.22	1.235	1.25	V
Reference Voltage	$V_{REF}$	Over temperature(Note 4)	1.19		1.27	V
Feedback pin Bias Current	$I_{FB}$			20	40	nA
Reference Voltage Temperature Coefficient	$V_{REF(TC)}$			50		ppm/°C
Feedback Bias Current Temperature Coefficient	$I_{FB(TC)}$			0.1		nA/°C
<b>Error Comparator</b>						
Output Leakage Current	$I_{O(LEAK)}$	$V_{OH}=30\text{V}$			1	$\mu\text{A}$
Output Low Voltage	$V_{OL}$	$V_{IN}=4.5\text{V}$ , $I_{OL}=400\mu\text{A}$			250	mV
Threshold Voltage	Upper	$V_{THU}$ (Note 3)	3.2			%VO
	Lower	$V_{THL}$ (Note 3)			7.6	%VO
Hysteresis	$V_{HYS}$	(Note 3)		15		mV

### ■ ELECTRICAL CHARACTERISTICS(Cont.)

#### For UTC LP2951 8-Pin Version Only

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
<b>Shutdown Input</b>						
Input Logic Voltage	Low	$V_{IL}$	Regulator ON		1.3	V
	High	$V_{IH}$	Regulator OFF	2.0		
Shutdown Pin Input Current	$I_{SHDN}$	$V_{SHDN}=2.4V$		30	50	$\mu A$
		$V_{SHDN}=30V$		450	600	$\mu A$
Regulator Output Current Shutdown	$I_{DFF}$	$V_{SHDN} = 2V, V_{IN} = 30V, V_{OUT}=0$ Feedback pin tied to 5V Tap.		3	10	$\mu A$

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

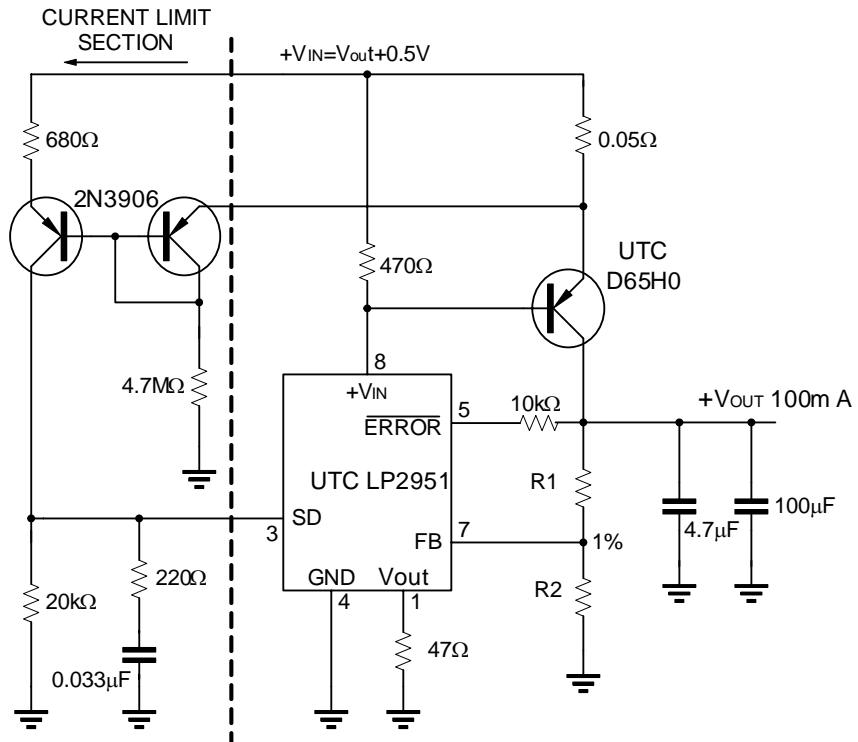
Note 2: Dropout Voltage is defined as the input to output differential at which the output voltage drops 100mV below its nominal value measured at 1V differential.

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

Note 4:  $V_{REF} \leq V_{OUT} \leq (V_{IN}-1V)$ ,  $2.3V \leq V_{IN} \leq 30V$ ,  $100\mu A \leq I_L \leq 100mA$ ,  $T_J \leq T_{J(MAX)}$

■ TYPICAL APPLICATION CIRCUIT

10 Ampere Low Dropout Regulator



$V_{OUT} = 1.23V * (1 + R1/R2)$   
 For 5V output use internal resistors Wire pin 6 to 7 and wire pin 2 to +Vout

Fig.1

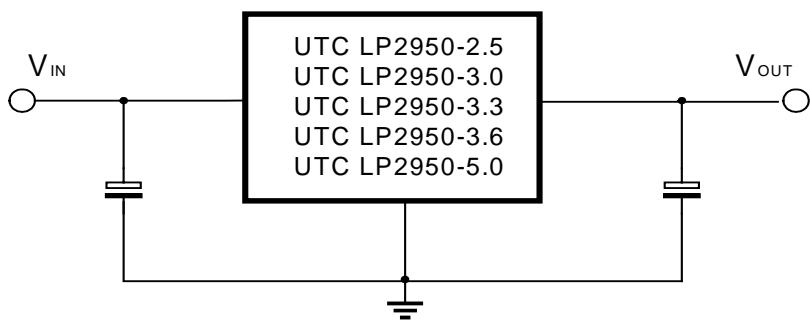
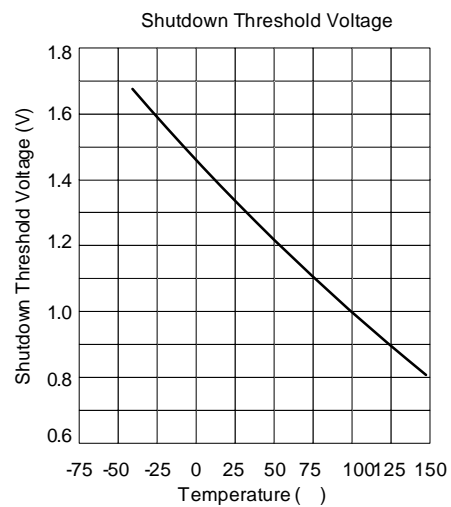
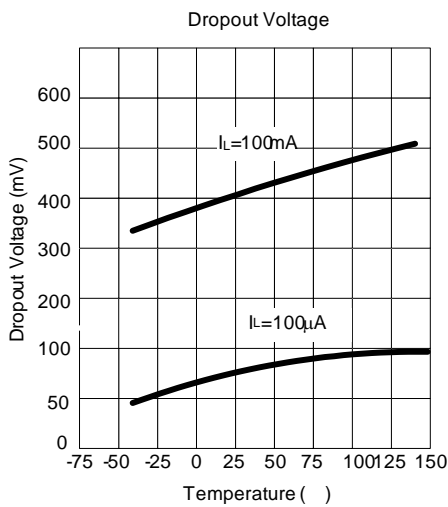
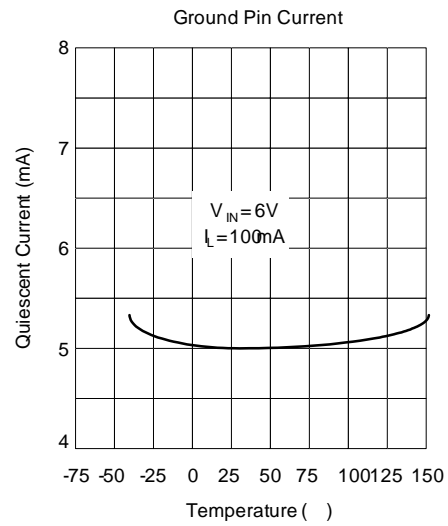
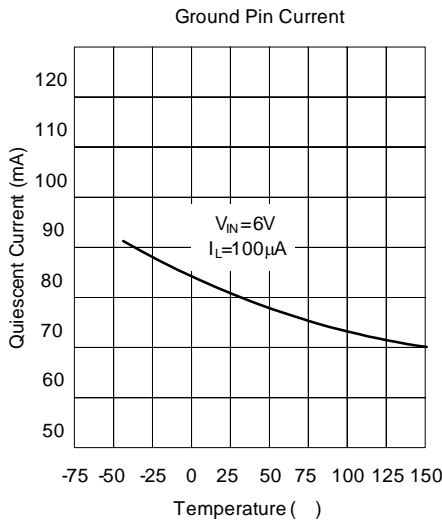
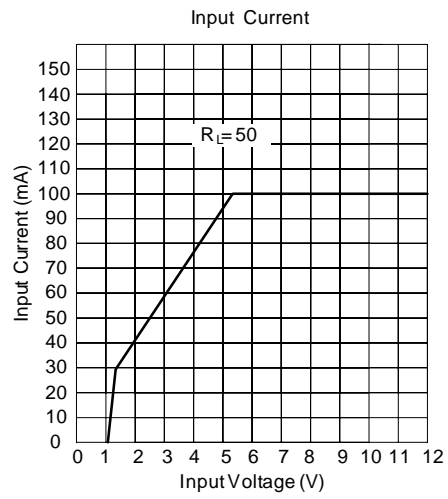
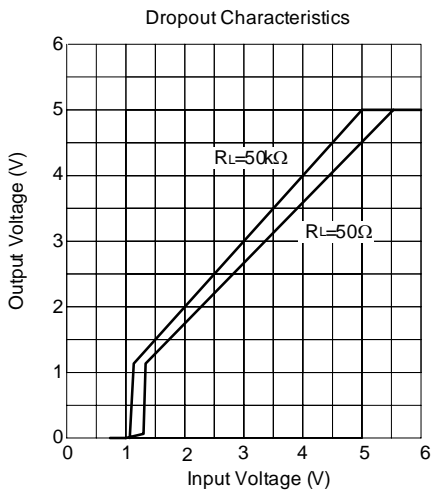
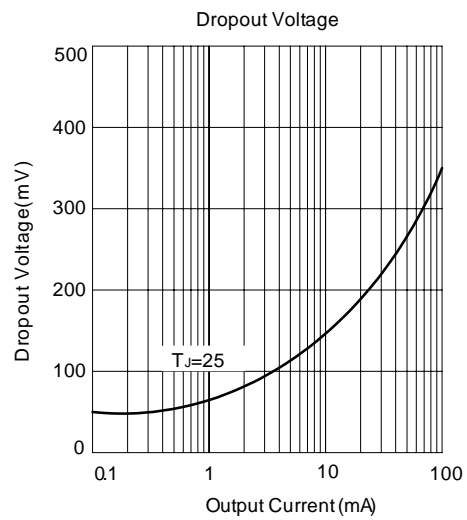
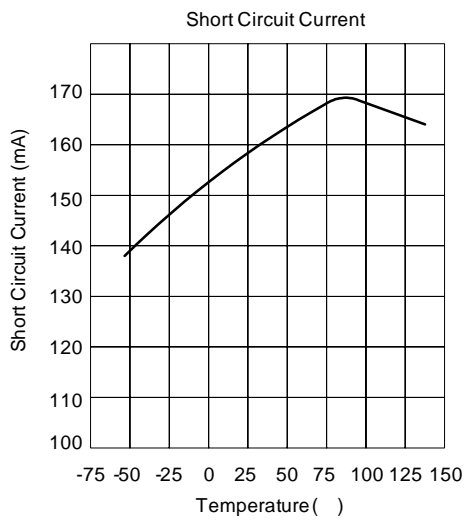


Fig.2

## ■ TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



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