

# LM2931A

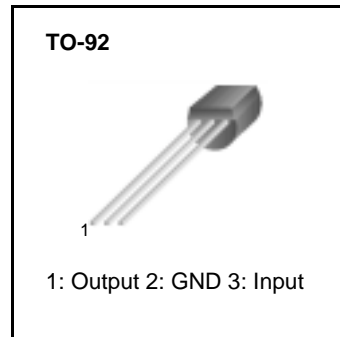
## Low Dropout Voltage Regulator

### Features

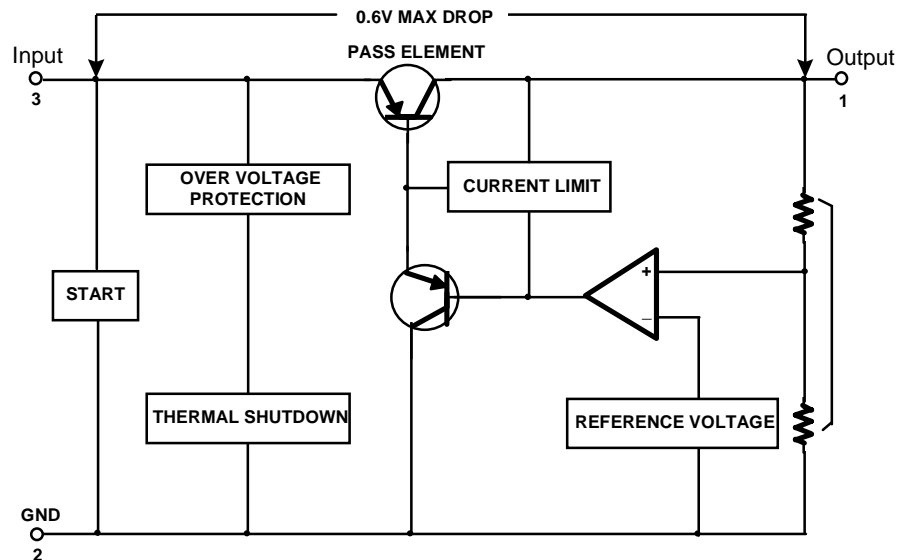
- Limited input voltage and high efficiency.
- Internal thermal over load protection.
- 60V load dump protection.
- Output current up to 0.1A.

### Description

LM2931A is a fixed 3-terminal low dropout voltage regulator designed to need very low quiescent current. Internally, implemented circuits include 60V load dump protection, -50V reverse transient short circuit and thermal over load protection.



### Internal Block Diagram



## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Input Voltage	$V_i$	33	V
Over Protection Voltage	$V_{(OP)}$	60	V
Operating Temperature Range	TOPR	-40~+125	°C
Maximum Junction Temperature	$T_J$	150	°C
Storage Temperature Range	TSTG	-65~+150	°C

## Electrical Characteristics

( $V_i = 14V$ ,  $I_O = 10mA$ ,  $C_O = 100\mu F$ ,  $T_A = 25^\circ C$ )

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Output Voltage (I)	$V_O$ (I)	$V_i = 14V$ , $I_O = 10mA$	4.81	5.0	5.19	V
Output Voltage (II)	$V_O$ (II)	$V_i = 6 \sim 26V$ , $I_O = 100mA$ $T_J = -40 \sim +125^\circ C$	4.75	5.0	5.25	V
Line Regulation (I)	$\Delta V_O$ (I)	$V_i = 9 \sim 16V$ , $I_O = 10mA$	-	2.0	10	mV
Line Regulation (II)	$\Delta V_O$ (II)	$V_i = 6 \sim 26V$ , $I_O = 10mA$	-	4.0	30	mV
Load Regulation	$\Delta V_O$ (III)	$V_i = 14V$ , $I_O = 5 \sim 100mA$	-	10	50	mV
Output Impedance	$Z_O$	$V_i = 14V$ , $I_O = 100mA$	-	100	600	$m\Omega$
Quiescent Current (I)	$I_Q$ (I)	$V_i = 6 \sim 26V$ , $I_O \leq 10mA$	-	0.1	1.0	mA
Quiescent Current (II)	$I_Q$ (II)	$V_i = 14V$ , $I_O \leq 100mA$	-	5.0	30	mA
Output Noise Voltage	$V_N$	$V_i = 14V$ , $I_O = 10mA$ , $f = 10Hz \sim 100KHz$	-	150	1000	$\mu V_{rms}$
Ripple Rejection	RR	$V_i = 14V$ , $I_O = 10mA$ , $f = 120Hz$	55	80	-	dB
Dropout Voltage (I)	$V_D$ (I)	$I_O = 10mA$ , $V_D = V_i - V_O$	-	0.03	0.2	V
Dropout Voltage (II)	$V_D$ (II)	$I_O = 100mA$ , $V_D = V_i - V_O$	-	0.1	0.6	V
Max Operational Input Voltage	$V_{IN}$	$I_O = 10mA$	26	33	-	V
Max Line Transient	$V_{LT(MAX)}$	$V_i = 14V$ , $I_O = 10mA$ , Time = 100ms	60	70	-	V
Reverse Polarity Input Voltage DC	$V_{I(DC)}$	$V_i = 14V$ , $I_O = 10mA$ , $V_O \geq -0.3V$	- 15	- 30	-	V
Reverse Polarity Input Voltage Transient	$V_{I(TR)}$	$V_i = 14V$ , $I_O = 10mA$ , Time $\leq 10ms$	- 50	- 80	-	V
Peak Output Current	$I_{PK}$	$V_i = 14V$	200	400	600	mA

## Typical Performance Characteristics

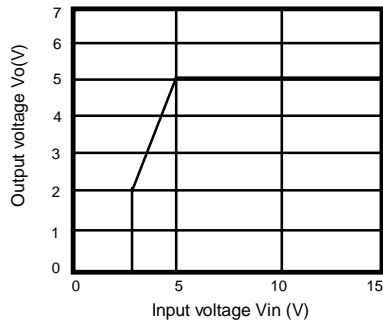


Figure 1. Output Voltage vs. Input Voltage

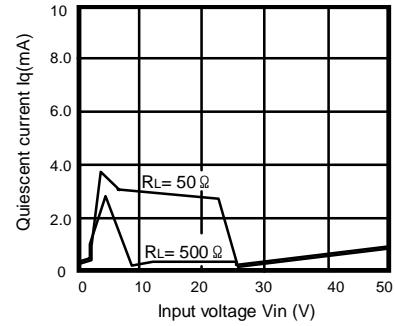


Figure 2. Quiescent Current vs. Input Voltage

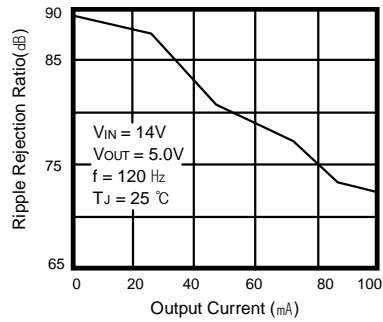


Figure 3. Ripple Rejection vs. Output Current

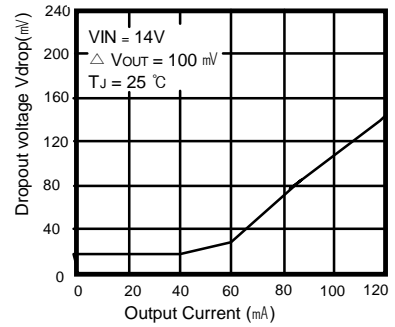


Figure 4. Drop Voltage vs. Output Current

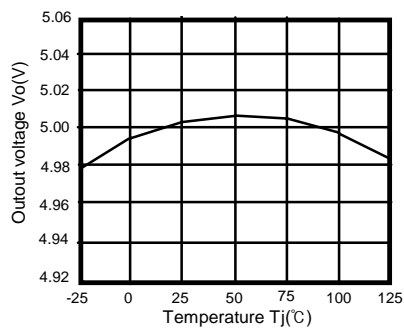


Figure 5. Output Voltage vs. Temperature( $T_j$ )

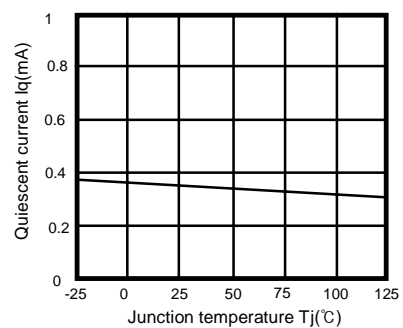


Figure 6. Quiescent Current vs. Temperature( $T_j$ )

## Typical Application

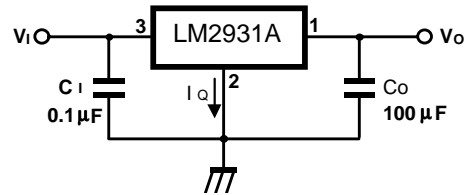


Figure 1. Application Circuit

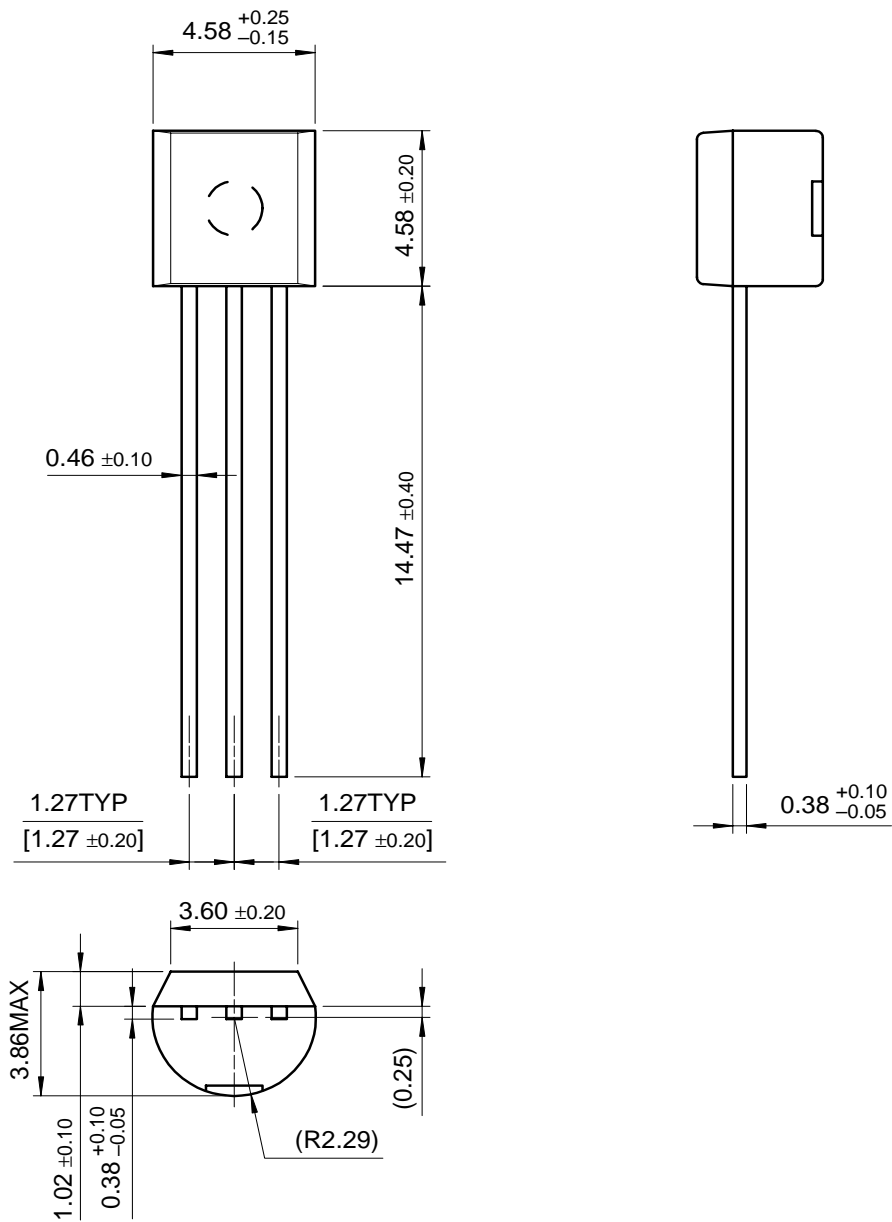
- $C_1$  is required if regulator is located an appreciable distance from power supply filter.
- $C_o$  improves stability .

## Mechanical Dimensions

### Package

Dimensions in millimeters

### TO-92



## Ordering Information

Product Number	Package	Operating Temperature
LM2931AZ5	TO-92	-40°C to + 125°C



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