

SANYO

No.2173B

L5431**High-Precision Variable Shunt
Voltage Regulator**

The L5431 is a high-precision variable shunt voltage regulator IC whose output voltage can be set to a value from approximately 2.5V to 36V by using external resistors. Because of low output resistance and fast pulse response, the L5431 can be most suitably used as high-precision voltage reference, high-speed comparator, or zener diode.

Features

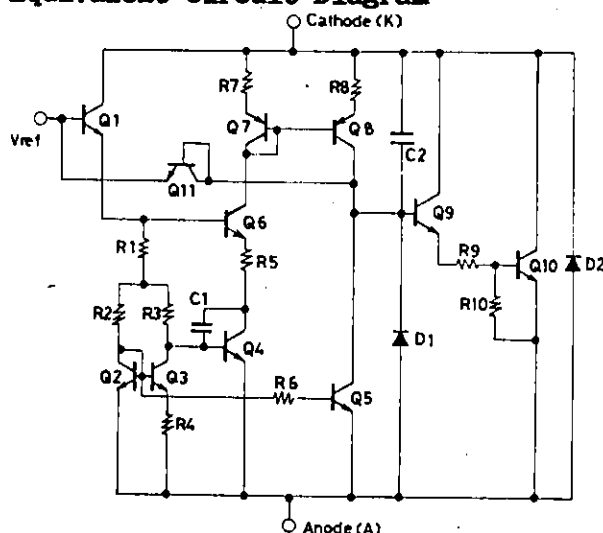
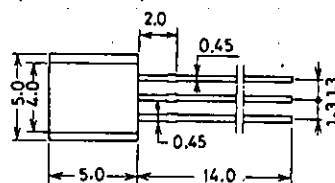
- (1) Excellent temperature characteristic of V_{ref} : 50ppm/ $^{\circ}\text{C}$ (typ)
- (2) Output voltage settable: Approximately 2.5V to 36V
- (3) Output flow-in current range: 1mA to 100mA
- (4) Low dynamic resistance: 0.15ohm(typ)
- (5) Fast response
- (6) Low output noise voltage
- (7) Small-sized TO-92

Maximum Ratings at $T_a=25^{\circ}\text{C}$

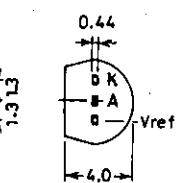
Maximum Voltage Applied across Cathode and Anode	V_{KA} max	Referenced to anode	37	unit V
Cathode Current	I_K max		-100 to +150	mA
Reference Voltage Pin Input Current	I_{ref}		-0.05 to +10	mA
Allowable Power Dissipation	P_d max	$T_a \leq 25^{\circ}\text{C}$	750	mW
Operating Temperature	T_{opr}		-20 to +85	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-65 to +150	$^{\circ}\text{C}$

Recommended Operating Conditions at $T_a=25^{\circ}\text{C}$

Voltage Applied across Cathode and Anode	V_{KA}		V_{ref} to 36	unit V
Cathode Current	I_K	Stabilized state	1 to 100	mA

Equivalent Circuit Diagram**Package Dimensions 3101
(unit: mm)**

JEDEC: TO-92
EIAJ: SC-43
SANYO: NP



K: Cathode
A: Anode
 V_{ref} : Reference voltage

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Electrical Characteristics at $T_a=25^{\circ}\text{C}$

			min	typ	max	unit	Test Circuit
Reference Voltage	V_{ref}	$V_{\text{KA}}=V_{\text{ref}}, I_{\text{K}}=10\text{mA}$	2440	2495	2550	mV	Fig.1
Reference Voltage Change with Temperature (Note1)	$\Delta V_{\text{ref}}(T_a)$	$V_{\text{KA}}=V_{\text{ref}}, I_{\text{K}}=10\text{mA}, T_a=0 \text{ to } +70^{\circ}\text{C}$		8	17	mV	Fig.1
Vref Change Ratio to V_{KA}	$\frac{\Delta V_{\text{ref}}}{\Delta V_{\text{KA}}}$	$I_{\text{K}}=10\text{mA}, \Delta V_{\text{KA}}=10\text{V to } V_{\text{ref}}, I_{\text{K}}=10\text{mA}, \Delta V_{\text{KA}}=36\text{V to } 10\text{V}$	-1.4	-2.7		mV/V	Fig.2
Reference Voltage Pin Input Current Change with Temperature (Note1)	$\Delta I_{\text{ref}}(T_a)$	$I_{\text{K}}=10\text{mA}, R_1=10\text{kohms}, R_2=\infty, T_a=0 \text{ to } +70^{\circ}\text{C}$		2	4	μA	Fig.2
Minimum Cathode Current	I_{KMIN}	$V_{\text{KA}}=V_{\text{ref}}, \text{regulation available}$	0.4	1		mA	Fig.1
OFF-State Cathode Current	I_{Koff}	$V_{\text{KA}}=36\text{V}, V_{\text{ref}}=0$	0.1	1		μA	Fig.3
Dynamic Resistance (Note2)	$ Z_{\text{KA}} $	$V_{\text{KA}}=V_{\text{ref}}, f \leq 1\text{kHz}, I_{\text{K}}=1 \text{ to } 100\text{mA}$	0.15	0.5		ohm	Fig.1

Input Voltage

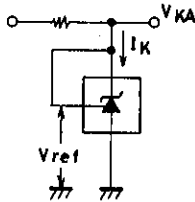


Fig.1

Input Voltage

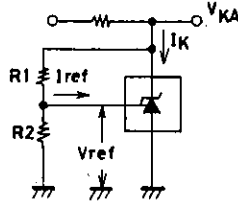


Fig.2

Input Voltage

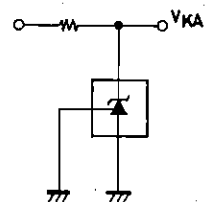
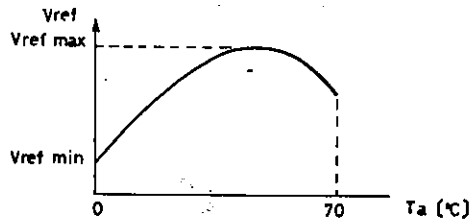


Fig.3

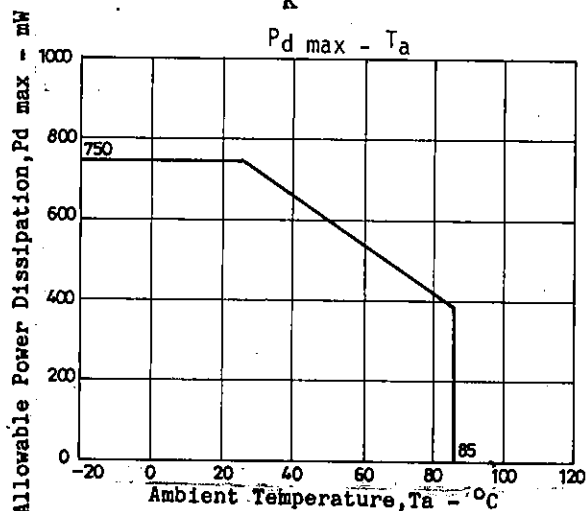
Note1: $\Delta V_{\text{ref}}(T_a)$ is defined by using $V_{\text{ref max}}$ and $V_{\text{ref min}}$ as follows:

$$\Delta V_{\text{ref}}(T_a) = V_{\text{ref max}} - V_{\text{ref min}}$$



Note2: The dynamic resistance is defined as follows:

$$|Z_{\text{KA}}| = \frac{\Delta V_{\text{KA}}}{\Delta I_{\text{K}}}$$



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