



HTL431

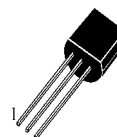
Description

The HTL431 are three-terminal adjustable regulator series with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between V_{REF} (approximately 2.5 volts) and 36 volts with two external resistors. These devices have a typical dynamic output impedance of 0.2Ω . Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications.

Features

- Equivalent Full-Range Temperature Coefficient of $50\text{PPM}/^{\circ}\text{C}$ Typical
- Programmable Output Voltage to 36 Volts
- Sink current Capability of 1.0 to 100mA
- Low Dynamic Output Impedance 0.20Ω Typical
- Low Output Noise Voltage
- Fast Turn-on Response

TO-92



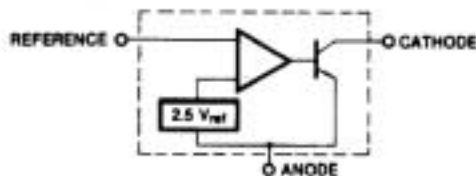
- 1—R (REF)
- 2—A (ANODE)
- 3—K (CATHODE)

Absolute Maximum Ratings ($T_a=25^{\circ}\text{C}$)

T_j —Junction Temperature	150 $^{\circ}\text{C}$
T_{stg} —Storage Temperature Range	-65~150 $^{\circ}\text{C}$
P_D —Power Dissipation D,LP Suffix Package	770mW
V_{KA} —Cathode Voltage	37V
I_{KA} —Cathode Current Range (Continuous)	-100~150mA
I_{REF} —Reference Input Current Range	-0.05~10mA



Internal Block Diagram



Typical Application

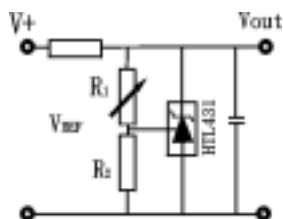


Figure 1 Shunt Regulator

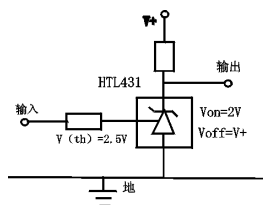


Figure2 Temperature Compensated

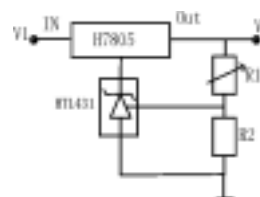


Figure 3. Output Control for Three-Terminal Fixed Regulator

**Electrical Characteristics** ($T_A=25^{\circ}\text{C}$, unless otherwise specified)

Symbol	Parameter	Min	Typ	Max	Unit	Conditions	
V_{REF}	Reference Input Voltage	2440	2495	2550	mV	$V_{KA}=V_{REF}$, $I_K=10\text{mA}$	
V_{REF}/T	Deviation of Reference Input Voltage Over-Temperature(Note 1)		4.5	17	mV	$T_A=\text{Full Range}$	
$\Delta V_{REF}/\Delta V_{KA}$	Ratio of Change in Reference Input Voltage To the Change in Cathode Voltage		-1.0	-2.7	mV/W	$I_K=10\text{mA}$	$\Delta V_{KA}=10\text{V}-V_{REF}$
			-0.5	-2		$I_K=10\text{mA}$	$\Delta V_{KA}=36\text{V}-10\text{V}$
I_{REF}	Reference Input Current		1.5	4	μA	$I_K=10\text{mA}$, $R_1=10\text{K}\Omega$ $R_2=\infty$	
I_{REF}/T	Deviation of Reference Input Current Over Full Temperature Range		0.4	1.2	μA	$T_A=\text{Full Range}$	
$I_{KA}(\text{MIN})$	Minimum Cathode Current for		0.45	1.0	mA	$V_{KA}=V_{REF}$	
$I_{KA}(\text{OFF})$	Off-Stage Cathode Current		0.05	1.0	μA	$V_{KA}=36\text{V}$ $V_{REF}=0$	
Z_{KA}	Dynamic Impedance (Note 2)		0.15	0.5	Ω	$V_{KA}=V_{REF}$ $I_K=1\text{mA}-100\text{mA}$ $F\leq 1\text{kHz}$	



Typical Performance Characteristics

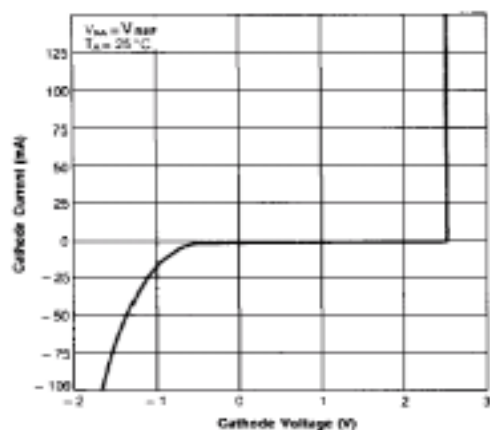


Figure 1. Cathode Current vs. Cathode Voltage

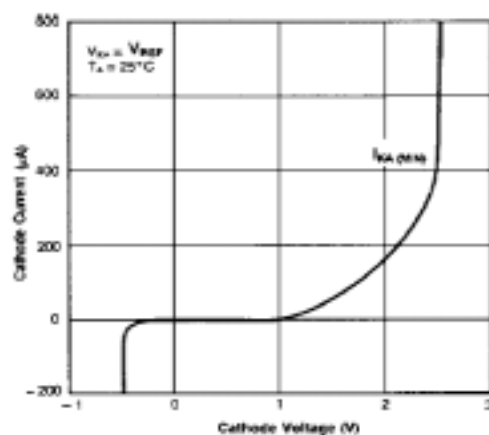


Figure 2. Cathode Current vs. Cathode Voltage

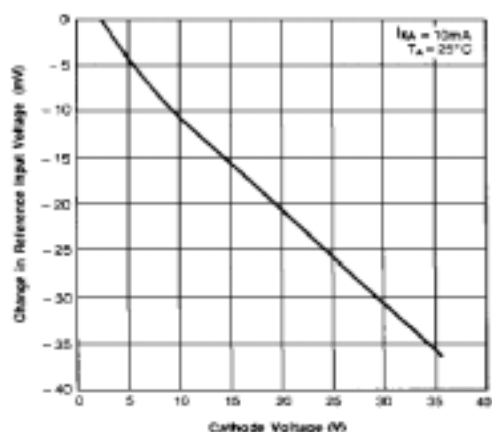


Figure 3. Change In Reference Input Voltage vs. Cathode Voltage

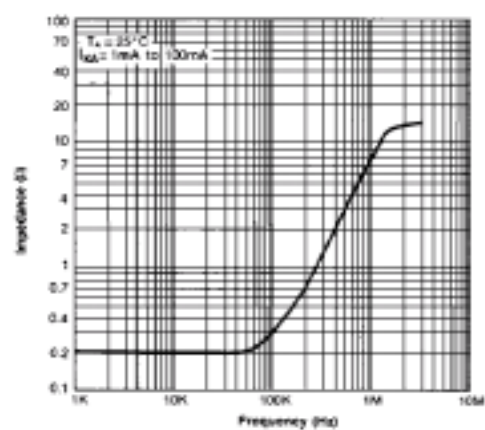


Figure 4. Dynamic Impedance Frequency

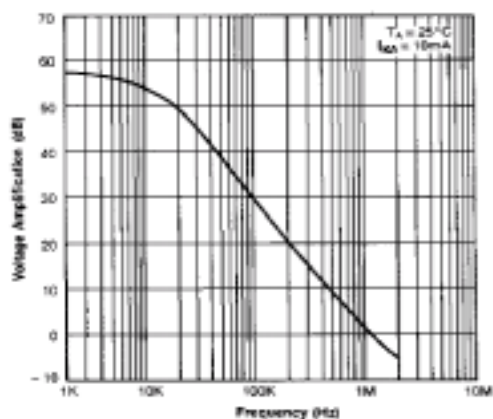


Figure 5. Small Signal Voltage Amplification vs. Frequency

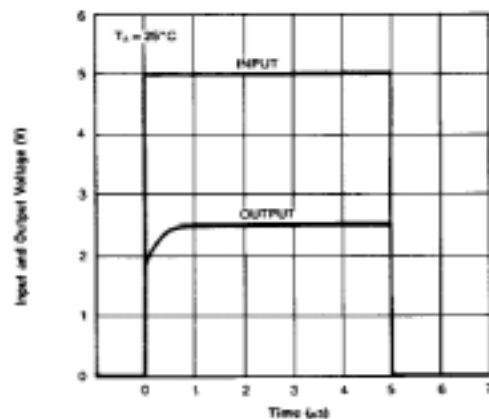


Figure 6. Pulse Response