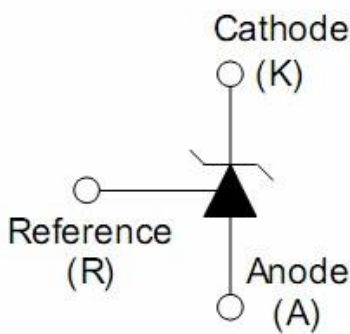
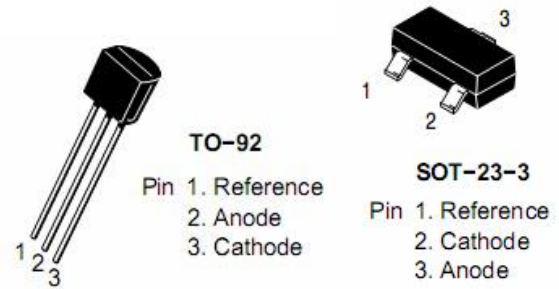


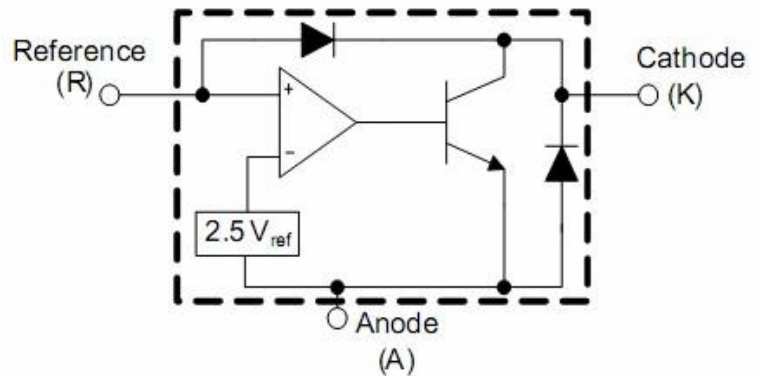
DESCRIPTION

The 431S is a 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 40 volts with two external resistors. These devices have a typical dynamic output impedance of 0.26Ω . Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications. The 431S is characterized for operation from $(-40$ to $+125^{\circ}\text{C})$.

- Programmable Output Voltage to 40V
- Low Dynamic Output Impedance 0.26Ω (Typ)
- Sink Current Capability of $100\mu\text{A}$ to 100mA
- Equivalent Full-Range Temperature Coefficient of $(50\text{ppm}/^{\circ}\text{C})^*$
- Temperature Compensated for Operation over Full Rated Operating Temperature Range
- Low Output Noise Voltage
- ESD 2000V
- Fast Turn on Respons
- Available in TO-92, SOP- 8, SOT-89 or SOT-23-3 packages



Symbol



Representative Block diagram

ABSOLUTE MAXIMUM RATINGS

(Operating temperature range applies unless otherwise specified)

Characteristic	Symbol	Value	Unit
Cathode Voltage	V_{KA}	40	V
Cathode Current Range (Continuous)	I_K	-100 ~ 150	mA
Reference Input Current Range	I_{REF}	-0.05 ~ +10	mA
Power Dissipation at 25°C : TO – 92 Package ($R_{thJA} = 178^{\circ}\text{C}/\text{W}$)	P_D	0.7	W
SOT – 23 – 3 Package ($R_{thJA} = 625^{\circ}\text{C}/\text{W}$)		0.2	W
Junction Temperature Range	T_J	-40 ~ 125	$^{\circ}\text{C}$
Operating Temperature Range	T_A	(-40 ~ 125)	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	-65 ~ +150	$^{\circ}\text{C}$

RECOMMENDED OPERATING CONDITIONS

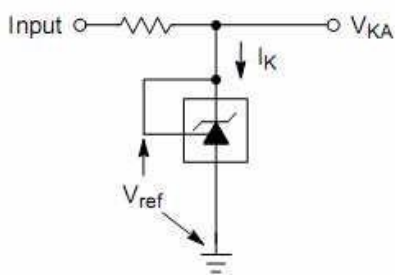
Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Cathode Voltage	V_{KA}		V_{REF}	-	40	V
Cathode Current	I_K		0.1	-	100	mA

ELECTRICAL CHARACTERISTICS

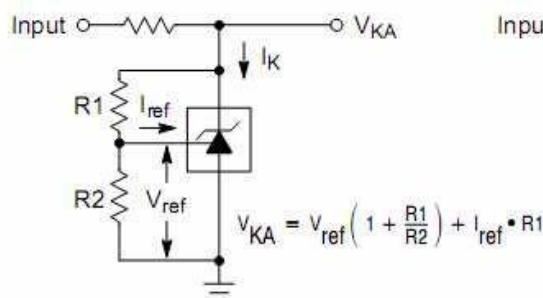
($T_A = 25^\circ\text{C}$, $V_{KA} = V_{REF}$, $I_K = 10\text{mA}$ unless otherwise specified)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Reference Input Voltage	V_{REF}	$V_{KA} = V_{REF}$, $I_K = 10\text{mA}$	2.488	2.5	2.512	V
Deviation of Reference Input Voltage Over Full Temperature Range	$V_{REF(\text{dev})}$	$V_{KA} = V_{REF}$, $I_K = 10\text{mA}$ $-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$	-	4	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$	$\Delta V_{KA} = 10\text{V} - V_{REF}$ $\Delta V_{KA} = 36\text{V} - 10\text{V}$	-0.4 -0.4	-0.2 0.1	2.7 2.0	mV/V
Reference Input Current	I_{REF}	$R_1 = 10\text{K}\Omega$, $R_2 = \infty$	-	0.2	4	μA
Deviation of Reference Input Current Over Full Temperature Range	$I_{REF(\text{dev})}$	$R_1 = 10\text{K}\Omega$, $R_2 = \infty$ $-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$	-	0.05	0.4	μA
Minimum Cathode Current for Regulation	$I_{K(\text{min})}$	-	-	0.05	0.1	mA
Off-State Cathode Current	$I_{K(\text{off})}$	$V_{KA} = 40\text{V}$, $V_{REF} = 0$	-	0.25	0.5	μA
Dynamic Impedance	Z_{KA}	$I_K = 1\text{mA}$ to 100mA , $f \leq 1.0\text{KHz}$	-	0.26	0.5	Ω

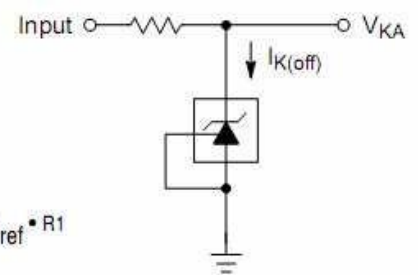
TEST CIRCUITS



Test Circuit
for $V_{KA} = V_{ref}$

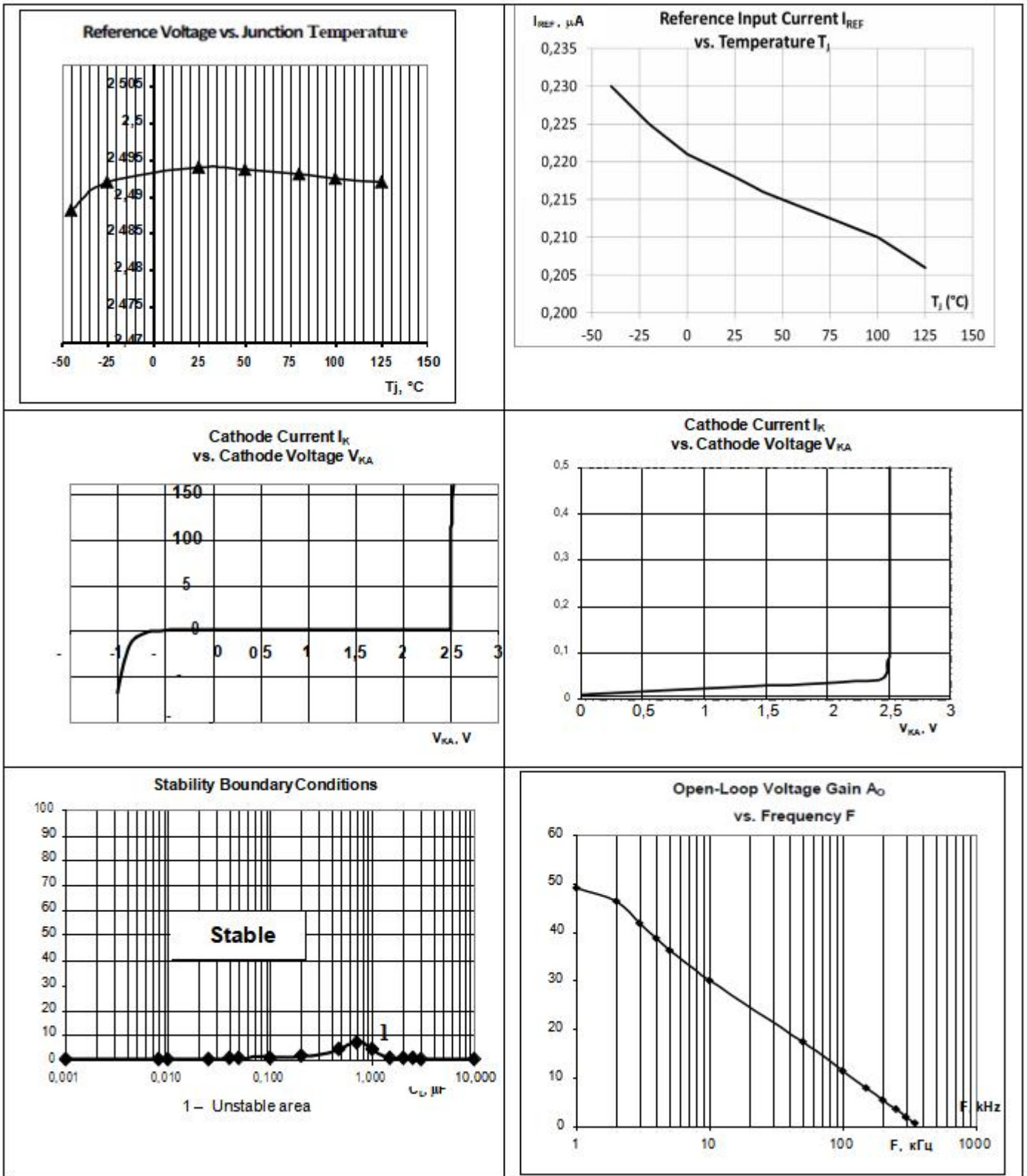


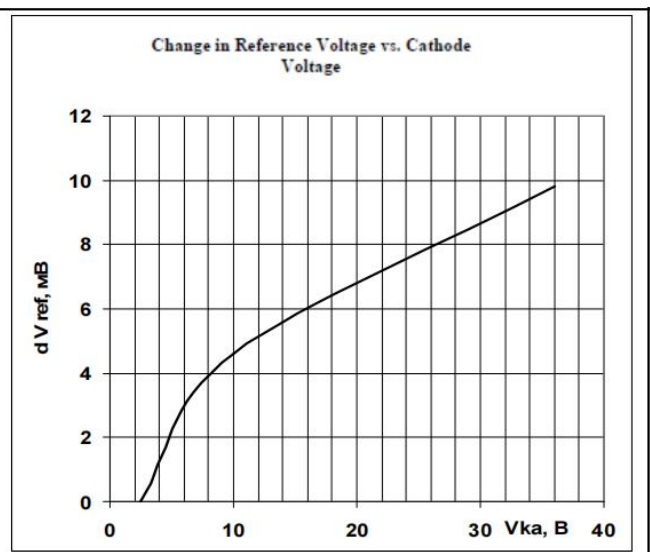
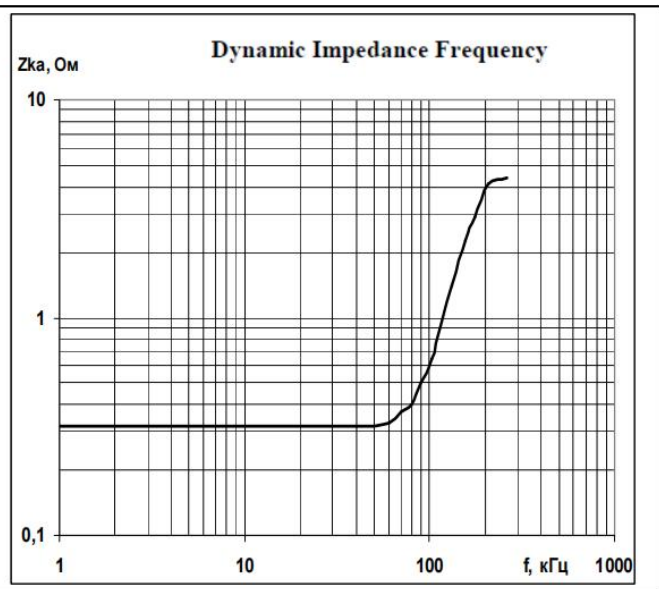
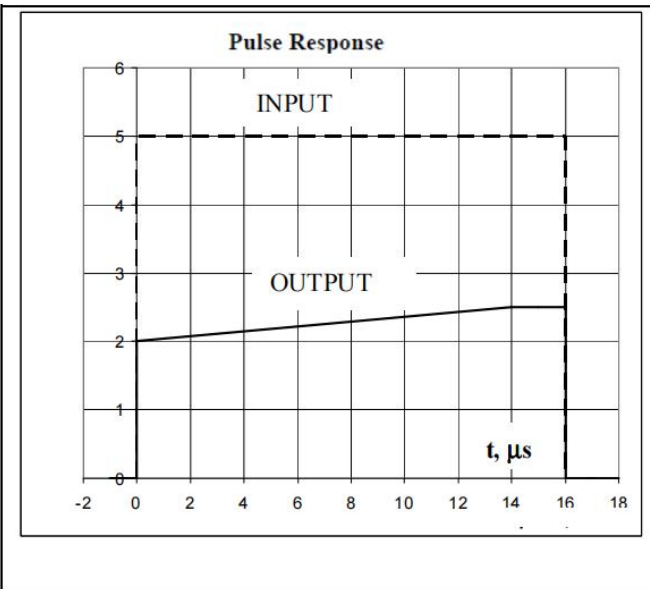
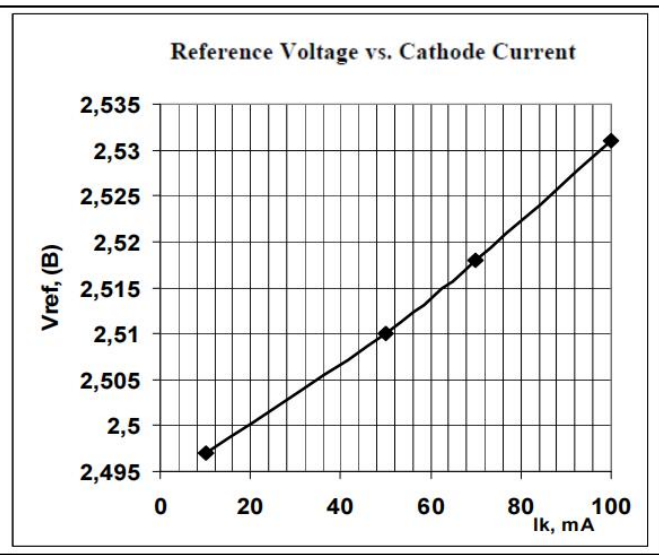
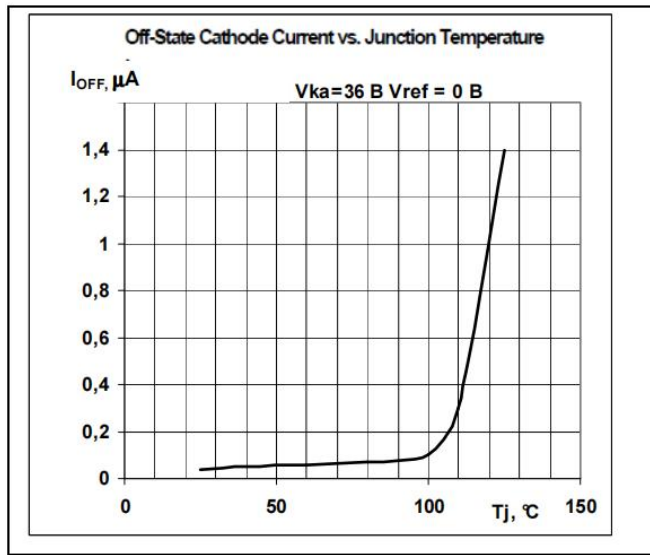
Test Circuit
for $V_{KA} > V_{ref}$



Test Circuit
for $I_{K(\text{off})}$

TYPICAL PERFORMANCE CHARACTERISTICS





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