

DESCRIPTION

The CT431D are three-terminal adjustable shunt regulators with a specified thermal stability. The output voltage may be set to any value between V_{ref} (approx. 2.5V) and 36V with two external resistors. The active output circuitry provides a very sharp turn-on characteristic making these devices an excellent replacement for Zener diodes in many applications.

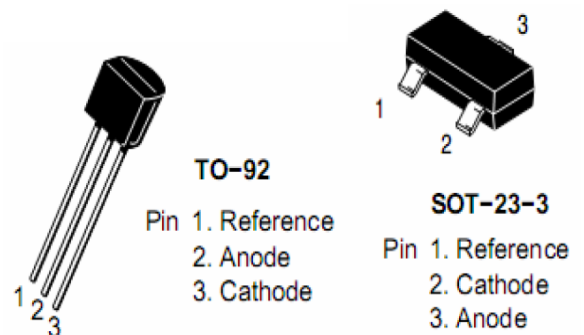
FEATURES

- Low Dynamic output impedance 0.1 Ω (Typ)
- Adjustable output voltage
- Fast turn-on response
- Sink current capability of 0.1mA to 100mA
- Low output noise
- Industrial temperature range
- Improved temperature compensation
- Excellent temperature coefficient 25ppm/ $^{\circ}\text{C}$
- Electrostatic discharge voltage 2.5kV

APPLICATIONS

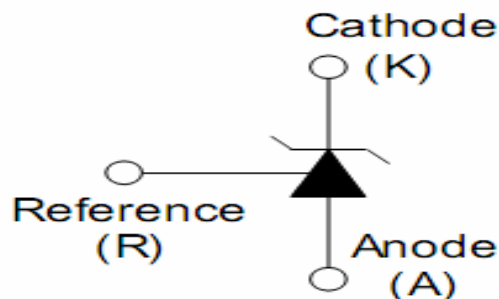
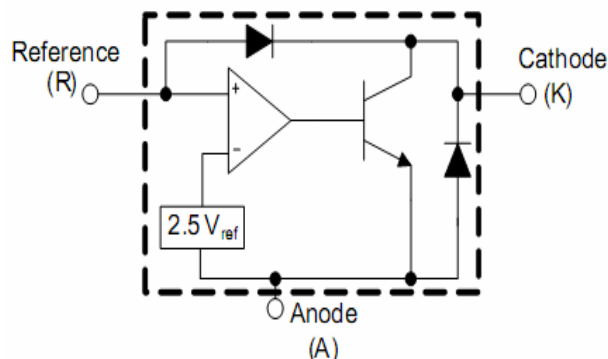
- Adjustable Voltage and Current Referencing
- Zener Replacement
- Voltage Monitoring
- Comparator with Integrated Reference

PIN CONFIGURATION



Representative Block Diagram

Symbol



ABSOLUTE MAXIMUM RATINGS

(Operating temperature range applies unless otherwise specified)

Characteristic	Symbol	Value	Unit
Cathode voltage (<i>Note 1</i>)	V_{KA}	40	V
Continuous cathode current range	I_K	-100 to 150	mA
REF (Reference) input current range	I_{REF}	-50 μ A to 10mA	mA
Operating free-air temperature range	T_A	-40 to 125	°C
Lead temperature (1.6mm aside from the case, 10 seconds)	T_{LEAD}	260	°C
ESD (HBM)	$V_{(ESD)}$	2.5	kV

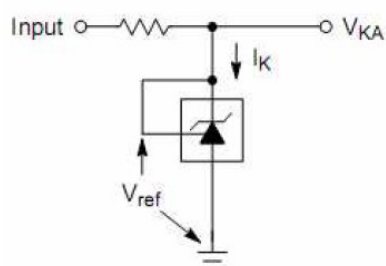
Note 1: The voltage values are with respect to the anode terminal unless otherwise noted.

RECOMMENDED OPERATING CONDITIONS

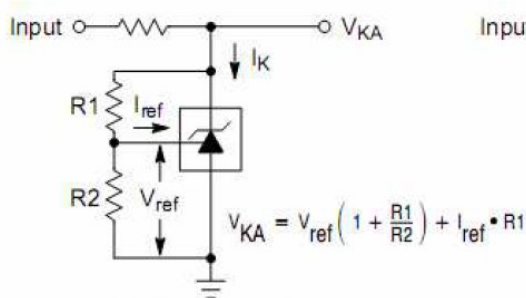
Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Cathode Voltage	V_{KA}		V_{REF}	-	36	V
Cathode Current	I_K		0.3	-	100	mA

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

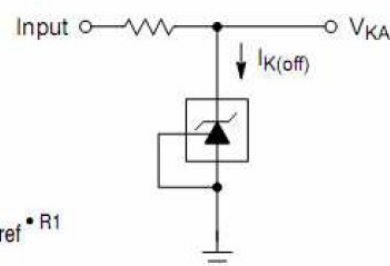
Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Reference Input Voltage	V_{REF}	$V_{KA} = V_{REF}$, $I_K = 10\text{ mA}$	2.483	2.495	2.507	V
Reference Input Voltage	V_{REF}	$V_{KA} = V_{REF}$, $I_K = 10\text{ mA}$	2.487	2.5	2.513	V
Deviation of Reference Input Voltage Over Full Temperature Range	$V_{REF(dev)}$	$V_{KA} = V_{REF}$, $I_K = 10\text{ mA}$ $0\text{ }^{\circ}\text{C} \leq T_A \leq 125\text{ }^{\circ}\text{C}$	-	8	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$	$\Delta V_{KA} = 10\text{ V} - V_{REF}$ $\Delta V_{KA} = 36\text{ V} - 10\text{ V}$	-2.7 -2.0	-1.0 -0.4		mV/V
Reference Input Current	I_{REF}	$R_1 = 10\text{ K}\Omega$, $R_2 = \infty$	-	0.5	1.2	μA
Deviation of Reference Input Current Over Full Temperature Range	$I_{REF(dev)}$	$R_1 = 10\text{ K}\Omega$, $R_2 = \infty$ $-40\text{ }^{\circ}\text{C} \leq T_A \leq 125\text{ }^{\circ}\text{C}$	-	0.4	1.2	μA
Minimum Cathode Current for Regulation	$I_{K(min)}$	$V_{KA} = V_{REF}$	-	0.08	0.3	mA
Off-State Cathode Current	$I_{K(off)}$	$V_{KA} = 36\text{ V}$, $V_{REF} = 0$	-	0.01	0.8	μA
Dynamic Impedance	Z_{KA}	$I_K = 1\text{ mA}$ to 100 mA , $f \leq 1.0\text{ KHz}$	-	0.1	0.37	Ω

TEST CIRCUITS


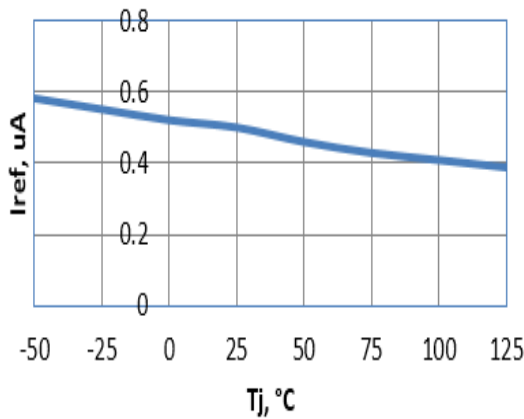
Test Circuit
for $V_{KA} = V_{ref}$



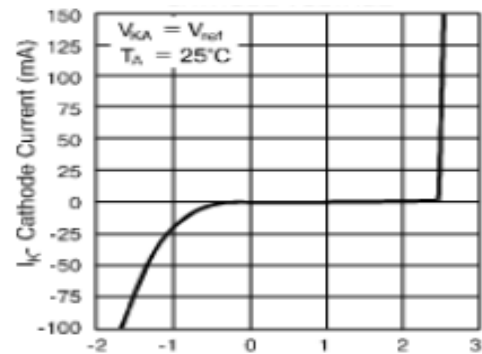
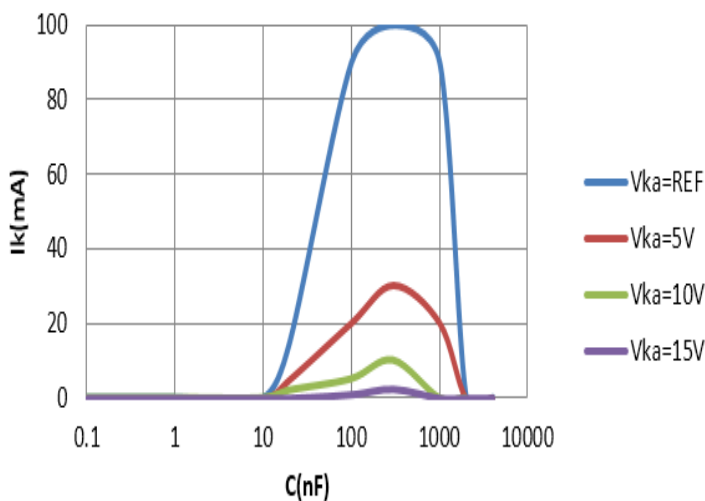
Test Circuit
for $V_{KA} > V_{ref}$



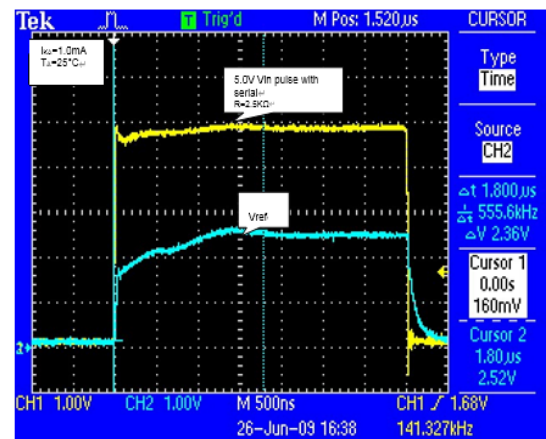
Test Circuit
for $I_{K(off)}$

TYPICAL PERFORMANCE CHARACTERISTICS


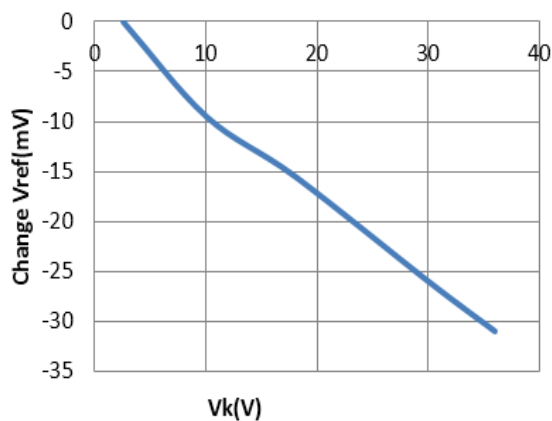
Reference Voltage(V) vs. Junction temperature(°C)


 Cathode Current I_K vs. Cathode Voltage V_{KA}


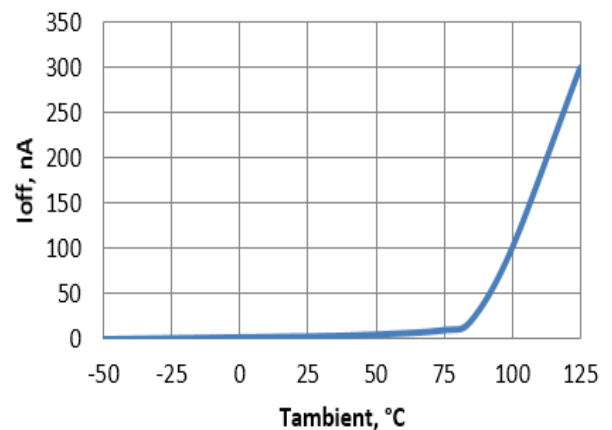
CL, load Capacitor(nF)



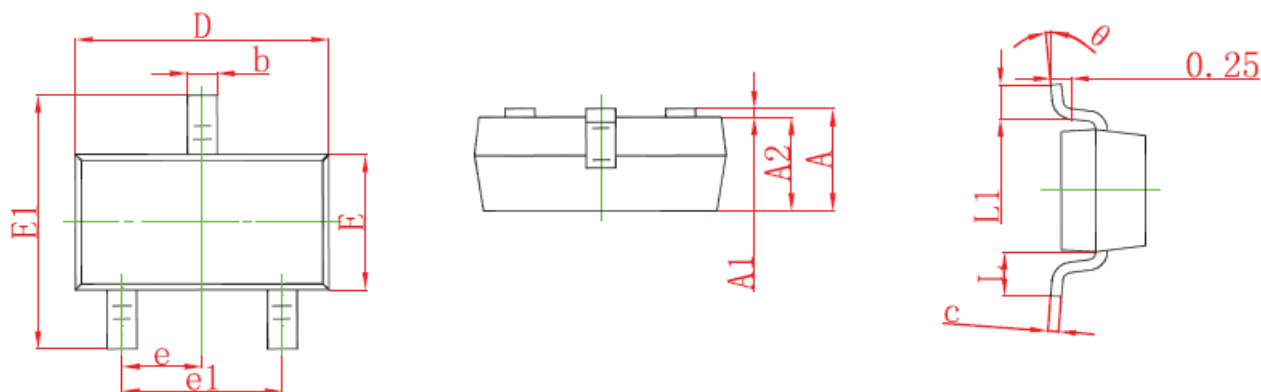
Pulse Response(μS)



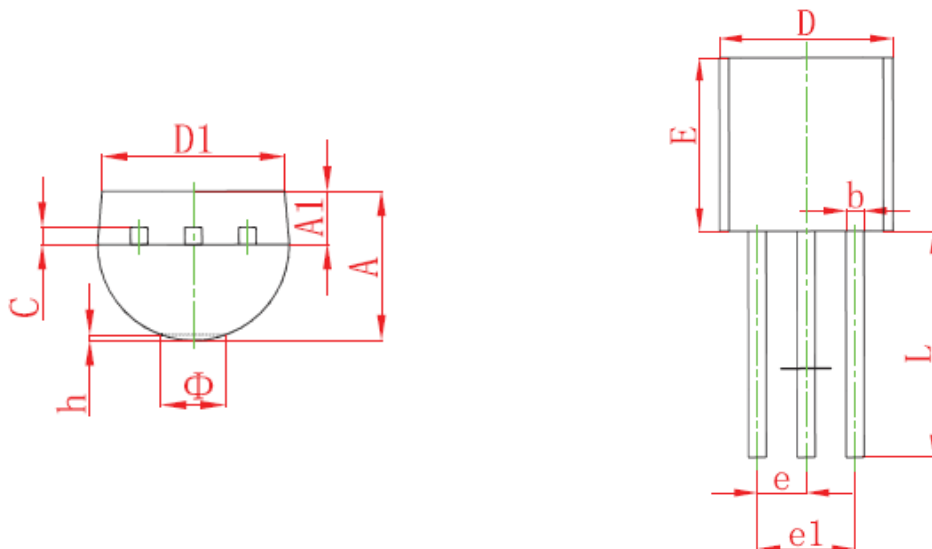
Change in Voltage Ref vs Voltage Cathode



Off-State Cathode Current vs. Ambient Temperature

SOT-23 Package Outline Dimensions


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TYP		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
Y	0°	8°	0°	8°

TO-92 Package Outline Dimensions


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
ř		1.600		0.063
h	0.000	0.380	0.000	0.015

Important Notice

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