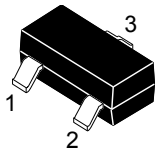
Description

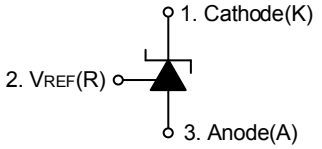
The H431CN is a three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges.

The output voltage may be set to any value between V_{REF} (approximately 2.495V) and 36V with two external resistors.

It provides very wide applications, including shunt regulator, series regulator, switching regulator, voltage reference and others.



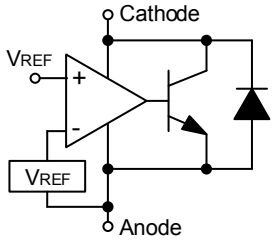
SOT-23



Features

- Programmable output Voltage to 36V
- Low dynamic output impedance 0.2Ω
- Sink current capability of 1 to 100mA
- Equivalent full-range temperature coefficient of 50ppm/°C typical for operation over full rated operating temperature range
- RoHS compliant and Halogen Free

Block Diagram



Classification of V_{REF}

P/N	Rank	Range(V)	Marking	Topr
H431CN	0.5%	2.482~2.507	LA3	-40~+125°C

Maximum Ratings (Operating temperature range applies unless otherwise specified)

Parameter	Symbol	Value	Units
Cathode Voltage	V_{KA}	36	V
Cathode Current Range (Continuous)	I_{KA}	-100~+150	mA
Reference Input Current Range	I_{REF}	-0.05~+10	mA
Operating Junction Temperature	T_J	150	°C
Operating Ambient Temperature	T_{opr}	-40~+125	°C
Storage Temperature	T_{stg}	-65~+150	°C

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Cathode Voltage	V_{KA}	V_{REF}	-	36	V
Cathode Current	I_{KA}	1	-	100	mA

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ.	Max.	Unit
Reference Input Voltage*1	V_{REF}	$V_{KA}=V_{REF}, I_{KA}$=10mA	-	2.495	-	V
Deviation of reference Input Voltage Over Temperature*2	$\Delta V_{REF}/\Delta T$	$V_{KA}=V_{REF}, I_{KA}$=10mA $T_{MIN}\leq T_A\leq T_{MAX}$	-	4.5	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$	I_{KA}=10mA, ΔV_{KA}=10V~V_{REF}	-	-1.0	-2.7	mV/V
		I_{KA}=10mA, ΔV_{KA}=36V~10V	-	-0.5	-2.0	mV/V
Reference Input Current	I_{REF}	I_{KA}=10mA, R_1=10kΩ, R_2=∞	-	1.5	4	μA
Deviation of Reference Input Current Over Full Temperature Range	$\Delta I_{REF}/\Delta T$	I_{KA}=10mA, R_1=10kΩ, R_2=∞ T_A=full Temperature	-	0.4	1.2	μA
Minimum Cathode Current for Regulation	$I_{KA(mim)}$	$V_{KA}=V_{REF}$	-	0.05	0.1	mA
Off-State Cathode Current	$I_{KA(off)}$	V_{KA}=36V,V_{REF}=0	-	0.05	1.0	μA
Dynamic Impedance	Z_{KA}	$V_{KA}=V_{REF}$, I_{KA}=1 to 100mA f≤1.0kHz	-	0.15	0.5	Ω

*1: In order to match the special request of customer

*2: T_{MIN}=-40°C, T_{MAX}=+125°C

Typical Performance Characteristics

Fig 1 Cathode Current vs Cathode Voltage

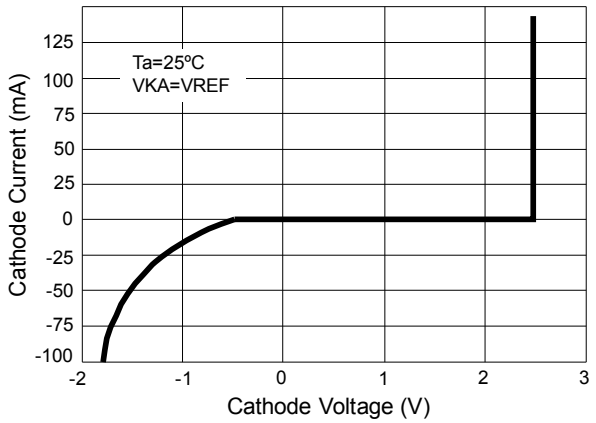


Fig 2 Cathode Current vs Cathode Voltage

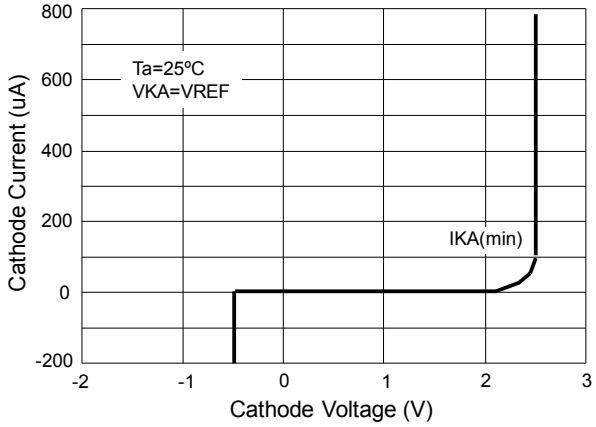


Fig 3 Change in Reference Input Voltage vs Cathode Voltage

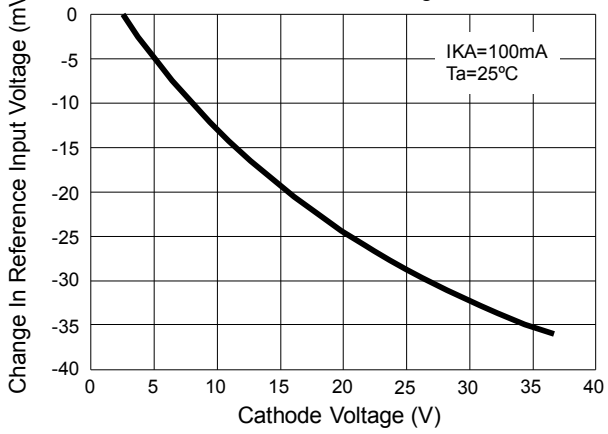


Fig 4 Pulse Response

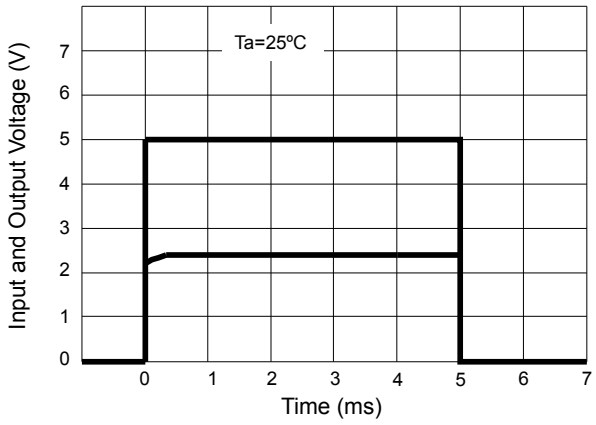


Fig 5 Dynamic Impedance vs Frequency

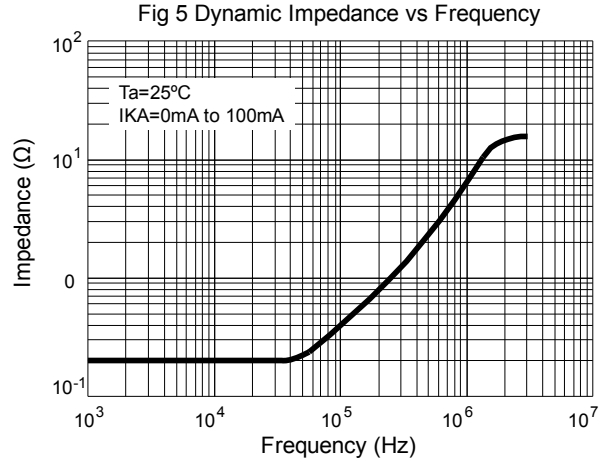
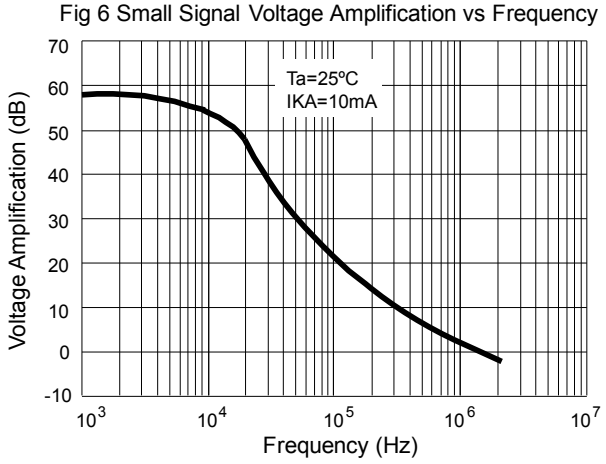
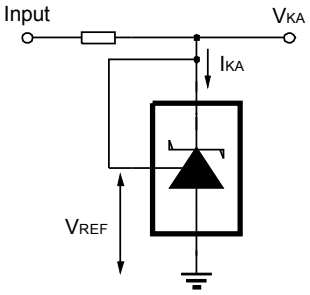


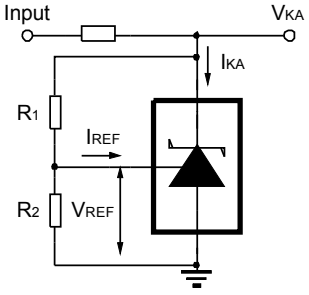
Fig 6 Small Signal Voltage Amplification vs Frequency



Test Circuit

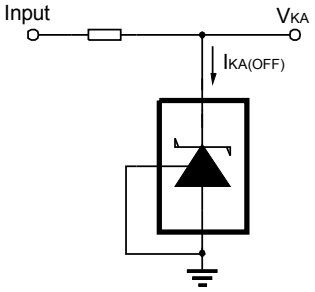


Test Circuit for $V_{KA}=V_{REF}$



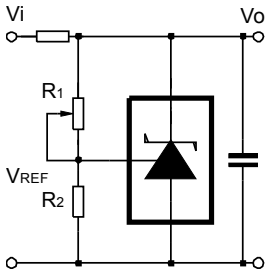
$V_{KA}=V_{REF}*(1+R_1/R_2)+I_{REF}*R_1$

Test Circuit for $V_{KA}\geq V_{REF}$



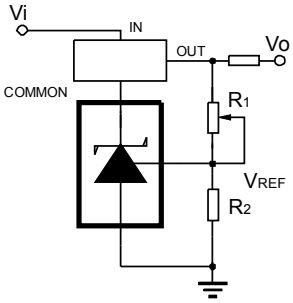
Test Circuit for $I_{KA(OFF)}$

Application Circuit



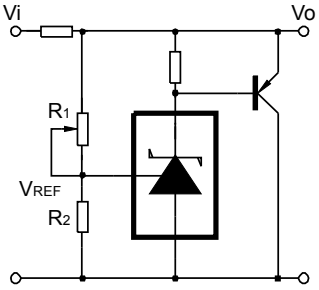
$V_o=(1+R_1/R_2)*V_{REF}$

Shutdown Regulator

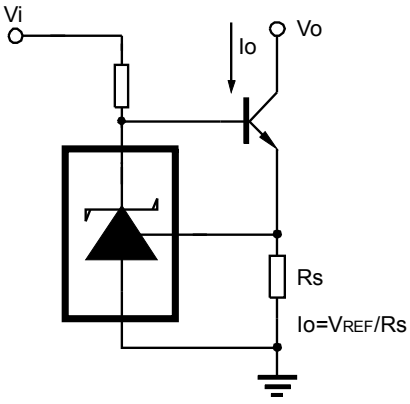


$V_o=(1+R_1/R_2)*V_{REF}$

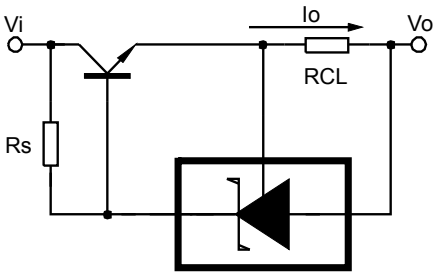
Output Control of a Three-Terminal Fixed Regulator



Higher-Current Shunt Regulator



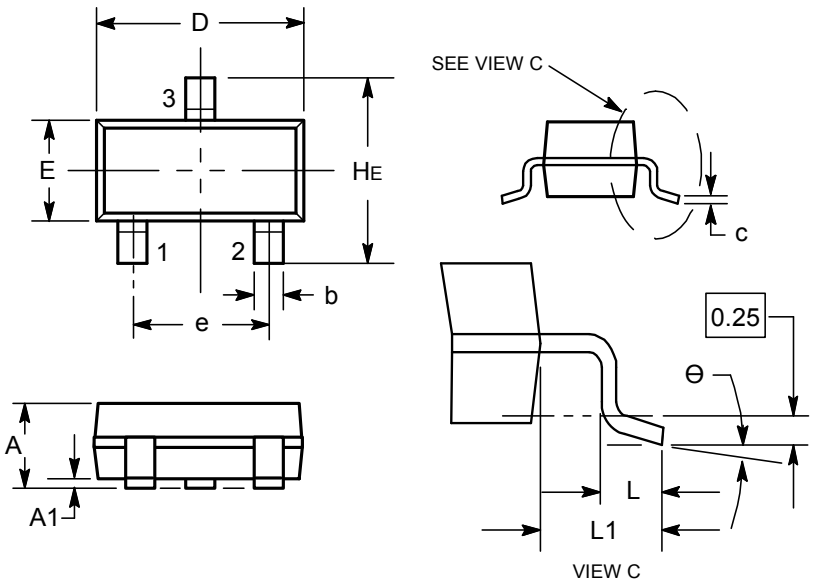
Constant-Current Sink



$I_o=V_{REF}/RCL$

Current Limiting or Current Source

Package Dimension



DIM	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.89	1	1.11	0.035	0.04	0.044
A1	0.01	0.06	0.1	0.001	0.002	0.004
b	0.37	0.44	0.5	0.015	0.018	0.02
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.9	3.04	0.11	0.114	0.12
E	1.20	1.3	1.4	0.047	0.051	0.055
e	1.78	1.9	2.04	0.07	0.075	0.081
L	0.10	0.2	0.3	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.4	2.64	0.083	0.094	0.104
θ	0^O	-	10^O	0^O	-	10^O

Notes:
1. Dimensioning and tolerancing per ansi Y14.5m, 1982.
2. Controlling Dimension: Millimeter.
3. Maximum lead thickness includes lead finish. Minimum lead thickness is the minimum thickness of base material.
4. Dimensions d and e do not include mold flash, protrusions or gate burrs.

Soldering Footprint