



A431xM

Programmable Voltage Reference

Features

- Programmable output voltage to 20 volts
- Sink current capability of 1.0mA to 100mA
- Low dynamic impedance 0.15Ω typical
- Temperature compensated for operation over full rated operating temperature
- Equivalent full-range temperature coefficient of 50ppm/°C (Typical)
- Low output Noise voltage

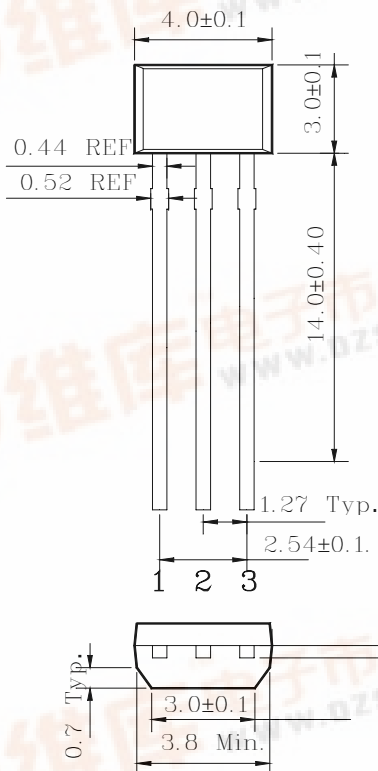
Ordering Information

Type NO.	Marking	Package Code
A431xM	A431□	TO-92M

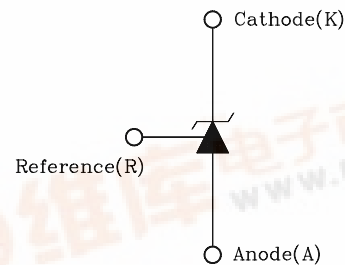
□: grade => None:2% , A:1% , B:0.5%

Outline Dimensions

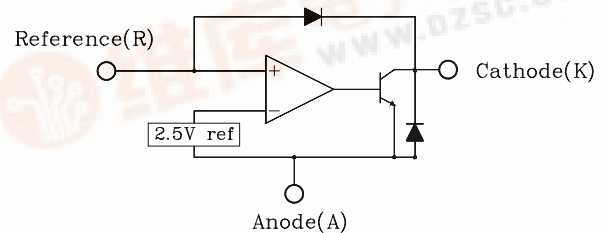
unit : mm



Symbol



Functional block diagram



PIN Connections

1. Reference
2. Anode
3. Cathode

Absolute maximum ratings

(Operating ambient temperature range applies unless other specified)

Parameter	Symbol	Ratings	Unit
Cathode to anode voltage	V_{KA}	20	V
Cathode current range(Continuous)	I_K	-100 ~ +150	mA
Reference input current range(Continuous)	I_{ref}	-0.05~+10	mA
Power dissipation	P_D	500	mW
Operating temperature range	T_{opr}	-40~+85	°C
Storage temperature range	T_{stg}	-65~+150	°C

Recommended operating conditions

Parameter	Symbol	Ratings		Unit
		Min.	Max.	
Cathode to Anode voltage	V_{KA}	V_{ref}	20	V
Cathode current range(Continuous)	I_K	1.0	100	mA

Electrical Characteristics

(Ambient temperature at 25°C, unless otherwise noted.)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Reference input voltage (Fig. 1, Note 1)	V_{ref}	$V_{KA}=V_{ref}, I_K=10mA$ A431BM	2.482	2.495	2.508	V
		A431AM	2.470		2.520	
Deviation of reference input voltage Over temperature(Fig. 1, Note 1,2)	ΔV_{ref}	$V_{KA}=V_{ref}, I_K=10mA$ @ $T_a=T_{LOW}$ to T_{HIGH}	-	7.0	30	mV
Ratio of change in reference input Voltage to the change in cathode Voltage(Fig. 2)	$\frac{\Delta V_{ref}}{\Delta V_{KA}}$	$I_K=10mA$ $\Delta V_{KA}=10V-V_{ref}$	-	1.2	2.7	mV/V
		$\Delta V_{KA}=20V-10V$	-	0.7	2.0	
Reference input current(Fig. 2)	I_{ref}	$I_K=10mA$ $R1=10K\Omega, R2=\infty$	-	1.8	4.0	μA
Deviation of reference input voltage over temperature(Fig. 2)	ΔI_{ref}	$I_K=10mA$ $R1=10K\Omega, R2=\infty$	-	0.4	2.5	μA
Minimum cathode current for Regulation(Fig. 1)	I_{MIN}	$V_{KA}=V_{ref}$	-	0.35	1.0	mA
Off-state cathode current(Fig. 3)	I_{OFF}	$V_{KA}=20V, V_{ref}=0V$	-	2.7	1000	nA
Dynamic impedance(Fig. 1, Note 3)	Z_{KA}	$V_{KA}=V_{ref}, f \leq 1.0KHz$ $I_{KA}=1.0mA-100mA$	-	0.14	0.5	Ω

Fig. 1

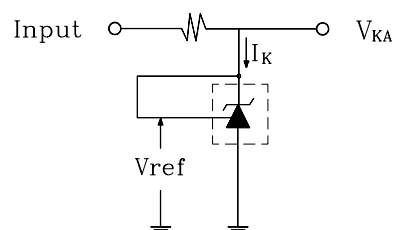


Fig. 2

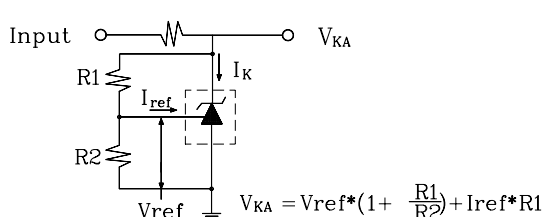
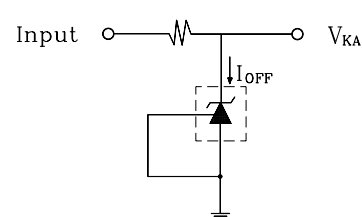


Fig. 3



<Note 1> : $T_{LOW}=-40^{\circ}C, T_{HIGH}=+85^{\circ}C$, <Note 2> : $\Delta V_{ref} = V_{ref} \text{ Max.} - V_{ref} \text{ Min.}$, <Note 3> : $Z_{KA} = \Delta V_{KA} / \Delta I_K$

Characteristic diagrams

Fig. 4 I_K vs. V_{KA}

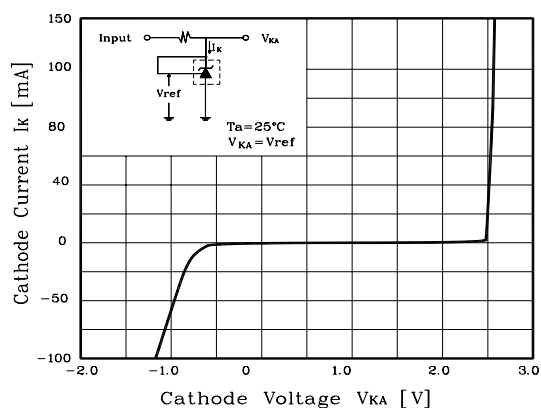


Fig. 5 I_{MIN} vs. V_{KA}

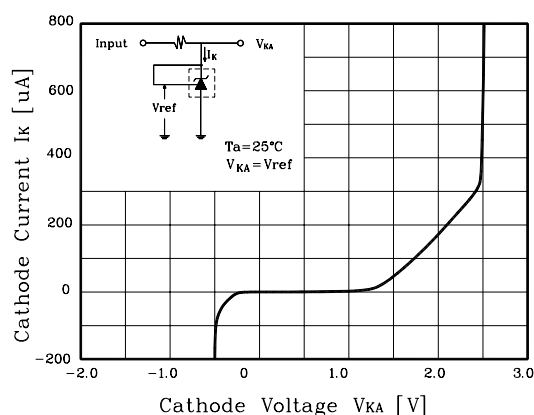


Fig. 6 ΔV_{ref} vs. T_a

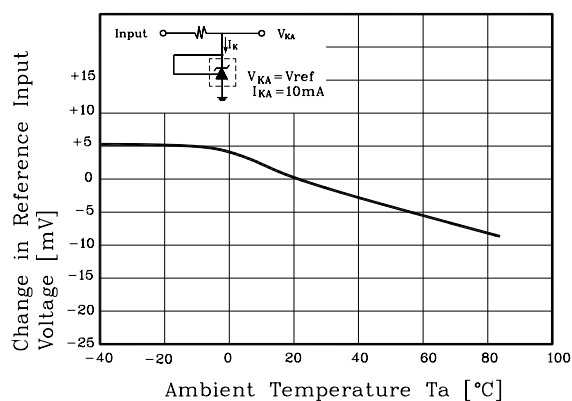


Fig. 7 G_v vs. frequency

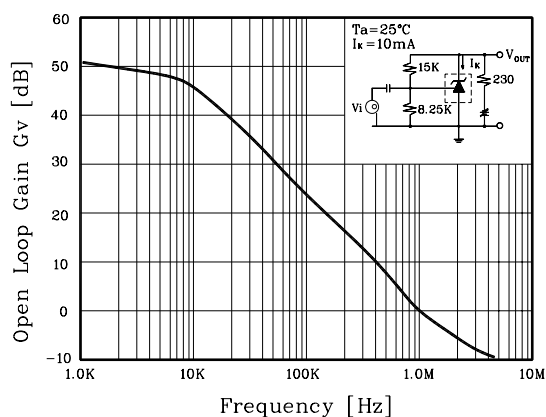
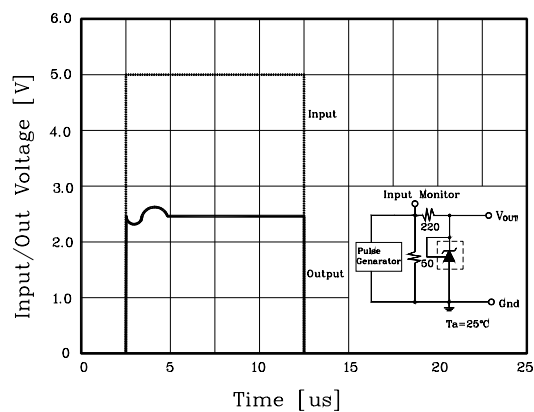


Fig. 8 Pulse response



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