

# MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



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MOV



GDT



PLED

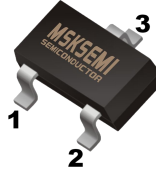

## TL431

Product specification

## Features

- Programmable output Voltage to 36 V
- Low dynamic output impedance
- Sink current capability of 1 to 100 mA
- Low output noise voltage
- Fast turn on response

## Reference News

SOT-23	MARKING
	

1	Reference
2	Cathode
3	Anode

## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ , unless otherwise noted.)

Parameter	Symbol	Value	Unit
Cathode Voltage	$V_{KA}$	36	V
Cathode Current Range (Continuous)	$I_{KA}$	- 100 to + 150	mA
Reference Input Current Range	$I_{REF}$	- 0.05 to + 10	mA
Power Dissipation	$P_D$	350	mW
Operating Temperature Range	$T_{opr}$	- 25 to + 85	$^\circ\text{C}$
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	- 65 to + 150	$^\circ\text{C}$

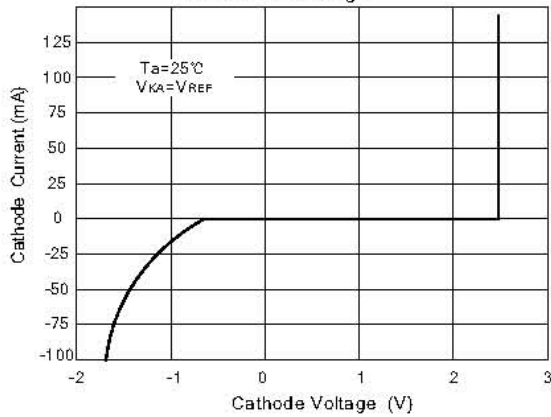
## Recommended Operating Conditions

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

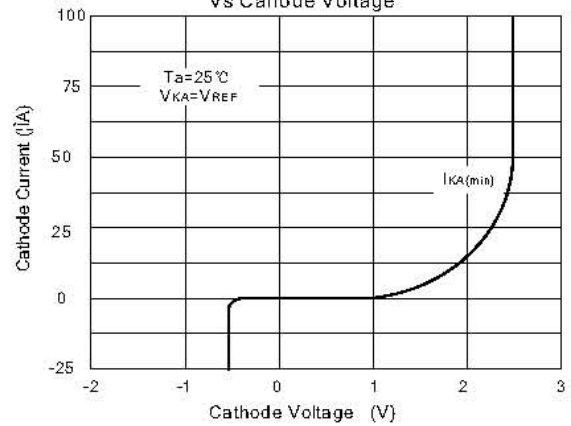
## Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Min.	Typ.	Max.	Unit
Reference Input Voltage at $V_{KA} = V_{REF}$ , $I_{KA} = 10\text{ mA}$	$V_{REF}$	2.488	2.495	2.502	V
Deviation of Reference Input Voltage Over Temperature at $V_{KA} = V_{REF}$ , $I_{KA} = 10\text{ mA}$ , $-25^\circ\text{C} \leq T_a \leq +85^\circ\text{C}$	$\Delta V_{REF}/\Delta T$	-	4.5	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage at $I_{KA} = 10\text{ mA}$ $\Delta V_{KA} = 10\text{ V to } V_{REF}$ $\Delta V_{KA} = 36\text{ V to } 10\text{ V}$	$\Delta V_{REF}/\Delta V_{KA}$	- -	-1.0 -0.5	-2.7 -2	mV/V
Reference Input Current at $I_{KA} = 10\text{ mA}$ , $R1 = 10\text{ K}\Omega$ , $R2 = \infty$	$I_{REF}$	-	1.5	4	$\mu\text{A}$
Deviation of Reference Input Current Over Full Temperature at $I_{KA} = 10\text{ mA}$ , $R1 = 10\text{ K}\Omega$ , $R2 = \infty$ , $-25^\circ\text{C} \leq T_a \leq +85^\circ\text{C}$	$\Delta I_{REF}/\Delta T$	-	0.4	1.2	$\mu\text{A}$
Minimum Cathode Current for Regulation at $V_{KA} = V_{REF}$	$I_{KA(min)}$	-	0.45	1	mA
Off-Stage Cathode Current at $V_{KA} = 36\text{ V}$ , $V_{REF} = 0$	$I_{KA(OFF)}$	-	0.05	1	$\mu\text{A}$
Dynamic Impedance at $V_{KA} = V_{REF}$ , $I_{KA} = 1\text{ to }100\text{ mA}$ , $f \leq 1\text{ KHz}$	$Z_{KA}$	-	0.15	0.5	$\Omega$

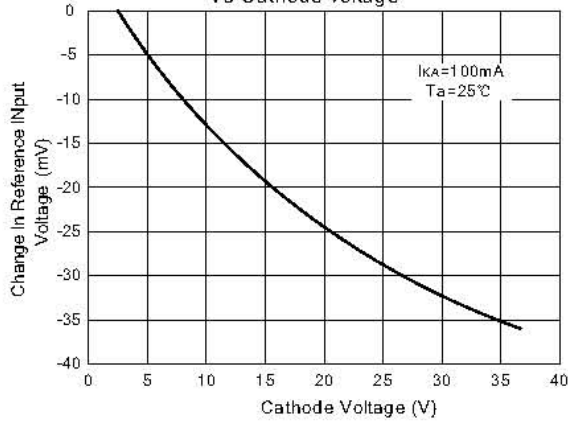
**Fig 1 Cathode Current  
Vs Cathode Voltage**



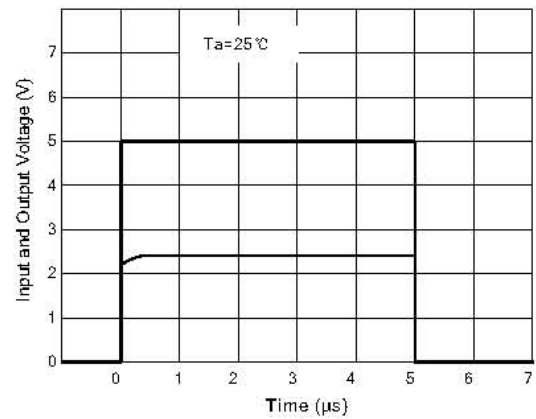
**Fig 2 Cathode Current  
Vs Cathode Voltage**



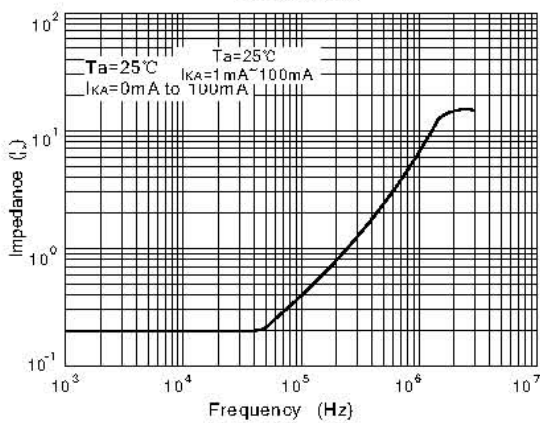
**Fig 3 Change in Reference Input  
Voltage Vs Cathode voltage**



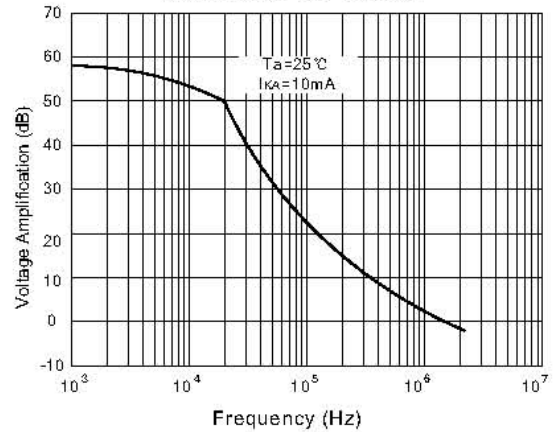
**Fig 4 Pulse Response**



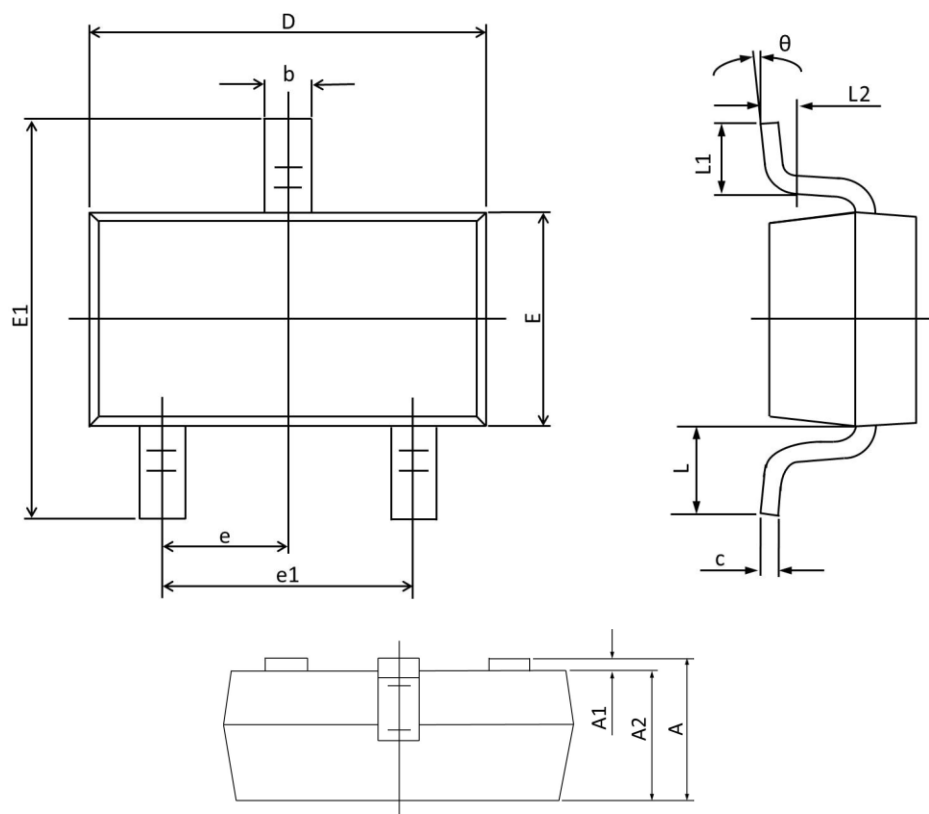
**Fig 5 Dynamic Impedance  
Vs Frequency**



**Fig 6 Small Signal Voltage  
Amplification Vs Frequency**



SOT-23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Max	Min	Max	Min
A	1.150	0.900	0.045	0.035
A1	0.100	0.000	0.004	0.000
A2	1.050	0.900	0.041	0.035
b	0.500	0.300	0.020	0.012
c	0.150	0.080	0.006	0.003
D	3.000	2.800	0.118	0.110
E	1.400	1.200	0.055	0.047
E1	2.550	2.250	0.100	0.089
e	0.95 TYP.		0.037 TYP.	
e1	2.000	1.800	0.079	0.071
L	0.55 REF.		0.022 REF.	
L1	0.500	0.300	0.020	0.012
L2	0.25 TYP.		0.01 TYP.	
$\theta$	8°	0°	8°	0°

REEL SPECIFICATION

P/N	PKG	QTY
TL431	SOT-23	3000

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