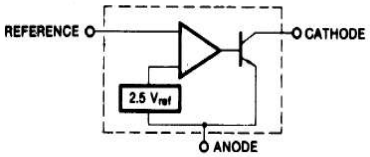
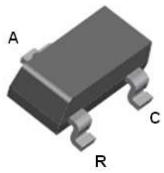
Programmable Shunt Regulator BL431

FEATURES

Lead-free

- Programmable output voltage to 36 volts
- Low dynamic output impedance 0.20 typical
- Sink current capability of 1.0 to 100mA
- Equivalent full-range temperature coefficient of 50ppm/℃ typical
- Temperature compensated for operation over full rated Operating temperature range
- Low output noise voltage
- Fast turn-on response





SOT-23

ORDERING INFORMATION

Type No.	Marking	Package Code
BL431	431	SOT-23

MAXIMUM RATING @ Ta=25℃ unless otherwise specified

Parameter	Symbol	limits	unit
Electrostatic discharge Human-body model(HBM),per ANSI/ESDA/JEDEC JS-001(Note1)	$V_{(ESD)}$	±2000	V
Electrostatic discharge Charged-device model(CDM), per JEDEC specification JESD22C101(Note2)		±1000	
Cathode Voltage	V_{KA}	37	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
Thermal Resistance Junction–to–Ambient	$R_{\theta JA}$	350	℃/W
Thermal Resistance, Junction–to–Case	$R_{\theta JC}$	155	℃/W
Operating Junction Temperature	T_J	150	℃
Operating temperature Range	T_{OPR}	-25 to + 105	℃
Storage temperature Range	T_{STG}	-65 to +150	℃

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Notes:

1.JEDEC document JEP155 states that 500-v HBM allows safe manufacturing with a standard ESD control process.Manufacturing with less than 500-v HBM is possible with the necessary precautions.

2. JEDEC document JEP157 states that 250-v CDM allows safe manufacturing with a standard ESD control process.Manufacturing with less than 250-v CDM is possible with the necessary precautions.

Recommended Operating Conditions

Parameter	symbol	Min	Typ	Max	Unit
Cathode Voltage	V_{KA}	V_{REF}	-	36	V
Cathode Current	I_{KA}	1.0	-	100	mA

ELECTRICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

Parameter	symbol	conditions		Min.	Typ.	Max.	unit
Reference Input voltage	V_{REF}	$V_{KA}=V_{REF}, I_{KA}=10mA$		2.44	2.5	2.55	V
Deviation of Reference Input Voltage Over-Temperature	$\Delta V_{REF}/\Delta T$	$V_{KA}=V_{REF}, I_{KA}=10mA$, $T_{MIN}\le T_A\le T_{MAX}$			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}		-10	-2.7	mV/V
			ΔV_{KA}=36V-10V		-0.5	-2.0	
Reverse Input current	I_{REF}	I_{KA}=10mA, R_1=10KΩ,R_2=∞			1.5	4	μA
Deviation of Reference Input Currrent Over Full Temperature Range	$\Delta I_{REF}/\Delta T$	I_{KA}=10mA, R_1=10KΩ,R_2=∞ T_A=Full Range			0.4	1.2	μA
Minimun Cathode Current for Regulation	$I_{KA(MIN}$	$V_{KA}= V_{REF}$			0.45	1.0	mA
Off-Stage Cathode Current	$I_{KA(OFF)}$	V_{KA}=36V, V_{REF}=0			0.05	1.0	μA
Dynamic Impedance	Z_{ZA}	$V_{KA}= V_{REF}$, I_{KA}=1 to 100mA f≥1.0KHz			0.15	0.5	Ω

•T_{MIN}=-25℃,T_{MAX}=+85℃

CLASSIFICATION OF V_{ref}

Rank	0.5%	1%	2%
Range	2.488-2.512	2.475-2.525	2.450-2.550

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TYPICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

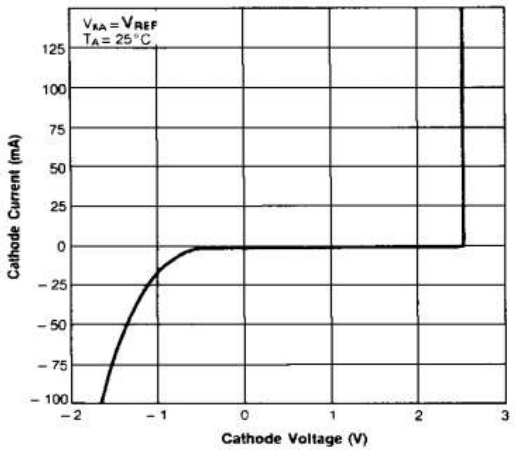


Figure 1. Cathode Current vs. Cathode Voltage

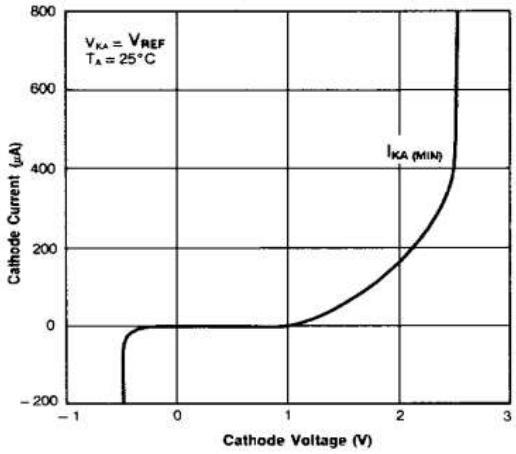


Figure 2. Cathode Current vs. Cathode Voltage

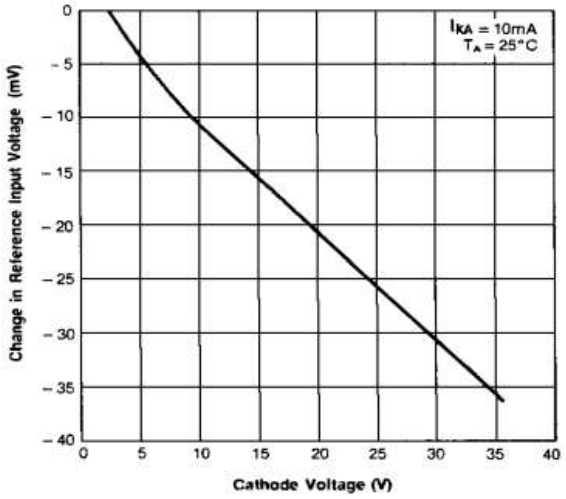


Figure 3. Change In Reference Input Voltage vs. Cathode Voltage

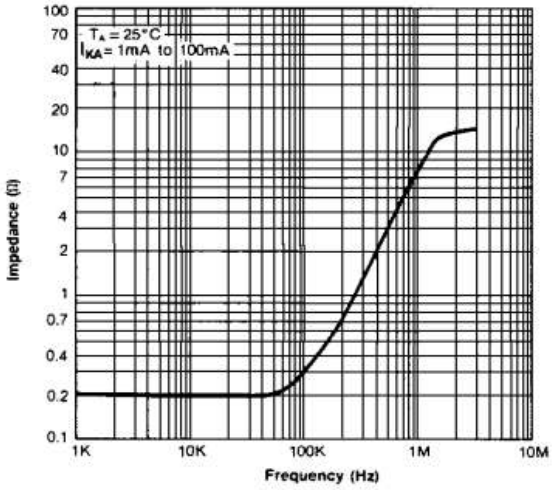


Figure 4. Dynamic Impedance Frequency

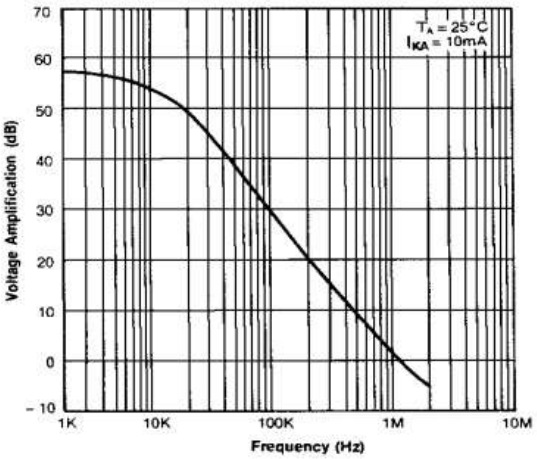


Figure 5. Small Signal Voltage Amplification vs. Frequency

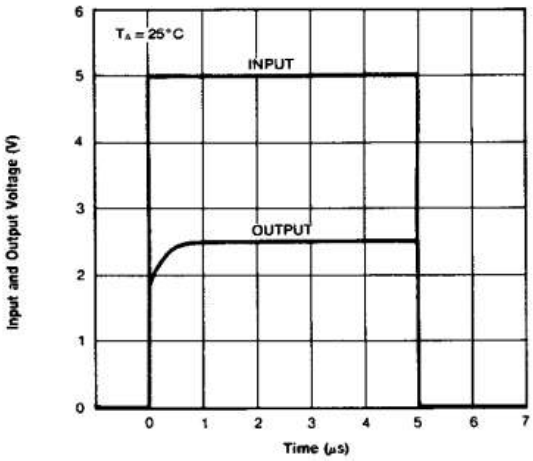


Figure 6. Pulse Response

Programmable Shunt Regulator BL431

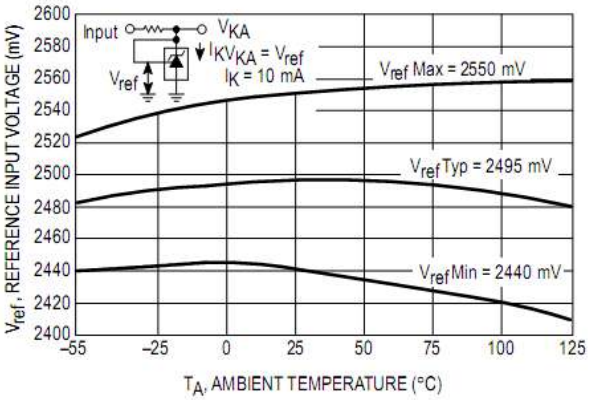


Figure 7. Reference Input Voltage versus Ambient Temperature

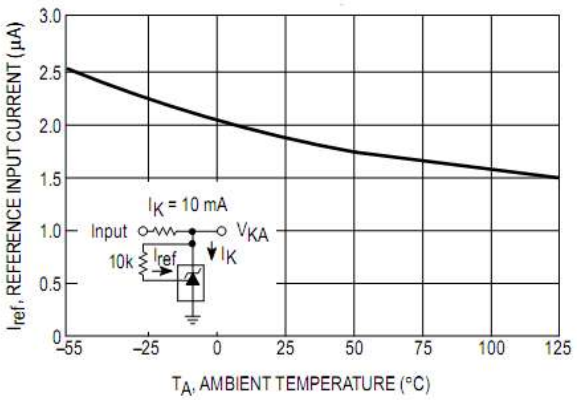
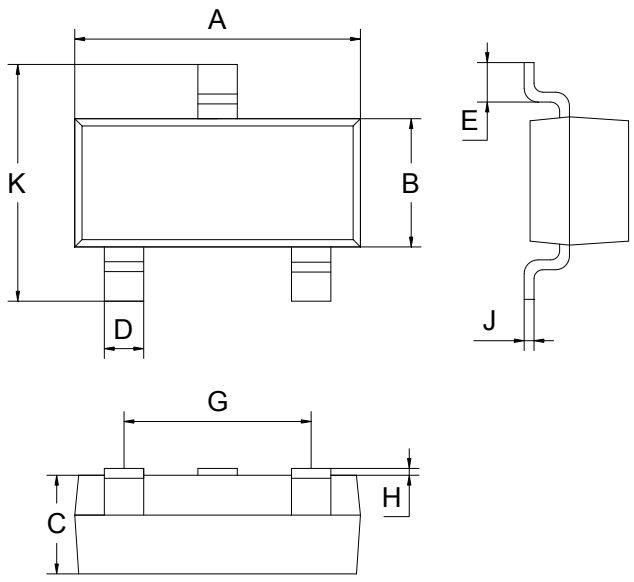


Figure 8. Reference Input Current versus Ambient Temperature

PACKAGE OUTLINE

Plastic surface mounted package SOT-23



SOT-23		
Dim	Min	Max
A	2.70	3.10
B	1.10	1.50
C	1.0 Typical	
D	0.4 Typical	
E	0.35	0.48
G	1.80	2.00
H	0.02	0.1
J	0.1 Typical	
K	2.20	2.60
All Dimensions in mm		

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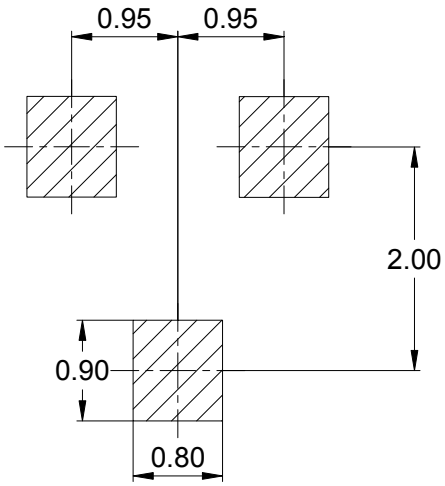
SOLDERING FOOTPRINT



Unit : mm

PACKAGE INFORMATION

Device	Package	Shipping
BL431	SOT-23	3000/Tape&Reel