



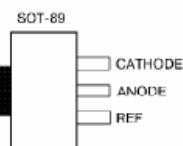
FEATURES

- Equivalent Full-Range Temperature Coefficient 30 ppm/°C
- Temperature Compensated for Operation Over Full Rated Operating Temperature Range
- Adjustable Output Voltage
- Fast Turn-On Response
- Sink Current Capability 1mA to 100 mA
- Low (0.2 Ω Typ) Dynamic Output Impedance
- Low Output Noise

DESCRIPTION

The 431M are three-terminal adjustable shunt regulators with specified thermal stability. The output voltage may be set to any value between V_{ref} (approximately 2.5V) and 36V with two external resistors. These devices have a typical output impedance of 0.2 Ω . Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacements for Zener diodes in many applications.

Pin Configuration (TOP VIEW)



SYMBOL



Absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Parameter	Value	Units
Cathode voltage (see Note 1)	37	V
Continuous cathode current range	-100 to 150	mA
Reference input current range	-50 μ A to 10mA	
Operating free-air temperature range	0 to 70	°C
Lead temperature 1.6mm from case for 10 seconds	260	

Note 1: Voltage values are with respect to the anode terminal unless otherwise noted

Recommended operating conditions

Parameter	MIN	MAX	UNIT
Cathode voltage, V_{Kk}	V_{ref}	36	V
Cathode current, I_k (for regulation)	1	100	mA

Electrical characteristics at 25 °C free-air temperature (unless otherwise noted)

Parameter	Symbol	Test Circuit	Test Conditions	MIN	TYP	MAX	UNIT	
Reference input voltage	V_{ref}	1	$V_{KA}=V_{ref}$, $I_k=10mA$	2474	2500	2526	mV	
Deviation of reference input voltage over full temperature range	$V_{ref(dev)}$	1	$V_{KA}=V_{ref}$, $I_k=10mA$, $T_A=full\ range$		4	17		
Ratio of change in reference input voltage to the change in cathode voltage	$\frac{\Delta V_{ref}}{\Delta V_{KA}}$	2	$I_k=10mA$	$\Delta V_{KA}=10V\ to\ V_{ref}$	-2,7	-1.0		mV/V
				$\Delta V_{KA}=36V\ to\ 10V$	-2	-0.4		
Reference input current	I_{ref}	2	$I_k=10mA$, $R1=10K\Omega$, $R2=\infty$		1.3	4	μ A	
Deviation of reference input current over full temperature range	$I_{ref(dev)}$	2	$I_k=10mA$, $R1=10K\Omega$, $R2=\infty$, $T_A=full\ range$		0.4	1.2		
Minimum cathode current for regulation	I_{min}	1	$V_{KA}=V_{ref}$		0.4	1.0	mA	
Off-state cathode current	I_{off}	3	$V_{KA}=36V$, $V_{ref}=0$		0.1	1	μ A	
Dynamic impedance	$ Z_{KA} $	1	$V_{KA}=V_{ref}$, $I_k=1mA\ to\ 100mA$, $f_s \leq 1KHz$		0.2	0.5	Ω	

Adjustable Precision Shunt Regulators



VSP MIKRON

431M

PARAMETER MEASUREMENT INFORMATION

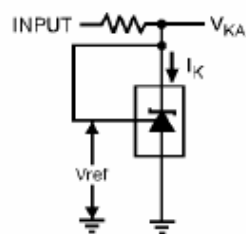


FIGURE 1. TEST CIRCUIT FOR $V_{KA} = V_{ref}$

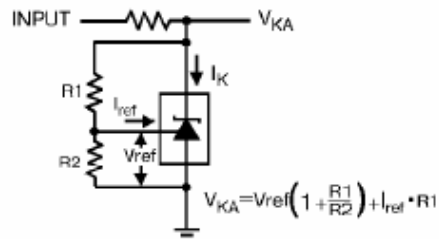


FIGURE 2. TEST CIRCUIT FOR $V_{KA} > V_{ref}$

$$V_{KA} = V_{ref} \left(1 + \frac{R1}{R2} \right) + I_{ref} \cdot R1$$

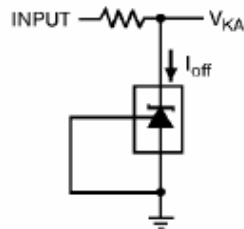


FIGURE 3. TEST CIRCUIT FOR I_{off}

TYPICAL CHARACTERISTICS

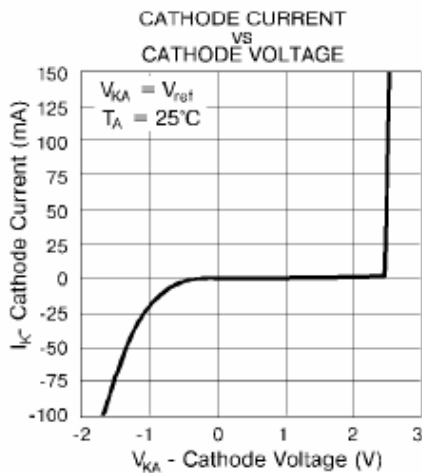


FIGURE 1

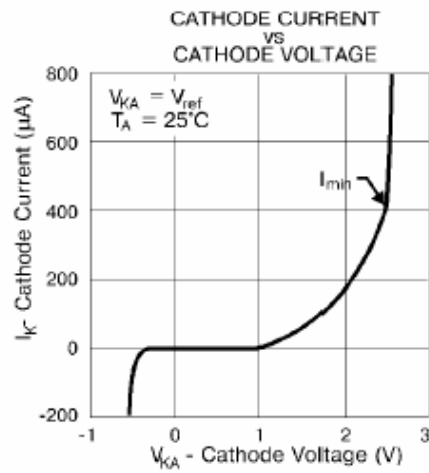


FIGURE 2

TYPICAL APPLICATIONS

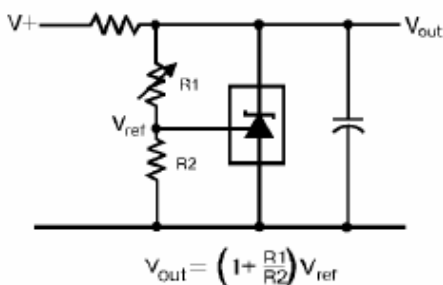


FIGURE 1. SHUNT REGULATOR

$$V_{out} = \left(1 + \frac{R1}{R2} \right) V_{ref}$$

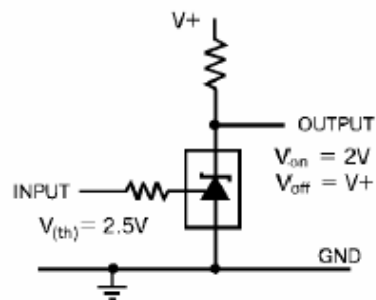


FIGURE 2. SINGLE-SUPPLY COMPARATOR WITH TEMPERATURE-COMPENSATED THRESHOLD

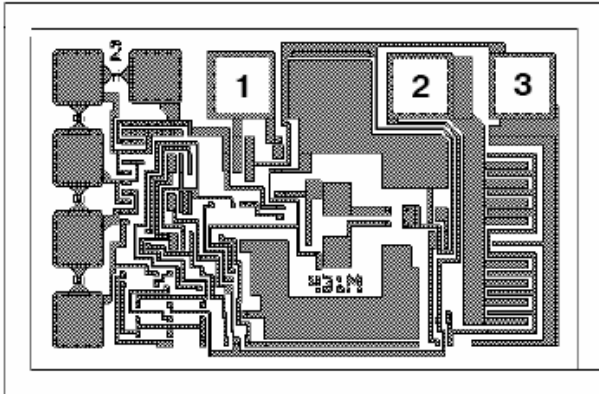
Adjustable Precision Shunt Regulators



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PAD LOCATION 431M



Wafer Thickness: $460 \pm 30 \mu\text{m}$ (or $350 \pm 30 \mu\text{m}$,
 $280 \pm 30 \mu\text{m}$)
Top metal: AlSi
Backside metal: - (or Ti-Ni (V)-Ag)
Wafer size: 100 mm

Chip size: 0.91 x 0.60 mm

PAD LOCATION COORDINATES

Pad N	Pad Name	Coordinates (μm)	
		X	Y
1	reference	359.5	473.5
2	anode	631.5	472.5
3	cathode	786.5	472.5