

### Features

- The Reference Input Voltage Tolerance is 0.5%
- Sink Current Capability of 1mA to 100 mA
- Programmable Output Voltage 36V
- Low Output Noise Voltage and Fast Turn On Response
- The Typical Value of the Equivalent Temperature Factor in the Whole Temperature Scope is 50 ppm/°C
- Moisture Sensitivity Level 3
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free. "Green" Device (Note 1)
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)

### Maximum Ratings

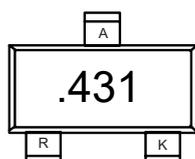
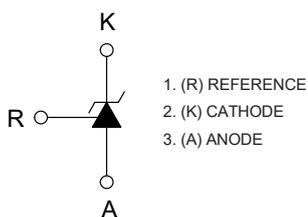
Parameter	Symbol	Value	Unit
Cathode Voltage	$V_{KA}$	40	V
Cathode Current Range	$I_K$	-100~150	mA
Reference Input Current Range	$I_{REF}$	0.05~10	mA
Power Dissipation at 25 °C	$P_D$	0.3	W
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	400	°C/W
Operating Temperature	$T_{opr}$	-40~125	°C
Storage Temperature Range	$T_{STG}$	-65~150	°C

### Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Cathode Voltage	$V_{KA}$	$V_{REF}$	36	V
Cathode Current Range	$I_K$	1.0	100	mA

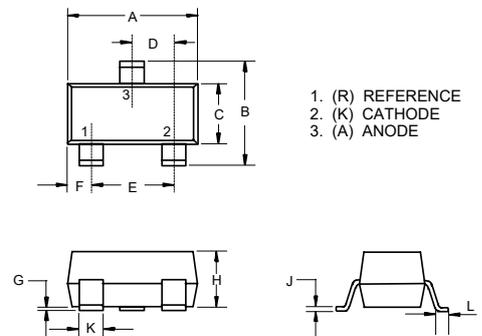
Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

### Internal Structure and Marking Code



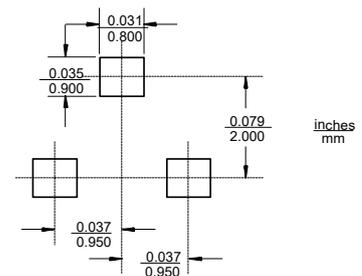
# Programmable Precision Regulator

## SOT-23



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.110	0.120	2.80	3.04	
B	0.083	0.104	2.10	2.64	
C	0.047	0.055	1.20	1.40	
D	0.034	0.041	0.85	1.05	
E	0.067	0.083	1.70	2.10	
F	0.018	0.024	0.45	0.60	
G	0.0004	0.006	0.01	0.15	
H	0.035	0.043	0.90	1.10	
J	0.003	0.007	0.08	0.18	
K	0.012	0.020	0.30	0.51	
L	0.007	0.020	0.20	0.50	

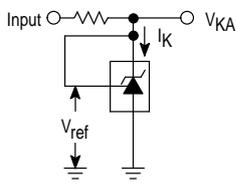
### Suggested Solder Pad Layout



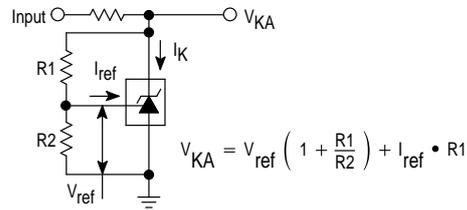
**Electrical Characteristics ( $V_{KA}=V_{REF}$ ,  $I_K=10mA$ ,  $T_A=25^{\circ}C$ , Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Reference output Voltage	$V_{REF}$	$V_{KA}=V_{REF}$ , $I_{KA}=10mA$	2.483	2.495	2.507	V
Deviation of Reference Input Voltage	$\Delta V_{REF} / \Delta T$	$V_{KA}=V_{REF}$ , $I_{KA}=10mA$ $-40^{\circ}C \leq T_A \leq 125^{\circ}C$		4.5	8	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{REF} / \Delta V_{KA}$	$\Delta V_{KA}=10V \sim V_{REF}$ , $I_{KA}=10mA$	-4.0	0	2.7	mV
		$\Delta V_{KA}=36V \sim 10V$ , $I_{KA}=10mA$	-0.4	0	2.0	mV
Reference Input Current	$I_{ref}$	$I_{KA}=10mA$ , $R_1=10K\Omega$ , $R_2=\infty$		1.8	4.0	$\mu A$
Deviation of Reference Input Current Over Full Temperature Range	$\Delta I_{REF} / \Delta T$	$I_{KA}=10mA$ , $R_1=10K\Omega$ , $R_2=\infty$ $-40^{\circ}C \leq T_A \leq 125^{\circ}C$		0.4	1.2	$\mu A$
Minimum Cathode Current for Regulation	$I_{KA(min)}$	$V_{KA}=V_{REF}$		0.25	0.5	mA
Off-State Cathode Current	$I_{KA(off)}$	$V_{KA}=40V$ , $V_{REF}=0V$		0.2	0.9	$\mu A$
Dynamic Impedance	$Z_{KA}$	$V_{KA}=V_{REF}$ , $I_{KA}=1$ to $100mA$ , $f \leq 1.0KHz$		0.27	0.5	$\Omega$

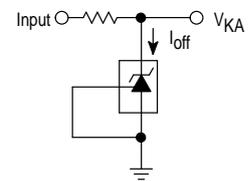
**Figure 1. Test Circuit for  $V_{KA} = V_{ref}$**



**Figure 2. Test Circuit for  $V_{KA} > V_{ref}$**

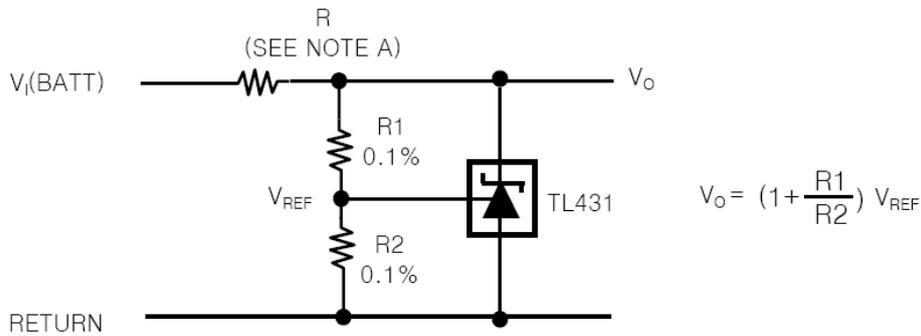


**Figure 3. Test Circuit for  $I_{off}$**



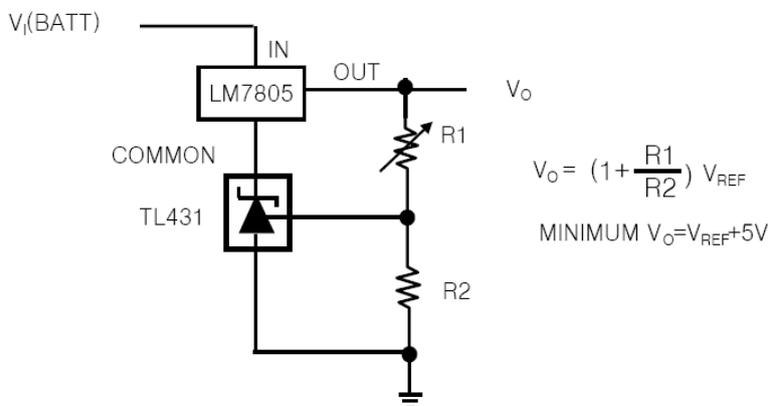
## APPLICATION INFORMATION

### 1. Shunt Regulator

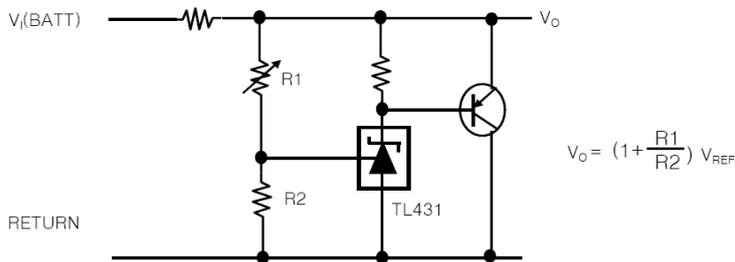


Note A : R Should provide cathode current 1mA to the TL431 at minimum  $V_{I(BATT)}$

### 2. Output Control of a Three-Terminal Fixed Regulator

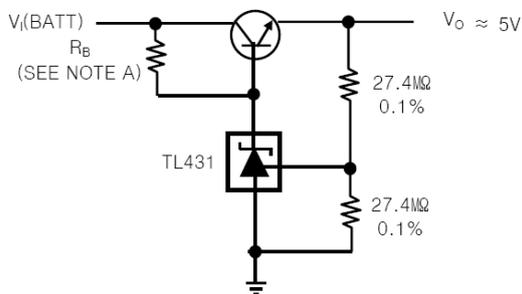


### 3. High-Current Shunt Regulator

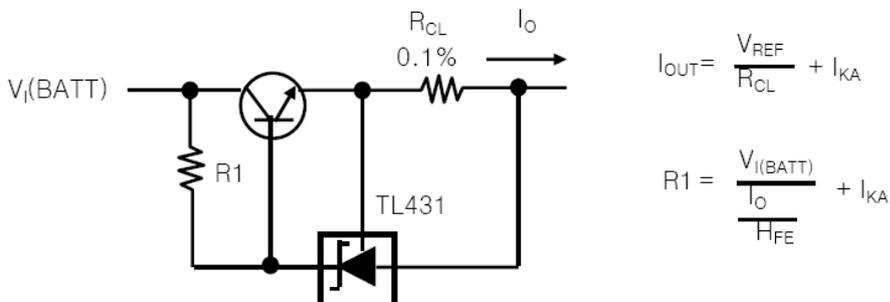


NOTE A : R<sub>B</sub> Should provide cathode current ≥ 1mA to the TL431.

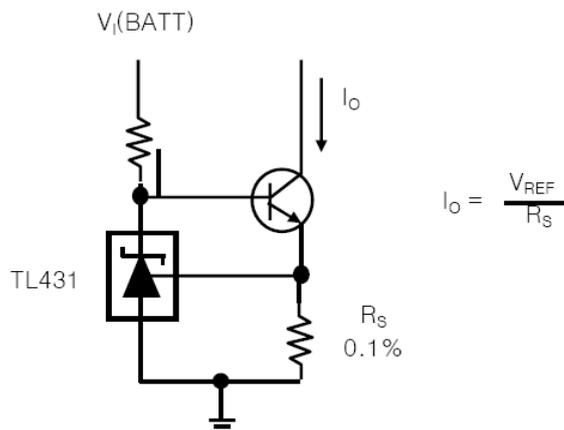
### 4. Efficient 5-V Precision Regulator



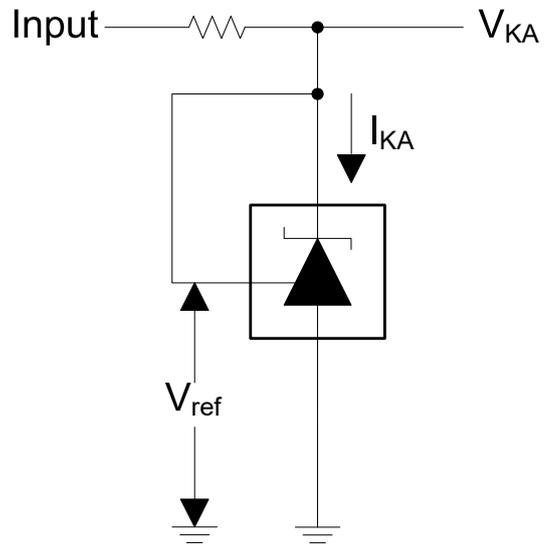
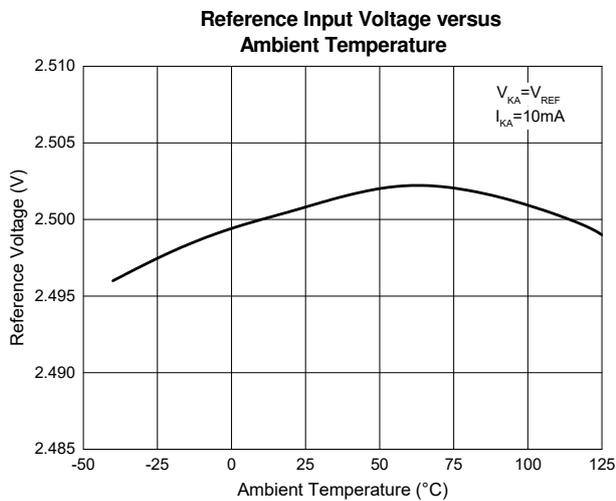
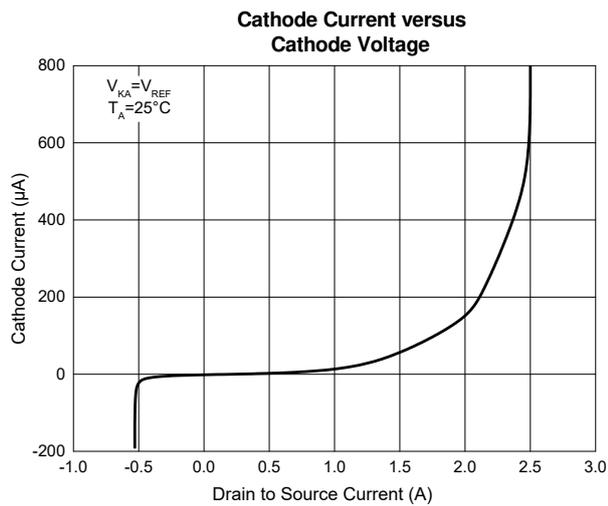
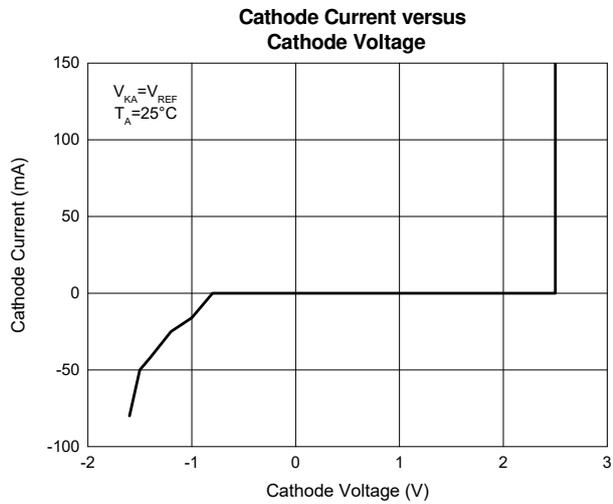
### 5. Precision Current Limiter



### 6. Precision Constant-Current Sink

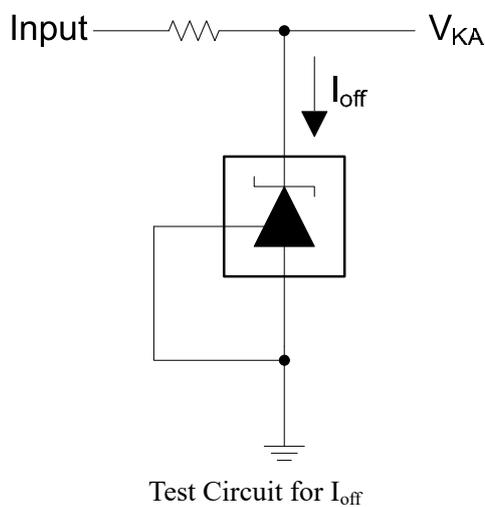
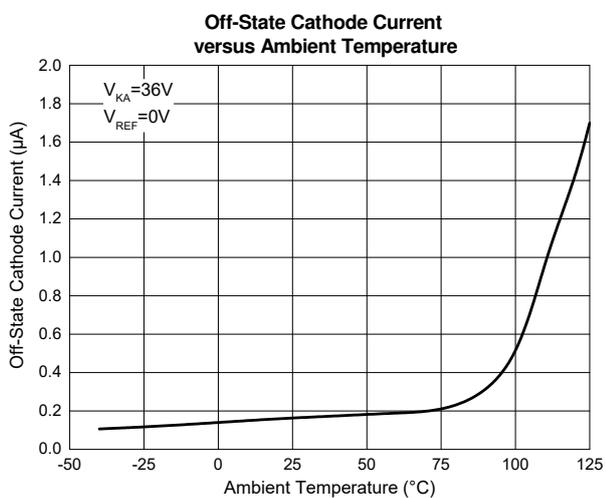
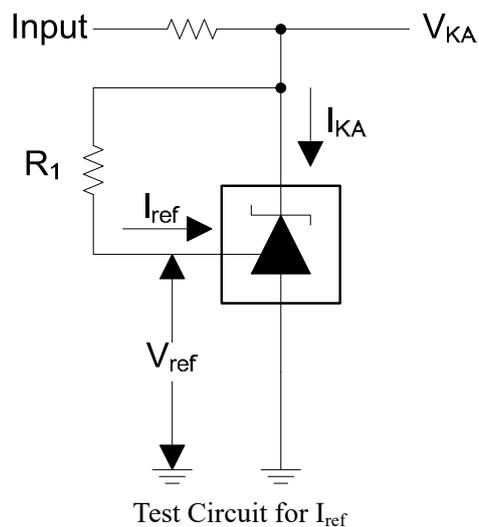
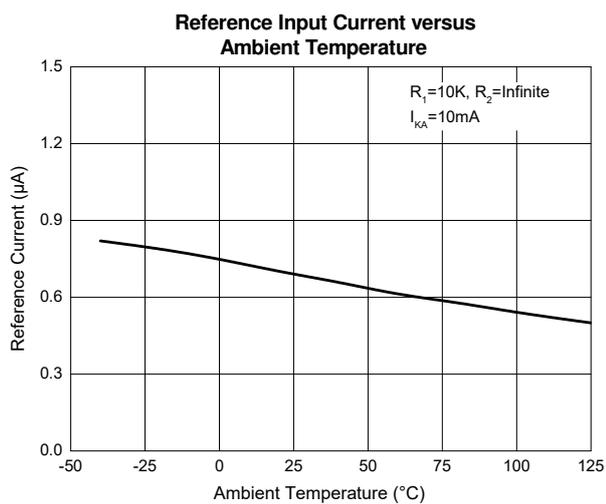
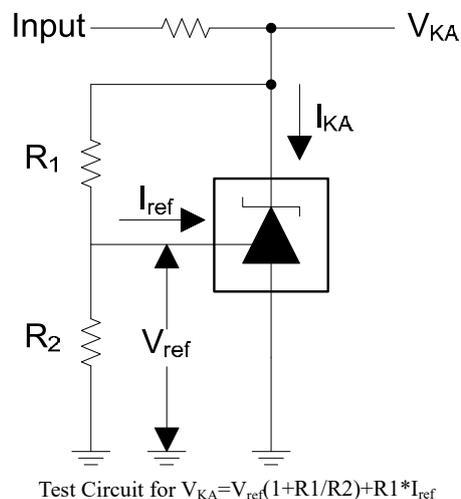
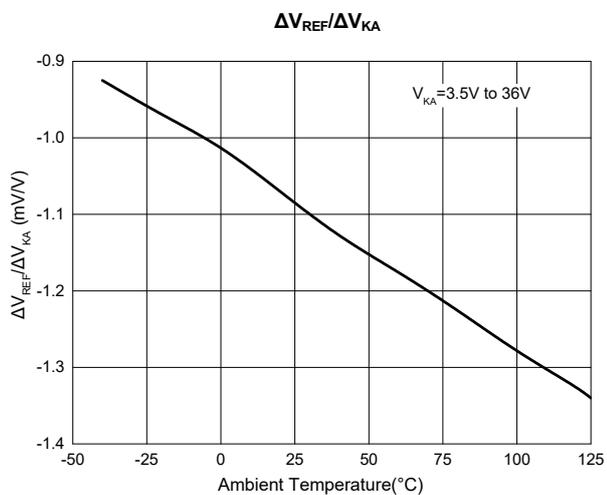


Curve Characteristics



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

Curve Characteristics



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 3Kpcs/Reel

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