

## Features

- The Reference Input Voltage Tolerance is 1%
- Sink Current Capability of 0.1mA to 100 mA
- Programmable Output Voltage 18V
- 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
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 1
- 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                        | $V_{KA}$        | 20       | V    |
| Cathode Current Range                  | $I_K$           | -100~100 | mA   |
| Reference Input Current Range          | $I_{REF}$       | 10       | mA   |
| Power Dissipation at 25 °C             | $P_D$           | 0.3      | W    |
| Thermal Resistance Junction to Ambient | $R_{\theta JA}$ | 417      | °C/W |
| Operating Temperature                  | $T_{opr}$       | -40~125  | °C   |
| Storage Temperature Range              | $T_{STG}$       | -65~150  | °C   |

## Recommended Operating Conditions

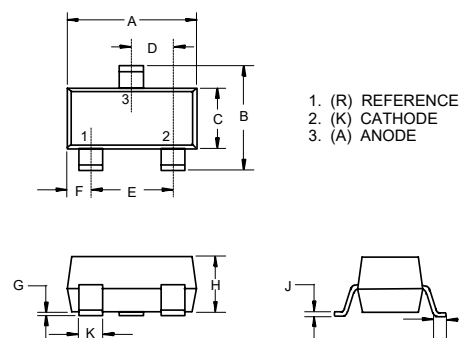
| Parameter             | Symbol   | Min       | Max | Unit |
|-----------------------|----------|-----------|-----|------|
| Cathode Voltage       | $V_{KA}$ | $V_{REF}$ | 18  | V    |
| Cathode Current Range | $I_K$    | 0.1       | 100 | mA   |

## Marking Code: 432

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

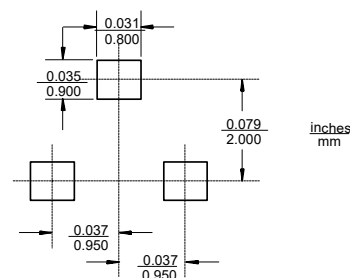
# Programmable Precision Regulator

## 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 |      |

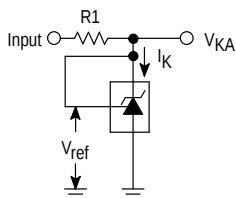
## Suggested Solder Pad Layout



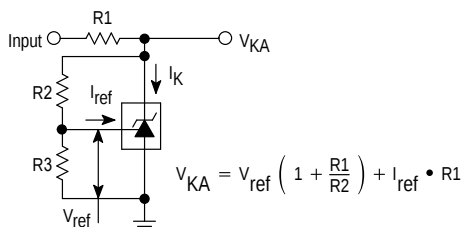
**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

| Parameter                                                                   | Symbol                                 | Test Conditions                                                                       | Min   | Typ   | Max   | Unit     |
|-----------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------|-------|-------|-------|----------|
| Reference output Voltage                                                    | $V_{ref}$                              | $V_{KA}=V_{REF}$ , $I_{KA}=10mA$                                                      | 1.228 | 1.240 | 1.252 | V        |
| Deviation of Reference Input Voltage                                        | $\frac{\Delta V_{ref}}{\Delta T}$      | $V_{KA}=V_{REF}$ , $I_{KA}=10mA$<br>$T_{min} \leq T \leq T_{max}$                     |       | 8     | 25    | mV       |
| Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage | $\frac{\Delta V_{ref}}{\Delta V_{KA}}$ | $\Delta V_{KA}=16V \sim V_{ref}$                                                      |       | -0.5  | -1.5  | mV/V     |
| Reference Input Current                                                     | $I_{ref}$                              | $I_{KA}=10mA$ ,<br>$R_1=10K\Omega$ , $R_2=\infty$                                     |       | 0.15  | 0.4   | $\mu A$  |
| Deviation of Reference Input Current Over Full Temperature Range            | $\frac{\Delta I_{ref}}{\Delta T}$      | $I_{KA}=10mA$ ,<br>$R_1=10K\Omega$ , $R_2=\infty$<br>$T_A=20^\circ C$ to $80^\circ C$ |       | 0.1   | 0.4   | $\mu A$  |
| Minimum Cathode Current for Regulation                                      | $I_{KA(min)}$                          | $V_{KA}=V_{REF}$                                                                      |       | 55    | 100   | $\mu A$  |
| Off-State Cathode Current                                                   | $I_{KA(off)}$                          | $V_{KA}=6V$ , $V_{REF}=0V$                                                            |       | 0.01  | 0.1   | $\mu A$  |
| Dynamic Impedance                                                           | $Z_{KA}$                               | $I_{KA}=1$ to $100mA$ , $f \leq 1.0KHz$                                               |       | 0.05  | 0.15  | $\Omega$ |

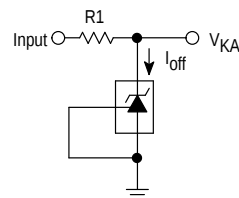
**Figure 1. Test Circuit for  $V_{KA} = V_{ref}$**



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



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



## APPLICATION INFORMATION

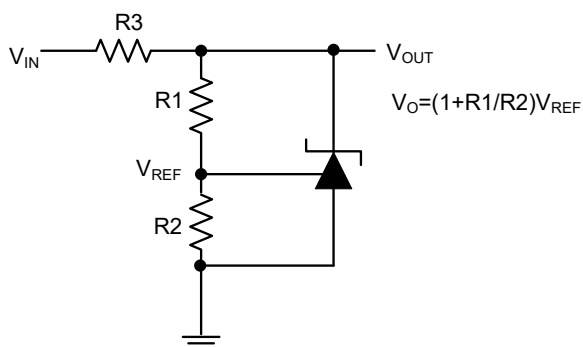


Figure 4. Shunt Regulator

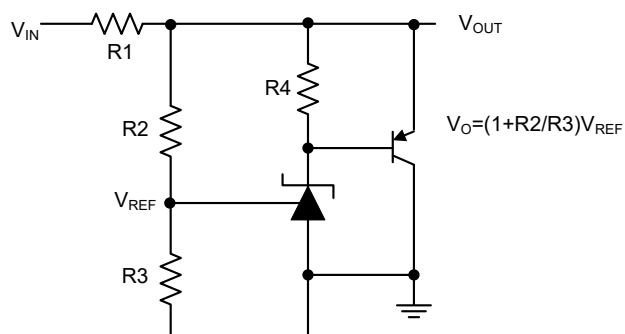


Figure 5. High Current Shunt Regulator

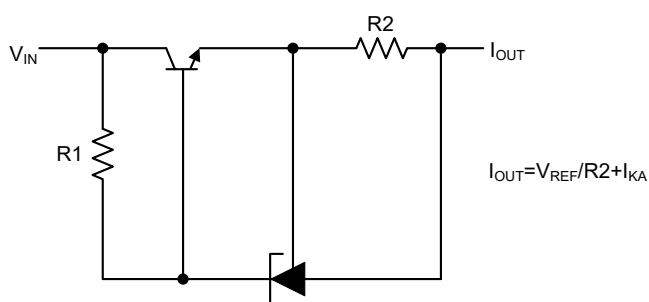


Figure 6. Current Source or Current Limit

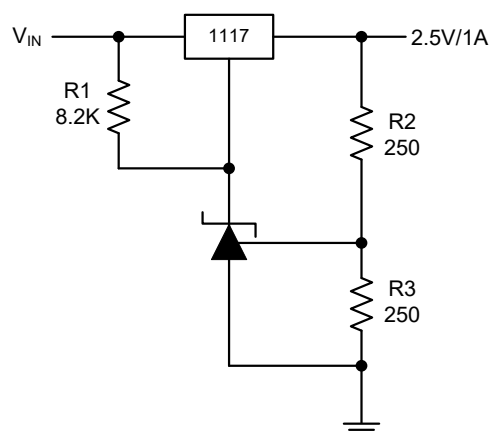


Figure 7. Precision 2.5V/1A Regulator

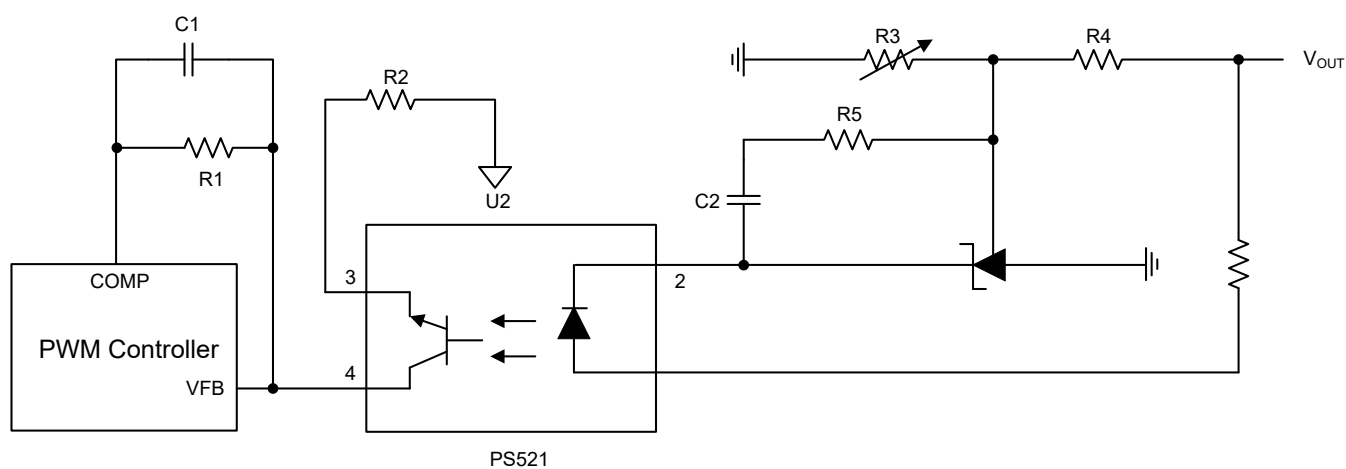


Figure 8. PWM Converter with Reference

## Curve Characteristics

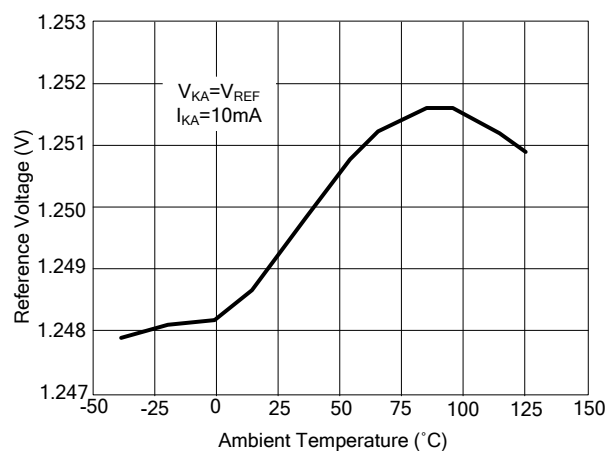


Figure 9. Reference Voltage VS. Ambient Temperature

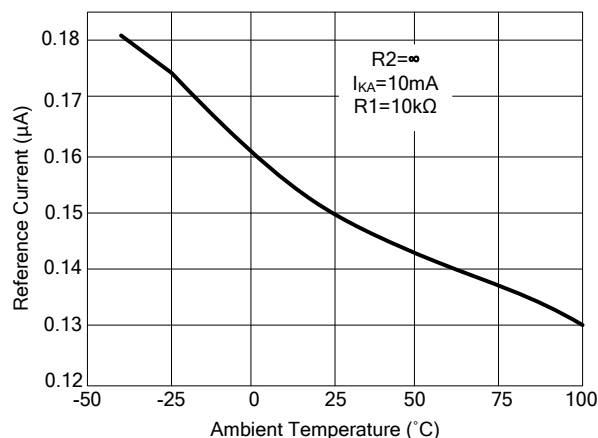


Figure 10. Reference Current VS. Ambient Temperature

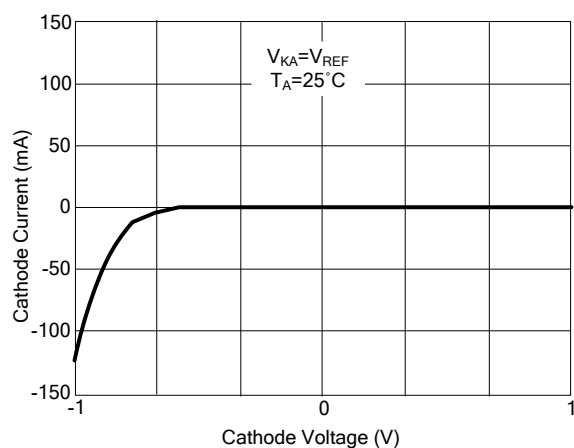


Figure 11. Cathode Current VS. Cathode Voltage

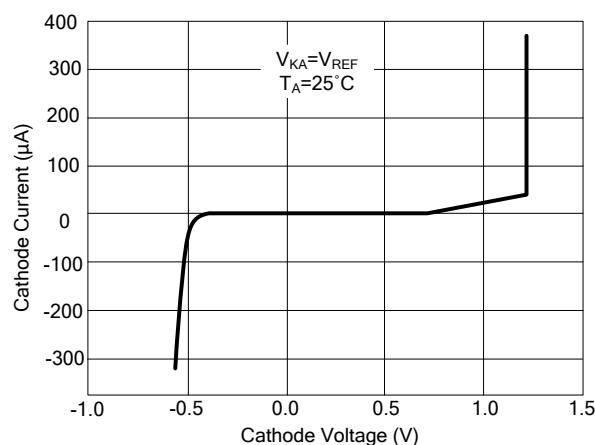


Figure 12. Current VS. cathode Voltage

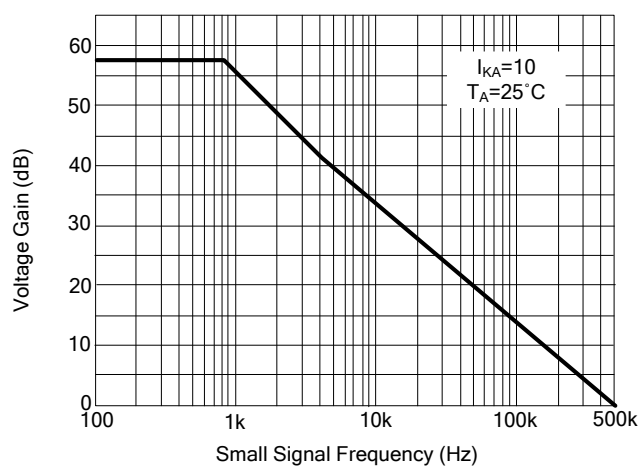
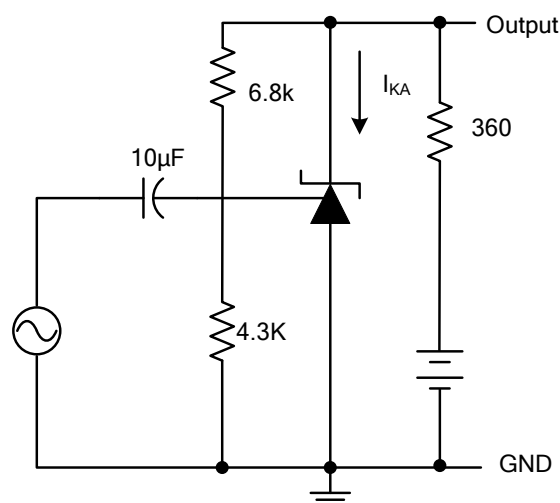


Figure 13. Small Signal Voltage Gain Vs. Frequency



## Curve Characteristics

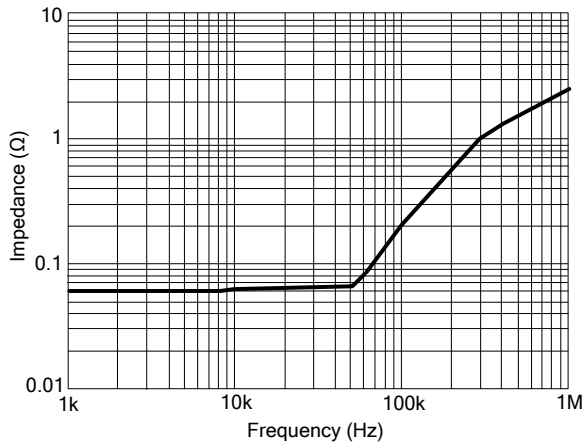


Figure 14. Dynamic Impedance Vs. Frequency

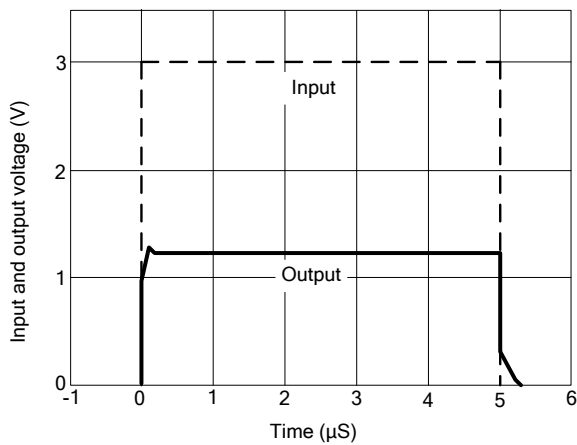
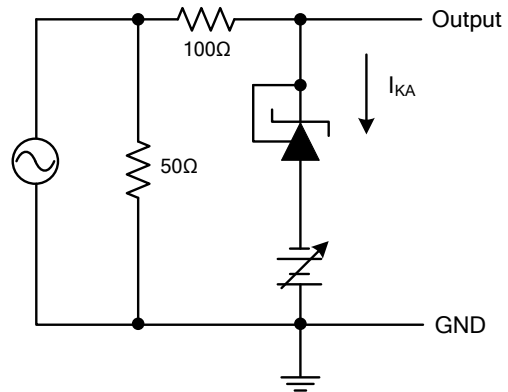


Figure 15. Pulse Response of Input and Output Voltage

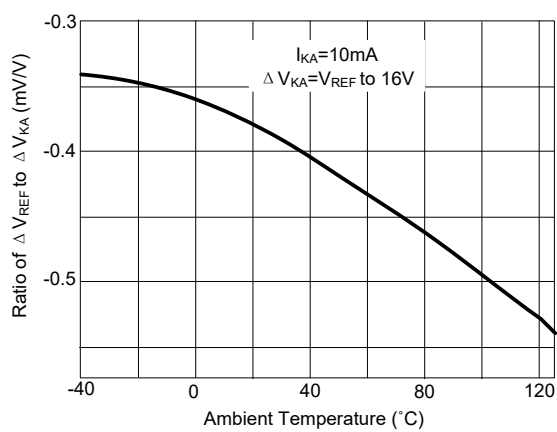
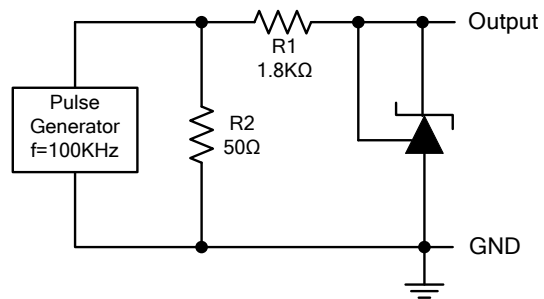


Figure 16. Ratio of Delta Reference Voltage to the Ratio of Delta Cathode Voltage Vs. Ambient Temperature

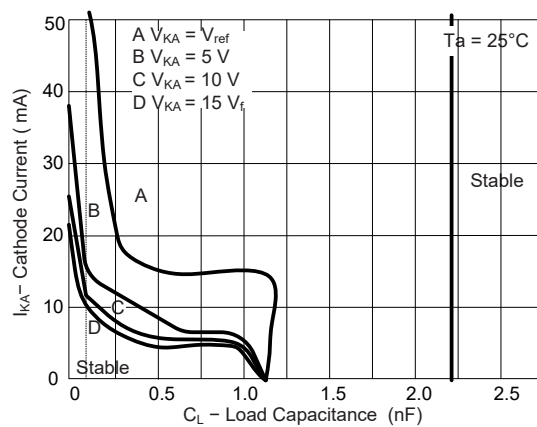


Figure 17. Cathode Current Vs Load Capacitance

## Ordering Information

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

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