## Features

- Low Quiescent Current: 1.6μA
- Low Dropout Voltage: 500mV@100mA
- High Accuracy: ±2%
- Excellent Line and Load Transient Response
- Output Current-Limit Protection
- Output Short-Circuit Protection
- Over-Temperature Protection
- ESD Protected up to 4KV(HBM),200V(CDM)(Note 1)
- Moisture Sensitivity Level 3
- Halogen Free. “Green” Device (Note 2)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix designates RoHS Compliant. See ordering information)

## Applications

- Battery-Powered Equipment
- Smoke Detectors and Sensors
- Micro-controller Applications
- Household Electric Appliances

## Description

The MC5200K3 is a high-performance low drop-out linear regulator with input voltage at 30V and output current to 200mA. despite of the already low quiescent current at 1.6μA. operation integrity is further fortified with full suite of protection features (thermal shut-down, short-circuit handling, current limiting). The device delivers accurate (±2%) output voltage at fixed 3.3V.

## Part Number and Marking Code

| Part Number | Marking Code |
|---|---|
| MC5200K3-3.3 | 5233 |

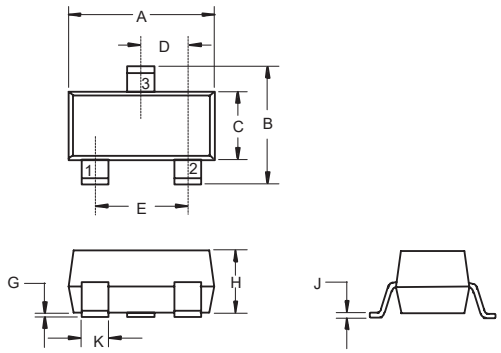
Note:

1. Devices are ESD sensitive. Handling precaution recommended

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

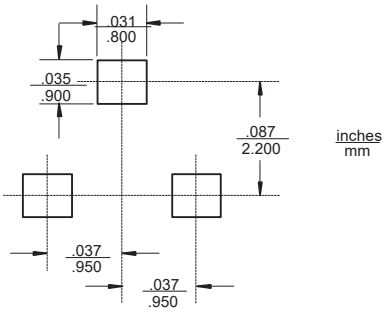
# 200mA Low Drop-out Voltage Regulators

## SOT-23-3L

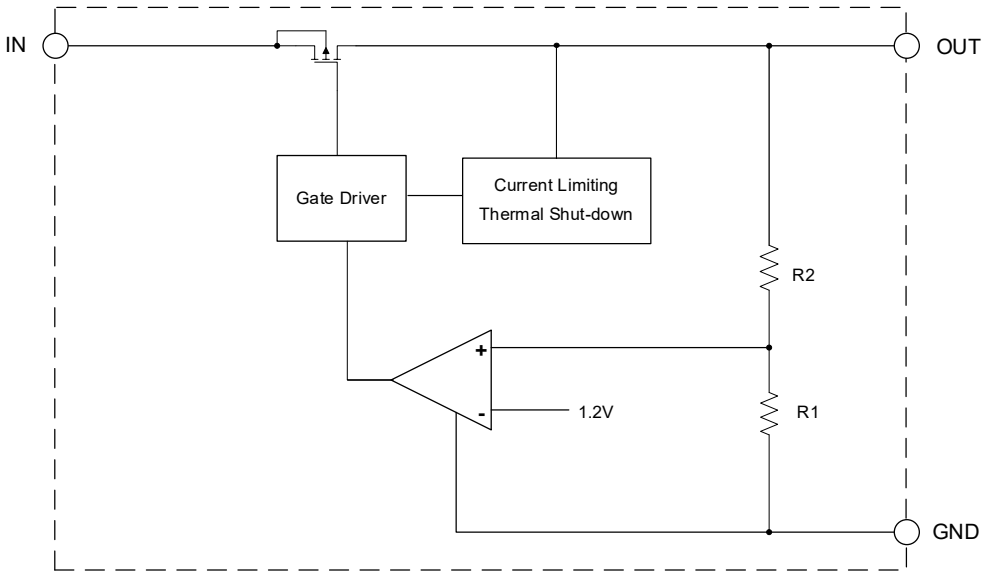



| DIMENSIONS | | | | | |
|---|---|---|---|---|---|
| DIM | INCHES | | MM | | NOTE |
| | MIN | MAX | MIN | MAX | |
| A | 0.113 | 0.117 | 2.87 | 2.97 | |
| B | 0.108 | 0.112 | 2.75 | 2.85 | |
| C | 0.061 | 0.065 | 1.55 | 1.65 | |
| D | 0.036 | 0.038 | 0.914 | 0.965 | |
| E | 0.073 | 0.077 | 1.85 | 1.95 | |
| G | 0.0016 | 0.0039 | 0.04 | 0.100 | |
| H | 0.041 | 0.045 | 1.05 | 1.15 | |
| J | 0.006 | 0.007 | 0.14 | 0.17 | |
| K | 0.012 | 0.020 | 0.30 | 0.50 | |

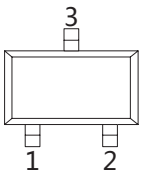
**Suggested Solder Pad Layout**



## Functional Block Diagram

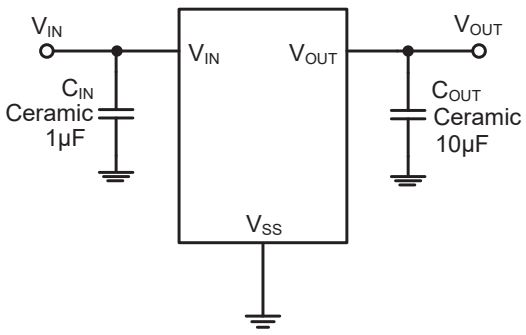



## Pin Configuration and Functions (Top View)




| Number | Name | Pin Function |
|---|---|---|
| 1 | $V_{SS}$ | Ground |
| 2 | $V_{OUT}$ | Output |
| 3 | $V_{IN}$ | Power Input |

## Typical Application Circuit



## Absolute Maximum Ratings

- Operating Junction Temperature Range: -40~+125°C
- Storage Temperature Range: -40~+150°C
- Thermal Resistance: 200°C/W Junction to Ambient

| Parameter | Symbol | Ratings | Units |
|---|---|---|---|
| Input Voltage to GND | $V_{IN}$~$V_{SS}$ | -0.3 ~ 36 | V |
| Output Voltage to GND | $V_{OUT}$~$V_{SS}$ | -0.3 ~ 7 | V |
| Input Voltage to Output Voltage | $V_{IN}$~$V_{OUT}$ | -0.3 ~ 31 | V |
| Output Current | $I_{OUT}$ | 200 | mA |
| Power Dissipation | $P_D$ | 0.6 | W |

## Electrical Characteristics
## ($V_{IN}$=$V_{OUT}$+1V, $C_{IN}$=1μF, $C_{OUT}$=10μF, $T_A$=25℃, unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | | 3 | | 30 | V |
| Quiescent Current | $I_Q$ | $V_{IN}$=12V, $I_{OUT}$=0 | 1.3 | 1.6 | 1.8 | μA |
| Output Voltage | $V_{OUT}$ | $V_{IN}$=12V, $I_{OUT}$=10mA | $V_{OUT}$ *0.98 | $V_{OUT}$ | $V_{OUT}$ *1.02 | V |
| Output Current | $I_{OUT}$ | | | 200 | | mA |
| Dropout Voltage(Note3) | $V_{DROP}$ | $I_{OUT}$=100mA, $V_{IN}$=$V_{OUTNOM}$-0.1V | | 500 | | mV |
| | | $I_{OUT}$=150mA, $V_{IN}$=$V_{OUTNOM}$-0.1V | | 700 | | |
| Line Regulation | $\Delta V_{OUT}/\Delta V_{IN}$ | $I_{OUT}$=1mA, $V_{OUTNOM}$+1V≤$V_{IN}$≤30V | | 0.1 | | mV/V |
| Load Regulation | $\Delta V_{OUT}/\Delta I_{OUT}$ | $V_{IN}$=7V, 1mA≤$I_{OUT}$≤150mA | | 0.1 | | mV/mA |
| Current Limit | $I_{LIMIT}$ | | | 370 | | mA |
| Short Current | $I_{SHORT}$ | | | 120 | | mA |
| Thermal Shut-down Threshold | $T_{SHDN}$ | Temperature Rising | | 154 | | °C |
| | | Temperature Falling | | 125 | | °C |

Note3: When the output drops below its nominal value by 2%, the voltage difference between IN and OUT pins equates to $V_{DROP}$.

## Curve Characteristics

Fig. 1 - Output Voltage

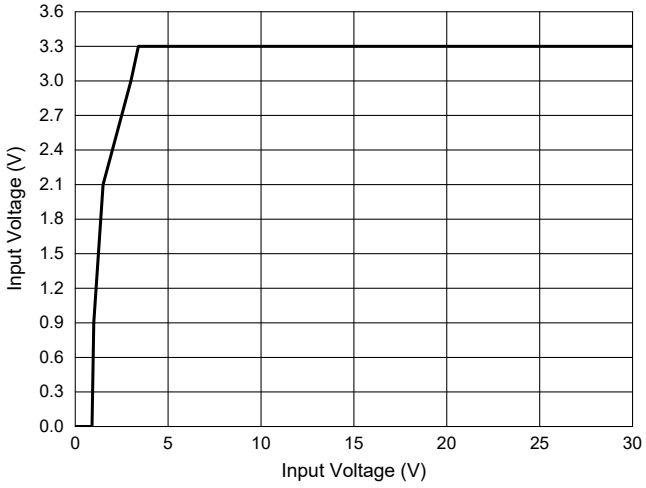



Fig. 2 - Output Voltage vs Temperature

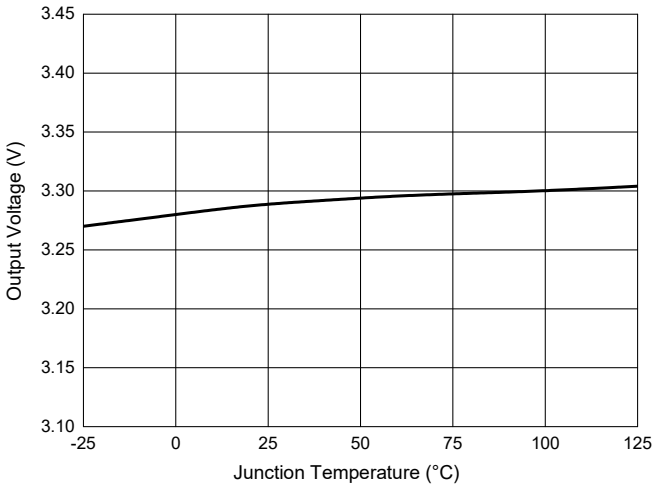



Fig. 3 - Drop-out Voltage

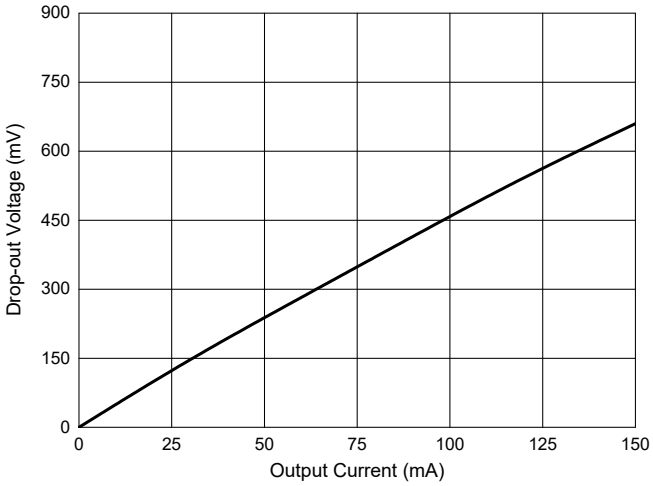



Fig. 4 - Quiescent Current

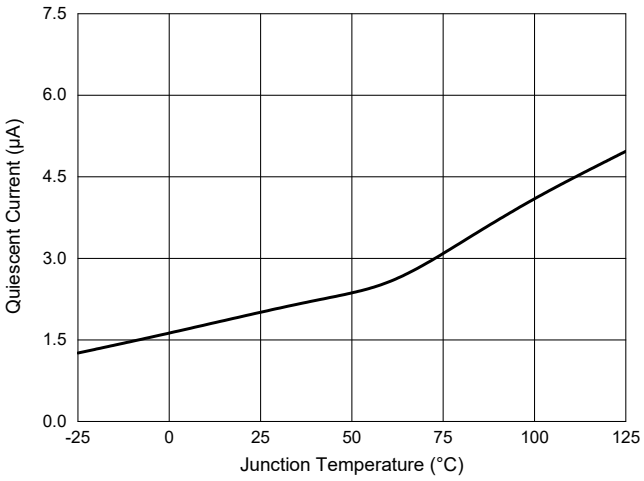



Fig. 5 - Quiescent Current

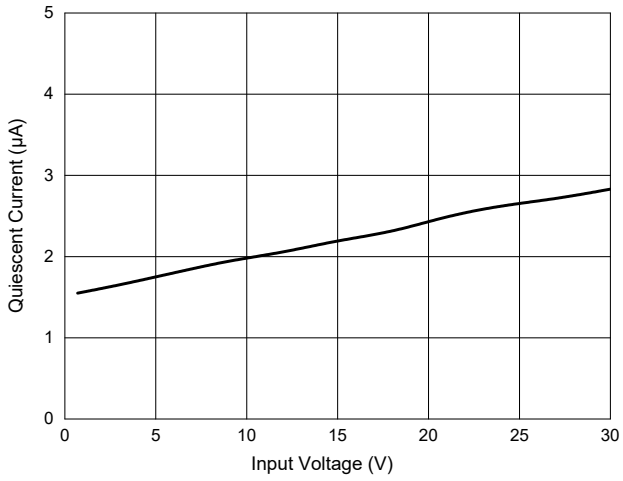
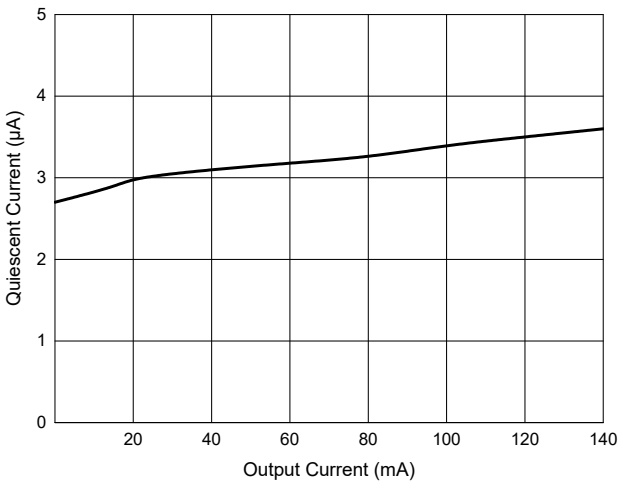



Fig. 6 - Quiescent Current



## Ordering Information

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