

RoHS Compliant Product

Description

The SM2123 series of positive, linear regulators feature low quiescent current (30µA typ.) with low dropout voltage, making them ideal for battery applications. These rugged devices have both Thermal Shutdown, and Current Fold-back to prevent device failure under the "Worst" of operating conditions. The SM2123 is stable with an output capacitance of 2.2µF or greater.

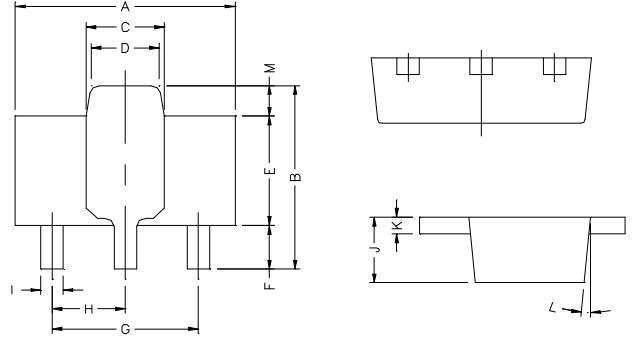
Features

- * High Accurate $\pm 1.5\%$
- * Over-Temperature Shutdown
- * Factory Pre-set Output Voltage
- * Very Low Dropout Voltage
- * Low Temperature Coefficient
- * Short Circuit Current Fold-back
- * Guaranteed 300mA output
- * Current Limiting

Applications

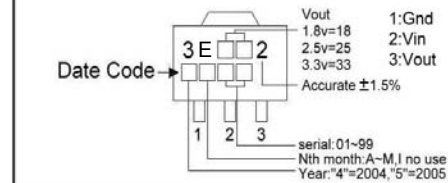
- * PC Peripherals
- * Wireless Devices
- * Portable Electronics
- * Battery Powered Widgets
- * Electronic Scales
- * Instrumentation
- * Cordless Phones

SOT-89

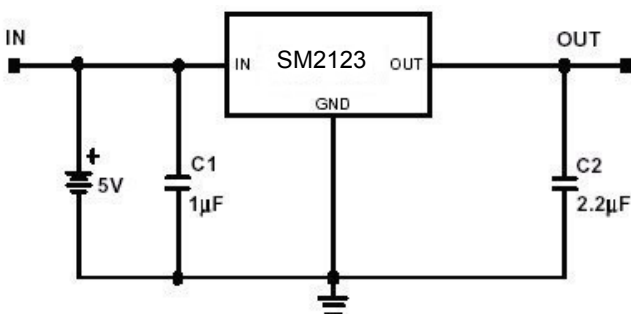


| REF. | Millimeter | | REF. | Millimeter | |
|------|------------|------|------|------------|------|
| | Min. | Max. | | Min. | Max. |
| A | 4.4 | 4.6 | G | 3.00 | REF. |
| B | 4.05 | 4.25 | H | 1.50 | REF. |
| C | 1.50 | 1.70 | I | 0.40 | 0.52 |
| D | 1.30 | 1.50 | J | 1.40 | 1.60 |
| E | 2.40 | 2.60 | K | 0.35 | 0.41 |
| F | 0.89 | 1.20 | L | 5° TYP. | |
| | | | M | 0.70 REF. | |

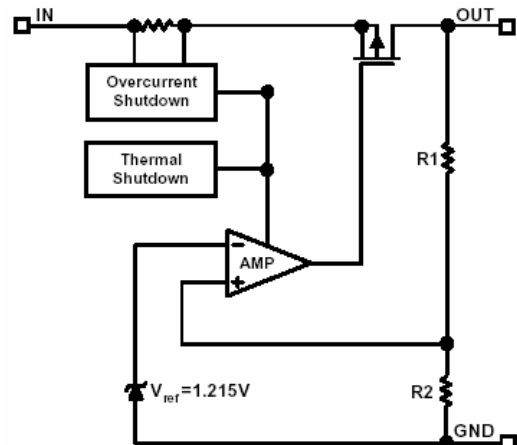
Marking :



Typical Application Circuit



Block Diagram



Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|--|--------------------|--------------------|------|
| Input Voltage | V_{IN} | 8 | V |
| Output Current | I_{OUT} | $P_D/(V_{IN}-V_O)$ | mA |
| Output Voltage | V_{OUT} | 1.3~5 | V |
| Operating Ambient Temperature | T_{opr} | -40~+85 | °C |
| Junction Temperature | T_j | -40~+125 | °C |
| Max. Junction Temperature | $T_j \text{ Max.}$ | 150 | °C |
| Thermal Resistance | θ_{jc} | 38 | W/°C |
| | θ_{ja} | 180 | W/°C |
| Power Dissipation ($\Delta T=100^\circ\text{C}$) | P_D | 550 | mW |
| EDS Classification | | B | |

Electrical Characteristics $T_a=25^\circ\text{C}$

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition | |
|--|----------------|-------------------|----------------|------|--------|--|--|
| Output Voltage | $V_{OUT(E)}^1$ | -1.5% | $V_{OUT(E)}^2$ | 1.5% | V | $V_{IN}=V_{OUT(T)}+1V, I_o=1mA$ | |
| Output Current | I_o | 300 | - | - | mA | $V_{IN}=V_{OUT(T)}+2V, V_{OUT} \geq V_{OUT(E)} * 0.96$ | |
| Current Limit | I_{LIM} | 300 | 450 | - | mA | $V_o > 1.2V$ | |
| Load Regulation | REG_{LOAD} | -1 | 0.2 | 1 | % | $V_{IN}=V_{OUT(T)}+2V, I_o=1mA \text{ to } 300mA$ | |
| Dropout Voltage | $V_{DROPOUT}$ | - | - | 1300 | mV | $1.3V \leq V_{OUT(T)} \leq 2.0V$ | $I_o=300mA$ $V_o=V_{OUT(E)}-2\%$ |
| | | - | - | 400 | | $2.0V < V_{OUT(T)} \leq 2.8V$ | |
| | | - | - | 300 | | $2.8V < V_{OUT(T)}$ | |
| Quiescent Current | I_q | - | 30 | 50 | µA | $V_{IN}=V_{OUT(T)}+1V$ | |
| Line Regulation | REG_{LINE} | -0.2 | - | 0.2 | % | $1.3V \leq V_{OUT(T)} \leq 1.4V$ | $I_o=1mA$ $V_{IN}=V_{OUT(T)}+1$ to $V_{OUT(T)}+2$ |
| | | -0.15 | - | 0.15 | | $1.4V < V_{OUT(T)} \leq 2.0V$ | |
| | | -0.1 | 0.02 | 0.1 | | $2.0V < V_{OUT(T)} < 4.0V$ | |
| | | -0.4 | 0.2 | 0.4 | | $4.0V \leq V_{OUT(T)}$ | |
| Input Voltage | V_{IN} | Note ³ | - | 7 | V | | |
| Over Temperature Shutdown | O_{TS} | - | 150 | - | °C | | |
| Over Temperature Hystersis | O_{TH} | - | 30 | - | °C | | |
| Output Voltage Temperature Coefficient | T_C | - | 30 | - | ppm/°C | | |
| Short Circuit Current ⁴ | I_{SC} | - | 150 | 300 | mA | $V_{IN}=V_{OUT(T)}+1V, V_{OUT}=0V$ | |
| PSRR | PSRR | - | 50 | - | dB | $f=1kHz$ | $I_o=100mA$ $C_o=2.2\mu F$ |
| | | - | 20 | - | | $f=10kHz$ | |
| | | - | 15 | - | | $f=100kHz$ | |
| Output Voltage Noise | eN | - | 30 | - | µVrms | $C_o=2.2\mu F$ $f=10Hz \sim 100kHz$ $I_o=10mA$ | |

Note 1: $V_{OUT(E)}$ = Effective Output Voltage (i.e. the output voltage when " $V_{OUT(T)} + 1.0V$ " is provided at the V_{IN} pin while maintaining a certain I_{OUT} value).

2: $V_{OUT(T)}$ = Specified Output Voltage

3: $V_{IN(MIN)} = V_{OUT} + V_{DROPOUT}$

4: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

Ordering Information(contd.)

| Part Number | Marking | Output Voltage | Part Number | Marking | Output Voltage |
|-------------|---------------|----------------|-------------|---------------|----------------|
| SM2123-13 | 3E132 XXXX | 1.3V | SM2123-15 | 3E152 XXXX | 1.5V |
| SM2123-18 | 3E182 XXXX | 1.8V | SM2123-19 | 3E192 XXXX | 1.9V |
| SM2123-20 | 3E202 XXXX | 2.0V | SM2123-25 | 3E252 XXXX | 2.5V |
| SM2123-27 | 3E272 XXXX | 2.7V | SM2123-28 | 3E282 XXXX | 2.8V |
| SM2123-29 | 3E292 XXXX | 2.9V | SM2123-30 | 3E302 XXXX | 3.0V |
| SM2123-31 | 3E312 XXXX | 3.1V | SM2123-33 | 3E332 XXXX | 3.3V |
| SM2123-34 | 3E342 XXXX | 3.4V | SM2123-35 | 3E352 XXXX | 3.5V |
| SM2123-36 | 3E362 XXXX | 3.6V | SM2123-37 | 3E372 XXXX | 3.7V |
| SM2123-38 | 3E382 XXXX | 3.8V | SM2123-50 | 3E502 XXXX | 5.0V |

Characteristics Curve

