



300mA Low Dropout CMOS Positive Voltage Regulator

CMOS Positive Voltage Regulator

Description

The FM2123 series of positive, linear regulators feature low quiescent current (30 μ A 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 GM2123 is stable with an output capacitance of 2.2 μ F or greater.

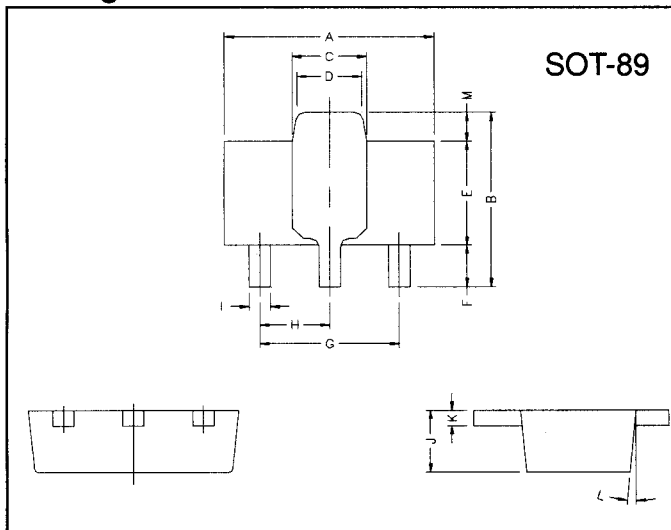
Features

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

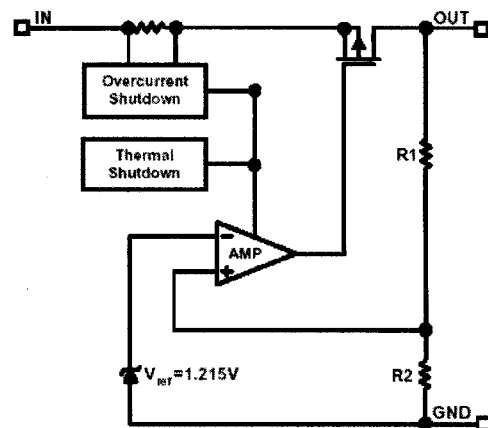
Applications

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

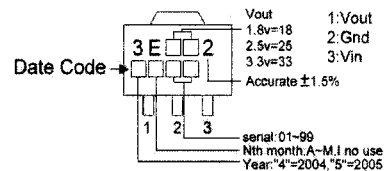
Package Dimensions



Block Diagram

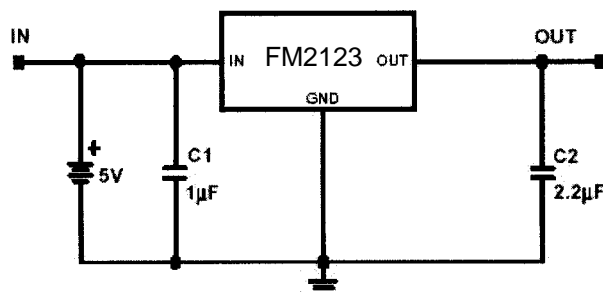


Marking :



| 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. |

Typical Application Circuit





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Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|-------------------------------|--------------------|---------------------------------------|------|
| Input Voltage | V _{IN} | 8 | V |
| Output Current | I _{OUT} | PD/(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 |
| Maximum Junction Temperature | T _{j Max} | 150 | °C |
| Thermal Resistance | θ _{jc} | 38 | °C/W |
| | θ _{ja} | 180 | °C/W |
| Power Dissipation(ΔT=100°C) | PD | 550 | mW |
| EDS Classification | | B | |

Electrical Characteristics Ta=25°C

| Parameter | Symbol | Condition | Min | TYP | Max | Unit | |
|--|--------------------------------|--|-----------------------------------|--------------------------------|------|--------|----|
| Output Voltage | V _{OUT(E)} (Note1) | V _{IN} =V _{OUT(T)} +1V, I _o =1mA | -1.5% | V _{OUT(T)} (Note2) | 1.5% | V | |
| Output Current | I _o | V _{IN} =V _{OUT(T)} +2V, V _{OUT} ≥V _{OUT(E)} *0.96 | 300 | - | - | mA | |
| Current Limit | I _{LIM} | V _O >1.2V | 300 | 450 | - | mA | |
| Load Regulation | REG _{LOAD} | V _{IN} =V _{OUT(T)} +2V, I _o =1mA to 300mA | -1 | 0.2 | 1 | % | |
| Dropout Voltage | V _{DROPOUT} | I _o =300mA V _O =V _{OUT(E)} -2% | 1.3V ≤ V _{OUT(T)} ≤ 2.0V | - | - | 1300 | mV |
| | | | 2.0V < V _{OUT(T)} ≤ 2.8V | - | - | 400 | |
| | | | 2.8V < V _{OUT(T)} | - | - | 300 | |
| Quiescent Current | I _q | V _{IN} =V _{OUT(T)} +1V | - | 30 | 50 | μA | |
| Line Regulation | REG _{LINE} | I _o =1mA V _{IN} =V _{OUT(T)} +1 to V _{OUT(T)} +2 | 1.3V ≤ V _{OUT(T)} ≤ 1.4V | -0.2 | - | 0.2 | % |
| | | | 1.4V < V _{OUT(T)} ≤ 2.0V | -0.15 | - | 0.15 | |
| | | | 2.0V < V _{OUT(T)} < 4.0V | -0.1 | 0.02 | 0.1 | |
| | | | 4.0V ≤ V _{OUT(T)} | -0.4 | 0.2 | 0.4 | |
| Input Voltage | V _{IN} | | Note3 | - | 7 | V | |
| Over Temperature Shutdown | OTS | | - | 150 | - | °C | |
| Over Temperature Hysteresis | OTH | | - | 30 | - | °C | |
| Output Voltage Temperature Coefficient | TC | | - | 30 | - | ppm/°C | |
| Short Circuit Current(Note4) | I _{SC} | V _{IN} =V _{OUT(T)} +1V V _{OUT} =0V | - | 150 | 300 | mA | |
| Power Supply Rejection | PSRR | I _o =100mA C _o =2.2μF | f=1kHz | - | 50 | - | dB |
| | | | f=10kHz | - | 20 | - | |
| | | | f=100kHz | - | 15 | - | |
| Output Voltage Noise | e _N | f=10Hz~100kHz I _o =10mA | | | | μVrms | |

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.

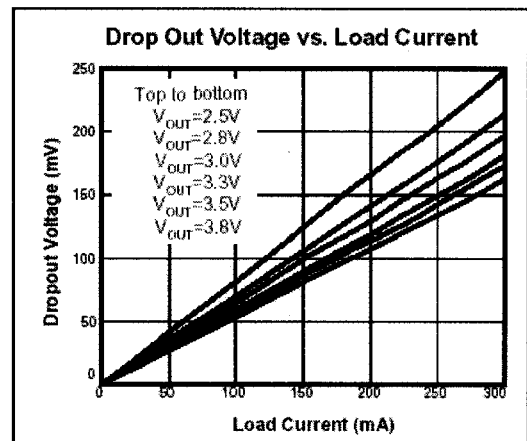
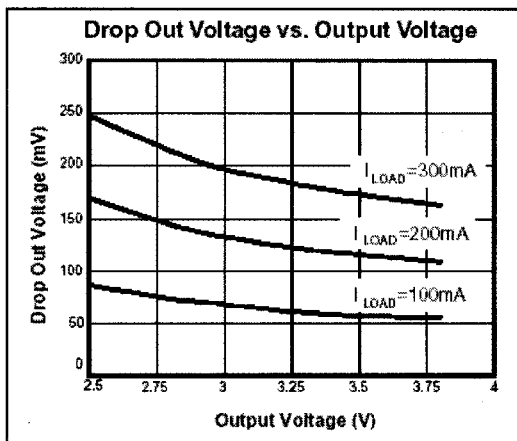
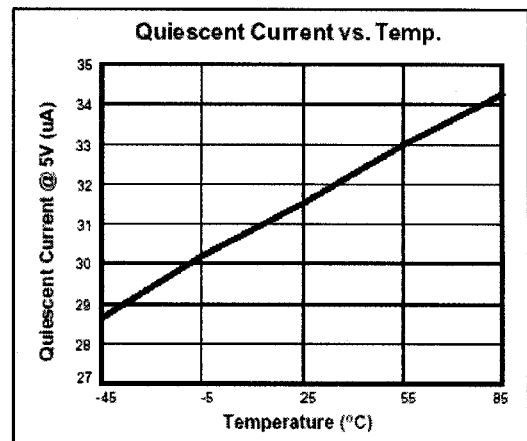
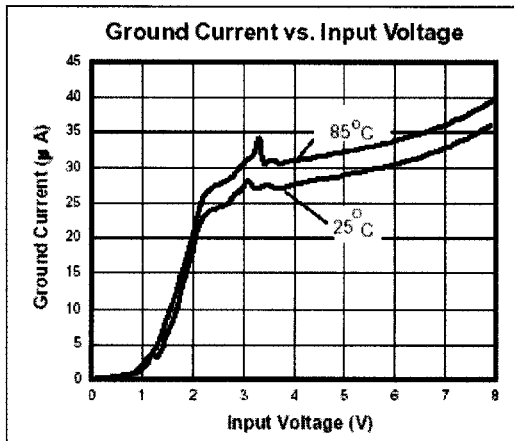


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Ordering Information (contd.)

| Part Number | Marking | Output Voltage | Part Number | Marking | Output Voltage |
|-------------|---------------|----------------|-------------|---------------|----------------|
| FM2123-13 | 3E132 XXXX | 1.3V | FM2123-15 | 3E152 XXXX | 1.5V |
| FM2123-18 | 3E182 XXXX | 1.8V | FM2123-19 | 3E192 XXXX | 1.9V |
| FM2123-20 | 3E202 XXXX | 2.0V | FM2123-25 | 3E252 XXXX | 2.5V |
| FM2123-27 | 3E272 XXXX | 2.7V | FM2123-28 | 3E282 XXXX | 2.8V |
| FM2123-29 | 3E292 XXXX | 2.9V | FM2123-30 | 3E302 XXXX | 3.0V |
| FM2123-31 | 3E312 XXXX | 3.1V | FM2123-33 | 3E332 XXXX | 3.3V |
| FM2123-34 | 3E342 XXXX | 3.4V | FM2123-35 | 3E352 XXXX | 3.5V |
| FM2123-36 | 3E362 XXXX | 3.6V | FM2123-37 | 3E372 XXXX | 3.7V |
| FM2123-38 | 3E382 XXXX | 3.8V | FM2123-50 | 3E502 XXXX | 5.0V |

Characteristics Curve





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