GM2123

CMOS Positive Voltage Regulator

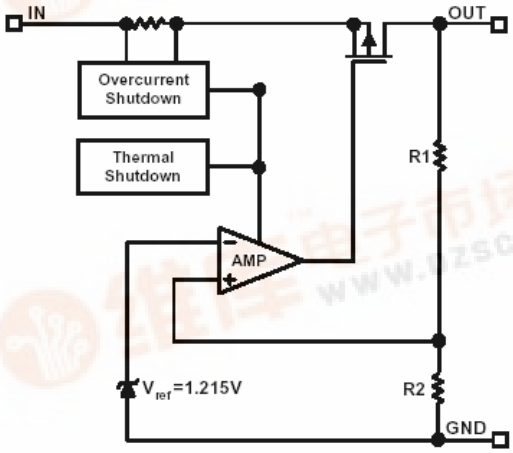
Description

The GM2123 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 GM2123 is stable with an output capacitance of 2.2μF 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± 1.5%
- Low Temperature Coefficient

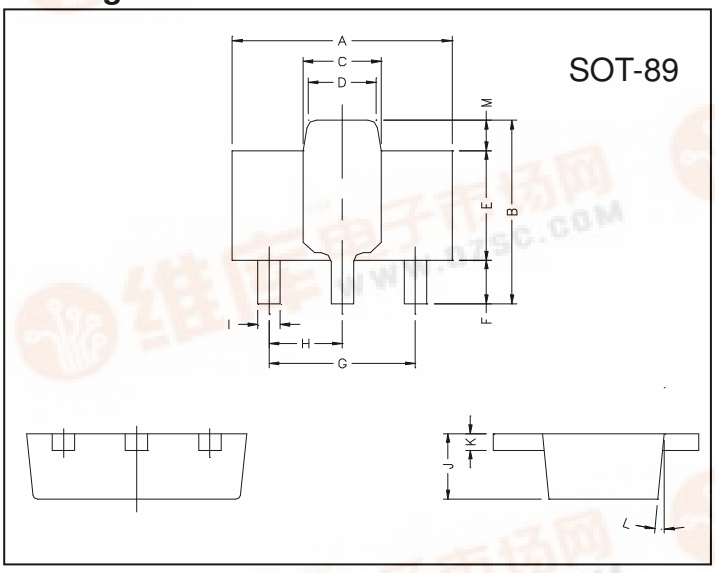
Block Diagram



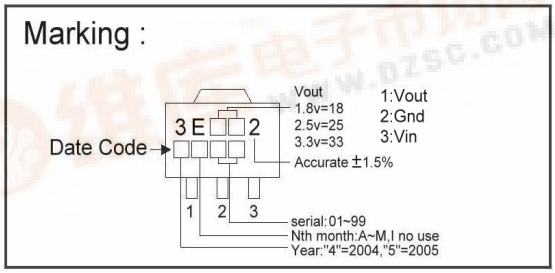
Applications

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

Package Dimensions

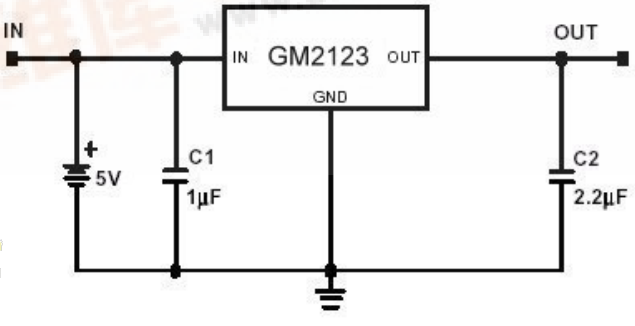


Marking :



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



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	Topr	-40 ~ +85	℃
Junction Temperature	Tj	-40 ~ +125	℃
Maximum Junction Temperature	$T_{j\,Max}$	150	℃
Thermal Resistance	θjc	38	℃/W
	θja	180	℃/W
Power Dissipation(△T=100℃)	PD	550	mW
EDS Classification		B	

Electrical Characteristics Ta=25℃

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	VIN			Note3	-	7	V
Over Temperature Shutdown	OTS			-	150	-	℃
Over Temperature Hysterisis	OTH			-	30	-	℃
Output Voltage Temperature Coefficient	TC			-	30	-	ppm/℃
Short Circuit Current(Note4)	I_{SC}	V_{IN}=V_{OUT}(T)+1V V_{OUT}=0V		-	150	300	mA
Power Supply Rejection	PSRR	Io=100mA Co=2.2μF	f=1kHz	-	50	-	dB
			f=10kHz	-	20	-	
			f=100kHz	-	15	-	
Output Voltage Noise	eN	f=10Hz~100kHz Io=10mA	Co=2.2μF	-	30	-	μVrms

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

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

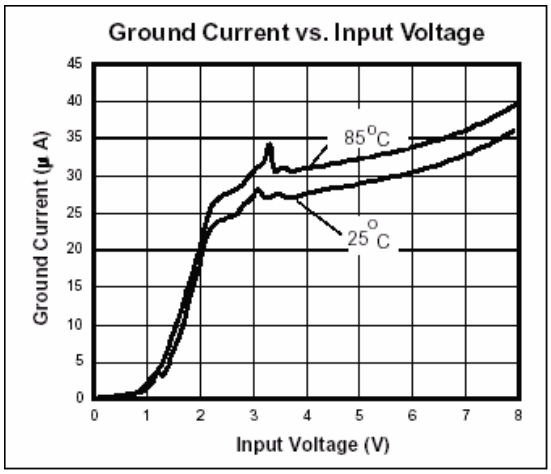
3: $V_{IN\,(MIN)}$ =V_{OUT}+$V_{DROPOUT}$

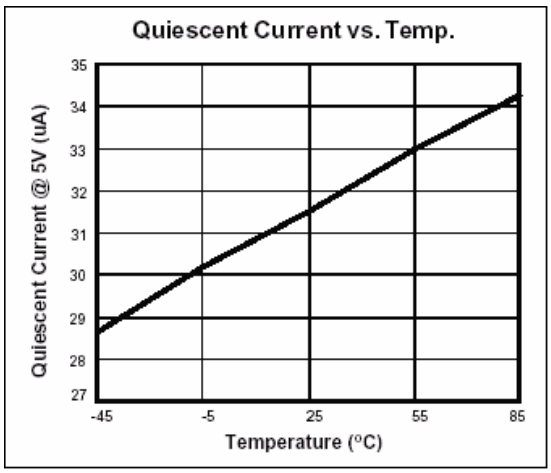
4: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

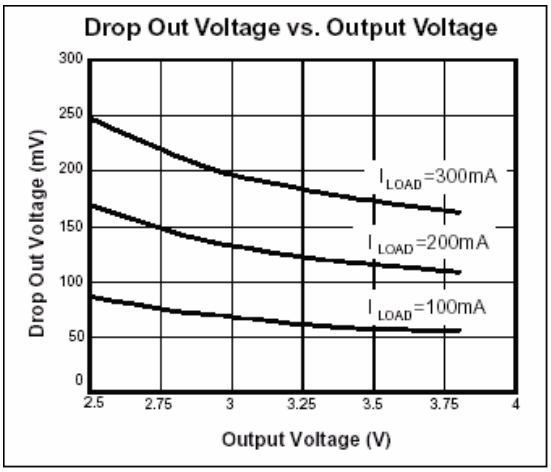
Ordering Information (contd.)

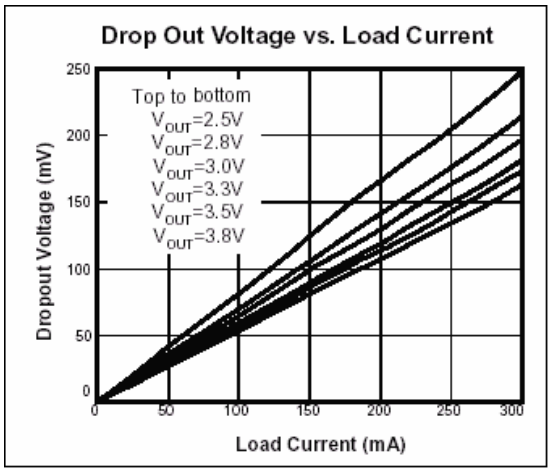
Part Number	Marking	Output Voltage	Part Number	Marking	Output Voltage
GM2123-13	3E132 XXXX	1.3V	GM2123-15	3E152 XXXX	1.5V
GM2123-18	3E182 XXXX	1.8V	GM2123-19	3E192 XXXX	1.9V
GM2123-20	3E202 XXXX	2.0V	GM2123-25	3E252 XXXX	2.5V
GM2123-27	3E272 XXXX	2.7V	GM2123-28	3E282 XXXX	2.8V
GM2123-29	3E292 XXXX	2.9V	GM2123-30	3E302 XXXX	3.0V
GM2123-31	3E312 XXXX	3.1V	GM2123-33	3E332 XXXX	3.3V
GM2123-34	3E342 XXXX	3.4V	GM2123-35	3E352 XXXX	3.5V
GM2123-36	3E362 XXXX	3.6V	GM2123-37	3E372 XXXX	3.7V
GM2123-38	3E382 XXXX	3.8V	GM2123-50	3E502 XXXX	5.0V

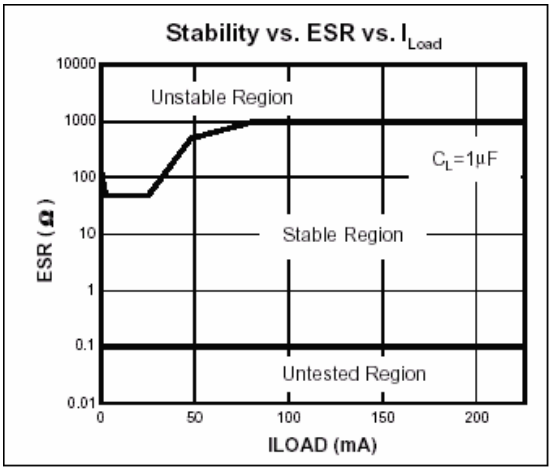
Characteristics Curve

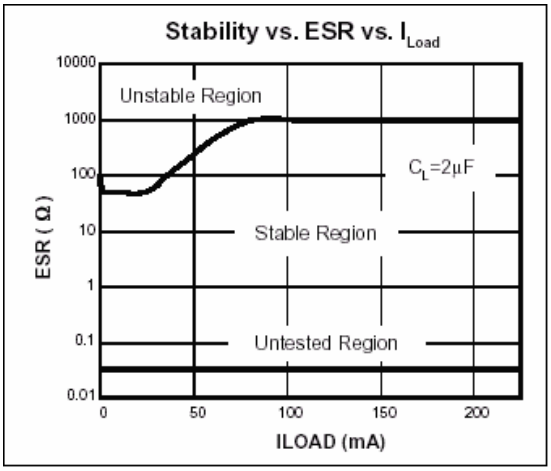


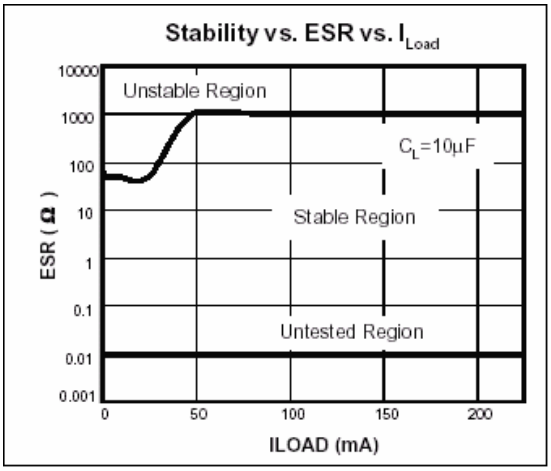


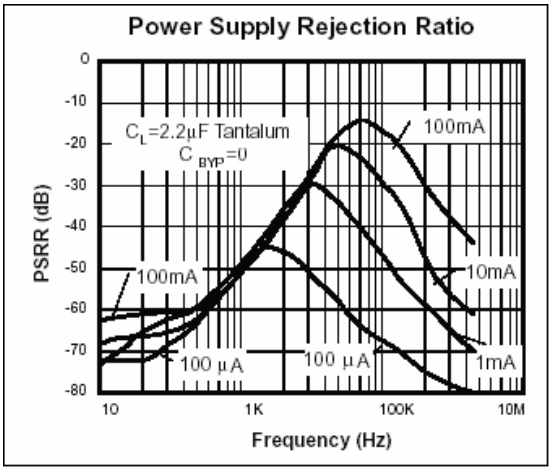


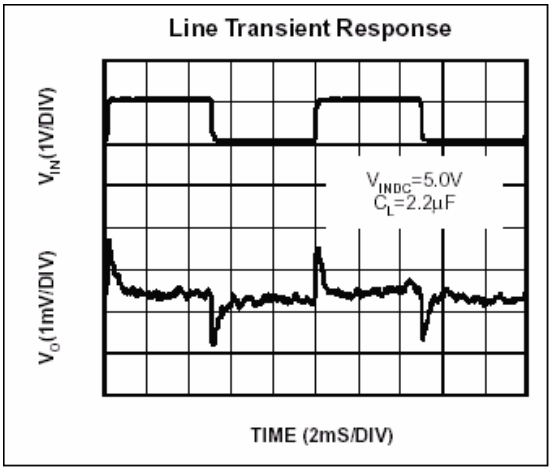


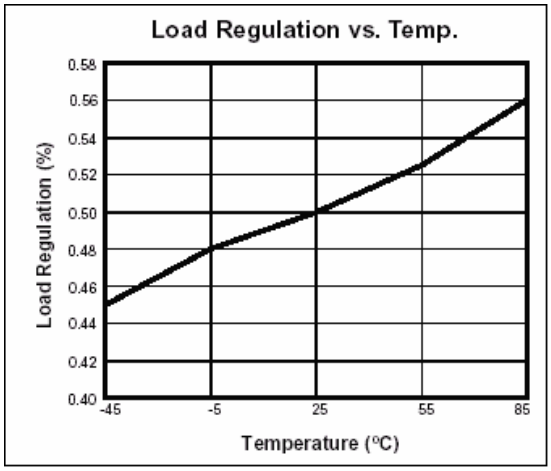

Stability vs. ESR vs. I_{Load}
Unstable Region
C_L=1µF
Stable Region
Untested Region
ESR (Ω)
ILOAD (mA)

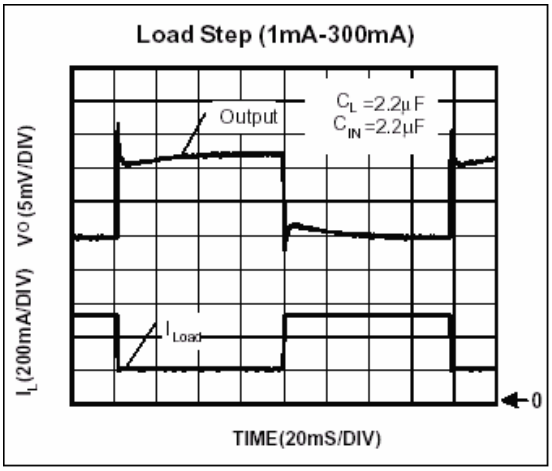

Stability vs. ESR vs. I_{Load}
Unstable Region
C_L=2µF
Stable Region
Untested Region
ESR (Ω)
ILOAD (mA)

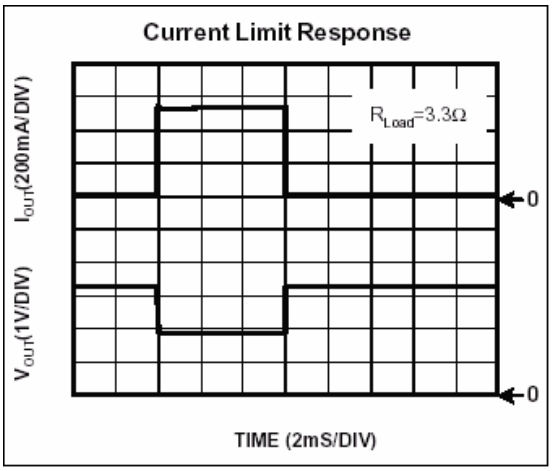

Stability vs. ESR vs. I_{Load}
Unstable Region
C_L=10µF
Stable Region
Untested Region
ESR (Ω)
ILOAD (mA)

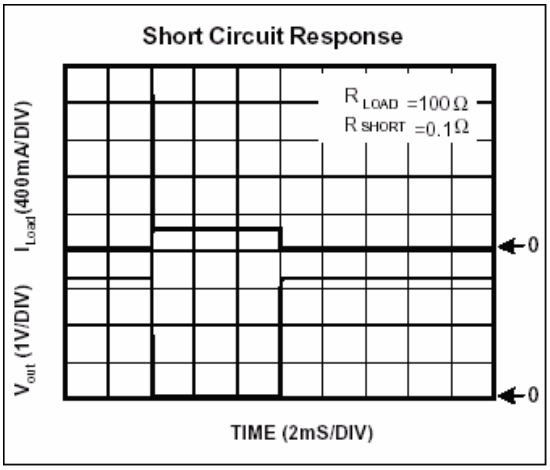

Power Supply Rejection Ratio
C_L=2.2µF Tantalum
C_{BYP}=0
100mA
10mA
1mA
100 µA
PSRR (dB)
Frequency (Hz)

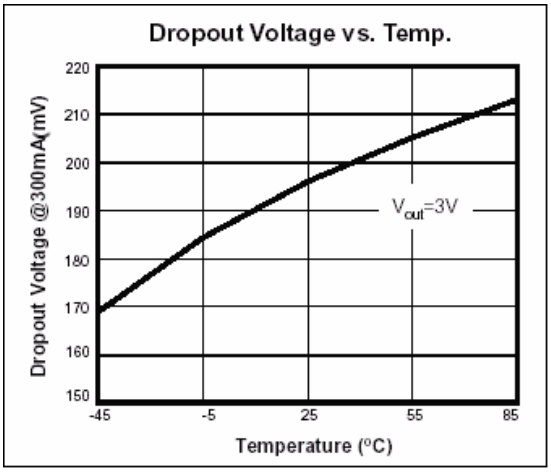

Line Transient Response
V_{IN}(1V/DIV)
V_O(1mV/DIV)
V_{INDC}=5.0V
C_L=2.2µF
TIME (2mS/DIV)

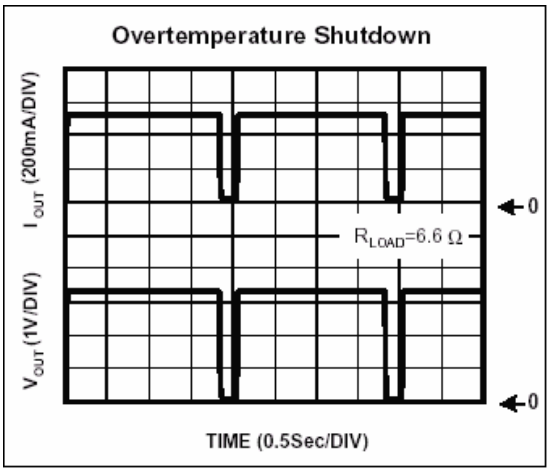

Load Regulation vs. Temp.
Load Regulation (%)
Temperature (°C)

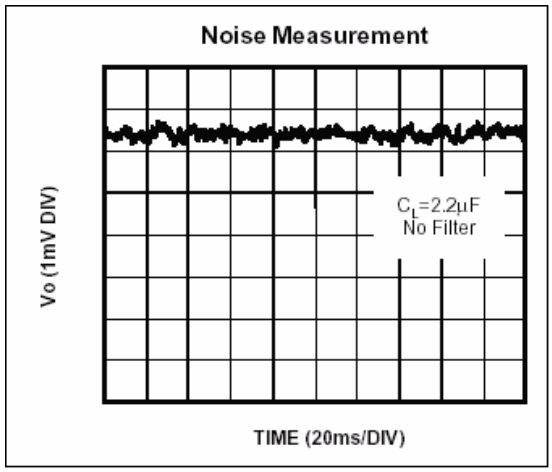












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