Elektronische Bauelemente

SM2116

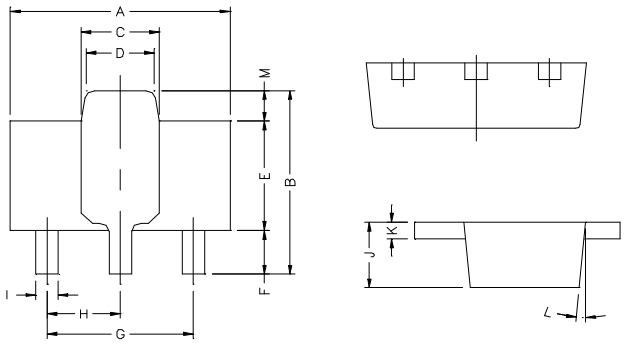
CMOS Positive Voltage Regulator

RoHS Compliant Product

Description

The SM2116 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 SM2116 is stable with an output capacitance of 2.2μF or greater.

SOT-89

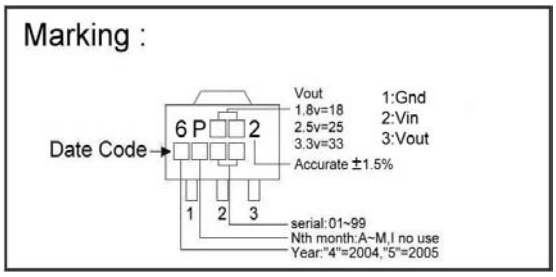


REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.4	4.6	G	3.00 REF.	
B	4.05	4.25	H	1.50 REF.	
C	1.50	1.70	I	0.40	0.52
D	1.30	1.50	J	1.40	1.60
E	2.40	2.60	K	0.35	0.41
F	0.89	1.20	L	5° TYP.	
			M	0.70 REF.	

Features

* High Accurate ±1.5%
* Over-Temperature Shutdown
* Factory Pre-set Output Voltage
* Very Low Dropout Voltage
* Low Temperature Coefficient
* Short Circuit Current Fold-back
* Guaranteed 600mA output
* Current Limiting

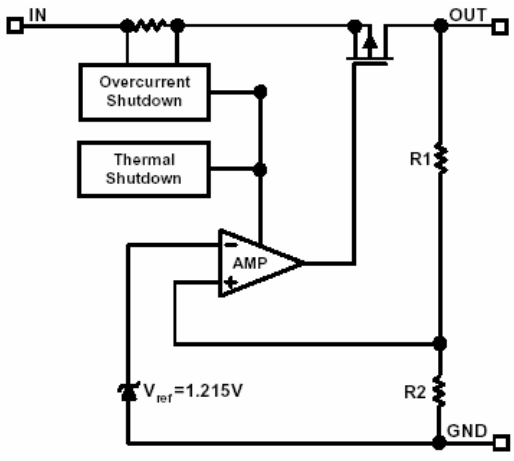
Marking :



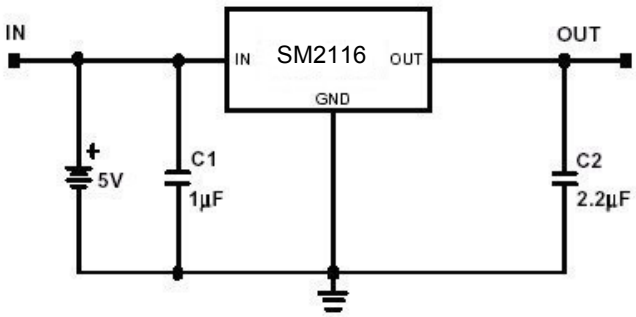
Applications

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

Block Diagram



Typical Application Circuit



Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Input Voltage	V_{IN}	8	V
Output Current	I_{OUT}	1	A
Output Voltage	V_{OUT}	1.3~3.8	V
Supply Voltage	V_{IN}	4.5~5.5	V
Operating Ambient Temperature	Topr	-40~+85	°C
Junction Temperature	Tj	-40~+125	°C
Max. Junction Temperature	Tj Max.	150	°C
Thermal Resistance	θjc	18	W/°C
	θja	180	W/°C
Power Dissipation (△ T=100°C)	P_D	550	mW
EDS Classification		B	

Electrical Characteristics Ta=25℃ unless otherwise noted

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	$V_{IN}=V_{OUT}(T)+2V$, $V_{OUT}\geqq V_{OUT}(E)*0.96$		600	-	-	mA
Current Limit	I_{LIM}	$V_O>1.2V$		600	800	-	mA
Load Regulation	REG_{LOAD}	$V_{IN}=V_{OUT}(T)+2V$, $I_O=1mA$ to 600mA		-	0.2	1	%
Dropout Voltage	$V_{DROPOUT}$	$I_O=600mA$ $V_O=V_{OUT}(E)$-2%	$1.3V\leqq V_{OUT}(T)\leqq 1.4V$	-	-	1900	mV
			$1.4V<V_{OUT}(T)\leqq 2.0V$	-	-	1400	
			$2.0V<V_{OUT}(T)\leqq 2.8V$	-	-	800	
			$2.8V<V_{OUT}(T)$	-	-	600	
Quiescent Current	I_Q	$V_{IN}=V_{OUT}(T)+1V$, $I_O=0mA$		-	30	50	μA
Line Regulation	REG_{LINE}	$I_O=1mA$ $V_{IN}=V_{OUT}$ $V_{OUT}(T)+2$	$1.3V\leqq V_{OUT}(T)\leqq 1.4V$	-0.2	-	0.2	%
			$1.4V<V_{OUT}(T)\leqq 2.0V$	-0.15	-	0.15	
			$2.0V<V_{OUT}(T)<4.0V$	-0.1	0.02	0.1	
			$4.0V\leqq V_{OUT}(T)$	-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}	$V_{IN}=V_{OUT}(T)+1V$, $V_{OUT}<0.8V$		-	300	600	mA
Power Supply Rejection	PSRR	Io=100mA Co=2.2μF	f=100Hz	-	60	-	dB
			f=1kHz	-	50	-	
			f=10kHz	-	20	-	
Output Voltage Noise	eN	f=10Hz~100kHz Io=10mA, C_{BYP}=0μF	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

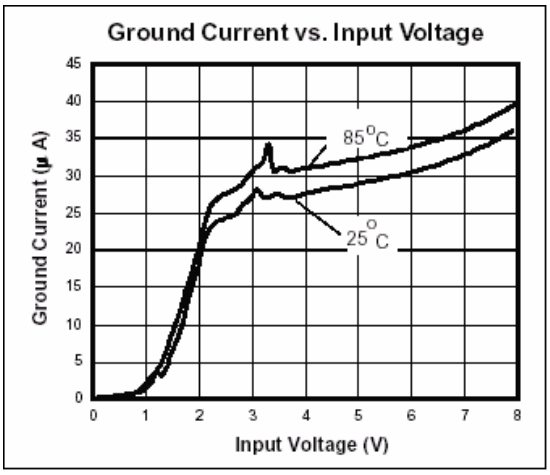
3: $V_{IN\,(MIN)}=V_{OUT}+V_{DROPOUT}$

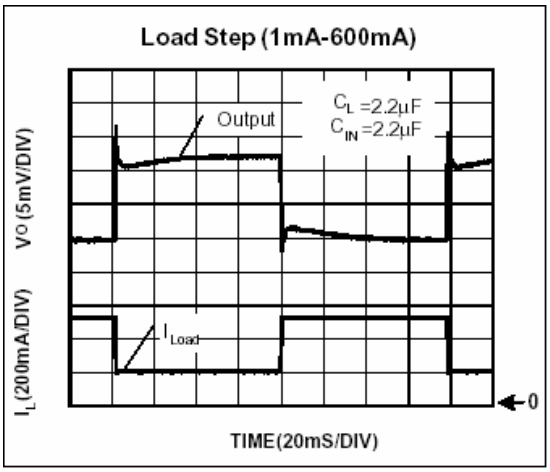
4: To prevent the Short Circuit Current protection feature from being prematurely activated, the input voltage must be applied before a current source load is applied.

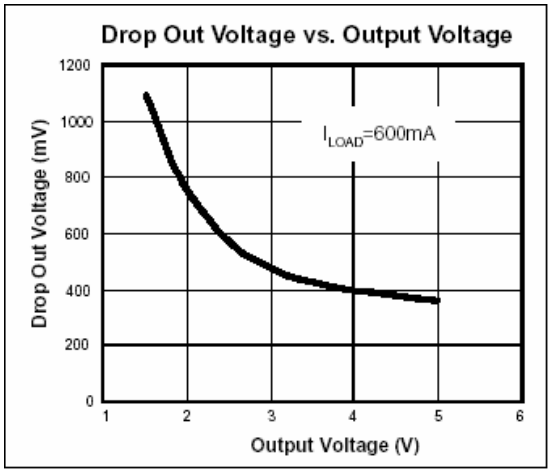
Ordering Information(contd.)

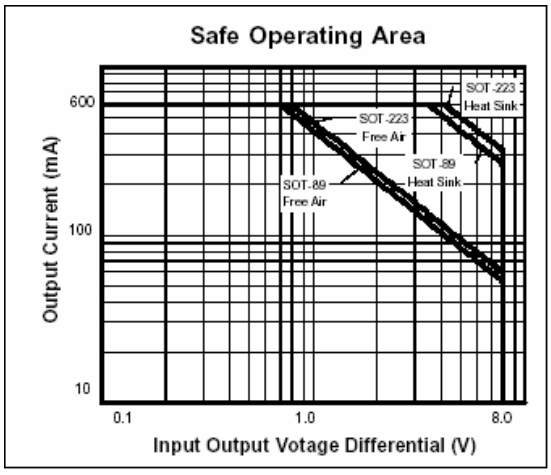
Part Number	Marking	Output Voltage	Part Number	Marking	Output Voltage
SM2116-13	6P132 XXXX	1.3V	SM2116-15	6P152 XXXX	1.5V
SM2116-18	6P182 XXXX	1.8V	SM2116-19	6P192 XXXX	1.9V
SM2116-20	6P202 XXXX	2.0V	SM2116-25	6P252 XXXX	2.5V
SM2116-27	6P272 XXXX	2.7V	SM2116-28	6P282 XXXX	2.8V
SM2116-29	6P292 XXXX	2.9V	SM2116-30	6P302 XXXX	3.0V
SM2116-31	6P312 XXXX	3.1V	SM2116-33	6P332 XXXX	3.3V
SM2116-34	6P342 XXXX	3.4V	SM2116-35	6P352 XXXX	3.5V
SM2116-36	6P362 XXXX	3.6V	SM2116-37	6P372 XXXX	3.7V
SM2116-38	6P382 XXXX	3.8V	SM2116-2H	6P2H2 XXXX	2.85V

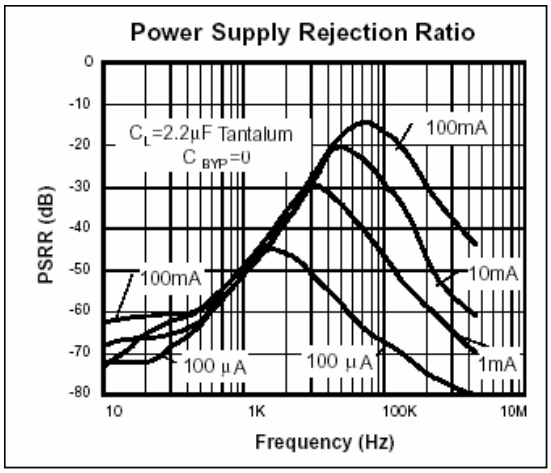
Characteristics Curve

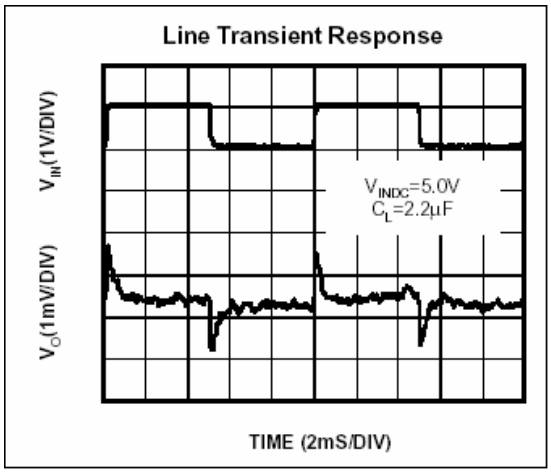


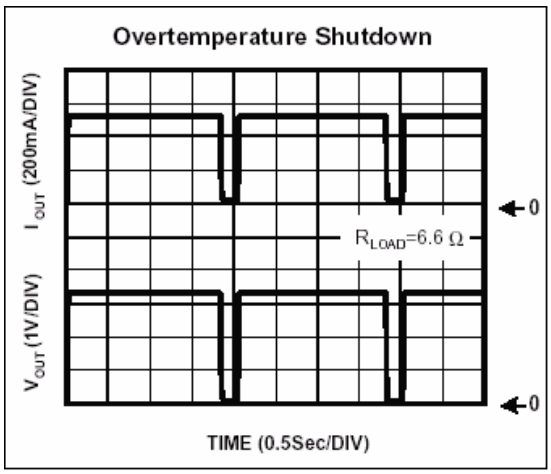


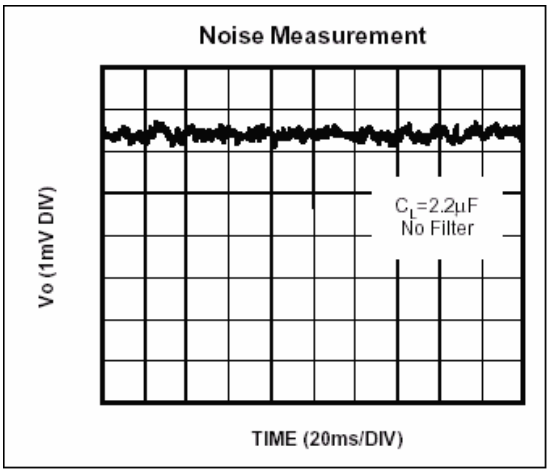


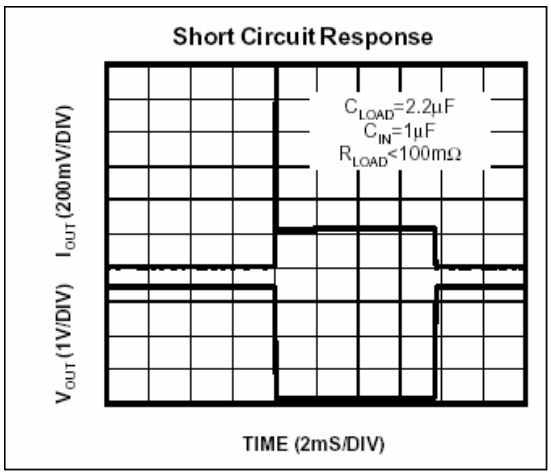


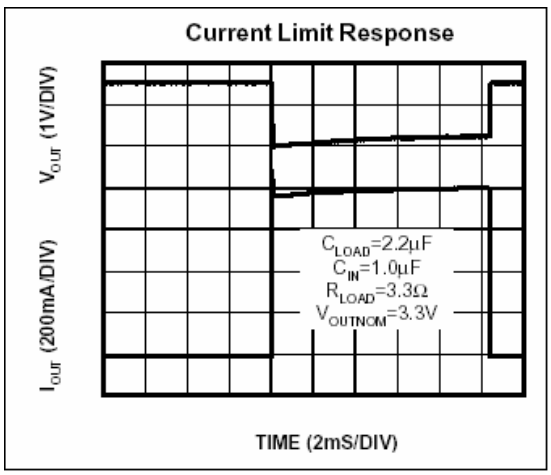

Power Supply Rejection Ratio
PSRR (dB)
0
-10
-20
-30
-40
-50
-60
-70
-80
10
1K
100K
10M
Frequency (Hz)
C_L=2.2µF Tantalum
C_BYP=0
100mA
10mA
1mA
100 µA
100 µA
100mA


Line Transient Response
V_IN(1V/DIV)
V_O(1mV/DIV)
V_INDC=5.0V
C_L=2.2µF
TIME (2mS/DIV)


Overtemperature Shutdown
I_OUT (200mA/DIV)
V_OUT (1V/DIV)
R_LOAD=6.6 Ω
0
0
TIME (0.5Sec/DIV)


Noise Measurement
Vo (1mV DIV)
C_L=2.2µF
No Filter
TIME (20ms/DIV)


Short Circuit Response
I_OUT (200mV/DIV)
V_OUT (1V/DIV)
C_LOAD=2.2µF
C_IN=1µF
R_LOAD<100mΩ
TIME (2mS/DIV)


Current Limit Response
V_OUT (1V/DIV)
I_OUT (200mA/DIV)
C_LOAD=2.2µF
C_IN=1.0µF
R_LOAD=3.3Ω
V_OUTNOM=3.3V
TIME (2mS/DIV)