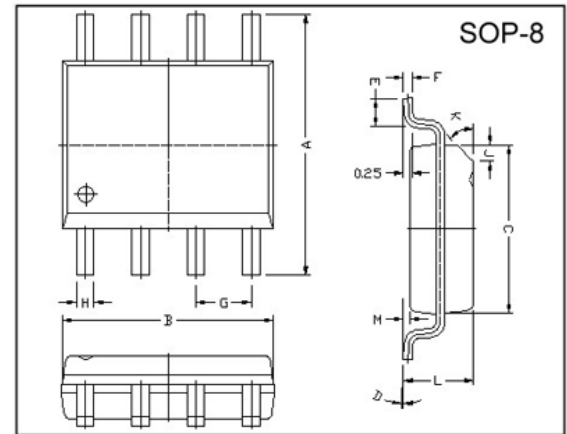


RoHS Compliant Product

## Description

The SSC2166 series of positive, linear regulators feature low quiescent current (30µA typ.) with low dropout voltage, making them ideal for battery applications. The space-saving SOP-8 package is attractive for "Pocket" and "Hand Held" applications. These rugged devices have both Thermal Shutdown and Current Fold-back to prevent device failure under the "Worst" of operating conditions. In applications requiring a low noise, regulated supply, place a 1000pF capacitor between Bypass and ground. The SSC2166 is stable with an output capacitance of 2.2µF or greater.



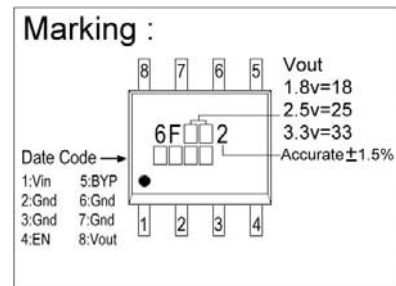
## Features

- \* Low Temperature Coefficient
- \* Over-Temperature Shutdown
- \* Factory Pre-set Output Fold-Back
- \* Very Low Dropout Voltage
- \* Noise Reduction Bypass Capacitor
- \* Short Circuit Current Fold-back
- \* Guaranteed 600mA output
- \* Current Limiting
- \* Highly Accurate ±1.5%

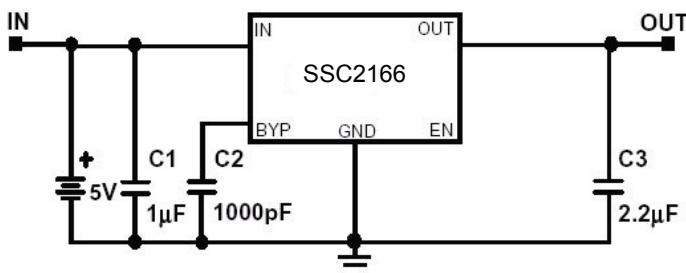
REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	5.80	6.20	M	0.10	0.25
B	4.80	5.00	H	0.35	0.49
C	3.80	4.00	L	1.35	1.75
D	0°	8°	J	0.375 REF.	
E	0.40	0.90	K	45°	
F	0.19	0.25	G	1.27 TYP.	

## Applications

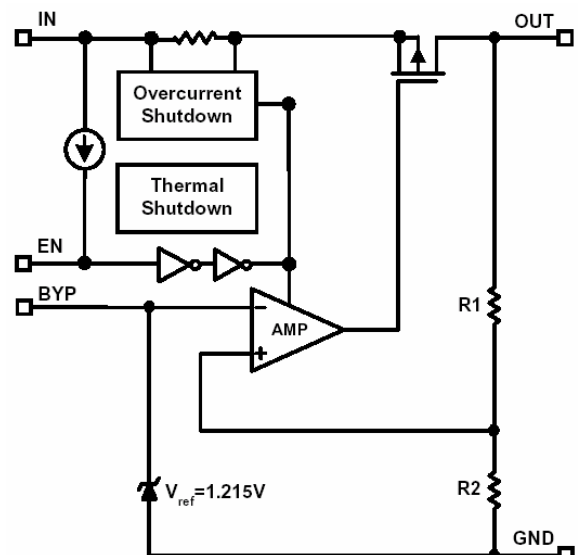
- \* PC Peripherals
- \* Wireless Devices
- \* Portable Electronics
- \* Battery Powered Widgets
- \* Instrumentation
- \* Cordless Phones
- \* Electronic Scales



## Typical Application Circuit



## Functional 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	$V_{OUT}$	1.5~3.8	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	$\theta_{ja}$	123.7	°C/W
Power Dissipation ( $\Delta T=100^\circ\text{C}$ )	$P_D$	810	mW
EDS Classification		B	

## Electrical Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Output Voltage	$V_{OUT(E)}^1$	-1.5%	$V_{OUT(T)}^2$	1.5%	V	$V_{IN}=V_{OUT(T)}+2V, I_o=1\text{mA}$
Output Current	$I_o$	600	-	-	mA	$V_{IN}=V_{OUT(T)}+2V, V_O>1.2V$
Current Limit	$I_{LIM}$	600	800	-	mA	$V_{IN}=V_{OUT(T)}+2V, V_O>1.2V$
Load Regulation	$REG_{LOAD}$	-	0.2	1	%	$V_{IN}=V_{OUT(T)}+2V, I_o=1\text{mA} \sim 600\text{mA}$
Dropout Voltage	$V_{DROPOUT}$	-	-	1900	mV	$1.3V \leq V_{OUT(T)} \leq 1.4V$
		-	-	1400		$1.4V < V_{OUT(T)} \leq 2.0V$
		-	-	800		$2.0V < V_{OUT(T)} \leq 2.8V$
		-	-	600		$2.8V < V_{OUT(T)}$
$V_O = V_{OUT(E)} - 2\%$						
Quiescent Current	$I_Q$	-	30	50	uA	$V_{IN}=V_{OUT(T)}+1V, I_o=0\text{mA}$
Line Regulation	$REG_{LINE}$	-0.2	-	0.2	%	$1.3V \leq V_{OUT(T)} \leq 1.4V$
		-0.15	-	0.15		$1.4V < V_{OUT(T)} \leq 2.0V$
		-0.1	0.02	0.1		$2.0V < V_{OUT(T)}$
$V_{IN} = V_{OUT(T)} + 1$						
Input Voltage	$V_{IN}$	Note <sup>3</sup>	-	7	V	
Over Temperature Shutdown	$O_{TS}$	-	150	-	°C	
Over Temperature Hysteresis	$O_{TH}$	-	30	-	°C	
Output Voltage Temperature Coefficient	$T_C$	-	30	-	ppm/°C	
Short Circuit Current <sup>4</sup>	$I_{SC}$	-	300	600	mA	$V_{IN}=V_{OUT(T)}+1V, V_{OUT}<0.8V$
Power Supply Rejection	PSRR	-	75	-	dB	$f=1\text{kHz}$
		-	55	-		$f=10\text{kHz}$
		-	30	-		$f=100\text{Hz}$
$I_o=100\text{mA}, C_o=2.2\mu\text{F} \text{ (ceramic)}, C_{BYP}=0.01\mu\text{F}$						
Output Voltage Noise	eN	-	30	-	uVrms	$f=10\text{Hz} \sim 100\text{kHz}, I_o=10\text{mA}, C_o=2.2\mu\text{F}, C_{BYP}=0.01\mu\text{F}$
EN Input Threshold	$V_{EH}$	2	-	$V_{IN}$	V	$V_{IN}=2.7V \text{ to } 7V$
	$V_{EL}$	0	-	0.4		
EN Input Bias Current	$I_{EH}$	-	-	0.1	uA	$V_{EN}=V_{IN}, V_{IN}=2.7V \text{ to } 7V$
	$I_{EL}$	-	-	0.5		$V_{EN}=0V, V_{IN}=2.7V \text{ to } 7V$
Shutdown Supply Current	$I_{SD}$	-	0.5	0.1	uA	$V_{IN}=5V, V_O=0V, V_{EN}<V_{EL}$

Note 1:  $V_{OUT(E)}$  =Effective Output Voltage (i.e. the output voltage when " $V_{OUT(T)} + 2.0V$ " 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.



Elektronische Bauelemente

# SSC2166

600mA CMOS

Positive Voltage Regulator

## Ordering Information(contd.)

Part Number	Marking	Output Voltage	Part Number	Marking	Output Voltage
SSC2166-15	6F152 XXXX	1.5V	SSC2166-18	6F182 XXXX	1.8V
SSC2166-25	6F252 XXXX	2.5V	SSC2166-27	6F272 XXXX	2.7V
SSC2166-28	6F282 XXXX	2.8V	SSC2166-2H	6F2H2 XXXX	2.85V
SSC2166-29	6F292 XXXX	2.9V	SSC2166-30	6F302 XXXX	3.0V
SSC2166-31	6F312 XXXX	3.1V	SSC2166-33	6F332 XXXX	3.3V
SSC2166-34	6F342 XXXX	3.4V	SSC2166-35	6F352 XXXX	3.5V
SSC2166-36	6F362 XXXX	3.6V	SSC2166-37	6F372 XXXX	3.7V
SSC2166-38	6F382 XXXX	3.8V			

## Detailed Description

The SSC2166 series of COMS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection and thermal shutdown. The P-channel pass transistor receives data from the error amplifier, over-current shutdown, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits become active when the junction temperature exceeds 150°C, or the current exceeds 600mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120°C. The SSC2166 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The SSC2166 also incorporates current fold-back to reduce power dissipation when the output is short circuited. The feature becomes active when the output drops below 0.8 V, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8 V.

## External Capacitors

The SSC2166 is stable with an output capacitance to ground of 2.2uF or greater. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Conversely, Aluminum Electrolytic capacitors exhibit the highest ESR, resulting in the poorest AC response. Unfortunately, large value ceramic capacitors are comparatively expensive. One option is to parallel a 0.1uF ceramic capacitor with a 10uF Aluminum Electrolytic. The benefit is low ESR, high capacitance, and low overall cost. A second capacitor is recommended between the input and ground to stabilize  $V_{IN}$ . The input capacitor should be at least 0.1uF to have a beneficial effect. A third capacitor can be connected between the BY-PASS pin and GND. This capacitor can be a low cost Polyester Film variety between the value of 0.001~0.01uF. A large capacitor improves the AC ripple rejection, but also makes the output come up slowly. This "Soft" turn-on is desirable in some applications to limit turn-on surges. All capacitors should be placed in close proximity to the pins. A "Quiet" ground termination is desirable. This can be achieved with a "Star" connection.

## Enable

When EN pin is pulled low, the PMOS pass transistor shuts off, and all internal circuits are powered down. In this state, the quiescent current is less than 2uA. This pin behaves much like an electronic switch.

## Characteristics Curve

