

PRELIMINARY - July 20, 1998

TEL:805-498-2111 FAX:805-498-3804 WEB:http://www.semtech.com

DESCRIPTION

The SC112 is a 150 mA ultra low dropout linear regulator with a built in CMOS/TTL logic level control switch, designed specifically for battery powered applications where low quiescent current and low dropout are critical for battery longevity.

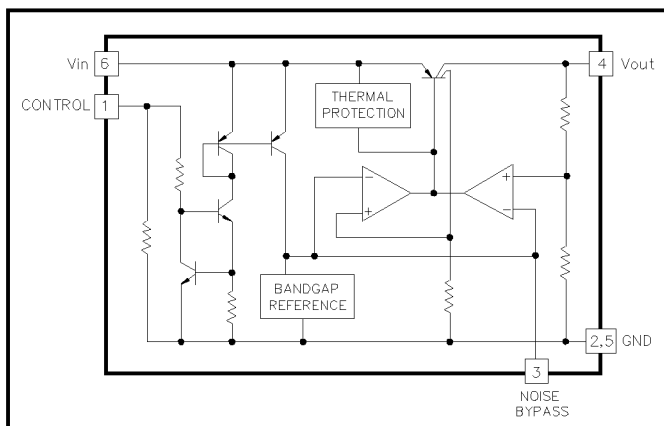
The SC112 uses a Semtech proprietary internal vertical PNP device for the pass element, providing a low dropout voltage of 180 mV at a load of 60 mA.

The output noise is reduced to 30 μ V (typical) by placing a very low leakage 0.01 μ F capacitor on pin 3 (noise bypass).

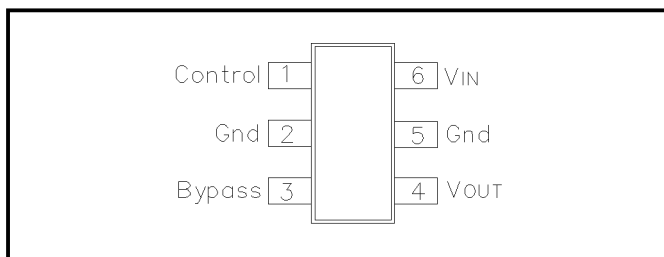
Each device contains a bandgap reference, error amplifier, vertical PNP pass element, thermal and current limiting circuitry and resistor divider network for setting output voltage.

The SC112 is packaged in a six lead SOT-23 surface mount package for a very small footprint and it requires only a 1 μ F capacitor on the output and a 0.01 μ F on the bypass pin for a minimum amount of external components.

BLOCK DIAGRAM



PIN CONFIGURATION



FEATURES

- Low dropout voltage
- CMOS/TTL compatible control switch
- Very low quiescent current 180 μ A (ON, no load)
- Internal thermal shutdown
- Short circuit protection
- Very low standby current 0.1 μ A (OFF)
- Low noise with external bypass capacitor

APPLICATIONS

- Battery powered systems
- Cellular telephones
- Cordless telephones
- Pagers, personal digital assistants
- Portable instrumentation
- Low voltage systems

ORDERING INFORMATION

DEVICE ⁽¹⁾⁽²⁾	PACKAGE	Temp Range (T _J)
SC112XXCSK	6 pin SOT-23	-40° to +125°C

Notes:

(1) Where XX denotes voltage options. Available voltages are: 2.75V (27), 3.0V, 3.25V (32), 3.3V, 3.5V, 4.0V, 4.5V, 4.75V (47) and 5.0V. Contact factory for additional voltage options.

(2) Add suffix 'TR' for tape and reel packaging.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Maximum	Units
Input Supply Voltage	V _{in}	-0.3 to +16	V
Power Dissipation	P _D	Internally Limited	W
Thermal Resistance	θ_{JA}	410	°C/W
Operating Temperature Range	T _A	-40 to +80	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C
Lead Temperature (Soldering) 10 sec.	T _{LEAD}	260	°C
ESD Rating	ESD	2	kV

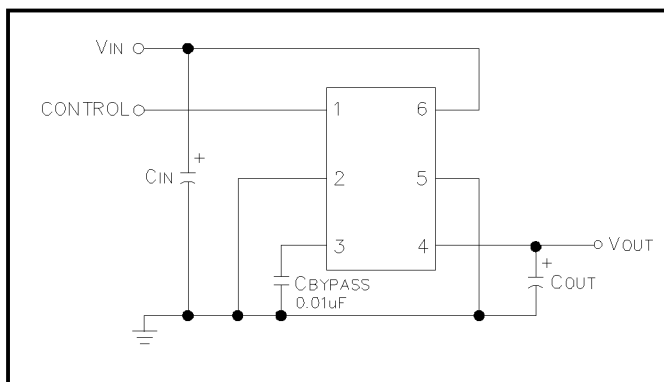
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ELECTRICAL CHARACTERISTICS

Unless specified, $T_A = 25^\circ\text{C}$, $V_{IN} = V_{O(nom)} + 1\text{V}$, $C_{BYPASS} = 0.01\mu\text{F}$

Parameter	Symbol	Test Conditions	MIN	TYP	MAX	Units
Supply Voltage Range	V_{IN}		1.8		15	V
Supply Current	I_{IN}	$I_O = 0\text{ mA}$, Except I_{CONT}		170	350	μA
Standby Current	I_{INS}	$V_{IN} = 8\text{V}$, Output off			0.1	μA
Output Voltage	V_O	$I_O = 30\text{ mA}$				V
2.75V Version			2.660	2.750	2.840	
3.0V Version			2.900	3.000	3.100	
3.25V Version			3.150	3.250	3.350	
3.3V Version			3.201	3.300	3.399	
3.5V Version			3.390	3.500	3.610	
4.0V Version			3.880	4.000	4.120	
4.5V Version			4.370	4.500	4.630	
4.75V Version			4.610	4.750	4.890	
5.0V Version			4.850	5.000	5.150	
Dropout Voltage	V_{DROP}	$I_O = 60\text{ mA}$		0.18	0.3	V
Output Current	I_O		150	170		mA
Recommended Output Current	I_{OR}				130	mA
Line Regulation	$REG_{(LINE)}$	$V_{IN} = (V_{O(NOM)} + 0.5) \rightarrow (V_{O(NOM)} + 5.5)\text{ V}$		3.0	20	mV
Load Regulation	$REG_{(LOAD)}$	$I_O = 5\text{ mA} \rightarrow 60\text{ mA}$ $I_O = 5\text{ mA} \rightarrow 100\text{ mA}$		30 80	60 150	mV
Ripple Rejection	R_A	100 mV(rms), $f = 400\text{ Hz}$, $I_O = 10\text{ mA}$		60		dB
Temperature Coefficient		$I_O = 10\text{ mA}$ $-25^\circ\text{C} \leq T_A \leq +75^\circ\text{C}$		0.30		mV/ $^\circ\text{C}$
Output Noise Voltage	V_{NO}	10 Hz < f < 100 kHz, $I_O = 30\text{ mA}$, $C_{BYPASS} = 0.01\mu\text{F}$		30		$\mu\text{V(rms)}$
Noise Bypass Terminal Voltage	V_{REF}			1.25		V
Control Terminal Specification						
Control Current	I_{CONT}	Output on, $V_{CONT} = 2.4\text{V}$		14	40	μA
Control Voltage	V_{CONT}	Output on	2.4			V
		Output off			0.6	
Output Rise Time Off $\rightarrow$ On	t_r	$I_O = 30\text{ mA}$, $V_{CONT} = 0 \rightarrow 2.4\text{V}$		0.3		ms

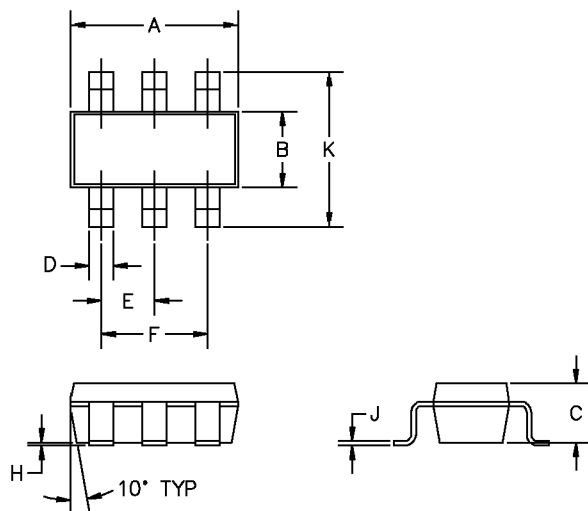
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APPLICATION CIRCUIT**NOTES FOR APPLICATION CIRCUIT:**

- (1) C_{IN} is needed if the device is far from the supply's filter capacitors, or for operation from a battery. A value of $1.0\mu F$ or greater should be used.
- (2) For full current operation, C_{OUT} should be $3.3\mu F$ or greater, low ESR, such as tantalum or aluminum electrolytic. Larger value capacitors will improve the overall transient response.
- (3) C_{BYPASS} (required) should be placed as close as possible to pin 3 and ground. A high quality, low leakage $0.01\mu F$ capacitor is recommended.
- (4) CONTROL may be tied to V_{IN} if the shutdown feature is not required. Maximum CONTROL voltage = V_{IN} .
- (5) Connect both ground pins (2 and 5) to ground to maximize heat conduction.

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MECHANICAL OUTLINE - SOT23-6L

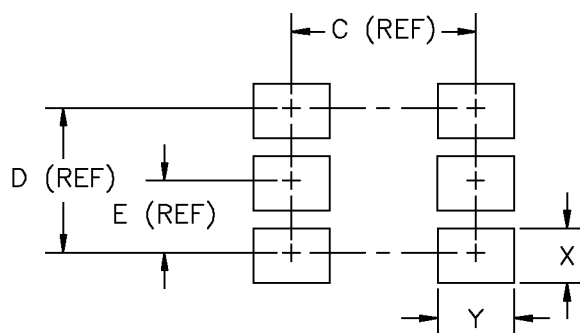


DIMENSIONS (1)					NOTE
DIM ^N	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	.110	.120	2.80	3.05	—
B	.059	.070	1.50	1.75	—
C	.036	.051	.90	1.30	—
D	.014	.020	.35	.50	—
E	.033	.040	.85	1.05	—
F	.067	.083	1.7	2.1	—
H	.0004	.006	.010	.150	—
J	.0035	.008	.090	.20	—
K	.102	.118	2.6	3.00	—

② PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH
AND METAL BURR.

① CONTROLLING DIMENSIONS: MILLIMETERS.

LAND PATTERN - SOT23-6L



DIM ^N	DIMENSIONS		NOTE
	INCHES	MM	
C	.094	2.4	—
D	.074	1.9	—
E	.037	.95	—
X	.028	.7	—
Y	.039	1.0	—