


SEMTECH
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**80 mA ULTRA LOW DROPOUT
VOLTAGE REGULATOR**
SC5203

PRELIMINARY - April 13, 1998

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DESCRIPTION

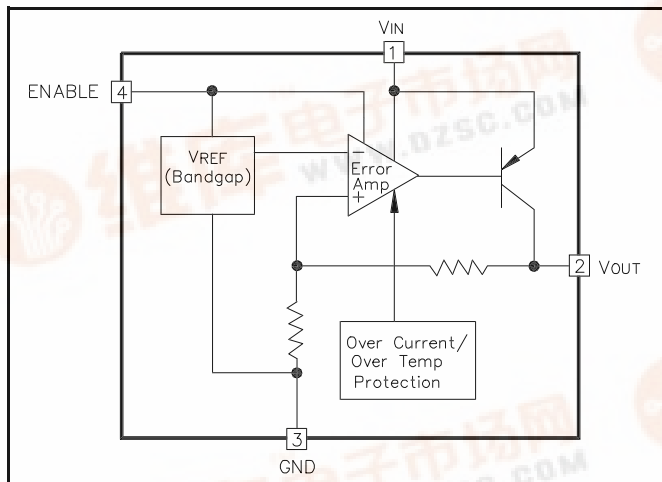
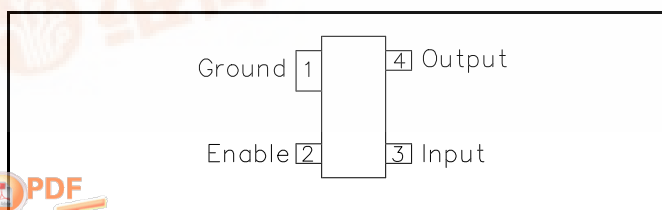
The SC5203 is an 80 mA ultra low dropout linear regulator with a built in CMOS/TTL logic level Enable switch, designed specifically for battery powered applications where low quiescent current and low dropout are critical for battery longevity.

The SC5203 uses a Semtech proprietary internal vertical PNP device for the pass element, providing a low dropout voltage of 300 mV at a load of 80 mA, while maintaining a low ground pin current.

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 SC5203 is packaged in a 4 pin SOT-143 surface mount package providing a very small footprint and requires only a 1 μ F capacitor on the output for a minimum amount of external components.

Available with adjustable and fixed output voltages, the SC5203 is ideally suited for cellular telephone, pager and laptop/palmtop computer applications.

BLOCK DIAGRAM

PIN CONFIGURATION

FEATURES

- Low dropout voltage - 300 mV @ 80 mA load
- Guaranteed 80 mA output current
- Low ground pin current
- Reversed input polarity protection
- Wide supply voltage range
- Wide output voltage range
- Logic controlled enable
- Surface mount packaging (SOT-143)

APPLICATIONS

- Battery Powered Systems
- Cellular Telephones
- Laptop, Notebook and Palmtop Computers
- Bar Code Scanners
- High Efficiency Linear Power Supplies

ORDERING INFORMATION

DEVICE	PACKAGE	TEMP RANGE
SC5203-X.XCSK ⁽¹⁾⁽²⁾	SOT-143	-40° to +125°C

Notes:

(1) Where -X.X denotes voltage options. Available voltages are: 3.0V, 3.3V, 3.6V, 3.8V, 4.0V, 4.75V (4.7) and 5.0V. Contact factory for additional voltage options.

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

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Maximum	Units
Input Supply Voltage	V _{IN}	-0.3 to +20	V
Power Dissipation	P _D	Internally Limited	W
Thermal Resistance	θ_{JA}	410	°C/W
Operating Junction Temperature Range	T _J	-40 to +125	°C
Storage Temperature Range	T _{STG}	-60 to +150	°C
Lead Temperature (Soldering) 5 seconds	T _{LEAD}	260	°C
ESD Rating	ESD	1.5	kV

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ELECTRICAL CHARACTERISTICS

Unless specified, $V_{IN} = V_O + 1V$, $I_L = 1mA$, $C_L = 1\mu F$, $V_{EN} \geq 2V$

		Test Conditions		Test Limits			
Parameter	Symbol		T_J	Min	Typ	Max	Units
Supply Voltage Range	V_{IN}		-40 to 125°C	2.5		16	V
Output Voltage Accuracy	V_O		25°C	-3		3	%
			-40 to 125°C	-4		4	
Output Voltage Temperature Coefficient ⁽¹⁾	$\frac{\Delta V_O}{\Delta T}$				50	200	ppm/°C
Line Regulation	REG_{LINE}	$V_{IN} = (V_{OUT} + 1V) \text{ to } 16V$	25°C		.008	0.3	%
			-40 to 125°C			0.5	
Load Regulation	REG_{LOAD}	$I_L = 0.1mA \text{ to } 80mA$	25°C		0.6		%
Dropout Voltage ⁽²⁾	$V_{IN} - V_O$	$I_L = 100\mu A$	25°C		20		mV
		$I_L = 20mA$	25°C		200		
			-40 to 125°C			350	
		$I_L = 50mA$	25°C		250		
		$I_L = 80mA$	25°C		300		
			-40 to 125°C			600	
Quiescent Current	I_Q	$V_{EN} \leq 0.4V$	25°C		0.01	10	μA
Ground Pin Current	I_{GND}	$V_{EN} \geq 2V, I_L = 100\mu A$	25°C		180		μA
		$V_{EN} \geq 2V, I_L = 20mA$	25°C		225		
		$V_{EN} \geq 2V, I_L = 50mA$	25°C		1100		
		$V_{EN} \geq 2V, I_L = 80mA$	25°C		1800		
Ground Pin Current at Dropout	I_{GNDDO}	$V_{IN} = 0.5V \text{ less than } V_{O(nom)}$	25°C		400		μA
Current Limit	I_{LIMIT}	$V_{OUT} = 0V$	25°C		180		mA
			-40 to 125°C			250	
Thermal Regulation	$\frac{\Delta V_O}{\Delta P_D}$				.05		%/W

NOTES:

(1) Defined as the worst case output voltage change divided by the operating temperature range.

(2) Defined as the input to output differential at which the output voltage drops to 2% below the value measured at a differential of 1V.

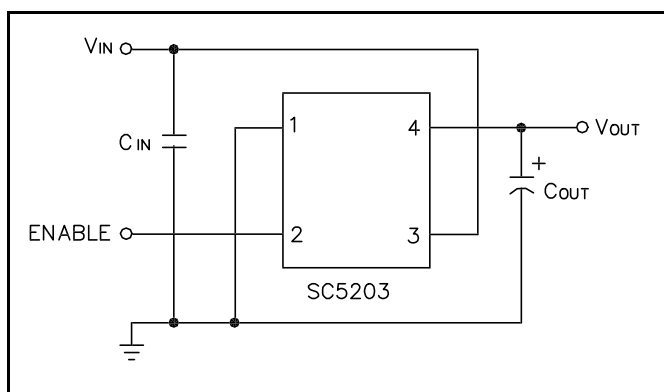
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ELECTRICAL CHARACTERISTICS (Cont.)

Unless specified, $V_{IN} = V_O + 1V$, $I_L = 1mA$, $C_L = 1\mu F$, $V_{EN} \geq 2V$

		Test Conditions		Test Limits			
Parameter	Symbol		T _J	Min	Typ	Max	Units
Enable Input							
Enable Input Voltage	V _{EN}	High = O/P On	-40 to 125°C	2.0			V
		Low = O/P Off	-40 to 125°C			0.6	
Enable Input Current	I _{EN}	V _{EN} ≤ 0.6V	25°C		0.01	1	µA
		V _{EN} ≥ 2.0V	25°C		15		
			-40 to 125°C			50	

APPLICATION CIRCUIT

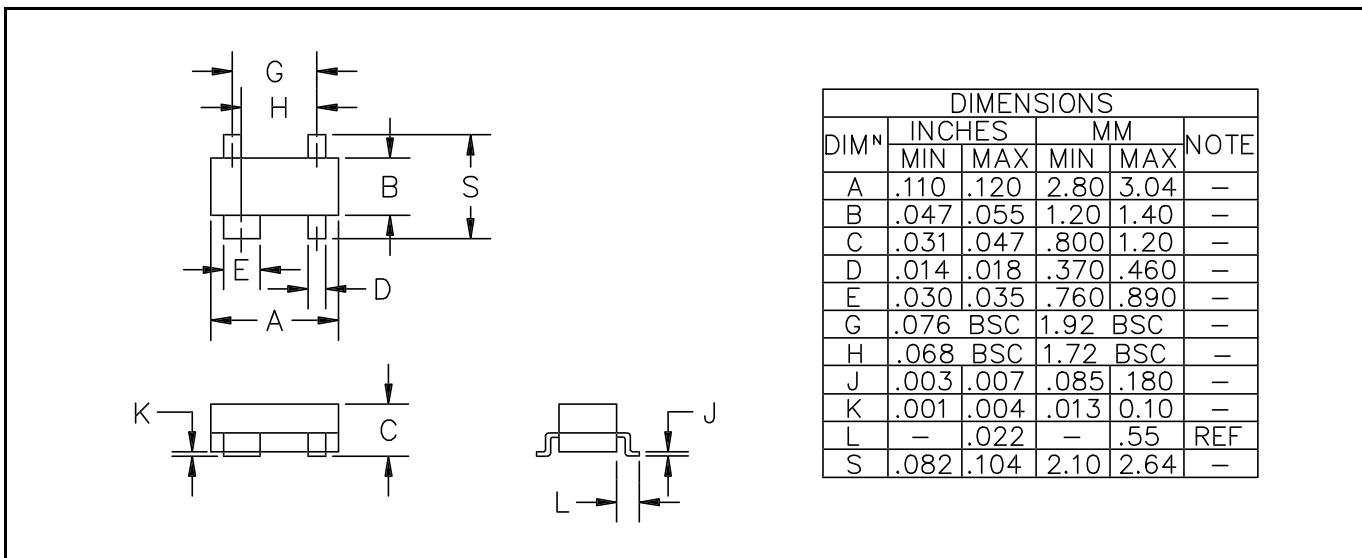


NOTES FOR APPLICATION CIRCUIT:

- (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 0.1 μF or greater should be used.
- (2) For full current operation, C_{OUT} should be 1 μF or greater, low ESR, such as tantalum or aluminum electrolytic. Larger value capacitors will improve the overall transient response.
- (3) ENABLE may be tied to V_{IN} if the shutdown feature is not required. Maximum ENABLE voltage = V_{IN} .

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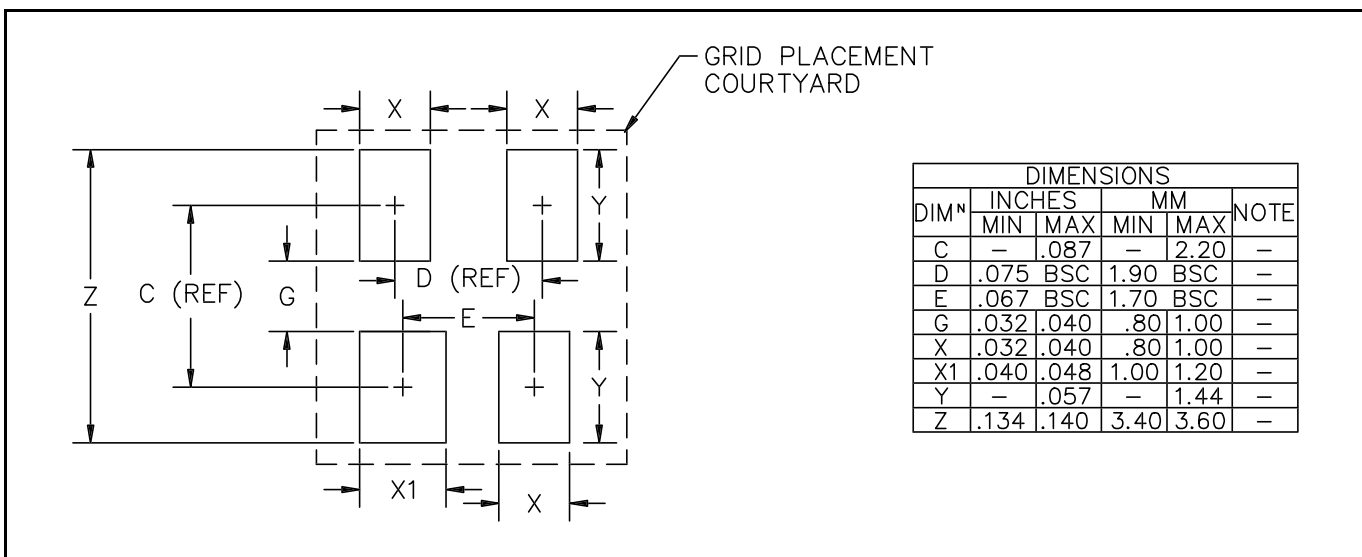
OUTLINE DRAWING - SOT-143



Notes:

- (1) Controlling dimension: Millimeters.
- (2) Dimension A and B do not include mold protrusions. Mold protrusions are .006" max.

LAND PATTERN - SOT-143



Notes:

- (1) Controlling dimension is millimeters.
- (2) Grid placement courtyard is 8 x 8 elements (4mm x 4mm) in accordance with the international grid detailed in IEC publication 97.