

POWER MANAGEMENT

PRELIMINARY

Description

The SC1552 high performance positive voltage regulator is designed for use in applications requiring low dropout performance at up to 3A. Additionally, the SC1552 provides excellent regulation over variations in line, load and temperature.

Similar to Semtech's popular EZ1085, the SC1552 includes extra features for maximum flexibility - a low power shutdown mode and a power-on reset output. The active high enable pin, when pulled low, shuts the regulator down so that it draws less than 10 μ A from the input supply. The power-on reset output remains asserted low until 175ms (typical) after the output voltage rises above the reset threshold. When the output drops below the reset threshold, reset asserts low within 20 μ s (typical).

Outstanding features include low dropout performance at rated current, fast transient response, internal current limiting and thermal shutdown protection of the output device.

The SC1552 is available with two standard output voltage options, 2.5V and 3.3V. It comes in the popular 5 pin TO-263 surface mount package.

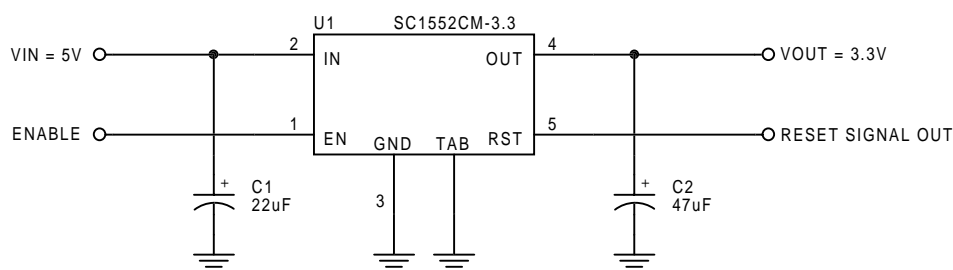
Features

- ◆ Low dropout voltage: 1.4V maximum
- ◆ Full current rating over line and temperature
- ◆ Fast transient response
- ◆ $\pm 3\%$ total output regulation over line, load and temperature
- ◆ Active high enable input
- ◆ Power-on reset output with 175ms (typical) delay
- ◆ Line regulation typically 0.015%
- ◆ Load regulation typically 0.05%
- ◆ TO-263-5 surface mount package

Applications

- ◆ Microcontroller power supplies
- ◆ Battery chargers
- ◆ Post regulators
- ◆ Battery chargers

Typical Application Circuit



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Absolute Maximum Ratings

Parameter	Symbol	Maximum	Units
Maximum Input Pin Voltage	V_{IN}, V_{EN}	7	V
Power Dissipation	P_D	Internally Limited	W
Thermal Impedance Junction to Ambient	θ_{JA}	60	°C/W
Thermal Impedance Junction to Case	θ_{JC}	3	°C/W
Operating Ambient Temperature Range	T_A	0 to +70	°C
Operating Junction Temperature Range	T_J	0 to +125	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C
Lead Temperature (Soldering) 10 Seconds	T_{LEAD}	300	°C

Electrical Characteristics

Unless specified: $3.9V \leq V_{IN} \leq 7.0V$ (2.5V option, $4.7V \leq V_{IN} \leq 7.0V$ for the 3.3V option), $V_{EN} = V_{IN}$, $0A \leq I_{OUT} \leq 3A$, $T_A = 25^\circ C$.
 Values in **bold** apply over full operating temperature range.

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
IN						
Supply Voltage (2.5V option)	V_{IN}		3.9		7.0	V
Supply Voltage (3.3V option)	V_{IN}		4.7		7.0	V
Supply Current	I_{IN}			15	20	mA
					25	
Off State Supply Current	$I_{IN(OFF)}$	$V_{EN} = 0V$		5	10	μA
					15	
OUT						
Output Voltage ⁽¹⁾	V_{OUT}	$V_{IN} = 5V, I_{OUT} = 0mA$	-1%	V_{OUT}	+1%	V
			-3%		+3%	
Line Regulation ⁽¹⁾	REG_{LINE}	$V_{IN} = (V_{OUT(NOM)} + 1.4V) \text{ to } 7V, I_{OUT} = 0mA$		0.015	0.100	%
					0.150	
Load Regulation ⁽¹⁾	REG_{LOAD}	$V_{IN} = 5V, I_{OUT} = 0A \text{ to } 3A$		0.05	0.20	%
					0.30	
Dropout Voltage ⁽¹⁾⁽²⁾	V_D	$I_{OUT} = 3A$		1.3	1.4	V

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Electrical Characteristics (Cont.)

Unless specified: $3.9V \leq V_{IN} \leq 7.0V$ (2.5V option, $4.7V \leq V_{IN} \leq 7.0V$ for the 3.3V option), $V_{EN} = V_{IN}$, $0A \leq I_{OUT} \leq 3A$, $T_A = 25^\circ C$.
 Values in **bold** apply over full operating temperature range.

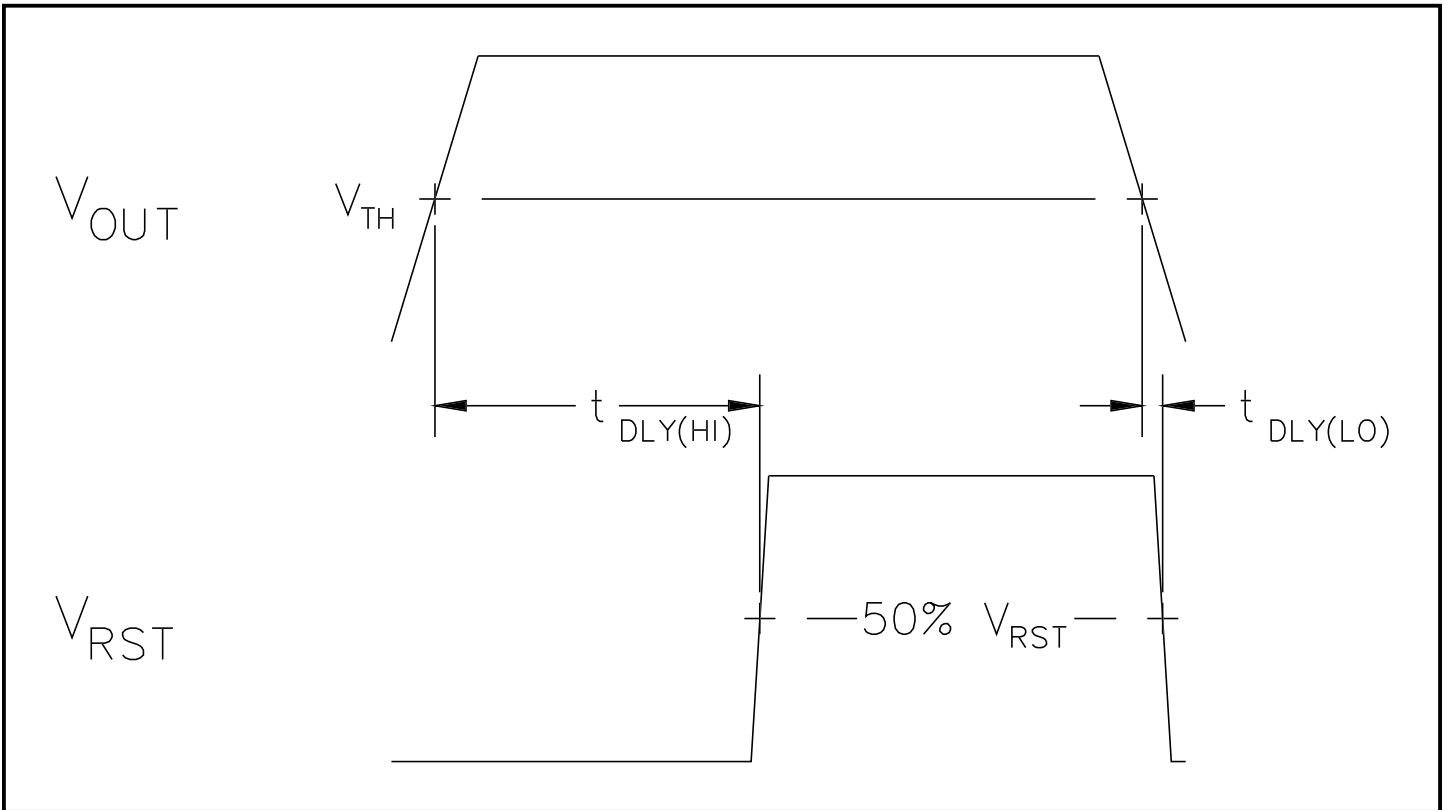
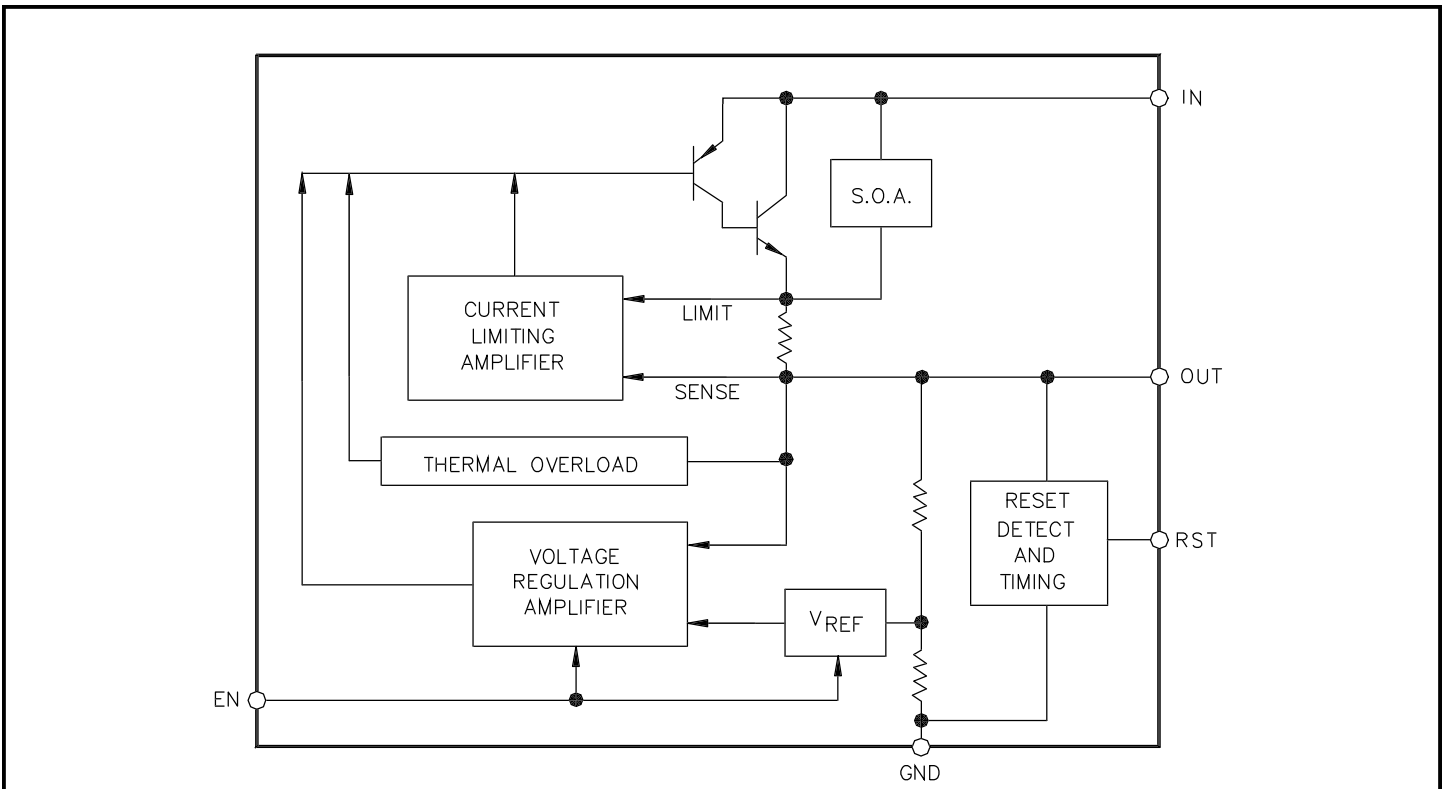
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
OUT (Cont.)						
Current Limit ⁽¹⁾	I_{CL}		3.0	4.5		A
Temperature Coefficient	T_C			0.005		%/ $^\circ C$
Temperature Stability	T_S	$V_{IN} = 5V, I_{OUT} = 0.5A$		0.5		%
RMS Output Noise	e_n	$f = 10Hz \text{ to } 10kHz$		0.003		% V_{OUT}
Ripple Rejection Ratio	R_A	$V_{IN} = 5V, f = 120Hz$	60	72		dB
EN						
Enable Pin Control Voltage	V_{EN}	Device OFF			0.4	V
		Device ON	1.6			
Enable Pin Current	I_{EN}	$V_{EN} = 0V, V_{IN} = 5V$ (OFF)		0.15	1.00	μA
		$V_{EN} = V_{IN} = 5V$ (ON)		35	100	
RST						
Reset Threshold	V_{TH}	V_{OUT} falling		93		% V_{OUT}
		V_{OUT} rising		94		
Reset Delay ⁽³⁾	$t_{DLY(LO)}$	V_{OUT} falling		20		μs
	$t_{DLY(HI)}$	V_{OUT} rising	140	175	560	ms
Reset Output Voltage	V_{OL}	$V_{OUT} \leq V_{TH}, I_{RST} = -1.2mA$		0.1	0.2	V
	V_{OH}	$V_{OUT} = V_{OUT(NOM)}, I_{RST} = 500\mu A$	0.8 V_{IN}			V
OVER TEMPERATURE PROTECTION						
High Trip Level	T_{HI}			170		$^\circ C$
Hysteresis	T_{HYST}			10		$^\circ C$

Notes:

(1) Low duty cycle pulse testing with Kelvin connections required.

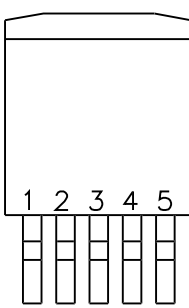
(2) $\Delta V_{OUT}, \Delta V_{REF} = 1\%$.

(3) Reset delay is measured from ($V_{OUT} = V_{TH}$) to ($V_{RST} = 50\%$) - see Timing Diagram on page 4.

Timing Diagram

Block Diagram


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Pin Configurations

Top View



Pin	Function
1	EN
2	IN
3/TAB	GND
4	OUT
5	RST

TO-263-5

Ordering Information

Part Number ⁽¹⁾⁽²⁾	Package
SC1552CM-X.XTR	TO-263-5

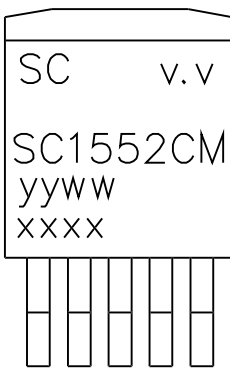
Notes:

(1) Where X.X denotes voltage options. Available voltages are: 2.5V and 3.3V. Contact factory for additional voltage options.

(2) Only available in tape and reel packaging. A reel contains 800 devices.

Pin Descriptions

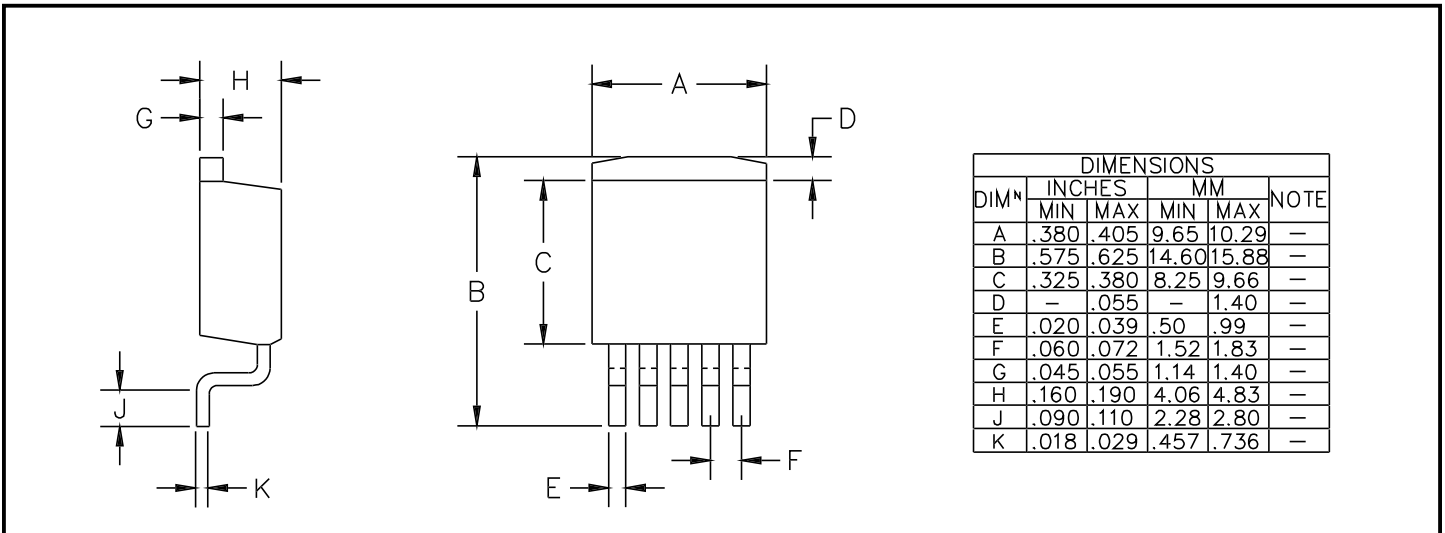
Pin	Pin Name	Pin Function
1	EN	Active high enable pin. Pulling this pin high will enable the output. While the device will be turned off if this pin is left open, it is recommended to pull it low to turn the device off for noise immunity. Connect to IN if not being used.
2	IN	Input supply pin.
3	GND	Ground pin. Electrically connected to the device tab.
4	OUT	Regulated output pin, sourcing up to 1.5A.
5	RST	Reset pin. Remains low while V_{OUT} is below the reset threshold, and for 175ms (typical) after V_{OUT} rises above the threshold. When V_{OUT} drops below the threshold, RST pulls low within 20 μ s (typical).

Marking Information


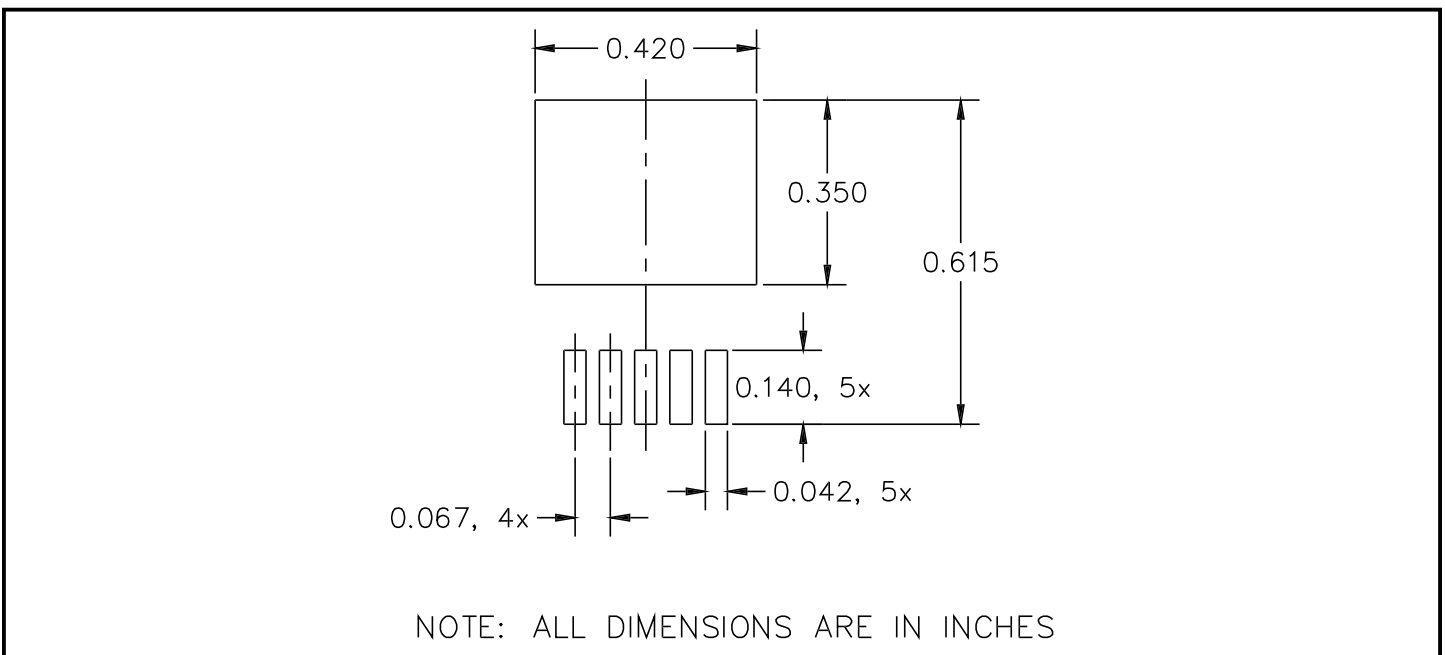
Top View

v.v = Voltage Option (Example: 2.5)
 yyww = Datecode (Example: 0015)
 xxxx = Semtech Lot No. (Example: 00101)

Outline Drawing - TO-263-5



Minimum Land Pattern - TO-263-5



Contact Information

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