SC1541
1.0A Low Dropout Voltage Regulator with Enable

Description

The SC1541 is a high performance low dropout positive voltage regulator designed for use in applications where power management is critical, such as battery powered systems.

Additionally, the SC1541 provides excellent regulation over variations in line, load and temperature. Outstanding features include low dropout performance at rated current, fast transient response, internal current limiting and thermal shutdown protection of the output device. A very low quiescent current of 10µA in shutdown mode reduces power dissipation.

The SC1541 is available with three different voltage options as standard and two package options, SO-8 and 5-lead TO-263.

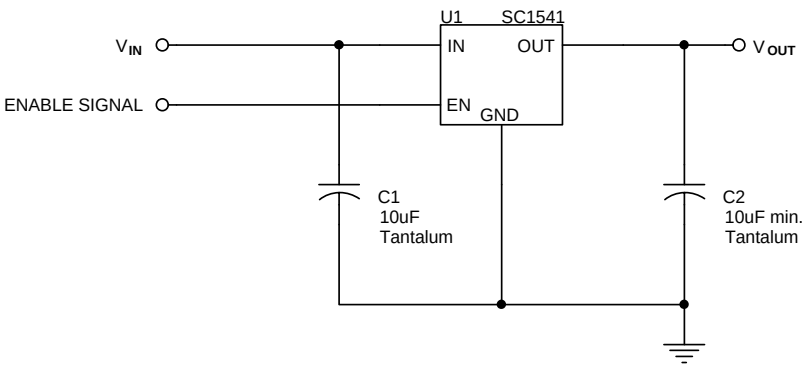
Features

- Low dropout performance, 1.3V max
- Full current rating over line and temperature
- Fast transient response
- ±2% total output regulation over line, load and temperature
- 10µA max. quiescent current in shutdown
- Three fixed output voltages
- Line regulation 0.2% max.
- Load regulation 0.4% max.
- SO-8 and TO-263 packages

Applications

- Low voltage microcontrollers
- Switching power supply post-regulation
- Instantly available circuits
- Motherboards
- Battery operated equipment

Typical Application Circuit



Notes:

(1) Input and output capacitors should be located close to the device.

(2) Connect all pins to PCB (SO-8 package) for optimal thermal characteristics.

(3) Increasing the output capacitor value will improve the overall transient response.

(4) The device is enabled when $V_{EN} = V_{IN}$, and shut down when EN is pulled to ground. EN should not be taken higher than V_{IN}. A CMOS signal referenced to V_{IN} would be ideal for switching the SC1541 on and off.

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 Resistance Junction to Case SO-8 TO-263	θ_{JC}	 39 3	°C/W
Thermal Resistance Junction to Ambient SO-8(1) TO-263	θ_{JA}	 65 60	°C/W
Operating Junction Temperature Range	T_J	0 to 125	°C
Storage Temperature Range	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering) 10 Sec	T_{LEAD}	300	°C
ESD Rating (Human Body Model)	V_{ESD}	2	kV

Note:
(1) 1 inch square of 1/16" FR-4, double sided, 1 oz. minimum copper weight.

Electrical Characteristics

Unless otherwise specified: I_O = 0mA to 1A, $V_{EN} = V_{IN}$, 1.8V Option: V_{IN} = 3.2V to 7.0V, 2.5 Option: V_{IN} = 3.9V to 7.0V, 3.3V Option: V_{IN} = 4.7V to 7.0V. Values in **bold** apply over full operating temperature range.

Parameter	Symbol		Min	Typ	Max	Units
Output Voltage (1)	V_{OUT}	V_{IN} = 5V, I_{OUT} = 0mA	-1	V_{OUT}	+1	%
			-2		**+2**	
Line Regulation(1)	$REG_{(LINE)}$	I_{OUT} = 10mA		0.035	**0.2**	%
Load Regulation(1)	$REG_{(LOAD)}$	V_{IN} = 5V		0.2	**0.4**	%
Dropout Voltage(1)(2)	V_D	I_{OUT} = 1A		1.10	**1.30**	V
Current Limit(1)	I_{CL}		**1.1**			A
Quiescent Current	I_Q	$V_{IN} = V_{EN}$ = 5V		5	7	mA
					10	
		V_{IN} = 5V, V_{EN} < 0.25V		6	8	µA
					10	
Enable Pin Control Voltage	V_{EN}	Device OFF	**0.25**	0.45		V
		Device ON		(V_{OUT} + 0.5)	**(V_{OUT} + 0.8)**	
Enable Pin Current	I_{EN}	V_{EN} = 0V, V_{IN} = 5V (OFF)		0.1	**1.0**	µA
		$V_{EN} = V_{IN}$ = 5V (ON)		15	**25**	

Electrical Characteristics (Cont.)

Unless otherwise specified: I_O = 0mA to 1A, $V_{EN} = V_{IN}$, 1.8V Option: V_{IN} = 3.2V to 7.0V, 2.5 Option: V_{IN} = 3.9V to 7.0V, 3.3V Option: V_{IN} = 4.7V to 7.0V. Values in **bold** apply over full operating temperature range.

Parameter	Symbol		Min	Typ	Max	Units
Temperature Coefficient	T_C			**0.005**		%/C
Temperature Stability	T_S			**0.5**		%
RMS Output Noise(3)	V_N			0.003		$\%V_{OUT}$
Ripple Rejection Ratio(4)	R_A	V_{IN} = 5V	**60**	72		dB

Notes:

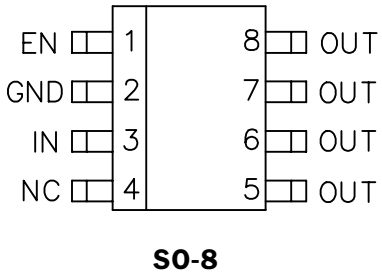
(1) Low duty cycle pulse testing with Kelvin connections required.

(2) ΔV_{OUT}, ΔV_{REF} = 1%.

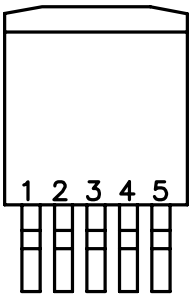
(3) Bandwidth of 10 Hz to 10kHz.

(4) 120Hz input ripple.

Pin Configurations



SO-8



TO-263-5

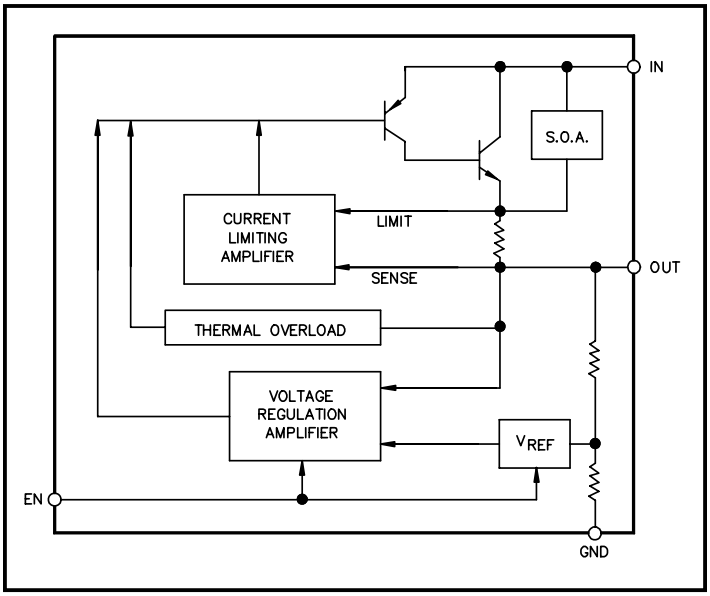
PIN	FUNCTION
1	EN
2	GND
3/TAB	OUT
4	IN
5	NC

Ordering Information

Device[1][2]	Package
SC1541CM-X.X.TR	TO-263-5
SC1541CS-X.X.TR	SO-8

Notes:
(1) Where X.X denotes voltage options. Available voltages are: 1.8V, 2.5V and 3.3V. Contact factory for additional voltage options.
(2) Only available in tape and reel packaging. A reel contains 800 (TO-263-5) or 2500 (SO-8) devices.

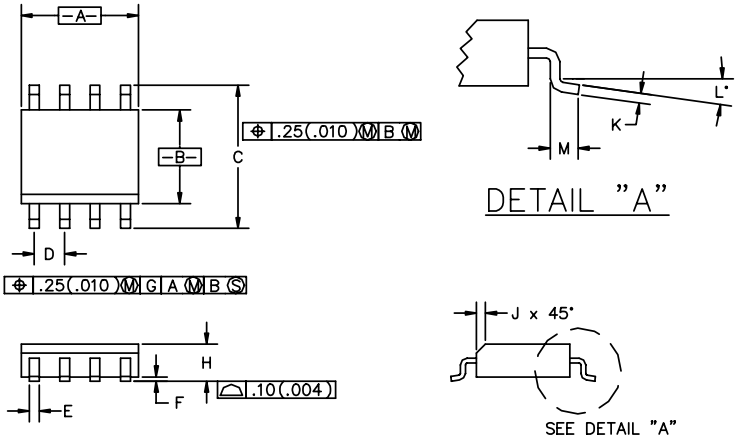
Block Diagram



Pin Descriptions

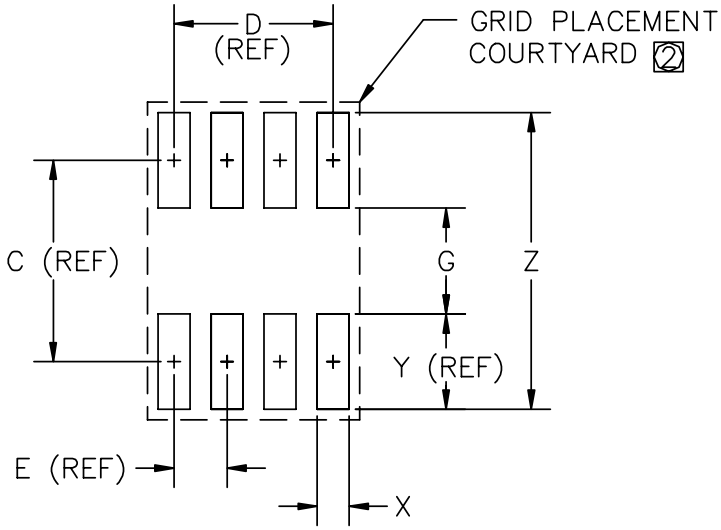
Pin Name	SO-8 Pin #	TO-263-5 Pin #	Pin Function
EN	1	1	Active high enable for the regulator output. Connect to V_{IN} if not being used.
GND	2	2	Ground pin. Bottom end of the internal feedback resistor chain.
NC	4	5	No connection.
IN	3	4	This is the input supply pin for the device.
OUT	5, 6, 7, 8	3/TAB	This is the power output of the device. This pin is electrically connected to the tab of the TO-263-5 package.

Outline Drawing - SO-8



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.188	.197	4.80	5.00	
B	.149	.158	3.80	4.00	
C	.228	.244	5.80	6.20	
D	.050	BSC	1.27	BSC	
E	.013	.020	0.33	0.51	
F	.004	.010	0.10	0.25	
H	.053	.069	1.35	1.75	
J	.011	.019	0.28	0.48	
K	.007	.010	.19	.25	
L	0°	8°	0°	8°	
M	.016	.050	0.40	1.27	

Land Pattern - SO-8(1)



DIMENSIONS (1)					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
C	–	.19	–	5.00	–
D	–	.15	–	3.81	–
E	–	.05	–	1.27	–
G	.10	.11	2.60	2.80	–
X	.02	.03	.60	.80	–
Y	–	.09	–	2.40	–
Z	–	.29	7.20	7.40	–

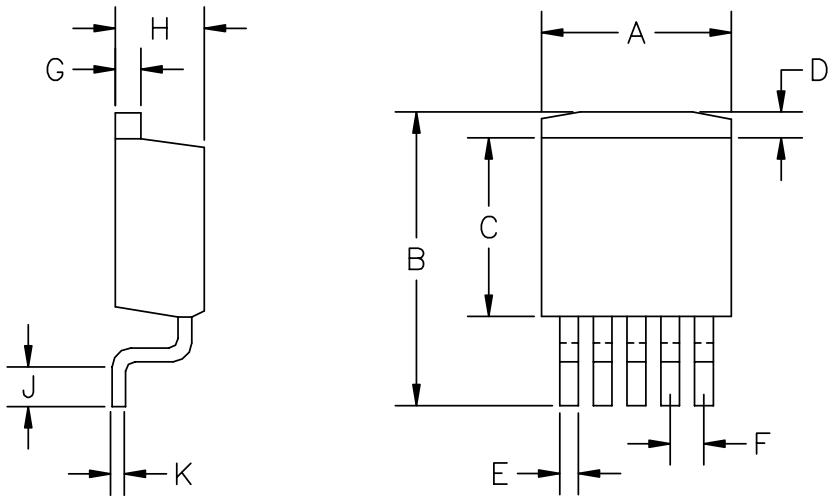
(2) GRID PLACEMENT COURTYARD IS 12x16 ELEMENTS (6 mm X 8mm) IN ACCORDANCE WITH THE INTERNATIONAL GRID DETAILED IN IEC PUBLICATION 97.

(1) CONTROLLING DIMENSION: MILLIMETERS

Note:

(1) More copper area should be used to lower $R_{TH(J-A)}$ as needed.

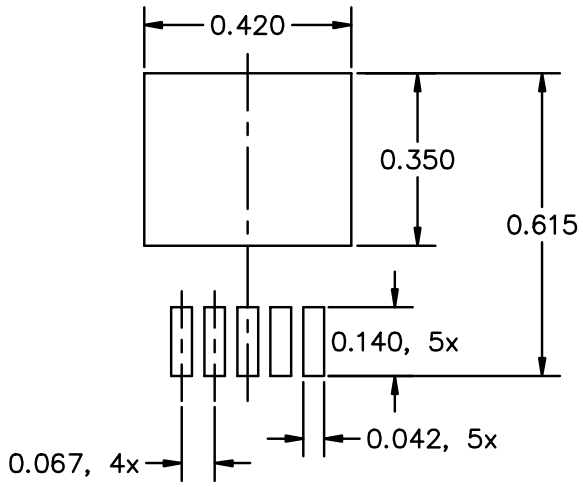
Outline Drawing - TO-263-5L



DIM	DIMENSIONS INCHES MIN	INCHES MAX	MM MIN	MM MAX	NOTE
A	.380	.405	9.65	10.29	—
B	.575	.625	14.60	15.88	—
C	.325	.380	8.25	9.66	—
D	—	.055	—	1.40	—
E	.020	.039	.50	.99	—
F	.060	.072	1.52	1.83	—
G	.045	.055	1.14	1.40	—
H	.160	.190	4.06	4.83	—
J	.090	.110	2.28	2.80	—
K	.018	.029	.457	.736	—

JEDEC TO-263

Land Pattern - TO-263-5L(1)



NOTE: ALL DIMENSIONS ARE IN INCHES

Note:

(1) More copper area should be used to lower $R_{TH(J-A)}$ as needed.

Contact Information

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