

POWER MANAGEMENT
PRELIMINARY
Description

The SC4436 is a five terminal device for voltage regulation or over voltage protection of an isolated power supply with output voltages down to 600mV.

It is intended to be used as a replacement for three terminal shunt regulators such as SC431L where the output voltage is too low for the device to function in conjunction with an opto-isolator. SC4436 achieves this by having separate supply and output pins, allowing the output to sink 20mA of current at voltages ranging from 0.2V to 30V, while the supply pin still has sufficient voltage for the device to function. In this way, allowing for a 1.4V drop through an opto-isolator diode, regulation down to 600mV out can be achieved.

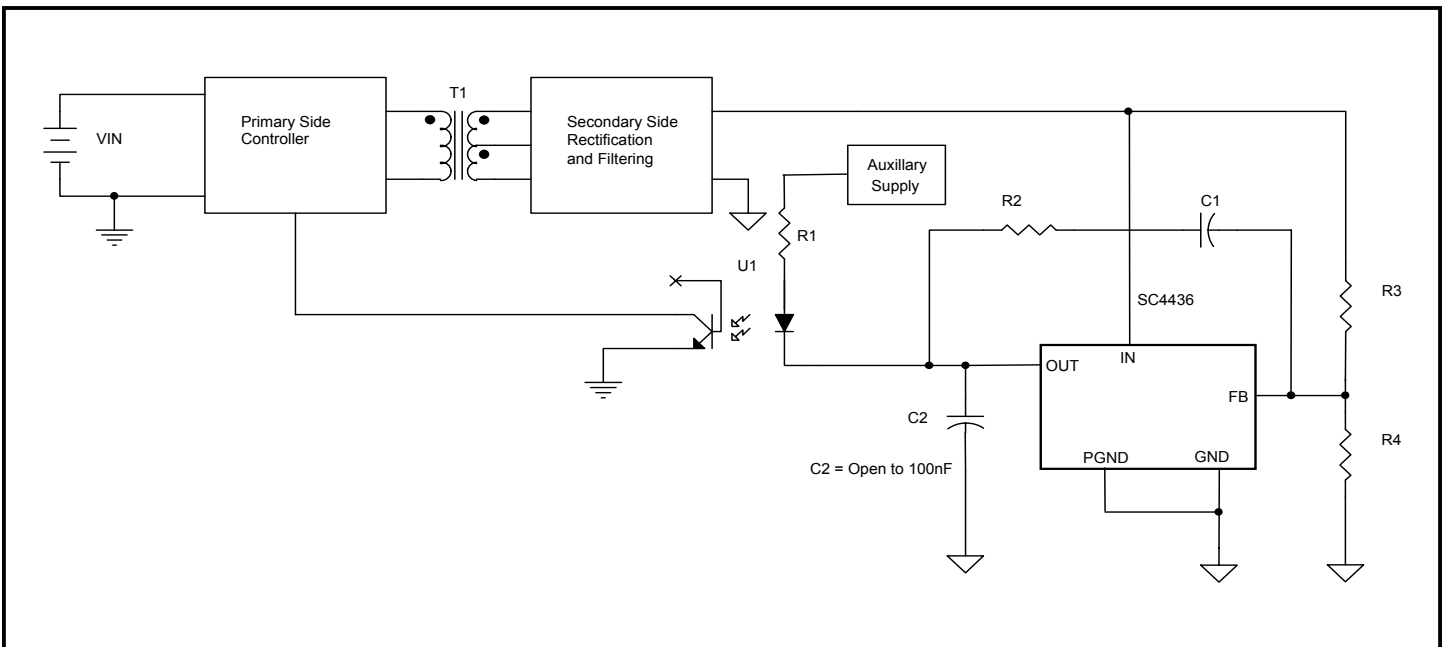
The SC4436 shunt regulator is available with initial reference voltage accuracies of 0.5% in the space saving 5 lead SC-70.

Features

- ◆ Sub 1V reference (0.6V)
- ◆ Trimmed bandgap design
- ◆ Very low operating current (10 μ A)
- ◆ Wide supply voltage range (1.7V to 30V)
- ◆ Unconditionally stable
- ◆ Very low temperature coefficient (TBD ppm/ $^{\circ}$ C)
- ◆ Industrial temperature range
- ◆ Available in space-saving SC-70 package

Applications

- ◆ Telecom Power Supplies
- ◆ Servers and workstation Supplies
- ◆ Secondary side regulation for very low output voltage power supplies
- ◆ Opto driver for very low output voltage isolated power supplies
- ◆ Battery operated applications
- ◆ Point of use power supplies

Typical Application Circuit


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Absolute Maximum Ratings

Exceeding the specifications below may result in permanent damage to the device, or device malfunction. Operation outside of the parameters specified in the Electrical Characteristics section is not implied.

Parameter	Symbol	Maximum	Units
Input Voltage to GND	V_{IN}	-0.3 to 35	V
Output Voltage to GND	V_{IOUT}	-0.3 to 35	V
Feedback Voltage to GND	V_{FB}	-0.3 to $V_{IN}+0.3V$	V
PGND to GND		-0.3 to +0.3	V
Thermal Impedance, Junction to Ambient	θ_{JA}	332	°C/W
Operating Ambient Temperature Range	T_A	-40 to +85	°C
Operating Junction Temperature Range	T_J	-40 to +150	°C
Storage Temperature Range	T_{STG}	-65 to +150	°C
Lead Temperature (Soldering) 10 seconds	T_{LEAD}	300	°C

Electrical Characteristics

Unless specified: $V_{IN} = 1.7V$ to $30V$, $I_{OUT} = 1mA$ to $20mA$, $OUT = FB$, $C_{IN} = 0.1\mu F$, $C_{OUT} = 1.0\mu F$, $T_A = -40^\circ C$ to $85^\circ C$.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
IN						
Voltage Range	V_{IN}		1.7		30	V
Supply Current	I_{IN}	$V_{IN} = 1.7V$ to $30V$				
			$I_{OUT} = 0.3mA$	0.5	1	mA
				0.8	1.5	
FB						
FB Threshold Accuracy		$T_A = +25^\circ C$	0.597	0.600	0.603	V
		$T_A = -40^\circ C$ to $+85^\circ C$	0.594	0.6	0.606	
FB Load Regulation		$I_{OUT} = 1mA$ to $20mA$		3.8	6	mV
FB Line Regulation		$V_{IN} = 2V$ to $15V$		0.2	1	mV
		$V_{IN} = 1.7V$ to $30V$			1.5	
FB Output Voltage Regulation		$V_{OUT} = 0.2V$ to $18V$, $I_{OUT} = 1mA$		0.2	1	mV
FB Input Bias Current	$I_{FB(BIAS)}$	$V_{IN} = 30V$	-60	12	+60	nA

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Electrical Characteristics (Cont.)

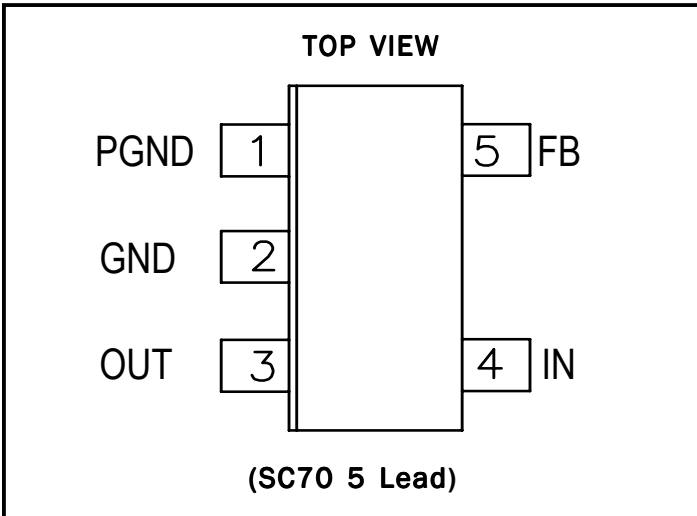
 Unless specified: $V_{IN} = 1.7V$ to $30V$, $I_{OUT} = 1mA$ to $20mA$, $OUT = FB$, $C_{IN} = 0.1\mu F$, $C_{OUT} = 1.0\mu F$, $T_A = -40^{\circ}C$ to $85^{\circ}C$.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OUT						
Voltage Range	V_{OUT}		0.2		30	V
Maximum Output Current	$I_{OUT(MAX)}$	$V_{OUT} = 0.25V$, $V_{IN} = 2V$, $V_{FB} = 0.630V$	20			mA
Output Leakage Current	$I_{OUT(LEAK)}$	$V_{IN} = 30V$, $V_{OUT} = 30V$, $V_{FB} = 0V$	$T_A = +25^{\circ}C$	0.001	0.1	μA
			$T_A = +85^{\circ}C$	0.03		
Dynamic Output Impedance	Z_{OUT}	$I_{OUT} = 1mA$ to $20mA$, $f < 1Hz$		0.2	0.32	Ω
Dynamic Output Slew rate		$I_{OUT} = 5mA$, $V_{IN} = 3.3V$, $V_{FB} = 0.63V$		20		$V/\mu s$

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Pin Configuration



Ordering Information

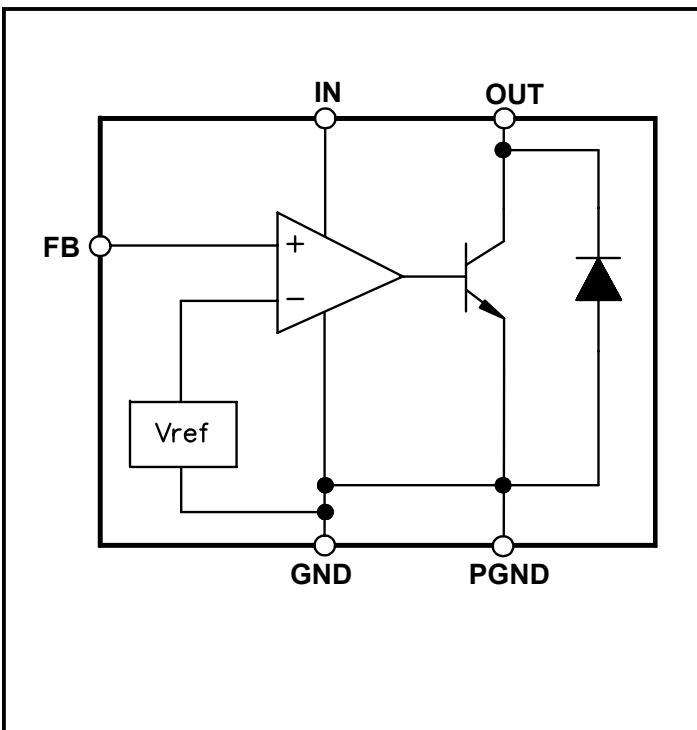
Part Number ⁽¹⁾	Package
SC4436IRTR	5 lead SC70

Notes: (1) Only available in tape and reel packaging. (Suffix '.TR' e.g. SC4436IRTR).

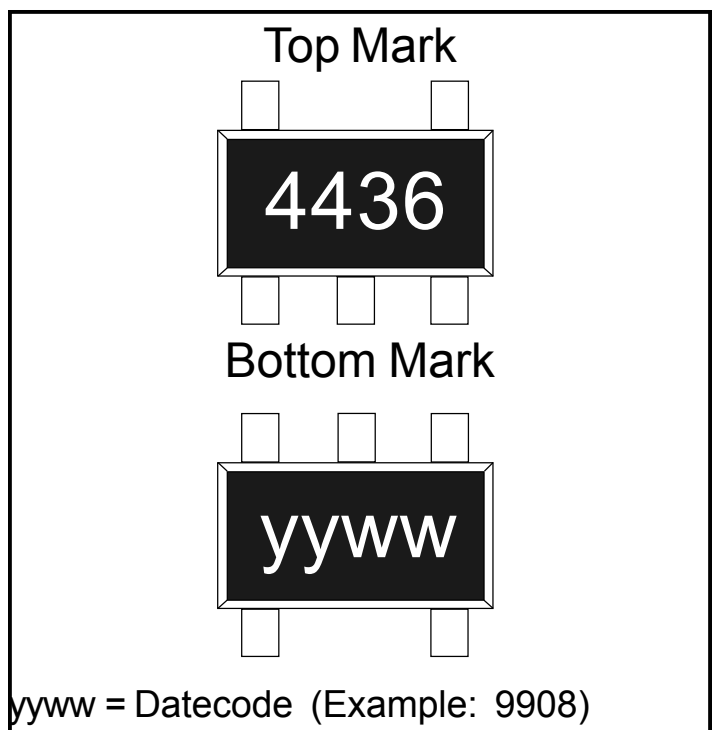
Pin Descriptions

Pin #	Pin Name	Pin Function
1	PGND	Power ground, should be connected to the GND right at the SC4436 IC pin.
2	GND	Analog ground, should be connected to the PGND right at the SC4436 IC pin.
3	OUT	This is the output pin of the device, essentially an open collector.
4	IN	This is the input supply pin for the IC., should be bypassed with a 0.1uF capacitor to GND.
5	FB	This is connected to the non-inverting input of the error amplifier.

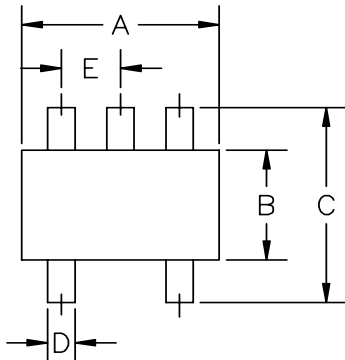
Block Diagram



Marking Information

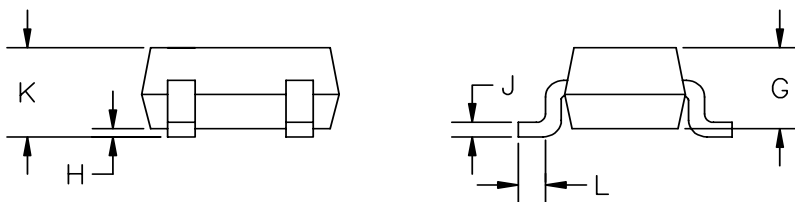


Outline Drawing - SC70-5L



DIM ^N	DIMENSIONS ^①				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
A	.071	.087	1.80	2.20	—
B	.045	.053	1.15	1.35	—
C	.071	.094	1.80	2.40	—
D	.006	.012	.150	.300	—
E	.026	BSC	.650	BSC	—
G	.031	.039	.800	1.00	—
H	0.00	.004	0.00	.100	—
J	.004	.007	.100	.180	—
K	.031	.043	.800	1.10	—
L	.004	.012	.100	.300	—

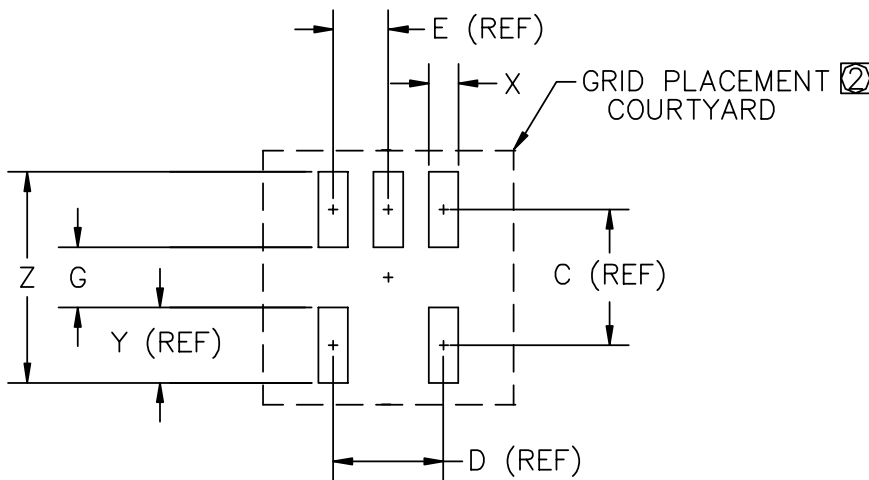
JEDEC EIAJSC70



② PACKAGE OUTLINE EXCLUSIVE OF MOLD FLASH AND METAL BURR.

① CONTROLLING DIMENSIONS: MILLIMETERS.

Land Pattern - SC70-5L



DIM ^N	DIMENSIONS ^①				NOTE
	INCHES		MM		
	MIN	MAX	MIN	MAX	
C	—	.063	—	1.60	—
D	—	.052	—	1.30	—
E	—	.026	—	.65	—
G	—	.028	—	.70	—
X	—	.014	—	.35	—
Y	—	.035	—	.90	—
Z	—	.098	—	2.50	—

② GRID PLACEMENT COURTYARD IS 6 x 6 ELEMENTS (3 mm X 3 mm) IN ACCORDANCE WITH THE INTERNATIONAL GRID DETAILED IN IEC PUBLICATION 97.

① CONTROLLING DIMENSION: MILLIMETERS

Contact Information

Semtech Corporation
Power Management Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804