

### POWER MANAGEMENT

#### Description

The SC1461 is a versatile charge pump designed for use in battery operated power supply applications. A simple, low current boost circuit can be implemented without costly inductors or capacitors. Internal MOSFETs and control circuitry eliminate the need for costly board space and design time. The small device footprint allows for compact circuit design.

The SC1461 is a Capless™ charge pump for applications that require up to 8mA of output current. Three modes of output voltage can be programmed via the ADJ pin.

Modes include:

$$V_o = (1.32 * V_{IN}) \pm 4\% @ 7\text{mA of output current}$$

$$V_o = (1.515 * V_{IN}) \pm 4\% @ 4\text{mA of output current}$$

and the adjustable mode where an external resistor divider determines the output voltage.

The SC1461 is packaged in a 5 lead SOT-23 package.

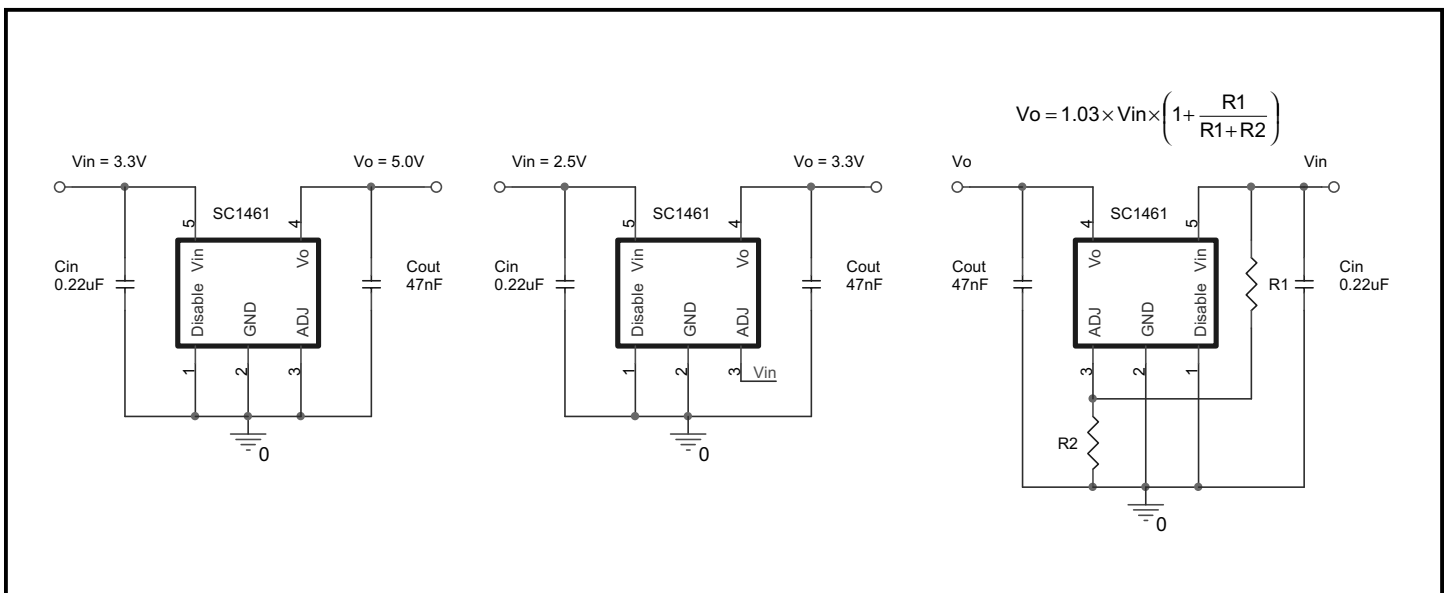
#### Features

- ◆ Small size - 5 pin SOT-23 package
- ◆ 4% voltage accuracy
- ◆ 65uA typ. quiescent current
- ◆ User selectable output voltages of  $1.515 * V_{IN}$ ,  $1.32 * V_{IN}$ , or adjustable output
- ◆ All specifications rated over full temperature range (-40°C to 85°C)

#### Applications

- ◆ PDA Power Supplies
- ◆ Notebook Power Supplies
- ◆ Peripheral Card Supplies
- ◆ Industrial Power Supplies
- ◆ High Density DC/DC Conversion

#### Typical Application Circuit



**POWER MANAGEMENT**
**Absolute Maximum Ratings**

Parameter	Symbol	Maximum	Units
Supply Voltage	$V_{IN}$	-0.3 to +4	V
Output Voltage	VO	-0.3 to +6	V
Thermal Resistance Junction to Ambient	$\theta_{JA}$	410	°C/W
Operating Temperature	$T_A$	-40 to +85	°C
Temperature Range	$T_J$	-40 to +125	°C
Storage Temperature	$T_{STG}$	-65 to 150	°C
Lead Temperature (Soldering) 10 Seconds	$T_L$	300	°C

**Electrical Characteristics**

Unless specified:  $2.25V \leq V_{IN} \leq 3.63V$ ,  $0 \leq I_o \leq 8mA$ ,  $C_{in} = 0.22\mu F$ ,  $C_{out} = 47nF$ ,  $T_a = -40$  to  $85^\circ C$

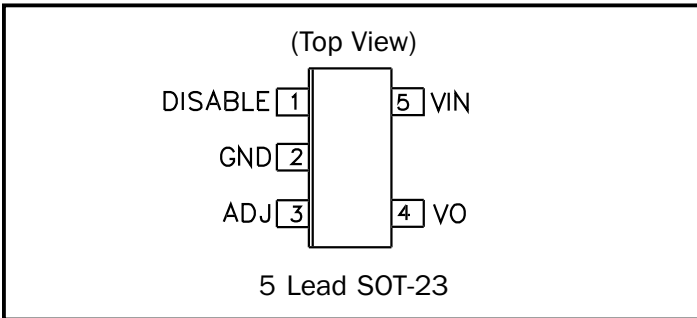
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Input Supply Voltage	$V_{IN}$		2.25		3.63	V
Input Supply Current	$I_{IN}$	ADJ, DISABLE = GND, $I_o = 0mA$ , $V_{IN} = 3.3V$		65	100	$\mu A$
		ADJ = GND, DISABLE = $V_{IN}$ $I_o = 0mA$ , $V_{IN} = 3.3V$		0.1	1	
Output Voltage	$V_o$	ADJ, DISABLE = GND, $I_o \leq 4mA$	-4	$1.515 \times V_{IN}$	4	%
		ADJ = $V_{IN}$ , DISABLE = GND, $I_o \leq 7mA$	-4	$1.32 \times V_{IN}$	4	
Output Ripple (pk-pk) <sup>(1)</sup>	$V_R$	ADJ = $V_{IN}$ , DISABLE = GND, $I_o \leq 7mA$		50		mV
Output Current	$I_o$	ADJ = $V_{IN} = 2.5V$ , DISABLE = GND	7	8		mA
		ADJ, DISABLE = GND, $V_{IN} = 3.3V$	4	7		mA
Efficiency <sup>(1)</sup>	$\eta$	ADJ = $V_{IN} = 2.5V$ , DISABLE = GND $I_o = 7mA$		50		%
Oscillator Frequency <sup>(2)</sup>	OSC	ADJ = $V_{IN} = 2.5V$ , DISABLE = GND		12		MHz
		ADJ, DISABLE = GND, $V_{IN} = 3.3V$		13.5		
Time to Regulation at Turn-On <sup>(1)</sup>	$t_{ON}$	ADJ = $V_{IN} = 2.5V$ , DISABLE = GND $I_o = 7mA$ , $C_{OUT} = 47nF$		25		$\mu s$
Disable Threshold Voltage	$D_{ISHI}$			1	1.3	V
	$D_{ISLO}$		.5	0.9		V
Disable current	$I_{DISABLE}$	Disable = 0V		1	10	$\mu A$

**NOTES:**

- (1) All electrical characteristics are for the application circuit on page 1.
- (2) Guaranteed by design.
- (3) This device is ESD sensitive. Use of standard ESD handling precautions is required.

**POWER MANAGEMENT**

**Pin Configuration**



**Ordering Information**

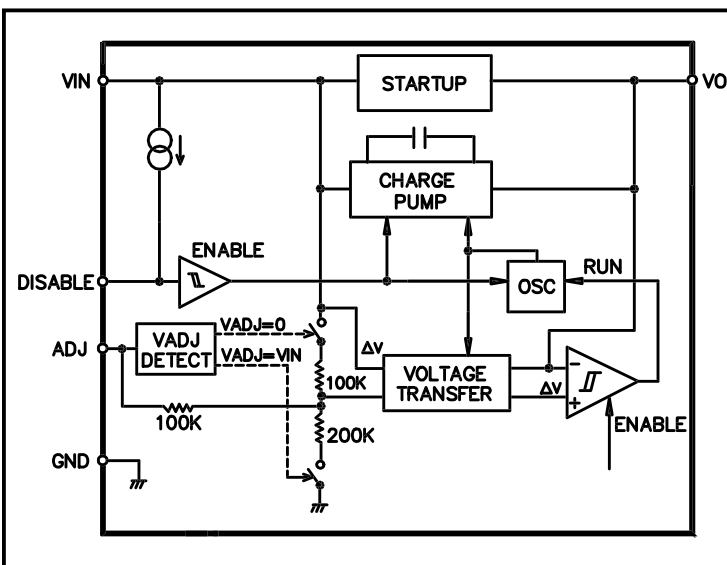
Device <sup>(1)</sup>	Package
SC1461SKTR	5-SOT-23
SC1461EVB	Evaluation Board

**Note: (1)** Only available in tape and reel packaging. A reel contains 3000 devices.

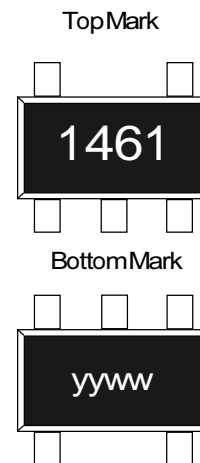
**Pin Descriptions**

Pin #	Pin Name	Pin Function
1	DISABLE	Disable pin is internally pulled to $V_{IN}$ resulting in standby mode and the output will be disabled. Grounding this pin will enable the output.
2	GND	Ground.
3	ADJ	Mode selection pin. Grounding this pin will yield $V_o = 1.515 \cdot V_{in}$ . Pulling this pin to $V_{IN}$ will yield $V_o = 1.32 \cdot V_{IN}$ . An external voltage divider connected at $V_{IN}$ will achieve: $V_o = 1.03 \times V_{in} \times \left( 1 + \frac{R1}{R1+R2} \right)$ See Applications Circuits.
4	VO	Voltage output.
5	VIN	Supply voltage input.

**Block Diagram**

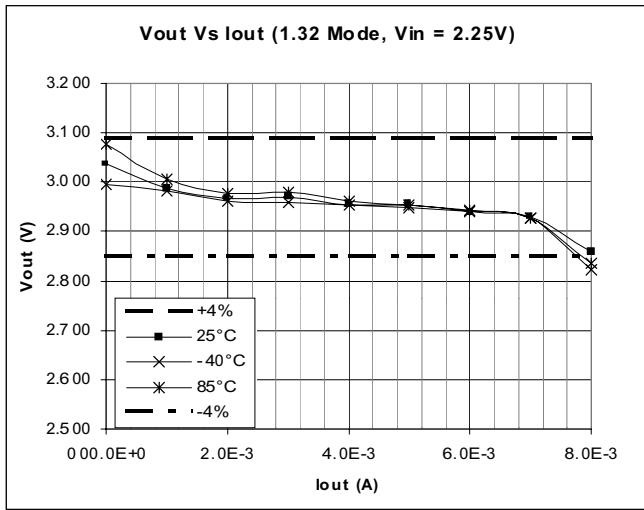


**Marking Information**

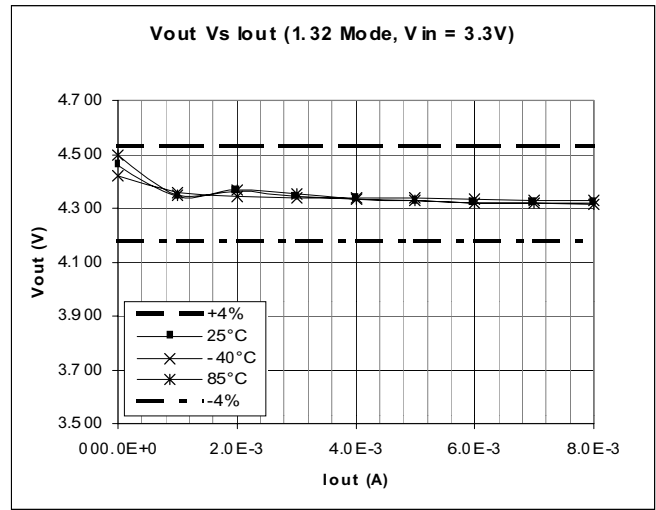


yyww = Datecode (Example: 9908)

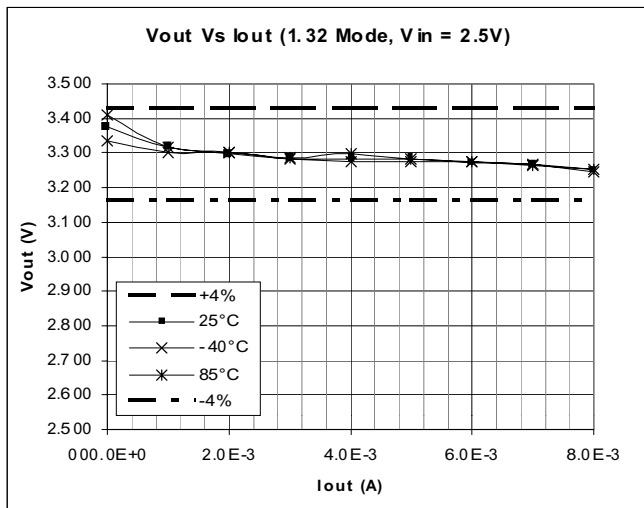
**POWER MANAGEMENT**  
**Typical Characteristics**



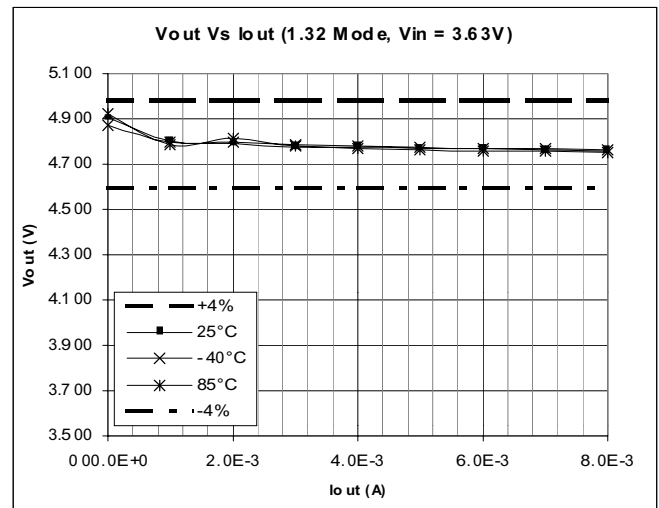
Typical Vout vs Iout  
 1.32 Mode Vin = 2.25V



Typical Vout vs Iout  
 1.32 Mode Vin = 3.30V



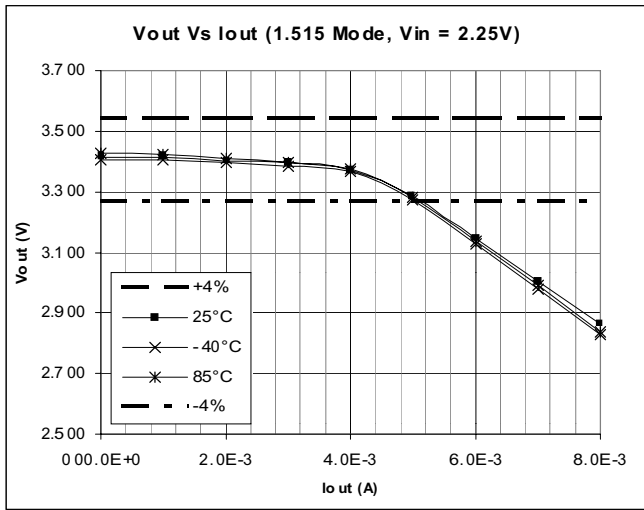
Typical Vout vs Iout  
 1.32 Mode Vin = 2.50V



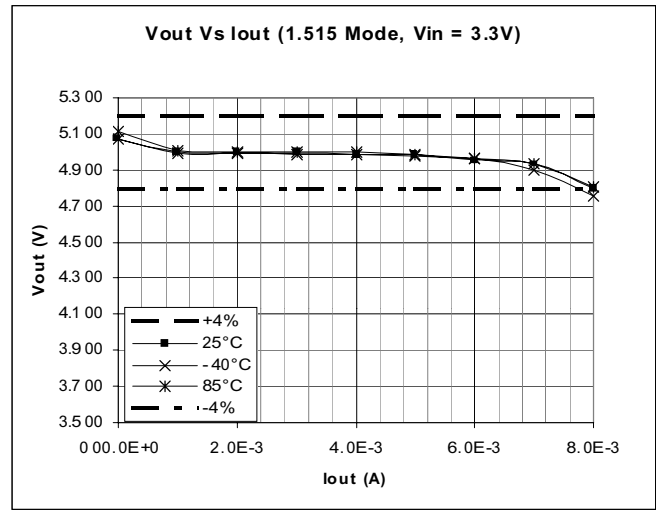
Typical Vout vs Iout  
 1.32 Mode Vin = 3.63V

POWER MANAGEMENT

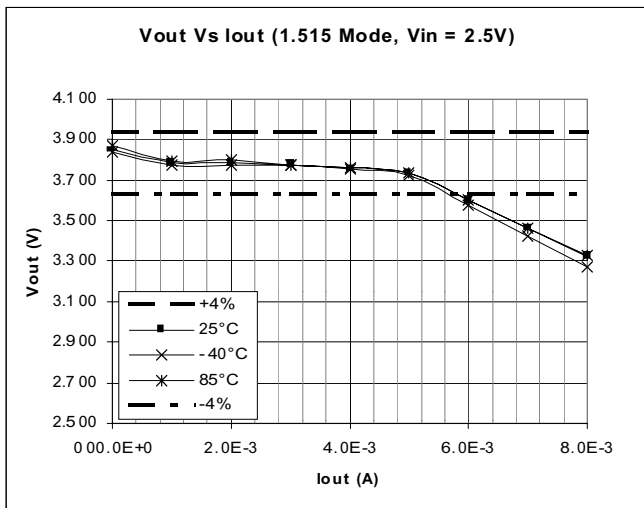
Typical Characteristics



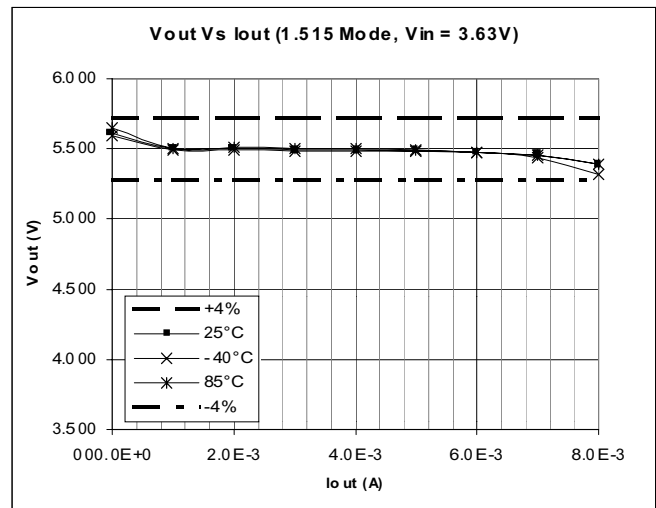
Typical Vout vs Iout  
1.515 Mode Vin = 2.25V



Typical Vout vs Iout  
1.515 Mode Vin = 3.30V



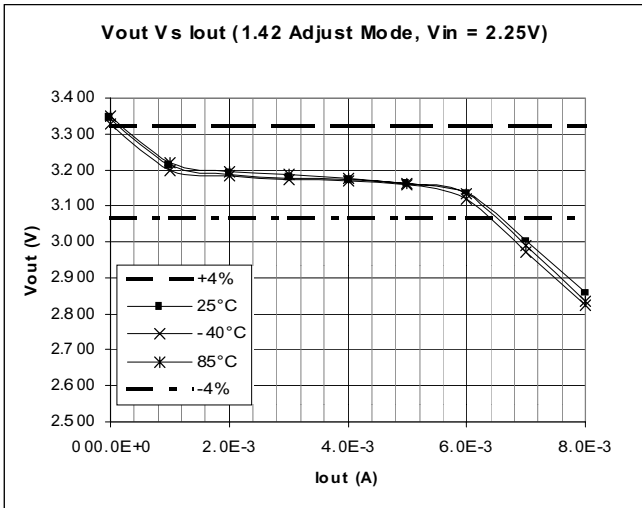
Typical Vout vs Iout  
1.515 Mode Vin = 2.50V



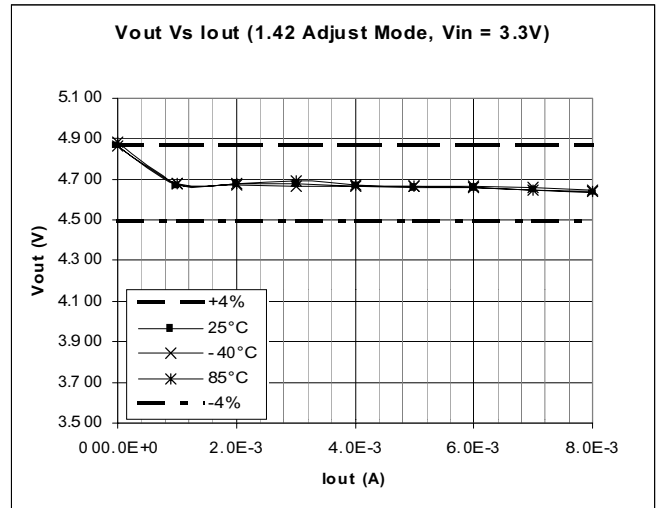
Typical Vout vs Iout  
1.515 Mode Vin = 3.63V

POWER MANAGEMENT

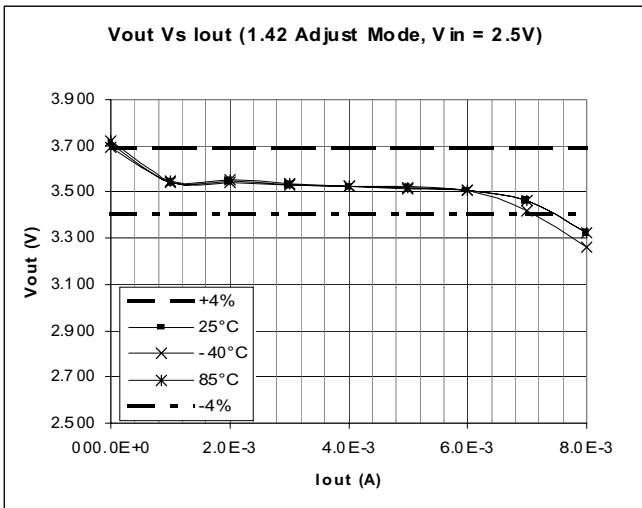
Typical Characteristics



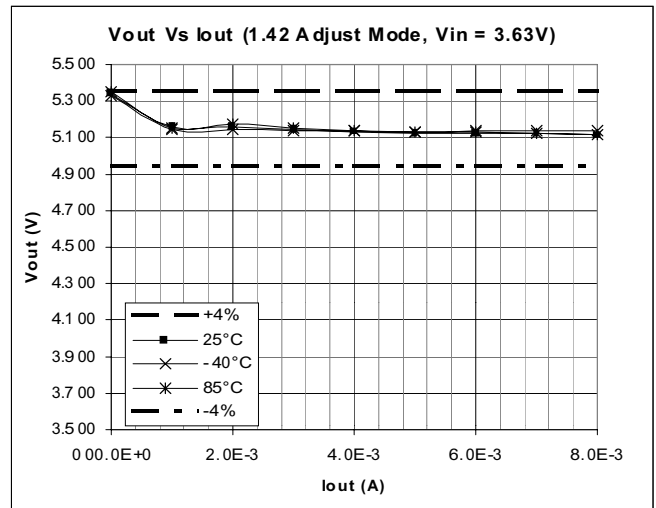
Typical Vout vs Iout  
Adjust Mode = 1.42 \* Vin    Vin = 2.25V



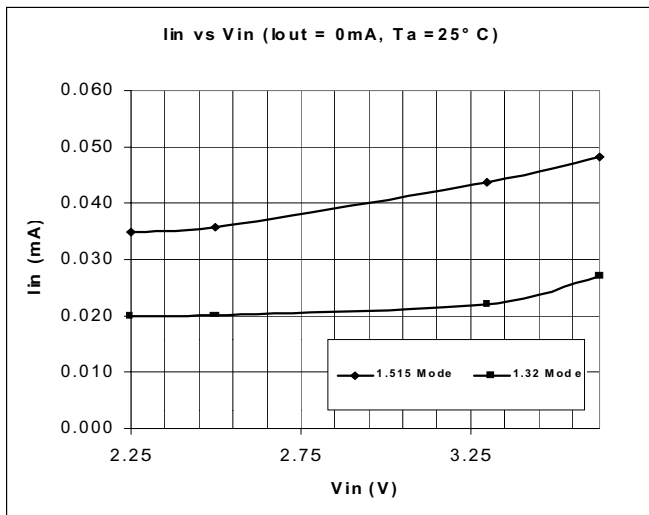
Typical Vout vs Iout  
Adjust Mode = 1.42 \* Vin    Vin = 3.30V



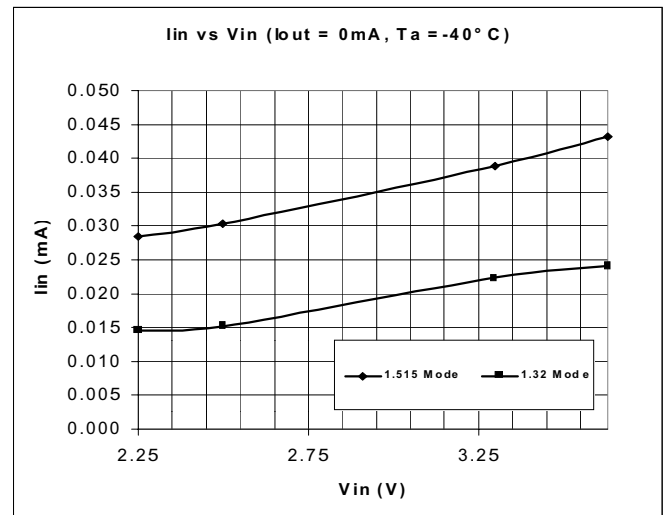
Typical Vout vs Iout  
Adjust Mode = 1.42 \* Vin    Vin = 2.50V



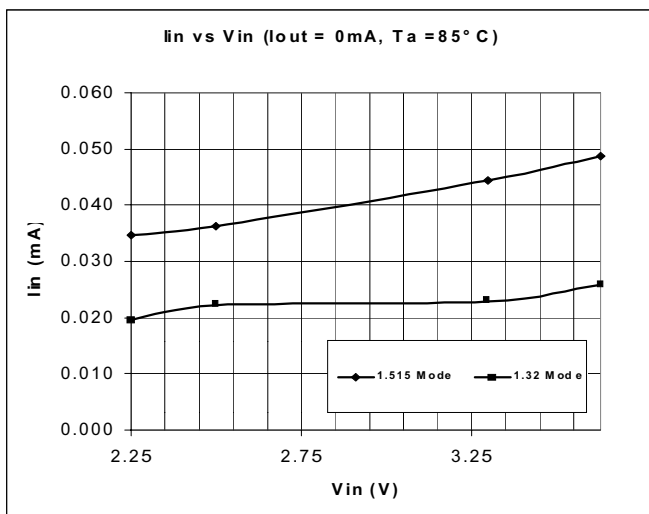
Typical Vout vs Iout  
Adjust Mode = 1.42 \* Vin    Vin = 3.63V

**POWER MANAGEMENT**
**Typical Characteristics**


Typical lin vs Vin  
Iout = 0mA Ta = 25°C



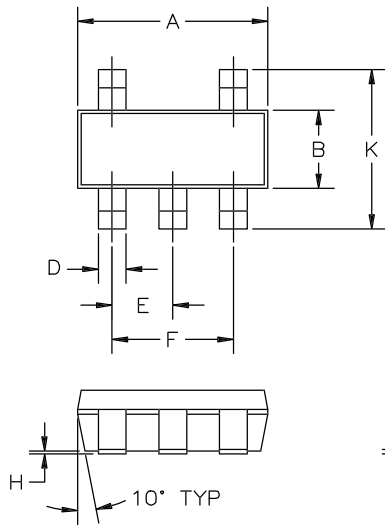
Typical lin vs Vin  
Iout = 0mA Ta = -40°C



Typical lin vs Vin  
Iout = 0mA Ta = 85°C

**POWER MANAGEMENT**

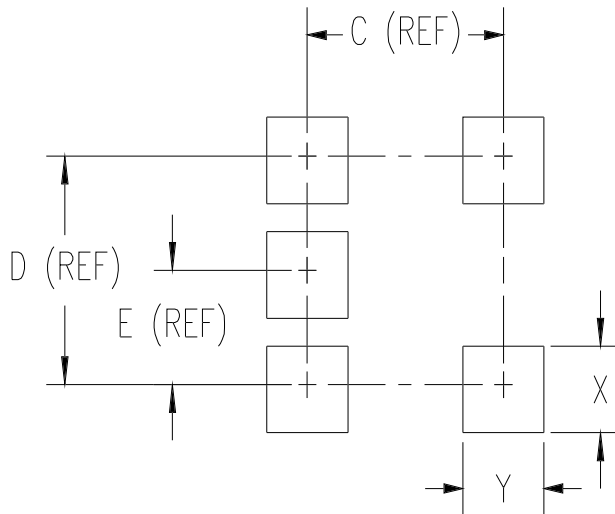
**Outline Drawing - SOT-23-5L**



DIM <sup>N</sup>	INCHES		MM		NOTE
	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 - SOT-23-5L**



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

**Contact Information**

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