

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.

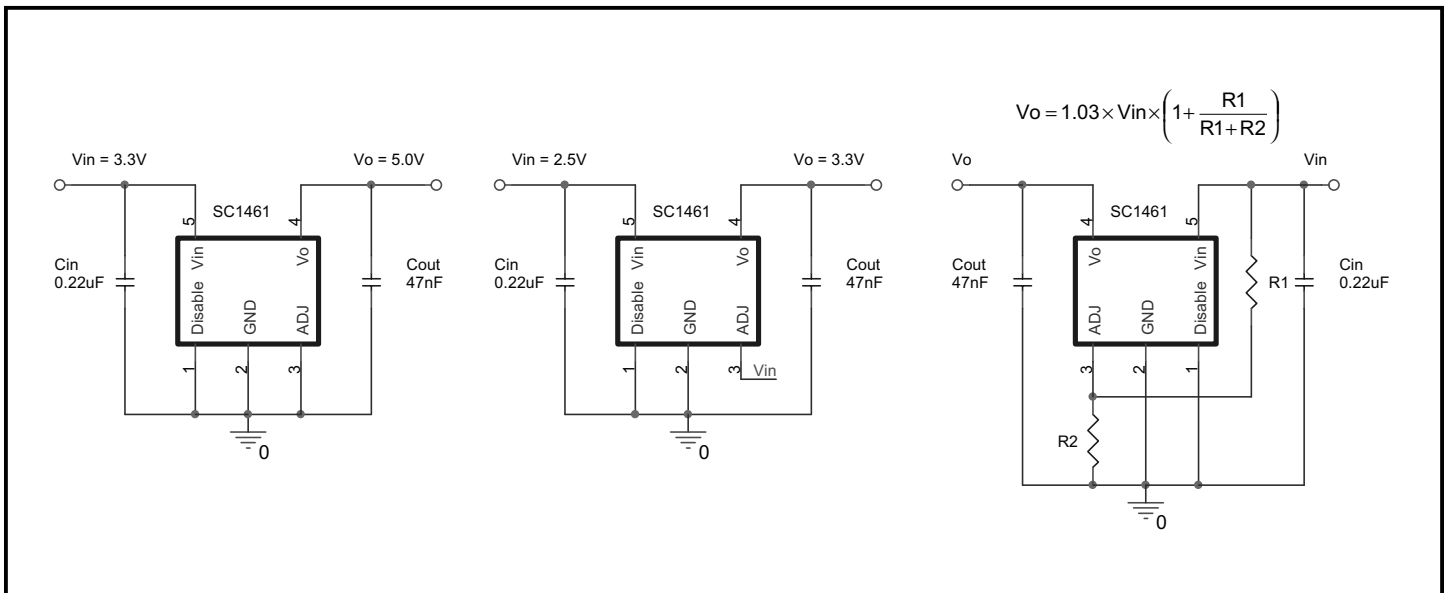
Features

- ◆ 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



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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 | θ_{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 $85^\circ C$

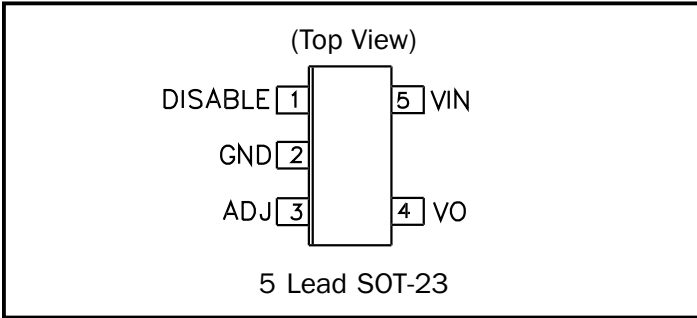
| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|--|---------------|---|------|-----------------------|------|---------|
| Input Supply Voltage | V_{IN} | | 2.25 | | 3.63 | V |
| Input Supply Current | I_{IN} | ADJ, DISABLE = GND, $I_o = 0mA$, $V_{IN} = 3.3V$ | | 65 | 100 | μA |
| | | ADJ = 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) ⁽¹⁾ | 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 ⁽¹⁾ | η | ADJ = $V_{IN} = 2.5V$, DISABLE = GND $I_o = 7mA$ | | 50 | | % |
| Oscillator Frequency ⁽²⁾ | 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 ⁽¹⁾ | t_{ON} | ADJ = $V_{IN} = 2.5V$, DISABLE = GND $I_o = 7mA$, $C_{OUT} = 47nF$ | | 25 | | μs |
| Disable Threshold Voltage | D_{ISHI} | | | 1 | 1.3 | V |
| | D_{ISLO} | | .5 | 0.9 | | V |
| Disable current | $I_{DISABLE}$ | Disable = 0V | | 1 | 10 | μA |

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.

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Pin Configuration



Ordering Information

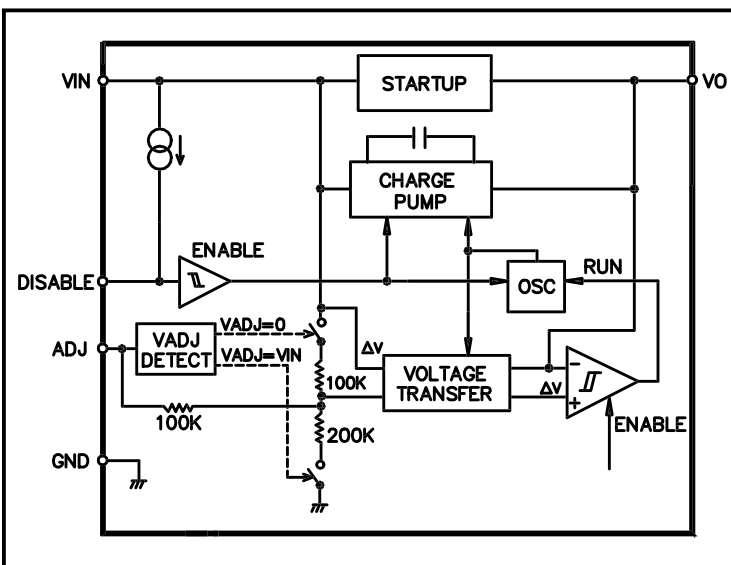
| Device ⁽¹⁾ | Package |
|-----------------------|------------------|
| SC1461ISKTR | 5-SOT-23 |
| SC1461EVB | Evaluation Board |

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

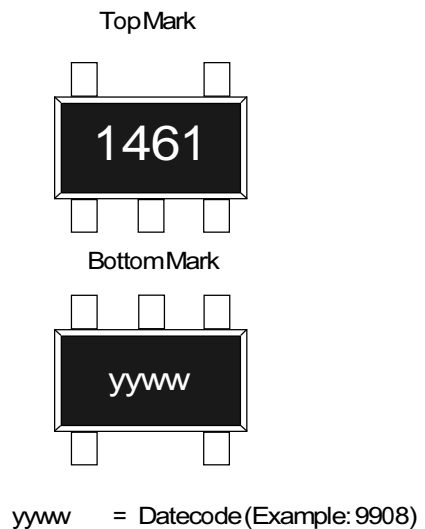
Pin Descriptions

| 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. |

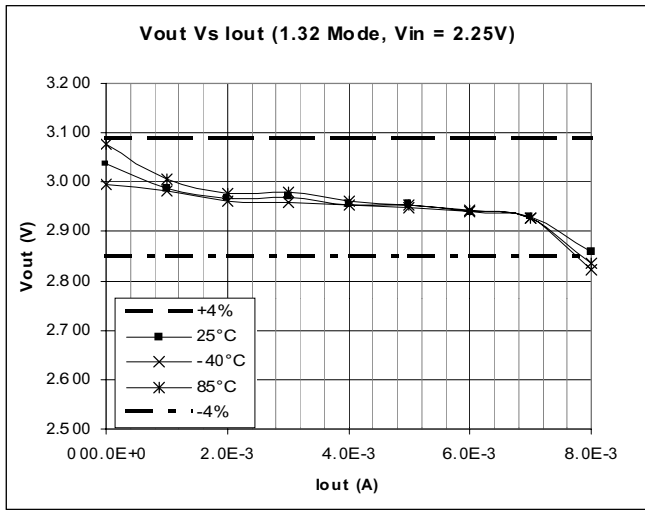
Block Diagram



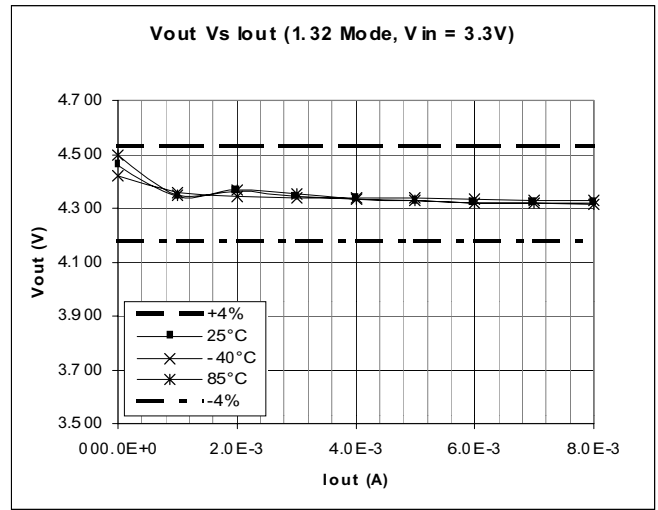
Marking Information



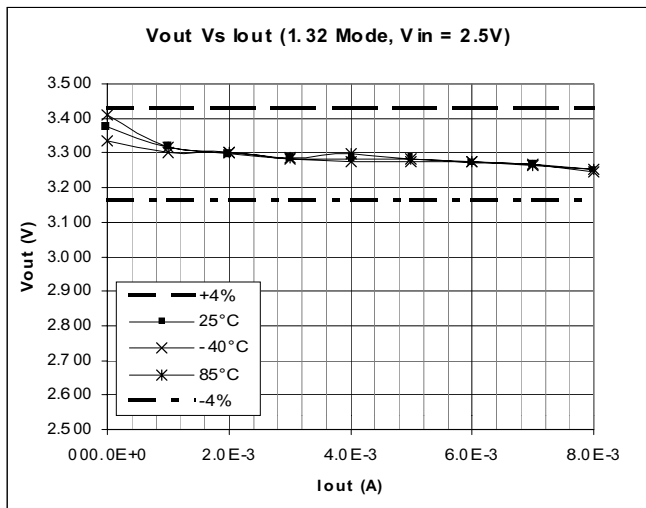
POWER MANAGEMENT
Typical Characteristics



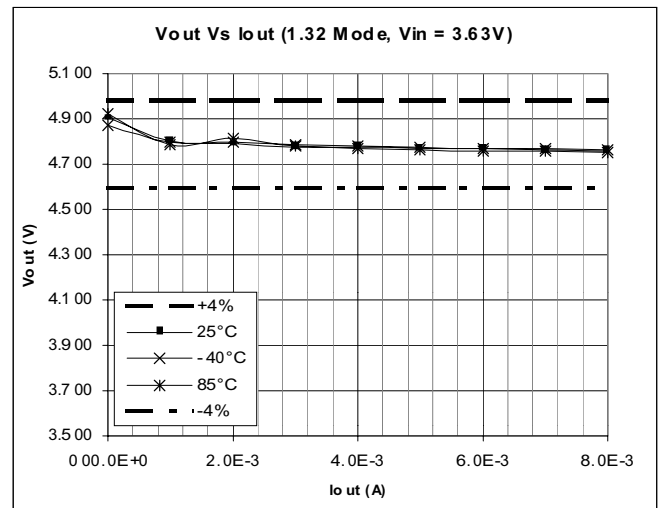
Typical Vout vs Iout
 1.32 Mode Vin = 2.25V



Typical Vout vs Iout
 1.32 Mode Vin = 3.30V



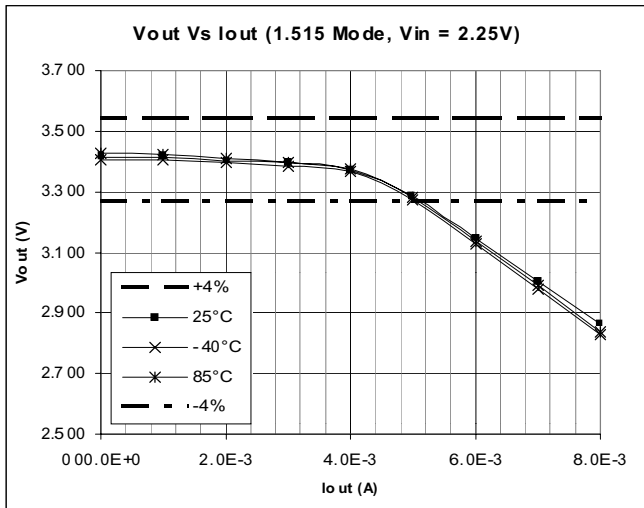
Typical Vout vs Iout
 1.32 Mode Vin = 2.50V



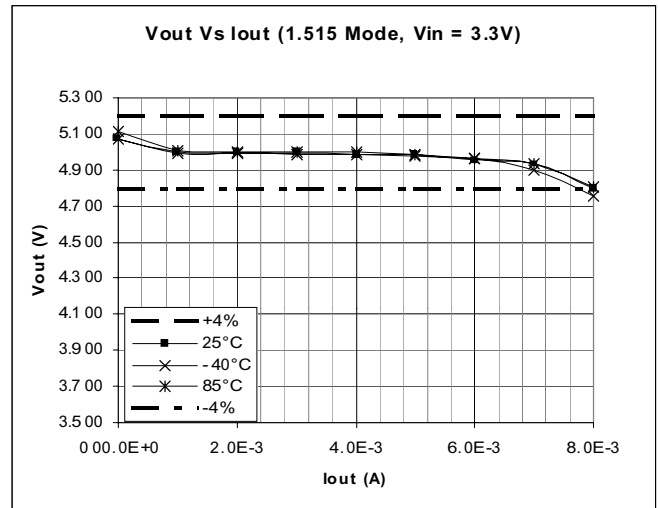
Typical Vout vs Iout
 1.32 Mode Vin = 3.63V

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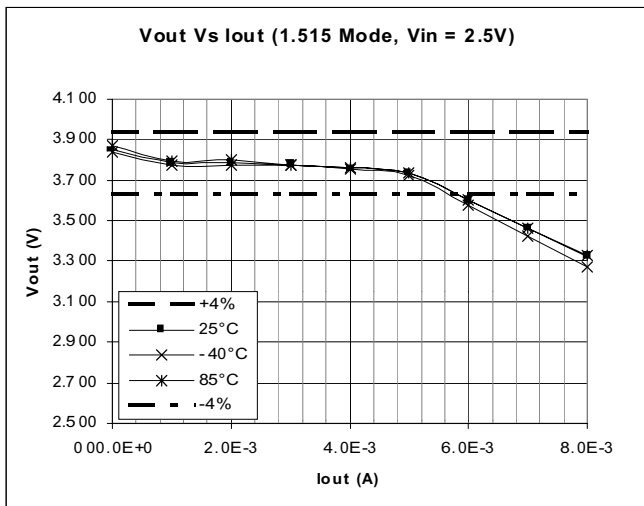
Typical Characteristics



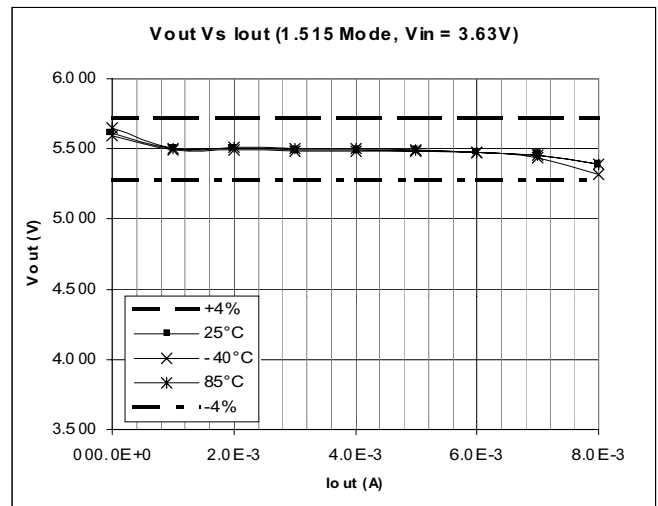
Typical Vout vs Iout
1.515 Mode Vin = 2.25V



Typical Vout vs Iout
1.515 Mode Vin = 3.30V



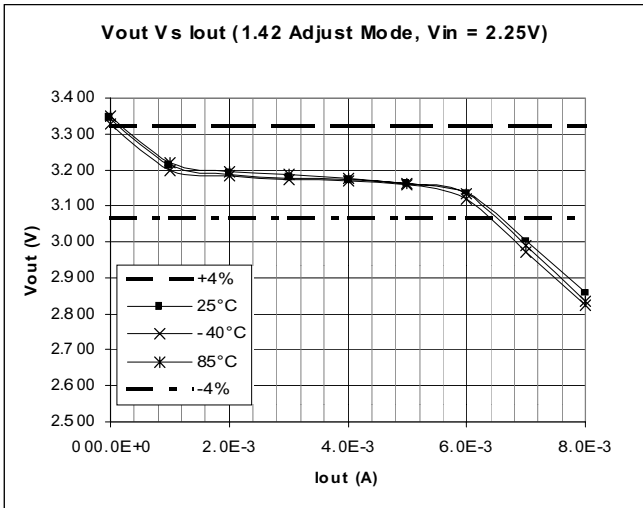
Typical Vout vs Iout
1.515 Mode Vin = 2.50V



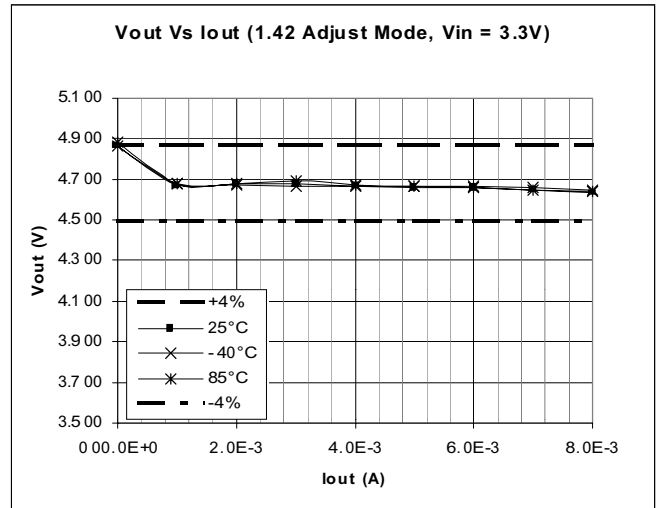
Typical Vout vs Iout
1.515 Mode Vin = 3.63V

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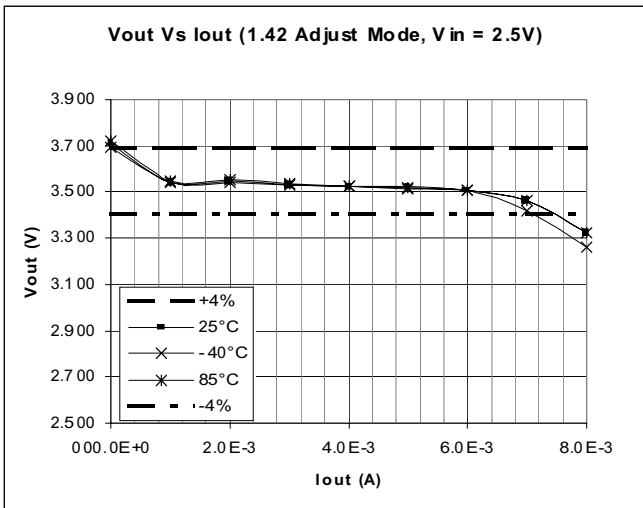
Typical Characteristics



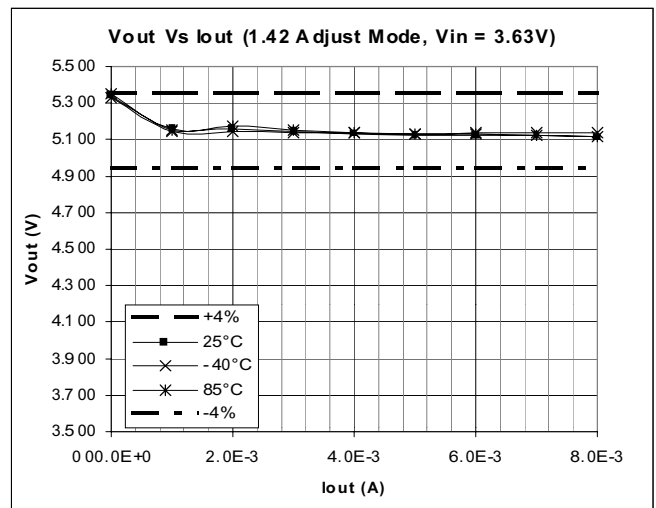
Typical Vout vs Iout
Adjust Mode = 1.42 * Vin Vin = 2.25V



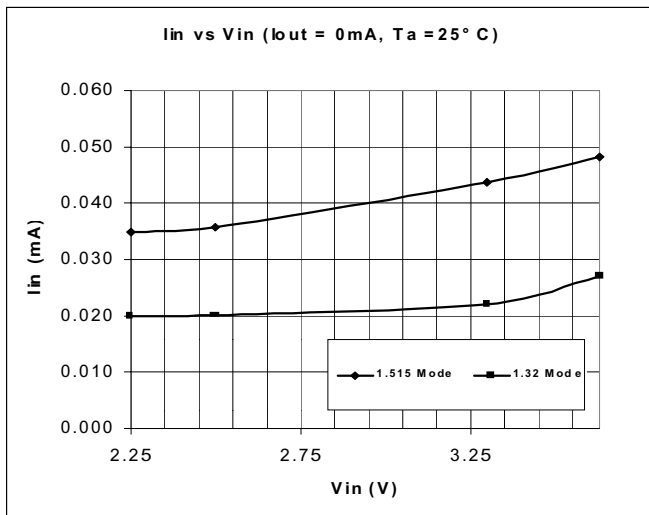
Typical Vout vs Iout
Adjust Mode = 1.42 * Vin Vin = 3.30V



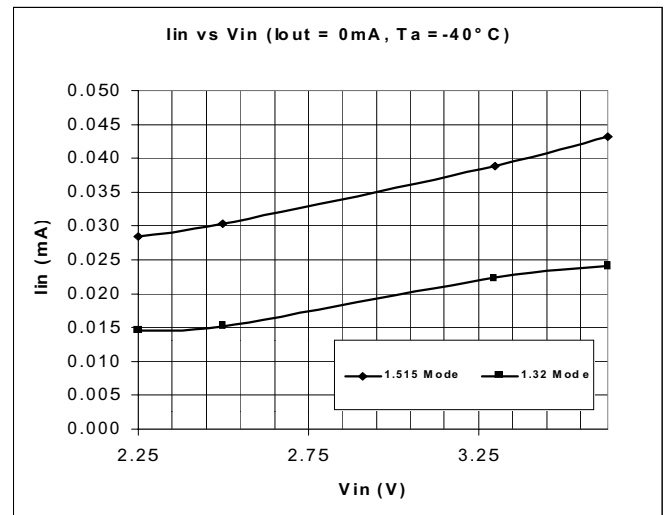
Typical Vout vs Iout
Adjust Mode = 1.42 * Vin Vin = 2.50V



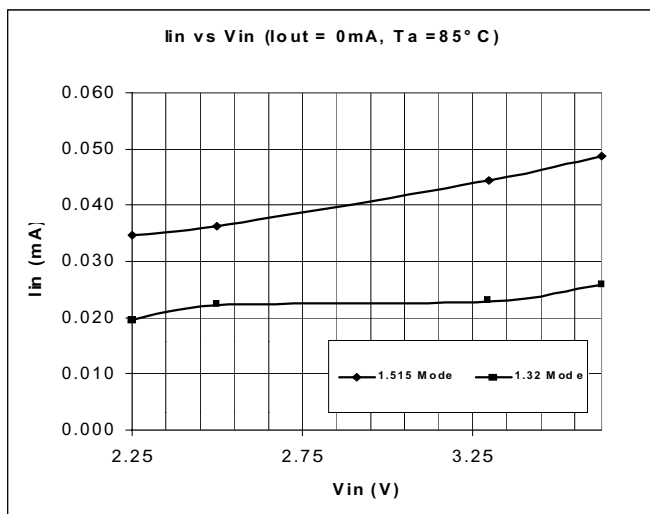
Typical Vout vs Iout
Adjust Mode = 1.42 * Vin Vin = 3.63V

POWER MANAGEMENT
Typical Characteristics


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



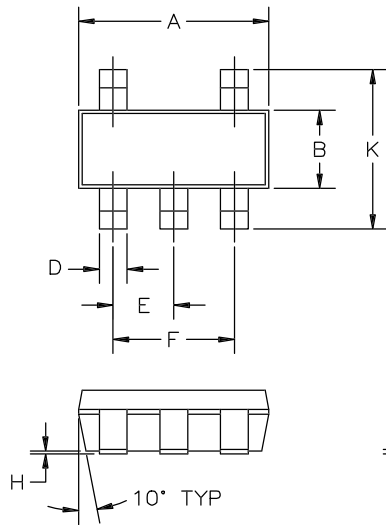
Typical Iin vs Vin
Iout = 0mA Ta = -40°C



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

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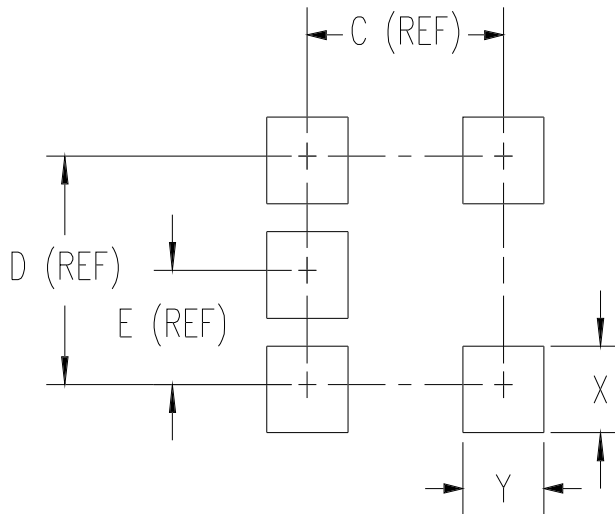
Outline Drawing - SOT-23-5L



| DIM ^N | 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 ^N | INCHES | MM | NOTE |
| C | .094 | 2.4 | — |
| D | .074 | 1.9 | — |
| E | .037 | .95 | — |
| X | .028 | .7 | — |
| Y | .039 | 1.0 | — |

Contact Information

Semtech Corporation
 Power Management Products Division
 652 Mitchell Rd., Newbury Park, CA 91320
 Phone: (805)498-2111 FAX (805)498-3804