



Modify Record :

| 版次 | 新版本 | 旧版本 | 修改单位 | 修改内容 |
|------------|-----|-----|------|----------------------|
| 2016-06-01 | 1.0 | NA | 研发部 | 新文件制成（因工程产品，故 RD 开头） |
| 2020-06-29 | 1.1 | 1.0 | 研发部 | 增加 SOT89（导电胶）封装 |
| 2020-07-28 | 1.2 | 1.1 | 研发部 | 更新 SOT23-5 脚位 |
| 2020-08-03 | 1.3 | 1.2 | 研发部 | 增加应用信息，更新联系方式 |
| 2020-08-11 | 1.4 | 1.3 | 研发部 | 增加典型性能特性 |
| 2020-08-13 | 1.5 | 1.4 | 研发部 | 增加典型应用电路，更新SOT23-5脚位 |
| 2022-10-09 | 1.6 | 1.5 | 研发部 | 更新电压 |

General Description

SE85XX series is designed for power-sensitive applications. It includes a precision and high voltage input stage, an ultra-low-power bias current branch, and results in a ultra-low-power and low-dropout linear regulator.

The SE85XX operates from an input voltage of $V_{OUT}+1V$ to 35V, consumes only 2.5 μ A of quiescent current, and offers 1% initial accuracy and low dropout voltage, 300mV typical at 100mA.

SE85XX has 1.8V, 2.8V, 3.0V, 3.3V, 3.6V, 5.0V fixed voltage versions.

Other features include short-circuit protection and thermal shutdown.

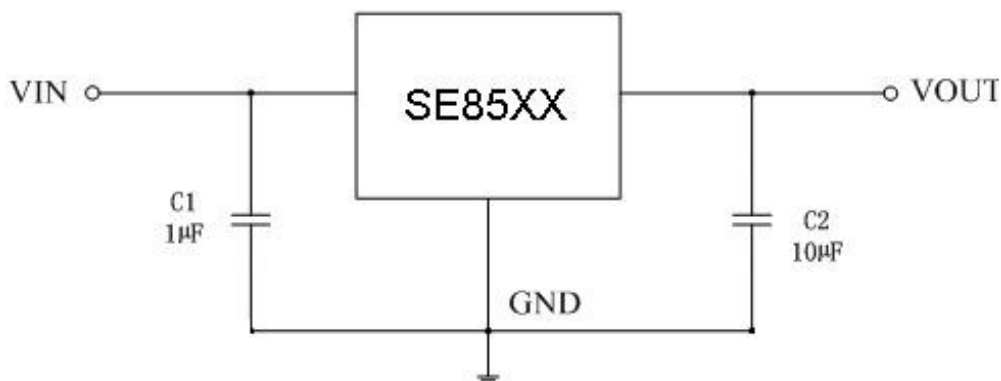
Features

- Ultra Low Quiescent Current: 2.5 μ A(Typ.)
- Wide Operating Voltage: $V_{OUT}+1V$ to 35V
- High output current: $\geq 200mA$
- System startup with no overshoot
- Short circuit protection is designed with no overshoot
- UVLO 1.8V
- Low Dropout Voltage
- High Accuracy Output Voltage: $\pm 1\%$
- Excellent power / load transient response
- Low temperature coefficient: $\pm 100ppm/^{\circ}C$
- Thermal and Short-Circuit Protection
- SOT-89、SOT-23、SOT23-5 package
- Customer Pin Assignments are available

Applications

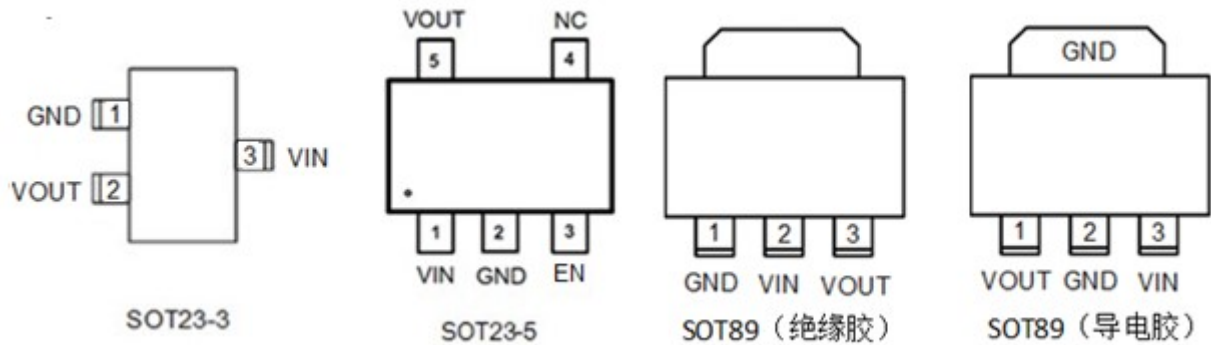
- Battery-powered Smoke sensor
- Smoke sensor
- Microcontrollers
- Household appliances and instruments

Application Diagram



Pin Configuration

(Customer pin assignments are available)

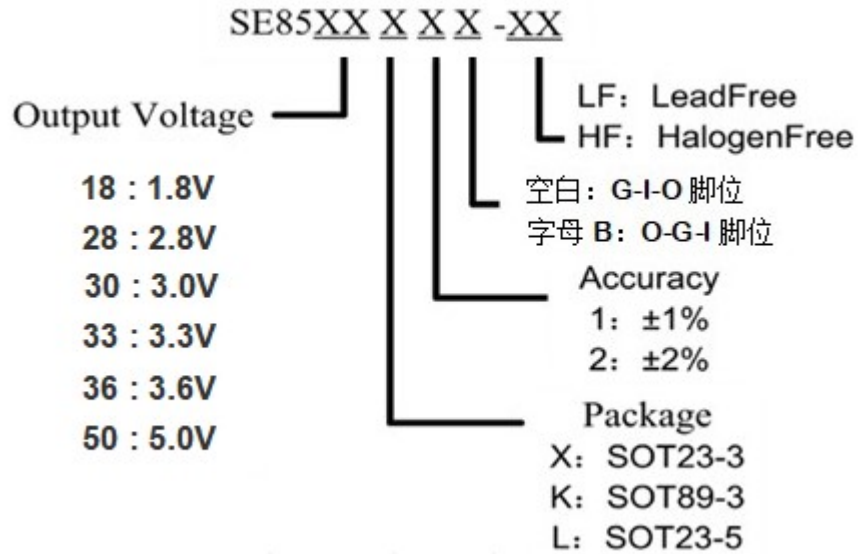


PIN Definitions

| Pin Name | Number SOT23-3 | Number SOT23-5 | Number SOT89(绝) | Number SOT89(导) | Function Description |
|----------|----------------|----------------|-----------------|-----------------|---------------------------|
| GND | 1 | 2 | 1 | 2 | Ground |
| VOUT | 2 | 5 | 3 | 1 | Output Voltage |
| VIN | 3 | 1 | 2 | 3 | Power Supply Input |
| EN | N/A | 3 | N/A | N/A | High Enable / Low Disable |
| NC | N/A | 4 | N/A | N/A | Not Connected |

Absolute Maximum Rating

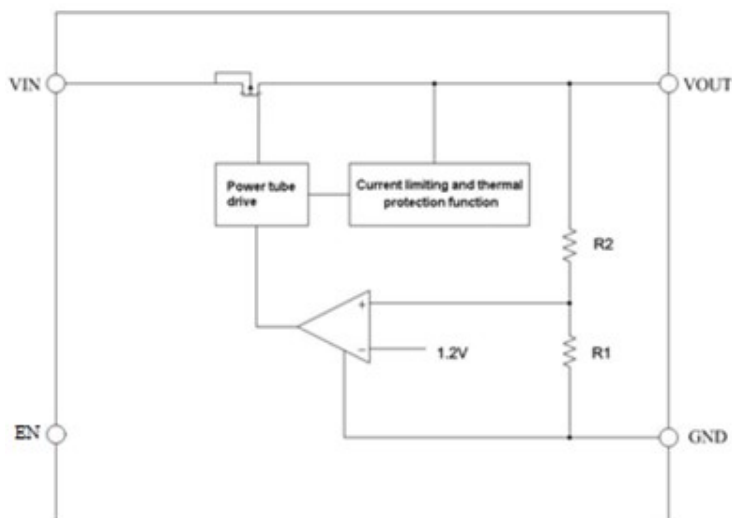
| Symbol | Parameter | Value | Units |
|--------------------------------|---|-------------|-------|
| V_{IN} | Input Supply Voltage | 40 | V |
| V_{OUT} | Output Voltage | 6 | |
| T_A | Operating Temperature | -40---105 | °C |
| T_{STG} | Storage Temperature | -40---150 | |
| T_J | Maximum Junction Temperature | 150 | |
| T_{LEAD} | Lead Temperature (Soldering) 10 seconds | 260 | |
| θ_{JA} | Thermal Resistance, Junction-to-Ambient | 165(SOT89) | °C/W |
| | | 280(SOT23) | |
| P_D | Power Consumption | 750 (SOT89) | mW |
| | | 250 (SOT23) | |
| Electrostatic discharge rating | Human Body Model (HBM) | 4 | kV |
| | Charged Device Model (MM) | 100 | V |

Ordering Information


| Part Number | Marking Information | Package | Specs | Packing | Remarks |
|------------------|---------------------|---------|-----------------------------------|---|--|
| SE85XX XXX-HF | <u>85XXz</u> | SOT23-3 | 3K/disc, 30K/box, 120K/case | Tape On Reel, 7-inch plastic disc in vacuum- sealed aluminum bag, with discant inserted. | Number Underline: year; XX means Voltage; z means week; YY means year; WW means week; HF: Halogen Free. |
| | <u>85XXz</u> | SOT23-5 | 1K/disc, 10K/box, 40K/case | | |
| | SE85XX YYWW-HF | SOT89 | | | |

Operating Rating

| Parameter | Value | Units |
|---|------------------------|--------------|
| Operating Temperature | -20 $^{\circ}$ C ~ 85 | $^{\circ}$ C |
| Storage Temperature | -40 $^{\circ}$ C ~ 125 | $^{\circ}$ C |
| Lead Temperature (Soldering) 10 seconds | 260 \pm 5 | $^{\circ}$ C |

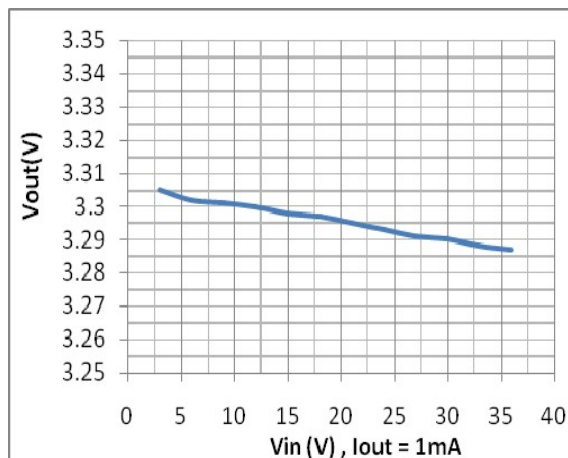
Block Diagram


Electrical Characteristics

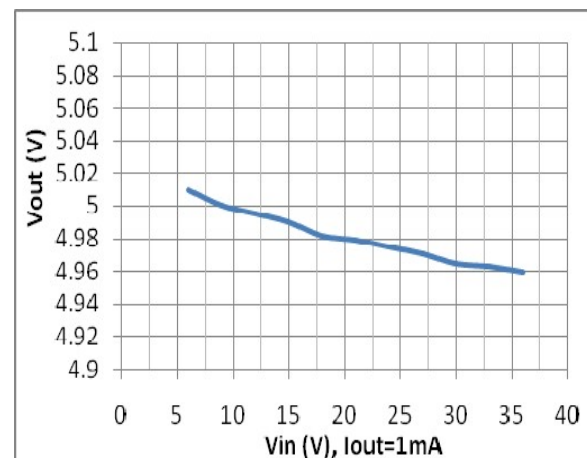
($V_{IN}=V_{OUT}+1V$; $T_j=25^{\circ}C$ unless otherwise noted.)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|--|---|-----|------|-----|--------|
| V_{IN} | Input Supply Voltage | | 1.8 | | 36 | V |
| V_{OUT} | Output Voltage Accuracy | $I_{OUT}=10mA$ | -1% | | 1% | V |
| | | | -2% | | 2% | V |
| I_Q | Quiescent Current | | | 2.5 | 6.0 | μA |
| I_{OUT} | Output Current | | 200 | 250 | | mA |
| V_{DROP} | Dropout Voltage | $I_{OUT}=10mA$ $\Delta V_{OUT} = -V_{OUT} * 2\%$ | | 30 | | mV |
| | | $I_{OUT}=100mA$ $\Delta V_{OUT} = -V_{OUT} * 2\%$ | | 300 | | mV |
| | | $I_{OUT}=200mA$ $\Delta V_{OUT} = -V_{OUT} * 2\%$ | | 600 | | mV |
| V_{LR} | Load Regulation | $1mA \leq I_{OUT} \leq 100mA$ | | 40 | | mV |
| V_{SR} | Line Regulation | $I_{OUT}=1mA$, $V_{IN}=(V_{OUT}+1V)$ to 30V | | 0.02 | | %/V |
| PSRR | Power Supply Rejection Ratio | $V_{in}=12V$, $I_{out}=10mA$ $F=1KHz, V_{out}=3.3V$ | — | 80 | — | dB |
| V_{ENH} | Enable High Level | Enabled | 1 | — | — | V |
| V_{ENL} | Enable Low Level | Disabled | | — | 0.4 | V |
| I_{EN} | EN Current | $EN=0 \sim V_{IN}(R_{EN}=100K)$ | | 1 | | μA |
| I_{LIMIT} | Current Limit | $V_{IN}=(V_{OUT}+1V)$ to 30V $R_{LOAD}=V_{OUT}/1A$ | | 450 | | mA |
| T_{SHDN} | Thermal Protection | | | 150 | | °C |
| TC_{VOUT} | Output Voltage Temperature Coefficient | $I_{OUT}=10mA$ $-40^{\circ}C \leq T_{AMB} \leq 100^{\circ}C$ | | ±100 | | ppm/°C |

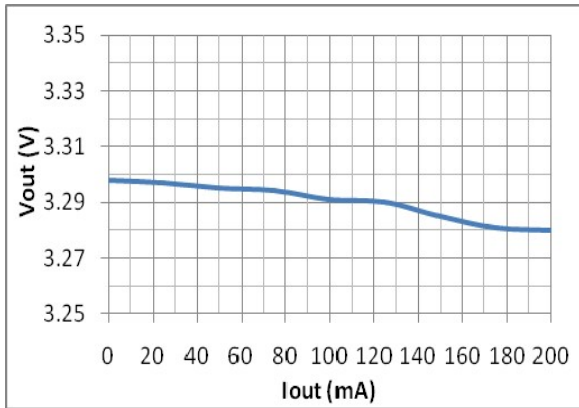
Typical Performance Characteristics



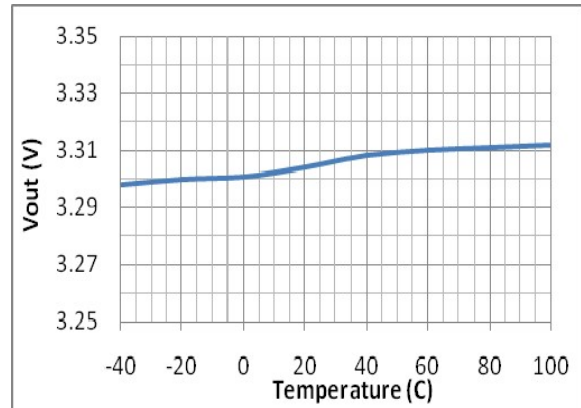
$V_{OUT}: 3.3V$



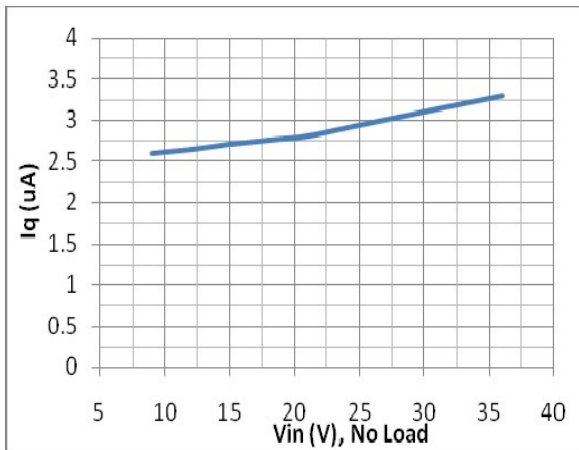
$V_{OUT}: 5.0V$



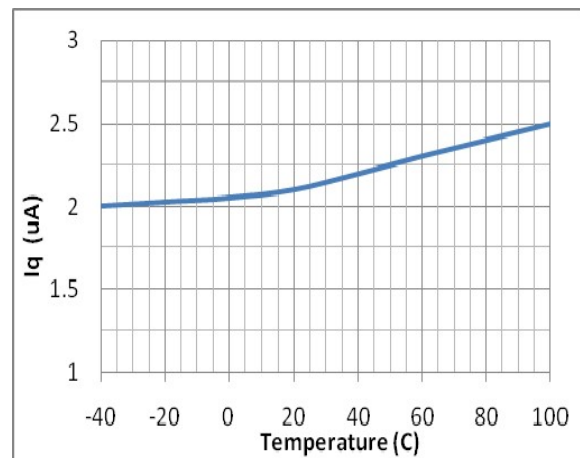
V_{OUT}: 3.3V



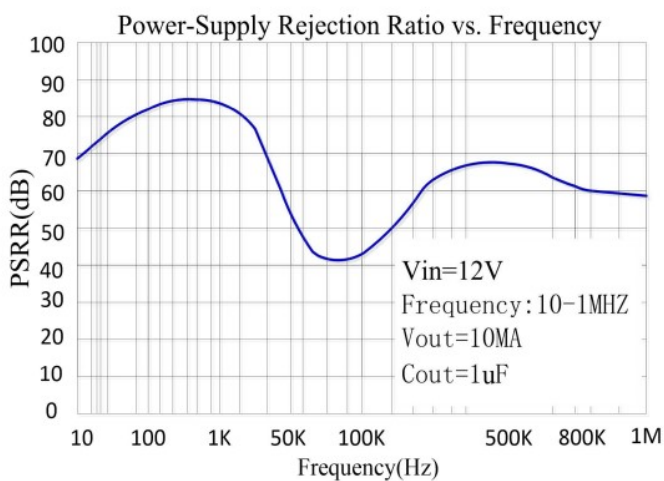
V_{OUT}: 3.3V



V_{OUT}: 3.3V

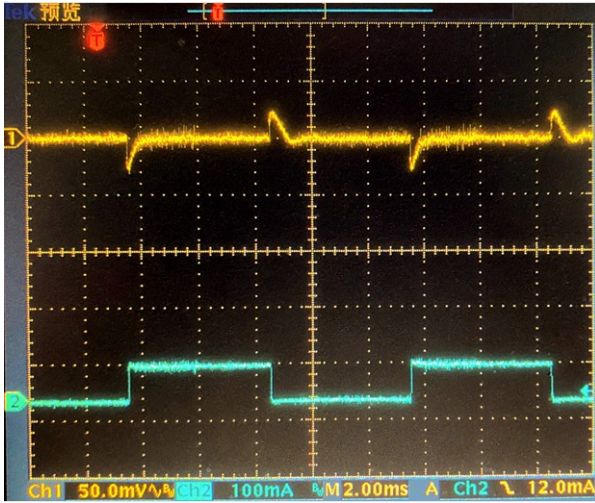


V_{OUT}: 5.0V



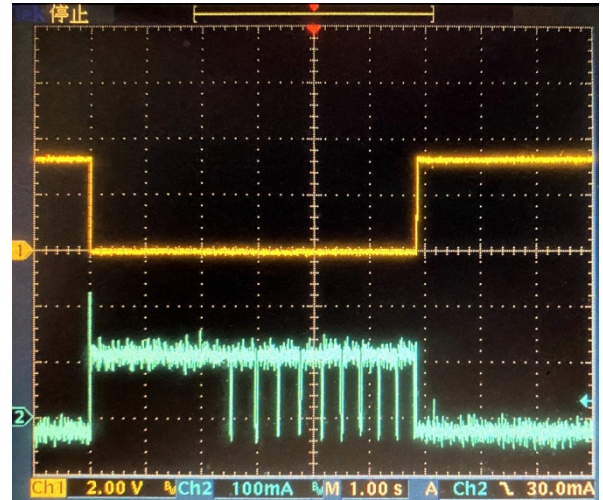


Load Transient ($V_{in}=12V$)
10mA~100mA

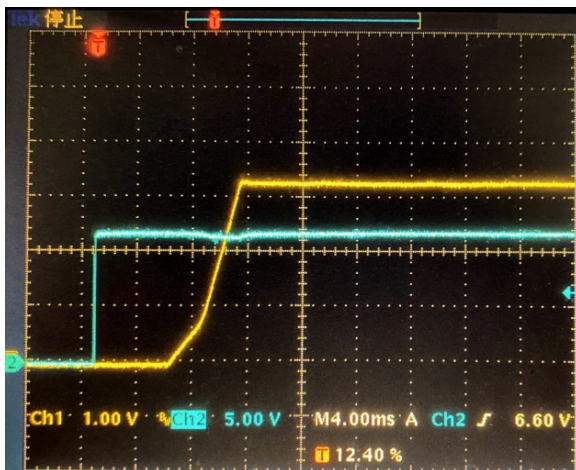


EN OFF \rightarrow ON

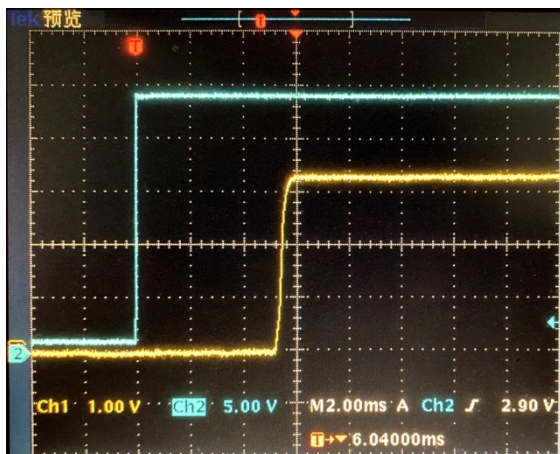
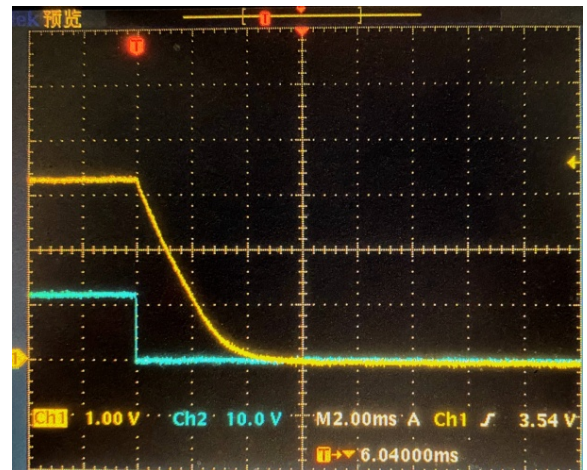
Short-Circuit and OTP ($V_{in}=24V$)



EN ON \rightarrow OFF (No Load)
Discharge



VCC Power ON



APPLICATION INFORMATION

INPUT CAPACITOR

An input ceramic capacitor of 1 μ F is required between the VIN and GND pin. The capacitor shall be placed as close as possible to VIN pin, and the wide copper trace is also recommended.

OUTPUT CAPACITOR

The recommended is 10 μ F ceramic capacitor. The minimum capacitance for stable and correct operation is 1 μ F. The higher the value of this output capacitor, the lower the ripple during the operations. The output capacitor should be placed as close to the Output Pin as possible. The wide copper trace is recommended.

NO-LOAD STABILITY

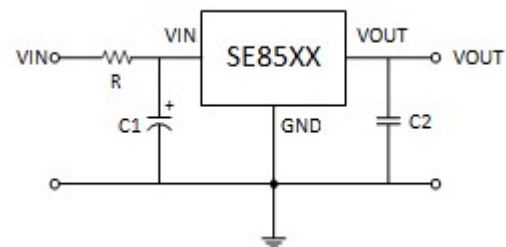
The SE85XX will remain stable and in regulation with no external load. This is especially important in CMOS RAM keep-alive applications.

FOLD-BACK SHORT-CIRCUIT PROTECTION

When short-circuit occurs, SE85XX will fold back the short-circuit currents to a pre-determined lower level, This will reduce excessive heat in otherwise large current conditions. This feature provides another level of protection to IC itself and also the whole system.

IN-RUSH CURRENT AND VOLTAGE

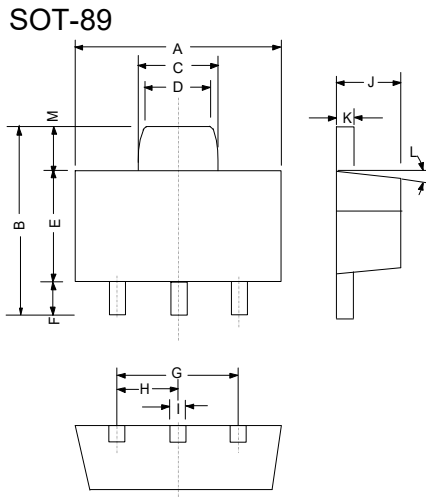
The following figure shows a typical application circuit for the SE85XX devices. Please keep in mind that in-rush current can push up the Vin overshoot by as much as 50%. For example, when Vin=30V, the in-rush caused spike voltage can be as high as 45V. Therefore the voltage rating of Cin needs to be higher than 50% of the application.



In live insertion application, it is suggested that R, C1 are selected as following:

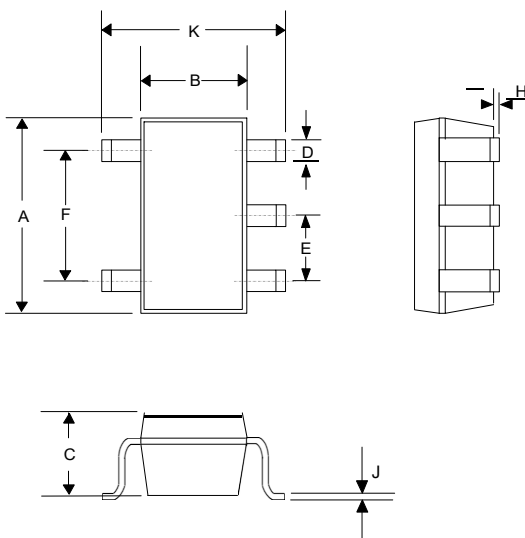
1. C1=10 μ F ~ 100 μ F ceramic or electrolytic capacitor with maximum voltage greater than 50V, R=0
2. If the average current is known, for example a t 10mA, then for an input voltage of 20V, the C1 =1 μ F ~ 10 μ F ceramic or electrolytic with maximum voltage greater than 40V and R=1K Ω in the type of 1206 at 1/4W rating can be selected.

Outline Drawing for SOT-89



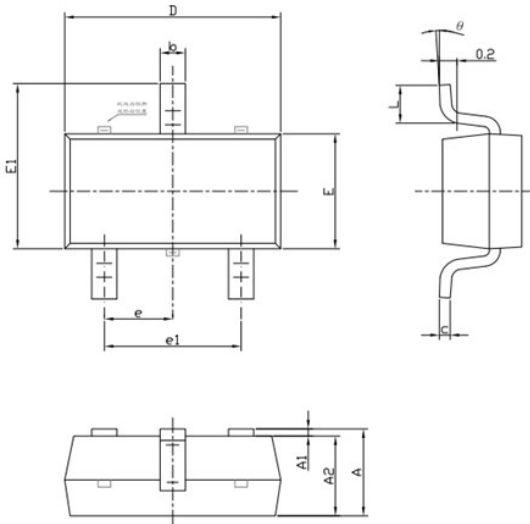
| DIMENSIONS | | | | |
|------------------|----------|-------|----------|-------|
| DIM ^N | INCHES | | MM | |
| | MIN | MAX | MIN | MAX |
| A | 0.173 | 0.181 | 4.400 | 4.600 |
| B | 0.159 | 0.167 | 4.050 | 4.250 |
| C | 0.067 | 0.075 | 1.700 | 1.900 |
| D | 0.051 | 0.059 | 1.300 | 1.500 |
| E | 0.094 | 0.102 | 2.400 | 2.600 |
| F | 0.035 | 0.047 | 0.890 | 1.200 |
| G | 0.118REF | | 3.00 REF | |
| H | 0.059REF | | 1.50 REF | |
| I | 0.016 | 0.020 | 0.400 | 0.520 |
| J | 0.055 | 0.063 | 1.400 | 1.600 |
| K | 0.014 | 0.016 | 0.350 | 0.410 |
| L | 10 °TYP | | 10 °TYP | |
| M | 0.028REF | | 0.70 REF | |

Outline Drawing for SOT-23-5



| DIMENSIONS | | | | |
|------------------|--------|-------|-------|------|
| DIM ^N | INCHES | | MM | |
| | MIN | MAX | MIN | MAX |
| A | 0.110 | 0.120 | 2.80 | 3.05 |
| B | 0.059 | 0.070 | 1.50 | 1.75 |
| C | 0.036 | 0.051 | 0.90 | 1.30 |
| D | 0.014 | 0.020 | 0.35 | 0.50 |
| E | - | 0.037 | - | 0.95 |
| F | - | 0.075 | - | 1.90 |
| H | - | 0.006 | - | 0.15 |
| J | 0.0035 | 0.008 | 0.090 | 0.20 |
| K | 0.102 | 0.118 | 2.60 | 3.00 |

Outline Drawing for SOT-23-3



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|----------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E | 1.500 | 1.700 | 0.059 | 0.067 |
| E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |

Customer Support

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