

## High Voltage, Low Power LDO

### DESCRIPTION

The SUM3575 is a high voltage, low power consumption and high performance LDO. The family uses an advanced CMOS process and a PMOSFET pass device to achieve fast start-up, with high output voltage accuracy. The SUM3575 is stable with a 1.0  $\mu\text{F}$  ~ 10  $\mu\text{F}$  ceramic output capacitor, and uses a precision voltage reference and feedback loop to achieve a worst-case accuracy of 2% over all load, line, process, and temperature variations.

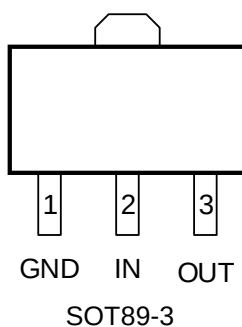
### FEATURES

- Wide Input Voltage Range: up to 18 V
- Output Current: 200 mA
- Standard Fixed Output Voltage: 3.3 V
- Other Output Voltage Options Available on Request
- Low IQ: 1.5  $\mu\text{A}$
- Low Dropout Voltage
- Short current protection: 100 mA
- Excellent Load / Line Transient Response
- Line Regulation: 0.01 %/V typical
- Package: SOT89-3

### ORDER INFORMATION

| Model   | Package | Ordering Number | Packing Option      |
|---------|---------|-----------------|---------------------|
| SUM3575 | SOT89-3 | SUM3575-33P     | Tape and Reel, 1000 |

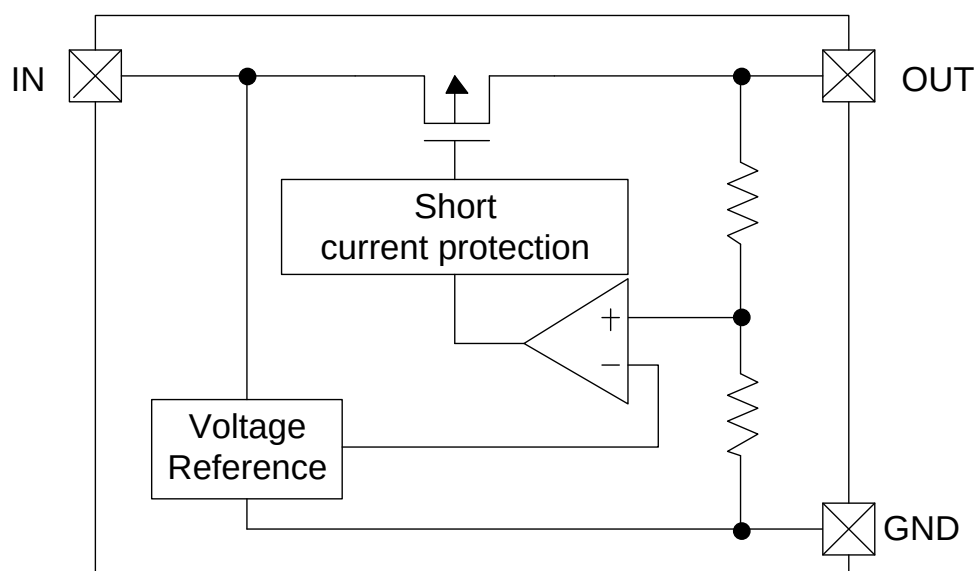
## PIN CONFIGURATION(TOP VIEW)



## PIN DESCRIPTIONS

| Pin | Symbol | Description                                                                                       |
|-----|--------|---------------------------------------------------------------------------------------------------|
| 1   | GND    | Ground.                                                                                           |
| 2   | IN     | Supply input pin. Must be closely decoupled to GND with a 1 $\mu$ F or greater ceramic capacitor. |
| 3   | OUT    | Output pin. Bypass a 1 $\mu$ F or greater ceramic capacitor from this pin to ground.              |

## BLOCK DIAGRAM



## FUNCTIONAL DESCRIPTION

### Input Capacitor

A 1  $\mu\text{F}$  – 10  $\mu\text{F}$  ceramic capacitor is recommended to connect between  $V_{\text{IN}}$  and GND pins to decouple input power supply glitch and noise. The amount of the capacitance may be increased without limit. This input capacitor must be located as close as possible to the device to assure input stability and less noise. For PCB layout, a wide copper trace is required for both  $V_{\text{IN}}$  and GND.

### Output Capacitor

An output capacitor is required for the stability of the LDO. The recommended output capacitance is from 1  $\mu\text{F}$  to 10  $\mu\text{F}$ , Equivalent Series Resistance (ESR) is from 5 m $\Omega$  to 100 m $\Omega$ , and temperature characteristics are X7R or X5R. Higher capacitance values help to improve load/line transient response. The output capacitance may be increased to keep low undershoot / overshoot. Place output capacitor as close as possible to OUT and GND pins.

### Low Quiescent Current

The SUM3575, consuming only 1.5  $\mu\text{A}$  for all input range or output loading, provides great power saving in portable and low power applications.

### Short Current Limit Protection

When output current at the OUT pin is higher than current limit threshold or the OUT pin is short-circuit to GND, the short current limit protection will be triggered and clamp the output current to approximately 100 mA to prevent over-current and to protect the regulator from damage due to overheating.

## RECOMMENDED OPERATING CONDITIONS

| Parameter                   | Rating     | Unit |
|-----------------------------|------------|------|
| Operating Temperature Range | -40 to +85 | °C   |

## ABSOLUTE MAXIMUM RATINGS

| Parameter                                | Rating                 |     | Unit   |
|------------------------------------------|------------------------|-----|--------|
| IN pin to GND pin                        | -0.3 to 22             |     | V      |
| OUT pin to GND pin                       | -0.3 to 6              |     | V      |
| Thermal Resistance (Junction to Ambient) | SOT89-3                | 135 | °C/W   |
| Junction Temperature                     | 150                    |     | °C     |
| Storage Temperature                      | -65 to 150             |     | °C     |
| Lead Temperature (Soldering, 10 sec)     | 300                    |     | °C     |
| ESD (HBM mode)                           | ESDA/JEDEC JS-001-2017 |     | ±6000V |

### NOTE:

Stresses beyond those listed under “ABSOLUTE MAXIMUM RATINGS” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## CAUTION

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. SUMSEMI recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications. SUMSEMI reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact SUMSEMI sales office to get the latest datasheet.

## ELECTRICAL CHARACTERISTICS

$V_{IN} = V_{OUT} + 2\text{ V}$ ,  $T_A = 25^\circ$ ,  $C_{IN} = 10\text{ }\mu\text{f}$ ,  $C_{OUT} = 10\text{ }\mu\text{f}$  unless otherwise noted.

| Parameter                      | Symbol              | Test Conditions                                                                                                                | Min                   | Typ  | Max                   | Unit                |
|--------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-----------------------|---------------------|
| Input Voltage Operation Range  | $V_{IN}$            |                                                                                                                                |                       |      | 18                    | V                   |
| Dropout Voltage                | $V_{DROP}$          | $V_{OUT} = 3.3\text{ V}$ , $I_{OUT} = 150\text{ mA}$                                                                           |                       | 820  |                       | mV                  |
|                                |                     | $V_{OUT} = 3.3\text{ V}$ , $I_{OUT} = 100\text{ mA}$                                                                           |                       | 520  |                       |                     |
| DC Supply Quiescent Current    | $I_Q$               |                                                                                                                                |                       | 1.5  | 3                     | $\mu\text{A}$       |
| Regulated Output Voltage       | $V_{OUT}$           | $I_{OUT} = 1\text{ mA}$                                                                                                        | $V_{OUT} \times 0.98$ |      | $V_{OUT} \times 1.02$ | V                   |
| Output Voltage Line Regulation | $\text{Reg}_{LINE}$ | $V_{IN} = V_{OUT} + 1\text{ V to }18\text{ V}$ ,<br>$I_{OUT} = 10\text{ mA}$<br>( $\Delta V_{OUT} / \Delta V_{IN} / V_{OUT}$ ) |                       | 0.01 | 0.04                  | %/V                 |
| Output Voltage Load Regulation | $\text{Reg}_{LOAD}$ | $I_{OUT}$ from 1 mA to 150 mA<br>$V_{IN} = V_{OUT} + 2\text{ V}$                                                               |                       | 5    | 20                    | mV                  |
|                                |                     | $I_{OUT}$ from 1 mA to 150 mA<br>$V_{IN} = 10\text{ V}$                                                                        |                       | 25   | 60                    | mV                  |
| Maximum Output Current         | $I_{OUT}$           | $V_{IN} = V_{OUT} + 2\text{ V}$                                                                                                | 200                   |      |                       | mA                  |
| Short Current Protection       | $I_{SHORT}$         | OUT short to GND                                                                                                               |                       | 100  |                       | mA                  |
| Power Supply Rejection Ratio   | PSRR                | $f = 1\text{ kHz}$ , $C_{OUT} = 1\text{ }\mu\text{F}$<br>$I_{OUT} = 20\text{ mA}$ ,                                            |                       | 55   |                       | dB                  |
|                                |                     | $f = 10\text{ kHz}$ , $C_{OUT} = 1\text{ }\mu\text{F}$<br>$I_{OUT} = 30\text{ mA}$ ,                                           |                       | 75   |                       |                     |
| Output Noise                   | $e_N$               | 10 Hz to 100 kHz,<br>$I_{OUT} = 30\text{ mA}$                                                                                  |                       | 90   |                       | $\mu\text{V}_{RMS}$ |

## TYPICAL PERFORMANCE CHARACTERISTICS

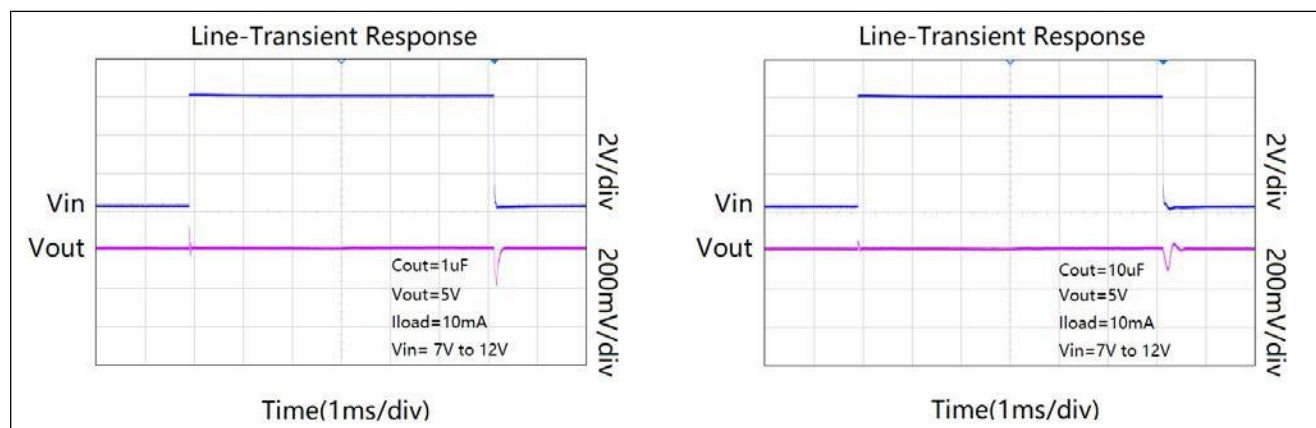


Fig1. Line-Transient Response

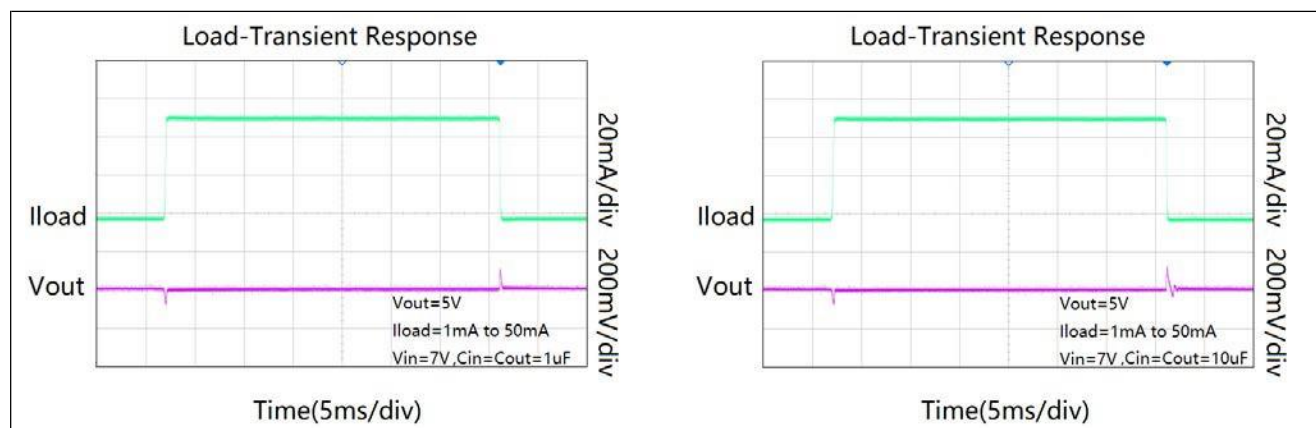


Fig2. Load-Transient Response

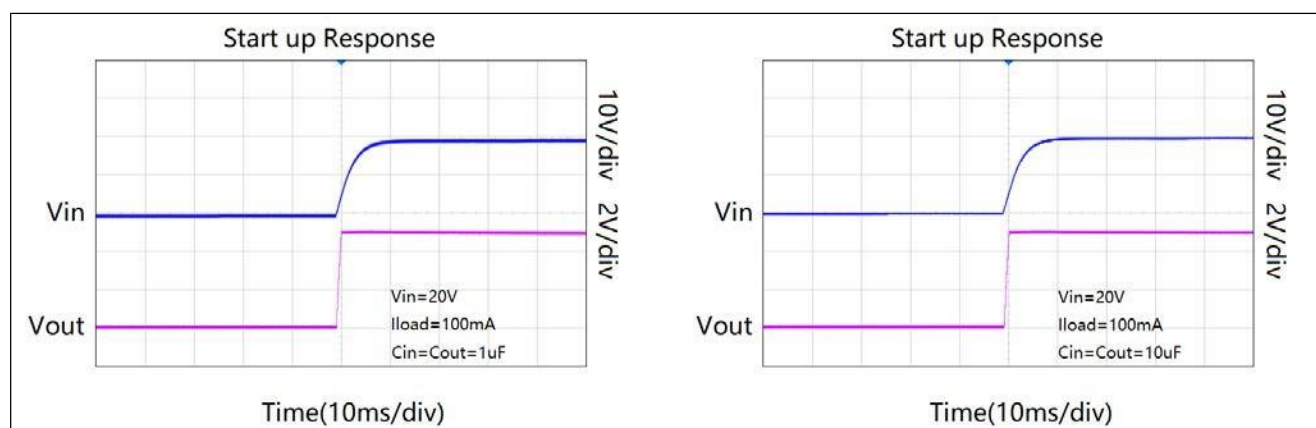


Fig3. Start up Response

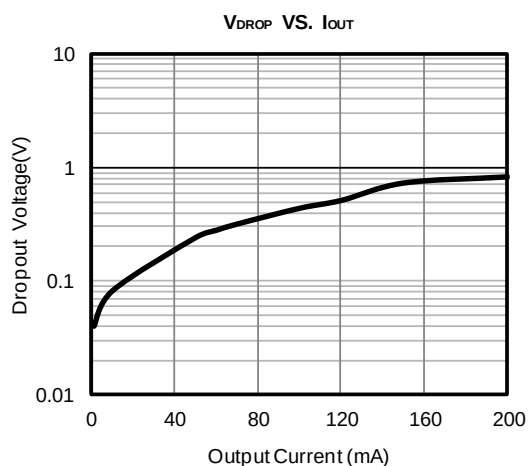


Fig4. Dropout Voltage VS Output Current

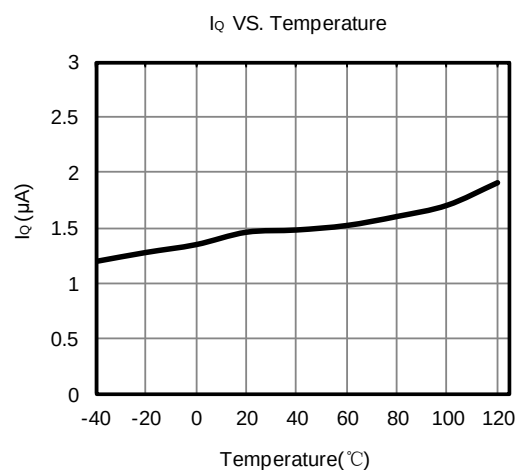
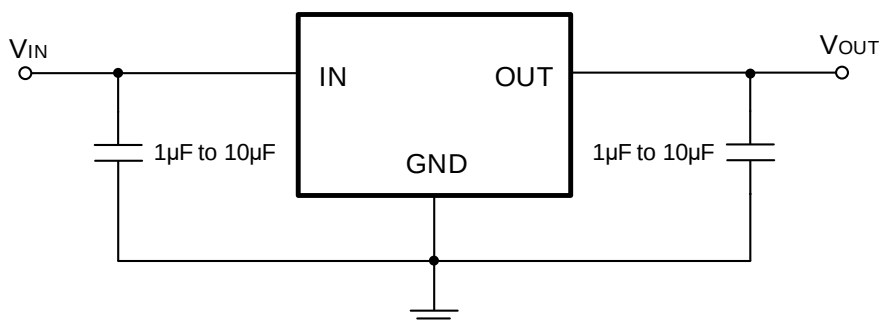


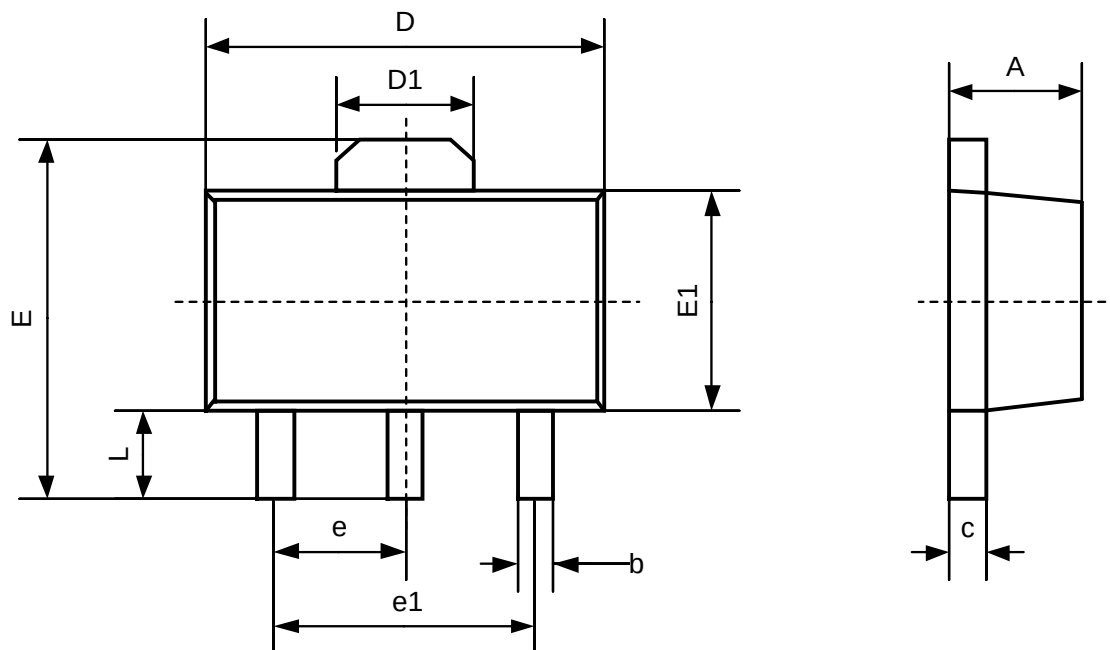
Fig5. DC Supply Quiescent Current VS Temperature

## APPLICATION CIRCUITS



## PACKAGE OUTLINE

### SOT89-3



| Symbol | Dimensions In Millimeters |      |
|--------|---------------------------|------|
|        | Min                       | Max  |
| A      | 1.40                      | 1.60 |
| b      | 0.32                      | 0.52 |
| c      | 0.35                      | 0.44 |
| D      | 4.40                      | 4.60 |
| D1     | 1.55BSC                   |      |
| E      | 3.94                      | 4.25 |
| E1     | 2.30                      | 2.60 |
| e      | 1.50BSC                   |      |
| e1     | 3.00BSC                   |      |
| L      | 0.90                      | 1.20 |
| θ      | 0°                        | 8°   |

V 1.0