## GENERAL DESCRIPTION

The CM2862 family is a positive voltage linear regulator developed utilizing CMOS technology featured low quiescent current (30µA typ.), low dropout voltage, and high output voltage accuracy. Built-in low on-resistance transistor provides low dropout voltage and large output current. A 2.2µF or greater can be used as an output capacitor.

The SOT-89 packages are attractive for “Pocket” and “Hand Held” applications.

These robust devices are designed to prevent device failure under the worst operation condition with both Thermal Shutdown and Current Fold-back.

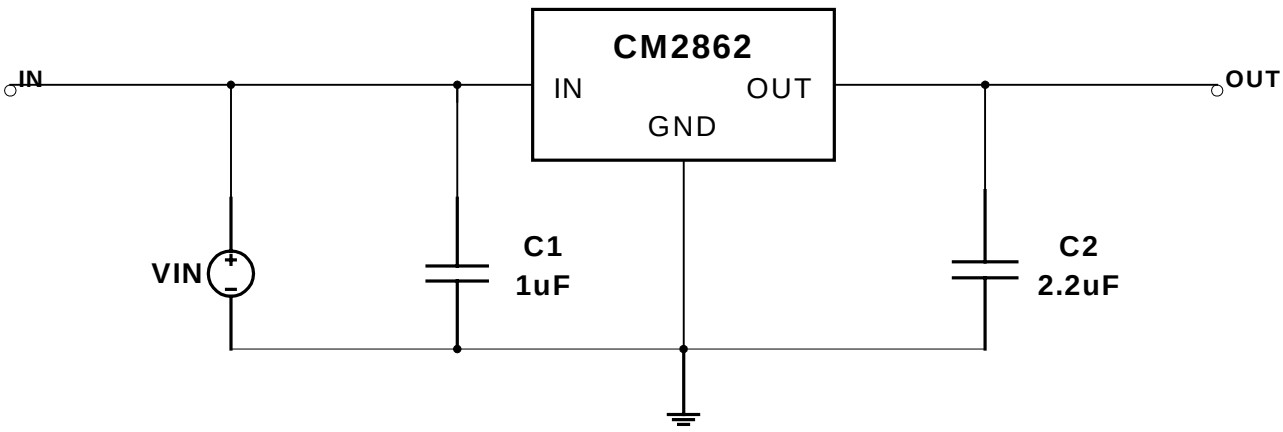
## FEATURES

- Very Low Dropout Voltage
- Low Current Consumption: Typ. 30µA, Max. 35µA
- High Accuracy Output Voltage: +/- 1.5%
- Guaranteed 600mA Output
- Thermal Shutdown
- Current Limiting
- Compact Package: SOT-89
- Factory Pre-set Output Voltages
- Short Circuit Current Fold-Back
- Low Temperature Coefficient

## APPLICATIONS

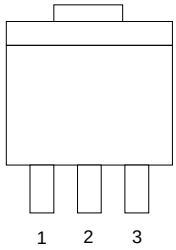
- Battery-powered devices
- Personal communication devices
- Home electric/electronic appliances
- PC peripherals

## TYPICAL APPLICATIONS



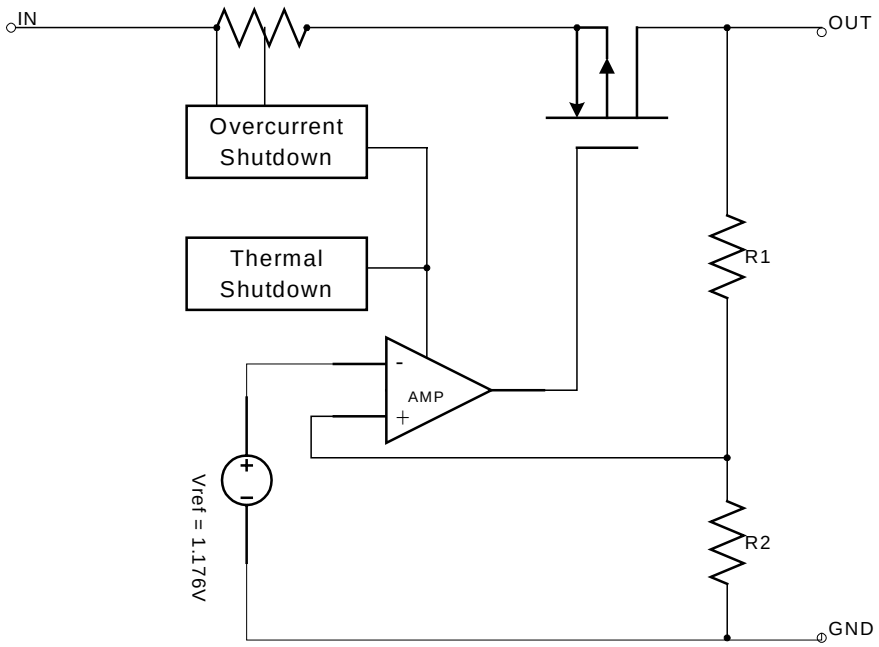
## PIN CONFIGURATION

SOT-89
Top View




| | 2862 |
|---|---|
| Pin 1 | VOUT |
| Pin 2 | GND |
| Pin 3 | VIN |

## BLOCK DIAGRAM




## ORDERING INFORMATION

| Part Number | Output Voltage | Temperature Range | Package |
|---|---|---|---|
| CM2862KIM89 | 2.5V | -40℃ ~ +85℃ | SOT-89 |
| CM2862SIM89 | 3.3V | -40℃ ~ +85℃ | SOT-89 |

**Note: For other pre-set output voltage, please contact Champion Sales office.**

## ABSOLUTE MAXIMUM RATINGS

Input Voltage ..... +7V
Output Current ..... 1A
Output Voltage ..... GND-0.3V to $V_{IN}$+0.3V
ESD Classification ..... B

## OPERATING RATINGS

Supply Voltage ..... 4.5V to 5.5V
Ambient Temperature Range ($T_A$) ..... -40℃ to +85℃
Junction Temperature Range ..... -40℃ to +125℃

## THERMAL INFORMATION

| Parameter | | Maximum | Unit |
|---|---|---|---|
| Thermal Resistance ($\Theta_{jc}$) | SOT-89 | 100 | ℃/W |
| Thermal Resistance ($\Theta_{ja}$) | SOT-89 | 180 | ℃/W |
| Internal Power Dissipation ($P_D$) ($\Delta T$ = 100℃, No Heatsink) | SOT-89 | 400 | mW |
| Maximum Junction Temperature | | 150 | ℃ |
| Maximum Lead Temperature (10 Sec) | | 300 | ℃ |

## ELECTRICAL CHARACTERISTICS

$T_A$ = +25℃; $V_{IN}$ = $V_{IN(MIN)}$ unless otherwise noted

| Parameter | Symbol | Test Conditions | | CM2862 Min. | CM2862 Typ. | CM2862 Max. | Unit |
|---|---|---|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | | | Note 1 | | 7 | V |
| Output Voltage Accuracy | $V_{OUT}$ | $I_O$ = 1mA | | -1.5 | | 1.5 | % |
| Dropout Voltage | $V_{DROPOUT}$ | $I_O$ = 600mA, $V_{OUT}$=$V_{O(NOM)}$-1.5%, | 1.5V<$V_{O(NOM)}$<=2.0V | | | 1000 | mV |
| | | | 2.0V<$V_{O(NOM)}$<=2.8V | | | 800 | |
| | | | 2.8V<$V_{O(NOM)}$<3.8V | | | 600 | mV |
| Output Current | $I_O$ | $V_{OUT}$ > 1.2V | | 600 | | | mA |
| Current Limit | $I_{LIM}$ | $V_{OUT}$ > 1.2V, $V_{IN}$ = $V_{IN(MIN)}$ | | 600 | 1000 | | mA |
| Short Circuit Current | $I_{SC}$ | $V_{OUT}$ < 0.8V | | | 250 | | mA |
| Quiescent Current | $I_Q$ | $I_O$ = 0mA | | | 30 | 50 | μA |
| Ground Pin Current | $I_{GND}$ | $I_O$ = 1mA to 600mA | | | 30 | 50 | μA |
| Line Regulation | $REG_{LINE}$ | $I_{OUT}$=5mA, $V_{IN}$=$V_{OUT}$+1 to $V_{OUT}$+2 | $V_{OUT}$ <= 2.0V | | | 0.15 | % |
| | | | $V_{OUT}$ > 2.0V | | 0.02 | 0.1 | % |
| Load Regulation | $REG_{LOAD}$ | $I_O$=1mA to 600mA | | | 0.2 | 1 | % |
| Over Temperature Shutdown | OTS | | | | 150 | | ℃ |
| Over Temperature Hystersis | OTH | | | | 30 | | ℃ |
| $V_{OUT}$ Temperature Coefficient | TC | | | | 30 | | ppm/℃ |
| Power Supply Rejection | PSRR | $I_O$ = 100mA $C_O$=2.2μF ceramic | f=1kHz | | 50 | | dB |
| | | | f=10kHz | | 20 | | |
| | | | f=100kHz | | 15 | | |
| Output Voltage Noise | eN | f=10Hz to 100kHz $I_O$ = 10mA, $C_{VBG}$=0μF | $C_O$=2.2μF | | 30 | | μVrms |
| | | | $C_O$=100μF | | 20 | | |

**Note 1.** $V_{IN(MIN)}$ = $V_{OUT}$ + $V_{DROPOUT}$
**Note 2.** As $V_{IN}$ is larger than $V_{IN(MIN)}$, the Current Limit and output short current Spec value will increase

## DETAILED DESCRIPTION

The CM2862 family of CMOS regulators contain a PMOS pass transistor, voltage reference, error amplifier, over-current protection, thermal shutdown, and short circuit protection.

The P-channel pass transistor receives data from the error amplifier, over-current shutdown, short output protection, and thermal protection circuits. During normal operation, the error amplifier compares the output voltage to a precision reference. Over-current and Thermal shutdown circuits become active when the junction temperature exceeds 150℃, or the current exceeds 600mA. During thermal shutdown, the output voltage remains low. Normal operation is restored when the junction temperature drops below 120℃.

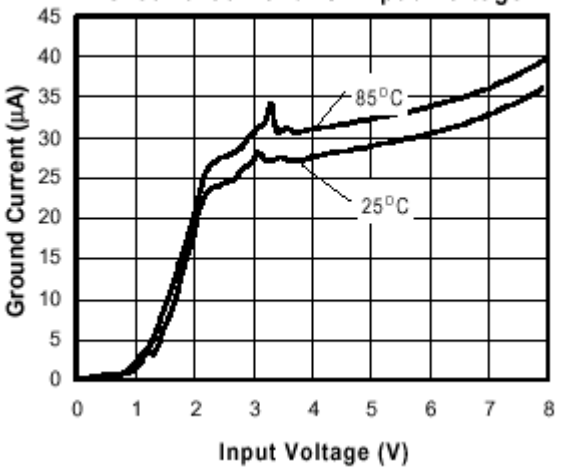
The CM2862 switches from voltage mode to current mode when the load exceeds the rated output current. This prevents over-stress. The CM2862 also incorporates current fold-back to reduce power dissipation when the output is short-circuited. This feature becomes active when the output drops below 0.8V, and reduces the current flow by 65%. Full current is restored when the voltage exceeds 0.8V.

## EXTERNAL CAPACITOR

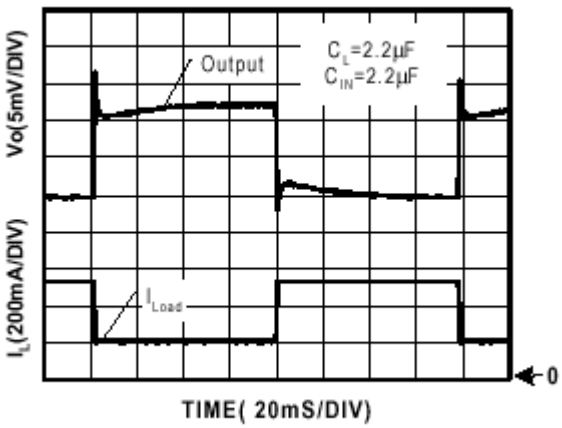
The CM2862 is stable with an output capacitor to ground of 2.2µF or greater. It can keep stable even with higher or poor ESR capacitors. A second capacitor is recommended between the input and ground to stabilize VIN. The input capacitor should be larger than 0.1µF to have a beneficial effect. All capacitors should be placed in close proximity to the pins. A “quiet” ground termination is desirable.

## TYPICAL ELECTRICAL CHARACTERISTICS

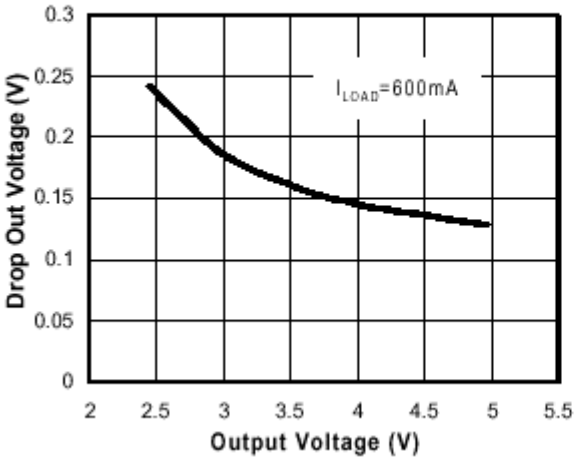
Ground Current vs. Input Voltage



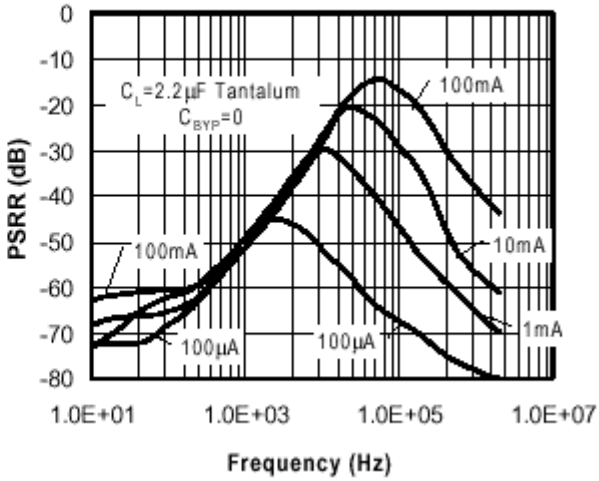

Load Step ( 1mA-300mA)



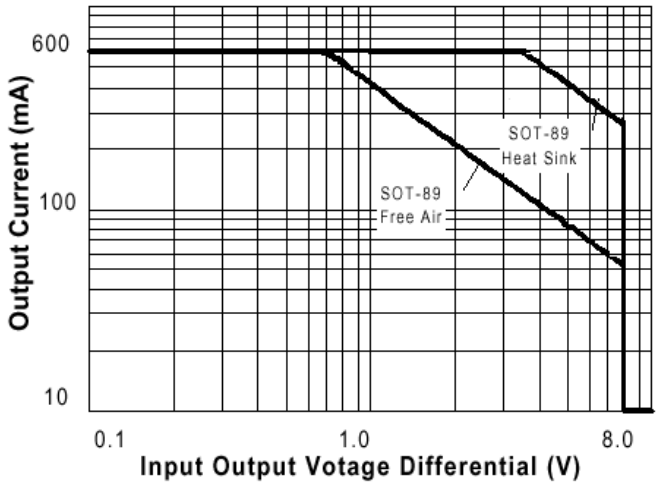

Drop Out Voltage vs. Output Voltage



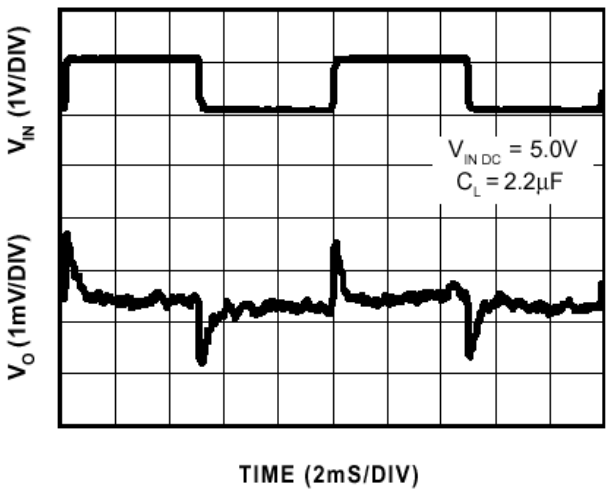

Power Supply Rejection Ratio



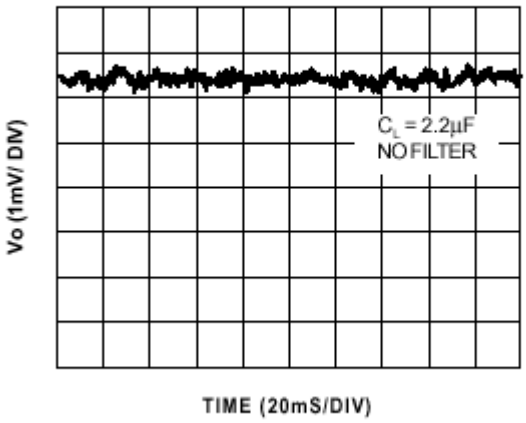

Safe Operating Area



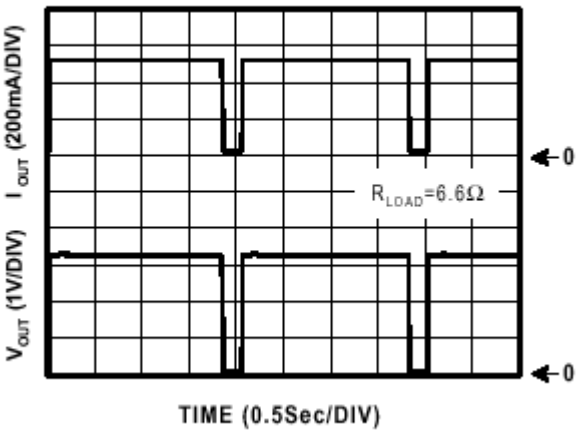

Transient Line Response



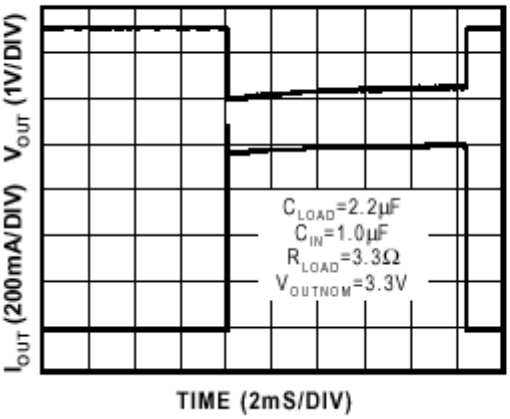
Noise Measurement



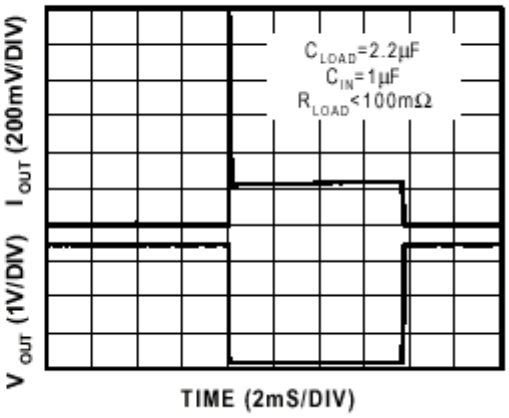

Overtemperature Shutdown




Current Limit Response

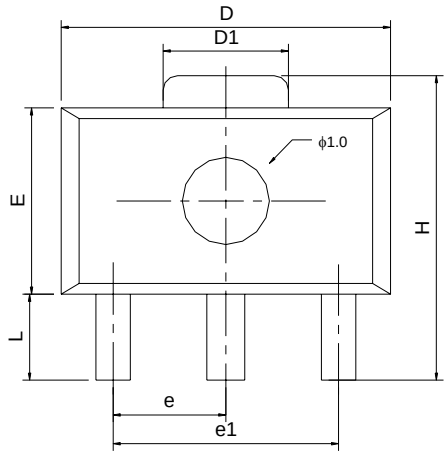


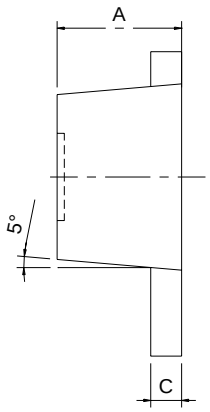

Short Circuit Response

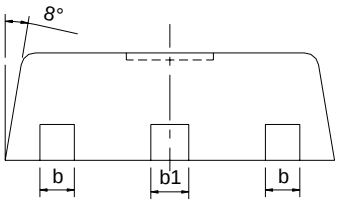


## PACKAGE DIMENSION

### SOT-89 (M89)




| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHS | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.40 | 1.50 | 1.60 | 0.055 | 0.059 | 0.063 |
| L | 0.80 | --- | 1.20 | 0.031 | --- | 0.047 |
| b | 0.36 | 0.42 | 0.48 | 0.014 | 0.016 | 0.018 |
| b1 | 0.41 | 0.47 | 0.53 | 0.016 | 0.018 | 0.020 |
| C | 0.38 | 0.40 | 0.43 | 0.014 | 0.015 | 0.017 |
| D | 4.40 | 4.50 | 4.60 | 0.173 | 0.177 | 0.181 |
| D1 | 1.40 | 1.60 | 1.75 | 0.055 | 0.062 | 0.069 |
| H | 3.94 | --- | 4.25 | 0.155 | --- | 0.167 |
| E | 2.40 | 2.50 | 2.60 | 0.094 | 0.098 | 0.102 |
| e1 | 2.90 | 3.00 | 3.10 | 0.114 | 0.118 | 0.122 |
| e | 1.45 | 1.50 | 1.55 | 0.057 | 0.059 | 0.061 |

## NUMBERING SCHEME

### Ordering Number: CM2862XYZ (note1)

**note1**:
CM2862: 600mA CMOS LDO
X : Suffix for voltage output (note 2)
Y : Suffix for Temperature Range (note 3)
Z : Suffix for Package Type (note 4)

**note 2**: see CMOS LDO Voltage Suffix Table

**note 3**:
Y= I : -40℃~+85℃ (only I grade support for all CMOS LDOs)

**note 4:**
Z is single alphabet with or without digits
M89 : SOT-89 (TR only)

**CMOS LDO Voltage Suffix Table**

| Output Voltage | Suffix | Output Voltage | Suffix |
|---|---|---|---|
| 1.5V | A | 3.0V | P |
| 1.6V | B | 3.1V | Q |
| 1.7V | C | 3.2V | R |
| 1.8V | D | 3.3V | S |
| 1.9V | E | 3.4V | T |
| 2.0V | F | 3.5V | U |
| 2.1V | G | 3.6V | V |
| 2.2V | H | 3.7V | W |
| 2.3V | I | 3.8V | X |
| 2.4V | J | 3.9V | Y |
| 2.5V | K | 4.0V | Z |
| 2.6V | L | | |
| 2.7V | M | | |
| 2.8V | N | | |
| 2.9V | O | | |

## IMPORTANT NOTICE

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