

# Micropower SOT-23, 120mA Low-Dropout Voltage Regulator ON/OFF Switch



## CLM2805

### FEATURES

- Smallest Possible Size (SOT-23-5)
- 5V, 4.8V, 4.5V, 4V, 3.5V, 3.3V, 3V, 2.5V Fixed Output
- Guaranteed Output Current in Excess of 120mA
- Available in Adjustable Output With ON/OFF Switch
- Internal Thermal Overload Protection
- Voltage Dropout is Less Than 100mV at 50mA Output
- Reverse Battery Protection
- Short Circuit Protection
- Low Cost Solution

### APPLICATIONS

- Cellular Phone
- Palmtop/Laptop Computer
- Personal Digital Assistance (PDA)
- Radio Control Systems
- Camcorder, Camera
- Portable Instrumentation
- Radio Control Systems
- Cordless Telephones

### DESCRIPTION

The CLM2805 is a low power voltage regulator. This product is designed for battery-powered applications such as cordless telephones, radio control systems and portable computers. The CLM2805 features very low quiescent current (0.4mA) and very low dropout put voltage (typ. 50mV at a light load of 300mV at 100mA). Other features include the logic-compatible on/off input which enables the regulator to be switched on and off. The CLM2805 is offered in an ultra small package, 5-pin SOT-23 as a fixed, adjustable with ON/OFF Switch.

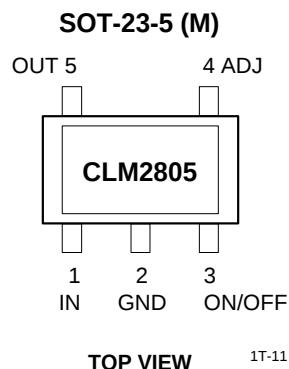
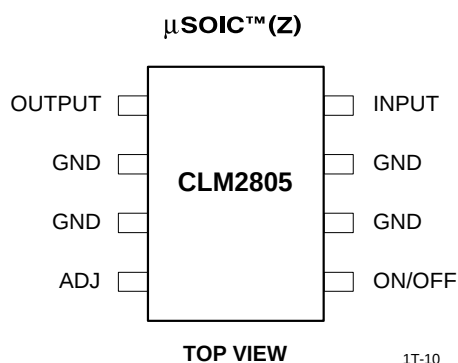
The regulator output voltage may be internally pin-strapped for a 5V, 4.8V, 4.5V, 4V, 3.5V, 3.3V, 3V, 2.5V or programmed from 3V to 24V with an external pair of resistors. For other fix voltages consult the factory.

### ORDERING INFORMATION

| Part        | Package      | Temperature Range |
|-------------|--------------|-------------------|
| CLM2805A-X  | SOT-23 5-Pin | -40°C to 85°C     |
| CLM2805C-X  | SOT-23 5-Pin | -40°C to 85°C     |
| CLM2805AZ-X | μSOIC 8-Pin  | -40°C to 85°C     |
| CLM2805CZ-X | μSOIC 8-Pin  | -40°C to 85°C     |

X = Output Voltage (for other output voltages consult with factory).  
No need for adjustable output.

### PIN CONNECTIONS



**ABSOLUTE MAXIMUM RATINGS**

Power Dissipation . . . . . Internally Limited  
 Lead Temp. (soldering, 5 seconds) . . . . . 260°C  
 Storage Temperature Range . . . . . -65°C to +150°C

Operating Junction Temperature Range . . . . -40°C to +85°C  
 Input Supply Voltage . . . . . -3V to +26V  
 ESD Rating . . . . . 2KV

**DC ELECTRICAL CHARACTERISTICS**  $V_S = 14V$ ,  $T_A = 25^\circ C$ ,  $I_O = 10mA$ ,  $C_2 = 100\mu F$ , unless otherwise specified (Note 1).

|                                           | CLM2805A     |      |      | CLM2805C     |      |      |         |                                                                             |
|-------------------------------------------|--------------|------|------|--------------|------|------|---------|-----------------------------------------------------------------------------|
| PARAMETERS                                | MIN          | TYP  | MAX  | MIN          | TYP  | MAX  | UNITS   | CONDITIONS                                                                  |
| 3.0 VOLT VERSION                          | CLM2805A-3   |      |      | CLM2805C-3   |      |      |         |                                                                             |
| Output Voltage                            | 2.94         | 3.00 | 3.06 | 2.91         | 3.00 | 3.09 | V       |                                                                             |
|                                           | 2.88         | 3.00 | 3.12 | 2.85         | 3.00 | 3.15 |         | 6V<V <sub>IN</sub> <26V, I <sub>O</sub> = 120mA Over Temp.                  |
| 3.3 VOLT VERSION                          | CLM2805A-3.3 |      |      | CLM2805C-3.3 |      |      |         |                                                                             |
| Output Voltage                            | 3.23         | 3.30 | 3.36 | 3.20         | 3.30 | 3.39 | V       |                                                                             |
|                                           | 3.20         | 3.30 | 3.39 | 3.16         | 3.30 | 3.43 |         | 6V<V <sub>IN</sub> <26V, I <sub>O</sub> = 120mA Over Temp.                  |
| 5 VOLT VERSION                            | CLM2805A-5   |      |      | CLM2805C-5   |      |      |         |                                                                             |
| Output Voltage                            | 4.81         | 5.00 | 5.19 | 4.75         | 5.00 | 5.25 | V       |                                                                             |
|                                           | 4.75         |      | 5.25 | 4.5          |      | 5.5  |         | 6V<V <sub>IN</sub> <26V, I <sub>O</sub> = 120mA Over Temp.                  |
| ALL VOLTAGE OPTIONS                       |              |      |      |              |      |      |         |                                                                             |
| Long Term Stability                       |              | 20   |      |              | 20   |      | mV/1000 |                                                                             |
| Line Regulation                           |              | 2.0  | 10   |              | 4.0  | 30   | mV      | 9V<V <sub>IN</sub> <16V                                                     |
|                                           |              | 4.0  | 30   |              |      |      |         | 6V<V <sub>IN</sub> <26V                                                     |
| Load Regulation                           |              | 14   | 50   |              | 14   | 50   |         | 5mA<I <sub>O</sub> <120mA                                                   |
| Dropout Voltage                           |              | 0.05 | 0.2  |              | 0.05 | 0.2  | V       | I <sub>O</sub> = 10mA                                                       |
|                                           |              | 0.07 | 0.1  |              | 0.07 | 0.1  |         | I <sub>O</sub> = 50mA                                                       |
|                                           |              | 0.3  | 0.6  |              | 0.3  | 0.6  |         | I <sub>O</sub> = 120mA                                                      |
| Quiescent Current                         |              | 0.4  | 1.0  |              | 0.4  | 1.0  | mA      | I <sub>O</sub> = 10mA, 6V<V <sub>IN</sub> <26V, -40°C<T <sub>J</sub> <125°C |
|                                           |              | 15   |      |              | 15   |      |         | I <sub>O</sub> = 120mA, V <sub>IN</sub> = 14V, T <sub>J</sub> = 25°C        |
| Maximum Operational Input Voltage         | 26           | 33   |      | 26           | 33   |      | V       |                                                                             |
| Maximum Line Transient                    | 60           | 70   |      | 70           | 50   |      |         | R <sub>L</sub> = 500Ω, V <sub>O</sub> <5.5V, 100ms                          |
| Reverse Polarity Input Voltage, DC        | -15          | -30  |      | -15          | 30   |      |         | V <sub>O</sub> >-3V, R <sub>L</sub> = 500Ω                                  |
| Reverse Polarity Input Voltage, Transient | -50          | -80  |      | -50          | -80  |      |         | 1% Duty Cycle, τ<100ms, R <sub>L</sub> = 500Ω                               |
| Output Noise Voltage                      |              | 500  |      |              | 500  |      | μVrms   | 10Hz-100kHz, C <sub>OUT</sub> = 100μF                                       |
| Ripple Rejection                          |              | 80   |      |              | 80   |      | dB      | f <sub>O</sub> = 12Hz                                                       |

**ADJUSTABLE**  $V_{IN} = 14V$ ,  $V_O = 3V$ ,  $I_O = 10mA$ ,  $R_1 = 27k$ ,  $C_2 = 100\mu F$ ,  $T_J = 25^\circ C$

| PARAMETERS        | CLM2805A/C |      |      | UNITS | CONDITIONS                               |
|-------------------|------------|------|------|-------|------------------------------------------|
|                   | MIN        | TYP  | MAX  |       |                                          |
| Reference Voltage | 1.14       | 1.20 | 1.26 | V     | $I_O \leq 120mA$ , over Tem. $R_1 = 27K$ |
|                   | 1.08       |      | 1.32 |       |                                          |

**ADJUSTABLE VERSION ONLY**  $V_{IN} = 14V$ ,  $V_O = 3V$ ,  $I_O = 10mA$ ,  $R_1 = 27k$ ,  $C_2 = 100\mu F$ ,  $T_J = 25^\circ C$

| PARAMETERS                                | CLM2805C |      |     | UNITS           | CONDITIONS                                     |
|-------------------------------------------|----------|------|-----|-----------------|------------------------------------------------|
|                                           | MIN      | TYP  | MAX |                 |                                                |
| Output Voltage Range                      | 3.0      |      | 24  | V               |                                                |
| Line Regulation                           |          | 0.2  | 1.5 | mV              | $V_{OUT} + 0.6V < V_{IN} < 26V$                |
| Load Regulation                           |          | 0.3  | 1.0 | % max           | $5mA < I_O < 100mA$                            |
| Output Impedance                          |          | 40   |     | $m\Omega/V$     | 100mA DC and 10mA rms, 100Hz - 10kHz           |
| Quiescent Current                         |          | 0.4  | 1.0 | mA              | $I_O = 10mA$                                   |
|                                           |          | 15   |     |                 | $I_O = 120mA$                                  |
|                                           |          | 0.8  | 1.0 |                 | During Shutdown $R_L = 500\Omega$              |
| Output Noise Voltage                      |          | 100  |     | $\mu V_{rms}/V$ | 10Hz - 100kHz                                  |
| Long Term Stability                       |          | 0.4  |     | %/1000h         |                                                |
| Ripple Rejection                          |          | 0.02 |     | %/V             | $f_O = 120Hz$                                  |
| Dropout Voltage                           |          | 0.05 | 0.2 | V               | $I_O = 10mA$                                   |
|                                           |          | 0.3  | 0.6 |                 | $I_O = 120mA$                                  |
| Maximum Operational Input Voltage         | 26       | 33   |     |                 |                                                |
| Maximum Line Transient                    | 60       | 70   |     |                 | $I_O = 10mA$ , Reference Voltage $< 1.5V$      |
| Reverse Polarity Input Voltage, DC        | -15      | -30  |     |                 | $V_O > 0.3V$ , $R_L = 500\Omega$               |
| Reverse Polarity Input Voltage, Transient | -50      | -80  |     |                 | 1% Duty Cycle, $T < 100ms$ , $R_L = 500\Omega$ |
| On/Off Threshold Current                  |          | 20   | 50  | $\mu A$         |                                                |
| Threshold Voltage On                      |          | 2.0  | 1.2 | V               | $V_O = 3V$                                     |
| Threshold Voltage Off                     | 3.25     | 2.2  |     |                 |                                                |

**Notes:**

1. See TYPICAL APPLICATIONS notes to ensure constant junction temperature, low duty cycle pulse testing used.
2. All limits are at  $125^\circ C$  or over the full operating temperature junction range of  $-40^\circ C$  to  $+125^\circ C$ .
3. The maximum power dissipation is a function of maximum junction temperature, total thermal resistance and ambient temperature.
4. Human body model,  $100\mu F$  discharged through  $1.5K\Omega$ .