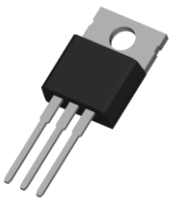
# 3-Terminal 1.5A Negative Voltage Regulator LM79xx

## FEATURES

- Output Current Up to 1.5A
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Compensation
- Output Voltage of −5V, −12V



TO-220-3

## DESCRIPTION

This LM7905 series of fixed-negative voltage monolithic integrated circuit voltage regulator is designed to complement LM7805 series in a wide range of applications. These applications include on-card regulation for elimination of noise and distribution problems associated with single-point regulation.

Each of these regulators can deliver up to 1.5A of output current. The internal limiting and thermal shutdown features of these regulators make them essentially immune to overload. In addition to use as fixed-voltage regulators, these devices can be used with external components to obtain adjustable output voltages and current and also as the power pass element in precision regulators.

**ORDERING INFORMATION**

| Device | Package |
|---|---|
| LM79xxT | TO-220-3L |

xx: Output Voltage

## ABSOLUTE MAXIMUM RATINGS (Note 1)

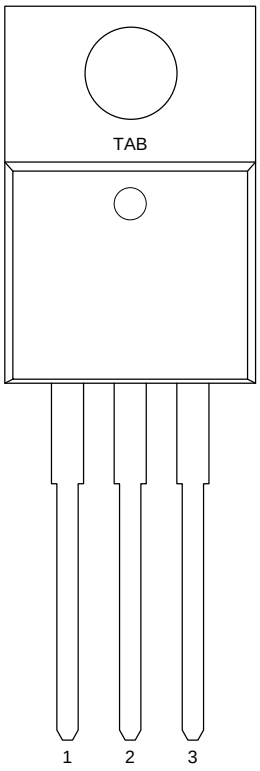
| CHARACTERISTIC | SYMBOL | MIN | MAX | UNIT |
|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | - | −35 | V |
| Maximum Operating Junction Temperature | $T_J$ | −40 | 125 | °C |
| Storage Temperature | $T_{STG}$ | −65 | 150 | °C |

Note 1. 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 under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

## ORDERING INFORMATION

| VOUT | Package | Order No. | Description | Supplied As | Status |
|---|---|---|---|---|---|
| −5.0V | TO-220-3L | LM7905T | 1.5A, Fixed | Tube | Active |
| −12V | TO-220-3L | LM7912T | 1.5A, Fixed | Tube | Active |

## PIN CONFIGURATION

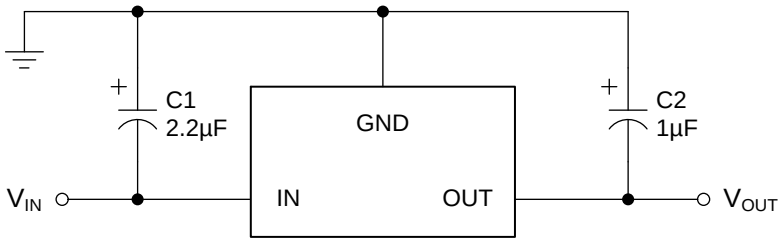


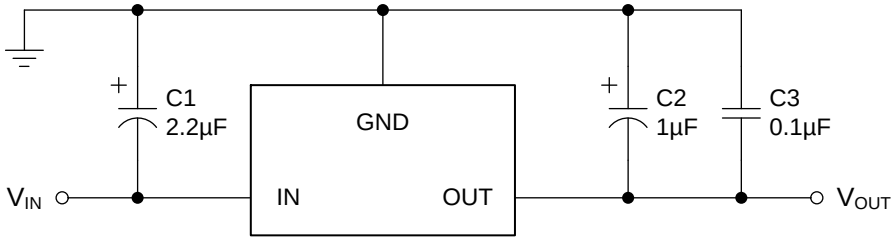

TO-220

## PIN DESCRIPTION

| Pin No. | Pin Name | Pin Function |
|---|---|---|
| 1 | GND | Ground |
| 2 | IN | Input Voltage |
| 3 | OUT | Output Voltage |
| TAB | TAB | Input Voltage |

## TYPICAL APPLICATION CIRCUITS




* C1 required for stability. Value given may be increased.

** C2 required for stability. Value given may be increased.

*** C3 considered improving the transient response.

## ELECTRICAL CHARACTERISTICS: LM7905

Specifications with standard type face are for $T_J$ = 25°C, and those with **boldface type** apply over full operating temperature range In the *Recommended Operating Ratings*. Conditions are $V_{IN}$ = −10V, $I_{OUT}$ = 500mA, $C_{IN}$ = 2.2μF, $C_{OUT}$ = 1μF, unless otherwise noted.

| PARAMETER | SYMBOL | TEST CONDITIONS (Note 3) | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage (Note 4) | $V_{OUT}$ | | −4.80 | −5.0 | −5.20 | V |
| | | −20V ≤ $V_{IN}$ ≤ −7.0V,<br>5.0mA ≤ $I_{OUT}$ ≤ 1.0A | **−4.75** | **−5.0** | **−5.25** | |
| Line Regulation | $\Delta V_{LINE}$ | −25V ≤ $V_{IN}$ ≤ −7.0V, $I_{OUT}$ = 100mA | - | - | 47.5 | mV |
| | | −12V ≤ $V_{IN}$ ≤ −8.0V, $I_{OUT}$ = 100mA | - | - | 23.5 | |
| | | −25V ≤ $V_{IN}$ ≤ −7.0V, $I_{OUT}$ = 500mA | - | - | 95.0 | |
| | | −12V ≤ $V_{IN}$ ≤ −8.0V, $I_{OUT}$ = 500mA | - | - | 47.5 | |
| Load Regulation | $\Delta V_{LOAD}$ | 5.0mA ≤ $I_{OUT}$ ≤ 1.5A | - | - | 95 | mV |
| | | 250mA ≤ $I_{OUT}$ ≤ 750mA | - | - | 47.5 | |
| Dropout Voltage | $V_D$ | $I_{OUT}$ = 1.0A | - | 2.0 | - | V |
| Bias Current | $I_B$ | | - | - | 7.8 | mA |
| Bias Current Change | $\Delta I_B$ | −25V ≤ $V_{IN}$ ≤ −7.0V | - | - | 1.25 | mA |
| | | 5.0mA ≤ $I_{OUT}$ ≤ 1.5A | - | - | 0.48 | |
| Peak Output Current | $I_{OMAX}$ | | - | 2.2 | - | A |
| Ripple Rejection | RR | $I_{OUT}$ = 0.2A, Frequency = 100Hz<br>-8.0V ≤ $V_{IN}$ ≤ -18.0V | - | 70 | - | dB |

Note 3. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

## ELECTRICAL CHARACTERISTICS: LM7912

Specifications with standard type face are for $T_J$ = 25°C, and those with **boldface type** apply over full operating temperature range In the *Recommended Operating Ratings*. Conditions are $V_{IN}$ = −19V, $I_{OUT}$ = 500mA, $C_{IN}$ = 2.2μF, $C_{OUT}$ = 1μF, unless otherwise noted.

| PARAMETER | SYMBOL | TEST CONDITIONS (Note 3) | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Voltage (Note 4) | $V_{OUT}$ | | −11.52 | −12.0 | −12.48 | V |
| | | −20V ≤ $V_{IN}$ ≤ −7.0V,<br>5.0mA ≤ $I_{OUT}$ ≤ 1.0A | **−11.4** | **−12.0** | **−12.6** | |
| Line Regulation | $\Delta V_{LINE}$ | −30V ≤ $V_{IN}$ ≤ −14.5V, $I_{OUT}$ = 100mA | - | - | 114 | mV |
| | | −22V ≤ $V_{IN}$ ≤ −16V, $I_{OUT}$ = 100mA | - | - | 58.5 | |
| | | −30V ≤ $V_{IN}$ ≤ −14.5V, $I_{OUT}$ = 500mA | - | - | 228 | |
| | | −22V ≤ $V_{IN}$ ≤ −16V, $I_{OUT}$ = 500mA | - | - | 114 | |
| Load Regulation | $\Delta V_{LOAD}$ | 5.0mA ≤ $I_{OUT}$ ≤ 1.5A | - | - | 228 | mV |
| | | 250mA ≤ $I_{OUT}$ ≤ 750mA | - | - | 114 | |
| Dropout Voltage | $V_D$ | $I_{OUT}$ = 1.0A | - | 2.0 | - | V |
| Bias Current | $I_B$ | | - | - | 7.8 | mA |
| Bias Current Change | $\Delta I_B$ | −25V ≤ $V_{IN}$ ≤ −7.0V | - | - | 1.25 | mA |
| | | 5.0mA ≤ $I_{OUT}$ ≤ 1.5A | - | - | 0.48 | |
| Peak Output Current | $I_{OMAX}$ | | - | 2.2 | - | A |
| Ripple Rejection | RR | $I_{OUT}$ = 0.2A, Frequency = 100Hz<br>-8.0V ≤ $V_{IN}$ ≤ -18.0V | - | 70 | - | dB |

Note 3. Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately.

Note 4. This specification applies only for DC power dissipation permitted by absolute maximum ratings.

## TYPICAL OPERATING CHARACTERISTICS

T.B.D.

## APPLICATION INFORMATION

T.B.D.

## REVISION NOTICE

The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.