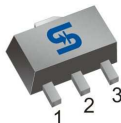


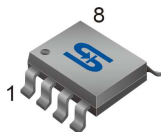
# TS79L00 Series

## 3-Terminal 100mA Negative Voltage Regulator

**TO-92**

**SOT-89**

**Pin Definition:**

1. Ground
2. Input
3. Output

**SOP-8**

**Pin Definition:**

- |           |           |
|-----------|-----------|
| 1. Output | 8. N/C    |
| 2. Input  | 7. Input  |
| 3. Input  | 6. Input  |
| 4. N/C    | 5. Ground |

### General Description

The TS79L00 Series of negative voltage regulators are inexpensive, easy-to-use devices suitable for a multitude of applications that require a regulated supply of up to 100mA. Like their higher power TS7900 and TS79M00 Series cousins, these regulators feature internal current limiting and thermal shutdown making them remarkably rugged. No external components are required with the TS79L00 devices in many applications.

These devices offer a substantial performance advantage over the traditional zener diode-resistor combination, as output impedance and quiescent current are substantially reduced.

### Features

- Output Voltage Range -5V, -9V, -12V
- Output current up to 100mA
- Internal thermal overload protection
- Internal short-circuit current limiting
- Output transistor safe-area compensation
- Output voltage offered in 4% tolerance

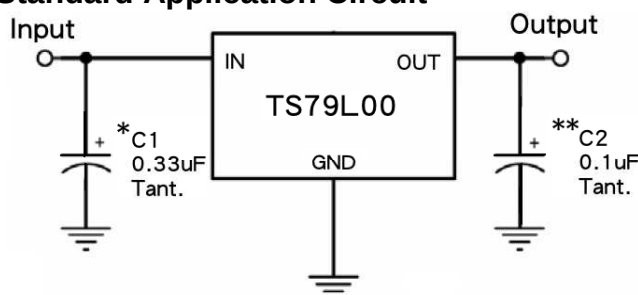
### Ordering Information

| Part No.     | Package | Packing            |
|--------------|---------|--------------------|
| TS79LxxCT B0 | TO-92   | 1Kpcs / Bulk       |
| TS79LxxCT A3 | TO-92   | 2Kpcs / Ammo       |
| TS79LxxCY RM | SOT-89  | 1Kpcs / 7" Reel    |
| TS79LxxCS RL | SOP-8   | 2.5Kpcs / 13" Reel |

Note: Where **xx** denote voltage option

**05**=-5V, **09**=-9V, **12**=-12V

### Standard Application Circuit



A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0V above the output voltage even during the low point on the input ripple voltage.

XX = these two digits of the type number indicate voltage.

\* = Cin is required if regulator is located an appreciable distance from power supply filter.

\*\* = Co is not needed for stability; however, it does improve transient response.

### Absolute Maximum Rating (Ta = 25°C unless otherwise noted)

| Parameter                                |        | Symbol           | Limit            | Unit |
|------------------------------------------|--------|------------------|------------------|------|
| Input Voltage                            |        | V <sub>IN</sub>  | -35              | V    |
| Power Dissipation                        |        | P <sub>D</sub>   | Internal Limited | W    |
| Operating Temperature range              |        | T <sub>OPR</sub> | 0~+125           | °C   |
| Junction Temperature                     |        | T <sub>J</sub>   | +150             | °C   |
| Storage Temperature Range                |        | T <sub>STG</sub> | -65~+150         | °C   |
| Thermal Resistance - Junction to Case    | TO-92  | R <sub>θJC</sub> | --               | °C/W |
|                                          | SOT-89 |                  | 18               |      |
|                                          | SOP-8  |                  | 20               |      |
| Thermal Resistance - Junction to Ambient | TO-92  | R <sub>θJA</sub> | 210              | °C/W |
|                                          | SOT-89 |                  | --               |      |
|                                          | SOP-8  |                  | 60*              |      |

**Note:** \* Considering 6cm<sup>2</sup> of copper board heat-sink

### TS79L05 Electrical Characteristics

( $V_{in} = -10V$ ,  $I_{out} = 40mA$ ,  $0^{\circ}C \leq T_j \leq 125^{\circ}C$ ,  $C_{in} = 0.33\mu F$ ,  $C_{out} = 0.1\mu F$ ; unless otherwise specified.)

| Parameter                                 | Symbol                        | Test Condition                                                   |                               | Min   | Typ   | Max   | Unit           |
|-------------------------------------------|-------------------------------|------------------------------------------------------------------|-------------------------------|-------|-------|-------|----------------|
| Output voltage                            | $V_{out}$                     | $T_j = 25^{\circ}C$                                              |                               | -4.80 | -5    | -5.20 | V              |
|                                           |                               | $-7.5V \leq V_{in} \leq -20V$ ,<br>$5mA \leq I_{out} \leq 100mA$ |                               | -4.75 | -5    | -5.25 |                |
| Line Regulation                           | REG <sub>line</sub>           | $T_j = 25^{\circ}C$                                              | $-7.5V \leq V_{in} \leq -20V$ | --    | 50    | 150   | mV             |
| Load Regulation                           | REG <sub>load</sub>           | $T_j = 25^{\circ}C$                                              | $5mA \leq I_{out} \leq 100mA$ | --    | 20    | 60    |                |
|                                           |                               |                                                                  | $5mA \leq I_{out} \leq 40mA$  | --    | 10    | 30    |                |
| Quiescent Current                         | $I_q$                         | $I_{out} = 0$ , $T_j = 25^{\circ}C$                              |                               | --    | 3     | 6     | mA             |
| Quiescent Current Change                  | $\Delta I_q$                  | $-7.5V \leq V_{in} \leq -25V$                                    |                               | --    | --    | 1.5   |                |
|                                           |                               | $5mA \leq I_{out} \leq 40mA$                                     |                               | --    | --    | 0.1   |                |
| Output Noise Voltage                      | $V_n$                         | $10Hz \leq f \leq 100KHz$ , $T_j = 25^{\circ}C$                  |                               | --    | 40    | --    | $\mu V$        |
| Ripple Rejection Ratio                    | RR                            | $f = 120Hz$ , $-8V \leq V_{in} \leq -18V$                        |                               | 41    | 49    | --    | dB             |
| Voltage Drop                              | $V_{drop}$                    | $I_{out} = 100mA$ , $T_j = 25^{\circ}C$                          |                               | --    | 1.7   | --    | V              |
| Peak Output Current                       | $I_{o\ peak}$                 | $T_j = 25^{\circ}C$                                              |                               | --    | 0.15  | --    | A              |
| Temperature Coefficient of Output Voltage | $\Delta V_{out} / \Delta T_j$ | $I_{out} = 5mA$ , $0^{\circ}C \leq T_j \leq 125^{\circ}C$        |                               | --    | -0.65 | --    | $mV/^{\circ}C$ |

### TS79L09 Electrical Characteristics

( $V_{in} = -15V$ ,  $I_{out} = 40mA$ ,  $0^{\circ}C \leq T_j \leq 125^{\circ}C$ ,  $C_{in} = 0.33\mu F$ ,  $C_{out} = 0.1\mu F$ ; unless otherwise specified.)

| Parameter                                 | Symbol                        | Test Condition                                                    |                                | Min   | Typ  | Max   | Unit           |
|-------------------------------------------|-------------------------------|-------------------------------------------------------------------|--------------------------------|-------|------|-------|----------------|
| Output voltage                            | $V_{out}$                     | $T_j = 25^{\circ}C$                                               |                                | -8.65 | -9   | -9.36 | V              |
|                                           |                               | $-11.5V \leq V_{in} \leq -24V$ ,<br>$5mA \leq I_{out} \leq 100mA$ |                                | -8.57 | -9   | -9.45 |                |
| Line Regulation                           | REG <sub>line</sub>           | $T_j = 25^{\circ}C$                                               | $-11.5V \leq V_{in} \leq -24V$ | --    | 90   | 180   | mV             |
| Load Regulation                           | REG <sub>load</sub>           | $T_j = 25^{\circ}C$                                               | $5mA \leq I_{out} \leq 100mA$  | --    | 30   | 90    |                |
|                                           |                               |                                                                   | $5mA \leq I_{out} \leq 40mA$   | --    | 15   | 45    |                |
| Quiescent Current                         | $I_q$                         | $I_{out} = 0$ , $T_j = 25^{\circ}C$                               |                                | --    | 3    | 6     | mA             |
| Quiescent Current Change                  | $\Delta I_q$                  | $-11V \leq V_{in} \leq -23V$                                      |                                | --    | --   | 1.5   |                |
|                                           |                               | $5mA \leq I_{out} \leq 40mA$                                      |                                | --    | --   | 0.1   |                |
| Output Noise Voltage                      | $V_n$                         | $10Hz \leq f \leq 100KHz$ , $T_j = 25^{\circ}C$                   |                                | --    | 60   | --    | $\mu V$        |
| Ripple Rejection Ratio                    | RR                            | $f = 120Hz$ , $-13V \leq V_{in} \leq -24V$                        |                                | 37    | 57   | --    | dB             |
| Voltage Drop                              | $V_{drop}$                    | $I_{out} = 100mA$ , $T_j = 25^{\circ}C$                           |                                | --    | 1.7  | --    | V              |
| Peak Output Current                       | $I_{o\ peak}$                 | $T_j = 25^{\circ}C$                                               |                                | --    | 0.15 | --    | A              |
| Temperature Coefficient of Output Voltage | $\Delta V_{out} / \Delta T_j$ | $I_{out} = 5mA$ , $0^{\circ}C \leq T_j \leq 125^{\circ}C$         |                                | --    | -0.9 | --    | $mV/^{\circ}C$ |

- Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
- This specification applies only for DC power dissipation permitted by absolute maximum ratings.

# TS79L00 Series

## 3-Terminal 100mA Negative Voltage Regulator

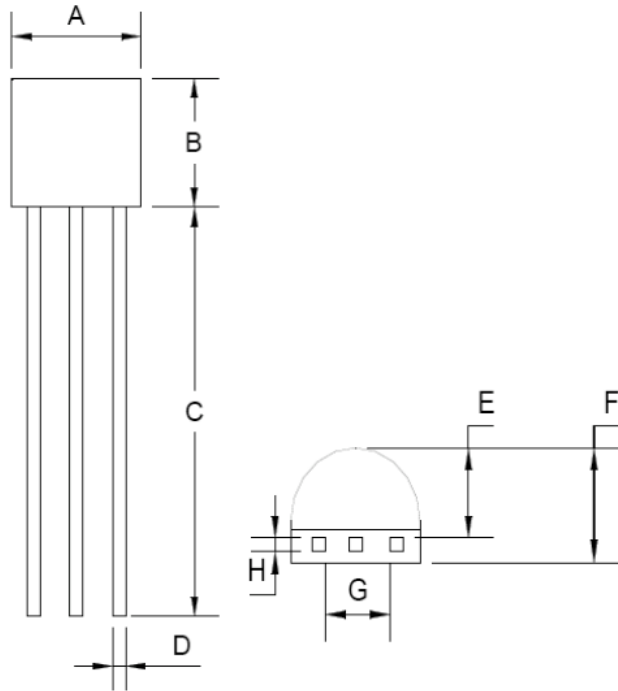
### TS79L12 Electrical Characteristics

$V_{in} = -19V$ ,  $I_{out} = 40mA$ ,  $0^{\circ}C \leq T_j \leq 125^{\circ}C$ ,  $C_{in} = 0.33\mu F$ ,  $C_{out} = 0.1\mu F$ ; unless otherwise specified.)

| Parameter                                 | Symbol                        | Test Condition                                                    |                                | Min    | Typ  | Max    | Unit           |
|-------------------------------------------|-------------------------------|-------------------------------------------------------------------|--------------------------------|--------|------|--------|----------------|
| Output voltage                            | $V_{out}$                     | $T_j = 25^{\circ}C$                                               |                                | -11.53 | -12  | -12.48 | V              |
|                                           |                               | $-14.5V \leq V_{in} \leq -27V$ ,<br>$5mA \leq I_{out} \leq 100mA$ |                                | -11.42 | -12  | -12.60 |                |
| Line Regulation                           | REGline                       | $T_j = 25^{\circ}C$                                               | $-14.5V \leq V_{in} \leq -27V$ | --     | 120  | 240    | mV             |
| Load Regulation                           | REGload                       | $T_j = 25^{\circ}C$                                               | $5mA \leq I_{out} \leq 100mA$  | --     | 40   | 120    |                |
|                                           |                               |                                                                   | $5mA \leq I_{out} \leq 40mA$   | --     | 20   | 60     |                |
| Quiescent Current                         | $I_q$                         | $I_{out} = 0$ , $T_j = 25^{\circ}C$                               |                                | --     | 3    | 6.5    | mA             |
| Quiescent Current Change                  | $\Delta I_q$                  | $-16V \leq V_{in} \leq -27V$                                      |                                | --     | --   | 1.5    |                |
|                                           |                               | $5mA \leq I_{out} \leq 40mA$                                      |                                | --     | --   | 0.1    |                |
| Output Noise Voltage                      | $V_n$                         | $10Hz \leq f \leq 100KHz$ , $T_j = 25^{\circ}C$                   |                                | --     | 80   | --     | $\mu V$        |
| Ripple Rejection Ratio                    | RR                            | $f = 120Hz$ , $-11V \leq V_{in} \leq -23V$                        |                                | 37     | 42   | --     | dB             |
| Voltage Drop                              | $V_{drop}$                    | $I_{out} = 100mA$ , $T_j = 25^{\circ}C$                           |                                | --     | 1.7  | --     | V              |
| Peak Output Current                       | $I_{o\ peak}$                 | $T_j = 25^{\circ}C$                                               |                                | --     | 0.15 | --     | A              |
| Temperature Coefficient of Output Voltage | $\Delta V_{out} / \Delta T_j$ | $I_{out} = 5mA$ , $0^{\circ}C \leq T_j \leq 125^{\circ}C$         |                                | --     | -1.0 | --     | $mV/^{\circ}C$ |

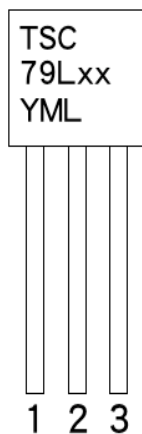
- Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible, and thermal effects must be taken into account separately.
- This specification applies only for DC power dissipation permitted by absolute maximum ratings.

### TO-92 Mechanical Drawing



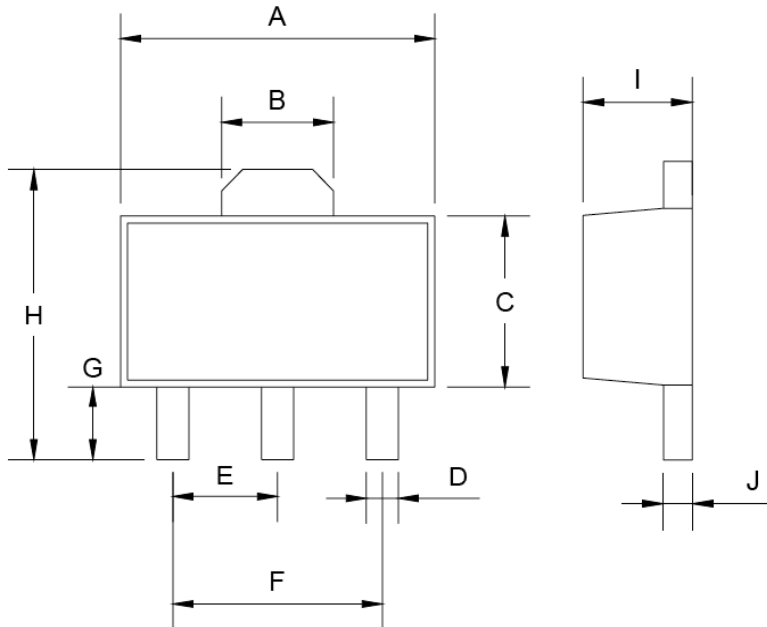
| TO-92 DIMENSION |             |      |            |       |
|-----------------|-------------|------|------------|-------|
| DIM             | MILLIMETERS |      | INCHES     |       |
|                 | MIN         | MAX  | MIN        | MAX   |
| A               | 4.30        | 4.70 | 0.169      | 0.185 |
| B               | 4.30        | 4.70 | 0.169      | 0.185 |
| C               | 14.30(typ)  |      | 0.563(typ) |       |
| D               | 0.43        | 0.49 | 0.017      | 0.019 |
| E               | 2.19        | 2.81 | 0.086      | 0.111 |
| F               | 3.30        | 3.70 | 0.130      | 0.146 |
| G               | 2.42        | 2.66 | 0.095      | 0.105 |
| H               | 0.37        | 0.43 | 0.015      | 0.017 |

### Marking Diagram



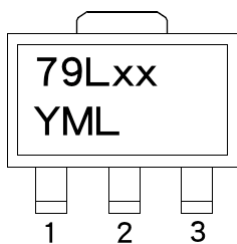
- XX** = Output Voltage  
(**05**=-5V, **09**=-9V, **12**=-12V)
- Y** = Year Code
- M** = Month Code  
(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apr, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
- L** = Lot Code

### SOT-89 Mechanical Drawing



| SOT-89 DIMENSION |             |      |        |       |
|------------------|-------------|------|--------|-------|
| DIM              | MILLIMETERS |      | INCHES |       |
|                  | MIN         | MAX  | MIN    | MAX   |
| A                | 4.40        | 4.60 | 0.173  | 0.181 |
| B                | 1.50        | 1.7  | 0.059  | 0.070 |
| C                | 2.30        | 2.60 | 0.090  | 0.102 |
| D                | 0.40        | 0.52 | 0.016  | 0.020 |
| E                | 1.50        | 1.50 | 0.059  | 0.059 |
| F                | 3.00        | 3.00 | 0.118  | 0.118 |
| G                | 0.89        | 1.20 | 0.035  | 0.047 |
| H                | 4.05        | 4.25 | 0.159  | 0.167 |
| I                | 1.4         | 1.6  | 0.055  | 0.068 |
| J                | 0.35        | 0.44 | 0.014  | 0.017 |

### Marking Diagram

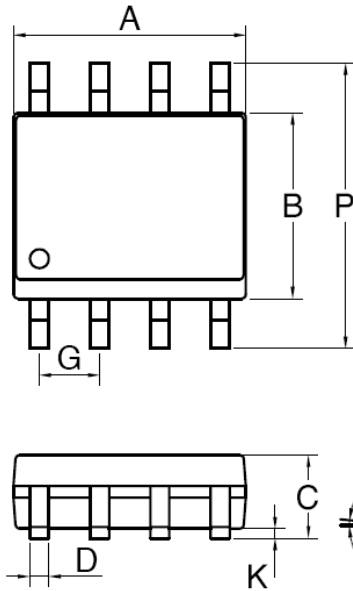


- XX** = Output Voltage  
(**05**=-5V, **09**=-9V, **12**=-12V)
- Y** = Year Code
- M** = Month Code  
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# TS79L00 Series

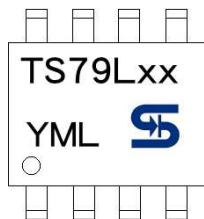
## 3-Terminal 100mA Negative Voltage Regulator

### SOP-8 Mechanical Drawing



| SOP-8 DIMENSION |             |      |         |       |
|-----------------|-------------|------|---------|-------|
| DIM             | MILLIMETERS |      | INCHES  |       |
|                 | MIN         | MAX  | MIN     | MAX.  |
| A               | 4.80        | 5.00 | 0.189   | 0.196 |
| B               | 3.80        | 4.00 | 0.150   | 0.157 |
| C               | 1.35        | 1.75 | 0.054   | 0.068 |
| D               | 0.35        | 0.49 | 0.014   | 0.019 |
| F               | 0.40        | 1.25 | 0.016   | 0.049 |
| G               | 1.27BSC     |      | 0.05BSC |       |
| K               | 0.10        | 0.25 | 0.004   | 0.009 |
| M               | 0°          | 7°   | 0°      | 7°    |
| P               | 5.80        | 6.20 | 0.229   | 0.244 |
| R               | 0.25        | 0.50 | 0.010   | 0.019 |

### Marking Diagram



- XX** = Output Voltage  
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(**A**=Jan, **B**=Feb, **C**=Mar, **D**=Apr, **E**=May, **F**=Jun, **G**=Jul, **H**=Aug, **I**=Sep, **J**=Oct, **K**=Nov, **L**=Dec)
- L** = Lot Code

# **TS79L00 Series**

## **3-Terminal 100mA Negative Voltage Regulator**

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