



## 78L05U Three-Terminal Positive Voltage Regulator

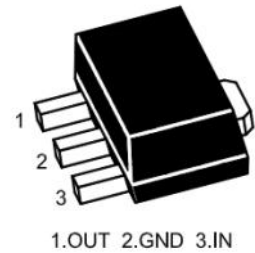
### Features

Maximum Output current  $I_o$ : 0.1A

Output Voltage  $V_o$ : 5V

Continuous Total Dissipation  $P_d$ : 0.5W ( $T_a = 25^\circ\text{C}$ )

Marking: 78L05



SOT-89-3L

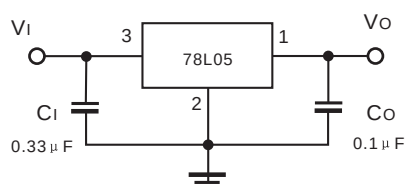
Absolute Maximum Ratings (Operating temperature range applies unless otherwise specified)

| Parameter                            | Symbol    | Rating          | Unit             |
|--------------------------------------|-----------|-----------------|------------------|
| Input Voltage                        | $V_i$     | 30              | V                |
| Operating Junction Temperature Range | $T_{OPR}$ | $-55 \sim +125$ | $^\circ\text{C}$ |
| Storage Temperature Range            | $T_{STG}$ | $-55 \sim +150$ | $^\circ\text{C}$ |

Electrical Characteristics ( $V_i=10\text{V}$ ,  $I_o=40\text{mA}$ ,  $C_i=0.33\mu\text{F}$ ,  $C_o=0.1\mu\text{F}$ , unless otherwise specified)

| Parameter                | Symbol       | Test conditions                                                                                               | Min  | Typ | Max  | Unit          |
|--------------------------|--------------|---------------------------------------------------------------------------------------------------------------|------|-----|------|---------------|
| Output Voltage           | $V_o$        | $T_J = 25^\circ\text{C}$                                                                                      | 4.8  | 5.0 | 5.2  | V             |
|                          |              | $T_J = 0 \sim 125^\circ\text{C}$ , $7\text{V} \leq V_i \leq 20\text{V}$ , $I_o = 1\text{mA} \sim 40\text{mA}$ | 4.75 | 5.0 | 5.25 | V             |
|                          |              | $T_J = 0 \sim 125^\circ\text{C}$ , $I_o = 1\text{mA} \sim 70\text{mA}$                                        | 4.75 | 5.0 | 5.25 | V             |
| Load Regulation          | $\Delta V_o$ | $T_J = 25^\circ\text{C}$ , $I_o = 1\text{mA} \sim 100\text{mA}$                                               |      | 15  | 60   | mV            |
|                          |              | $T_J = 25^\circ\text{C}$ , $I_o = 1\text{mA} \sim 40\text{mA}$                                                |      | 8   | 30   | mV            |
| Line Regulation          | $\Delta V_o$ | $7\text{V} \leq V_i \leq 20\text{V}$                                                                          |      | 32  | 150  | mV            |
|                          |              | $T_J = 25^\circ\text{C}$ , $8\text{V} \leq V_i \leq 20\text{V}$                                               |      | 26  | 100  | mV            |
| Quiescent Current        | $I_q$        | $T_J = 25^\circ\text{C}$                                                                                      |      | 3.8 | 6    | mA            |
| Quiescent current Change | $\Delta I_q$ | $T_J = 0 \sim 125^\circ\text{C}$ , $8\text{V} \leq V_i \leq 20\text{V}$                                       |      |     | 1.5  | mA            |
|                          |              | $T_J = 0 \sim 125^\circ\text{C}$ , $1\text{mA} \leq I_o \leq 40\text{mA}$                                     |      |     | 0.1  |               |
| Output Noise Voltage     | $V_N$        | $T_J = 25^\circ\text{C}$ , $10\text{Hz} \leq f \leq 100\text{KHz}$                                            |      | 42  |      | $\mu\text{V}$ |
| Ripple Rejection         | RR           | $T_J = 0 \sim 125^\circ\text{C}$ , $8\text{V} \leq V_i \leq 20\text{V}$ , $f = 120\text{Hz}$                  | 41   | 49  |      | dB            |
| Dropout Voltage          | $V_D$        | $T_J = 25^\circ\text{C}$                                                                                      |      | 1.7 |      | V             |

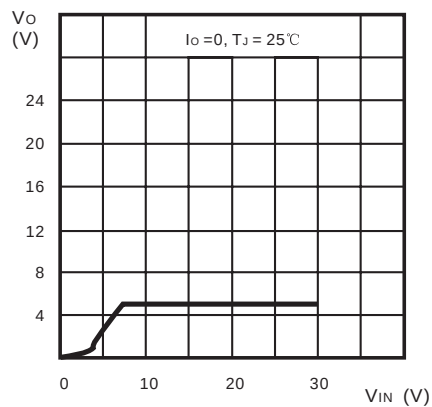
### Typical Application



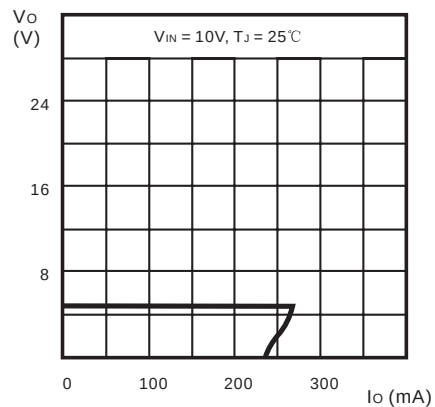
Note: Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators.



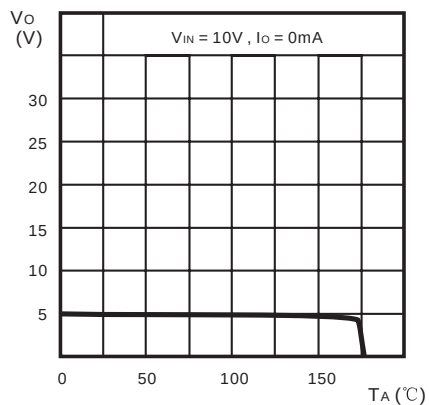
## Typical Characteristics



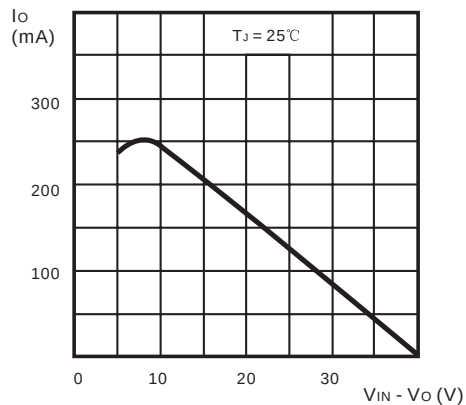
Output Characteristics



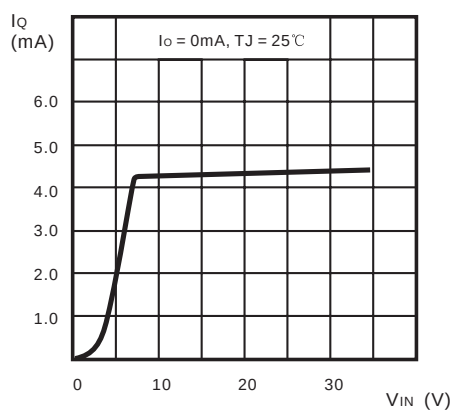
Load Characteristics



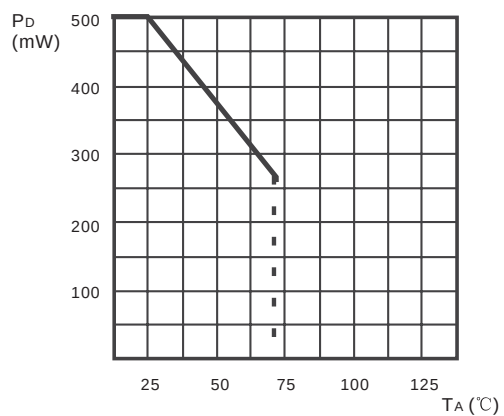
Thermal Shutdown



Short Circuit Output Current



Quiescent Current vs Input Voltage

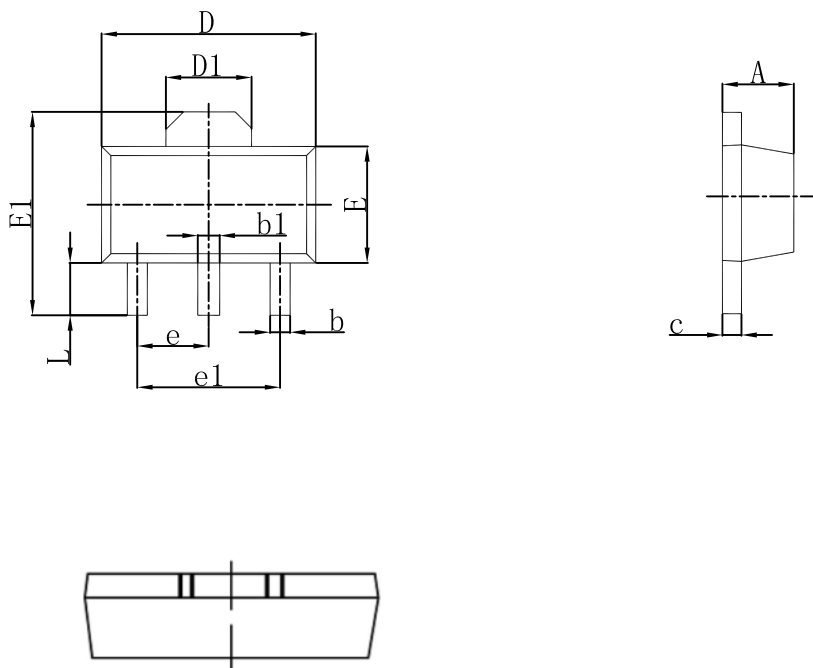


Power Dissipation vs. Ambient Temperature



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### SOT-89-3L Outlines Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.400                     | 1.600 | 0.055                | 0.063 |
| b      | 0.320                     | 0.520 | 0.013                | 0.020 |
| b1     | 0.400                     | 0.580 | 0.016                | 0.023 |
| c      | 0.350                     | 0.440 | 0.014                | 0.017 |
| D      | 4.400                     | 4.600 | 0.173                | 0.181 |
| D1     | 1.550 REF.                |       | 0.061 REF.           |       |
| E      | 2.300                     | 2.600 | 0.091                | 0.102 |
| E1     | 3.940                     | 4.250 | 0.155                | 0.167 |
| e      | 1.500 TYP.                |       | 0.060 TYP.           |       |
| e1     | 3.000 TYP.                |       | 0.118 TYP.           |       |
| L      | 0.900                     | 1.200 | 0.035                | 0.047 |