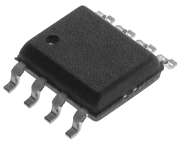
# POSITIVE VOLTAGE REGULATORS

## DESCRIPTION

The LM78Lxx series of three-terminal positive regulators employ internal current limiting and thermal shutdown, making themessentially indestructible. If adequate heat-sink is provided, they can deliver up to 100 mA output current. They are intended as fixed voltage regulators in a wide range of applications including local or on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power pass elements to make high-current voltage regulators. The LM78Lxx series used as Zener diode/resistor combination replacement, offers an effective output impedance improvement of typically twoorders of magnitude, along with lower quiescent current and lower noise.



SOP8

SOT-89

TO-92


SOT23-3

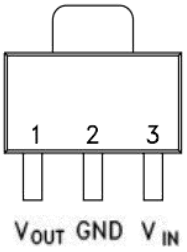
## FEATURES

- Output current up to 100 ma
- Output voltages of 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V, 20V, 24V, 33V.
- Thermal overload protection
- Short circuit protection
- No external components are required
- Availableineither±5%

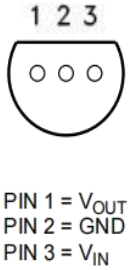
## ORDERING INFORMATION

| DEVICE | Package Type | MARKING | Packing | Packing Qty |
|---|---|---|---|---|
| LM78L05ACPKRG | SOT-89 | 78L05 | REEL | 1000pcs/reel |
| LM78L06ACPKRG | | 78L06 | REEL | 1000pcs/reel |
| LM78L08ACPKRG | | 78L08 | REEL | 1000pcs/reel |
| LM78L09ACPKRG | | 78L09 | REEL | 1000pcs/reel |
| LM78L10ACPKRG | | 78L10 | REEL | 1000pcs/reel |
| LM78L12ACPKRG | | 78L12 | REEL | 1000pcs/reel |
| LM78L15ACPKRG | | 78L15 | REEL | 1000pcs/reel |
| LM78L18ACPKRG | | 78L18 | REEL | 1000pcs/reel |
| LM78L20ACPKRG | | 78L20 | REEL | 1000pcs/reel |
| LM78L24ACPKRG | | 78L24 | REEL | 1000pcs/reel |
| LM78L33ACPKRG | | 78L33 | REEL | 1000pcs/reel |
| LM78L05ACLPG | TO-92 | 78L05 | BAG | 1000pcs/bag |
| LM78L06ACLPG | | 78L06 | BAG | 1000pcs/bag |
| LM78L08ACLPG | | 78L08 | BAG | 1000pcs/bag |
| LM78L09ACLPG | | 78L09 | BAG | 1000pcs/bag |
| LM78L10ACLPG | | 78L10 | BAG | 1000pcs/bag |
| LM78L12ACLPG | | 78L12 | BAG | 1000pcs/bag |
| LM78L15ACLPG | | 78L15 | BAG | 1000pcs/bag |
| LM78L18ACLPG | | 78L18 | BAG | 1000pcs/bag |
| LM78L20ACLPG | | 78L20 | BAG | 1000pcs/bag |
| LM78L24ACLPG | | 78L24 | BAG | 1000pcs/bag |
| LM78L33ACLPG | | 78L33 | BAG | 1000pcs/bag |
| LM78L05ACDRG | SOP8 | 78L05 | REEL | 2500pcs/reel |
| LM78L06ACDRG | | 78L06 | REEL | 2500pcs/reel |
| LM78L08ACDRG | | 78L08 | REEL | 2500pcs/reel |
| LM78L09ACDRG | | 78L09 | REEL | 2500pcs/reel |
| LM78L10ACDRG | | 78L10 | REEL | 2500pcs/reel |
| LM78L12ACDRG | | 78L12 | REEL | 2500pcs/reel |
| LM78L15ACDRG | | 78L15 | REEL | 2500pcs/reel |
| LM78L18ACDRG | | 78L18 | REEL | 2500pcs/reel |
| LM78L20ACDRG | | 78L20 | REEL | 2500pcs/reel |
| LM78L24ACDRG | | 78L24 | REEL | 2500pcs/reel |
| LM78L33ACDRG | | 78L33 | REEL | 2500pcs/reel |
| LM78L05ACDBZRG | SOT23-3 | 78L05 | REEL | 3000pcs/reel |
| LM78L06ACDBZRG | | 78L06 | REEL | 3000pcs/reel |
| LM78L08ACDBZRG | | 78L08 | REEL | 3000pcs/reel |
| LM78L09ACDBZRG | | 78L09 | REEL | 3000pcs/reel |
| LM78L10ACDBZRG | | 78L10 | REEL | 3000pcs/reel |
| LM78L12ACDBZRG | | 78L12 | REEL | 3000pcs/reel |
| LM78L15ACDBZRG | | 78L15 | REEL | 3000pcs/reel |
| LM78L18ACDBZRG | | 78L18 | REEL | 3000pcs/reel |
| LM78L20ACDBZRG | | 78L20 | REEL | 3000pcs/reel |
| LM78L24ACDBZRG | | 78L24 | REEL | 3000pcs/reel |
| LM78L33ACDBZRG | | 78L33 | REEL | 3000pcs/reel |

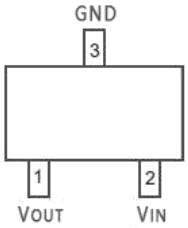
## CONNECTION DIAGRAM (top view)



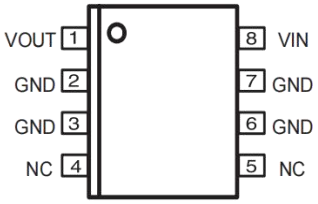

SOT89-3




TO-92




SOT23-3




SOP8

## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter² | | Value | Unit |
|---|---|---|---|---|
| $V_I$ | DC Input Voltage | $V_O$ = 5 to 10 V | 30 | V |
| | | $V_O$ = 12 to 15 V | 35 | |
| | | $V_O$ = 18 to 33 V | 40 | |
| $I_O$ | Output Current | | 100 | mA |
| $P_{tot}$ | Power Dissipation | | Internally Limited (*) | |
| $T_{stg}$ | Storage Temperature Range | | -40 to 150 | °C |
| $T_{op}$ | Operating Junction TemperatureRange | | 0 to 70 | °C |

## ELECTRICAL CHARACTERISTICS OF LM78L05A

refer to the test circuits, $V_I$ = 10V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 4.8 | 5 | 5.2 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 7 to 20 V | 4.75 | | 5.25 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 10 V | 4.75 | | 5.25 | |
| $V_O$ | Line Regulation | $V_I$ = 7 to 20 V $T_J$ = 25°C | | | 150 | mV |
| | | $V_I$ = 8 to 20 V $T_J$ = 25°C | | | 100 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 60 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 30 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6 | mA |
| | | $T_J$ = 125°C | | | 5.5 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 8 to 20 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 40 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 8 to 18 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 41 | 49 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L06A

refer to the test circuits, $V_I$ = 12V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 5.76 | 6 | 6.24 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 8.5 to 20 V | 5.7 | | 6.3 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 12 V | 5.7 | | 6.3 | |
| $V_O$ | Line Regulation | $V_I$ = 8.5 to 20 V $T_J$ = 25°C | | | 150 | mV |
| | | $V_I$ = 9 to 20 V $T_J$ = 25°C | | | 100 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 60 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 30 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6 | mA |
| | | $T_J$ = 125°C | | | 5.5 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 9 to 20 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 50 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 9 to 20 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 39 | 46 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L08A

refer to the test circuits, $V_I$ = 14V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 7.68 | 8 | 8.32 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 10.5 to 23 V | 7.6 | | 8.4 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 14 V | 7.6 | | 8.4 | |
| $V_O$ | Line Regulation | $V_I$ = 10.5 to 23 V $T_J$ = 25°C | | | 175 | mV |
| | | $V_I$ = 11 to 23 V $T_J$ = 25°C | | | 125 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 80 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 40 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6 | mA |
| | | $T_J$ = 125°C | | | 5.5 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 11 to 23 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 60 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 12 to 23 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 37 | 45 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L09A

refer to the test circuits, $V_I$ = 15V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 8.64 | 9 | 9.36 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 11.5 to 23 V | 8.55 | | 9.45 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 15 V | 8.55 | | 9.45 | |
| $V_O$ | Line Regulation | $V_I$ = 11.5 to 23 V $T_J$ = 25°C | | | 225 | mV |
| | | $V_I$ = 12 to 23 V $T_J$ = 25°C | | | 150 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 80 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 40 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6 | mA |
| | | $T_J$ = 125°C | | | 5.5 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 12 to 23 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 70 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 12 to 23 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 37 | 44 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L10A

refer to the test circuits, $V_I$ = 16V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 9.6 | 10 | 10.4 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ =12.5 to 23 V | 9.5 | | 10.5 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 16 V | 9.5 | | 10.5 | |
| $V_O$ | Line Regulation | $V_I$ = 12.5 to 23 V $T_J$ = 25°C | | | 230 | mV |
| | | $V_I$ = 13 to 23 V $T_J$ = 25°C | | | 170 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 80 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 40 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6 | mA |
| | | $T_J$ = 125°C | | | 5.5 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 13 to 23 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 60 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 14 to 23 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 37 | 45 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L12A

refer to the test circuits, $V_I$ = 19V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 11.5 | 12 | 12.5 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 14.5 to 27 V | 11.4 | | 12.6 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 19 V | 11.4 | | 12.6 | |
| $V_O$ | Line Regulation | $V_I$ = 14.5 to 27 V $T_J$ = 25°C | | | 250 | mV |
| | | $V_I$ = 16 to 27 V $T_J$ = 25°C | | | 200 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 100 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 50 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6.5 | mA |
| | | $T_J$ = 125°C | | | 6 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 16 to 27 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 80 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 15 to 25 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 37 | 42 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L15A

refer to the test circuits, $V_I$ = 19V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 14.4 | 15 | 15.6 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 17.5 to 30 V | 14.25 | | 15.75 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 23 V | 14.25 | | 15.75 | |
| $V_O$ | Line Regulation | $V_I$ = 17.5 to 30 V $T_J$ = 25°C | | | 300 | mV |
| | | $V_I$ = 20 to 30 V $T_J$ = 25°C | | | 250 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 150 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 75 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6.5 | mA |
| | | $T_J$ = 125°C | | | 6 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 20 to 30 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 90 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 18.5 to 28.5 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 34 | 39 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L18A

refer to the test circuits, $V_I$ = 27V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 17.3 | 18 | 18.7 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 22 to 33V | 17.1 | | 18.9 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 27 V | 17.1 | | 18.9 | |
| $V_O$ | Line Regulation | $V_I$ = 21 to 33 V $T_J$ = 25°C | | | 320 | mV |
| | | $V_I$ = 22 to 33 V $T_J$ = 25°C | | | 270 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 170 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 85 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6.5 | mA |
| | | $T_J$ = 125°C | | | 6 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 23 to 33 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 120 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 23 to 33 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 33 | 38 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L20A

refer to the test circuits, $V_I$ = 29V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 19.2 | 20 | 20.8 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 24 to 33V | 19 | | 21 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 29V | 19 | | 21 | |
| $V_O$ | Line Regulation | $V_I$ = 22.5 to 34 V $T_J$ = 25°C | | | 330 | mV |
| | | $V_I$ = 24 to 34 V $T_J$ = 25°C | | | 280 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 180 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 90 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6.5 | mA |
| | | $T_J$ = 125°C | | | 6 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 25 to 33 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 120 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 25 to 35 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 32 | 38 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L24A

refer to the test circuits, $V_I$ = 27V, $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 23 | 24 | 25 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 27 to 38V | 22.8 | | 25.2 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 33 V | 22.8 | | 25.2 | |
| $V_O$ | Line Regulation | $V_I$ = 27 to 38 V $T_J$ = 25°C | | | 350 | mV |
| | | $V_I$ = 28 to 38 V $T_J$ = 25°C | | | 300 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 200 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 100 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6.5 | mA |
| | | $T_J$ = 125°C | | | 6 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 28 to 38 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$ = 25°C | | 200 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 23 to 33 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 31 | 37 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

## ELECTRICAL CHARACTERISTICS OF LM78L33A

refer to the test circuits, $V_I$ = 3 6 V , $I_O$ = 40 mA, $C_I$ = 0.33 μF, $C_O$ = 0.1 μF,

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output Voltage | $T_J$ = 25°C | 31.68 | 33 | 34.32 | V |
| $V_O$ | Output Voltage | $I_O$ = 1 to 40 mA $V_I$ = 36 to 40 V | 31.35 | | 34.65 | V |
| | | $I_O$ = 1 to 70 mA $V_I$ = 38 V | 31.35 | | 34.65 | |
| $V_O$ | Line Regulation | $V_I$ = 36 to 40 V $T_J$ = 25°C | | | 150 | mV |
| | | $V_I$ = 37 to 40 V $T_J$ = 25°C | | | 100 | |
| $V_O$ | Load Regulation | $I_O$ = 1 to 100 mA $T_J$ = 25°C | | | 60 | mV |
| | | $I_O$ =1 to 40 mA $T_J$ = 25°C | | | 30 | |
| $I_d$ | Quiescent Current | $T_J$ = 25°C | | | 6 | mA |
| | | $T_J$ = 125°C | | | 5.5 | mA |
| $I_d$ | Quiescent Current Change | $I_O$ =1 to 40 mA | | | 0.1 | mA |
| | | $V_I$ = 36 to 40 V | | | 1.5 | |
| eN | Output Noise Voltage | B =10Hz to 100KHz $T_J$= 25°C | | 120 | | V |
| SVR | Supply Voltage Rejection | $V_I$ = 36 to 40 V f = 120Hz<br>$I_O$ = 40 mA $T_J$ = 25°C | 41 | 49 | | dB |
| $V_d$ | Dropout Voltage | | | 1.7 | | V |

Figure 1 : 78L05/12 Output Voltage vs Ambient Temperature

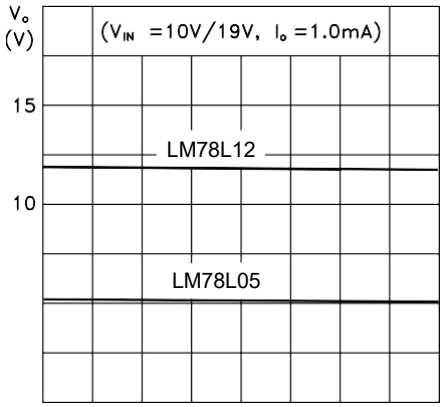
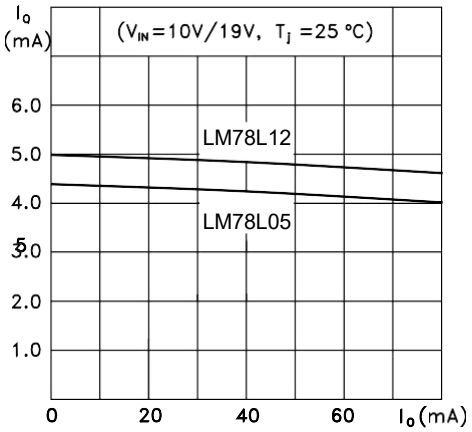
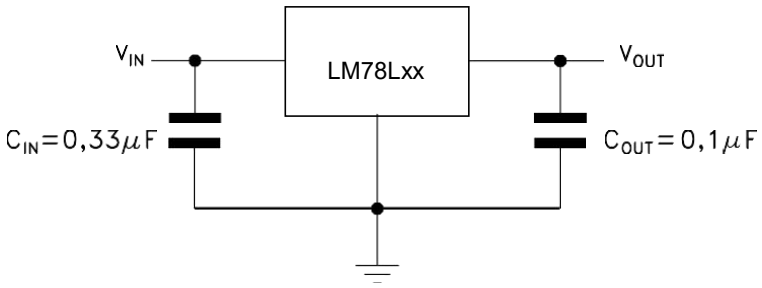


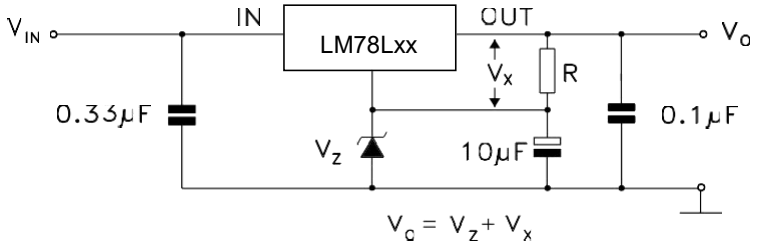

Figure 2: 78L05/12 Quiescent Current vs Output Current



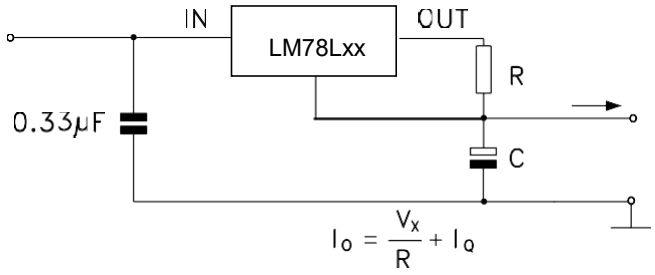
TEST CIRCUITS



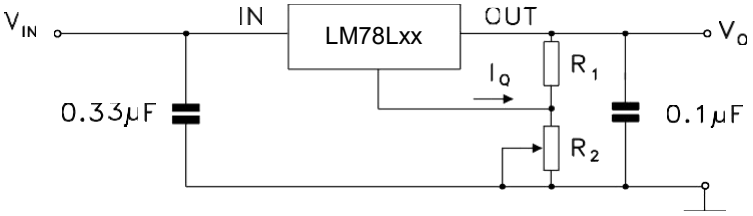

Edit Boost Circuit




Current Regulator

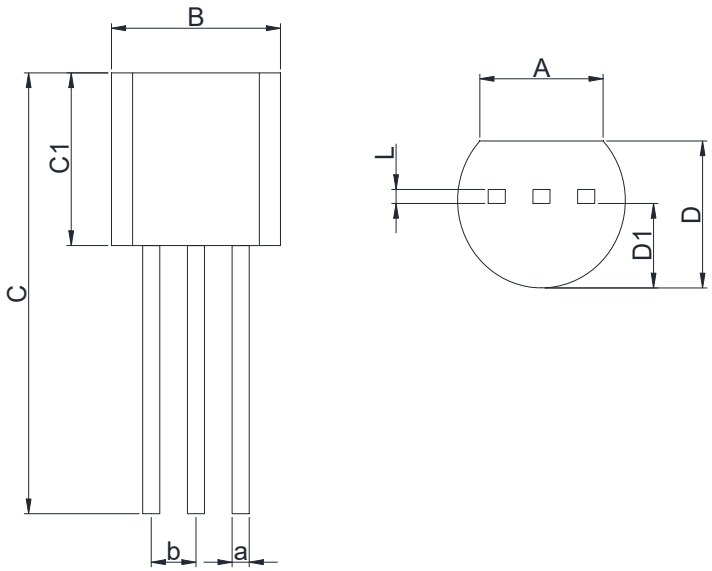



Adjustable Output Regulator



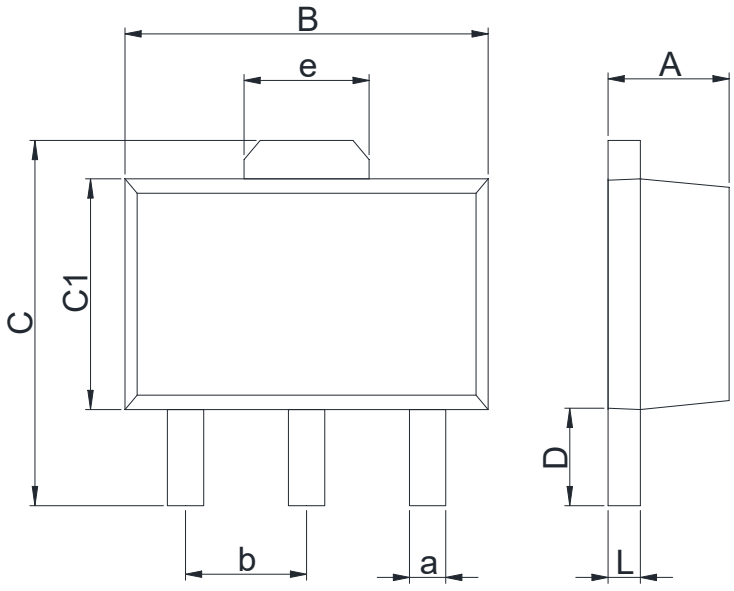
## Physical Dimensions

TO-92




| Dimensions In Millimeters(TO-92) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Symbol:** | A | B | C | C1 | D | D1 | L | a | b |
| **Min:** | 3.43 | 4.44 | 11.2 | 4.32 | 3.17 | 2.03 | 0.33 | 0.40 | 1.27BSC |
| **Max:** | 3.83 | 5.21 | 12.7 | 5.34 | 4.19 | 2.67 | 0.42 | 0.52 | |

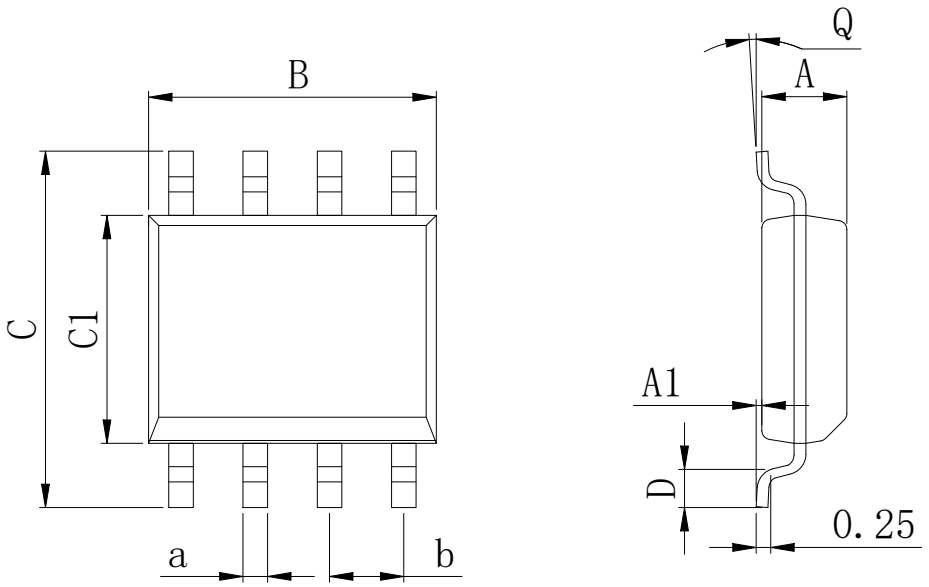
SOT89-3




| Dimensions In Millimeters(SOT89-3L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Symbol:** | A | B | C | C1 | D | L | a | b | e |
| **Min:** | 1.40 | 4.40 | 3.94 | 2.30 | 090 | 0.35 | 0.40 | 1.50 | 1.55 |
| **Max:** | 1.60 | 4.60 | 4.25 | 2.60 | 1.20 | 0.44 | 0.50 | BSC | BSC |

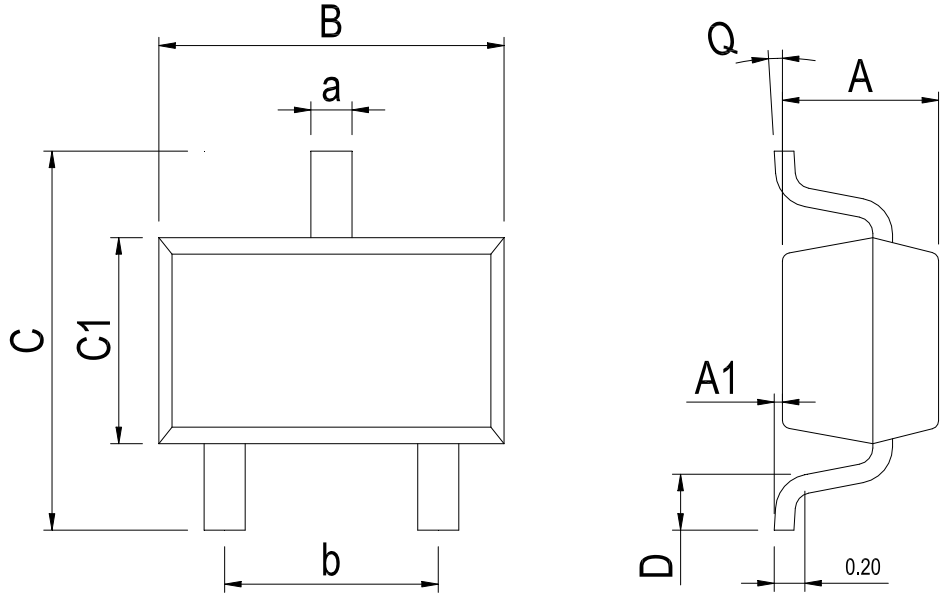
## Physical Dimensions

SOP8




| Dimensions In Millimeters(SOP8) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Symbol:** | A | A1 | B | C | C1 | D | Q | a | b |
| **Min:** | 1.35 | 0.05 | 4.90 | 5.80 | 3.80 | 0.40 | 0° | 0.35 | 1.27 BSC |
| **Max:** | 1.55 | 0.20 | 5.10 | 6.20 | 4.00 | 0.80 | 8° | 0.45 | |

SOT23-3




| Dimensions In Millimeters(SOT23-3) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Symbol:** | A | A1 | B | C | C1 | D | Q | a | b |
| **Min:** | 1.05 | 0.00 | 2.82 | 2.65 | 1.50 | 0.30 | 0° | 0.30 | 1.90 BSC |
| **Max:** | 1.15 | 0.15 | 3.02 | 2.95 | 1.70 | 0.60 | 8° | 0.40 | |

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