

Series3-Terminal 0.1A Positive Voltage Regulators

LR78LXX

DESCRIPTION

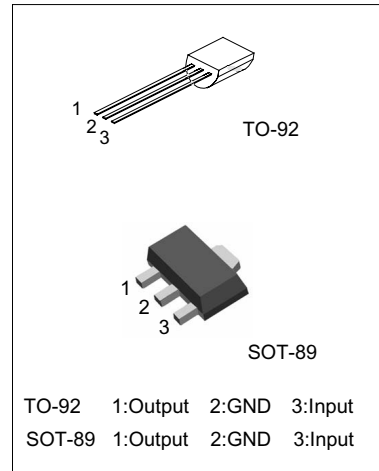
The LRC LR78LXX family is monolithic fixed voltage regulator integrated circuit. They are suitable for applications that required supply current up to 100mA.

FEATURES

- *Output current up to 100mA
- *Fixed output voltage of 5V, 6V, 8V, 9V, 12V, 15V, 18V and 24V available
- *Thermal overload shutdown protection
- *Short circuit current limiting
- *We declare that material of product compliance with ROHS requirements.

ORDERING INFORMATION

- *LR78Lxx: TO-92
- *LR78LxxU: SOT89



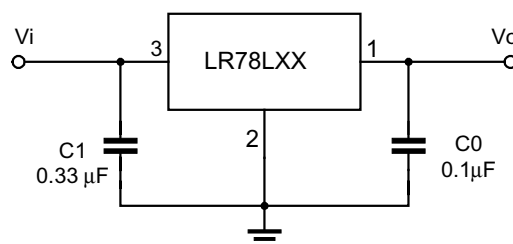
ABSOLUTE MAXIMUM RATINGS

(Operating temperature range applies unless otherwise specified)

| PARAMETER | SYMBOL | MIN. | MAX. | UNIT |
|-------------------------------------|-----------|------|------|------|
| Input voltage (for $V_o=5\sim 9V$) | V_i | | 30 | V |
| (for $V_o=12\sim 24V$) | V_i | | 35 | V |
| Output Current | I_o | | 100 | mA |
| Power Dissipation | PD | | | mW |
| TO-92 | | | 625 | |
| SOT-89 | | | 350 | |
| Operating Junction Temperature | T_J | -55 | +150 | °C |
| Operating Ambient Temperature | T_{OPR} | -55 | +125 | °C |
| Storage Temperature Range | T_{STG} | -55 | +150 | °C |

ESD: HBM 2000V

APPLICATION CIRCUIT



Note 1: To specify an output voltage, substitute voltage value for "XX".

Note 2: Bypass capacitors are recommended for optimum stability and transient response and should be located as close as possible to the regulators.

LR78L00 Series 3-Terminal 0.1A Positive Voltage Regulators

LR78L05 ELECTRICAL CHARACTERISTICS

($V_I=10V$, $I_o=40mA$, $-55^\circ C < T_j < 125^\circ C$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP. | MAX | UNIT |
|--------------------------|--------------|---|------|------|------|---------------|
| Output Voltage | V_o | $T_j=25^\circ C$ | 4.80 | 5.0 | 5.20 | V |
| | | $7V \leq V_I \leq 20V, I_o=1mA-40mA$ | 4.75 | | 5.25 | V |
| | | $7V \leq V_I \leq V_{MAX}, I_o=1mA-70mA$ | 4.75 | | 5.25 | V (note 2) |
| Load Regulation | V_o | $T_j=25^\circ C, I_o=1mA-100mA$ | | 11 | 60 | mV |
| | | $T_j=25^\circ C, I_o=1mA-40mA$ | | 5.0 | 30 | mV |
| Line regulation | V_o | $7V \leq V_I \leq 20V, T_j=25^\circ C$ | | 32 | 150 | mV |
| | | $8V \leq V_I \leq 20V, T_j=25^\circ C$ | | 26 | 100 | mV |
| Quiescent Current | I_q | $V_I=10V, I_o=0mA, T_j=25^\circ C$ | | 3.8 | 6.1 | mA |
| Quiescent Current Change | ΔI_q | $8V \leq V_I \leq 20V$ | | | 1.5 | mA |
| | ΔI_q | $1mA \leq V_I \leq 40mA$ | | | 0.1 | mA |
| Output Noise Voltage | V_N | $10Hz \leq f \leq 100kHz$ | | 42 | | μV |
| Ripple Rejection | RR | $8V \leq V_I \leq 20V, f=120Hz, T_j=25^\circ C$ | 41 | 49 | | dB |
| Dropout Voltage | V_d | $T_j=25^\circ C$ | | 1.7 | | V |

LR78L06 ELECTRICAL CHARACTERISTICS

($V_I=12V$, $I_o=40mA$, $-55^\circ C < T_j < 125^\circ C$, $C_1=0.33\mu F$, $C_o=0.1\mu F$, unless otherwise specified)(Note 1)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP. | MAX | UNIT |
|--------------------------|--------------|--|------|------|------|---------------|
| Output Voltage | V_o | $T_j=25^\circ C$ | 5.76 | 6.0 | 6.24 | V |
| | | $8.5V \leq V_I \leq 20V, I_o=1mA-40mA$ | 5.70 | | 6.30 | V |
| | | $8.5V \leq V_I \leq V_{MAX}, I_o=1mA-70mA$ | 5.70 | | 6.30 | V (note 2) |
| Load Regulation | V_o | $T_j=25^\circ C, I_o=1mA-100mA$ | | 12.8 | 80 | mV |
| | | $T_j=25^\circ C, I_o=1mA-70mA$ | | 5.8 | 40 | mV |
| Line regulation | V_o | $8.5V \leq V_I \leq 20V, T_j=25^\circ C$ | | 64 | 175 | mV |
| | | $9V \leq V_I \leq 20V, T_j=25^\circ C$ | | 54 | 125 | mV |
| Quiescent Current | I_q | $V_I=12V, I_o=0mA, T_j=25^\circ C$ | | 3.9 | 6.0 | mA |
| Quiescent Current Change | ΔI_q | $9V \leq V_I \leq 20V$ | | | 1.5 | mA |
| | ΔI_q | $1mA \leq V_I \leq 40mA$ | | | 0.1 | mA |
| Output Noise Voltage | V_N | $10Hz \leq f \leq 100kHz$ | | 49 | | μV |
| Ripple Rejection | RR | $10V \leq V_I \leq 20V, f=120Hz, T_j=25^\circ C$ | 40 | 46 | | dB |
| Dropout Voltage | V_d | $T_j=25^\circ C$ | | 1.7 | | V |

LR78L00 Series 3-Terminal 0.1A Positive Voltage Regulators

LR78L08 ELECTRICAL CHARACTERISTICS

($V_I=14V, I_O=40mA, -55^{\circ}C < T_J < 125^{\circ}C, C_1=0.33\mu F, C_o=0.1\mu F$, unless otherwise specified)(Note 1)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|------|-----|------|---------------|
| Output Voltage | V_O | $T_J=25^{\circ}C$ | 7.68 | 8.0 | 8.32 | V |
| | | $10.5V \leq V_I \leq 23V, I_O=1mA-40mA$ | 7.60 | | 8.40 | V |
| | | $10.5V \leq V_I \leq V_{MAX}, I_O=1mA-70mA$ | 7.60 | | 8.40 | V (note 2) |
| Load Regulation | V_O | $T_J=25^{\circ}C, I_O=1mA-100mA$ | | 18 | 80 | mV |
| | | $T_J=25^{\circ}C, I_O=1mA-70mA$ | | 10 | 40 | mV |
| Line regulation | V_O | $10.5V \leq V_I \leq 23V, T_J=25^{\circ}C$ | | 42 | 175 | mV |
| | | $11V \leq V_I \leq 23V, T_J=25^{\circ}$ | | 36 | 125 | mV |
| Quiescent Current | I_q | $V_{IN}=14V, I_O=0mA, T_J=25^{\circ}C$ | | 4.0 | 6.0 | mA |
| Quiescent Current Change | ΔI_q | $11V \leq V_I \leq 23V$ | | | 1.5 | mA |
| | ΔI_q | $1mA \leq V_I \leq 40mA$ | | | 0.1 | mA |
| Output Noise Voltage | V_N | $10Hz \leq f \leq 100kHz$ | | 54 | | μV |
| Ripple Rejection | RR | $11V \leq V_I \leq 23V, f=120Hz, T_J=25^{\circ}C$ | 39 | 46 | | dB |
| Dropout Voltage | V_d | $T_J=25^{\circ}C$ | | 1.7 | | V |

LR78L09 ELECTRICAL CHARACTERISTICS

($V_I=15V, I_O=40mA, -55^{\circ}C < T_J < 125^{\circ}C, C_1=0.33\mu F, C_o=0.1\mu F$, unless otherwise specified)(Note 1)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|------|-----|------|---------------|
| Output Voltage | V_O | $T_J=25^{\circ}C$ | 8.64 | 9.0 | 9.36 | V |
| | | $11.5V \leq V_I \leq 24V, I_O=1mA-40mA$ | 8.55 | | 9.45 | V |
| | | $11.5V \leq V_I \leq V_{MAX}, I_O=1mA-70mA$ | 8.55 | | 9.45 | V (note 2) |
| Load Regulation | V_O | $T_J=25^{\circ}C, I_O=1mA-100mA$ | | 20 | 90 | mV |
| | | $T_J=25^{\circ}C, I_O=1mA-40mA$ | | 11 | 45 | mV |
| Line regulation | V_O | $11.5V \leq V_I \leq 24V, T_J=25^{\circ}C$ | | 90 | 200 | mV |
| | | $13V \leq V_I \leq 24V, T_J=25^{\circ}C$ | | 100 | 150 | mV |
| Quiescent Current | I_q | $V_{IN}=15V, I_O=0mA, T_J=25^{\circ}C$ | | 4.1 | 6.0 | mA |
| Quiescent Current Change | ΔI_q | $13V \leq V_I \leq 24V$ | | | 1.5 | mA |
| | ΔI_q | $1mA \leq V_I \leq 40mA$ | | | 0.1 | mA |
| Output Noise Voltage | V_N | $10Hz \leq f \leq 100kHz$ | | 58 | | μV |
| Ripple Rejection | RR | $12V \leq V_I \leq 23V, f=120Hz, T_J=25^{\circ}C$ | 38 | 44 | | dB |
| Dropout Voltage | V_d | $T_J=25^{\circ}C$ | | 1.7 | | V |

LR78L00 Series3-Terminal 0.1A Positive Voltage Regulators

LR78L12 ELECTRICAL CHARACTERISTICS

($V_I=19V, I_o=40mA, -55^{\circ}C < T_j < 125^{\circ}C, C_1=0.33\mu F, C_o=0.1\mu F$, unless otherwise specified)(Note 1)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|-------|------|-------|---------------|
| Output Voltage | V_o | $T_j=25^{\circ}C$ | 11.5 | 12.0 | 12.5 | V |
| | | $14.5V \leq V_I \leq 27V, I_o=1mA-40mA$ | 11.40 | | 12.60 | V |
| | | $14.5V \leq V_I \leq V_{MAX}, I_o=1mA-70mA$ | 11.40 | | 12.60 | V (note 2) |
| Load Regulation | V_o | $T_j=25^{\circ}C, I_o=1mA-100mA$ | | 25 | 150 | mV |
| | | $T_j=25^{\circ}C, I_o=1mA-40mA$ | | 12 | 75 | mV |
| Line regulation | V_o | $14.5V \leq V_I \leq 27V, T_j=25^{\circ}C$ | | 55 | 250 | mV |
| | | $16V \leq V_I \leq 27V, T_j=25^{\circ}C$ | | 49 | 200 | mV |
| Quiescent Current | I_q | $V_{IN}=19V, I_o=0mA, T_j=25^{\circ}C$ | | 4.3 | 6.5 | mA |
| Quiescent Current Change | ΔI_q | $16V \leq V_I \leq 27V$ | | | 1.5 | mA |
| | ΔI_q | $1mA \leq V_I \leq 40mA$ | | | 0.1 | mA |
| Output Noise Voltage | V_N | $10Hz \leq f \leq 100kHz$ | | 70 | | μV |
| Ripple Rejection | RR | $15V \leq V_I \leq 25V, f=120Hz, T_j=25^{\circ}C$ | 37 | 42 | | dB |
| Dropout Voltage | V_d | $T_j=25^{\circ}C$ | | 1.7 | | V |

LR78L15 ELECTRICAL CHARACTERISTICS

($V_I=23V, I_o=40mA, -55^{\circ}C < T_j < 125^{\circ}C, C_1=0.33\mu F, C_o=0.1\mu F$, unless otherwise specified)(Note 1)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|-------|------|-------|---------------|
| Output Voltage | V_o | $T_j=25^{\circ}C$ | 14.40 | 15.0 | 15.60 | V |
| | | $17.5V \leq V_I \leq 30V, I_o=1mA-40mA$ | 14.25 | | 15.75 | V |
| | | $17.5V \leq V_I \leq V_{MAX}, I_o=1mA-70mA$ | 14.25 | | 15.75 | V (note 2) |
| Load Regulation | V_o | $T_j=25^{\circ}C, I_o=1mA-100mA$ | | 20 | 150 | mV |
| | | $T_j=25^{\circ}C, I_o=1mA-70mA$ | | 25 | 150 | mV |
| Line regulation | V_o | $17.5V \leq V_I \leq 30V, T_j=25^{\circ}C$ | | 25 | 150 | mV |
| | | $20V \leq V_I \leq 30V, T_j=25^{\circ}C$ | | 15 | 75 | mV |
| Quiescent Current | I_q | $V_{IN}=23V, I_o=0mA, T_j=25^{\circ}C$ | | 4.6 | 6.5 | mA |
| Quiescent Current Change | ΔI_q | $20V \leq V_I \leq 30V$ | | | 1.5 | mA |
| | ΔI_q | $1mA \leq V_I \leq 40mA$ | | | 0.1 | mA |
| Output Noise Voltage | V_N | $10Hz \leq f \leq 100kHz$ | | 82 | | μV |
| Ripple Rejection | RR | $18.5V \leq V_I \leq 28.5V, f=120Hz, T_j=25^{\circ}C$ | 34 | 39 | | dB |
| Dropout Voltage | V_d | $T_j=25^{\circ}C$ | | 1.7 | | V |

LR78L00 Series3-Terminal 0.1A Positive Voltage Regulators

LR78L18 ELECTRICAL CHARACTERISTICS

($V_I=27V, I_o=40mA, -55^{\circ}C < T_j < 125^{\circ}C, C_1=0.33\mu F, C_o=0.1\mu F$, unless otherwise specified)(Note 1)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|-------|------|-------|---------------|
| Output Voltage | V_o | $T_j=25^{\circ}C$ | 17.30 | 18.0 | 18.70 | V |
| | | $21V \leq V_I \leq 33V, I_o=1mA-40mA$ | 17.10 | | 18.90 | V |
| | | $21V \leq V_I \leq V_{MAX}, I_o=1mA-70mA$ | 17.10 | | 18.90 | V (note 2) |
| Load Regulation | V_o | $T_j=25^{\circ}C, I_o=1mA-100mA$ | | 30 | 180 | mV |
| | | $T_j=25^{\circ}C, I_o=1mA-40mA$ | | 19 | 90 | mV |
| Line regulation | V_o | $21V \leq V_I \leq 33V, T_j=25^{\circ}C$ | | 70 | 360 | mV |
| | | $22V \leq V_I \leq 33V, T_j=25^{\circ}C$ | | 60 | 300 | mV |
| Quiescent Current | I_q | $V_{IN}=27V, I_o=0mA, T_j=25^{\circ}C$ | | 4.7 | 6.5 | mA |
| Quiescent Current Change | ΔI_q | $21V \leq V_I \leq 33V$ | | | 1.5 | mA |
| | ΔI_q | $1mA \leq V_I \leq 40mA$ | | | 0.1 | mA |
| Output Noise Voltage | V_N | $10Hz \leq f \leq 100kHz$ | | 150 | | μV |
| Ripple Rejection | RR | $23V \leq V_I \leq 33V, f=120Hz, T_j=25^{\circ}C$ | 32 | 36 | | dB |
| Dropout Voltage | V_d | $T_j=25^{\circ}C$ | | 1.7 | | V |

LR78L24 ELECTRICAL CHARACTERISTICS

($V_I=33V, I_o=40mA, -55^{\circ}C < T_j < 125^{\circ}C, C_1=0.33\mu F, C_o=0.1\mu F$, unless otherwise specified)(Note 1)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------|--------------|---|-------|------|-------|---------------|
| Output Voltage | V_o | $T_j=25^{\circ}C$ | 23.04 | 24.0 | 24.96 | V |
| | | $27V \leq V_I \leq 38V, I_o=1mA-40mA$ | 22.8 | | 25.2 | V |
| | | $27V \leq V_I \leq V_{MAX}, I_o=1mA-70mA$ | 22.8 | | 25.2 | V (note 2) |
| Load Regulation | V_o | $T_j=25^{\circ}C, I_o=1mA-100mA$ | | 40 | 200 | mV |
| | | $T_j=25^{\circ}C, I_o=1mA-40mA$ | | 20 | 100 | mV |
| Line regulation | V_o | $27V \leq V_I \leq 38V, T_j=25^{\circ}C$ | | 160 | 360 | mV |
| | | $28V \leq V_I \leq 38V, T_j=25^{\circ}C$ | | 150 | 300 | mV |
| Quiescent Current | I_q | $V_{IN}=33V, I_o=0mA, T_j=25^{\circ}C$ | | 4.7 | 6.5 | mA |
| Quiescent Current Change | ΔI_q | $27V \leq V_I \leq 38V$ | | | 1.5 | mA |
| | ΔI_q | $1mA \leq V_I \leq 40mA$ | | | 0.1 | mA |
| Output Noise Voltage | V_N | $10Hz \leq f \leq 100kHz$ | | 200 | | μV |
| Ripple Rejection | RR | $27V \leq V_I \leq 38V, f=120Hz, T_j=25^{\circ}C$ | 34 | 45 | | dB |
| Dropout Voltage | V_d | $T_j=25^{\circ}C$ | | 1.7 | | V |

Note 1: The Maximum steady state usable output current is dependent on input voltage, heat sinking, lead length of the package and copper pattern of PCB. The data above represent pulse test conditions with junction temperatures specified at the initiation of test.

Note 2: Power dissipation < 0.5W

Figure 1: Output Voltage Vs Ambient Temperature

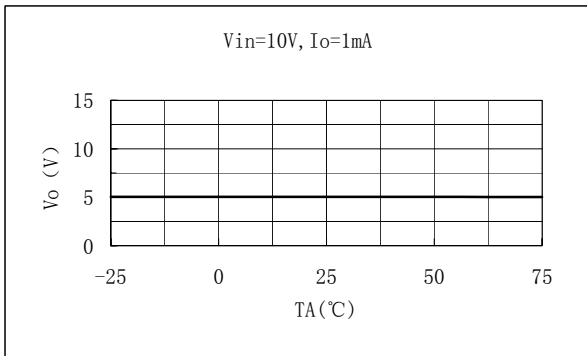


Figure 2: Quiescent Current Vs Output Current

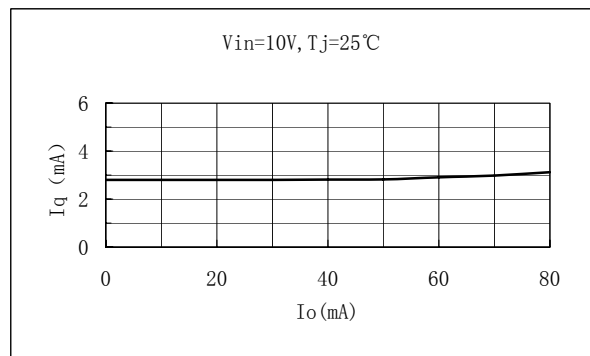


Figure3: Load Characteristics

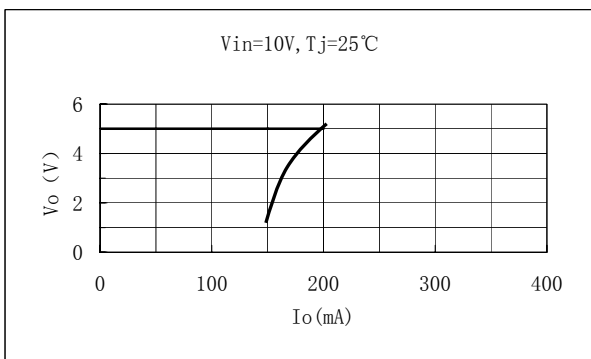


Figure4: Quiescent Current Vs Input Voltage

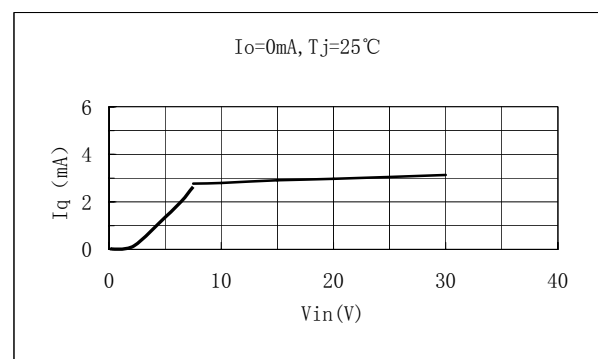


Figure 5: Thermal Shutdown

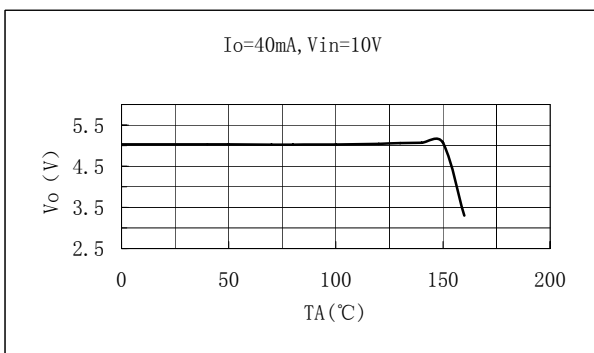
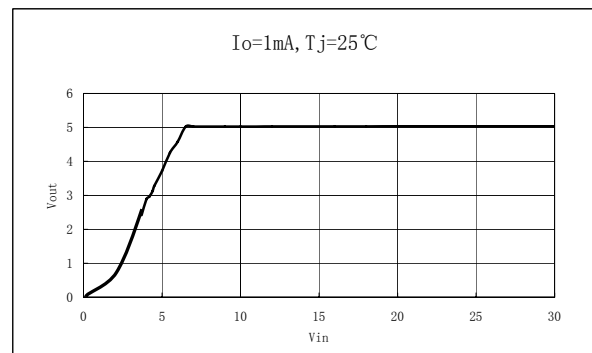
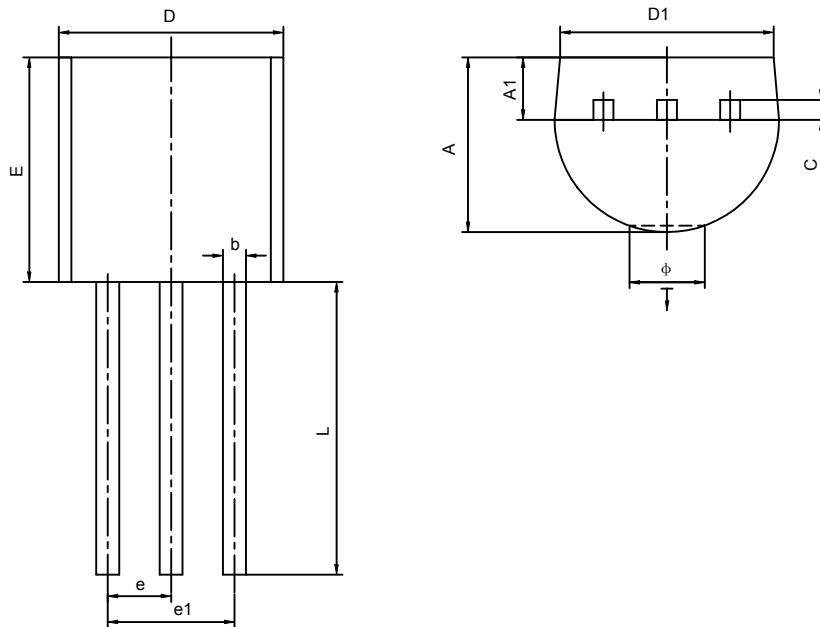


Figure 6: Output characteristics

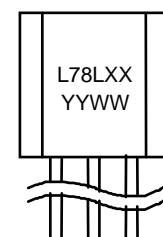


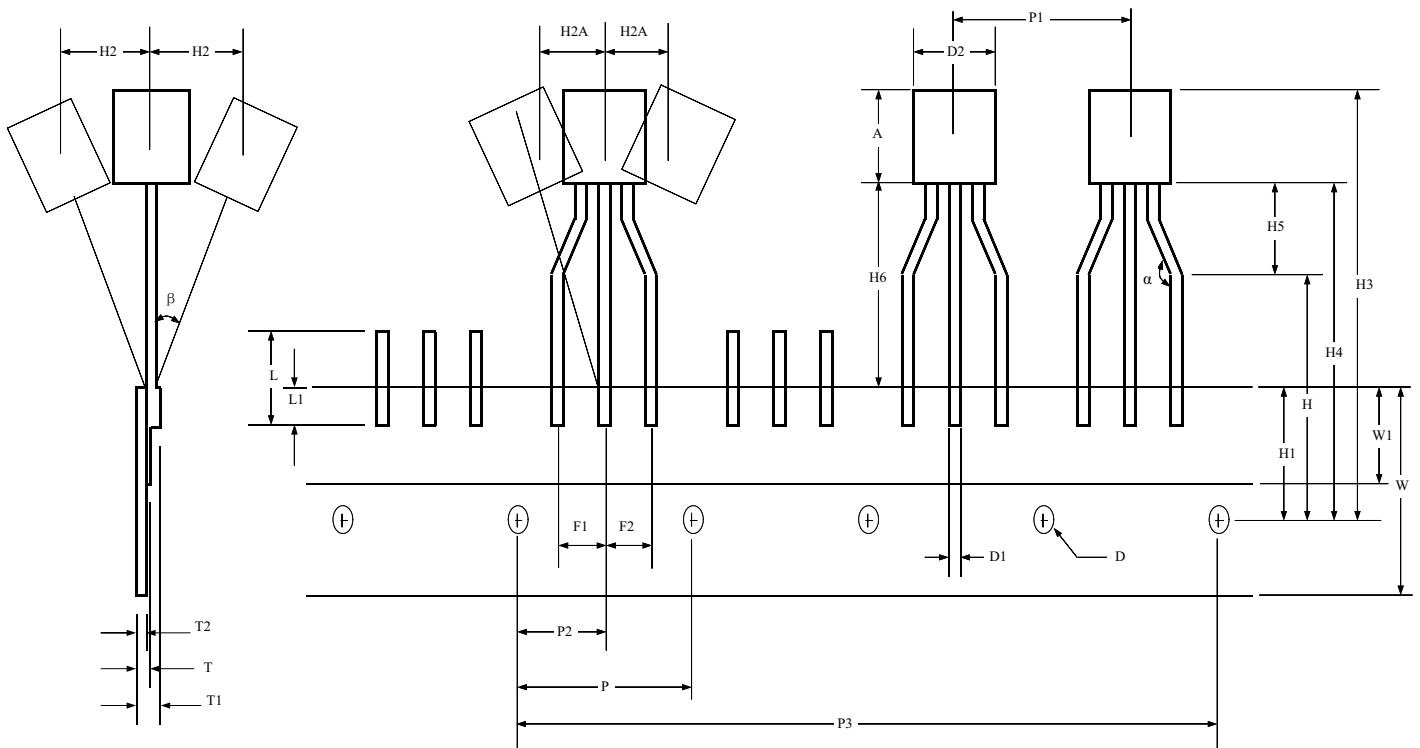
TO-92 PACKAGE OUTLINE DIMENSIONS


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 3.300 | 3.700 | 0.130 | 0.146 |
| A1 | 1.100 | 1.400 | 0.043 | 0.055 |
| b | 0.380 | 0.550 | 0.015 | 0.022 |
| c | 0.360 | 0.510 | 0.014 | 0.020 |
| D | 4.400 | 4.700 | 0.173 | 0.185 |
| D1 | 3.430 | | 0.135 | |
| E | 4.300 | 4.700 | 0.169 | 0.185 |
| e | 1.270TYP | | 0.050TYP | |
| e1 | 2.440 | 2.640 | 0.096 | 0.104 |
| L | 14.100 | 14.500 | 0.555 | 0.571 |
| Ö | | 1.600 | | 0.063 |
| ↓ | 0.000 | 0.380 | 0.000 | 0.015 |

SHIPPING INFORMATION

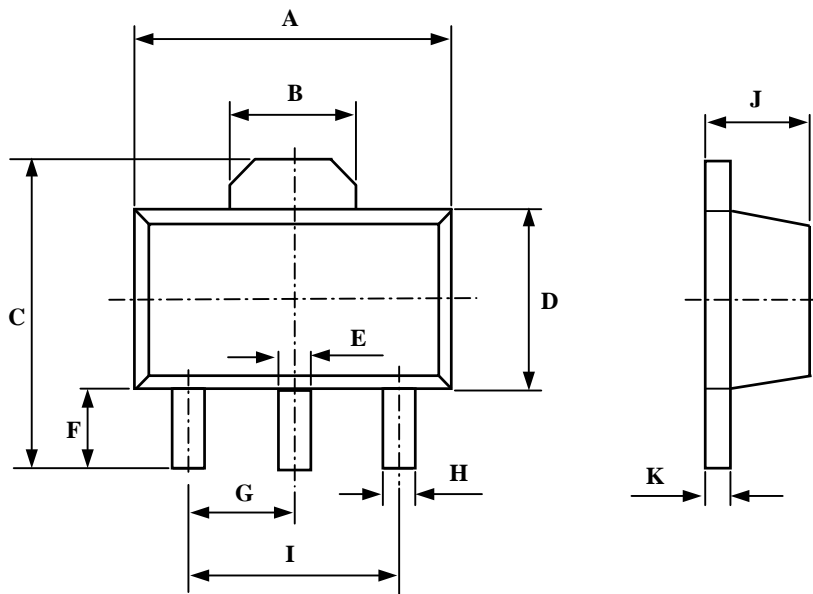
1. Bag: 1000 Units/ Bag 10 Bag/ Box(240mm*170mm*96mm)
4 Box/ Chest(365mm*270mm*210mm)
2. Tape: 2000 Units/ Box 10 Box/ Chest

MARKING


TO-92 TAPPING OUTLINE DIMENSIONS


| symbol | mm | | inch | | symbol | mm | | inch | |
|--------|-------|-------|--------|-------|----------|-------|-------|-------|-------|
| | min | max | min | max | | min | max | min | max |
| A | 4.40 | 4.80 | 0.173 | 0.189 | L | - | 11.00 | - | 0.433 |
| D | 3.80 | 4.20 | 0.150 | 0.165 | L1 | 2.50 | - | 0.098 | - |
| D1 | 0.45 | 0.55 | 0.018 | 0.022 | P | 12.50 | 12.90 | 0.492 | 0.508 |
| D2 | 4.40 | 4.80 | 0.173 | 0.189 | P1 | 12.50 | 12.90 | 0.492 | 0.508 |
| F1,F2 | 2.40 | 2.90 | 0.094 | 0.114 | P2 | 6.31 | 6.39 | 0.248 | 0.252 |
| F1-F2 | -0.30 | 0.30 | -0.012 | 0.012 | P3 | 50.30 | 51.30 | 1.980 | 2.020 |
| H | 15.50 | 16.50 | 0.610 | 0.650 | T | - | 0.55 | - | 0.022 |
| H1 | 8.50 | 9.50 | 0.335 | 0.374 | T1 | - | 1.42 | - | 0.056 |
| H2 | - | 1.00 | - | 0.039 | T2 | 0.36 | 0.55 | 0.014 | 0.022 |
| H2A | - | 1.00 | - | 0.039 | W | 17.50 | 19.00 | 0.689 | 0.748 |
| H3 | - | 26.00 | - | 1.024 | W1 | 5.00 | 7.00 | 0.197 | 0.276 |
| H4 | - | 21.00 | - | 0.827 | W2 | - | 0.50 | - | 0.020 |
| H5 | 3.00 | 5.00 | 0.118 | 0.197 | α | 145° | 155° | 145° | 155° |
| H6 | 9.00 | 11.00 | 0.354 | 0.433 | β | - | 4° | - | 4° |

SOT-89-3L PACKAGE OUTLINE DIMENSIONS

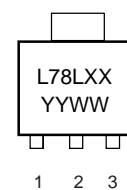


| SYMBOL | Dimensions In Mm | | Dimensions In Inches | |
|--------|------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 4.000 | 4.600 | 0.173 | 0.181 |
| B | 1.550 REF | | 0.061 REF | |
| C | 3.940 | 4.250 | 0.155 | 0.167 |
| D | 2.300 | 2.600 | 0.091 | 0.102 |
| E | 0.400 | 0.580 | 0.016 | 0.023 |
| F | 0.900 | 1.200 | 0.035 | 0.047 |
| G | 1.5 TYP | | 0.06 TYP | |
| H | 0.320 | 0.520 | 0.013 | 0.020 |
| I | 3 TYP | | 0.118 TYP | |
| J | 1.400 | 1.600 | 0.055 | 0.063 |
| K | 0.350 | 0.440 | 0.014 | 0.017 |

SHIPPING INFORMATION

Tape: 2500 Units/ Reel(13 inch)
 2 Reel/ Box(340mm*340mm*50mm)
 6 Box/ Chest(360mm*360mm*315mm)

MARKING



单击下面可查看定价，库存，交付和生命周期等信息

[>>LRC\(乐山无线电\)](#)