

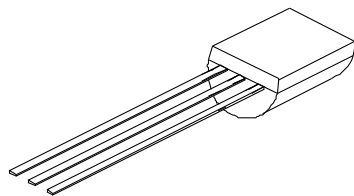
## 1.Description

The 78LXX series of fixed voltage monolithic integrated circuit voltage regulators are suitable for applications that required supply up to 150mA.

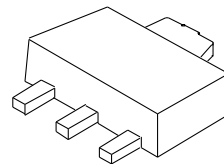
## 2.Features

- Maximum output current of 150mA
- Output voltage of 3.3V,5V,6V,8V,9V,10V, 12V,15V and 24V
- Thermal overload protection
- Short circuit current limiting
- Output voltage accuracy: 1%

## 3.Pinning information

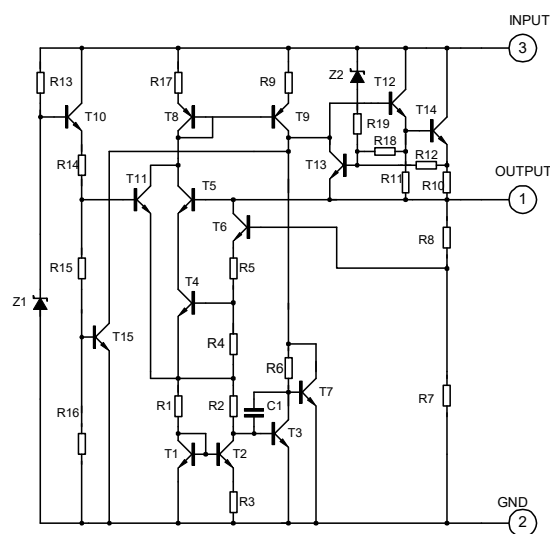


TO-92



SOT-89

## 4.Block Diagram





## 5. Absolute Maximum Ratings

| Characteristics                                        | Symbol    | Value      | Units |
|--------------------------------------------------------|-----------|------------|-------|
| Input voltage (for $V_o=5,8V$ )<br>(for $V_o=12,15V$ ) | $V_I$     | 30         | V     |
|                                                        |           | 35         | V     |
| High power dissipation                                 | $P_d$     | 700        | mW    |
| Junction Temperature Range                             | $T_{OPR}$ | -20 to 120 | °C    |
| Storage Temperature Range                              | $T_{STG}$ | -55 to 150 | °C    |



## 6.1 Electrical Characteristics (78L33)

( $V_i=8.3V$ ,  $I_o=80mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                               | Min   | Typ  | Max   | Units           |
|----------------------------------|-----------------------|----------------------------------------------------------|-------|------|-------|-----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                        | 3.168 | 3.3  | 3.432 | V               |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                        | 3.168 |      | 3.432 | V               |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 200mA$                  |       | 10   | 60    | mV              |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 80mA$                   |       | 7    | 30    | mV              |
| Line regulation                  | $\Delta V_o$          | $5.3V\leq V_i\leq 20V$ , $T_J=25^{\circ}C$               |       | 7    | 150   | mV              |
|                                  |                       | $6.3V\leq V_i\leq 20V$ , $T_J=25^{\circ}C$               |       | 4    | 100   | mV              |
| Quiescent Current                | $I_q$                 | $T_J=25^{\circ}C$                                        |       | 2    | 5.5   | mA              |
| Quiescent Current Change         | $\Delta I_q$          | $6.3V\leq V_i\leq 20V$                                   |       |      | 1.5   | mA              |
|                                  | $\Delta I_q$          | $1mA\leq I_o\leq 80mA$                                   |       |      | 0.1   | mA              |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$ , $T_J=25^{\circ}C$              |       | 40   |       | $\mu V$         |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                                |       | 0.45 |       | mV/ $^{\circ}C$ |
| Ripple Rejection                 | RR                    | $6.3V\leq V_i\leq 16.3V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 40    | 49   |       | dB              |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                        |       | 1.7  |       | V               |



## 6.2 Electrical Characteristics (78L05)

( $V_i=10V$ ,  $I_o=40mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                           | Min  | Typ  | Max  | Units           |
|----------------------------------|-----------------------|------------------------------------------------------|------|------|------|-----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                    | 4.95 | 5    | 5.05 | V               |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                    | 4.95 | 5    | 5.05 | V               |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 130mA$              |      | 11   | 60   | mV              |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 40mA$               |      | 5    | 30   | mV              |
| Line regulation                  | $\Delta V_o$          | $7V\leq V_i\leq 20V$ , $T_J=25^{\circ}C$             |      | 8    | 150  | mV              |
|                                  |                       | $8V\leq V_i\leq 20V$ , $T_J=25^{\circ}C$             |      | 6    | 100  | mV              |
| Quiescent Current                | $I_q$                 |                                                      |      | 2    | 5.5  | mA              |
| Quiescent Current Change         | $\Delta I_q$          | $8V\leq V_i\leq 20V$                                 |      |      | 1.5  | mA              |
|                                  | $\Delta I_q$          | $1mA\leq V_i\leq 40mA$                               |      |      | 0.1  | mA              |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$                              |      | 40   |      | $\mu V$         |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                            |      | 0.65 |      | mV/ $^{\circ}C$ |
| Ripple Rejection                 | RR                    | $8V\leq V_i\leq 20V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 40   | 49   |      | dB              |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                    |      | 1.7  |      | V               |



## 6.3 Electrical Characteristics (78L06)

( $V_i=12V$ ,  $I_o=40mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                            | Min  | Typ  | Max  | Units           |
|----------------------------------|-----------------------|-------------------------------------------------------|------|------|------|-----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                     | 5.94 | 6    | 6.06 | V               |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                     | 5.94 | 6    | 6.06 | V               |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 130mA$               |      | 12.8 | 80   | mV              |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 70mA$                |      | 5.8  | 40   | mV              |
| Line regulation                  | $\Delta V_o$          | $8.5V\leq V_i\leq 20V$ , $T_J=25^{\circ}C$            |      | 64   | 175  | mV              |
|                                  |                       | $9V\leq V_i\leq 20V$ , $T_J=25^{\circ}C$              |      | 54   | 125  | mV              |
| Quiescent Current                | $I_q$                 |                                                       |      | 2    | 5.5  | mA              |
| Quiescent Current Change         | $\Delta I_q$          | $9V\leq V_i\leq 20V$                                  |      |      | 1.5  | mA              |
|                                  | $\Delta I_q$          | $1mA\leq V_i\leq 40mA$                                |      |      | 0.1  | mA              |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$                               |      | 49   |      | $\mu V$         |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                             |      | 0.75 |      | mV/ $^{\circ}C$ |
| Ripple Rejection                 | RR                    | $10V\leq V_i\leq 20V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 38   | 46   |      | dB              |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                     |      | 1.7  |      | V               |



## 6.4 Electrical Characteristics (78L08)

( $V_i=14V$ ,  $I_o=40mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                            | Min  | Typ  | Max  | Units          |
|----------------------------------|-----------------------|-------------------------------------------------------|------|------|------|----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                     | 7.92 | 8    | 8.08 | V              |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                     | 7.92 | 8    | 8.08 | V              |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 130mA$               |      | 15   | 80   | mV             |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 70mA$                |      | 8    | 40   | mV             |
| Line regulation                  | $\Delta V_o$          | $10.5V\leq V_i\leq 23V$ , $T_J=25^{\circ}C$           |      | 10   | 175  | mV             |
|                                  |                       | $11V\leq V_i\leq 23V$ , $T_J=25^{\circ}C$             |      | 8    | 125  | mV             |
| Quiescent Current                | $I_q$                 |                                                       |      | 2    | 5.5  | mA             |
| Quiescent Current Change         | $\Delta I_q$          | $11V\leq V_i\leq 23V$                                 |      |      | 1.5  | mA             |
|                                  | $\Delta I_q$          | $1mA\leq V_i\leq 40mA$                                |      |      | 0.1  | mA             |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$                               |      | 49   |      | $\mu V$        |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                             |      | 0.75 |      | $mV/^{\circ}C$ |
| Ripple Rejection                 | RR                    | $11V\leq V_i\leq 23V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 36   | 45   |      | dB             |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                     |      | 1.7  |      | V              |



## 6.5 Electrical Characteristics (78L09)

( $V_i=15V$ ,  $I_o=40mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                            | Min  | Typ  | Max  | Units          |
|----------------------------------|-----------------------|-------------------------------------------------------|------|------|------|----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                     | 8.91 | 9    | 9.09 | V              |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                     | 8.91 | 9    | 9.09 | V              |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 130mA$               |      | 20   | 90   | mV             |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 40mA$                |      | 10   | 45   | mV             |
| Line regulation                  | $\Delta V_o$          | $11.5V\leq V_i\leq 24V$ , $T_J=25^{\circ}C$           |      | 90   | 200  | mV             |
|                                  |                       | $13V\leq V_i\leq 24V$ , $T_J=25^{\circ}C$             |      | 100  | 150  | mV             |
| Quiescent Current                | $I_q$                 |                                                       |      | 2    | 5.5  | mA             |
| Quiescent Current Change         | $\Delta I_q$          | $13V\leq V_i\leq 24V$                                 |      |      | 1.5  | mA             |
|                                  | $\Delta I_q$          | $1mA\leq V_i\leq 40mA$                                |      |      | 0.1  | mA             |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$                               |      | 49   |      | $\mu V$        |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                             |      | 0.75 |      | $mV/^{\circ}C$ |
| Ripple Rejection                 | RR                    | $12V\leq V_i\leq 23V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 36   | 44   |      | dB             |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                     |      | 1.7  |      | V              |



## 6.6 Electrical Characteristics (78L12)

( $V_i=19V$ ,  $I_o=40mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                            | Min   | Typ | Max   | Units          |
|----------------------------------|-----------------------|-------------------------------------------------------|-------|-----|-------|----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                     | 11.88 | 12  | 12.12 | V              |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                     | 11.88 | 12  | 12.12 | V              |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 130mA$               |       | 25  | 150   | mV             |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 40mA$                |       | 12  | 75    | mV             |
| Line regulation                  | $\Delta V_o$          | $14.5V\leq V_i\leq 27V$ , $T_J=25^{\circ}C$           |       | 25  | 300   | mV             |
|                                  |                       | $16V\leq V_i\leq 27V$ , $T_J=25^{\circ}C$             |       | 20  | 250   | mV             |
| Quiescent Current                | $I_q$                 |                                                       |       | 2   | 5.5   | mA             |
| Quiescent Current Change         | $\Delta I_q$          | $16V\leq V_i\leq 27V$                                 |       |     | 1.5   | mA             |
|                                  | $\Delta I_q$          | $1mA\leq V_i\leq 40mA$                                |       |     | 0.1   | mA             |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$                               |       | 80  |       | $\mu V$        |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                             |       | 1   |       | $mV/^{\circ}C$ |
| Ripple Rejection                 | RR                    | $15V\leq V_i\leq 25V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 36    | 42  |       | dB             |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                     |       | 1.7 |       | V              |





## 6.7 Electrical Characteristics (78L15)

( $V_i=23V$ ,  $I_o=40mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                                | Min   | Typ | Max   | Units           |
|----------------------------------|-----------------------|-----------------------------------------------------------|-------|-----|-------|-----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                         | 14.85 | 15  | 15.15 | V               |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                         | 14.85 | 15  | 15.15 | V               |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 130mA$                   |       | 20  | 150   | mV              |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 70mA$                    |       | 25  | 150   | mV              |
| Line regulation                  | $\Delta V_o$          | $17.5V\leq V_i\leq 30V$ , $T_J=25^{\circ}C$               |       | 25  | 150   | mV              |
|                                  |                       | $20V\leq V_i\leq 30V$ , $T_J=25^{\circ}C$                 |       | 15  | 75    | mV              |
| Quiescent Current                | $I_q$                 |                                                           |       | 2.2 | 6     | mA              |
| Quiescent Current Change         | $\Delta I_q$          | $20V\leq V_i\leq 30V$                                     |       |     | 1.5   | mA              |
|                                  | $\Delta I_q$          | $1mA\leq V_i\leq 40mA$                                    |       |     | 0.1   | mA              |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$                                   |       | 90  |       | $\mu V$         |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                                 |       | 1.3 |       | mV/ $^{\circ}C$ |
| Ripple Rejection                 | RR                    | $18.5V\leq V_i\leq 28.5V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 33    | 39  |       | dB              |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                         |       | 1.7 |       | V               |



## 6.8 Electrical Characteristics (78L18)

( $V_i=27V$ ,  $I_o=40mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                            | Min   | Typ | Max   | Units           |
|----------------------------------|-----------------------|-------------------------------------------------------|-------|-----|-------|-----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                     | 17.82 | 18  | 18.18 | V               |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                     | 17.82 | 18  | 18.18 | V               |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 130mA$               |       | 30  | 170   | mV              |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 40mA$                |       | 15  | 85    | mV              |
| Line regulation                  | $\Delta V_o$          | $21V\leq V_i\leq 33V$ , $T_J=25^{\circ}C$             |       | 145 | 300   | mV              |
|                                  |                       | $22V\leq V_i\leq 33V$ , $T_J=25^{\circ}C$             |       | 135 | 250   | mV              |
| Quiescent Current                | $I_q$                 |                                                       |       | 2.2 | 6     | mA              |
| Quiescent Current Change         | $\Delta I_q$          | $21V\leq V_i\leq 33V$                                 |       |     | 1.5   | mA              |
|                                  | $\Delta I_q$          | $1mA\leq V_i\leq 40mA$                                |       |     | 0.1   | mA              |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$                               |       | 150 |       | $\mu V$         |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                             |       | 1.8 |       | mV/ $^{\circ}C$ |
| Ripple Rejection                 | RR                    | $23V\leq V_i\leq 33V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 32    | 38  |       | dB              |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                     |       | 1.7 |       | V               |



## 6.9 Electrical Characteristics (78L24)

( $V_i=33V$ ,  $I_o=40mA$ ,  $0<T_J<125^{\circ}C$ ,  $C_1=0.33\mu F$ ,  $C_o=0.1\mu F$ , unless otherwise specified) (Note 1)

| Parameter                        | Symbol                | Conditions                                            | Min   | Typ | Max   | Units          |
|----------------------------------|-----------------------|-------------------------------------------------------|-------|-----|-------|----------------|
| Output Voltage                   | $V_o$                 | $T_J=25^{\circ}C$                                     | 23.76 | 24  | 24.24 | V              |
| Output Voltage (note 2)          |                       | $T_J=25^{\circ}C$                                     | 23.76 | 24  | 24.24 | V              |
| Load Regulation                  | $\Delta V_o$          | $T_J=25^{\circ}C$ , $I_o=1mA\sim 130mA$               |       | 40  | 200   | mV             |
|                                  |                       | $T_J=25^{\circ}C$ , $I_o=1mA\sim 40mA$                |       | 20  | 100   | mV             |
| Line regulation                  | $\Delta V_o$          | $27V\leq V_i\leq 38V$ , $T_J=25^{\circ}C$             |       | 160 | 300   | mV             |
|                                  |                       | $28V\leq V_i\leq 38V$ , $T_J=25^{\circ}C$             |       | 150 | 250   | mV             |
| Quiescent Current                | $I_q$                 |                                                       |       | 2.2 | 6     | mA             |
| Quiescent Current Change         | $\Delta I_q$          | $21V\leq V_i\leq 38V$                                 |       |     | 1.5   | mA             |
|                                  | $\Delta I_q$          | $1mA\leq V_i\leq 40mA$                                |       |     | 0.1   | mA             |
| Output Noise Voltage             | $V_N$                 | $10Hz\leq f\leq 100kHz$                               |       | 200 |       | $\mu V$        |
| Temperature coefficient of $V_o$ | $\Delta V_o/\Delta T$ | $I_o=5mA$                                             |       | 2   |       | $mV/^{\circ}C$ |
| Ripple Rejection                 | RR                    | $27V\leq V_i\leq 38V$ , $f=120Hz$ , $T_J=25^{\circ}C$ | 30    | 37  |       | dB             |
| Dropout Voltage                  | $V_d$                 | $T_J=25^{\circ}C$                                     |       | 1.7 |       | V              |

### Notes

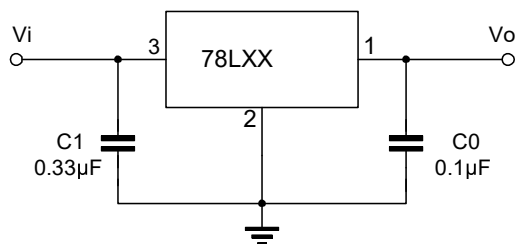
1: The Maximum steady state usable output current and input voltage are very dependent on the heating sinking and/or lead temperature length of the package. The data above represent pulse test conditions with junction temperatures as indicated at the initiation of test.

Note 2: Power dissipation  $<0.75W$ .

Note 3: Output voltage of 78Lxx.



## 7. Typical Application

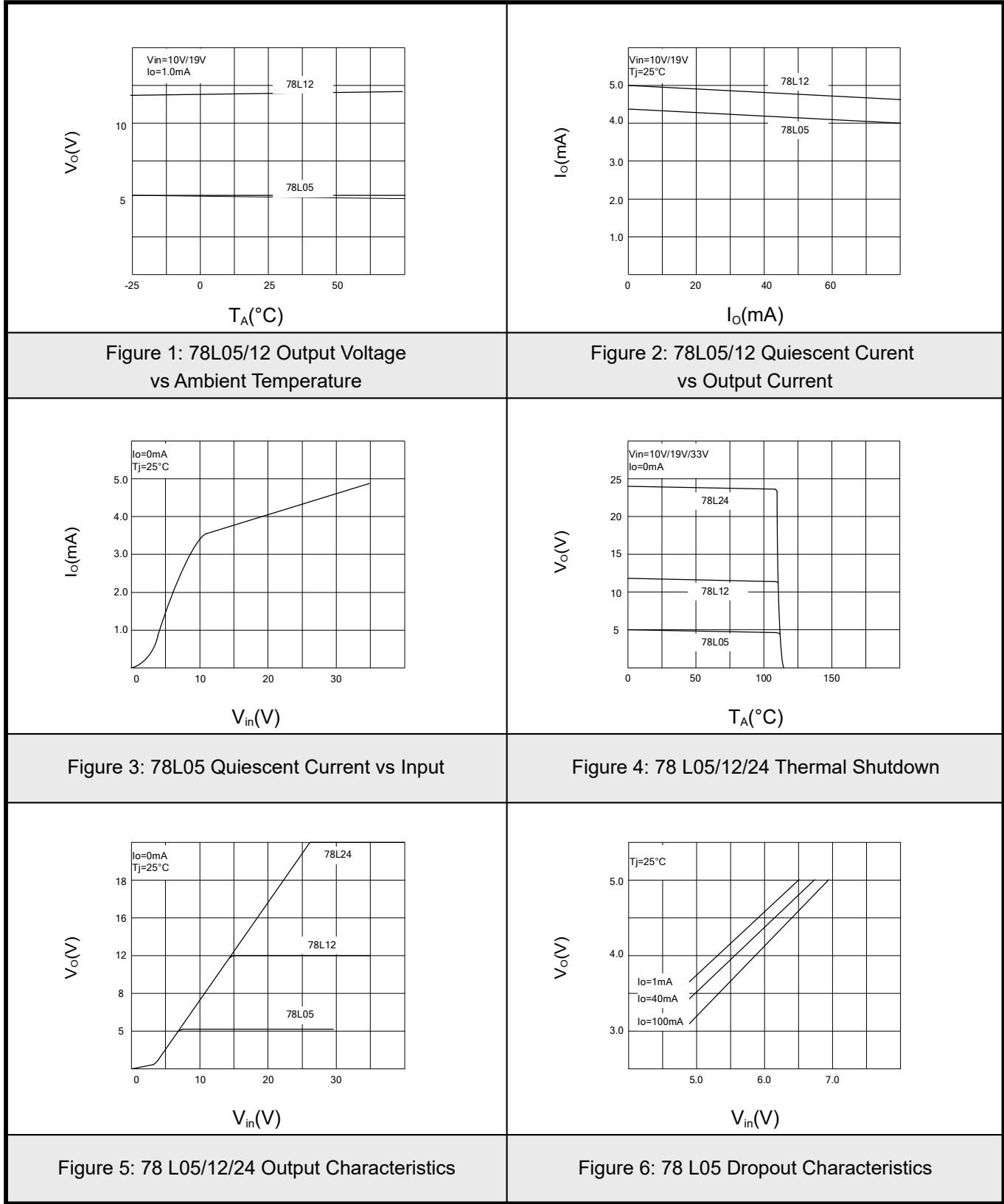


Note 1: To specify an output voltage, substitute voltage value for "XX".

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

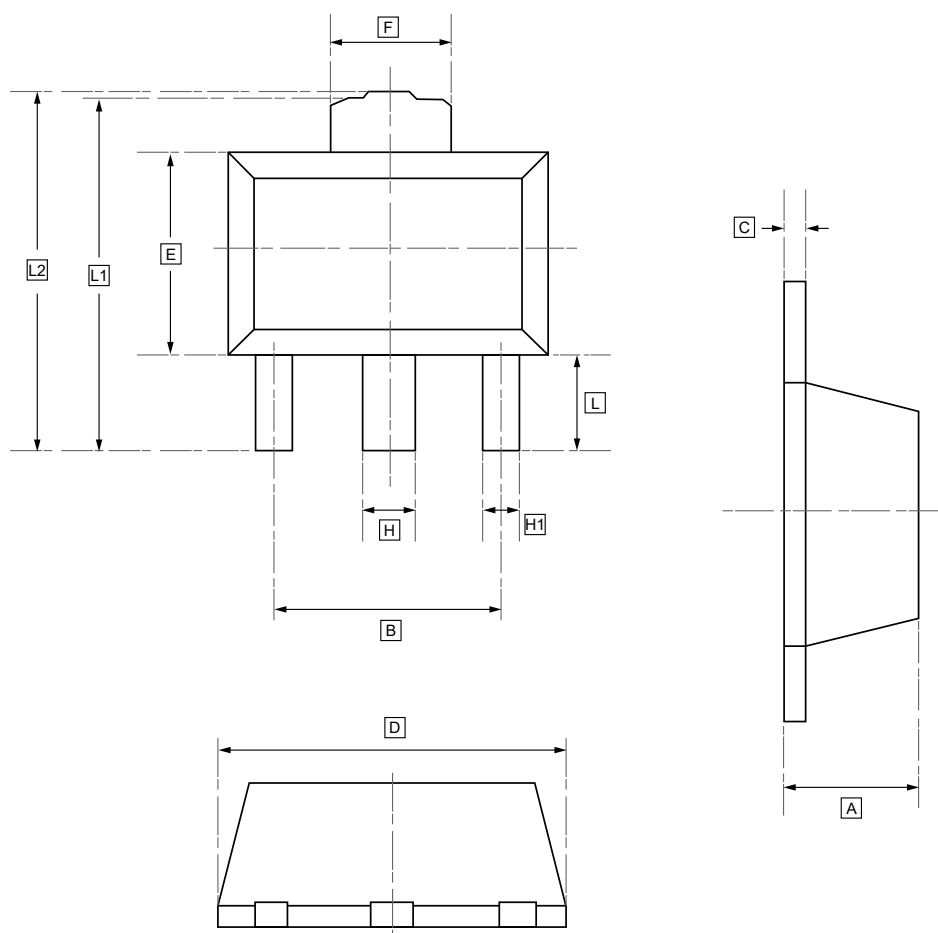


8. Typical characteristic





## 9.1 SOT-89 Package Outline Dimensions

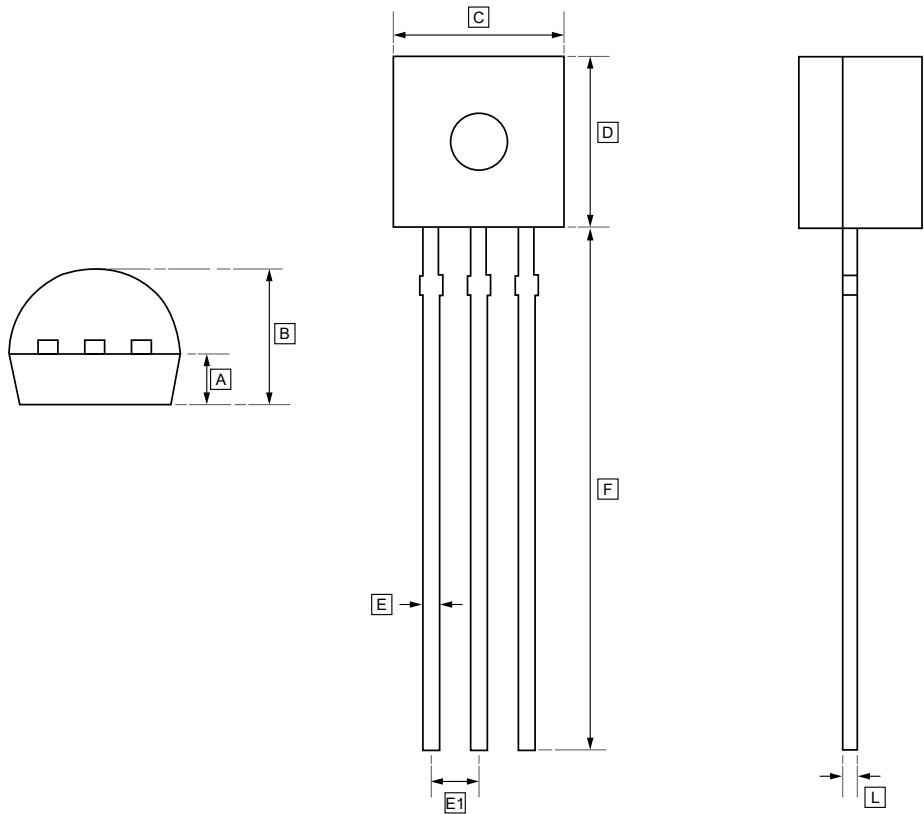


### DIMENSIONS (mm are the original dimensions)

| Symbol | A     | B     | C     | D     | E     | F     | H     | H1    | L     | L1    | L2    |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Min    | 1.450 | 2.950 | 0.330 | 4.450 | 2.450 | 1.650 | 0.450 | 0.370 | 0.900 | 4.100 | 4.100 |
| Max    | 1.550 | 3.050 | 0.430 | 4.550 | 2.550 | 1.750 | 0.580 | 0.480 | 1.000 | 4.300 | 4.350 |



9.2 TO-92 Package Outline Dimensions

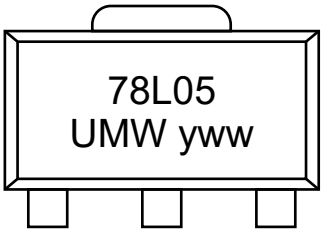


DIMENSIONS (mm are the original dimensions)

| Symbol | A    | B    | C    | D    | E    | E1   | F     | L    |
|--------|------|------|------|------|------|------|-------|------|
| Min    | 1.10 | 3.50 | 4.50 | 4.40 | 0.35 | 1.27 | 13.50 | 0.35 |
| Max    | 1.30 | 3.90 | 4.90 | 4.90 | 0.45 | TYP  | 14.50 | 0.40 |



10.Ordering information



yww: Batch Code

| Order Code    | Marking | Package | Base QTY | Delivery Mode |
|---------------|---------|---------|----------|---------------|
| UMW78L33-150  | 78L33   | SOT-89  | 1000     | Tape and reel |
| UMW 78L05-150 | 78L05   | SOT-89  | 1000     | Tape and reel |
| UMW 78L06-150 | 78L06   | SOT-89  | 1000     | Tape and reel |
| UMW 78L08-150 | 78L08   | SOT-89  | 1000     | Tape and reel |
| UMW 78L09-150 | 78L09   | SOT-89  | 1000     | Tape and reel |
| UMW78L12-150  | 78L12   | SOT-89  | 1000     | Tape and reel |
| UMW78L15-150  | 78L15   | SOT-89  | 1000     | Tape and reel |
| UMW78L18-150  | 78L18   | SOT-89  | 1000     | Tape and reel |
| UMW78L24-150  | 78L24   | SOT-89  | 1000     | Tape and reel |





## 11.Disclaimer

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