

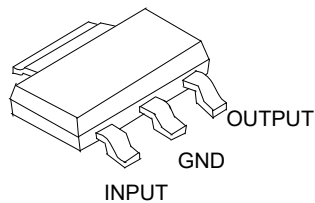
## 1.Description

The 78MXX three-terminal positive regulators are available in the TO-252 package with several fixed output voltages making it useful in a wide range of applications.

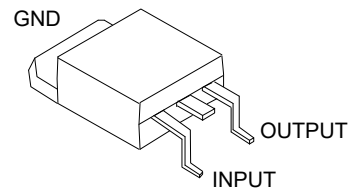
## 2.Features

- Output Current up to 1A
- Output Voltages of 5,6,8,9,12,15,18,24V
- Thermal Overload Protection Short Circuit Protection
- Output Transistor Safe Operating area (SOA) Protection

## 3.Pinning information

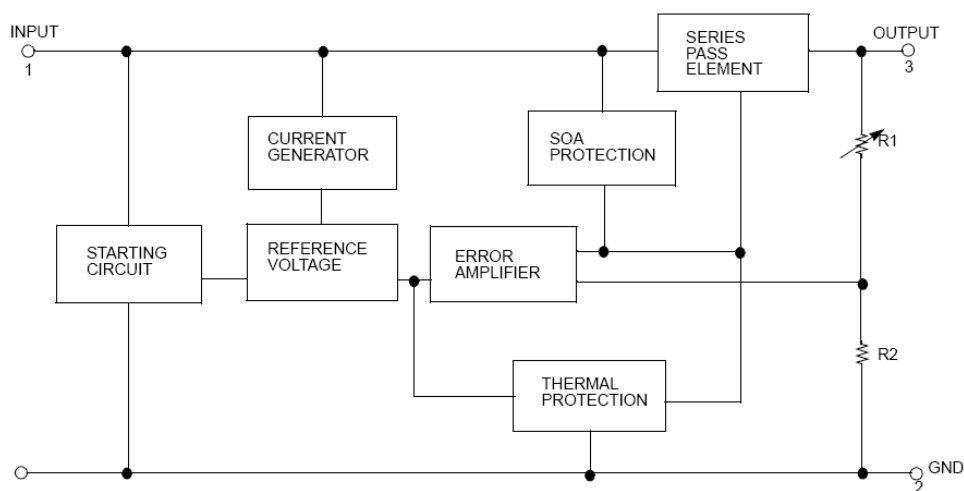


**SOT-223**



**TO-252**

## 4.Internal Block Diagram





## 5. Absolute Maximum Rating

| Parameter                                      |                    | Symbol    | Value      | Units              |
|------------------------------------------------|--------------------|-----------|------------|--------------------|
| DC Input Voltage                               | for $V_O=5$ to 18V | $V_I$     | 35         | V                  |
|                                                | for $V_O=24$ V     |           | 40         | V                  |
| Output Current                                 |                    | $I_{OUT}$ | 1          | A                  |
| Power Dissipation ( $T_C=25^{\circ}\text{C}$ ) | SOT-223            | $P_D$     | 1          | W                  |
|                                                | TO-252             |           | 2          | W                  |
| Junction Temperature                           |                    | $T_J$     | -20 to 125 | $^{\circ}\text{C}$ |
| Storage Temperature                            |                    | $T_{STG}$ | -55 to 150 | $^{\circ}\text{C}$ |

## 6. Thermal Data

| Parameter        |         | Symbol        | Value | Units                |
|------------------|---------|---------------|-------|----------------------|
| Junction to Case | SOT-223 | $\theta_{JC}$ | 100   | $^{\circ}\text{C/W}$ |
|                  | TO-252  |               | 60    | $^{\circ}\text{C/W}$ |



## 7.1 Electrical Characteristics (78M05)

(Refer to the test circuits,  $0 < T_J < +125^{\circ}\text{C}$ ,  $I_O = 350\text{mA}$ ,  $V_I = 10\text{V}$ , unless otherwise specified,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ )

| Parameter                | Symbol                | Conditions                                                       |                                      | Min  | Typ  | Max  | Units                  |
|--------------------------|-----------------------|------------------------------------------------------------------|--------------------------------------|------|------|------|------------------------|
| Output Voltage           | $V_O$                 | $I_O = 5\text{mA} \sim 350\text{mA}$ , $V_I = 7 \sim 20\text{V}$ |                                      | 4.75 | 5    | 5.25 | V                      |
| Line Regulation(Note)    | $\Delta V_O$          | $I_O = 200\text{mA}$<br>$T_J = 25^{\circ}\text{C}$               | $V_I = 7\text{V} \sim 25\text{V}$    |      |      | 100  | mV                     |
|                          |                       |                                                                  | $V_I = 8\text{V} \sim 25\text{V}$    |      |      | 50   | mV                     |
| Load Regulation(Note)    | $\Delta V_O$          | $T_J = 25^{\circ}\text{C}$                                       | $I_O = 5\text{mA} \sim 500\text{mA}$ |      |      | 100  | mV                     |
|                          |                       |                                                                  | $I_O = 5\text{mA} \sim 200\text{mA}$ |      |      | 50   | mV                     |
| Quiescent Current        | $I_Q$                 | $T_J = 25^{\circ}\text{C}$                                       |                                      |      |      | 6    | mA                     |
| Quiescent Current Change | $\Delta I_Q$          | $I_O = 5\text{mA} \sim 350\text{mA}$                             |                                      |      |      | 0.5  | mA                     |
|                          |                       | $I_O = 200\text{mA}$ , $V_I = 8 \sim 25\text{V}$                 |                                      |      |      | 0.8  | mA                     |
| Output Voltage Drift     | $\Delta V / \Delta T$ | $I_O = 5\text{mA}$ , $T_J = 0 \sim 125^{\circ}\text{C}$          |                                      |      | -0.5 |      | mV/ $^{\circ}\text{C}$ |
| Output Noise Voltage     | $V_N$                 | $f = 10\text{Hz} \sim 100\text{KHz}$                             |                                      |      | 40   |      | $\mu\text{V}$          |
| Ripple Rejection         | RR                    | $f = 120\text{Hz}$ , $V_I = 8 \sim 18\text{V}$                   |                                      |      | 80   |      | dB                     |
| Dropout Voltage          | $V_D$                 | $T_J = 25^{\circ}\text{C}$ , $I_O = 500\text{mA}$                |                                      |      | 2    |      | V                      |
| Short Circuit Current    | $I_{SC}$              | $T_J = 25^{\circ}\text{C}$ , $V_I = 35\text{V}$                  |                                      |      | 800  |      | mA                     |
| Peak Current             | $I_{PK}$              | $T_J = 25^{\circ}\text{C}$                                       |                                      |      | 1300 |      | mA                     |

Notes:

Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.



## 7.2 Electrical Characteristics (78M06)

(Refer to the test circuits,  $0 < T_J < +125^{\circ}\text{C}$ ,  $I_O = 350\text{mA}$ ,  $V_I = 11\text{V}$ , unless otherwise specified,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ )

| Parameter                | Symbol                | Conditions                                                       |                                      | Min | Typ  | Max | Units                  |
|--------------------------|-----------------------|------------------------------------------------------------------|--------------------------------------|-----|------|-----|------------------------|
| Output Voltage           | $V_O$                 | $I_O = 5\text{mA} \sim 350\text{mA}$ , $V_I = 8 \sim 21\text{V}$ |                                      | 5.7 | 6    | 6.3 | V                      |
| Line Regulation(Note)    | $\Delta V_O$          | $I_O = 200\text{mA}$<br>$T_J = 25^{\circ}\text{C}$               | $V_I = 8\text{V} \sim 25\text{V}$    |     |      | 100 | mV                     |
|                          |                       |                                                                  | $V_I = 9\text{V} \sim 25\text{V}$    |     |      | 50  | mV                     |
| Load Regulation(Note)    | $\Delta V_O$          | $T_J = 25^{\circ}\text{C}$                                       | $I_O = 5\text{mA} \sim 500\text{mA}$ |     |      | 120 | mV                     |
|                          |                       |                                                                  | $I_O = 5\text{mA} \sim 200\text{mA}$ |     |      | 60  | mV                     |
| Quiescent Current        | $I_Q$                 | $T_J = 25^{\circ}\text{C}$                                       |                                      |     |      | 8   | mA                     |
| Quiescent Current Change | $\Delta I_Q$          | $I_O = 5\text{mA} \sim 350\text{mA}$                             |                                      |     |      | 0.5 | mA                     |
|                          |                       | $I_O = 200\text{mA}$ , $V_I = 9 \sim 25\text{V}$                 |                                      |     |      | 0.8 | mA                     |
| Output Voltage Drift     | $\Delta V / \Delta T$ | $I_O = 5\text{mA}$ , $T_J = 0 \sim 125^{\circ}\text{C}$          |                                      |     | -0.5 |     | mV/ $^{\circ}\text{C}$ |
| Output Noise Voltage     | $V_N$                 | $f = 10\text{Hz} \sim 100\text{KHz}$                             |                                      |     | 45   |     | $\mu\text{V}$          |
| Ripple Rejection         | RR                    | $f = 120\text{Hz}$ , $V_I = 9 \sim 19\text{V}$                   |                                      |     | 80   |     | dB                     |
| Dropout Voltage          | $V_D$                 | $T_J = 25^{\circ}\text{C}$ , $I_O = 500\text{mA}$                |                                      |     | 2    |     | V                      |
| Short Circuit Current    | $I_{SC}$              | $T_J = 25^{\circ}\text{C}$ , $V_I = 35\text{V}$                  |                                      |     | 800  |     | mA                     |
| Peak Current             | $I_{PK}$              | $T_J = 25^{\circ}\text{C}$                                       |                                      |     | 1300 |     | mA                     |

Notes:

Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.



### 7.3 Electrical Characteristics (78M08)

(Refer to the test circuits,  $0 < T_J < +125^{\circ}\text{C}$ ,  $I_O = 350\text{mA}$ ,  $V_I = 14\text{V}$ , unless otherwise specified,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ )

| Parameter                | Symbol                | Conditions                                                                   | Min | Typ  | Max | Units                  |
|--------------------------|-----------------------|------------------------------------------------------------------------------|-----|------|-----|------------------------|
| Output Voltage           | $V_O$                 | $I_O = 5\text{mA} \sim 350\text{mA}$ , $V_I = 10.5 \sim 23\text{V}$          | 7.6 | 8    | 8.4 | V                      |
| Line Regulation(Note)    | $\Delta V_O$          | $I_O = 200\text{mA}$<br>$T_J = 25^{\circ}\text{C}$                           |     |      | 100 | mV                     |
|                          |                       | $V_I = 10.5\text{V} \sim 25\text{V}$<br>$V_I = 11\text{V} \sim 25\text{V}$   |     |      | 50  | mV                     |
| Load Regulation(Note)    | $\Delta V_O$          | $T_J = 25^{\circ}\text{C}$                                                   |     |      | 160 | mV                     |
|                          |                       | $I_O = 5\text{mA} \sim 500\text{mA}$<br>$I_O = 5\text{mA} \sim 200\text{mA}$ |     |      | 80  | mV                     |
| Quiescent Current        | $I_Q$                 | $T_J = 25^{\circ}\text{C}$                                                   |     |      | 6   | mA                     |
| Quiescent Current Change | $\Delta I_Q$          | $I_O = 5\text{mA} \sim 350\text{mA}$                                         |     |      | 0.5 | mA                     |
|                          |                       | $I_O = 200\text{mA}$ , $V_I = 10.5 \sim 25\text{V}$                          |     |      | 0.8 | mA                     |
| Output Voltage Drift     | $\Delta V / \Delta T$ | $I_O = 5\text{mA}$ , $T_J = 0 \sim 125^{\circ}\text{C}$                      |     | -0.8 |     | mV/ $^{\circ}\text{C}$ |
| Output Noise Voltage     | $V_N$                 | $f = 10\text{Hz} \sim 100\text{KHz}$                                         |     | 52   |     | $\mu\text{V}$          |
| Ripple Rejection         | RR                    | $f = 120\text{Hz}$ , $V_I = 11.5 \sim 21.5\text{V}$                          |     | 80   |     | dB                     |
| Dropout Voltage          | $V_D$                 | $T_J = 25^{\circ}\text{C}$ , $I_O = 500\text{mA}$                            |     | 2    |     | V                      |
| Short Circuit Current    | $I_{SC}$              | $T_J = 25^{\circ}\text{C}$ , $V_I = 35\text{V}$                              |     | 800  |     | mA                     |
| Peak Current             | $I_{PK}$              | $T_J = 25^{\circ}\text{C}$                                                   |     | 1300 |     | mA                     |

Notes:

Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.



## 7.4 Electrical Characteristics (78M09)

(Refer to the test circuits,  $0 < T_J < +125^{\circ}\text{C}$ ,  $I_O = 350\text{mA}$ ,  $V_I = 15\text{V}$ , unless otherwise specified,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ )

| Parameter                | Symbol                | Conditions                                                                   | Min  | Typ  | Max  | Units                  |
|--------------------------|-----------------------|------------------------------------------------------------------------------|------|------|------|------------------------|
| Output Voltage           | $V_O$                 | $I_O = 5\text{mA} \sim 350\text{mA}$ , $V_I = 11.5 \sim 24\text{V}$          | 8.45 | 9    | 9.55 | V                      |
| Line Regulation(Note)    | $\Delta V_O$          | $I_O = 200\text{mA}$<br>$T_J = 25^{\circ}\text{C}$                           |      |      | 100  | mV                     |
|                          |                       | $V_I = 11.5\text{V} \sim 25\text{V}$<br>$V_I = 12\text{V} \sim 25\text{V}$   |      |      | 50   | mV                     |
| Load Regulation(Note)    | $\Delta V_O$          | $T_J = 25^{\circ}\text{C}$                                                   |      |      | 180  | mV                     |
|                          |                       | $I_O = 5\text{mA} \sim 500\text{mA}$<br>$I_O = 5\text{mA} \sim 200\text{mA}$ |      |      | 90   | mV                     |
| Quiescent Current        | $I_Q$                 | $T_J = 25^{\circ}\text{C}$                                                   |      |      | 6    | mA                     |
| Quiescent Current Change | $\Delta I_Q$          | $I_O = 5\text{mA} \sim 350\text{mA}$                                         |      |      | 0.5  | mA                     |
|                          |                       | $I_O = 200\text{mA}$ , $V_I = 11.5 \sim 25\text{V}$                          |      |      | 0.8  | mA                     |
| Output Voltage Drift     | $\Delta V / \Delta T$ | $I_O = 5\text{mA}$ , $T_J = 0 \sim 125^{\circ}\text{C}$                      |      | -0.8 |      | mV/ $^{\circ}\text{C}$ |
| Output Noise Voltage     | $V_N$                 | $f = 10\text{Hz} \sim 100\text{KHz}$                                         |      | 52   |      | $\mu\text{V}$          |
| Ripple Rejection         | RR                    | $f = 120\text{Hz}$ , $V_I = 12.5 \sim 22.5\text{V}$                          |      | 80   |      | dB                     |
| Dropout Voltage          | $V_D$                 | $T_J = 25^{\circ}\text{C}$ , $I_O = 500\text{mA}$                            |      | 2    |      | V                      |
| Short Circuit Current    | $I_{SC}$              | $T_J = 25^{\circ}\text{C}$ , $V_I = 35\text{V}$                              |      | 800  |      | mA                     |
| Peak Current             | $I_{PK}$              | $T_J = 25^{\circ}\text{C}$                                                   |      | 1300 |      | mA                     |

Notes:

Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.



## 7.5 Electrical Characteristics (78M12)

(Refer to the test circuits,  $0 < T_J < +125^{\circ}\text{C}$ ,  $I_O = 350\text{mA}$ ,  $V_I = 19\text{V}$ , unless otherwise specified,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ )

| Parameter                | Symbol                | Conditions                                                                   | Min  | Typ  | Max  | Units                  |
|--------------------------|-----------------------|------------------------------------------------------------------------------|------|------|------|------------------------|
| Output Voltage           | $V_O$                 | $I_O = 5\text{mA} \sim 350\text{mA}$ , $V_I = 14.5 \sim 27\text{V}$          | 11.4 | 12   | 12.6 | V                      |
| Line Regulation(Note)    | $\Delta V_O$          | $I_O = 200\text{mA}$<br>$T_J = 25^{\circ}\text{C}$                           |      |      | 100  | mV                     |
|                          |                       | $V_I = 14.5\text{V} \sim 30\text{V}$<br>$V_I = 16\text{V} \sim 30\text{V}$   |      |      | 50   | mV                     |
| Load Regulation(Note)    | $\Delta V_O$          | $T_J = 25^{\circ}\text{C}$                                                   |      |      | 240  | mV                     |
|                          |                       | $I_O = 5\text{mA} \sim 500\text{mA}$<br>$I_O = 5\text{mA} \sim 200\text{mA}$ |      |      | 120  | mV                     |
| Quiescent Current        | $I_Q$                 | $T_J = 25^{\circ}\text{C}$                                                   |      |      | 6    | mA                     |
| Quiescent Current Change | $\Delta I_Q$          | $I_O = 5\text{mA} \sim 350\text{mA}$                                         |      |      | 0.5  | mA                     |
|                          |                       | $I_O = 200\text{mA}$ , $V_I = 14.5 \sim 30\text{V}$                          |      |      | 0.8  | mA                     |
| Output Voltage Drift     | $\Delta V / \Delta T$ | $I_O = 5\text{mA}$ , $T_J = 0 \sim 125^{\circ}\text{C}$                      |      | -0.8 |      | mV/ $^{\circ}\text{C}$ |
| Output Noise Voltage     | $V_N$                 | $f = 10\text{Hz} \sim 100\text{KHz}$                                         |      | 75   |      | $\mu\text{V}$          |
| Ripple Rejection         | RR                    | $f = 120\text{Hz}$ , $V_I = 15 \sim 25\text{V}$                              |      | 80   |      | dB                     |
| Dropout Voltage          | $V_D$                 | $T_J = 25^{\circ}\text{C}$ , $I_O = 500\text{mA}$                            |      | 2    |      | V                      |
| Short Circuit Current    | $I_{SC}$              | $T_J = 25^{\circ}\text{C}$ , $V_I = 35\text{V}$                              |      | 800  |      | mA                     |
| Peak Current             | $I_{PK}$              | $T_J = 25^{\circ}\text{C}$                                                   |      | 1300 |      | mA                     |

Notes:

Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.



## 7.6 Electrical Characteristics (78M15)

(Refer to the test circuits,  $0 < T_J < +125^{\circ}\text{C}$ ,  $I_O = 350\text{mA}$ ,  $V_I = 23\text{V}$ , unless otherwise specified,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ )

| Parameter                | Symbol                | Conditions                                                          |                                      | Min   | Typ  | Max   | Units                  |
|--------------------------|-----------------------|---------------------------------------------------------------------|--------------------------------------|-------|------|-------|------------------------|
| Output Voltage           | $V_O$                 | $I_O = 5\text{mA} \sim 350\text{mA}$ , $V_I = 17.5 \sim 30\text{V}$ |                                      | 14.25 | 15   | 15.75 | V                      |
| Line Regulation(Note)    | $\Delta V_O$          | $I_O = 200\text{mA}$<br>$T_J = 25^{\circ}\text{C}$                  | $V_I = 17.5\text{V} \sim 30\text{V}$ |       |      | 100   | mV                     |
|                          |                       |                                                                     | $V_I = 20\text{V} \sim 30\text{V}$   |       |      | 50    | mV                     |
| Load Regulation(Note)    | $\Delta V_O$          | $T_J = 25^{\circ}\text{C}$                                          | $I_O = 5\text{mA} \sim 500\text{mA}$ |       |      | 300   | mV                     |
|                          |                       |                                                                     | $I_O = 5\text{mA} \sim 200\text{mA}$ |       |      | 150   | mV                     |
| Quiescent Current        | $I_Q$                 | $T_J = 25^{\circ}\text{C}$                                          |                                      |       |      | 6     | mA                     |
| Quiescent Current Change | $\Delta I_Q$          | $I_O = 5\text{mA} \sim 350\text{mA}$                                |                                      |       |      | 0.5   | mA                     |
|                          |                       | $I_O = 200\text{mA}$ , $V_I = 17.5 \sim 30\text{V}$                 |                                      |       |      | 0.8   | mA                     |
| Output Voltage Drift     | $\Delta V / \Delta T$ | $I_O = 5\text{mA}$ , $T_J = 0 \sim 125^{\circ}\text{C}$             |                                      |       | -1   |       | mV/ $^{\circ}\text{C}$ |
| Output Noise Voltage     | $V_N$                 | $f = 10\text{Hz} \sim 100\text{KHz}$                                |                                      |       | 100  |       | $\mu\text{V}$          |
| Ripple Rejection         | RR                    | $f = 120\text{Hz}$ , $V_I = 18.5 \sim 28.5\text{V}$                 |                                      |       | 70   |       | dB                     |
| Dropout Voltage          | $V_D$                 | $T_J = 25^{\circ}\text{C}$ , $I_O = 500\text{mA}$                   |                                      |       | 2    |       | V                      |
| Short Circuit Current    | $I_{SC}$              | $T_J = 25^{\circ}\text{C}$ , $V_I = 35\text{V}$                     |                                      |       | 800  |       | mA                     |
| Peak Current             | $I_{PK}$              | $T_J = 25^{\circ}\text{C}$                                          |                                      |       | 1300 |       | mA                     |

Notes:

Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.



## 7.7 Electrical Characteristics (78M18)

(Refer to the test circuits,  $0 < T_J < +125^{\circ}\text{C}$ ,  $I_O = 350\text{mA}$ ,  $V_I = 26\text{V}$ , unless otherwise specified,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ )

| Parameter                | Symbol                | Conditions                                                                   | Min  | Typ  | Max  | Units                  |
|--------------------------|-----------------------|------------------------------------------------------------------------------|------|------|------|------------------------|
| Output Voltage           | $V_O$                 | $I_O = 5\text{mA} \sim 350\text{mA}$ , $V_I = 20.5 \sim 33\text{V}$          | 17.1 | 18   | 18.9 | V                      |
| Line Regulation(Note)    | $\Delta V_O$          | $I_O = 200\text{mA}$<br>$T_J = 25^{\circ}\text{C}$                           |      |      | 100  | mV                     |
|                          |                       | $V_I = 21\text{V} \sim 33\text{V}$<br>$V_I = 24\text{V} \sim 33\text{V}$     |      |      | 50   | mV                     |
| Load Regulation(Note)    | $\Delta V_O$          | $T_J = 25^{\circ}\text{C}$                                                   |      |      | 360  | mV                     |
|                          |                       | $I_O = 5\text{mA} \sim 500\text{mA}$<br>$I_O = 5\text{mA} \sim 200\text{mA}$ |      |      | 180  | mV                     |
| Quiescent Current        | $I_Q$                 | $T_J = 25^{\circ}\text{C}$                                                   |      |      | 6    | mA                     |
| Quiescent Current Change | $\Delta I_Q$          | $I_O = 5\text{mA} \sim 350\text{mA}$                                         |      |      | 0.5  | mA                     |
|                          |                       | $I_O = 200\text{mA}$ , $V_I = 21 \sim 33\text{V}$                            |      |      | 0.8  | mA                     |
| Output Voltage Drift     | $\Delta V / \Delta T$ | $I_O = 5\text{mA}$ , $T_J = 0 \sim 125^{\circ}\text{C}$                      |      | -1.2 |      | mV/ $^{\circ}\text{C}$ |
| Output Noise Voltage     | $V_N$                 | $f = 10\text{Hz} \sim 100\text{KHz}$                                         |      | 100  |      | $\mu\text{V}$          |
| Ripple Rejection         | RR                    | $f = 120\text{Hz}$ , $V_I = 22 \sim 32\text{V}$                              |      | 70   |      | dB                     |
| Dropout Voltage          | $V_D$                 | $T_J = 25^{\circ}\text{C}$ , $I_O = 500\text{mA}$                            |      | 2    |      | V                      |
| Short Circuit Current    | $I_{SC}$              | $T_J = 25^{\circ}\text{C}$ , $V_I = 35\text{V}$                              |      | 800  |      | mA                     |
| Peak Current             | $I_{PK}$              | $T_J = 25^{\circ}\text{C}$                                                   |      | 1300 |      | mA                     |

Notes:

Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.



## 7.8 Electrical Characteristics (78M24)

(Refer to the test circuits,  $0 < T_J < +125^{\circ}\text{C}$ ,  $I_O = 350\text{mA}$ ,  $V_I = 33\text{V}$ , unless otherwise specified,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ )

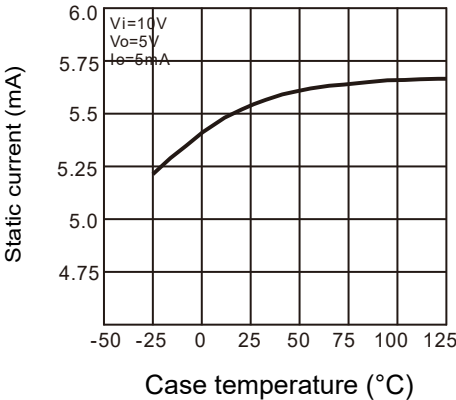
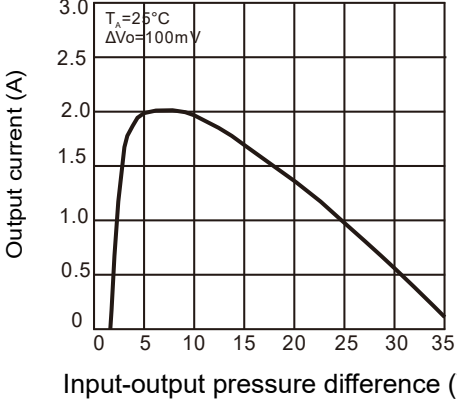
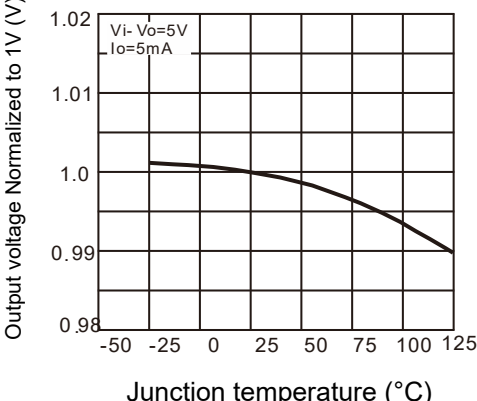
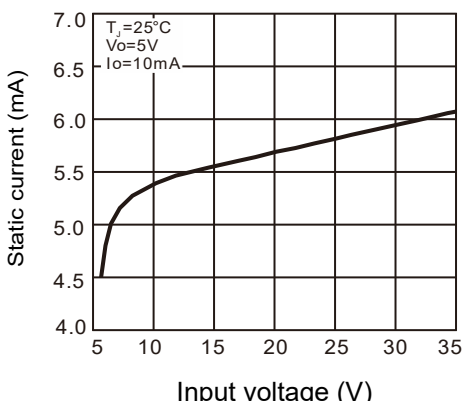
| Parameter                | Symbol                | Conditions                                                        |                                      | Min  | Typ  | Max  | Units                  |
|--------------------------|-----------------------|-------------------------------------------------------------------|--------------------------------------|------|------|------|------------------------|
| Output Voltage           | $V_O$                 | $I_O = 5\text{mA} \sim 350\text{mA}$ , $V_I = 27 \sim 35\text{V}$ |                                      | 22.8 | 24   | 25.2 | V                      |
| Line Regulation(Note)    | $\Delta V_O$          | $I_O = 200\text{mA}$<br>$T_J = 25^{\circ}\text{C}$                | $V_I = 27\text{V} \sim 35\text{V}$   |      |      | 100  | mV                     |
|                          |                       |                                                                   | $V_I = 28\text{V} \sim 35\text{V}$   |      |      | 50   | mV                     |
| Load Regulation(Note)    | $\Delta V_O$          | $T_J = 25^{\circ}\text{C}$                                        | $I_O = 5\text{mA} \sim 500\text{mA}$ |      |      | 480  | mV                     |
|                          |                       |                                                                   | $I_O = 5\text{mA} \sim 200\text{mA}$ |      |      | 240  | mV                     |
| Quiescent Current        | $I_Q$                 | $T_J = 25^{\circ}\text{C}$                                        |                                      |      |      | 6    | mA                     |
| Quiescent Current Change | $\Delta I_Q$          | $I_O = 5\text{mA} \sim 350\text{mA}$                              |                                      |      |      | 0.5  | mA                     |
|                          |                       | $I_O = 200\text{mA}$ , $V_I = 27 \sim 38\text{V}$                 |                                      |      |      | 0.8  | mA                     |
| Output Voltage Drift     | $\Delta V / \Delta T$ | $I_O = 5\text{mA}$ , $T_J = 0 \sim 125^{\circ}\text{C}$           |                                      |      | -1.2 |      | mV/ $^{\circ}\text{C}$ |
| Output Noise Voltage     | $V_N$                 | $f = 10\text{Hz} \sim 100\text{KHz}$                              |                                      |      | 170  |      | $\mu\text{V}$          |
| Ripple Rejection         | RR                    | $f = 120\text{Hz}$ , $V_I = 28 \sim 38\text{V}$                   |                                      |      | 70   |      | dB                     |
| Dropout Voltage          | $V_D$                 | $T_J = 25^{\circ}\text{C}$ , $I_O = 500\text{mA}$                 |                                      |      | 2    |      | V                      |
| Short Circuit Current    | $I_{SC}$              | $T_J = 25^{\circ}\text{C}$ , $V_I = 35\text{V}$                   |                                      |      | 800  |      | mA                     |
| Peak Current             | $I_{PK}$              | $T_J = 25^{\circ}\text{C}$                                        |                                      |      | 1300 |      | mA                     |

Notes:

Load and line regulation are specified at constant junction temperature. Change in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty is used.

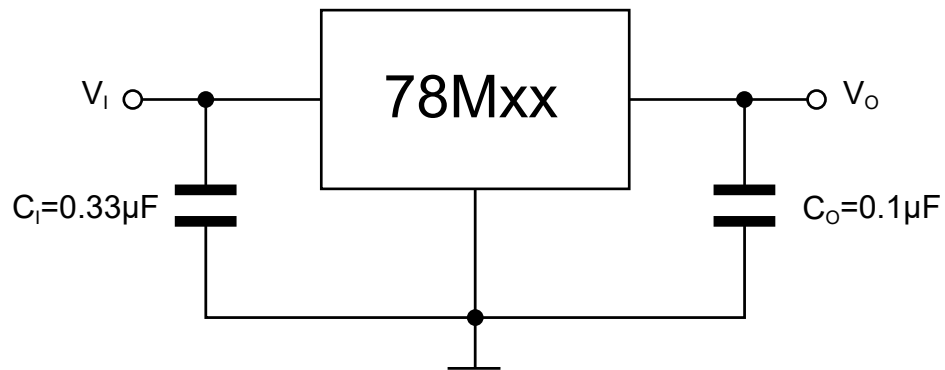


8.1Typical characteristic

|                                                                                    |                                                                                     |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|   |   |
| Figure 1: Static current                                                           | Figure 2: Transfer Characteristics                                                  |
|  |  |
| Figure 3: Output voltage                                                           | Figure 4: Static current                                                            |

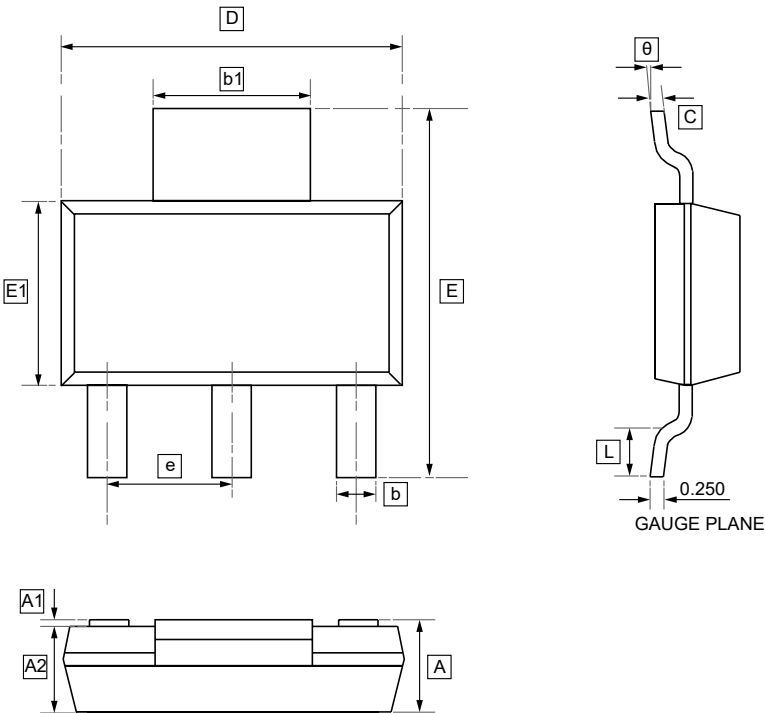


## 9. Typical Application





10.1SOT-223 Package Outlie Dimensions

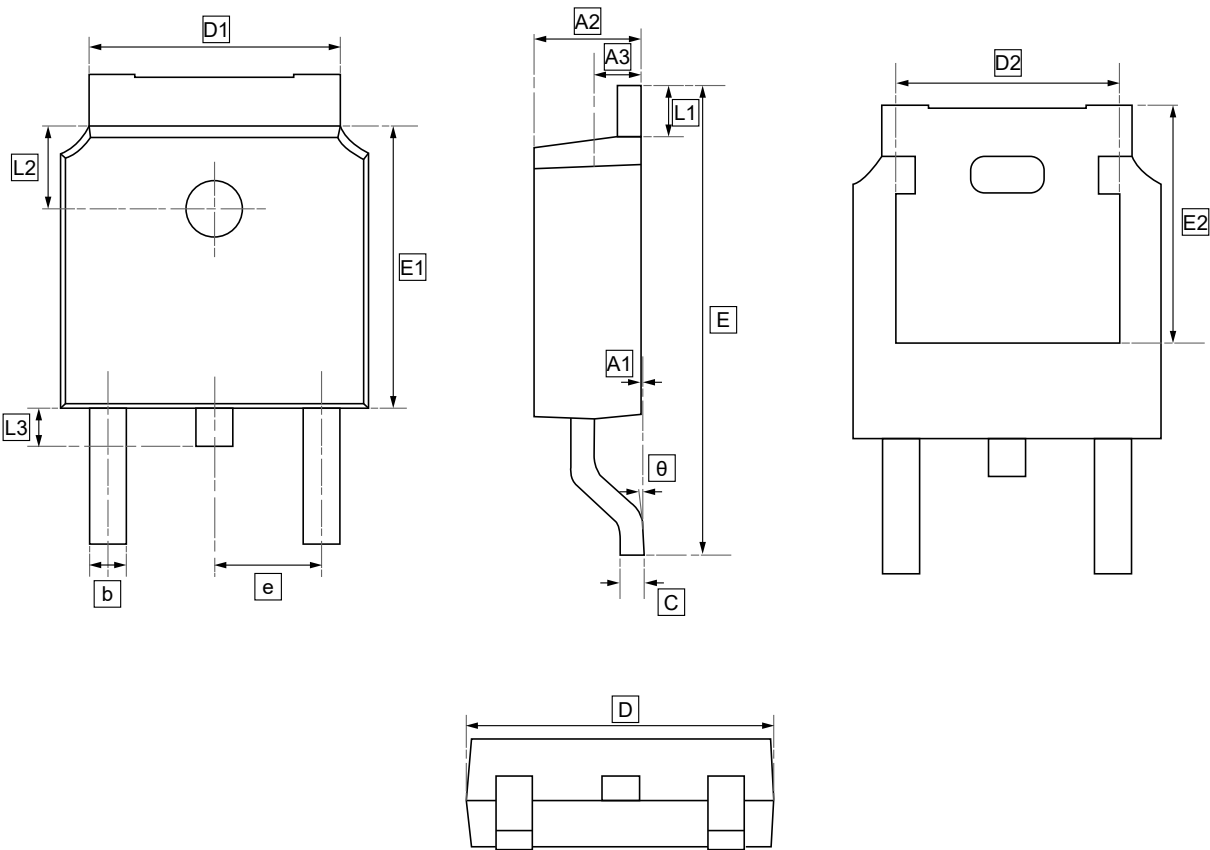


DIMENSIONS (mm are the original dimensions)

| Symbol | A     | A1    | A2    | b     | b1    | c     | D     | E     | E1    | e     | L     | θ   |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| Min    | -     | 0.020 | 1.500 | 0.660 | 2.900 | 0.230 | 6.300 | 6.700 | 3.300 | 2.300 | 0.750 | 0°  |
| Max    | 1.800 | 0.100 | 1.700 | 0.840 | 3.100 | 0.350 | 6.700 | 7.300 | 3.700 | BSC   | -     | 10° |



10.2TO-252 Package Outline Dimensions

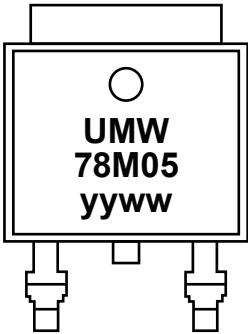


DIMENSIONS (mm are the original dimensions)

| Symbol | A1   | A2   | A3   | b    | c    | D    | D1   | D2   | E     | E1   | E2   | e     | L1   | L2   | L3   | θ    |
|--------|------|------|------|------|------|------|------|------|-------|------|------|-------|------|------|------|------|
| Min    | 0.00 | 2.18 | 0.90 | 0.65 | 0.46 | 6.35 | 4.95 | 4.32 | 9.40  | 5.97 | 5.21 | 2.286 | 0.89 | 1.70 | 0.60 | 0.00 |
| Max    | 0.13 | 2.39 | 1.10 | 0.85 | 0.61 | 6.73 | 5.46 | 4.90 | 10.41 | 6.22 | 5.38 |       | 1.27 | 1.90 | 1.00 | 8.00 |



11.Ordering information



yy: Year Code  
ww: Week Code

| Order Code | Marking | Package | Base QTY | Delivery Mode |
|------------|---------|---------|----------|---------------|
| UMW 78M05  | 78M05   | TO-252  | 2500     | Tape and reel |
| UMW 78M06  | 78M06   | TO-252  | 2500     | Tape and reel |
| UMW 78M08  | 78M08   | TO-252  | 2500     | Tape and reel |
| UMW 78M09  | 78M09   | TO-252  | 2500     | Tape and reel |
| UMW 78M12  | 78M12   | TO-252  | 2500     | Tape and reel |
| UMW 78M15  | 78M15   | TO-252  | 2500     | Tape and reel |
| UMW 78M24  | 78M24   | TO-252  | 2500     | Tape and reel |



## 12.Disclaimer

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