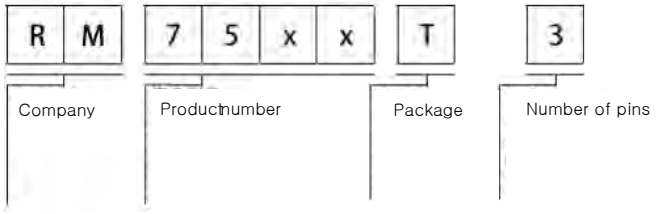
# 30V 170mA 1.2uA Low Dropout Linear Regulator

## ■Description

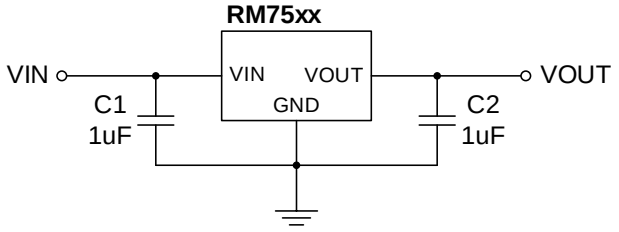
The RM75xx is a high ripple rejection, low power consumption, low dropout CMOS voltage regulator with short circuit protection. Its quiescent current at no-load is as low as 1.2uA, and it can provide an output current of 170mA under the condition that the input and output voltage difference is extremely small, and it can still maintain a good regulation rate. It is very suitable for portable battery-powered products, watch meters and security products, etc.

The RM75xx retains all common features of low dropout regulators, including low dropout PMOS pass devices, short circuit protection and thermal shutdown.

## ■Naming Convention




## ■Typical Application Circuit




## ■Features

- ± 2% output voltage tolerance
- $V_{IN}$ range up to 30V
- Ultra-low quiescent current 1.2uA
- Dropout voltage typically 600 mV at $I_{OUT}$ =100mA
- Built-in Thermal Protection
- Built-in Overcurrent Protection
- Compatible with low ESR ceramic capacitors

## ■Application

- Portable battery powered devices (screen electronic cigarette, etc.)
- Consumer electronic devices (wireless charging, PD data cables, etc.)
- Smart meters (electricity, gas, etc.)
- Communication equipment (mobile phone, PDA, etc.)
- Home appliances (light strips, remote control, etc.)
- Electric tools, BMS

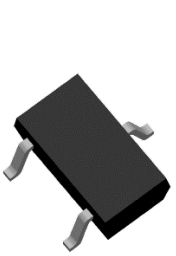
## ■Package (RoHS Compliant)

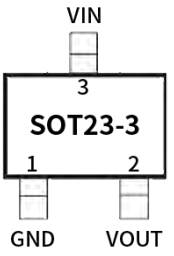
- SOT23-3
- SOT89-3

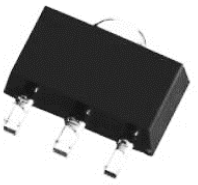
## ■Ordering Information

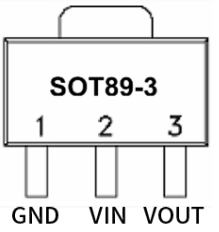
| Order Code | $V_{IN}$ (V) | $V_{OUT}$ (V) | $I_{OUT}$ max (mA) | $I_Q$ (uA) | Output Precision | PSRR (dB@1KHz) | Dropout Voltage (mV) | EN | Package |
|---|---|---|---|---|---|---|---|---|---|
| RM7518T3 | 5~30 | 1.8 | 170 | 1.2 | ± 2% | 70 | 600@100mA | — | SOT23-3 |
| RM7518N3 | | | | | | | | | SOT89-3 |
| RM7530T3 | | 3.0 | | | | | | | SOT23-3 |
| RM7530N3 | | | | | | | | | SOT89-3 |
| RM7533T3 | | 3.3 | | | | | | | SOT23-3 |
| RM7533N3 | | | | | | | | | SOT89-3 |
| RM7540T3 | | 4.0 | | | | | | | SOT23-3 |
| RM7540N3 | | | | | | | | | SOT89-3 |
| RM7544T3 | | 4.4 | | | | | | | SOT23-3 |
| RM7544N3 | | | | | | | | | SOT89-3 |
| RM7550T3 | | 5.0 | | | | | | | SOT23-3 |
| RM7550N3 | | | | | | | | | SOT89-3 |

## ■ Pin Configuration



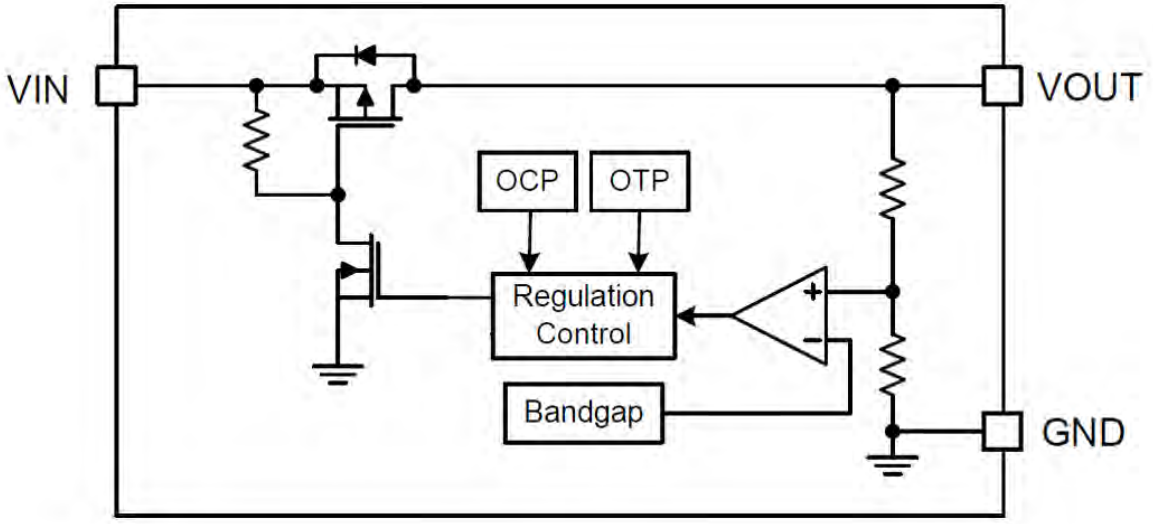





| Pin Name | Pin No. SOT23-3 | Pin No. SOT89-3 | Pin Function |
|---|---|---|---|
| GND | 1 | 1 | Ground |
| VOUT | 2 | 3 | Output Voltage Pin |
| VIN | 3 | 2 | Input Voltage Pin |

## ■Functional Block Diagram



## ■Absolute Maximum Ratings

| Project | Symbol | Value | | Units |
|---|---|---|---|---|
| Input Voltage | $V_{IN}$ | -0.3 ~ +33 | | V |
| Junction Temperature | $T_J$ | 150 | | ℃ |
| Power Dissipation | $P_D$ | SOT23-3 | 0.29 | W |
| | | SOT89-3 | 0.5 | |
| Thermal Resistance | $R_{\theta JA}$ | SOT23-3 | 350 | ℃/W |
| | | SOT89-3 | 200 | |
| Lead Temperature (Soldering, 10sec) | — | 300 | | ℃ |
| Storage Temperature | Tstg | -65 ~ +150 | | ℃ |
| ESD (Human Body Model) | ESD | ±4500 | | V |

(1) Absolute maximum ratings indicate that exceeding these ratings may cause damage to the component. The operating rating is the specified operating conditions of the device.Running the rated value does not imply a validated performance limit. For performance limits and related testing conditions, please refer to the electrical characteristics table.

(2) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(3) $R_{\theta JA}$ is measured at $T_A$ = 25°C on a high effective thermal conductivity four-layer test board per JEDEC 51-7.

## ■Recommended Operating Conditions

| Project | Symbol | Value | Units |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | 5 ~ 30 | V |
| Operating Temperature | $T_A$ | -40 ~ +85 | ℃ |
| Operating Junction Temperature Range | $T_J$ | -40 ~ +125 | ℃ |

## ■Electrical Characteristics

$V_{IN}$ = 5V, or '$V_{OUT}$ + 2V' (whichever is greater) , $I_{OUT}$ = 1mA, $C_{IN}$ = $C_{OUT}$ = 1uF, $T_J$ = 25℃, unless otherwise specified

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| $\Delta V_{OUT}$ | Output Voltage Accuracy | $T_J$ = 25℃ | -2% | | 2% | V |
| $\Delta V_{LINE}$ | Line Regulation | $V_{IN}$ = '$V_{OUT}$ + 2V' ~ 30V<br>$V_{IN}$ = 5V ~30V, if $V_{OUT}$ < 3V | | 2 | 50 | mV |
| $\Delta V_{LOAD}$ | Load Regulation | $I_{OUT}$ = 1mA ~ 150mA | | 40 | 75 | mV |
| $V_{DROP}$ | Dropout Voltage | $I_{OUT}$ = 100mA | | 600 | | mV |
| | | $I_{OUT}$ = 150mA | | 1000 | | |
| $I_Q$ | Quiescent Current | $I_{OUT}$ = 0mA | | 1.2 | 2.5 | uA |
| $I_{CL}$ | Current Limit | | 190 | 220 | | mA |
| PSRR | Power-supply Rejection Ratio | $I_{OUT}$ = 10mA, f = 1KHz | | 70 | | dB |
| $T_{SD}$ | Thermal Shutdown | | | 150 | | ℃ |
| $T_{SDHY}$ | Thermal Shutdown Hysteresis | | | 25 | | ℃ |

## ■Typical Characteristics

$V_{IN}$ = 12V, $I_{OUT}$ = 1mA, $V_{OUT}$ = 3V, $C_{IN}$ = $C_{OUT}$ = 1uF, $T_J$ = 25℃, unless otherwise specified

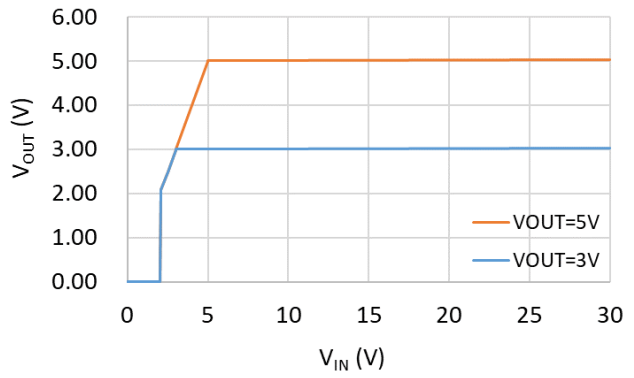



Fig 1. $V_{OUT}$ vs. $V_{IN}$

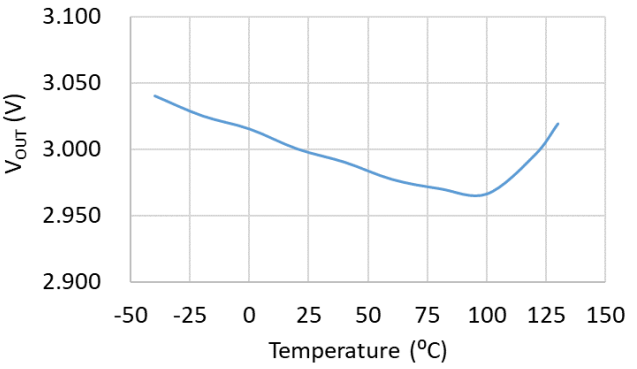



Fig 2. $V_{OUT}$ vs. Temperature

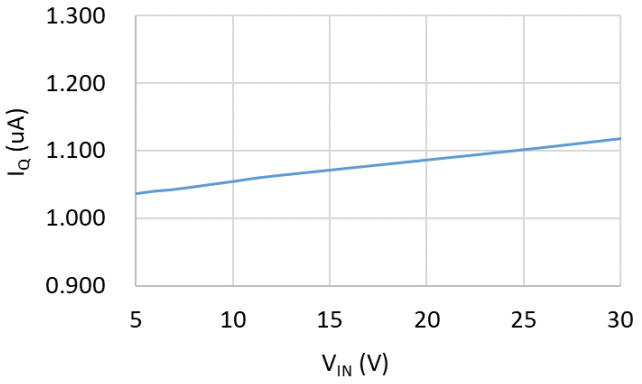



Fig 3. $I_Q$ vs. $V_{IN}$

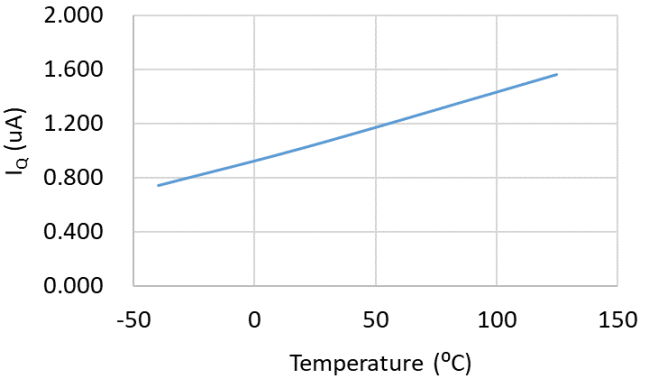



Fig 4. $I_Q$ vs. Temperature

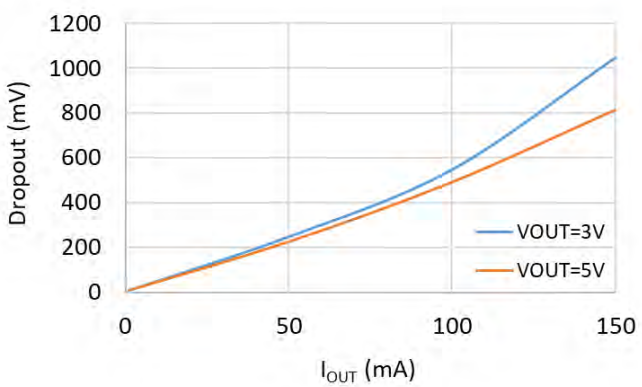



Fig 5. Dropout vs. $I_{OUT}$

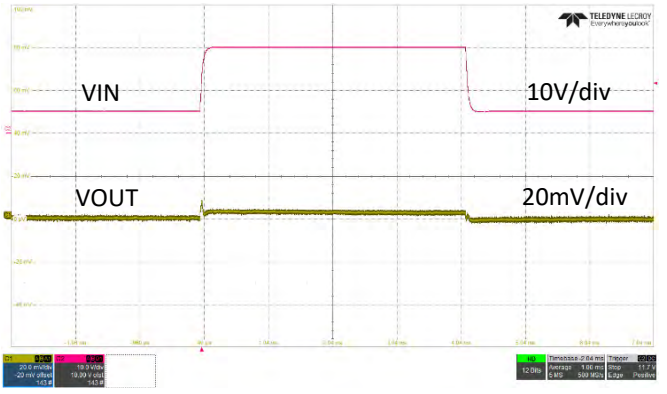



Fig 6. VIN Line Transient
($V_{IN}$ = 5V ↔ 20V)

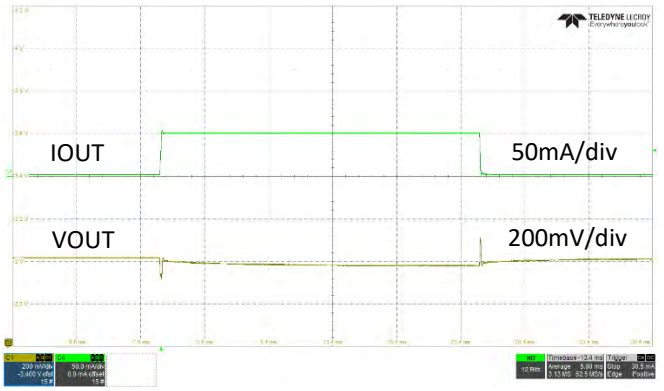



Fig 7. VOUT Load Transient
($I_{OUT}$ = 1mA ↔ 50mA)

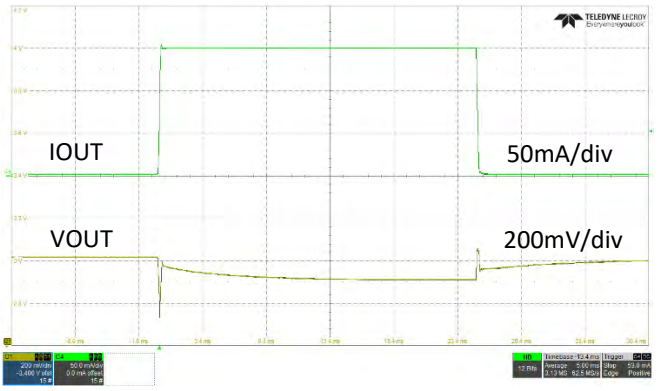



Fig 8. VOUT Load Transient
($I_{OUT}$ = 1mA ↔ 150mA)

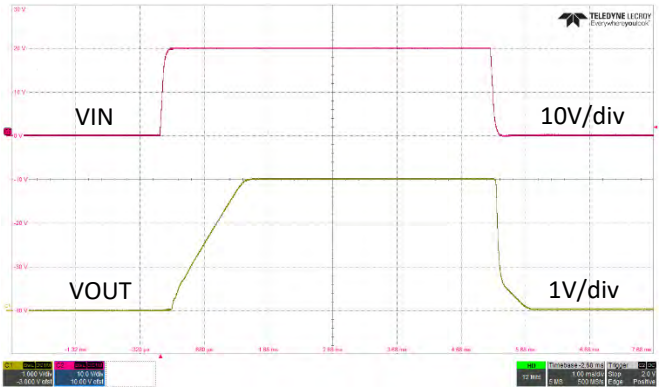



Fig 9. VIN Start up、Shut down
($V_{IN}$ = 20V, $I_{OUT}$ = 5mA)

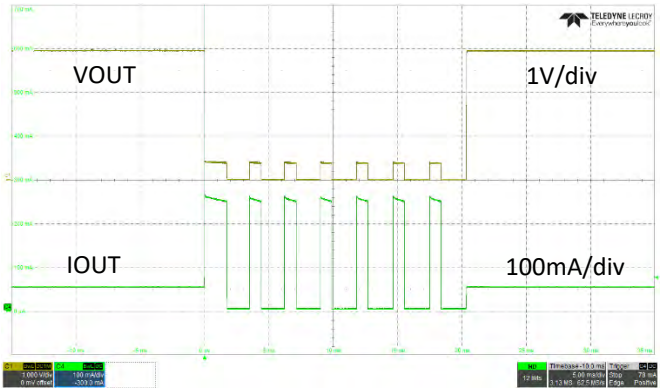



Fig 10. VOUT Short to GND
($V_{IN}$ = 12V, $I_{OUT}$ = 60mA)

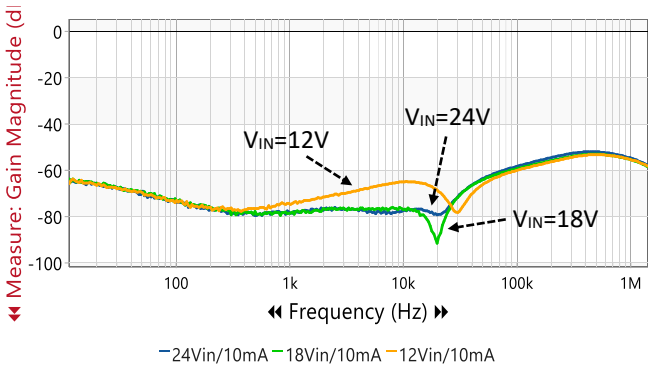
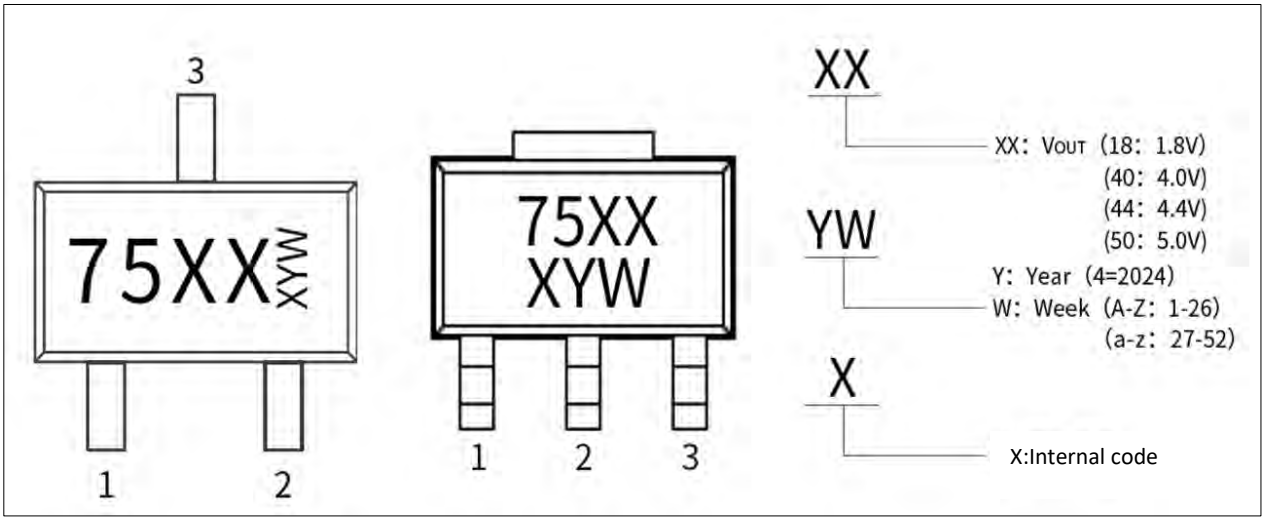
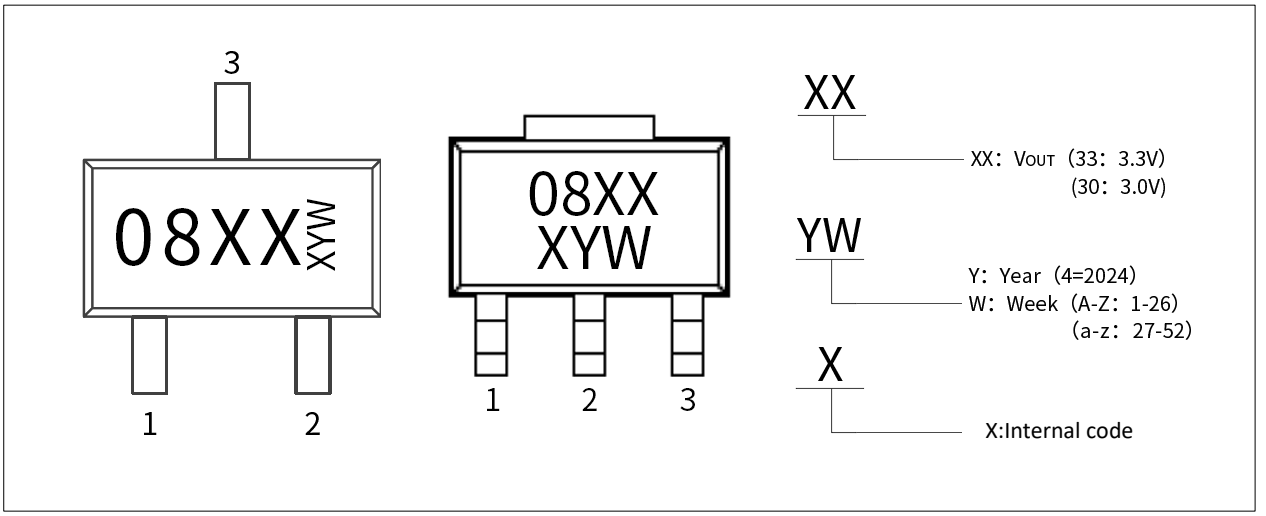



Fig 11. PSRR
($V_{IN}$ = 12V/18V/24V, $V_{OUT}$ = 3V, $I_{OUT}$ = 10mA)

## ■Silkscreen Instructions



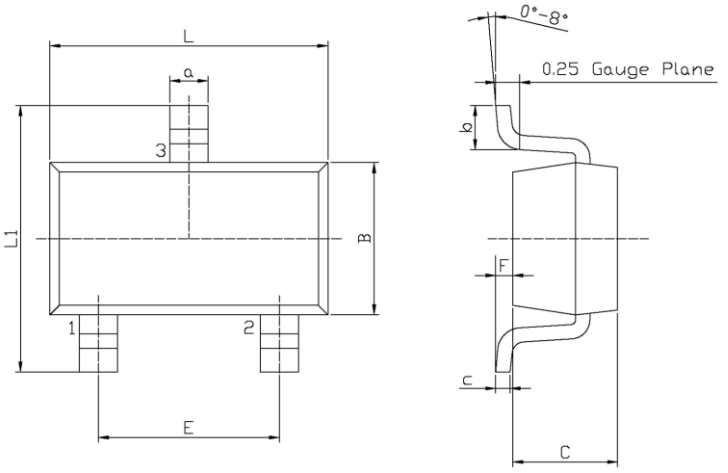




| Chip Model | Package | Chip Screen Printing | Character Description |
|---|---|---|---|
| RM7518N3 | SOT89-3 | 75XX | XX:Corresponds to output voltage<br>18 = 1.8V<br>40 = 4.0V<br>44 = 4.4V<br>50 = 5.0V |
| RM7540N3 | | | |
| RM7544N3 | | | |
| RM7550N3 | | | |
| RM7518T3 | SOT23-3 | | |
| RM7540T3 | | | |
| RM7544T3 | | | |
| RM7550T3 | | | |
| RM7533N3 | SOT89-3 | 08XX | XX:Corresponds to output voltage<br>33 = 3.3V<br>30 = 3.0V |
| RM7530N3 | | | |
| RM7533T3 | SOT23-3 | | |
| RM7530T3 | | | |

## ■Package Size

Unit：mm。

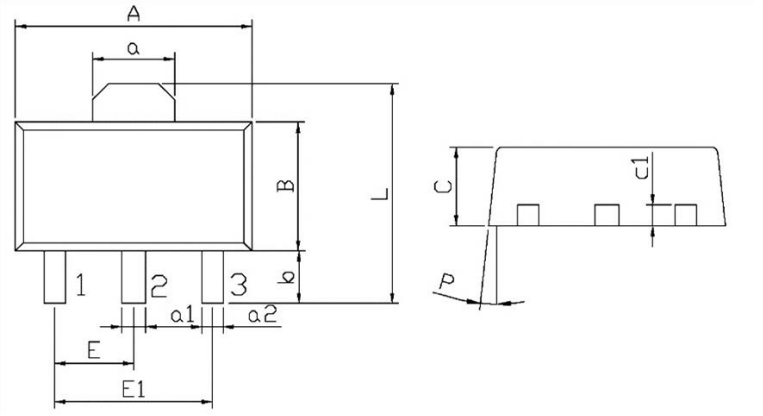
**SOT23-3**：




Unit: mm

| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|---|---|---|---|---|---|
| | Min | Max | | Min | Max |
| L | 2.82 | 3.02 | a | 0.35 | 0.50 |
| B | 1.50 | 1.70 | c | 0.10 | 0.20 |
| C | 0.90 | 1.30 | b | 0.35 | 0.55 |
| L1 | 2.60 | 3.00 | F | 0 | 0.15 |
| E | 1.80 | 2.00 | | | |

**SOT89-3**：




| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|---|---|---|---|---|---|
| | Min | Max | | Min | Max |
| A | 4.4 | 4.7 | a1 | 0.36 | 0.56 |
| B | 2.35 | 2.65 | a2 | 0.30 | 0.50 |
| L | 3.878 | 4.478 | C | 1.40 | 1.70 |
| a | 1.45 | 1.65 | c1 | 0.35 | 0.50 |
| E | 1.40 | 1.60 | P | 6° | |
| E1 | 2.80 | 3.20 | | | |
| b | 0.80 | 1.20 | | | |

## ■Packaging Quantity

| Package | Reel | Reel Size | G.W. |
|---|---|---|---|
| SOT89-3 | 1000 pcs | 7 inch | 0.14 kg |
| SOT23-3 | 3000 pcs | 7 inch | 0.12 kg |