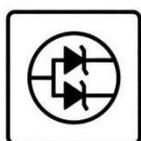


# MSKSEMI 美森科

SEMICONDUCTOR



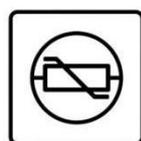
ESD



TVS



TSS



MOV



GDT



PLED

## LM317

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Product specification

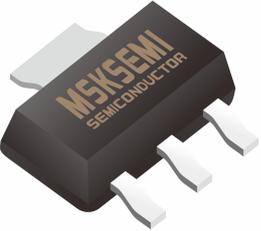
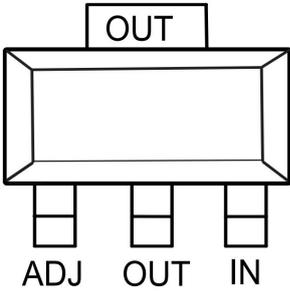
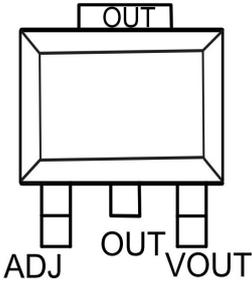
**DESCRIPTION**

This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply more than 1.5A of load current with an output voltage adjustable over a 1.2 to 37V. It employs internal current limiting, thermal shut-down and safe area compensation.

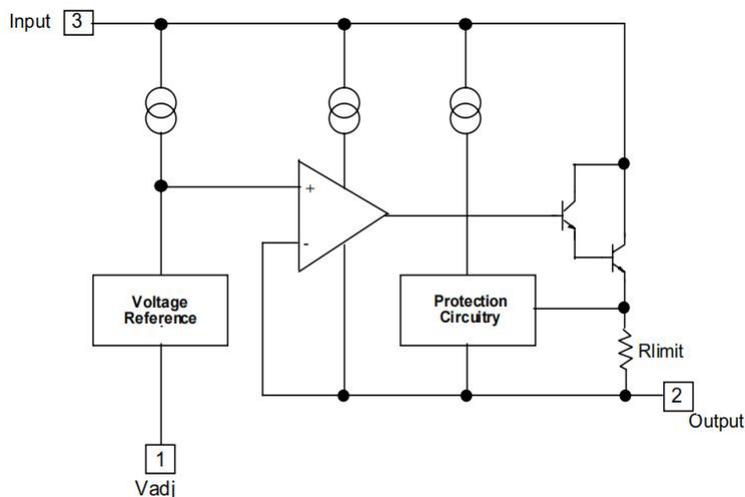
**FEATURE**

- Internal thermal overload protection
- Internal short circuit current limiting
- Output transistor safe operating area compensation

**Reference News**

| SOT-223   | SOT-252  |
|---|--|
|   |   |
|  |  |

**Internal Block Diagram**



## Absolute Maximum Ratings

| Symbol                | Parameter                                 | Value              | Units |
|-----------------------|---|--------------------|-------|
| $V_I-V_O$             | Input-Output Voltage Differential         | 40                 | V     |
| $T_{LEAD}$            | Lead Temperature                          | 230                | °C    |
| $P_D$                 | Power Dissipation                         | Internally limited | W     |
| $T_J$                 | Operating Junction Temperature Range      | 0~125              | °C    |
| $T_{stg}$             | Storage Temperature Range                 | -55~125            |       |
| $\Delta V_O/\Delta T$ | Temperature Coefficient of Output Voltage | ±0.02              | %/°C  |

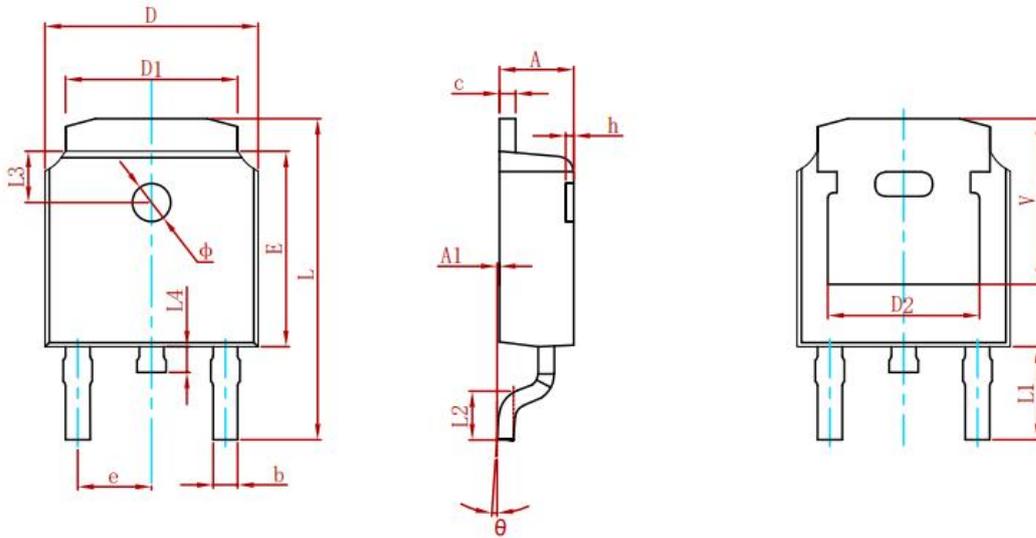
## ELECTRICAL CHARACTERISTICS

( $V_O-V_I=5V, I_O=0.5A, 0^\circ C \leq T_J \leq +125^\circ C, I_{MAX}=1.5A, P_{DMAX}=20W$ , unless otherwise specified)

| Parameter                                   | Symbol           | Test conditions  | MIN  | TYP        | MAX       | UNIT     |
|---|------------------|--|------|------------|-----------|----------|
| Line Regulation(note1)                      | $R_{line}$       | $T_A=25^\circ C$<br>$3V \leq V_I-V_O \leq 40V$   |      | 0.01       | 0.04      | %V       |
|   |                  | $3V \leq V_I-V_O \leq 40V$   |      | 0.02       | 0.07      |          |
| Load Regulation(note1)                      | $R_{load}$       | $T_A=25^\circ C, 10mA \leq I_O \leq I_{MAX}$<br>$V_O < 5V$<br>$V_O \geq 5V$                      |      | 18<br>0.4  | 25<br>0.5 | mV       |
|   |                  | $10mA \leq I_O \leq I_{MAX}$<br>$V_O < 5V$<br>$V_O \geq 5V$                                      |      | 40<br>0.8  | 70<br>1.5 | % $V_O$  |
| Adjustable Pin Current                      | $I_{ADJ}$        | -  |      | 46         | 100       | $\mu A$  |
| Adjustable Pin Current Change               | $\Delta I_{ADJ}$ | $3V \leq V_I-V_O \leq 40V$<br>$10mA \leq I_O \leq I_{MAX}, P_D \leq P_{MAX}$                     |      | 2.0        | 5         |          |
| Reference Voltage                           | $V_{REF}$        | $3V \leq V_{IN}-V_O \leq 40V$<br>$10mA \leq I_O \leq I_{MAX}, P_D \leq P_{MAX}$                  | 1.20 | 1.25       | 1.30      | V        |
| Temperature Stability                       | $ST_T$           | -  |      | 0.7        |           | %/ $V_O$ |
| Minimum Load Current to Maintain Regulation | $I_{L(MIN)}$     | $V_I-V_O=40V$  |      | 3.5        | 12        | mA       |
| Maximum Output Current                      | $I_{O(MAX)}$     | $V_I-V_O \leq 15V, P_D \leq P_{MAX}$<br>$V_I-V_O \leq 40V, P_D \leq P_{MAX}$<br>$T_A=25^\circ C$ | 1.0  | 2.2<br>0.3 |           | A        |
| RMS Noise,% of $V_{OUT}$                    | $N$              | $T_A=25^\circ C, 10Hz \leq f \leq 10KHz$   |      | 0.003      | 0.01      | %/ $V_O$ |
| Ripple Rejection                            | RR               | $V_O=10V, f=120Hz$<br>without $C_{ADJ}$<br>$C_{ADJ}=10\mu F$ (note2)                             | 66   | 60<br>75   |           | dB       |
| Long-Term Stability, $T_J=T_{HIGH}$         | ST               | $T_A=25^\circ C$ for end point<br>mesasurements, 1 0 0 0 HR                                      |      | 0.3        | 1         | %        |
| Thermal Resistance Junction to case         | $R_{\theta JC}$  | -  |      | 5          |           | °C/W     |

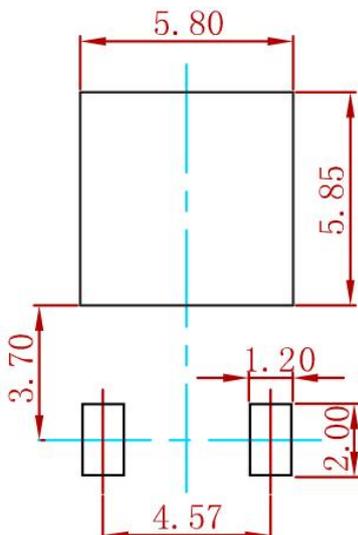
**PACKAGE MECHANICAL DATA**

**SOT-252**



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 2.200                     | 2.400  | 0.087                | 0.094 |
| A1     | 0.000                     | 0.127  | 0.000                | 0.005 |
| b      | 0.635                     | 0.770  | 0.025                | 0.030 |
| c      | 0.460                     | 0.580  | 0.018                | 0.023 |
| D      | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1     | 5.100                     | 5.460  | 0.201                | 0.215 |
| D2     | 4.830 REF.                |        | 0.190 REF.           |       |
| E      | 6.000                     | 6.200  | 0.236                | 0.244 |
| e      | 2.186                     | 2.386  | 0.086                | 0.094 |
| L      | 9.712                     | 10.312 | 0.382                | 0.406 |
| L1     | 2.900 REF.                |        | 0.114 REF.           |       |
| L2     | 1.400                     | 1.700  | 0.055                | 0.067 |
| L3     | 1.600 REF.                |        | 0.063 REF.           |       |
| L4     | 0.600                     | 1.000  | 0.024                | 0.039 |
| φ      | 1.100                     | 1.300  | 0.043                | 0.051 |
| θ      | 0°                        | 8°     | 0°                   | 8°    |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| V      | 5.250 REF.                |        | 0.207 REF.           |       |

**Suggested Pad Layout**

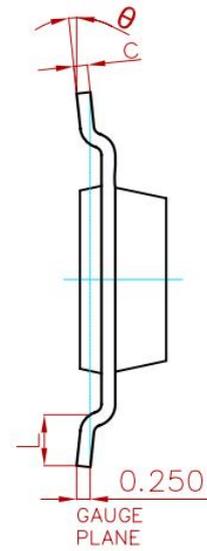
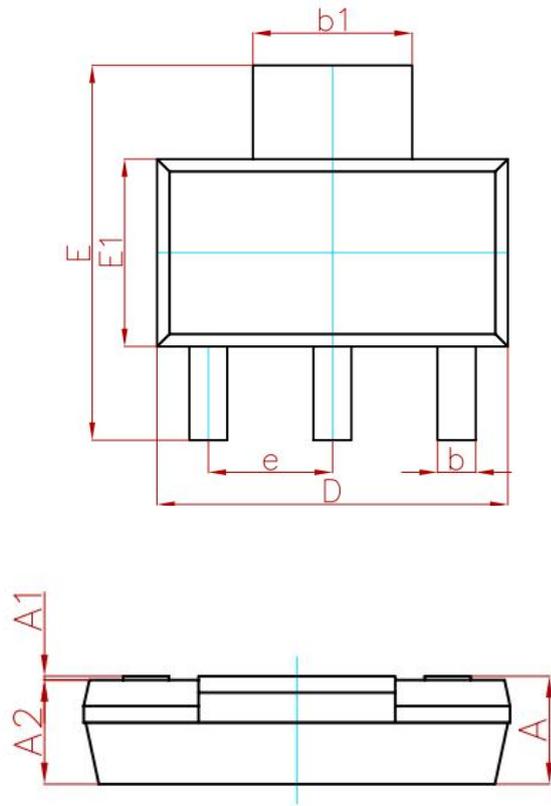


**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.

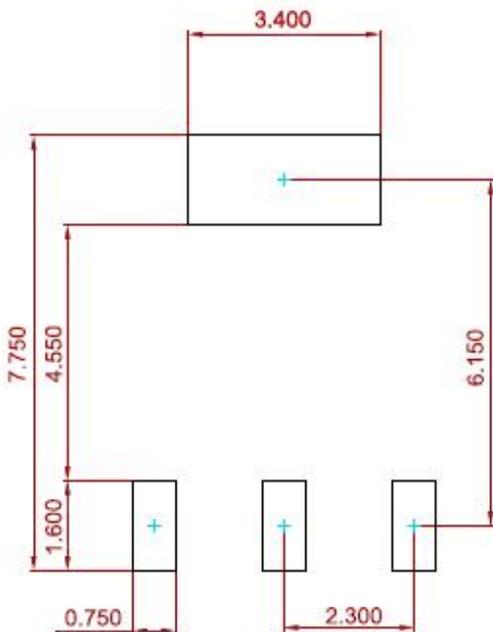
**PACKAGE MECHANICAL DATA**

**SOT-223**



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min.                      | Max.  | Min.                 | Max.  |
| A        | —                         | 1.800 | —                    | 0.071 |
| A1       | 0.020                     | 0.100 | 0.001                | 0.004 |
| A2       | 1.500                     | 1.700 | 0.059                | 0.067 |
| b        | 0.660                     | 0.840 | 0.026                | 0.033 |
| $b_1$    | 2.900                     | 3.100 | 0.114                | 0.122 |
| c        | 0.230                     | 0.350 | 0.009                | 0.014 |
| D        | 6.300                     | 6.700 | 0.248                | 0.264 |
| E        | 6.700                     | 7.300 | 0.264                | 0.287 |
| E1       | 3.300                     | 3.700 | 0.130                | 0.146 |
| e        | 2.300 (BSC)               |       | 0.091 (BSC)          |       |
| L        | 0.750                     | —     | 0.030                | —     |
| $\theta$ | 0°                        | 10°   | 0°                   | 10°   |

**Suggested Pad Layout**



- Note:
1. Controlling dimension: in millimeters.
  2. General tolerance:  $\pm 0.05\text{mm}$ .
  3. The pad layout is for reference purposes only.

**ORDERING INFORMATION**

| P/N          | PKG     | QTY  |
|--------------|---------|------|
| LM317MDT-MS  | TO-252  | 2500 |
| LM317DCYR-MS | SOT-223 | 2500 |

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