

## **HIGH CURRENT ADJUSTABLE VOLTAGE REGULATOR BL317B**

### **DESCRIPTION**

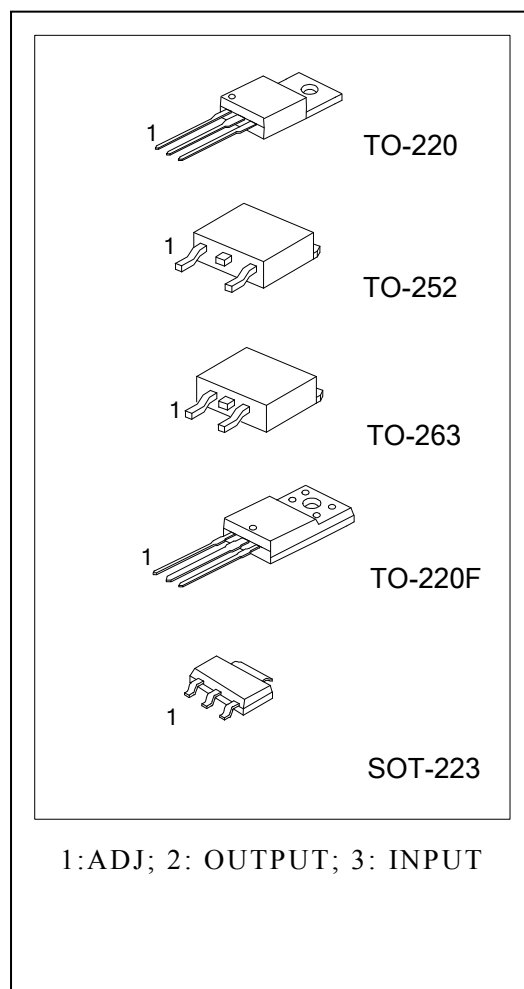
The BL317B is an adjustable 3-terminal positive voltage regulator, designed to supply more than 1.5A of output current with voltage adjustable from 1.3V ~ 37V.

### **FEATURES**

- Output current up to 1.5A
- Output voltage adjustable from 1.3V to 37V
- Internal short circuit protection
- Internal over temperature protection
- Safe-Area compensation for output transistor

### **APPLICATIONS**

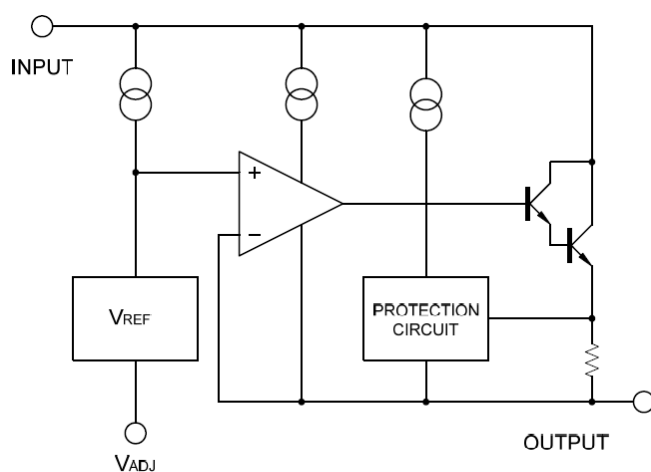
- PC Motherboard
- LCD Monitor
- Graphic Card
- DVD Player
- Network Interface Card/Switch
- Telecom Equipment
- Printer and other Peripheral Equipment



## ORDERING INFORMATION

| Device    | Package   | Shipping     |
|-----------|-----------|--------------|
| BL317BT   | TO-220    | Tube         |
| BL317BF   | TO-220F   | Tube         |
| BL317BY-B | TO-252    | 2500pcs/Reel |
| BL317BY-T | TO-252    | 80pcs/Tube   |
| BL317BK   | TO-263-2L | Reel         |
| BL317BS   | SOT-223   | Reel         |

## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS (Ta=25°C) \*

| Characteristic                      | Symbol                            | Min.             | Max. | Unit |
|-------------------------------------|-----------------------------------|------------------|------|------|
| Input - Output Voltage Difference   | V <sub>in</sub> -V <sub>out</sub> |                  | 40   | V    |
| Power Dissipation                   | P <sub>d</sub>                    | Internal limited |      |      |
| Operating Temperature Range         | TOPR                              | 0                | 125  | °C   |
| Storage temperature                 | T <sub>s</sub>                    | -65              | 150  | °C   |
| Lead temperature (soldering, 10sec) | T <sub>LEAD</sub>                 |                  | 260  | °C   |

\*: Absolute maximum ratings are stress ratings only and functional device operation is not implied. The device could be damaged beyond Absolute maximum ratings.

**ELECTRICAL CHARACTERISTICS**

( $V_I - V_O = 5V$ ,  $0^\circ C < T_j < 125^\circ C$ ,  $I_O = 500mA$ ,  $I_{MAX} = 1.5A$ ,  $P_{MAX} = 20W$ , unless otherwise specified)

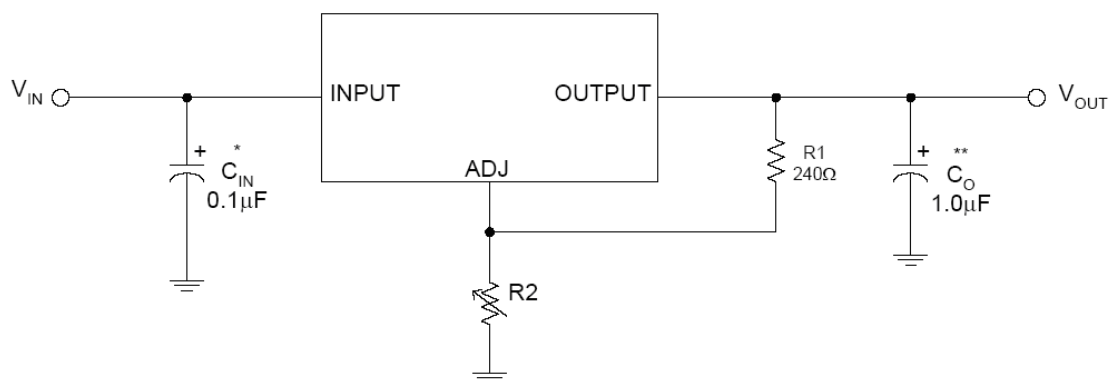
| Parameter                           | Symbol        | Test conditions                                                                    | Min  | Typ   | Max  | Unit    |
|-------------------------------------|---------------|------------------------------------------------------------------------------------|------|-------|------|---------|
| Line Regulation                     | $\Delta V_O$  | $T_a = 25^\circ C, 3V \leq V_I - V_O \leq 40V$                                     |      | 0.01  | 0.04 | % / V   |
|                                     |               | $T_a = 0 - 125^\circ C, 3V \leq V_I - V_O \leq 40V$                                |      | 0.02  | 0.07 |         |
| Load Regulation                     | $\Delta V_O$  | $T_a = 25^\circ C$<br>$10mA \leq I_O \leq I_{MAX}$                                 |      | 18    | 25   | mV      |
|                                     |               | $VO \leq 6V$                                                                       |      | 0.4   | 0.5  | % / VO  |
|                                     |               | $VO \leq 5V$                                                                       |      | 40    | 70   | mV      |
|                                     |               | $T_a = 0 - 125^\circ C$<br>$VO \leq 6V$                                            |      | 0.8   | 1.5  | % / VO  |
| Adjustable Pin current              | IADJ          |                                                                                    |      | 46    | 100  | $\mu A$ |
| Adjustable Pin Current Change       | $\Delta IADJ$ | $2.5V \leq V_I - V_O \leq 40V$ ,<br>$10mA \leq I_O \leq I_{MAX}, P_D \leq P_{MAX}$ |      | 2.0   | 5    | $\mu A$ |
| Reference Voltage                   | VREF          | $3V \leq V_I - V_O \leq 40V$ ,<br>$10mA \leq I_O \leq I_{MAX}, P_D \leq P_{MAX}$   | 1.20 | 1.25  | 1.30 | V       |
| Temperature Stability               | STT           |                                                                                    |      | 0.7   |      | % / VO  |
| Minimum Load Current for regulation | IL(MIN)       | $V_I - V_O = 40V$                                                                  |      | 3.5   | 10   | mA      |
| Maximum output Current              | IO(MAX)       | $V_I - V_O \leq 15V, P_D \leq P_{MAX}$                                             | 1.5  | 2.2   |      | A       |
|                                     |               | $V_I - V_O \leq 40V, P_D \leq P_{MAX}$ ,<br>$T_a = 25^\circ C$                     | 0.15 | 0.4   |      |         |
| RMS Noise v.s. % of Vout            | eN            | $T_A = 25^\circ C, 10HZ \leq f \leq 10KHZ$                                         |      | 0.003 | 0.01 | % / VO  |
| Ripple Rejection                    | RR            | $V_O = 10V, f = 120HZ, C_{ADJ} = 0$                                                |      | 60    |      | dB      |
|                                     |               | $V_O = 10V, f = 120HZ, C_{ADJ} = 10\mu F$                                          | 66   | 75    |      |         |
| Long-term Stability, $T_J = THIGH$  | ST            | $T_A = 25^\circ C, 1000 \text{ hr}$                                                |      | 0.3   | 1    | %       |

Note: Testing with low duty pulse should be used to avoid heating effect.

## THERMAL DATA

| Parameter           |         | Symbol        | RATING | UNITS                       |
|---------------------|---------|---------------|--------|-----------------------------|
| Junction-to-Ambient | TO-252  | $\theta_{JA}$ | 112    | $^{\circ}\text{C}/\text{W}$ |
|                     | TO-220  |               | 54     |                             |
|                     | TO-220F |               | 44     |                             |
|                     | TO-263  |               | 64     |                             |
|                     | SOT-223 |               | 165    |                             |
| Junction-to-Case    | TO-252  | $\theta_{JC}$ | 12     | $^{\circ}\text{C}/\text{W}$ |
|                     | TO-220  |               | 5      |                             |
|                     | TO-220F |               | 5      |                             |
|                     | TO-263  |               | 5      |                             |
|                     | SOT-223 |               | 23     |                             |

## APPLICATION CIRCUIT



\* =  $C_{IN}$  is required if the regulator is located near power supply filter.

\*\* =  $C_O$  is needed for stability and it improves transient response.

$$V_{OUT} = V_{REF} \times (1 + R2/R1) + I_{ADJ} \times R2$$

Since  $I_{ADJ}$  is controlled to less than  $100\mu\text{A}$ , the error associated with this term is negligible in most applications.

## CHARACTERISTICS CURVES

Fig.1. Load Regulation vs temperature

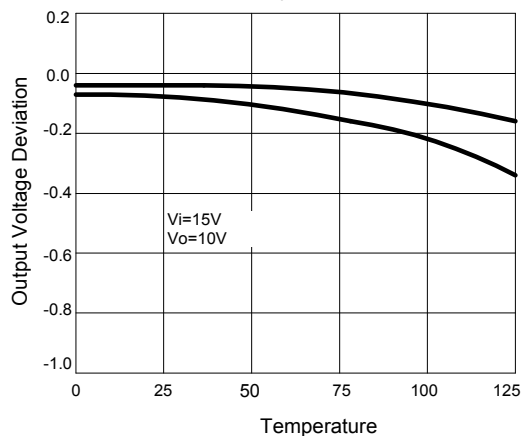


Fig.2 Adjustment Current vs Temperature

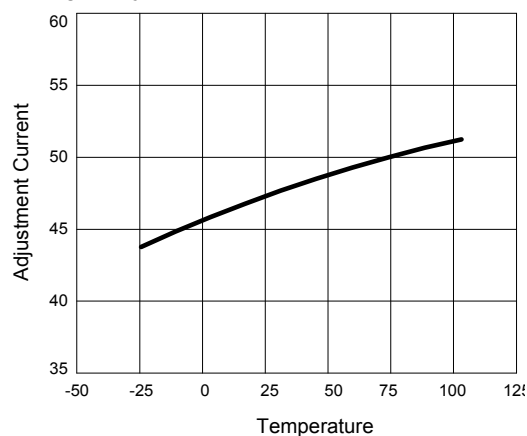


Fig.3. Dropout Voltage vs Input-Output Voltage Difference

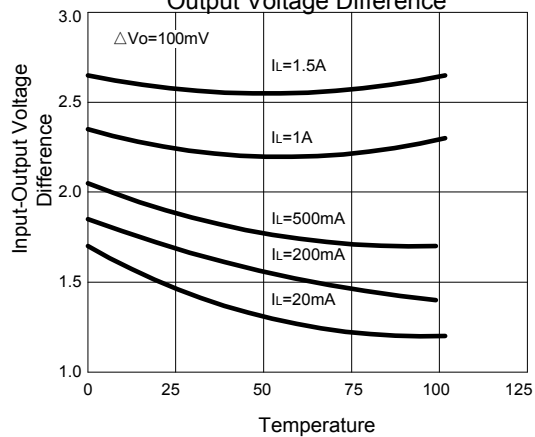
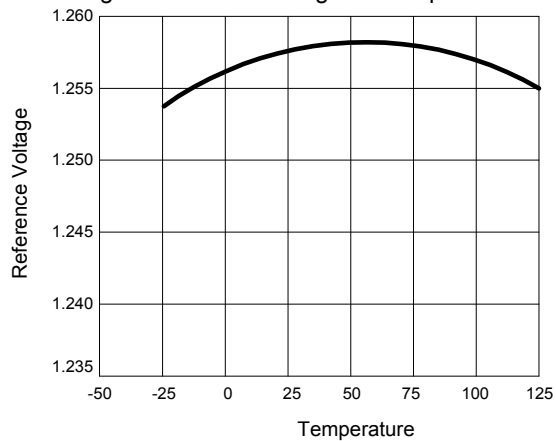
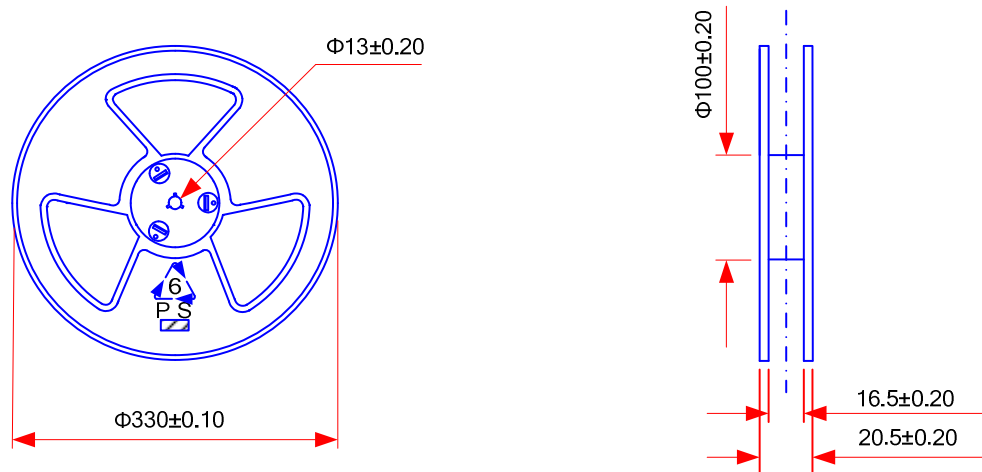


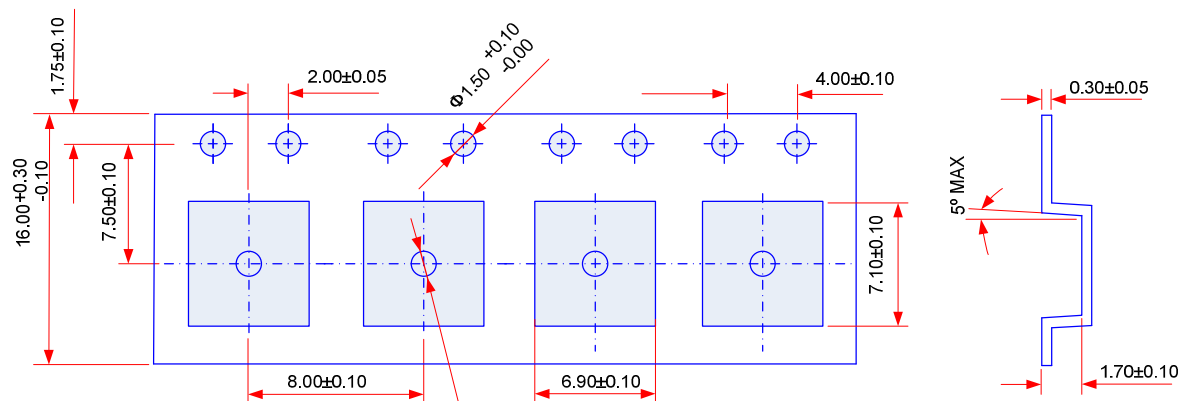
Fig.4 Reference Voltage vs Temperature



**Taping reel dimension:**



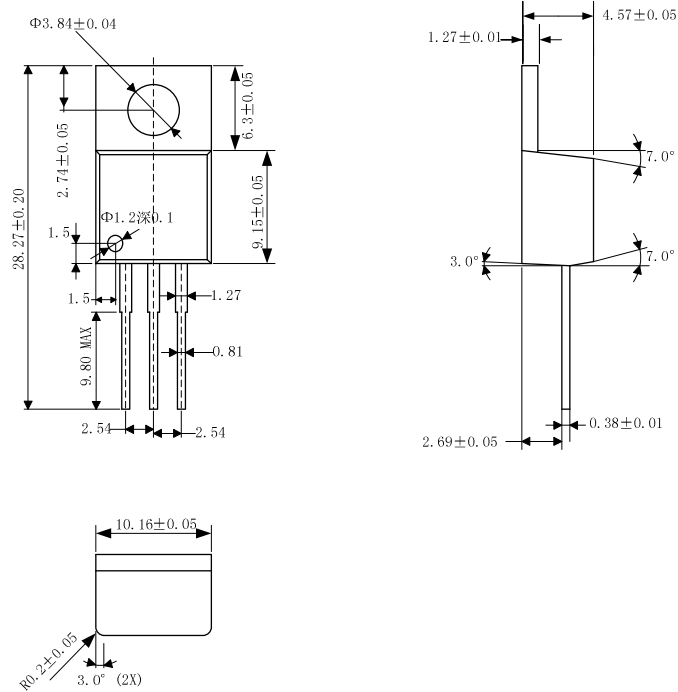
**Taping dimension:**



PACKAGE DIMENSIONS

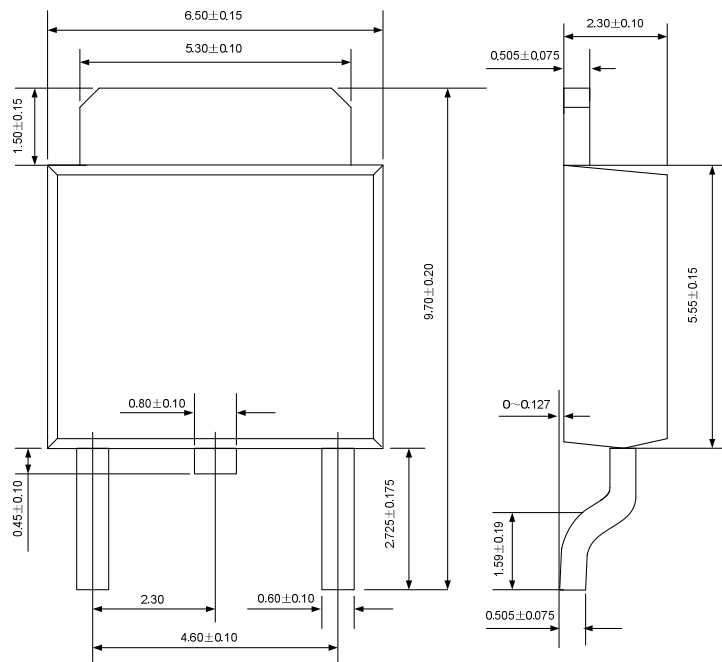
TO-220

Unit: mm

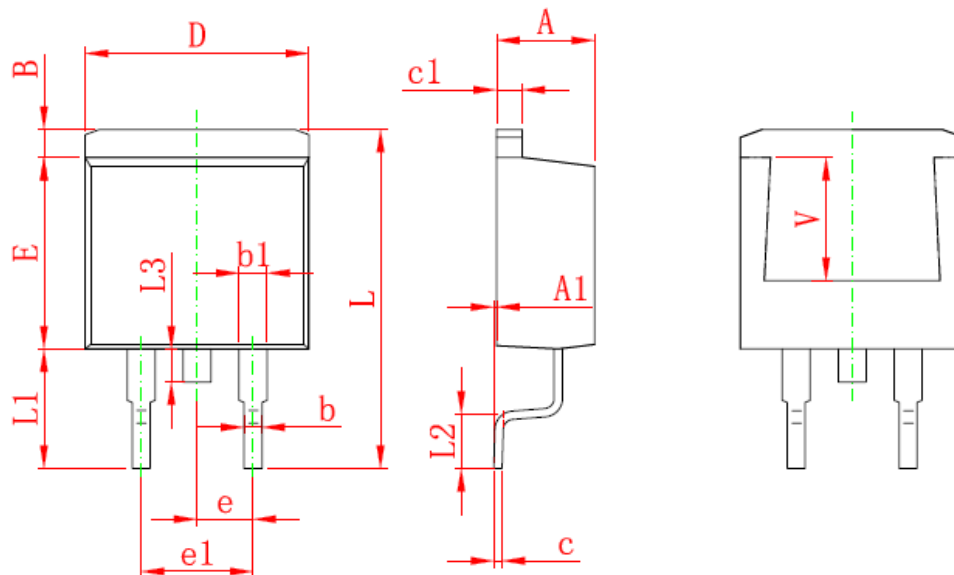


TO-252

Unit: mm



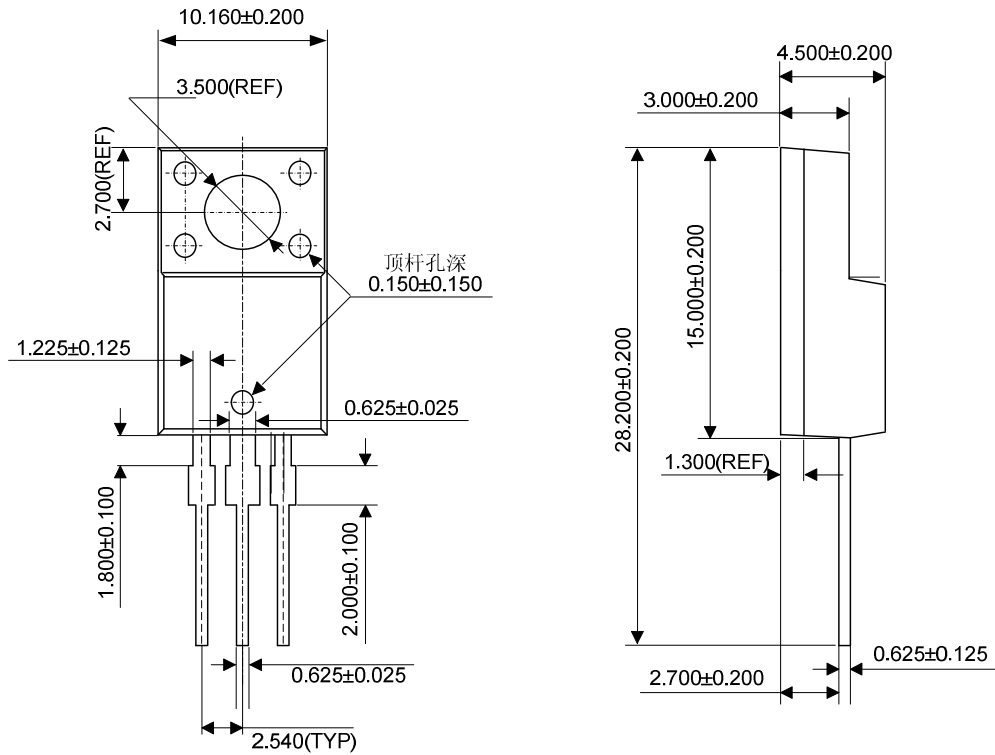
TO-263  
 Unit: mm



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 4.470                     | 4.670  | 0.176                | 0.184 |
| A1     | 0.000                     | 0.150  | 0.000                | 0.006 |
| B      | 1.170                     | 1.370  | 0.046                | 0.054 |
| b      | 0.710                     | 0.910  | 0.028                | 0.036 |
| b1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| c      | 0.310                     | 0.530  | 0.012                | 0.021 |
| c1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| D      | 10.010                    | 10.310 | 0.394                | 0.406 |
| E      | 8.500                     | 8.900  | 0.335                | 0.350 |
| e      | 2.540 TYP                 |        | 0.100 TYP            |       |
| e1     | 4.980                     | 5.180  | 0.196                | 0.204 |
| L      | 15.050                    | 15.450 | 0.593                | 0.608 |
| L1     | 5.080                     | 5.480  | 0.200                | 0.216 |
| L2     | 2.340                     | 2.740  | 0.092                | 0.108 |
| L3     | 1.300                     | 1.700  | 0.051                | 0.067 |
| V      | 5.600 REF                 |        | 0.220 REF            |       |

TO-220F

Unit: mm



SOT-223

Unit: mm

