

### Features

- Low Quiescent Current: 2.5uA
- High Input Voltage Rating: Up to 30V
- Low voltage drop
- Fixed Output Voltages:  
1.8V, 2.5V, 3.0V, 3.3V, 3.6V, 4.0V, 4.4V and 5.0V
- High-accuracy Output Voltage:  $\pm 2\%$
- Fast Transient Response
- Over current protection

### Description

The HT73XX series are highly accurate, LDO Voltage Regulators that are manufactured using CMOS technology and the input voltage of HT73XX series is in Excess of 30V.

The HT73XX features very fast response against line voltage transient and load current transient, and ensures no overshoot voltage during the HT73XX start up and short circuit recovery.

The HT73XX features integrated short-circuit shutdown protection.

The HT73XX is available with fixed output voltages of 1.8V, 2.5V, 3.0V, 3.3V, 3.6V, 4.0V, 4.4V and 5.0V.

### Application

- Battery-powered equipment
- Smoke detector and sensor
- Micro controller Applications
- Home Appliance

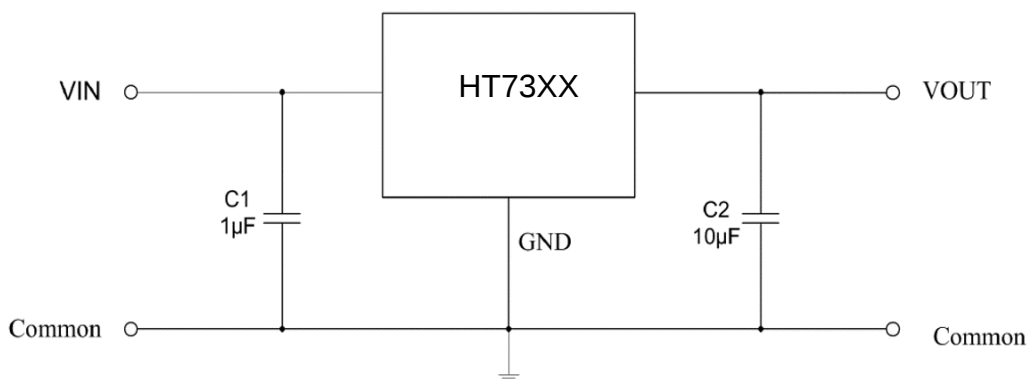


Halogen-Free

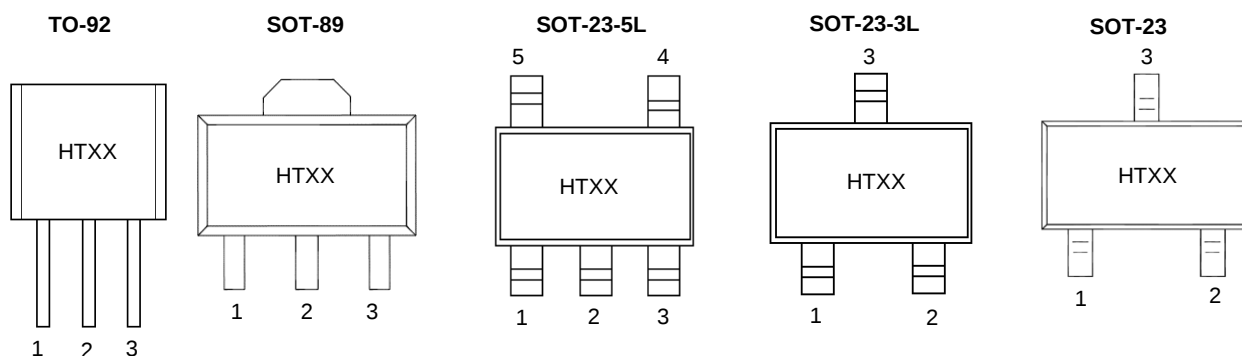
| Type   | Output voltage | Package                                             | Marking |
|--------|----------------|-----------------------------------------------------|---------|
| HT7318 | 1.8V           | SOT-23<br>SOT-23-3L<br>SOT-23-5L<br>SOT-89<br>TO-92 | HTXX    |
| HT7325 | 2.5V           |                                                     |         |
| HT7330 | 3.0V           |                                                     |         |
| HT7333 | 3.3V           |                                                     |         |
| HT7336 | 3.6V           |                                                     |         |
| HT7340 | 4.0V           |                                                     |         |
| HT7344 | 4.4V           |                                                     |         |
| HT7350 | 5.0V           |                                                     |         |

Note: "XX" Represents the output voltage

## Application Circuits

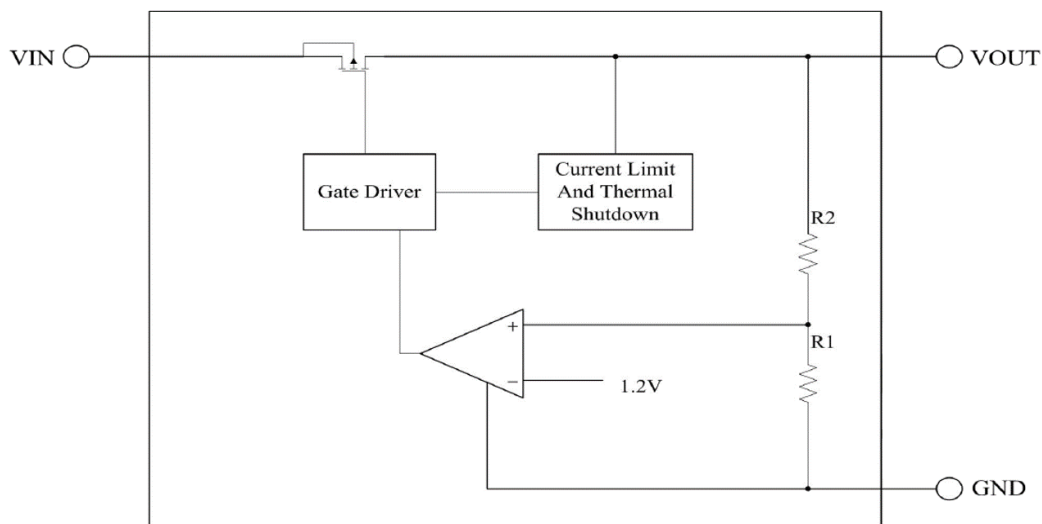


## Packages And Pin Assignment



| Pin No. |           |           |        |       | Pin Name | Pin Description |
|---------|-----------|-----------|--------|-------|----------|-----------------|
| SOT-23  | SOT-23-3L | SOT-23-5L | SOT-89 | TO-92 |          |                 |
| 1       | 1         | 1         | 1      | 1     | GND      | Ground pin      |
| 3       | 3         | 2         | 2      | 2     | VIN      | Input pin       |
| 2       | 2         | 3         | 3      | 3     | OUT      | Output pin      |
| -       | -         | 4,5       | -      | -     | NC       | No connection   |

## Functional Block Diagram



**Absolute Maximum Ratings**

| Item                                        | Description                    | Min                | Max | Unit |
|---------------------------------------------|--------------------------------|--------------------|-----|------|
| Voltage                                     | VIN to GND                     | -0.3               | 30  | V    |
|                                             | VOUT to GND                    | -0.3               | 6   | V    |
|                                             | VOUT to VIN                    | -30                | 0.3 | V    |
| Current                                     | Peak Output Current            | Internally Limited |     |      |
| Temperature                                 | Operating Junction Temperature | -40                | 125 | °C   |
|                                             | Storage Temperature            | -65                | 150 | °C   |
| Power Dissipation                           | TO-92                          | 600                |     | mW   |
|                                             | SOT-89                         | 600                |     | mW   |
|                                             | SOT-23-5L                      | 400                |     | mW   |
|                                             | SOT-23-3L                      | 380                |     | mW   |
|                                             | SOT-23                         | 280                |     | mW   |
| Thermal Resistance<br>(Junction to Ambient) | TO-92                          | 165                |     | °C/W |
|                                             | SOT-89                         | 165                |     | °C/W |
|                                             | SOT-23-5L                      | 250                |     | °C/W |
|                                             | SOT-23-3L                      | 260                |     | °C/W |
|                                             | SOT-23                         | 360                |     | °C/W |
| Electrostatic<br>Discharge Rating           | Human Body Model (HBM)         | 2                  |     | KV   |
|                                             | Charged Device Model (MM)      | 100                |     | V    |

**Electrical Characteristics**(At T<sub>A</sub>=25°C, C<sub>IN</sub>=1μF, V<sub>IN</sub>=V<sub>OUTNOM</sub>+1.0V, C<sub>OUT</sub>=10μF, unless otherwise noted)

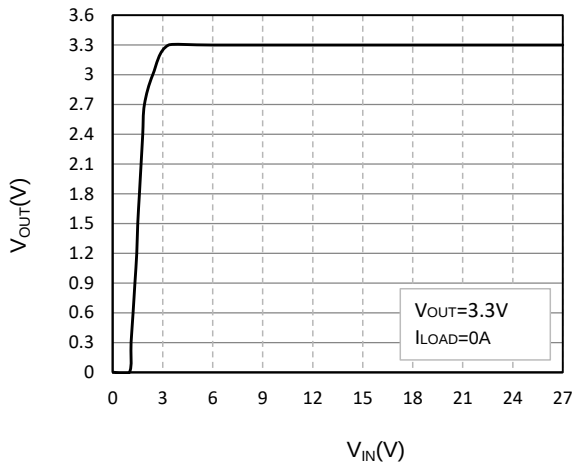
| Symbol                                  | Parameter                      | Test Conditions                                                                              | Min                           | Typ                 | Max                           | Unit              |
|-----------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------|-------------------------------|---------------------|-------------------------------|-------------------|
| V <sub>IN</sub>                         | Input Voltage                  | -                                                                                            | 3.0                           | -                   | 30                            | V                 |
| V <sub>OUT</sub>                        | Output Voltage                 | V <sub>IN</sub> =12V, I <sub>OUT</sub> =10mA                                                 | V <sub>OUTNOM</sub><br>* 0.98 | V <sub>OUTNOM</sub> | V <sub>OUTNOM</sub><br>* 1.02 | V                 |
| I <sub>OUT</sub>                        | Output Current                 |                                                                                              | -                             | 250                 | -                             | mA                |
| I <sub>GND</sub>                        | Quiescent Current              | V <sub>IN</sub> =12V, No load                                                                | -                             | 2.0                 | -                             | uA                |
| V <sub>DROP</sub>                       | Dropout Voltage <sup>(1)</sup> | V <sub>OUT</sub> =5V, I <sub>OUT</sub> =100mA,<br>V <sub>IN</sub> =V <sub>OUTNOM</sub> +0.7V | -                             | 200                 | -                             | mV                |
| I <sub>SHORT</sub>                      | Short Current                  |                                                                                              | -                             | 100                 | -                             | mA                |
| $\frac{\Delta V_{OUT}}{\Delta V_{OUT}}$ | Load Regulation                | V <sub>IN</sub> =6V, 1mA ≤ I <sub>OUT</sub> ≤ 150mA                                          | -                             | 0.2                 | -                             | mV/mA             |
| $\frac{\Delta V_{OUT}}{\Delta V_{IN}}$  | Line Regulation                | I <sub>OUT</sub> =1mA, V <sub>OUTNOM</sub> +1V ≤ V <sub>IN</sub> ≤ 24V                       | -                             | 0.1                 | -                             | mV/V              |
| e <sub>N</sub>                          | Output Noise                   | 10Hz to 100kHz, I <sub>OUT</sub> =30mA                                                       | -                             | 120                 | -                             | uV <sub>RMS</sub> |

Note: (1) Dropout Voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.

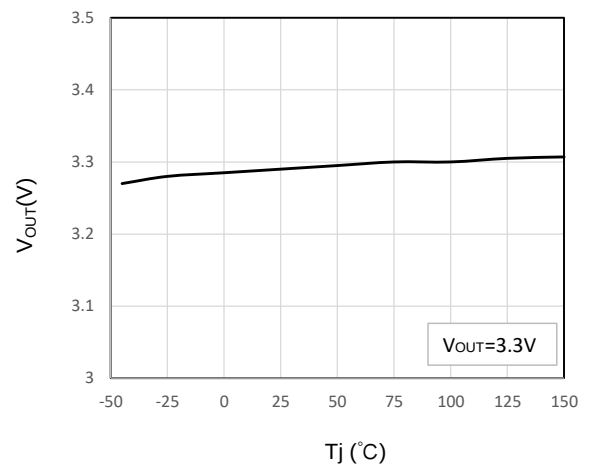


## Typical Performance Characteristic

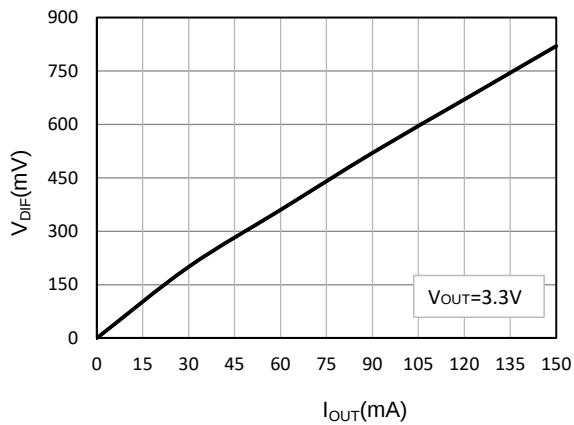
Output Voltage VS Input Voltage



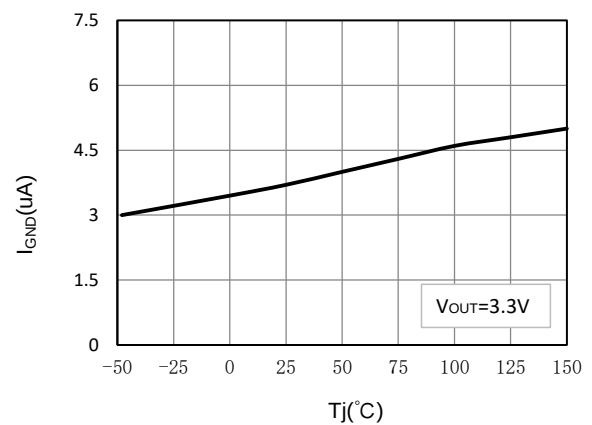
Output Voltage VS Temperature



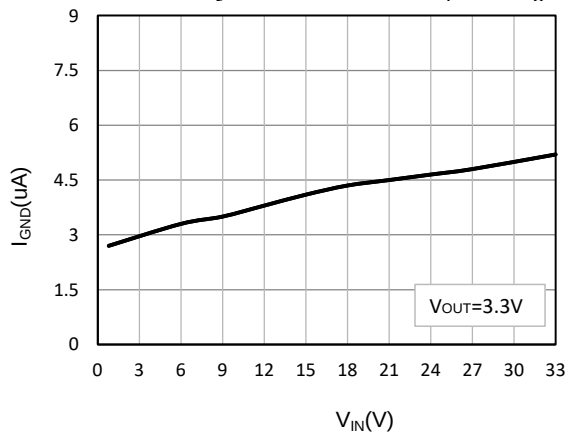
Dropout Voltage VS Output Current



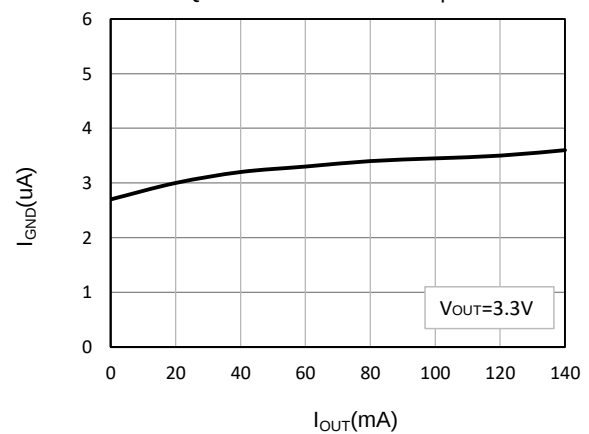
Quiescent Current VS Temperature



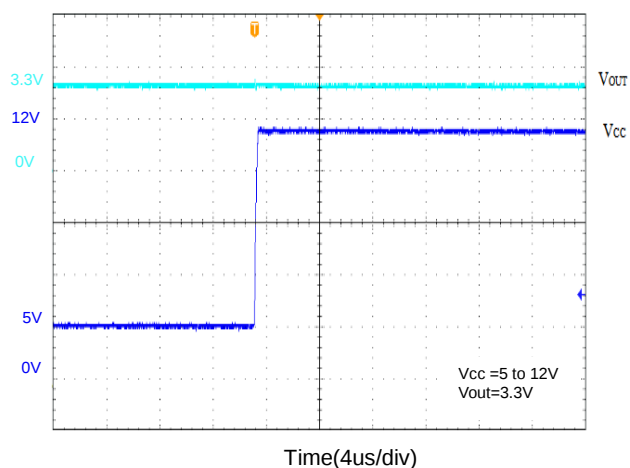
Quiescent Current VS Input Voltage



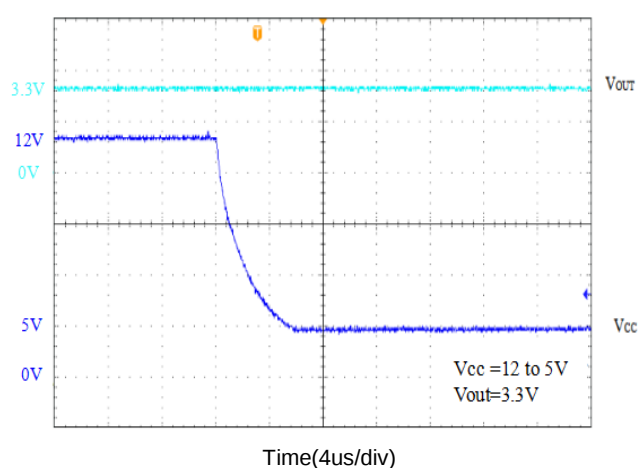
Quiescent Current VS Output Current



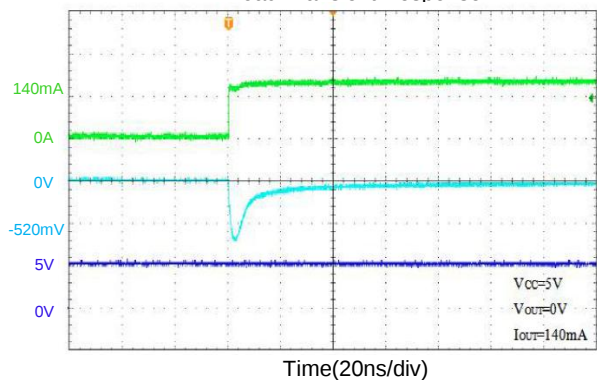
Line Transient Response



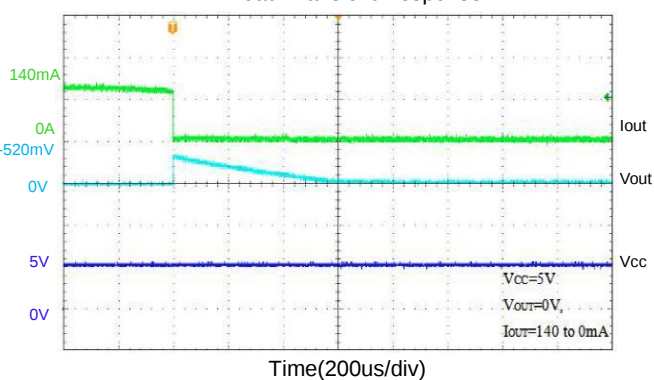
Line Transient Response



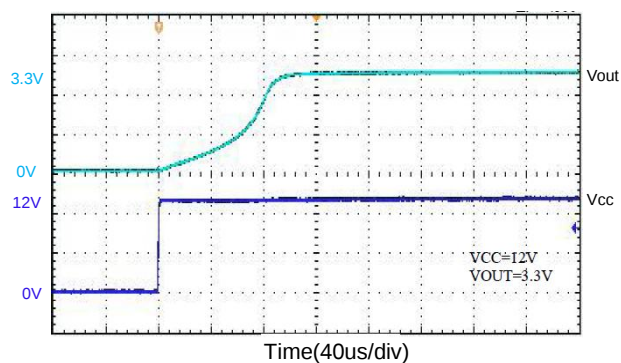
Load Transient Response



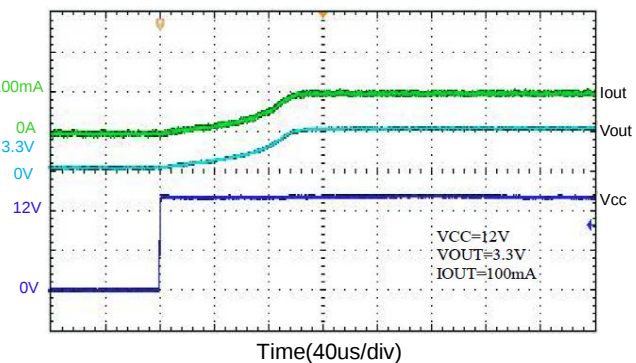
Load Transient Response



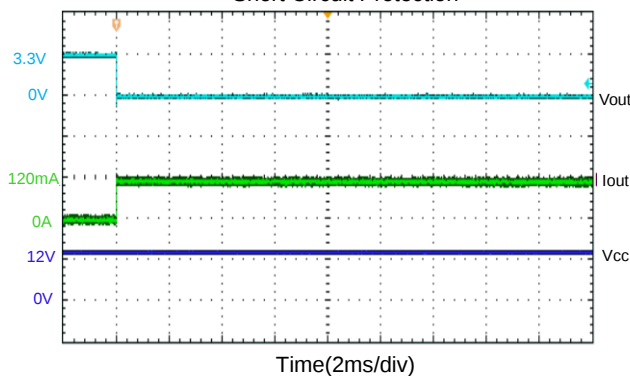
Start Up



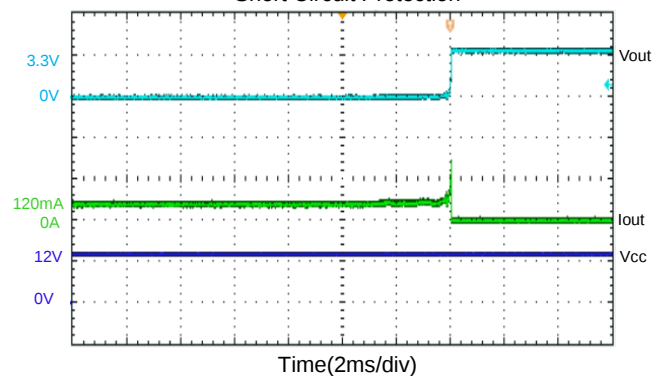
Start Up



Short Circuit Protection



Short Circuit Protection



## Functional Description

### Input Capacitor

A 1 $\mu$ F ceramic capacitor is recommended to connect between VIN and GND pins to decouple input power supply glitch and noise. The amount of the capacitance may be increased without limit. This input capacitor must be located as close as possible to the device to assure input stability and less noise. For PCB layout, a wide copper trace is required for both VIN and GND.

### Output Capacitor

An output capacitor is required for the stability of the HT73XX. The recommended minimum output capacitance is 10 $\mu$ F, ceramic capacitor is recommended, and temperature characteristics are X7R or X5R. Higher capacitance values help to improve load/line transient response. The output capacitance may be increased to keep low undershoot/overshoot. Place output capacitor as close as possible to VOUT and GND pins.

### Current Limit and Short Circuit Protection

When output current at VOUT pin is higher than current limit threshold or the VOUT pin is direct short to GND, the current limit protection will be triggered and clamp the output current at a pre-designed level to prevent over-current and thermal damage.

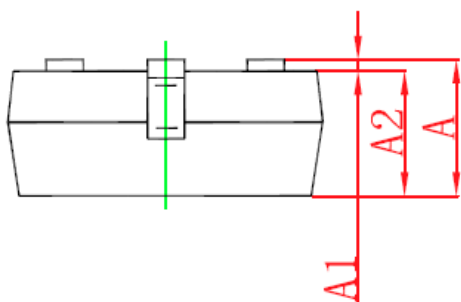
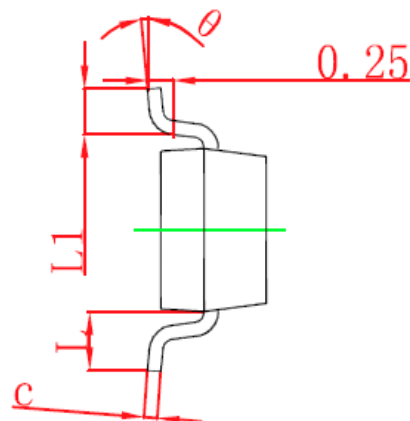
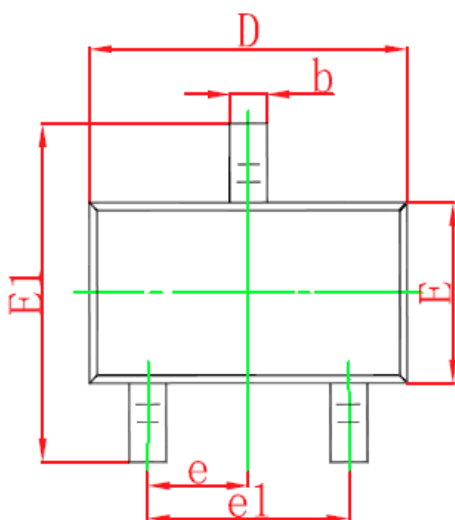
### Thermal Protection

The HT73XX has internal thermal sense and protection circuits. When excessive power dissipation happens on the device, such as short circuit at the output pin or very heavy load current with a large voltage drop across the HT73XX, the internal thermal protection circuit will be triggered, and it will shut down the power MOSFET to prevent the HT73XX from damage. As soon as excessive thermal condition is removed and the temperature of the device drops down, the thermal protection circuit will release the control of the power MOSFET, and the HT73XX goes to normal operation.



## Package Outline Dimensions

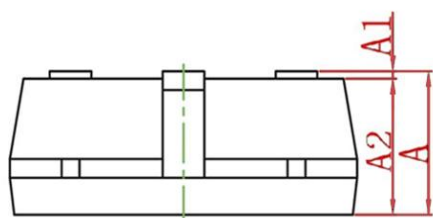
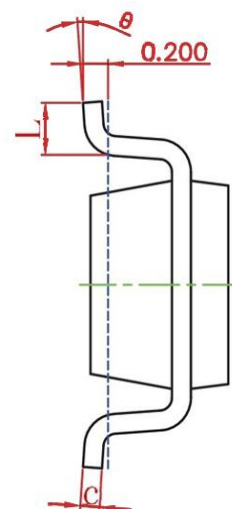
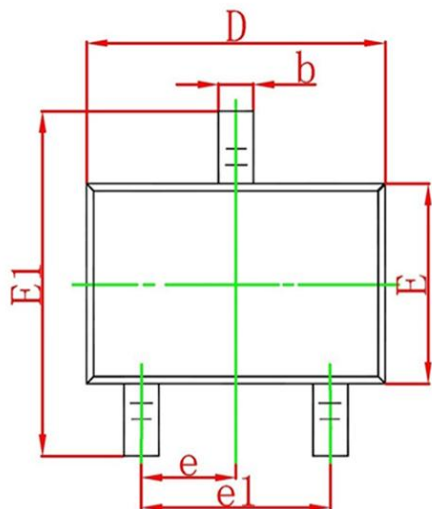
SOT-23



| Symbol | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|--------|-------------------------------|-------|----------------------|-------|
|        | Min                           | Max   | Min                  | Max   |
| A      | 0.900                         | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                         | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                         | 1.050 | 0.035                | 0.041 |
| b      | 0.300                         | 0.500 | 0.012                | 0.020 |
| c      | 0.080                         | 0.150 | 0.003                | 0.006 |
| D      | 2.800                         | 3.000 | 0.110                | 0.118 |
| E1     | 2.250                         | 2.550 | 0.088                | 0.100 |
| E      | 1.200                         | 1.400 | 0.047                | 0.055 |
| e      | 0.950TYP                      |       | 0.037TYP             |       |
| e1     | 1.800                         | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                     |       | 0.022 REF            |       |
| L1     | 0.300                         | 0.500 | 0.012                | 0.020 |
| θ      | 0°                            | 8°    | 0°                   | 8°    |

## Package Outline Dimensions

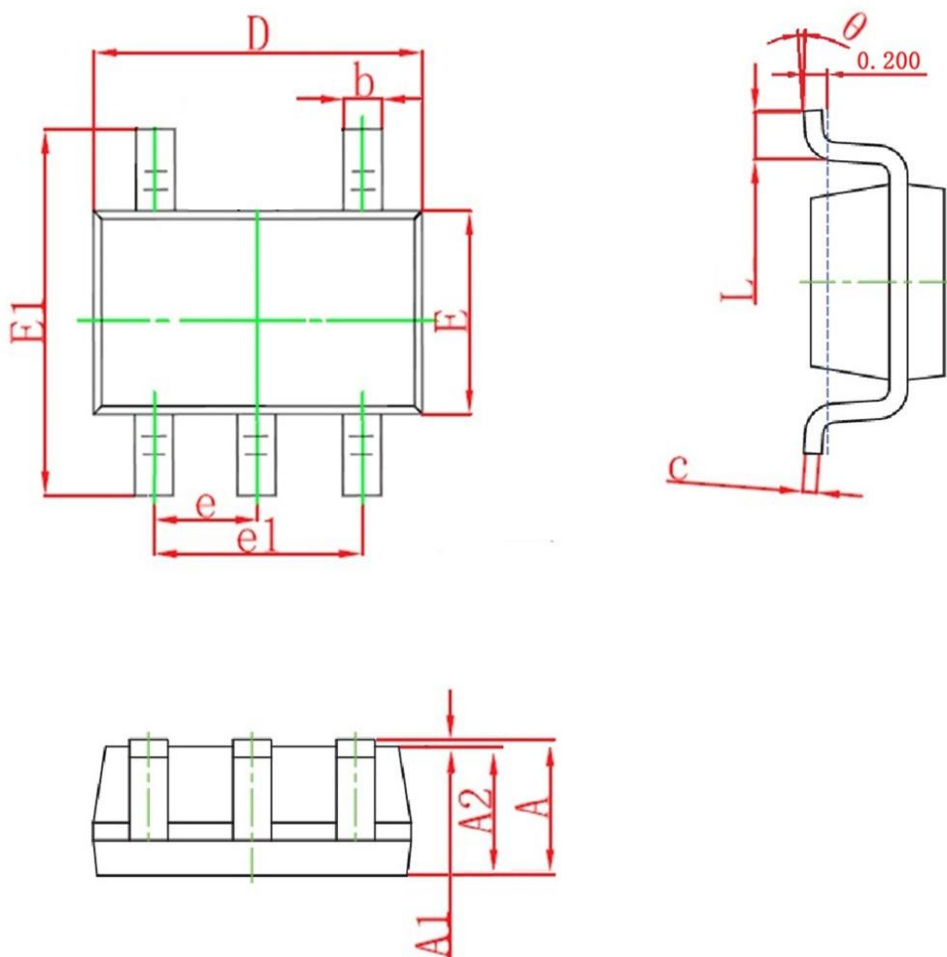
SOT-23-3L



| Symbol | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|--------|-------------------------------|-------|----------------------|-------|
|        | Min                           | Max   | Min                  | Max   |
| A      | 1.050                         | 1.250 | 0.042                | 0.050 |
| A1     | 0.000                         | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                         | 1.150 | 0.042                | 0.046 |
| b      | 0.300                         | 0.500 | 0.012                | 0.020 |
| c      | 0.100                         | 0.200 | 0.004                | 0.008 |
| D      | 2.820                         | 3.020 | 0.112                | 0.120 |
| E      | 1.500                         | 1.700 | 0.060                | 0.068 |
| E1     | 2.650                         | 2.950 | 0.106                | 0.118 |
| e      | 0.950TYP                      |       | 0.037TYP             |       |
| e1     | 1.800                         | 2.000 | 0.071                | 0.079 |
| L      | 0.300                         | 0.600 | 0.012                | 0.024 |
| θ      | 0°                            | 8°    | 0°                   | 8°    |



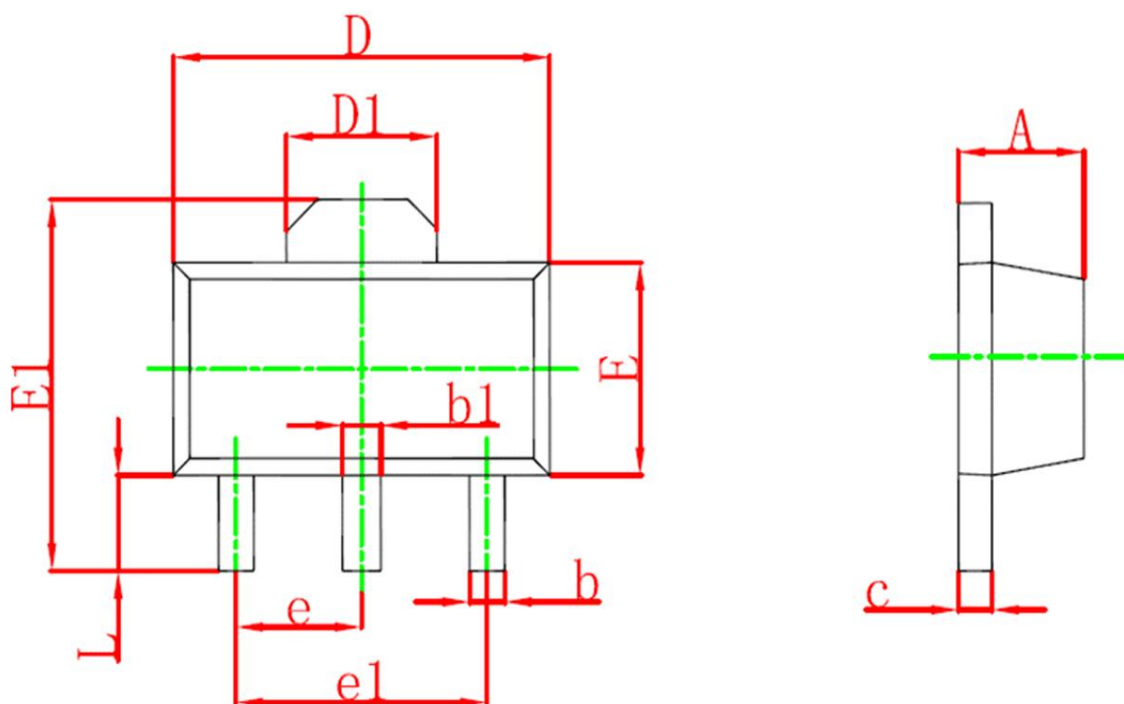
SOT-23-5L



| Symbol | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|--------|-------------------------------|-------|----------------------|-------|
|        | Min                           | Max   | Min                  | Max   |
| A      | 1.050                         | 1.250 | 0.041                | 0.049 |
| A1     | 0.000                         | 0.100 | 0.000                | 0.004 |
| A2     | 1.050                         | 1.150 | 0.041                | 0.045 |
| b      | 0.300                         | 0.500 | 0.012                | 0.020 |
| c      | 0.100                         | 0.200 | 0.004                | 0.008 |
| D      | 2.820                         | 3.020 | 0.111                | 0.119 |
| E      | 1.500                         | 1.700 | 0.059                | 0.067 |
| E1     | 2.650                         | 2.950 | 0.104                | 0.116 |
| e      | 0.950TYP                      |       | 0.037TYP             |       |
| e1     | 1.800                         | 2.000 | 0.071                | 0.079 |
| L      | 0.300                         | 0.600 | 0.012                | 0.024 |
| θ      | 0°                            | 8°    | 0°                   | 8°    |



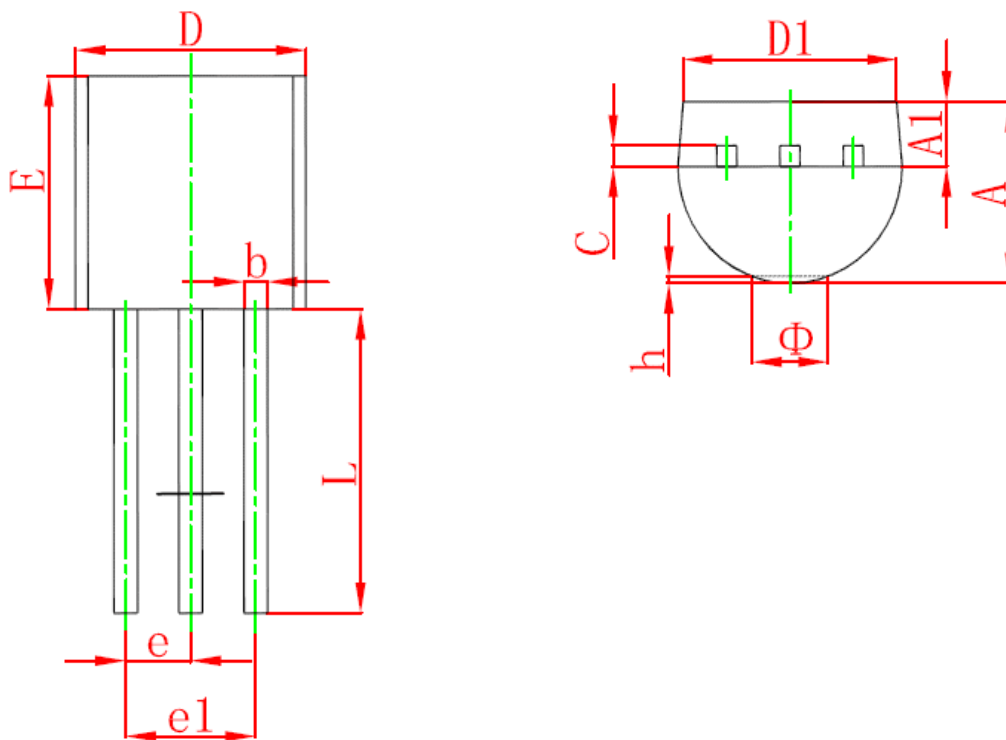
SOT-89



| Symbol | Dimensions in Millimeters(mm) |       | Dimensions in Inches |       |
|--------|-------------------------------|-------|----------------------|-------|
|        | Min                           | Max   | Min                  | Max   |
| A      | 1.400                         | 1.600 | 0.055                | 0.063 |
| b      | 0.320                         | 0.520 | 0.013                | 0.020 |
| b1     | 0.400                         | 0.580 | 0.016                | 0.023 |
| c      | 0.350                         | 0.440 | 0.014                | 0.017 |
| D      | 4.400                         | 4.600 | 0.173                | 0.181 |
| D1     | 1.550 REF                     |       | 0.061 REF            |       |
| E      | 2.300                         | 2.600 | 0.091                | 0.102 |
| E1     | 3.940                         | 4.250 | 0.155                | 0.167 |
| e      | 1.500 TYP                     |       | 0.060 TYP            |       |
| e1     | 3.000 TYP                     |       | 0.118 TYP            |       |
| L      | 0.900                         | 1.200 | 0.035                | 0.047 |



TO-92



| Symbol | Dimensions in Millimeters(mm) |        | Dimensions In Inches |       |
|--------|-------------------------------|--------|----------------------|-------|
|        | Min                           | Max    | Min                  | Max   |
| A      | 3.480                         | 3.560  | 0.137                | 0.140 |
| A1     | 1.100                         | 1.400  | 0.043                | 0.055 |
| b      | 0.390                         | 0.500  | 0.015                | 0.020 |
| c      | 0.360                         | 0.400  | 0.014                | 0.016 |
| D      | 4.400                         | 4.800  | 0.173                | 0.189 |
| D1     | 3.430                         |        | 0.135                |       |
| E      | 4.500                         | 4.700  | 0.177                | 0.185 |
| e      | 1.250TYP                      |        | 0.049TYP             |       |
| e1     | 2.440                         | 2.640  | 0.096                | 0.104 |
| L      | 13.000                        | 15.000 | 0.512                | 0.590 |
| Φ      |                               | 1.600  |                      | 0.063 |
| h      | 0.000                         | 0.380  | 0.000                | 0.015 |