

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 HT75XX series are highly accurate, LDO Voltage Regulators that are manufactured using CMOS technology and the input voltage of HT75XX series is in Excess of 30V.

The HT75XX features very fast response against line voltage transient and load current transient, and ensures no overshoot voltage during the HT75XX start up and short circuit recovery.

The HT75XX features integrated short-circuit shutdown protection.

The HT75XX 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

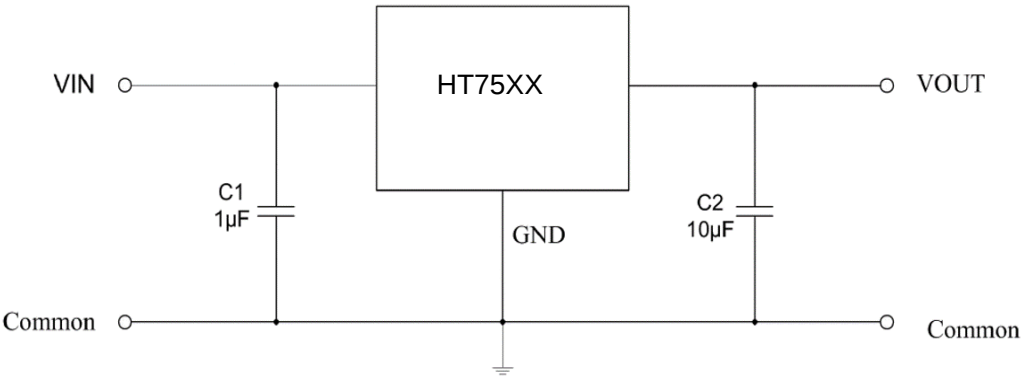
- Battery-powered equipment
- Smoke detector and sensor
- Micro controller Applications
- Home Appliance



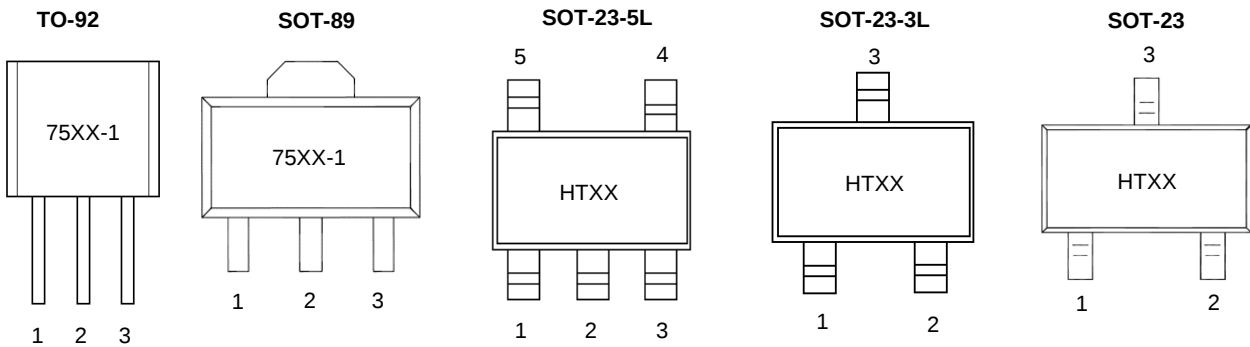
Halogen-Free

Type	Output voltage	Package	Marking	
HT7518	1.8V	SOT-23 SOT-23-3L SOT-23-5L SOT-89 TO-92	SOT-23	HTXX
HT7525	2.5V		SOT-23-3L	
HT7530	3.0V		SOT-23-5L	
HT7533	3.3V		SOT-89 TO-92	75XX-1
HT7536	3.6V			
HT7540	4.0V			
HT7544	4.4V			
HT7550	5.0V			

Application Circuits

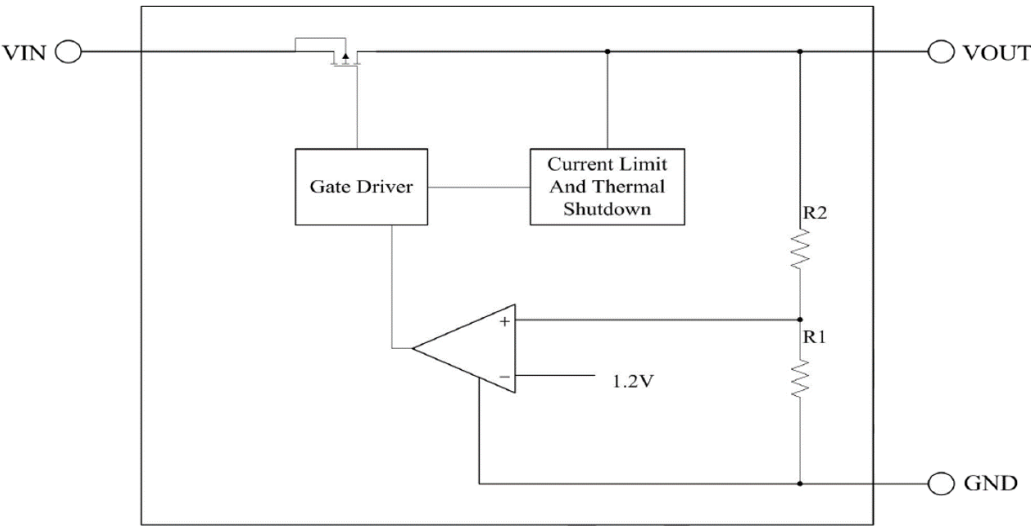


Packages And Pin Assignment



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 (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 Discharge Rating	Human Body Model (HBM)	2		KV
	Charged Device Model (MM)	100		V

Electrical Characteristics

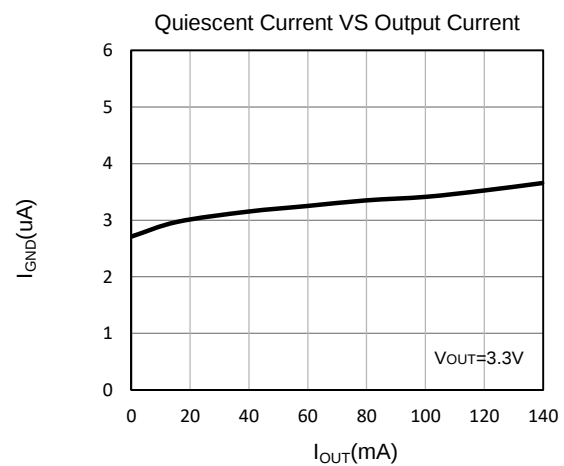
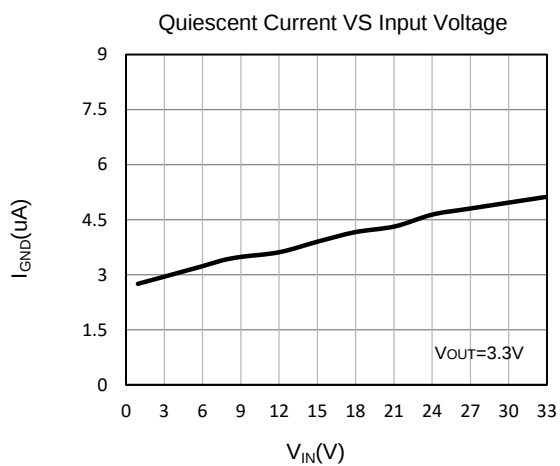
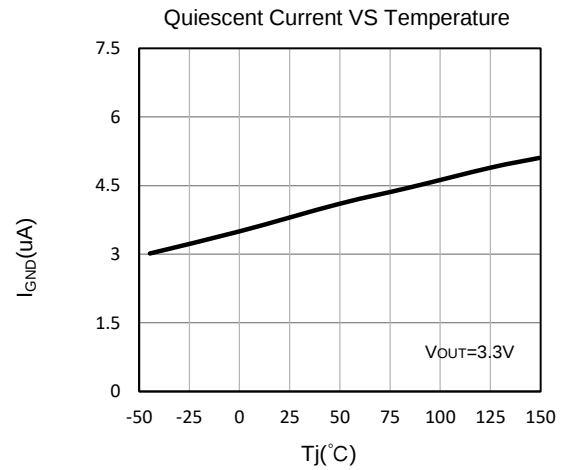
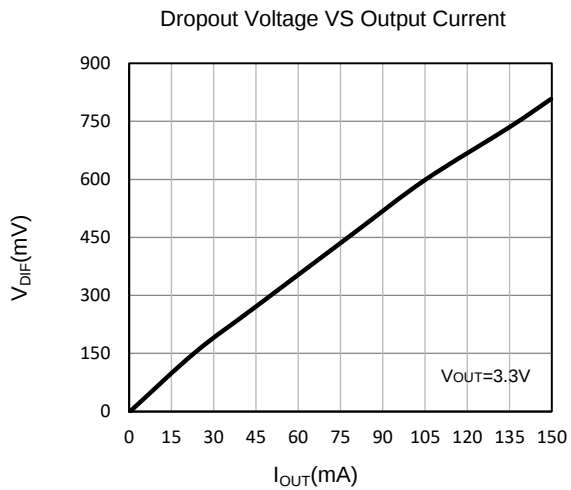
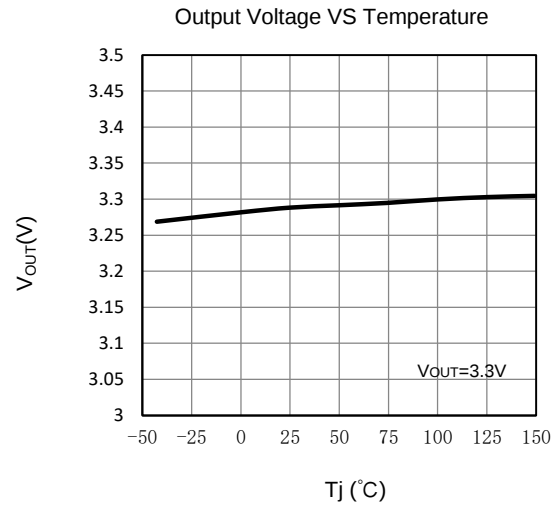
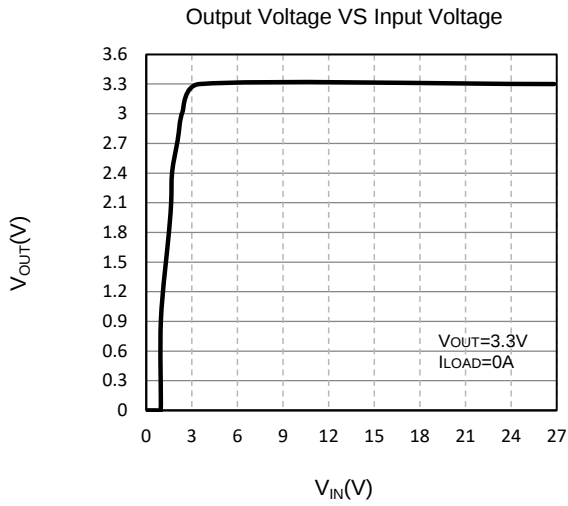
(At $T_A=25^{\circ}\text{C}$, $C_{IN}=1\mu\text{F}$, $V_{IN}=V_{OUTNOM}+1.0\text{V}$, $C_{OUT}=10\mu\text{F}$, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{IN}	Input Voltage	-	3.0	-	30	V
V_{OUT}	Output Voltage	$V_{IN}=12\text{V}$, $I_{OUT}=10\text{mA}$	$V_{OUTNOM} * 0.98$	V_{OUTNOM}	$V_{OUTNOM} * 1.02$	V
I_{OUT}	Output Current		-	150	-	mA
I_{GND}	Quiescent Current	$V_{IN}=12\text{V}$, No load	-	2.5	-	uA
V_{DROP}	Dropout Voltage ⁽¹⁾	$V_{OUT}=5\text{V}$, $I_{OUT}=50\text{mA}$, $V_{IN}=V_{OUTNOM}+0.7\text{V}$	-	300	-	mV
I_{SHORT}	Short Current		-	100	-	mA
$\frac{\Delta V_{OUT}}{\Delta V_{OUT}}$	Load Regulation	$V_{IN}=6\text{V}$, $1\text{mA} \leq I_{OUT} \leq 50\text{mA}$	-	0.2	-	mV/mA
$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Line Regulation	$I_{OUT}=1\text{mA}$, $V_{OUTNOM}+1\text{V} \leq V_{IN} \leq 24\text{V}$	-	0.1	-	mV/V
e_N	Output Noise	10Hz to 100kHz, $I_{OUT}=30\text{mA}$	-	120	-	μV_{RMS}

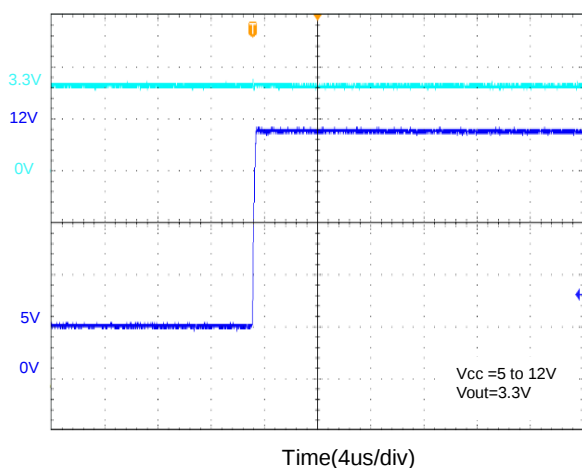
Note: (1) Dropout Voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.



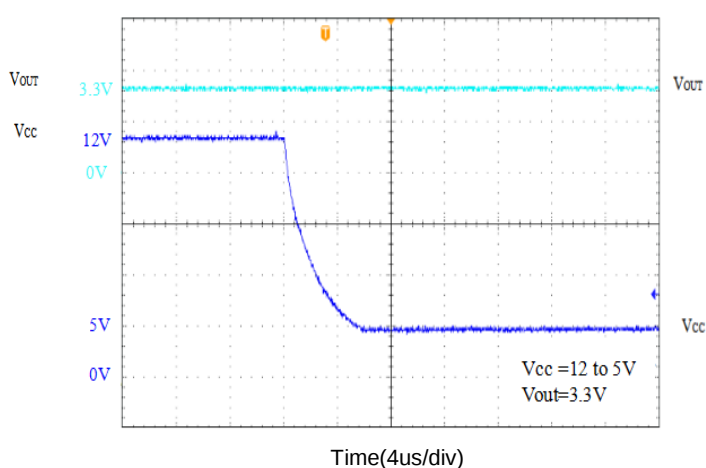
Typical Performance Characteristic



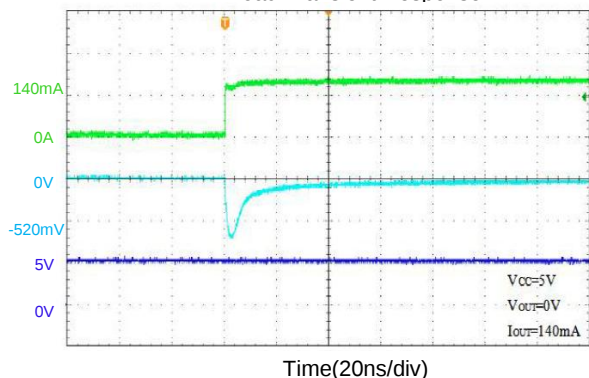
Line Transient Response



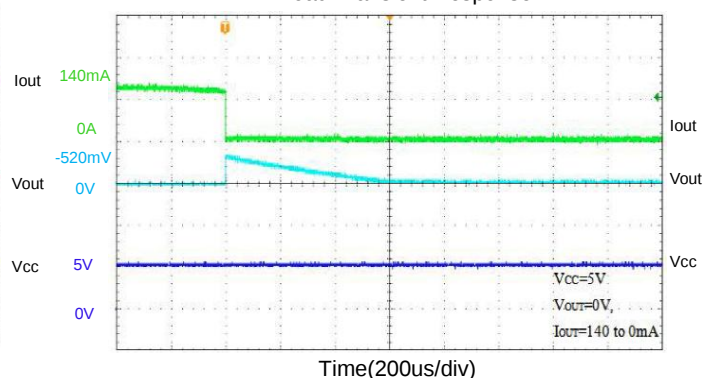
Line Transient Response



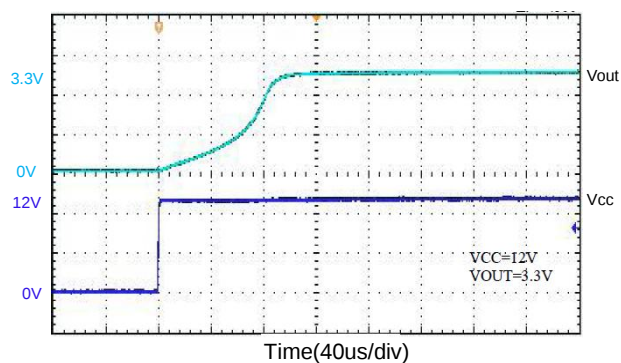
Load Transient Response



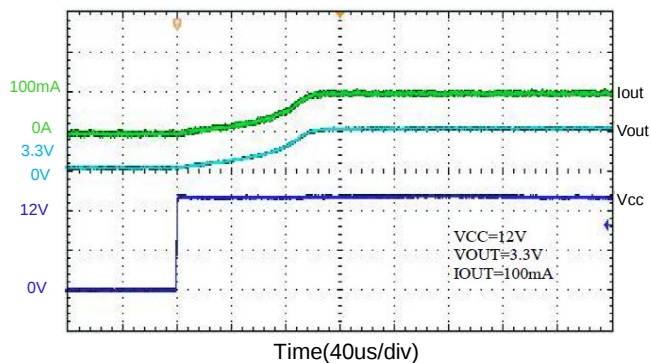
Load Transient Response



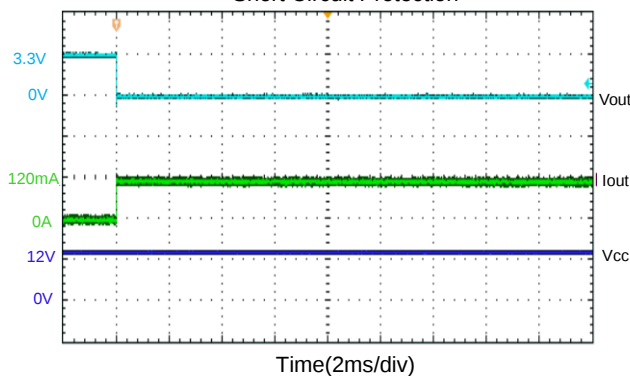
Start Up



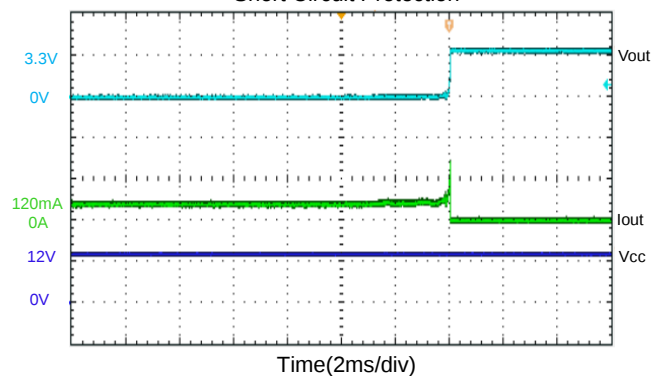
Start Up



Short Circuit Protection



Short Circuit Protection



Functional Description

Input Capacitor

A 1 μ 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 HT75XX. The recommended minimum output capacitance is 10 μ 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

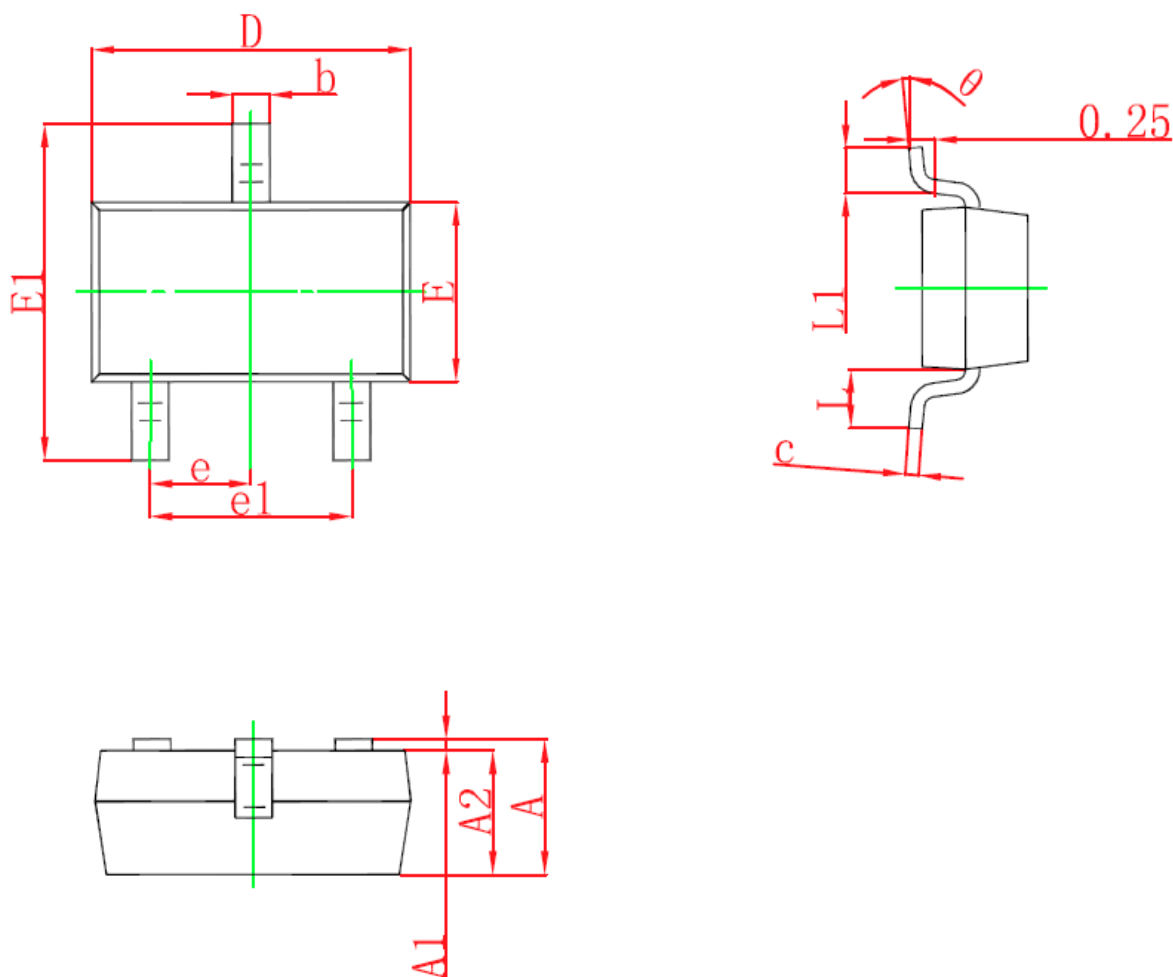
When output current at VOUT pin is higher than current limit threshold or the VOUT pin is direct short to GND, the current limit protection will be triggered and clamp the output current at a pre-designed level to prevent over-current and thermal damage.

Thermal Protection

The HT75XX 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 HT75XX, the internal thermal protection circuit will be triggered, and it will shut down the power MOSFET to prevent the HT75XX 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 HT75XX goes to normal operation.

Package Outline Dimensions

SOT-23

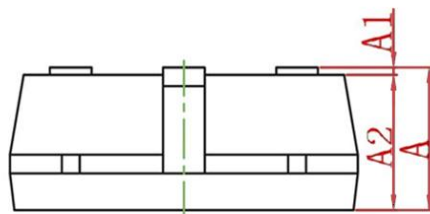
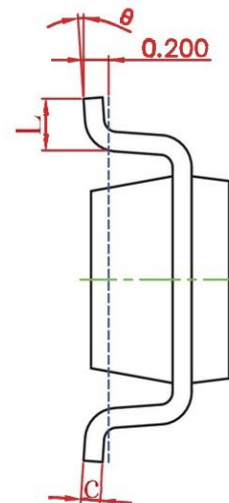
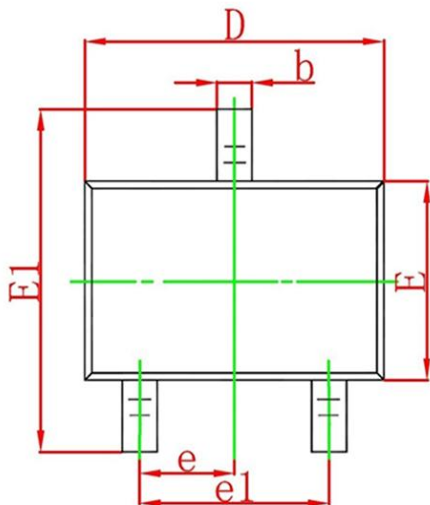


Symbol	Dimensions in Millimeters(mm)		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E1	2.250	2.550	0.088	0.100
E	1.200	1.400	0.047	0.055
e	0.950TYP		0.037TYP	
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

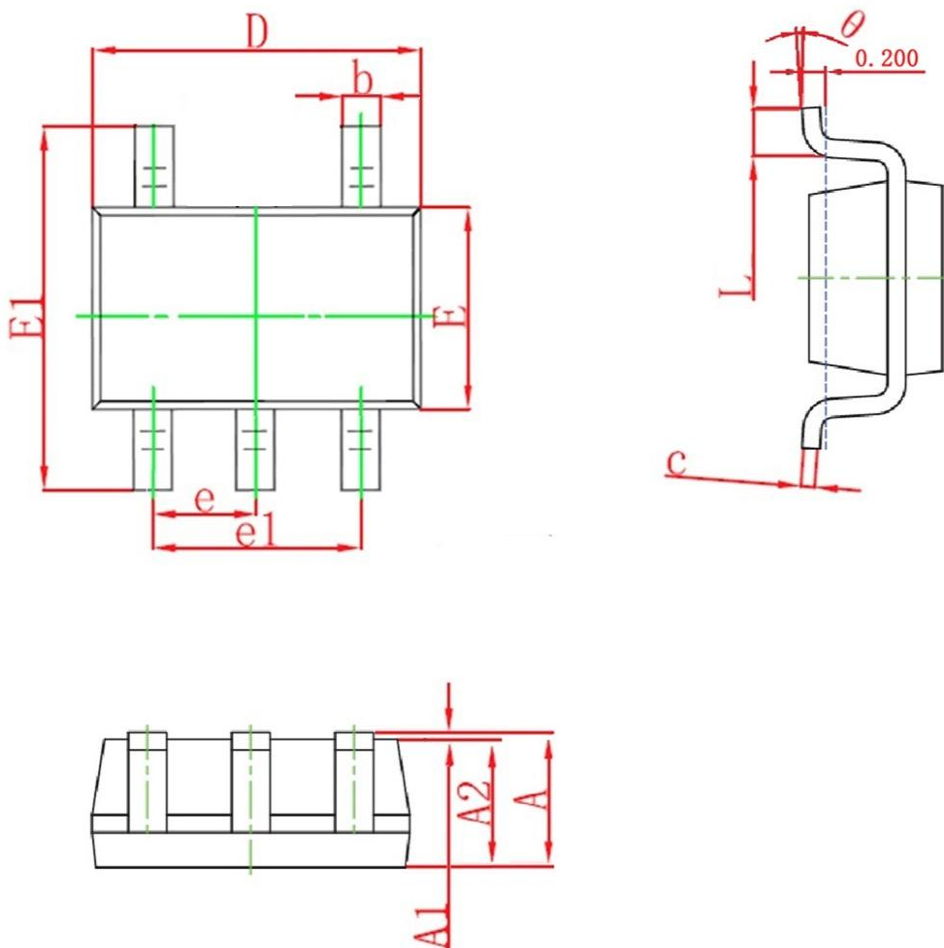
SOT-23-3L



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°



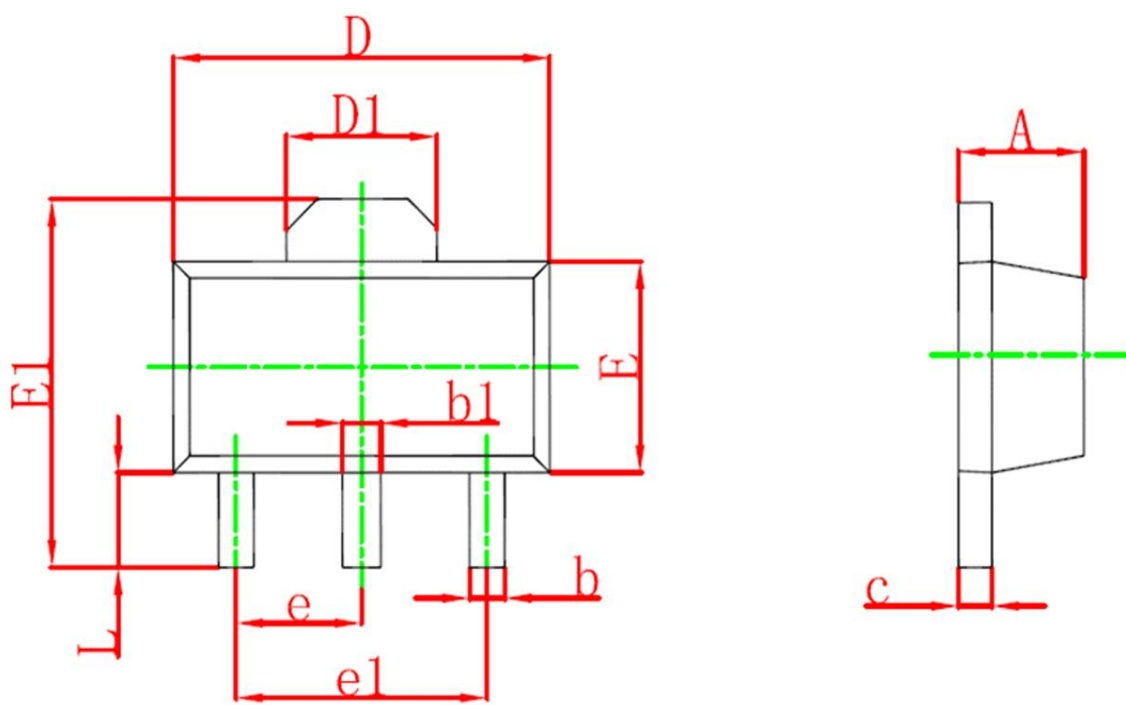
SOT-23-5L



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°



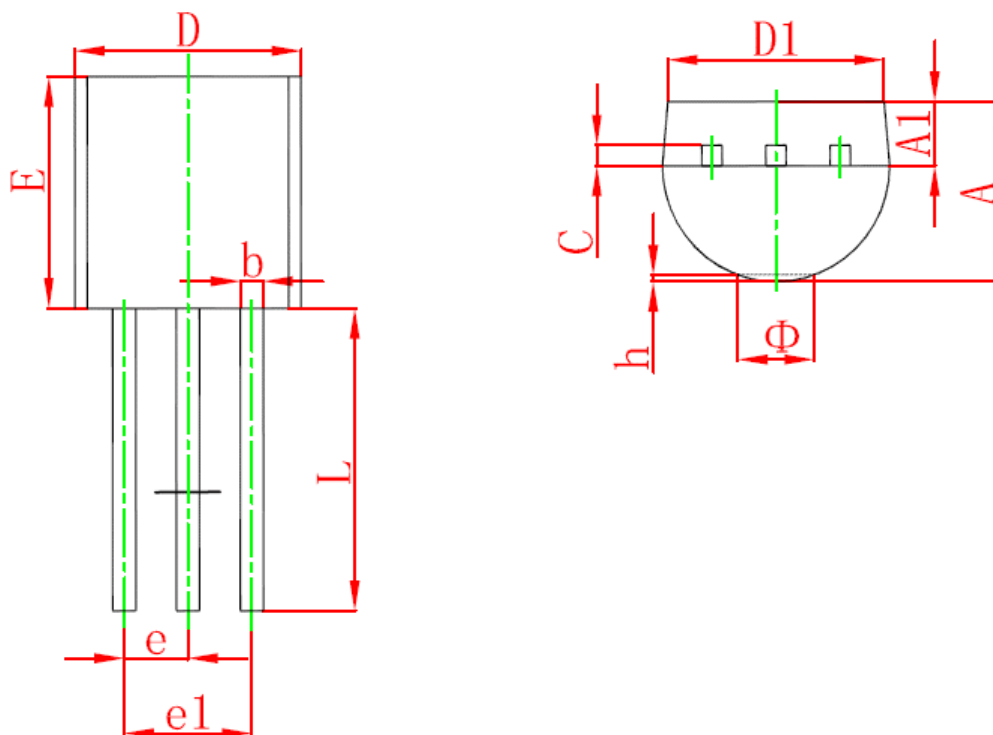
SOT-89



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