

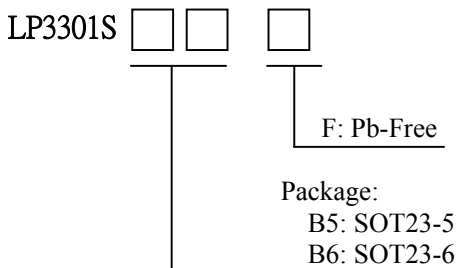
1.2MHz,30V/1.4A High Performance, Boost Converter

General Description

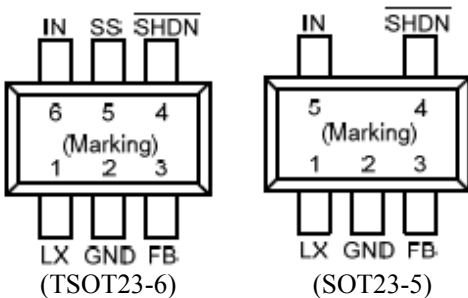
The LP3301S is a 1.2MHz PWM boost switching regulator designed for constant-voltage boost applications. The LP3301S can drive a string of up to 30V. The LP3301S implements a constant frequency 1.2MHz PWM control scheme. The high frequency PWM operation also saves board space by reducing external component sizes. To improve efficiency, the feedback voltage is set to 1250 mV, which reduces the power dissipation in the voltage setting resistor.

Highly integration and internal compensation network minimizes as 5 external component counts. Optimized operation frequency can meet the requirement of small LC filters value and low operation current with high efficiency.

Ordering Information



Pin Configurations



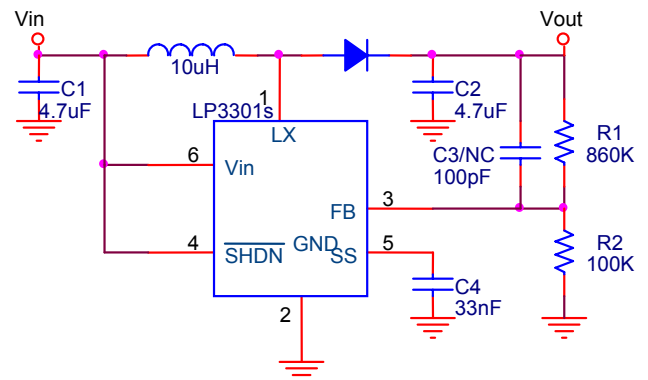
Features

- ✧ High Efficiency: 95%
- ✧ 1.2MHz Fixed-Frequency PWM Operation
- ✧ Maximum Output Voltage up to 30V
- ✧ Guaranteed 13V/400mA Output with 5V input
- ✧ Operating Range : 2.7V to 5.5V
- ✧ Shutdown Supply Current: <1uA
- ✧ Programmable Soft-star
- ✧ Available in SOT23-6/SOT23-5 Package
- ✧ Minimize the External Component
- ✧ RoHS Compliant and 100% Lead (Pb)-Free

Applications

- ✧ Panel Bias Voltage supply
- ✧ OLED Backlight driver
- ✧ Notebook Computers
- ✧ Portable Applications
- ✧ MID/PTV

Typical Application Circuit



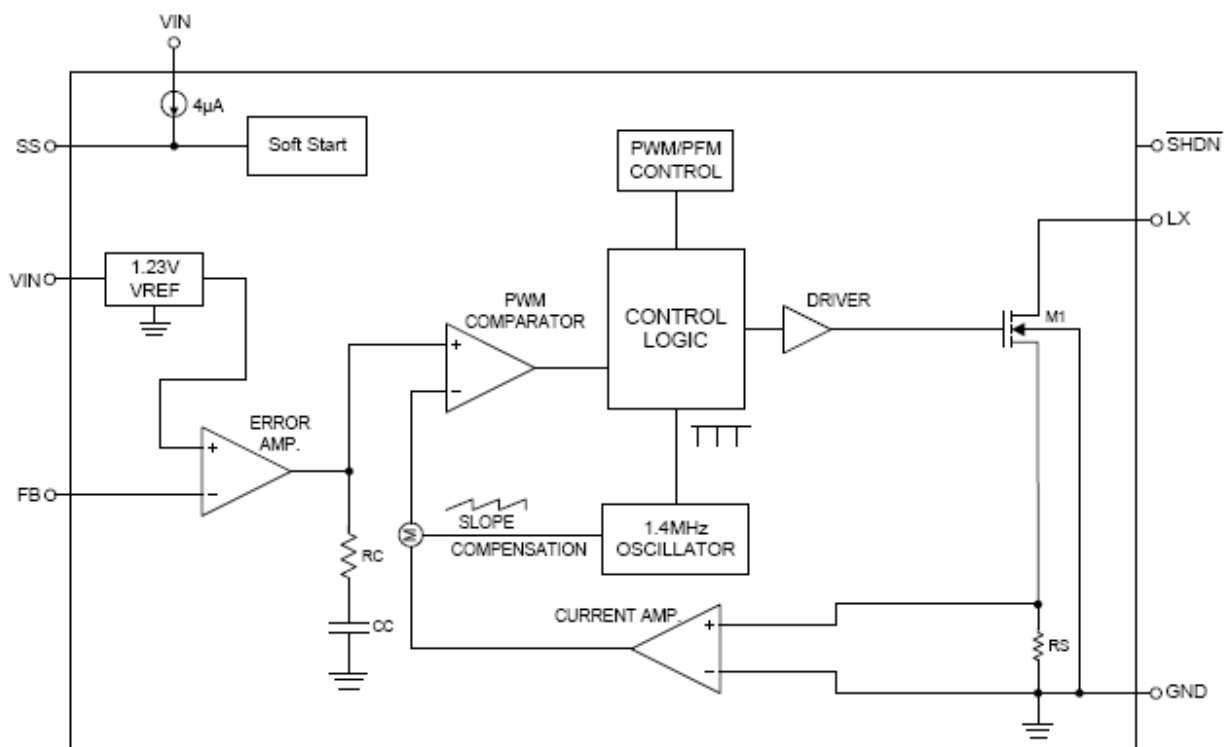
Marking information

Please view website.

Functional pin description

SOT-23-5	SOT-23-6	Pin Name	Pin Function
1	1	LX	Switch Pin. Connect this Pin to inductor and catch diode. Minimize the track area to reduce EMI.
2	2	GND	Ground Pin
3	3	FB	Feedback Reference Voltage Pin. Series connect a resistor between Vout and ground as a voltage sense. The feedback voltage is 1250mV.
4	4	/SHDN	Chip Enable (Active High). Voltage sensing input to trigger the function of over voltage protection. Note that this pin is high impedance. There should be a pull low 100k Ω resistor connected to GND when the control signal is floating.
	5	SS	Softstar pin. Leave SS open to disable the soft-star function.
5	6	Vin	Supply Input Voltage Pin. Bypass 1uF capacitor to GND to reduce the input noise.

Function Block Diagram



Absolute Maximum Ratings

Supply Input Voltage-----	-0.3V to 6.0V
LX Input Voltage -----	-0.3V to 40V
The Other Pins -----	-0.3V to 5.5V
Power Dissipation, Pd @ TA = 25°C TSOT-23-5/6-----	0.455W
Lead Temperature (Soldering, 10 sec.) -----	260°C
Operation Temperature Range -----	-40°C to 80°C
Storage Temperature Range -----	-65°C to 150°C

Electrical Characteristics

Parameter	Symbol	Test Condition	Min	Typ.	Max	Units
System Supply Input						
Operation voltage Range	VDD		2.7		6	V
Under Voltage Lock Out	VDD		2.2	2.4	2.6	V
Supply Current	IDD	FB=0.2V, Switch		430	550	uA
Shut Down Current	IDD	VEN < 0.4V		0.1	1	uA
Line Regulation		VIN : 3.0~4.3V		2		%
Oscillator						
Operation Frequency	FOSC			1.2		MHz
Maximum Duty Cycle			90			%
Feedback Voltage	LP3301S			1.25		V
MOSFET						
On Resistance of MOSFET	RDS(ON)			0.5		Ω
SW Current Limit	ILM			1.4		A
Protection						
Shut Down Voltage	VEN		0.3			V
Enable on Voltage	VEN				1.0	V

Typical Operating Characteristics

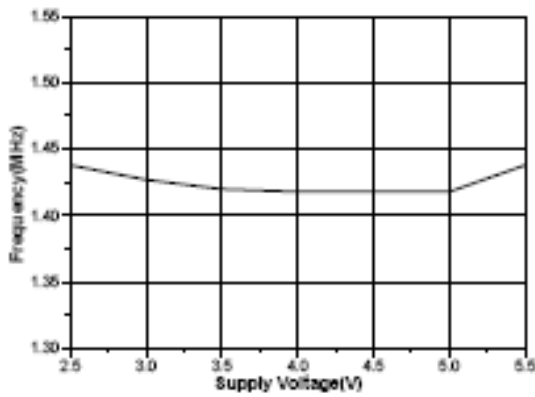


Figure 6. Frequency vs. Supply Voltage

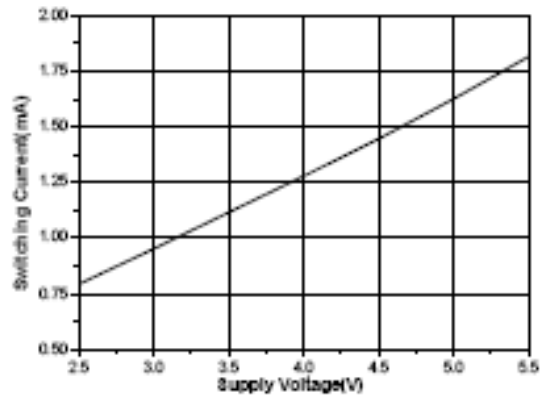


Figure 7. Switching Current vs. Supply Voltage

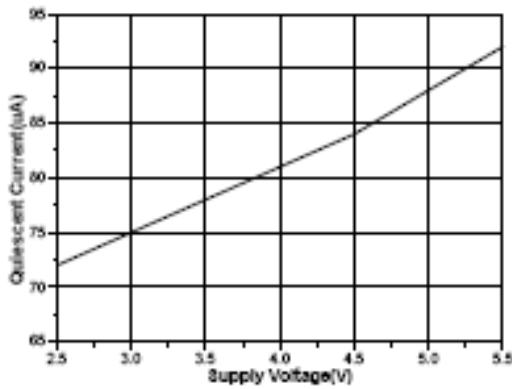


Figure 8. Non-Switching Current vs. Supply Voltage

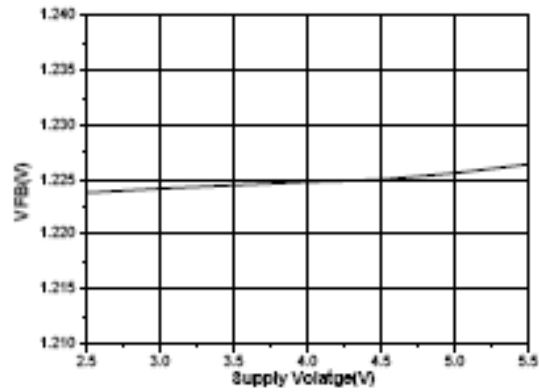


Figure 9. Feedback Voltage vs. Supply Voltage

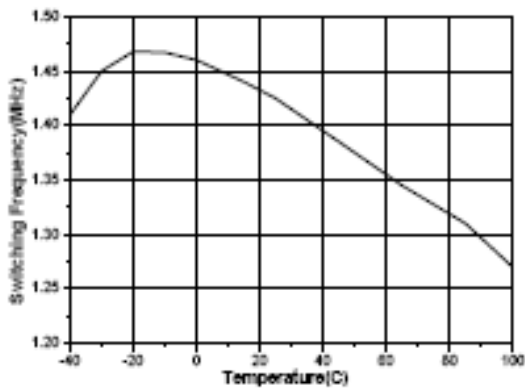


Figure 10. Switching Frequency vs. Temperature

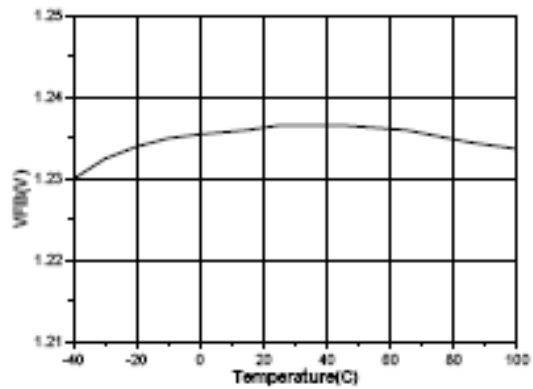


Figure 11. Feedback Voltage vs. Temperature

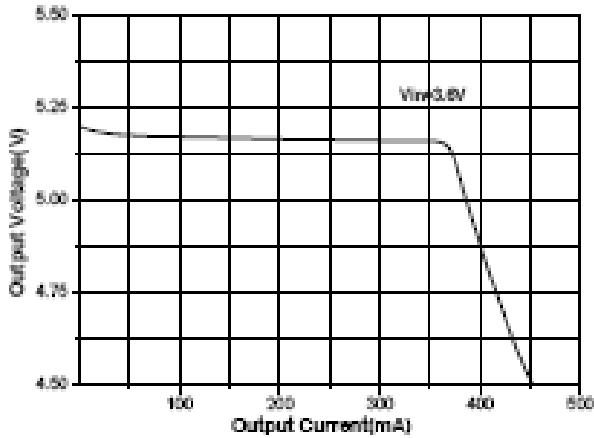


Figure 12. Load Regulation ($V_o=5V$)

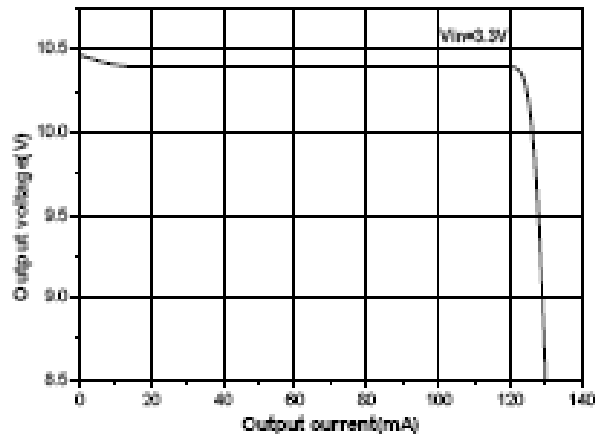


Figure 13. Load Regulation ($V_o=10V$)

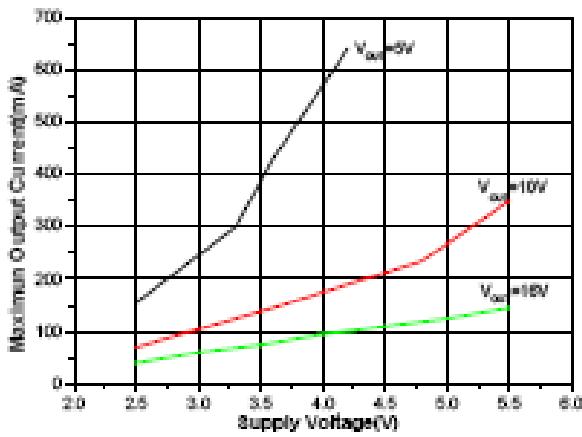


Figure 14. Maximum Output Current vs. Supply Voltage

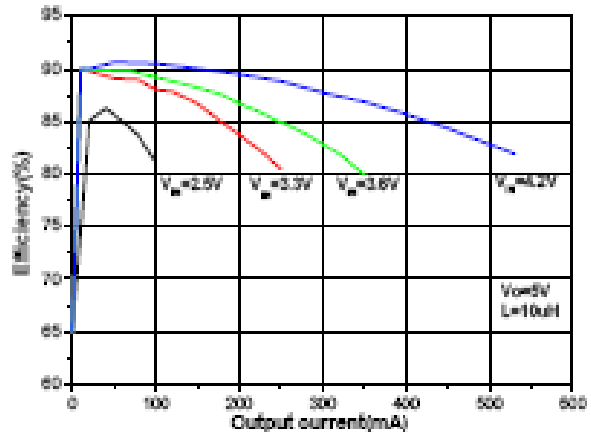


Figure 15. Efficiency vs. Output Current ($V_o=5V$)

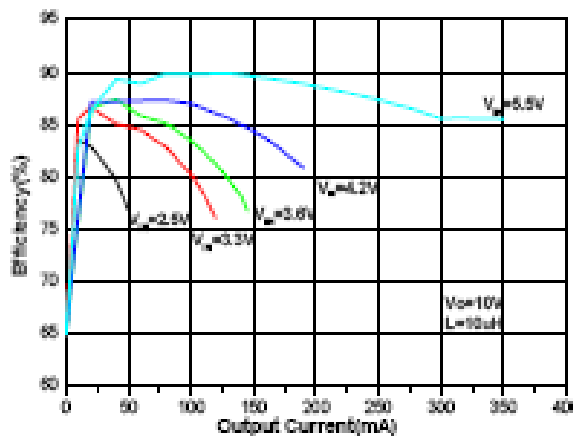


Figure 16. Efficiency vs. Output Current ($V_o=10V$)

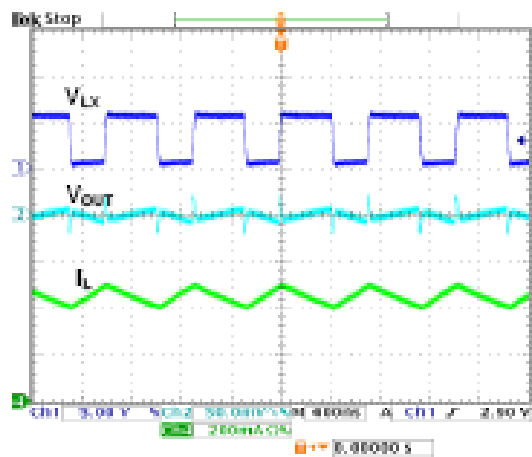
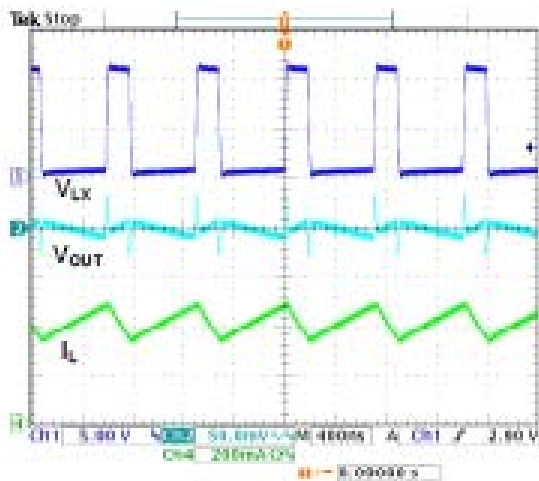
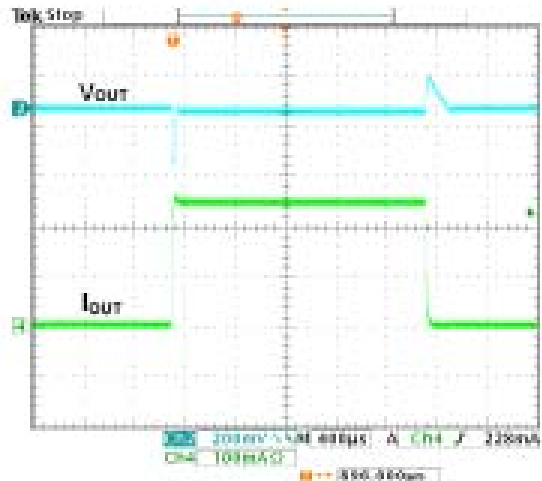


Figure 17. Operation Waveform



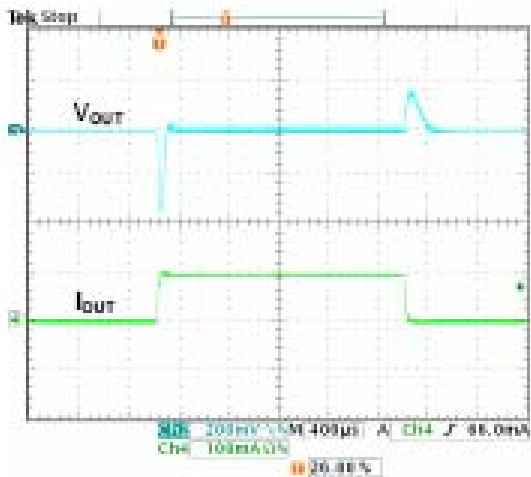
$V_{IN}=3.3V, V_O=10V, I_O=100mA, L1=10\mu H$

Figure 18. Operation Waveform



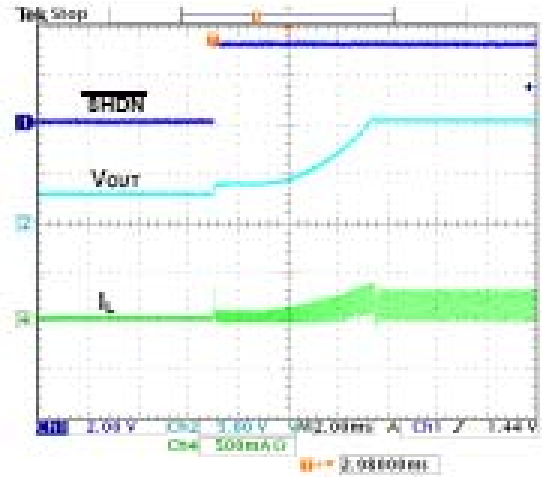
$V_{IN}=3.6V, V_O=5V, I_O=5 \text{ to } 250mA, CFF=220pF$

Figure 19. Load Step Response



$V_{IN}=3.3V, V_O=10V, I_O=5 \text{ to } 250mA, CFF=220pF$

Figure 20. Load Step Response



$V_{IN}=3.3V, V_{OUT}=10V, I_O=50mA, C88=33nF$

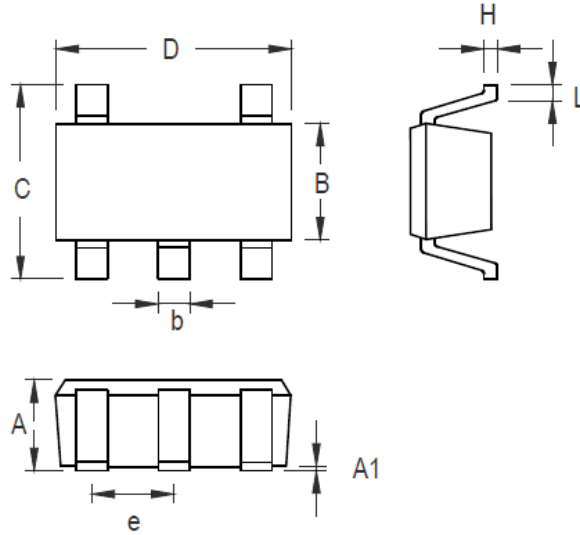
Figure 21. Start-Up from Shutdown

Applications Information

Inductor Selection

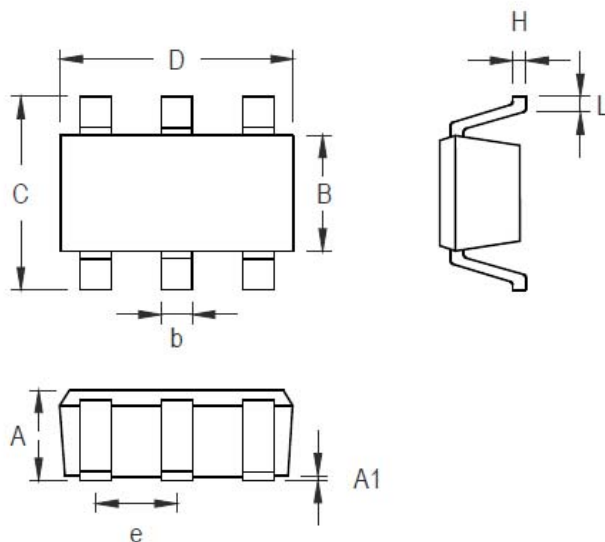
The recommended value of inductor for 30V applications are 4.7 to 22µH. Small size and better efficiency are the major concerns for portable device, such as LP3301S used for mobile phone. The inductor should have low core loss at 1.2MHz and low DCR for better efficiency. To avoid inductor saturation current rating should be considered.

Packing information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.035	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.356	0.559	0.014	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

SOT-23-5 Surface Mount Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.889	1.295	0.031	0.051
A1	0.000	0.152	0.000	0.006
B	1.397	1.803	0.055	0.071
b	0.250	0.560	0.010	0.022
C	2.591	2.997	0.102	0.118
D	2.692	3.099	0.106	0.122
e	0.838	1.041	0.033	0.041
H	0.080	0.254	0.003	0.010
L	0.300	0.610	0.012	0.024

SOT-23-6 Surface Mount Package