概述 General Description

The 78L05 of three terminal positive regulators is designed to output 5V/100mA for a wide range of applications, such as on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, the chip can be used with power-pass elements to make high-current voltage regulators. The internal limiting and thermal-shutdown features of the regulatoressentially make 78L05 immune to overload. The 78L05 is available in the plastic TO-92,SOT-223,SOP-8,and SOT-89 packages.

78L05 是一种三端调整器，输出+5V/100mA 电流，应用广泛。例如可用作板卡调整器降低噪声，和单点调整器结合起来解决分布式电源问题。而且，这款芯片和功率调整元件组合可以输出大电流。内置的限流和热关断保护 78L05 免于过载烧毁。78L05 提供三种塑料封装：TO-92， SOT-223,SOP-8和 SOT-89。

特点 Features

- 全温度范围内输出电压精度：±3%
  Output voltage tolerance of over the temperature range ±3%
- 输出电流 100mA
  Output current of 100mA
- 内置过热保护
  Internal thermal overload protection
- 内置过流保护
  Internal over-current protection
- 无需外部元件
  No external component

应用 Applications

- 高效率线性调整器
  High Efficiency Linear Regulator
- 开关电源的后级调整器
  Post Regulation for Switching Supply
- 为微处理器提供电源
  Microprocessor Power Supply
- 主板的 I/O 端口电源
  Mother Board I/O Power Supply

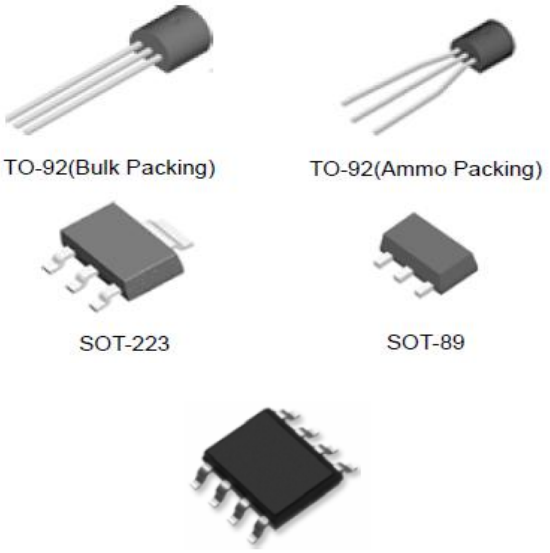
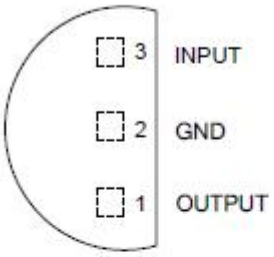


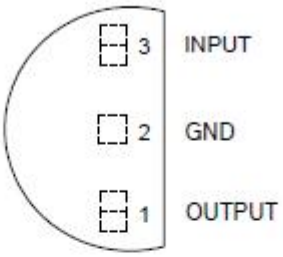
Figure 1. Package Type of 78L05

管脚说明 Pin Configuration

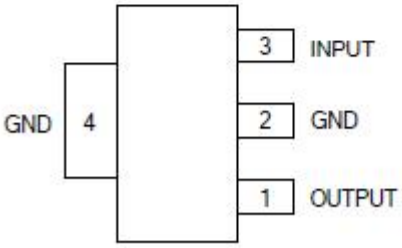
Z Package
(TO-92(Bulk Packing))



Z Package
(TO-92(Ammo Packing))

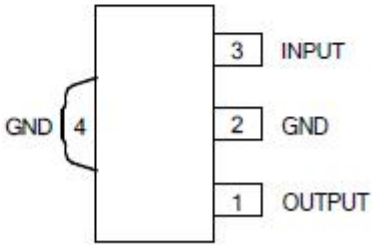


H Package
(SOT-223)



Connect pin 4 to pin 2 or leave
pin 4 electrically isolated

R Package
(SOT-89)



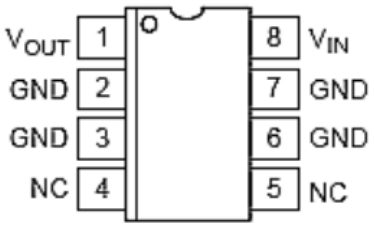


Figure 2. Pin Configuration of 78L05 (Top view)

功能框图 Functional Block Diagram

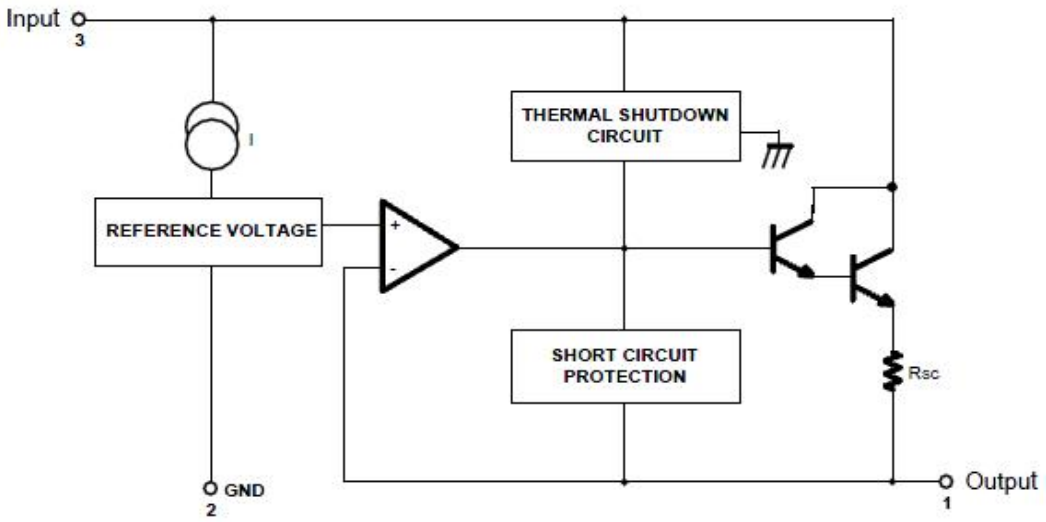


Figure 3. Functional Block Diagram of 78L05

绝对最大额定值 Absolute Maximum Rating (Note 1)

项目 Parameter	符号 Symbol	数值 Value		单位 Unit
输入电压 Input Voltage	V_{IN}	30		V
结温 Junction Temperature	T_J	150		℃
焊接温度 Lead Temperature (Soldering, 10sec)	T_{LEAD}	260		℃
功耗 Power Dissipation(T_A=25℃)	P_D	TO-92	0.65	W
		SOT-223	0.7	
		SOT-89	0.65	
		SOP-8	0.83	
存储温度 Storage Temperature Range	T_{STG}	-50 to 150		℃

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

备注 1：超过"绝对最大额定值"的应力可能会造成器件永久损坏。这些仅是应力额定值，器件工作在上述条件以及超出"建议工作条件"的情况是不可取的。长期处于"绝对最大额定值"可能影响器件的可靠性。

推荐工作条件 Recommended Operating Conditions

项目 Parameter	符号 Symbol	最小值 Min	最大值 Max	单位 Unit
输入电压 Input Voltage	V_{IN}	7	25	V
结温 Junction Temperature	T_J	-40	125	℃

电特性表 Electrical Characteristics

除非特指，典型字体表示 T_J=25℃，I_{OUT}=40mA，V_{IN}=10V，C_{IN}=0.33 μF，C_{OUT}=0.1 μF，**黑色字体的温度范围-40℃到 125℃。**

Limits in standard typeface are for T_J=25℃, **Bold typeface applies over -40℃ to 125℃**, I_{OUT}=40mA, V_{IN}=10V, C_{IN}=0.33 μF, C_{OUT}=0.1 μF , unless otherwise specified.

项目 Parameter	符号 Symbol	测试条件 Conditions	数值 Value			单位 Unit
			最小 Min	典型 Typ	最大 Max	
输出电压 Output Voltage	V_{OUT}		4.85	5	5.15	V
		7.0V≤V_{IN}≤20V 1.0mA≤I_{OUT}≤40mA	4.85		5.15	
线性调整率 Line Regulation	V_{RLINE}	7.0V≤V_{IN}≤20V I_{OUT}=40mA		30	70	mV
负载调整率 Load Regulation	V_{RLOAD}	1.0mA≤I_{OUT}≤100mA		20	40	mV
		1.0mA≤I_{OUT}≤40mA		10	30	
压差 Dropout Voltage	V_{DROP}			1.7	2	V
短路电流 Short Current	Ios			100		mA

静态电流 Quiescent Current	I_Q	I_{OUT}=0		2.3	4	mA
静态电流的变化 Quiescent Current Change	$\triangle I_Q$	8.0V≦V_{IN}≦20V		0.1	0.3	mA
		1.0mA≦I_{OUT}≦40mA		0.2		
输出噪声电压 Output Noise Voltage	N_O	10Hz ≤f≤100KHz		40		μV
电源抑制比 Ripple Rejection	PSRR	f=120Hz, 8.0V≦V_{IN}≦20V	47	75		dB
峰值输出电流 Peak Output Current	I_{PK}			160		mA
输出电压平均温度系数 Average Temperature Coefficient of Output Voltage	$\triangle V_{OUT}/\triangle T$	I_{OUT}=5.0mA		-0.35		mV/℃
最小输入电压 Minimum Value of Input Voltage Required to Maintain Line Regulation	V_{IN}(min)			6.7	7	V
热阻 Thermal Resistance	θ_{JC}	TO-92		81		℃/W
		SOT-89		84		
		SOT-223		71		

典型性能 Typical Performance Characteristics

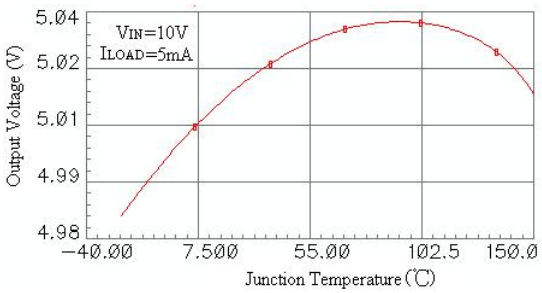


Figure 4. Output Voltage vs. Junction Temperature

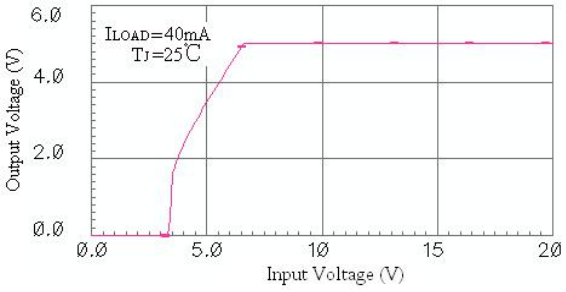


Figure 5. Output Voltage vs. Input Voltage

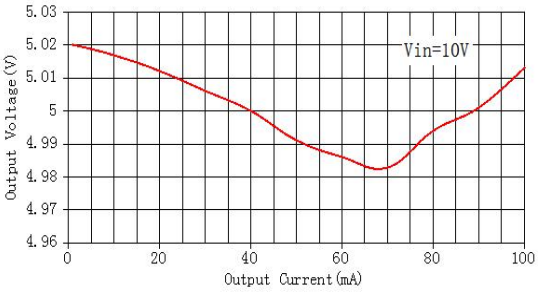


Figure 6. Output Voltage vs. Load Current

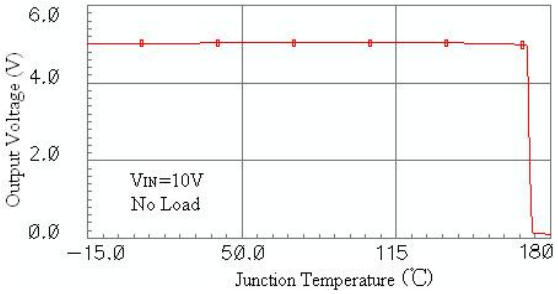


Figure 7. Thermal Shutdown

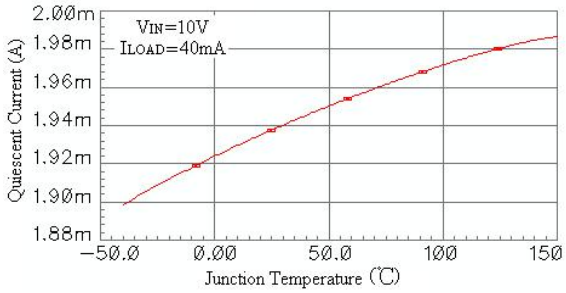


Figure 8. Quiescent Current vs. Junction Temperature

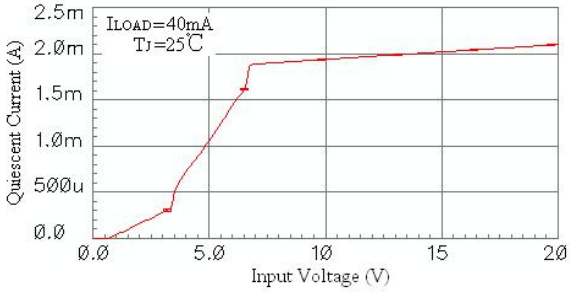


Figure 9. Quiescent Current vs. Input voltage

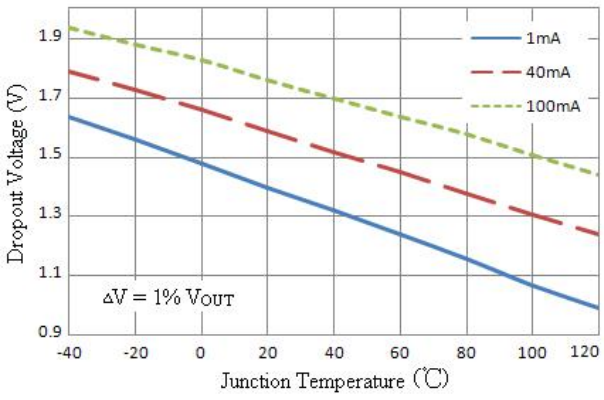


Figure 10. Dropout Voltage vs. Junction Temperature

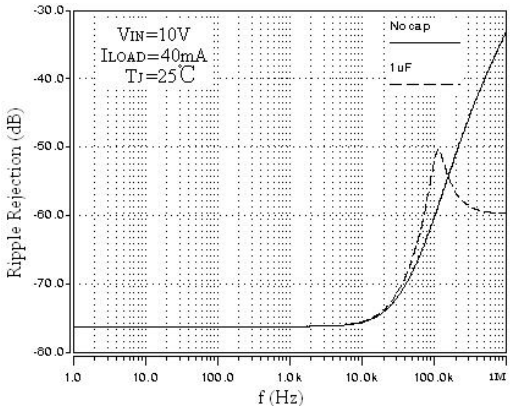


Figure 11. Ripple Rejection

典型应用 Typical Application

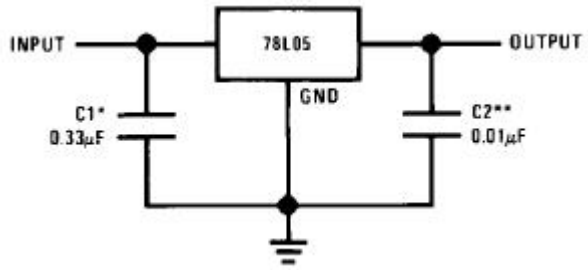
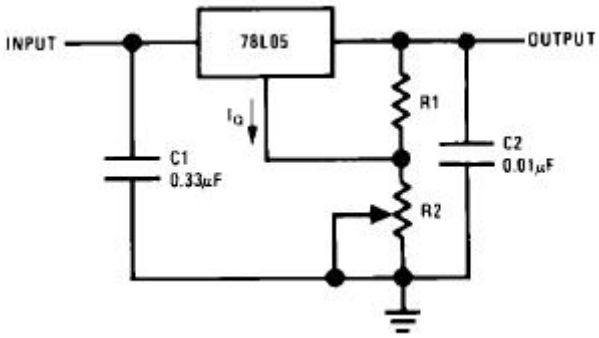


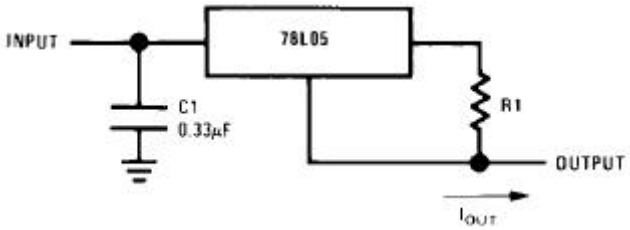
Figure 14. Fixed Output Regulator



$V_{OUT} = 5V + (5V/R1 + I_Q)R2$

$5V/R1 > 3I_Q$, load regulation(Lr) $\approx$ [(R1 + R2)/R1](Lr of 78L05)

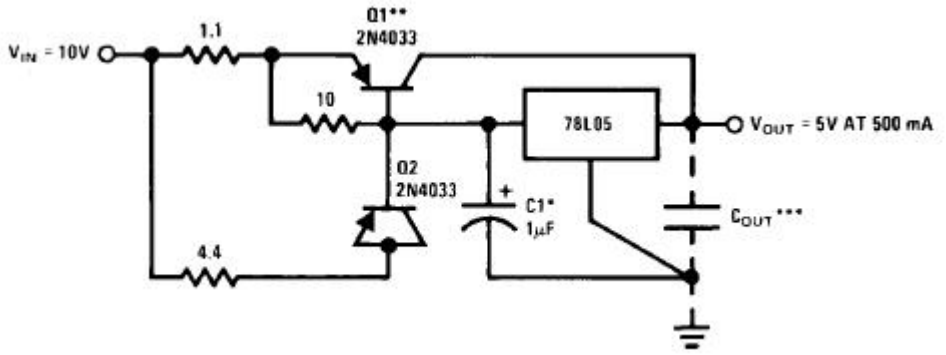
Figure 15. Adjustable Output Regulator



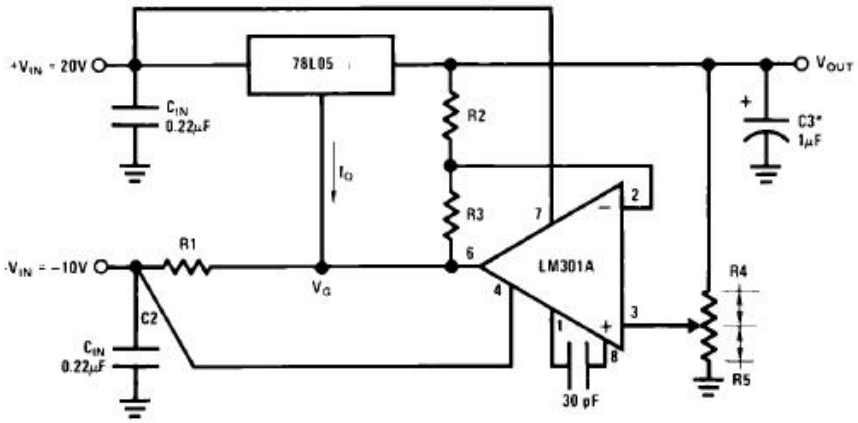
$I_{OUT} = (V_{OUT}/R1)+I_Q > I_Q$ over line and load change

Figure 16. Current Regulator

典型应用 Typical Application(Continued)



Optional: Improves ripple rejection and transient response.
Load Regulation: 0.6% $0 \leqslant I_L \leqslant 250mA$ pulsed with t_{ON} = 50ms
Figure 17. 5V 500mA Regulator with Short Circuit Protection



*Solid tantalum
$V_{OUT} = V_G + 5V$ $R1 = -V_{IN}/I_Q$
$V_{OUT} = 5V(R2/R4)$ for $(R2+R3) = (R4+R5)$
A 0.5V output will correspond to $(R2/R4) = 0.1(R3/R4)=0.9$
Figure 18. Variable Output Regulator 0.5V to 18V

Note2: Senichip are responsible for consistency of product. The devices should be working in recommended condition. Before new design product being bulk production, pilot production should be done. Senichip assumes no liability for applications assistance or customer design product.

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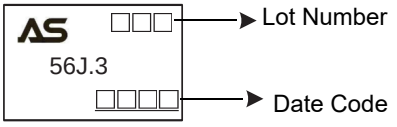
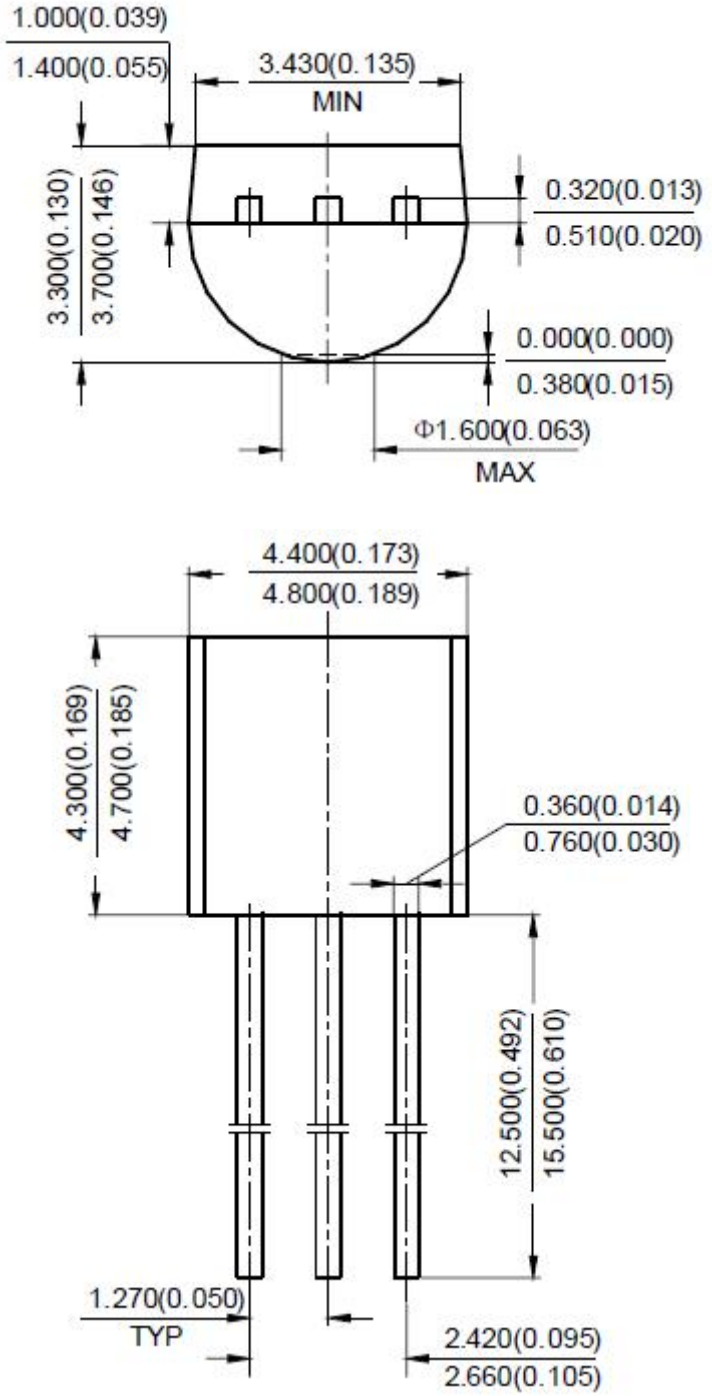
Ordering and Marking Information

Device	Marking	Package	Packaging	Quantity
ASPL78L05S	78L05	SOP8-8	Tape&Reel	3000/Reel
ASPL78L05DT	78L05	SOT223	Tape&Reel	3000/Reel
ASPL78L05DI	78L05	SOT89-3	Tape&Reel	1000/Reel
ASPL78L05LP	78L05	TO-92	BAG	

PACKAGE	MARKING
SOP-8 SOT223 SOT89-3 TO-92	

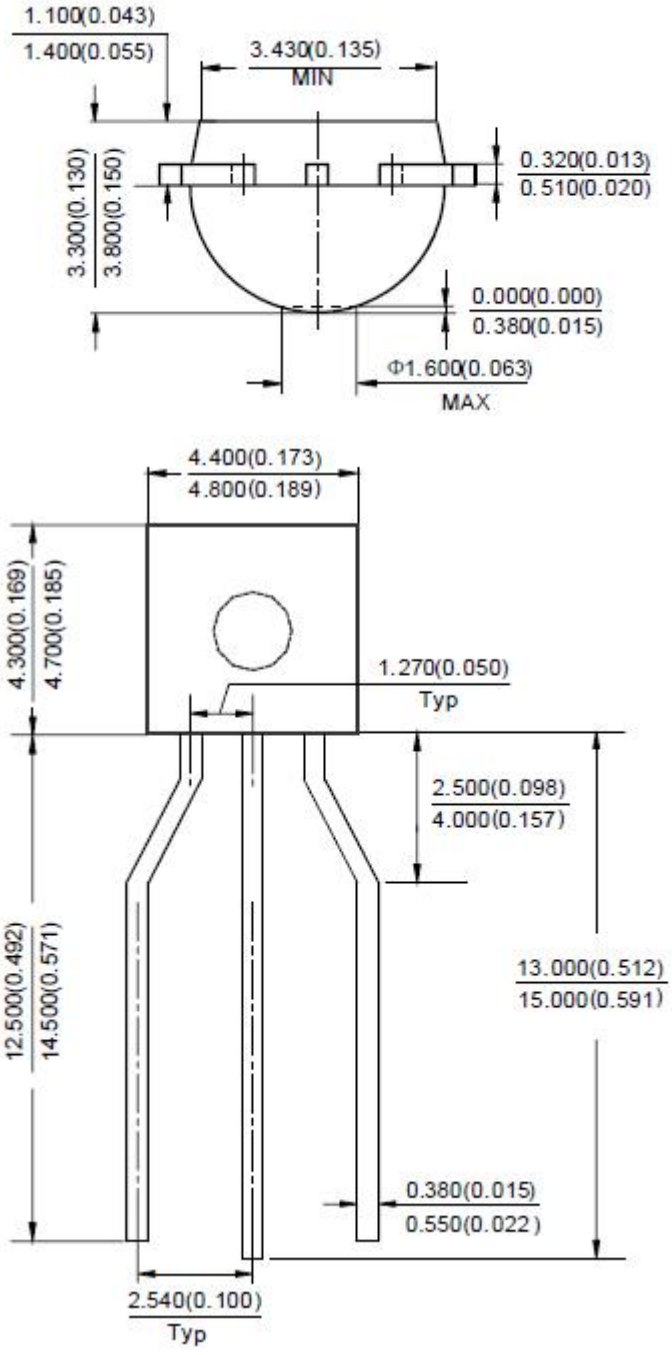
外观尺寸 Mechanical Dimensions

TO-92 (Bulk Packing)　　Unit: mm (inch)



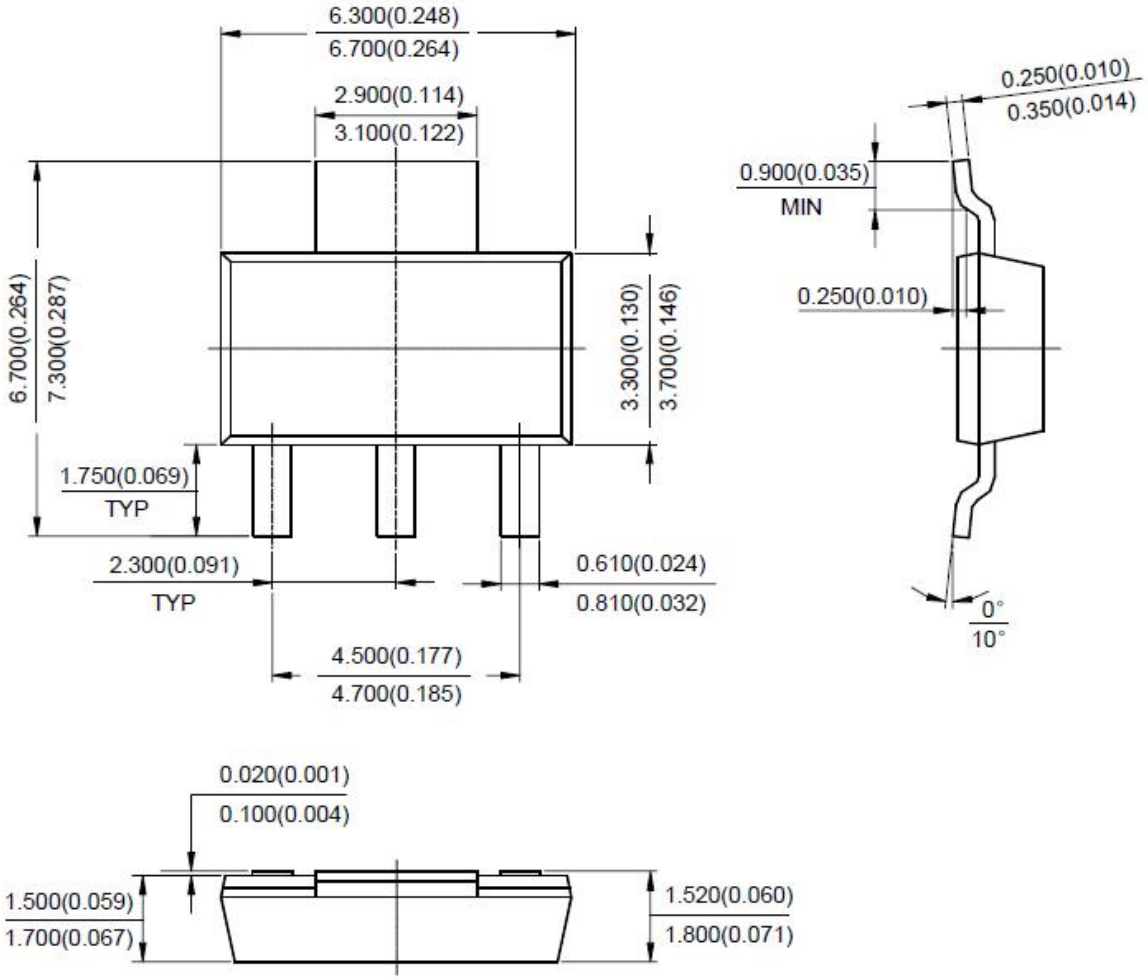
外观尺寸 Mechanical Dimensions (Continued)

TO-92 (Ammo Packing) Unit: mm (inch)



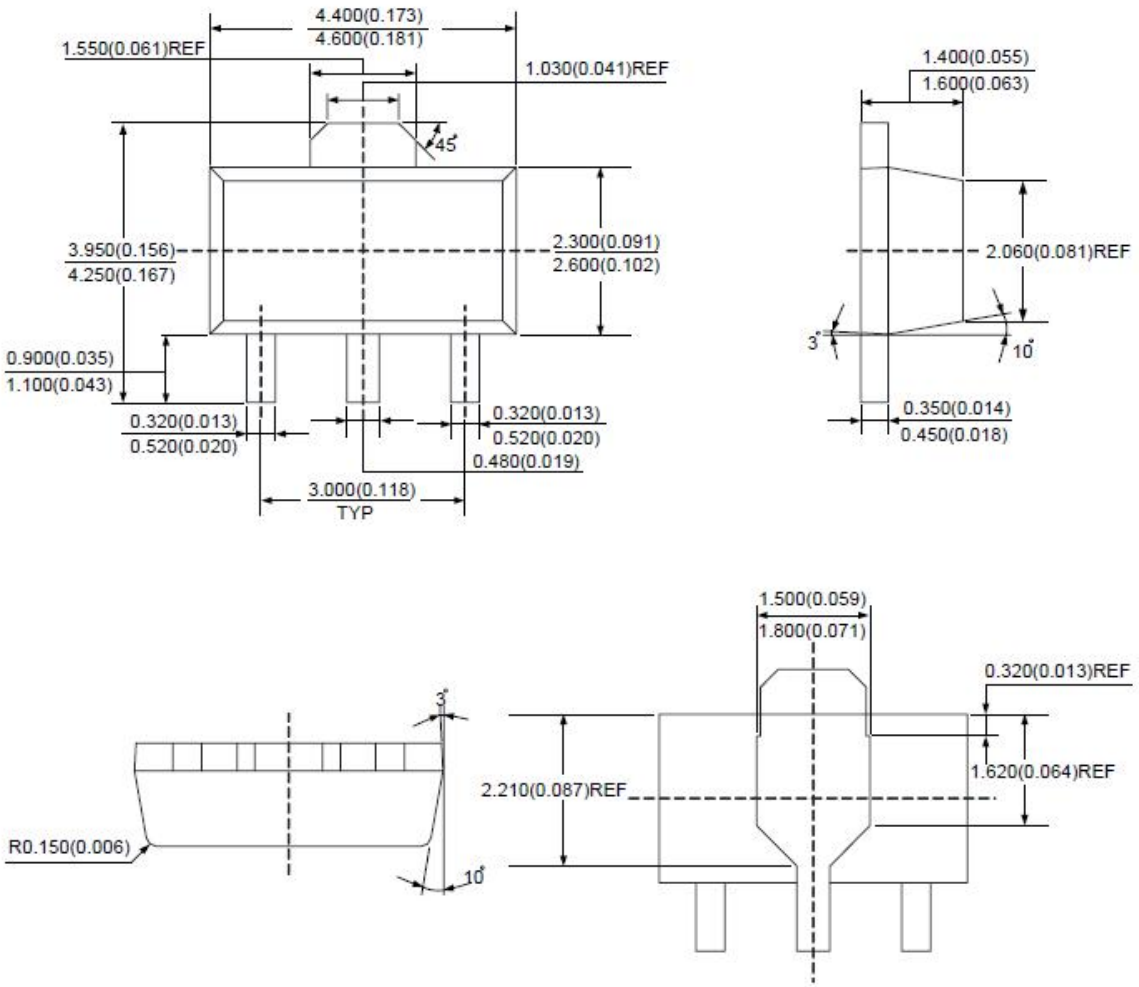
外观尺寸 Mechanical Dimensions (Continued)

SOT-223 Unit: mm (inch)

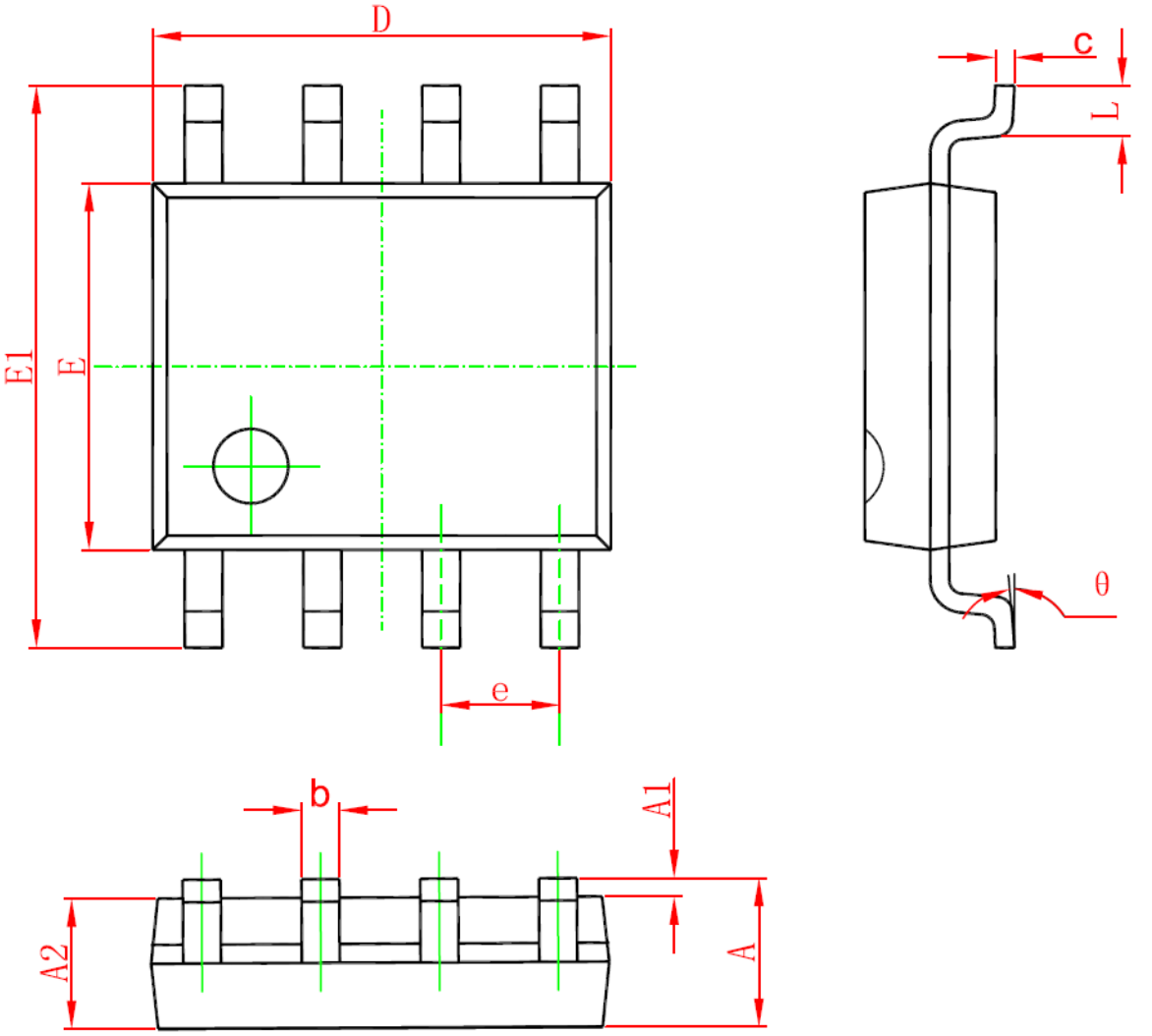


外观尺寸 Mechanical Dimensions (Continued)

SOT-89 Unit: mm (inch)



SOP-8 PACKAGE IN FORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

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