GPL6376 Series

28V Low Current Consumption 300mA CMOS Voltage Regulator

Product Summary

The GPL6376 series are a group of positive voltage regulators manufactured by CMOS technologies with low power consumption and low dropout voltage, which provide large output currents even when the difference of the input-output voltage is small. The GPL6376 series can deliver 300mA output current and allow an input voltage as high as 28V. The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

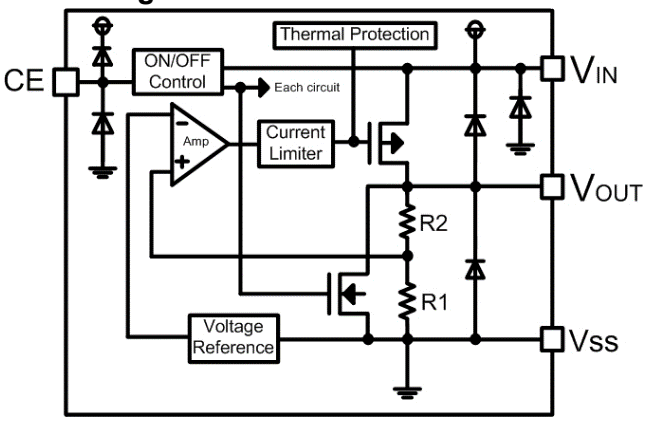
Features

- Low Quiescent Current: 2μA
- Operating Voltage Range: 2.5V~28V
- Output Current: 300mA
- Low Dropout Voltage：200mV@100mA(V_{OUT}=3.3V)
- Output Voltage: 1.2~12V
- High Accuracy: ±2%(Typ.)
- High Power Supply Rejection Ratio:
- 70dB@1kHz
- Low Output Noise:
- 27xV_{OUT} μV_{RMS} (10Hz~100kHz)
- Excellent Line and Load Transient Response
- Built-in Current Limiter, Short-Circuit Protection
- Over-Temperature Protection
- Stable with Ceramic or Tantalum Capacitor

Applications

- Cordless Phones
- Radio control systems
- Laptop, Palmtops and PDAs
- Single-lens reflex DSC
- PC peripherals with memory
- Wireless Communication Equipment
- Portable Audio Video Equipment
- Car Navigation Systems
- LAN Cards
- Ultra-low Power Microcontrollers

Block Diagram



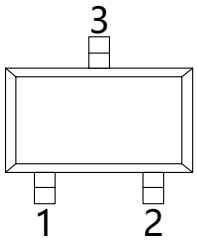
Order Information

GPL6376V①②

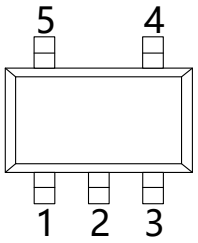
Designator	Description
①	**Output Voltage** **e.g. 3.3V=33**
②	**Package:** **SOT-23-3L=K3** **SOT-23-5L=K5** **SOT-89-3L=KE** **SOT-223=DT**

PIN CONFIGURATION

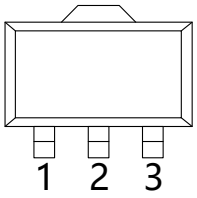
SOT-23-3L



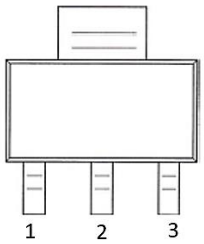
SOT-23-5L



SOT-89-3



SOT-223



SOT-23-3 & SOT-89-3

PIN NUMBER					PIN NAME	FUNCTION
SOT-23-3		SOT-223	SOT-89-3			
K3	YK3	DT	KE	SKE		
1	3	2	1	2	V_{SS}	Ground
2	1	3	3	1	V_{OUT}	Output
3	2	1	2	3	V_{IN}	Power input

SOT-23-5

PIN NUMBER			SYMBOL	FUNCTION
K5	SK5	FK5		
1	2	1	V_{IN}	Power Input Pin
2	1	2	V_{SS}	Ground
3	5	/	CE	Chip Enable Pin
4	4	3&4	NC	No Connection
5	3	5	V_{OUT}	Output Pin

Absolute Maximum Ratings[1] (T_A=25℃,unless otherwise noted)

Parameter		Symbol	Ratings	Units
Input Voltage[2]		V_{IN}	-0.3~33	V
Output Voltage[2]		V_{OUT}	-0.3~13	V
CE Pin Voltage[2]		V_{CE}	-0.3~33	V
Power Dissipation	SOT-23-3/5	P_D	0.4	W
	SOT-89-3		0.6	
	SOT-223		0.6	
Operating Junction Temperature Range[3]		T_j	-45~125	°C
Storage Temperature		T_{stg}	-65~150	°C
Lead Temperature(Soldering, 10 sec)		T_{solder}	260	°C

1) Stresses beyond 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-rated conditions for extended periods my affect device reliability.

2) All voltages are with respect to network ground terminal.

3) This IC includes over temperature protection that is intended to protect the device during momentary overload. Junction temperature will exceed 125°C when over temperature protection is active. Continuous operation above the specified maximum operating junction temperature may impair device reliability.

Recommended Operating Conditions

Paramerer	Min.	Nom.	Max.	Units
Supply voltage at V_{IN}	2.5		28	V
Operating junction temperature range, T_j	-40		125	°C
Operating free air temperature range, T_A	-40		85	°C

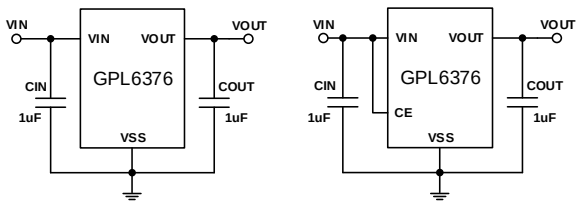
Electrical Characteristics(V_{IN}=V_{OUT}+2V, C_{IN}=C_{OUT}=1μF, T_A=25℃, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS		MIN.	TYP.(4)	MAX.	UNITS
Input Voltage	V_{IN}			2.5	—	28	V
Output Voltage Range	V_{OUT}			1.2	—	12	V
Output Voltage Accuracy		I_{OUT}=1mA		-2	—	2	%
				-1	—	1	%
Dropout Voltage	V_{dif}(5)	I_{OUT} =100mA,V_{OUT}=3.3V		—	200	—	mV
Supply Current	I_{SS}	I_{OUT}=0	1.2V≤V_{OUT}≤7.0V	—	2	5	μA
			7.0V<V_{OUT}≤12.0V	—	3	6	μA
Line Regulation	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta V_{IN}}$	I_{OUT} =10mA V_{OUT} +1V≤V_{IN}≤28V		—	0.01	0.3	%/V
Load Regulation	ΔV_{OUT}	V_{IN}= V_{OUT} +1V, 1mA≤I_{OUT}≤100mA		—	10	—	mV
Temperature Coefficient	$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_A}$	I_{OUT}=10mA, -40°C<T_A<125°C			50		ppm
Output Current Limit	I_{LIM}	V_{OUT}= 0.5 x $V_{OUT(Normal)}$, V_{IN} = 5V		350	600	-	mA
Short Current	I_{SHORT}	V_{OUT} =V_{SS}		—	100	—	mA
Power Supply Rejection Ratio	PSRR	I_{OUT}=50mA	100Hz		75		dB
			1kHz	—	70	—	
			10kHz	—	55	—	
			100kHz	—	40	—	
Output Noise Voltage	V_{ON}	BW=10Hz to 100kHz		—	27 x V_{OUT}	—	μV_{RMS}
Thermal Shutdown Temperature	T_{SD}	——		—	160	—	°C
Thermal Shutdown Hysteresis	$\triangle T_{SD}$	——		—	20	—	°C
Standby Current	I_{STBY}	CE = V_{SS}				0.5	μA
CE "High" Voltage	V_{CE}"H"			1.5		V_{IN}	V
CE "Low" Voltage	V_{CE}"L"					0.3	V
C_{OUT} Auto-Discharge Resistance	$R_{DISCHRG}$	V_{IN}=5V, V_{OUT}=3.0V, V_{CE}=V_{SS}			150		Ω

4) Typical numbers are at 25°C and represent the most likely norm.

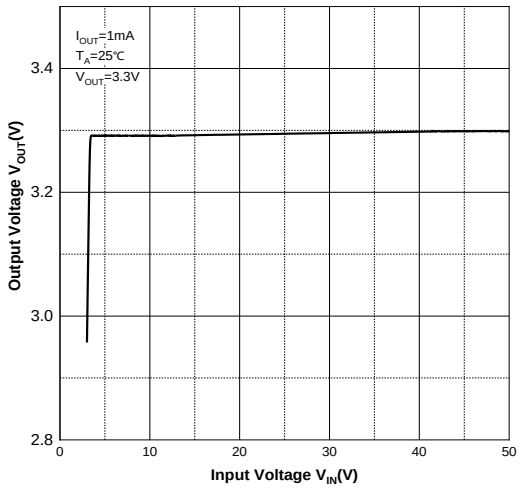
5) V_{dif} : The Difference Of Output Voltage And Input Voltage When Input Voltage Is Decreased Gradually Till Output Voltage Equals To 98% Of V_{OUT} (E).

Typical Application

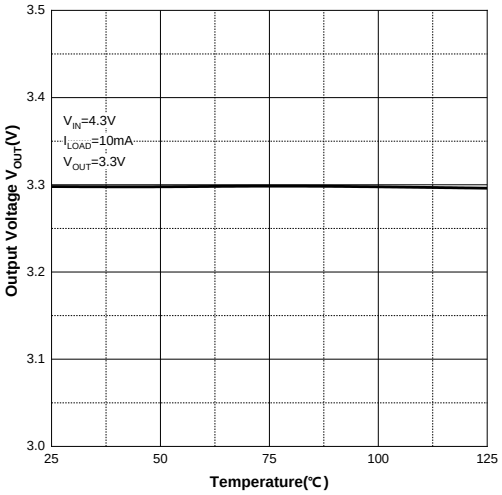


Typical Performance Characteristics

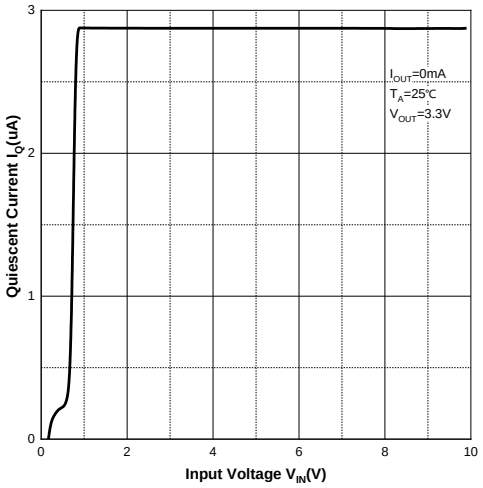
Line Regulation



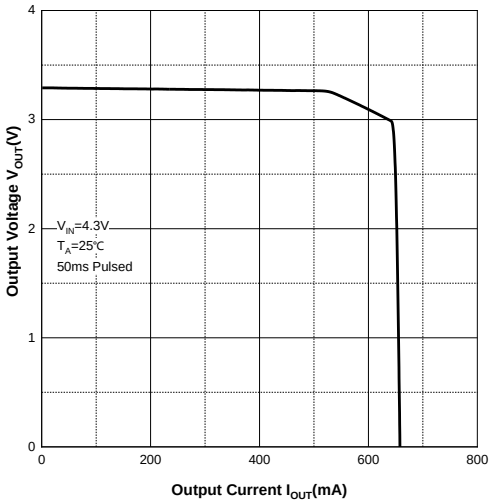
Temperature Regulation



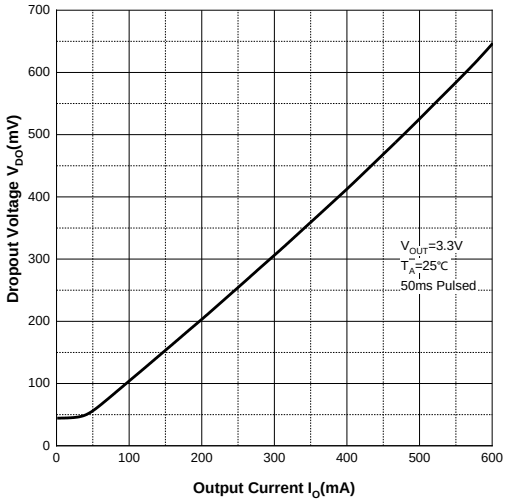
Quiescent Current



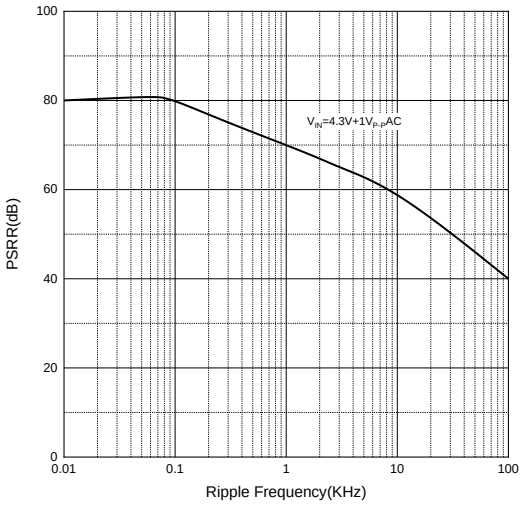
Load Regulation



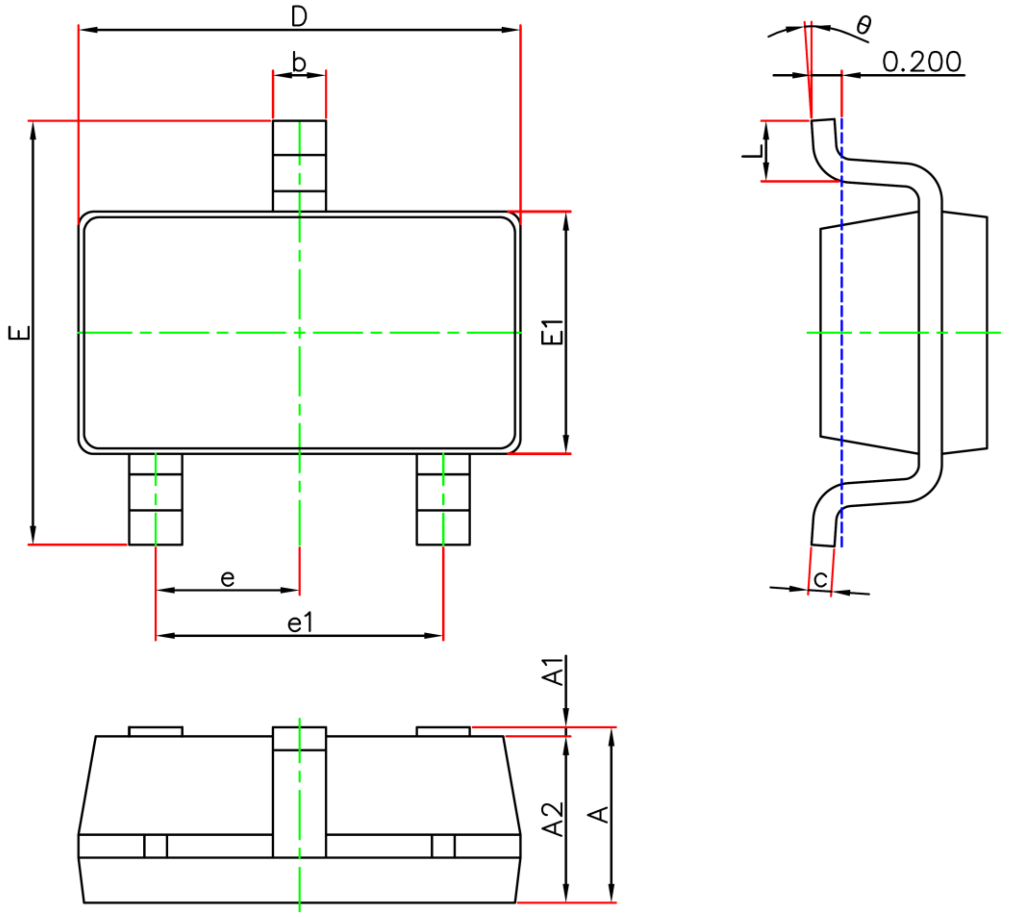
Dropout Voltage



PSRR vs. Frequency

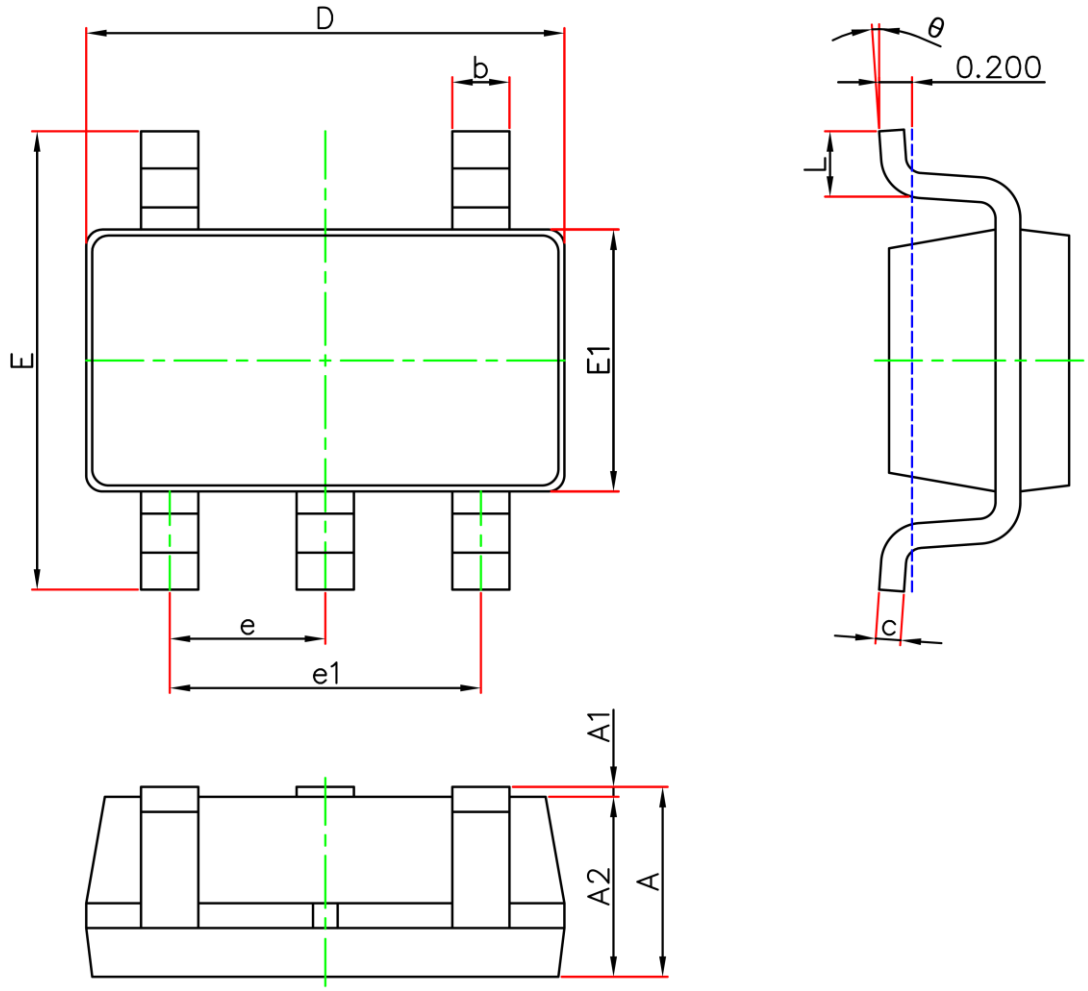


SOT-23-3L Package Outline Dimensions



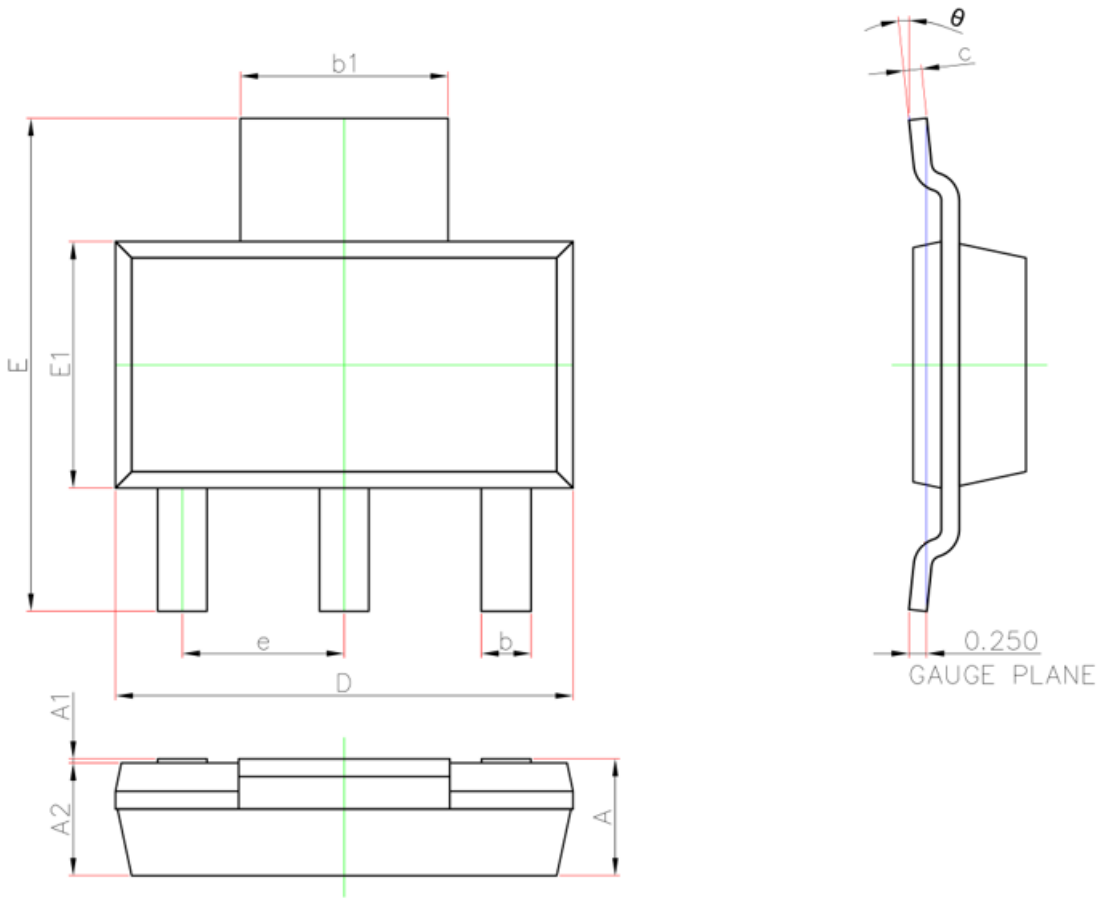
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0	0.150	0.000	0.006
A2	1.050	1.250	0.041	0.049
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
e	0.950TYP		0.037TYP	
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 Package Outline Dimensions



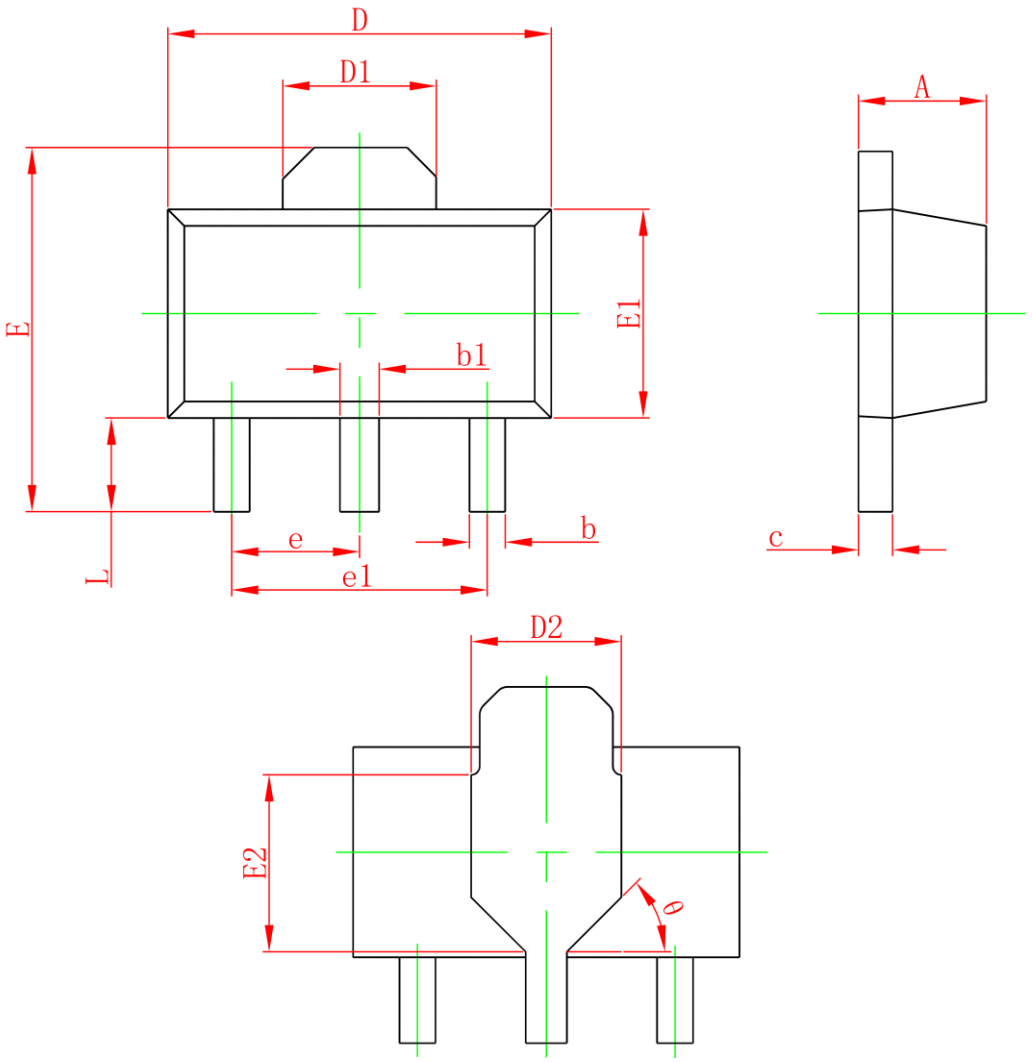
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0	0.150	0.000	0.006
A2	1.050	1.250	0.041	0.049
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
e	0.950TYP		0.037TYP	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

SOT-223 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.800MAX		0.071MAX	
A1	0.020	0.100	0.001	0.004
A2	1.500	1.700	0.059	0.067
b	0.600	0.840	0.024	0.033
b1	2.900	3.100	0.114	0.122
c	0.200	0.400	0.008	0.016
D	6.100	6.700	0.240	0.264
E	6.700	7.300	0.264	0.287
E1	3.300	3.700	0.130	0.146
e	2.300BSC		0.091BSC	
θ	0°	10°	0°	10°

SOT-89-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		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	0.380	0.580	0.015	0.023
c	0.350	0.500	0.014	0.020
D	4.400	4.600	0.173	0.181
D1	1.650REF		0.065REF	
D2	1.650	1.850	0.065	0.073
E	3.900	4.400	0.154	0.173
E1	2.300	2.600	0.091	0.102
E2	1.900REF		0.075REF	
e	1.500TYP		0.059TYP	
e1	3.000TYP		0.118TYP	
L	0.900	1.200	0.035	0.047
θ	45°		45°	