

Product Summary

The GPL6109 series are a group of positive voltage regulators manufactured by CMOS technologies with high ripple rejection, ultra-low noise, low power consumption and low dropout voltage, which can prolong battery life in portable electronics. The GPL6109 series work with low-ESR ceramic capacitors, reducing the amount of board space necessary for power applications. The GPL6109 series consume less than 0.1 μ A in shutdown mode and have fast turn-on time less than 50 μ S. The series are very suitable for the battery-powered equipments, such as RF applications and other systems requiring a quiet voltage source.

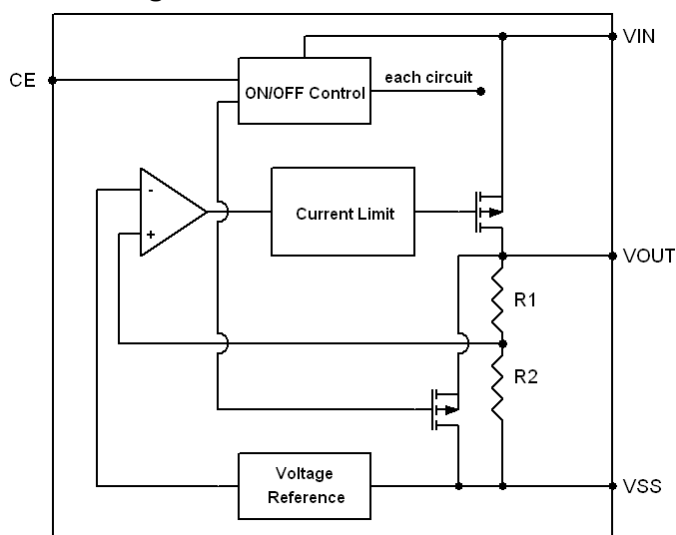
Features

- Low Quiescent Current: 70 μ A
- Guaranteed Output Current: 1.0A (Typ.)
- Operating Voltage Range: 2.0V~6.0V
- Input Voltage Range: 1.6V~6.0V
- Output Voltage: 0.9V~4.0V
- High Accuracy: $\pm 2\%$ (Typ.)
- High PSRR : 70dB@10KHz
- Excellent Line Regulation: 0.02%/V
- Built-in Current Limiter, Short-Circuit Protection

Applications

- Cellular and Smart Phones
- Radio control systems
- Laptop, Palmtops and PDAs
- Digital Still and Video Cameras
- MP3, MP4 Player
- Battery-Powered Equipment

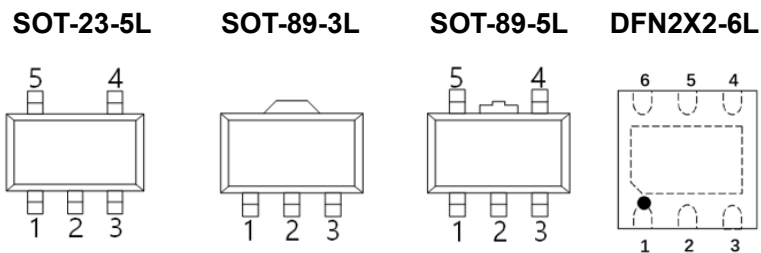
Block Diagram



Order Information

Designator	Description
①	Output Voltage e.g. 1.8V=18
②	Package: SOT-23-5L=K5 SOT-89-3L=KE SOT-89-5L=KT DFN2X2-6L=FP

Pin Configuration



Pin Number	Pin Name	Function
SOT-89-3L		
1	V_{SS}	Ground
3	V_{OUT}	Output
2	V_{IN}	Power input

Pin Number		Pin Name	Function
SOT-23-5L	SOT-89-5L		
1	5	V_{IN}	Power Input Pin
2	2	V_{SS}	Ground
3	4	CE	Chip Enable Pin
4	3	NC	No Connection
5	1	V_{OUT}	Output Pin

PIN NUMBER	PIN NAME	FUNCTION
DFN2X2-6L		
1	CE	Chip Enable Pin
2	V_{SS}	Ground
3	V_{IN}	Power input Pin
4	V_{OUT}	Output Pin
5	NC	Not Connection
6	FB	Feedback Pin: Used to Set Output Voltage

Absolute Maximum Ratings ($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter		Symbol	Ratings	Units
Input Voltage		V_{IN}	$V_{SS}-0.3\sim V_{SS}+7$	V
Output Voltage		V_{OUT}	$V_{SS}-0.3\sim V_{IN}+0.3$	V
Output Current		I_{OUT}	1300	mA
Power Dissipation	SOT-89	P_D	600	mW
	DFN2X2-6L	P_D	800	mW
	SOT-23-5L	P_D	400	mW
Operating Free Air Temperature Range		T_{opr}	$-40\sim+85$	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	$-40\sim+125$	$^{\circ}\text{C}$
Lead Temperature(Soldering, 10 sec)		T_{solder}	260	$^{\circ}\text{C}$

Electrical Characteristics($V_{IN}=V_{OUT}+1\text{V}$, $C_{IN}=C_{OUT}=1\mu\text{F}$, $T_A=25^{\circ}\text{C}$, unless otherwise specified)

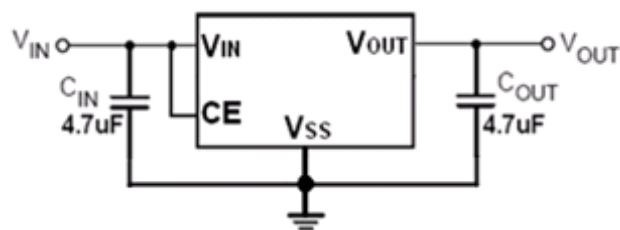
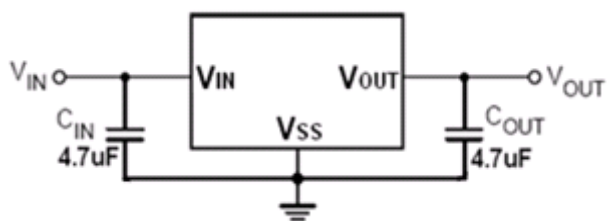
Parameter		Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage		V _{OUT(E)} ²⁾	I _{OUT} =100mA	V _{OUT} *0.98	V _{OUT}	V _{OUT} *1.02	V
Supply Current		I _{SS}	I _{OUT} =0		70	140	μA
Shutdown Current		I _{SHDN}	V _{CE} = V _{SS}		0.1	1.0	μA
Output Current		I _{OUT}	—	1000	1300		mA
Dropout Voltage ³⁾		V _{dif1}	I _{OUT} =300mA		70		mV
		V _{dif2}	I _{OUT} =1000mA		240		
Load Regulation		ΔV _{OUT}	V _{IN} = V _{OUT} +1V, 1mA≤I _{OUT} ≤1.0A		30		mV
Line Regulation		$\frac{\Delta V_{OUT}}{\Delta V_{IN} * V_{OUT}}$	I _{OUT} =100mA V _{OUT} +1V≤V _{IN} ≤6V		0.02	0.2	%/V
Output Voltage Temperature Characteristics		$\frac{\Delta V_{OUT}}{\Delta T * V_{OUT}}$	I _{OUT} =10mA -40≤T≤+85		50		ppm
Short Current		I _{Short}	V _{OUT} =V _{SS}		120		mA
Input Voltage		V _{IN}	—	1.6		6.0	V
Power Supply Rejection Rate	1kHz	PSRR	I _{OUT} =100mA		75		dB
	10kHz				70		
CE "High" Voltage		V _{CE} "H"		1.5		V _{IN}	V
CE "Low" Voltage		V _{CE} "L"				0.3	V
Thermal Shutdown Temperature		T _{SD}			150		℃
Thermal Shutdown Temperature Hysteresis		△T _{SD}			30		

1) V_{OUT} : Specified Output Voltage.

2) $V_{OUT(E)}$: Effective Output Voltage (i.e. The output voltage when $V_{IN} = (V_{OUT} + 1.0\text{V})$ and maintain a certain I_{OUT} Value).

3) 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



Input capacitor (C_{IN}): 4.7μF or more;

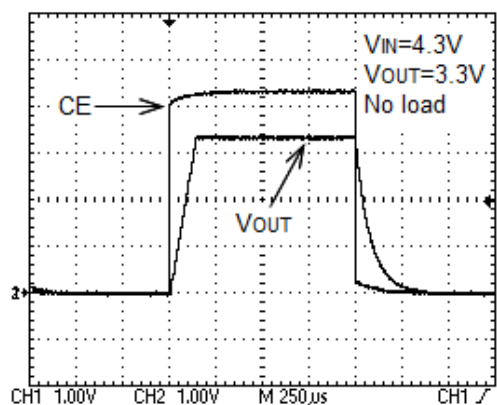
Output capacitor (C_{OUT}): 4.7μF or more;

Caution: A general series regulator may oscillate, depending on the external components selected.

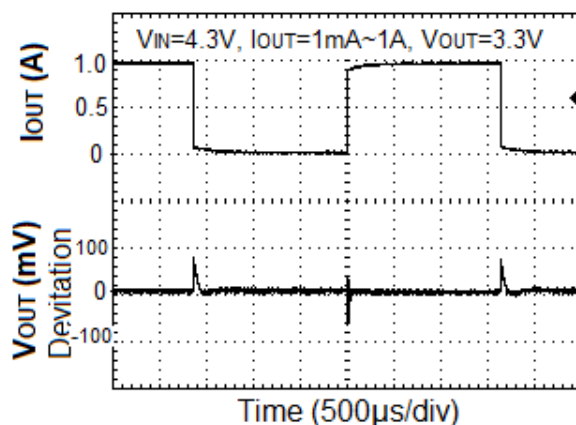
Check that no oscillation occurs with the application using the above capacitor.

Typical Performance Characteristics

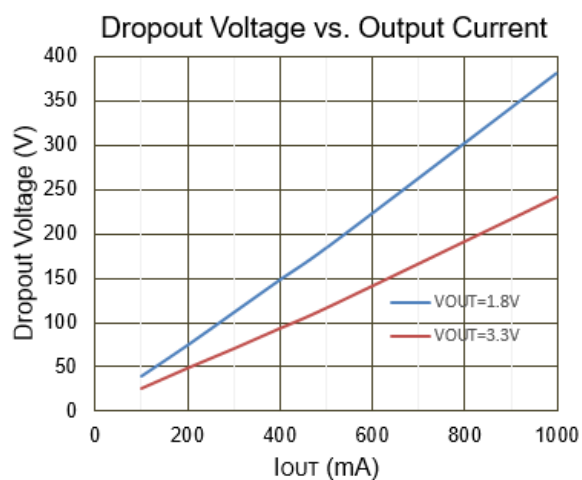
CE Start & Shutdown Response



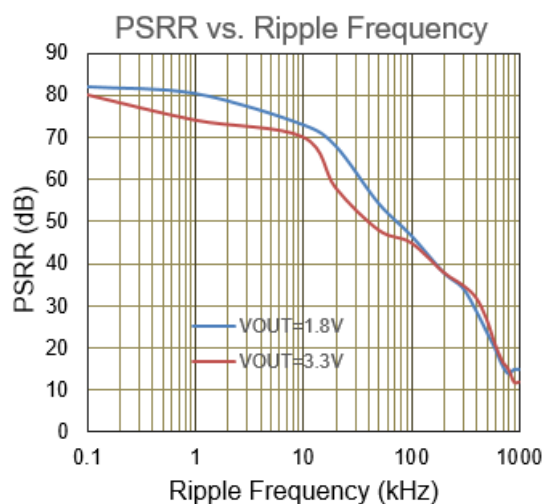
Load Transient Response

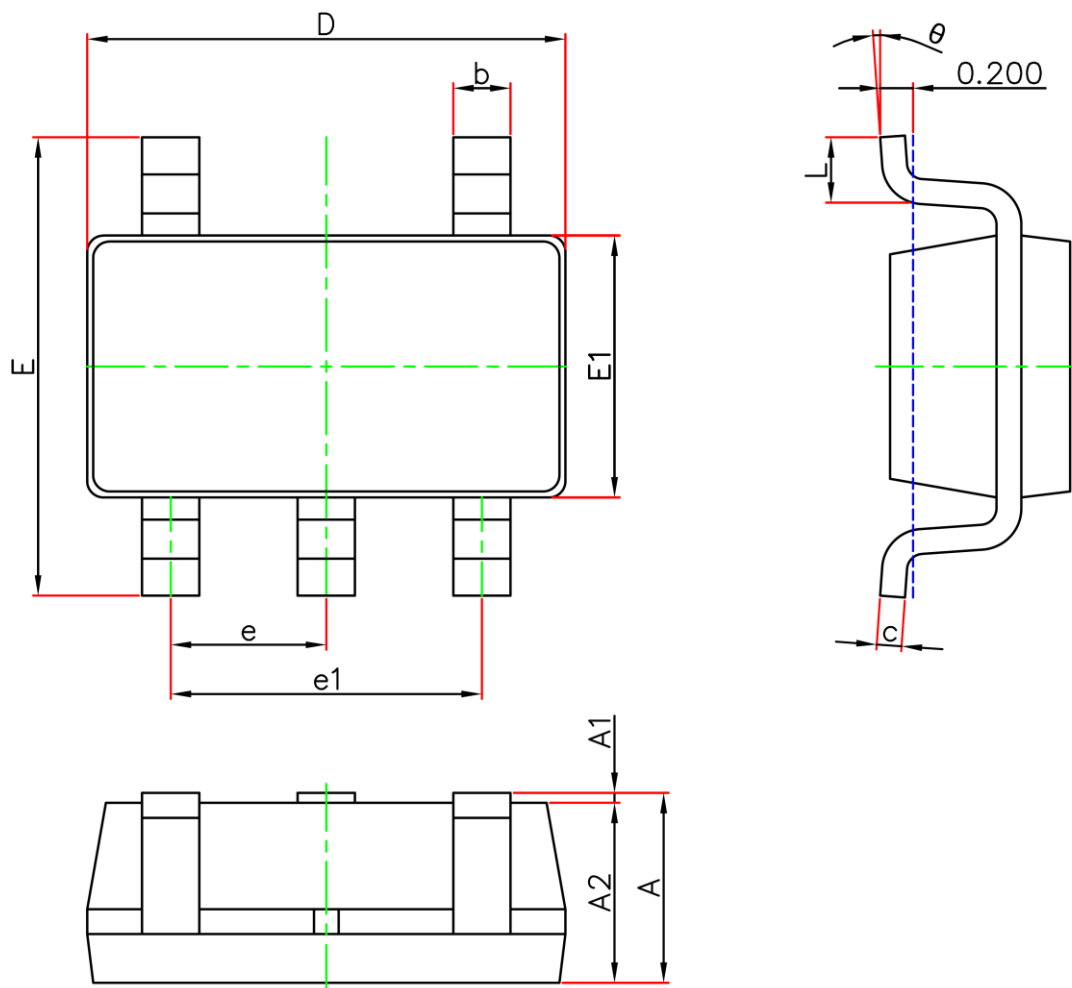


Dropout Voltage vs. Output Current

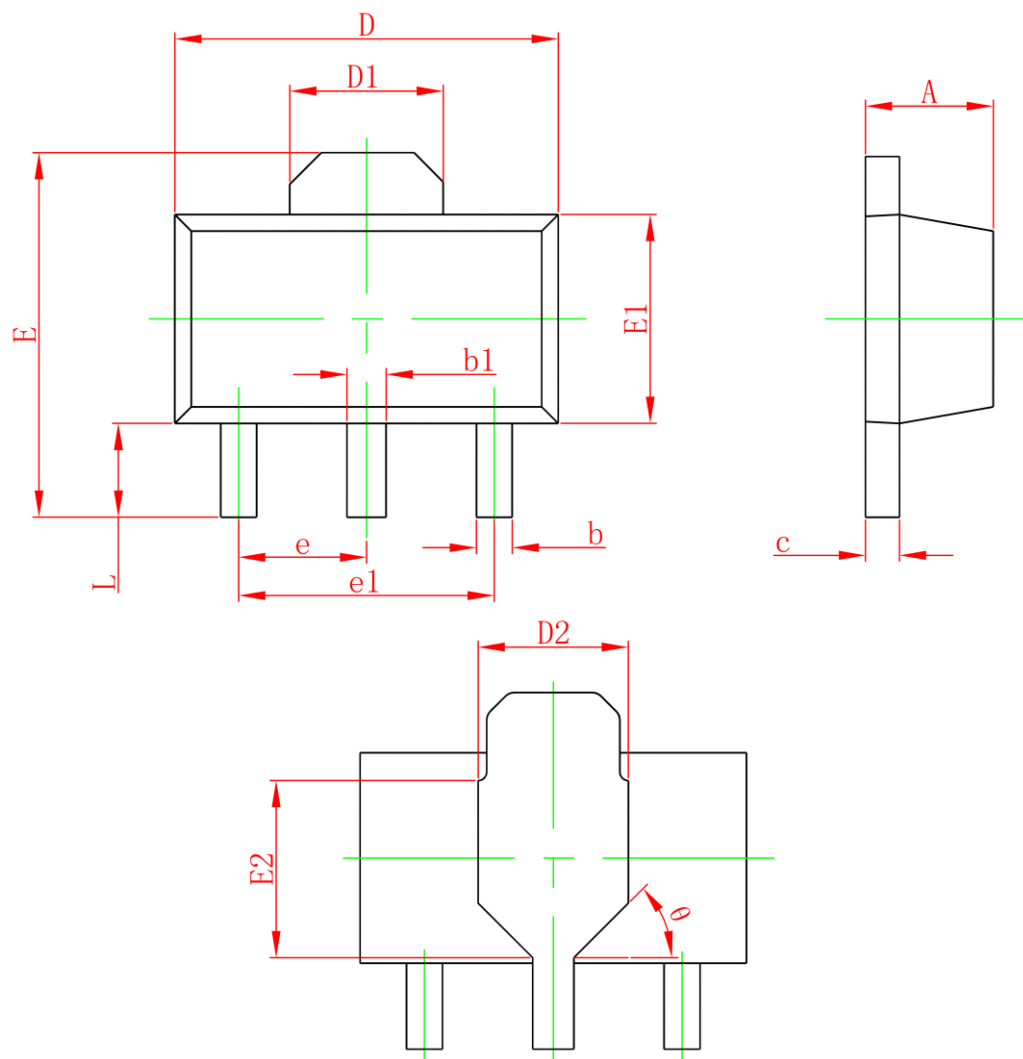


Power Supply Rejection Ratio



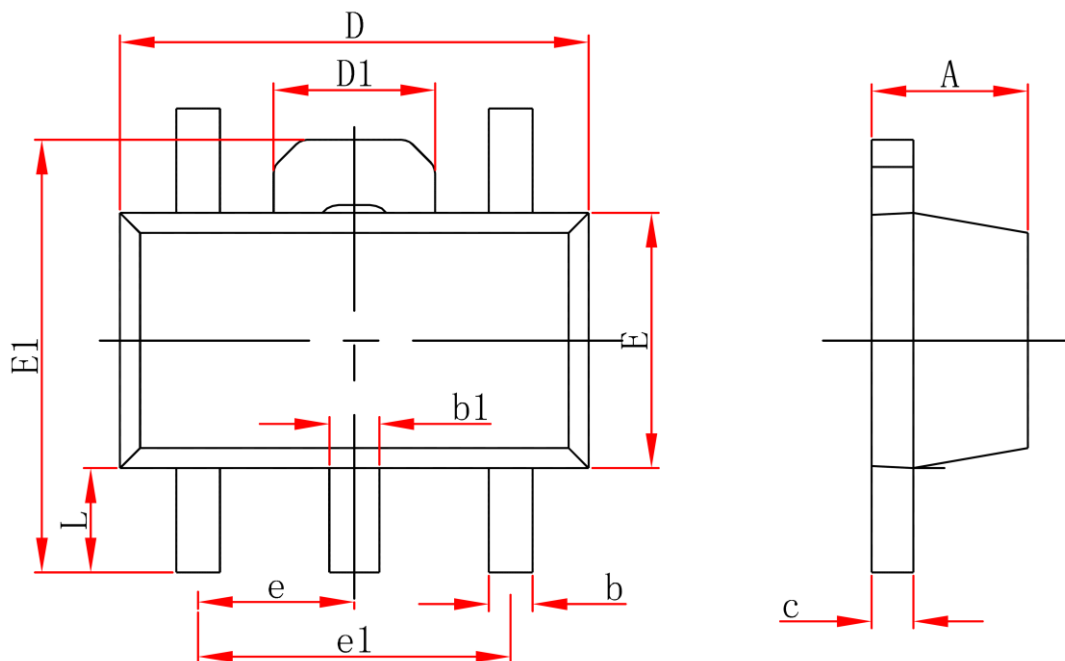
SOT-23-5L Package Outline Dimensions


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°

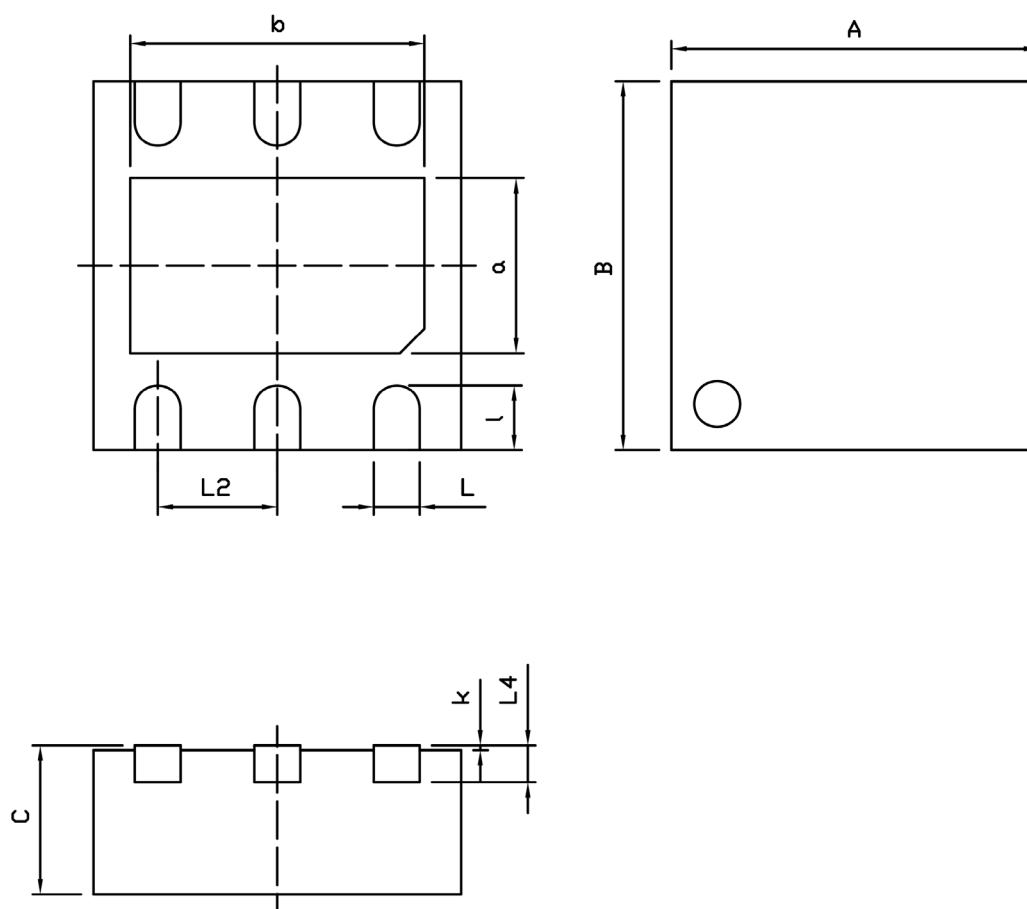
SOT-89-3L Package Outline Dimensions


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°	

SOT-89-5L 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	
E	2.300	2.600	0.091	0.102
E1	3.900	4.400	0.154	0.173
e	1.500TYP		0.059TYP	
e1	3.000TYP		0.118TYP	
L	0.900	1.200	0.035	0.047

DFN2X2-6L Package Outline Dimensions


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.950	2.050	0.077	0.081
B	1.950	2.050	0.077	0.081
C	0.700	0.800	0.028	0.031
L	0.200	0.300	0.008	0.012
L2	0.650TYP		0.026TYP	
L4	0.203TYP		0.008TYP	
a	0.900	1.000	0.035	0.039
b	1.550	1.650	0.061	0.065
l	0.300	0.400	0.012	0.016
k	0.000	0.050	0.000	0.002

Attention:

- GreenPower Electronics reserves the right to improve product design function and reliability without notice.
- Any and all semiconductor products have certain probability to fail or malfunction, which may result in personal injury, death or property damage. Customers are solely responsible for providing adequate safe measures when design their systems.
- GreenPower Electronics products belong to consumer electronics or other civilian electronic products.