500mA，Low Quiescent, Low Dropout LDO Linear Regulators

General Description

GX6210 series are low quiescent, low-dropout linear voltage regulators.GX6210 series are based on the CMOS process and allow high voltage input .The allow operation voltage as high as 18V.

GX6210 series have short circuit protection function.

Features

- High output accuracy：± 2%
- Input voltage：1.8V ~ 18 V
- Output voltage：1.5V ~ 5.0V
- Ultra-low quiescent current (Typ. = 1.5 μ A)
- Output Current：Iout = 500mA

  （When Vin = 4V and Vout =3V）

  Low dropout voltage: 11mV@ Iout =10mA (Typ. Vout = 3.0V)
- Input good stability：Typ. 0.03% / V
- Short-circuit Current:：Typ. 50mA
- Ceramic capacitor can be used

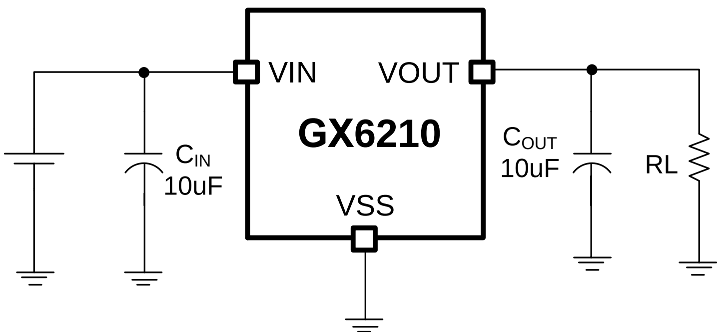
Typical Application

- Power source for home electric/electronic appliances
- Power source for battery-powered devices
- Power source for personal communication devices

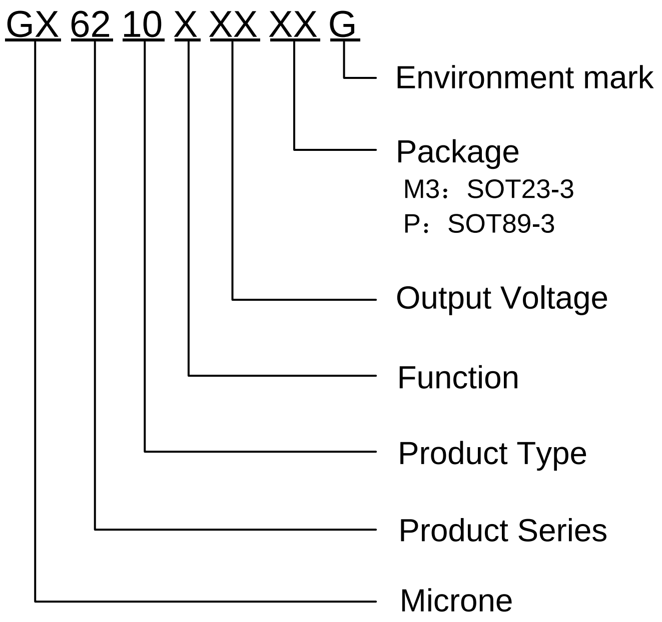
Package

- 3-pin SOT23-3、SPT89-3

Typical Application Circuit



Selection Guide

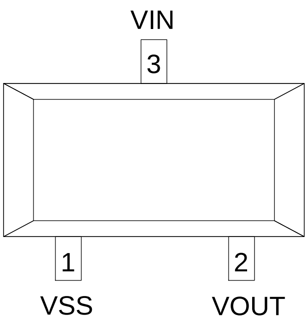


product series	product description
GX6210A15PG	V_{OUT} =1.5V； Package：SOT89-3
GX6210A25M3G	V_{OUT} =2.5V； Package：SOT23-3
GX6210A28M3G	V_{OUT} =2.8V； Package：SOT23-3
GX6210A28PG	V_{OUT} =2.8V； Package：SOT89-3
GX6210A30M3G	V_{OUT} =3.0V； Package：SOT23-3
GX6210A30PG	V_{OUT} =3.0V； Package：SOT89-3
GX6210A33M3G	V_{OUT} =3.3V； Package：SOT23-3
GX6210A33PG	V_{OUT} =3.3V； Package：SOT89-3
GX6210A36PG	V_{OUT} =3.6V； Package：SOT89-3
GX6210A40PG	V_{OUT} =4.0V； Package：SOT89-3
GX6210A50M3G	V_{OUT} =5.0V； Package：SOT23-3
GX6210A50PG	V_{OUT} =5.0V； Package：SOT89-3

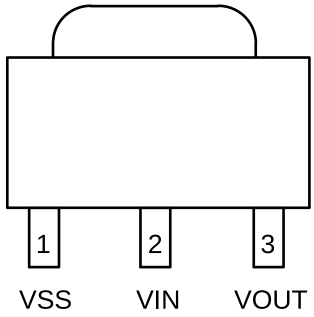
NOTE: 1. At present ,there are eight kinds of voltage value: 1.5、2.5、2.8V、3.0V、3.3V、3.6V、4.0V、5.0V。

2. If you need other voltage and package, please contact our sales staff。

Pin Configuration



SOT23-3



SOT89-3

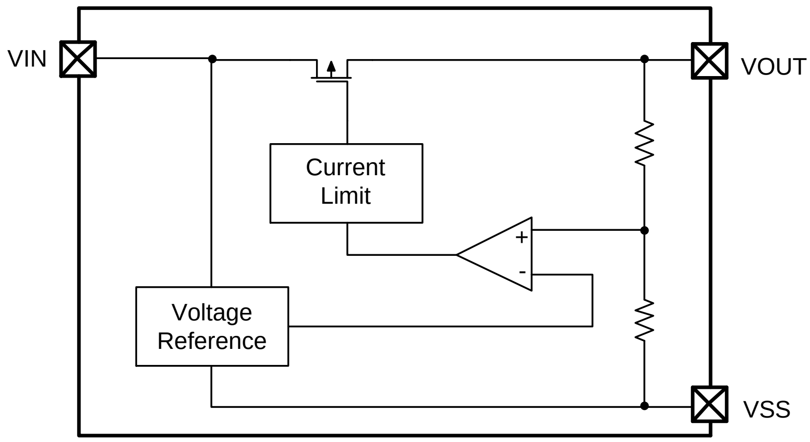
Pin Assignment

Pin Number		Name	Function
M3	P		
SOT23-3	SOT89-3		
1	1	VSS	Ground
2	3	VOUT	Output
3	2	VIN	Input

Absolute Maximum Ratings

Parameter		Symbol	Description	Units
Input Voltage		V_{IN}	18	V
Output Current		I_{OUT}	700	mA
Output Voltage		V_{OUT}	Vss-0.3 ~ Vout+0.3	V
Power Dissipation	SOT23-3	Pd	0.54	W
	SOT89-3	Pd	1.25	W
Thermal resistance (Junction to air)	SOT23-3	θ_{JA}	230	℃/W
	SOT89-3	θ_{JA}	100	℃/W
Maximum junction temperature		T_J	-40 ~ +150	℃
Operating Ambient Temperature		T_{Opr}	-40 ~ +85	℃
Storage Temperature		T_{stg}	-55 ~ +150	℃
Lead Temperature			260℃，10sec	

Block Diagram



Electrical Characteristics

GX6210A15 (V_{IN}= V_{OUT}+1.5V，C_{IN}=C_{OUT}=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=40mA, V_{IN}=Vout+1.5V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V_{IN}		-	-	18	V
Maximum Output Current	I_{OUT} _max	V_{IN}=Vout+1.5V	-	500	-	mA
Load Regulation	ΔV_{OUT}	V_{IN}=Vout+1.5V,1mA≤I_{OUT}≤200mA	-	12	30	mV
Dropout Voltage(Note 3)	V_{DIF1}	I_{OUT} =10mA	-	40	60	mV
	V_{DIF2}	I_{OUT} =100mA	-	330	500	mV
	V_{DIF3}	I_{OUT} =200mA	-	560	840	mV
Supply Current	I_{SS}	V_{IN}=Vout+1.5V	-	1.5	2.5	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	I_{OUT} =10mA Vout+1.5V ≤V_{IN}≤18V	-	0.03	0.1	%/V
Temperature coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta \times V_{OUT}}$	V_{IN}=Vout+1.5V ,I_{OUT} =10mA -40℃≤Ta≤125℃	-	±60	±100	Ppm/℃
Short-circuit Current	Ishort	V_{IN}=Vout+1.5V	-	70	100	mA

GX6210A30 (V_{IN}= V_{OUT}+1.0V，C_{IN}=C_{OUT}=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=40mA, V_{IN}=Vout+1V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V_{IN}		-	-	18	V
Maximum Output Current	I_{OUT} _max	V_{IN}=Vout+1V	-	500	-	mA
Load Regulation	ΔV_{OUT}	V_{IN}=Vout+1V,1mA≤I_{OUT}≤200mA	-	12	30	mV
Dropout Voltage(Note 3)	V_{DIF1}	I_{OUT} =10mA	-	11	14	mV
	V_{DIF2}	I_{OUT} =100mA	-	110	140	mV

	V_{DIF3}	I_{OUT} =200mA	-	220	280	mV
Supply Current	I_{SS}	V_{IN}=Vout+1V	-	1.5	2.5	μA
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	I_{OUT} =10mA Vout+1V ≤V_{IN}≤18V	-	0.03	0.1	%/V
Temperature coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta \times V_{OUT}}$	V_{IN}=Vout+1V ,I_{OUT} =10mA -40℃≤Ta≤125℃	-	±60	±100	Ppm/℃
Short-circuit Current	Ishort	V_{IN}=Vout+1V	-	50	70	mA

GX6210A33 (V_{IN}= V_{OUT}+1.0V，C_{IN}=C_{OUT}=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=40mA, V_{IN}=Vout+1V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V_{IN}		-	-	18	V
Maximum Output Current	I_{OUT} _max	V_{IN}=Vout+1V	-	500	-	mA
Load Regulation	ΔV_{OUT}	V_{IN}=Vout+1V,1mA≤I_{OUT}≤200mA	-	12	30	mV
Dropout Voltage(Note 3)	V_{DIF1}	I_{OUT} =10mA	-	10	13	mV
	V_{DIF2}	I_{OUT} =100mA	-	100	130	mV
	V_{DIF3}	I_{OUT} =200mA	-	200	260	mV
Supply Current	I_{SS}	V_{IN}=Vout+1V	-	1.6	2.5	μ A
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	I_{OUT} =10mA Vout+1V ≤V_{IN}≤18V	-	0.03	0.1	%/V
Temperature coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta \times V_{OUT}}$	V_{IN}=Vout+1V ,I_{OUT} =10mA -40℃≤Ta≤125℃	-	±60	±100	Ppm/℃
Short-circuit Current	Ishort	V_{IN}=Vout+1V	-	50	70	mA

GX6210A50 (V_{IN}= V_{OUT}+1.0V，C_{IN}=C_{OUT}=10uF，Ta=25^{O}C, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Output Voltage	V_{OUT}(E) (Note 2)	I_{OUT}=40mA, V_{IN}=Vout+1V	X 0.98	V_{OUT} (T) (Note 1)	X 1.02	V
Input Voltage	V_{IN}		-	-	18	V
Maximum Output Current	I_{OUT} _max	V_{IN}=Vout+1V	-	500	-	mA
Load Regulation	ΔV_{OUT}	V_{IN}=Vout+1V,1mA≤I_{OUT}≤200mA	-	10	30	mV
Dropout Voltage(Note 3)	V_{DIF1}	I_{OUT} =10mA	-	8	11	mV
	V_{DIF2}	I_{OUT} =100mA	-	80	110	mV
	V_{DIF3}	I_{OUT} =200mA	-	160	220	mV
Supply Current	I_{SS}	V_{IN}=Vout+1V	-	1.7	2.5	μ A
Line Regulations	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	I_{OUT} =10mA Vout+1V ≤V_{IN}≤18V	-	0.03	0.1	%/V
Temperature coefficient	$\frac{\Delta V_{OUT}}{\Delta Ta \times V_{OUT}}$	V_{IN}=Vout+1V ,I_{OUT} =10mA -40℃≤Ta≤125℃	-	±60	±100	Ppm/℃
Short-circuit Current	Ishort	V_{IN}=Vout+1V	-	50	70	mA

Note： 1. V_{OUT} (T) ： Specified Output Voltage

2. V_{OUT} (E) ： Effective Output Voltage (ie. The output voltage when “V_{OUT} (T)+1.0V”is provided at the Vin pin while maintaining a certain Iout value.)

3.V_{DIF}： V_{IN1} –V_{OUT} (E)’

V_{IN1} ： The input voltage when V_{OUT} (E)’ appears as input voltage is gradually decreased.

V_{OUT} (E)’=A voltage equal to 98% of the output voltage whenever an amply stabilized Iout and {V_{OUT} (T) +1.0V} is input.

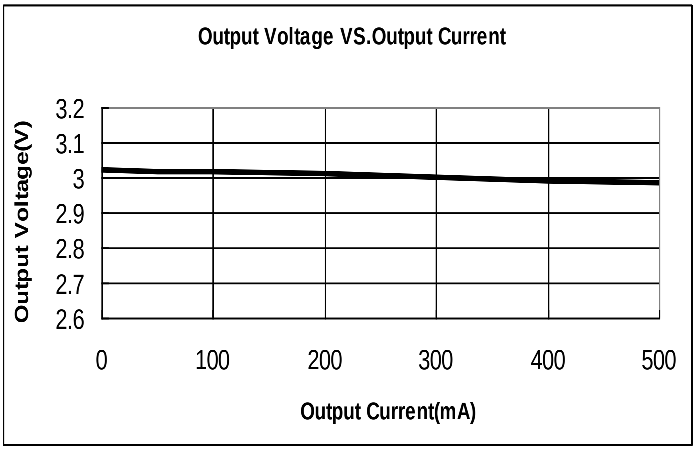
Precautions

- During the test, if AC/DC power supply and the ceramic chip capacitors collocation is used, there may be serious voltage spike phenomenon instantaneously. When the power supply access to 15V, the voltage is rushed to about 30V instantaneously. Because of exceeding the limit voltage of chip, the chip is damaged. If you string a small resistance of 1 ohm in the input end during the test, the peak phenomenon can be avoided.
- In the test, there is serious burr phenomenon only when the AC/DC power is used with ceramic chip capacitors. But electrolytic capacitors and tantalum capacitance won't appear above phenomenon. Please be sure to pay attention to this point when you use AC/DC power.
- In normal use, when any type of capacitor is used with battery or the supply of fire power, the above phenomenon doesn’t occur.

Type Characteristics

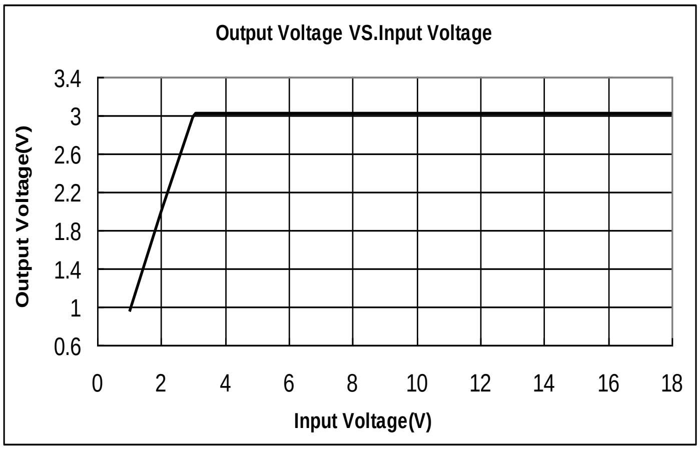
（1）Output Voltage VS. Output Current

（Ta = 25 °C，VIN=4V） GX6210A30



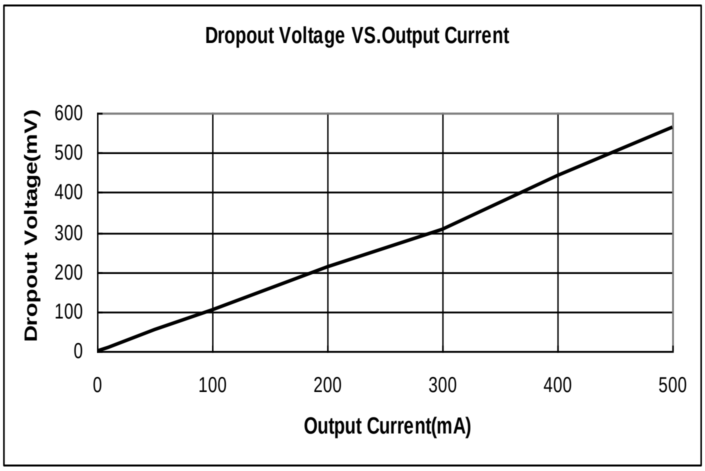
（2）Output Voltage VS. Input Voltage

（Ta = 25 °C，Iout=10mA） GX6210A30



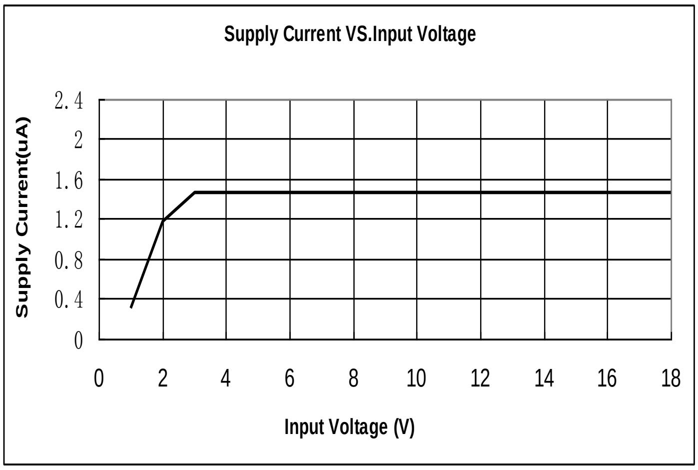
（3）Dropout Voltage VS. Output Current

（Ta = 25 °C） GX6210A30



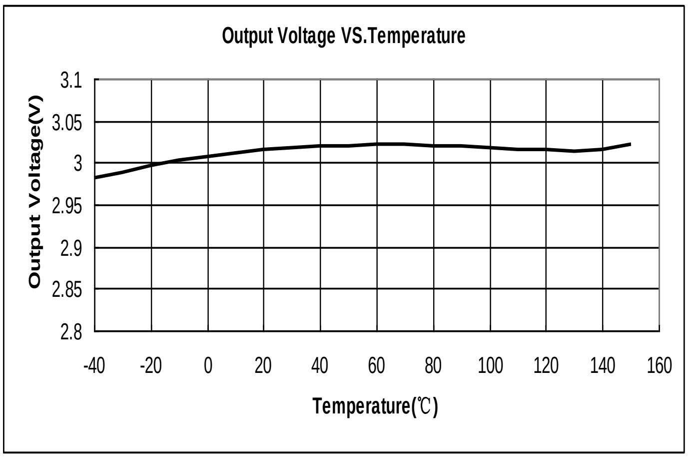
（4）Supply Current VS. Input Voltage

（Ta = 25 °C） GX6210A30



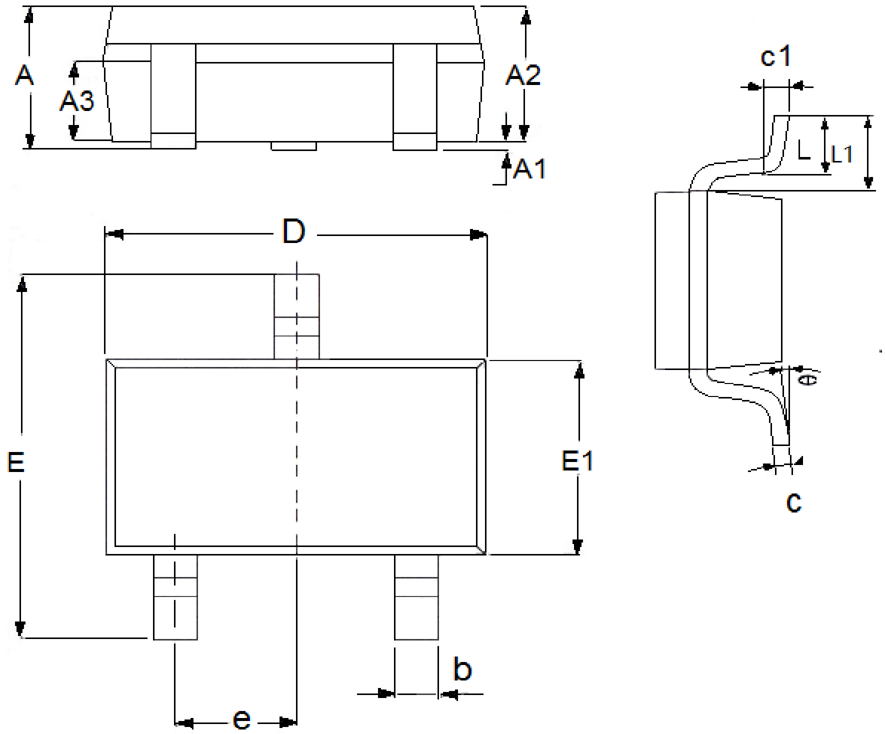
（5）Output Voltage VS. Temperature

（VIN=4V ,Iout=10mA） GX6210A30



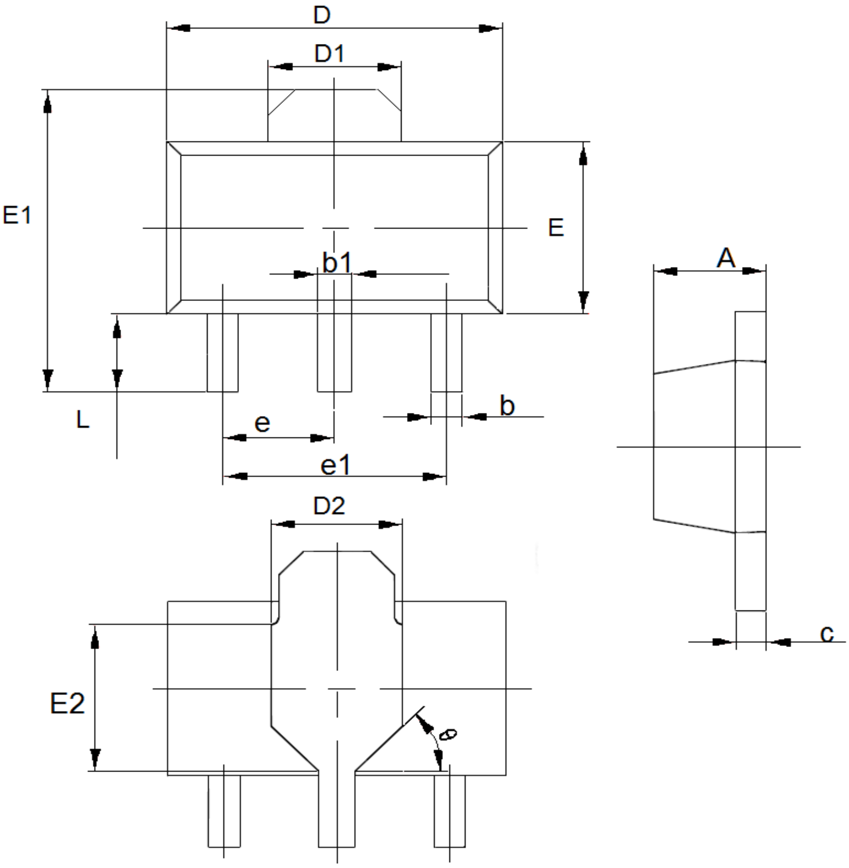
Packaging Information

- **Package：SOT23-3**



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.05	1.45	0.0413	0.0571
A1	0	0.15	0.0000	0.0059
A2	0.9	1.3	0.0354	0.0512
A3	0.6	0.7	0.0236	0.0276
b	0.25	0.5	0.0098	0.0197
c	0.1	0.25	0.0039	0.0098
D	2.8	3.1	0.1102	0.1220
E	2.6	3.1	0.1023	0.1220
E1	1.5	1.8	0.0591	0.0709
e	0.95(TYP)		0.0374(TYP)	
L	0.25	0.6	0.0098	0.0236
L1	0.59(TYP)		0.0232(TYP)	
θ	0	8°	0.0000	8°
c1	0.2(TYP)		0.0079(TYP)	

- **Package：SOT89-3**



DIM	Millimeters		Inches	
	Min	**Max**	**Min**	**Max**
A	1.4	1.6	0.0551	0.0630
b	0.32	0.52	0.0126	0.0205
b1	0.4	0.58	0.0157	0.0228
c	0.35	0.45	0.0138	0.0177
D	4.4	4.6	0.1732	0.1811
D1	1.55(TYP)		0.061(TYP)	
D2	1.75(TYP)		0.0689(TYP)	
e1	3.0(TYP)		0.1181(TYP)	
E	2.3	2.6	0.0906	0.1023
E1	3.94	4.4	0.1551	0.1732
E2	1.9(TYP)		0.0748(TYP)	
e	1.5(TYP)		0.0591(TYP)	
L	0.8	1.2	0.0315	0.0472
θ	45°		45°	