



DESCRIPTION

The A6500F voltage regulator has low voltage differential, high PSRR, and ultra-low standby current. The A6500F has an extremely low static current of 0.5uA when unloaded, making it very suitable for micro control unit systems, especially portable and other battery powered systems that are always online. The A6500F retains all common features of low dropout regulators, including low dropout PMOS pass devices, short circuit protection and thermal shutdown.

The A6500F has a maximum operating voltage of 6V and an output voltage tolerance of $\pm 2\%$, and can be selected with an output voltage as low as 1.8V.

The A6500F is available in SOT-23, SOT-25, SOT89-3 and DFN4(1x1) Packages.

FEATURES

- V_{IN} Range up to 6V
- Output Voltage Range: 1.8V~5V
- Output Voltage Tolerance: $\pm 2\%$
- Maximum Output Current: 500mA
- Ultra-Low Quiescent Current (I_Q = 0.5uA)
- Dropout Voltage Typically 660mV @500mA
- Built-in Thermal Protection
- Built-in Overcurrent Protection
- Compatible with Low ESR Ceramic Capacitors

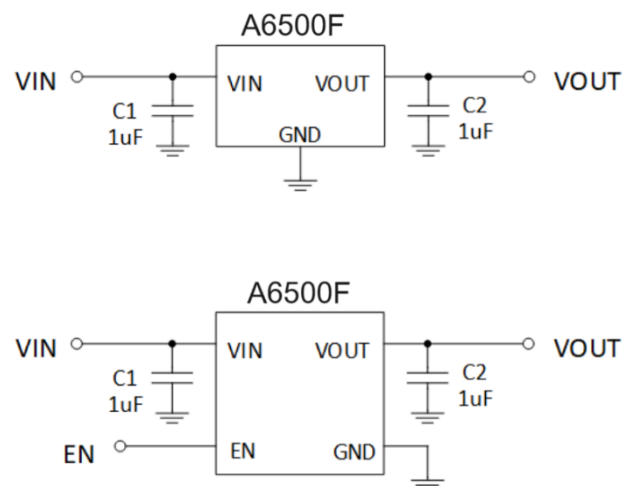
APPLICATION

- Portable Battery Powered Devices
- Ultra Low Power Microcontroller.
- Laptop Computer

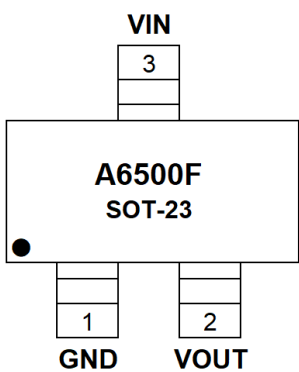
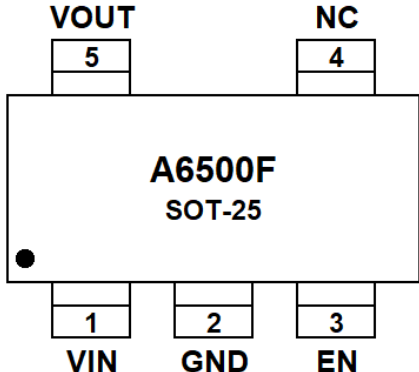
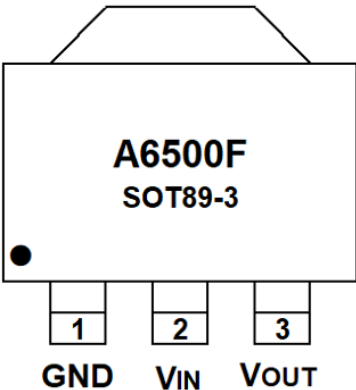
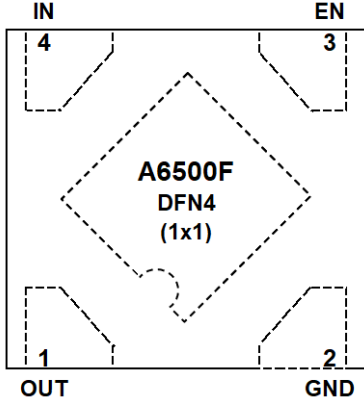
ORDERING INFORMATION

Package Type	Part Number	
SOT-23 SPQ: 3,000pcs/Reel	E3	A6500FE3R-XX
		A6500FE3VR-XX
SOT-25 SPQ: 3,000pcs/Reel	E5	A6500FE5R-XX
		A6500FE5VR-XX
SOT89-3 SPQ: 1,000pcs/Reel	K3	A6500FK3R-XX
		A6500FK3VR-XX
DFN4 (1x1) SPQ: 10,000pcs/Reel	J4	A6500FJ4R-XX
		A6500FJ4VR-XX
Note	XX: Output Voltage 18=1.8V, 50=5.0V V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

TYPICAL APPLICATION



**PIN DESCRIPTION**

 A6500F SOT-23 SOT-23, E3 Top View				 A6500F SOT-25 SOT-25, E5 Top View	
 A6500F SOT89-3 SOT89-3, K3 Top View				 A6500F DFN4 (1x1) DFN4 (1x1), J4 Top View	
Pin #				Symbol	Function
SOT-23	SOT-25	SOT89-3	DFN4 (1x1)		
3	1	2	4	V _{IN}	Input Voltage Pin
1	2	1	2	GND	Ground
2	5	3	1	V _{OUT}	Output Voltage Pin
-	3	-	3	EN	Enable Pin
-	4	-	-	NC	Not Connected

**ABSOLUTE MAXIMUM RATINGS**

V _{IN} , Input Voltage		-0.3V ~ +6.5V
V _{EN} , EN Input Voltage		-0.3V ~ +6.5V
T _J , Junction Temperature		150°C
P _D , Power Dissipation	SOT-23	0.29W
	SOT-25	0.29W
	SOT89-3	0.50W
	DFN4 (1x1)	0.40W
R _{θJA} , Thermal Resistance	SOT-23	350°C/W
	SOT-25	350°C/W
	SOT89-3	200°C/W
	DFN4 (1x1)	250°C/W
-, Lead Temperature (Soldering, 10 sec.)		300°C
T _{STG} , Storage Temperature		-65°C~+150°C

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED WORK CONDITIONS

Parameter	Symbol	Min	Max	Unit
Input Voltage	V _{IN}	2.5	6	V
Operating Temperature	T _A	-40	85	°C
Junction Temperature	T _J	-40	125	°C

**ELECTRICAL CHARACTERISTICS**

V_{IN} = V_{OUT} + 1V, I_{OUT} = 1mA, C_{IN} = C_{OUT} = 1μF, T_J = 25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range	V _{IN}		2.5		6	V
Output Voltage Accuracy	ΔV _{OUT}	T _J = 25°C	-2	-	2	%
Line Regulation	ΔV _{LINE}	V _{IN} = V _{OUT} +1V ~6V	-	0.01	0.2	%/V
Load Regulation	ΔV _{LOAD}	I _{OUT} = 1mA~100mA, V _{IN} = V _{OUT} +1V or 3.5V (Whichever is larger)	-	8	20	mV
		I _{OUT} = 1mA~300mA, V _{IN} = V _{OUT} +1V or 3.5V (Whichever is larger)	-	25	60	
		I _{OUT} = 1mA~500mA, V _{IN} = V _{OUT} +1V or 3.5V (Whichever is larger)	-	40	100	
Dropout Voltage (V _{OUT} ≥2.5V)	V _{DROP}	I _{OUT} = 100mA	-	120	-	mV
		I _{OUT} = 300mA	-	360	-	
		I _{OUT} = 500mA	-	660	-	
Dropout Voltage (V _{OUT} <2.5V)		I _{OUT} = 100mA	-	190	-	
		I _{OUT} = 300mA	-	570	-	
		I _{OUT} = 500mA	-	970	-	
Quiescent Current	I _Q	I _{OUT} =0mA	-	0.5	1	uA
Shutdown Current	I _{SD}	V _{EN} =0V	-	30	-	nA
Enable High Level	V _{ENHI}	-	0.80	-	-	V
Enable Low Level	V _{ENLO}	-	-	-	0.2	V
Current Limit	I _{CL}	V _{IN} = ‘V _{OUT} +1V’ or 3.5V (Whichever is larger)	550	700	-	mA
Output Shutdown Discharge Resistor	R _{DIS}	V _{EN} =0V, Between V _{OUT} and GND	-	10	-	Ω
Power-Supply Rejection Ratio	PSRR	I _{OUT} = 10mA, f=1kHz	-	75	-	dB
		I _{OUT} = 10mA, f=10kHz	-	80	-	
Thermal Shutdown	T _{SD}	-	-	150	-	°C
Thermal Shutdown HY	T _{SDHY}	-	-	20	-	°C



TYPICAL PERFORMANCE CHARACTERISTICS

$V_{IN} = V_{OUT} + 1V$, $I_{OUT} = 1mA$, $C_{IN} = C_{OUT} = 1\mu F$, $T_J = 25^\circ C$, unless otherwise noted.

Fig 1. Input Voltage Transient

($V_{IN} = 4.3V \leftrightarrow 6V$)

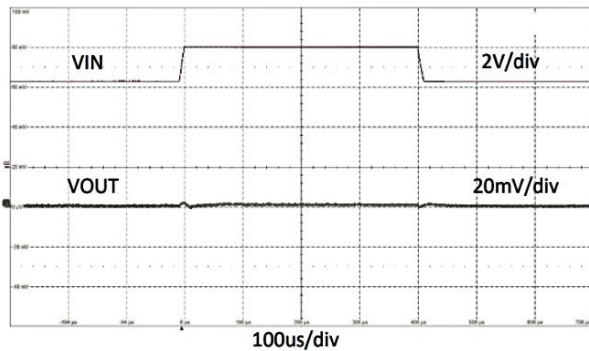


Fig 2. Load Transient

($V_{OUT} = 3.3V$, $I_{OUT} = 1mA \leftrightarrow 300mA$)

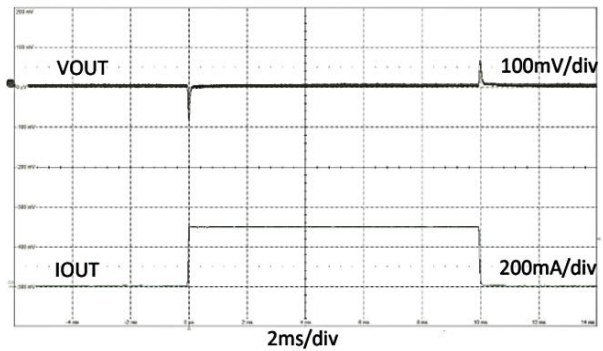


Fig 3. Load Transient

($V_{OUT} = 3.3V$, $I_{OUT} = 1mA \leftrightarrow 500mA$)

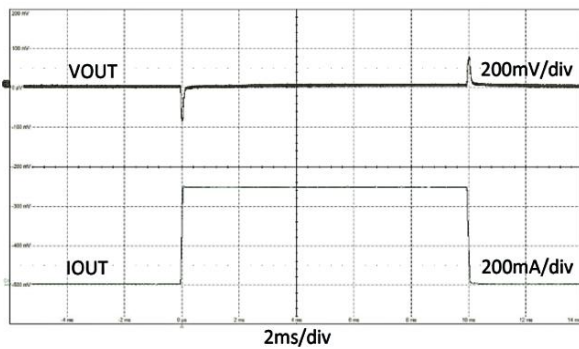


Fig 4. V_{IN} Power On, Power Off

($V_{IN} = 5V$, $I_{OUT} = 5mA$)

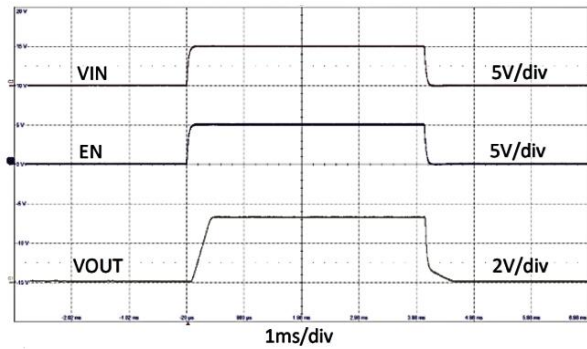


Fig 5. EN Enabled and Disabled

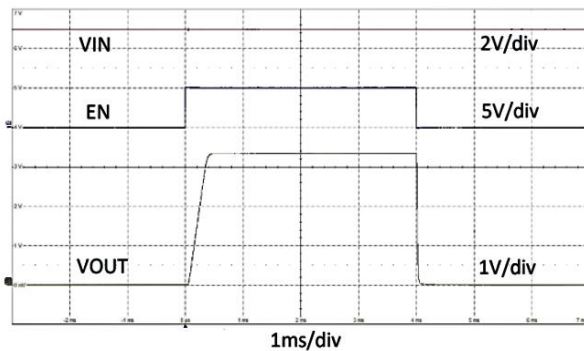


Fig 6. PSRR ($V_{IN} = 3.8V$, $V_{OUT} = 2.8V$, $I_{OUT} = 10mA$)

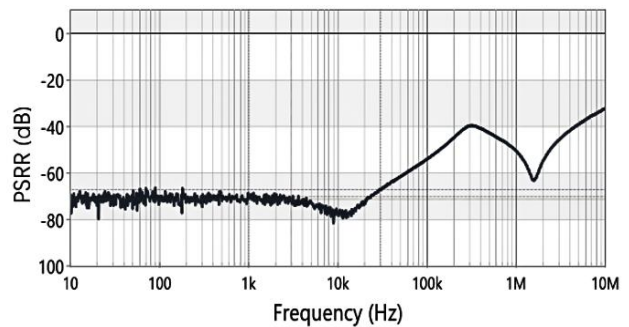




Fig 7. V_{OUT} vs. V_{IN}

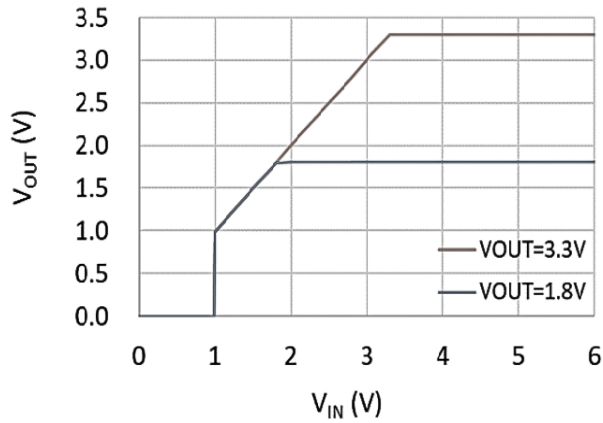


Fig 8. V_{OUT} vs. Temperature

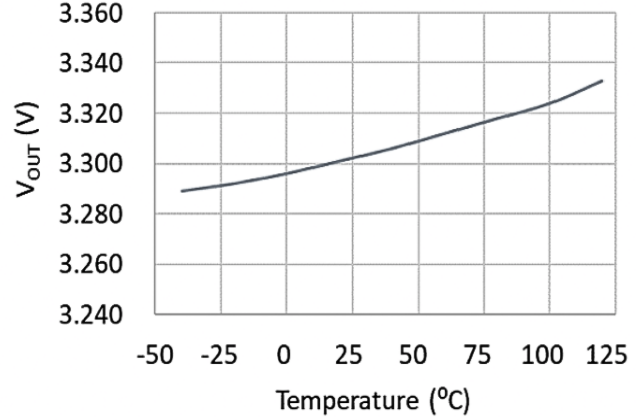


Fig 9. I_Q vs. V_{IN}

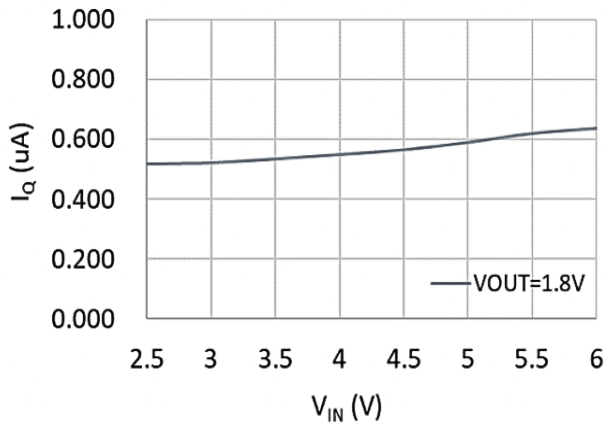


Fig 10. I_Q vs. Temperature

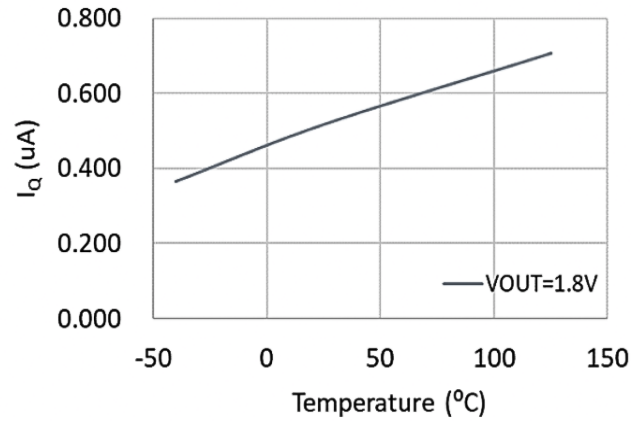


Fig 11. Dropout Voltage vs. I_{OUT}

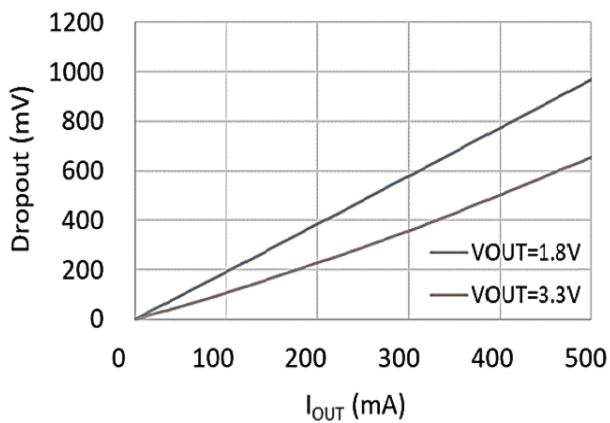
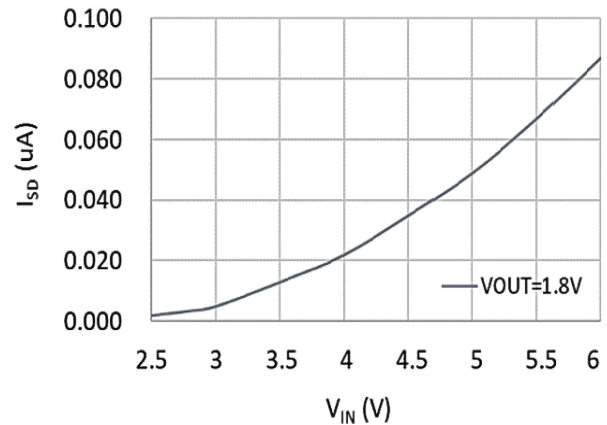
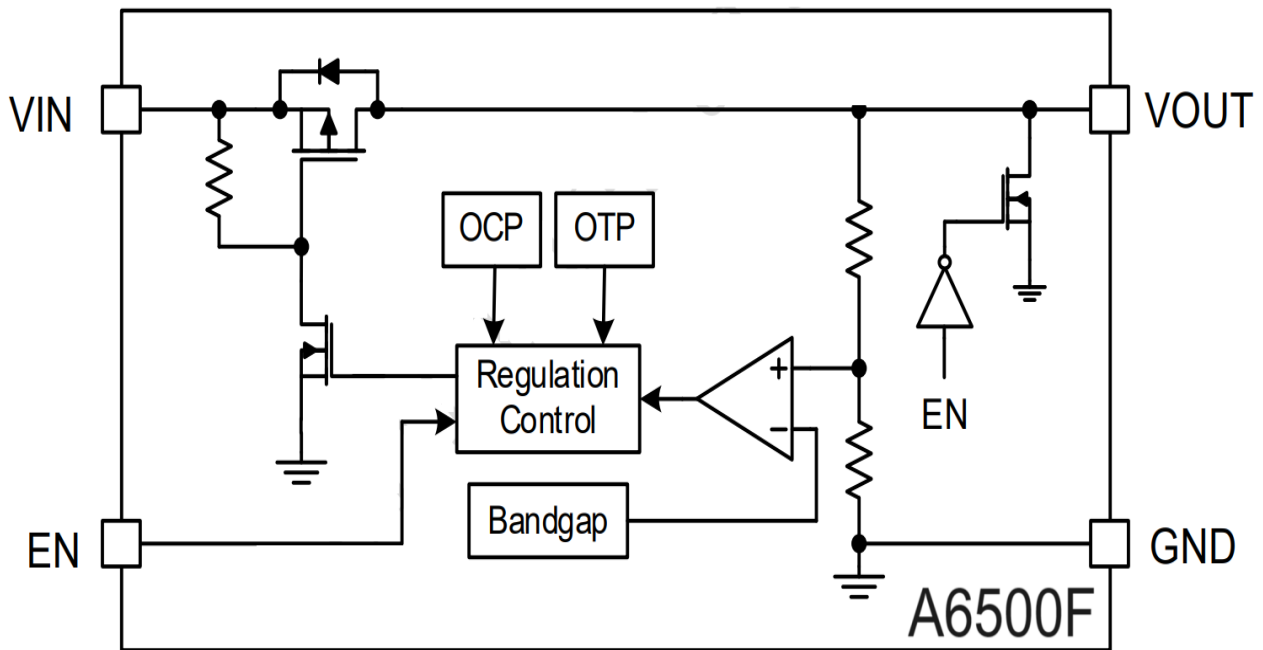


Fig 12. I_{SD} vs. V_{IN}



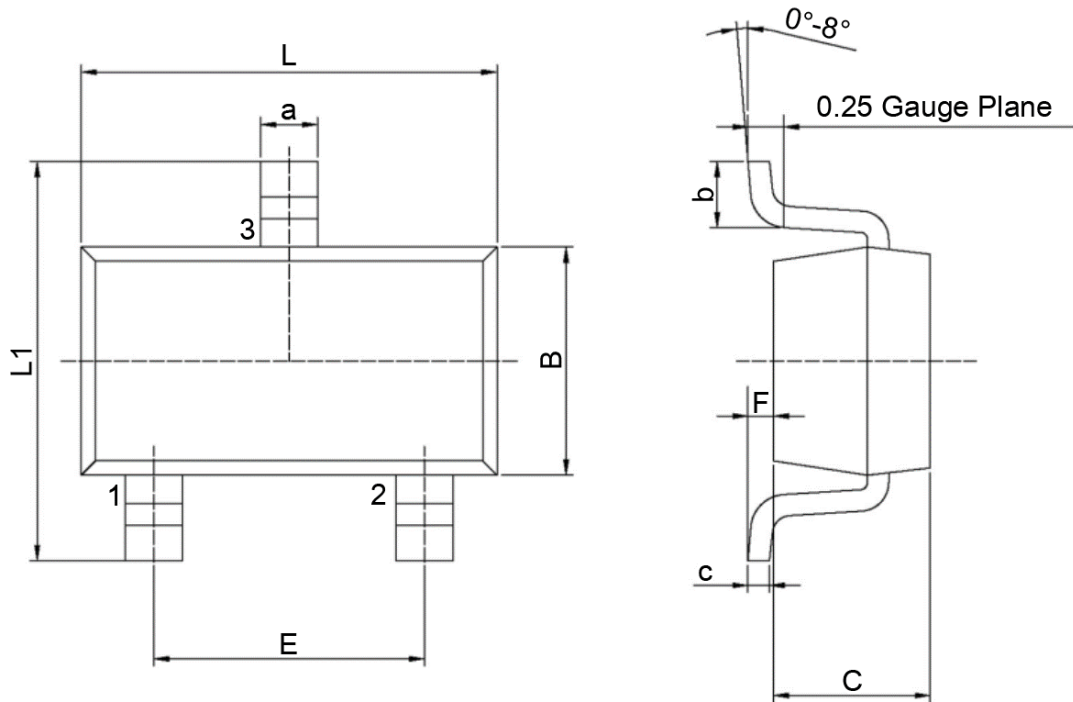


BLOCK DIAGRAM



**PACKAGE INFORMATION**

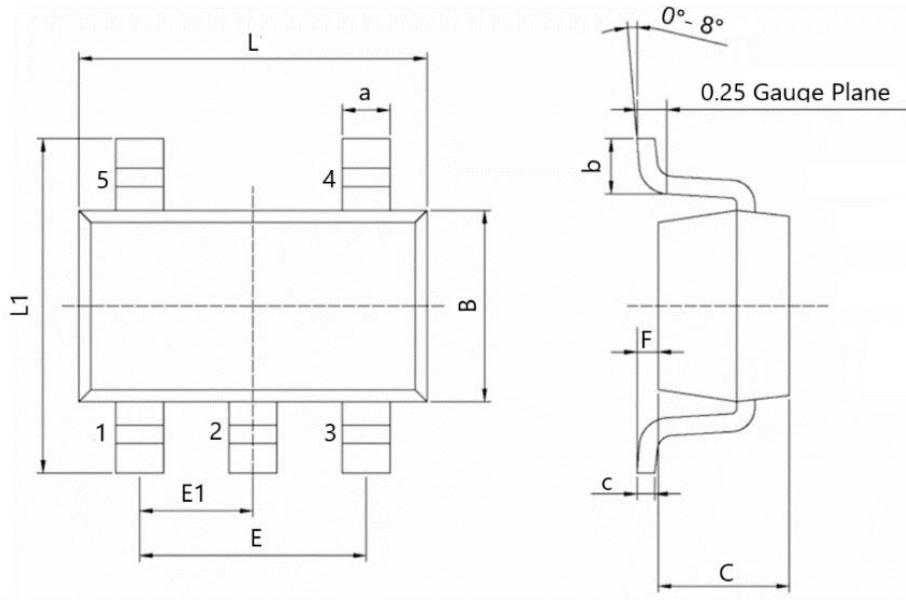
Dimension in SOT-23 (Unit: mm)



Symbol	MILLIMETERS	
	Min.	Max.
a	0.350	0.500
B	1.500	1.700
b	0.350	0.550
C	0.900	1.300
c	0.100	0.200
E	1.800	2.000
F	0	0.150
L	2.820	3.020
L1	2.600	3.000



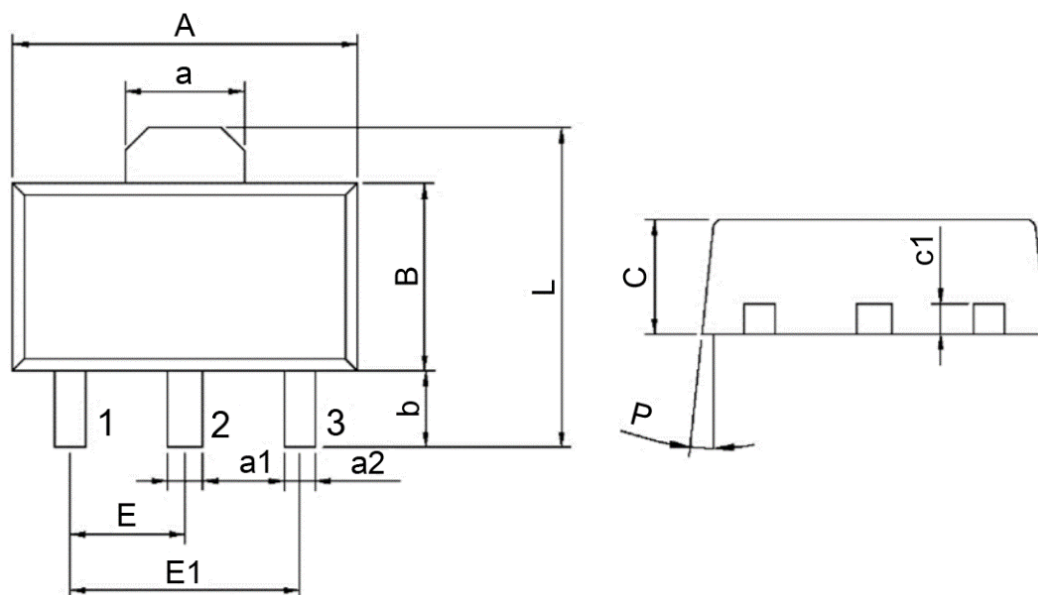
Dimension in SOT-25 (Unit: mm)



Symbol	Min.	Max.
a	0.350	0.500
B	1.500	1.700
b	0.350	0.550
C	0.900	1.300
c	0.100	0.200
E	1.800	2.000
E1	0.850	1.050
F	0.000	0.150
L	2.820	3.020
L1	2.600	3.000



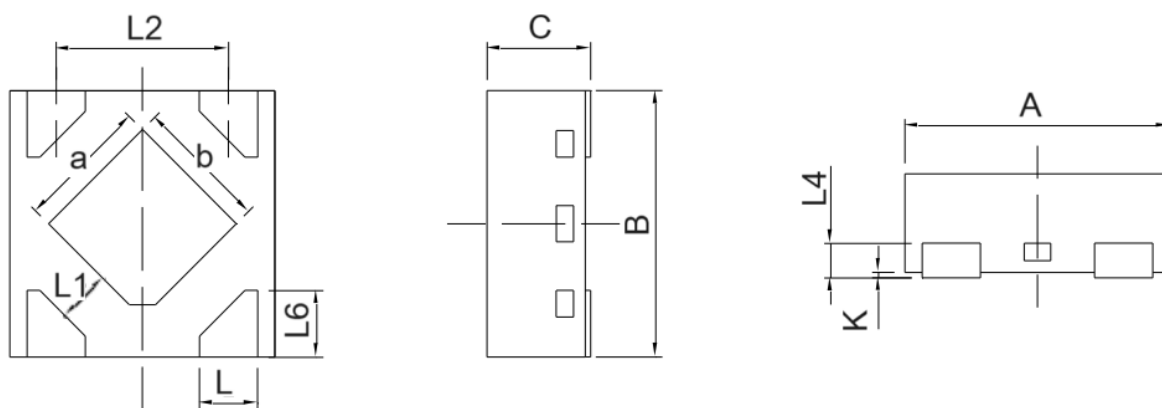
Dimension in SOT89-3 (Unit: mm)



Symbol	Millimeters	
	Min	Max
A	4.400	4.700
a	1.450	1.650
a1	0.360	0.560
a2	0.300	0.500
B	2.350	2.650
b	0.800	1.200
C	1.400	1.700
c1	0.350	0.500
E	1.400	1.600
E1	2.800	3.200
L	3.878	4.478
P	6°	



Dimension in DFN4 (1x1) (Unit: mm)



Symbol	Min.	Max.
A	0.950	1.050
a	0.430	0.530
B	0.950	1.050
b	0.430	0.530
C	0.340	0.400
K	0.000	0.050
L	0.170	0.270
L1	0.150	-
L2	0.650 TYP.	
L4	0.100 TYP.	
L6	0.200	0.300

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