



DESCRIPTION

The A6250C series are highly precise, low power consumption, positive voltage regulators manufactured using CMOS and laser trimming technologies. The series provides large currents with a significantly small dropout voltage.

The A6250C consists of a current limiter circuit, a driver transistor, a precision reference voltage and an error correction circuits. The A6250C is compatible with low ESR ceramic capacitors. The current limiter's foldback circuit operates as a short circuit protection as well as the output current limiter for the output pin. Output voltages are internally by laser trimming technologies. It is selectable in 0.1V increments within a range 1.2V to 5.0V.

The A6250C is available in SOT89-3 and SOT-23 packages.

ORDERING INFORMATION

Package Type	Part Number	
SOT89-3 SPQ: 1,000pcs/Reel	K3	A6250CK3R-XX
		A6250CK3VR-XX
SOT-23 SPQ: 3,000pcs/Reel	E3	A6250CE3R-XX
		A6250CE3VR-XX
Note	XX: Output Voltage 30=3.0V; 33=3.3V V: Halogen free Package R: Tape & Reel	
	AiT provides all RoHS products	

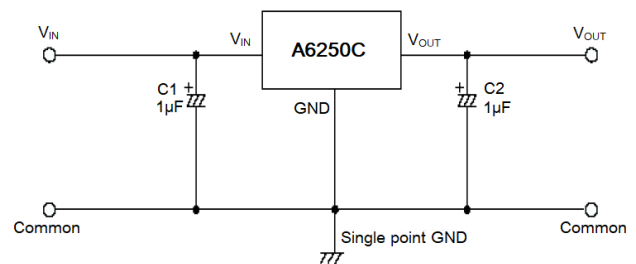
FEATURES

- Maximum output current: 250mA ($V_{IN} \geq V_{OUT} + 1V$)
- Dropout voltage: 160mV @ 50mA (3.0V type)
- Output voltage range: 1.2V to 5.0V (selectable in 100mV steps)
- Highly optional accurate: $\pm 2\%$
- Low power consumption: 2 μ A (TYP.)
- Internal protector current limiter and short protector
- Available in SOT89-3 and SOT-23 packages

APPLICATION

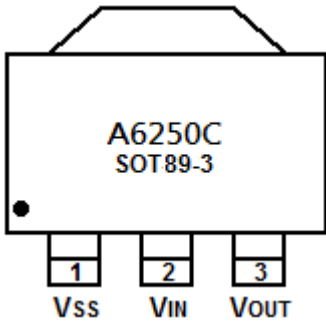
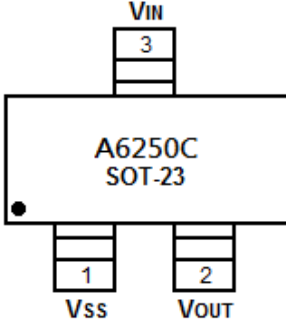
- Smart phones/Mobile phones
- Portable game consoles
- Digital still cameras/Camcorders
- Digital audio equipments
- Reference voltage sources
- Multi-function power supplies

TYPICAL APPLICATION





PIN DESCRIPTION

 Top View		 Top View	
Pin #		Symbol	Function
SOT89-3	SOT-23		
1	1	V _{SS}	Ground
2	3	V _{IN}	Input
3	2	V _{OUT}	Output



ABSOLUTE MAXIMUM RATINGS

V_{IN} , Input Voltage	$V_{SS}-0.3V \sim V_{SS}+6V$	
V_{OUT} , Output Current	$V_{SS}-0.3V \sim V_{IN} +0.3V$	
P_D , Power Dissipation	SOT-23	250mW
	SOT89-3	500mW
T_{OPR} , Operating Ambient Temperature	$-40^{\circ}C \sim 85^{\circ}C$	
T_{STG} , Storage Temperature	$-40^{\circ}C \sim 125^{\circ}C$	

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.

ELECTRICAL CHARACTERISTICS

$V_{IN}=4.0V, V_{OUT}=3.0V, T=25^{\circ}C$

Parameter	Symbol	Conditions		Min	Typ.	Max	Unit	Circuit	
Output Voltage	V _{OUT(E)1}	V _{IN} =V _{OUT(S)} +1.0V, I _{OUT} =1mA, ± 2%		V _{OUT(S)} ×0.98	V _{OUT(S)}	V _{OUT(S)} ×1.02	V	1	
		V _{IN} =V _{OUT(S)} +1.0V, I _{OUT} =1mA, ± 1%		V _{OUT(S)} ×0.99	V _{OUT(S)}	V _{OUT(S)} ×1.01			
Output Current	I _{OUT}	V _{IN} ≥V _{OUT(S)} +1.0V		250 *1	-	-	mA	1	
Dropout Voltage	V _{drop}	I _{OUT} = 50mA	1.5V ≤V _{OUT(S)} ≤2.5V	-	0.20	0.28	V	1	
			2.6V ≤V _{OUT(S)} ≤3.3V	-	0.16	0.24			
			3.4V ≤V _{OUT(S)} ≤5.0V	-	0.12	0.20			
Line Regulations	$\frac{\Delta V_{OUT1}}{\Delta V_{IN} \times V_{OUT}}$	V _{OUT(S)} +0.5V ≤V _{IN} ≤5.5V I _{OUT} =1mA		-	0.05	0.2	%/V		
Input Voltage	ΔV _{OUT2}	V _{IN} =V _{OUT(S)} +1.0V 1.0mA ≤ I _{OUT} ≤50mA		-	20	40	mV		
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	V _{IN} =V _{OUT(S)} +1.0V, I _{OUT} =10mA -40°C ≤T _A ≤85°C		-	±100	-	ppm /°C		
Supply Current	I _{SS1}	V _{IN} =V _{OUT(S)} +1.0 V		-	2	-	uA		2
Input Voltage	V _{IN}			1.8	-	6	V	-	
Ripple-Rejection	RR	V _{IN} =V _{OUT(S)} +1.0V , f=1.0kHz V _{RIP} =0.5V _{rms} , I _{OUT} =10mA		-	40	-	dB	1	
Short current	I _{SHORT}	V _{IN} =V _{OUT(S)} +1.5V		-	30	-	mA	1	
Current Limiter	I _{LIM}	V _{IN} =V _{OUT(S)} +1.5V		-	380	-	mA	1	

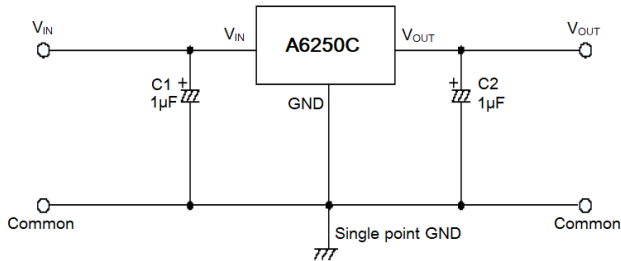
NOTE: Lower input voltage and the output voltage, maximum output current will decrease. Example:

$$I_{OUT(max)}=150mA @ (V_{IN}=2.5V, V_{OUT}=1.5V)$$

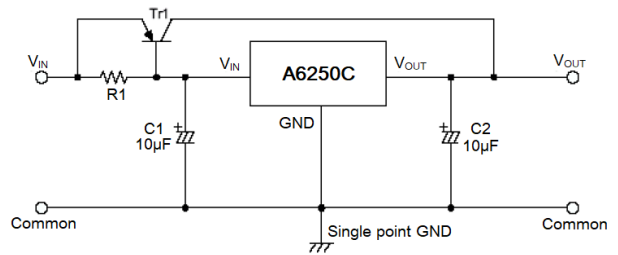


TYPICAL PERFORMANCE CHARACTERISTICS

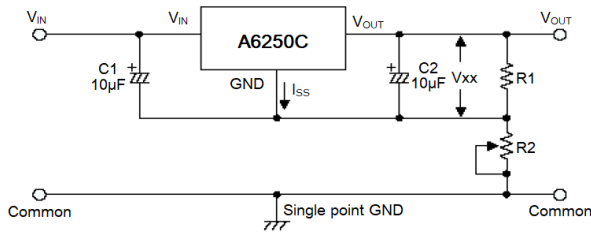
1. Basic circuit



2. High output current positive voltage regulator

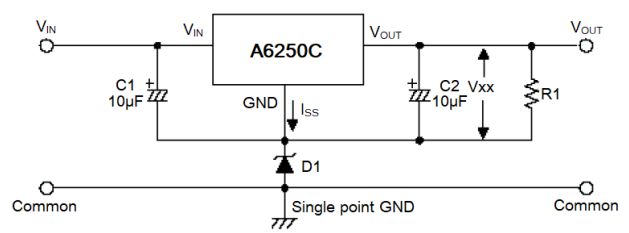


3. Circuit for increasing output voltage



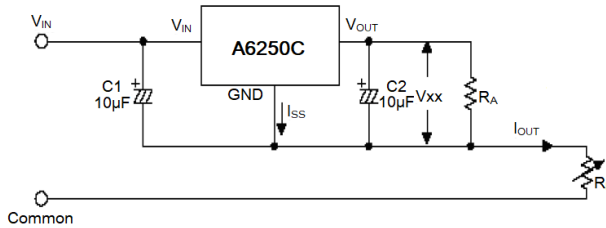
$$V_{OUT} = V_{XX} \left(1 + \frac{R_1}{R_2} \right) + I_{SS} R_2$$

4. Circuit for increasing output voltage



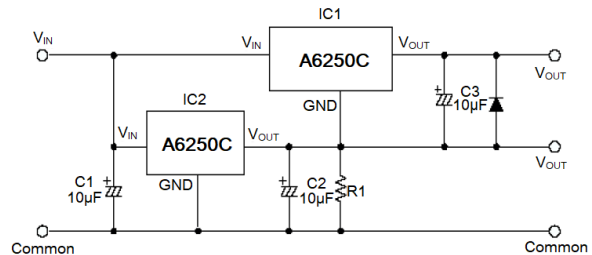
$$V_{OUT} = V_{XX} + V_{D1}$$

5. Constant current regulator



$$I_{OUT} = \frac{V_{XX}}{R_A} + I_{SS}$$

6. Dual supply



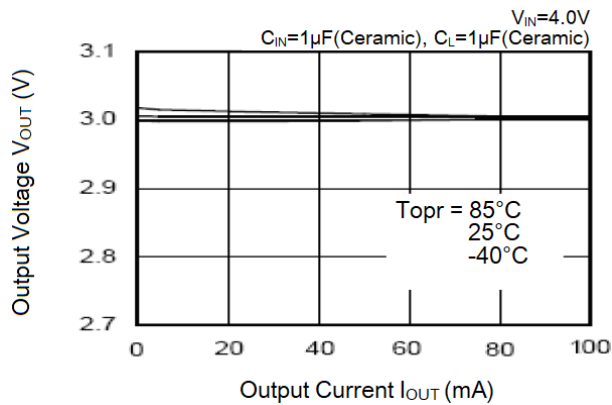
NOTE: The above connection diagram and constant will not guarantee successful operation. Perform thorough evaluation using the actual application to set the constant.



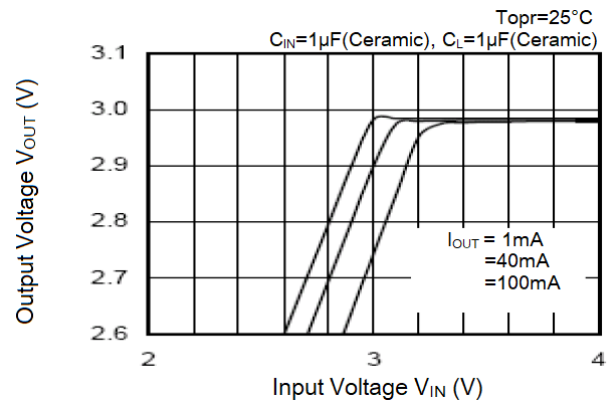
TYPICAL PERFORMANCE CHARACTERISTICS

3.0V output

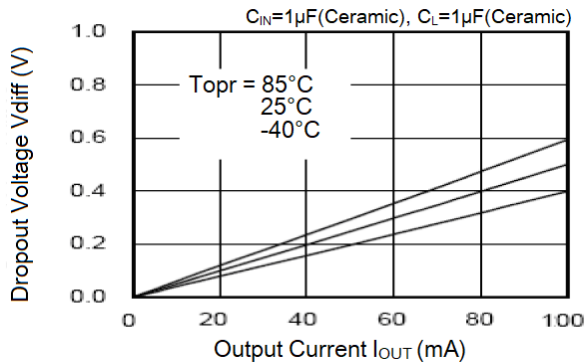
1. Output Voltage vs. Output Current



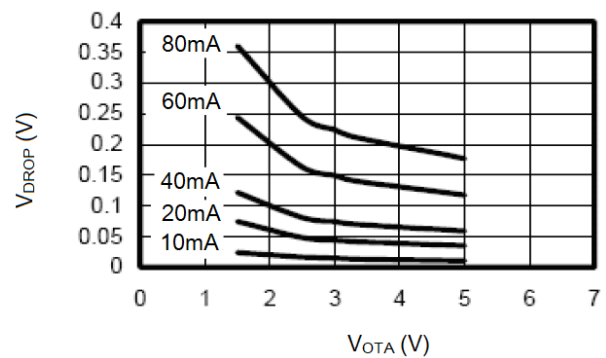
2. Output Voltage vs. Input Voltage



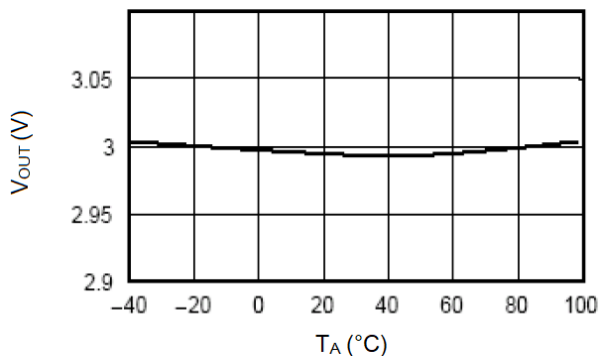
3. Dropout Voltage vs. Output Current



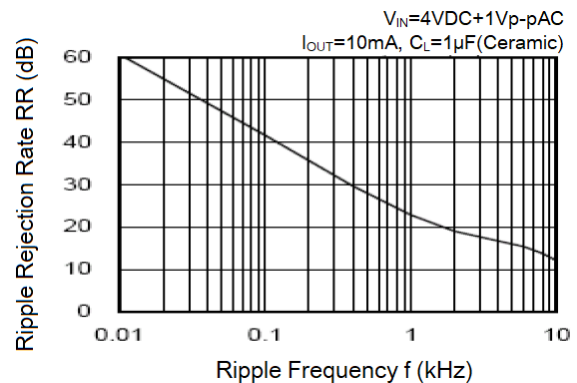
4. Dropout Voltage vs. Output Voltage



5. Output Voltage vs. Ambient Temperature



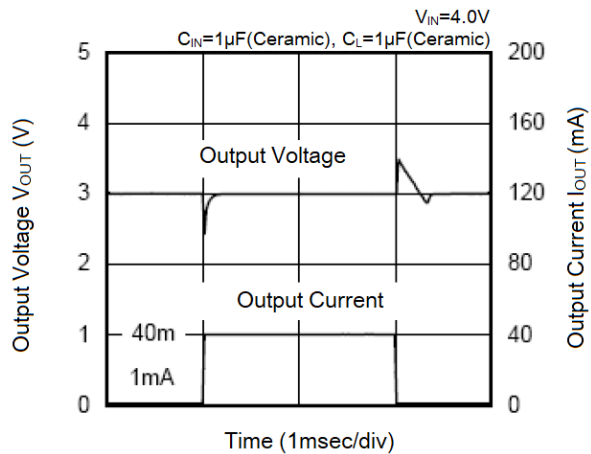
6. Ripple Rejection Rate



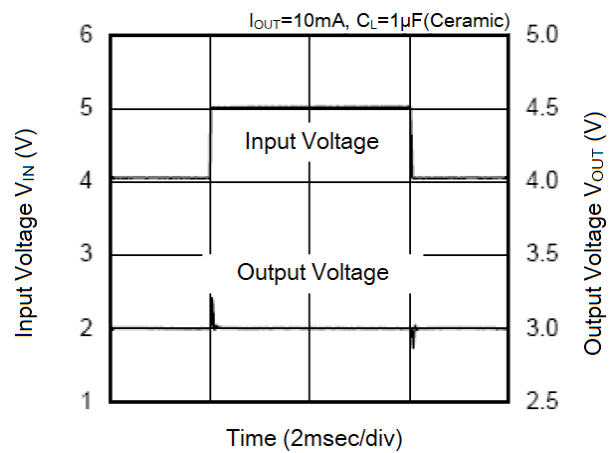


7. Transient Response

Input Transient Response

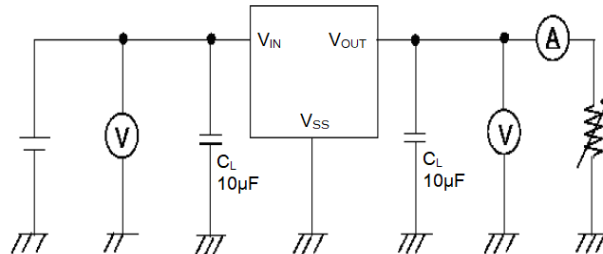


Load Transient Response

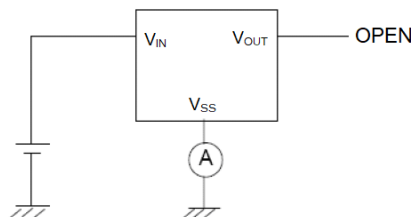


TEST CIRCUIT

1. Circuit 1



2. Circuit 2



APPLICATION CONDITIONS

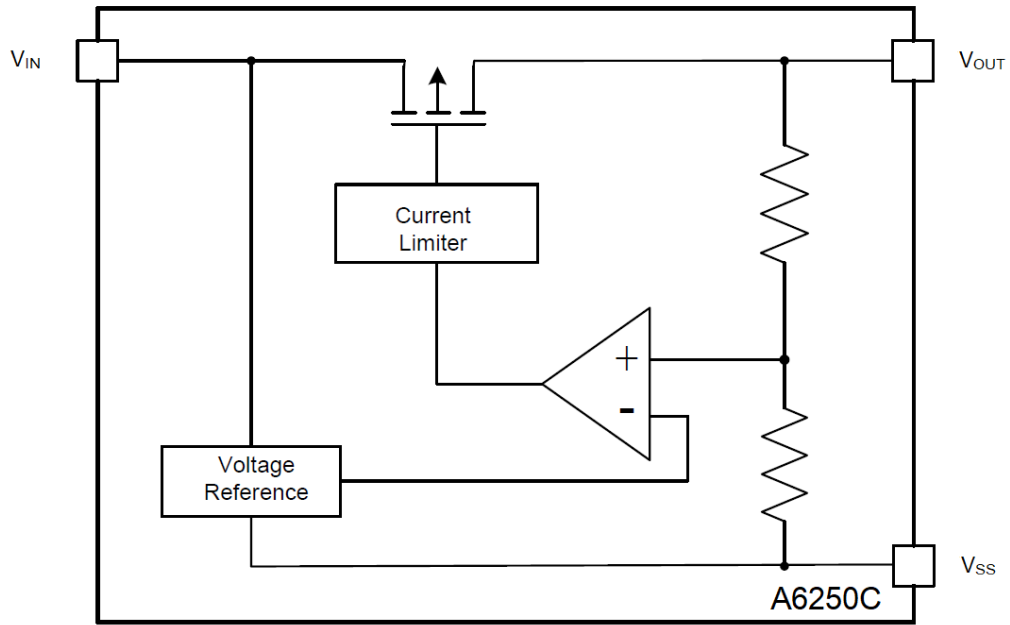
Input capacitor (C_{IN}): 1.0 μF or more

Output capacitor (C_L): 0.1 μF or more (tantalum capacitor)

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.



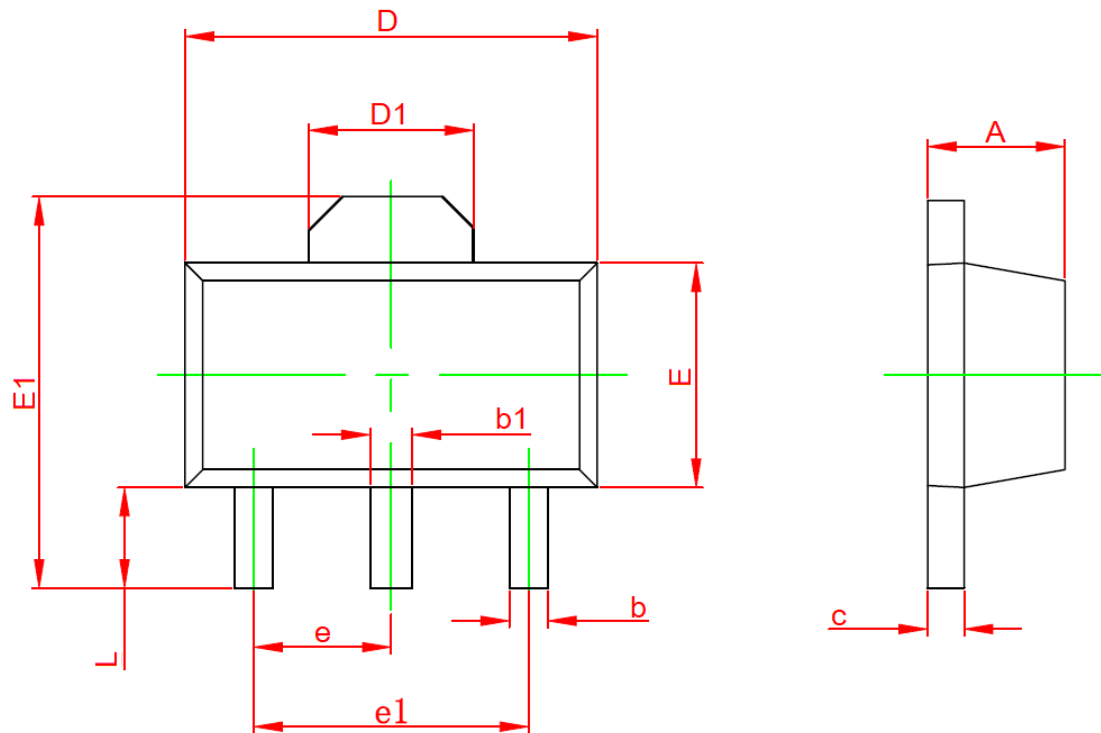
BLOCK DIAGRAM





PACKAGE INFORMATION

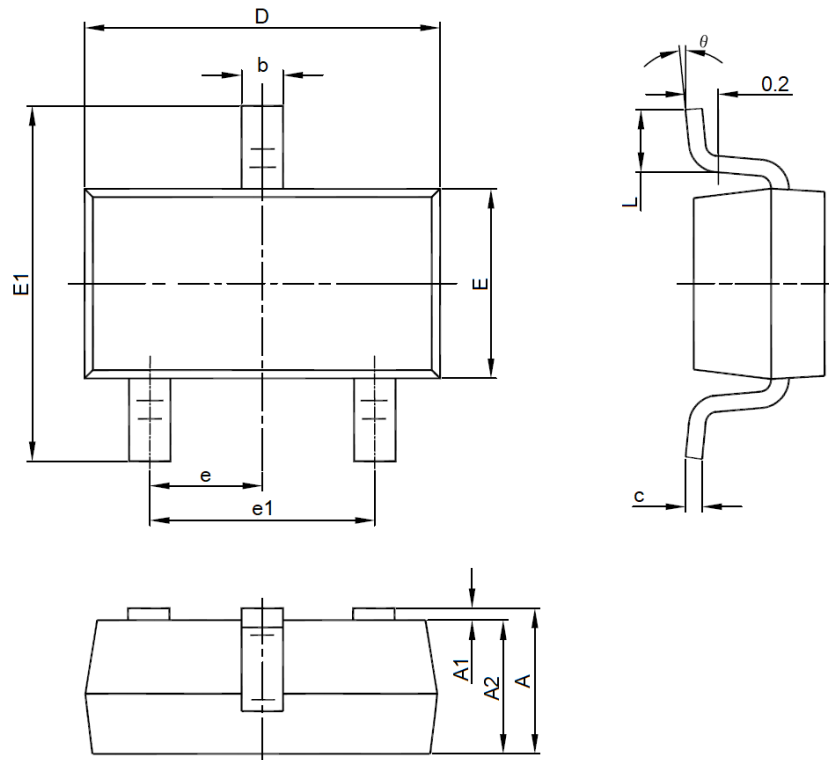
Dimension in SOT89-3 (Unit: mm)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.197
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060 TYP	
e1	3.000 TYP		0.188 TYP	
L	0.900	1.200	0.035	0.047



Dimension in SOT-23 (Unit: mm)



Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
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	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



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