DESCRIPTION

A6500A is a positive voltage output, low power consumption, low dropout voltage regulator.

A6500A can provide output value in the range of 0.9V~4.5V every 0.1V step under a wide input voltage ranging from 2.0V to 6V.

A6500A includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

A6500A has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And A6500A uses trimming technique to guarantee output voltage accuracy within ±2%.

A6500A is available in SOT-23, SOT-25, SC70-5, DFN4(1x1) and DFN4(1.2x1.6) packages.

ORDERING INFORMATION

Package Type	Part Number	
SOT-23 SPQ: 3,000pcs/Reel	E3	A6500AE3R-XX
		A6500AE3VR-XX
SOT-25 SPQ: 3,000pcs/Reel	E5	A6500AE5R-XX
		A6500AE5VR-XX
SC70-5 SPQ: 3,000pcs/Reel	C5	A6500AC5R-XX
		A6500AC5VR-XX
DFN4(1x1) SPQ: 5,000pcs/Reel	J4	A6500AJ4R-XX
		A6500AJ4VR-XX
DFN4(1.2x1.6) SPQ: 5,000pcs/Reel	J4B	A6500AJ4BR-XX
		A6500AJ4BVR-XX
Note	XX: Output Voltage 18=1.8V, 28=2.8V, 33=3.3V V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		

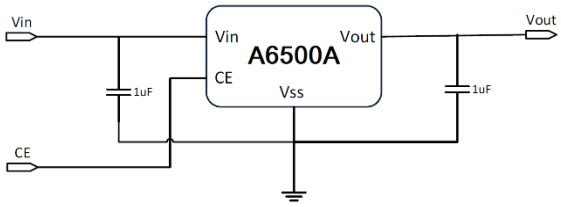
FEATURES

- Output voltage range: 0.9V~4.5V (customized on command every 0.1V step)
- Low power consumption: 80uA (Typ.)
- Shutdown mode: 0.1uA
- Low dropout voltage: 65mV@100mA @ V_{OUT} =3.3V(Typ.)
- High ripple rejection:70dB@1KHz (Typ.)
- Low temperature coefficient ± 100ppm/ ℃ Excellent line regulation: 0.05%/V
- Build-in chip enable and discharge circuit.
- Highly accurate: ±2%
- Output current limit

APPLICATIONS

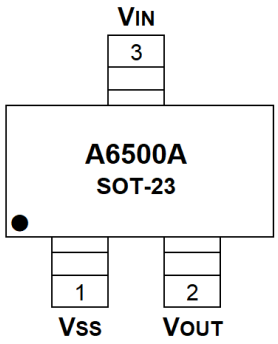
- Power source for cellular phones and various kind of PCSs
- Battery Powered equipment.
- Power Management of MP3, PDA, DSC, Mouse, PS2 Games
- Voltage Reference
- Regulation after Switching Power

TYPICAL APPLICATION

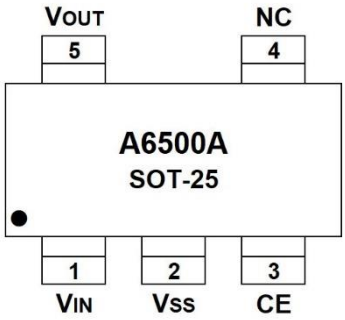


NOTE: Input capacitor (C_{IN} =1uF) and Output capacitor (C_{OUT} =1uF) are recommended in all application circuit.

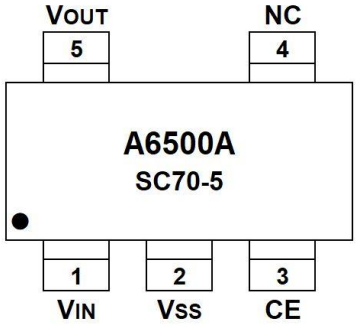
PIN DESCRIPTION



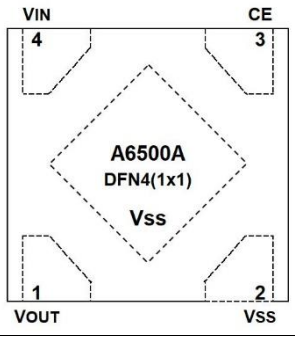
SOT-23, E3
Top View



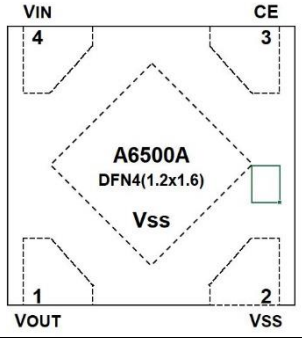
SOT-25, E5
Top View



SC70-5, C5
Top View



DFN4(1x1), J4
Top View



DFN4(1.2x1.6), J4B
Top View

Pin #					Symbol	Function
SOT-23	SOT-25	SC70-5	DFN4 (1x1)	DFN4 (1.2x1.6)		
1	2	2	2, Thermal Pad	2, Thermal Pad	V_{SS}	Ground.
2	5	5	1	1	V_{OUT}	Output Voltage.
3	1	1	4	4	V_{IN}	Supply Voltage Input.
					GND	Ground.
	3	3	3	3	CE	Chip Enable.
	4	4			NC	No Connection.

ABSOLUTE MAXIMUM RATINGS

Max Input Voltage		+8V
Operating Junction Temperature (Tj)		125℃
Output Current		500mA
Ambient Temperature (Ta)		-40℃ ~ +85℃
Power Dissipation	SOT-23	400mW
	SOT-25	400mW
	SC70-5	250mW
	DFN4(1x1)	600mW
	DFN4(1.2x1.6)	800mW
Storage Temperature (Ts)		-40℃ ~ +150℃
Lead Temperature & Time		260℃,10S
ESD(HBM)		>2000V

Stresses above 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 in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Note:

Heat Sink Area of PCB for DFN4(1x1) and DFN4(1.2x1.6) is recommended at least 2.5mmx4mm.

Exceed these limits to damage to the device.

Exposure to absolute maximum rating conditions may affect device reliability.

RECOMMENDED OPERATION RANGE

Parameters	Value
Input Voltage Range	2V ~ 6V
Ambient Temperature*	-40℃ ~ +85℃

*The operation ambient temperature range is verified on several test samples. Not a test condition for volume production whose test is only performed under 25℃

ELECTRICAL CHARACTERISTICS

C_{IN} =1uF, C_{OUT} =1uF, T_A =25℃, unless otherwise specified.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input Voltage	V_{IN}		2.0	-	6.0	V
Output Voltage, V_{OUT}>1.5V	V_{OUT}	V_{IN} = Set V_{OUT} +1V, 1mA≤ I_{OUT}≤ 30mA	V_{OUT} X0.98	V_{OUT}	V_{OUT} X1.02	V
Output Voltage, V_{OUT}<=1.5V			V_{OUT} -0.03		V_{OUT} +0.03	
Maximum Output Current	$I_{OUT(MAX.)}$	V_{IN} – V_{OUT}=1V	300	-	-	mA
Dropout Voltage, V_{OUT}≥2.8V	$Vdrop^1$	I_{OUT} =100mA	-	65	100	mV
		I_{OUT} =300mA	-	195	300	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} X V_{OUT}}$	I_{OUT} =40mA 2.8V≤ V_{IN}≤ 6V	-	0.05	0.2	%/V
Load Regulation	ΔV_{OUT}/ I_{OUT}	V_{IN} = Set V_{OUT} +1V, 1mA≤ I_{OUT}≤ 300mA	-	50	80	mV
Supply Current	I_{ss}	V_{IN} = Set V_{OUT} +1V	-	80	-	μA
Supply Current (Standby)	$I_{standby}$	V_{IN} = Set V_{OUT} +1V, V_{CE}= V_{SS}	-	0.1	1.0	μA
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T X V_{OUT}}$	I_{OUT} =30mA	-	±100	-	ppm/℃
Ripple Rejection	PSRR	F =1KHz, Ripple=0.5Vp-p V_{IN} = Set V_{OUT} +1V	-	70	-	dB
Current Limit	I_{LIMIT}		500	-	-	mA
CE Input Voltage “H”	V_{CEH}		1.0	-	V_{IN}	V
CE Input Voltage “L”	V_{CEL}		-	-	0.5	V
Discharge Resistor	Rdischarge	CE=0, Vout =3.0V	-	1.5K	-	ohm
CE pin pull down resistor	R_{CEPD}	CE=Vin=5V	-	500K	-	

NOTE:

V_{drop}= V_{IN} 1-(V_{OUT} 2*0.98) V_{OUT} 2 is the output voltage when V_{IN} = V_{OUT} 1 +1.0V and I_{OUT} =300mA.

Vin1 is the input voltage at which the output voltage becomes 98% of V_{OUT} 1 after gradually decreasing the input voltage.

TYPICAL PERFORMANCE CHARACTERISTICS

Fig.1 Load Regulation (V_{IN} =5V)

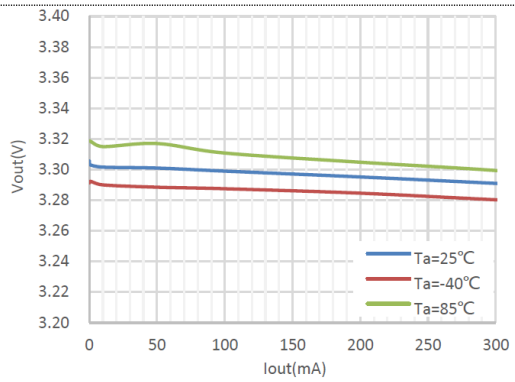


Fig.2 Line Regulation (I_{OUT} =10mA)

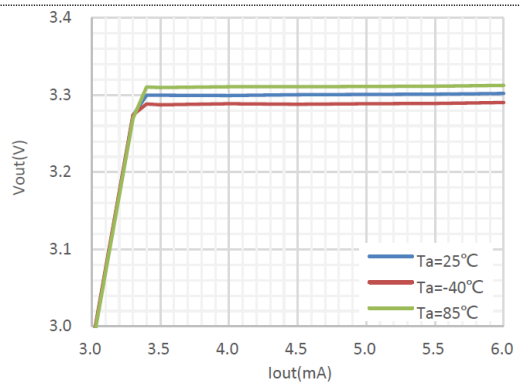


Fig.3 Dropout Voltage (V_{OUT} =3.3V)

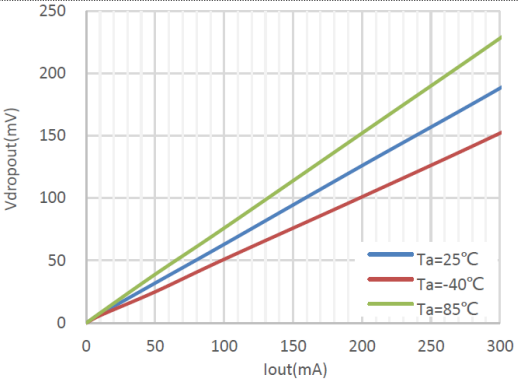


Fig.4 I_Q (V_{OUT} =3.3V)

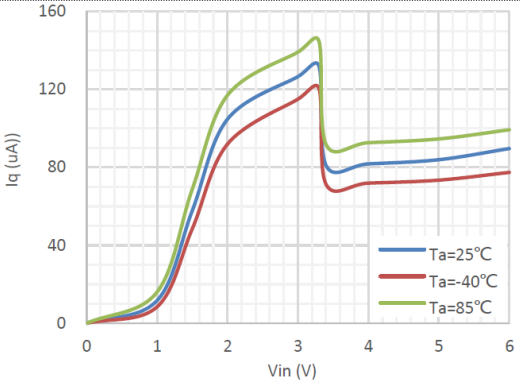


Fig.5 Current Limit

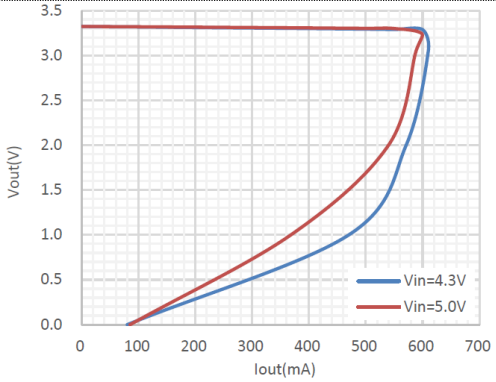


Fig.6 PSRR

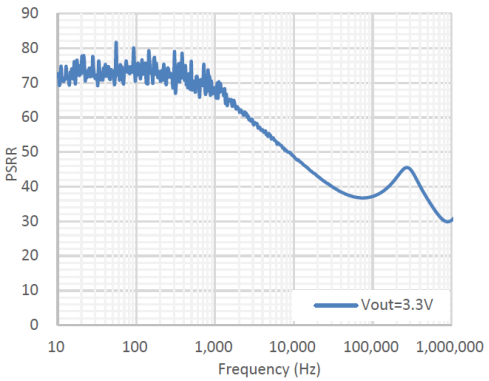


Fig.7 V_{OUT} vs Temp (V_{IN} =5V, I_{OUT} =10mA)

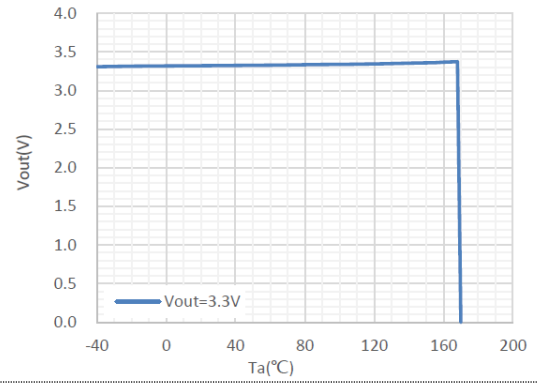


Fig.8 Load Transient Response

(V_{IN} =5V, V_{OUT}=3.3V, I_{OUT}=10-300mA, T_{RISE}=10uS)

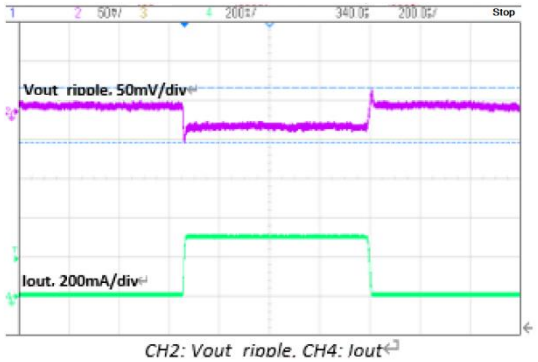


Fig.9 CE Chip Enable Response

(CE =0V~5V, V_{IN}=5V, V_{OUT}=3.3V, I_{OUT}=300mA)

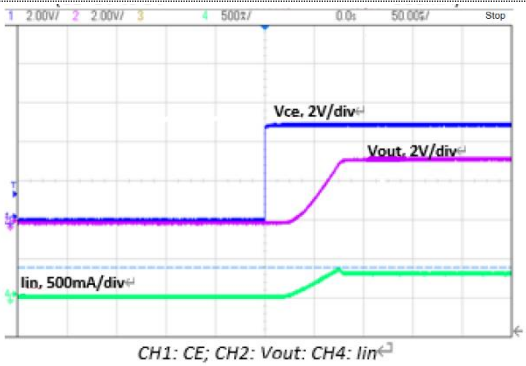
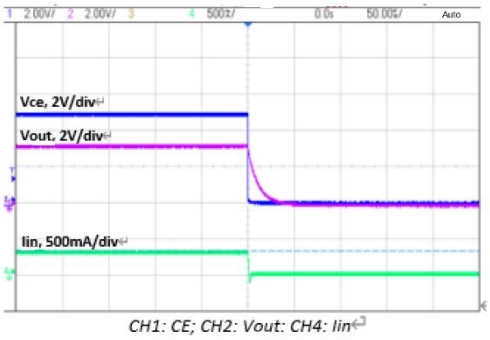
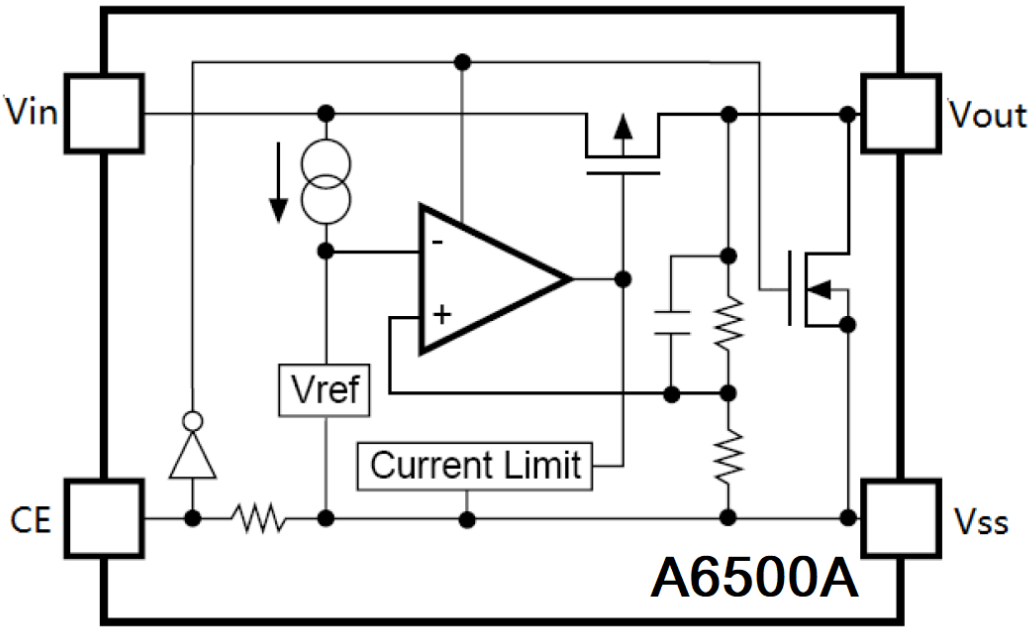


Fig.10 CE Chip Enable Response

(CE =5V~0V, V_{IN}=5V, V_{OUT}=3.3V, I_{OUT}=300mA)

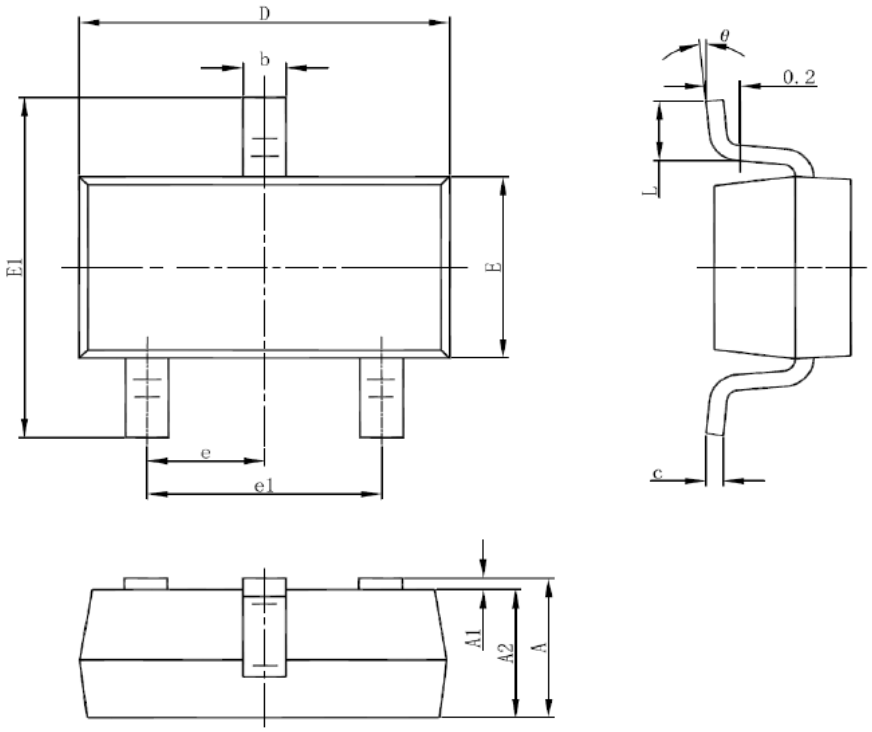


BLOCK DIAGRAM



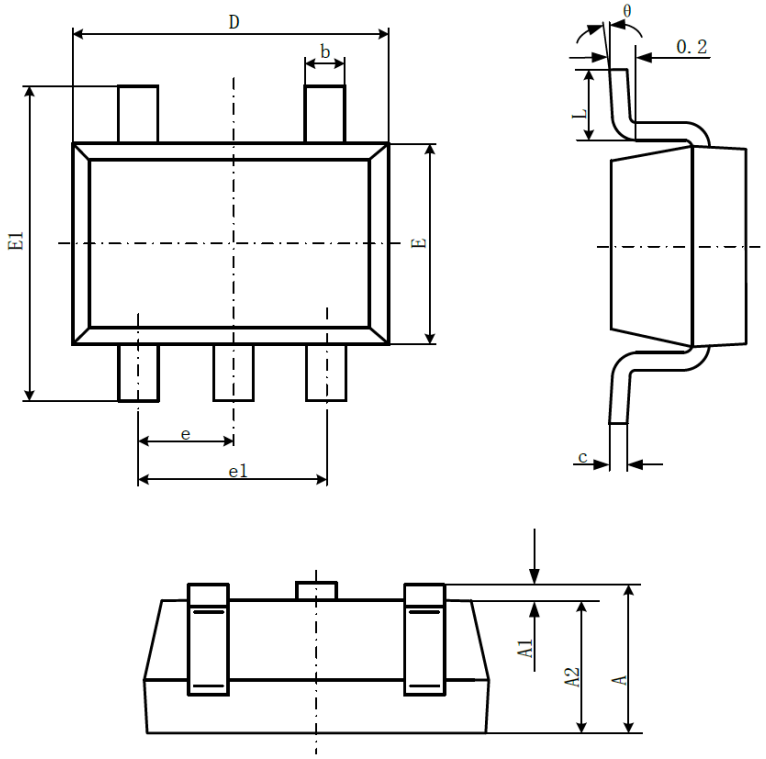
PACKAGE INFORMATION

Dimension in SOT-23 (Unit: mm)



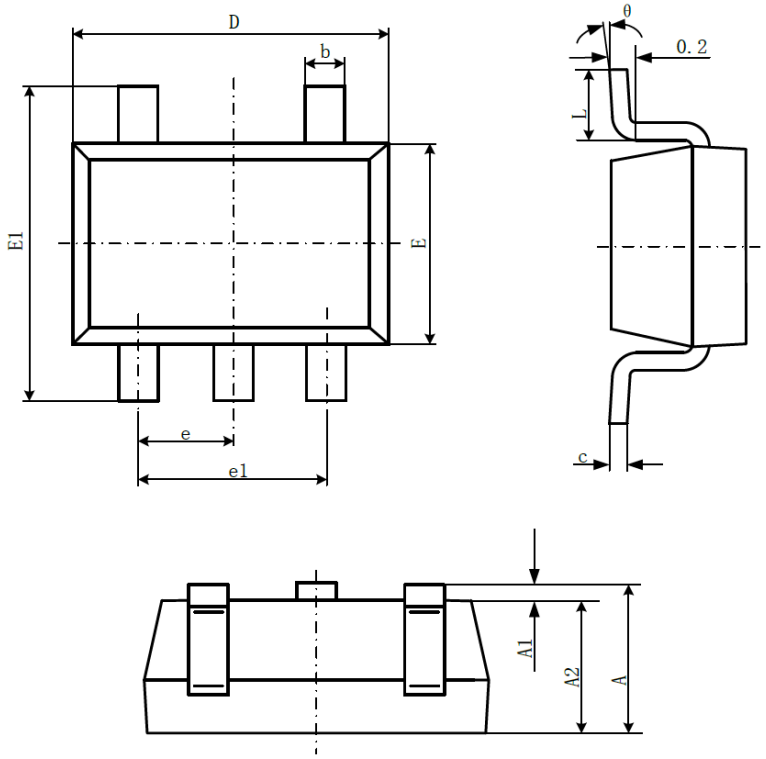
Symbol	MILLIMETERS	
	Min.	Max.
A	1.100	1.300
A1	0.000	0.140
A2	1.100	1.160
b	0.300	0.500
c	0.100	0.200
D	2.820	3.020
E	1.5000	1.700
E1	2.650	2.950
e	0.950(BSC)	
e1	1.900(BSC)	
L	0.300	0.600
θ	0°	8°

Dimension in SOT-25 (Unit: mm)



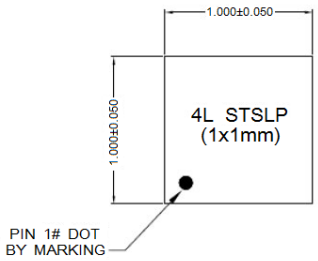
Symbol	MILLIMETERS	
	Min.	Max.
A	1.100	1.300
A1	0.000	0.100
A2	0.700	0.900
b	0.300	0.500
c	0.145	0.250
D	2.700	3.100
E	1.500	1.800
E1	2.500	3.100
e	0.950(BSC)	
e1	1.900(BSC)	
L	0.300	0.600
θ	0°	8°

Dimension in SC70-5 (Unit: mm)

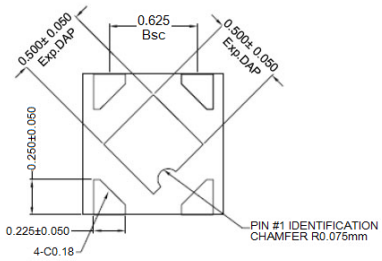


Symbol	MILLIMETERS	
	Min.	Max.
A	0.800	1.100
A1	0.000	0.100
A2	0.800	1.000
b	0.150	0.400
c	0.080	0.260
D	2.000	2.050
E	1.150	1.350
E1	1.800	2.450
e	0.650 BSC	
e1	1.300 BSC	
L	0.210	0.460
θ	0°	8°

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



TOP WIEW

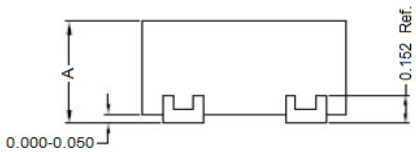


BOTTOM VIEW

NOTE:

1) 'A' DIMENSION AS BELOW TABLE

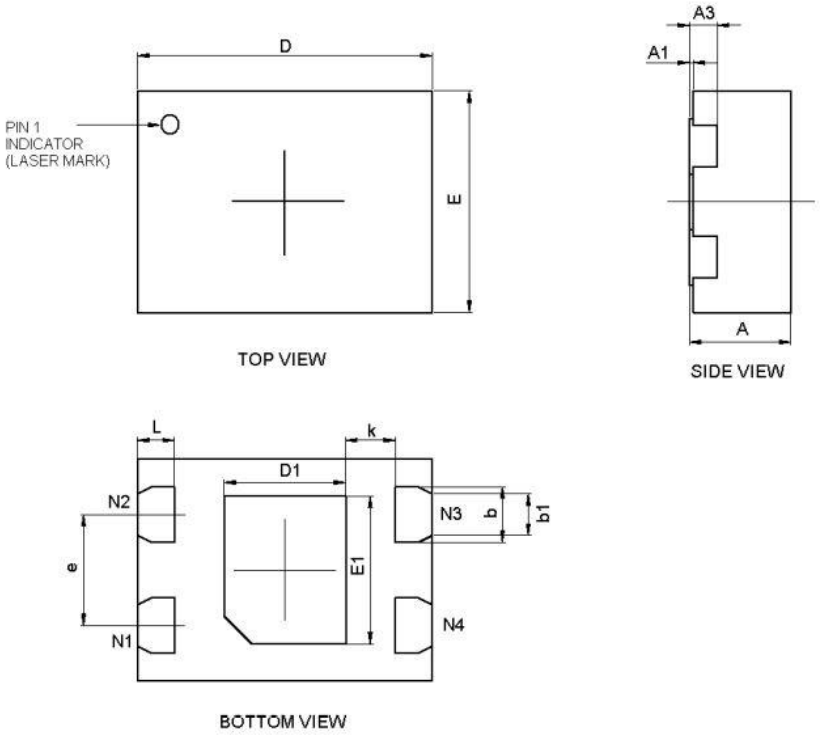
		STSLP
A	MAX.	0.600
	NOM.	0.550
	MIN.	0.500



SIDE VIEW

Symbol	MILLIMETERS	
	Min.	Max.
A	0.50	0.60
A1	0.00	0.05
A3	0.152 REF	
b	0.18	0.28
D	0.95	1.05
E	0.95	1.05
D2	0.45	0.55
E2	0.45	0.55
L	0.20	0.30
e	0.625 BSC	

Dimension in DFN4 (1.2x1.6) (Unit: mm)



Symbol	Dimensions In Millimeters	
	Min	Max
A	0.500	0.600
A1	0.000	0.050
A3	0.152 (TYP)	
D	1.500	1.700
E	1.100	1.300
D1	0.560	0.760
E1	0.700	0.900
b	0.250	0.350
b1	0.175	0.275
e	0.600 (TYP)	
L	0.150	0.250
k	0.200 (TYP)	

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