



## DESCRIPTION

A6303 series is a group of positive voltage output, low power consumption, low dropout voltage regulator.

A6303 can provide output value in the range of 1.0V~4.5V every 0.1V step. It also can be customized on command. A6303 can also work under a wide input voltage ranging from 2.0V to 6V.

A6303 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

A6303 has excellent load and line transient response and good temperature characteristics, which can assure the stability of chip and power system. And it uses trimming technique to guarantee output voltage accuracy within  $\pm 2\%$ .

The A6303 is available in SOT-25, SC70-5 and DFN4(1x1) packages.

## ORDERING INFORMATION

Package Type	Part Number	
SOT-25 SPQ: 3,000pcs/Reel	E5	A6303E5R-XXA
		A6303E5VR-XXA
SC70-5 SPQ: 3,000pcs/Reel	C5	A6303C5R-XX
		A6303C5VR-XX
DFN4(1x1) SPQ: 5,000pcs/Reel	J4	A6303J4R-XX
		A6303J4VR-XX
Note	XX: Output Voltage A: Type A V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS free products		

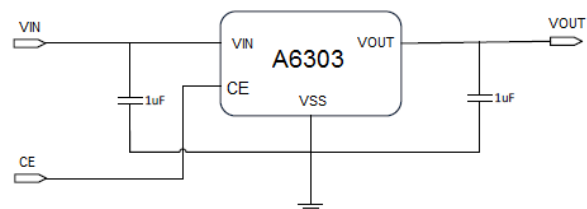
## FEATURES

- Output voltage range: 1.0V~4.5V (customized on command every 0.1V step)
- Low power consumption: 35uA (Typ.)
- Low output noise (47uVRMS)
- Shutdown mode: 0.1uA
- Low dropout voltage: 300mV@300mA (Typ.)
- High ripple rejection: 70dB@1kHz (Typ.)
- Low temperature coefficient:  $\pm 100\text{ppm}/^\circ\text{C}$
- Excellent line regulation: 0.05%/V
- Build-in 1.5k discharge resistor when CE low
- Highly accurate:  $\pm 2\%$
- Output current limit
- Fold-back output short circuit protection
- Available in SOT-25, SC70-5 and DFN4(1x1) packages

## APPLICATION

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

## TYPICAL APPLICATION



NOTE: Input capacitor ( $C_{IN}=1\mu\text{F}$ ) and Output capacitor ( $C_{OUT}=1\mu\text{F}$ ) are recommended in all application circuit.



**PIN DESCRIPTION**

<p>Top View</p>			<p>Top View</p>			<p>Top View</p>		
Pin #			Symbol	Function				
SOT-25	SC70-5	DFN4(1x1)						
2	2	2	V <sub>SS</sub>	Ground Pin				
1	1	4	V <sub>IN</sub>	Supply Voltage Input				
5	5	1	V <sub>OUT</sub>	Output Voltage				
3	3	3	CE	Chip Enable				
4	4	-	NC	No Connection				



## ABSOLUTE MAXIMUM RATINGS

Max Input Voltage		8V
T <sub>J</sub> , Operating Junction Temperature		125°C
Output Current		300mA
T <sub>A</sub> , Ambient Temperature		-40°C ~85°C
Power Dissipation	SOT-23	250mW
	SOT-25	250mW
	SC-70-5	250mW
	DFN4(1x1)	600mW
	DFN4(1.2x1.6)	800mW
T <sub>s</sub> , Storage Temperature		-40°C ~150°C
Lead Temperature & Time		260°C, 10s

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.

NOTE1: Heat Sink Area of PCB for DFN4(1x1) is recommended at least 2.5mmx4mm

## RECOMMENDED OPERATING CONDITIONS

Parameter	MIN	MAX	Units
Input Voltage Range	2	6	V
Ambient Temperature <sup>NOTE2</sup>	-40	85	°C

NOTE2: 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°C.



## ELECTRICAL CHARACTERISTICS

Test Conditions:  $C_{IN}=1\mu F$ ,  $C_{OUT}=1\mu F$ ,  $T_A=25^\circ C$ , unless otherwise noted.

A6303, For Arbitrary Output Voltage

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Input Voltage	$V_{IN}$		2	-	6	V
Output Voltage	$V_{OUT}$	$V_{IN}=\text{Set } V_{OUT}+1V$ $1mA \leq I_{OUT} \leq 30mA$	$V_{OUT} > 1.5V$	$V_{OUT} \times 0.98$	$V_{OUT} \times 1.02$	V
			$V_{OUT} \leq 1.5V$	$V_{OUT} - 0.03$	$V_{OUT} + 0.03$	
Max Output Current	$I_{OUT} (\text{Max})$	$V_{IN} - V_{OUT} = 1V$	300	-	-	mA
Dropout Voltage $V_{OUT} \geq 2.8V$	$V_{DROPNOTE3}$	$I_{OUT} = 100mA$	-	100	150	mV
		$I_{OUT} = 300mA$	-	300	400	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	$I_{OUT} = 40mA$ $2.8V \leq V_{IN} \leq 6V$	-	0.05	0.2	%/V
Load Regulation	$\Delta V_{OUT} / \Delta I_{OUT}$	$V_{IN} = \text{Set } V_{OUT} + 1V$ $1mA \leq I_{OUT} \leq 300mA$	-	50	80	mV
Supply Current	$I_{SS}$	$V_{IN} = \text{Set } V_{OUT} + 1V$	-	35	80	$\mu A$
Supply Current (Standby)	$I_{STANDBY}$	$V_{IN} = \text{Set } V_{OUT} + 1V$ , $V_{CE} = V_{SS}$	-	0.1	1.0	$\mu A$
Output Voltage Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T \times V_{OUT}}$	$I_{OUT} = 30mA$	-	$\pm 100$	-	ppm/ $^\circ C$
Ripple Rejection	PSRR	$f = 1kHz$ , Ripple = 0.5Vp-p $V_{IN} = \text{Set } V_{OUT} + 1V$	-	70	-	dB
Current Limit	$I_{LIM}$		300	-	-	mA
CE Input Voltage "H"	$V_{CEH}$		1.5	-	$V_{IN}$	V
CE Input Voltage "L"	$V_{CEL}$		0	-	0.25	V
Output Noise	EN	BW = 10Hz ~ 100kHz	-	47	-	$\mu V_{RMS}$
Discharge Resistor	$R_{discharge}$	CE = 0, $V_{OUT} = 3.0V$	-	1.5k	-	$\Omega$
CE pin pull down resistor	$R_{cepd}$	CE = $V_{IN} = 5V$	-	500k	-	$\Omega$

NOTE3:  $V_{DROPNOTE3} = V_{IN1} - (V_{OUT2} \times 0.98)$   $V_{OUT2}$  is the output voltage when  $V_{IN} = V_{OUT1} + 1.0V$  and  $I_{OUT} = 300mA$ .

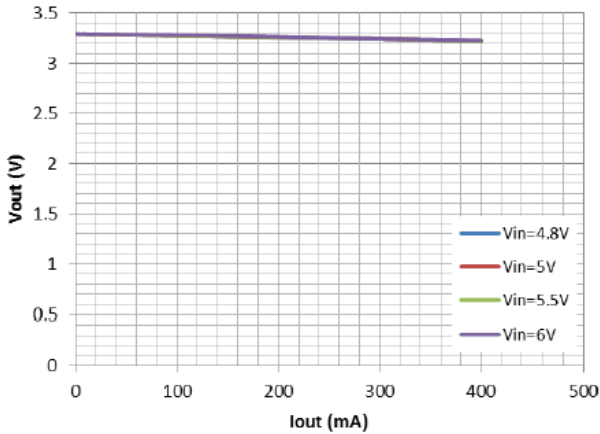
$V_{IN1}$  is the input voltage at which the output voltage becomes 98% of  $V_{OUT1}$  after gradually decreasing the input voltage.



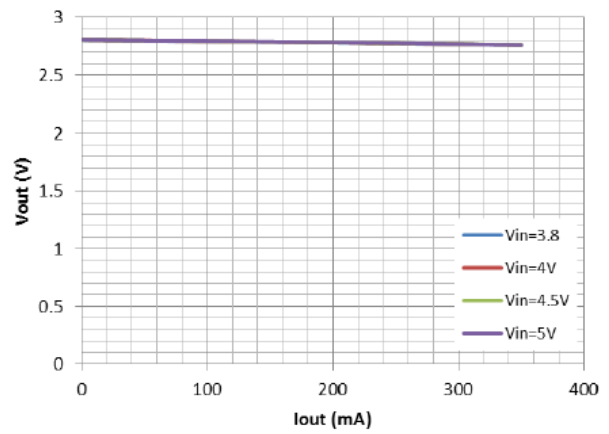
## TYPICAL PERFORMANCE CHARACTERISTICS

T=25°C

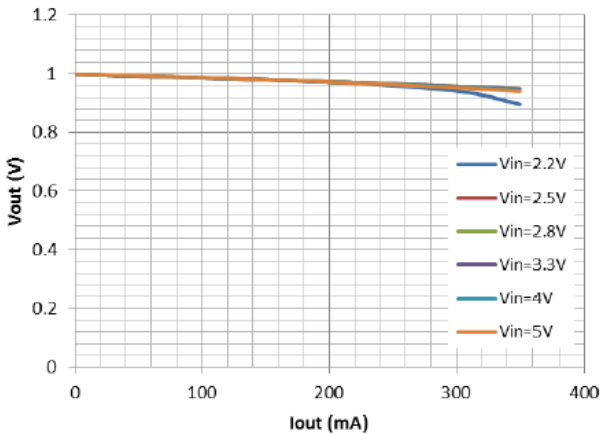
1. Load Regulation,  $V_{OUT}=3.3V$



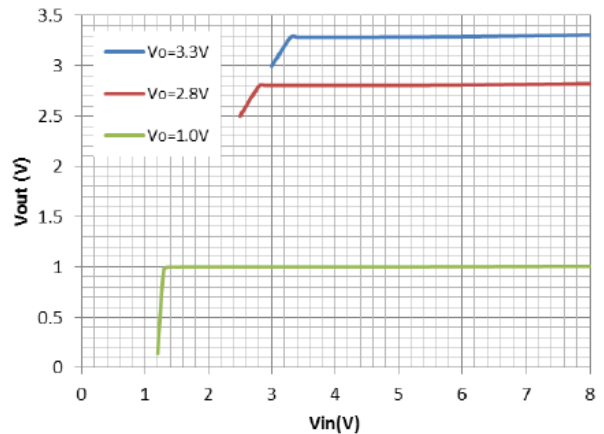
2. Load Regulation,  $V_{OUT}=2.8V$



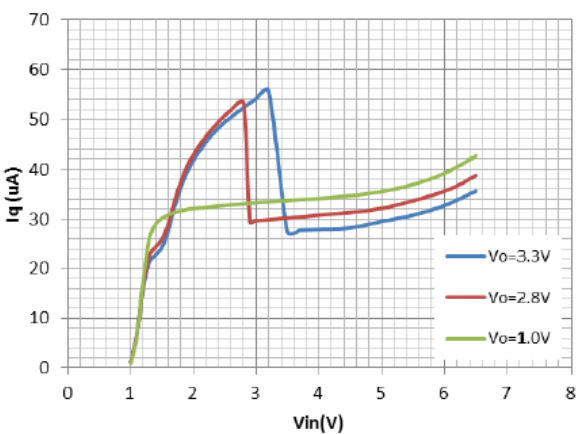
3. Load Regulation,  $V_{OUT}=1.0V$



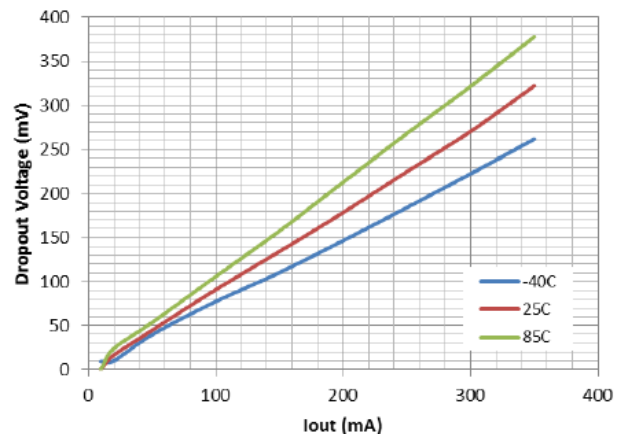
4. Line Regulation,  $I_{OUT}=0mA$



5. Quiescent Current,  $I_{OUT}=0mA, CE=high$

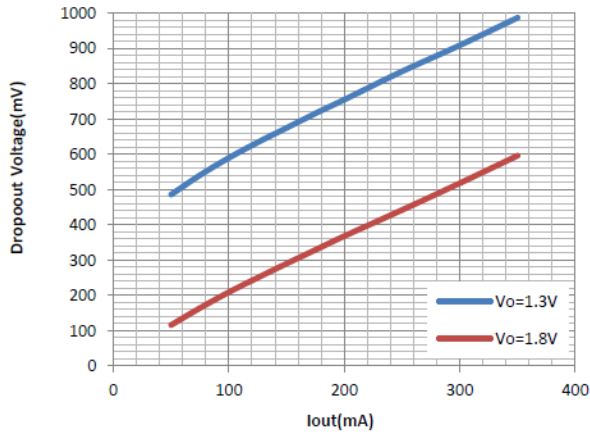


6. Dropout Voltage,  $V_{OUT}=3.3V$

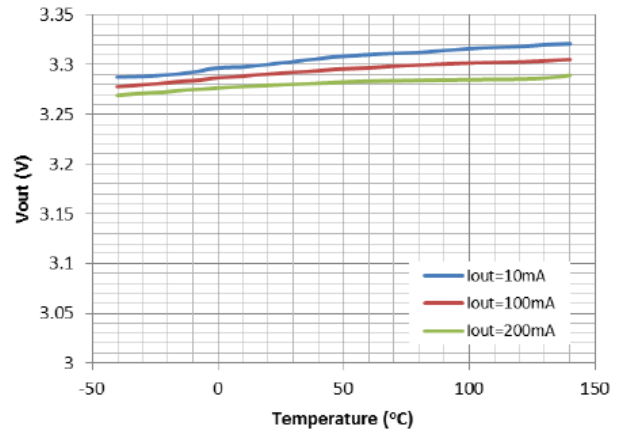




7. Dropout Voltage

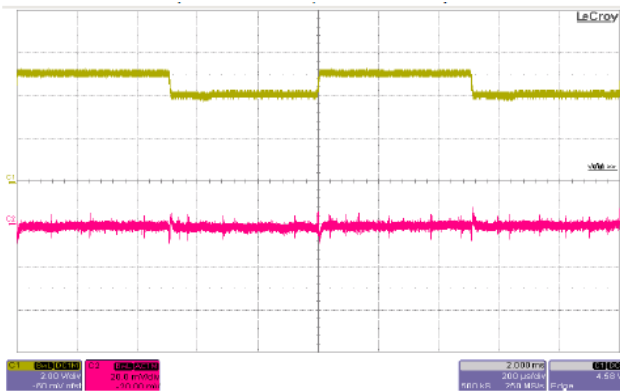


8. VOUT Temperature Coefficient, VOUT=3.3V



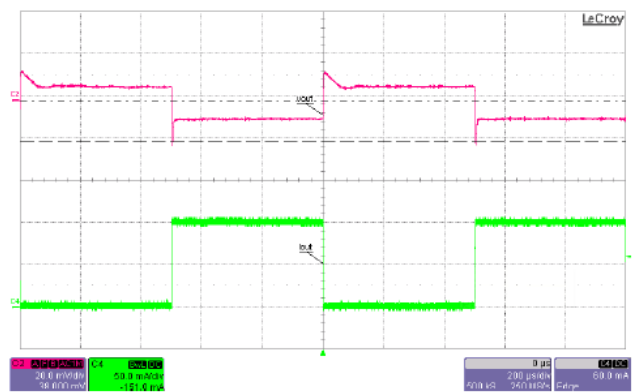
9. Line Transient Response,

VOUT=3.3V, IOUT=20mA, Brown: VIN; Red: VOUT

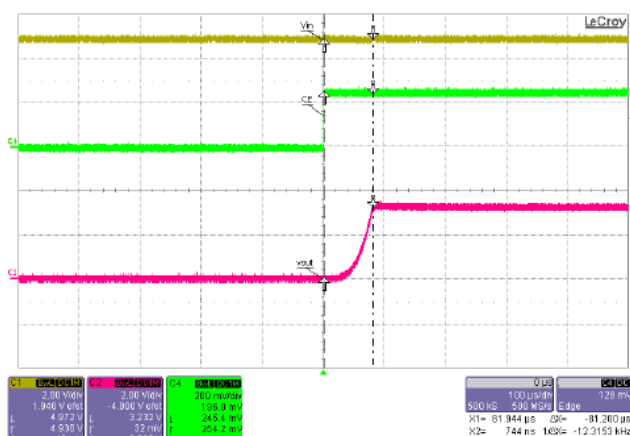


10. Load Transient Response, VIN=5V, VOUT=3.3V,

IOUT=1~100mA, Green: IOUT; Red: VOUT

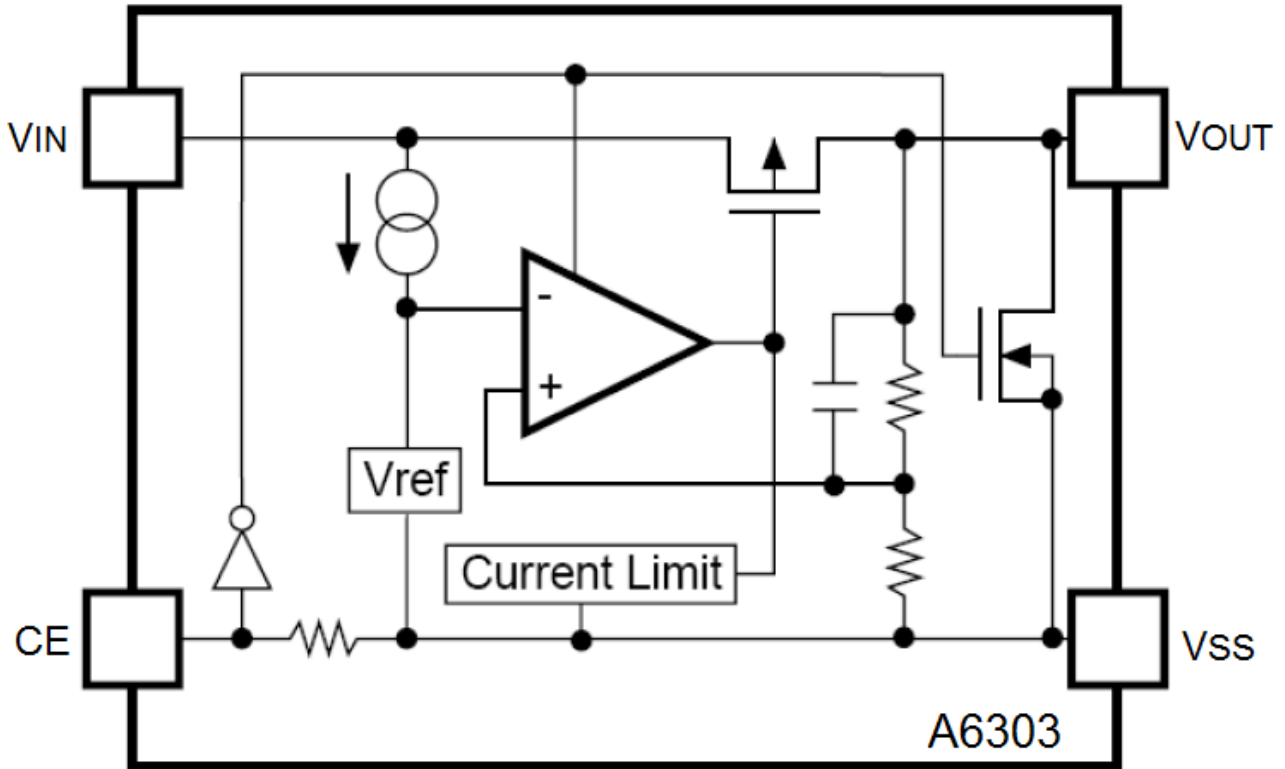


11. CE Chip Enable Response





**BLOCK DIAGRAM**





## DETAILED INFORMATION

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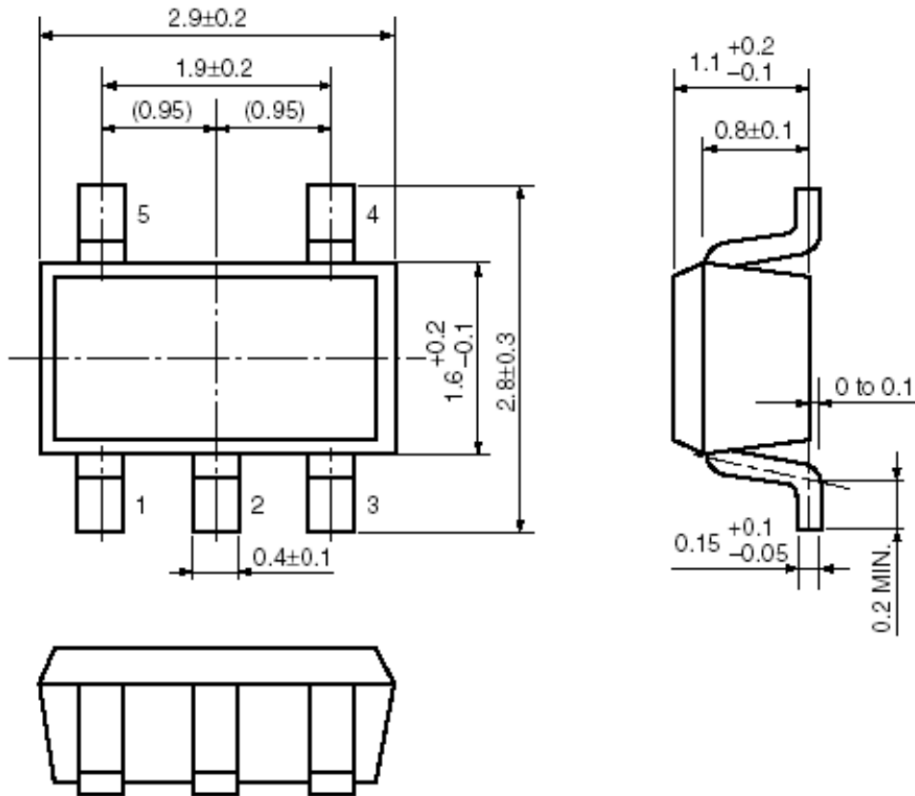
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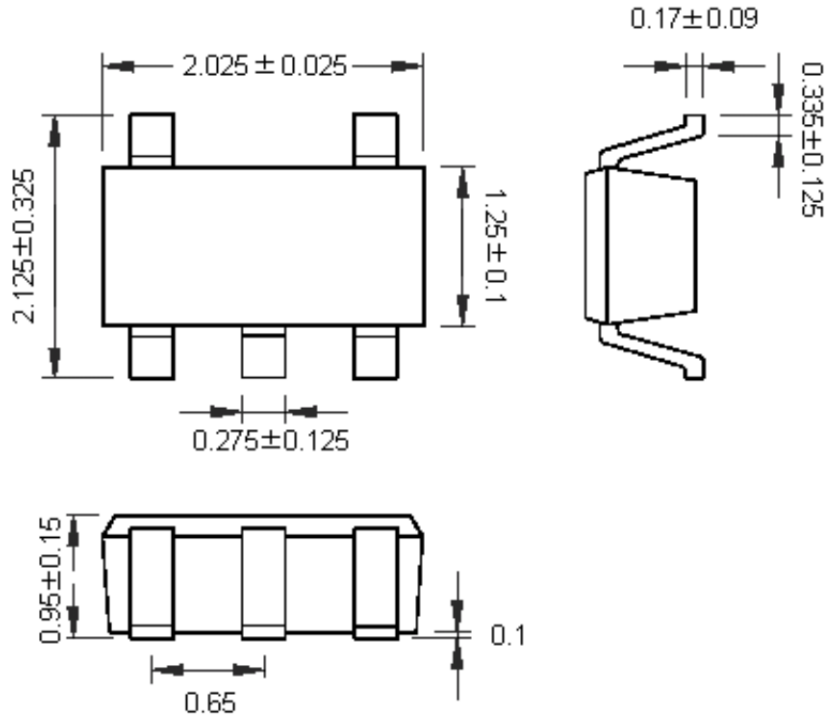
## PACKAGE INFORMATION

Dimension in SOT-25 (Unit: mm)



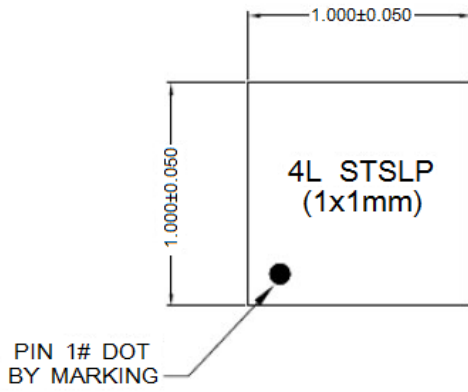


Dimension in SC70-5 (Unit: mm)

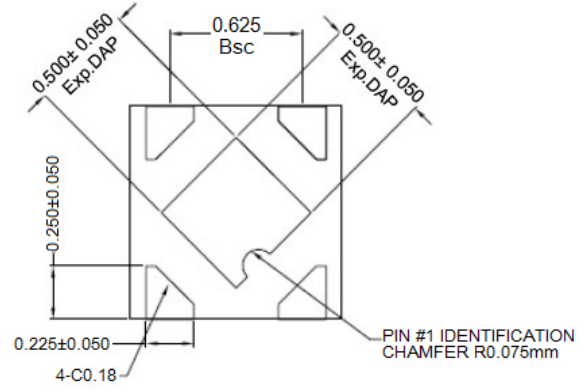




Dimension in DFN4 (1x1) (Unit: mm)



**TOP VIEW**

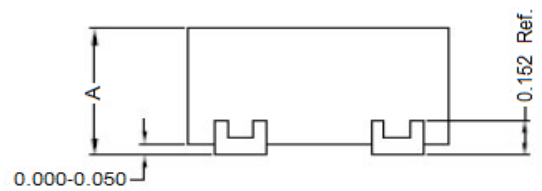


**BOTTOM VIEW**

**NOTE:**

1) 'A' DIMENSION AS BELOW TABLE

<b>A</b>	<b>STSLP</b>	
	<b>MAX.</b>	<b>0.600</b>
	<b>NOM.</b>	<b>0.550</b>
<b>MIN.</b>	<b>0.500</b>	



**SIDE VIEW**



## IMPORTANT NOTICE

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