



ACE525C

300mA High PSRR, Linear Regulator

Description

ACE525C series are a group of positive voltage output, low power consumption, low dropout voltage regulators.

ACE525C can provide output value in the range of 1.0V~4.5V every 0.1V step. It also can be customized on command. ACE525C can also work under a wide input voltage ranging from 1.5V to 6V.

ACE525C includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

ACE525C 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 $\pm 2\%$.

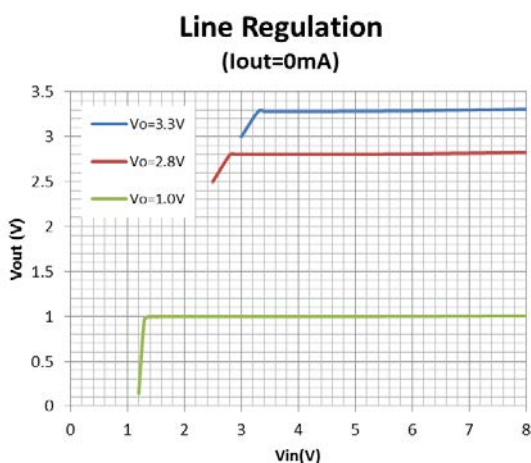
Features

- Input voltage range: 1.5~6V
- 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 chip enable circuit
- Highly accurate: $\pm 2\%$
- Output current limit
- Fold-back output short circuit protection

Application

- 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 Performance Characteristic:





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Absolute Maximum Ratings

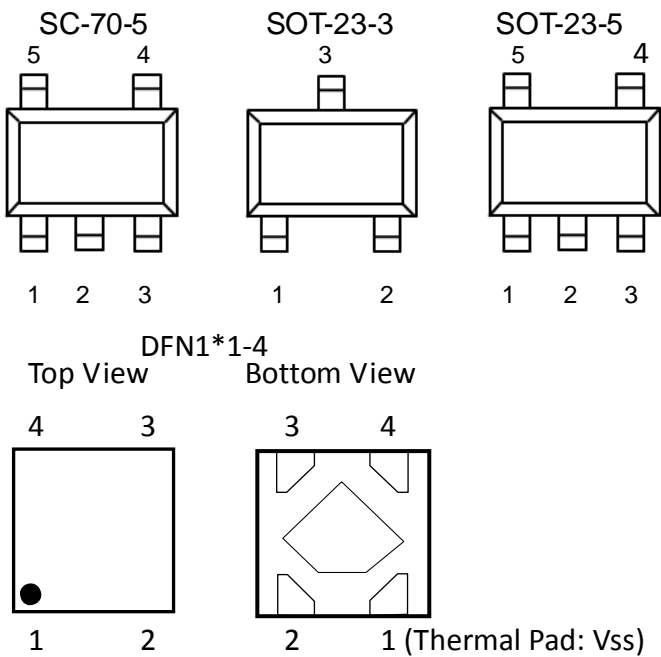
Parameter	Symbol	Max	Unit
Max Input voltage	V_{IN}	8	V
Power Dissipation			mW
SC-70-5		250	
SOT-23-3L		250	
SOT-23-5		250	
DFN1*1-4		600	
Junction temperature	T_J	125	°C
Storage temperature	T_S	- 45 to 150	°C
Output Current		300	mA
Ambient Temperature	T_A	-40 to 85	°C

Note: Heat Sink Area of PCB for DFN1x1-4 is recommended at least 2.5mmx4mm.

Exceed these limits to damage to the device.

Exposure to absolute maximum rating conditions may affect device reliability.

Packaging Type



SC-70-5	SOT-23-3	SOT-23-5	DFN1*1-4	Description	Function
5	2	5	1	V_{out}	Output pin
1	3	1	4	V_{in}	Input pin
2	1	2	2	V_{SS}	Ground pin
3		3	3	CE	Chip Enable pin
4		4		NC	No Connection

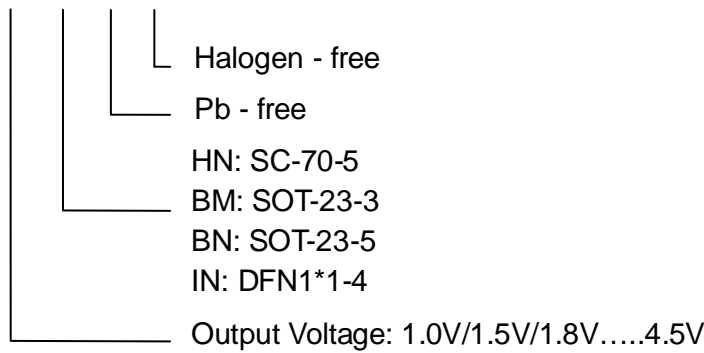


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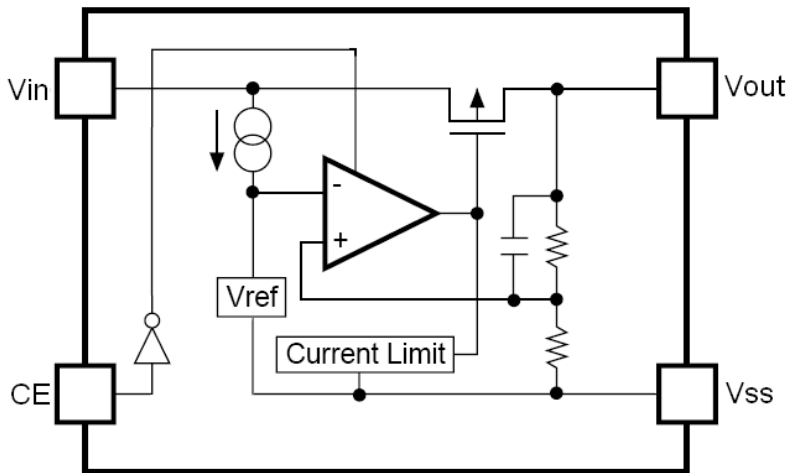
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Ordering information

ACE525C XX XX + H



Block Diagram



Recommended Work Conditions

Item	Min	Max	Unit
Input Voltage Range	1.5	6	V
Ambient Temperature	-40	85	°C

Electrical Characteristics

ACE525C, For Arbitrary Output Voltage. (Test Conditions: $C_{in}=1\mu F, C_{out}=1\mu F, T_A=25^\circ C$, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{in}	Input Voltage		1.5		6	V
V_{out}	Output Voltage	$V_{out} > 1.5V$	$V_{out} \times 0.98$	V_{out}	$V_{out} \times 1.02$	V
		$V_{out} \leq 1.5V$	$V_{out} - 0.03$		$V_{out} + 0.03$	
$I_{out} (Max.)$	Maximum Output Current	$V_{in} - V_{out} = 1V$	300			mA



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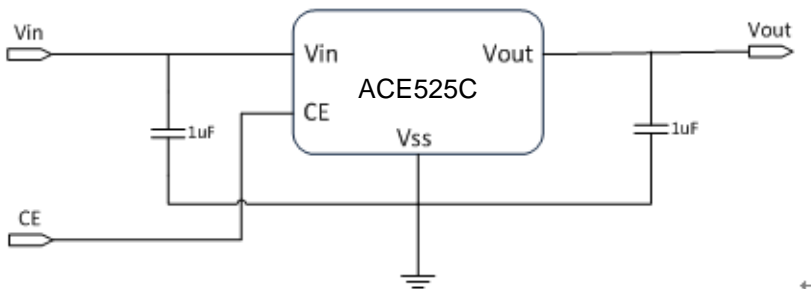
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Vdrop1	Dropout Voltage, $V_{out} \geq 2.8V$	$I_{out}=100mA$	100	150	mV
		$I_{out}=300mA$	300	400	mV
$\frac{\Delta V_{out}}{\Delta V_{in}} \times V_{out}$	Line Regulation	$I_{out}=40mA$ $2.8V \leq V_{in} \leq 6V$	0.05	0.2	%/V
ΔV_{out}	Load Regulation	$V_{in} = \text{Set } V_{out} + 1V$ $1mA \leq I_{out} \leq 300mA$	50	80	mV
I_{ss}	Supply Current	$V_{in} = \text{Set } V_{out} + 1V$	35	80	μA
$I_{standby}$	Supply Current (Standby)	$V_{in} = \text{Set } V_{out} + 1V$ $V_{ce} = V_{ss}$	0.1	1.0	μA
$\frac{\Delta V_{out}}{\Delta T} \times V_{out}$	Output Voltage Temperature Coefficient	$I_{out}=30mA$	± 100		ppm/ $^{\circ}C$
PSRR	Ripple Rejection	$F=1KHz$, Ripple=0.5Vp-p $V_{in} = \text{Set } V_{out} + 1V$	70		dB
I_{lim}	Current Limit		300		mA
V_{ceh}	CE Input Voltage "H"		1.5	V_{in}	V
V_{cel}	CE Input Voltage "L"		0	0.25	V
e_n	Output Noise	$BW=10Hz \sim 100kHz$	47		μV_{rms}

Note: $V_{drop} = V_{in1} - (V_{out2} \times 0.98)$ 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 Application Circuit



Note: Input capacitor ($C_{in}=1\mu F$) and Output capacitor ($C_{out}=1\mu F$) are recommended in all application circuit.

Explanation :

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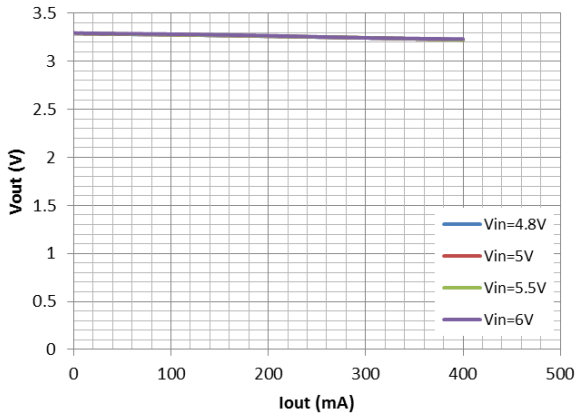


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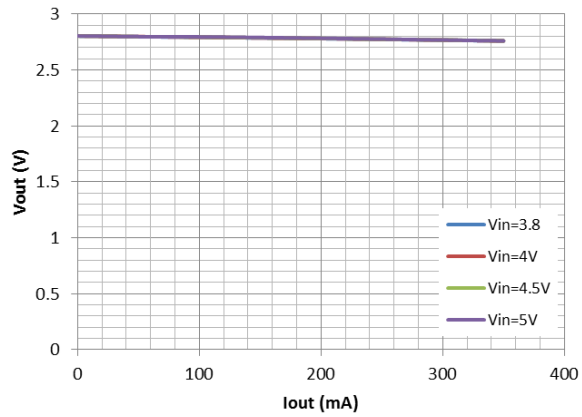
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Typical Performance Characteristics ($T_A=25^\circ\text{C}$)

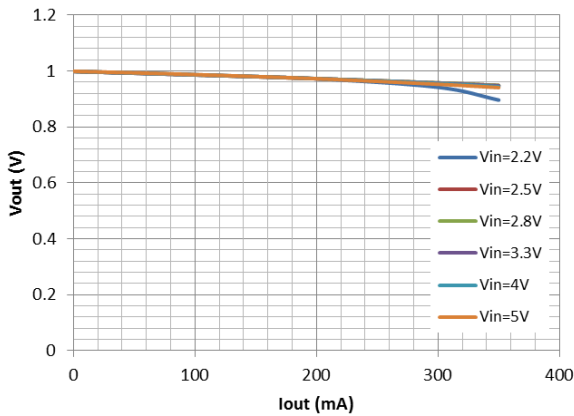
Load Regulation
($V_{out}=3.3\text{V}$)



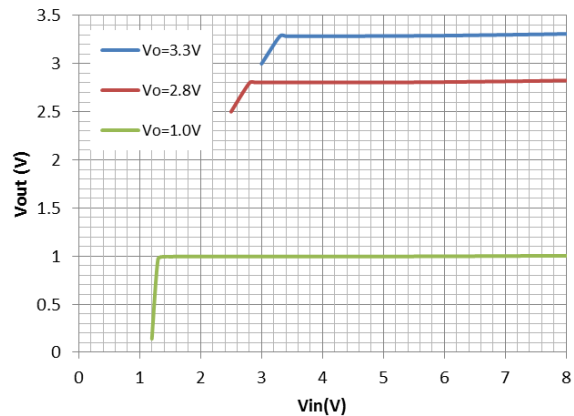
Load Regulation
($V_{out}=2.8\text{V}$)



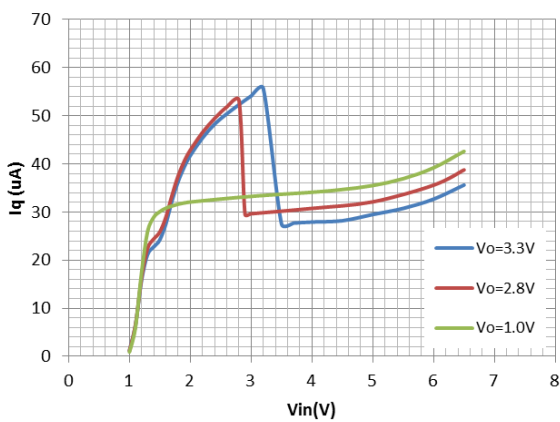
Load Regulation
($V_{out}=1.0\text{V}$)



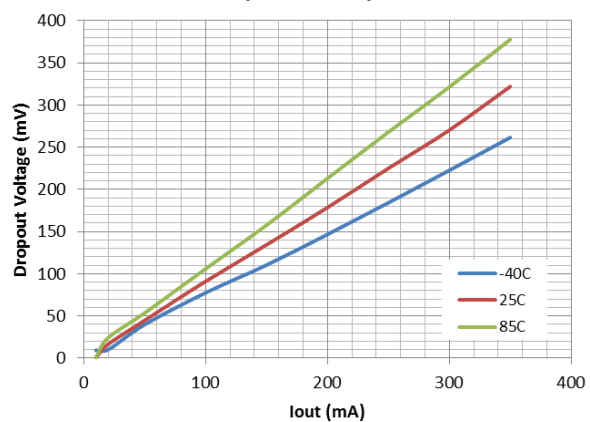
Line Regulation
($I_{out}=0\text{mA}$)



Quiescent Current
($I_{out}=0\text{mA}$ and $CE=\text{high}$)



Dropout Voltage
($V_{out}=3.3\text{V}$)



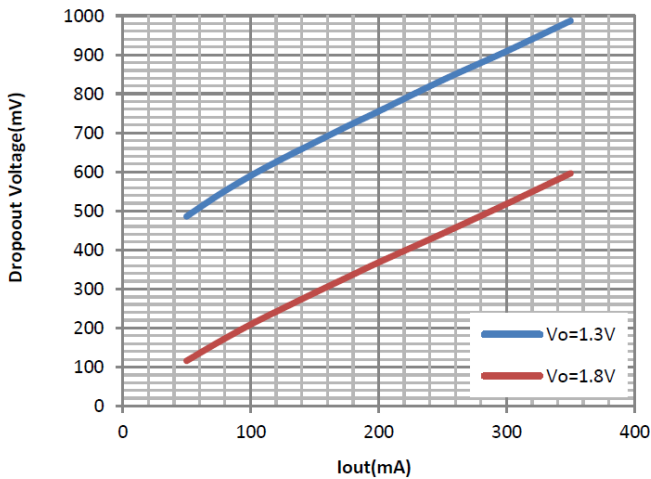


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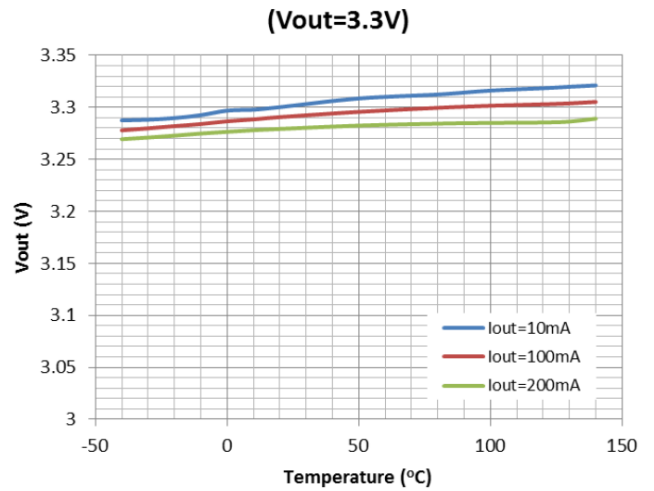
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Typical Performance Characteristics

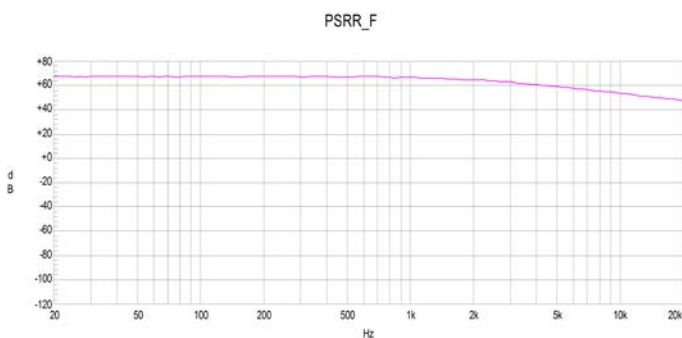
Dropout Voltage



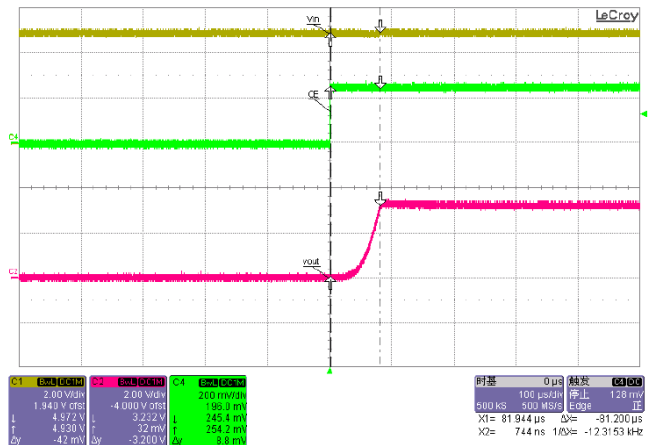
Vout Temperature Coefficient (Vout=3.3V)



Ripple rejection vs Frequency

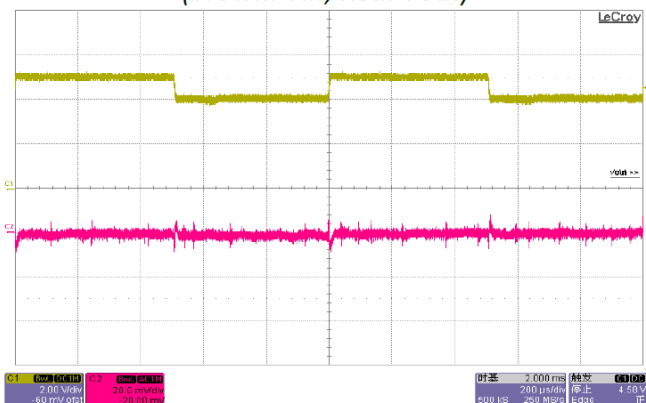


CE Chip Enable Response



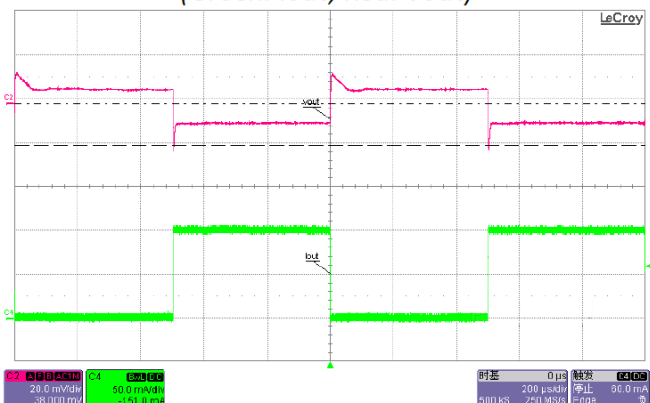
Line Transient Response

Vout=3.3V, Iout=20mA
(brown: Vin; Red: Vout)



Load Transient Response

Vin=5V, Vout=3.3V, Iout=1-100mA
(Green: Iout; Red: Vout)



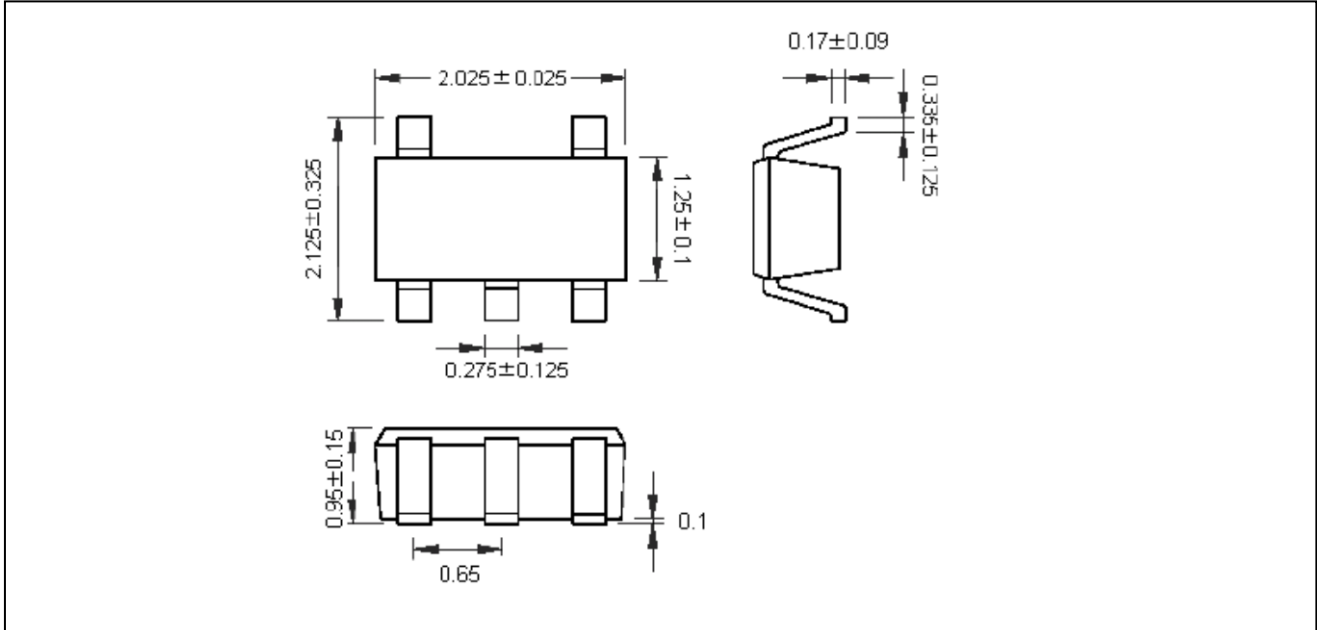


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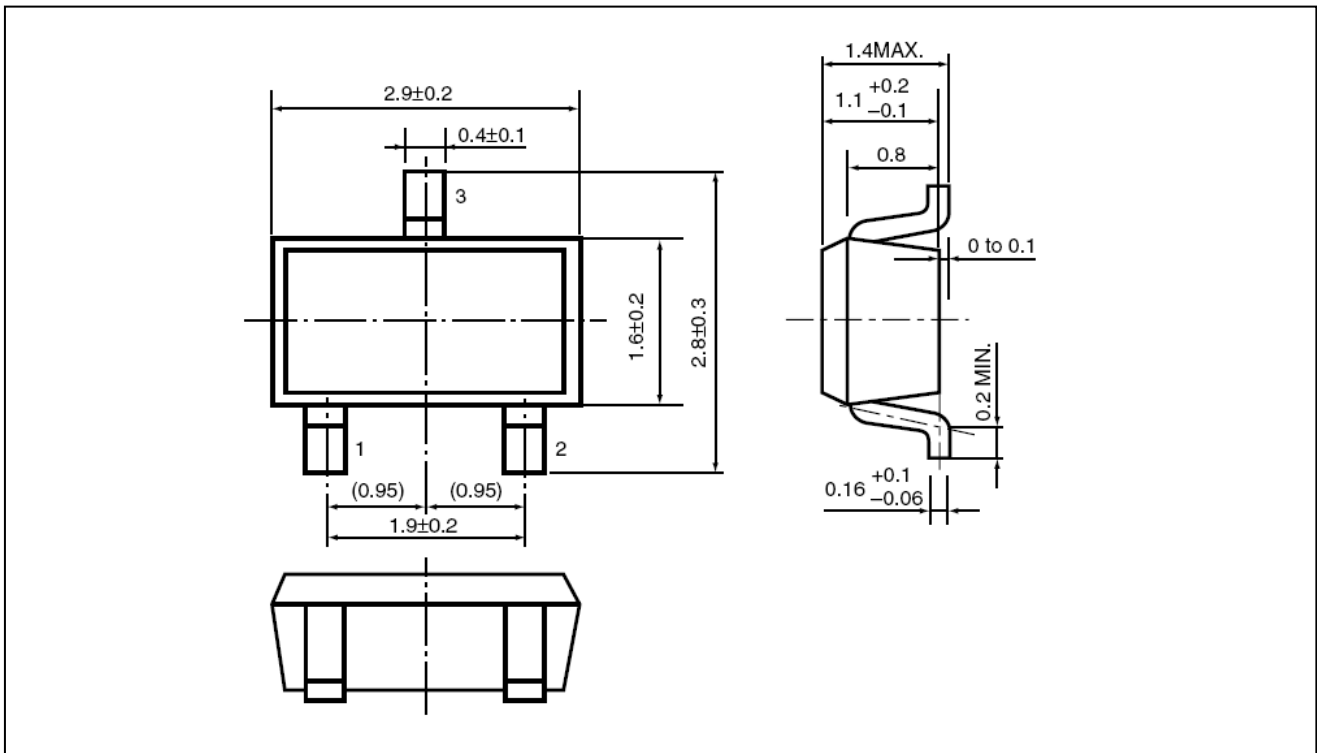
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Packing Information

SC-70-5



SOT-23-3



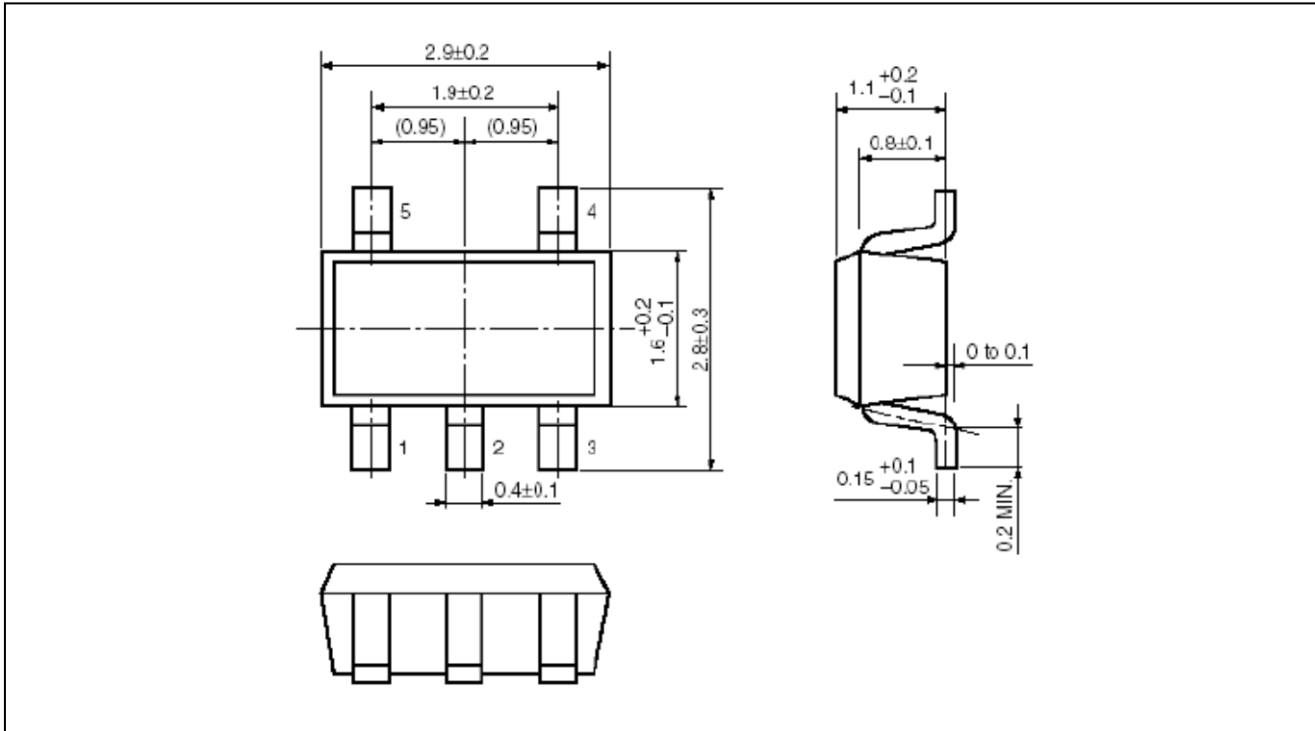


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Packing Information

SOT-23-5



DFN1*1-4

Top view dimensions: Width D , length L , pin 1 ID laser mark, pin 1 offset L , pin 2 offset e , pin 3 offset K , pin 4 offset b , pin 3 width $D2$, pin 4 width $E2$, and a $(C0.12)$ chamfer.

Side view dimensions: Total height A , pin 1 height $A1$, and a $(A3)$ lead length.

COMMON DIMENSIONS
UNITS OF MEASURE=MILLIMETER

Symbol	Min	Typ	Max
A	0.50	0.55	0.60
A1	0.00	0.02	0.05
A3	0.100REF		
b	0.175	0.225	0.275
D	0.95	1.00	1.05
E	0.95	1.00	1.05
D2	0.43	0.48	0.53
E2	0.43	0.48	0.53
L	0.2	0.25	0.30
e	0.60	0.65	0.70
K	0.15		

Notes: All dimensions are in millimeters exclude mold flash or protrusions.



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Notes

ACE does not assume any responsibility for use as critical components in life support devices or systems without the express written approval of the president and general counsel of ACE Electronics Co., LTD. As sued herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.