



ACE505

Low noise 150mA LDO regulator

Description

ACE505 series is a group of positive voltage output, low power consumption, low dropout voltage regulator.

ACE505 can provide output value in the range of 1.2V~5.0V every 0.1V step. It also can be customized on command.

ACE505 includes high accuracy voltage reference, error amplifier, current limit circuit and output driver module.

ACE505 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

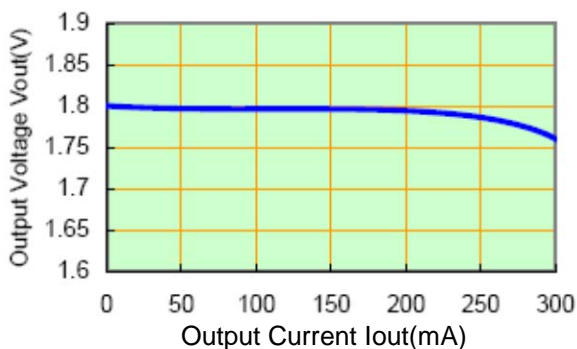
- Low Power Consumption: 25uA (Typ.)
- Low output noise (27uVRMS)
- Standby Mode: 0.1uA
- Low dropout Voltage: 0.2V@100mA (Typ.)
- High Ripple Rejection: 65dB@1kHz (Typ.)
- Low Temperature Coefficient: $\pm 100\text{ppm}/^\circ\text{C}$
- Excellent Line regulation: 0.05%/V
- Build-in chip enable circuit
- Output Voltage Range: 1.2V~5.0V (customized on command every 0.1V step)
- Highly Accurate: $\pm 2\%$ ($\pm 1\%$ customized)
- Output Current Limit

Application

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

Typical Performance Characteristic:

ACE505-1.8V Output





ACE505

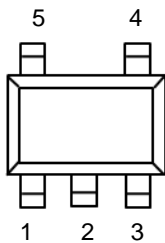
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Absolute Maximum Ratings

Parameter	Symbol	Max	Unit
Input Voltage		10	V
Output Current		200	mA
Power Dissipation SOT-23-5 SC-70-5		250 250	mW
Operating Junction temperature	T _J	125	°C
Storage temperature	T _s	- 45 to 150	°C

Packaging Type

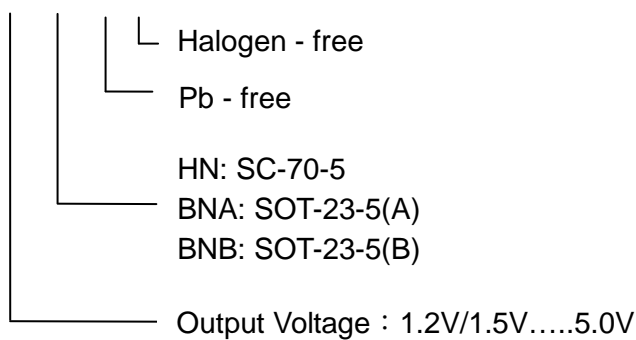
SC-70-5 / SOT-23-5



SC-70-5	SOT-23-5(A)	SOT-23-5(B)	Description	Function
5	5	1	V _{OUT}	Output pin
1	1	3	V _{DD}	Input Pin
2	2	2	GND	Ground Pin
3	3	4	CE	Chip Enable Pin
4	4	5	NC	No Connection

Ordering information

ACE505 XX XX + H

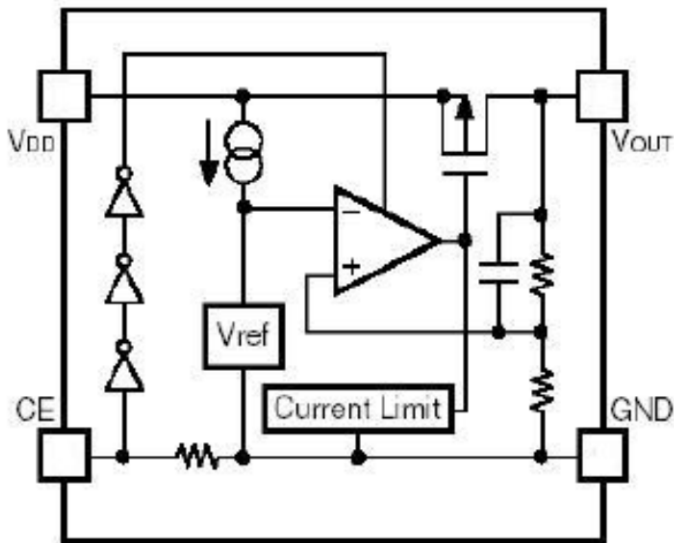




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Block Diagram



Recommended Work Conditions

Item	Min	Max	Unit
Input Voltage Range		8	V
Ambient Temperature	-40	85	°C

Electrical Characteristics

(Test Conditions: $C_{in}=1\mu F$, $C_{out}=2.2\mu F$, $T_A=25^\circ C$, unless otherwise specified.)

ACE505, for arbitrary output voltage

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{in}	Input Voltage		1.8		8	V
V_{out}	Output Voltage	$V_{out} > 1.5V$	$V_{in} = \text{Set } V_{out} + 1V$	$V_{out} \times 0.98$	$V_{out} \times 1.02$	V
		$V_{out} \leq 1.5V$	$1mA \leq I_{out} \leq 30mA$	$V_{out} - 0.03$	$V_{out} + 0.03$	
$I_{out} (\text{Max.})$	Maximum Output Current	$V_{in} - V_{out} = 1V$	150			mA
Dropout Voltage	Input-Output Voltage Differential	Refer to the Electrical Characteristics by Output Voltage				
$\frac{\Delta V_{out}}{\Delta V_{in} - V_{out}}$	Line Regulation	$I_{out} = 40mA$ $1.6V \leq V_{in} \leq 8V$		0.05	0.2	%/V
ΔV_{out}	Load Regulation	$V_{in} = \text{Set } V_{out} + 1V$ $1mA \leq I_{out} \leq 80mA$		12	40	mV
I_{ss}	Supply Current	$V_{in} = \text{Set } V_{out} + 1V$		25	50	μA
$I_{standby}$	Supply Current (Standby)	$V_{in} = \text{Set } V_{out} + 1V$ $V_{ce} = Gnd$		0.1	1.0	μA
$\Delta V_{out}/$	Output Voltage	$I_{out} = 30mA$		± 100		ppm



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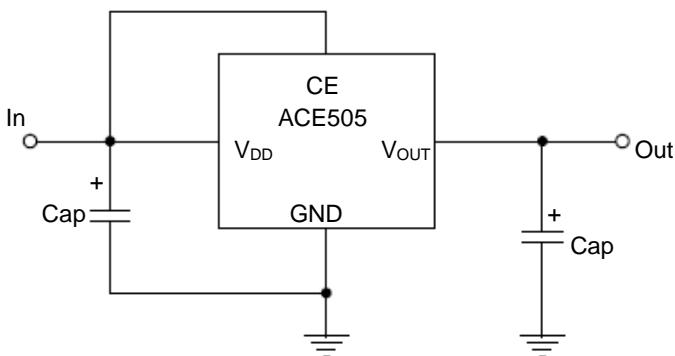
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$\Delta T \cdot V_{out}$	Temperature Coefficiency					/°C
PSRR	Ripple Rejection	F=1kHz, Ripple=0.5Vp-p Vin=Set Vout+1V		65		dB
Ilim	Short Current Limit	Vout=0V		20		mA
Rpd	CE Pull down Resistance		2.0	5.0	10.0	MΩ
Vceh	CE Input Voltage "H"		1.5		Vin	V
Vcel	CE Input Voltage "L"		0		0.25	V
en	Output Noise	BW=10Hz~100kHz		27		uVrms

Electrical Characteristics by Output Voltage

Output Voltage Vout (V)	Dropout Voltage, V_{DIF} (V)		
	Condition	Typ.	Max.
Vout = 1.5V	Iout = 120mA	0.38	0.70
Vout = 1.6V		0.36	0.65
Vout = 1.7V		0.34	0.60
1.8 ≤ Vout ≤ 2.0		0.32	0.55
2.1 ≤ Vout ≤ 2.7		0.28	0.50
2.8 ≤ Vout ≤ 4.0		0.22	0.35

Typical Application Circuit



Application hints:

Note: Input capacitor ($C_{in}=1\mu F$) and Output capacitor ($C_{out}=1\mu F/2.2\mu F$) are recommended in all application circuit.



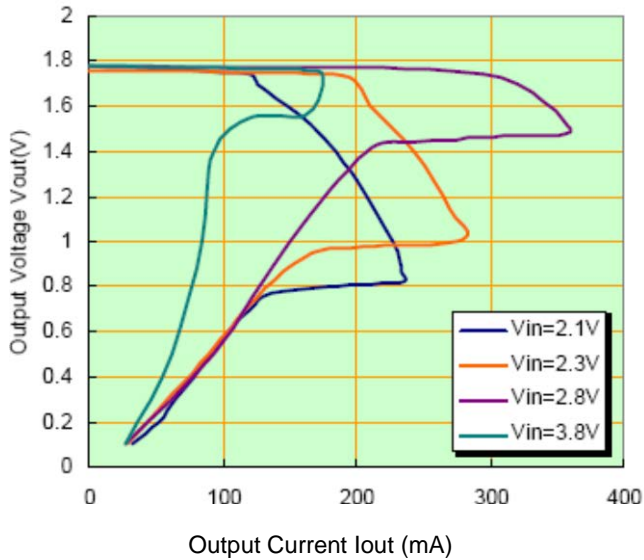
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Typical Performance Characteristics

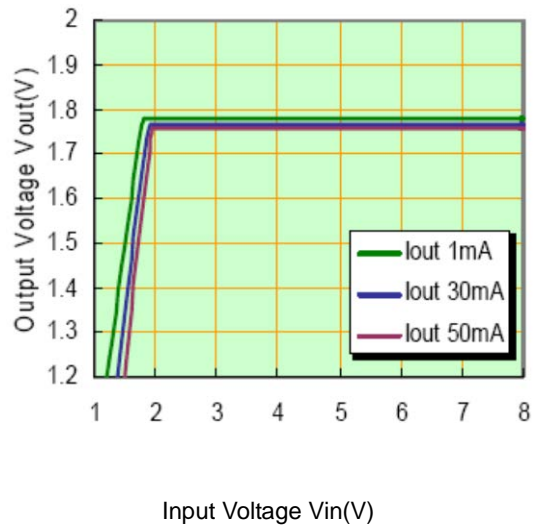
1. Output Voltage vs. Output Current (with output short protection)

ACE505-1.8V

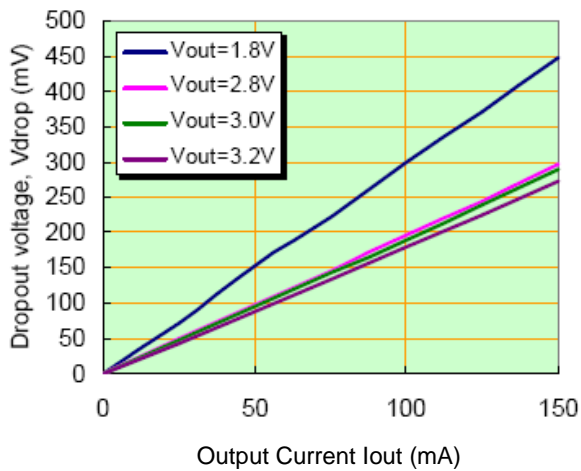


2. Output Voltage vs. Input Voltage

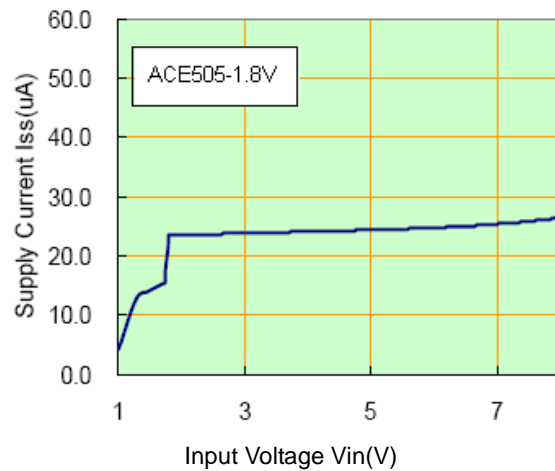
ACE505-1.8V



3. Dropout Voltage vs. Output Current



4. Supply Current vs. Input Voltage

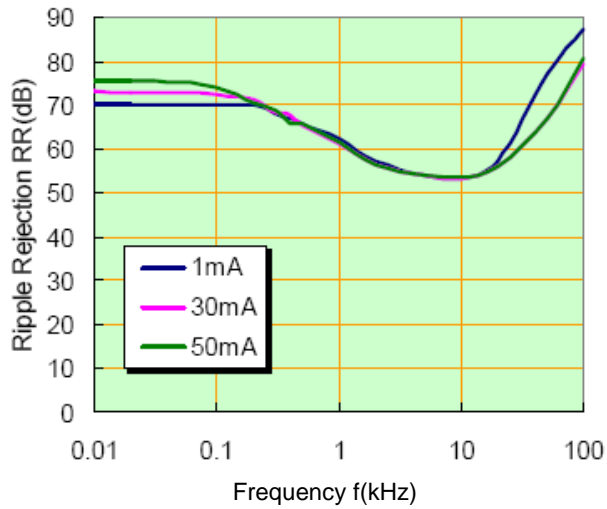




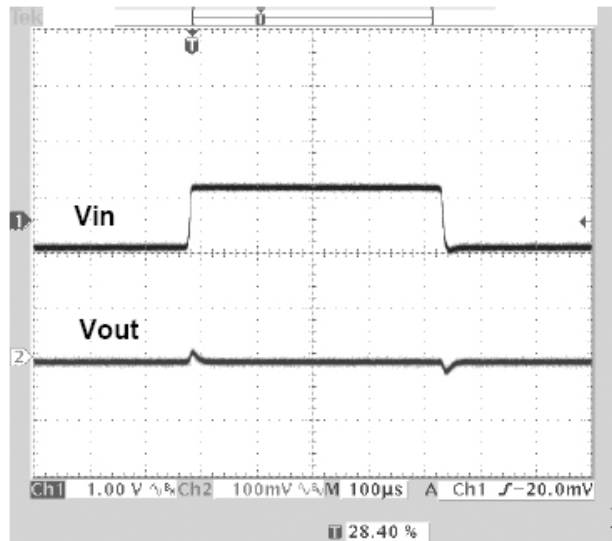
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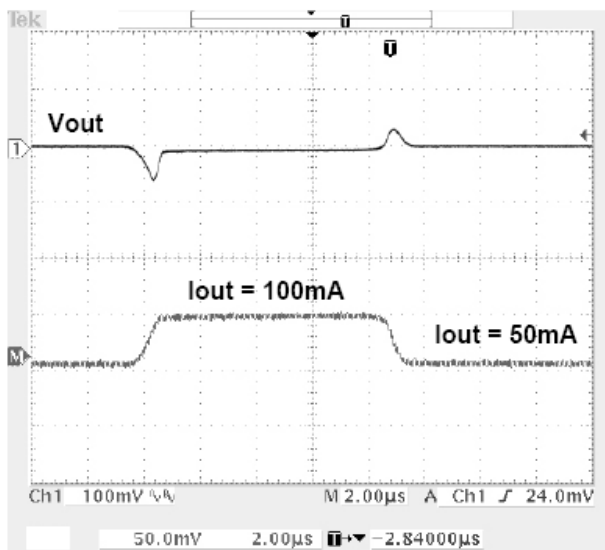
5. Ripple rejection vs. Frequency



6. Line transient response



7. Load transient response



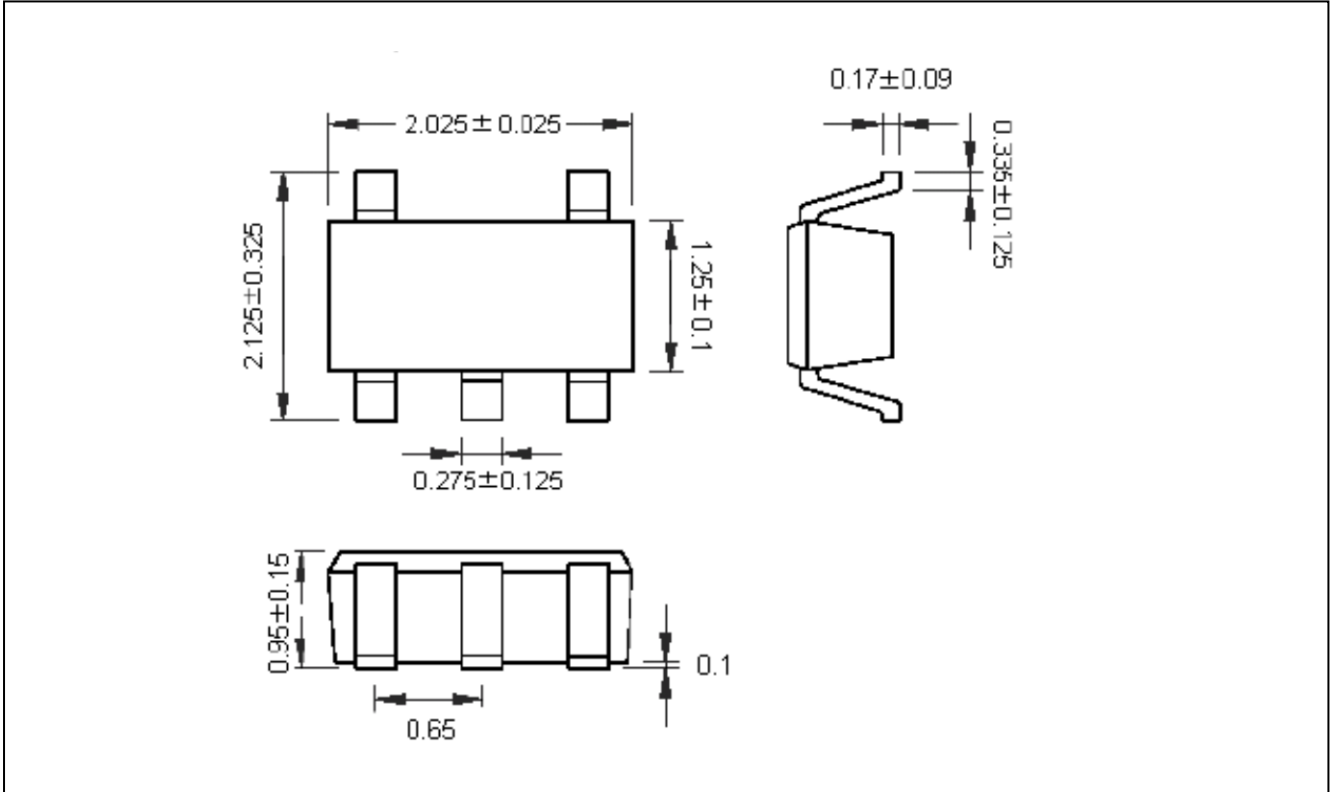


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Packing Information

SC-70-5



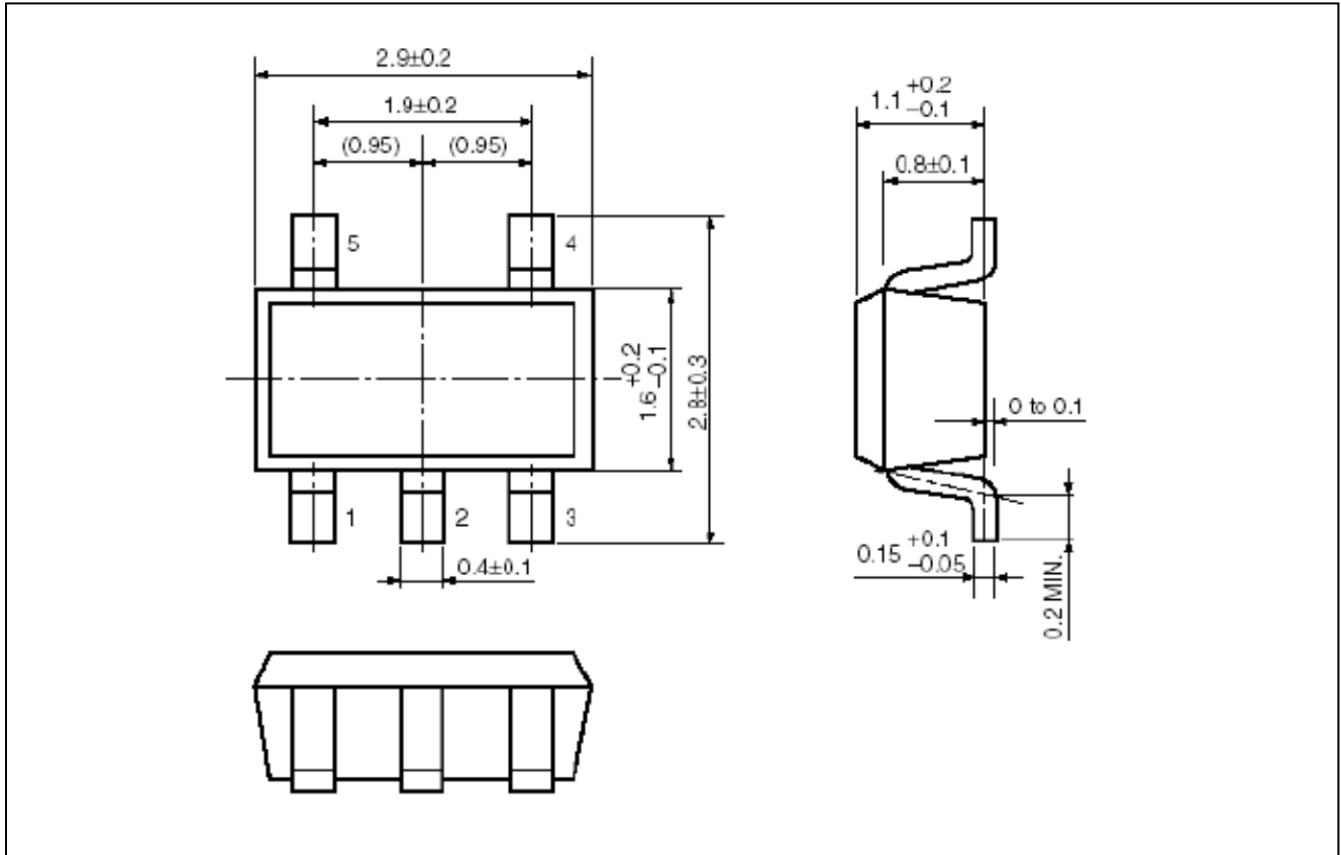


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Packing Information

SOT-23-5





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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:

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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.

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