



# 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

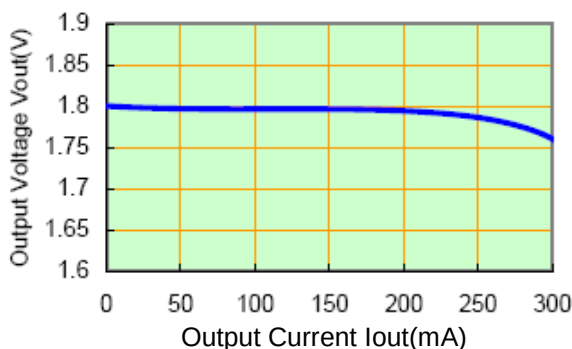
- Low Power Consumption: 25uA (Typ.)
- Low output noise (27uVRMS)
- Standby Mode: 0.1uA
- Low dropout Voltage: 0.2V@100mA (Typ.)
- High Ripple Rejection: 65dB@1kHz (Typ.)
- Low Temperature Coefficient:  $\pm 100\text{ppm}/^\circ\text{C}$
- Excellent Line regulation: 0.05%/V
- Build-in chip enable circuit
- 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

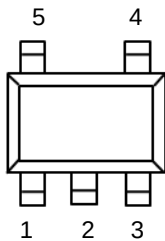
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## Absolute Maximum Ratings

| Parameter                                | Symbol | Max         | Unit |
|------------------------------------------|--------|-------------|------|
| Input Voltage                            |        | 10          | V    |
| Output Current                           |        | 200         | mA   |
| Power Dissipation<br>SOT-23-5<br>SC-70-5 |        | 250<br>250  | mW   |
| Operating Junction temperature           | $T_J$  | 125         | °C   |
| Storage temperature                      | $T_S$  | - 45 to 150 | °C   |

## Packaging Type

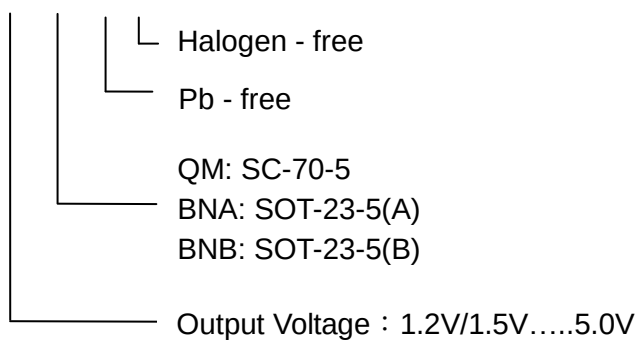
SC-70-5 / SOT-23-5



| 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

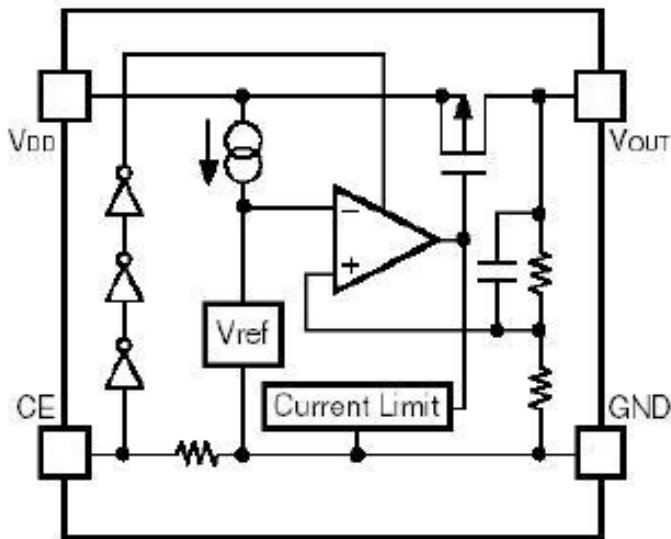




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## Block Diagram



## 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                  | Unit    |
|------------------------------------------|-----------------------------------|--------------------|-----------------------------------------------------------|----------------------|------|----------------------|---------|
| $V_{in}$                                 | Input Voltage                     |                    |                                                           | 1.8                  |      | 8                    | V       |
| $V_{out}$                                | Output Voltage                    | $V_{out}>1.5V$     | $V_{in}=Set\ V_{out}+1V$<br>$1mA\leq I_{out}\leq 30mA$    | $V_{out}\times 0.98$ |      | $V_{out}\times 1.02$ | V       |
|                                          |                                   | $V_{out}\leq 1.5V$ |                                                           | $V_{out}-0.03$       |      | $V_{out}+0.03$       |         |
| $I_{out}\ (Max.)$                        | Maximum Output Current            |                    | $V_{in}-V_{out}=1V$                                       | 150                  |      |                      | mA      |
| Dropout Voltage                          | Input-Output Voltage Differential |                    | Refer to the Electrical Characteristics by Output Voltage |                      |      |                      |         |
| $\Delta V_{out} / \Delta V_{in}-V_{out}$ | Line Regulation                   |                    | $I_{out}=40mA$<br>$1.6V\leq V_{in}\leq 8V$                |                      | 0.05 | 0.2                  | %/V     |
| $\Delta V_{out} / \Delta I_{out}$        | Load Regulation                   |                    | $V_{in}=Set\ V_{out}+1V$<br>$1mA\leq I_{out}\leq 80mA$    |                      | 12   | 40                   | mV      |
| $I_{ss}$                                 | Supply Current                    |                    | $V_{in}=Set\ V_{out}+1V$                                  |                      | 25   | 50                   | $\mu A$ |
| $I_{standby}$                            | Supply Current (Standby)          |                    | $V_{in}=Set\ V_{out}+1V$<br>$V_{ce}=Gnd$                  |                      | 0.1  | 1.0                  | $\mu A$ |



## ACE505

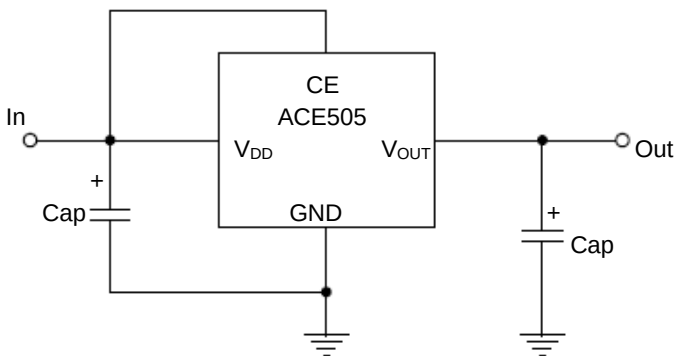
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|                                         |                                         |                                              |     |           |      |         |
|-----------------------------------------|-----------------------------------------|----------------------------------------------|-----|-----------|------|---------|
| $\Delta V_{out}/\Delta T \cdot V_{out}$ | Output Voltage Temperature Coefficiency | $I_{out}=30mA$                               |     | $\pm 100$ |      | ppm /°C |
| PSRR                                    | Ripple Rejection                        | F=1kHz,<br>Ripple=0.5Vp-p<br>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<br>Vout (V) | Dropout Voltage, V <sub>DIF</sub> (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 (Cin=1uF) and Output capacitor (Cout=1uF/2.2uF) are recommended in all application circuit.



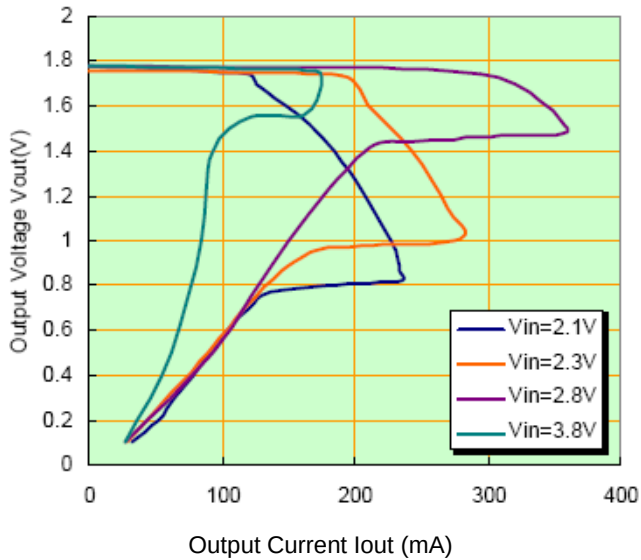
# ACE505

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## Typical Performance Characteristics

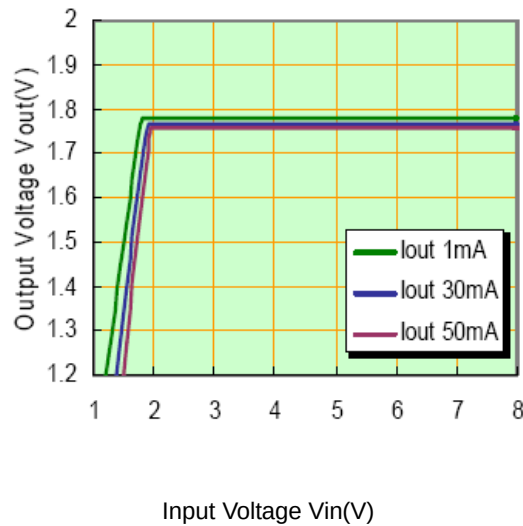
### 1. Output Voltage vs. Output Current (with output short protection)

ACE505-1.8V

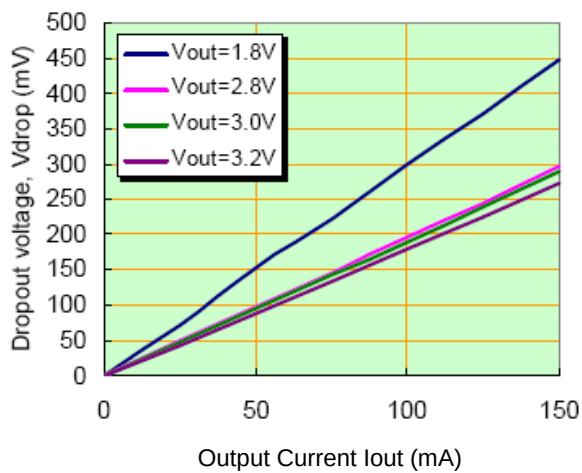


### 2. Output Voltage vs. Input Voltage

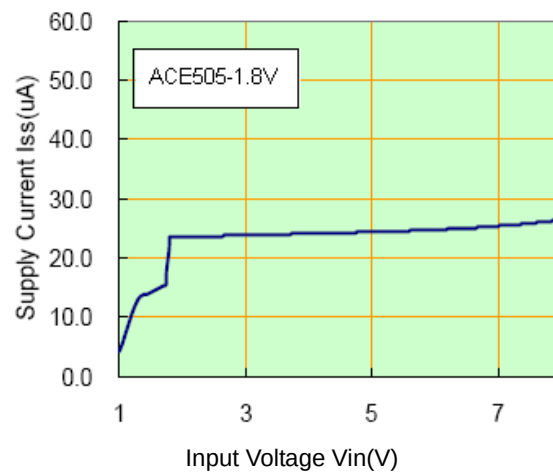
ACE505-1.8V



### 3. Dropout Voltage vs. Output Current



### 4. Supply Current vs. Input Voltage

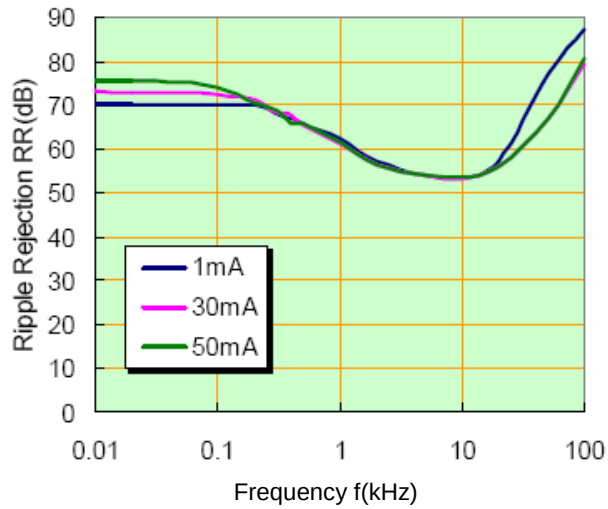




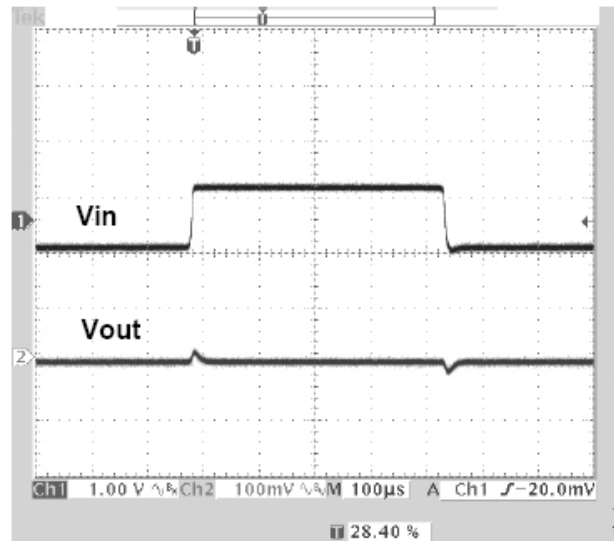
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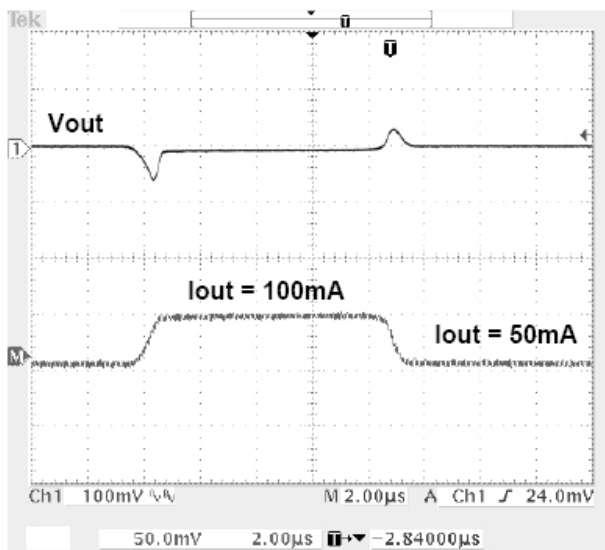
### 5. Ripple rejection vs. Frequency



### 6. Line transient response



### 7. Load transient response



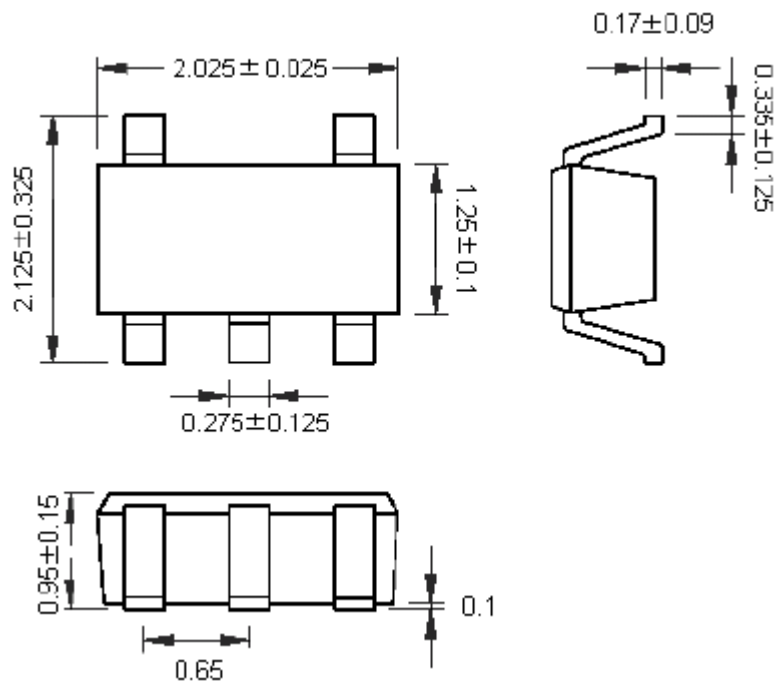


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### Packing Information

#### SC-70-5



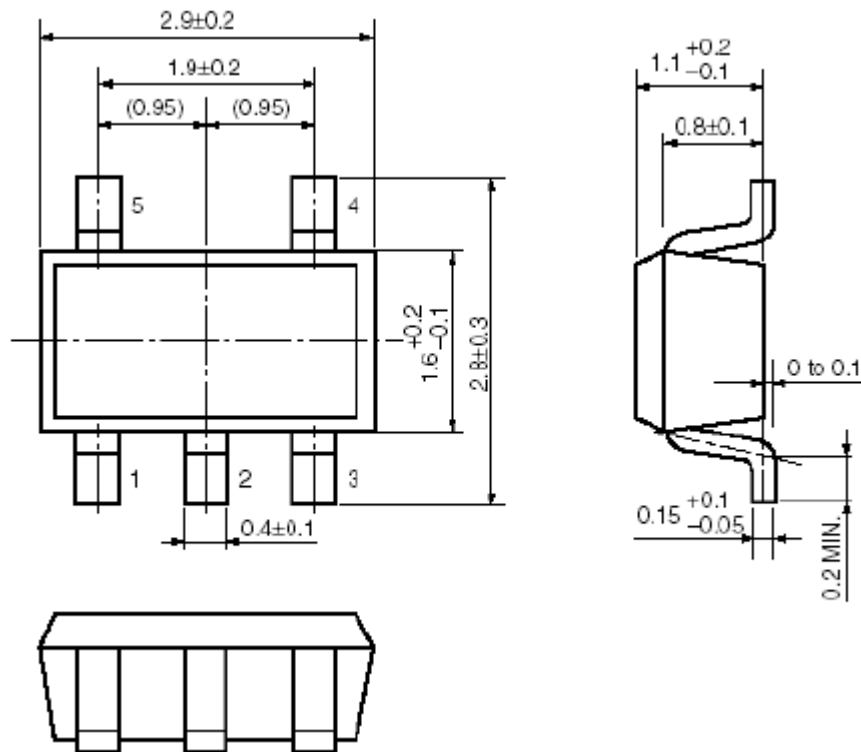


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### Packing Information

#### SOT-23-5







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### Notes

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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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