

#### 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  $\pm 2\%$ .

ACE505 is available in SOT-23-5, SC-70-5 packages which is lead free. It also can available in these packages with lead.

#### Features

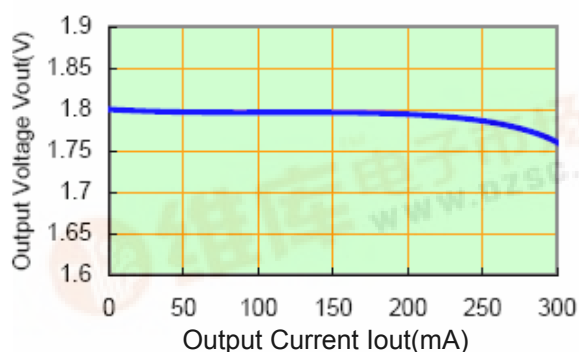
- Low Power Consumption: 25uA (Typ.)
- Low output noise (27uVRMS)
- Standby Mode: 0.1uA
- Low dropout Voltage: 0.2V@100mA (Typ.)
- High Ripple Rejection: 65dB@1kHz (Typ.)
- Low Temperature Coefficient:  $\pm 100\text{ppm}/^\circ\text{C}$
- Excellent Line regulation: 0.05%/V
- Build-in chip enable circuit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

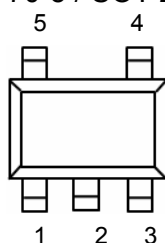


### Absolute Maximum Ratings

| Parameter                                | Symbol         | Max         | Unit |
|------------------------------------------|----------------|-------------|------|
| Input Voltage                            |                | 10          | V    |
| Output Current                           |                | 200         | mA   |
| Power Dissipation<br>SOT-23-5<br>SC-70-5 |                | 200         | mW   |
| Junction temperature                     | T <sub>J</sub> | 125         | °C   |
| Storage temperature                      | T <sub>S</sub> | - 45 to 150 | °C   |

### Packaging Type

SC-70-5 / SOT-23-5

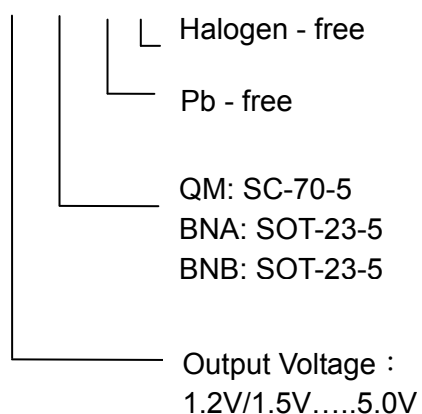


| Pin              | SC-70-5 | SOT-23-5(A) | SOT-23-5(B) | Function        |
|------------------|---------|-------------|-------------|-----------------|
| V <sub>OUT</sub> | 5       | 5           | 1           | Output pin      |
| V <sub>DD</sub>  | 1       | 1           | 3           | Input Pin       |
| GND              | 2       | 2           | 2           | Ground Pin      |
| CE               | 3       | 3           | 4           | Chip Enable Pin |
| NC               | 4       | 4           | 5           | No Connection   |

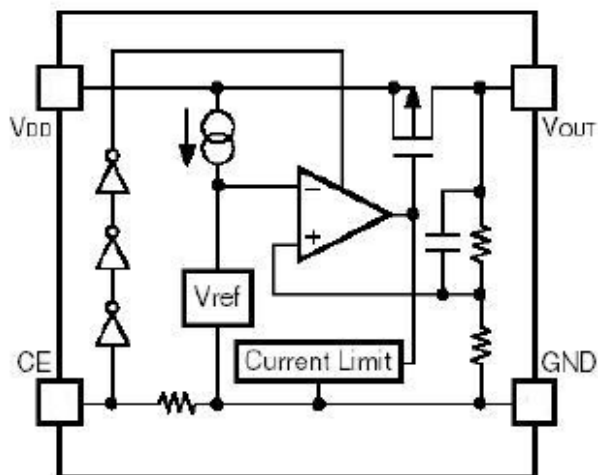
### Ordering information

#### Selection Guide

ACE505 XX XX + H



## Block Diagram



## Recommended Work Conditions

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

## Electrical Characteristics

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

ACE505, for arbitrary output voltage

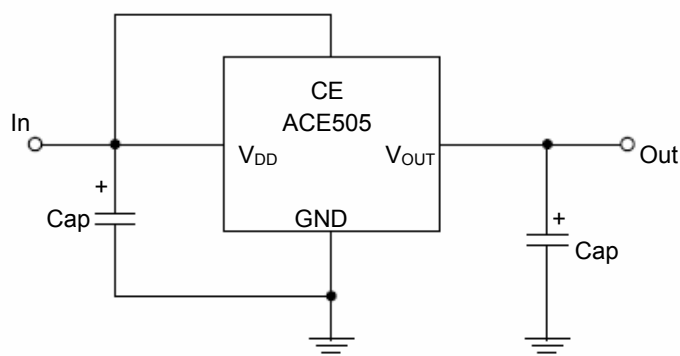
| Symbol                                         | Parameter                               | Conditions                                                          | Min                   | Typ       | Max                   | Units   |
|------------------------------------------------|-----------------------------------------|---------------------------------------------------------------------|-----------------------|-----------|-----------------------|---------|
| $V_{in}$                                       | Input Voltage                           |                                                                     | 1.8                   |           | 8                     | V       |
| $V_{out}$                                      | Output Voltage                          | $V_{in} = \text{Set } V_{out} + 1V$<br>$1mA \leq I_{out} \leq 30mA$ | $V_{out} \times 0.98$ |           | $V_{out} \times 1.02$ | V       |
| $I_{out} \text{ (Max.)}$                       | Maximun Output Current                  | $V_{in} - V_{out} = 1V$                                             | 150                   |           |                       | mA      |
| Dropout Voltage                                | Input-Output Voltage Differentia        | Refer to the ELECTRICAL CHARACTERISTICS by OUTPUT VOLTAGE           |                       |           |                       |         |
| $\Delta V_{out} / \Delta V_{in} \cdot V_{out}$ | 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                         | $V_{in} = \text{Set } V_{out} + 1V$<br>$1mA \leq I_{out} \leq 80mA$ |                       | 12        | 40                    | mV      |
| $I_{ss}$                                       | Supply Current                          | $V_{in} = \text{Set } V_{out} + 1V$                                 |                       | 25        | 50                    | $\mu A$ |
| $I_{standby}$                                  | Supply Current (Srandby)                | $V_{in} = \text{Set } V_{out} + 1V$<br>$V_{ce} = Gnd$               |                       | 0.1       | 1.0                   | $\mu A$ |
| $\Delta V_{out} / \Delta T \cdot V_{out}$      | Output Voltage Temperature Coefficiency | $I_{out} = 30mA$                                                    |                       | $\pm 100$ |                       | ppm/°C  |
| PSRR                                           | Ripple Rejection                        | $F = 1kHz$ ,                                                        |                       | 65        |                       | dB      |

|      |                            |                                   |     |     |      |       |
|------|----------------------------|-----------------------------------|-----|-----|------|-------|
|      |                            | Ripple=0.5Vp-p<br>Vin=Set Vout+1V |     |     |      |       |
| Ilim | Short Current Limit        | Vout=0V                           |     | 20  |      | mA    |
| Rpd  | CE Pull down<br>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:

Note1: Input capacitor (Cin=1uF) is recommended in all application circuit.

Note2: Output capacitor (Cout=1uF/2.2uF) is recommended in all application to assure the stability of circuit.

### Explanation :

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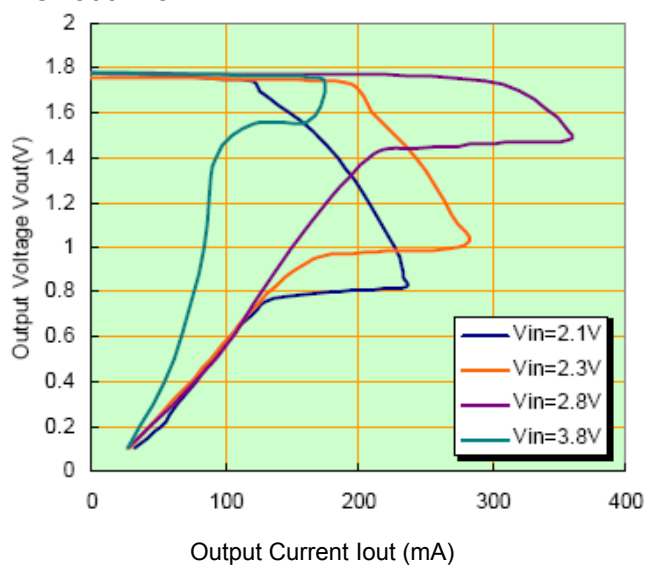
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## Typical Performance Characteristics

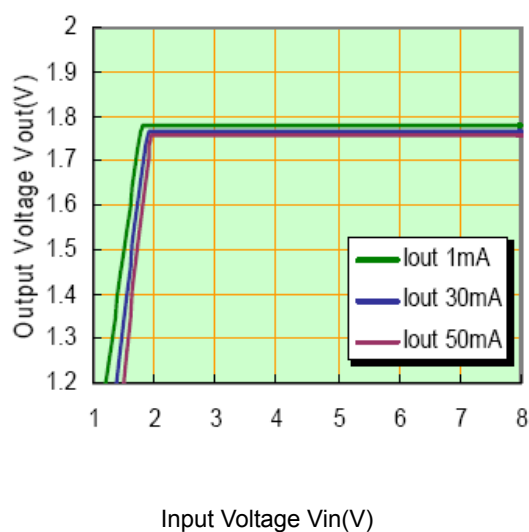
### 1. Output Voltage vs. Output Current (with output short protection)

ACE505-1.8V

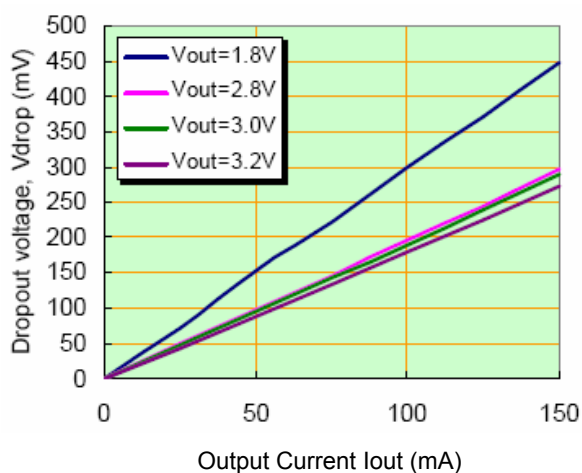


### 2. Output Voltage vs. Input Voltage

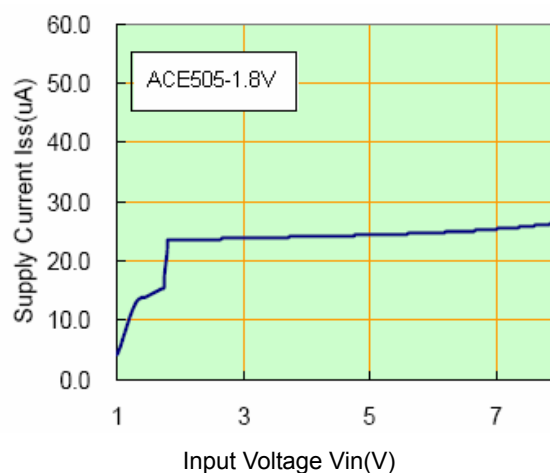
ACE505-1.8V



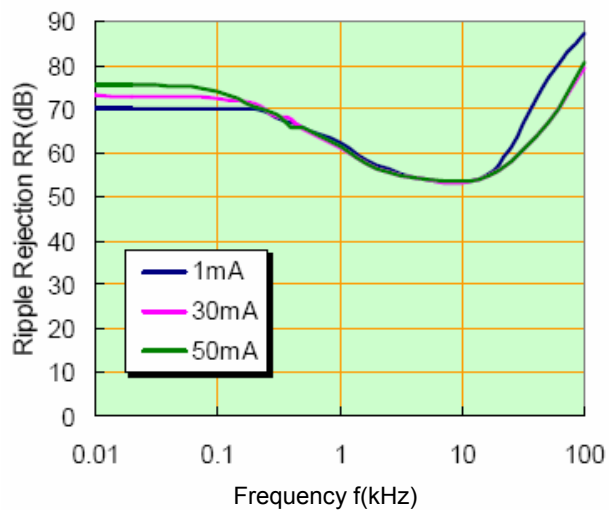
### 3. Dropout Voltage vs. Output Current



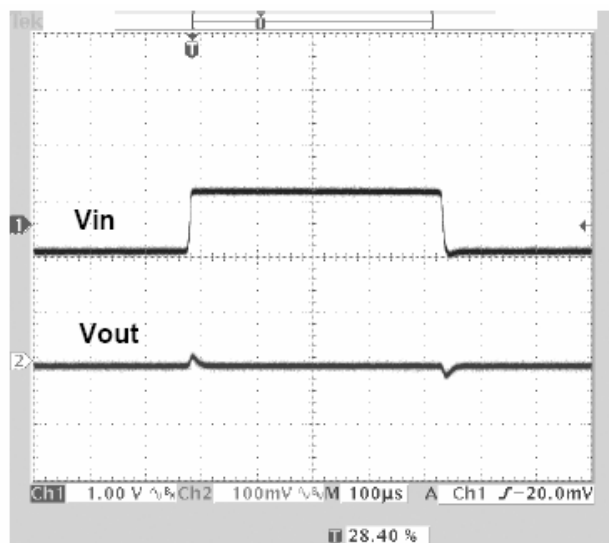
### 4. Supply Current vs. Input Voltage



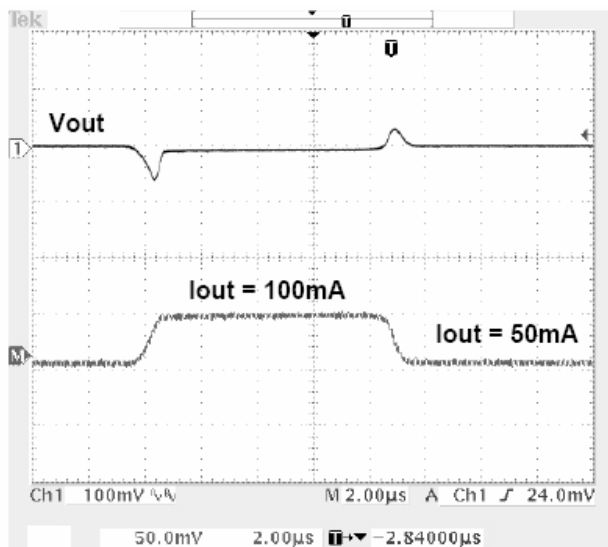
### 5. Ripple rejection vs. Frequency



### 6. Line transient response

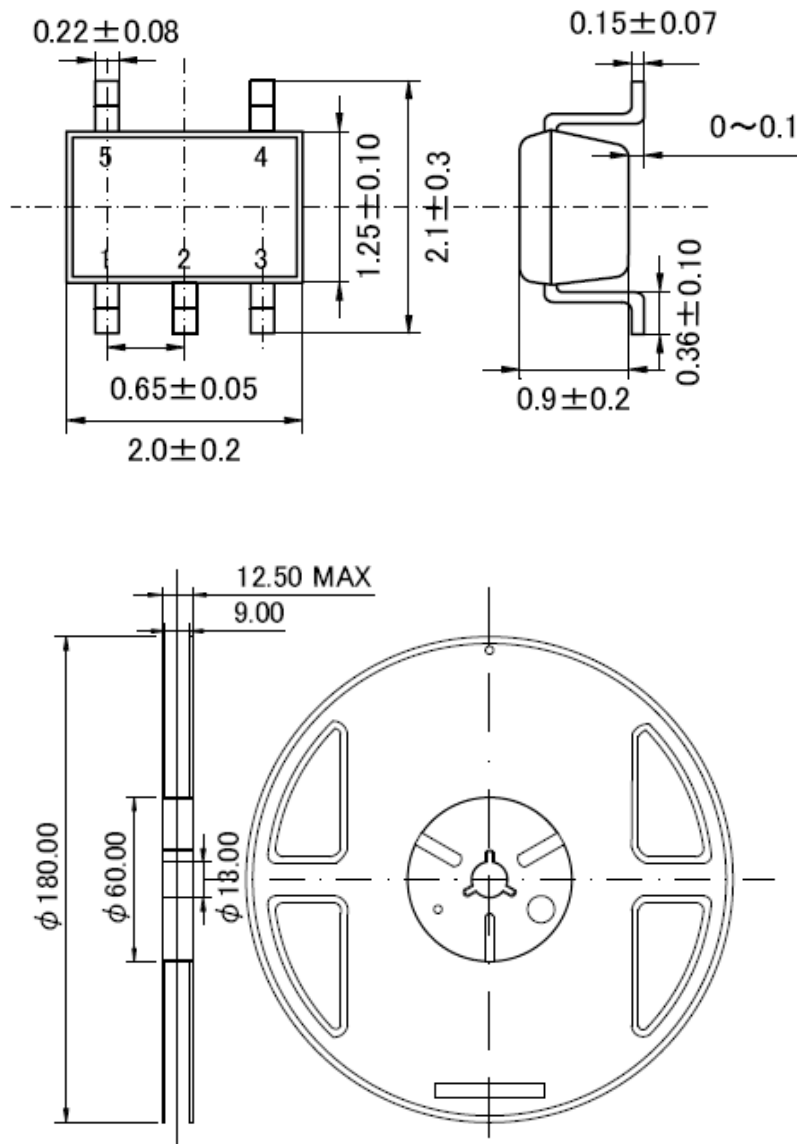


### 7. Load transient response



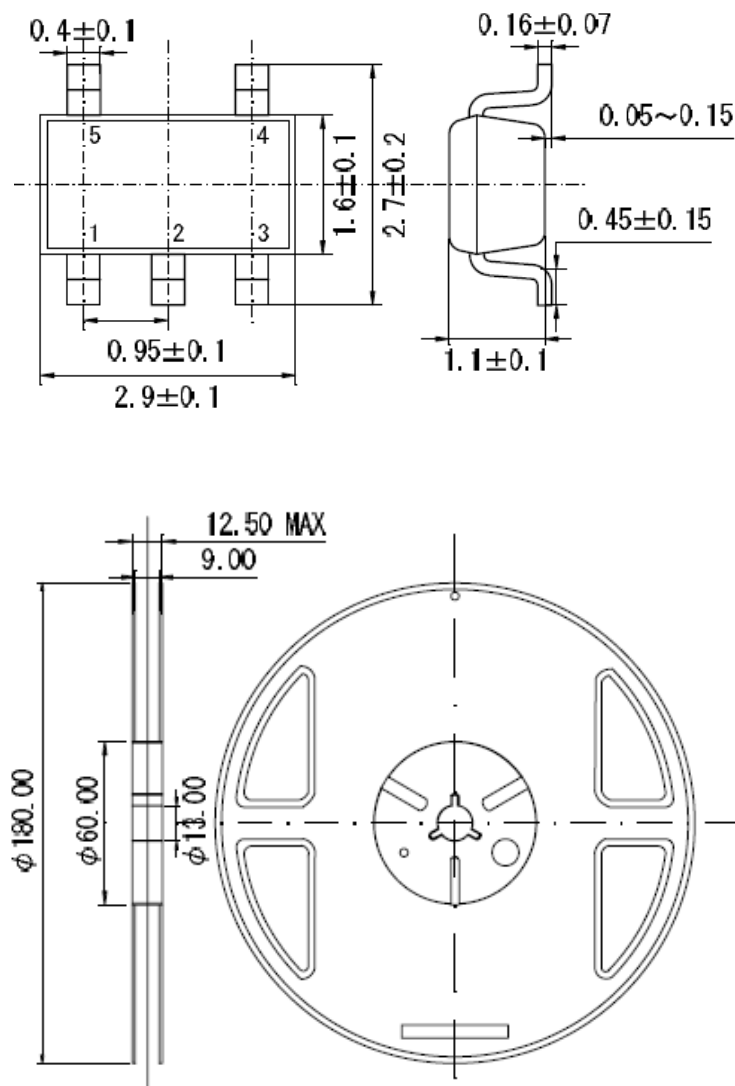
## Packing Information

**SC-70-5**



Packing Information

SOT-23-5





#### Notes

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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.

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