

## 1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

AS7805A

### General Description

The AS7805A is a three terminal positive regulator designed for a wide variety of applications including local, on-card regulation.

The AS7805A is complete with internal current limiting, thermal shutdown protection, and safe-area compensation which make it virtually immune from output overload. If adequate heat sinking is provided, this IC can deliver output current up to 1A.

The AS7805A is available in TO-220-3 and TO-252-2 (1) packages.

### Features

- Output Current up to 1A
- Fixed Output Voltage of 5V
- Output Voltage Accuracy of  $\pm 4\%$  over the Full Temperature Range
- Internal Short Circuit Current Limiting
- Internal Thermal Overload Protection
- Output Transistor Safe-area Protection
- Low Load Regulation
- Stable Performance in High Temperature

### Applications

- High Efficiency Linear Regulator
- Post Regulation for Switching Supply
- Microprocessor Power Supply
- Mother Board

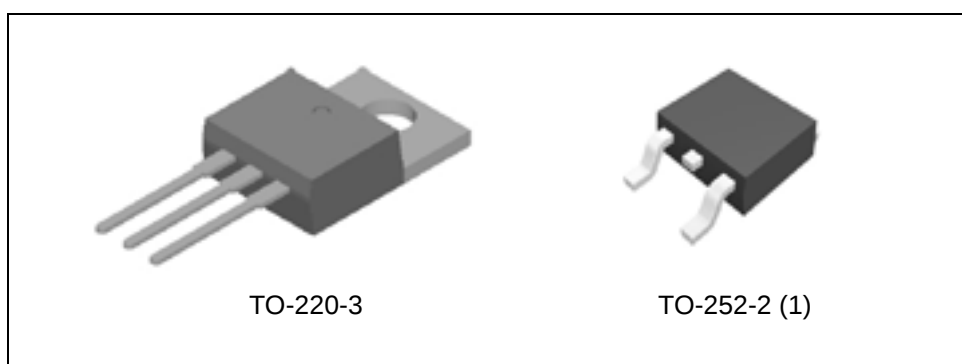


Figure 1. Package Types of AS7805A

# 1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

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## Pin Configuration

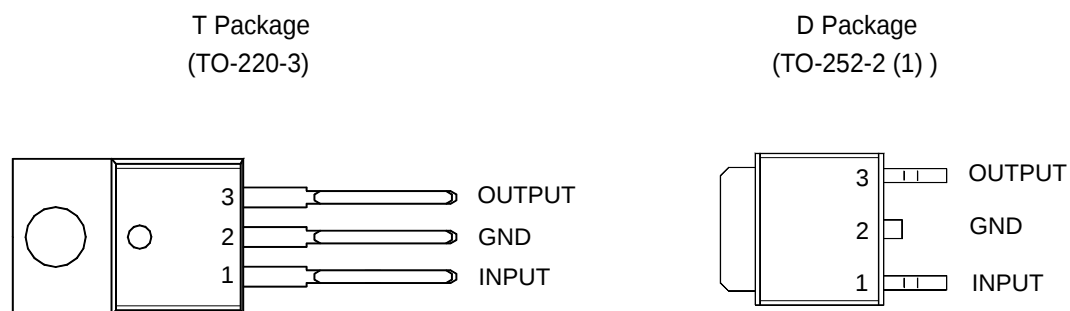


Figure 2. Pin Configuration of AS7805A (Top View)

## Pin Description

| Pin Number | Pin Name | Function       |
|------------|----------|----------------|
| 1          | INPUT    | Voltage Input  |
| 2          | GND      | Ground         |
| 3          | OUTPUT   | Voltage Output |



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## Functional Block Diagram

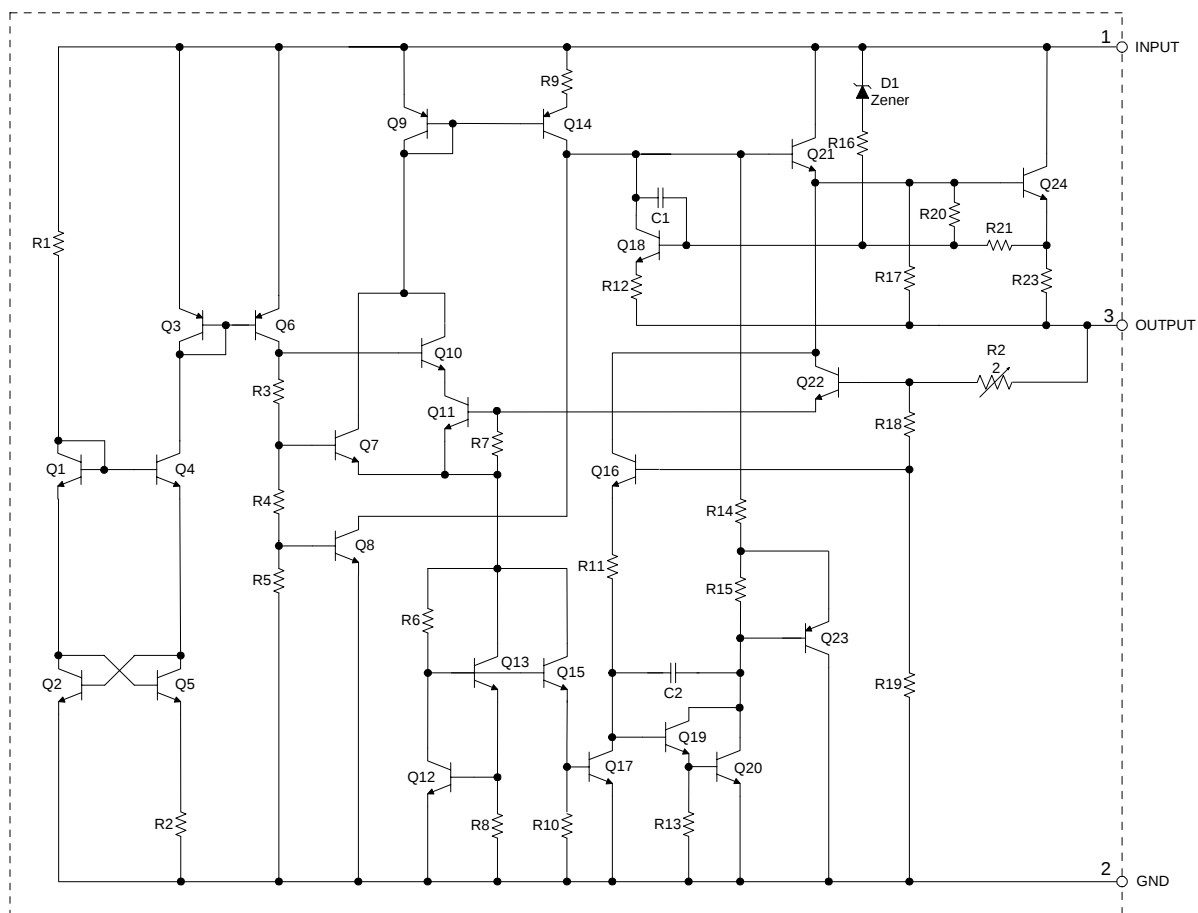
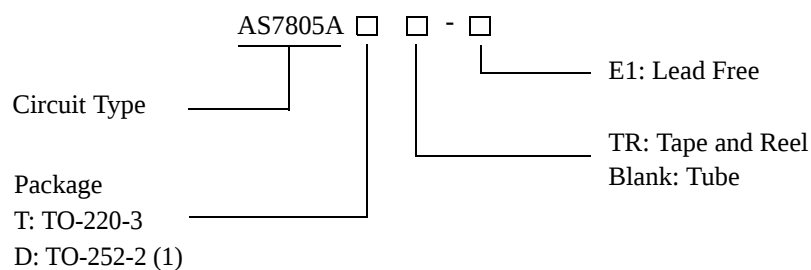


Figure 3. Functional Block Diagram of AS7805A

# 1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

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## Ordering Information



| Package      | Temperature Range | Part Number   | Marking ID  | Packing Type |
|--------------|-------------------|---------------|-------------|--------------|
| TO-220-3     | -40 to 125°C      | AS7805AT-E1   | AS7805AT-E1 | Tube         |
| TO-252-2 (1) | -40 to 125°C      | AS7805AD-E1   | AS7805AD-E1 | Tube         |
|              |                   | AS7805ADTR-E1 | AS7805AD-E1 | Tape & Reel  |

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant.

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## Absolute Maximum Ratings (Note 1)

| Parameter                           | Symbol        | Value              |     | Unit |
|-------------------------------------|---------------|--------------------|-----|------|
| Input Voltage                       | $V_{IN}$      | 36                 |     | V    |
| Lead Temperature (Soldering, 10sec) | $T_{LEAD}$    | 260                |     | °C   |
| Power Dissipation                   | $P_D$         | Internally Limited |     | W    |
| Operating Junction Temperature      | $T_J$         | 150                |     | °C   |
| Storage Temperature Range           | $T_{STG}$     | -65 to 150         |     | °C   |
| Thermal Resistance                  | $\theta_{JA}$ | TO-220-3           | 60  | °C/W |
|                                     |               | TO-252-2 (1)       | 100 |      |
| ESD (Human Body Model)              | ESD           | 6000               |     | V    |
| ESD (Machine Model)                 | ESD           | 500                |     | V    |

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

## Recommended Operating Conditions

| Parameter                            | Symbol   | Min | Max | Unit |
|--------------------------------------|----------|-----|-----|------|
| Input Voltage                        | $V_{IN}$ |     | 25  | V    |
| Operating Junction Temperature Range | $T_J$    | -40 | 125 | °C   |

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## Electrical Characteristics

$V_{IN}=10V$ ,  $I_{OUT}=1A$ ,  $T_J=-40$  to  $125^{\circ}C$ , unless otherwise specified.

| Parameter                              | Symbol                              | Conditions                                                         | Min | Typ  | Max | Unit             |
|----------------------------------------|-------------------------------------|--------------------------------------------------------------------|-----|------|-----|------------------|
| Output Voltage                         | $V_{OUT}$                           | $T_J=25^{\circ}C$                                                  | 4.9 | 5    | 5.1 | V                |
|                                        |                                     | $I_{OUT}=5mA$ to $1A$ , $V_{IN}=7.5V$ to $20V$ ,<br>$P_D \leq 15W$ | 4.8 |      | 5.2 |                  |
| Line Regulation                        | $V_{RLINE}$                         | $V_{IN}=7.5V$ to $20V$ ,<br>$I_{OUT}=500mA$ , $T_J=25^{\circ}C$    |     | 25   | 50  | mV               |
|                                        |                                     | $V_{IN}=7.5V$ to $20V$ ,<br>$I_{OUT}=500mA$ , $T_J=75^{\circ}C$    |     | 15   | 40  | mV               |
| Load Regulation                        | $V_{RLOAD}$                         | $V_{IN}=10V$ , $I_{OUT}=5mA$ to $1A$ , $T_J=25^{\circ}C$           |     | 20   | 50  | mV               |
| Quiescent Current                      | $I_Q$                               | $V_{IN}=10V$ , $I_{OUT}=0$                                         |     | 3.2  | 6   | mA               |
| Quiescent Current Change               | $\Delta I_Q$                        | $V_{IN}=8V$ to $25V$ , $I_{OUT}=500mA$ , $T_J=25^{\circ}C$         |     | 0.3  | 0.8 | mA               |
|                                        |                                     | $I_{OUT}=5mA$ to $1A$ , $T_J=25^{\circ}C$                          |     | 0.08 | 0.5 |                  |
| Ripple Rejection                       | PSRR                                | $V_{IN}=8V$ to $18V$ , $f=120Hz$ , $I_{OUT}=500mA$                 |     | 70   |     | dB               |
| Dropout Voltage                        | $V_{DROP}$                          | $\Delta V_{OUT}=1\%$ , $I_{OUT}=1A$ , $T_J=25^{\circ}C$            |     | 2    |     | V                |
| Output Noise Voltage                   | $N_O$                               | $f=10Hz$ to $100kHz$ , $T_A=25^{\circ}C$                           |     | 10   |     | $\mu V/V_O$      |
| Output Resistance                      | $R_O$                               | $f=1kHz$                                                           |     | 10   |     | $m\Omega$        |
| Short Circuit Current                  | $I_{SC}$                            | $V_{IN}=35V$ , $T_A=25^{\circ}C$                                   |     | 0.05 |     | A                |
| Peak Output Current                    | $I_{PK}$                            | $V_{IN}=10V$ , $T_J=25^{\circ}C$                                   |     | 2.2  |     | A                |
| Output Voltage Temperature Coefficient | $\Delta V_{OUT}/\Delta T$           |                                                                    |     | 0.4  |     | $mV/^{\circ}C$   |
|                                        | $(\Delta V_{OUT}/V_{OUT})/\Delta T$ |                                                                    |     | 80   |     | ppm/ $^{\circ}C$ |

# 1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

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## Typical Performance Characteristics

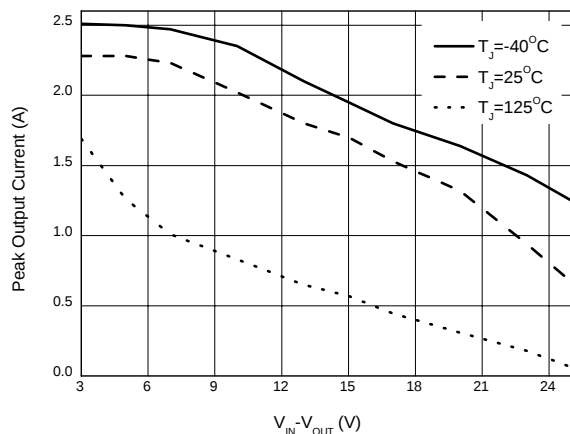


Figure 4. Peak Output Current vs. Input/Output Differential Voltage

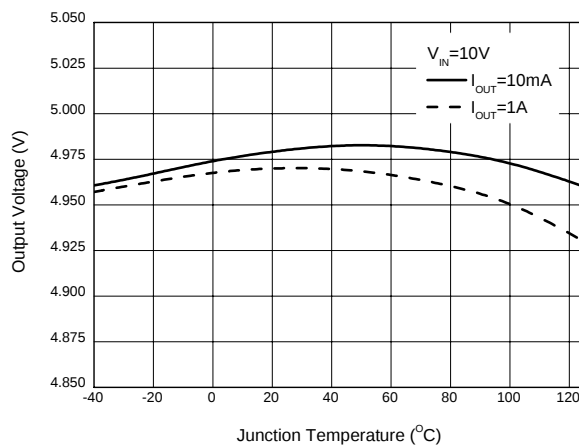


Figure 5. Output Voltage vs. Junction Temperature

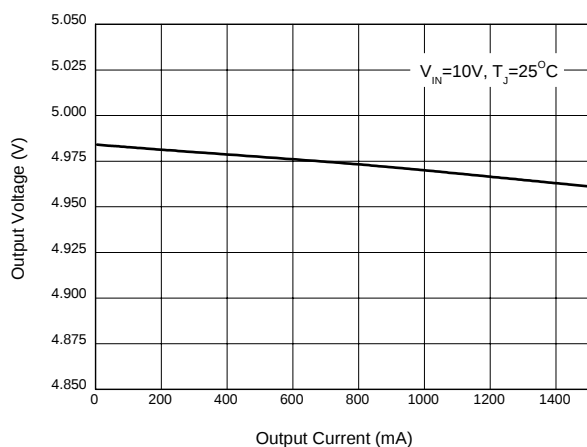


Figure 6. Output Voltage vs. Output Current

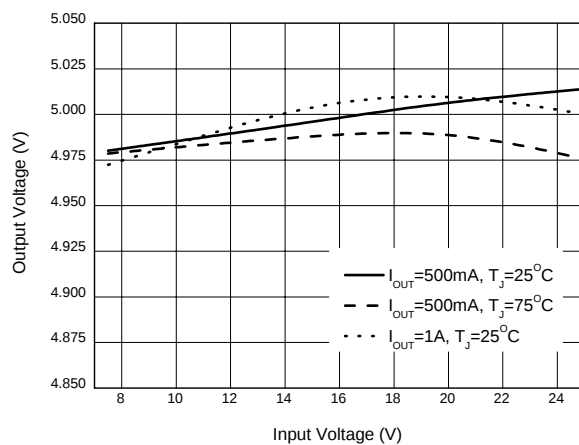


Figure 7. Output Voltage vs. Input Voltage

# 1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

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## Typical Performance Characteristics (Continued)

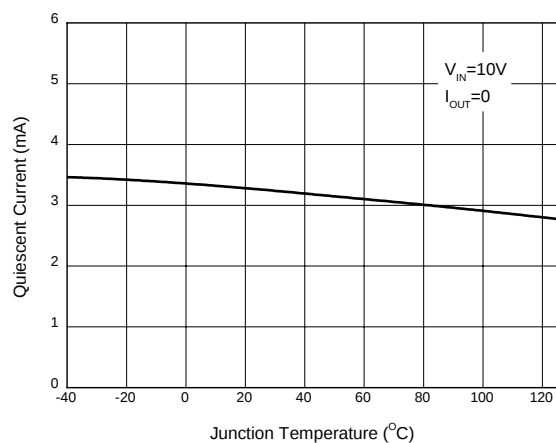


Figure 8. Quiescent Current vs. Junction Temperature

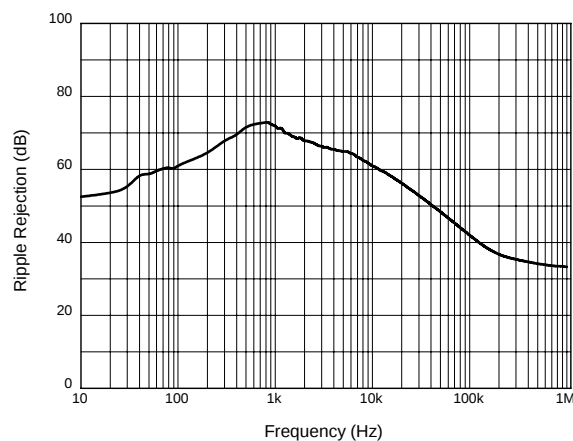


Figure 9. Ripple Rejection vs. Frequency

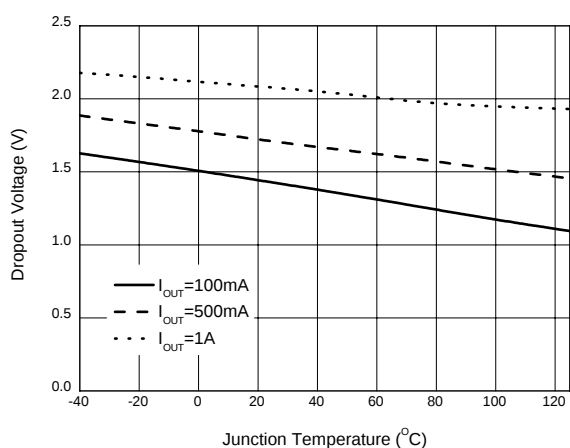


Figure 10. Dropout Voltage vs. Junction Temperature

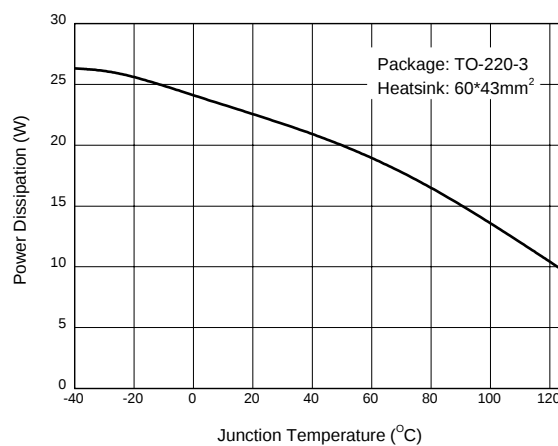


Figure 11. Power Dissipation vs. Junction Temperature

**1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR**

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**Typical Performance Characteristics (Continued)**

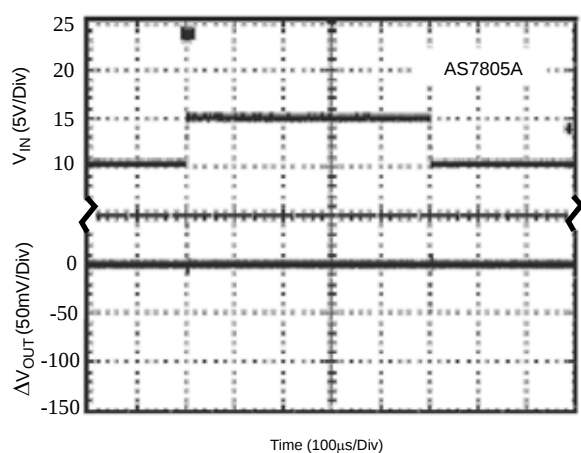


Figure 12. Line Transient  
(Conditions:  $I_{OUT}=500\text{mA}$ ,  $C_{OUT}=0.1\mu\text{F}$ )

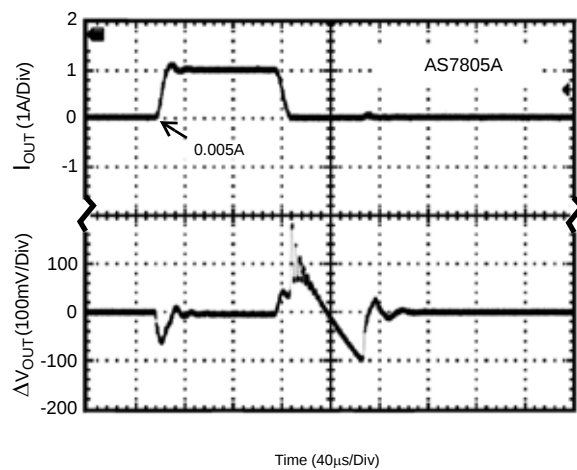


Figure 13. Load Transient  
(Conditions:  $V_{IN}=10\text{V}$ ,  $C_{IN}=0.33\mu\text{F}$ ,  $C_{OUT}=0.1\mu\text{F}$ )

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## Typical Application

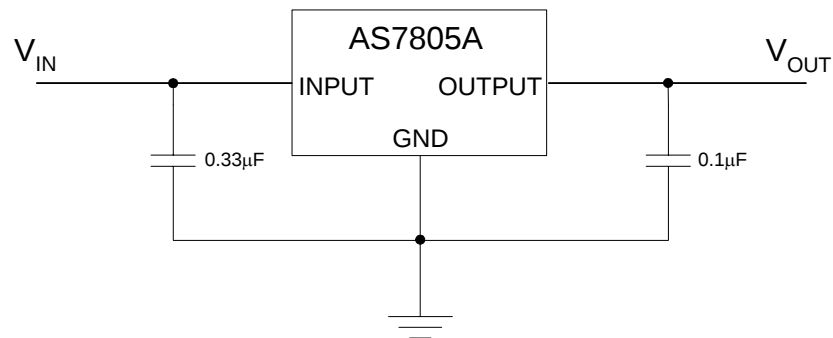
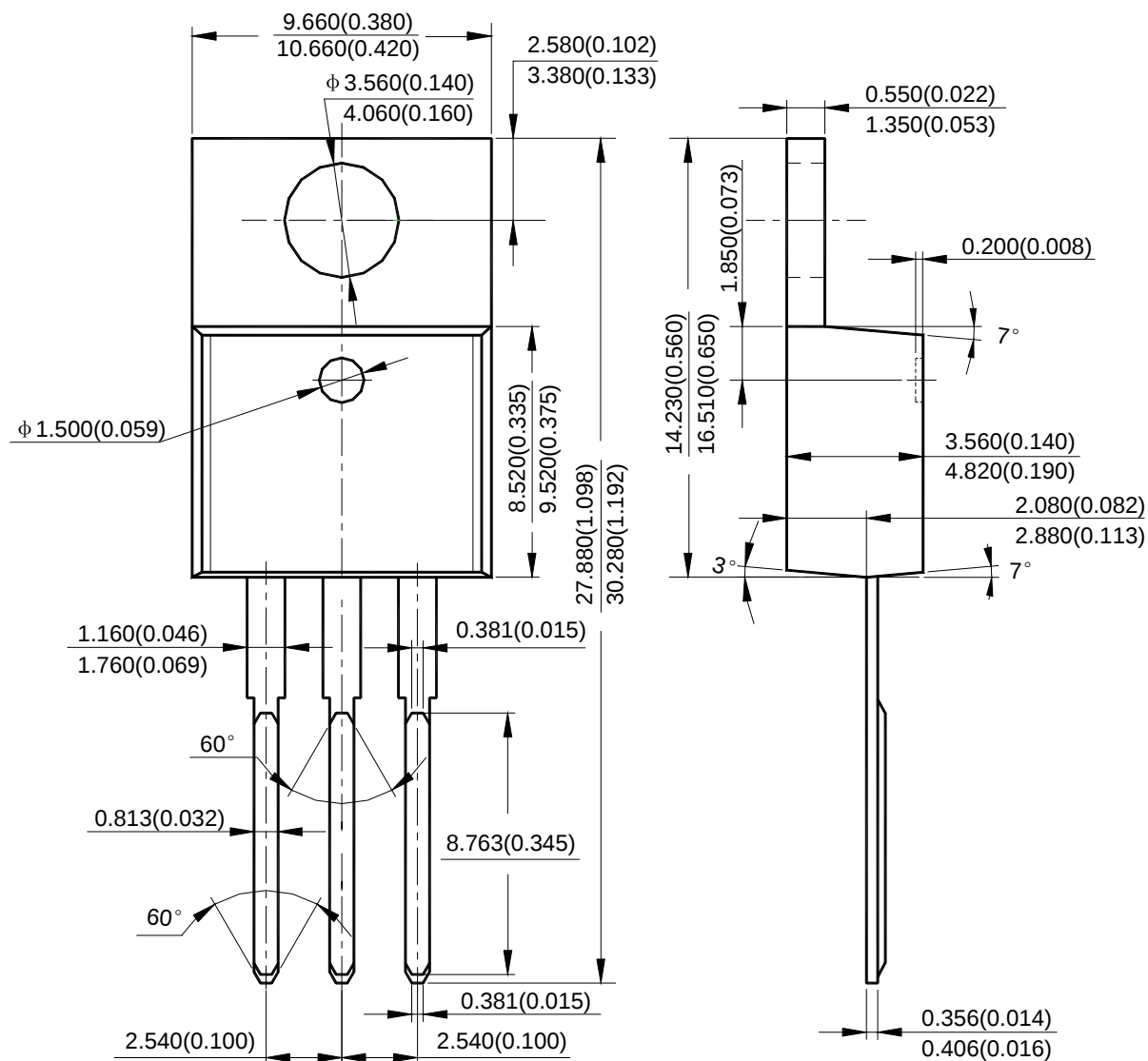
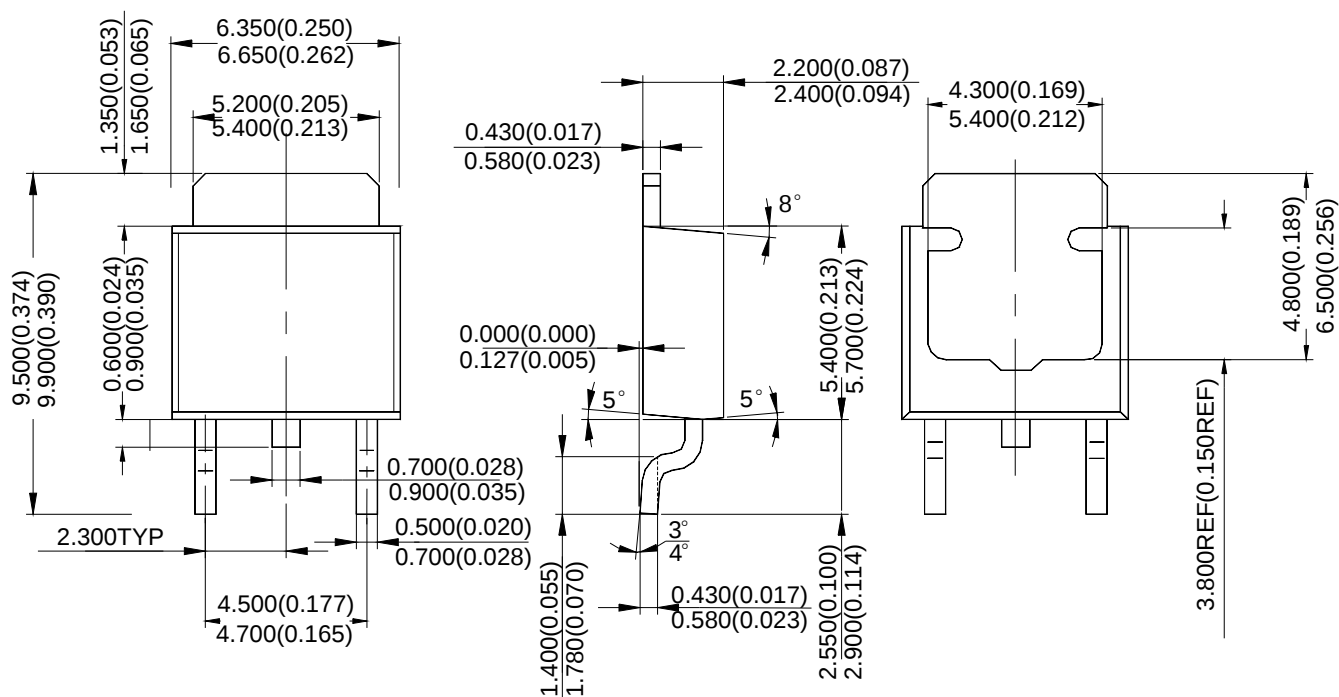


Figure 14. Typical Application of AS7805A

**1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR****AS7805A****Mechanical Dimensions****TO-220-3****Unit: mm(inch)**

**1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR****AS7805A****Mechanical Dimensions (Continued)****TO-252-2(1)****Unit: mm(inch)**



BCD Semiconductor Manufacturing Limited

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#### MAIN SITE

##### **BCD Semiconductor Manufacturing Limited**

##### **- Wafer Fab**

##### **Shanghai SIM-BCD Semiconductor Manufacturing Limited**

800, Yi Shan Road, Shanghai 200233, China

Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

#### REGIONAL SALES OFFICE

##### **Shenzhen Office**

##### **Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd. Shenzhen Office**

##### **Advanced Analog Circuits (Shanghai) Corporation Shenzhen Office**

Room E, 5F, Noble Center, No.1006, 3rd Fuzhong Road, Futian District, Shenzhen 518026, China

Tel: +86-755-8826 7951

Fax: +86-755-8826 7865

##### **BCD Semiconductor Manufacturing Limited**

##### **- IC Design Group**

##### **Advanced Analog Circuits (Shanghai) Corporation**

8F, Zone B, 900, Yi Shan Road, Shanghai 200233, China

Tel: +86-21-6495 9539, Fax: +86-21-6485 9673

##### **Taiwan Office**

##### **BCD Semiconductor (Taiwan) Company Limited**

4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei,

Taiwan

Tel: +886-2-2656 2808

Fax: +886-2-2656 2806

##### **USA Office**

##### **BCD Semiconductor Corporation**

30920 Huntwood Ave. Hayward,

CA 94544, U.S.A

Tel : +1-510-324-2988

Fax: +1-510-324-2788



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**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331