

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

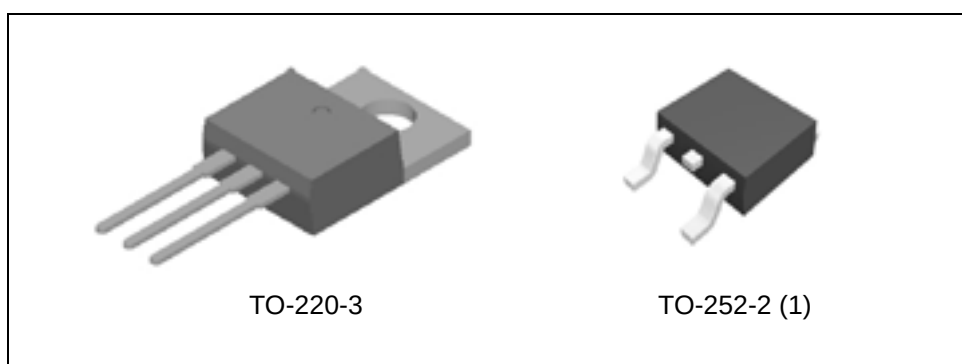


Figure 1. Package Types of AS7805A

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Pin Configuration

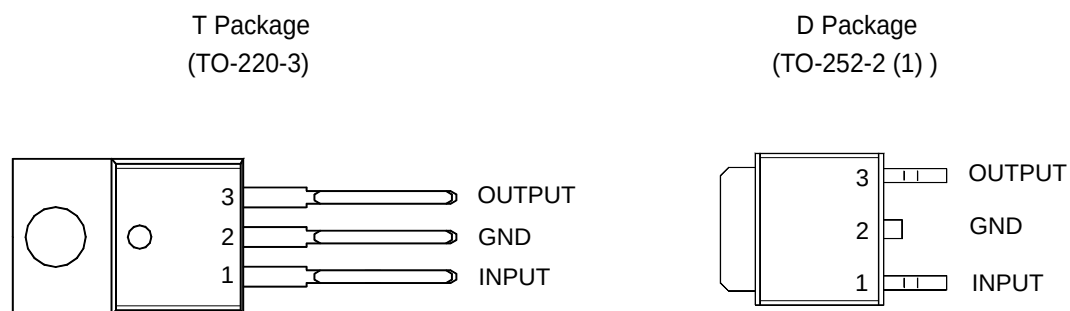


Figure 2. Pin Configuration of AS7805A (Top View)

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

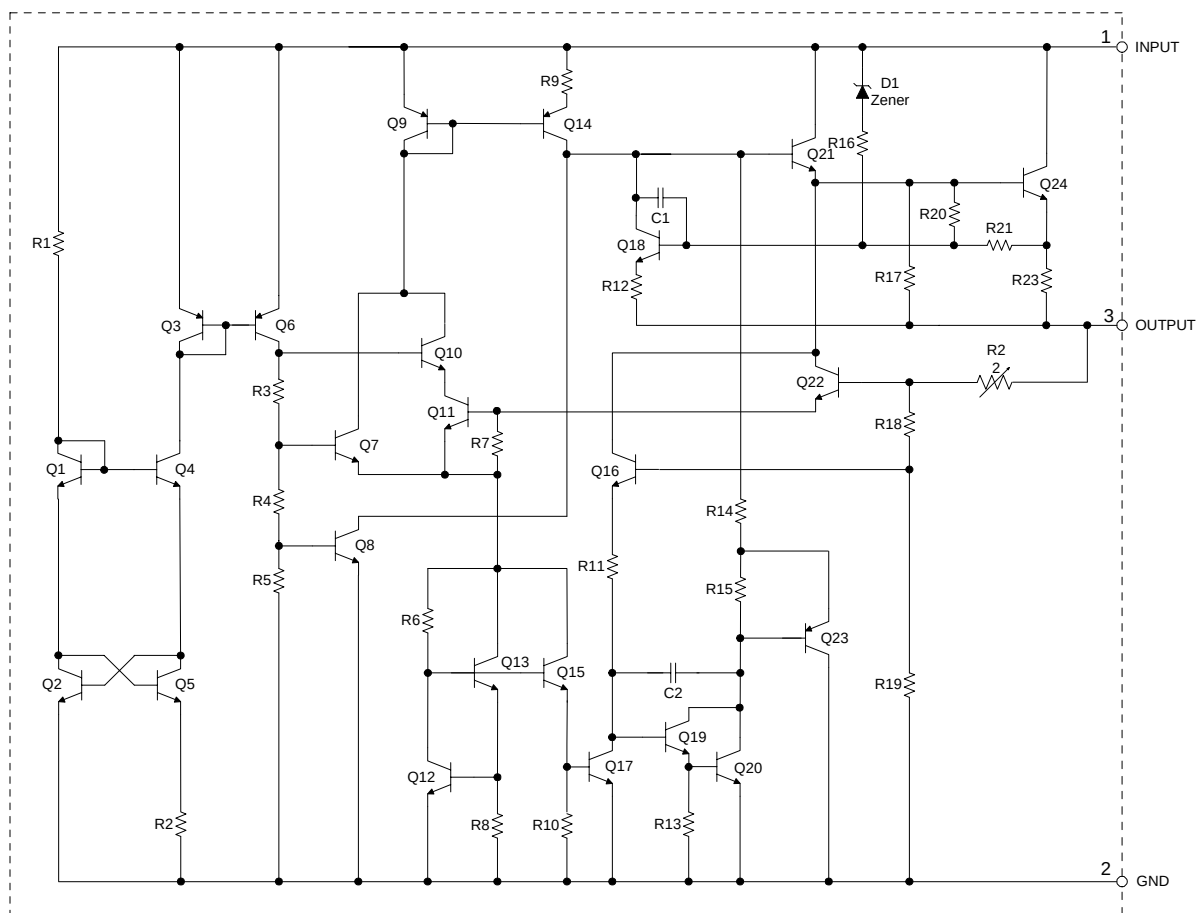
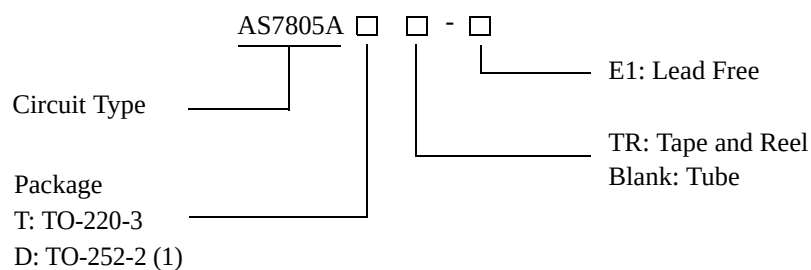


Figure 3. Functional Block Diagram of AS7805A

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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	θ_{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 $20V$, $P_D \leq 15W$	4.8		5.2	
Line Regulation	V_{RLINE}	$V_{IN}=7.5V$ to $20V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		25	50	mV
		$V_{IN}=7.5V$ to $20V$, $I_{OUT}=500mA$, $T_J=75^{\circ}C$		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	ΔI_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/ $^{\circ}C$

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Typical Performance Characteristics

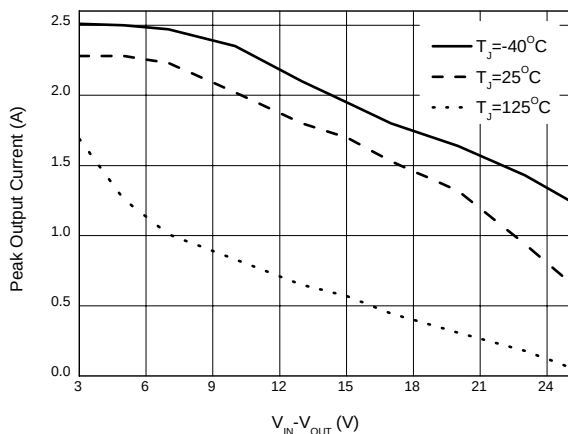


Figure 4. Peak Output Current vs. Input/Output Differential Voltage

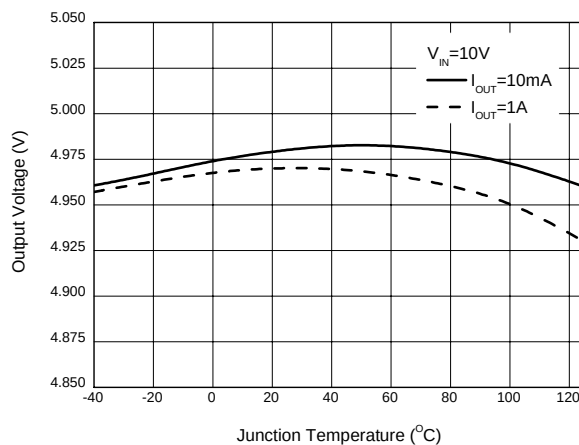


Figure 5. Output Voltage vs. Junction Temperature

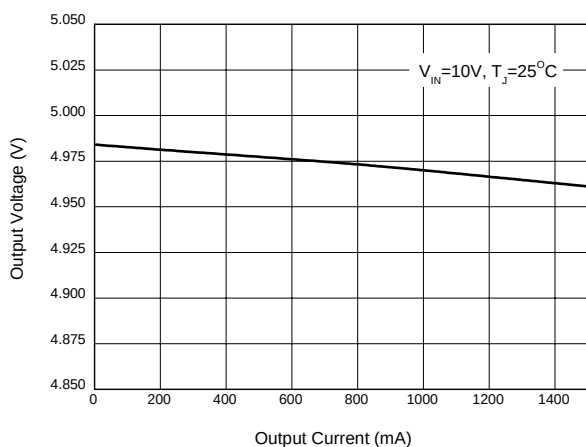


Figure 6. Output Voltage vs. Output Current

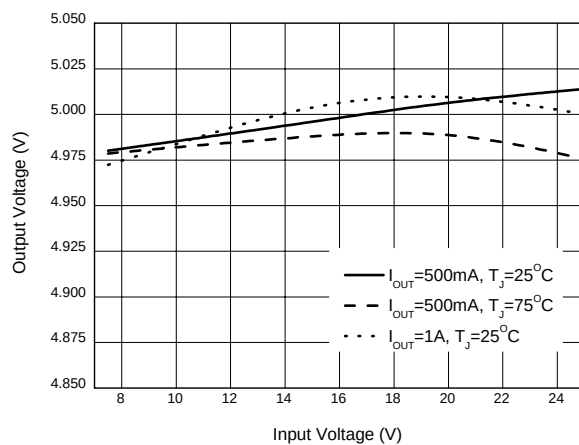


Figure 7. Output Voltage vs. Input Voltage

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Typical Performance Characteristics (Continued)

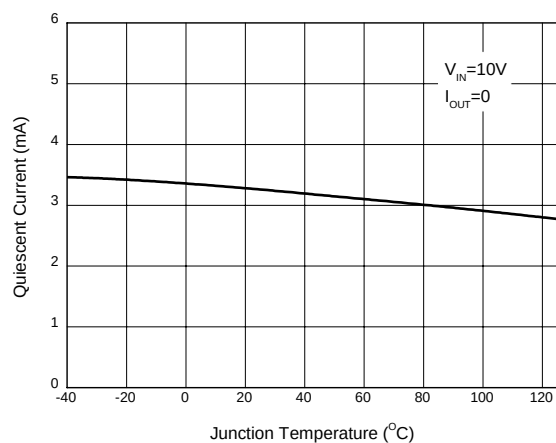


Figure 8. Quiescent Current vs. Junction Temperature

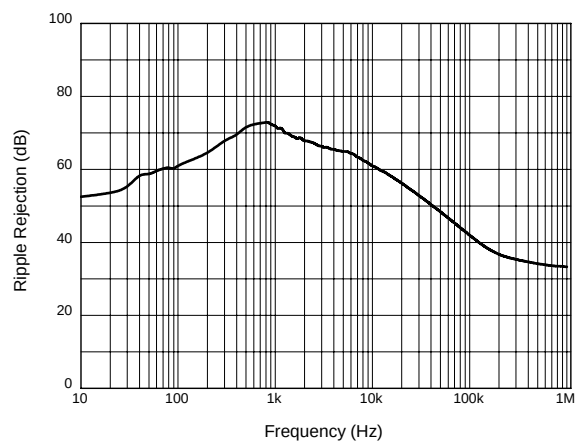


Figure 9. Ripple Rejection vs. Frequency

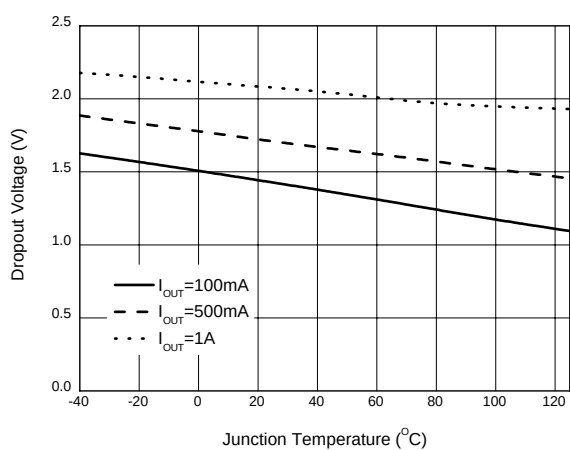


Figure 10. Dropout Voltage vs. Junction Temperature

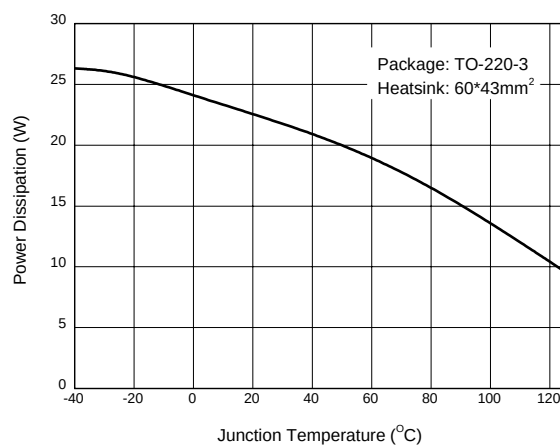


Figure 11. Power Dissipation vs. Junction Temperature

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Typical Performance Characteristics (Continued)

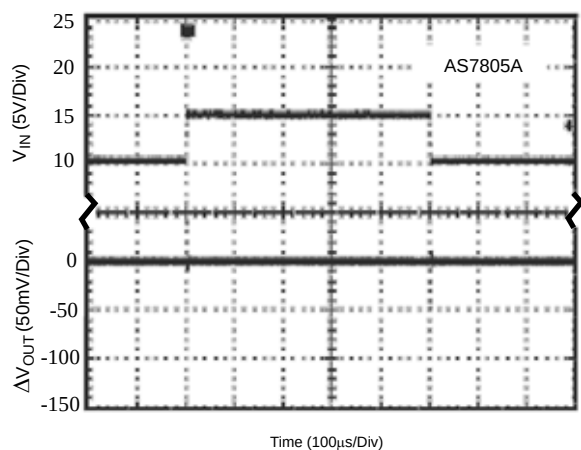


Figure 12. Line Transient
(Conditions: $I_{OUT}=500\text{mA}$, $C_{OUT}=0.1\mu\text{F}$)

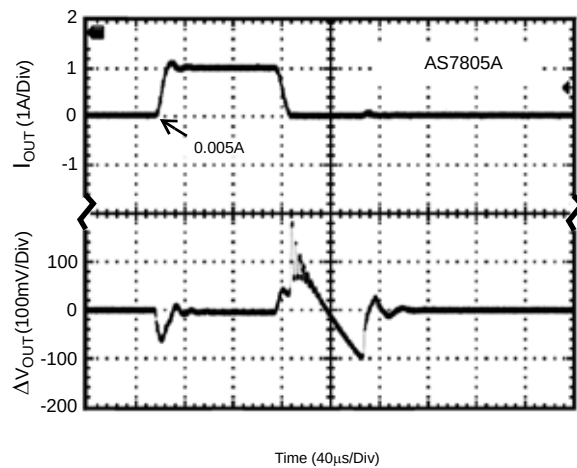


Figure 13. Load Transient
(Conditions: $V_{IN}=10\text{V}$, $C_{IN}=0.33\mu\text{F}$, $C_{OUT}=0.1\mu\text{F}$)

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Typical Application

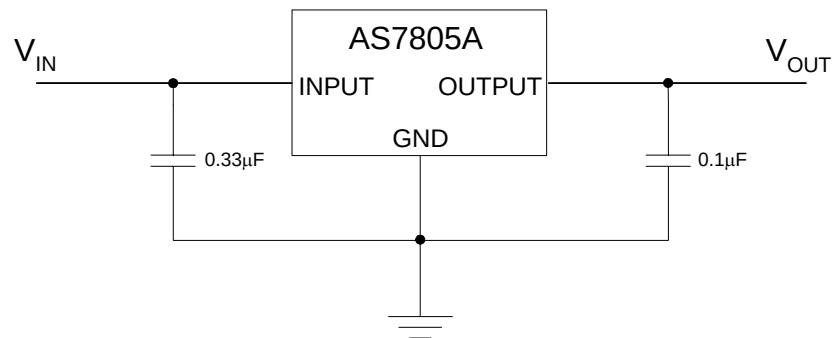
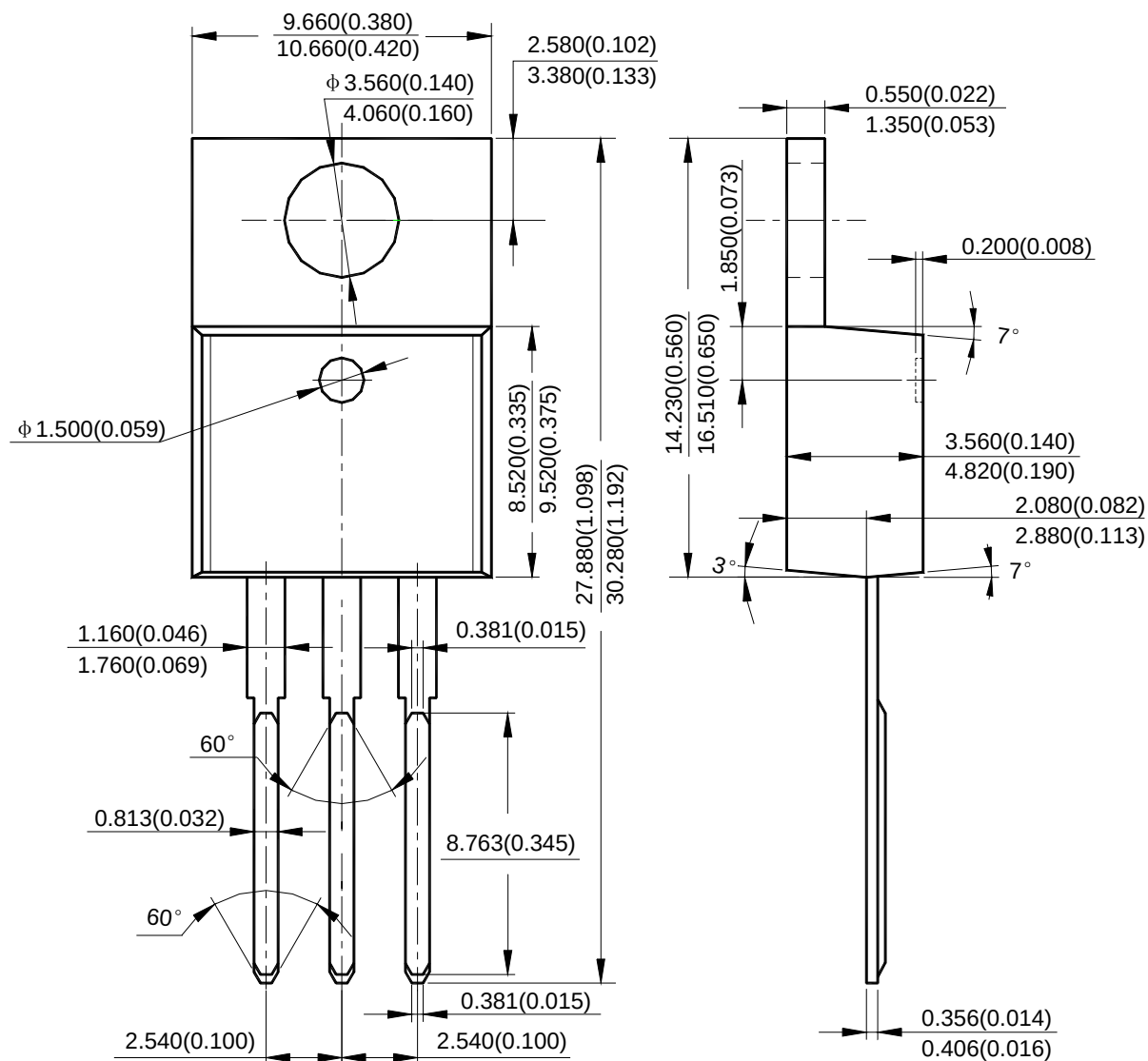
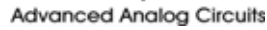


Figure 14. Typical Application of AS7805A

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



TO-252-2(1)

Technical drawing of a mechanical part showing three views: front, side, and top. The drawing includes dimensions in millimeters (mm) and inches (in), and angles.

Front View Dimensions:

- Overall width: 6.350 (0.250) / 6.650 (0.262)
- Top flange width: 5.200 (0.205) / 5.400 (0.213)
- Top flange thickness: 1.350 (0.053) / 1.650 (0.065)
- Central slot width: 0.600 (0.024) / 0.900 (0.035)
- Overall height: 9.500 (0.374) / 9.900 (0.390)
- Bottom flange width: 4.500 (0.177) / 4.700 (0.165)
- Bottom flange thickness: 0.700 (0.028) / 0.900 (0.035)
- Central slot depth: 0.500 (0.020) / 0.700 (0.028)
- Bottom flange offset: 2.300 TYP

Side View Dimensions:

- Overall width: 2.200 (0.087) / 2.400 (0.094)
- Top flange width: 0.430 (0.017) / 0.580 (0.023)
- Top flange thickness: 0.430 (0.017) / 0.580 (0.023)
- Central slot width: 0.000 (0.000) / 0.127 (0.005)
- Overall height: 5.400 (0.213) / 5.700 (0.224)
- Bottom flange width: 0.430 (0.017) / 0.580 (0.023)
- Bottom flange thickness: 2.550 (0.100) / 2.900 (0.114)
- Bottom flange offset: 1.400 (0.055) / 1.780 (0.070)
- Angles: 8°, 5°, 3°, 4°

Top View Dimensions:

- Overall width: 4.300 (0.169) / 5.400 (0.212)
- Overall height: 4.800 (0.189) / 6.500 (0.256)
- Bottom flange width: 3.800 REF (0.150 REF)



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