

1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR**AS78XXA****General Description**

The AS78XXA series are three terminal positive voltage regulators designed for a wide variety of applications including local, on-card regulation.

The AS78XXA are complete with internal current limiting, thermal shutdown protection, and safe-area compensation which make them virtually immune from output overload. If adequate heat sinking are provided, these regulators can deliver output currents up to 1A.

The AS78XXA are available in TO-220-3 and TO-252-2 (1) packages.

Features

- Output Current up to 1A
- Fixed Output Voltages of 5V, 8V, 9V, 12V, 15V and 18V
- 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

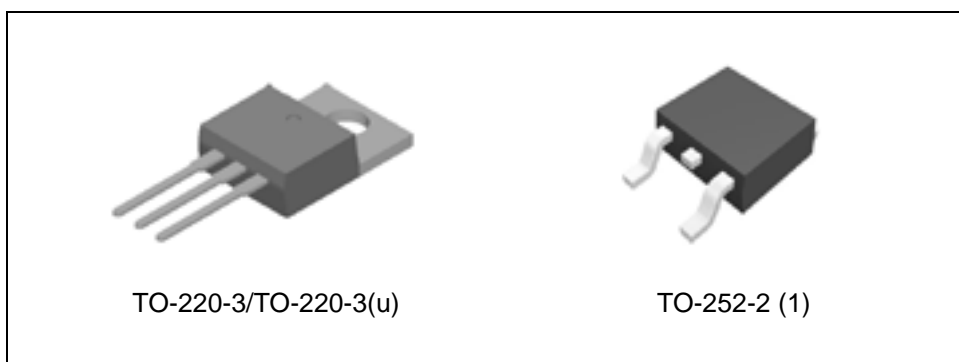


Figure 1. Package Types of AS78XXA

1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

AS78XXA

Pin Configuration

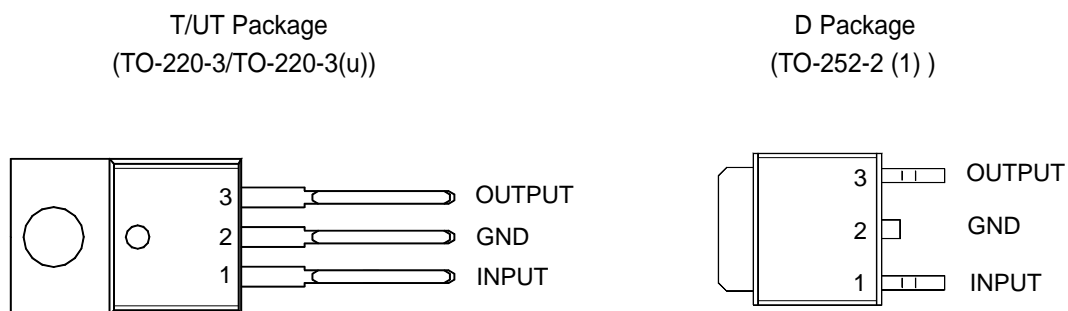


Figure 2. Pin Configuration of AS78XXA (Top View)

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

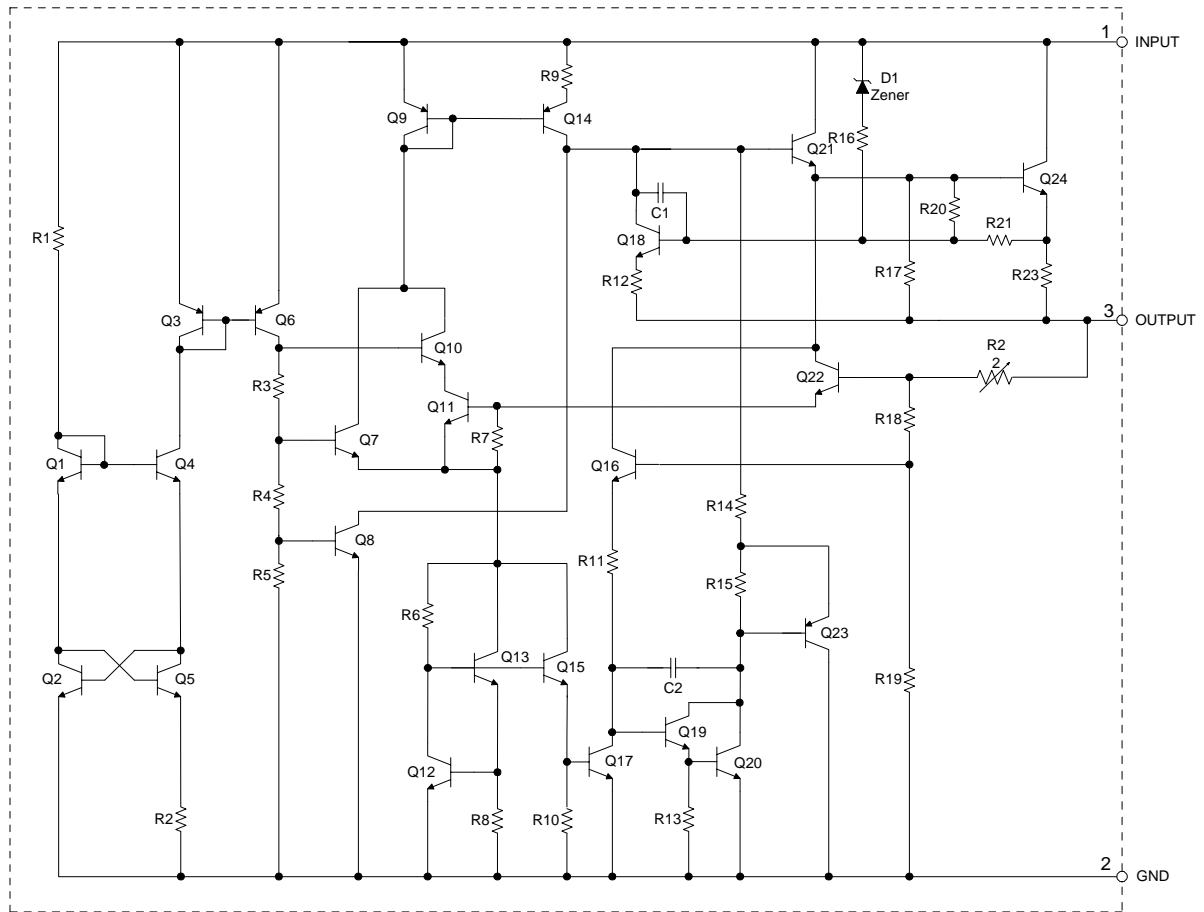


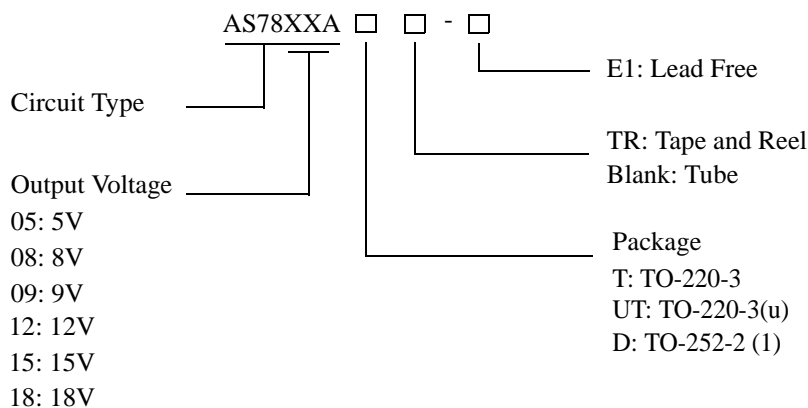
Figure 3. Functional Block Diagram of AS78XXA



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

AS78XXA

Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing Type
TO-220-3	-40 to 125°C	AS7805AT-E1	AS7805AT-E1	Tube
		AS7808AT-E1	AS7808AT-E1	Tube
		AS7809AT-E1	AS7809AT-E1	Tube
		AS7812AT-E1	AS7812AT-E1	Tube
		AS7815AT-E1	AS7815AT-E1	Tube
		AS7818AT-E1	AS7818AT-E1	Tube
TO-220-3(u)	-40 to 125°C	AS7805AUT-E1	AS7805AUT-E1	Tube
		AS7808AUT-E1	AS7808AUT-E1	Tube
		AS7809AUT-E1	AS7809AUT-E1	Tube
		AS7812AUT-E1	AS7812AUT-E1	Tube
		AS7815AUT-E1	AS7815AUT-E1	Tube
		AS7818AUT-E1	AS7818AUT-E1	Tube
TO-252-2 (1)	-40 to 125°C	AS7805AD-E1	AS7805AD-E1	Tube
		AS7805ADTR-E1	AS7805AD-E1	Tape & Reel
		AS7808AD-E1	AS7808AD-E1	Tube
		AS7808ADTR-E1	AS7808AD-E1	Tape & Reel
		AS7809AD-E1	AS7809AD-E1	Tube
		AS7809ADTR-E1	AS7809AD-E1	Tape & Reel
		AS7812AD-E1	AS7812AD-E1	Tube
		AS7812ADTR-E1	AS7812AD-E1	Tape & Reel
		AS7815AD-E1	AS7815AD-E1	Tube
		AS7815ADTR-E1	AS7815AD-E1	Tape & Reel
		AS7818AD-E1	AS7818AD-E1	Tube
		AS7818ADTR-E1	AS7818AD-E1	Tape & Reel

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

**1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR****AS78XXA****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/TO-220-3(u)	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	AS7805A	V_{IN}		25	V
	AS7808A			28	
	AS7809A			29	
	AS7812A			32	
	AS7815A			32	
	AS7818A			32	
Operating Junction Temperature Range		T_J	-40	125	°C



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

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Electrical Characteristics

AS7805A ($V_{IN}=10V$, $I_{OUT}=1A$, $T_J=-40$ 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
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/ $^{\circ}C$



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR AS78XXA

Electrical Characteristics (Continued)

AS7808A ($V_{IN}=14V$, $I_{OUT}=1A$, $T_J=-40$ to $125^{\circ}C$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	7.84	8	8.16	V
		$I_{OUT}=5mA$ to $1A$, $V_{IN}=10.6V$ to $23V$, $P_D \leq 15W$	7.7		8.3	
Line Regulation	V_{RLINE}	$V_{IN}=10.6V$ to $23V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		25	75	mV
Load Regulation	V_{RLOAD}	$V_{IN}=14V$, $I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		25	75	mV
Quiescent Current	I_Q	$V_{IN}=14V$, $I_{OUT}=0$		3.2	6	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=10.6V$ to $23V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		0.3	0.8	mA
		$I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		0.08	0.5	
Ripple Rejection	PSRR	$V_{IN}=11.5V$ to $21.5V$, $f=120Hz$, $I_{OUT}=500mA$		62		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}	$V_{IN}=35V$, $T_A=25^{\circ}C$		0.2		A
Peak Output Current	I_{PK}	$V_{IN}=14V$, $T_J=25^{\circ}C$		2.2		A
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$			0.64		$mV/^{\circ}C$
	$(\Delta V_{OUT}/V_{OUT})/\Delta T$			80		ppm/ $^{\circ}C$



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

AS78XXA

Electrical Characteristics (Continued)

AS7809A ($V_{IN}=15V$, $I_{OUT}=1A$, $T_J=-40$ to $125^{\circ}C$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	8.82	9	9.18	V
		$I_{OUT}=5mA$ to $1A$, $V_{IN}=11.5V$ to $23V$, $P_D \leq 15W$	8.65		9.35	
Line Regulation	V_{RLINE}	$V_{IN}=11.5V$ to $23V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		25	90	mV
Load Regulation	V_{RLOAD}	$V_{IN}=14V$, $I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		25	100	mV
Quiescent Current	I_Q	$V_{IN}=15V$, $I_{OUT}=0$		3.2	6	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=11.5V$ to $23V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		0.3	0.8	mA
		$I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		0.08	0.5	
Ripple Rejection	PSRR	$V_{IN}=11.5V$ to $21.5V$, $f=120Hz$, $I_{OUT}=500mA$		61		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}	$V_{IN}=35V$, $T_A=25^{\circ}C$		0.2		A
Peak Output Current	I_{PK}	$V_{IN}=15V$, $T_J=25^{\circ}C$		2.2		A
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$			0.72		$mV/^{\circ}C$
	$(\Delta V_{OUT}/V_{OUT})/\Delta T$			80		ppm/ $^{\circ}C$



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

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Electrical Characteristics (Continued)

AS7812A ($V_{IN}=19V$, $I_{OUT}=1A$, $T_J=-40$ to $125^{\circ}C$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	11.75	12	12.25	V
		$I_{OUT}=5mA$ to $1A$, $V_{IN}=14.8V$ to $27V$, $P_D \leq 15W$	11.5		12.5	
Line Regulation	V_{RLINE}	$V_{IN}=14.8V$ to $27V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		25	120	mV
Load Regulation	V_{RLOAD}	$V_{IN}=19V$, $I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		40	120	mV
Quiescent Current	I_Q	$V_{IN}=19V$, $I_{OUT}=0$		3.4	6	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=14.8V$ to $30V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		0.3	0.8	mA
		$I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		0.08	0.5	
Ripple Rejection	PSRR	$V_{IN}=15V$ to $25V$, $f=120Hz$, $I_{OUT}=500mA$		60		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	$f=1kHz$		11		$m\Omega$
Short Circuit Current	I_{SC}	$V_{IN}=35V$, $T_A=25^{\circ}C$		0.2		A
Peak Output Current	I_{PK}	$V_{IN}=18V$, $T_J=25^{\circ}C$		2.2		A
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$			0.96		$mV/^{\circ}C$
	$(\Delta V_{OUT}/V_{OUT})/\Delta T$			80		ppm/ $^{\circ}C$



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

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Electrical Characteristics (Continued)

AS7815A ($V_{IN}=23V$, $I_{OUT}=1A$, $T_J=-40$ to $125^{\circ}C$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	14.7	15	15.3	V
		$I_{OUT}=5mA$ to $1A$, $V_{IN}=17.9V$ to $30V$, $P_D \leq 15W$	14.4		15.6	
Line Regulation	V_{RLINE}	$V_{IN}=17.9V$ to $30V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		35	150	mV
Load Regulation	V_{RLOAD}	$V_{IN}=23V$, $I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		70	150	mV
Quiescent Current	I_Q	$V_{IN}=23V$, $I_{OUT}=0$		3.4	6	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=17.9V$ to $30V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		0.3	0.8	mA
		$I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		0.08	0.5	
Ripple Rejection	PSRR	$V_{IN}=18.5V$ to $28.5V$, $f=120Hz$, $I_{OUT}=500mA$		58		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	$f=1kHz$		11		$m\Omega$
Short Circuit Current	I_{SC}	$V_{IN}=35V$, $T_A=25^{\circ}C$		0.2		A
Peak Output Current	I_{PK}	$V_{IN}=21V$, $T_J=25^{\circ}C$		2.2		A
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$			1.2		$mV/^{\circ}C$
	$(\Delta V_{OUT}/V_{OUT})/\Delta T$			80		ppm/ $^{\circ}C$



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR AS78XXA

Electrical Characteristics (Continued)

AS7818A ($V_{IN}=27V$, $I_{OUT}=1A$, $T_J=-40$ to $125^{\circ}C$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	$T_J=25^{\circ}C$	17.64	18	18.36	V
		$I_{OUT}=5mA$ to $1A$, $V_{IN}=21V$ to $33V$, $P_D \leq 15W$	17.3		18.7	
Line Regulation	V_{RLINE}	$V_{IN}=21V$ to $33V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		45	180	mV
Load Regulation	V_{RLOAD}	$V_{IN}=27V$, $I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		85	180	mV
Quiescent Current	I_Q	$V_{IN}=27V$, $I_{OUT}=0$		3.6	6	mA
Quiescent Current Change	ΔI_Q	$V_{IN}=21V$ to $33V$, $I_{OUT}=500mA$, $T_J=25^{\circ}C$		0.3	0.8	mA
		$I_{OUT}=5mA$ to $1A$, $T_J=25^{\circ}C$		0.08	0.5	
Ripple Rejection	PSRR	$V_{IN}=22V$ to $32V$, $f=120Hz$, $I_{OUT}=500mA$		57		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	$f=1kHz$		11		$m\Omega$
Short Circuit Current	I_{SC}	$V_{IN}=35V$, $T_A=25^{\circ}C$		0.2		A
Peak Output Current	I_{PK}	$V_{IN}=24V$, $T_J=25^{\circ}C$		2.2		A
Output Voltage Temperature Coefficient	$\Delta V_{OUT}/\Delta T$			1.44		$mV/^{\circ}C$
	$(\Delta V_{OUT}/V_{OUT})/\Delta T$			80		ppm/ $^{\circ}C$



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

AS78XXA

Typical Performance Characteristics

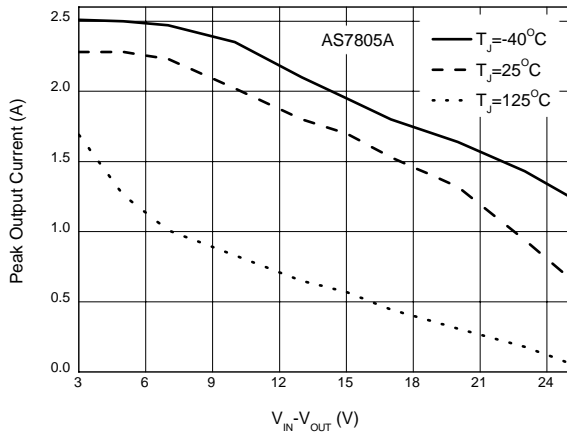


Figure 4. Peak Output Current vs. Input/Output Differential Voltage

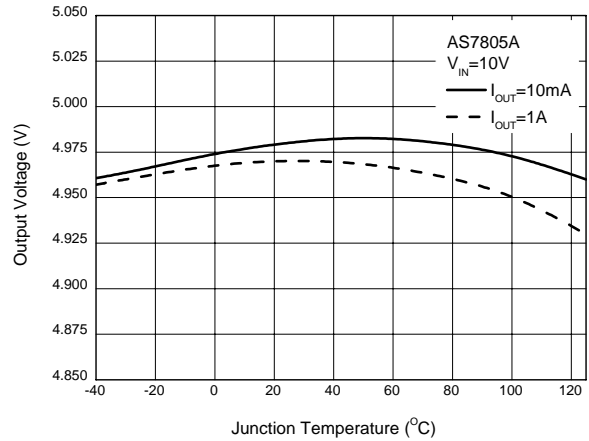


Figure 5. Output Voltage vs. Junction Temperature

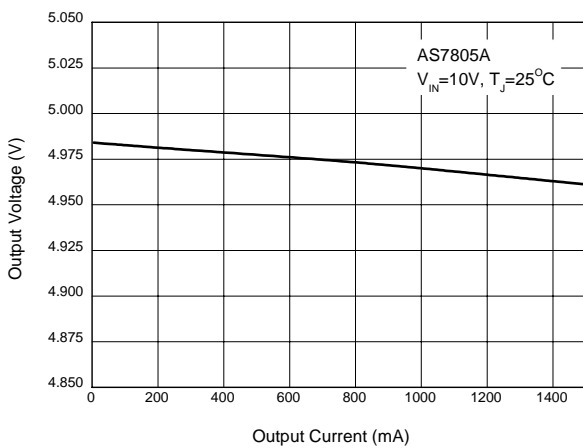


Figure 6. Output Voltage vs. Output Current

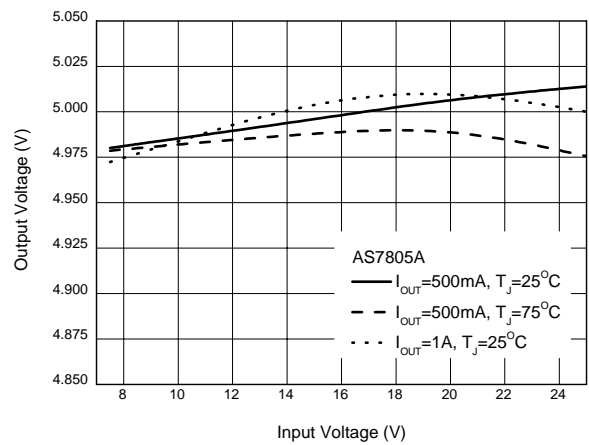


Figure 7. Output Voltage vs. Input Voltage



1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

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Typical Performance Characteristics (Continued)

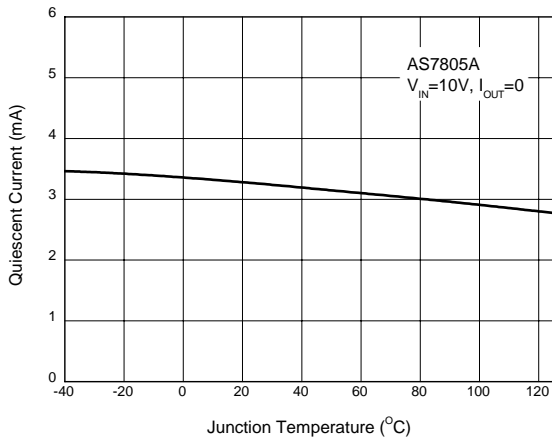


Figure 8. Quiescent Current vs. Junction Temperature

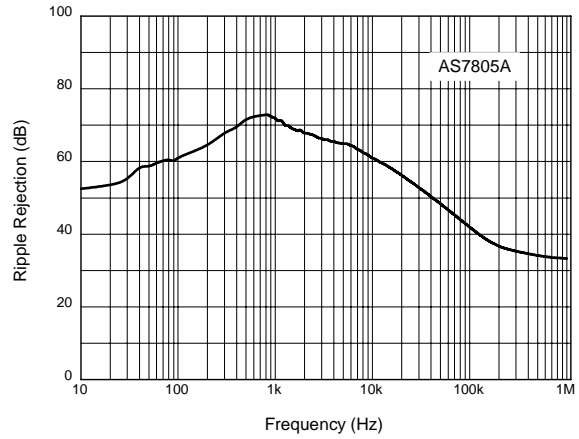


Figure 9. Ripple Rejection vs. Frequency

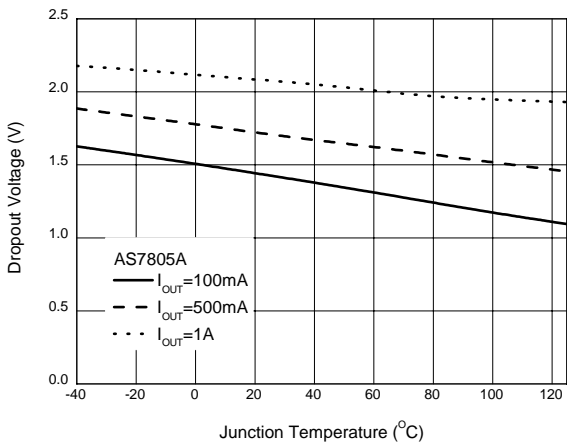


Figure 10. Dropout Voltage vs. Junction Temperature

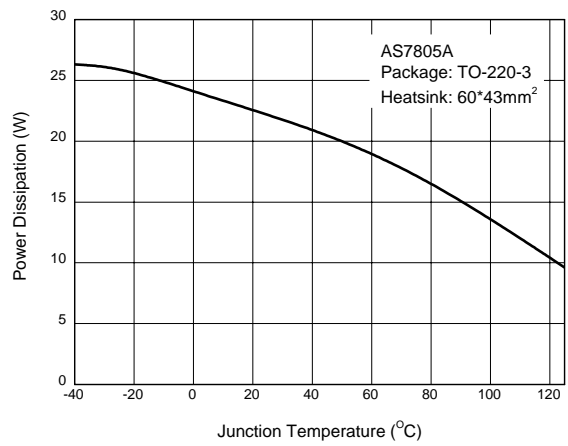


Figure 11. Power Dissipation vs. Junction Temperature

1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

AS78XXA

Typical Performance Characteristics (Continued)

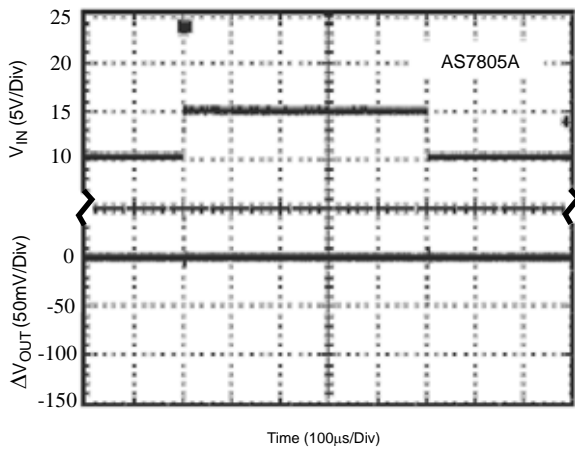


Figure 12. Line Transient
(Conditions: $I_{OUT}=500\text{mA}$, $C_{OUT}=0.1\mu\text{F}$)

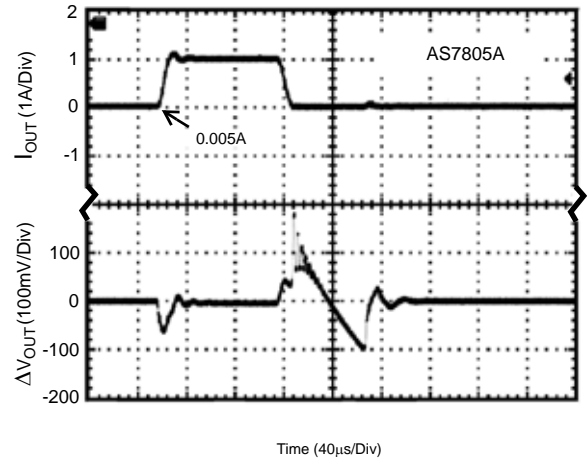


Figure 13. Load Transient
(Conditions: $V_{IN}=10\text{V}$, $C_{IN}=0.33\mu\text{F}$, $C_{OUT}=0.1\mu\text{F}$)

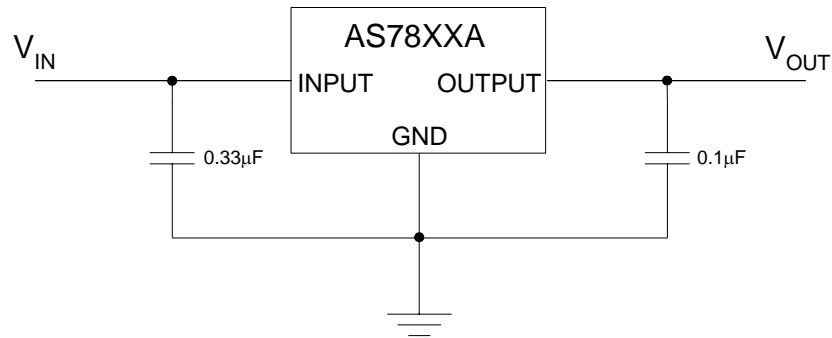
1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR**AS78XXA****Typical Application**

Figure 14. Typical Application of AS78XXA



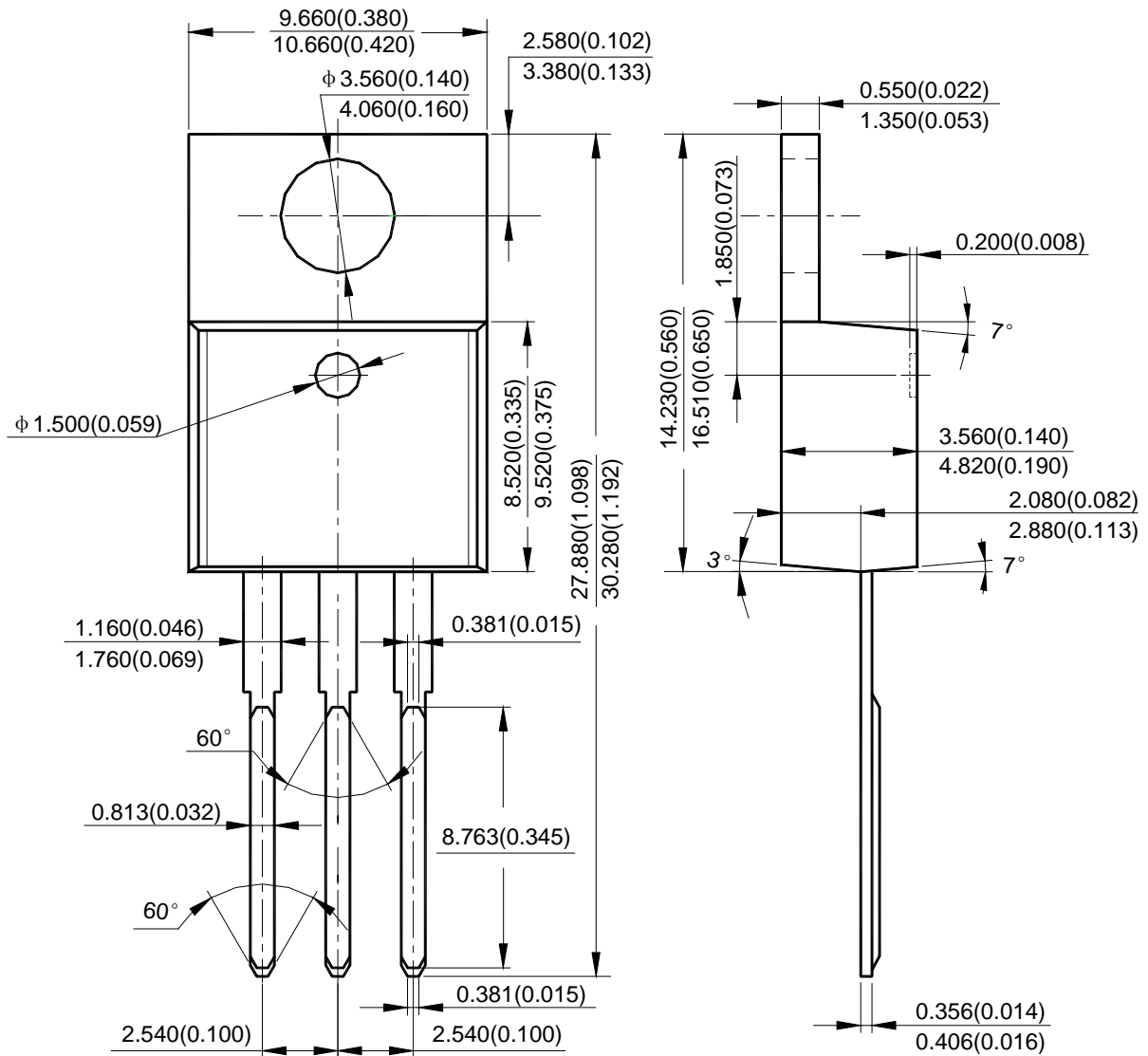
1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

AS78XXA

Mechanical Dimensions

TO-220-3/TO-220-3(u)

Unit: mm(inch)





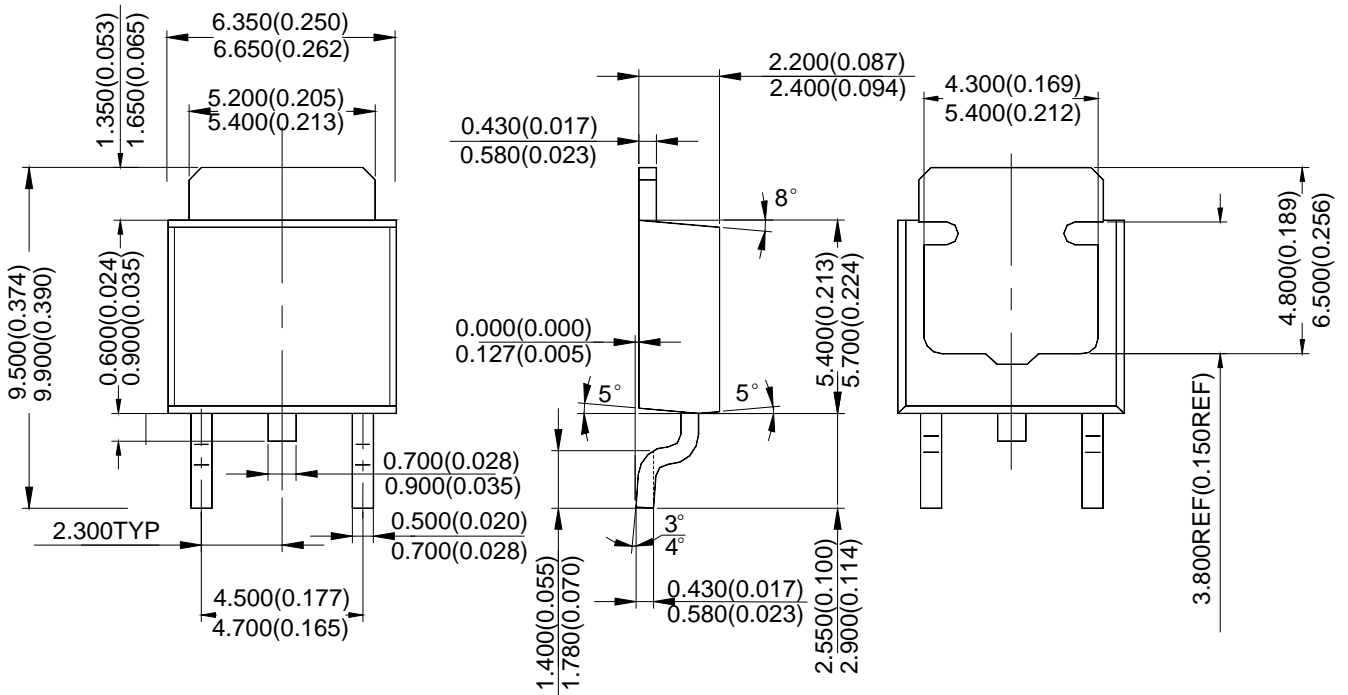
1A 3-TERMINAL POSITIVE VOLTAGE REGULATOR

AS78XXA

Mechanical Dimensions (Continued)

TO-252-2(1)

Unit: mm(inch)





BCD Semiconductor Manufacturing Limited

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