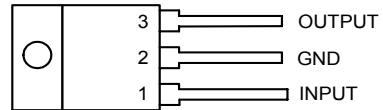


## 3-Terminal Positive Regulators

### Features

- Output Current up to 1.0A
- Fixed Output Voltages of 5V and 12V
- Output Voltage Tolerances of  $\pm 5\%$  over the Full Temperature Range
- Internal Short Circuit Current-limiting
- Internal Thermal Overload Protection
- Available in Lead Free, RoHS Compliant Packages

### TO-220 Package



### Applications

- Consumer Electronics
- Microprocessor Power Supply
- Mother Board I/O Power Supply

### General Description

The SP78XX series are monolithic integrated circuits designed as fixed-voltage regulators for a wide variety of applications including local, on-card regulation.

This series of regulators 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 is provided, these regulators can deliver output currents up to 1.0A.

The SP78XX series are available in two standard plastic packages: TO-220 and TO-252.

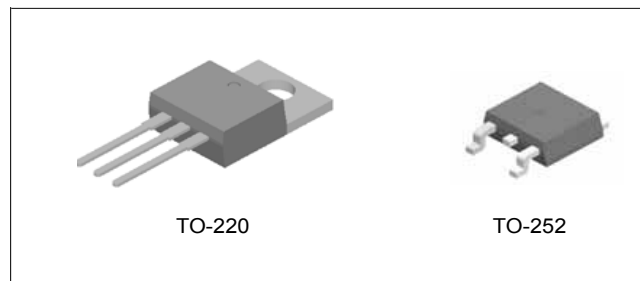


Figure 1. Package Types of SP78XX

# Pin Configuration

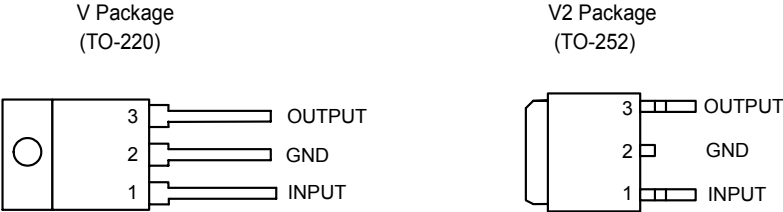


Figure 2. Pin Configuration of SP78XX (Top View)

# Pin Description

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

# Functional Block Diagram

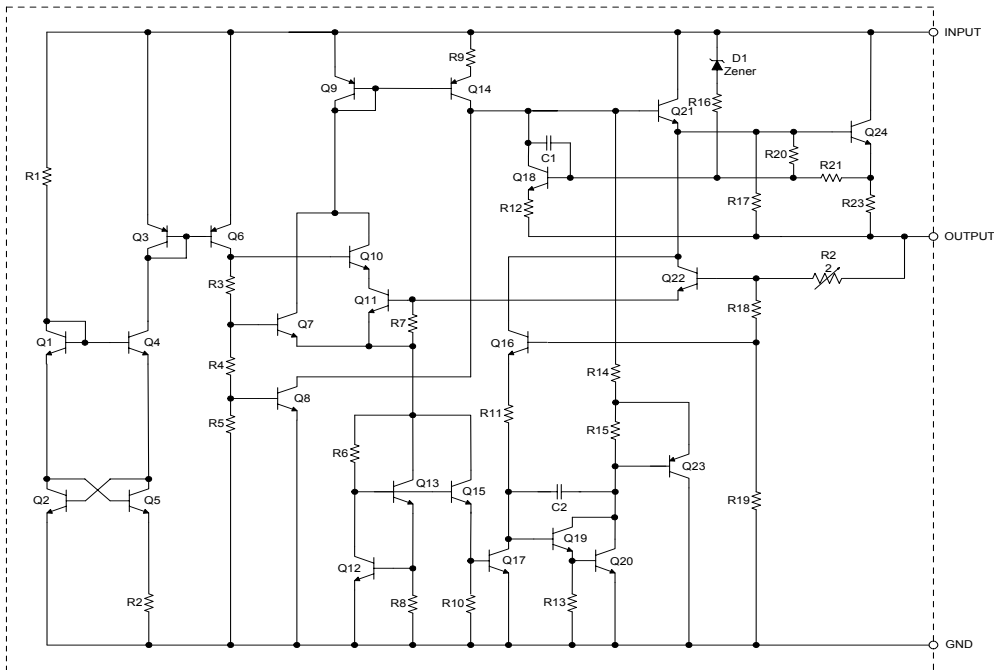


Figure 3. Functional Block Diagram of SP78XX

## Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Input Voltage	$V_{IN}$	20	V
Lead Temperature (Soldering, 10sec)		300	°C
Power Dissipation	$P_D$	Internally Limited	
Storage Temperature Range	$T_{STG}$	-65 to 150	°C
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
Supply Voltage	$V_{CC}$	7.5	18	V
Operating Junction Temperature Range	$T_J$	-40	125	°C

## Electrical Characteristics

**SP7805** ( $V_I=10V$ ,  $I_O=1A$ ,  $T_J=-40$  to  $125$  °C, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	$V_O$	$T_J=25^\circ\text{C}$	4.9	5.0	5.1	V
		$I_O=5\text{mA}$ to $1A$ , $V_I=7.5$ to $15V$ , $P_D \leq 15W$	4.8	5.0	5.2	
Line Regulation	$V_{RLINE}$	$V_I=8V$ to $15V$ , $I_O=1A$ , $T_J=25^\circ\text{C}$		1	20	mV
Load Regulation	$V_{RLOAD}$	$V_I=10V$ , $I_O=5\text{mA}$ to $1A$ , $T_J=25^\circ\text{C}$		10	35	mV
Quiescent Current	$I_Q$	$V_I=10V$		3.2	6.0	mA
Quiescent Current Change	$\Delta I_Q$	$V_I=8V$ to $15V$ , $I_O=500\text{mA}$ , $T_J=25^\circ\text{C}$		0.3	0.8	mA
		$I_O=5\text{mA}$ to $1A$ , $T_J=25^\circ\text{C}$		0.08	0.5	
Ripple Rejection	$\Delta V_I/\Delta V_O$	$V_I=8V$ to $15V$ , $f=120\text{Hz}$ , $I_O=300\text{mA}$	63	73		dB
Dropout Voltage	$V_I-V_O$	$\Delta V_O/V_O=1\%$ , $I_O=1A$ , $T_J=25^\circ\text{C}$		2.0		V
Output Noise Voltage	$N_O$	$f=10\text{Hz}$ to $100\text{KHz}$ , $T_A=25^\circ\text{C}$		10		$\mu\text{V}/V_O$
Output Resistance	$R_O$	$f=1.0\text{kHz}$		10		$\text{m}\Omega$
Short Circuit Current	$I_{PK}$	$V_I=15V$ , $T_A=25^\circ\text{C}$		0.8		A
Peak Output Current	$I_{MAX}$	$V_I=10V$ , $T_J=25^\circ\text{C}$		2.2		A
Output Voltage Drift	$\Delta V_O/\Delta T$			-0.3		$\text{mV}/^\circ\text{C}$

## Electrical Characteristics

**SP7812** ( $V_I=17V$ ,  $I_O=1A$ ,  $T_J=-40$  to  $125$  °C, unless otherwise specified.)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Output Voltage	$V_O$	$T_J=25^\circ\text{C}$	11.5	12	12.5	V
		$I_O=5\text{mA}$ to $1A$ , $V_I=14.8$ to $17V$ , $P_D \leq 15W$	11.4	12	12.6	
Line Regulation	$V_{RLINE}$	$V_I=14.5$ to $18V$ , $I_O=1A$ , $T_J=25^\circ\text{C}$		2.2	20	mV
Load Regulation	$V_{RLOAD}$	$V_I=17V$ , $I_O=5\text{mA}$ to $1A$ , $T_J=25^\circ\text{C}$		8.1	60	mV
Quiescent Current	$I_Q$	$V_I=17V$		3.4	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$V_I=14.5$ to $17V$ , $I_O=1A$ , $T_J=25^\circ\text{C}$			0.7	mA
		$I_O=5.0\text{mA}$ to $1A$ , $T_J=25^\circ\text{C}$			0.5	
Ripple Rejection	$\Delta V_I/\Delta V_O$	$V_I=15V$ to $17V$ , $f=120\text{Hz}$ , $I_O=300\text{mA}$	55	60		dB
Dropout Voltage	$V_I-V_O$	$\Delta V_O/V_O=1\%$ , $I_O=1A$ , $T_A=25^\circ\text{C}$		2.0		V
Output Noise Voltage	$N_O$	$f=10\text{Hz}$ to $100\text{KHz}$ , $T_A=25^\circ\text{C}$		10		$\mu\text{V}/V_O$
Output Resistance	$R_O$	$f=1.0\text{KHz}$		13		$\text{m}\Omega$
Short Circuit Current	$I_{PK}$	$V_I=15V$ , $T_A=25^\circ\text{C}$		0.8		A
Peak Output Current	$I_{MAX}$	$V_I=17V$ , $T_J=25^\circ\text{C}$		2.2		A
Output Voltage Drift	$\Delta V_O/\Delta T$			-0.8		$\text{mV}/^\circ\text{C}$

# Typical Performance Characteristics

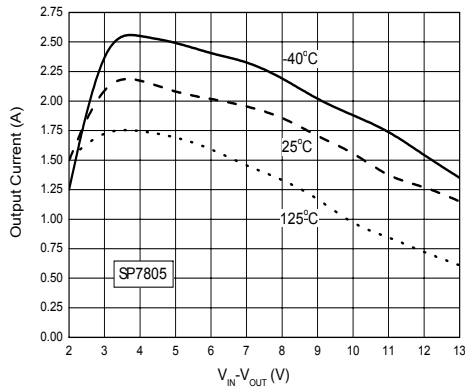


Figure 4. Peak Output Current vs. Input / Output Differential Voltage

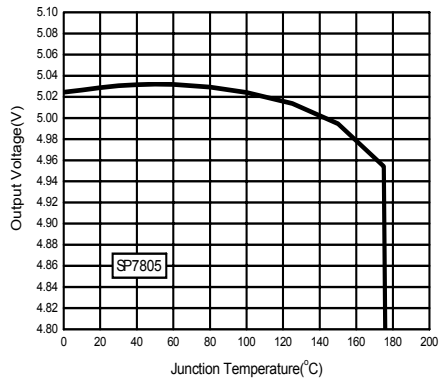


Figure 5. Output Voltage vs. Junction Temperature

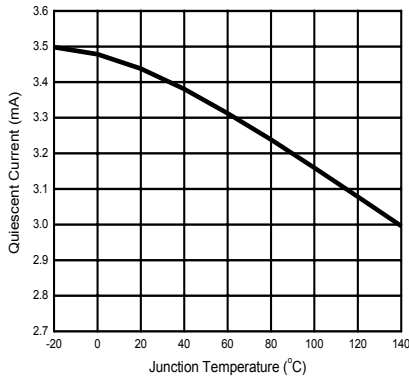


Figure 6. Quiescent Current vs. Junction Temperature

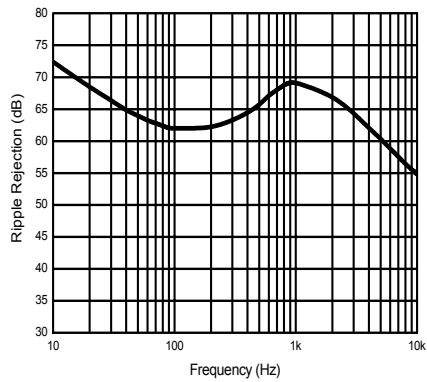


Figure 7. Ripple Rejection vs. Frequency

# Typical Application

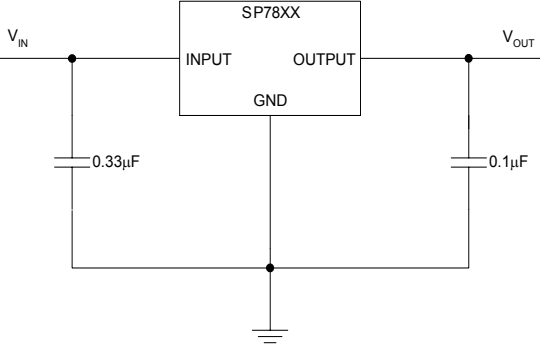
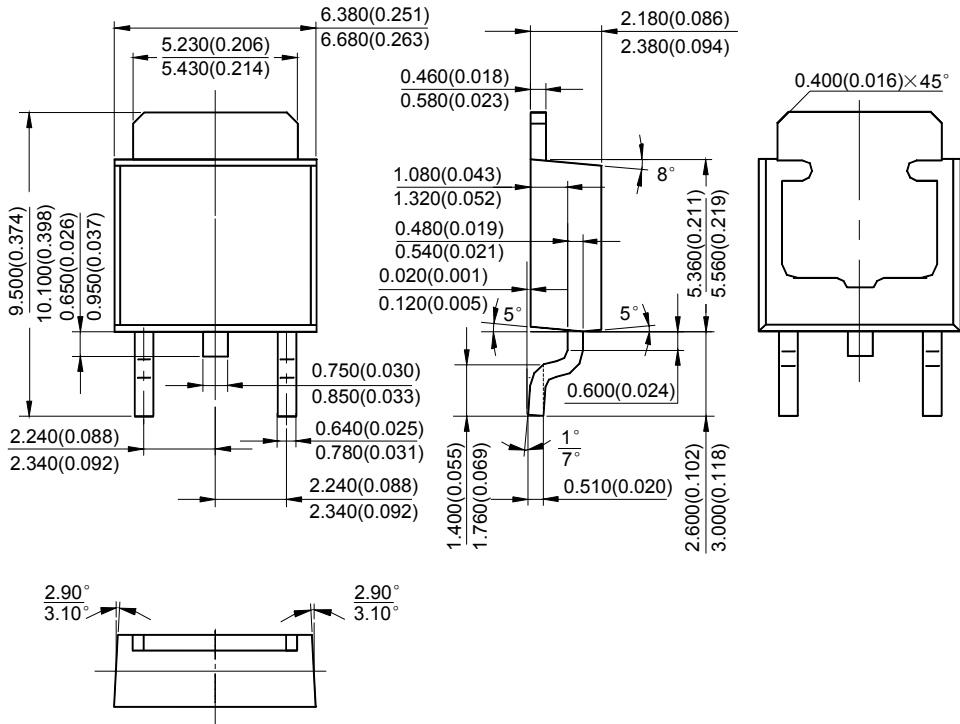


Figure 8. Fixed Output Regulator of SP78XX

Mechanical Dimension (Continued)

TO-252

Unit: mm(inch)

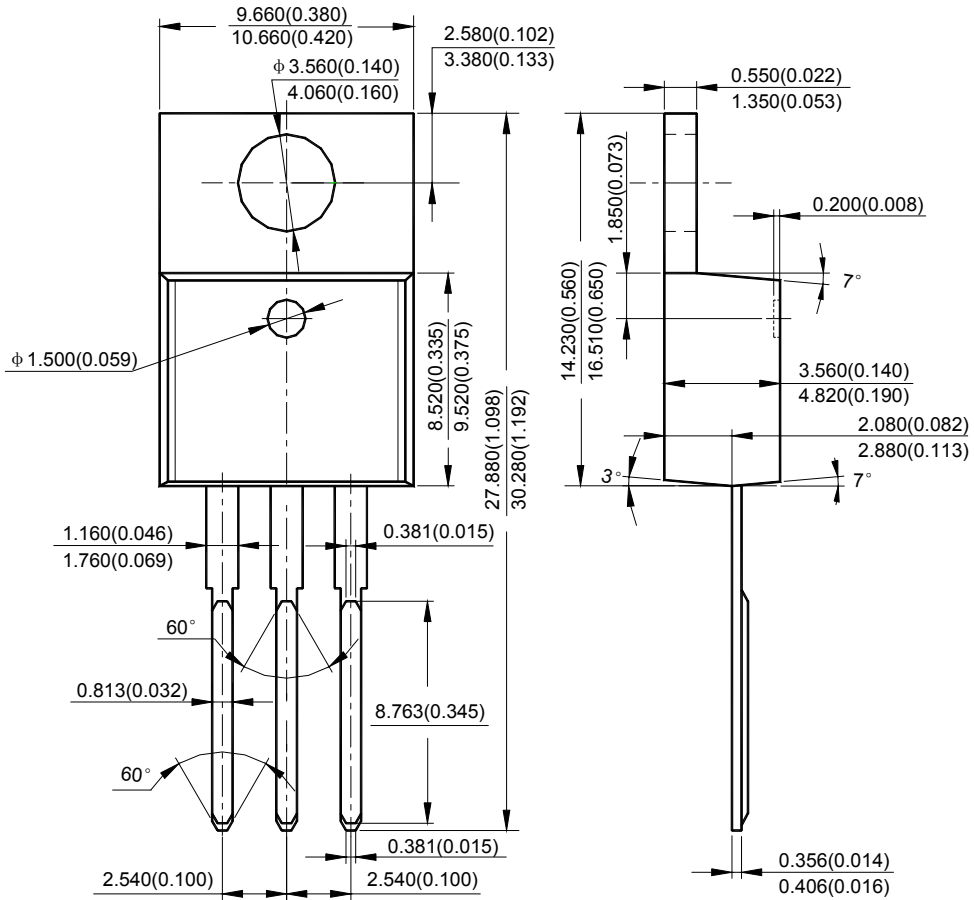


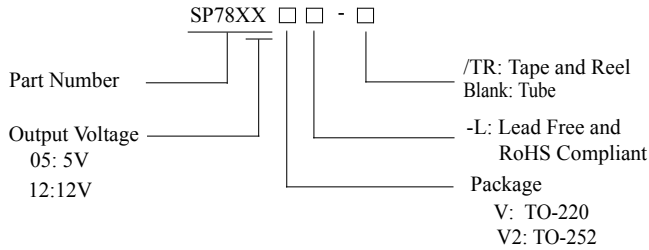


Mechanical Dimension

TO-220

Unit: mm(inch)





Sipex Corporation's Pb-free products, as designated with "-L" suffix in the part number, are RoHS compliant.

Part Number	Temperature Range	Voltage Tolerance	Output Voltage	Package	Pin Count	Packing Type
SP7805V-L	-40°C to +125°C	±5%	5V	TO-220	3	50/TUBE
SP7812V-L	-40°C to +125°C	±5%	12V	TO-220	3	50/TUBE
SP7805V2-L/TR	-40°C to +125°C	±5%	5V	TO-252	3	2,500/TR
SP7812V2-L/TR	-40°C to +125°C	±5%	12V	TO-252	3	2,500/TR



**Sipex Corporation**

**Headquarters and Sales Office**

233 South Hillview Drive  
Milpitas, CA 95035  
TEL: (408) 934-7500  
FAX: (408) 935-7600

Sipex Corporation reserves the right to make changes to any products described herein. Sipex does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under its patent rights nor the rights of others.