



AP78L12

12V OUTPUT 3-TERMINAL POSITIVE REGULATORS

Features

- 12.0V output voltage with tolerances of $\pm 5\%$ over the temperature range
- Output current in excess of 100mA
- Internal thermal overload protection
- Output transistor safe area protection
- Internal short circuit current limiting
- No external components
- Available in plastic TO92-3L and plastic SOP-8L low profile packages
- Lead-free Package: TO92-3L (Note 1)
- SOP-8L: Available in "Green" Molding Compound (No Br, Sb) (Note 2)
- Lead Free Finish / RoHS Compliant (Note 3)

General Description

The AP78L12 of three terminal positive regulators is available with fixed output voltages making them useful in a wide range of applications. These regulators can provide local on card regulation, eliminating the distribution problems associated with single point regulation. The voltages available allow the AP78L12 to be used in logic system, instrumentation, HiFi, and other solid state electronic equipment.

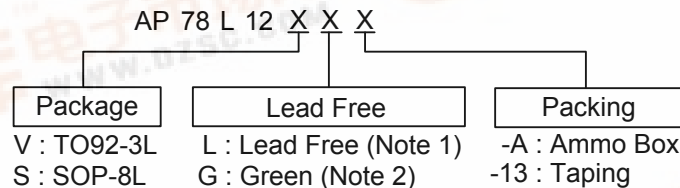
The AP78L12 is available in the plastic TO92-3L package, the plastic SOP-8L package using industrial standard package technology. With adequate heat sinking the regulator can deliver 100mA output current. Current limiting is included to limit the peak output current to a safe value. Safe area protection for the output transistors is provided to limit internal power dissipation. If internal power dissipation becomes too high for the heat sinking provided, the thermal shutdown circuit takes over preventing the IC from overheating.

Applications

Well suited for a wide range of applications, such as:

- Lighting Ballast
- STB
- Power supply
- Audio Equipment

Ordering Information



- Note: 1. TO92-3L is available in "Lead Free" only.
 2. SOP-8L is available in "Green" only.
 3. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

Device	Package Code	Packaging (Note 4)	Ammo Box / Tube		13" Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
AP78L12V	V	TO92-3L	2000/Box	-A	NA	NA
AP78L12S	S	SOP-8L	NA	NA	2500/Tape & Reel	-13

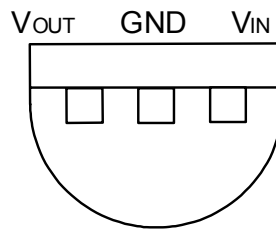
Note: 4. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.



Pin Assignments

(1) TO92-3L

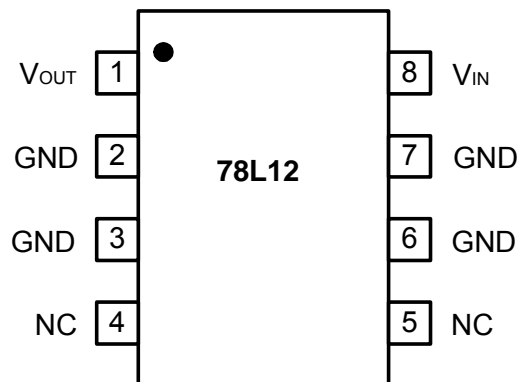
(Bottom View)



TO92-3L

(2) SOP-8L

(Top View)



SOP-8L

Pin Descriptions

Name	Description
V _{IN}	Operating Voltage Input
V _{OUT}	Voltage Output Pin
GND	Ground
NC	No Connection

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V _{CC}	Supply Voltage	+30	V
V _{OUT}	Output Voltage to Ground	12	V
T _{ST}	Storage Temperature	-65 to +150	°C
T _{OP}	Operating Junction Temperature	-20 to 125	°C
T _{MJ}	Maximum Junction Temperature	150	°C

Electrical Characteristics (All Output Voltage Versions)

Limits in standard typeface are for $T_A=25^\circ\text{C}$, **Bold typeface applies over -20°C to 125°C for SOP-8L and TO-92 Packages.**

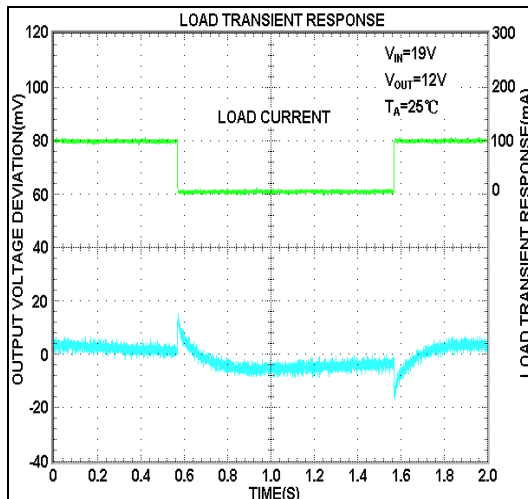
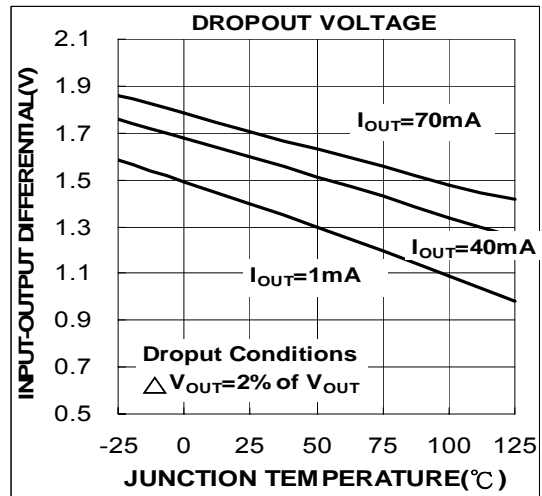
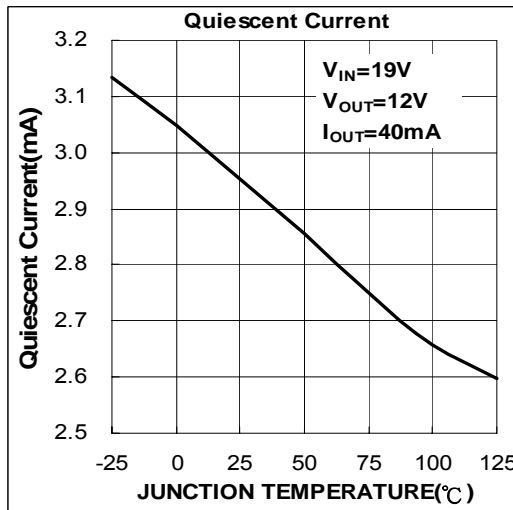
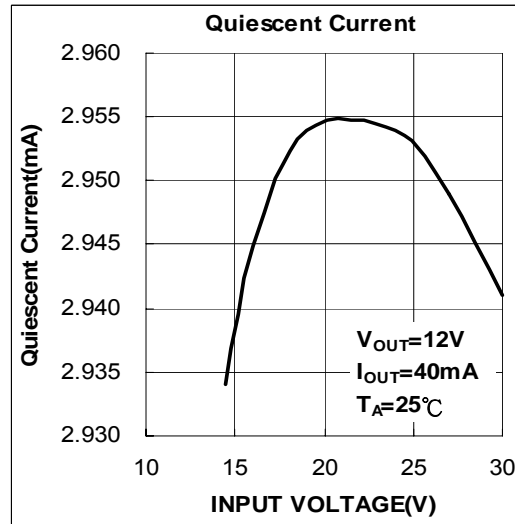
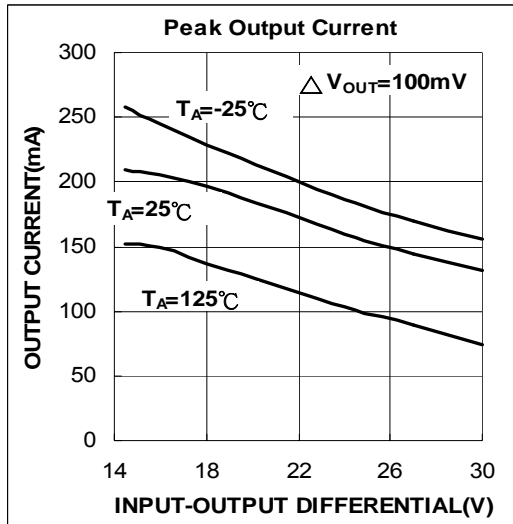
Unless otherwise specified: $V_{IN}=19\text{V}$, $I_O=40\text{mA}$, $C_I=0.33\mu\text{F}$, $C_O=0.1\mu\text{F}$.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_O	Output Voltage		11.5	12	12.5	V
		$14.5\text{V} \leq V_{IN} \leq 27\text{V}$ $1\text{mA} \leq I_O \leq 40\text{mA}$	11.4		12.6	
		$1\text{mA} \leq I_O \leq 70\text{mA}$	11.4		12.6	
ΔV_O	Line Regulation	$14.5\text{V} \leq V_{IN} \leq 27\text{V}$		30	180	mV
		$16\text{V} \leq V_{IN} \leq 27\text{V}$		20	110	
ΔV_O	Load Regulation	$1\text{mA} \leq I_O \leq 100\text{mA}$		30	100	mV
		$1\text{mA} \leq I_O \leq 40\text{mA}$		10	50	
I_Q	Quiescent Current			3	5	mA
ΔI_Q	Quiescent Current Change	$16\text{V} \leq V_{IN} \leq 27\text{V}$			1	
		$1\text{mA} \leq I_O \leq 40\text{mA}$			0.1	
V_n	Output Noise Voltage			80		μV
$\Delta V_{IN}/\Delta V_{OUT}$	Ripple Rejection	$f=120\text{Hz}$ $15\text{V} \leq V_{IN} \leq 25\text{V}$	40	54		dB
I_{PK}	Peak Output Current			140		mA
$\Delta V_O/\Delta T$	Average Output Voltage Tempco	$I_O=5\text{mA}$		-1.0		$\text{mV}/^\circ\text{C}$
$V_{IN}(\text{Min})$	Minimum Value of Input Voltage Required to Maintain Line Regulation			13.7	14.5	V
θ_{JA}	Thermal Resistance Junction to Ambient	TO92-3L (Note 5)		176		$^\circ\text{C}/\text{W}$
		SOP-8L (Note 6)		152		
θ_{JC}	Thermal Resistance Junction to case	TO92-3L (Note 5)		33		
		SOP-8L (Note 6)		7		

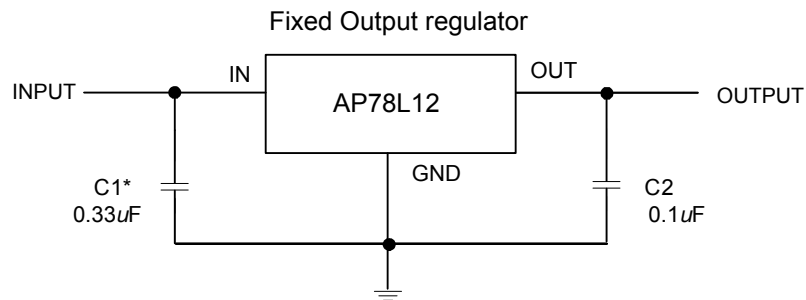
Note: 5. Test conditions for TO92-3L: No heat sink, no air flow.

6. Test conditions for SOP-8L, TO92-3L: Device mounted on 2 oz. copper, minimum recommended pad layout, FB-4 PCB.

Typical Performance Characteristics



Typical Application Circuit



★ : Required if the regulator is located more than 3" from the power supply filter.

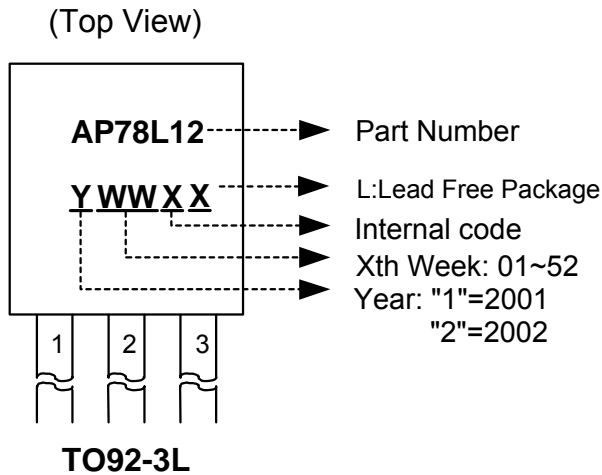
Function Description

Introduction

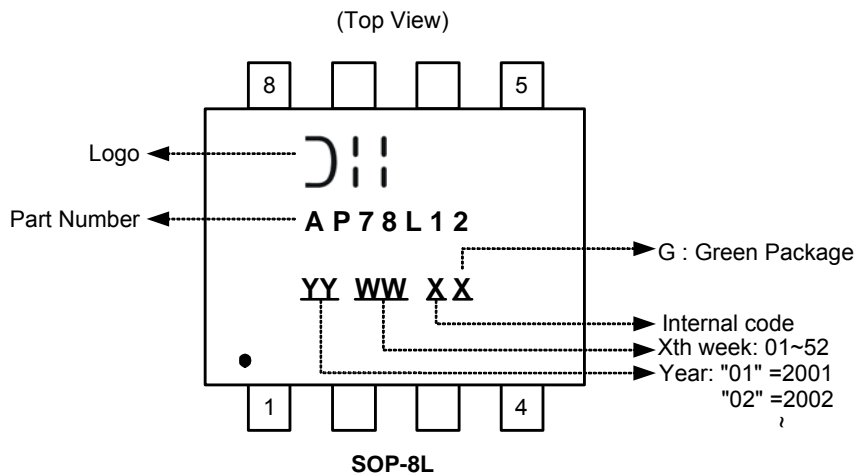
The AP78L12 fixed-mode 12V output voltage regulator is a three terminal device. The AP78L12 fixed voltage regulator series has built-in thermal overload protection which prevents the device from being damaged due to excessive junction temperature. The regulators also contain internal short-circuit protection which limits the maximum output current, and safe-area protection for the pass transistor which reduces the short-circuit current as the voltage across the pass transistor is increased.

Marking Information

(1) TO92-3L



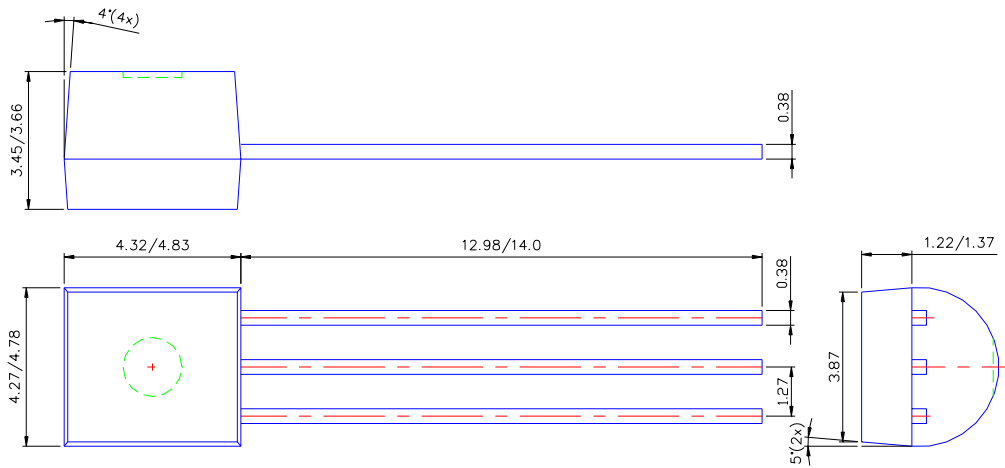
(2) SOP-8L



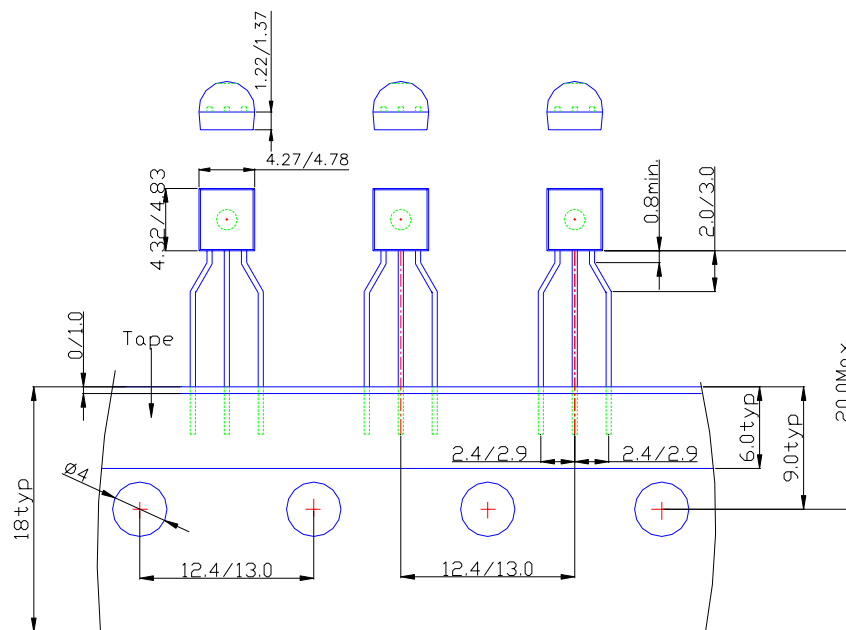
Device	Package	Identification Code
AP78L12S	SOP8	AP78L12

Package Information (unit: mm)

(1) Package Type: TO92-3L

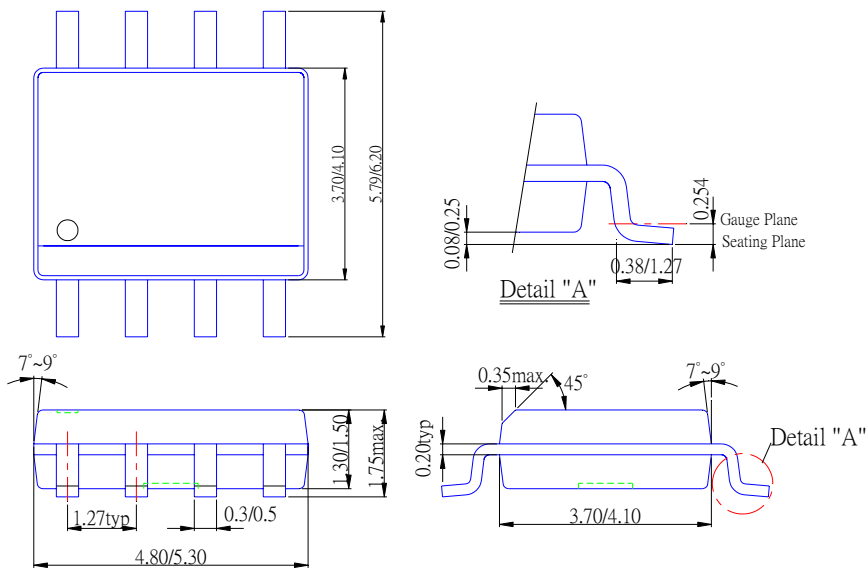


TO92-3L for Ammo pack



Package Information (Continued)

(2) Package Type: SOP-8L



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