


**TO-252-3L**

**TO-220F-3L**

### Description

The SN79xxx series are three-terminal Negative regulators providing over 1A output current with internal current limiting, thermal shutdown and safe area protection. These regulators are useful in a wide range of applications. Although they are just fixed voltage regulators, the SN79xxx series can be used with external components to obtain adjustable voltages and Currents.

### Application

- ◆ Consumer and personal electronics
- ◆ SMPS post-regulator / dc-to-dc modules
- ◆ High-efficiency linear power supplies

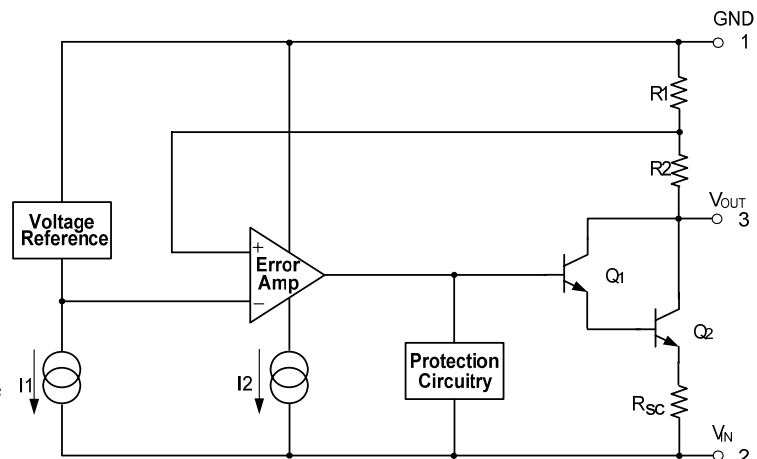
### Features and Benefits

- ◆ Output Current up to 1.0A
- ◆ Output Voltage : -5, -6, -8, -9, -10, -12, -15, -18, -24V
- ◆ Built in OVP, CLP circuit.
- ◆ Built in TSD Protection.
- ◆ Output Transistor Safe Area Protection.
- ◆ Ultra High level of ESD [ Built in ESD Protection Cell ]

### ORDERING INFORMATION

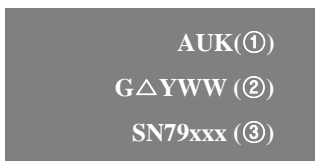
Product	Marking	Package
SN79xxD	SN79xxD	TO-252-3L
SN79xxPI	SN79xxPI	TO-220F-3L

### Equivalent Circuit



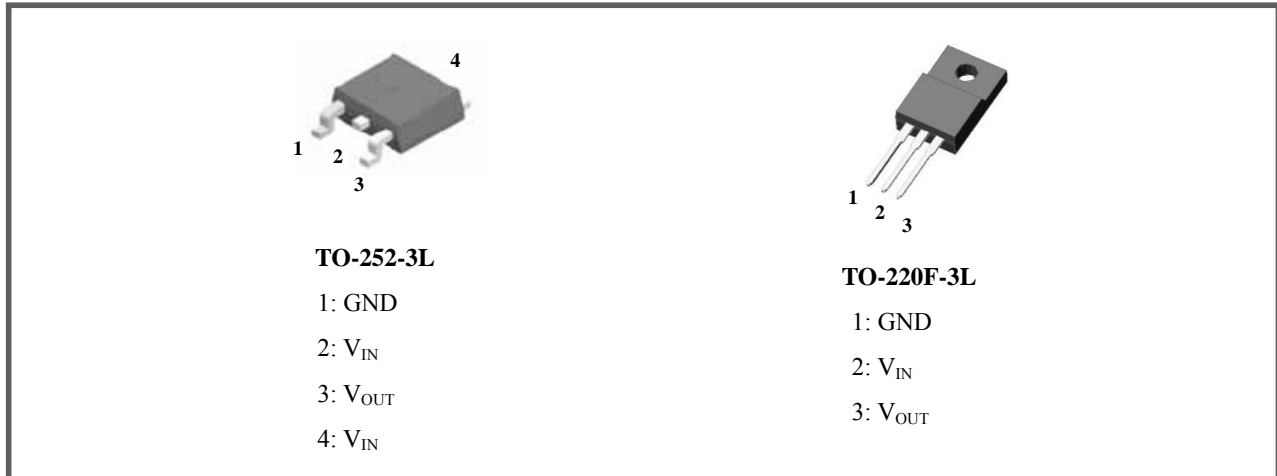
#### ▲ Marking Detail Information

[ TO-220F-3L & TO-253-3L PKG Marking ]



- ① AUK Logo
- ② Grade & M Code & Year & Week Code
- ③ Device Code

### ◆ Pin Configuration



### ◆ Product Line-up

Product Name	$V_{OUT}$	Operating Temperature	Package
SN7905D	-5.0V	-40~125°C	TO-252-3L
SN7906D	-6.0V	-40~125°C	TO-252-3L
SN7908D	-8.0V	-40~125°C	TO-252-3L
SN7909D	-9.0V	-40~125°C	TO-252-3L
SN7910D	-10V	-40~125°C	TO-252-3L
SN7912D	-12V	-40~125°C	TO-252-3L
SN7915D	-15V	-40~125°C	TO-252-3L
SN7918D	-18V	-40~125°C	TO-252-3L
SN7924D	-24V	-40~125°C	TO-252-3L
SN7905PI	-5.0V	-40~125°C	TO-220F-3L
SN7906PI	-6.0V	-40~125°C	TO-220F-3L
SN7908PI	-8.0V	-40~125°C	TO-220F-3L
SN7909PI	-9.0V	-40~125°C	TO-220F-3L
SN7910PI	-10V	-40~125°C	TO-220F-3L
SN7912PI	-12V	-40~125°C	TO-220F-3L
SN7915PI	-15V	-40~125°C	TO-220F-3L
SN7918PI	-18V	-40~125°C	TO-220F-3L
SN7924PI	-24V	-40~125°C	TO-220F-3L

◆ **Absolute Maximum Ratings ( Ta = 25°C )**

Parameter	Symbol	Limits		Unit
		TO-220F-3L	TO-252-3L	
Input Voltage	V <sub>IN</sub>	-40.0 ( V <sub>O</sub> =24V )		V
		-35.0 ( V <sub>O</sub> =5 to 18V )		
Power Dissipation	P <sub>d</sub>	2.0	1.3	W
Thermal Resistance Junction to Case	R <sub>θJC</sub>	5	5	°C/W
Thermal Resistance Junction to Air	R <sub>θJA</sub>	65	92	°C/W
Junction Temperature	T <sub>J</sub>	150		°C
Operate Temperature Range	T <sub>opr</sub>	-40 ~ +125		°C
Storage Temperature Range	T <sub>stg</sub>	-55 ~ +150		°C

Absolute maximum ratings indicate limits beyond which damage to the component may occur. Electrical specifications do not apply when operating the device outside of its operating ratings. The maximum allowable power dissipation is a function of the maximum junction temperature, T<sub>J(max)</sub>, the junction-to-ambient thermal resistance, θ<sub>JA</sub>, and the ambient temperature, T<sub>A</sub>.

The maximum allowable power dissipation at any ambient temperature is calculated using:

PD(max) = (T<sub>J(max)</sub> - T<sub>A</sub>) ÷ θ<sub>JA</sub>. Exceeding the maximum allowable power dissipation will result in excessive die temperature, and the regulator will go into thermal shutdown.

## ◆ Electrical characteristics

(  $V_{IN} = -10V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

Characteristic	Symbol	Test Condition*	SN7905x			Unit	
			Min.	Typ.	Max.		
Output Voltage**	$V_O$	$T_J = 25^\circ C$	-4.80	-5.0	-5.20	V	
		$-7.0V \leq V_{IN} \leq -20.0V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$	-4.75	-5.0	-5.25		
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-7.0V \leq V_{IN} \leq -25.0V$	-	35	100	mV	
		$-8.0V \leq V_{IN} \leq -12.0V$	-	8	50		
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	-	10	100	mV	
		$250mA \leq I_O \leq 750mA$	-	3.0	50		
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$	-	3.0	6.0	mA	
Quiescent Current Change	$\Delta I_{QC}$	$-8.0V \leq V_{IN} \leq -25V$	-	0.1	1.3	mA	
		$5.0mA \leq I_O \leq 1.0A$	-	0.05	0.5		
Ripple Rejection	RR	$-8.0V \leq V_{IN} \leq -18.0V$ , $I_O = 500mA$ $f = 120Hz$	54	60	-	dB	
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$	$T_A = 25^\circ C$	-	100	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$	-	2.2	-	A	
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$	-	-0.4	-	$mV/^\circ C$	

\* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

\*\* This specification applies only for dc power dissipation permitted by absolute maximum ratings.

### ◆ Electrical characteristics

(  $V_{IN} = -11V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

Characteristic	Symbol	Test Condition*		SN7906x			Unit
				Min.	Typ.	Max.	
Output Voltage**	$V_O$	$T_J = 25^\circ C$		-5.75	-6.0	-6.2	V
		$-9.0V \leq V_{IN} \leq -21V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$		-5.70	-6.0	-6.3	
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-8.0V \leq V_{IN} \leq -25.0V$	$T_J = 25^\circ C$	-	10	120	mV
		$-9.0V \leq V_{IN} \leq -13.0V$		-	5	60	
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	$T_J = 25^\circ C$	-	10	120	mV
		$250mA \leq I_O \leq 750mA$		-	3.0	60	
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$		-	3.0	6.0	mA
Quiescent Current Change	$\Delta I_{QC}$	$-8.0V \leq V_{IN} \leq -25.0V$		-	0.1	1.3	mA
		$5.0mA \leq I_O \leq 1.0A$		-	0.05	0.5	
Ripple Rejection	RR	$-9.0V \leq V_{IN} \leq -19.0V$ $f = 120Hz$		54	60	-	dB
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$		-	130	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$		-	2.2	-	A
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$		-	-0.5	-	$mV/^\circ C$

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## ◆ Electrical characteristics

(  $V_{IN} = -14V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

Characteristic	Symbol	Test Condition*		SN7908x			Unit
				Min.	Typ.	Max.	
Output Voltage**	$V_O$	$T_J = 25^\circ C$		-7.7	-8.0	-8.3	V
		$-10.5V \leq V_{IN} \leq -23.0V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$		-7.6	-8.0	-8.4	
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-10.5V \leq V_{IN} \leq -25.0V$	$T_J = 25^\circ C$	-	10	160	mV
		$-11V \leq V_{IN} \leq -17V$		-	5.0	80	
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	$T_J = 25^\circ C$	-	12	160	mV
		$250mA \leq I_O \leq 750mA$		-	4.0	80	
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$		-	3.0	6.0	mA
Quiescent Current Change	$\Delta I_{QC}$	$-10.5V \leq V_{IN} \leq -25.0V$		-	0.1	1.0	mA
		$5.0mA \leq I_O \leq 1.0A$		-	0.05	0.5	
Ripple Rejection	RR	$-11.5V \leq V_{IN} \leq -21.5V$ $f = 120Hz$		54	60	-	dB
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$		-	175	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$		-	2.2	-	A
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$		-	-0.6	-	$mV/^\circ C$

\* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

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### ◆ Electrical characteristics

(  $V_{IN} = -15V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

Characteristic	Symbol	Test Condition*		SN7909x			Unit
				Min.	Typ.	Max.	
Output Voltage**	$V_O$	$T_J = 25^\circ C$		-8.70	-9.0	-9.30	V
		$-11.5V \leq V_{IN} \leq -24.0V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$		-8.60	-9.0	-9.40	
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-11.5V \leq V_{IN} \leq -26.0V$	$T_J = 25^\circ C$	-	10	180	mV
		$-12.0V \leq V_{IN} \leq -18.0V$		-	5.0	90	
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	$T_J = 25^\circ C$	-	12	180	mV
		$250mA \leq I_O \leq 750mA$		-	4.0	90	
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$		-	3.0	6.0	mA
Quiescent Current Change	$\Delta I_{QC}$	$-11.5V \leq V_{IN} \leq -26.0V$		-	0.1	1.0	mA
		$5.0mA \leq I_O \leq 1.0A$		-	0.05	0.5	
Ripple Rejection	RR	$-13.0V \leq V_{IN} \leq -23.0V$ $f = 120Hz$		54	60	-	dB
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$		-	175	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$		-	2.2	-	A
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$		-	-0.6	-	$mV/^\circ C$

\* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

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### ◆ Electrical characteristics

(  $V_{IN} = -16V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

Characteristic	Symbol	Test Condition*		SN7910x			Unit
				Min.	Typ.	Max.	
Output Voltage**	$V_O$	$T_J = 25^\circ C$		-9.6	-10.0	-10.4	V
		$-12.0V \leq V_{IN} \leq -28.0V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$		-9.5	-10.0	-10.5	
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-12.5V \leq V_{IN} \leq -28.0V$	$T_J = 25^\circ C$	-	12.0	200	mV
		$-14.0V \leq V_{IN} \leq -20.0V$		-	6.0	100	
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	$T_J = 25^\circ C$	-	12.0	200	mV
		$250mA \leq I_O \leq 750mA$		-	4.0	100	
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$		-	3.0	6.0	mA
Quiescent Current Change	$\Delta I_{QC}$	$-12.5V \leq V_{IN} \leq -28V$		-	0.1	1.0	mA
		$5.0mA \leq I_O \leq 1.0A$		-	0.05	0.5	
Ripple Rejection	RR	$-13.0V \leq V_{IN} \leq -23.0V$ $f = 120Hz$		54	60	-	dB
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$		-	58	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$		-	2.2	-	A
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$		-	-1.0	-	$mV/^\circ C$

\* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

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### ◆ Electrical characteristics

(  $V_{IN} = -19V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

Characteristic	Symbol	Test Condition*	SN7812x			Unit	
			Min.	Typ.	Max.		
Output Voltage**	$V_O$	$T_J = 25^\circ C$	-11.5	-12.0	-12.5	V	
		$-15.5V \leq V_{IN} \leq -27.0V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$	-11.4	-12.0	-12.6		
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-14.5V \leq V_{IN} \leq -30.0V$	-	12.0	240	mV	
		$T_J = 25^\circ C$ $-16.0V \leq V_{IN} \leq -22.0V$	-	6.0	120		
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	-	12.0	240	mV	
		$T_J = 25^\circ C$ $250mA \leq I_O \leq 750mA$	-	4.0	120		
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$	-	3.0	6.0	mA	
Quiescent Current Change	$\Delta I_{QC}$	$-14.5V \leq V_{IN} \leq -30.0V$	-	0.1	1.0	mA	
		$5.0mA \leq I_O \leq 1.0A$	-	0.05	0.5		
Ripple Rejection	RR	$-15.0V \leq V_{IN} \leq -25.0V$ $f = 120Hz$	54	64	-	dB	
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$	$T_A = 25^\circ C$	-	200	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$	-	2.2	-	A	
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$	-	-0.8	-	$mV / ^\circ C$	

\* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

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### ◆ Electrical characteristics

(  $V_{IN} = -23V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

Characteristic	Symbol	Test Condition*	SN7915x			Unit	
			Min.	Typ.	Max.		
Output Voltage**	$V_O$	$T_J = 25^\circ C$	-14.4	-15.0	-15.6	V	
		$-18.0V \leq V_{IN} \leq -30.0V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$	-14.25	-15.0	-15.75		
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-17.5V \leq V_{IN} \leq -30.0V$	-	12.0	300	mV	
		$T_J = 25^\circ C$ $-20.0V \leq V_{IN} \leq -26.0V$	-	6.0	150		
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	-	12.0	300	mV	
		$T_J = 25^\circ C$ $250mA \leq I_O \leq 750mA$	-	4.0	150		
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$	-	3.0	6.0	mA	
Quiescent Current Change	$\Delta I_{QC}$	$-17.5V \leq V_{IN} \leq -30.0V$	-	0.1	1.0	mA	
		$5.0mA \leq I_O \leq 1.0A$	-	0.05	0.5		
Ripple Rejection	RR	$-18.5V \leq V_{IN} \leq -28.5V$ $f = 120Hz$	54	60	-	dB	
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$	$T_A = 25^\circ C$	-	250	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$	-	2.2	-	A	
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$	-	-0.9	-	$mV/^\circ C$	

\* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

\*\* This specification applies only for dc power dissipation permitted by absolute maximum ratings.

### ◆ Electrical characteristics

(  $V_{IN} = -27V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

Characteristic	Symbol	Test Condition*		SN7918x			Unit
				Min.	Typ.	Max.	
Output Voltage**	$V_O$	$T_J = 25^\circ C$		-17.3	-18.0	-18.7	V
		$-22.5V \leq V_{IN} \leq -33.0V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$		-17.1	-18.0	-18.9	
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-21.0V \leq V_{IN} \leq -33.0V$	$T_J = 25^\circ C$	-	15.0	360	mV
		$-24.0V \leq V_{IN} \leq -30.0V$		-	8.0	180	
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	$T_J = 25^\circ C$	-	15.0	360	mV
		$250mA \leq I_O \leq 750mA$		-	5.0	180	
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$		-	5.2	8.0	mA
Quiescent Current Change	$\Delta I_{QC}$	$-21.0V \leq V_{IN} \leq -33.0V$		-	0.1	1.0	mA
		$5.0mA \leq I_O \leq 1.0A$		-	0.05	0.5	
Ripple Rejection	RR	$-22.0V \leq V_{IN} \leq -32.0V$ $f = 120Hz$		54	60	-	dB
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$		-	300	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$		-	2.2	-	A
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$		-	-1.0	-	$mV/^\circ C$

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\*\* This specification applies only for dc power dissipation permitted by absolute maximum ratings.

### ◆ Electrical characteristics

(  $V_{IN} = -33V$ ,  $C_{IN} = 2.2\mu F$ ,  $C_{OUT} = 1.0\mu F$ ,  $I_{OUT} = 500mA$ ,  $T_J = 0^\circ C \sim 125^\circ C$  ; unless otherwise specified )

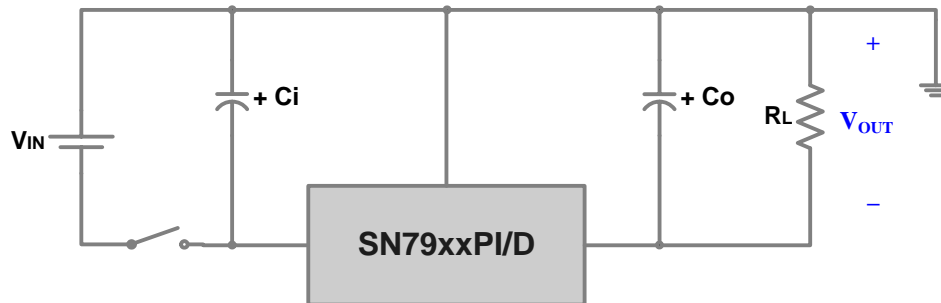
Characteristic	Symbol	Test Condition*	SN7924x			Unit	
			Min.	Typ.	Max.		
Output Voltage**	$V_O$	$T_J = 25^\circ C$	-23.0	-24.0	-25.0	V	
		$-27.0V \leq V_{IN} \leq -38.0V$ $5.0mA \leq I_O \leq 1.0A$ , $P_D \leq 15W$	-22.8	-24.0	-25.2		
Line Regulation	$\Delta V_{O(\Delta V_I)}$	$-27.0V \leq V_{IN} \leq -38.0V$	-	15.0	480	mV	
		$T_J = 25^\circ C$ $-30.0V \leq V_{IN} \leq -36.0V$	-	8.0	180		
Load Regulation	$\Delta V_{O(\Delta I_L)}$	$5.0mA \leq I_O \leq 1.5A$	-	15.0	480	mV	
		$T_J = 25^\circ C$ $250mA \leq I_O \leq 750mA$	-	5.0	240		
Quiescent Current	$I_{QC}$	$T_J = 25^\circ C$	-	3.0	6.0	mA	
Quiescent Current Change	$\Delta I_{QC}$	$-27.0V \leq V_{IN} \leq -38.0V$	-	0.1	1.0	mA	
		$5.0mA \leq I_O \leq 1.0A$	-	0.05	0.5		
Ripple Rejection	RR	$28.0V \leq V_{IN} \leq 38.0V$ $f = 120Hz$	54	60	-	dB	
Dropout Voltage	$V_{DROP}$	$I_O = 1.0A$	$T_J = 25^\circ C$	-	2.0	-	V
Output Noise Voltage	$V_N$	$10Hz \leq f \leq 100kHz$	$T_A = 25^\circ C$	-	400	-	$\mu V / V_O$
Short Circuit Current	$I_{SC}$	$V_I = -35V$	$T_A = 25^\circ C$	-	300	-	mA
Peak Output Current	$I_{PK}$	$T_J = 25^\circ C$	-	2.2	-	A	
Temperature coefficient of Output voltage	$\frac{\Delta V_O}{\Delta Temp}$	$I_O = 5.0mA$	-	-1.0	-	$mV / ^\circ C$	

\* Pulse testing techniques are used to maintain the junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into separately.

\*\* This specification applies only for dc power dissipation permitted by absolute maximum ratings.

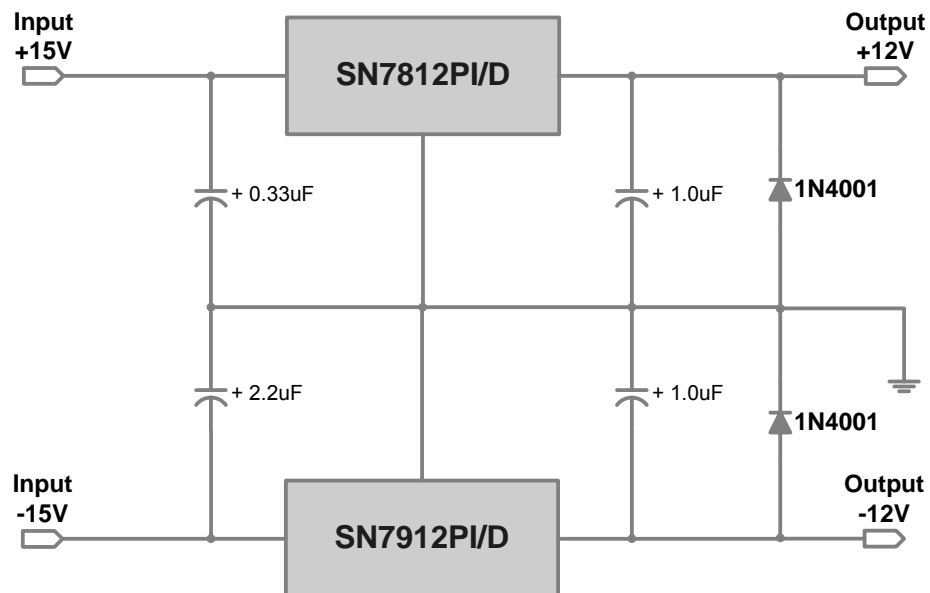
## Typical Application

### Negative Fixed Output Regulator

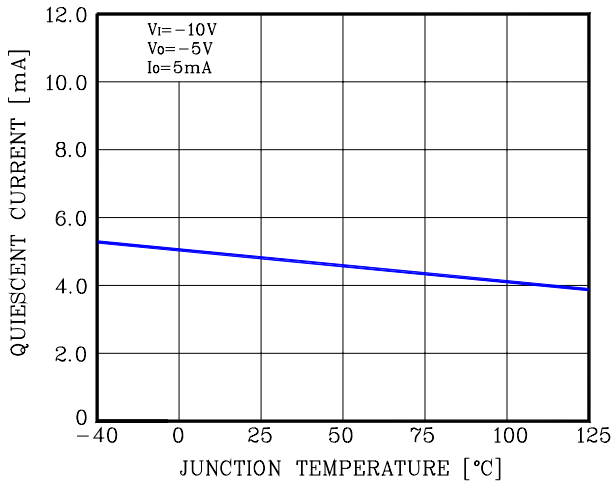


- 1)  $C_{IN}$  should be required if regulators are located far from power supply filter
- 2)  $C_O$  improves output stability and transient response
- 3) To specify an output voltage, substitute voltage value for “xx”

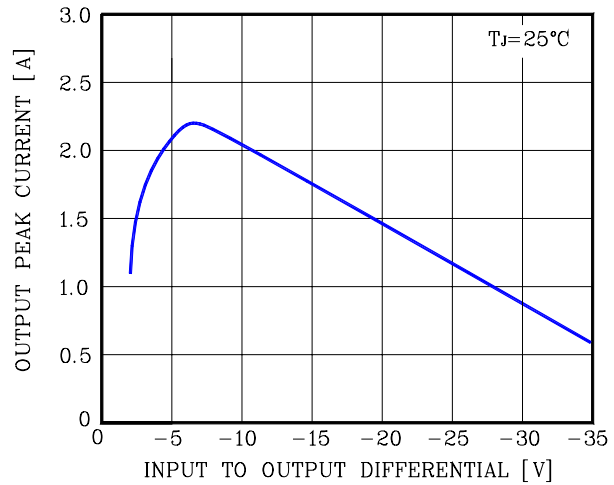
### Split Power Supply / OP-AMP Supply ( $\pm 12V / 1.0A$ )



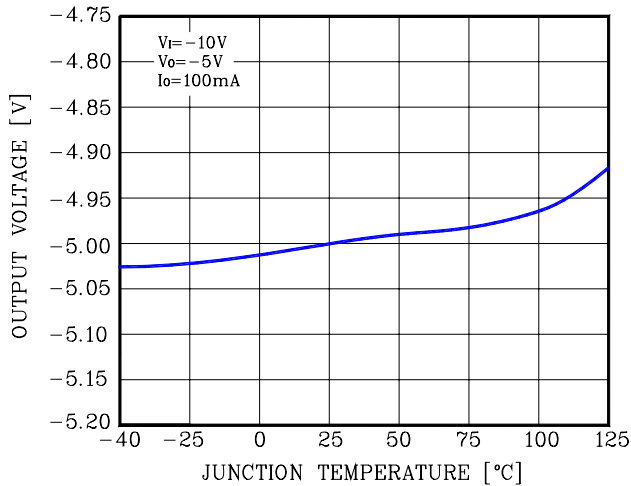
**Fig.1 Quiescent Current vs. Junction Temperature**



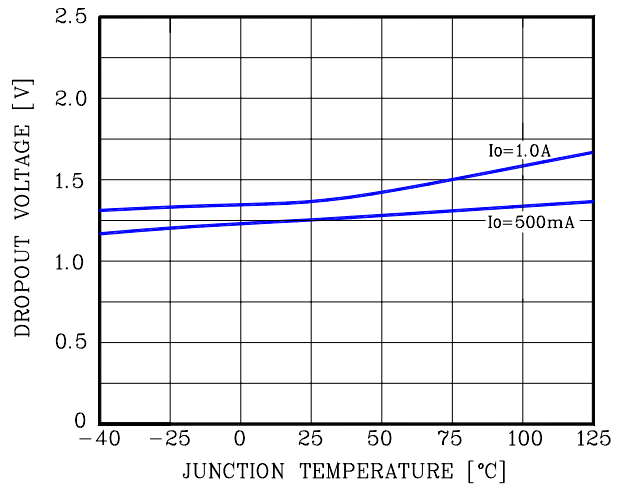
**Fig.2 Output Peak Current vs. Input to Output Differential**



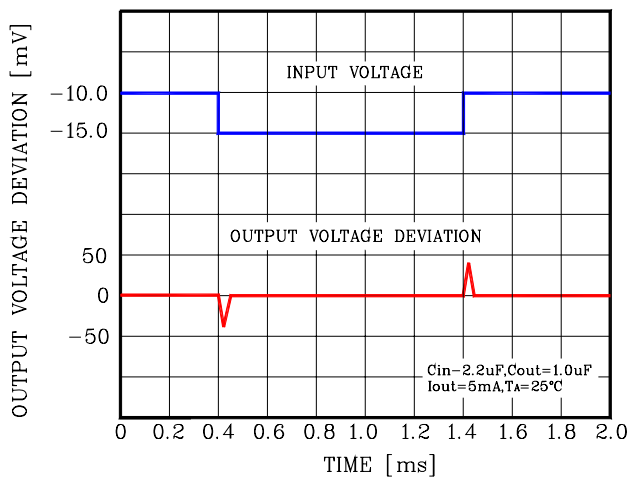
**Fig.3 Output Voltage vs. Junction Temperature**



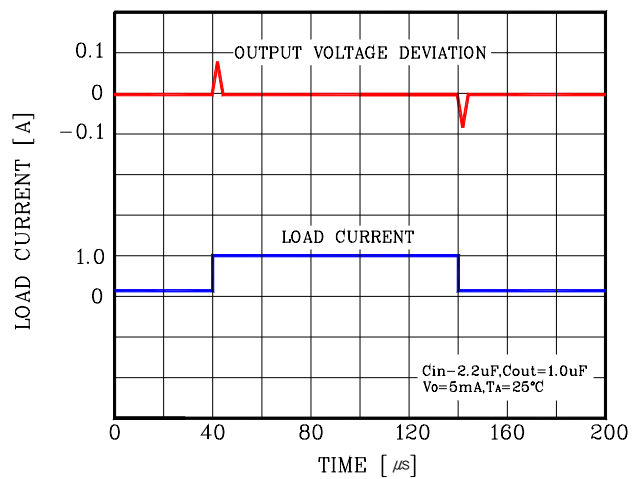
**Fig.4 Dropout Voltage vs. Input Voltage**



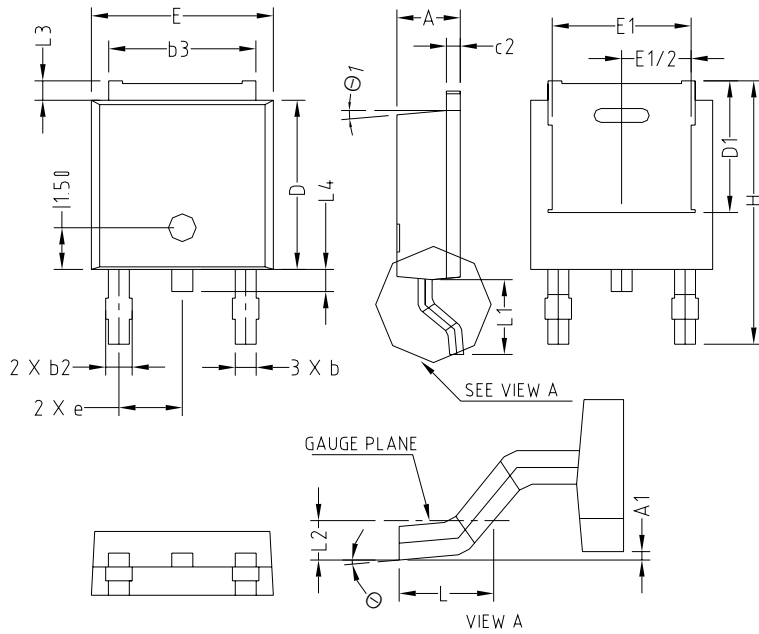
**Fig.5 Line Transient Response**



**Fig.6 Load Transient Response**

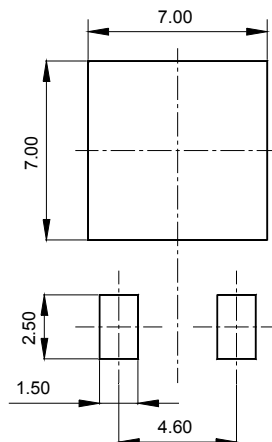


◆ TO-252-3L Outline Dimension (Unit : mm)

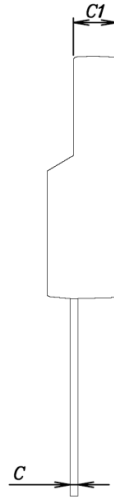
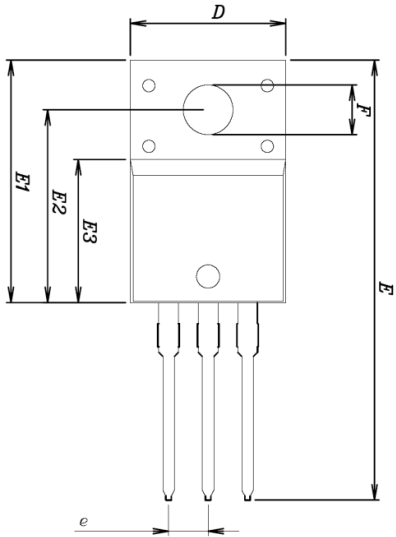


SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	2.20	2.30	2.40	
A1	0.00		0.127	
b	0.66	0.76	0.86	
b2	-	-	0.96	
b3	5.04	5.34	5.64	
c2	0.40	0.50	0.60	
D	5.90	6.10	6.30	
D1	14.75			
E	6.40	6.60	6.80	
E1	15.04			
e	2.30 BSC			
H	9.20	9.50	9.80	
L	1.27	1.47	1.67	
L1	2.50	2.70	2.90	
L2	0.508 BSC			
L3	0.50	0.70	0.90	
L4	0.60	0.80	1.00	
$\Theta$	0°	-	10°	
$\Theta 1$	5°			

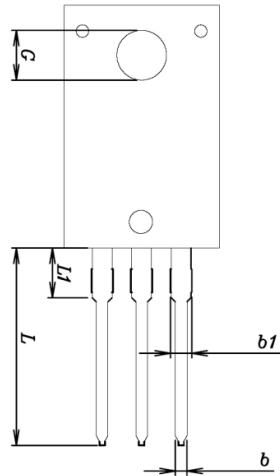
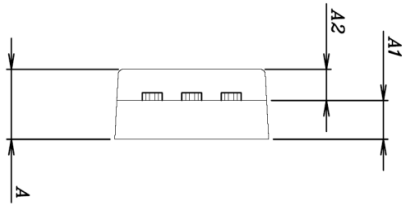
※ Recommend PCB solder land [Unit: mm]



◆ TO-220F-3L Outline Dimension (Unit : mm)



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	—	—	4.60	
A1	2.45	2.50	2.55	
A2	1.95	2.00	2.05	
b	0.65	0.75	0.85	
b1	1.07	1.27	1.47	
C	0.40	0.50	0.60	
C1	2.70	2.80	2.90	
D	9.90	10.00	10.10	
E	28.00	—	28.60	
E1	15.50	15.60	15.70	
E2	12.30	12.40	12.50	
E3	9.15	9.20	9.25	
F	3.10	3.20	3.30	
G	3.30	3.40	3.50	
e	2.54 BSC			
L	12.40	—	13.00	
L1	3.46 BSC			





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