


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

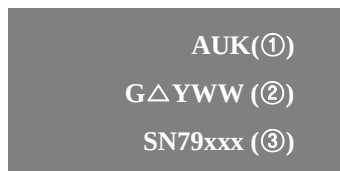
- ◆ Output Current up to 1.0A
- ◆ Output Voltage : -5, -6, -8, -9, -10, -12, -15, -18, -24V
- ◆ Built in OVP, CLP circuit.
- ◆ Built in TSD Protection.
- ◆ Output Transistor Safe Area Protection.
- ◆ Ultra High level of ESD [Built in ESD Protection Cell]

ORDERING INFORMATION

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

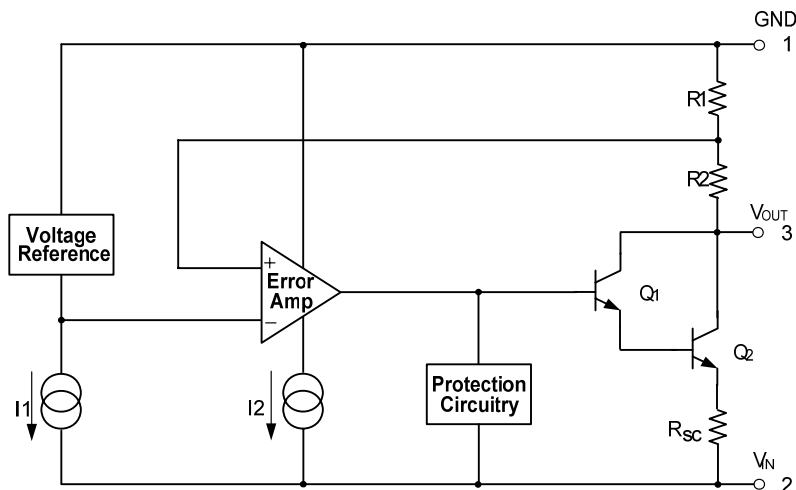
▲ Marking Detail Information

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

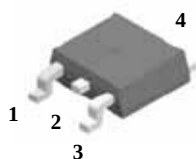


- ① AUK Logo
- ② Grade & M Code & Year & Week Code
- ③ Device Code

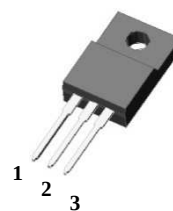
Equivalent Circuit



◆ Pin Configuration

**TO-252-3L**

- 1: GND
2: V_{IN}
3: V_{OUT}
4: V_{IN}

**TO-220F-3L**

- 1: GND
2: V_{IN}
3: V_{OUT}

◆ 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 ($T_a = 25^\circ\text{C}$)**

Parameter	Symbol	Limits		Unit
		TO-220F-3L	TO-252-3L	
Input Voltage	V _{IN}	-40.0 (V _O =24V)		V
		-35.0 (V _O =5 to 18V)		
Power Dissipation	P _d	2.0	1.3	W
Thermal Resistance Junction to Case	R _{ΘJC}	5	5	°C/W
Thermal Resistance Junction to Air	R _{ΘJA}	65	92	°C/W
Junction Temperature	T _J	150		°C
Operate Temperature Range	T _{opr}	-40 ~ +125		°C
Storage Temperature Range	T _{stg}	-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, $T_{J(max)}$, the junction-to-ambient thermal resistance, θ_{JA} , and the ambient temperature, T_A .

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

$PD(max) = (T_{J(max)} - T_A) \div \theta_{JA}$. 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 °C		-4.80	-5.0	-5.20	V
		-7.0V ≤ V _{IN} ≤ -20.0V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-4.75	-5.0	-5.25	
Line Regulation	ΔV _{O(ΔVI)}	-7.0V ≤ V _{IN} ≤ -25.0V	T _J =25 °C	-	35	100	mV
		-8.0V ≤ V _{IN} ≤ -12.0V		-	8	50	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	10	100	mV
		250mA ≤ I _O ≤ 750mA		-	3.0	50	
Quiescent Current	I _{QC}	T _J =25 °C		-	3.0	6.0	mA
Quiescent Current Change	ΔI _{QC}	-8.0V ≤ V _{IN} ≤ -25V		-	0.1	1.3	mA
		5.0mA ≤ I _O ≤ 1.0A			0.05	0.5	
Ripple Rejection	RR	-8.0V ≤ V _{IN} ≤ -18.0V, I _O =500 mA f=120Hz		54	60	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	100	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-0.4	-	mV/°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 °C		-5.75	-6.0	-6.2	V
		-9.0V ≤ V _{IN} ≤ -21V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-5.70	-6.0	-6.3	
Line Regulation	ΔV _{O(ΔVI)}	-8.0V ≤ V _{IN} ≤ -25.0V	T _J =25 °C	-	10	120	mV
		-9.0V ≤ V _{IN} ≤ -13.0V		-	5	60	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	10	120	mV
		250mA ≤ I _O ≤ 750mA		-	3.0	60	
Quiescent Current	I _{QC}	T _J =25 °C		-	3.0	6.0	mA
Quiescent Current Change	ΔI _{QC}	-8.0V ≤ V _{IN} ≤ -25.0V		-	0.1	1.3	mA
		5.0mA ≤ I _O ≤ 1.0A		-	0.05	0.5	
Ripple Rejection	RR	-9.0V ≤ V _{IN} ≤ -19.0V f=120Hz		54	60	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	130	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-0.5	-	mV/°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

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

Characteristic	Symbol	Test Condition*		SN7908x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V _O	T _J =25 °C		-7.7	-8.0	-8.3	V
		-10.5V ≤ V _{IN} ≤- 23.0V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-7.6	-8.0	-8.4	
Line Regulation	ΔV _{O(ΔVI)}	-10.5V ≤ V _{IN} ≤ -25.0V	T _J =25 °C	-	10	160	mV
		-11V ≤ V _{IN} ≤ -17V		-	5.0	80	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	12	160	mV
		250mA ≤ I _O ≤ 750mA		-	4.0	80	
Quiescent Current	I _{QC}	T _J =25 °C		-	3.0	6.0	mA
Quiescent Current Change	ΔI _{QC}	-10.5V ≤ V _{IN} ≤ -25.0V		-	0.1	1.0	mA
		5.0mA ≤ I _O ≤ 1.0A		-	0.05	0.5	
Ripple Rejection	RR	-11.5V ≤ V _{IN} ≤ -21.5V f=120Hz		54	60	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	175	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-0.6	-	mV/°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

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

Characteristic	Symbol	Test Condition*		SN7909x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V _O	T _J =25 °C		-8.70	-9.0	-9.30	V
		-11.5V ≤ V _{IN} ≤ -24.0V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-8.60	-9.0	-9.40	
Line Regulation	ΔV _{O(ΔVI)}	-11.5V ≤ V _{IN} ≤ -26.0V	T _J =25 °C	-	10	180	mV
		-12.0V ≤ V _{IN} ≤ -18.0V		-	5.0	90	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	12	180	mV
		250mA ≤ I _O ≤ 750mA		-	4.0	90	
Quiescent Current	I _{QC}	T _J =25 °C		-	3.0	6.0	mA
Quiescent Current Change	ΔI _{QC}	-11.5V ≤ V _{IN} ≤ -26.0V		-	0.1	1.0	mA
		5.0mA ≤ I _O ≤ 1.0A		-	0.05	0.5	
Ripple Rejection	RR	-13.0V ≤ V _{IN} ≤ -23.0V f=120Hz		54	60	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	175	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-0.6	-	mV/°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

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

Characteristic	Symbol	Test Condition*		SN7910x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V _O	T _J =25 °C		-9.6	-10.0	-10.4	V
		-12.0V ≤ V _{IN} ≤ -28.0V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-9.5	-10.0	-10.5	
Line Regulation	ΔV _{O(ΔVI)}	-12.5V ≤ V _{IN} ≤ -28.0V	T _J =25 °C	-	12.0	200	mV
		-14.0V ≤ V _{IN} ≤ -20.0V		-	6.0	100	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	12.0	200	mV
		250mA ≤ I _O ≤ 750mA		-	4.0	100	
Quiescent Current	I _{QC}	T _J =25 °C		-	3.0	6.0	mA
Quiescent Current Change	ΔI _{QC}	-12.5V ≤ V _{IN} ≤ -28V		-	0.1	1.0	mA
		5.0mA ≤ I _O ≤ 1.0A		-	0.05	0.5	
Ripple Rejection	RR	-13.0V ≤ V _{IN} ≤ -23.0V f=120Hz		54	60	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	58	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-1.0	-	mV/°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

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

Characteristic	Symbol	Test Condition*		SN7812x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V _O	T _J =25 °C		-11.5	-12.0	-12.5	V
		-15.5V ≤ V _{IN} ≤ -27.0V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-11.4	-12.0	-12.6	
Line Regulation	ΔV _{O(ΔVI)}	-14.5V ≤ V _{IN} ≤ -30.0V	T _J =25 °C	-	12.0	240	mV
		-16.0V ≤ V _{IN} ≤ -22.0V		-	6.0	120	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	12.0	240	mV
		250mA ≤ I _O ≤ 750mA		-	4.0	120	
Quiescent Current	I _{QC}	T _J =25 °C		-	3.0	6.0	mA
Quiescent Current Change	ΔI _{QC}	-14.5V ≤ V _{IN} ≤ -30.0V		-	0.1	1.0	mA
		5.0mA ≤ I _O ≤ 1.0A		-	0.05	0.5	
Ripple Rejection	RR	-15.0V ≤ V _{IN} ≤ -25.0V f=120Hz		54	64	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	200	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-0.8	-	mV/°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

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

Characteristic	Symbol	Test Condition*		SN7915x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V _O	T _J =25 °C		-14.4	-15.0	-15.6	V
		-18.0V ≤ V _{IN} ≤ -30.0V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-14.25	-15.0	-15.75	
Line Regulation	ΔV _{O(ΔVI)}	-17.5V ≤ V _{IN} ≤ -30.0V	T _J =25 °C	-	12.0	300	mV
		-20.0V ≤ V _{IN} ≤ -26.0V		-	6.0	150	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	12.0	300	mV
		250mA ≤ I _O ≤ 750mA		-	4.0	150	
Quiescent Current	I _{QC}	T _J =25 °C		-	3.0	6.0	mA
Quiescent Current Change	ΔI _{QC}	-17.5V ≤ V _{IN} ≤ -30.0V		-	0.1	1.0	mA
		5.0mA ≤ I _O ≤ 1.0A		-	0.05	0.5	
Ripple Rejection	RR	-18.5V ≤ V _{IN} ≤ -28.5V f=120Hz		54	60	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	250	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-0.9	-	mV/°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 °C		-17.3	-18.0	-18.7	V
		----- -22.5V ≤ V _{IN} ≤ -33.0V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-17.1	-18.0	-18.9	
Line Regulation	ΔV _{O(ΔVI)}	-21.0V ≤ V _{IN} ≤ -33.0V	T _J =25 °C	-	15.0	360	mV
		----- -24.0V ≤ V _{IN} ≤ -30.0V		-	8.0	180	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	15.0	360	mV
		----- 250mA ≤ I _O ≤ 750mA		-	5.0	180	
Quiescent Current	I _{QC}	T _J =25 °C		-	5.2	8.0	mA
Quiescent Current Change	ΔI _{QC}	-21.0V ≤ V _{IN} ≤ -33.0V		-	0.1	1.0	mA
		----- 5.0mA ≤ I _O ≤ 1.0A		-	0.05	0.5	
Ripple Rejection	RR	-22.0V ≤ V _{IN} ≤ -32.0V f=120Hz		54	60	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	300	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-1.0	-	mV/°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

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

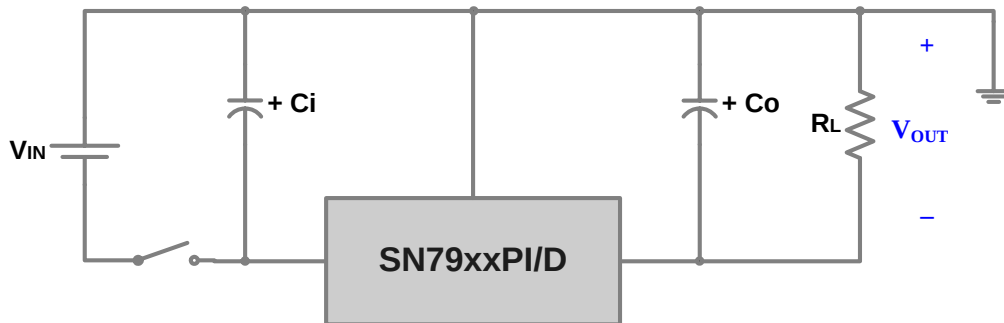
Characteristic	Symbol	Test Condition*		SN7924x			Unit
				Min.	Typ.	Max.	
Output Voltage**	V _O	T _J =25 °C		-23.0	-24.0	-25.0	V
		-27.0V ≤ V _{IN} ≤ -38.0V 5.0mA ≤ I _O ≤ 1.0A, P _D ≤ 15W		-22.8	-24.0	-25.2	
Line Regulation	ΔV _{O(ΔVI)}	-27.0V ≤ V _{IN} ≤ -38.0V	T _J =25 °C	-	15.0	480	mV
		-30.0V ≤ V _{IN} ≤ -36.0V		-	8.0	180	
Load Regulation	ΔV _{O(ΔIL)}	5.0mA ≤ I _O ≤ 1.5A	T _J =25 °C	-	15.0	480	mV
		250mA ≤ I _O ≤ 750mA		-	5.0	240	
Quiescent Current	I _{QC}	T _J =25 °C		-	3.0	6.0	mA
Quiescent Current Change	ΔI _{QC}	-27.0V ≤ V _{IN} ≤ -38.0V		-	0.1	1.0	mA
		5.0mA ≤ I _O ≤ 1.0A		-	0.05	0.5	
Ripple Rejection	RR	28.0V ≤ V _{IN} ≤ 38.0V f=120Hz		54	60	-	dB
Dropout Voltage	V _{DROP}	I _O =1.0A	T _J =25 °C	-	2.0	-	V
Output Noise Voltage	V _N	10Hz ≤ f ≤ 100kHz	T _A =25 °C	-	400	-	uV/ V _O
Short Circuit Current	I _{SC}	V _I =-35V,	T _A =25 °C	-	300	-	mA
Peak Output Current	I _{PK}	T _J =25 °C		-	2.2	-	A
Temperature coefficient of Output voltage	ΔV _O / ΔTemp	I _O =5.0mA		-	-1.0	-	mV/°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.

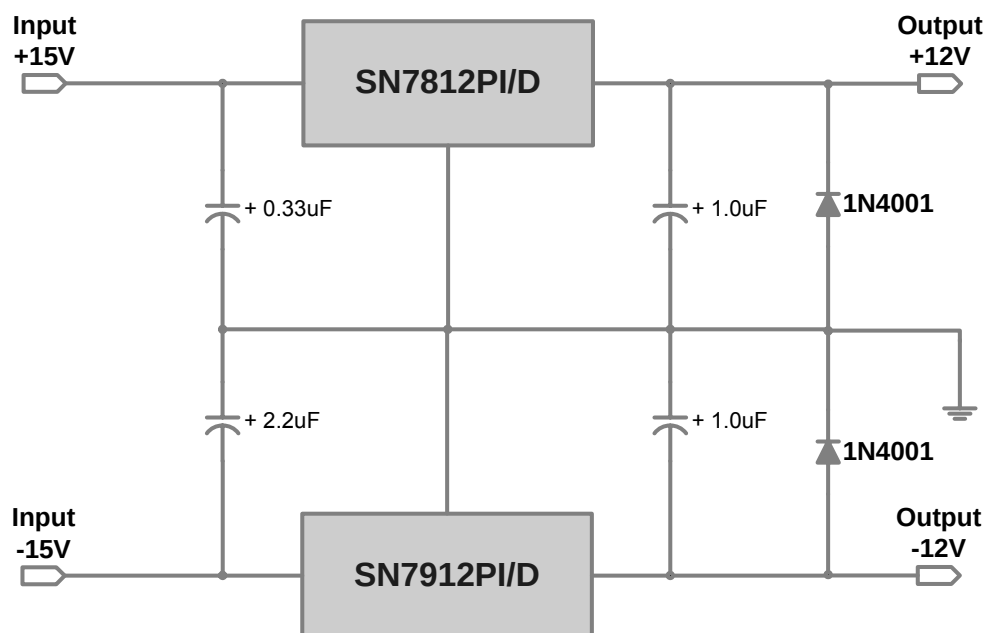
Typical Application

Negative Fixed Output Regulator

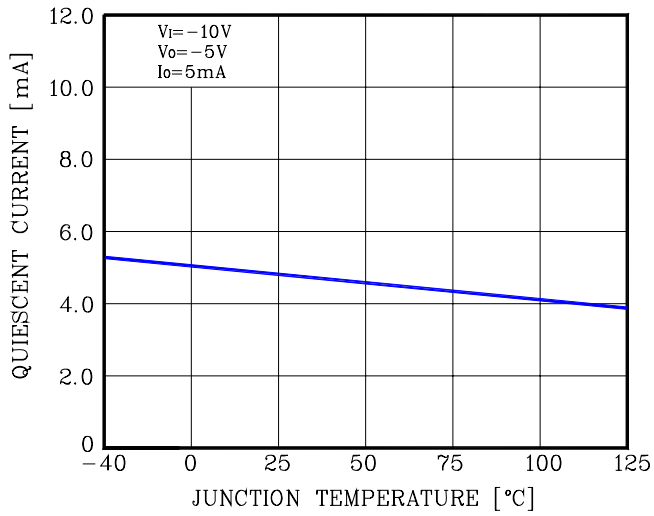


- 1) C_{IN} should be required if regulators are located far from power supply filter
- 2) C_O improves output stability and transient response
- 3) To specify an output voltage, substitute voltage value for “xx”

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**

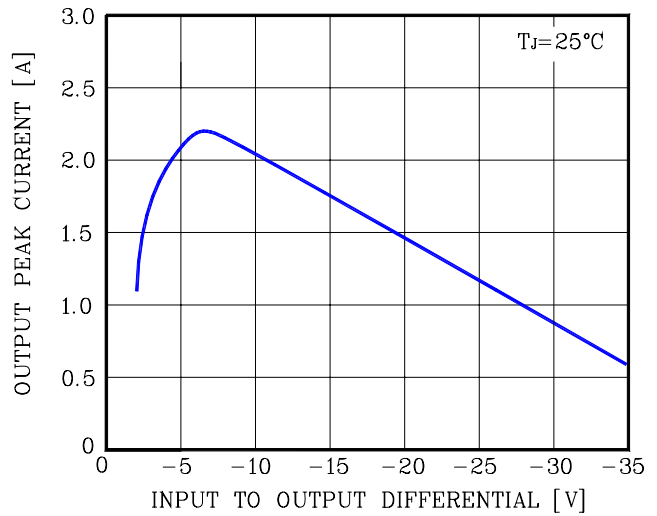


Fig.3 Output Voltage vs. Junction Temperature

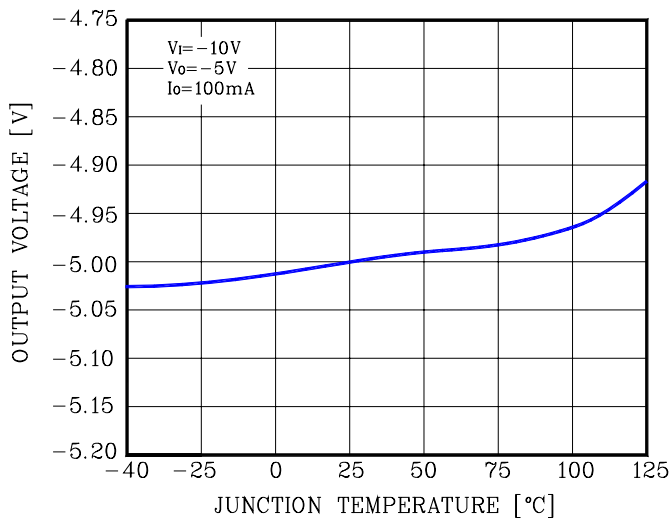


Fig.4 Dropout Voltage vs. Input Voltage

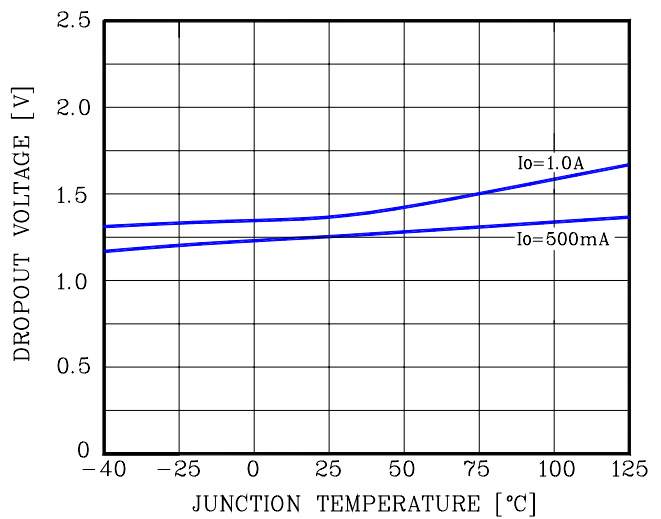


Fig.5 Line Transient Response

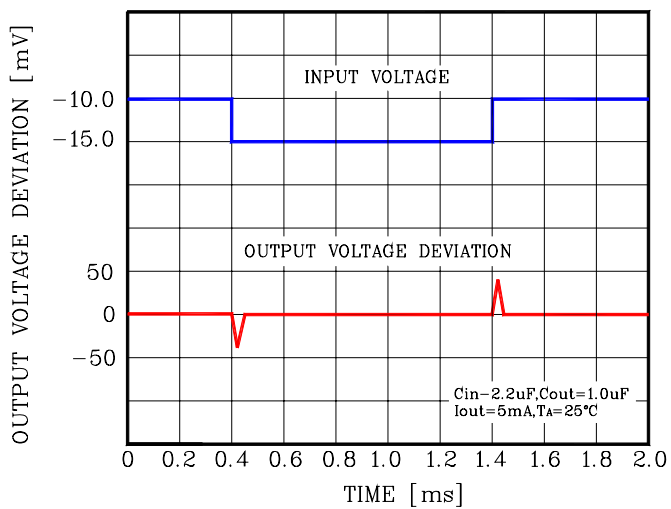
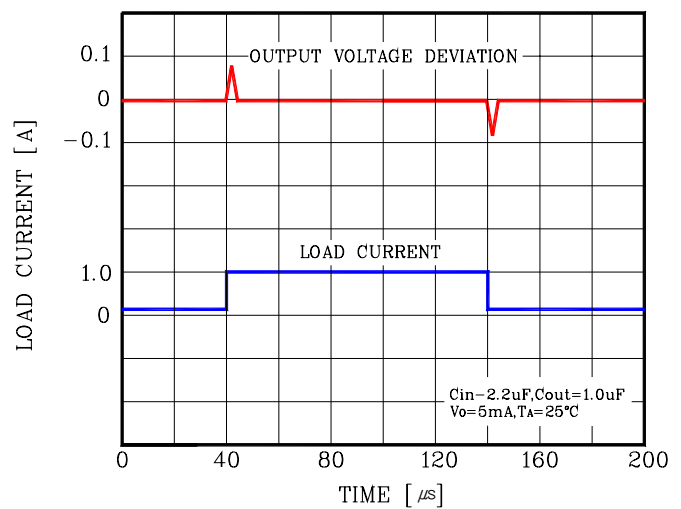
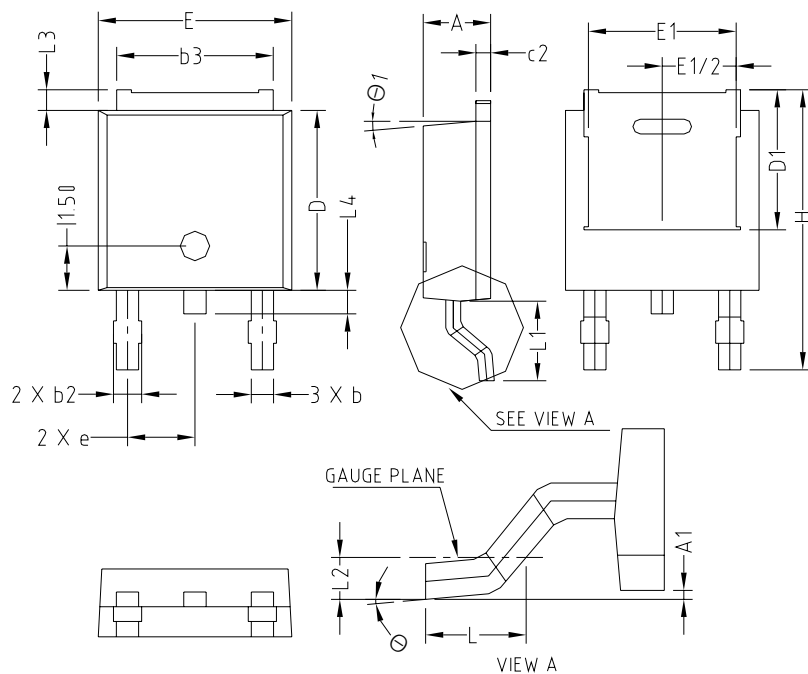


Fig.6 Load Transient Response

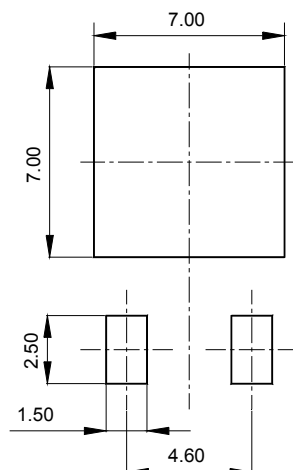


◆ TO-252-3L Outline Dimension (Unit : mm)

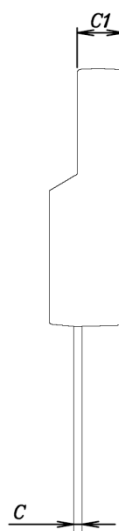
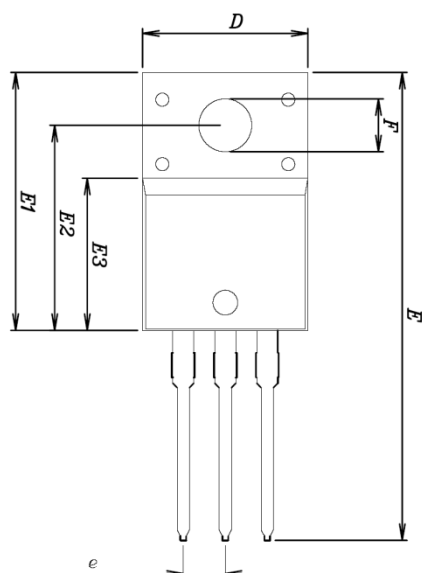


SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	2.20	2.30	2.40	
A1	0.00		0.127	
b	0.66	0.76	0.86	
b2	-	-	0.96	
b3	5.04	5.34	5.64	
c2	0.40	0.50	0.60	
D	5.90	6.10	6.30	
D1	[4.75]			
E	6.40	6.60	6.80	
E1	[5.04]			
e	2.30 BSC			
H	9.20	9.50	9.80	
L	1.27	1.47	1.67	
L1	2.50	2.70	2.90	
L2	0.508 BSC			
L3	0.50	0.70	0.90	
L4	0.60	0.80	1.00	
Θ	0°	-	10°	
Θ1	5°			

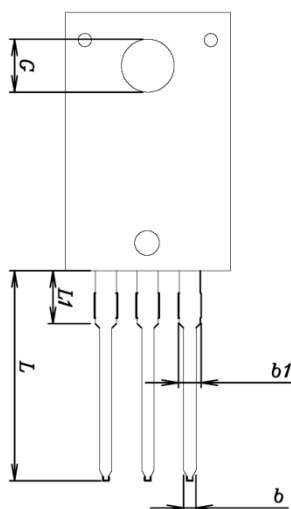
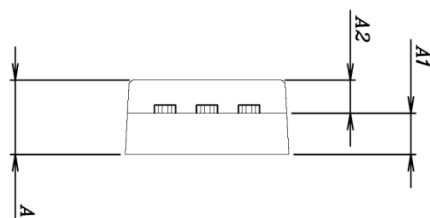
※ Recommend PCB solder land [Unit: mm]



◆ 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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