

Descriptions

This series of fixed-negative-voltage monolithic integrated-circuit voltage regulators is designed to complement series S7800 in a wide range of applications. These applications include on-card regulator for elimination of noise and distribution problems associated with single point regulations. Each of these regulators can deliver up to 1.0 amperes of output current. The internal current Limiting and thermal shutdown features of these regulators make them essentially immune to overload. In addition to use as fixed-voltage regulators, these device can be used with external components to obtain adjustable output voltages and also as the power pass element in precision regulators.

Features

- Output Current UP to 1.0A
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- No External Components
- Output Transistor Safe-Area Compensations

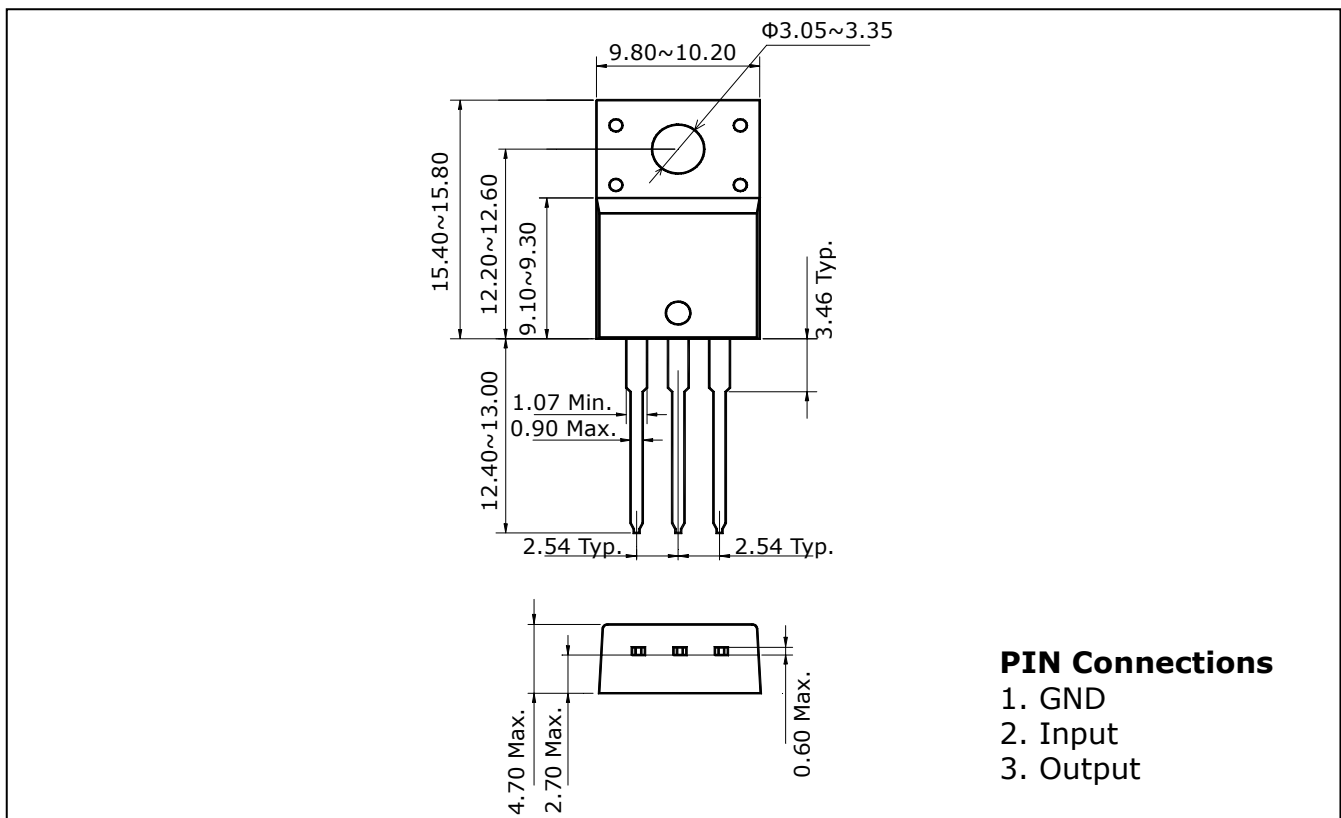
Ordering Information

Type NO.	Marking	Package Code
S79xxPI	S79□□PI	TO-220F

□□: Voltage Code (05:-5V, 08:-8V, 09:-9V, 12:-12V, 15:-15V)

Outline Dimensions

unit : mm



Absolute Maximum Ratings

Ta=25°C

Characteristic	Symbol	Ratings	Unit
Operating Input voltage	V_{IN}	-35	V
Power Dissipation (Tc=25°C)	P_D	20.8	W
Power Dissipation (without Heatsink)	P_D	2.0	W
Operating Junction Temperature	T_J	-30 ~ 125	°C
Storage Temperature	T_{STG}	-55 ~ 150	°C

Electrical Characteristics

(T_j = 0 to 125°C, Vin = -10V, Iout=500mA, unless otherwise specified.)

Characteristic	Symbol	Test Condition	S7905PI			Unit	
			Min.	Typ.	Max.		
Output Voltage	V_{OUT}	$T_j = 25^\circ\text{C}$	-4.8	-5.0	-5.2	V	
		$I_{OUT}=5\text{mA} \sim 1\text{A}$ $V_{IN}=-7.0\text{V} \sim -20\text{V}, P_D \leq 15\text{W}$	-4.75	-5.0	-5.25		
Line Regulation	ΔV_{OUT}	$V_{IN}=-7.0\text{V} \sim -25\text{V}$	-	12.5	50	mV	
		$V_{IN}=-8.0\text{V} \sim -12\text{V}$	-	4	15		
Load Regulation	ΔV_{OUT}	$I_{OUT}=5\text{mA} \sim 1.0\text{A}$	-	15	100	mV	
		$I_{OUT}=250\text{mA} \sim 750\text{mA}$	-	5	50		
Quiescent Current	I_B	$T_j = 25^\circ\text{C}$	-	1.5	2.0	mA	
Quiescent Current Change	ΔI_B	$V_{IN} = -7.0\text{V} \sim -25\text{V}$	-	0.15	0.5	mA	
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$	-	0.08	0.5		
Output Noise Voltage	V_N	$f=10\text{Hz} \sim 100\text{KHz}$	$T_j = 25^\circ\text{C}$	-	125	-	μV_{rms}
Ripple Rejection Ratio	RR	$f=120\text{Hz}, V_{IN}=-8.0\text{V} \sim -18\text{V}$		54	60	-	dB
Dropout Voltage	V_D	$I_{OUT}=1\text{A}$	$T_j = 25^\circ\text{C}$	-	2.0	-	V
Temperature coefficient of output Voltage Drift	T_{CVO}	$I_{OUT}=5\text{mA}$		-	-0.4	-	mV/°C
Peak Output Current	I_{PK}		$T_j = 25^\circ\text{C}$	-	2.1	-	A

* 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.

Electrical Characteristics

($T_j = 0$ to 125°C , $V_{in} = -14\text{V}$, $I_{out} = 500\text{mA}$, unless otherwise specified.)

Characteristic	Symbol	Test Condition		S7908PI			Unit
				Min.	Typ.	Max.	
Output Voltage	V_{OUT}		$T_j = 25^\circ\text{C}$	-7.7	-8.0	-8.3	V
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$ $V_{IN} = -10.5\text{V} \sim -23\text{V}$, $P_D \leq 15\text{W}$		-7.6	-8.0	-8.4	
Line Regulation	ΔV_{OUT}	$V_{IN} = -10.5\text{V} \sim -25\text{V}$	$T_j = 25^\circ\text{C}$	-	12.5	160	mV
		$V_{IN} = -11.0\text{V} \sim -17\text{V}$		-	4	80	
Load Regulation	ΔV_{OUT}	$I_{OUT} = 5\text{mA} \sim 1.0\text{A}$	$T_j = 25^\circ\text{C}$	-	15	160	mV
		$I_{OUT} = 250\text{mA} \sim 750\text{mA}$		-	5	80	
Quiescent Current	I_B		$T_j = 25^\circ\text{C}$	-	1.5	2.0	mA
Quiescent Current Change	ΔI_B	$V_{IN} = -10.5\text{V} \sim -25\text{V}$		-	0.15	1.0	mA
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$		-	0.08	0.5	
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$	$T_j = 25^\circ\text{C}$	-	200	-	μV_{rms}
Ripple Rejection Ratio	RR	$f = 120\text{Hz}$, $V_{IN} = -11.5\text{V} \sim -21.5\text{V}$		54	60	-	dB
Dropout Voltage	V_D	$I_{OUT} = 1\text{A}$	$T_j = 25^\circ\text{C}$	-	2.0	-	V
Temperature coefficient of output Voltage Drift	T_{CVO}	$I_{OUT} = 5\text{mA}$	$T_j = 25^\circ\text{C}$	-	-0.6	-	$\text{mV}/^\circ\text{C}$
Peak Output Current	I_{PK}		$T_j = 25^\circ\text{C}$	-	2.1	-	A

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Electrical Characteristics

($T_j = 0$ to 125°C , $V_{in} = -15\text{V}$, $I_{out} = 500\text{mA}$, unless otherwise specified.)

Characteristic	Symbol	Test Condition		S7909PI			Unit
				Min.	Typ.	Max.	
Output Voltage	V_{OUT}		$T_j = 25^\circ\text{C}$	-8.70	-9.0	-9.30	V
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$ $V_{IN} = -11.5\text{V} \sim -23\text{V}$, $P_D \leq 15\text{W}$		-8.60	-9.0	-9.40	
Line Regulation	ΔV_{OUT}	$V_{IN} = -10.5\text{V} \sim -25\text{V}$	$T_j = 25^\circ\text{C}$	-	10	180	mV
		$V_{IN} = -110\text{V} \sim -17\text{V}$		-	5	90	
Load Regulation	ΔV_{OUT}	$I_{OUT} = 5\text{mA} \sim 1\text{A}$	$T_j = 25^\circ\text{C}$	-	12	180	mV
		$I_{OUT} = 250\text{mA} \sim 750\text{mA}$		-	4	90	
Quiescent Current	I_B		$T_j = 25^\circ\text{C}$	-	3	6	mA
Quiescent Current Change	ΔI_B	$V_{IN} = -11.5\text{V} \sim -25\text{V}$		-	0.1	1.0	mA
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$		-	0.08	0.5	
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$	$T_j = 25^\circ\text{C}$	-	175	-	μV_{rms}
Ripple Rejection Ratio	RR	$f = 120\text{Hz}$, $V_{IN} = -9.0\text{V} \sim -19\text{V}$		54	60	-	dB
Dropout Voltage	V_D	$I_{OUT} = 1\text{A}$	$T_j = 25^\circ\text{C}$	-	2.0	-	V
Temperature coefficient of output Voltage Drift	T_{CVO}	$I_{OUT} = 5\text{mA}$	$T_j = 25^\circ\text{C}$	-	-0.4	-	$\text{mV}/^\circ\text{C}$
Peak Output Current	I_{PK}		$T_j = 25^\circ\text{C}$	-	2.1	-	A

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Electrical Characteristics

($T_j = 0$ to 125°C , $V_{in} = -19\text{V}$, $I_{out} = 500\text{mA}$, unless otherwise specified.)

Characteristic	Symbol	Test Condition		S7912PI			Unit
				Min.	Typ.	Max.	
Output Voltage	V_{OUT}		$T_j = 25^\circ\text{C}$	-11.5	-12.0	-12.5	V
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$ $V_{IN} = -14.5\text{V} \sim -27\text{V}$, $P_D \leq 15\text{W}$		-11.4	-12.0	-12.6	
Line Regulation	ΔV_{OUT}	$V_{IN} = -14.5\text{V} \sim -30\text{V}$	$T_j = 25^\circ\text{C}$	-	5	80	mV
		$V_{IN} = -16.0\text{V} \sim -22\text{V}$		-	3	30	
Load Regulation	ΔV_{OUT}	$I_{OUT} = 5\text{mA} \sim 1.0\text{A}$	$T_j = 25^\circ\text{C}$	-	15	200	mV
		$I_{OUT} = 250\text{mA} \sim 750\text{mA}$		-	5	75	
Quiescent Current	I_B		$T_j = 25^\circ\text{C}$	-	2.0	3.0	mA
Quiescent Current Change	ΔI_B	$V_{IN} = -14.5\text{V} \sim -30\text{V}$		-	0.04	0.5	mA
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$		-	0.08	0.5	
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$,	$T_j = 25^\circ\text{C}$	-	300	-	μV_{rms}
Ripple Rejection Ratio	RR	$f = 120\text{Hz}$, $V_{IN} = -15\text{V} \sim -25\text{V}$		54	60	-	dB
Dropout Voltage	V_D	$I_{OUT} = 1\text{A}$	$T_j = 25^\circ\text{C}$	-	2.0	-	V
Temperature coefficient of output Voltage Drift	T_{CVO}	$I_{OUT} = 5\text{mA}$	$T_j = 25^\circ\text{C}$	-	-0.8	-	$\text{mV}/^\circ\text{C}$
Peak Output Current	I_{PK}		$T_j = 25^\circ\text{C}$	-	2.1	-	A

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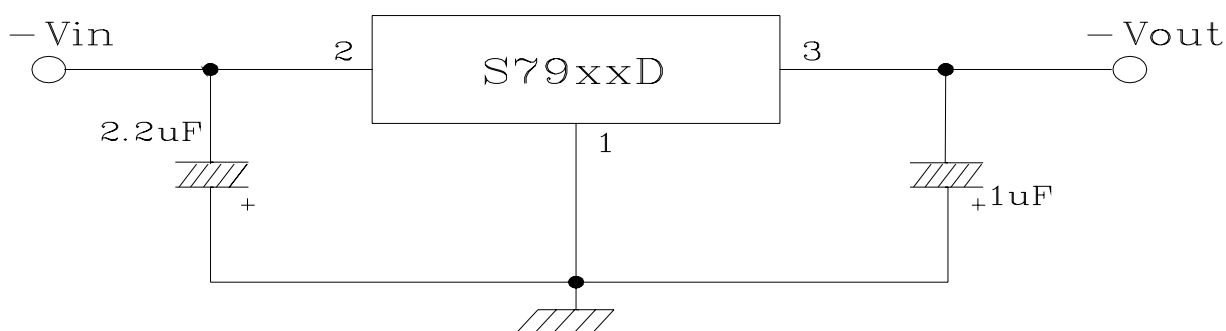
Electrical Characteristics

($T_j = 0$ to 125°C , $V_{in} = -23\text{V}$, $I_{out} = 500\text{mA}$, unless otherwise specified.)

Characteristic	Symbol	Test Condition		S7915PI			Unit
				Min.	Typ.	Max.	
Output Voltage	V_{OUT}		$T_j = 25^\circ\text{C}$	-14.4	-15.0	-15.6	V
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$ $V_{IN} = -17.5\text{V} \sim -30\text{V}$, $P_D \leq 15\text{W}$		-14.25	-15.0	-15.75	
Line Regulation	ΔV_{OUT}	$V_{IN} = -17.5\text{V} \sim -30\text{V}$	$T_j = 25^\circ\text{C}$	-	5	100	mV
		$V_{IN} = -20\text{V} \sim -26\text{V}$		-	3	50	
Load Regulation	ΔV_{OUT}	$I_{OUT} = 5\text{mA} \sim 1.0\text{A}$	$T_j = 25^\circ\text{C}$	-	15	200	mV
		$I_{OUT} = 250\text{mA} \sim 750\text{mA}$		-	5	75	
Quiescent Current	I_B		$T_j = 25^\circ\text{C}$	-	2.0	3.0	mA
Quiescent Current Change	ΔI_B	$V_{IN} = -17.5\text{V} \sim -30\text{V}$		-	0.04	0.5	mA
		$I_{OUT} = 5\text{mA} \sim 1\text{A}$		-	0.08	0.5	
Output Noise Voltage	V_N	$f = 10\text{Hz} \sim 100\text{KHz}$,	$T_j = 25^\circ\text{C}$	-	375	-	μV_{rms}
Ripple Rejection Ratio	RR	$f = 120\text{Hz}$, $V_{IN} = -18.5\text{V} \sim -28.5\text{V}$		54	60	-	dB
Dropout Voltage	V_D	$I_{OUT} = 1\text{A}$	$T_j = 25^\circ\text{C}$	-	2.0	-	V
Temperature coefficient of output Voltage Drift	T_{CVO}	$I_{OUT} = 5\text{mA}$	$T_j = 25^\circ\text{C}$	-	-1.0	-	$\text{mV}/^\circ\text{C}$
Peak Output Current	I_{PK}		$T_j = 25^\circ\text{C}$	-	2.1	-	A

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Test circuit



Electrical Characteristic Curves

Fig. 1 $V_{OUT} - V_{IN}$

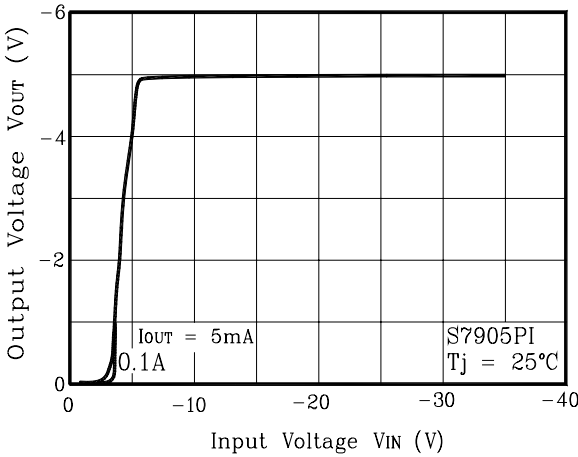


Fig. 2 Dropout - Voltage

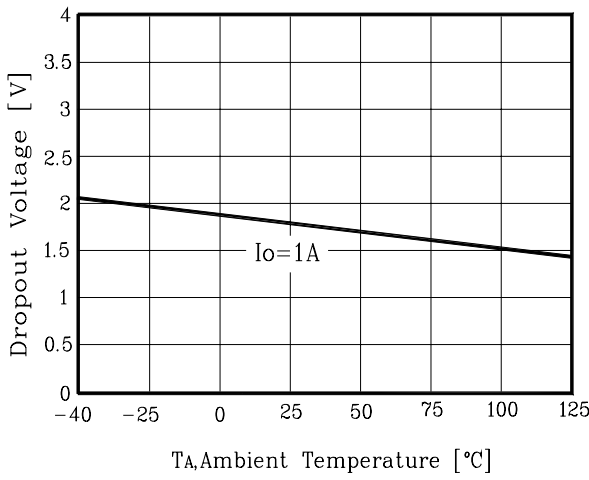


Fig. 3 $I_B - T_j$

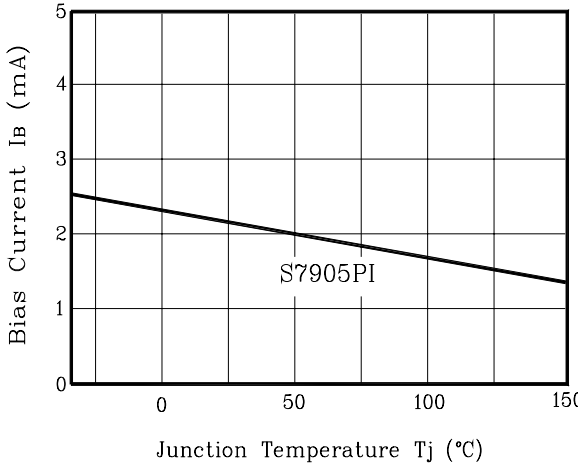


Fig. 4 $V_{OUT} - T_j$

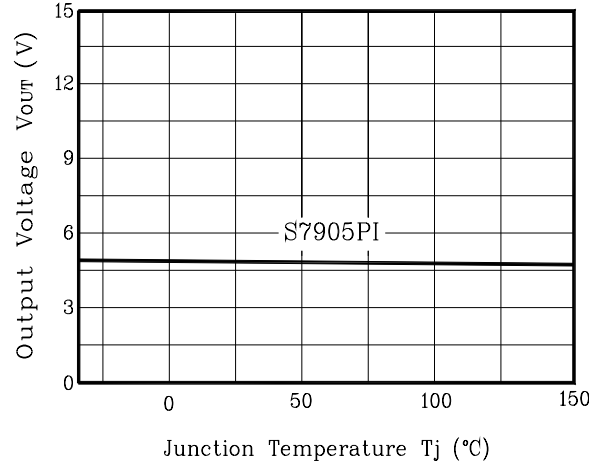
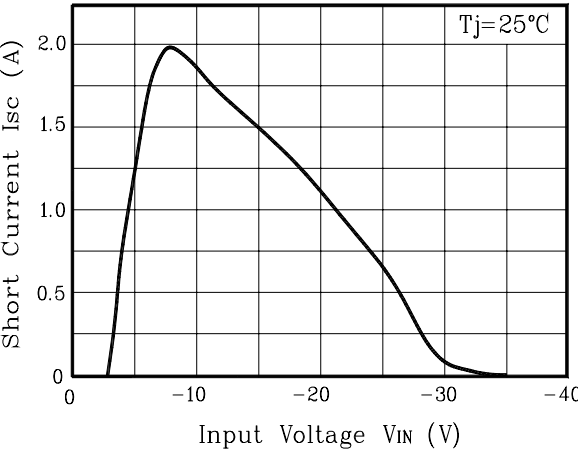


Fig. 5 $I_{SC} - V_{IN}$



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