



# Linear Voltage Regulator – 7912

## Negative Fixed 12V Voltage Regulator in bare die form

Rev 1.0  
19/04/19

### Description

The 7912 12V fixed 3-terminal negative voltage regulator delivers up to 1.5A of output current with adequate heat-sinking. The device is equipped with internal limiting, safe-area compensation + thermal shutdown features for overload immunity. The 7912 can be used with external components to obtain adjustable voltages or currents & can also be used as the power-pass element in precision high-current voltage regulators. No external components are needed other than to enhance performance or increase design flexibility.

### Features:

- $\pm 5\%$   $V_{OUT}$  tolerance over entire temperature range
- Greater than 1A output current capability
- Internal thermal overload protection
- Internal short-circuit current limit
- Output capacitor not essential for stability
- Full military temperature range
- Positive voltage complement is 7812

### Ordering Information

The following part suffixes apply:

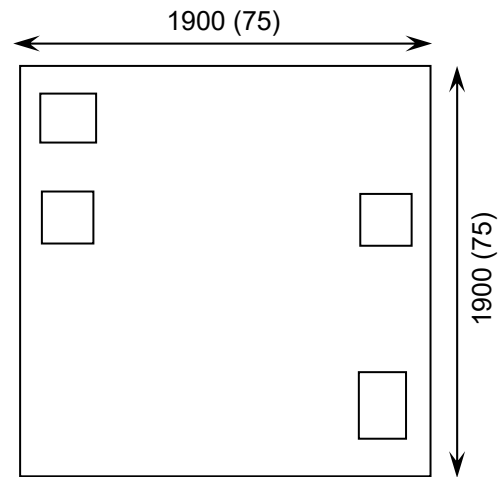
- No suffix - MIL-STD-883 /2010B Visual Inspection
- "H" - MIL-STD-883 /2010B Visual Inspection + MIL-PRF-38534 Class H LAT
- "K" - MIL-STD-883 /2010A Visual Inspection (Space) + MIL-PRF-38534 Class K LAT

LAT = Lot Acceptance Test.

For further information on LAT process flows see below.

[www.siliconsupplies.com/quality/bare-die-lot-qualification](http://www.siliconsupplies.com/quality/bare-die-lot-qualification)

### Die Dimensions in $\mu\text{m}$ (mils)



### Supply Formats:

- Default – Die in Waffle Pack (100 per tray capacity)
- Sawn Wafer on Tape – On request
- Unsawn Wafer – On request
- Tape & Reel – On request
- In Metal or Ceramic package – On request

### Mechanical Specification

Die Size (Unsawn)	1900 x1900 75 x 75	$\mu\text{m}$ mils
Minimum Bond Pad Size	230 x 230 9.05 x 9.05	$\mu\text{m}$ mils
Die Thickness	280 ( $\pm 20$ ) 11.02 ( $\pm 0.79$ )	$\mu\text{m}$ mils
Top Metal Composition	Al 1%Si 1.1 $\mu\text{m}$	
Back Metal Composition	Ti/Ni/Ag 1.2 $\mu\text{m}$	

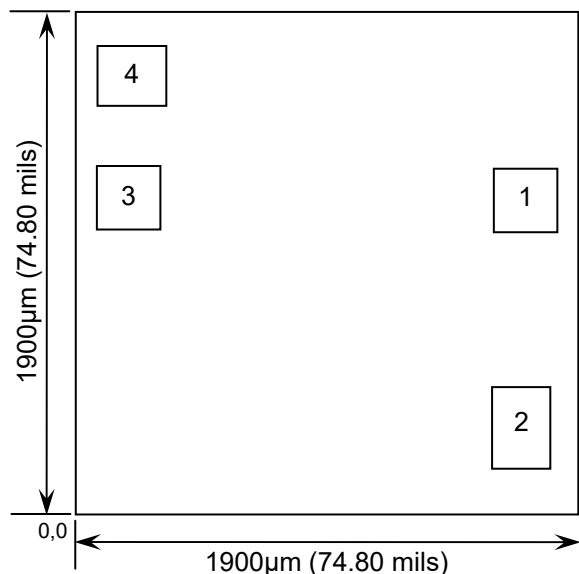




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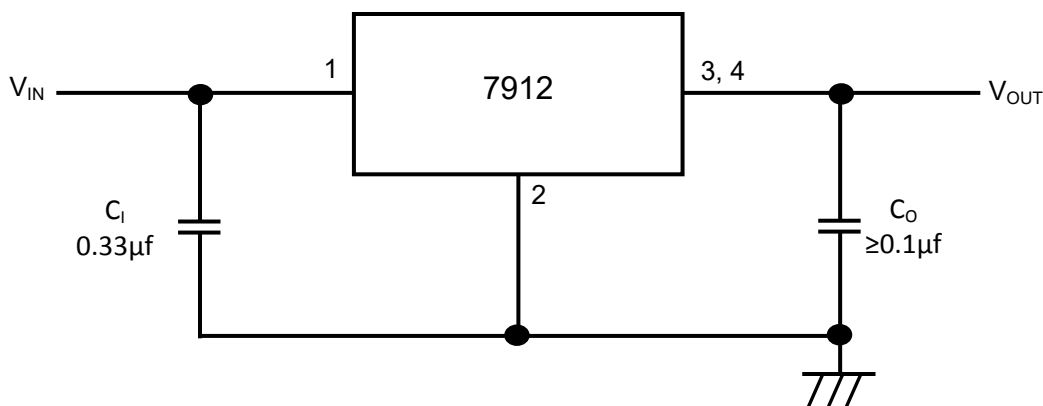
## Pad Layout and Functions



PAD	FUNCTION	COORDINATES ( $\mu\text{m}$ )	
		X	Y
1	$V_{\text{IN}}$	1.575	1.074
2	GND	1.572	0.188
3	$V_{\text{OUT}}$	0.088	1.059
4	$V_{\text{OUT}}$	0.088	1.553

CONNECT CHIP BACK TO  $V_{\text{IN}}$

## Typical Application



$C_i$  is required if the regulator is located an appreciable distance from power supply filter.  $C_o$  is not required for stability; however it does improve transient response. For optimum stability and transient response locate  $C_i$   $C_o$  as close as possible to the regulator. A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0 V above the output voltage even during the low point on the input ripple voltage.





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## Absolute Maximum Ratings

PARAMETER	SYMBOL	VALUE	UNIT
Input Voltage	$V_{IN}$	-35	V
Power Dissipation <sup>1</sup>	$P_D$	Internally Limited	W
Operating Temperature Range	-	-55 to 150	°C
Maximum Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-65 to 150	°C

## Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Voltage	$V_{IN}$	-7	-25	V
Output Current	$I_{OUT}$	-	1.5	A
Operating Temperature Range	$T_J$	-55	125	°C

## DC Electrical Characteristics, $V_I = -19V$ , $I_{OUT} = 500mA$ , $C_I = 0.33\mu F$ , $C_O = 0.1\mu F$ , $T_{MIN} \leq T_J \leq T_{MAX}$ (unless noted otherwise)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	$T_J = 25^\circ C$	-11.50	-12	-12.50	V
		$5mA \leq I_{OUT} \leq 1A$ , $-14.5V \geq V_{IN} \geq -27V$ , $P_D \leq 15$ Watts	-11.40	-	-12.60	
Line Regulation	$\Delta V_{OUT}$	$-14.5V \geq V_{IN} \geq -30V$ , $I_{OUT} = 0.1A$ , $T_J = 25^\circ C$	-	13	120	mV
		$-16V \geq V_{IN} \geq -22V$ , $I_{OUT} = 0.1A$ , $T_J = 25^\circ C$	-	6	60	
		$-14.5V \geq V_{IN} \geq -30V$ , $I_{OUT} = 0.5A$ , $T_J = 25^\circ C$	-	55	240	
		$-16V \geq V_{IN} \geq -22V$ , $I_{OUT} = 0.5A$ , $T_J = 25^\circ C$	-	24	120	
Load Regulation	$\Delta V_{OUT}$	$5mA \leq I_{OUT} \leq 1.5A$ , $T_J = 25^\circ C$	-	46	240	
		$250mA \leq I_{OUT} \leq 750mA$ , $T_J = 25^\circ C$	-	17	120	
Input Bias Current	$I_B$	$T_J = 25^\circ C$	-	4.3	7.8	mA
Input Bias Current Change	$\Delta I_B$	$-14.5V \geq V_{IN} \geq -27V$	-	-	1.0	mA
		$5mA \leq I_{OUT} \leq 1.5A$	-	-	0.5	
Output Noise Voltage	$V_n$	$10Hz \leq f \leq 100KHz$ , $T_J = 25^\circ C$	-	75	-	$\mu V/V_{OUT}$
Ripple Rejection	RR	$I_{OUT} = 20mA$ , $f = 120Hz$ ,	-	61	-	dB
Dropout Voltage	$V_{IN} - V_{OUT}$	$I_{OUT} = 1A$ , $T_J = 25^\circ C$	-	2	-	V
Peak Output Current	$I_{MAX}$	$T_J = 25^\circ C$	-	2.1	-	A
Avg. Output Voltage Temp. Coefficient	$TCV_{OUT}$	$I_{OUT} = 5mA$ , $0^\circ C \leq T_J \leq +125^\circ C$	-	-1.0	-	mV/°C

1. Results in die form are dependent on die attach and assembly method. Max power dissipation is internally limited by the die.



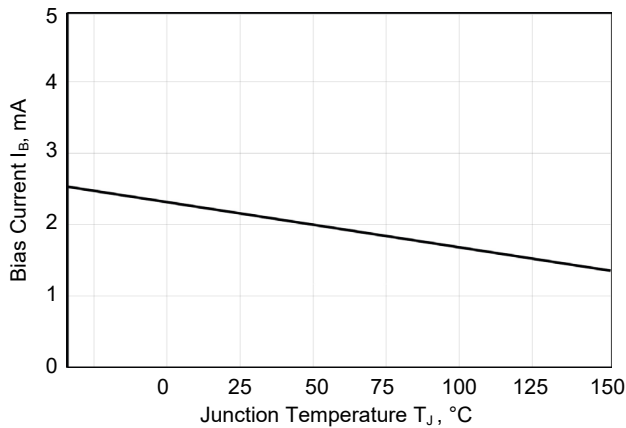


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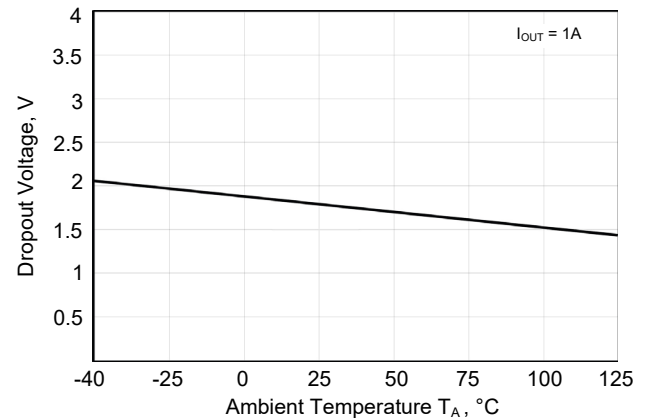
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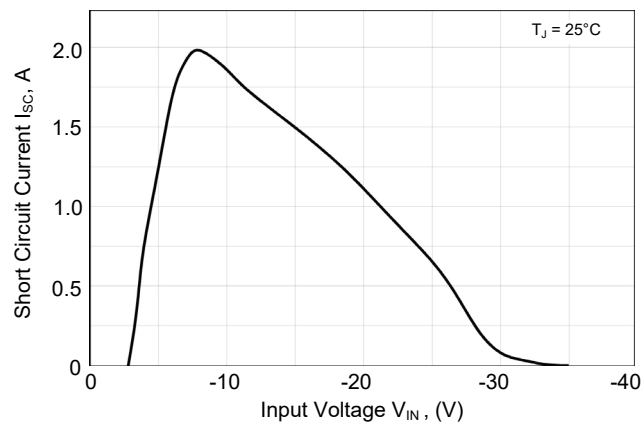
## Typical Characteristics



**Figure 1** – Bias Current Versus Temperature



**Figure 2** – Dropout Voltage Versus Temperature



**Figure 3** – Short-Circuit Current Versus Input Voltage

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