



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:

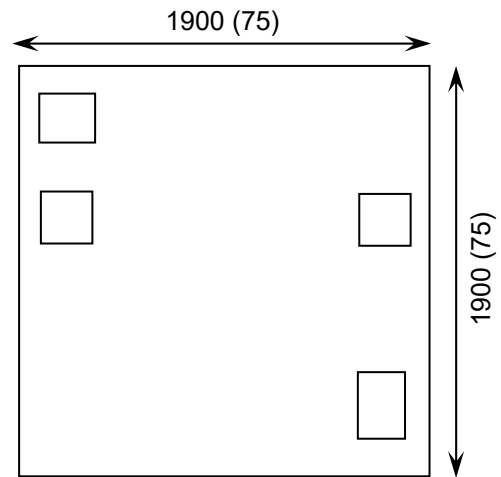
- No suffix - MIL-STD-883 /2010B Visual Inspection
- "H" - MIL-STD-883 /2010B Visual Inspection + MIL-PRF-38534 Class H LAT
- "K" - MIL-STD-883 /2010A Visual Inspection (Space) + MIL-PRF-38534 Class K LAT

LAT = Lot Acceptance Test.

For further information on LAT process flows see below.

www.siliconsupplies.com/quality/bare-die-lot-qualification

Die Dimensions in μm (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	μm mils
Minimum Bond Pad Size	230 x 230 9.05 x 9.05	μm mils
Die Thickness	280 (± 20) 11.02 (± 0.79)	μm mils
Top Metal Composition	Al 1%Si 1.1 μm	
Back Metal Composition	Ti/Ni/Ag 1.2 μm	

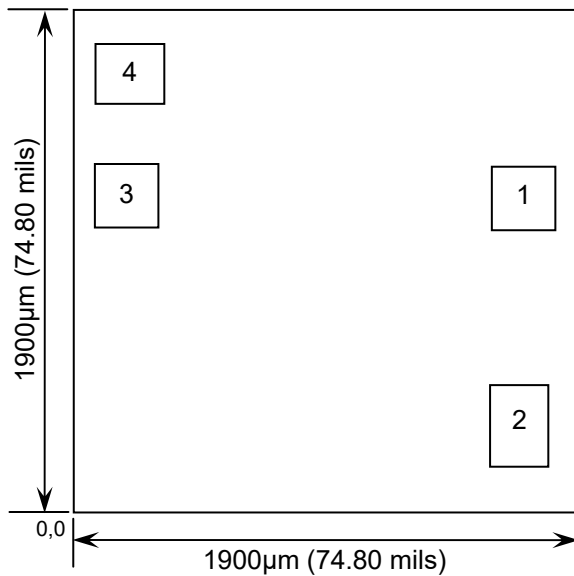




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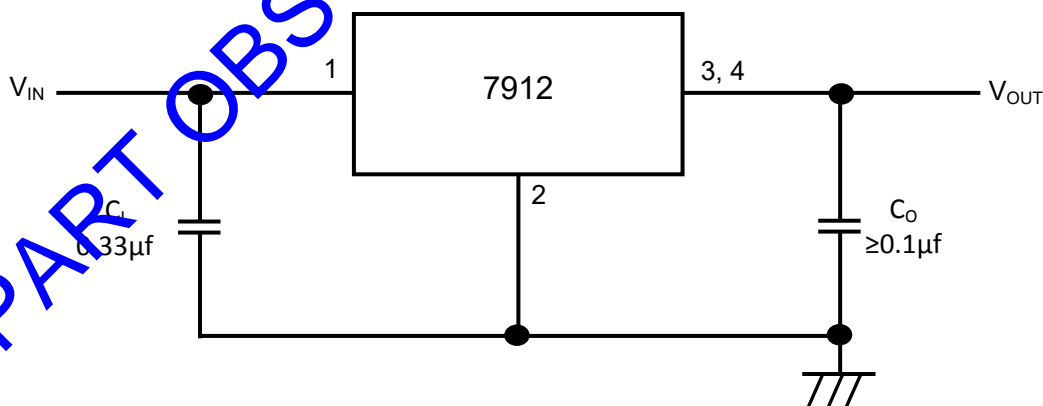
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Pad Layout and Functions



PAD	FUNCTION	COORDINATES (µm)	
		X	Y
1	V_{IN}	1.575	1.074
2	GNV	1.572	0.188
3	V_{OU}	0.088	1.059
4	V_{OUT}	0.088	1.553
CONNECT CHIP BACK TO V_{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 ¹	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
		$5mA \leq I_{OUT} \leq 1A,$ $-14.5V \geq V_{IN} \geq -27V, P_D \leq 15 \text{ Watts}$	-11.40	-	-12.60	
Line Regulation	ΔV_{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	ΔV_{OUT}	$5mA \leq I_{OUT} \leq 1.5A, T_J = 25^\circ C$	-	46	240	mV
		$250mA \leq I_{OUT} \leq 750mA, T_J = 25^\circ C$	-	17	120	
Input Bias Current	I_B	$T_J = 25^\circ C$	-	4.3	7.8	mA
Input Bias Current Change	ΔI_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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Typical Characteristics

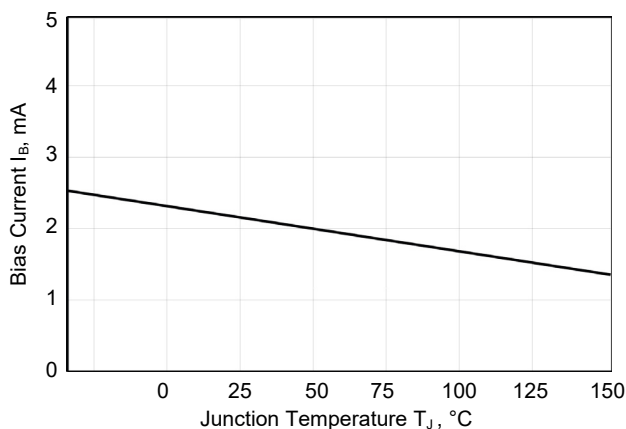


Figure 1 – Bias Current Versus Temperature

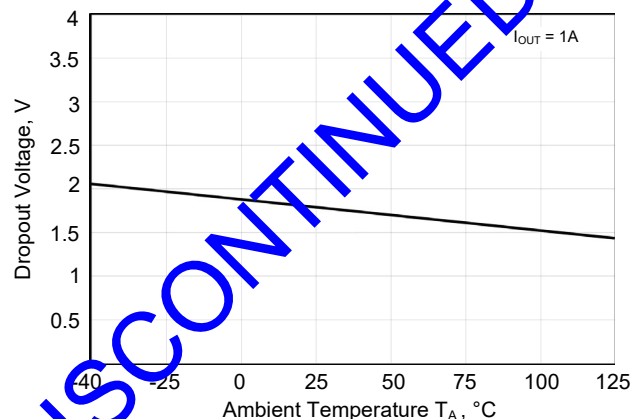


Figure 2 – Dropout Voltage Versus Temperature

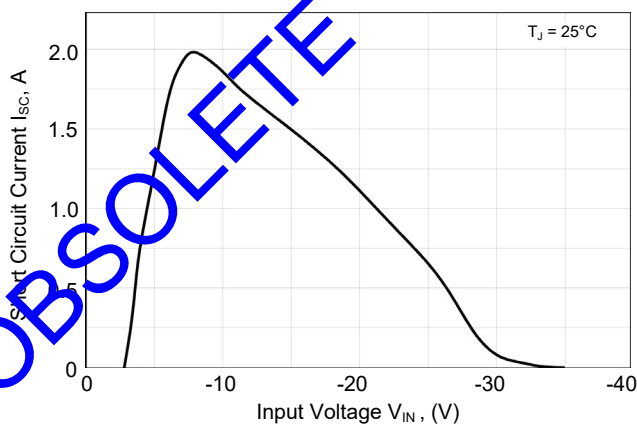


Figure 3 – Short-Circuit Current Versus Input Voltage

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