



Linear Voltage Regulator – 7905

Negative Fixed 5V Voltage Regulator in bare die form

Rev 1.0
19/04/19

Description

The 7905 5V 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 7905 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 7805

Ordering Information

The following part suffixes apply:

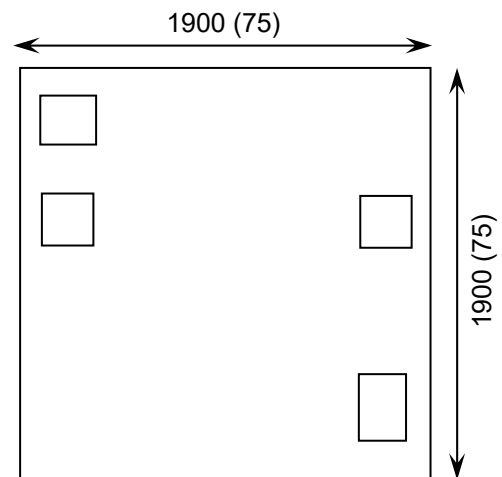
- No suffix - MIL-STD-883 /2010B Visual Inspection
- "H" - MIL-STD-883 /2010B Visual Inspection + MIL-PRF-38534 Class H LAT
- "K" - MIL-STD-883 /2010A Visual Inspection (Space) + MIL-PRF-38534 Class K LAT

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	

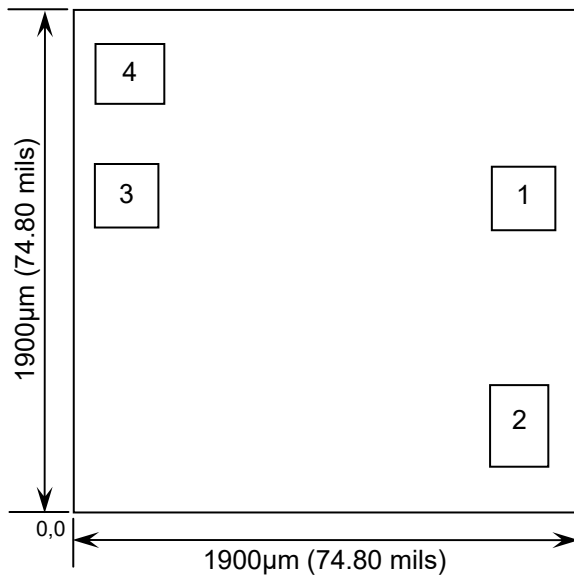




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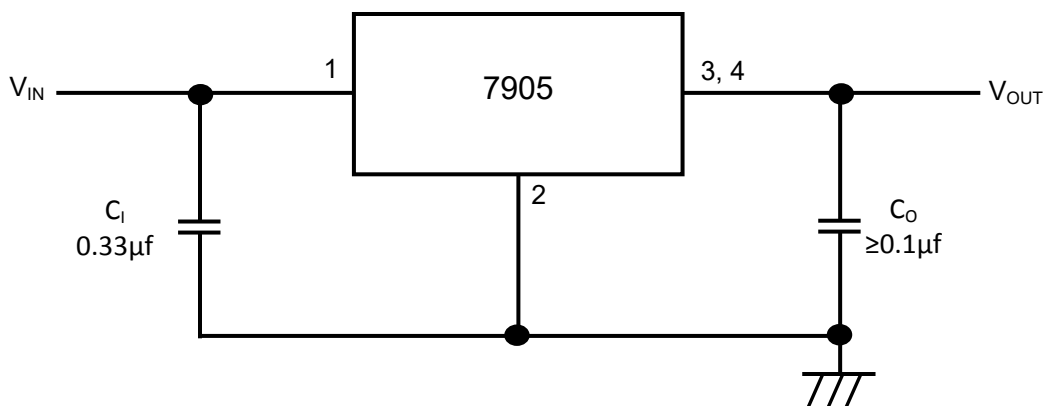
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Pad Layout and Functions



PAD	FUNCTION	COORDINATES (µm)	
		X	Y
1	V _{IN}	1.575	1.074
2	GND	1.572	0.188
3	V _{OUT}	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, $V_I = -10V$, $I_{OUT} = 500mA$, $C_I = 0.33\mu F$, $C_O = 0.1\mu F$, $T_{MIN} \leq T_J \leq T_{MAX}$ (unless noted otherwise)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$T_J = 25^\circ C$	-4.80	-5.00	-5.20	V
		$5mA \leq I_{OUT} \leq 1A$, $-7V \geq V_{IN} \geq -20V$, $P_D \leq 15$ Watts	-4.75	-5.00	-5.25	
Line Regulation	ΔV_{OUT}	$-7V \geq V_{IN} \geq -25V$, $I_{OUT} = 0.1A$, $T_J = 25^\circ C$	-	7	50	mV
		$-8V \geq V_{IN} \geq -12V$, $I_{OUT} = 0.1A$, $T_J = 25^\circ C$	-	2	25	
		$-7V \geq V_{IN} \geq -25V$, $I_{OUT} = 0.5A$, $T_J = 25^\circ C$	-	35	100	
		$-8V \geq V_{IN} \geq -12V$, $I_{OUT} = 0.5A$, $T_J = 25^\circ C$	-	8	50	
Load Regulation	ΔV_{OUT}	$5mA \leq I_{OUT} \leq 1.5A$, $T_J = 25^\circ C$	-	11	100	
		$250mA \leq I_{OUT} \leq 750mA$, $T_J = 25^\circ C$	-	4	50	
Input Bias Current	I_B		-	4.3	7.8	mA
Input Bias Current Change	ΔI_B	$-7.5V \geq V_{IN} \geq -25V$	-	-	1.3	mA
		$5mA \leq I_{OUT} \leq 1.5A$	-	-	0.5	
Output Noise Voltage	V_n	$10Hz \leq f \leq 100KHz$, $T_J = 25^\circ C$	-	40	-	$\mu V/V_{OUT}$
Ripple Rejection	RR	$I_{OUT} = 20mA$, $f = 120Hz$,	-	70	-	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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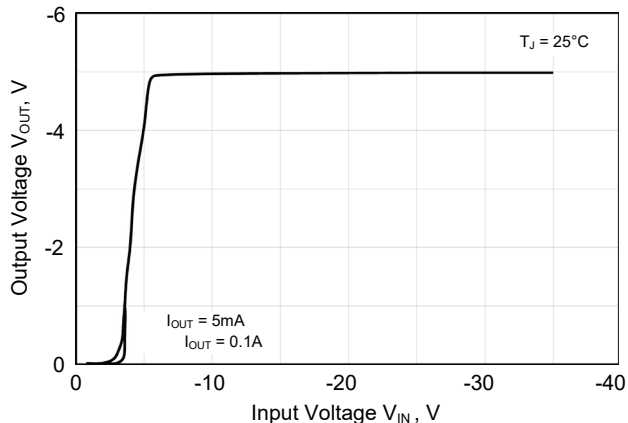


Figure 1 – Dropout Characteristics

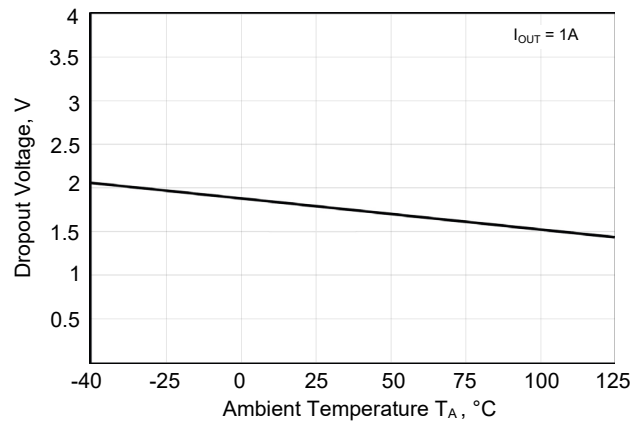


Figure 2 – Dropout Voltage Versus Temperature

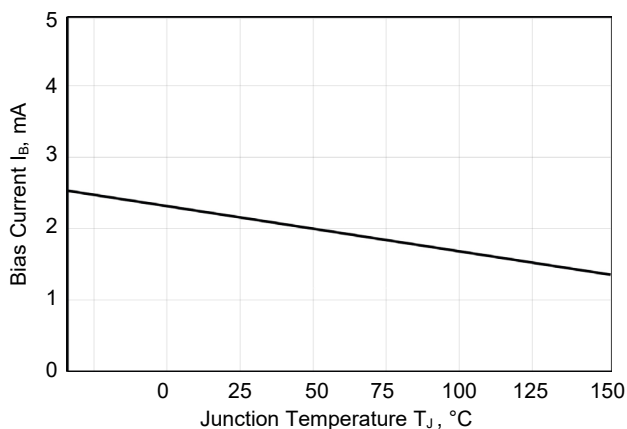


Figure 3 – Bias Current Versus Temperature

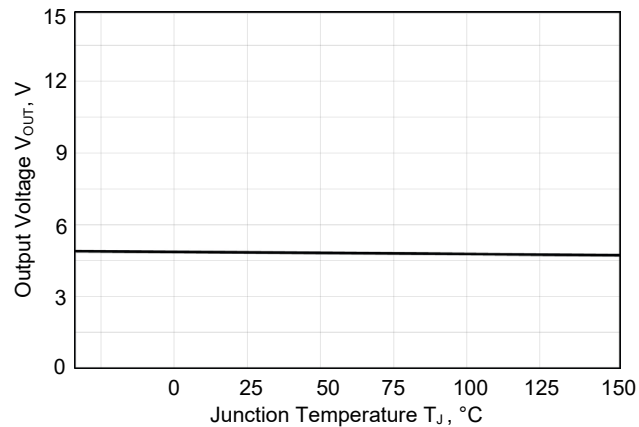


Figure 4 – Output Voltage Versus Temperature

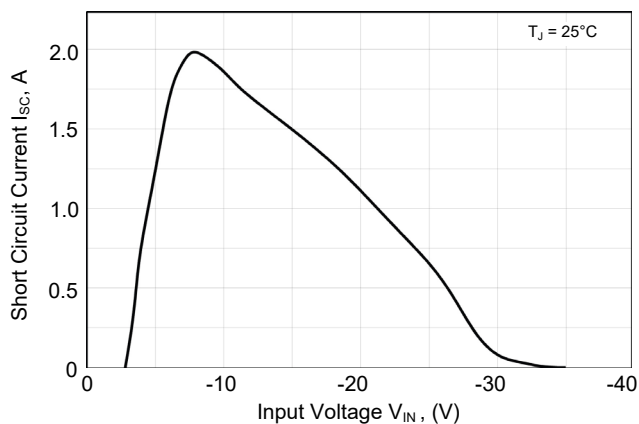


Figure 5 – Short-Circuit Current Versus Input Voltage





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