



# Linear Voltage Regulator – 78L05AC

**Positive Fixed 5V Voltage Regulator in bare die form**

**Rev 1.1  
20/12/17**

## Description

The 78L05AC is a 5V fixed 3-terminal voltage regulator delivering up to 100mA of output current and equipped with internal limiting + thermal shutdown features for overload immunity. Implementing this device at point-of-source removes the complexity of single point regulation methods with reduced noise. Used in replacement of a Zener diode/resistor combination, the device improves output impedance by x2 order of magnitude and delivers lower bias current with lower noise. The device can also be used with power-pass elements to make high-current voltage regulators.

## Features:

- ±5% V<sub>OUT</sub> tolerance over entire temperature range
- 100mA Output Current
- Internal thermal overload protection
- Internal short circuit current limit
- Full Military Temperature Range
- Negative Voltage complement is 79L05

## Ordering Information

The following part suffixes apply:

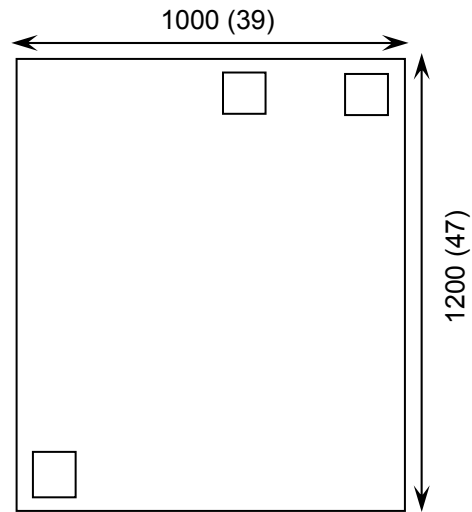
- No suffix - MIL-STD-883 /2010B Visual Inspection
- “H” - MIL-PRF-883 /2010B Visual Inspection + MIL-STD-38534 Class H LAT
- “K” - MIL-PRF-883 /2010A Visual Inspection (Space) + MIL-STD-38534 Class K LAT

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 µm (mils)



## Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – On request
- Unsawn Wafer – On request
- With Ti/Ni/Ag Back Metal – On request
- In Metal or Ceramic package – On request

## Mechanical Specification

Die Size (Unsawn)	1000 x 1200 39.37 x 47.24	µm mils
Minimum Bond Pad Size	110 x 105 4.33 x 4.13	µm mils
Die Thickness	280 (±20) 11 (±0.8)	µm mils
Top Metal Composition	Al 1%Si 1.4µm	
Back Metal Composition	N/A – Bare Si	

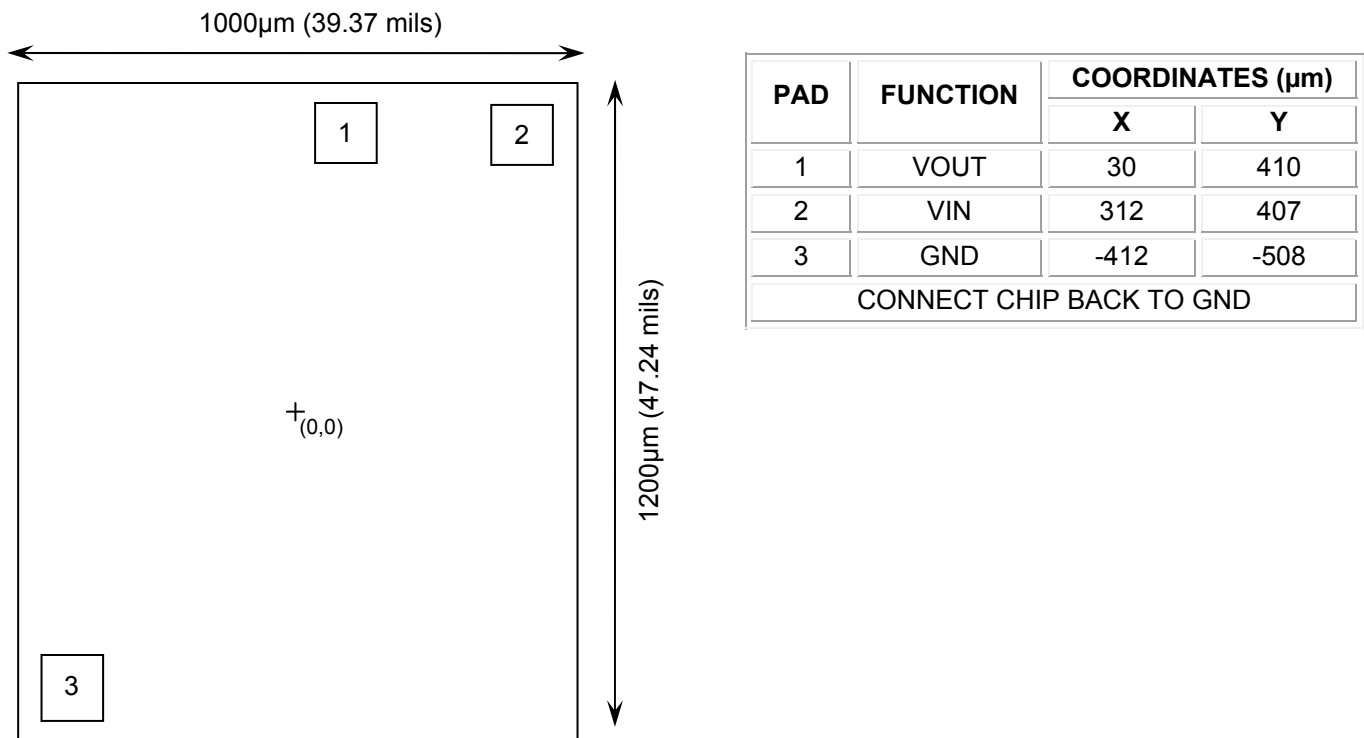




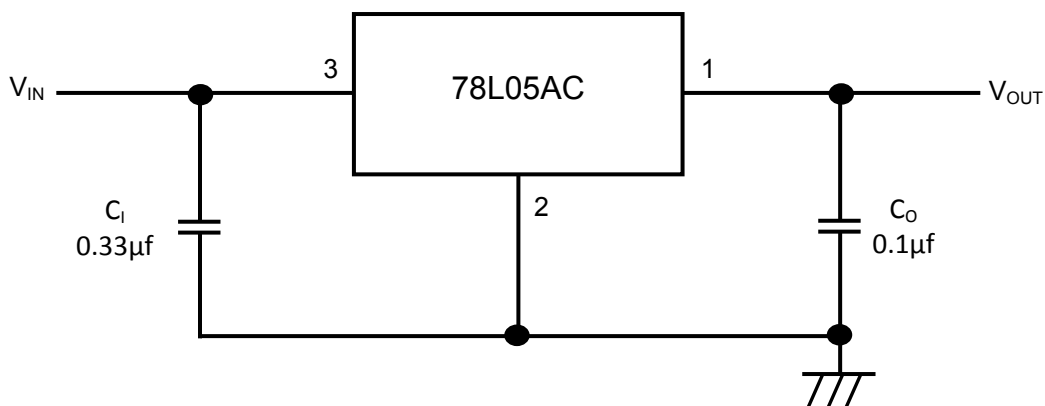
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## Pad Layout and Functions



## 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.





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## Absolute Maximum Ratings $T_A = 125^\circ\text{C}$ unless otherwise stated

PARAMETER	SYMBOL	VALUE	UNIT
Input Voltage	$V_{IN}$	30	V
Power Dissipation <sup>1</sup>	$P_D$	620	mW
Operating Temperature Range	-	-55 to 125	$^\circ\text{C}$
Maximum Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-65 to 150	$^\circ\text{C}$

## Operating Conditions $T_A = 125^\circ\text{C}$ unless otherwise stated

PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Voltage	$V_{IN}$	7	20	V
Output Current	$I_{OUT}$	-	100	mA
Operating Temperature Range	-	-55 to 125		$^\circ\text{C}$

## DC Electrical Characteristics, $V_I = 10\text{V}$ , $I_{OUT} = 40\text{mA}$ , $C_I = 0.3\mu\text{F}$ , $C_O = 0.1\mu\text{F}$ , $0^\circ\text{C} < T_J < +125^\circ\text{C}$ (unless noted otherwise)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	$T_J = 25^\circ\text{C}$ , $I_O = 40\text{mA}$	4.80	5.00	5.20	V
		$1\text{mA} \leq I_{OUT} \leq 40\text{mA}$ , $7\text{V} \leq V_{IN} \leq 20\text{V}$	4.75	5.00	5.25	
		$1\text{mA} \leq I_{OUT} \leq 70\text{mA}$ , $V_{IN} = 10\text{V}$	4.75	5.00	5.25	
Line Regulation	$\Delta V_{OUT}$	$7\text{V} \leq V_{IN} \leq 20\text{V}$ , $T_J = 25^\circ\text{C}$ , $I_O = 40\text{mA}$	-	32	150	mV
		$8\text{V} \leq V_{IN} \leq 20\text{V}$ , $T_J = 25^\circ\text{C}$ , $I_O = 40\text{mA}$	-	26	100	
Load Regulation	$\Delta V_{OUT}$	$1\text{mA} \leq I_{OUT} \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	15	60	mV
		$1\text{mA} \leq I_{OUT} \leq 40\text{mA}$ , $T_J = 25^\circ\text{C}$	-	8	30	
Input Bias Current	$I_B$	$T_J = 25^\circ\text{C}$	-	3.8	6.0	mA
		$T_J = 125^\circ\text{C}$	-	-	5.5	
Input Bias Current Change	$\Delta I_B$	$9\text{V} \leq V_{IN} \leq 20\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_{OUT} \leq 40\text{mA}$	-	-	0.1	
Output Noise Voltage	$e_N$	$10\text{Hz} \leq f \leq 100\text{KHz}$ , $T_A = 25^\circ\text{C}$	-	42	-	$\mu\text{V}_{RMS}$
Ripple Rejection	RR	$f = 120\text{Hz}$ , $8\text{V} \leq V_{IN} \leq 20\text{V}$ , $T_J = 25^\circ\text{C}$	41	49	-	dB
Dropout Voltage	$V_D$	$V_{IN} - V_{OUT}$	-	1.7	-	V

Notes: 1. Value measured in TO-92 package applicable only for DC power dissipation permitted by absolute maximum ratings. Results in die form are dependent on die attach and assembly method.





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