



# Linear Voltage Regulator – 78L05

Positive Fixed 5V Voltage Regulator in bare die form

Rev 1.0  
06/07/22

## Description

The 78L05 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 78L05 can also be used with power-pass elements to make high-current voltage regulators.

## Features:

- $\pm 5\%$   $V_{OUT}$  tolerance over entire temperature range
- 100mA Output Current
- Internal thermal overload protection
- Internal short circuit current limit
- Full military temperature range
- Industry smallest die size
- Negative Voltage complement is 79L05

## Ordering Information

The following part suffixes apply:

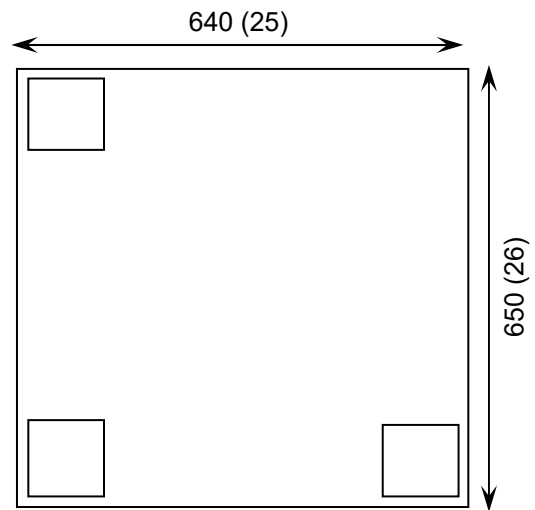
- No suffix - MIL-STD-883 /2010B Visual Inspection
- "H" - MIL-STD-883 /2010B Visual Inspection + MIL-PRF-38534 Class H LAT
- "K" - MIL-STD-883 /2010A Visual Inspection (Space) + MIL-PRF-38534 Class K LAT

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 (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)	640 x 650 25.20 x 25.59	$\mu\text{m}$ mils
Minimum Bond Pad Size	90 x 90 3.54 x 3.54	$\mu\text{m}$ mils
Die Thickness	280 ( $\pm 20$ ) 11 ( $\pm 0.8$ )	$\mu\text{m}$ mils
Top Metal Composition	Al 1%Si 1.4 $\mu\text{m}$	
Back Metal Composition	N/A – Bare Si	

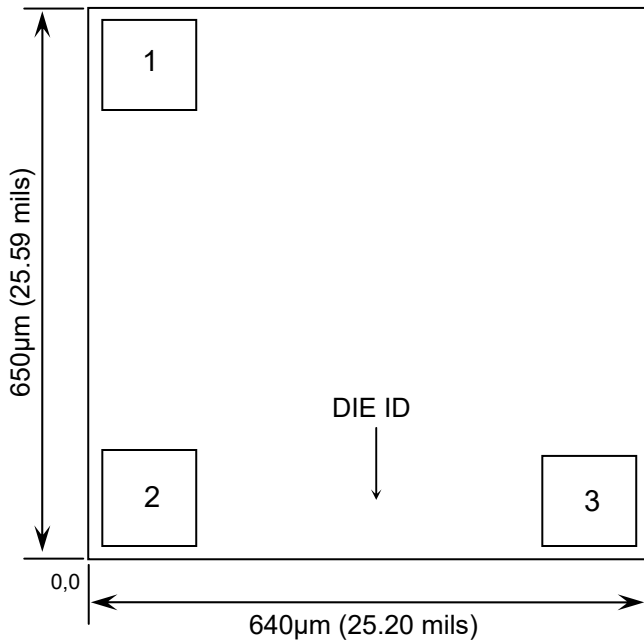




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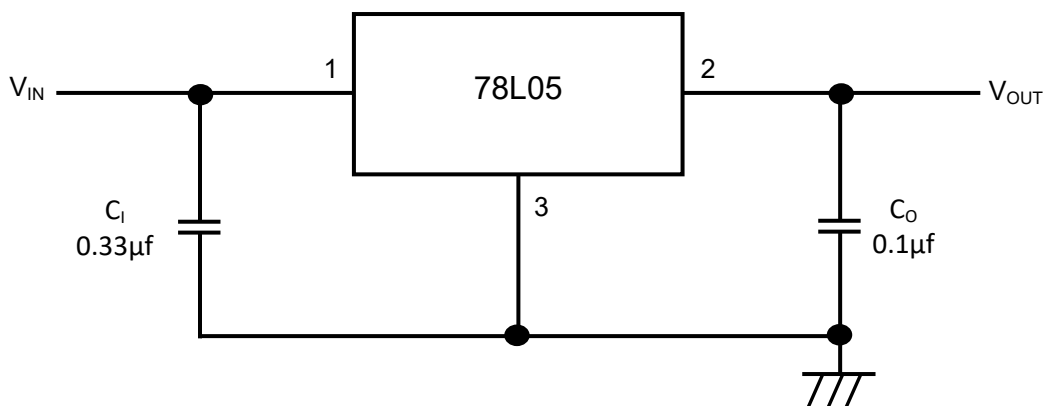
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## Pad Layout and Functions



PAD	FUNCTION	COORDINATES (µm)	
		X	Y
1	V <sub>IN</sub>	57	490.5
2	V <sub>OUT</sub>	58.5	61
3	GND	503	61
CONNECT CHIP BACK TO GND			

## 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

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	°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	20	V
Output Current	$I_{OUT}$	-	100	mA
Operating Temperature Range	$T_J$	-55	125	°C

## DC Electrical Characteristics, $V_I=10V$ , $I_{OUT}=40mA$ , $C_I=0.33\mu F$ , $C_O=0.1\mu f$ , $0^\circ C < T_J < +125^\circ C$ (unless noted otherwise)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{OUT}$	$T_J = 25^\circ C$ , $1mA \leq I_O \leq 70mA$	4.80	5.00	5.20	V
		$1mA \leq I_{OUT} \leq 40mA$ , $7V \leq V_{IN} \leq 20V$	4.75	5.00	5.25	
		$1mA \leq I_{OUT} \leq 70mA$ , $V_{IN} = 10V$	4.75	5.00	5.25	
Line Regulation	$\Delta V_{OUT}$	$7V \leq V_{IN} \leq 20V$ , $T_J = 25^\circ C$ , $I_O=40mA$	-	13	135	mV
		$8V \leq V_{IN} \leq 20V$ , $T_J = 25^\circ C$ , $I_O=40mA$	-	9	90	
Load Regulation	$\Delta V_{OUT}$	$1mA \leq I_{OUT} \leq 100mA$ , $T_J = 25^\circ C$	-	15	54	
		$1mA \leq I_{OUT} \leq 40mA$ , $T_J = 25^\circ C$	-	8	28	
Input Bias Current	$I_B$	$T_J = 25^\circ C$	-	1.9	5.0	mA
		$T_J = 125^\circ C$	-	1.8	4.5	
Input Bias Current Change	$\Delta I_B$	$8V \leq V_{IN} \leq 20V$	-	-	1.3	mA
		$1mA \leq I_{OUT} \leq 40mA$	-	-	0.09	
Output Noise Voltage	$e_N$	$10Hz \leq f \leq 100KHz$ , $T_A = 25^\circ C$	-	42	-	$\mu V_{RMS}$
Ripple Rejection	RR	$f = 120Hz$ , $8V \leq V_{IN} \leq 18V$ , $T_J = 25^\circ C$	43	64	-	dB
Dropout Voltage	$V_D$	$V_{IN} - V_{OUT}$	-	1.7	-	V

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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