



# Linear Voltage Regulator – LM120K-12

Negative fixed 1.5A output Voltage Regulator in bare die form

Rev 1.0  
06/12/19

## Description

The LM120K-12 is a 3-terminal fixed -12V negative regulator. The device supplies up to 1.5A of output current and requires only x1 external compensation capacitor at the output. Overload immunity features include internal current limiting, safe-area compensation + thermal shutdown. The LM120K-12 can be used with external components to obtain adjustable voltages or currents and can also be used as the power-pass element in precision high-current voltage regulators. The part is performance rated over the full military temperature range.

## Features:

- ±4% V<sub>OUT</sub> tolerance over entire temperature range
- 1.5A Output Current
- 30V Input-Output voltage differential
- Internal thermal overload protection
- Internal short-circuit current limit
- High ripple rejection
- Full military temperature range
- Positive voltage complement is LM140K-12

## Ordering Information

The following part suffixes apply:

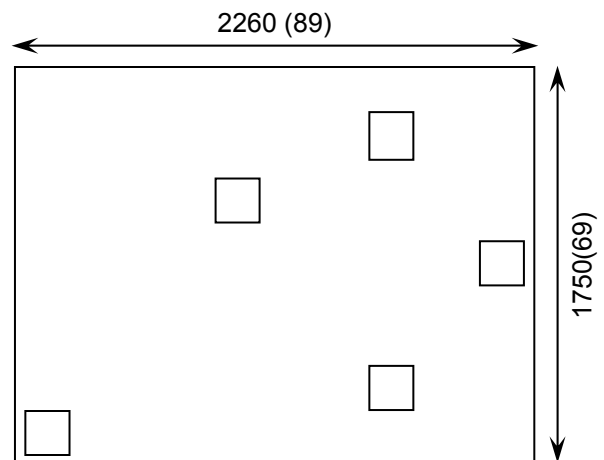
- No suffix - MIL-STD-883 /2010B Visual Inspection
- “H” - MIL-STD-883 /2010B Visual Inspection + MIL-PRF-38534 Class H LAT
- “K” - MIL-STD-883 /2010A Visual Inspection (Space) + MIL-PRF-38534 Class K LAT

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 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)	2260 x 1750 89 x 69	μm mils
Minimum Bond Pad Size	185 x 185 7.28 x 7.28	μm mils
Die Thickness	280 (±20) 11.02 (±0.79)	μm mils
Top Metal Composition	Al 1%Si 2.2μm	
Back Metal Composition	Ti/Ni/Ag 0.1-0.5-0.6μm	

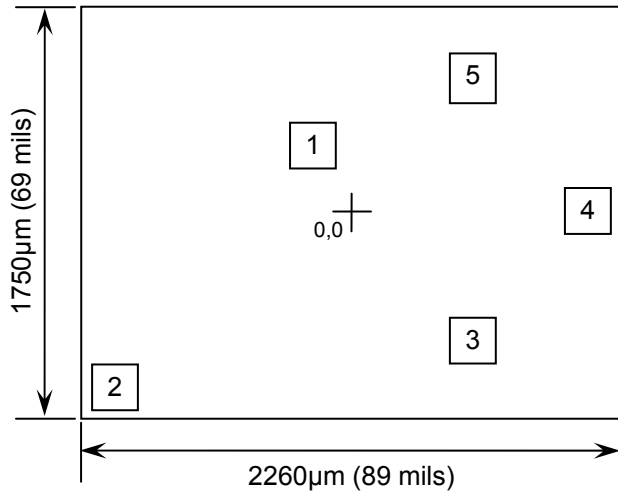




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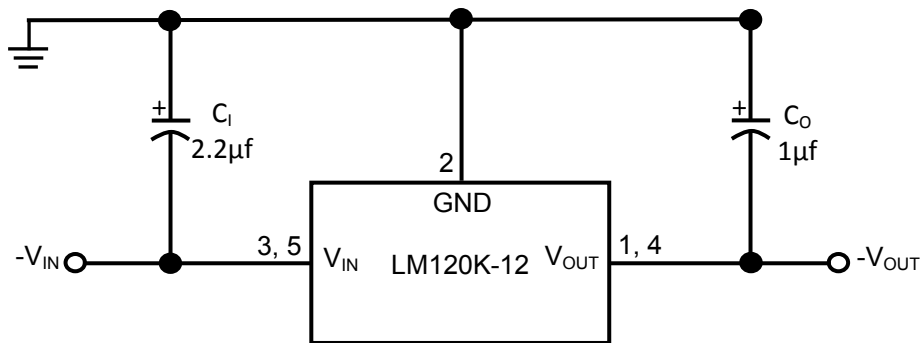
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## Pad Layout and Functions



PAD	FUNCTION	COORDINATES (µm)	
		X	Y
1	$V_{OUT}$	-178	279
2	GND	-1054	-768
3	$V_{IN}$	507	-558
4	$V_{OUT}$	1029	0
5	$V_{IN}$	508	570
CONNECT CHIP BACK TO $V_{IN}$			

## Typical Application



$C_1$  is required if the regulator is located an appreciable distance from power supply filter.  $C_0$  is required for stability. For optimum stability and transient response locate  $C_1$ ,  $C_0$  as close as possible to the regulator.

Figure 1 – Fixed Regulator





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## Absolute Maximum Ratings<sup>1</sup>

PARAMETER	SYMBOL	VALUE	UNIT
Input Voltage	$V_{IN}$	-35	V
Input-Output Voltage Differential	$V_{IN}$	30	V
Power Dissipation	$P_D$	Internally Limited	
Operating Junction Temperature	$T_J$	150	°C
Storage Temperature	$T_{STG}$	-65 to 150	°C

## Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Voltage	$V_{IN}$	-32	-14	V
Output Current	$I_{OUT}$	0.01	1.5	A
Operating Junction Temperature Range (Full Range)	$T_J$	-55 to 125		°C

## DC Electrical Characteristics

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS	
Output Voltage	$V_{OUT}$	$V_{IN} = -17V, I_{OUT} = 5mA$	$T_J = 25^\circ C$	-12.3	-12	-11.7	V
		$V_{IN} = -32V, I_{OUT} = 5mA$	Full Range	-12.5	-	-11.5	V
		$V_{IN} = -32V, I_{OUT} = 1A$	Full Range	-12.5	-	-11.5	V
		$V_{IN} = -14.5V, I_{OUT} = 5mA$	Full Range	-12.5	-	-11.5	V
		$V_{IN} = -14.5V, I_{OUT} = 1A$	Full Range	-12.5	-	-11.5	V
Line Regulation	$\Delta V_{OUT}$	$-32V \leq V_{IN} \leq -14V,$ $I_{OUT} = 5mA$	$T_J = 25^\circ C$	-10	-	10	mV
			Full Range	-20	-	20	
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = -17V,$ $5mA \leq I_{OUT} \leq 1A$	$T_J = 25^\circ C$	-80	-	80	mV
			Full Range	-80	-	80	
Quiescent Current	$I_Q$	$-32V \leq V_{IN} \leq -14V$	$T_J = 25^\circ C$	-	2	-	mA
			Full Range	-	-	4	
Quiescent Current Change	$\Delta I_Q$	$V_{IN} = -17V,$ $5mA \leq I_{OUT} \leq 1A$	$T_J = 25^\circ C$	-	0.1	0.4	mA
			Full Range	-	-	0.5	
		$-32V \leq V_{IN} \leq -14V$	$T_J = 25^\circ C$	-	0.1	0.4	mA
			Full Range	-	-	0.5	

1. Operation above the absolute maximum rating may cause device failure. Operation at the absolute maximum ratings, for extended periods, may reduce device reliability.





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## DC Electrical Characteristics continued

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Output Noise Voltage	$V_n$	$V_{IN} = -17V$ , $I_{OUT} = 5mA$ $10\text{ Hz} \leq f \leq 100\text{ kHz}$ , $C_L = 1\mu F$ $T_A = 25^\circ C$	-	400	-	$\mu V$
Short-Circuit Current	$I_{OS}$	$V_{IN} = -32V$ $T_J = 25^\circ C$	0.4	-	3.0	A

## AC Characteristics

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Ripple Rejection	RR	$V_{IN} = -17V$ , $I_{OUT} = 350mA$ $V_{RIPPLE} = 1V_{RMS}$ , $f_{RIPPLE} = 120Hz$ , $T_A = 25^\circ C$	56	80	-	dB

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