



# Linear Voltage Regulator – LM140K-12

Positive fixed 1.5A output Voltage Regulator in bare die form

Rev 1.0  
06/12/19

## Description

The LM140K-12 is a 3-terminal fixed 12V positive 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 LM140K-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
- 1.5A Output Current
- Internal thermal overload protection
- Internal short-circuit current limit
- High ripple rejection
- Full military temperature range
- Negative voltage complement is LM120K-12

## Ordering Information

The following part suffixes apply:

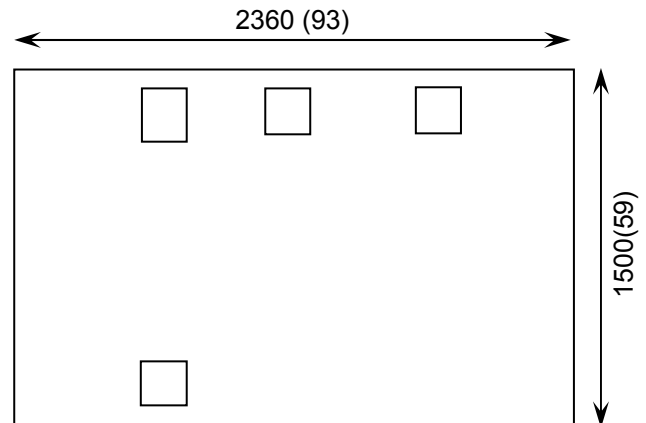
- No suffix - MIL-STD-883 /2010B Visual Inspection
- “H” - MIL-STD-883 /2010B Visual Inspection + MIL-PRF-38534 Class H LAT
- “K” - MIL-STD-883 /2010A Visual Inspection (Space) + MIL-PRF-38534 Class K LAT

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)	2360 x 1500 93 x 59	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	

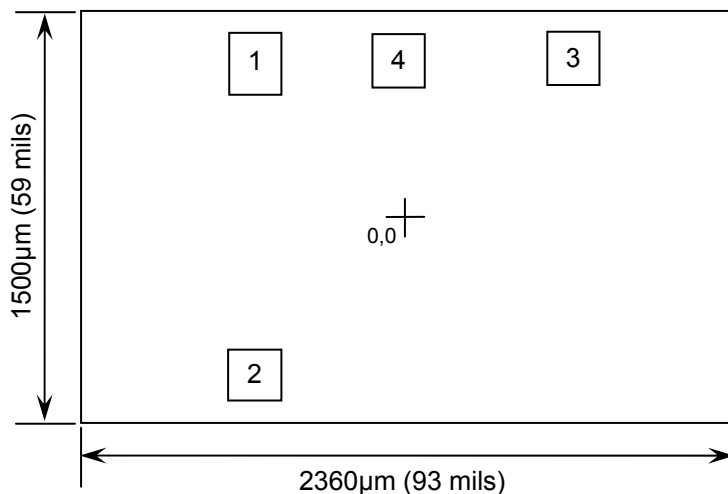




# Linear Voltage Regulator – LM140K-12

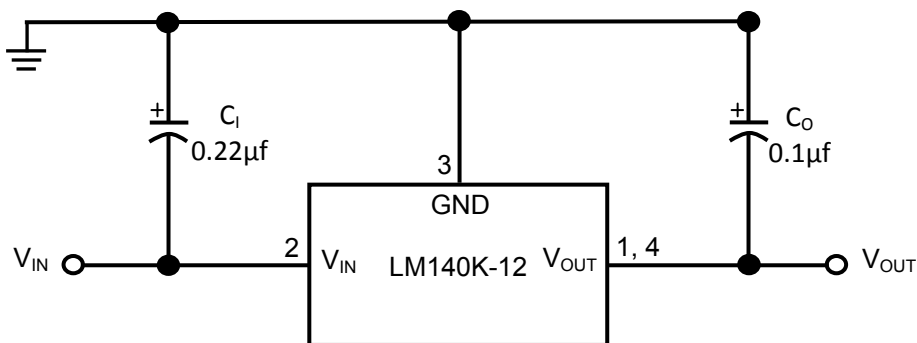
Rev 1.0  
06/12/19

## Pad Layout and Functions



PAD	FUNCTION	COORDINATES (µm)	
		X	Y
1	V <sub>OUT</sub>	-546	558
2	V <sub>IN</sub>	-546	-578
3	GND	610	575
4	V <sub>OUT</sub>	-25	572
CONNECT CHIP BACK TO GND			

## Typical Application



C<sub>1</sub> is required if the regulator is located an appreciable distance from power supply filter. C<sub>0</sub> is required for stability. For optimum stability and transient response locate C<sub>1</sub> C<sub>0</sub> as close as possible to the regulator.

Figure 1 – Fixed Regulator





# Linear Voltage Regulator – LM140K-12

Rev 1.0  
06/12/19

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

PARAMETER	SYMBOL	VALUE	UNIT
Input Voltage	$V_{IN}$	35	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	$V_{IN}$	14.5	30	V
Output Current	$I_{OUT}$	0.01	1.5A	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	$V_{OUT}$	$V_{IN} = 19V,$ $5mA \leq I_{OUT} \leq 1A$	$T_J = 25^\circ C$	11.50	12	12.50	V
		$V_{IN} = 15.5V \leq V_{IN} \leq 27V,$ $5mA \leq I_{OUT} \leq 1A,$ $P_D \leq 15W$	Full Range	11.40	-	12.60	V
		$V_{IN} = 35V,$ $5mA \leq I_{OUT} \leq 50mA$	Full Range	11.40	-	12.60	V
Line Regulation	$\Delta V_{OUT}$	$V_{IN} = 15V \leq V_{IN} \leq 35V,$ $I_{OUT} = 50mA$	Full Range	-	-	360	mV
		$V_{IN} = 15V \leq V_{IN} \leq 32V,$ $I_{OUT} = 350mA$	Full Range	-	-	120	mV
		$14.5V \leq V_{IN} \leq 30V,$ $I_{OUT} = 500mA$	$T_J = 25^\circ C$	-	4	120	mV
		$V_{IN} = 15V \leq V_{IN} \leq 27V,$ $I_{OUT} = 500mA$	Full Range	-	-	120	mV
		$14.6V \leq V_{IN} \leq 27V,$ $I_{OUT} = 1A$	$T_J = 25^\circ C$	-	-	120	mV
		$16V \leq V_{IN} \leq 22V,$ $I_{OUT} = 1A$	Full Range	-	-	60	mV

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





# Linear Voltage Regulator – LM140K-12

Rev 1.0  
06/12/19

## DC Electrical Characteristics continued

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS	
Load Regulation	$\Delta V_{OUT}$	$V_{IN} = 35V,$ $5mA \leq I_{OUT} \leq 50mA$	Full Range	-	-	360	mV
		$V_{IN} = 19V,$ $0.25A \leq I_{OUT} \leq 0.75A$	$T_J = 25^\circ C$	-	-	60	mV
		$V_{IN} = 17V,$ $5mA \leq I_{OUT} \leq 0.5A$	Full Range	-	-	240	mV
		$V_{IN} = 19V,$ $5mA \leq I_{OUT} \leq 1.5A$	$T_J = 25^\circ C$	-	12	120	mV
		$V_{IN} = 19V,$ $5mA \leq I_{OUT} \leq 1A$	Full Range	-	-	120	mV
Quiescent Current	$I_Q$	$V_{IN} = 19V,$ $I_{OUT} = 1A$	$T_J = 25^\circ C$	-	-	6	mA
			Full Range	-	-	7	
Quiescent Current Change	$\Delta I_Q$	$V_{IN} = 19V,$ $5mA \leq I_{OUT} \leq 1A$	Full Range	-	-	0.5	mA
		$15V \leq V_{IN} \leq 27V,$ $I_{OUT} \leq 1A$	$T_J = 25^\circ C$	-	-	0.8	
		$15V \leq V_{IN} \leq 30V,$ $I_{OUT} = 0.5A$	Full Range	-	-	0.8	
Output Noise Voltage	$V_n$	$V_{IN} = 19V, I_{OUT} = 5mA$ $10 Hz \leq f \leq 100 kHz$	$T_A = 25^\circ C$	-	75	-	$\mu V$
Short-Circuit Current	$I_{OS}$	$V_{IN} = 17V$	$T_J = 25^\circ C$	-	-	3.5	A
		$V_{IN} = 35V$	$T_J = 25^\circ C$	-	-	2	

## AC Characteristics

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Ripple Rejection	RR	$V_{IN} = 19V, I_{OUT} = 350mA$ $V_{RIPPLE} = 1V_{RMS}, f_{RIPPLE} = 120Hz,$ $T_A = 25^\circ C$	61	-	-	dB

**DISCLAIMER:** The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Silicon Supplies Ltd hereby disclaims any and all warranties and liabilities of any kind.

**LIFE SUPPORT POLICY:** Silicon Supplies Ltd components may be used in life support devices or systems only with the express written approval of Silicon Supplies Ltd, if a failure of such components can reasonably be expected to cause the failure of that life support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

