Linear Voltage Regulator – LM3480-5

Positive Fixed 5V Low Dropout Voltage Regulator in bare die form

Rev 1.0
19/04/19

Description

The LM3480-5 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. The device is a smaller and electrically improved replacement for the industry standard 78L05. The device accepts higher 30V input voltage & exhibits a maximum drop-out voltage of 1.2V across the full military temperature range. The device suits use as a post-regulator in switching DC/DC converters or as a bias supply in analog circuits.

Features:

- Wide input voltage range up to 30V
- 900mV dropout voltage typical
- 100mA output current
- Internal thermal overload protection
- Internal short-circuit current limit
- Full military temperature range
- Smaller electrical upgrade for 78L05 series.

Ordering Information

The following part suffixes apply:

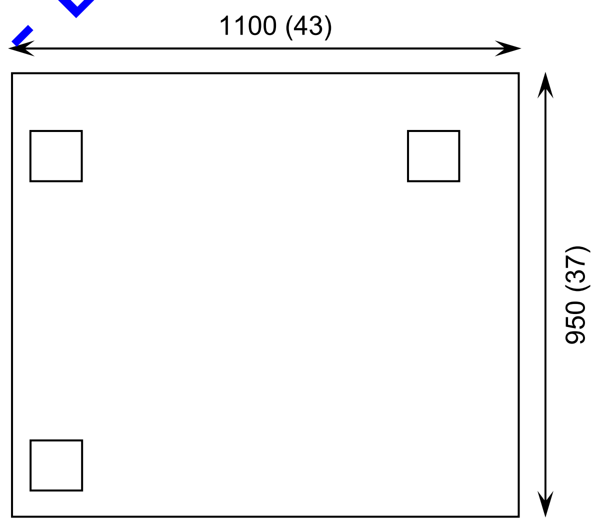
- No suffix - MIL-STD-883 /2010B Visual Inspection
- "**H**" - MIL-STD-883 /2010B Visual Inspection
  + MIL-PRF-38534 Class H LAT
- "**K**" - MIL-STD-883 /2010A Visual Inspection (Space)
  + MIL-PRF-38534 Class K LAT

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 (400 per tray capacity)
- Sawn Wafer on Tape – On request
- Un-sawn Wafer – On request
- With Ti/Ni/Ag Back Metal – On request
- In Metal or Ceramic package – On request

Mechanical Specification

Die Size (Unsawn)	1100 x 950 43.31 x 37.40	µm mils
Minimum Bond Pad Size	96 x 96 3.78 x 3.78	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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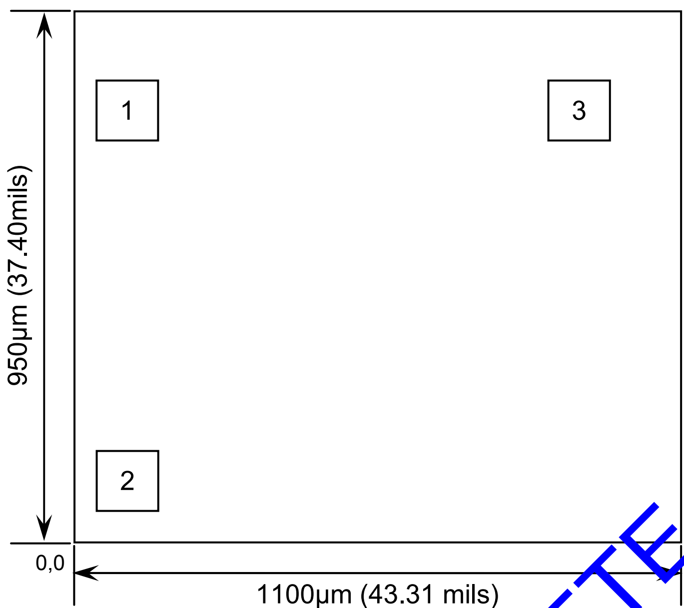
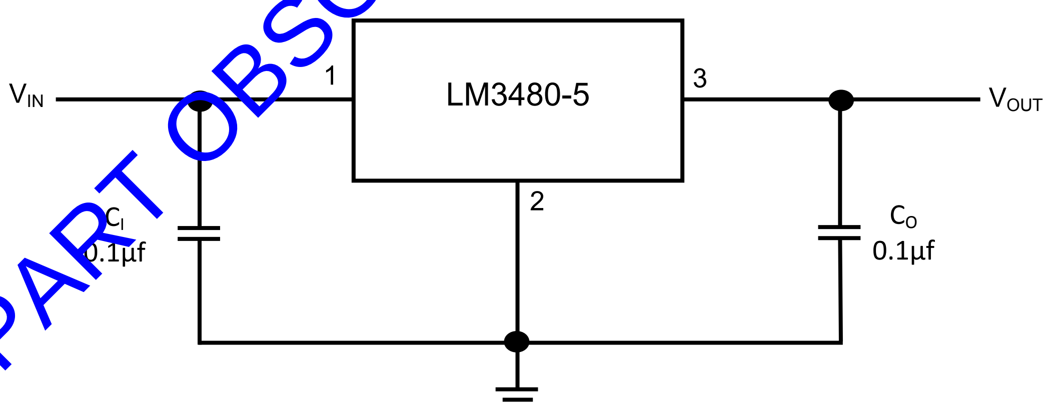
Pad Layout and Functions



PAD	FUNCTION	COORDINATES (µm)	
		X	Y
1	V_{IN}	92	747
2	GND	92	107
3	V_{OUT}	899	747
CONNECT CHIP BACK TO GND			

Typical Application



Application Notes:

0.1 µ F is the minimum C_I & C_O value required for stability & adequate transient performance. There is no specific ESR limitation, although excessively high ESR will compromise transient performance. There is no specific limitation on a maximum capacitance value on either input or output. Larger output capacitor values can be used to improve transient behaviour.

The device can operate with up to 30V input voltage supply. This input supply must be well regulated. Additional low ESR input capacitance improves the output noise performance if the input supply is noisy.

Absolute Maximum Ratings[1] T_J = 25°C unless otherwise stated

PARAMETER	SYMBOL	VALUE	UNIT
Input Voltage (V_{IN} to GND)	V_{IN}	-0.3 to 35	V
Power Dissipation[2]	P_D	Internally limited	mW
Operating Temperature Range	T_J	-55 to 125	°C
Maximum Junction Temperature	T_J	150	°C
Storage Temperature	T_{STG}	-65 to 150	°C
ESD Human-body model (HBM)	-	2	kV

Operating Conditions T_J = 25°C unless otherwise stated

PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Voltage	V_{IN}	0	30	V
Output Current	I_{OUT}	-	100	mA
Operating Temperature Range	T_J	-55	+125	°C

DC Electrical Characteristics T_J = 25°C unless otherwise specified

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	$V_{IN} = V_{OUT}$ +1.5V, 1mA ≤ I_O ≤ 100mA	T_J = 25°C	4.80	5.00	5.20	V
			Full range[3]	4.75	-	5.25	
Line Regulation	ΔV_{OUT}	V_{OUT}+1.5V ≤V_{IN}≤30V, I_O = 1mA	T_J = 25°C	-	12	-	mV
			Full range[3]	-	-	25	
Load Regulation	ΔV_{OUT}	$V_{IN} = V_{OUT}$ +1.5V, 0mA ≤ I_O ≤ 100mA	T_J = 25°C	-	20	-	
			Full range[3]	-	-	40	
Ground Pin Current	I_{GND}	V_{OUT}+1.5V ≤V_{IN}≤30V, No load	T_J = 25°C	-	3	-	mA
			Full range[3]	-	-	4	
Ground Pin Current Change	ΔI_{GND}	V_{OUT} +1.5V ≤ V_{IN} ≤ 20V, I_O =40mA		-	-	1.4	mA
		$V_{IN} = V_{OUT}$ +5V ≤ V_{IN} ≤ 20V, 1mA ≤ I_O ≤ 40mA		-	-	0.5	
Output noise voltage	e_n	V_{IN} = 10V, f = 10Hz – 100kHz, I_O =1mA, C_{OUT} = 0.1uF		-	150	-	μV_{RMS}
Dropout Voltage	$V_{IN} - V_{OUT}$	I_O = 10mA	T_J = 25°C	-	0.7	0.9	V
			Full range[3]	-	-	1	
		I_O = 100mA	T_J = 25°C	-	0.9	1.1	
			Full range[3]	-	-	1.2	

Notes: **1.** Operation above the absolute maximum rating may cause device failure. Operation at the absolute maximum ratings, for extended periods, may reduce device reliability. **2.** Maximum power dissipation depends on the ambient temperature and can be calculated using $P = (T_J - T_A) / R_{\theta JA}$ where T_J is the junction temperature, T_A is the ambient temperature, and $R_{\theta JA}$ is the junction-to-ambient thermal resistance. Results in die form are dependent on die attach and assembly method, the LM3480 actively limits its junction temperature to ~150°C. **3.** −55°C ≤ T_J ≤ 125°C

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Typical Performance Characteristics T_J = 25°C unless otherwise specified

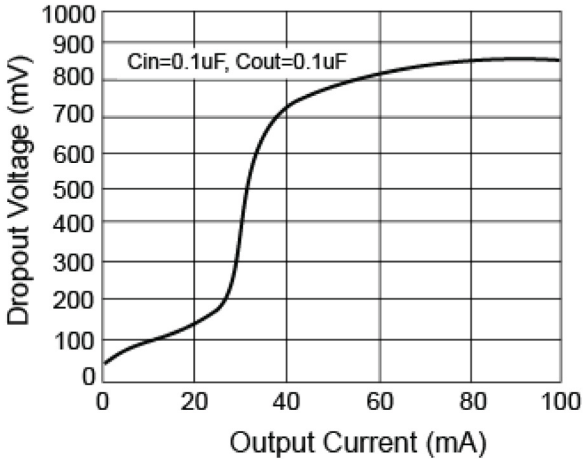

FIGURE 1. Dropout Voltage versus Load Current

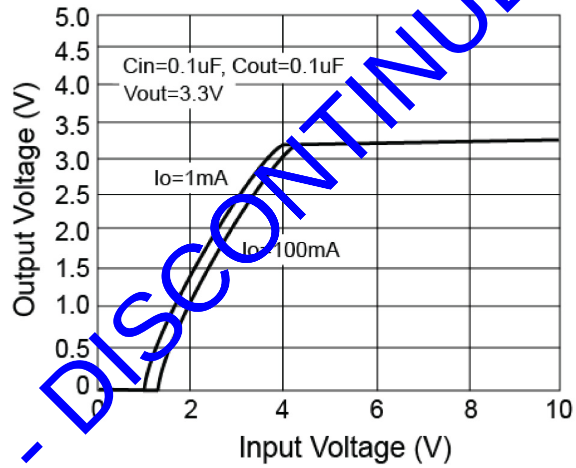

FIGURE 2. Output Voltage versus Input Voltage

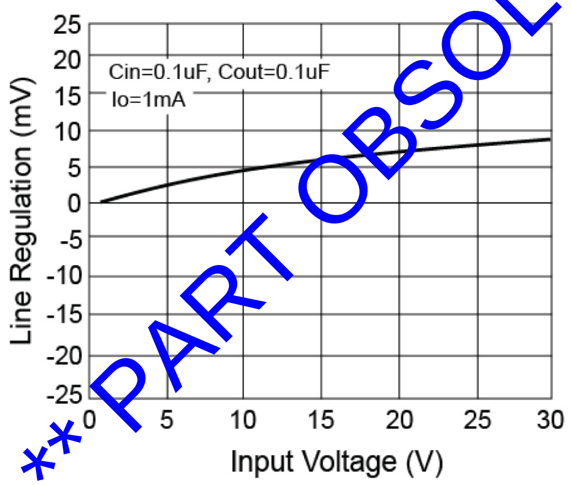

FIGURE 3. Line Regulation

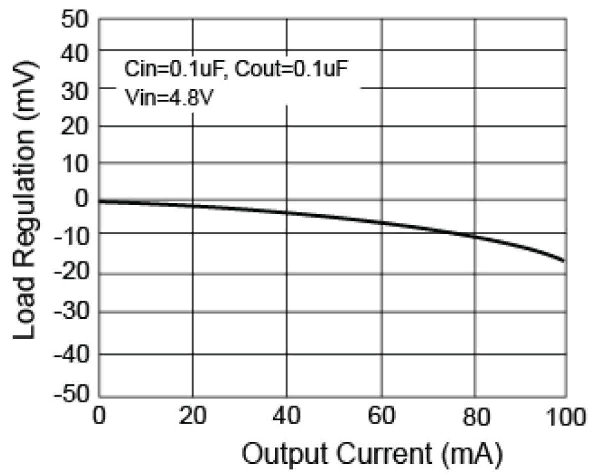

FIGURE 4. Load Regulation

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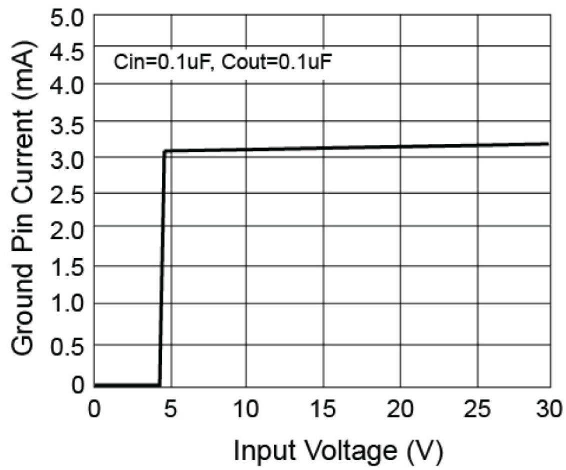

FIGURE 4. Ground Pin Current versus Input Voltage

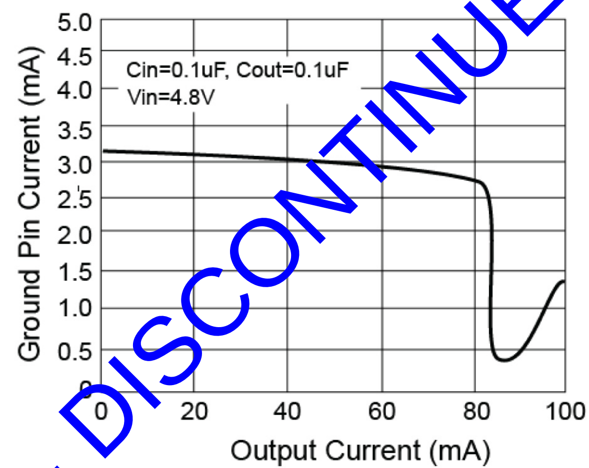

FIGURE 5. Ground Pin Current versus Output Current