LM3480 100-mA, SOT-23, Quasi Low-Dropout Linear Voltage Regulator

1 Features

- Input voltage range: up to 30 V
- 3.3-V, 5-V, 12-V, and 15-V Versions Available
- Packaged in the Tiny 3-Lead SOT-23 Package
- Key Specifications:
  - 30-V Maximum Input for Operation
  - 1.2-V Ensured Maximum Dropout Over Full Load and Temperature Ranges
  - 100-mA Ensured Minimum Load Current
  - ±5% Ensured Output Voltage Tolerance Over Full Load and Temperature Ranges
  - −40 to 125°C Junction Temperature Range for Operation

2 Applications

- Tiny Alternative to LM78Lxx Series and Similar Devices
- Tiny 5-V ±5% to 3.3-V, 100-mA Converter
- Post Regulator for Switching DC/DC Converter
- Bias Supply for Analog Circuits

3 Description

The LM3480 is an integrated linear voltage regulator. It features operation from an input as high as 30 V and an ensured maximum dropout of 1.2 V at the full 100-mA load. Standard packaging for the LM3480 is the 3-lead SOT-23 package.

The 5-V, 12-V, and 15-V members of the LM3480 series are intended as tiny alternatives to industry standard LM78Lxx series and similar devices. The 1.2-V quasi-low dropout of LM3480 series devices makes them a nice fit in many applications where the 2-V to 2.5-V dropout of LM78Lxx series devices precludes their (LM78Lxx series devices) use.

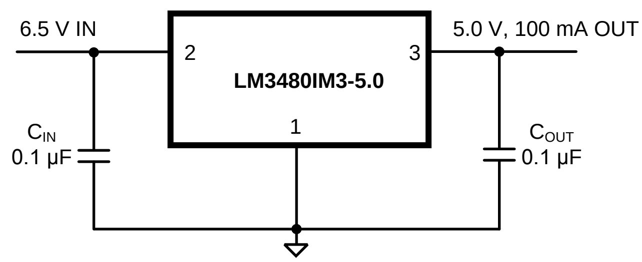
The LM3480 series features a 3.3-V member. The SOT-23 packaging and quasi-low dropout features of the LM3480 series converge in this device to provide a very nice, very tiny, 3.3-V, 100-mA bias supply that regulates directly off the system 5-V ±5% power supply.

Device Information(1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
LM3480	SOT-23 (3)	2.92 mm × 1.30 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Typical Application Circuit



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4 Revision History

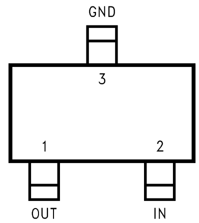
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision E (March 2013) to Revision F	Page
• Added *Pin Configuration and Functions* section, *Handling Rating* table, *Feature Description* section, *Device Functional Modes*, *Application and Implementation* section, *Power Supply Recommendations* section, *Layout* section, *Device and Documentation Support* section, and *Mechanical, Packaging, and Orderable Information* section	1

Changes from Revision D (March 2013) to Revision E	Page
• Changed layout of National Data Sheet to TI format	8

5 Pin Configuration and Functions

DBZ Package
3-Pin SOT-23
Top View



Pin Functions

PIN		I/O	DESCRIPTION
NAME	NO.		
OUT	1	O	Output voltage
IN	2	I	Input voltage supply
GND	3	—	Common ground

6 Specifications

6.1 Absolute Maximum Ratings(1)(2)

	MIN	MAX	UNIT
Input Voltage (IN to GND)	–0.3	35	V
Power Dissipation (3)		Internally Limited	
Junction Temperature (3)	–40	150	°C
Soldering Time, Temperature (4): Wave	4 s, 260	4 s, 260	°C
Soldering Time, Temperature (4): Infrared	10 s, 240	10 s, 240	°C
Soldering Time, Temperature (4): Vapor Phase	75 s, 219	75 s, 219	°C

(1) Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Ratings are conditions under which operation of the device is ensured. Operating Ratings do not imply ensured performance limits. For ensured performance limits and associated test conditions, see the *Electrical Characteristics: LM3480-3.3, LM3480-5.0*.
(2) If Military- or Aerospace-specified devices are required, please contact the TI Sales Office/Distributors for availability and specifications.
(3) The Absolute Maximum power dissipation depends on the ambient temperature and can be calculated using $P = (T_J – T_A) / R_{θJA}$ where T_J is the junction temperature, T_A is the ambient temperature, and $R_{θJA}$ is the junction-to-ambient thermal resistance. The 370-mW rating results from substituting the Absolute Maximum junction temperature, 150°C for T_J, 50°C for T_A, and 269.6°C/W for $R_{θJA}$. More power can be safely dissipated at lower ambient temperatures. Less power can be safely dissipated at higher ambient temperatures. The Absolute Maximum power dissipation can be increased by 3.7 mW for each °C below 50°C ambient. It must be derated by 3.7 mW for each °C above 50°C ambient. Heat sinking enables the safe dissipation of more power. The LM3480 actively limits its junction temperature to about 150°C.
(4) Times shown are dwell times. Temperatures shown are dwell temperatures. For detailed information on soldering plastic small-outline packages, see http://www.ti.com for other methods of soldering surface-mount devices.

6.2 Handling Ratings

			MIN	MAX	UNIT
T_{stg}	Storage temperature range		−65	150	°C
$V_{(ESD)}$	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins(1)	–2	2	kV
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins(2)	–0.5	0.5	

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

6.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)[1]

	MIN	MAX	UNIT
Maximum input voltage (IN to GND)	0	30	V
Junction temperature (T_J)	–40	125	°C

(1) Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Ratings are conditions under which operation of the device is ensured. Operating Ratings do not imply ensured performance limits. For ensured performance limits and associated test conditions, see the *Electrical Characteristics: LM3480-3.3, LM3480-5.0*.

6.4 Thermal Information

THERMAL METRIC[1]		LM3480 DBZ 3 PINS	UNIT
$R_{\theta JA}$	Junction-to-ambient thermal resistance	269.6	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	141.1	
$R_{\theta JB}$	Junction-to-board thermal resistance	63.1	
ψ_{JT}	Junction-to-top characterization parameter	24.2	
ψ_{JB}	Junction-to-board characterization parameter	62.1	

(1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report, SPRA953.

6.5 Electrical Characteristics: LM3480-3.3, LM3480-5.0

Typicals and limits appearing in normal type apply for $T_A = T_J = 25°C$. Nominal output voltage (V_{NOM}) = 3.3 V or 5.0 V.[1][2][3]

PARAMETER		TEST CONDITIONS	V_{NOM} = 3.3 V			V_{NOM} = 5.0 V			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
V_{OUT}	Output Voltage	$V_{IN} = V_{NOM} + 1.5$ V 1 mA ≤ I_{OUT} ≤ 100 mA	3.17	3.3	3.43	4.8	5	5.2	V
		$V_{IN} = V_{NOM} + 1.5$ V 1 mA ≤ I_{OUT} ≤ 100 mA −40°C ≤ T_J ≤ 125°C	3.14		3.46	4.75		5.25	
ΔV_{OUT}	Line Regulation	V_{NOM} + 1.5 V ≤ V_{IN} ≤ 30 V I_{OUT} = 1 mA		10			12		mV
		V_{NOM} + 1.5 V ≤ V_{IN} ≤ 30 V I_{OUT} = 1 mA −40°C ≤ T_J ≤ 125°C			25			25	
ΔV_{OUT}	Load Regulation	$V_{IN} = V_{NOM} + 1.5$ V 10 mA ≤ I_{OUT} ≤ 100 mA		20			20		mV
		$V_{IN} = V_{NOM} + 1.5$ V 10 mA ≤ I_{OUT} ≤ 100 m −40°C ≤ T_J ≤ 125°C			40			40	
I_{GND}	Ground Pin Current	V_{NOM} + 1.5 V ≤ V_{IN} ≤ 30 V No Load		2			2		mA
		V_{NOM} + 1.5 V ≤ V_{IN} ≤ 30 V No Load, −40°C ≤ T_J ≤ 125°C			4			4	
V_{IN} - V_{OUT}	Dropout Voltage	I_{OUT} = 10 mA		0.7	0.9		0.7	0.9	V
		I_{OUT} = 10 mA −40°C ≤ T_J ≤ 125°C			1			1	
		I_{OUT} = 100 mA		0.9	1.1		0.9	1.1	V
		I_{OUT} = 100 mA −40°C ≤ T_J ≤ 125°C			1.2			1.2	

(1) A typical is the center of characterization data taken with $T_A = T_J = 25°C$. Typicals are not ensured.
(2) All limits are ensured. All electrical characteristics having room-temperature limits are tested during production with $T_A = T_J = 25°C$. All hot and cold limits are ensured by correlating the electrical characteristics to process and temperature variations and applying statistical process control.
(3) All voltages except dropout are with respect to the voltage at the GND pin.

Electrical Characteristics: LM3480-3.3, LM3480-5.0 (continued)

Typicals and limits appearing in normal type apply for $T_A = T_J = 25°C$. Nominal output voltage (V_{NOM}) = 3.3 V or 5.0 V.[(1)(2)(3)]

PARAMETER		TEST CONDITIONS	V_{NOM} = 3.3 V			V_{NOM} = 5.0 V			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
e_n	Output Noise Voltage	V_{IN} = 10 V Bandwidth: 10 Hz to 100 kHz		100			150		μV_{rms}

6.6 Electrical Characteristics: LM3480-12, LM3480-15

Typicals and limits appearing in normal type apply for $T_A = T_J = 25°C$. Nominal output voltage (V_{NOM}) = 12 V or 15 V.[(1)(2)(3)]

PARAMETER		TEST CONDITIONS	V_{NOM} = 12 V			V_{NOM} = 15 V			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
V_{OUT}	Output Voltage	$V_{IN} = V_{NOM}$ + 1.5 V 1 mA ≤ I_{OUT} ≤ 100 mA	11.52	12	12.48	14.4	15	15.6	V
		$V_{IN} = V_{NOM}$ + 1.5 V 1 mA ≤ I_{OUT} ≤ 100 mA	11.4		12.6	14.25		15.75	
ΔV_{OUT}	Line Regulation	V_{NOM} + 1.5 V ≤ V_{IN} ≤ 30 V I_{OUT} = 1 mA		14			16		mV
		V_{NOM} + 1.5 V ≤ V_{IN} ≤ 30 V I_{OUT} = 1 mA			40			40	
ΔV_{OUT}	Load Regulation	$V_{IN} = V_{NOM}$ + 1.5 V 10 mA ≤ I_{OUT} ≤ 100 mA		36			45		mV
		$V_{IN} = V_{NOM}$ + 1.5 V 10 mA ≤ I_{OUT} ≤ 100 mA			60			75	
I_{GND}	Ground Pin Current	V_{NOM} + 1.5 V ≤ V_{IN} ≤ 30 V No Load		2			2		mA
		V_{NOM} + 1.5 V ≤ V_{IN} ≤ 30 V No Load			4			4	
V_{IN} - V_{OUT}	Dropout Voltage	I_{OUT} = 10 mA		0.7	0.9		0.7	0.9	V
		I_{OUT} = 10 mA			1			1	
		I_{OUT} = 100 mA		0.9	1.1		0.9	1.1	V
		I_{OUT} = 100 mA			1.2			1.2	
e_n	Output Noise Voltage	V_{IN} = 10 V Bandwidth: 10 Hz to 100 kHz		360			450		μV_{rms}

(1) A typical is the center of characterization data taken with $T_A = T_J = 25°C$. Typicals are not ensured.
(2) All limits are ensured. All electrical characteristics having room-temperature limits are tested during production with $T_A = T_J = 25°C$. All hot and cold limits are ensured by correlating the electrical characteristics to process and temperature variations and applying statistical process control.
(3) All voltages except dropout are with respect to the voltage at the GND pin.

6.7 Typical Characteristics

Unless indicated otherwise, $V_{IN} = V_{NOM} + 1.5$ V, $C_{IN} = 0.1$ µF, $C_{OUT} = 0.1$ µF, and $T_A = 25°C$.

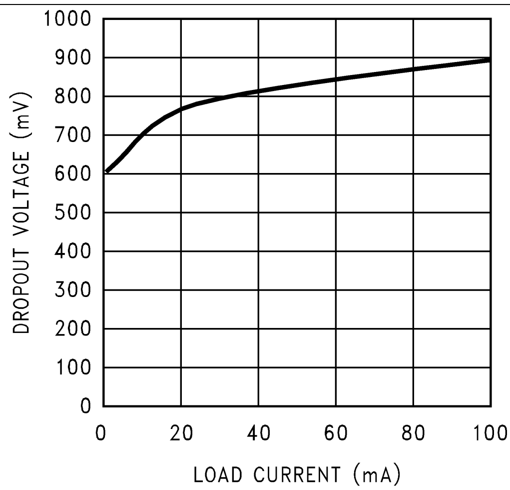


Figure 1. Dropout Voltage vs Load Current

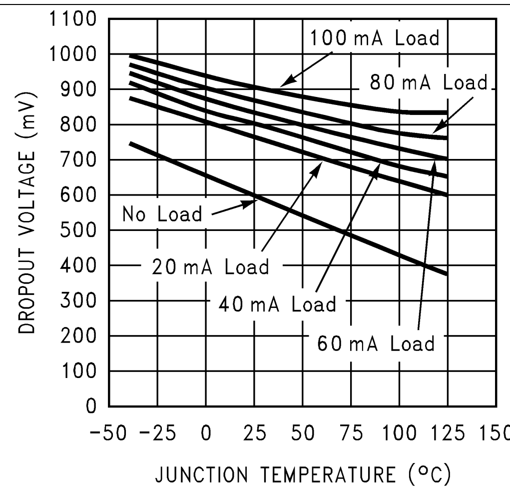


Figure 2. Dropout Voltage vs Junction Temperature

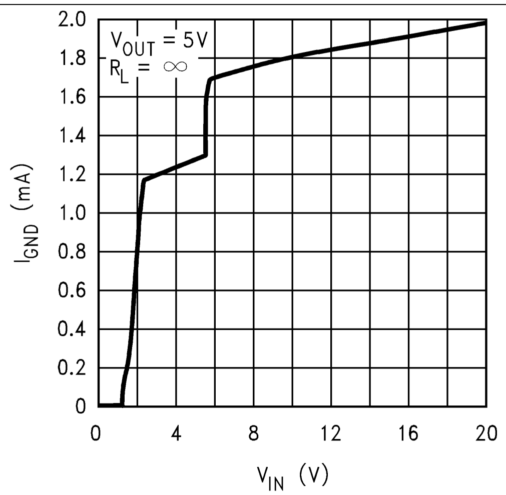


Figure 3. Ground Pin Current vs Input Voltage

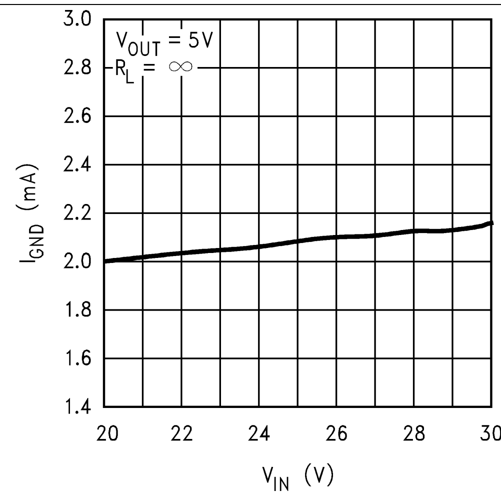


Figure 4. Ground Pin Current vs Input Voltage

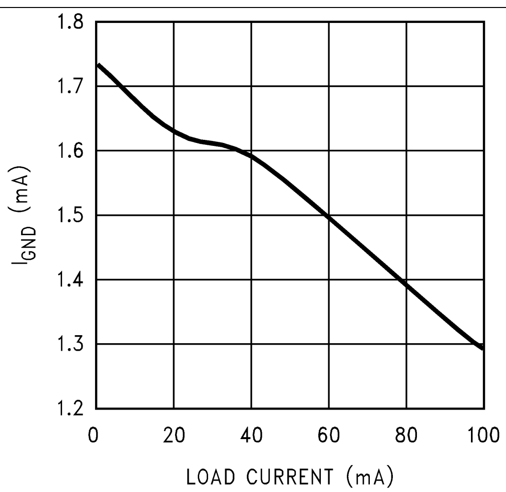


Figure 5. Ground Pin Current vs Load Current

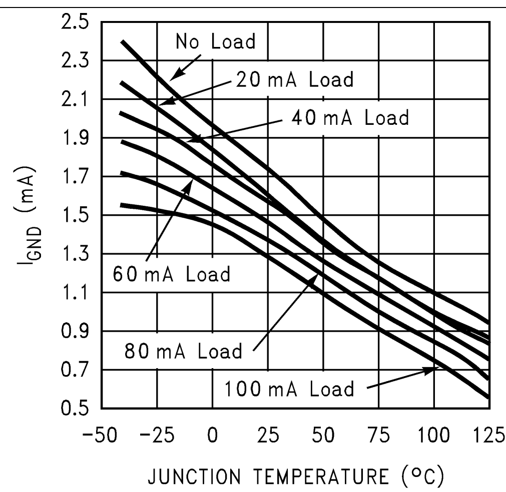


Figure 6. Ground Pin Current vs Junction Temperature

Typical Characteristics (continued)

Unless indicated otherwise, $V_{IN} = V_{NOM} + 1.5$ V, $C_{IN} = 0.1$ µF, $C_{OUT} = 0.1$ µF, and $T_A = 25°C$.

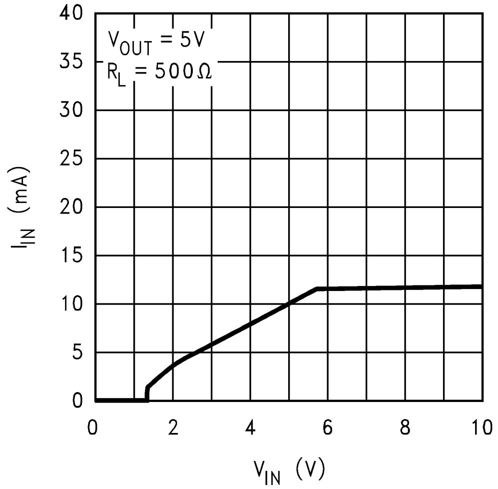


Figure 7. Input Current vs Input Voltage

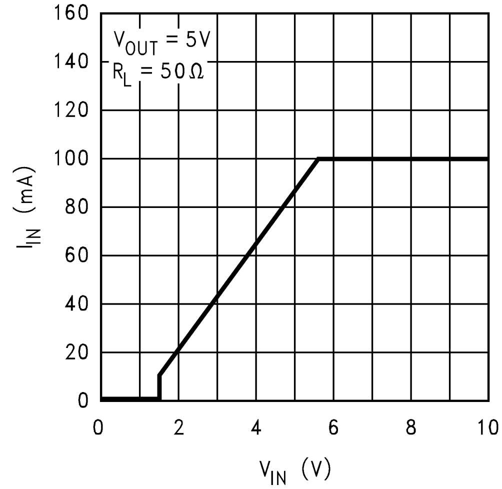


Figure 8. Input Current vs Input Voltage

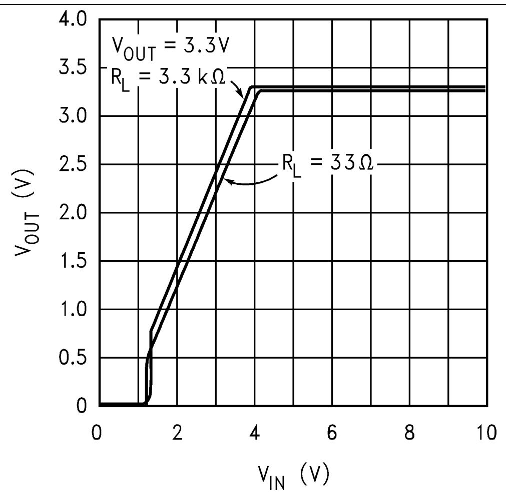


Figure 9. Output Voltage vs Input Voltage

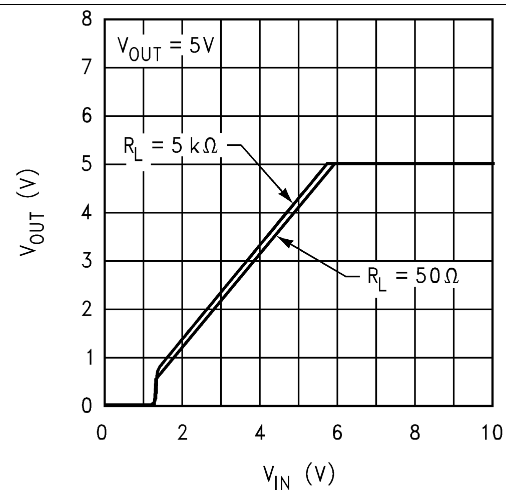


Figure 10. Output Voltage vs Input Voltage

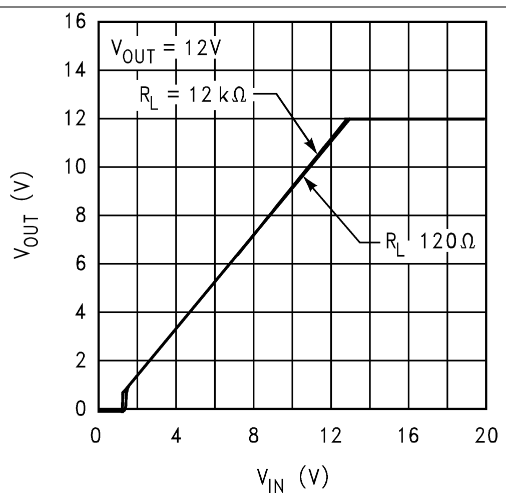


Figure 11. Output Voltage vs Input Voltage

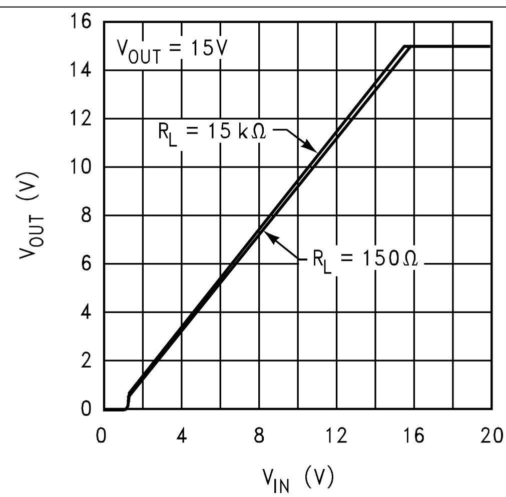


Figure 12. Output Voltage vs Input Voltage

Typical Characteristics (continued)

Unless indicated otherwise, $V_{IN} = V_{NOM} + 1.5$ V, $C_{IN} = 0.1$ µF, $C_{OUT} = 0.1$ µF, and $T_A = 25°C$.

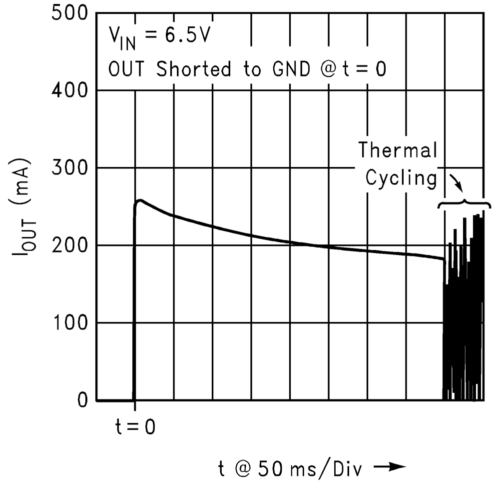


Figure 13. Output Short-Circuit Current

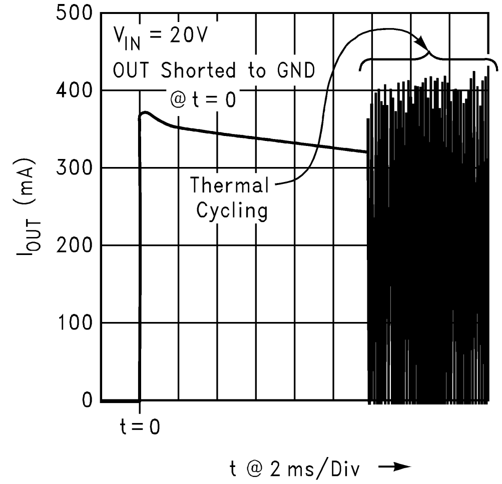


Figure 14. Output Short-Circuit Current

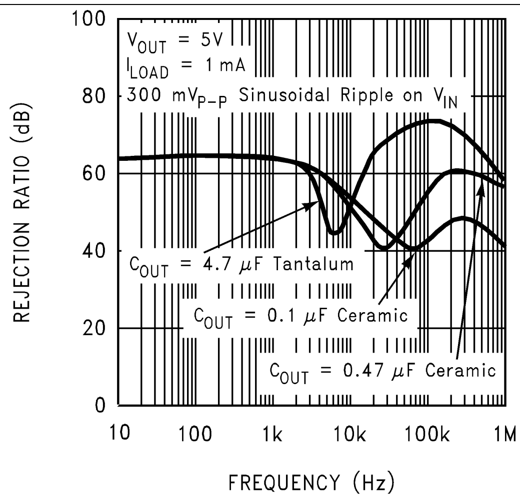


Figure 15. Power Supply Rejection Ratio

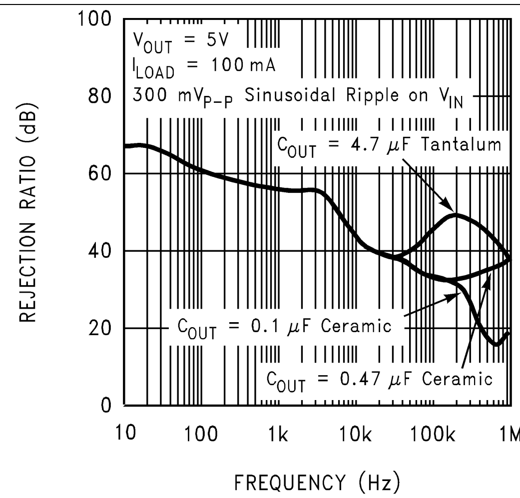


Figure 16. Power Supply Rejection Ratio

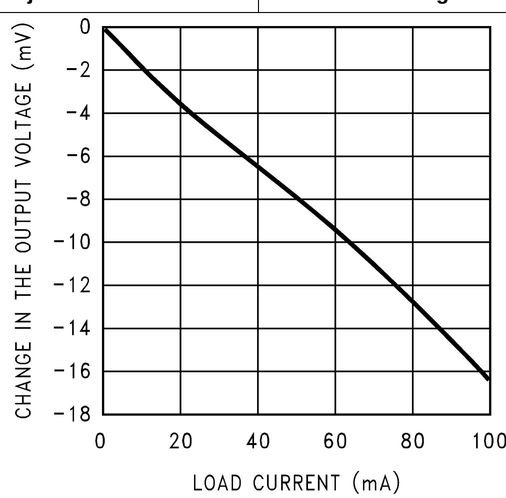


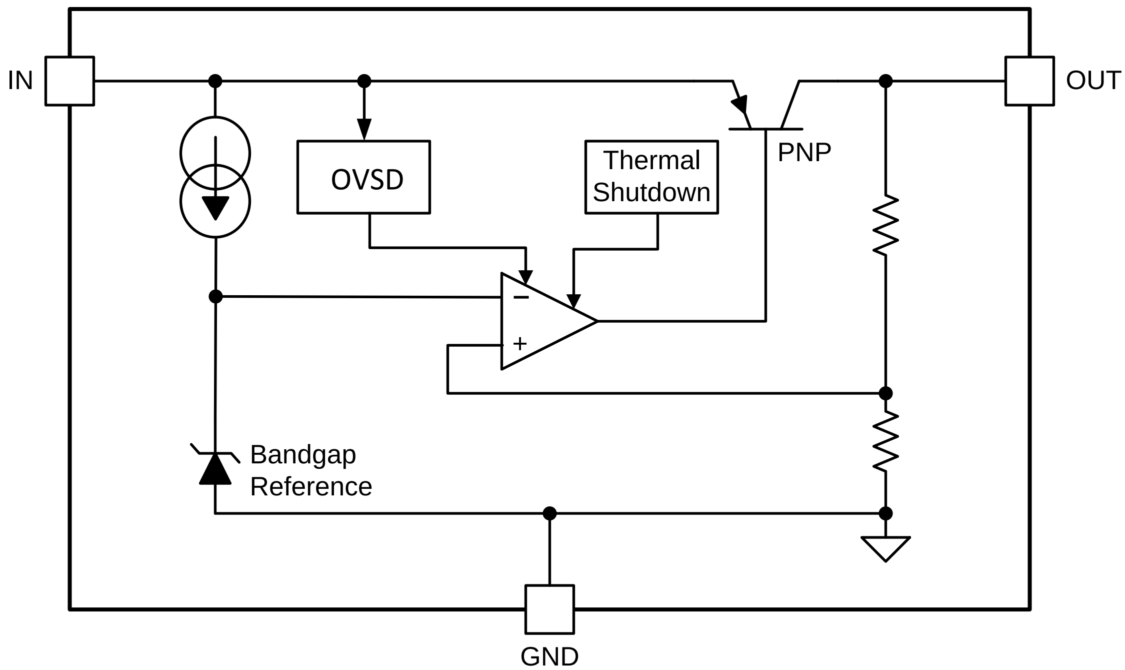
Figure 17. DC Load Regulation

7 Detailed Description

7.1 Overview

The LM3480 is an integrated linear voltage regulator with inputs that can be as high as 30 V. It ensures a maximum dropout of 1.2 V at the full load of 100 mA. The LM3480 has different output options including 3.3-V, 5-V, 12-V, and 15-V outputs, that make LM3480 the tiny alternative to industry standard LM78Lxx series and similar devices.

7.2 Functional Block Diagram



7.3 Feature Description

7.3.1 3.3-V, 5-V, 12-V, and 15-V Versions Available

The 3.3-V, 5-V, 12-V, and 15-V versions of LM3480 series are intended as tiny alternatives to industry standard LM78Lxx series and similar devices.

7.3.2 1.2-V Ensured Maximum Dropout

The 1.2-V quasi-low dropout of the LM3480 series devices make them a nice fit in many application where the 2-V to 2.5-V dropout of LM78Lxx series devices precludes their use.

7.4 Device Functional Modes

7.4.1 Operation with V_{IN} = 5 V

The 3.3-V member of LM3480 can operate with an input of 5 V ±5%, its tiny SOT-23 package and quasi-low dropout makes it suitable for providing a very tiny, 3.3-V, 100-mA bias supply from 5-V power supply.

8 Application and Implementation

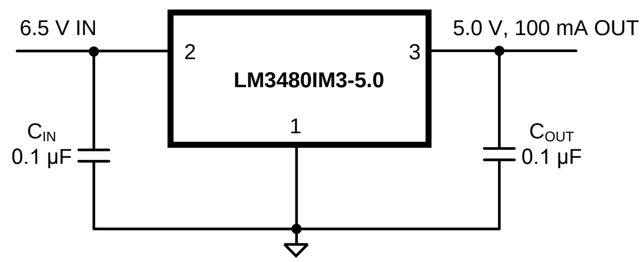
NOTE

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

8.1 Application Information

The LM3480 is a linear voltage regulator with 1.2-V ensured maximum dropout and 100-mA ensured minimum load current. This device has 3.3-V, 5-V, 12-V, and 15-V versions. The implementation of LM3480 is discussed in this section.

8.2 Typical Application



8.2.1 Design Requirements

DESIGN PARAMETER	EXAMPLE VALUE
Input voltage	6.5 V
Output voltage	5 V
Output current	100 mA

8.2.2 Detailed Design Procedure

8.2.2.1 External Capacitors

The output capacitor is critical to maintaining regulator stability, and must meet the required conditions for both ESR (Equivalent Series Resistance) and minimum amount of capacitance.

8.2.2.1.1 Output Capacitor

The output capacitance required to maintain stability is 0.1 µF. Larger values of output capacitance will give improved transient response.

8.2.3 Application Curves

Unless indicated otherwise, V_{IN} = 6.5 V, V_{OUT} = 5 V, C_{OUT} = 0.1 µF, and T_A = 25°C

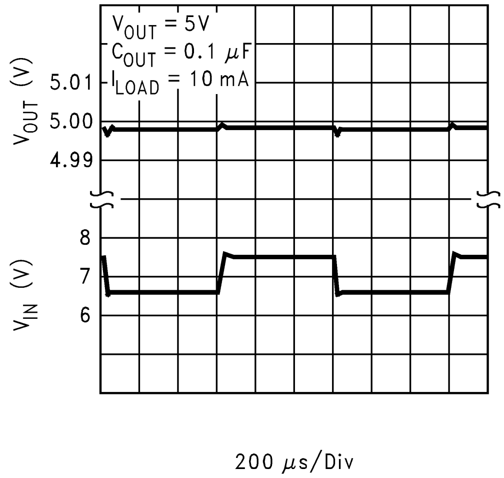


Figure 18. Line Transient Response

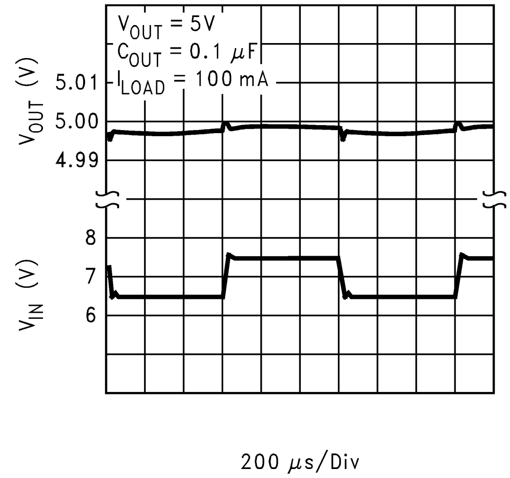


Figure 19. Line Transient Response

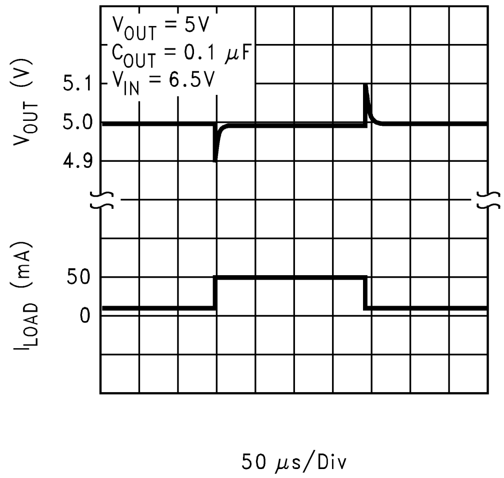


Figure 20. Load Transient Response

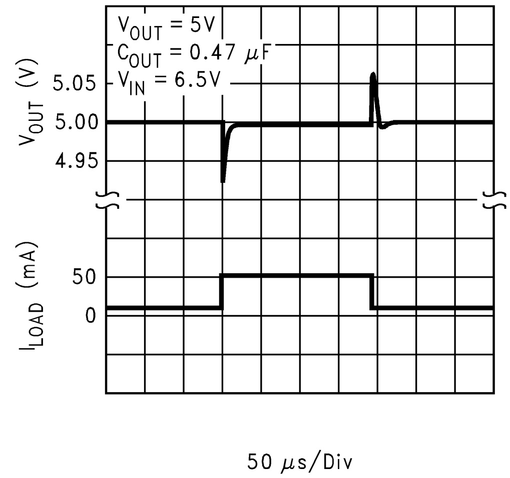


Figure 21. Load Transient Response

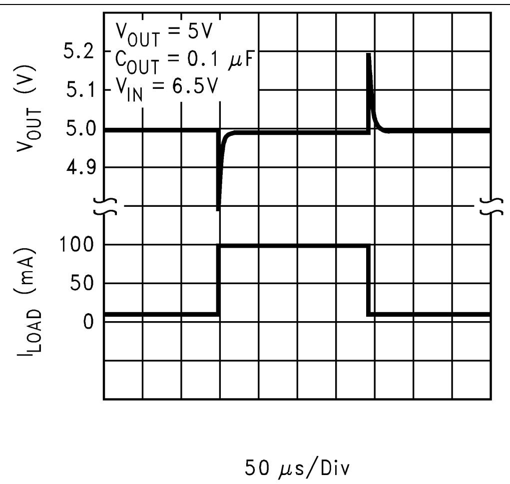


Figure 22. Load Transient Response

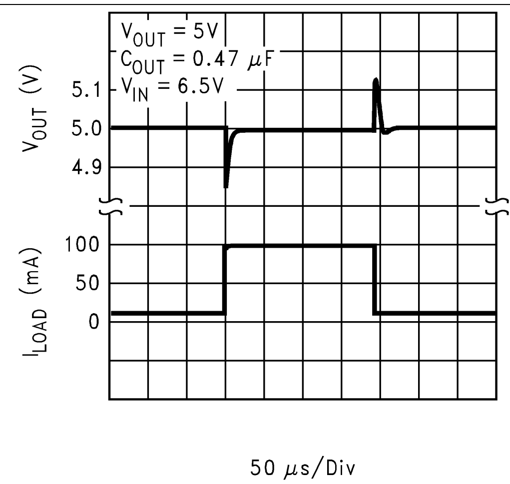


Figure 23. Load Transient Response

9 Power Supply Recommendations

The LM3480 is designed to operated from up to a 30-V input voltage supply. This input supply must be well regulated. If the input supply is noisy, additional input capacitors with low ESR can help to improve the output noise performance.

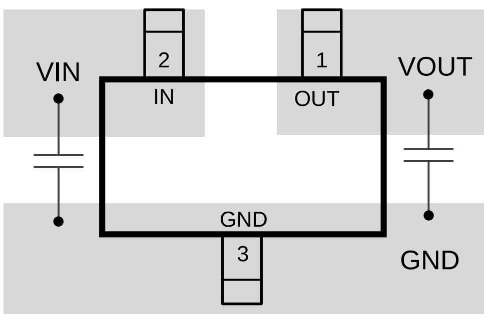
10 Layout

10.1 Layout Guidelines

For best overall performance, place all the circuit components on the same side of the circuit board and as near as practical to the respective LDO pin connections. Place ground return connections to the input and output capacitors, and to the LDO ground pin as close to each other as possible, connected by a wide, component-side, copper surface. The use of vias and long traces to create LDO circuit connections is strongly discouraged and negatively affects system performance. This grounding and layout scheme minimizes the inductive parasitic, and thereby reduces load-current transients, minimizes noise, and increases circuit stability.

A ground reference plane is also recommended and is either embedded in the PCB itself or located on the bottom side of the PCB opposite the components. This reference plane serves to assure accuracy of the output voltage, shield noise, and behaves similar to a thermal plane to spread heat from the LDO device. In most applications, this ground plane is necessary to meet thermal requirements.

10.2 Layout Example



11 Device and Documentation Support

11.1 Trademarks

All trademarks are the property of their respective owners.

11.2 Electrostatic Discharge Caution

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

11.3 Glossary

SLYZ022 — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

12 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
LM3480IM3-12	NRND	SOT-23	DBZ	3	1000	TBD	Call TI	Call TI	-40 to 125	L0C	
LM3480IM3-12/NOPB	ACTIVE	SOT-23	DBZ	3	1000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	L0C	Samples
LM3480IM3-15/NOPB	ACTIVE	SOT-23	DBZ	3	1000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	L0D	Samples
LM3480IM3-3.3	NRND	SOT-23	DBZ	3	1000	TBD	Call TI	Call TI	-40 to 125	L0A	
LM3480IM3-3.3/NOPB	ACTIVE	SOT-23	DBZ	3	1000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	L0A	Samples
LM3480IM3-5.0	NRND	SOT-23	DBZ	3	1000	TBD	Call TI	Call TI	-40 to 125	L0B	
LM3480IM3-5.0/NOPB	ACTIVE	SOT-23	DBZ	3	1000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	L0B	Samples
LM3480IM3X-12	NRND	SOT-23	DBZ	3	3000	TBD	Call TI	Call TI	-40 to 125	L0C	
LM3480IM3X-12/NOPB	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	L0C	Samples
LM3480IM3X-15/NOPB	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	L0D	Samples
LM3480IM3X-3.3	NRND	SOT-23	DBZ	3	3000	TBD	Call TI	Call TI	-40 to 125	L0A	
LM3480IM3X-3.3/NOPB	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	L0A	Samples
LM3480IM3X-5.0	NRND	SOT-23	DBZ	3	3000	TBD	Call TI	Call TI	-40 to 125	L0B	
LM3480IM3X-5.0/NOPB	ACTIVE	SOT-23	DBZ	3	3000	Green (RoHS & no Sb/Br)	CU SN	Level-1-260C-UNLIM	-40 to 125	L0B	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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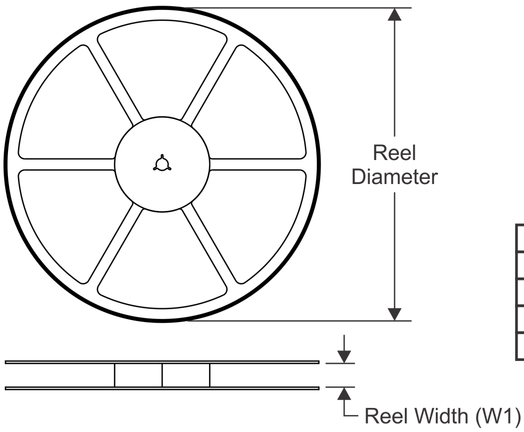
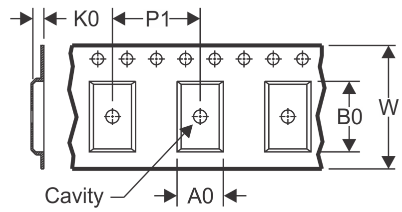
TAPE AND REEL INFORMATION

REEL DIMENSIONS

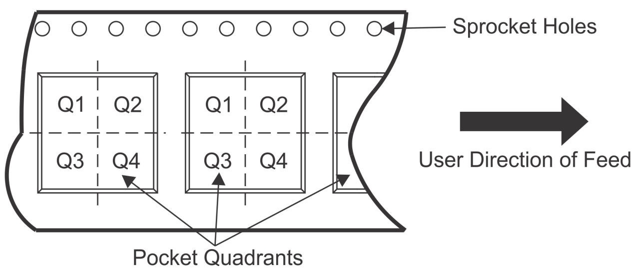


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

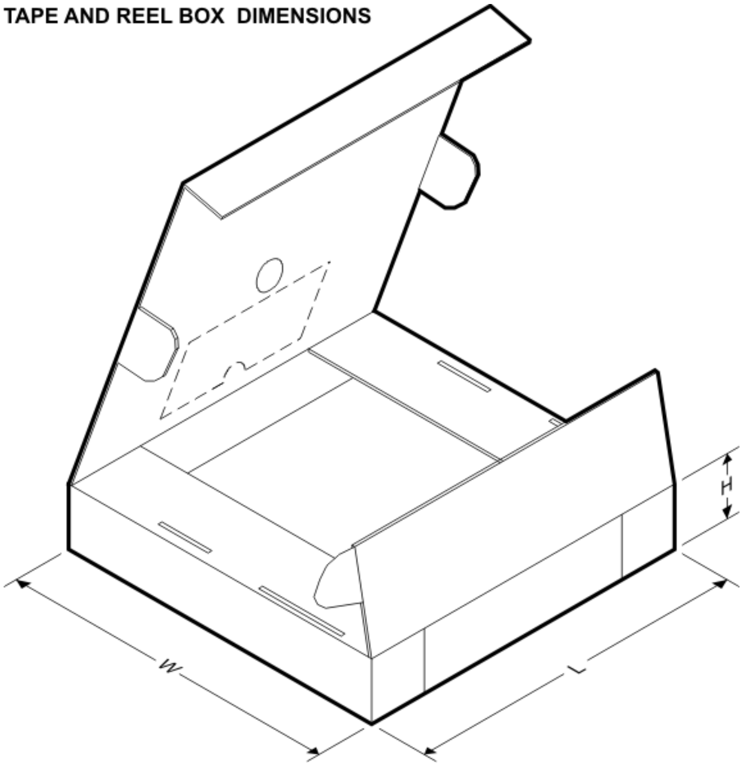
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
LM3480IM3-12	SOT-23	DBZ	3	1000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3-12/NOPB	SOT-23	DBZ	3	1000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3-15/NOPB	SOT-23	DBZ	3	1000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3-3.3	SOT-23	DBZ	3	1000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3-3.3/NOPB	SOT-23	DBZ	3	1000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3-5.0	SOT-23	DBZ	3	1000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3-5.0/NOPB	SOT-23	DBZ	3	1000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3X-12	SOT-23	DBZ	3	3000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3X-12/NOPB	SOT-23	DBZ	3	3000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3X-15/NOPB	SOT-23	DBZ	3	3000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3X-3.3	SOT-23	DBZ	3	3000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3X-3.3/NOPB	SOT-23	DBZ	3	3000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3X-5.0	SOT-23	DBZ	3	3000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3
LM3480IM3X-5.0/NOPB	SOT-23	DBZ	3	3000	178.0	8.4	3.3	2.9	1.22	4.0	8.0	Q3

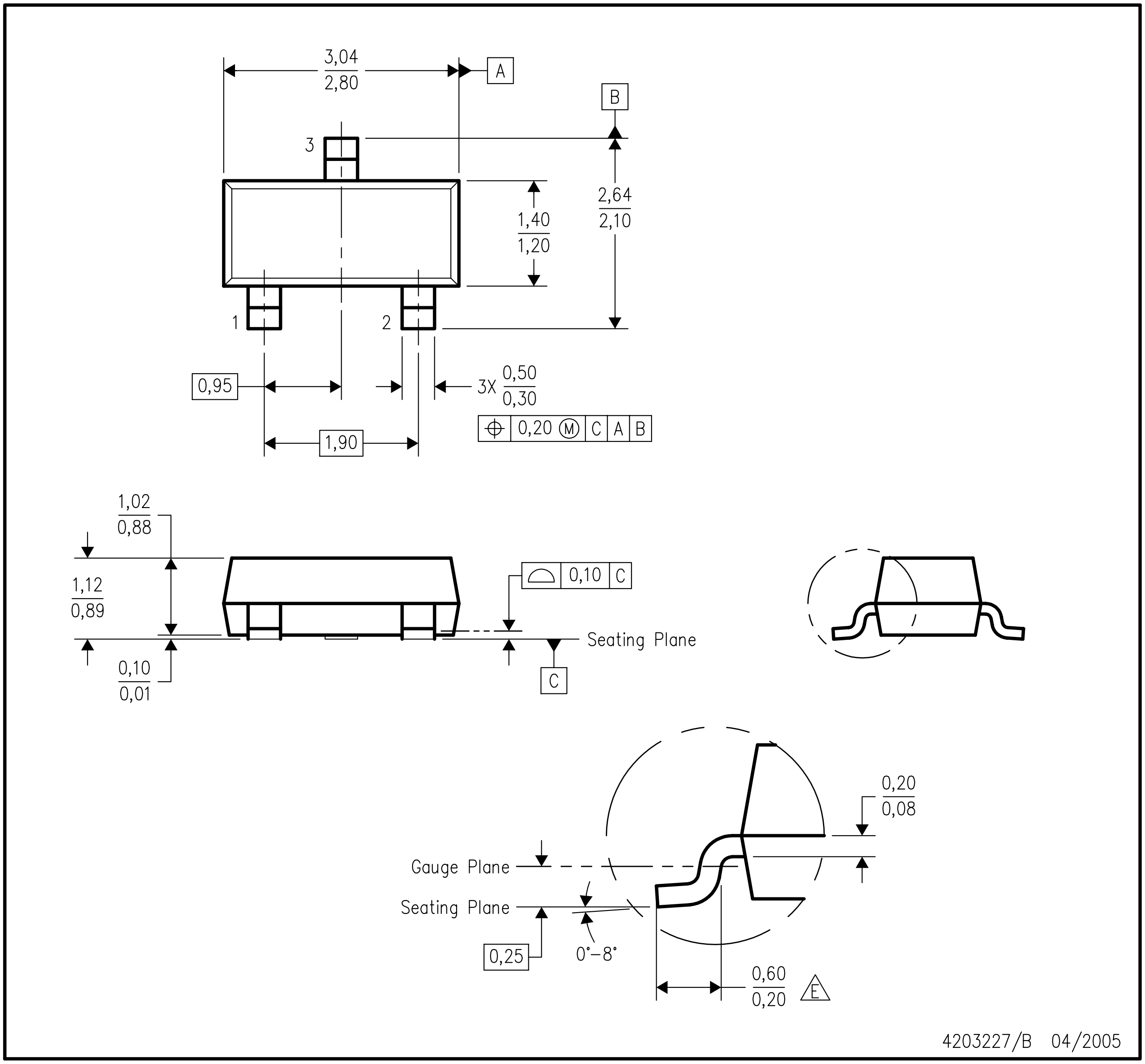
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
LM3480IM3-12	SOT-23	DBZ	3	1000	210.0	185.0	35.0
LM3480IM3-12/NOPB	SOT-23	DBZ	3	1000	210.0	185.0	35.0
LM3480IM3-15/NOPB	SOT-23	DBZ	3	1000	210.0	185.0	35.0
LM3480IM3-3.3	SOT-23	DBZ	3	1000	210.0	185.0	35.0
LM3480IM3-3.3/NOPB	SOT-23	DBZ	3	1000	210.0	185.0	35.0
LM3480IM3-5.0	SOT-23	DBZ	3	1000	210.0	185.0	35.0
LM3480IM3-5.0/NOPB	SOT-23	DBZ	3	1000	210.0	185.0	35.0
LM3480IM3X-12	SOT-23	DBZ	3	3000	210.0	185.0	35.0
LM3480IM3X-12/NOPB	SOT-23	DBZ	3	3000	210.0	185.0	35.0
LM3480IM3X-15/NOPB	SOT-23	DBZ	3	3000	210.0	185.0	35.0
LM3480IM3X-3.3	SOT-23	DBZ	3	3000	210.0	185.0	35.0
LM3480IM3X-3.3/NOPB	SOT-23	DBZ	3	3000	210.0	185.0	35.0
LM3480IM3X-5.0	SOT-23	DBZ	3	3000	210.0	185.0	35.0
LM3480IM3X-5.0/NOPB	SOT-23	DBZ	3	3000	210.0	185.0	35.0

DBZ (R–PDSO–G3) PLASTIC SMALL–OUTLINE



NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. Lead dimensions are inclusive of plating.
D. Body dimensions are exclusive of mold flash and protrusion. Mold flash and protrusion not to exceed 0.25 per side.
E. Falls within JEDEC TO–236 variation AB, except minimum foot length.

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